Base Load Power Hub (BLPH)

EQUIPMENT MANUFACTURERS RECORD BOOK (FINAL DOSSIER) - COMPLETE

Document Number: 1724000372-QC-DB-00023

Document Class: 2

01	19/12/2025	Accepted for Construction (AFC)	DA	DA	AD
00	08/11/2025	Issue for Review (IFR)	DA	DA	AD
Rev.	Date	Description	Prepared	Reviewed	Approved

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Base Load Power Hub (BLPH)

EQUIPMENT MANUFACTURERS RECORD BOOK (FINAL DOSSIER) - INDEX

Document Number: 1724000372-QC-LIS-00020

Document Class: 2

ROSETTI MARINO

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Sign	Date
ROSETTI MARINO S.p.A. Direzione Quality Control Dept.	02/10/202

01	05/09/2025	Accepted for Construction (AFC)	DA	DA	AD
00	11/10/2024	Issue for Review (IFR)	DA	DA	AD
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12	1724000372-QC-ITP-00002	01	INSPECTION AND TEST PLAN	10	08/06/2024
13	1724000372-QC-PRO-00016	03	DC UPS - FACTORY ACCEPTANCE TEST PROCEDURE	14	06/10/2024
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Base Load Power Hub (BLPH)

DESIGN DOSSIER

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Base Load Power Hub (BLPH)

SUPPLIER MASTER INFORMATION REGISTER

Document Number: 1724000372-MD-LIS-00001

Document Class: 3

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	12/06/2024

Rev.	Date	Description	Prepared	Reviewed	Approved
03	09/06/2024	Issue for Information (IFI)	DA	DA	AD
02	02/06/2024	Issue for Information (IFI)	DA	DA	AD
01	04/04/2024	Issue for Information (IFI)	DA	DA	AD
00	08/03/2024	Issue for Information (IFI)	DA	DA	AD

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	SMIR - REGISTRO DOCUMENTI / *SMIR - SUPPLIER MASTER INFORMATION REGISTER*									
	Ordine n° / *Order nr.* :	**1724000372**		**Fornitore / *Supplier* :**	**3W POWER S.p.A.**					
	Data / *Dated* :			**Codice F. / *S. Code* :**						
	Commessa / *Job* :			**Indirizzo / *Address* :**	**VIALE BIANCA MARIA 25 - MILANO**					
	Descrizione / *Description* :	**AC & DC UPS**		**Persona di riferim. / *Contact person* :**	**Daniela Antenori (daniela.antenori@aegps.com)**					
	Macrofase / *Phase* :									

Pos.	Document nr. Client (1)	Doc Client Rev. (1)	Document nr. Internal	Document nr. Internal Rev. (2)	Document nr. Supplier (3)	Doc Supplier Rev. (3)	Titolo Documento / Document title (4)	First issue date (8)	KEY Document Ingegneria	Document Approval (I/A)
							CONTROL DOCUMENTS			
1	1724000372-MD-LIS-00001	00	1724000372-MD-LIS-00001	00	TBD	00	SUPPLIER MASTER INDEX REGISTER (SMIR)		Y	A
							QUALITY DOCUMENTS			
2	1724000372-QC-ITP-00002	00	1724000372-QC-ITP-00002	00	TBD	00	INSPECTION AND TEST PLAN	29/03/2024		A
							ENGINEERING DOCUMENTS			
3	1724000372-EL-DA-00003	00	1724000372-EL-DA-00003	00	TBD	00	DC UPS - GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS	17/04/2024	Y	A
4	1724000372-EL-DA-00004	00	1724000372-EL-DA-00004	00	TBD	00	AC UPS - GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS	17/04/2024	Y	A
5	1724000372-EL-DS-00005	00	1724000372-EL-DS-00005	00	TBD	00	UPS & BATTERIES TECHNICAL DATA SHEET	03/04/2024	Y	A
6	1724000372-EL-DG-00006	00	1724000372-EL-DG-00006	00	TBD	00	DC UPS - SINGLE LINE DIAGRAM and INTERCONNECTING DIAGRAM	03/04/2024	Y	A
7	1724000372-EL-DG-00007	00	1724000372-EL-DG-00007	00	TBD	00	AC UPS - SINGLE LINE DIAGRAM and INTERCONNECTING DIAGRAM	03/04/2024	Y	A
8	1724000372-EL-DG-00008	00	1724000372-EL-DG-00008	00	TBD	00	DC UPS - WIRING DIAGRAM & TERMINAL SCHEDULE INCLUDING EQUIPMENTS LIST & BILL OF MATERIAL	22/04/2024	Y	A
9	1724000372-EL-DG-00009	00	1724000372-EL-DG-00009	00	TBD	00	AC UPS - WIRING DIAGRAM & TERMINAL SCHEDULE INCLUDING EQUIPMENTS LIST & BILL OF MATERIAL	22/04/2024	Y	A
10	1724000372-EL-DG-00010	00	1724000372-EL-DG-00010	00	TBD	00	DC UPS - BATTERY LAYOUT AND INTERCONNECTION DIAGRAM	03/04/2024	Y	A
11	1724000372-EL-DG-00011	00	1724000372-EL-DG-00011	00	TBD	00	AC UPS - BATTERY LAYOUT AND INTERCONNECTION DIAGRAM	03/04/2024	Y	A
12	1724000372-EL-CAL-00012	00	1724000372-EL-CAL-00012	00	TBD	00	BATTERY SIZING CALCULATION	29/03/2024	Y	A
13	1724000372-EL-CAL-00013	00	1724000372-EL-CAL-00013	00	TBD	00	HEAT DISSIPATION	29/03/2024		I
14	1724000372-EL-LIS-00014	00	1724000372-EL-LIS-00014	00	TBD	00	I/O LIST	22/04/2024	Y	A
15	1724000372-MAT-PRO-00015	00	1724000372-MAT-PRO-00015	00	TBD	00	PAINTING PROCEDURE	03/04/2024		A
16	1724000372-QC-PRO-00016	00	1724000372-QC-PRO-00016	00	TBD	00	DC UPS - FACTORY ACCEPTANCE TEST PROCEDURE	03/04/2024		A
17	1724000372-QC-PRO-00017	00	1724000372-QC-PRO-00017	00	TBD	00	AC UPS - FACTORY ACCEPTANCE TEST PROCEDURE	03/04/2024		A
18	1724000372-QC-PRO-00018	00	1724000372-QC-PRO-00018	00	TBD	00	DC UPS - SITE ACCEPTANCE TEST PROCEDURE / PRE-COMMISSIONING / COMMISSIONING PROCEDURES	03/04/2024		A
19	1724000372-QC-PRO-00019	00	1724000372-QC-PRO-00019	00	TBD	00	AC UPS - SITE ACCEPTANCE TEST PROCEDURE / PRE-COMMISSIONING / COMMISSIONING PROCEDURES	03/04/2024		A
20	1724000372-QC-LIS-00020	00	1724000372-QC-LIS-00020	00	TBD	00	EQUIPMENT MANUFACTURERS RECORD BOOK (FINAL DOSSIER) - INDEX	17/04/2024		A
							CERTIFICATES (ref. to notes in the RDDS)			
21	1724000372-QC-LIS-00021	00	1724000372-QC-LIS-00021	00	TBD	00	EX CERTIFICATION LIST	12/07/2024		A
22	1724000372-EL-LIS-00022	00	1724000372-EL-LIS-00022	00	TBD	00	ATEX DOCUMENTATION	12/07/2024		A
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24	1724000372-EL-MAN-00024	00	1724000372-EL-MAN-00024	00	TBD	00	DC UPS - INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)	09/08/2024		I
25	1724000372-EL-MAN-00025	00	1724000372-EL-MAN-00025	00	TBD	00	AC UPS - INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)	09/08/2024		I
26	1724000372-COM-LIS-00026	00	1724000372-COM-LIS-00026	00	TBD	00	SPARE PART INDEX REGISTER (COMMISSIONING, 2-YEAR's OPERATION, INSURANCE)	12/07/2024		I
							HANDLING, SHIPPING & SITE INSTALLATION			
27	1724000372-QC-PRO-00027	00	1724000372-QC-PRO-00027	00	TBD	00	PACKING, PREPARATION FOR SHIPPING + HANDLING AND STORAGE PROCEDURES	12/07/2024		I

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(1) Numero documento Cliente
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Document number internal

(3) Numero documento Fornitore (assegnato dal Fornitore)
Document number assigned by Supplier

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A4, A3, A1 (Supplier)

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Internal

Base Load Power Hub (BLPH)

DC UPS - SINGLE LINE DIAGRAM AND INTERCONNECTING DIAGRAM

Document Number: 1724000372-EL-DG-00006

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	29/07/2024

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DC UPS - TAG: UP-200F1 - SINGLE LINE DIAGRAM 4

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+REC1
UP-200F1 A

-M1/2
220-240 Vca
50-60Hz
FAN

-PR2-TH1
THERMOSTAT 100º

-PR2-TH2
THERMOSTAT 90º

-PR1-TH1
THERMOSTAT 100º

-PR1-TH2
THERMOSTAT 90º

Charger
100A 12Pulses

-Z1
0/450V

-X1
L1
70 mm²
4G16 mm2
unamoured cable

MAINS
3x400Vac 50Hz -50kA

L1;L2;L3;PE

-Q1
50A

-T1
110V/100A
019.6KVA

-PR2
-PR1

-R2
100mV
130A

-C1
3x6800µF
160V
Filtering 1%

-F1
NH00
125A

-V21
100A

-Q2
160A

-R3
100mV
130A

-Q3
160A

BATTERY
110Vdc
-X3
+/-
70 mm²

Battery
symmetry
-X31
+/-
4 mm²

-A10
BATTERY SIMMETRY
FAULT

+BP
BATTERY PROTECTION

2 (1x25) mm2

-F100
Plastic
box 80*80

+BAT

-L+/-
2P 125A
BUS BAR
110 VDC

-Q10
50A-C
-X2 1+/1
16 mm²
3G16 mm2
amoured cable
(+REC1-A1 /1.4) / SD1

CP-100F1
DC CONTROL 66kV G/S
LINE A-5.2KW

-SD1

-Q11
20A-C
-X2 2+/2
16 mm²
3G16 mm2
amoured cable
(+REC2-A1 /1.4) / SD2

CP-100F1
DC CONTROL 66kV G/S
LINE B-2KW

-SD2

-Q12
16A-C
-X2 3+/3
16 mm²
3G16 mm2
amoured cable

SG-100D1
DC CONTROL 6,6kV
SWITCHGEAR LINE A-1KW

-Q13
16A-C
-X2 4+/4
16 mm²
3G16 mm2
amoured cable

SG-100D1
DC CONTROL 6,6kV
SWITCHGEAR LINE B-1KW

-Q14
50A-C
-X2 5+/5
16 mm²

SPARE 5,5KW

-Q15
20A-C
-X2 6+/6
16 mm²

SPARE 2KW

-Q16
16A-C
-X2 7+/7
16 mm²

SPARE 1KW

-F10/F11
DEHNguard

-A21
EARTH +/-

-A1
GCAU
CONTROL UNIT

-A5.1
Relays
-CR1-X5

-A71

-A300
DISPLAY

-A73
MODBUS-TCP/IP

-A8
Isolated

-A310
KEY PAD

-KF
PSR-SCP- 24DC / SIL3

SD1 / (+BAT-SD1 /1.8)

-PR2-A2
TPC

-A320
INTERFACE

-PR1-A2
TPC

AUXILIARY SUPPLY
230Vac-50Hz

-X7
L/N
6 mm²
3G2.5 mm2
unamoured cable

-Q6
02A-C

-Q7
02A-C

-H3

-THF4
0/60ºC

-E50
100W

-Z2
400V

-X8
4 mm²
CHARGERS
INTERCONNECTION

2,5 mm²

INTERCONNECTION
-X6
50 mm²
PH4 35 mm²

+REC2
UP-200F1 B

-M1/2
220-240 Vca
50-60Hz
FAN

-PR2-TH1
THERMOSTAT 100º

-PR2-TH2
THERMOSTAT 90º

-PR1-TH1
THERMOSTAT 100º

-PR1-TH2
THERMOSTAT 90º

-A8
(+REC1-CR1-J13:1 /1.4)

Charger
100A 12Pulses

-Z1
0/450V

-X1
L1
70 mm²
4G16 mm2
unamoured cable

MAINS
3x400Vac 50Hz -50kA

L1;L2;L3;PE

-Q1
50A

-T1
110V/100A
019.6KVA

-PR2
-PR1

-R2
100mV
130A

-C1
3x6800µF
160V
Filtering 1%

-F1
NH00
125A

-V21
100A

-Q2
160A

-PR2-A2
TPC

-A320
INTERFACE

-PR1-A2
TPC

SD2 / (+BAT-SD2 /1.8)

-A1
GCAU
CONTROL UNIT

-A5.1
Relays
-CR1-X5

-A71

-A300
DISPLAY

-A73
MODBUS-TCP/IP

-A8
Isolated

-A310
KEY PAD

A8 / (+REC2-X8 /1.4)

AUXILIARY SUPPLY
230Vac-50Hz

-X7
L/N
6 mm²

-Q6
02A-C

-Q7
02A-C

-H3

-THF4
0/60ºC

-E50
100W

2,5 mm²

Battery
symmetry
-X31
+/-
4 mm²

-A10
BATTERY SIMMETRY
FAULT

ES521464

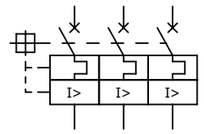
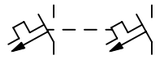
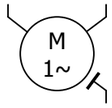
				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Single-line	1724000372-EL-DG-00006
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		System	
				Checked	JOP				
Stat	Alteration	Date	Name	Standard					

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Symbol

NO contact 	Female pin of a plug connection with direct connection point 	Circuit breaker, two-pole, form 2 
NC contact	Plug of a plug connection with direct connection point	Terminal with 2 connection points
Electromechanical operating device, general / relay coil 	Capacitor, polarized (electrolytic capacitor) 	
Fused terminal	Change-over contact with break point (2-path) 	Terminal with 6 connection points without saddle jumper connection points 
Fuse, single-pole, general 	Change-over contact with break point (3-path) 	Power circuit breaker, three-pole (L-, I-characteristic) 
Resistor, general	Terminal	
Circuit breaker, two-pole 	NC temperature switch 	
AC motor 	Heating element with PE 	

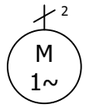
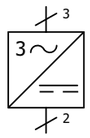
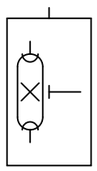
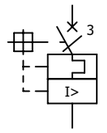
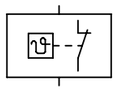
ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Symbols used		=
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm				+ 4 / 47
				Checked	JOP					& EPZ
Stat	Alteration	Date	Name	Standard					ES521464 en	A3 Sheet 1 Sheets

AEGPS_DOC_REV01
CAE EPLAN Electric P8
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IEC_single_symbol

Symbol

Semiconductor diode, general 	AC motor, without PE, with straight connection point 	
Thermocouple 	Circuit breaker, two-pole, form 2 	
Fuse circuit breaker, single-pole 	Terminal	
3Ph Bridge Rectifier 		
Fluorescent lamp with PE 	Power circuit breaker, three-pole (L-, I-characteristic) 	
Capacitor, polarized (electrolytic capacitor) 		
NC temperature switch 		
Heating element with PE 		

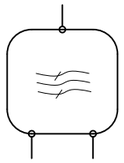
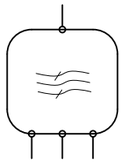
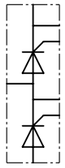
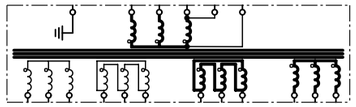
ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Symbols used	=
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm			+ 5 / 47
				Checked	JOP				& EPZ Sheet 2
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheets 4

AEGPS_DOC_REV01
CAE EPLAN Electric P8
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IEC_AEGPSI_symbol

Symbol

Cable, wire	Fuse 	
0.5mm² Wire	Shunt 	
Power interconnection Supplied 	Fuse-holder 1	
Power interconnection not supplied 	BUSBAR 	
Load switch disconnector, three-pole;rotary handle 	Filter single-phase 	
Ferrita 	Filter three-phase 	
Semipack SKKT 	Three-phase transformer 	
Fuse switch disconnector, three-pole 	Fuse holder Terminal 	

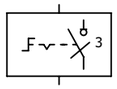
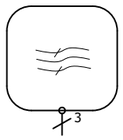
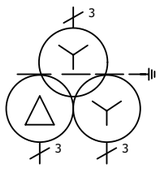
ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Symbols used	=
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm			+ 6 / 47
				Checked	JOP				& EPZ
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheet 3 Sheets

AEGPS_DOC_REV01
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IEC_AEGPSI_single_symbol

Symbol

Load switch disconnector, three-pole;rotary handle 		
SHUNT 		
Filter three-phase 		
Three-phase transformer 		

Base Load Power Hub (BLPH)

AC UPS - SINGLE LINE DIAGRAM AND INTERCONNECTING DIAGRAM

Document Number: 1724000372-EL-DG-00007

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	17/01/2025

Document Class: 2

03	15/01/2025	As-Built (ASB)	DA	DA	AD
02	01/10/2024	Accepted for Construction (AFC)	DA	DA	AD
01	28/08/2024	Issue for Review (IFR)	DA	DA	AD
00	20/04/2024	Issue for Review (IFR)	DA	DA	AD
Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Issue for Review (IFR)
02	Accepted for Construction (AFC)
03	As-Built

HOLDS LIST

No.	Description
1	
2	
3	
4	

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REFERENCE DOCUMENTS

Code	Description
123A90-DDL-EL-DG-20160	Base Load Power Hub (BLPH) - Electrical Single Line Diagrams AC UPS Systems
1723002197-EL-DG-00013	DP-200N1 LV SWBD 400-230V ELECTRICAL SINGLE LINE DIAGRAM
1723002197-EL-DG-00011	SG-200N1 LV SWBD 400-230V ELECTRICAL SINGLE LINE DIAGRAM

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AC UPS F&G - TAG: UP-200F4	7

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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3
SINGLE LINE DIAGRAM AND INTERCONNECTING DIAGRAM

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AUXILIARY
From Lighting & Small Power DB BOP DP-200N1
(Cubicle 03-Q41)
100-240V/N/PE~50/60Hz
back-up fuse gG10A 3G2.5mm2

LINE A
From LV Switchgear SG-200N1
(Cubicle A3/01)
Mains 400V;3/PE~50Hz
gG80A 4G35mm2

From LV Switchgear SG-200N1
(Cubicle A7/02)
Bypass mains 400V;3/PE~50Hz
gG63A 4G35mm2

LINE B
From LV Switchgear SG-200N1
(Cubicle A4/01)
Mains 400V;3/PE~50Hz
gG80A 4G35mm2

Not included in the AEG shipment

+MBC1
BY-200F3
Bypass transformer cabinet 40 kVA
1000007888.020
10009757

-X1 ◊ 1U,1V,1W,PE
-X10 ◊ U,V,W,PE
-X13 ◊ U,N,PE
-X14 ◊ U,N
-X1 ◊ 3U,3V,3W,PE
1.3 / B → B / 1.8
-A85
-H1
-Q10 L=80/85A I=0,8kA Icu=50kA
-T8 400V/400V 40kVA
-Q28.1 NC
-Q28.2 NC
-X1 ◊ 2U,2V,2W,PE
-X4 ◊ 1U,1V,1W,1N,PE
-X4 ◊ 2U,2V,2W,2N,PE
-X1 ◊ 4U,4V,4W,PE

+UPS1
BC-200F3A
Protect 8.33 40-400-210-400
1000007888.010
10009756

+UPS2
BC-200F3B
Protect 8.33 40-400-210-400
1000007888.010
10009756

-X13 ◊ U,N,PE
-X14 ◊ U,N
-E1-X1 ◊ U,V,W,PE
-E4-X4 ◊ U,V,W,N,PE
*2
B / 1.6
1.7 / B
-A85
-H1
-Q1 L=100/85A I=1,0kA Icu=50kA
-T40
-A1 REC
-A2 INV
-T1
-F1,-F2,-F3
-A18
Display
-A20
Parallel Adapter
INV CAN -X3 1-3 → 203 / 1.6
INV Sync -X5 1-4 → 205 / 1.6
1.5 / 203 → -X3 1-3 INV CAN
1.5 / 205 → -X5 1-4 INV Sync
-A3 SBS
-A4
-L11,-L12,-L13
Parallel preventive choke coil
-A24.1
BLÜ-PRO
-F91
-A12 ,-A13
Remote signaling
-E2-X2 ◊ L-,L+,PE
-X15 ◊ 2,3
-X130 ◊ 1,2
-E3-X3 ◊ U,V,W,N,PE

-X2 ◊ 1L+,1L-,PE
-X15 ◊ 2,3
-X91 ◊ 1M
-X5 ◊ 1U,1V,1W,1N,PE
-X5 ◊ 2U,2V,2W,2N,PE
-X2 ◊ 3L+,3L-,PE
-X15 ◊ 6,7
-X91 ◊ 3M
-Q71 NC
-Q72 NC
A / 1.6
1.5 / A
INV operation
Manual bypass
-Q29
-F25

DP-200F3

-QF31 B32A 300mA
-QF32 B32A ^^0mA
-QF33 B32A 300mA
-QF34 B16A 300mA
5pc
-QF38 B16A 300mA
-QF39 B10A 300mA
4pc
-QF42 B10A 300mA
-QF43 B10A
8pc
-QF50 B10A
-QF51 B6A
-QF52 B6A

-X2 ◊ 2L+,2L-,PE
-X15 ◊ 4,5
-X91 ◊ 2M
-X130 ◊ 1,2,1PE
-X31 ◊ U,N,PE
-X32 ◊ U,N,PE
-X33 ◊ U,N,PE
-X34 ◊ U,N,PE
-X38 ◊ V,N,PE
-X39 ◊ V,N,PE
-X42 ◊ W,N,PE
-X43 ◊ W,N,PE
-X50 ◊ U,N,PE
-X51 ◊ V,N,PE
-X52 ◊ V,N,PE
-X2 ◊ 4L+,4L-,PE
-X15 ◊ 8,9
-X91 ◊ 4M
-X130 ◊ 3,4,2PE

2(1x70 mm2)

Not included in the AEG shipment

max. gG16A — max. gG16A
Load
400/230V;3/N/PE~50Hz

+BFB1
CB-200F3A
Battery fuse box 200 A
*1
-Q2 L=200A
DC 24V max. 300W

+BFB2
CB-200F3B
Battery fuse box 200 A
*1
-Q2 L=200A
DC 24V max. 300W

+BAT1
BA-200F3A
Batteries installed on rack
18 x FLG 12-150
Battery voltage 216V
Battery capacity 150Ah
string 1
-R81

+BAT2
BA-200F3B
Batteries installed on rack
18 x FLG 12-150
Battery voltage 216V
Battery capacity 150Ah
string 1
-R81

Symbol	Description
	Mains breaker
	Transformer with two secondary windings
	Rectifier
	Inverter
	Transformer
	Static by-pass switch
	Coil
Display	Display control module
	Heater
	Light

*1 Attention! In the event of battery undervoltage < 130 V, the UPS automatically switches off battery isolator Q2.
If this happens, switch X15:3 must be switched into the open position (undervoltage trip blocked).
For restart, please refer to the chapter in the UPS operating instructions (charging the DC link capacitors) attached.
Unlock the tripped switch Q2 by switching to open position.
After charging the DC link capacitors, switch on Q2.
Attention! When the battery voltage reaches > 200 V, switch X15:3 must be switched back to the closed position.

*2 Connection cables are not included.

					Date	14.05.2024			
01	500000002053	13.08.2024	Beckschäfer	Editor	EEC	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	System 40 kVA	=
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck			Single-line diagram	+
Stat	Alteration	Date	Name	Norm				1000007888_010 en	& EPA
									A0 sheet 1 sheets

1000007888_010

Base Load Power Hub (BLPH)

AC UPS F&G - TAG: UP-200F4

SINGLE LINE DIAGRAM AND INTERCONNECTING DIAGRAM

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AUXILIARY
From Lighting & Small Power DB BOP DP-200N1 (Cubicle 03-Q42)
100-240V/N/PE~50/60Hz

back-up fuse
gG10A
3G2.5mm2

LINE A
From LV Switchgear SG-200N1 (Cubicle A6/05)
Mains
400V;3/PE~50Hz

gG80A
4G35mm2

From LV Switchgear SG-200N1 (Cubicle A2/04)
Bypass mains
400V;3/PE~50Hz

gG63A
4G35mm2

LINE B
From LV Switchgear SG-200N1 (Cubicle A6/06)
Mains
400V;3/PE~50Hz

gG80A
4G35mm2

Not included in the AEG shipment

+MBC1
BY-200F4
Bypass-Trafoschrank mit HU 20 kVA
1000007888.090
10009760

-X1 1U,1V,1W,PE
-X10 U,V,W,PE
-X13 U,N,PE
-X14 U,N
-X1 3U,3V,3PE
-A85
-H1
-Q10
L=50/35A
I=0,5kA
Icu=50kA
-T8
400V/400V/
20kVA
-Q28.1
NC
-Q28.2
NC
-X1 2U,2V,2W,PE
-X4 1U,1V,1W,1N,PE
-X4 2U,2V,2W,2N,PE
-X1 4U,4V,4W,PE

+UPS1
BC-200F4A
Protect 8.33 20-400-204-400
1000007888.080
10009759

-X13 U,N,PE
-X14 U,N
-A85
-H1
-E1-X1 U,V,W,PE
-E4-X4 U,V,W,N,PE
-Q1
L=100/85A
I=1,0kA
Icu=50kA
-T40
-A1
REC
-A2
INV
-T1
-F1,-F2,-F3
-A3
SBS
-A18
Display
-A20
Parallel Adapter
INV CAN
-X3
1-3
INV Sync
-X5
1-4
-A4
-L11,-L12,-L13
Parallel preventive choke coil
-A12 ,-A13
Remote signaling
-A24.1
-A24.2
-A24.3
BLÜ-PRO
-F91
-F92
-F93
-E2-X2 L-,L+,PE
-X15 2,3
-X130 1,2
-E3-X3 U,V,W,N,PE
-X2 1L+,1L-,PE
-X15 2,3
-X91 1M
-X92 1M
-X93 1M
-X5 1U,1V,1W,1N,PE
-Q71
NC
-X2 2L+,2L-,PE
-X15 4,5
-X91 2M
-X92 2M
-X93 2M
-X130 1,2,1PE

+UPS2
BC-200F4B
Protect 8.33 20-400-204-400
1000007888.080
10009759

-E4-X4 U,V,W,N,PE
-E1-X1 U,V,W,PE
-X13 U,N,PE
-X14 U,N
-A85
-H1
-Q1
L=100/85A
I=1,0kA
Icu=50kA
-T40
-A1
REC
-A2
INV
-T1
-F1,-F2,-F3
-A3
SBS
-A18
Display
-A20
Parallel Adapter
INV CAN
-X3
1-3
INV Sync
-X5
1-4
-A4
-L11,-L12,-L13
Parallel preventive choke coil
-A12 ,-A13
Remote signaling
-A24.1
-A24.2
-A24.3
BLÜ-PRO
-F91
-F92
-F93
-E3-X3 U,V,W,N,PE
-E2-X2 L-,L+,PE
-X15 2,3
-X130 1,2
-X5 2U,2V,2W,2N,PE
-Q72
NC
-X2 3L+,3L-,PE
-X15 6,7
-X91 3M
-X92 3M
-X93 3M
-X2 4L+,4L-,PE
-X15 8,9
-X91 4M
-X92 4M
-X93 4M
-X130 3,4,2PE

A / 1.6
1.5 / A
INV operation
Manual bypass
-Q29
-F25
DP-200F4
-QF31
B16A
300mA
5pc
-QF35
B16A
300mA
-QF36
B10A
3pc
-QF38
B10A
-X31 U,N,PE
-X35 V,N,PE
-X36 W,N,PE
-X38 V,N,PE

Not included in the AEG shipment

max. gG10A
max. gG10A
Load
400/230V;3/N/PE~50Hz

2(1x70 mm2)

+BFB1
CB-200F4A
Battery fuse box 200 A
-Q2
L=200A
DC 24V
max. 300W

+BFB2
CB-200F4B
Battery fuse box 200 A
-Q2
L=200A
DC 24V
max. 300W

+BAT1
BA-200F4A
Batteries installed on rack
3 x 18 x FTG 12-120
Battery voltage 216V
Battery capacity 360Ah
string 1
String 2
String 3
-R81

+BAT2
BA-200F4B
Batteries installed on rack
3 x 18 x FTG 12-120
Battery voltage 216V
Battery capacity 360Ah
string 1
String 2
String 3
-R81

Symbol	Description
	Mains breaker
	Transformer with two secondary windings
	Rectifier
	Inverter
	Transformer
	Static by-pass switch
	Coil
Display	Display control module
	Heater
	Light

*1 Attention! In the event of battery undervoltage < 130 V, the UPS automatically switches off battery isolator Q2.
If this happens, switch X15:3 must be switched into the open position (undervoltage trip blocked).
For restart, please refer to the chapter in the UPS operating instructions (charging the DC link capacitors) attached.
Unlock the tripped switch Q2 by switching to open position.
After charging the DC link capacitors, switch on Q2.
Attention! When the battery voltage reaches > 200 V, switch X15:3 must be switched back to the closed position.

*2 Connection cables are not included.

Base Load Power Hub (BLPH)

DC UPS - GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS

Document Number: 1724000372-EL-DA-00003

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
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Sign	Date
	04/02/2025

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
04	17/12/2024	As Built (ASB)	DA	DA	AD
03	06/10/2024	Accepted for Construction (AFC)	DA	DA	AD
02	26/07/2024	Accepted for Construction (AFC)	DA	DA	AD
01	20/05/2024	Issue for Review (IFR)	DA	DA	AD
00	05/04/2024	Issue for Review (IFR)	DA	DA	AD

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Issue for Review (IFR)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)
04	As Built (ASB)

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DC UPS - TAG: UP-200F1 - GENERAL ARRANGEMENT	4

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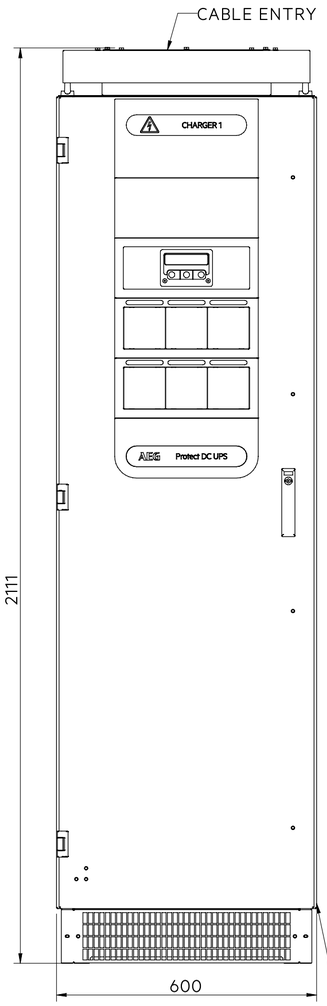
ACRONYMS

Z1	EMC FILTER BOARD
A73	TCP/IP COMMUNICATION BOARD
THF4	THERMOSTAT
Q1	AC INPUT CIRCUIT BREAKER
PR1 - PR2	THYRISTORS BRIDGE
U	TINNED COPPER CONNECTION
R2 - R3	SHUNT
A71	GCAU COMMUNICATION CARD
CR1	RELAY BOARD
Z2	EMC FILTER BOARD
H3	LIGHTING SET
M1 - M2	FAN
E50	HEATING RESISTOR
K3 - K4	AUXILIARY RELAY
KF	SECURITY RELAY
Q10 … Q16	LOAD CIRCUIT BREAKER
F1	FUSE 125A
F10 - F11	SURGE PROTECTION
F5 - F13 - F23 - F25 - F32 - F73	2P FUSE HOLDER

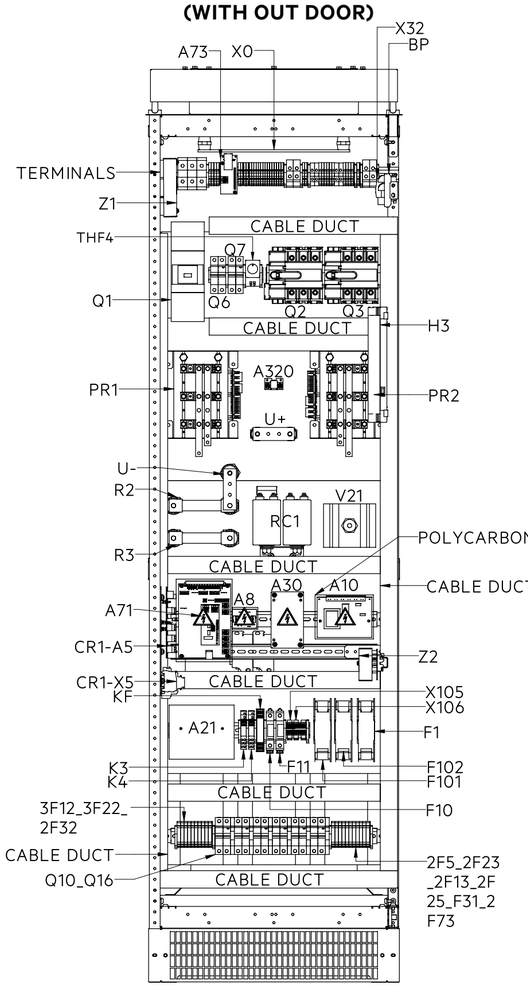
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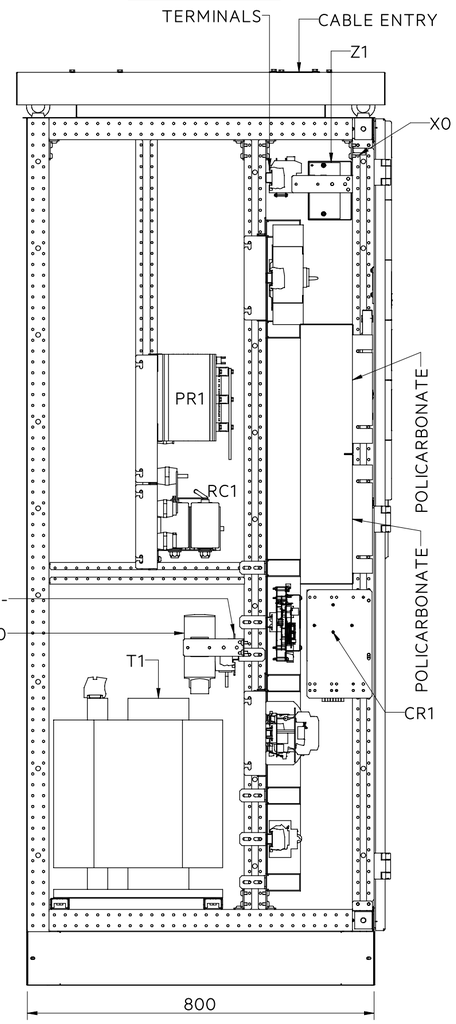
FRONT VIEW



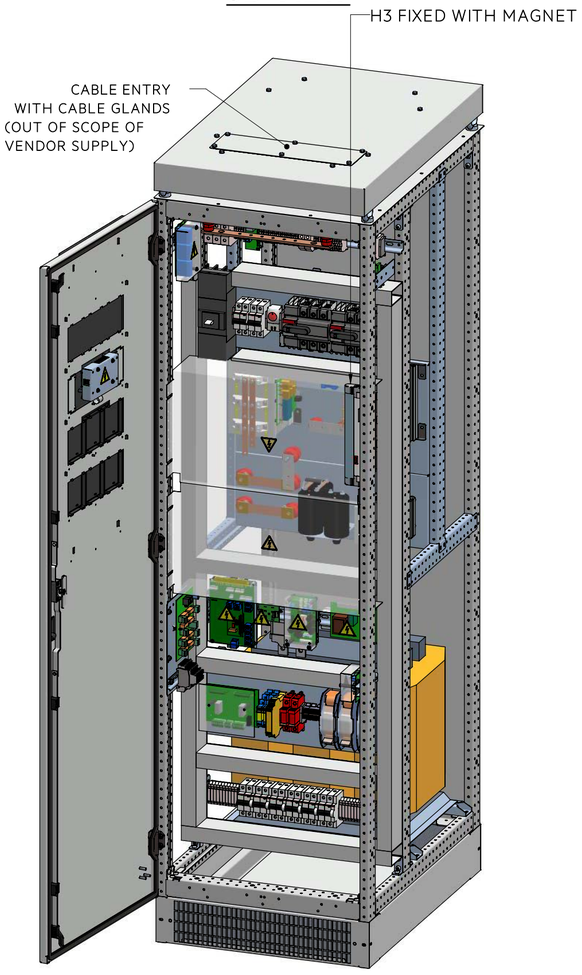
FRONT VIEW
(WITH OUT DOOR)



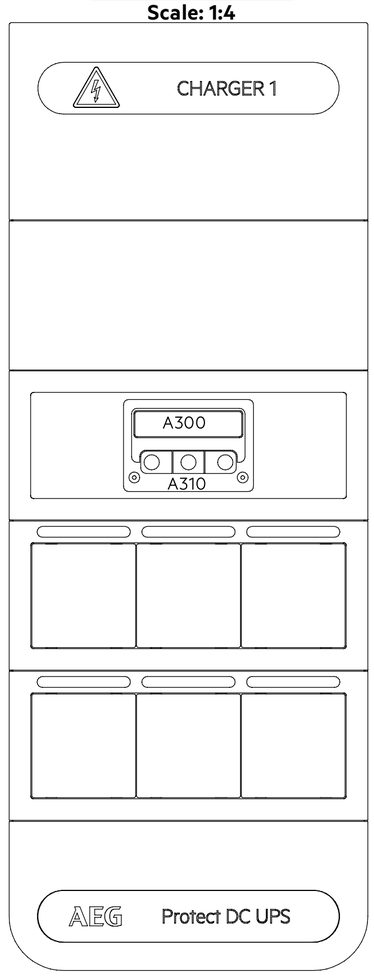
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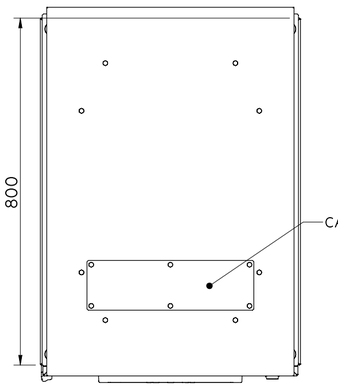
3D VIEW



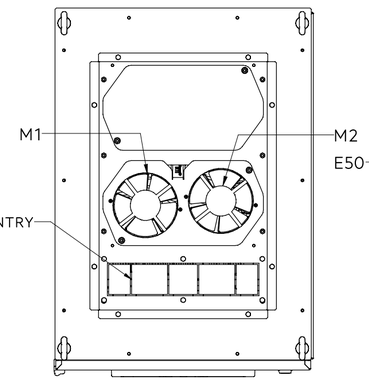
DOOR DETAIL
Scale: 1:4



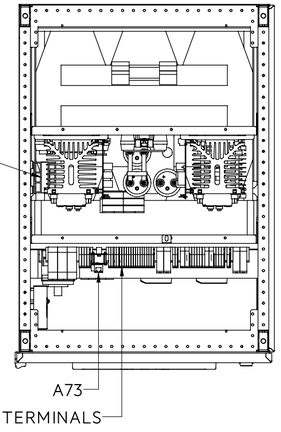
TOP VIEW



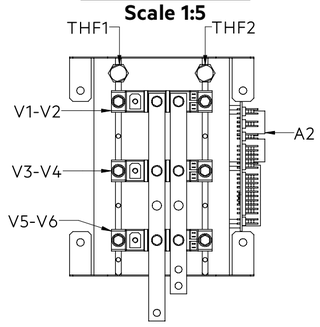
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(FANS DETAIL)



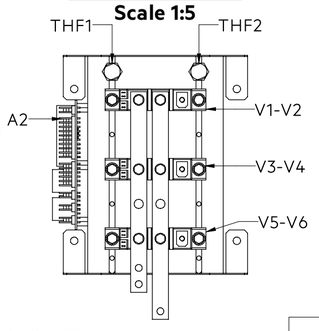
TOP VIEW
(WITHOUT ROOF)



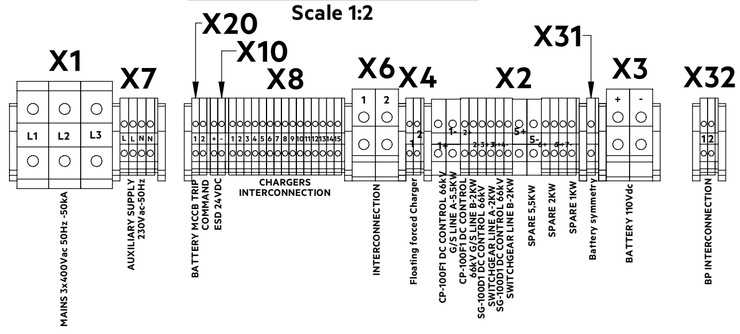
PR1 DETAIL
Scale 1:5



PR2 DETAIL
Scale 1:5

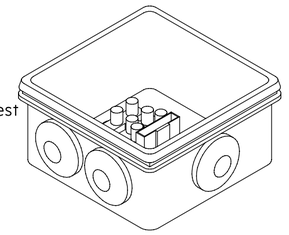


TERMINALS DETAIL
Scale 1:2



F100 DETAIL

Place the box the closest possible to the battery



Escala / *Scale:* 1:10					
Tol. Gen. / *Gen. Tol.*: ISO 2768-mK					
Dibujado / *Drawn* 22/05/2024 Por / *By* EAA	Rev *Issue*	Fecha *Date*	Dib. *Drawn*	Revisado *Checked*	Comentarios / *Comments*
Verificado / *Checked* 22/05/2024 Por / *By* EBM					

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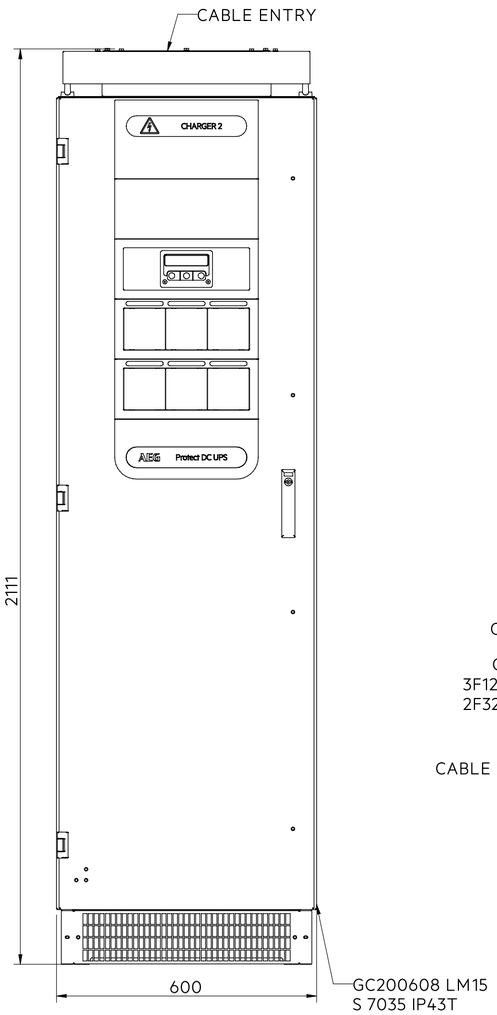
SAP Document: **ES521464A1_MEC**
SAP Code: **ES521464A1**

Denominación / *Description*:
DC UPS UP-200F1 CHARGER-A
1724000372-EL-DA-00003

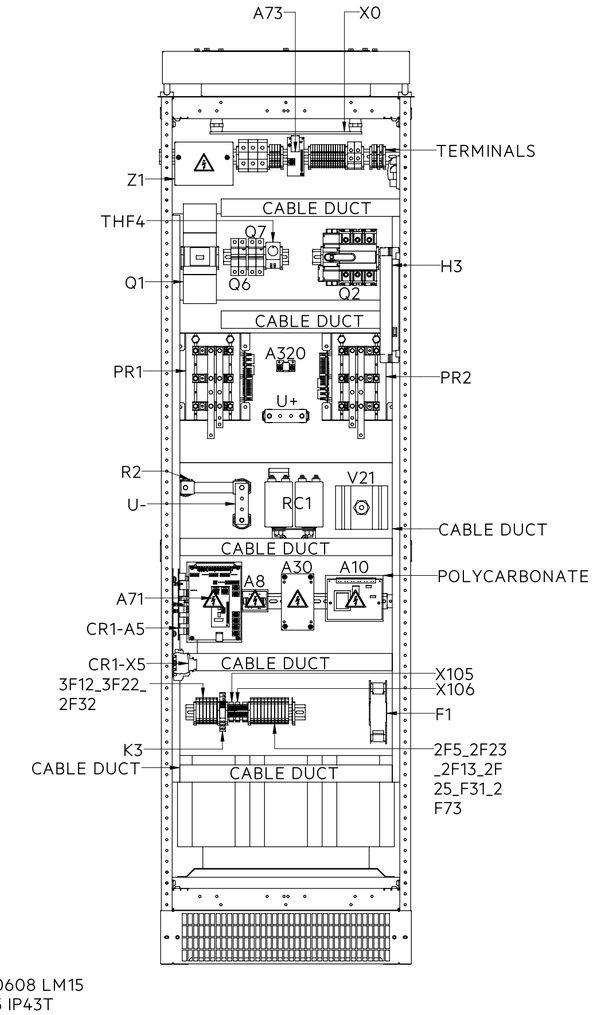
Formato/ *Format*: **A2** | Rev/ *Issue* **00**
Hoja / *Sheet*: 1/4

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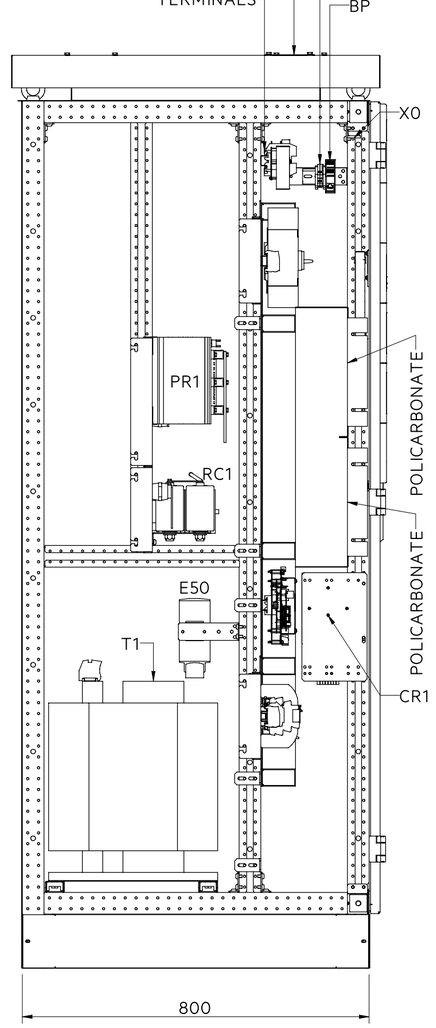
FRONT VIEW



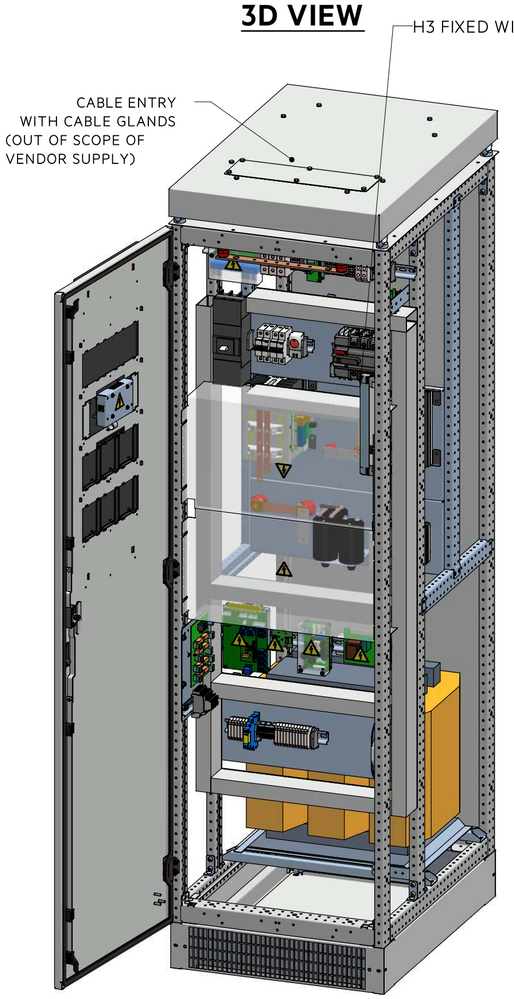
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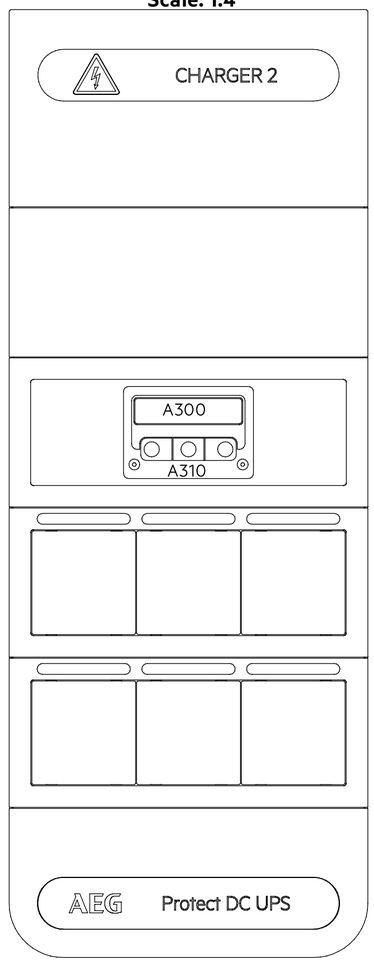
SIDE VIEW



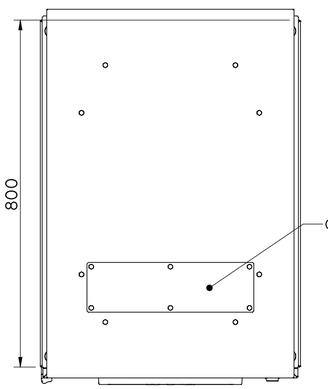
3D VIEW



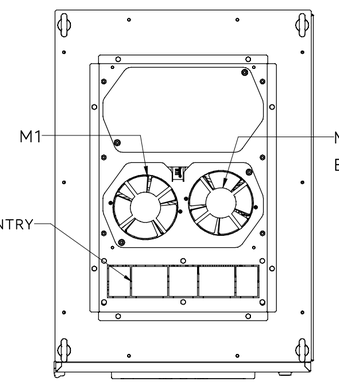
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Scale: 1:4



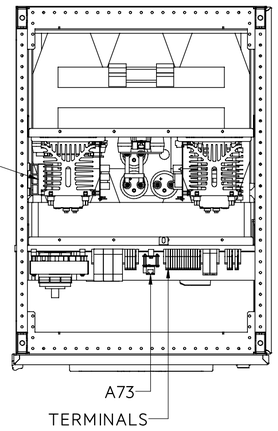
TOP VIEW



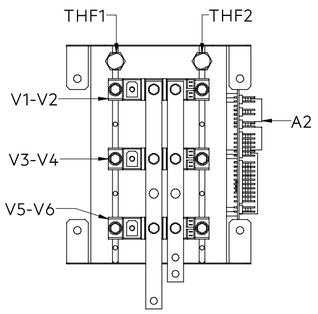
TOP VIEW
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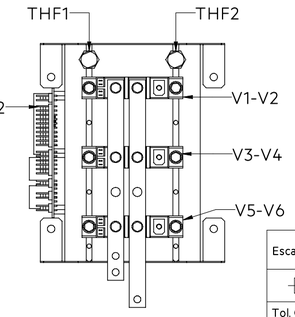
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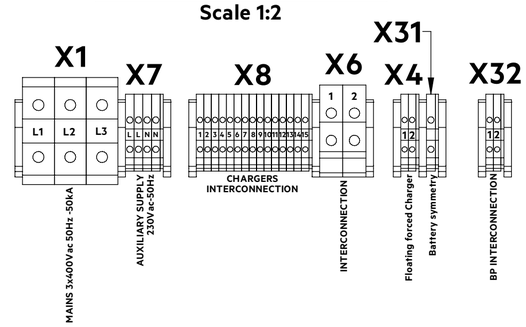
PR1 DETAIL
Scale 1:5



PR2 DETAIL
Scale 1:5



TERMINALS DETAIL
Scale 1:2



Escala / *Scale:* 1:10					
Tol. Gen. / *Gen. Tol.:* **ISO 2768-mK**					
Dibujado / *Drawn* 27/05/2024 Por / *By* EAA	Rev *Issue*	Fecha *Date*	Dib. *Drawn*	Revisado *Checked*	Comentarios / *Comments*
Verificado / *Checked* 27/05/2024 Por / *By* EBM					

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SAP Document: **ES521464A2_MEC**

SAP Code: **ES521464A2**

Denominación / *Description:*
DC UPS UP-200F1 CHARGER-B
1724000372-EL-DA-00003

Formato/ *Format:* **A2** | Rev/ *Issue* **00**

Hoja / *Sheet:* 1/4

Base Load Power Hub (BLPH)

AC UPS - GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS

Document Number: 1724000372-EL-DA-00004

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

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Sign	Date
	06/08/2024

Document Class: 2

03	06/08/2024	Accepted for Construction (AFC)	DA	DA	AD
02	05/08/2024	Accepted for Construction (AFC)	DA	DA	AD
01	10/06/2024	Issue for Review (IFR)	DA	DA	AD
00	20/04/2024	Issue for Review (IFR)	DA	DA	AD
Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Issue for Review (IFR)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

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Base Load Power Hub (BLPH)

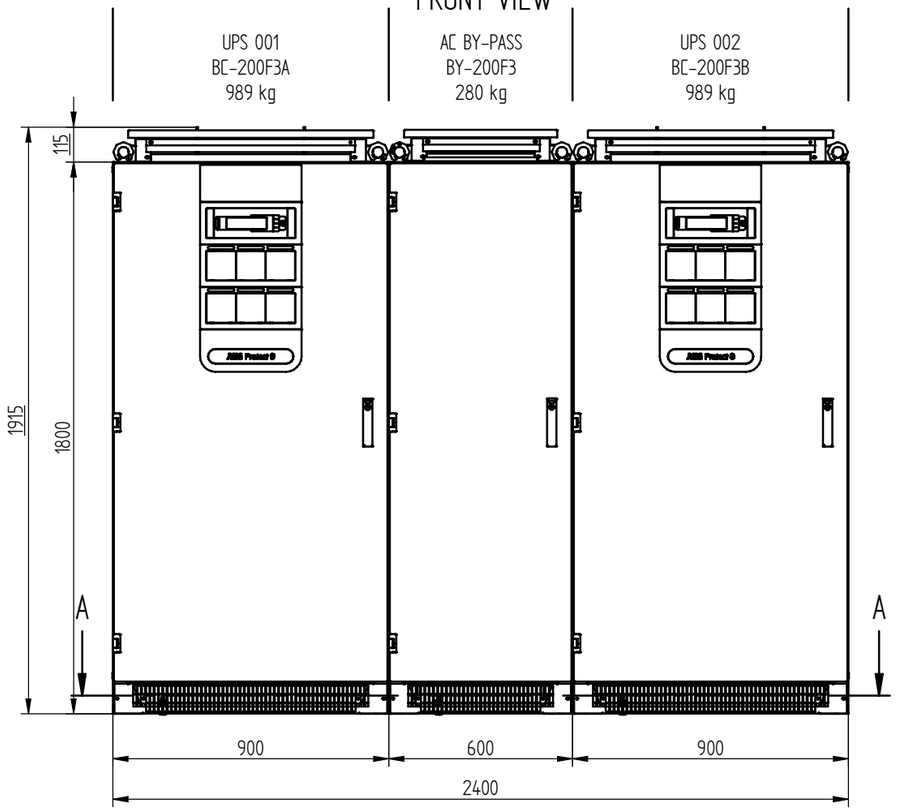
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GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS

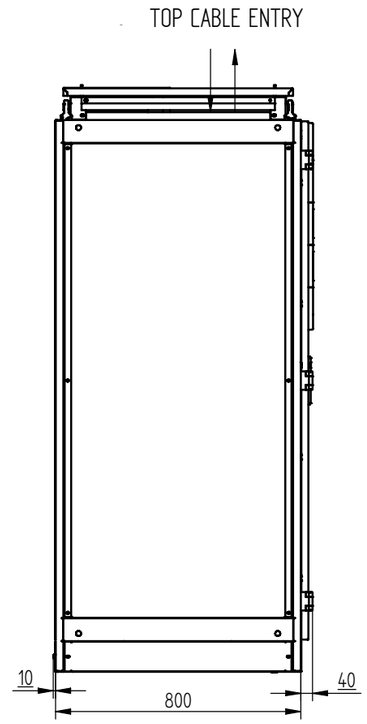
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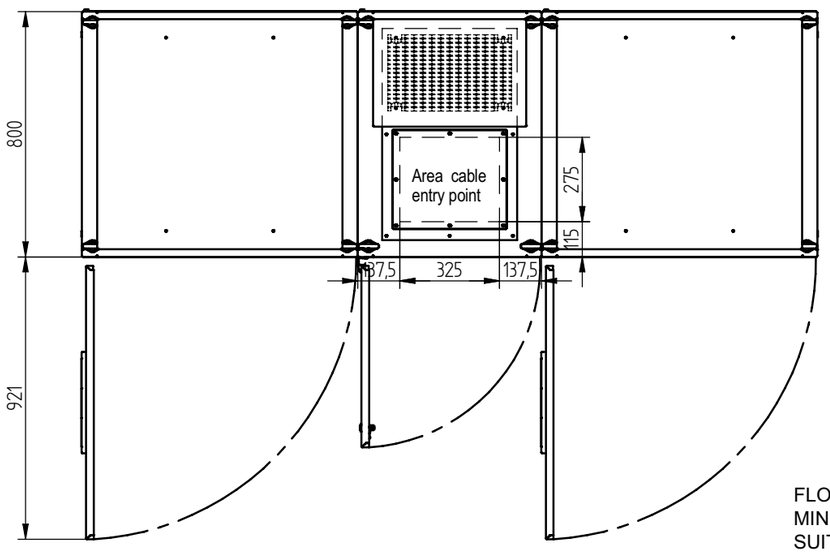
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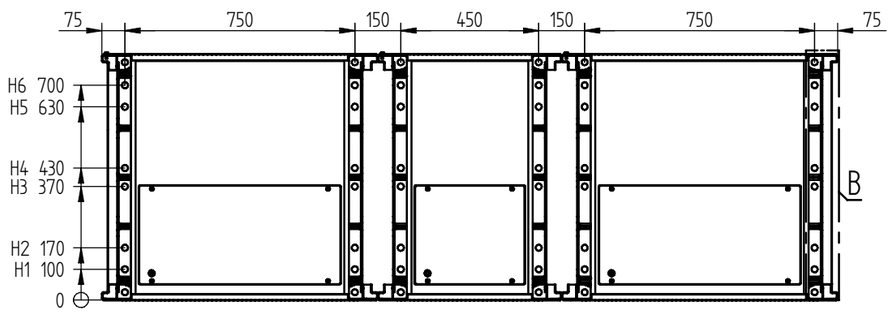
SIDE VIEW



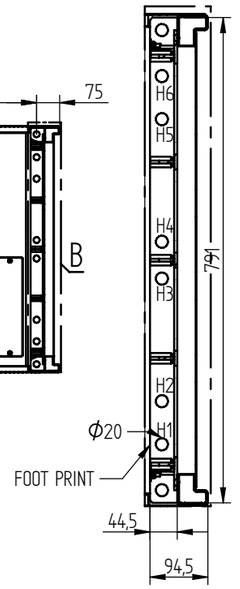
TOP VIEW



SECTION A-A – FOOT PRINT VIEW



DETAIL B FOOT PRINT



Befestigungspunkte / attachment points		
Zugänglichkeit / accessibility	Vorzug / preference	Optional
nur von vorn / only from the front	H1, H5	H2-H4
von vorn u. hinten / from front a. rear	H1, H6	H2-H5

FLOOR FIXING RECOMMENDED
MINI 150daN AT TEARING.
SUITABLE FROM M8 TO M18 BOLT RANGE.
SUGGESTED M16 BOLT WITH LARGE WASHER

Scale 1:20 Mass:-

Stat.	Alteration	Date	Name			Origin:	repl.for:	repl.by:
02	Top Entry	14.06.2024	Ste	Date	16.04.2024			
01	First Issue	16.04.2024	Ste	Editor	A.Stemmer			
				Date	16.04.2024			
				Check	J.S.			

AEG POWER SOLUTIONS

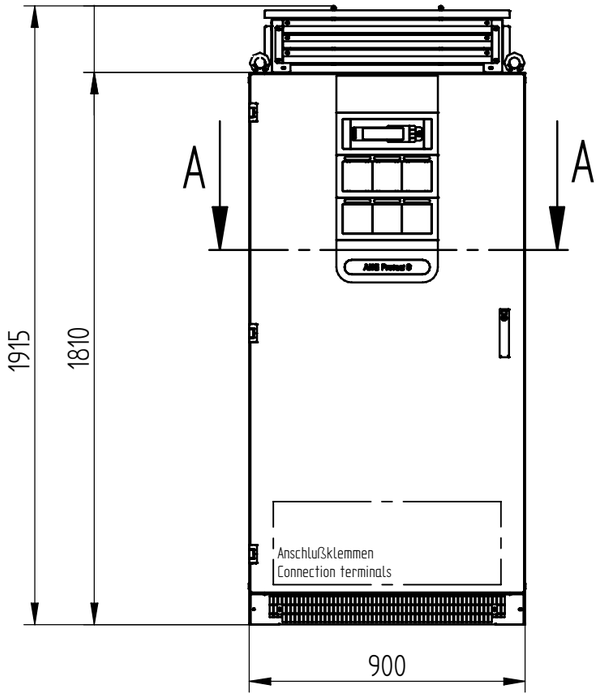
UPS SYSTEM 35 kVA
AC UPS PAS - TAG: UP-200F3
Outline drawing

1724000372-EL-DA-00004

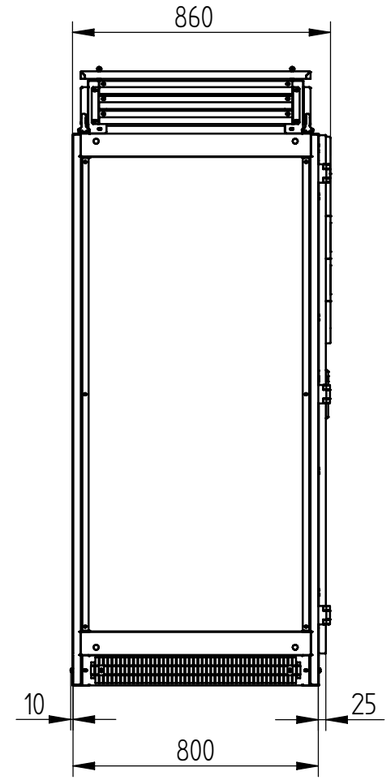
10009757_MTD_EN-02

CAD A3 en

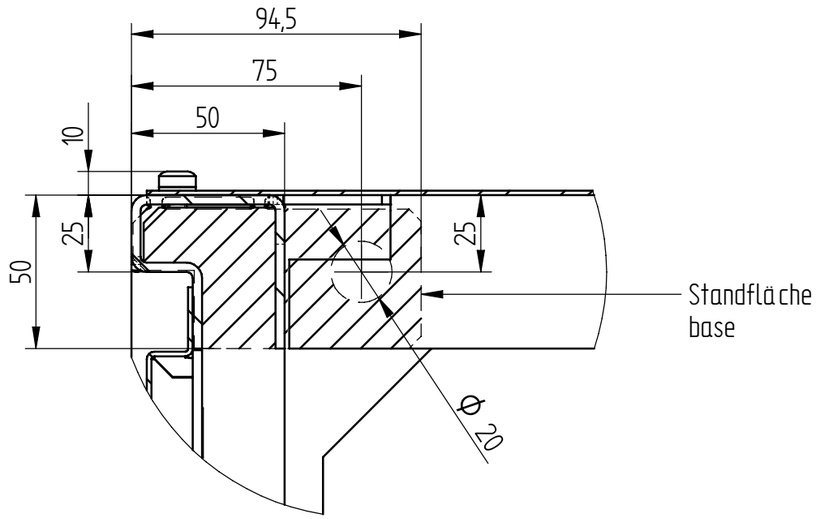
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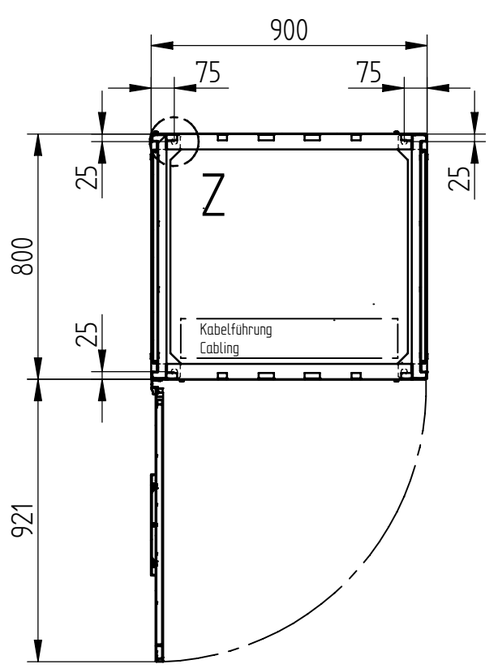
SECTION A-A



DETAIL Z



1:2



FOOT PRINT
VIEW

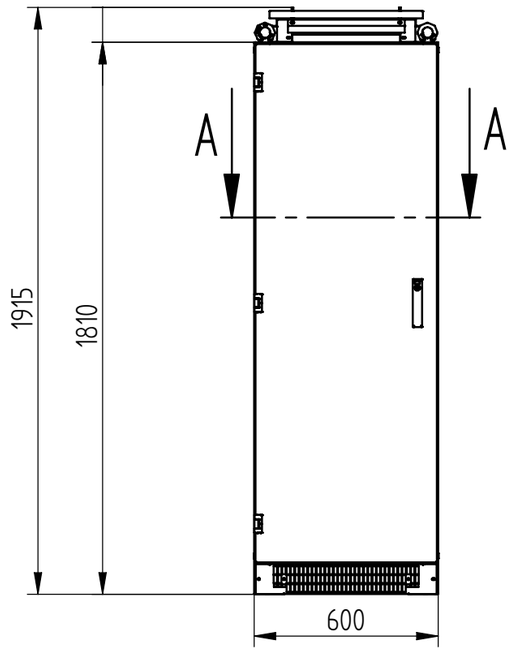
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Technical data sheet

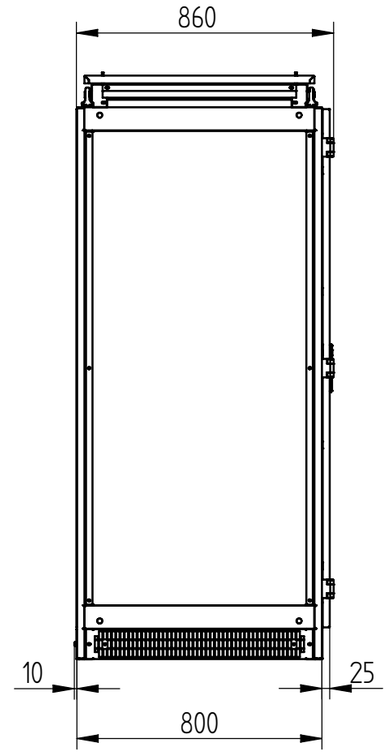
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Technisches Datenblatt

Scale 1:20

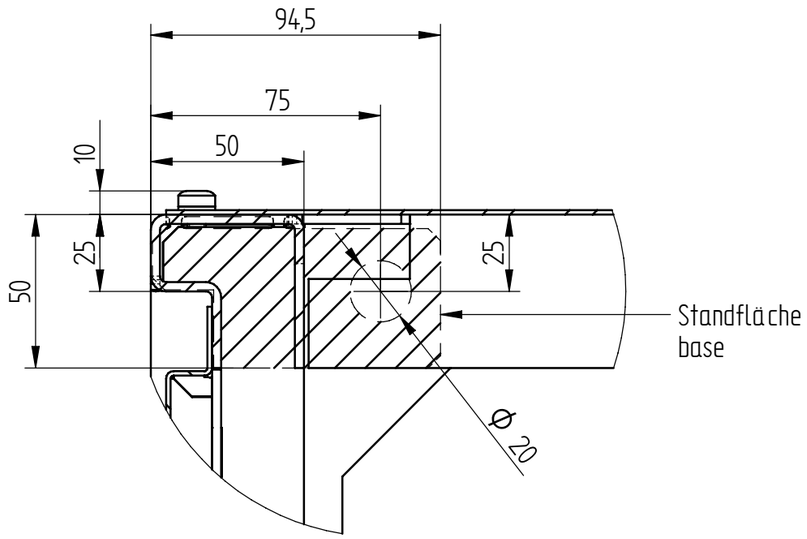
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				Editor	A.Gabel			
01	Logo/IP height update	23.01.2019	Sik	Date	23.01.2019			9100002469_mb-01 CAD A3 en Page Pa.
Stat.	Alteration	Date	Name	Check	M.Wasche	Origin: repl.for:	repl.by:	

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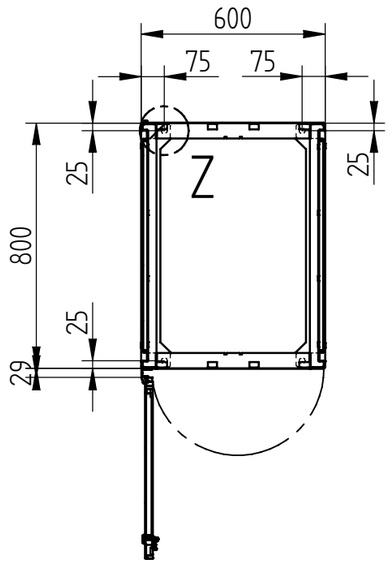


DETAIL Z



1:2

SECTION A-A

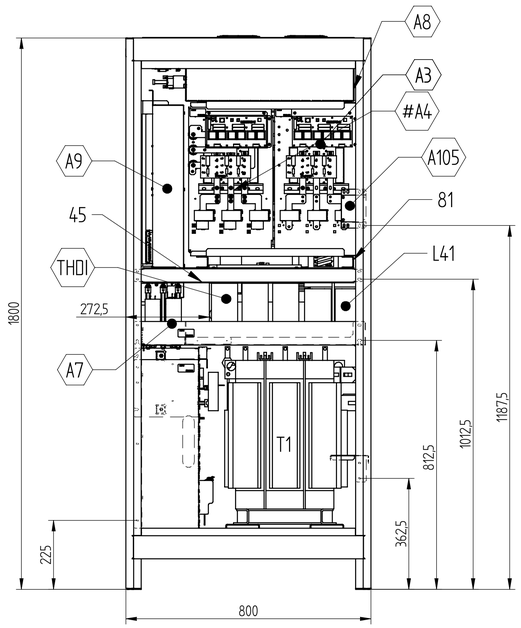


FOOT PRINT
VIEW

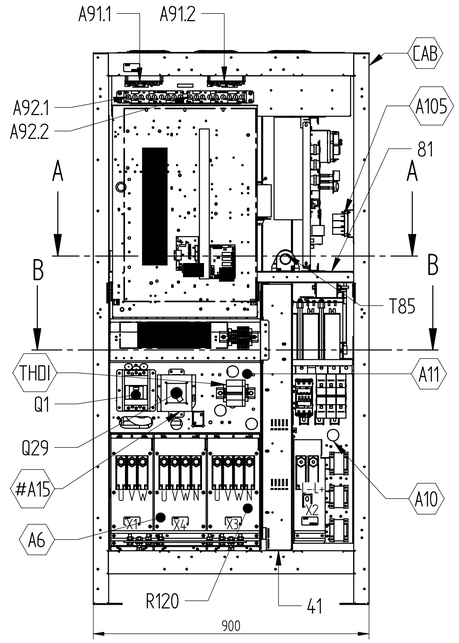
Scale 1:20

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				Editor	S.Sikora				
				Date	25.01.2019				
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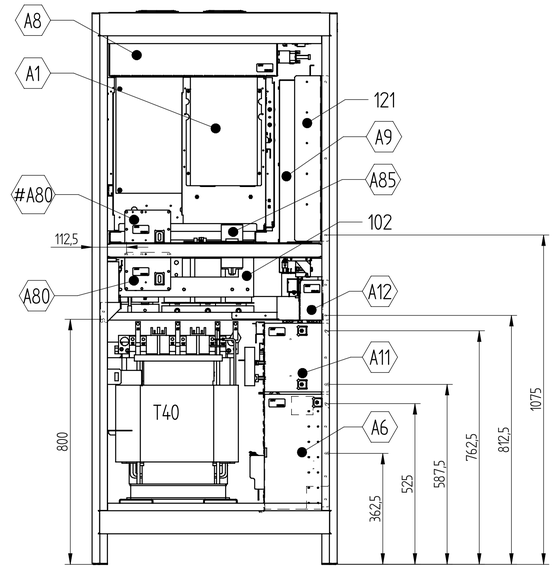
INTERNAL SIDE VIEW



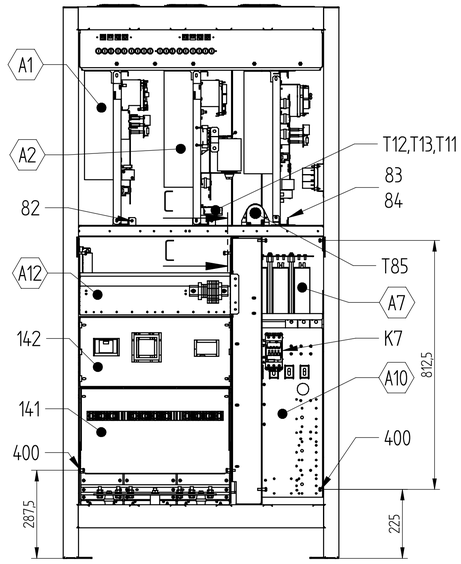
INTERNAL FRONT VIEW



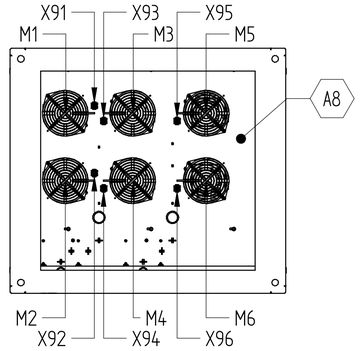
INTERNAL SIDE VIEW



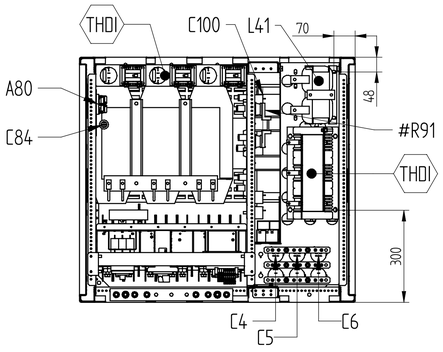
INTERNAL FRONT VIEW WITHOUT CONTROL

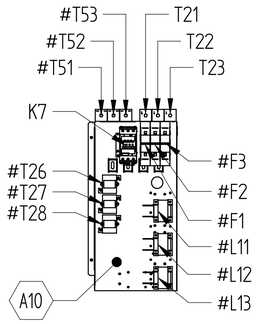


TOP VIEW

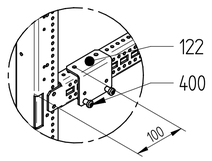


SECTION A-A



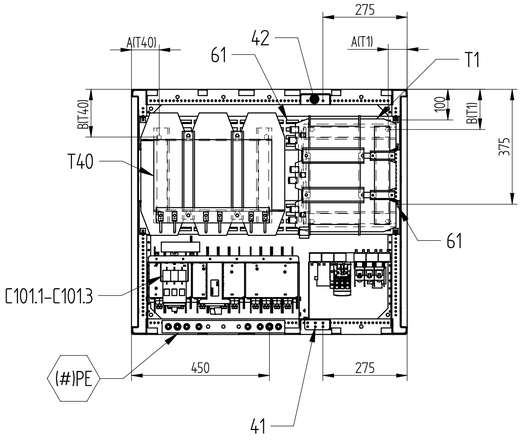


DETAIL Z

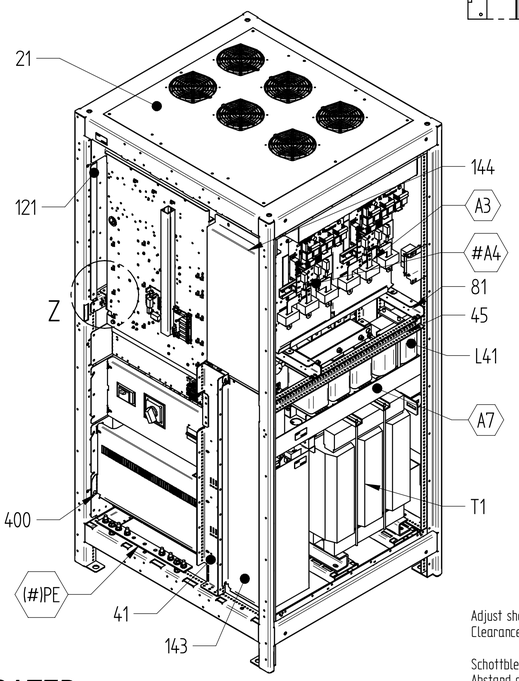


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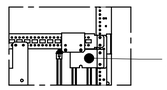
SECTION B-B



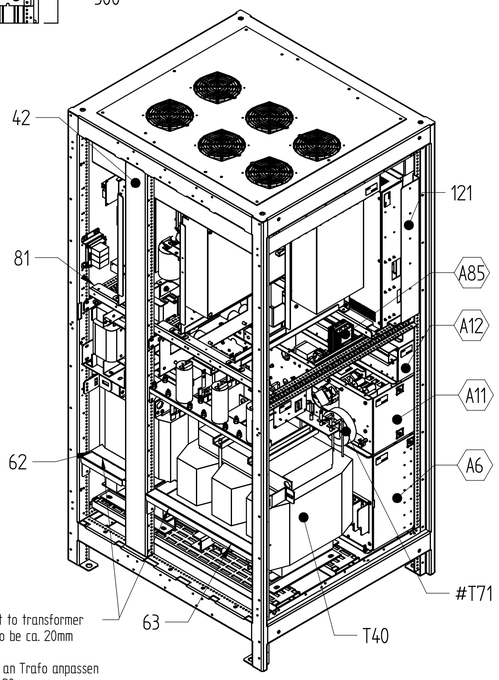
ISO VIEW



SECTION C-C



ISO VIEW



Adjust sheet to transformer
Clearance to be ca. 20mm

Schottblech an Trafo anpassen
Abstand ca. 20mm

Einbauorte T1 & T40 Assemblypositions T1 & T40			
Sachnummer Partnumber	Zulieferer Supplier	A	B
T1 - 40000243	Trasfo Project	62	131.5
T1 - 40000243	Intermagnetics	65	131.5
T1 - 40000243	IMEL	79.5	131.5
T1 - 40011987	Elettromil	62	131,5
T40 - 40012282	Trasfo Project	112	130.5
T40 - 40012282	Intermagnetics	112.5	131.5
T40 - 40012282	IMEL	85	179.5
T40 - 40004293	Trasfo Project	80	156.5
T40 - 40004293	Intermagnetics	87.5	156.5
T40 - 40004293	IMEL	86	156.5
T40 - 40000247	Trasfo Project	113	156.5
T40 - 40000247	Intermagnetics	87.5	131.5
T40 - 40000247	IMEL	60.5	156.5
T40 - 40004292	Trasfo Project	75	106.5
T40 - 40004292	Intermagnetics	80	106.5
T40 - 40004292	IMEL	62	131.5
T40 - 40003990	Trasfo Project	112	131.5
T40 - 40003990	Intermagnetics	65	106.5
T40 - 40003990	IMEL	65	156.5
T40 - 40013395	Elettromil	114,5	131
T40 - 40013398	Elettromil	88,5	156

FOR THE ACRONYMS INDICATED IN THIS DRAWING PLEASE REFER TO THE ELECTRICAL SCHEMATIC 1724000372-EL-DG-00009

A85 - Position may vary due to given space
- Position kann aufgrund der vorliegenden Platzverhältnisse variieren

#	= option
#terminal	= for options see 80000611
#communication	= for options see 80000614
PE/#PE	= for assembly see 80000619

Rev.	Alteration	Date	Name	Origin
07	5000000000266	20.02.2022	BESC	
06		03.07.2020	MK	
05		03.07.2020	MK	
04		16.04.2020	PA	
03		14.08.2019	BIK	
02		31.07.2018	MK	
01		13.12.2016	BIK	
00		15.07.2016	BIK	

Protect 8

Free size tolerances DIN ISO 2768 m | Surfaces

	Date	Name
Editor	15.02.2022	B.Schulte
Check	16.03.2022	M.Wäsche
Norm.		

AEG POWER SOLUTIONS

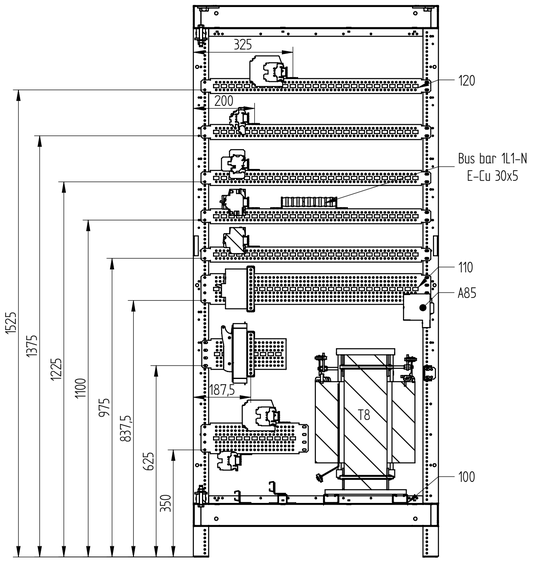
Scale 1:50 | Mass 6296 kg
Material:
Blank:
Protect 8.33/40-400-216-400-H18
Protect 8.33/40-400-216-400-H18

3AD000 | A1 | Page 1
20001274_MTL_EN-07 | en | 1 Pa

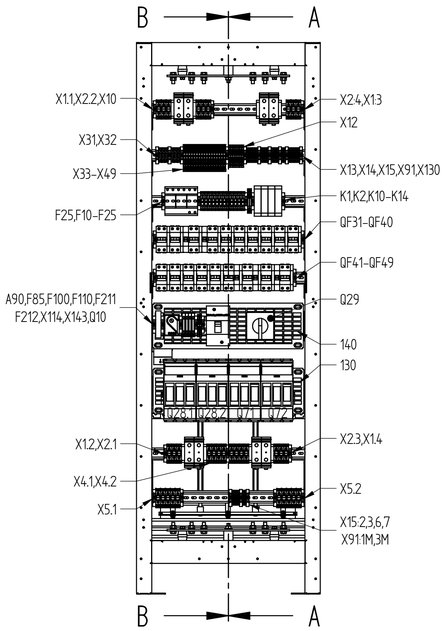
repl.for: 1000003406 | repl.by:

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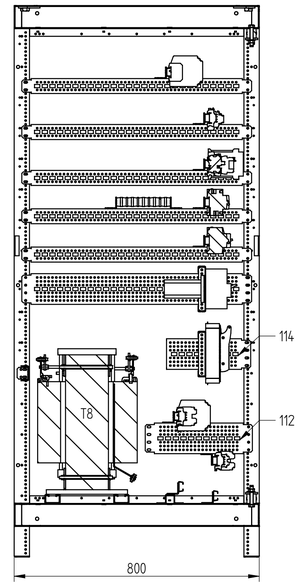
SECTION A-A
SIDE RIGHT INTERNAL VIEW



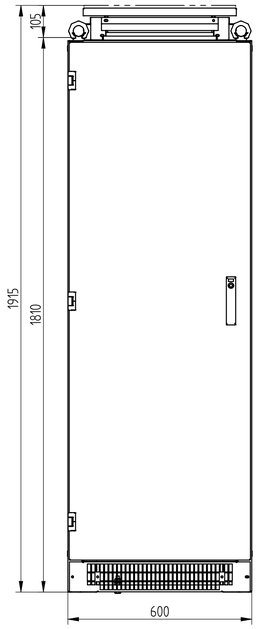
FRONT INTERNAL VIEW



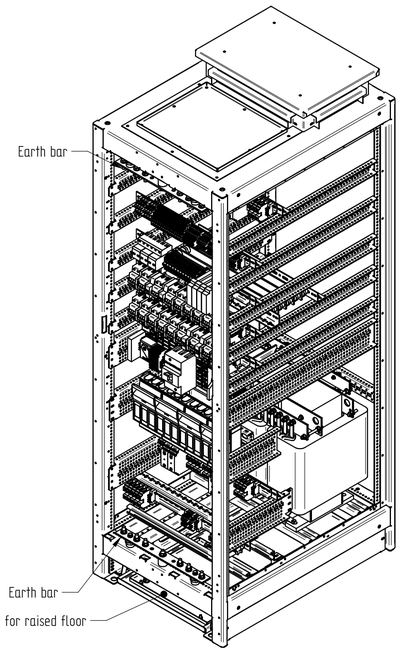
SECTION B-B
SIDE LEFT INTERNAL VIEW



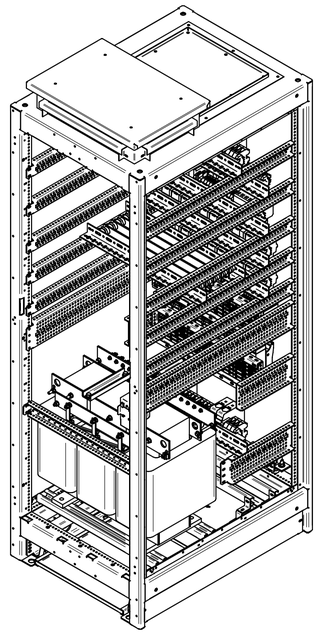
FRONT VIEW WITH DOOR



ISO FRONT VIEW



ISO REAR VIEW



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14188.020 AC BY-PASS - TAG: BY-200F3			Free size tolerances	Surfaces	Scale 1:10	Mass:
					-	
					-	
				Date	Name	Bypass Trans. Schrank 40kVA 400/400V
			Editor	10.07.2024	F.Müller	Bypass Trans. Cabinet 40kVA 400/400V
			Check	17.07.2024	D.Rogner	
			Norm.			
					AEG POWER SOLUTIONS	A1
01		10.07.2024	MU		10009757_MTL_EN-01	en
Rev.	Alteration	Date	Name	Origin		
					repl.for:	repl.by:

Base Load Power Hub (BLPH)

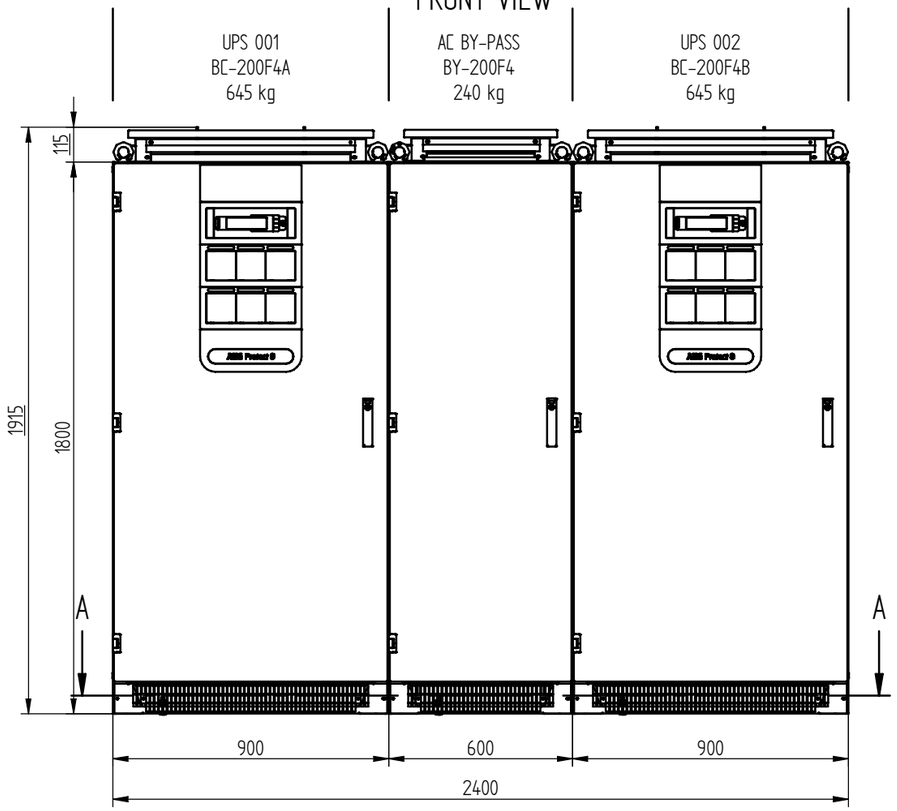
AC UPS F&G - TAG: UP-200F4

GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS

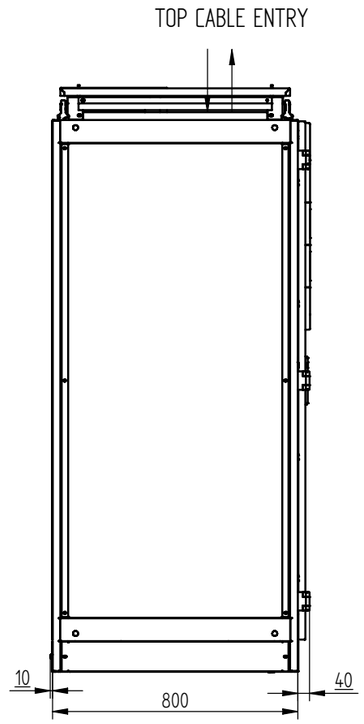
This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

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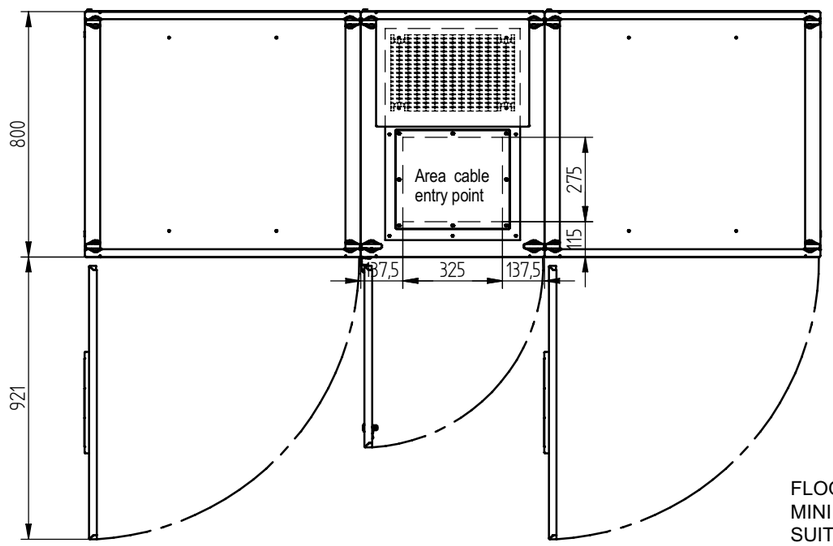
FRONT VIEW



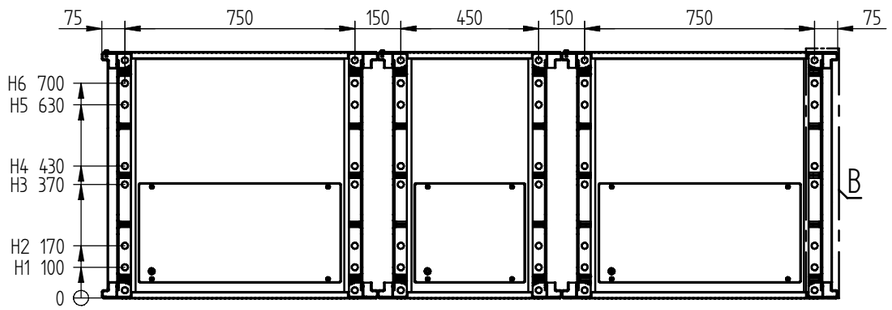
SIDE VIEW



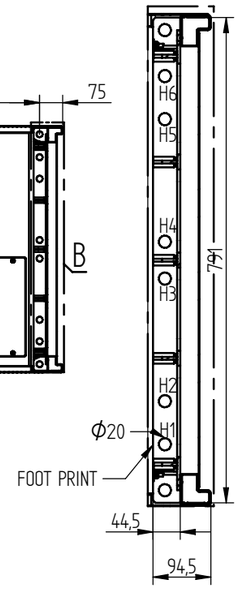
TOP VIEW



SECTION A-A - FOOT PRINT VIEW



DETAIL B
FOOT PRINT



Befestigungspunkte / attachment points		
Zugänglichkeit / accessibility	Vorzug / preference	Optional
nur von vorn / only from the front	H1, H5	H2-H4
von vorn u. hinten / from front a. rear	H1, H6	H2-H5

FLOOR FIXING RECOMMENDED
MINI 150daN AT TEARING.
SUITABLE FROM M8 TO M18 BOLT RANGE.
SUGGESTED M16 BOLT WITH LARGE WASHER

Scale 1:20 Mass:-

Stat.	Alteration	Date	Name		
02	Top Entry	14.06.2024	Ste	Date	16.04.2024
01	First Issue	16.04.2024	Ste	Editor	A.Stemmer
				Date	16.04.2024
				Check	J.S.

Origin: repl.for: repl.by:

AEG POWER SOLUTIONS

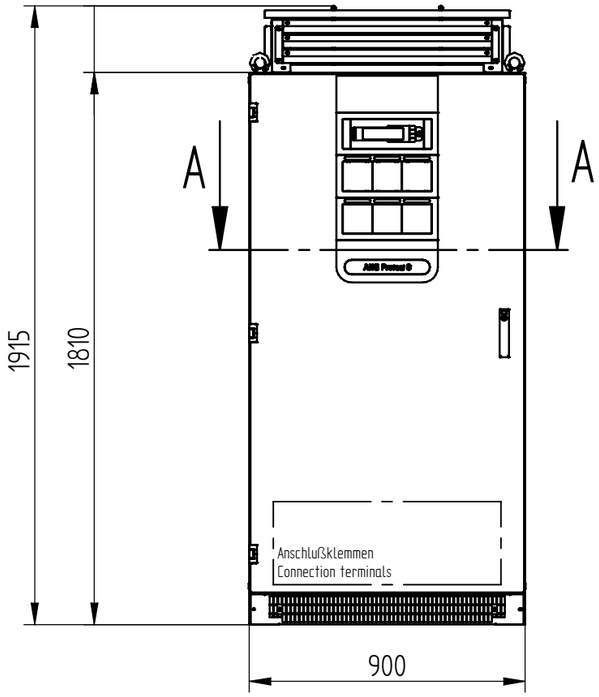
UPS SYSTEM 15 kVA
AC UPS F&G - TAG: UP-200F4
Outline drawing

1724000372-EL-DA-00004

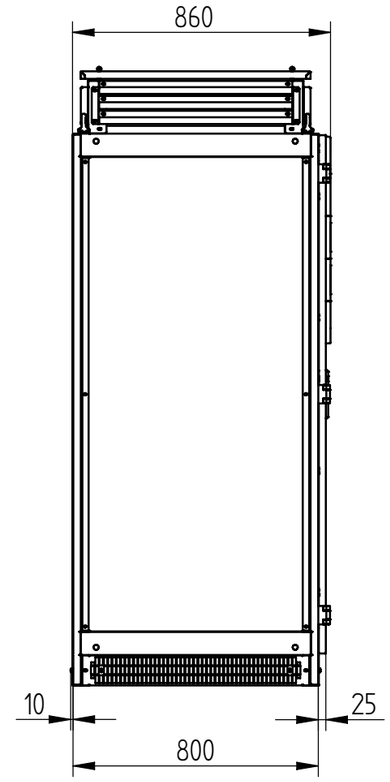
10009760_MTD_EN-02 CAD A3 en

Page 1
1 Pa.

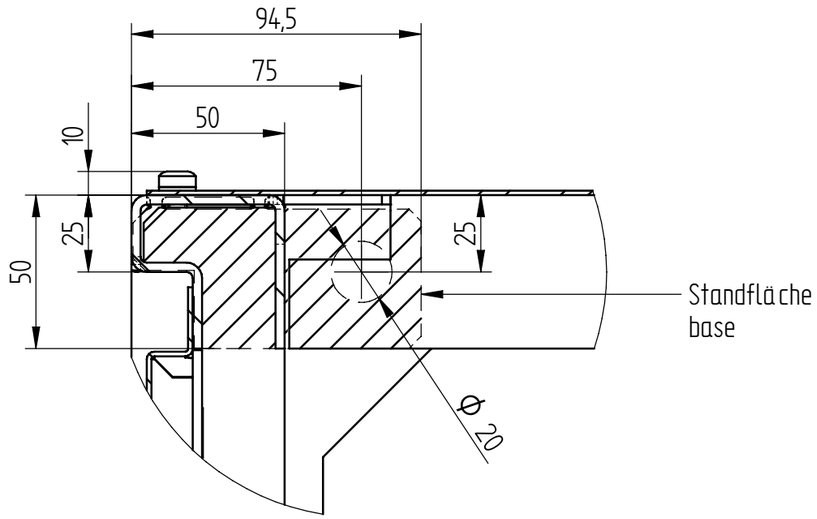
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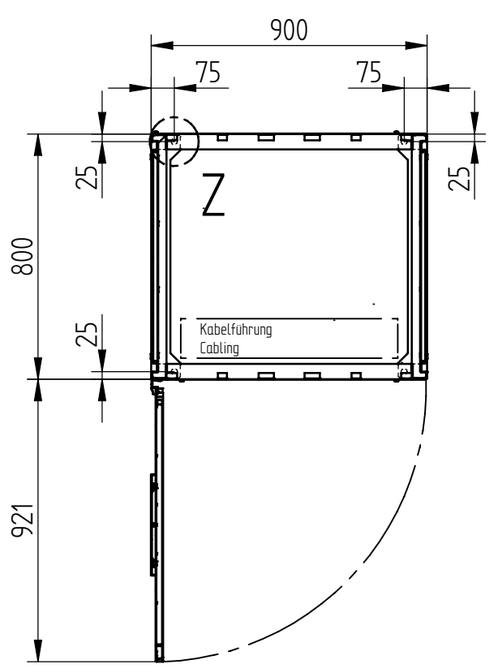
SECTION A-A



DETAIL Z



1:2



FOOT PRINT
VIEW

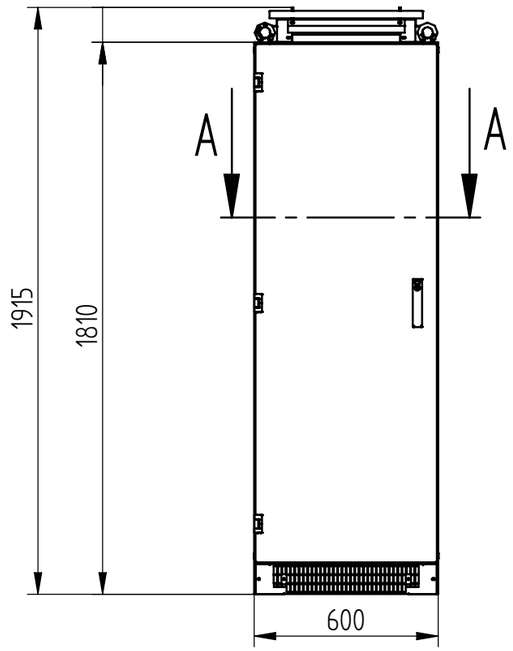
Supplementary data:
Technical data sheet

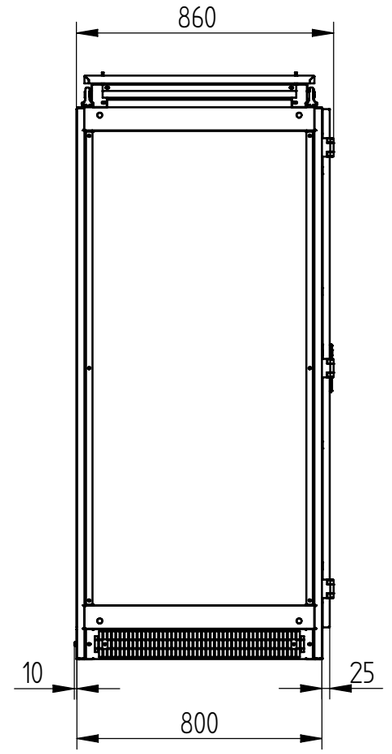
Ergänzende Angaben:
Technisches Datenblatt

Scale 1:20

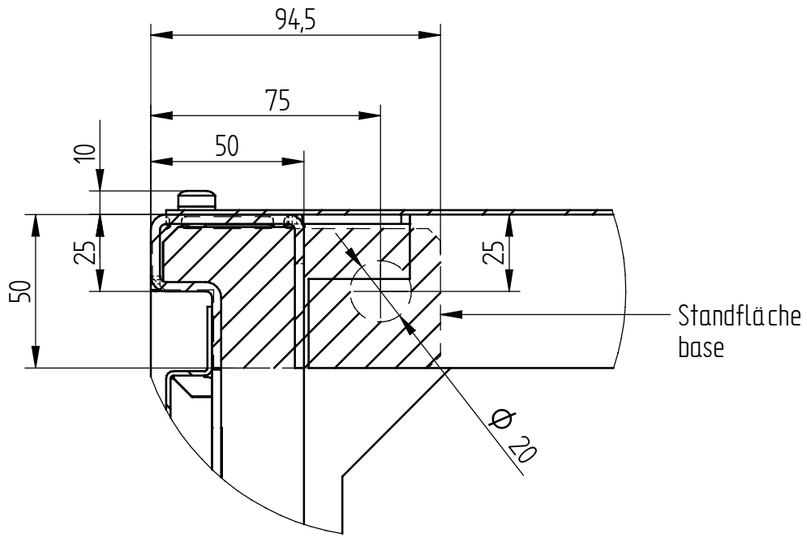
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				Editor	A.Gabel			
01	Logo/IP height update	23.01.2019	Sik	Date	23.01.2019			9100002469_mb-01 CAD A3 en Page Pa.
Stat.	Alteration	Date	Name	Check	M.Wasche	Origin: repl.for:	repl.by:	

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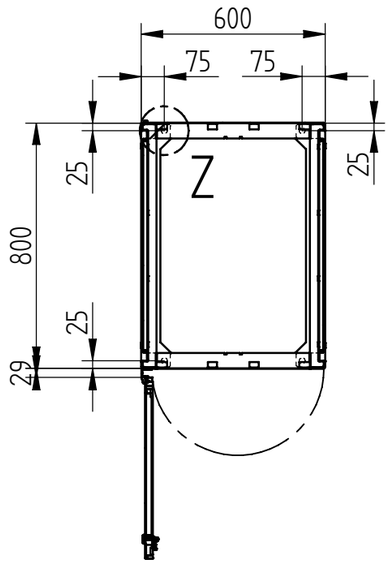


DETAIL Z



1:2

SECTION A-A

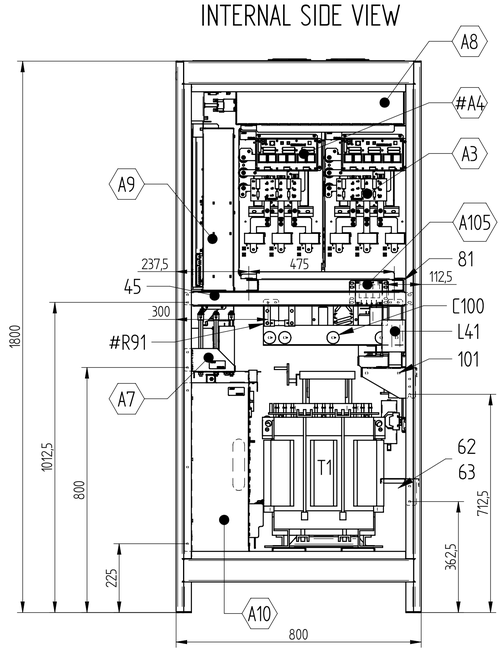


FOOT PRINT
VIEW

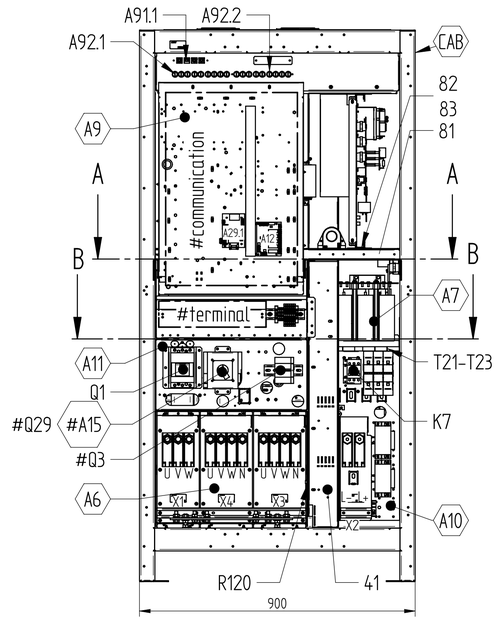
Scale 1:20

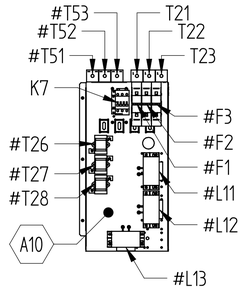
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				Editor	S.Sikora				
				Date	25.01.2019				
Stat.	Alteration	Date	Name	Check	M.Wasche	Origin:	repl.for:	repl.by:	9100003148_mb-00 CAD A3 en Page Pa.

INTERNAL SIDE VIEW

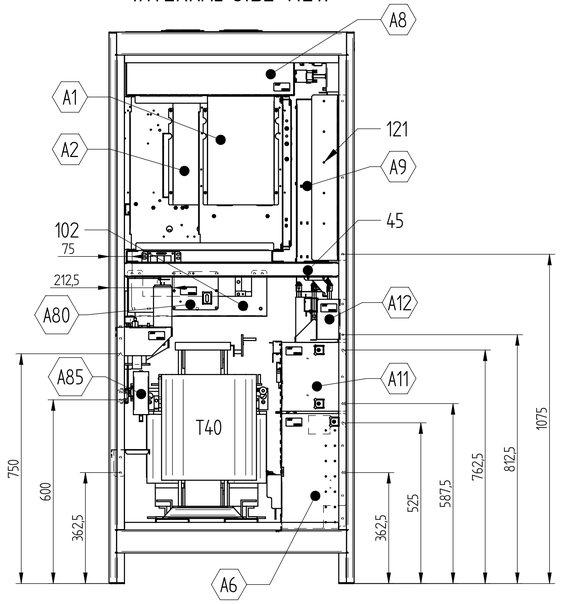


INTERNAL FRONT VIEW

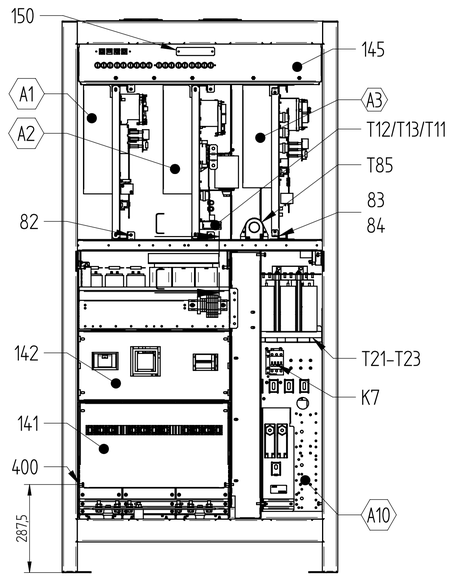




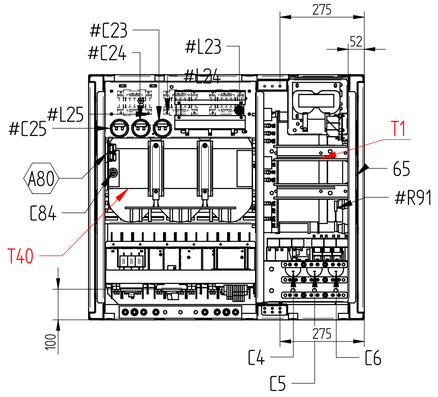
INTERNAL SIDE VIEW



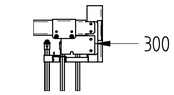
INTERNAL FRONTVIEW WITHOUT CONTROL



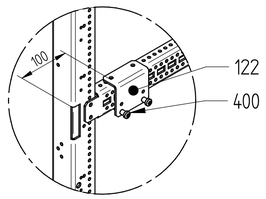
SECTION A-A



SECTION C-C

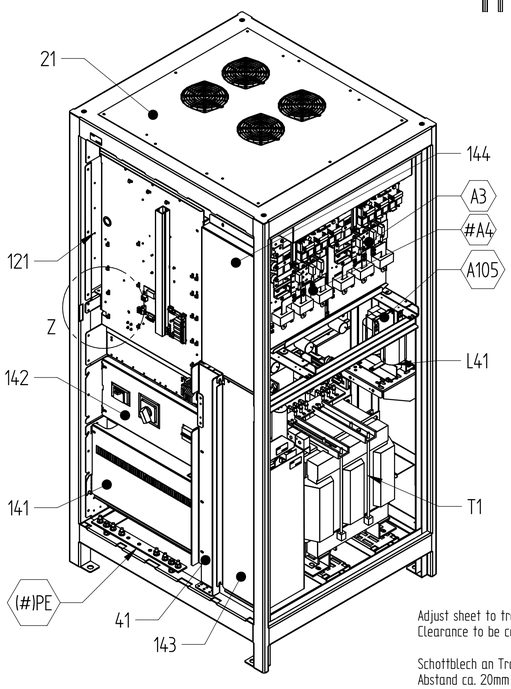


DETAIL Z

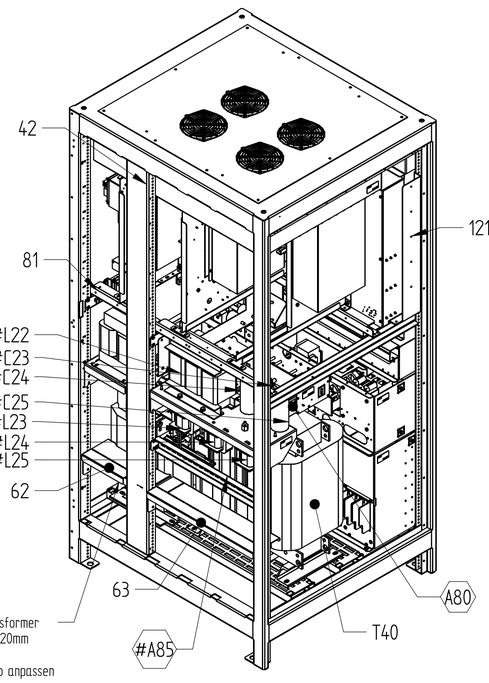


1:5

ISO VIEW



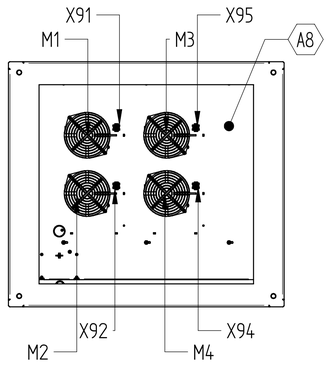
ISO VIEW



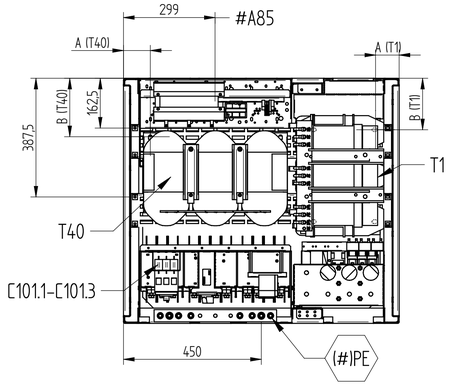
Adjust sheet to transformer
Clearance to be ca. 20mm

Schottblech an Trafo anpassen
Abstand ca. 20mm

TOP VIEW



SECTION B-B



Einbauorte T1 & T40 Assemblypositions T1 & T40			
Sachnummer Partnumber	Zulieferer Supplier	A	B
T1-40004031	Trasfo Project	80	168
T1-40004031	Intermagnetics	90	168
T1-40004031	IMEL	110	168
T1 - 40014529	Elettromil	87,5	219,5
T40-40012283	Eurotrafo	219	217
T40-40012283	Intermagnetics	90	194
T40-40012283	Trasfo Project	130	193
T40-40000247	Trasfo Project	138	169
T40-40000247	Intermagnetics	135	168
T40-40000247	IMEL	87	193
T40-40012282	Trasfo Project	138	167
T40-40012282	Intermagnetics	133	193
T40-40012282	IMEL	115	218
T40-40004293	Trasfo Project	120	168
T40-40004293	Intermagnetics	120	168
T40-40004293	IMEL	113	193
T40-40010351	Tamura	120	195
T40-40013398	Elettromil	137	170
T40-40014516	Elettromil	115	220

FOR THE ACRONYMS INDICATED IN THIS DRAWING PLEASE REFER TO THE ELECTRICAL DRAWING 1724000372-EL-DG-00009

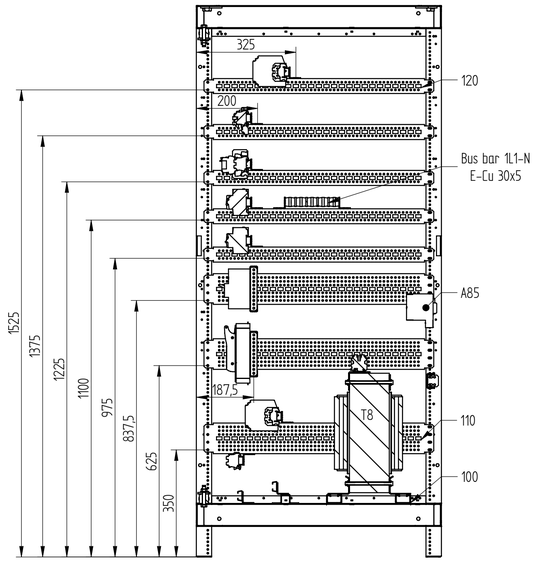
A85 - Position may vary due to given space
- Position kann aufgrund der vorliegenden Platzverhältnisse variieren

#	= option
#terminal	= for options see 80000611
#communication	= for options see 80000614
PE/#PE	= for assembly see 80000619

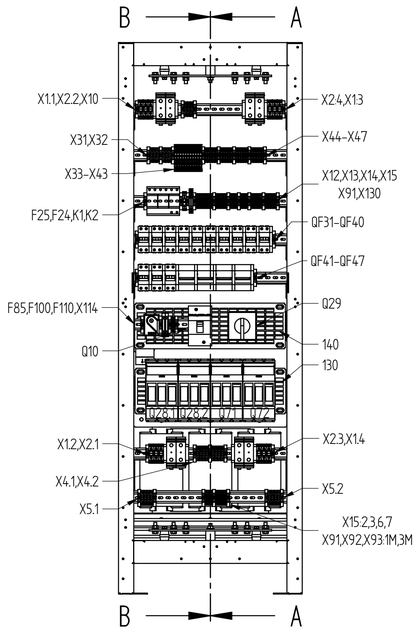
Protect 8				Free size tolerances DIN ISO 2768 m		Surfaces	Scale 1:5	Mass: 3947,797 kg
							Material:	
							Blank:	
08	5000000000331	04.04.2022	IGOL		Date	Name	Protect 8.33/20-400-216-400-H18	
07	80013319	11.08.2021	MK	Editor	10.08.2021	MKrieger	Protect 8.33/20-400-216-400-H18	
06	THDI add	11.08.2021	MK	Check	19.08.2022	BSchulte		
05	T40 TAMURA hinzu	28.03.2020	PA	Norm.				
04	adaption to standard	19.12.2019	PA					
03	80009868	03.08.2018	MK					
02	80009540	30.01.2017	SIK	AEG POWER SOLUTIONS			ZAD000	A1 Page 1
01	add option #A93	11.11.2016	WA				20001273_MTL_EN-08	en 1 Pa.
Rev.	Alteration	Date	Name	Origin			repl.for:	repl.by:

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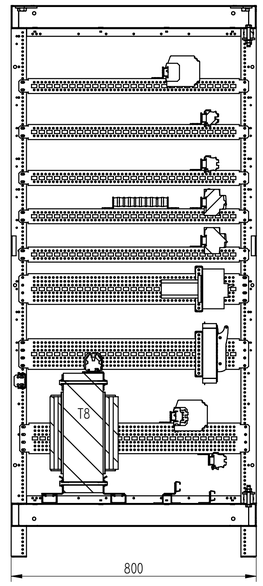
SECTION A–A
SIDE RIGHT INTERNAL VIEW



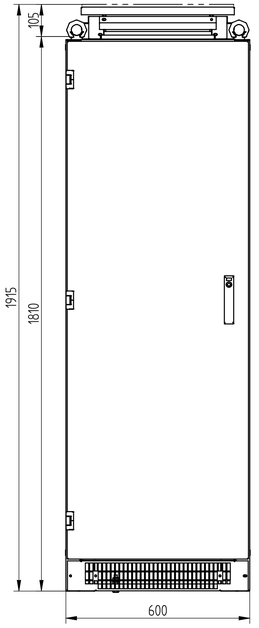
FRONT INTERNAL VIEW



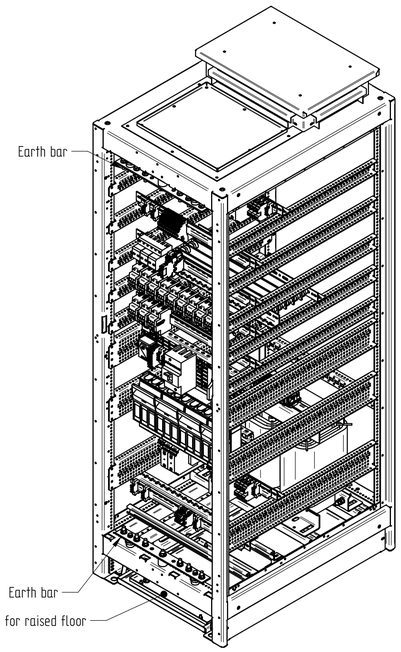
SECTION B–B
SIDE LEFT INTERNAL VIEW



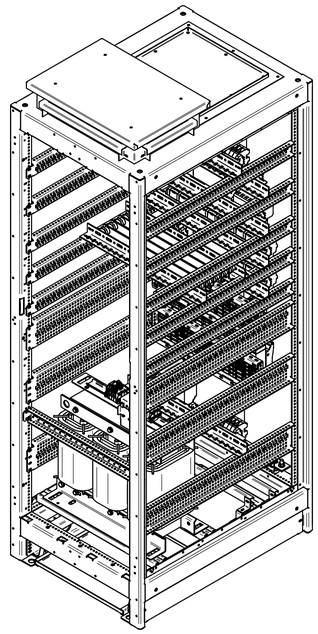
FRONT VIEW WITH DOOR



ISO FRONT VIEW



ISO REAR VIEW

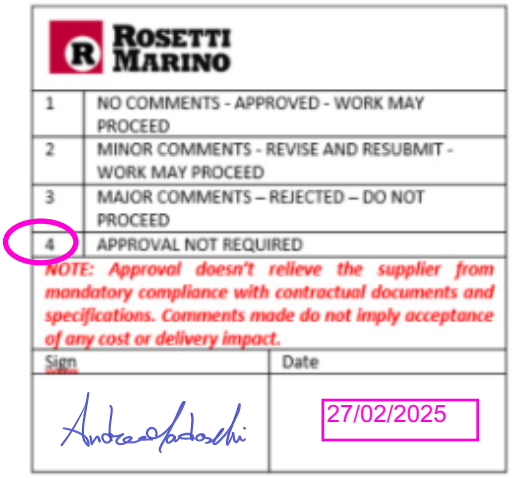


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14188.090 AC BY-PASS - TAG: BY-200F4			Free size tolerances	Surfaces	Scale 1:10 Mass:
					–
					–
				Date	Name
			Editor	16.07.2024	F.Müller
			Check	17.07.2024	D.Rogner
			Norm.		
			AEG POWER SOLUTIONS		Bypass Trans. Schrank 20kVA 400/400V Bypass Trans. Cabinet 20kVA 400/400V
01	16.07.2024	MÜ			10009760_MTL_EN-01 A1 Page 1
Rev.	Alteration	Date / Name	Origin		en 1 Pa
			repl.for:		repl.by:

Base Load Power Hub (BLPH)

DC UPS - WIRING DIAGRAM & TERMINAL SCHEDULE INCLUDING EQUIPMENTS LIST & BILL OF MATERIAL


ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
Andrea Padovani	27/02/2025

nber: 1724000372-EL-DG-00008

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
05	27/02/2025	As Built (ASB)	DA	DA	AD
04	18/12/2024	As Built (ASB)	DA	DA	AD
03	06/10/2024	Accepted for Construction (AFC)	DA	DA	AD
02	26/07/2024	Accepted for Construction (AFC)	DA	DA	AD
01	20/05/2024	Issue for Review (IFR)	DA	DA	AD
00	05/04/2024	Issue for Review (IFR)	DA	DA	AD

3W power | a company of AEG POWER SOLUTIONS

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Issue for Review (IFR)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)
04	As Built (ASB)
05	As Built (ASB)

HOLDS LIST

No.	Description
1	
2	
3	
4	

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Table of contents

Description	Sheet
COVER	1
REVISION / CHANGE LOG	2
HOLDS LIST	2
TABLE OF CONTENTS	3
DC UPS - TAG: UP-200F1 - ELECTRICAL DRAWING	4

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AEG

POWER SOLUTIONS

Manufacturer (company) AEG Power Solutions Iberica S.A.

Manufacturer (address) Albert Einstein 31
Parque Tecnológico de Álava 01510 Vitoria-Gasteiz
Spain

Phone +34 945 214110 www.aegps.es
+34 945 214165 servicios.iberica@aegps.com

AEG N°	ES521464
Customer	3W POWER S.P.A.
Project name	Hollandse Kust Noord (HKN) wind farm

Installation	
Systems Type	2xTPRe 110V 100A
Battery	10x FLG12-150 (60 Cells) (NON SUPPLIED)

Revision	01	Checked by :	JOP
Created on	21/03/2024	from	EBM
Changed by	22/07/2024	from	

Number of sheets 49

ES521464

				Date	21/03/2024	3W POWER S.P.A.			=
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Title page / cover sheet	1724000372-EL-DG-00008 + 1 / 49
01		22/07/2024	eva.beitia	Checked	JOP				& EAA
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheet 1
									Sheets 1

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		EAB	1/ 3		Table of contents	2/49			
		EAB	2/ 3		Table of contents	3/49			
		EAB	3/ 3		Table of contents	4/49		22/07/2024	eva.beitia
		EPZ	1/ 4		Symbols used	5/49			
		EPZ	2/ 4		Symbols used	6/49			
		EPZ	3/ 4		Symbols used	7/49			
		EPZ	4/ 4		Symbols used	8/49			
System									
		EFA	1/ 1		Single-line	9/49			
		EDA	1/ 1		Electrical characteristic	10/49	01	22/07/2024	eva.beitia
		MTB	1/ 1		Dimensional drawing	11/49			
	INT								
		EMA1	1/ 2		Interconnections	12/49	01	22/07/2024	eva.beitia
		EMA1	2/ 2		Interconnections	13/49	01	22/07/2024	eva.beitia
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		EFS	1/ 13		Main supply	14/49			
		EFS	2/ 13		Rectifier	15/49			
		EFS	3/ 13		Rectifier	16/49			
		EFS	4/ 13		Filtering	17/49	01	22/07/2024	eva.beitia
		EFS	5/ 13		DC output	18/49			
		EFS	6/ 13		Distribution	19/49	01	22/07/2024	eva.beitia
		EFS	7/ 13		Distribution	20/49			
		EFS	8/ 13		Distribution	21/49			
		EFS	9/ 13		Battery	22/49	01	22/07/2024	eva.beitia
		EFS	10/ 13		Control Unit	23/49	01	22/07/2024	eva.beitia

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		EFS	12/ 13		Relay board	25/49			
		EFS	13/ 13		Cabinet accesories	26/49			
		EMA	1/ 2		Terminal diagram	27/49			
		EMA	2/ 2		Terminal diagram	28/49	01	22/07/2024	eva.beitia
		EPB5	1/ 4		Bill of materials	29/49	01	22/07/2024	eva.beitia
		EPB5	2/ 4		Bill of materials	30/49	01	22/07/2024	eva.beitia
		EPB5	3/ 4		Bill of materials	31/49	01	22/07/2024	eva.beitia
		EPB5	4/ 4		Bill of materials	32/49	01	22/07/2024	eva.beitia
		MTB	1/ 1		Relay card detail	33/49			
	REC2								
		EFS	1/ 10		Main supply	34/49			
		EFS	2/ 10		Rectifier	35/49			
		EFS	3/ 10		Rectifier	36/49			
		EFS	4/ 10		Filtering	37/49	01	22/07/2024	eva.beitia
		EFS	5/ 10		DC output	38/49			
		EFS	6/ 10		Battery	39/49	01	22/07/2024	eva.beitia
		EFS	7/ 10		Control Unit	40/49	01	22/07/2024	eva.beitia
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		EFS	9/ 10		Relay board	42/49			
		EFS	10/ 10		Cabinet accesories	43/49			
		EMA	1/ 2		Terminal diagram	44/49	01	22/07/2024	eva.beitia
		EMA	2/ 2		Terminal diagram	45/49	01	22/07/2024	eva.beitia
		EPB5	1/ 3		Bill of materials	46/49	01	22/07/2024	eva.beitia
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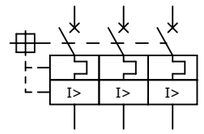
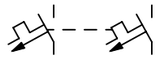
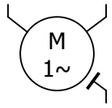
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		EPB5	3/ 3		Bill of materials	48/49	01	22/07/2024	eva.beitia
		MTB	1/ 1		Relay card detail	49/49			

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IEC_symbol

Symbol

NO contact 	Female pin of a plug connection with direct connection point 	Circuit breaker, two-pole, form 2 
NC contact	Plug of a plug connection with direct connection point	Terminal with 2 connection points
Electromechanical operating device, general / relay coil 	Capacitor, polarized (electrolytic capacitor) 	
Fused terminal	Change-over contact with break point (2-path) 	Terminal with 6 connection points without saddle jumper connection points 
Fuse, single-pole, general 	Change-over contact with break point (3-path) 	Power circuit breaker, three-pole (L-, I-characteristic) 
Resistor, general	Terminal	
Circuit breaker, two-pole 	NC temperature switch 	
AC motor 	Heating element with PE 	

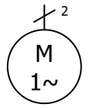
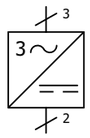
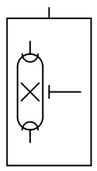
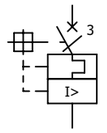
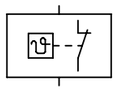
ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Symbols used		=
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm				+ 4 / 47
				Checked	JOP					& EPZ
Stat	Alteration	Date	Name	Standard					ES521464 en	A3 Sheet 1 Sheets

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IEC_single_symbol

Symbol

Semiconductor diode, general 	AC motor, without PE, with straight connection point 	
Thermocouple 	Circuit breaker, two-pole, form 2 	
Fuse circuit breaker, single-pole 	Terminal	
3Ph Bridge Rectifier 		
Fluorescent lamp with PE 	Power circuit breaker, three-pole (L-, I-characteristic) 	
Capacitor, polarized (electrolytic capacitor) 		
NC temperature switch 		
Heating element with PE 		

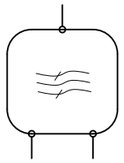
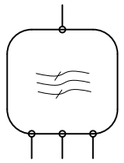
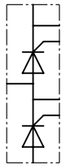
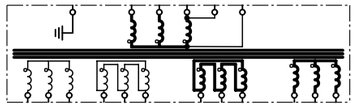
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IEC_AEGPSI_symbol

Symbol

Cable, wire	Fuse 	
0.5mm² Wire	Shunt 	
Power interconnection Supplied 	Fuse-holder 1	
Power interconnection not supplied 	BUSBAR 	
Load switch disconnector, three-pole;rotary handle 	Filter single-phase 	
Ferrita 	Filter three-phase 	
Semipack SKKT 	Three-phase transformer 	
Fuse switch disconnector, three-pole 	Fuse holder Terminal 	

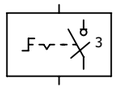
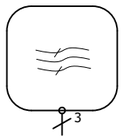
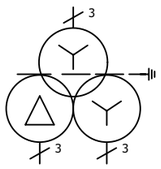
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				Editor	EBM	Hollandse Kust Noord (HKN) wind farm			+ 6 / 47
				Checked	JOP				& EPZ
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheet 3 Sheets

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IEC_AEGPSI_single_symbol

Symbol

Load switch disconnector, three-pole;rotary handle 		
SHUNT 		
Filter three-phase 		
Three-phase transformer 		

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+REC1
UP-200F1 A

-M1/2
220-240 Vca
50-60Hz
FAN

-PR2-TH1
THERMOSTAT 100º

-PR2-TH2
THERMOSTAT 90º

-PR1-TH1
THERMOSTAT 100º

-PR1-TH2
THERMOSTAT 90º

Charger
100A 12Pulses

-Z1
0/450V

-X1
L1
70 mm²
4G16 mm2
unamoured cable

MAINS
3x400Vac 50Hz -50kA

L1;L2;L3;PE

-Q1
50A

-T1
110V/100A
019.6KVA

-PR2
-PR1

-R2
100mV
130A

-C1
3x6800µF
160V
Filtering 1%

-F1
NH00
125A

-V21
100A

-Q2
160A

-R3
100mV
130A

-Q3
160A

BATTERY
110Vdc
-X3
+/-
70 mm²

Battery
symmetry
-X31
+/-
4 mm²

-A10
BATTERY SIMMETRY
FAULT

+BP
BATTERY PROTECTION

2 (1x25) mm2

-F100
Plastic
box 80*80

+BAT

-L+/-
2P 125A
BUS BAR
110 VDC

-Q10
50A-C
-X2 1+/1
16 mm²
3G16 mm2
amoured cable
(+REC1-A1 /1.4) / SD1

CP-100F1
DC CONTROL 66kV G/S
LINE A-5.2KW

-SD1

-Q11
20A-C
-X2 2+/2
16 mm²
3G16 mm2
amoured cable
(+REC2-A1 /1.4) / SD2

CP-100F1
DC CONTROL 66kV G/S
LINE B-2KW

-SD2

-Q12
16A-C
-X2 3+/3
16 mm²
3G16 mm2
amoured cable

SG-100D1
DC CONTROL 6,6kV
SWITCHGEAR LINE A-1KW

-Q13
16A-C
-X2 4+/4
16 mm²
3G16 mm2
amoured cable

SG-100D1
DC CONTROL 6,6kV
SWITCHGEAR LINE B-1KW

-Q14
50A-C
-X2 5+/5
16 mm²

SPARE 5,5KW

-Q15
20A-C
-X2 6+/6
16 mm²

SPARE 2KW

-Q16
16A-C
-X2 7+/7
16 mm²

SPARE 1KW

-F10/F11
DEHNguard

-A21
EARTH +/-

-A1
GCAU
CONTROL UNIT

-A5.1
Relays
-CR1-X5

-A71

-A300
DISPLAY

-A73
MODBUS-TCP/IP

-A8
Isolated

-A310
KEY PAD

-KF
PSR-SCP- 24DC / SIL3

SD1 / (+BAT-SD1 /1.8)

-PR2-A2
TPC

-A320
INTERFACE

-PR1-A2
TPC

AUXILIARY SUPPLY
230Vac-50Hz

-X7
L/N
6 mm²
3G2.5 mm2
unamoured cable

-Q6
02A-C

-Q7
02A-C

-H3

-THF4
0/60ºC

-E50
100W

-Z2
400V

-X8
4 mm²
CHARGERS
INTERCONNECTION

2,5 mm²

INTERCONNECTION
-X6
50 mm²
PH4 35 mm²

+REC2
UP-200F1 B

-M1/2
220-240 Vca
50-60Hz
FAN

-PR2-TH1
THERMOSTAT 100º

-PR2-TH2
THERMOSTAT 90º

-PR1-TH1
THERMOSTAT 100º

-PR1-TH2
THERMOSTAT 90º

-A8
(+REC1-CR1-J13:1 /1.4)

Charger
100A 12Pulses

-Z1
0/450V

-X1
L1
70 mm²
4G16 mm2
unamoured cable

MAINS
3x400Vac 50Hz -50kA

L1;L2;L3;PE

-Q1
50A

-T1
110V/100A
019.6KVA

-PR2
-PR1

-R2
100mV
130A

-C1
3x6800µF
160V
Filtering 1%

-F1
NH00
125A

-V21
100A

-Q2
160A

-PR2-A2
TPC

-A320
INTERFACE

-PR1-A2
TPC

SD2 / (+BAT-SD2 /1.8)

-A1
GCAU
CONTROL UNIT

-A5.1
Relays
-CR1-X5

-A71

-A300
DISPLAY

-A73
MODBUS-TCP/IP

-A8
Isolated

-A310
KEY PAD

A8 / (+REC2-X8 /1.4)

AUXILIARY SUPPLY
230Vac-50Hz

-X7
L/N
6 mm²

-Q6
02A-C

-Q7
02A-C

-H3

-THF4
0/60ºC

-E50
100W

2,5 mm²

Battery
symmetry
-X31
+/-
4 mm²

-A10
BATTERY SIMMETRY
FAULT

ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Single-line	1724000372-EL-DG-00006
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		System	
				Checked	JOP				
Stat	Alteration	Date	Name	Standard					

= System
+ 8 / 47
& EFA
ES521464 en
A3
Sheet 1
Sheets 1

AEGPS_DOC_REV01
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Type 2xTPRe 110V 100A Battery 10x FLG12-150 (60 Cells) (NON SUPPLIED) Mains AC 3x400Vac 50Hz

SETTINGS	**20ºC**		TEMPERATURE COMPENSATION
FLOATING CHARGE	2,25	V/cel	X
HIGH RATE CHARGE	2,30	V/cel	

WIRING

CABLE LABELLING : Standard AEG PS

CABLE TYPE : Standard AEG PS

SECTION SEE WIRING SCHEMATIC

FITRAGE	1%
PROTECTION WITH DOOR OPEN	IP 20
PROTECTION WITH DOOR CLOSED	IP 43
ELECTRONIC BOARDS VARNISHED	
COMPONENTS LABEL	Engraved indivual labels

This system includes some components which must be replaced periodically. The average life time of these components is provided in parts list section of this document. Please contact your nearest customer service location for more information

RELAY CHARACTERISTICS

Common alarm (GCAU card) : 250VAC/5A

24Vdc	48Vdc	110Vdc	220Vdc
6A	1,2A	0,3A	0,1A

Relay Alarm (Relay PCB) : 250VAC/5A

24Vdc	48Vdc	110Vdc	220Vdc
8A	2A	0,5A	0,4A

Legend

Power Control

0.5 mm²

Interconnections

Provided — Int — Int

Not Supplied — Int — Int

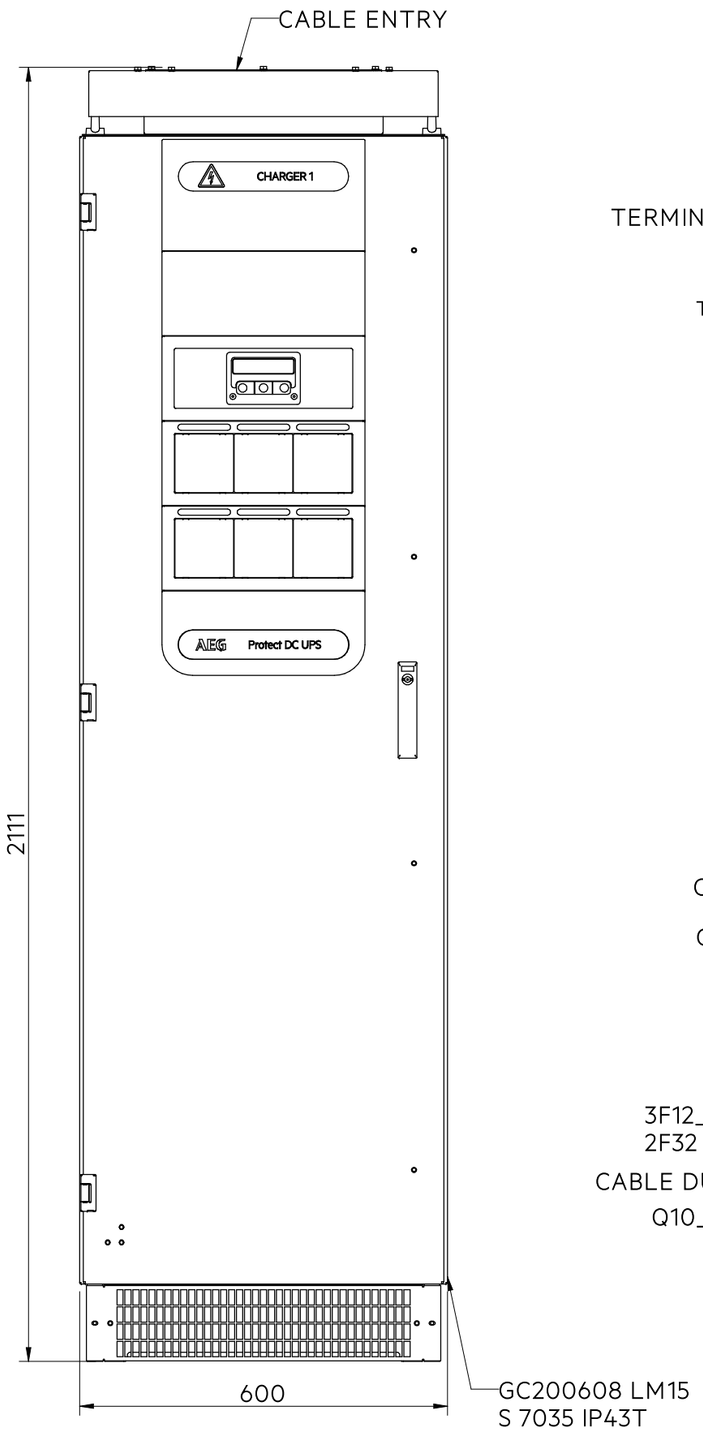
Power Control

ES521464

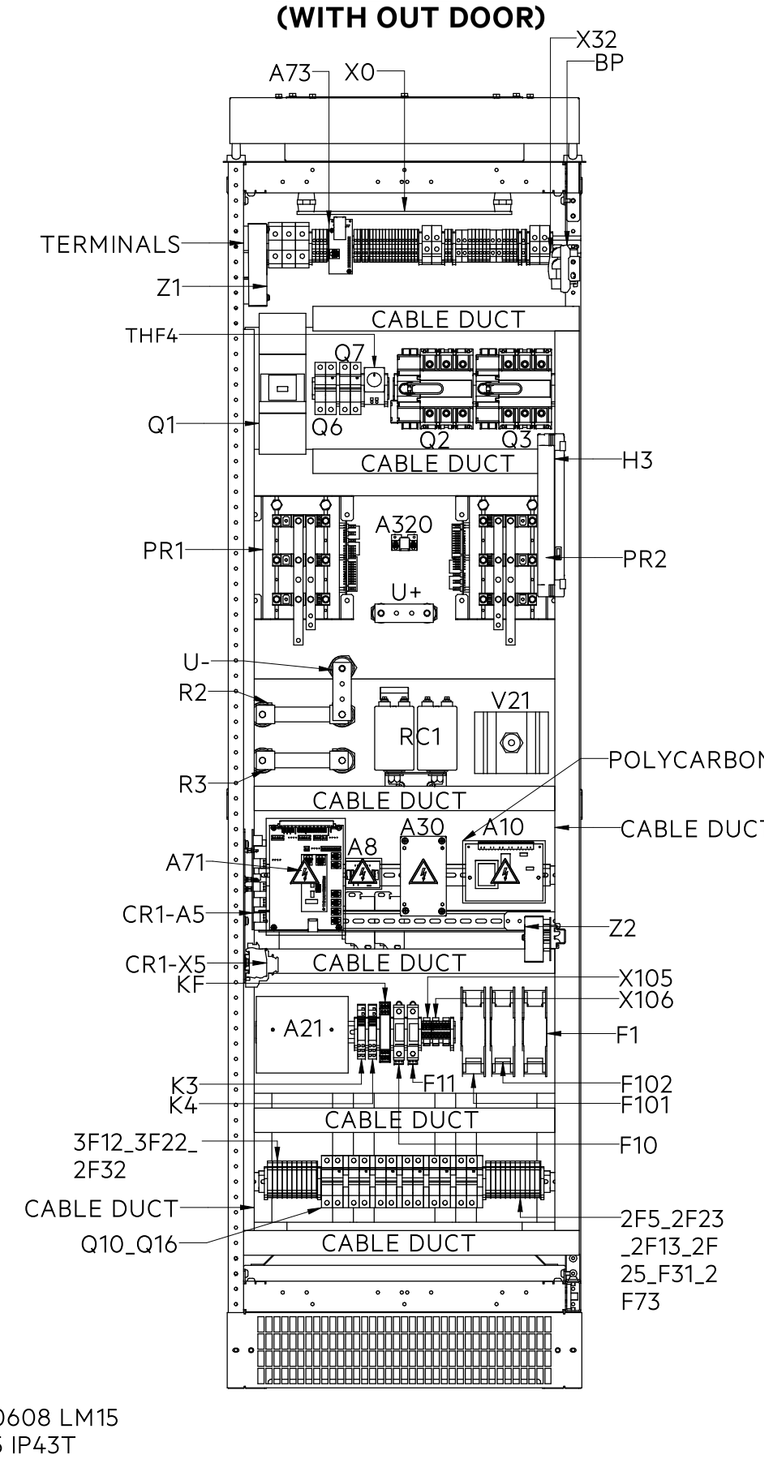
				Date	21/03/2024	3W POWER S.P.A.		Electrical characteristic	= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS		+ 10 / 49
01		22/07/2024	eva.beitia	Checked	JOP			System	& EDA Sheet 1
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheets 1

Los productos fabricados en este documento cumplen de acuerdo con la directiva RoHS 2002/95 / EC - Products manufactured according to this document must be compliant with RoHS 2002/95/EC

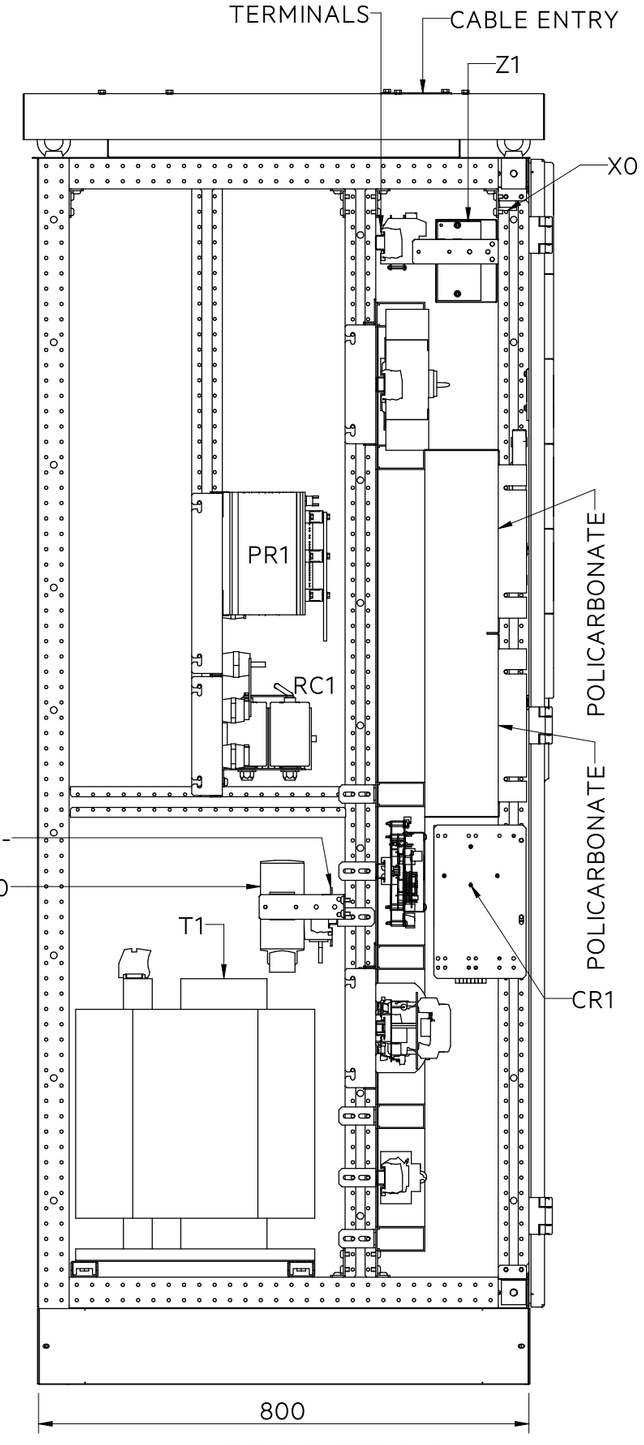
FRONT VIEW



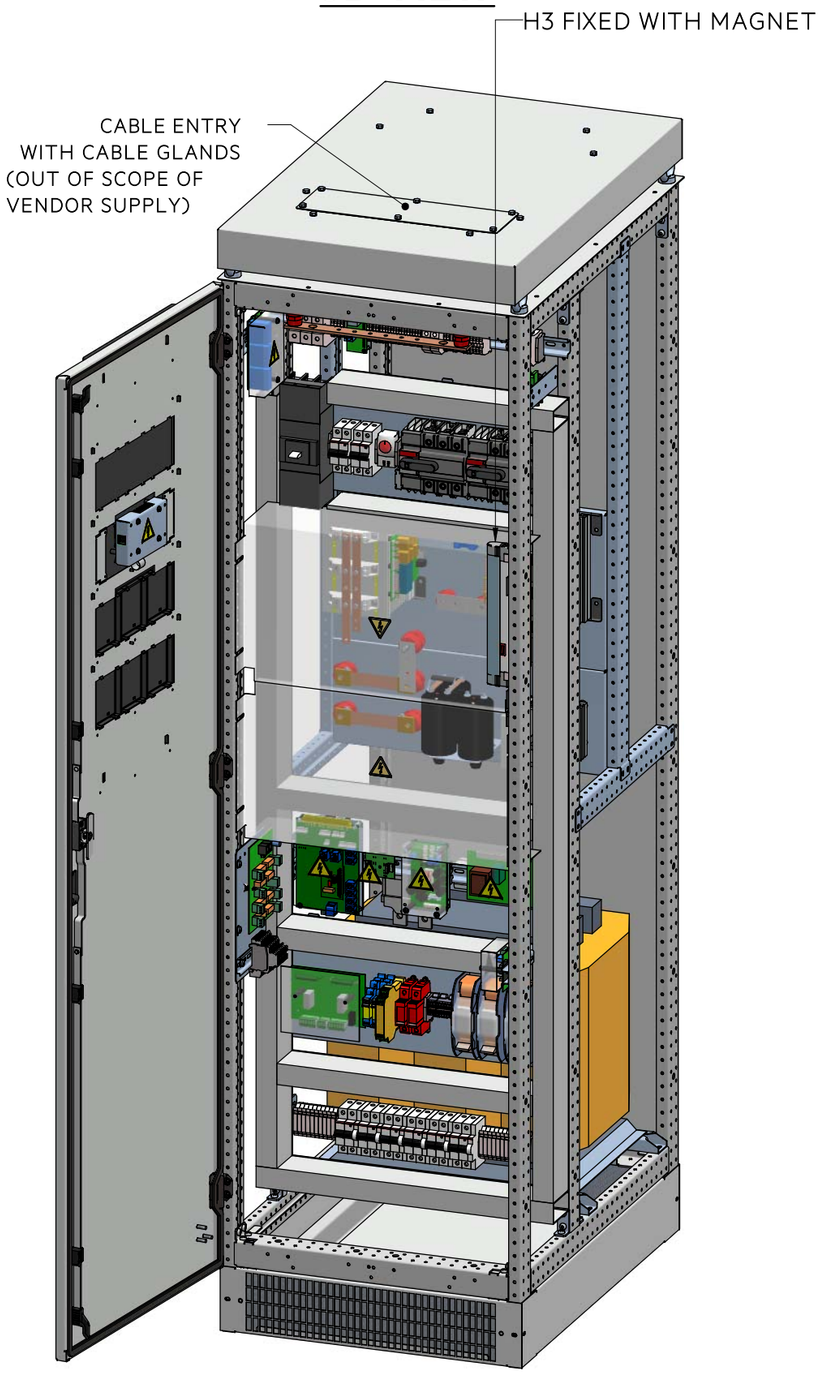
FRONT VIEW
(WITH OUT DOOR)



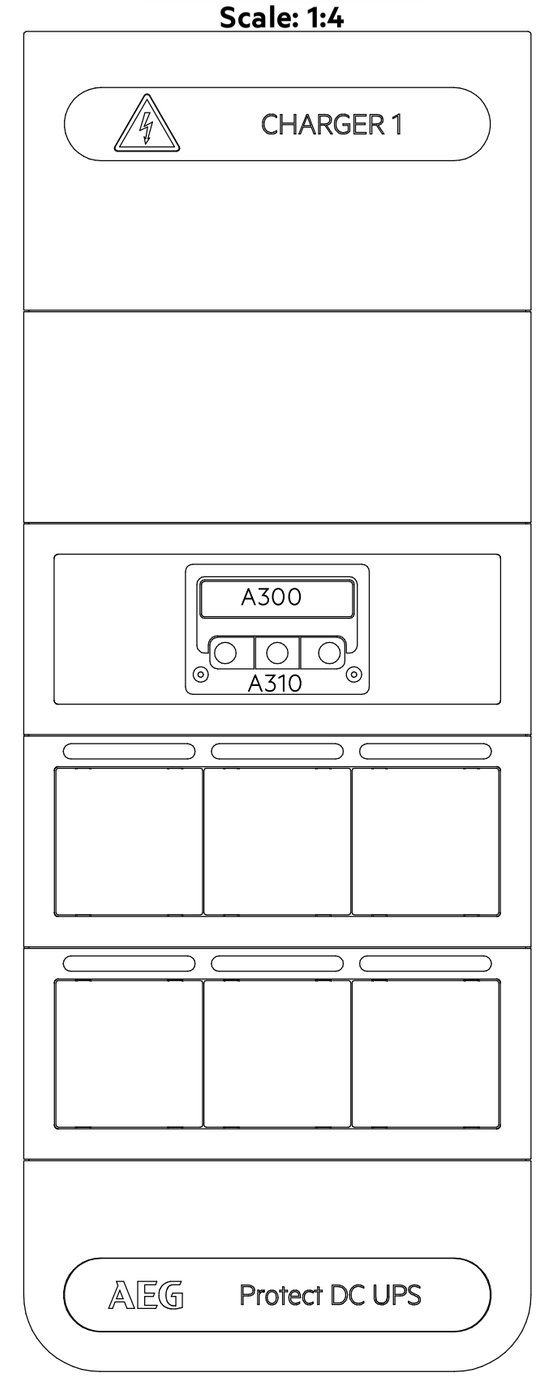
SIDE VIEW



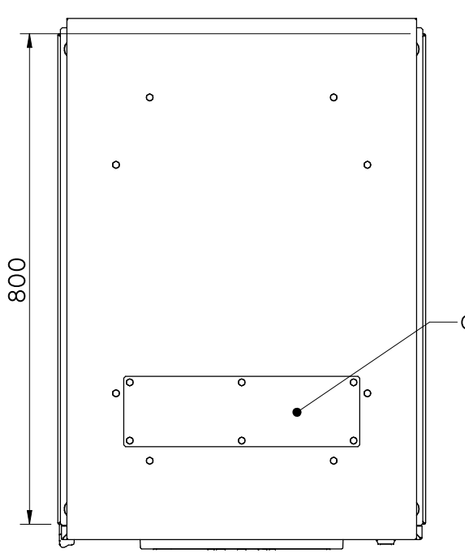
3D VIEW



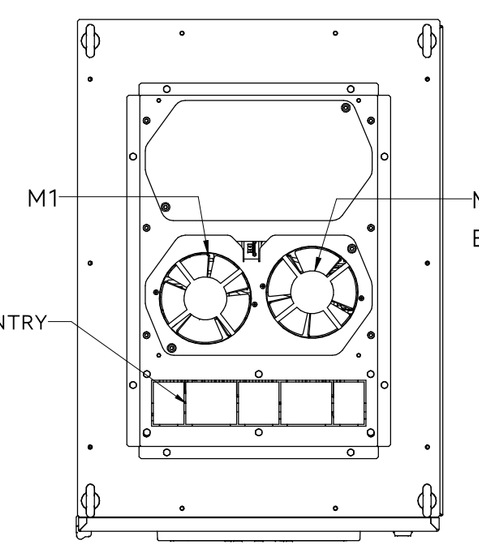
DOOR DETAIL
Scale: 1:4



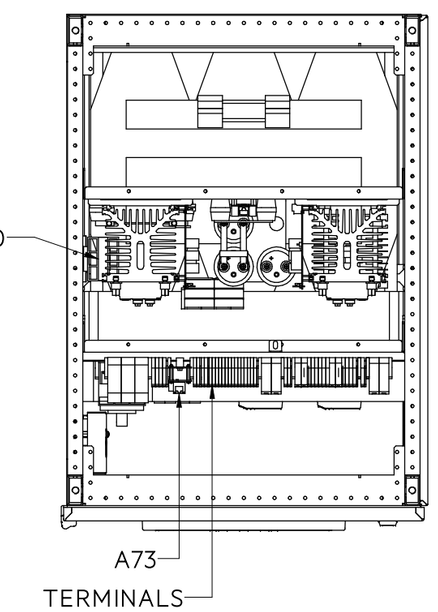
TOP VIEW



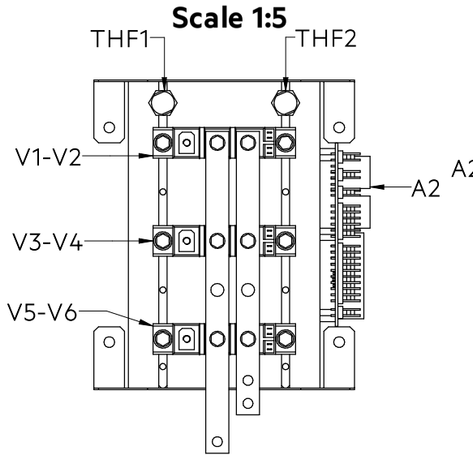
TOP VIEW
(FANS DETAIL)



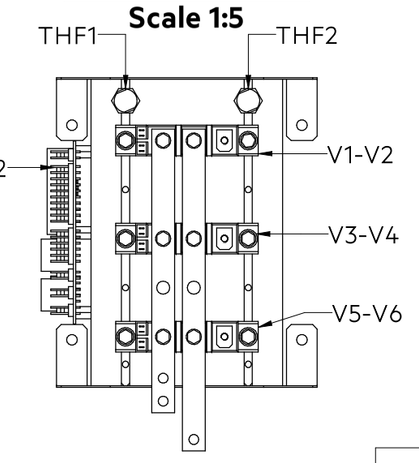
TOP VIEW
(WITHOUT ROOF)



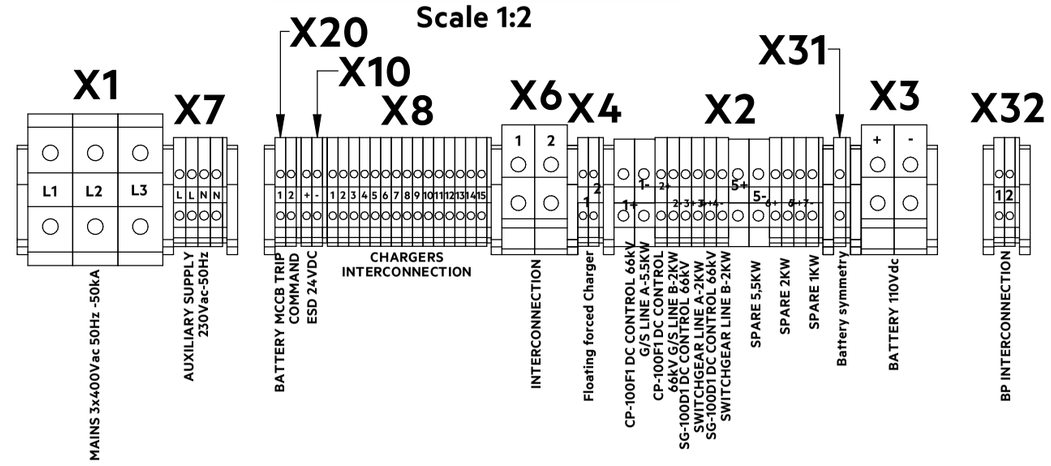
PR1 DETAIL
Scale 1:5



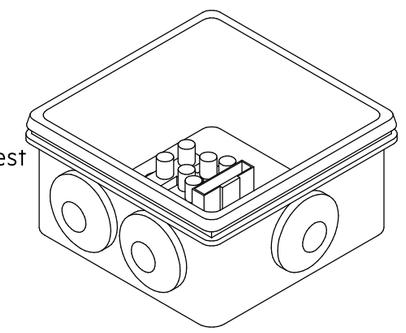
PR2 DETAIL
Scale 1:5



TERMINALS DETAIL
Scale 1:2



F100 DETAIL



Place the box the closest possible to the battery

Escala / *Scale:* 1:10					
Tol. Gen. / *Gen. Tol.:* ISO 2768-mK					
Dibujado / *Drawn* 22/05/2024 Por / *By* EAA	Rev *Issue*	Fecha *Date*	Dib. *Drawn*	Revisado *Checked*	Comentarios / *Comments*
Verificado / *Checked* 22/05/2024 Por / *By* EBM					

AEG POWER SOLUTIONS
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WEB: WWW.AEGPS.ES

SAP Document: **ES521464A1_MEC**

SAP Code: **ES521464A1**

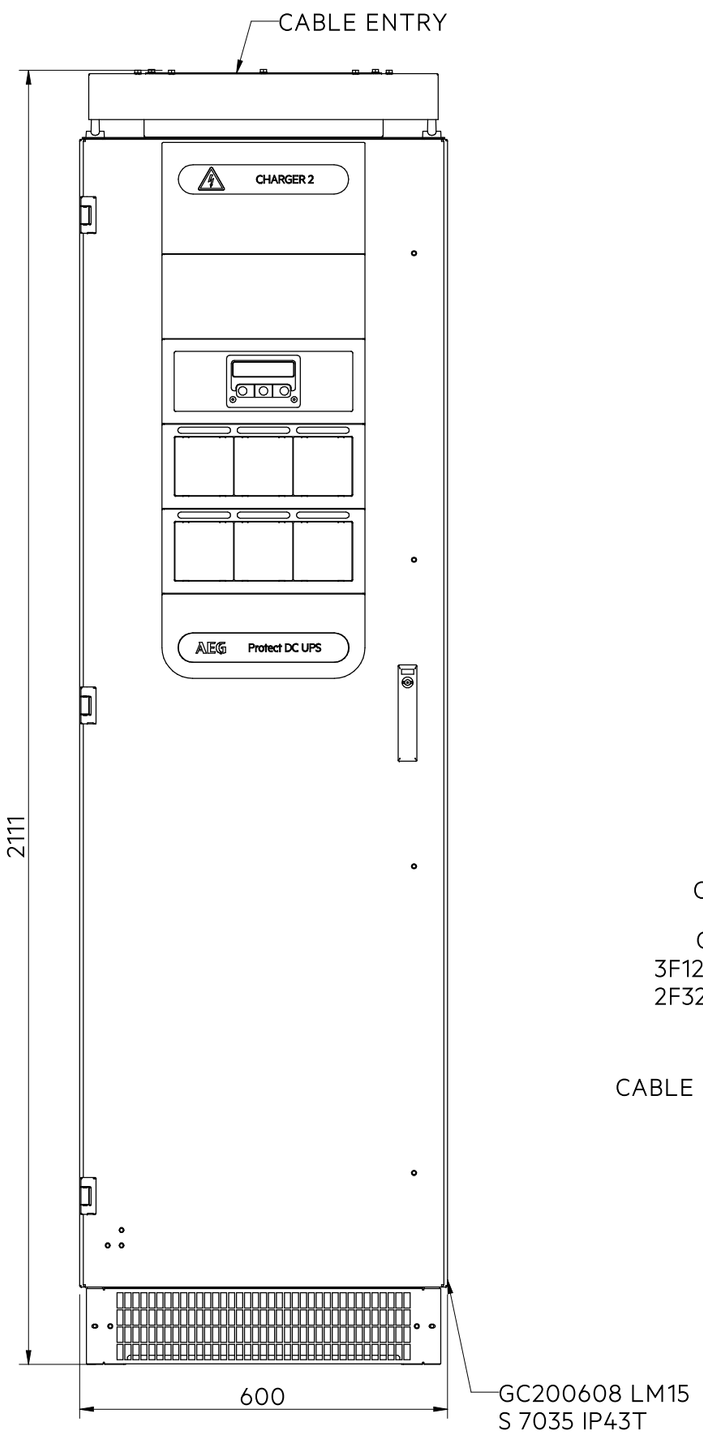
Denominación / *Description:*
DC UPS UP-200F1 CHARGER-A
1724000372-EL-DA-00003

Formato/ *Format:* **A2** | Rev/ *Issue* **00**

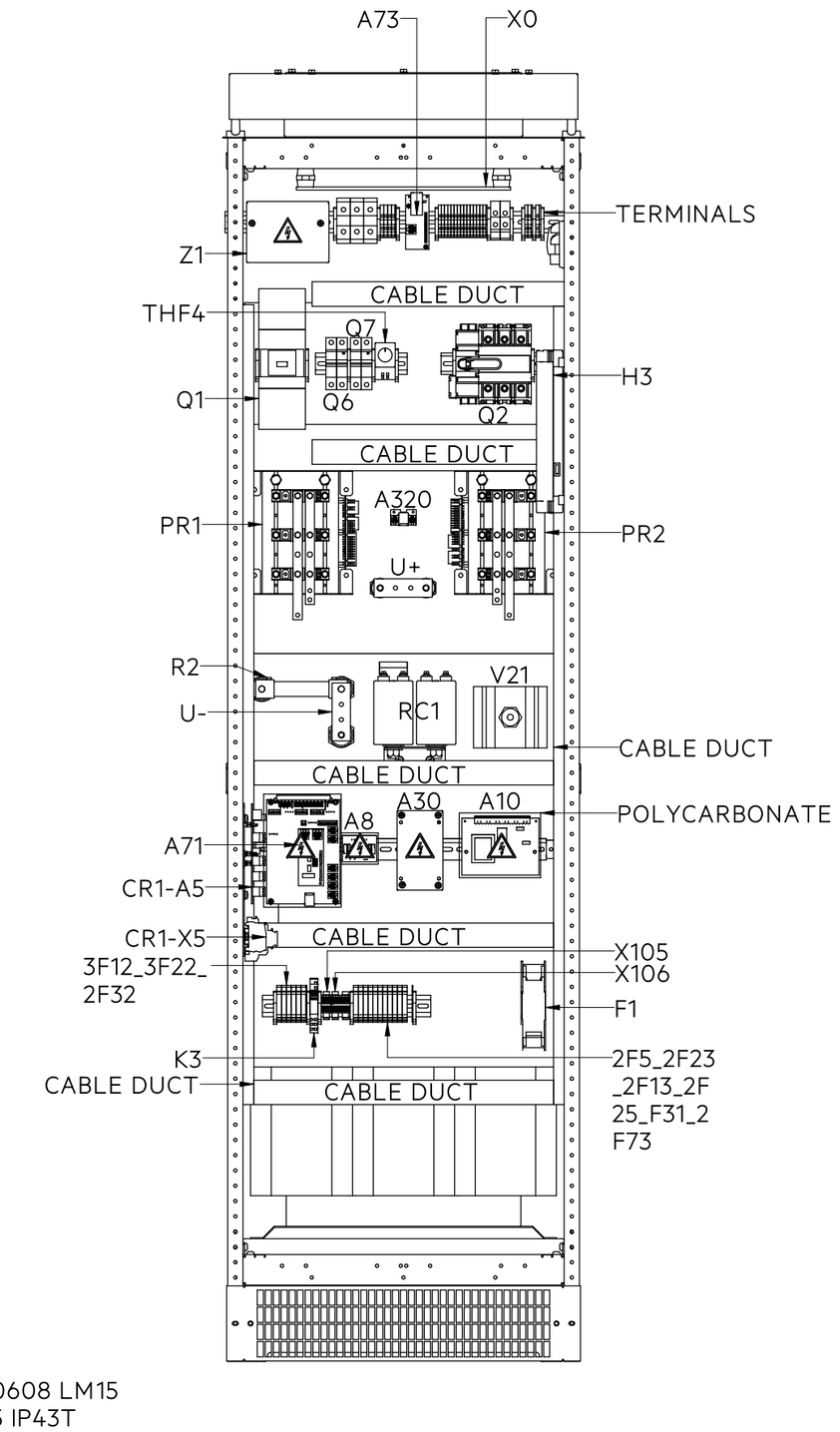
Hoja / *Sheet:* 1/4

Los productos fabricados en este documento cumplen de acuerdo con la directiva RoHS 2002/95 / EC - Products manufactured according to this document must be compliant with RoHS 2002/95/EC

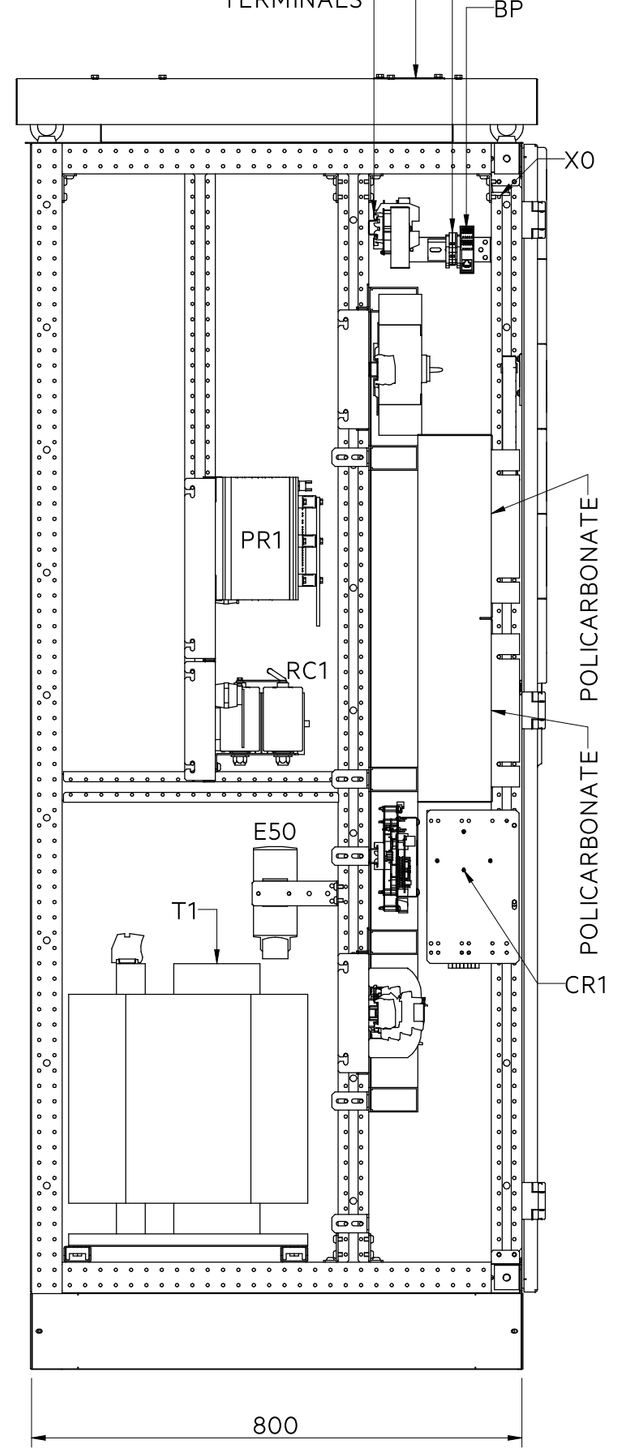
FRONT VIEW



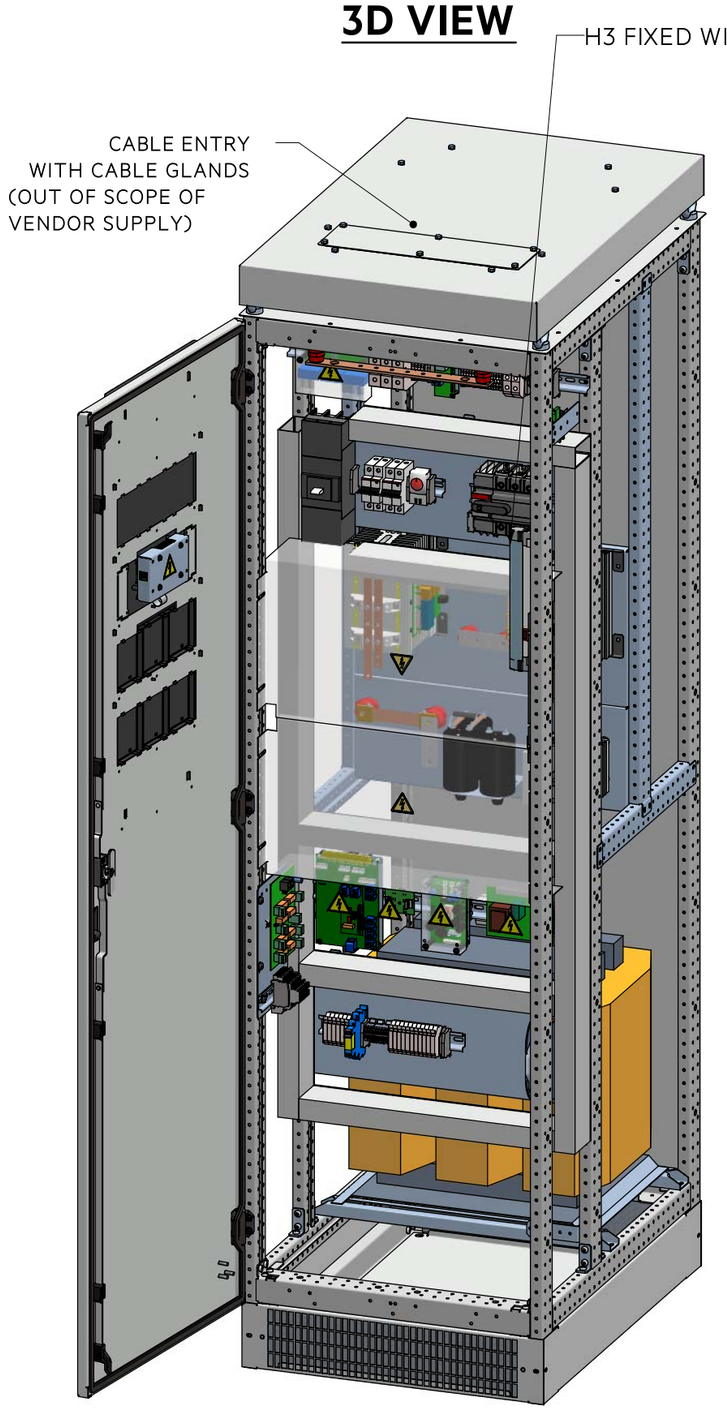
FRONT VIEW
(WITH OUT DOOR)



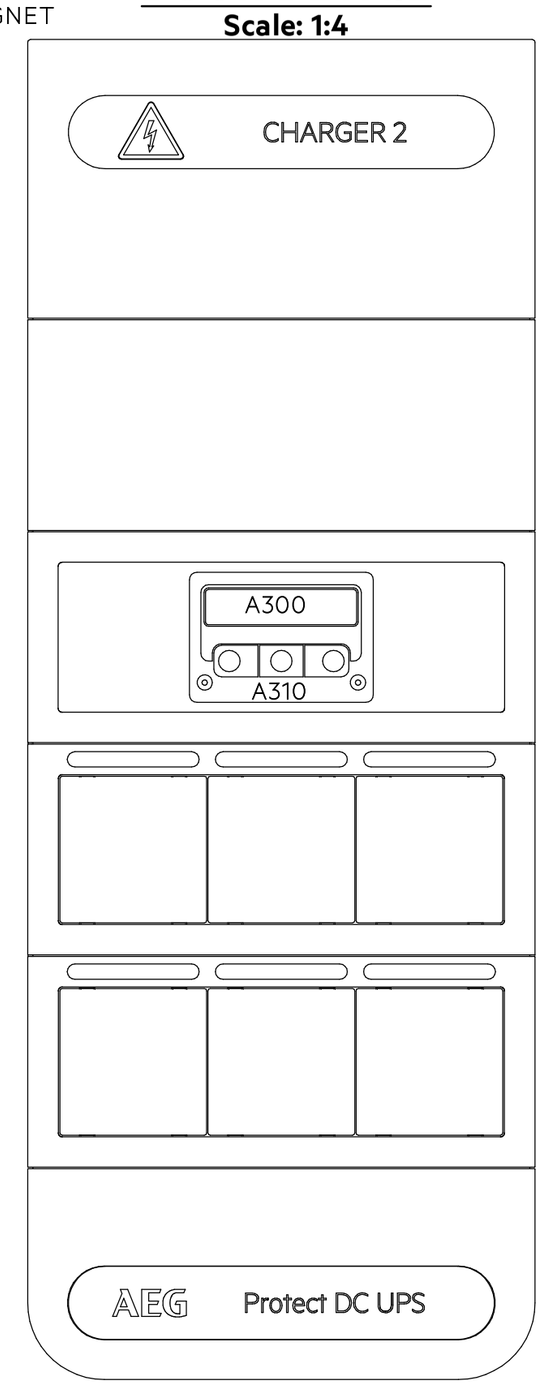
SIDE VIEW



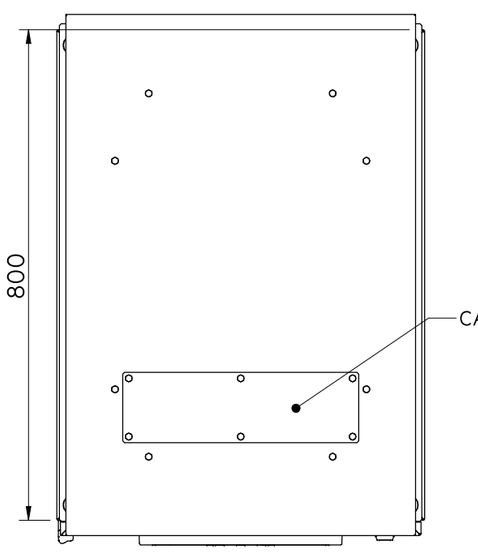
3D VIEW



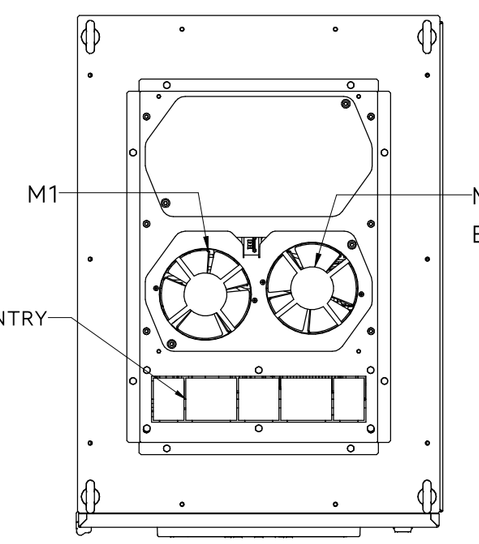
DOOR DETAIL
Scale: 1:4



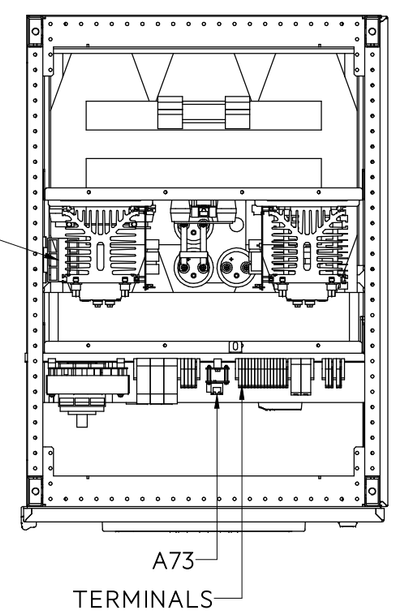
TOP VIEW



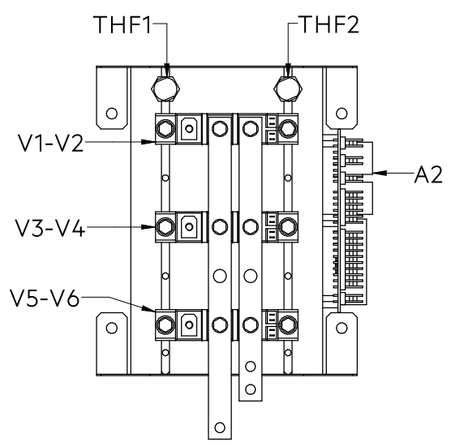
TOP VIEW
(FANS DETAIL)



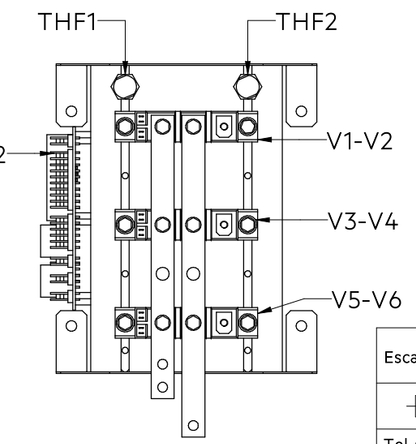
TOP VIEW
(WITHOUT ROOF)



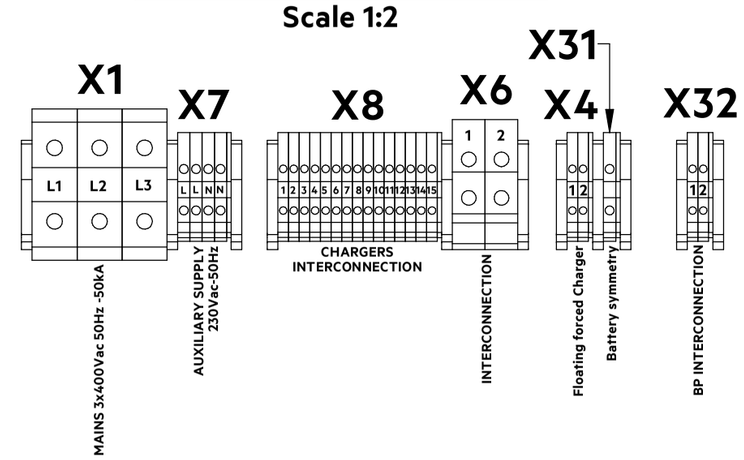
PR1 DETAIL
Scale 1:5



PR2 DETAIL
Scale 1:5



TERMINALS DETAIL
Scale 1:2



Escala / *Scale:* 1:10					
Tol. Gen. / *Gen. Tol.:* **ISO 2768-mK**					
Dibujado / *Drawn* 27/05/2024 Por / *By* EAA	Rev *Issue*	Fecha *Date*	Dib. *Drawn*	Revisado *Checked*	Comentarios / *Comments*
Verificado / *Checked* 27/05/2024 Por / *By* EBM					

AEG POWER SOLUTIONS
C/ ALBERT EINSTEIN, 31
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01510 - VITORIA (ALAVA)
TELF: +34 945 21 41 10 / FAX: +34 945 21 41 11
WEB: WWW.AEGPS.ES

SAP Document: **ES521464A2_MEC**
SAP Code: **ES521464A2**

Denominación / *Description:*
DC UPS UP-200F1 CHARGER-B
1724000372-EL-DA-00003

Formato/ *Format:* **A2** | Rev/ *Issue* **00**
Hoja / *Sheet:* 1/4

AEGPS_DOC_REV01
CAE EPLAN Electric P8
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ES521464

Interconnections list

Source	Number From Cable					Target	Provided
	Wire Number Location	Cross-section	Cable type		Length		
+REC1-F100 (+REC1&EFS/9.6) Source terminal	F100⇔BAT:MP					(+REC1&EFS/9.8) +REC1-BAT:MP Target terminal	NO
+REC1-X6:2 (+REC1&EFS/5.5) Source terminal CORD END TERMINAL 50mm²	X6:2⇔X6:2	PH4 35 mm²	HV HFFR	BLACK	5	(+REC2&EFS/5.6) +REC2-X6:2 Target terminal CORD END TERMINAL 50mm²	YES
+REC1-X6:1 (+REC1&EFS/5.5) Source terminal CORD END TERMINAL 35mm²	X6:1⇔X6:1	PH4 35 mm²	HV HFFR	BLACK	5	(+REC2&EFS/5.6) +REC2-X6:1 Target terminal CORD END TERMINAL 35mm²	YES
+REC1-X7:L (+REC1&EFS/13.2) Source terminal CORD END TERMINAL 2,5mm²	X7:L⇔X7:L	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/10.2) +REC2-X7:L Target terminal CORD END TERMINAL 2,5mm²	YES
+REC1-X7:N (+REC1&EFS/13.2) Source terminal CORD END TERMINAL 2,5mm²	X7:N⇔X7:N	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/10.2) +REC2-X7:N Target terminal CORD END TERMINAL 2,5mm²	YES
+REC1-X8:7 (+REC1&EFS/6.2) Source terminal CORD END TERMINAL 2,5mm²	X8:7⇔X8:7	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.7) +REC2-X8:7 Target terminal CORD END TERMINAL 2,5mm²	YES
+REC1-X8:6 (+REC1&EFS/6.2) Source terminal CORD END TERMINAL 2,5mm²	X8:6⇔X8:6	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.7) +REC2-X8:6 Target terminal CORD END TERMINAL 2,5mm²	YES
+REC1-X8:5 (+REC1&EFS/6.2) Source terminal CORD END TERMINAL 2,5mm²	X8:5⇔X8:5	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.7) +REC2-X8:5 Target terminal CORD END TERMINAL 2,5mm²	YES
+REC1-X8:14 (+REC1&EFS/6.4) Source terminal CORD END TERMINAL 2,5mm²	X8:14⇔X8:14	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.7) +REC2-X8:14 Target terminal CORD END TERMINAL 2,5mm²	YES
+REC1-X8:15 (+REC1&EFS/6.4) Source terminal CORD END TERMINAL 2,5mm²	X8:15⇔X8:15	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.7) +REC2-X8:15 Target terminal CORD END TERMINAL 2,5mm²	YES
+REC1-X8:10 (+REC1&EFS/8.5) Source terminal CORD END TERMINAL 2,5mm²	X8:10⇔X8:10	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.7) +REC2-X8:10 Target terminal CORD END TERMINAL 2,5mm²	YES
+REC1-X8:11 (+REC1&EFS/8.5) Source terminal CORD END TERMINAL 2,5mm²	X8:11⇔X8:11	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.7) +REC2-X8:11 Target terminal CORD END TERMINAL 2,5mm²	YES
+REC1-X8:9 (+REC1&EFS/9.2) Source terminal CORD END TERMINAL 2,5mm²	X8:9⇔X8:9	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.3) +REC2-X8:9 Target terminal CORD END TERMINAL 2,5mm²	YES
+REC1-X8:8 (+REC1&EFS/9.2) Source terminal CORD END TERMINAL 2,5mm²	X8:8⇔X8:8	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.4) +REC2-X8:8 Target terminal CORD END TERMINAL 2,5mm²	YES
+REC1-X8:13 (+REC1&EFS/9.5) Source terminal CORD END TERMINAL 2,5mm²	X8:13⇔X8:13	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/6.5) +REC2-X8:13 Target terminal CORD END TERMINAL 2,5mm²	YES

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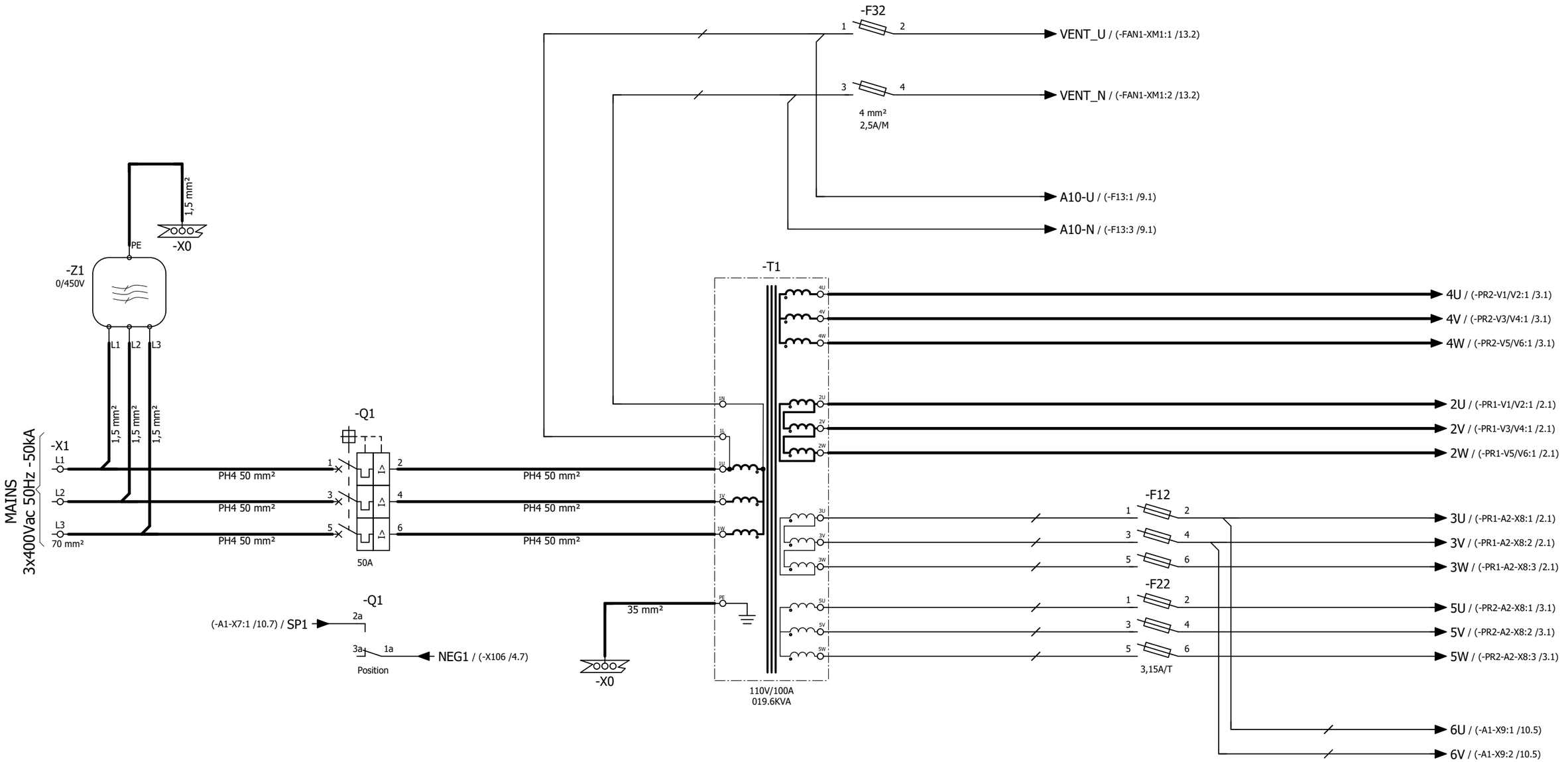
Interconnections list

Source	Number From Cable: Wire Number Location	Cross-section	Cable type		Length	Target	Provided
+REC1-X8:12 (+REC1&EFS/9.5) Source terminal: CORD END TERMINAL 2,5mm²	X8:12⇔X8:12	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/6.5) +REC2-X8:12 Target terminal: CORD END TERMINAL 2,5mm²	YES
+REC1-X8:4 (+REC1&EFS/10.7) Source terminal: CORD END TERMINAL 2,5mm²	X8:4⇔X8:1	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.7) +REC2-X8:1 Target terminal: CORD END TERMINAL 2,5mm²	YES
+REC1-X8:3 (+REC1&EFS/10.7) Source terminal: CORD END TERMINAL 2,5mm²	X8:3⇔X8:2	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.7) +REC2-X8:2 Target terminal: CORD END TERMINAL 2,5mm²	YES
+REC1-X8:2 (+REC1&EFS/10.7) Source terminal: CORD END TERMINAL 2,5mm²	X8:2⇔X8:3	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.7) +REC2-X8:3 Target terminal: CORD END TERMINAL 2,5mm²	YES
+REC1-X8:1 (+REC1&EFS/10.7) Source terminal: CORD END TERMINAL 2,5mm²	X8:1⇔X8:4	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/7.7) +REC2-X8:4 Target terminal: CORD END TERMINAL 2,5mm²	YES
+REC1-X31 (+REC1&EFS/9.6) Source terminal:	X31⇔F100					(+REC1&EFS/9.6) +REC1-F100 Target terminal:	NO
+REC1-X31 (+REC1&EFS/9.6) Source terminal: CORD END TERMINAL 2,5mm²	X31⇔X31	2,5 mm²	H07Z1-K	BLACK	5	(+REC2&EFS/6.6) +REC2-X31 Target terminal: CORD END TERMINAL 2,5mm²	YES
+REC1-X32:2 (+REC1&EFS/10.8) Source terminal:	X32:2⇔X30:2					(+REC1&EFS/9.6) +BP-X30:2 Target terminal:	NO
+REC1-X32:1 (+REC1&EFS/10.8) Source terminal:	X32:1⇔X30:1					(+REC1&EFS/9.6) +BP-X30:1 Target terminal:	NO
+REC2-X32:2 (+REC2&EFS/7.8) Source terminal:	X32:2⇔X30:4					(+REC1&EFS/9.6) +BP-X30:4 Target terminal:	NO
+REC2-X32:1 (+REC2&EFS/7.8) Source terminal:	X32:1⇔X30:3					(+REC1&EFS/9.6) +BP-X30:3 Target terminal:	NO

ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Interconnections		= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Interconnections		+ INT 13 / 49
01		22/07/2024	eva.beitia	Checked	JOP			System		& EMA1
Stat	Alteration	Date	Name	Standard					ES521464 en	A3 Sheet 2
										Sheets

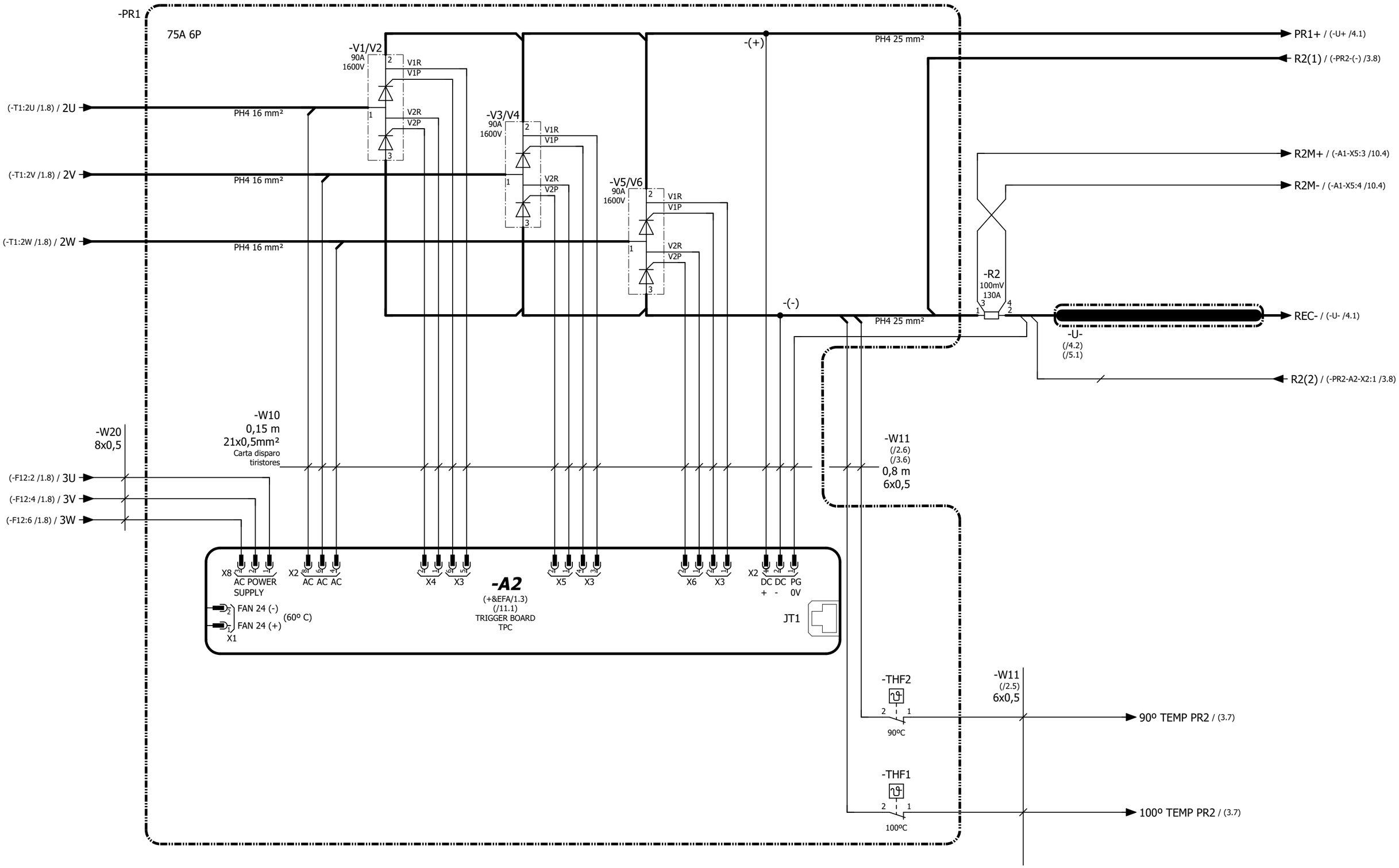
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ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Main supply		= System	
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Rectifier 1		+ REC1	14 / 49
				Checked	JOP			System		& EFS	Sheet 1
Stat	Alteration	Date	Name	Standard					ES521464 en	A3	Sheets 13

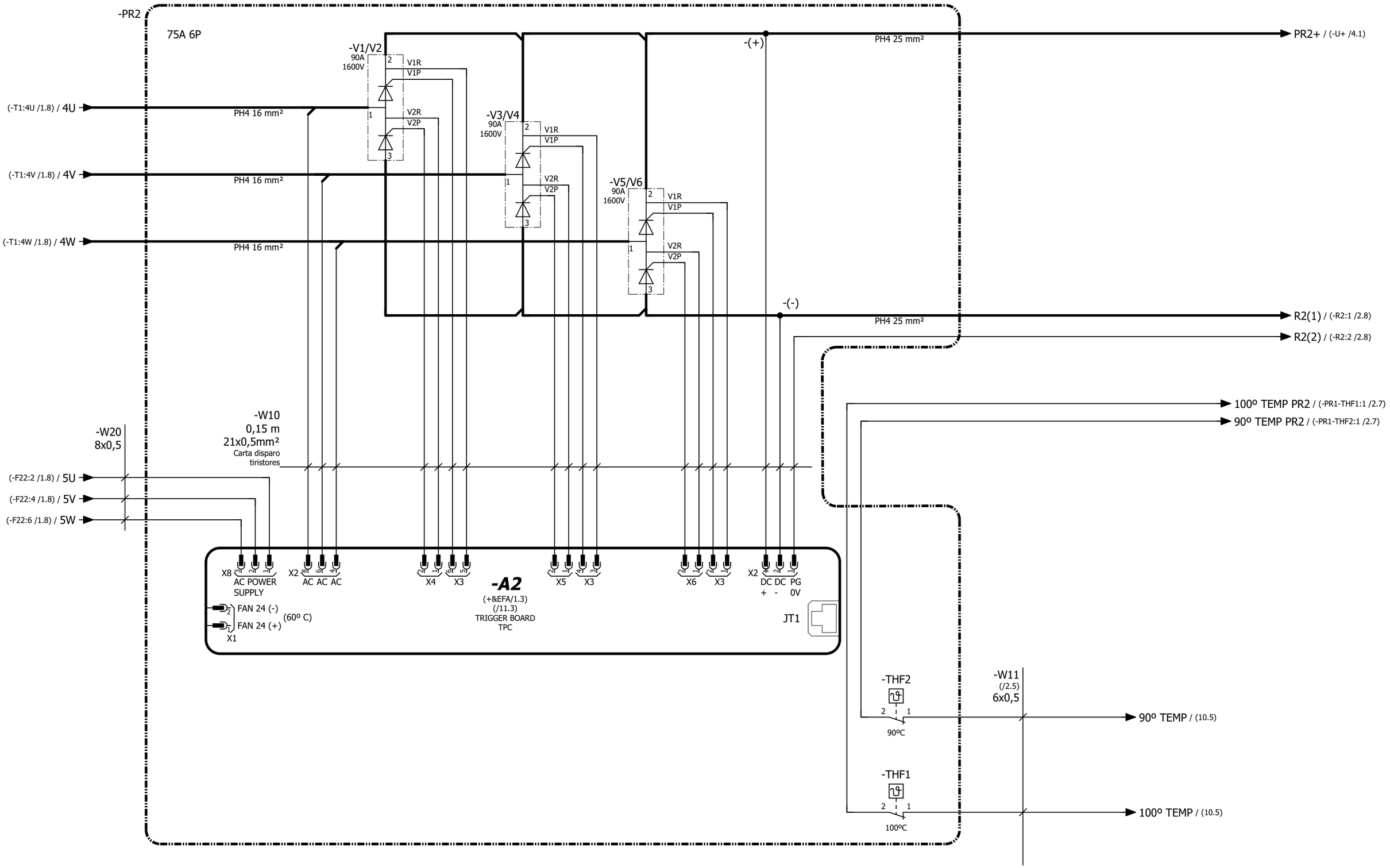
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ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Rectifier	= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Rectifier 1	+ REC1 — 15 / 49
				Checked	JOP			System	& EFS — A3 — Sheet 2
Stat	Alteration	Date	Name	Standard				ES521464 en	Sheets 13

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				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Rectifier	= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Rectifier 1	+ REC1 16 / 49
				Checked	JOP			System	& EFS
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheet 3
									Sheets 15

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(-PR1-(+) /2.8) / PR1+

(-PR2-(+) /3.8) / PR2+

-U+

PH4 35 mm²

PH4 10 mm²

-RC1
6800µF
160V

-C1
6800µF
160V

-R1
15K
±5%

CAUTION!!!!
CHARGED CAPACITORS INSIDE.
TERMINALS AND COMPONENTS COULD BE
LIVE EVEN WHEN THE EQUIPMENT IS
SWITCHED OFF. INSURE NO VOLTAGE IS PRESSENT
PRIOR TO ANY WORK INSIDE

-F1
1
2
125A/gL
NH00

PH4 35 mm²

REC+ / (-V21:A /5.1)

VBAT+ / (-A1-X2:1 /10.2)

GRD_FAULT / (-A1-X2:3 /10.2)

VPROT / (-A1-X2:4 /10.2)

(0V)_VPS0 / (-A1-X3:4 /10.3)

(-X32:2 /10.8) / NEG8

NEG7 / (-A10-X1:7 /9.3)
NEG6 / (-K4:11 /8.5)
NEG5 / (-X4:2 /10.8)
NEG4 / (-A21-JR1:2 /6.1)
NEG2 / (-KF:23 /6.4)
NEG1 / (-Q1:1a /1.3)

-X106
2.5 mm²
(-)

PH4 10 mm²

(-U- /2.8) / REC-

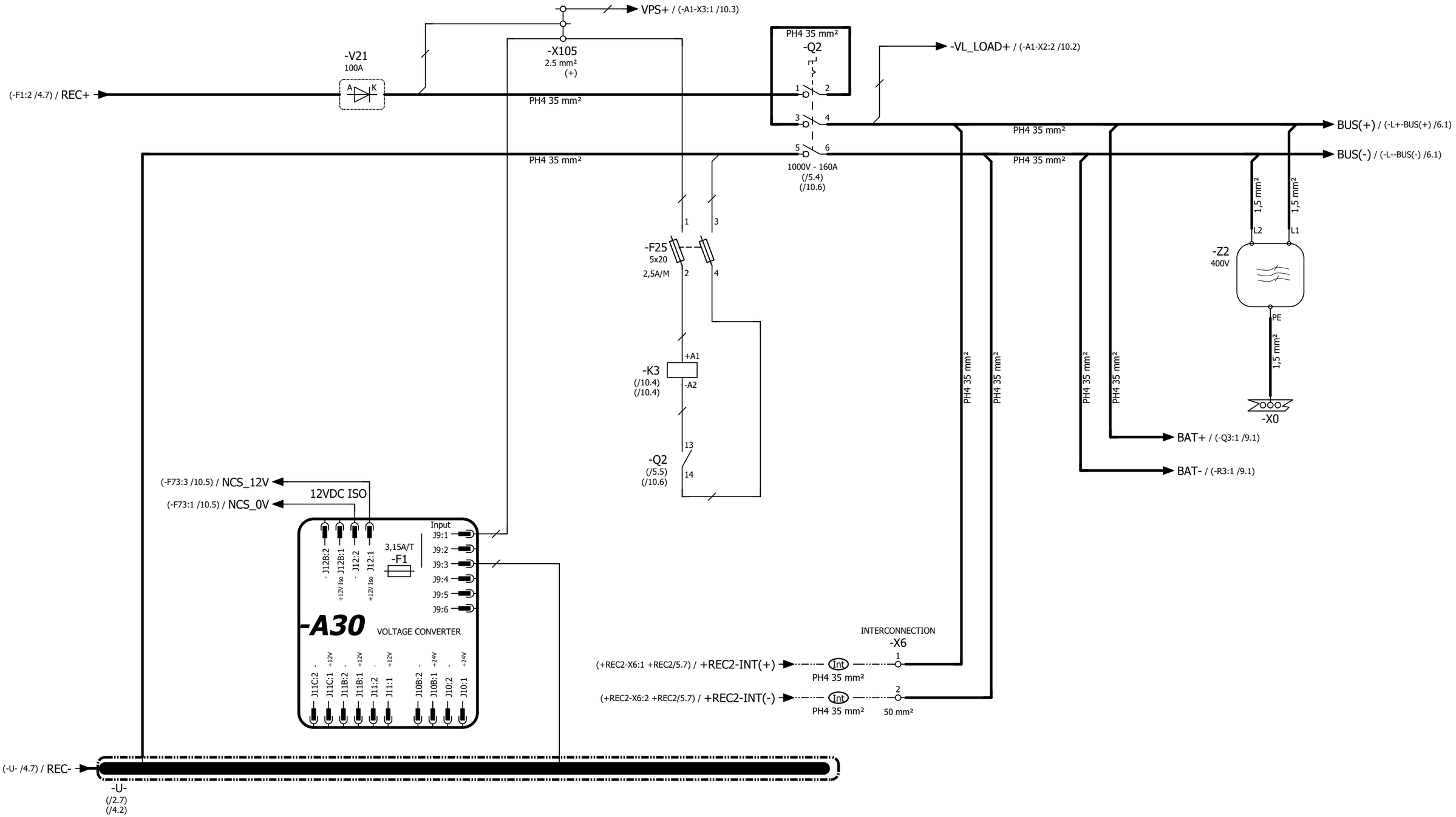
REC- / (-U- /5.1)

-U-
(/2.7)
(/5.1)

ES521464

				Date	21/03/2024	3W POWER S.P.A.			= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Filtering Rectifier 1 System	+ REC1 17 / 49
01		22/07/2024	eva.beitia	Checked	JOP				& EFS Sheet 4
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheets 13

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ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	DC output Rectifier 1 System		= System	
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm				+ REC1	18 / 49
				Checked	JOP					& EFS	Sheet 5
Stat	Alteration	Date	Name	Standard					ES521464 en	A3	Sheets 13

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-L+ 1P 250A. BUS BAR
(5.8) BUS(+)
-BUS(+)
(5.8) BUS(-)
-BUS(-)
-L- 1P 250A. BUS BAR
(7.1) (+)
(7.1) (-)

(-X106 /4.7) / NEG2

CHARGERS INTERCONNECTION -X8
(+REC2-X8:15 +REC2/7.7) / +REC2-NG2 — Int — 15

BATTERY MCCB TRIP COMMAND
-X20
1
2
4 mm²

-KF
PHOENIX CONTACT
2986960
PSR-SCP- 24DC / SIL3
A1 A2
13 14 23 24 31 32

-X10
ESD 24VDC
+ 1
- 2
4 mm²

Remote off from ESD. 24VDC Always energized.

CHARGERS INTERCONNECTION -X8
(+REC2-X8:14 +REC2/7.7) / +REC2-SP2 — Int — 14

(-A1-X7:2 /10.7) / SP2

-F101 NH 00 80A/gG
-F102 NH 00 80A/gG
PH4 16 mm²
-F10
-F11
DG S 150 FM DEHNguard
PH4 16 mm² -X0

-X0
-A21
EARTH + - BOARD
+ - PE
T+ T- T+ T-
JR1 JR2 JR1 JR2
1 2 3 1 2 3 4 5 6 4 5 6

(-X106 /4.7) / -NEG4

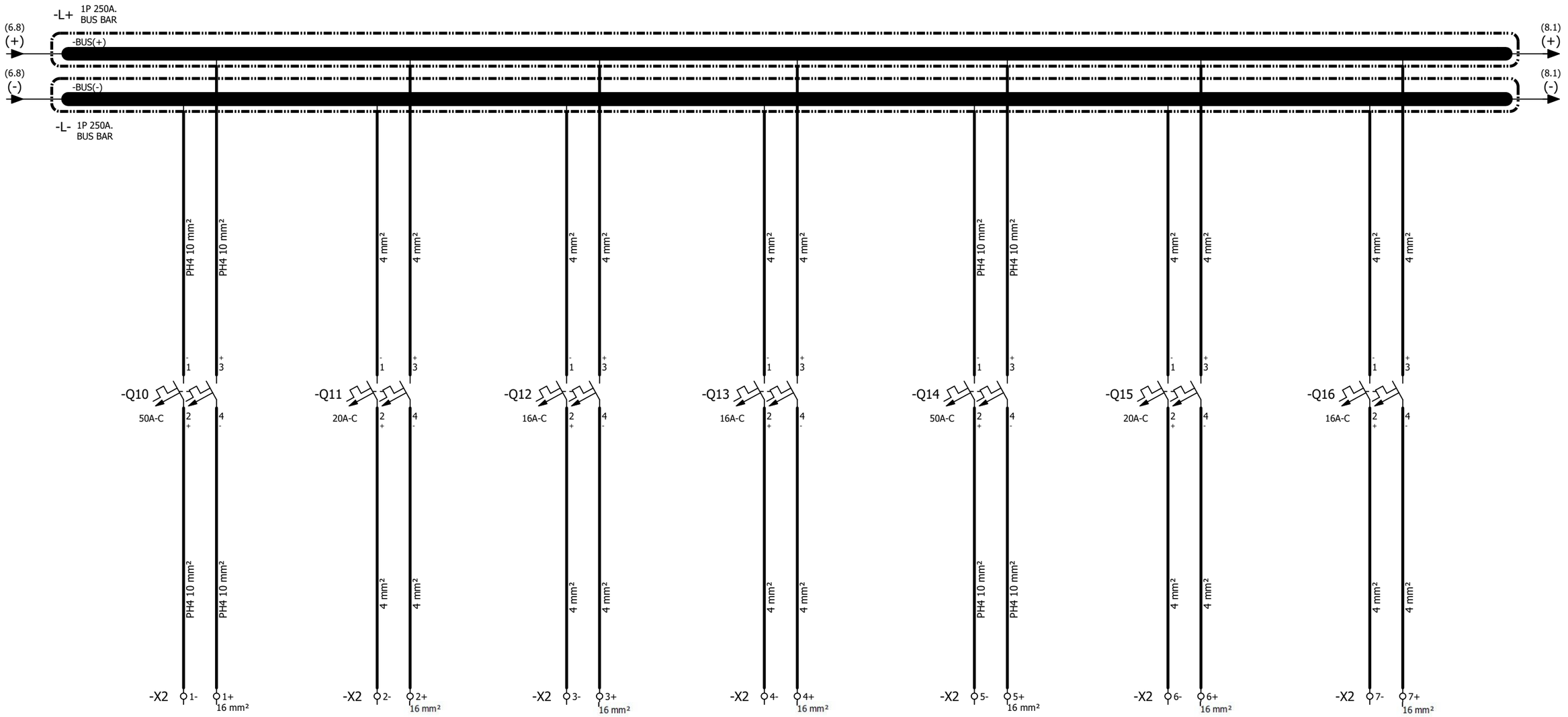
CHARGERS INTERCONNECTION -X8
5 — Int — +REC2-SP4 / (+REC2-X8:5 +REC2/7.7)
6 — Int — +REC2-SP5 / (+REC2-X8:6 +REC2/7.7)
7 — Int — +REC2-NG4 / (+REC2-X8:7 +REC2/7.7)
4 mm²

(-A1-X7:5 /10.7) / SP5
(-A1-X7:4 /10.7) / SP4

ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Distribution		= System	
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Rectifier 1		+ REC1	19 / 49
01		22/07/2024	eva.beitia	Checked	JOP			System		& EFS	Sheet 6
Stat	Alteration	Date	Name	Standard					ES521464 en	A3	Sheets 13

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	-Q10	-Q11	-Q12	-Q13	-Q14	-Q15	-Q16
SUPPLIED FROM	50A-C	20A-C	16A-C	16A-C	50A-C	20A-C	16A-C
RATING	16 mm²	16 mm²	16 mm²	16 mm²	16 mm²	16 mm²	16 mm²
MAXIMUM CROSS-SECTION	98 96 95 (/8.5)	98 96 95 (/8.4)	98 96 95 (/8.4)	98 96 95 (/8.4)	98 96 95 (/8.4)	98 96 95 (/8.4)	98 96 95 (/8.4)
AUXILIARY CONTACT	CP-100F1 DC CONTROL 66kV G/S LINE A-5.2KW	CP-100F1 DC CONTROL 66kV G/S LINE B-2KW	SG-100D1 DC CONTROL 6,6kV SWITCHGEAR LINE A-1KW	SG-100D1 DC CONTROL 6,6kV SWITCHGEAR LINE B-1KW	SPARE 5,5KW	SPARE 2KW	SPARE 1KW
FUNCTION							

ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Distribution Rectifier 1 System	= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm			+ REC1 20 / 49
				Checked	JOP				& EFS Sheet 7
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheets 13

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-L+ 1P 250A. BUS BAR
(7.8) (+) -BUS(+)
(7.8) (-) -BUS(-)
-L- 1P 250A. BUS BAR

1
-F31 3,15A/T
2
95
-Q10 (/7.2) 98 96 Tripped
98
96
-Q11 (/7.3) Tripped
95
95
-Q12 (/7.3) 98 96 Tripped
98
96
-Q13 (/7.4) Tripped
95
95
-Q14 (/7.5) 98 96 Tripped
98
96
-Q15 (/7.6) Tripped
95
95
-Q16 (/7.7) 98 96 Tripped
+A1
-K4 (/8.4) (/8.5)
-A2

-K4 11 12 14
(-A1-X7:6 /10.7) / SP6
(-X106 /4.7) / NEG6

K4 21 22 24
-X8 4 mm² CHARGERS INTERCONNECTION 10 11
Int Int
+REC2-NG6 / (+REC2-X8:11 +REC2/7.7)
+REC2-SP6 / (+REC2-X8:10 +REC2/7.7)

ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Distribution Rectifier 1 System	= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm			+ REC1 21 / 49
				Checked	JOP				& EFS
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheet 8 Sheets 13

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(-L+-BUS(+) /5.7) / BAT+

(-L--BUS(-) /5.7) / BAT-

-R3
100mV
130A
1 2 3 4

PH4 35 mm²

(-K3:24 /10.4) / R3M+

(-K3:14 /10.4) / R3M-

CHARGERS INTERCONNECTION
-X8

(+REC2-X8:8 +REC2/7.4) / +REC2-R3M+ — Int — 8

(+REC2-X8:9 +REC2/7.3) / +REC2-R3M- — Int — 9

4 mm²

PH4 35 mm²
-Q3
1 2 3 4 5 6
1000V - 160A

PH4 35 mm²

PH4 35 mm²

50 mm²

BATTERY 110Vdc
-X3

+BP
(+&EFA/1.7)
BATTERY PROTECTION

BATTERY 110Vdc
BATTERY PROTECTION
NON SUPPLIED BY AEG PS
BATTERY 110Vdc

-BAT
10x FLG12-150 (60 Cells)
(+)
MP
(-)

(-X32:1 /10.8) / SP8 — Int — 1

(-X32:2 /10.8) / NG8 — Int — 2

(+REC2-X32:1 +REC2/7.8) / +REC2-SP8 — Int — 3

(+REC2-X32:2 +REC2/7.8) / +REC2-NG8 — Int — 4

-A10
(+&EFA/1.6)

(-F32:1 /1.6) / A10-U — F13 1 2 3,15A/T — X1 17

(-F32:3 /1.6) / A10-N — F13 3 4 3,15A/T 5x20 — X1 15

BATTERY SYMMETRY FAILURE

X1 3 1 5 + -

X1 7 8 9 13 12 11

F23
1 2 3,15A/T
3 4 3,15A/T 5x20

SP7 / (-A1-X7:7 /10.7)

NEG7 / (-X106 /4.7)

Battery symmetry
-X31

6 mm²

Int — max 10 mts — Plastic box 80*80 -F100 3.15A — max 10 mts — Int

Int — +REC2-BATT_SYMM / (+REC2-X31 +REC2/6.7)

CHARGERS INTERCONNECTION
-X8

12 — Int — +REC2-BATT_+ / (+REC2-X8:12 +REC2/6.6)

13 — Int — +REC2-BATT_- / (+REC2-X8:13 +REC2/6.6)

4 mm²

ES521464

				Date	21/03/2024	3W POWER S.P.A.			= System	
01		22/07/2024	eva.beitia	Editor	EBM	Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Battery Rectifier 1 System	+ REC1	22 / 49
01		22/07/2024	eva.beitia	Checked	JOP				& EFS	Sheet 9
Stat	Alteration	Date	Name	Standard					ES521464 en	A3 Sheets 13

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VBAT+ / (-F1:2 /4.7)
VL_LOAD+ / (-Q2:4 /5.6)
GRD_FAULT / (-F1:2 /4.7)
VPROT / (-F1:1 /4.7)
VPS+ / (-X105 /5.4)
(0V)_VPS0 / (-U- /4.7)
R3M- / (-R3:3 /9.2)
R3M+ / (-R3:4 /9.2)
R2M- / (-R2:3 /2.8)
R2M+ / (-R2:4 /2.8)
100º TEMP / (-PR2-THF1:1 /3.7)
90º TEMP / (-PR2-THF2:1 /3.7)
6U / (-F12:2 /1.8)
6V / (-F12:4 /1.8)

-K3 (12, 14, 11)
-K3 (22, 24, 21)
-W20 8x0,5
-Q2 (/5.5) (/5.4) (23, 24)
-F5 3,15A/T 5x20 (1, 3, 2, 4)

CHARGERS INTERCONNECTION
-X8

-A8
Isolated
REMOTE (cross)
+12V
0V
J1
J2
Int
4 mm² 2,5 mm²

+REC2-A / (+REC2-X8:4 +REC2/7.7)
+REC2-B / (+REC2-X8:3 +REC2/7.7)
+REC2-C / (+REC2-X8:2 +REC2/7.7)
+REC2-D / (+REC2-X8:1 +REC2/7.7)

BP INTERCONNECTION
-X32
SP8 / (+BP-X30:1 /9.6)
NG8 / (+BP-X30:2 /9.6)
NEG8 / (-X106 /4.6)

X1 Thyristor driving gate 1 / Thyristor driving cathode 1 / Thyristor driving gate 2 / Thyristor driving cathode 2
X2 Battery voltage measurement and charger regulation / Load voltage measurement / Ground fault dectection positive connection / Capacitor over voltage protection / Battery symmetry measurement
X3 Positive DC bus power supply / Low Voltage Disconnection contactor output / Negative DC bus power supply
X4 Relay shown in alarm status
X5 Battery shunt positive line / Battery shunt negative line / Charger shunt positive line / Charger shunt negative line
X6 Analog spare input positive line (0-10V) / Analog spare input negative line (0-10V)
X8 Dual Highrate (shared or parallel) / Feedback // high rate / Shutdown for bridge temperature security / Bridge temperature alarm
X9 Alternative power supply (20VAC) / Fan command (+24V)
X10 12V extern power supply + / Gnd & extern power supply -

-A1
(/11.2)
GCAU
CONTROL UNIT

A10

X7
Q1 OPEN — SP1 / (-Q1:2a /1.2)
REMOTE OFF INHIBITION — SP2 / (-KF:24 /6.4)
Digital spare input 3
GROUND FAULT - — SP4 / (-A21-JR2:3 /6.2)
GROUND FAULT + — SP5 / (-A21-JR1:3 /6.2)
DISTRIBUTION FAILURE — SP6 / (-K4:14 /8.4)
BATT.SYMM.FAULT — SP7 / (-A10-X1:8 /9.3)
VENTILATION FAILURE

-X4
Floating forced Charger (1)
Normally closed (2)
(-X106 /4.7) / NEG5
Stop boost charging in case of HVAC failure (open de contact)

-A71 EXTERN COMMUNICATION
H1
EIA232 J2
EIA485 J3
X11 DIN-Signal C096MS-4,4C1-2
J1 J2 J3 J4 J5 J7

-J8

-A73 NCS-TCP/IP
PT3 — PT4
PT1 — PT2
MODBUS-TCP/IP I4
EIA232
+12V
0V
H1

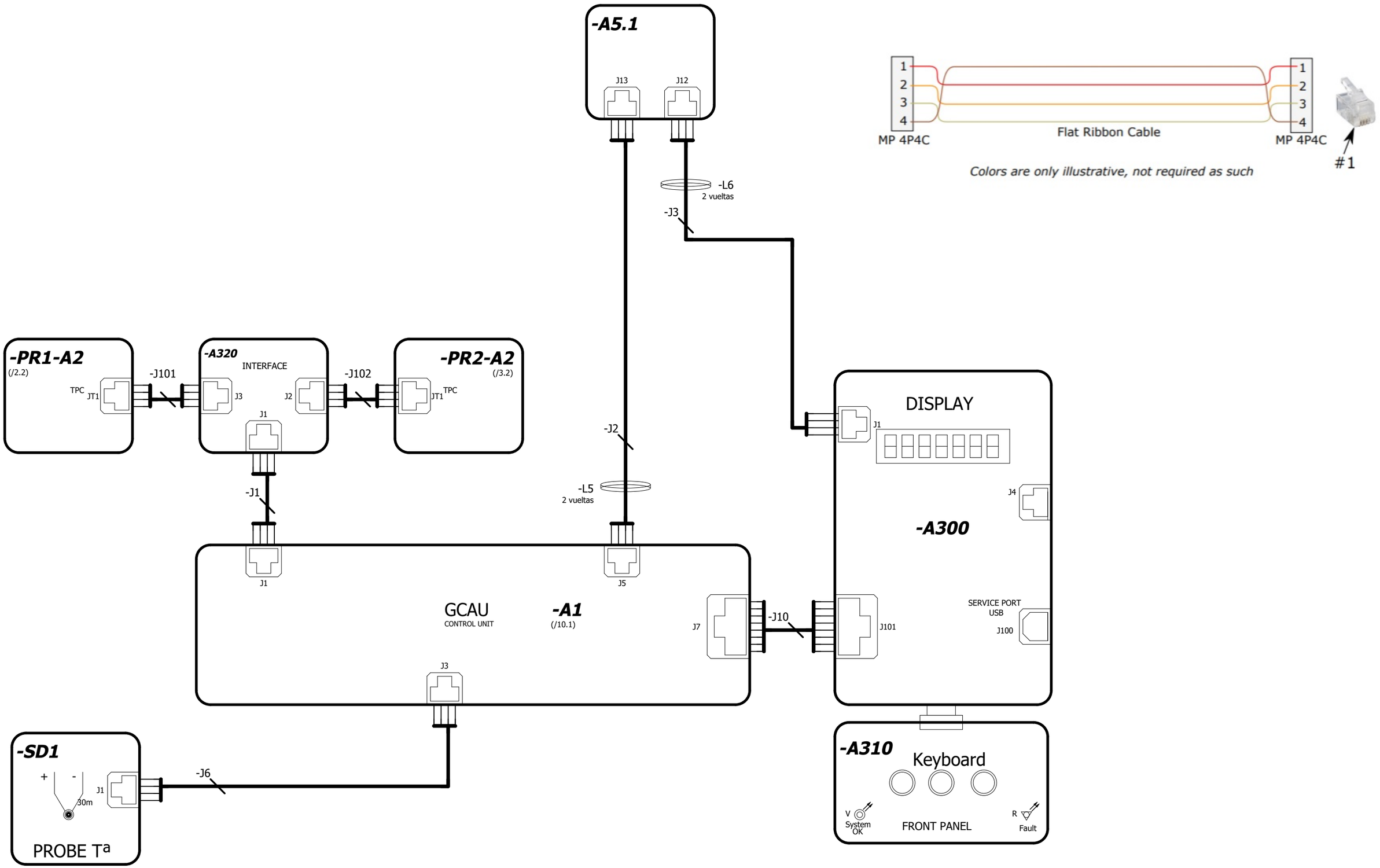
-F73 3,15A/T 5x20
NCS_0V / (-A30-J12:2 /5.2)
NCS_12V / (-A30-J12:1 /5.2)

-X
UMK-RJ45/S/8PTDA
-A7
-J16
CAT6A
MODBUS TCP/IP

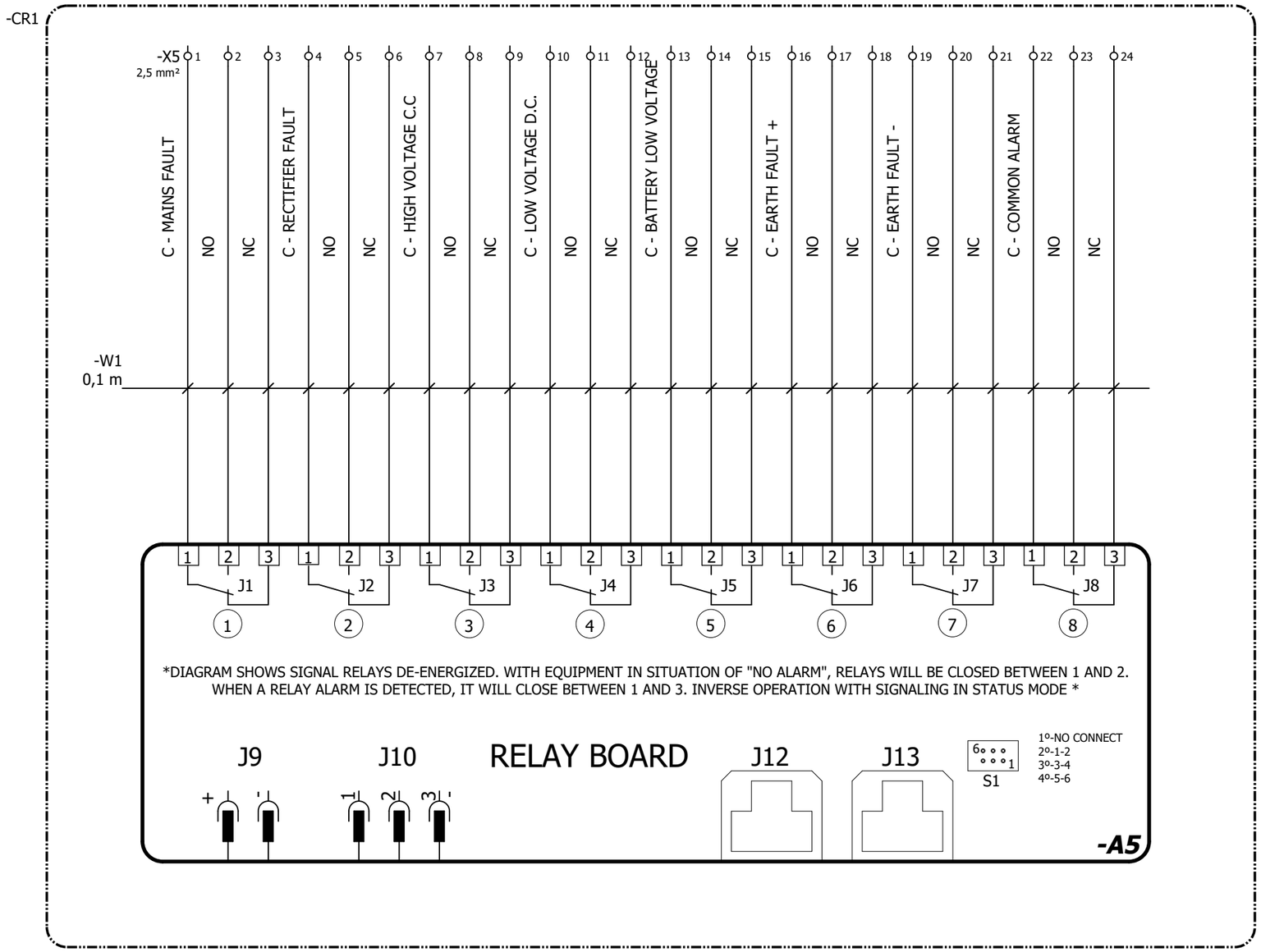
ES521464

				Date	21/03/2024	3W POWER S.P.A.			= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Control Unit Rectifier 1 System	+ REC1 — 23 / 49
01		22/07/2024	eva.beitia	Checked	JOP				& EFS — A3 — Sheet 10
Stat	Alteration	Date	Name	Standard				ES521464 en	Sheets 13

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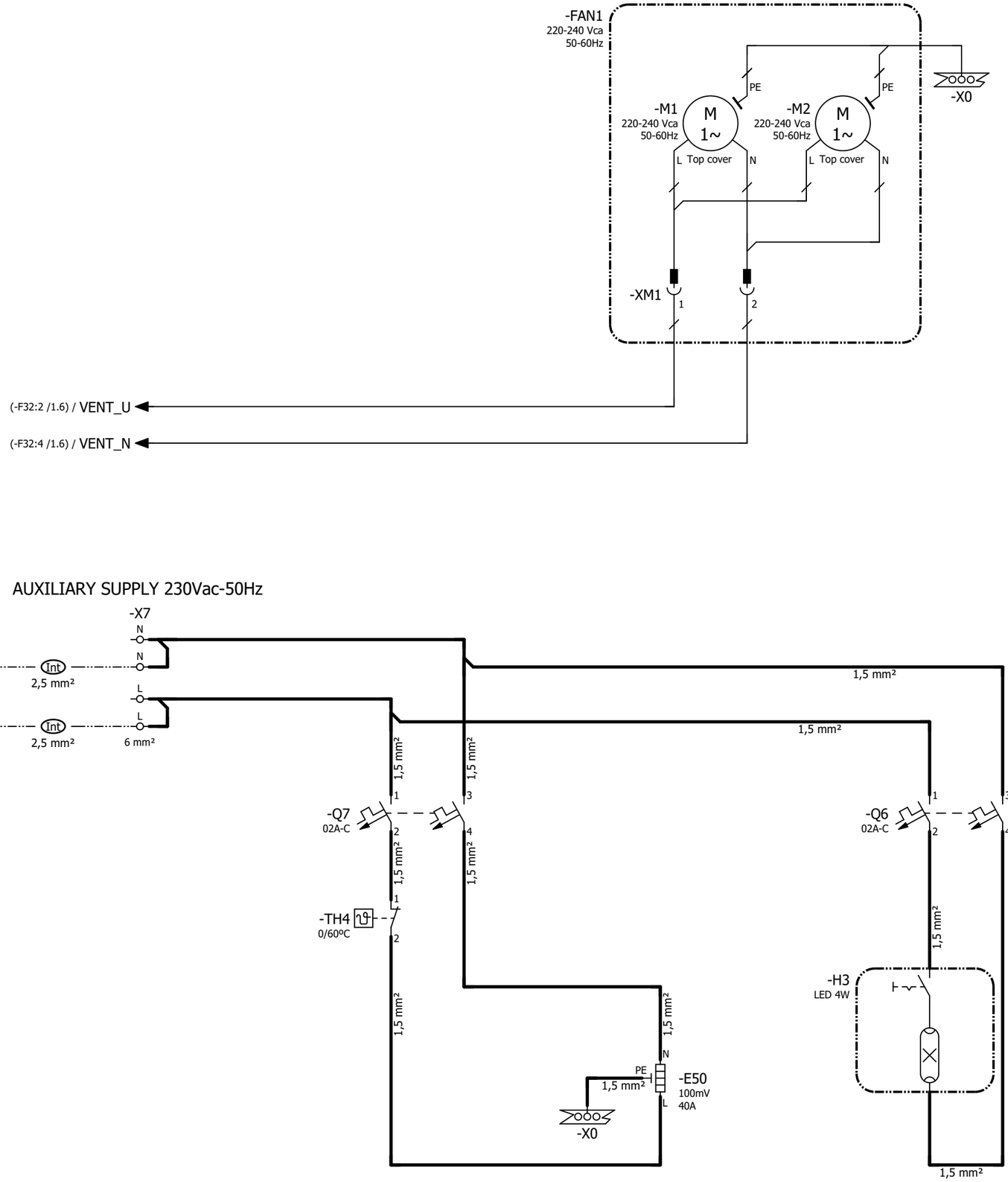
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				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Relay board Rectifier 1 System		= System	
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm				+ REC1	25 / 49
				Checked	JOP					& EFS	
Stat	Alteration	Date	Name	Standard					ES521464 en		A3
											Sheet 12
											Sheets 13

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				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Cabinet accesories	= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Rectifier 1	+ REC1 26 / 49
				Checked	JOP			System	& EFS Sheet 13
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheets 13

Terminal diagram

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Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X1						PART Nº	229170
-X1 (&EFS/1.1)	L1		16 mm²	70 mm²	SCREW TYPE	L1	MAINS 3x400Vac 50Hz -50kA
-X1 (&EFS/1.1)	L2		16 mm²	70 mm²	SCREW TYPE	L2	=
-X1 (&EFS/1.1)	L3		16 mm²	70 mm²	SCREW TYPE	L3	=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X2						PART Nº	229106
-X2 (&EFS/7.2)	1+		0.5 mm²	16 mm²	SCREW TYPE		CP-100F1 DC CONTROL 66kV G/S LINE A-5.2KW
-X2 (&EFS/7.2)	1-		0.5 mm²	16 mm²	SCREW TYPE		=
-X2 (&EFS/7.3)	2+		0.2 mm²	16 mm²	SCREW TYPE		CP-100F1 DC CONTROL 66kV G/S LINE B-2KW
-X2 (&EFS/7.3)	2-		0.2 mm²	16 mm²	SCREW TYPE		=
-X2 (&EFS/7.4)	3+		0.2 mm²	16 mm²	SCREW TYPE		SG-100D1 DC CONTROL 6,6kV SWITCHGEAR LINE A-1KW
-X2 (&EFS/7.3)	3-		0.2 mm²	16 mm²	SCREW TYPE		=
-X2 (&EFS/7.5)	4+		0.2 mm²	16 mm²	SCREW TYPE		SG-100D1 DC CONTROL 6,6kV SWITCHGEAR LINE B-1KW
-X2 (&EFS/7.4)	4-		0.2 mm²	16 mm²	SCREW TYPE		=
-X2 (&EFS/7.6)	5+		0.5 mm²	16 mm²	SCREW TYPE		SPARE 5,5KW
-X2 (&EFS/7.5)	5-		0.5 mm²	16 mm²	SCREW TYPE		=
-X2 (&EFS/7.6)	6+		0.2 mm²	16 mm²	SCREW TYPE		SPARE 2KW
-X2 (&EFS/7.6)	6-		0.2 mm²	16 mm²	SCREW TYPE		=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X2						PART Nº	229106
-X2 (&EFS/7.7)	7+		0.2 mm²	16 mm²	SCREW TYPE		SPARE 1KW
-X2 (&EFS/7.7)	7-		0.2 mm²	16 mm²	SCREW TYPE		=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X3						PART Nº	ES273150
-X3 (&EFS/9.6)	+		1 mm²	50 mm²	SCREW TYPE	+	BATTERY 110Vdc
-X3 (&EFS/9.6)	-		1 mm²	50 mm²	SCREW TYPE	-	=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X4						PART Nº	229104
-X4 (&EFS/10.8)	1		0.22 mm²	4 mm²	SCREW TYPE	C	Floating forced Charger
-X4 (&EFS/10.8)	2		0.22 mm²	4 mm²	SCREW TYPE	NC	=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X6						PART Nº	ES273150
-X6 (&EFS/5.5)	1		1 mm²	50 mm²	SCREW TYPE		INTERCONNECTION
-X6 (&EFS/5.5)	2		1 mm²	50 mm²	SCREW TYPE		=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X7						PART Nº	229106
-X7 (&EFS/13.2)	L		0.2 mm²	6 mm²	SCREW TYPE	L	AUXILIARY SUPPLY 230Vac-50Hz

Terminal diagram

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X7						PART Nº	229106
-X7 (&EFS/13.2)	L		0.2 mm²	6 mm²	SCREW TYPE	L	AUXILIARY SUPPLY 230Vac-50Hz
-X7 (&EFS/13.2)	N		0.2 mm²	6 mm²	SCREW TYPE	N	=
-X7 (&EFS/13.2)	N		0.2 mm²	6 mm²	SCREW TYPE	N	=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X8						PART Nº	229104
-X8 (&EFS/10.7)	1		0.22 mm²	4 mm²	SCREW TYPE		CHARGERS INTERCONNECTION
-X8 (&EFS/10.7)	2		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/10.7)	3		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/10.7)	4		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/6.2)	5		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/6.2)	6		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/6.2)	7		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/9.2)	8		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/9.2)	9		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/8.5)	10		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/8.5)	11		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/9.5)	12		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/9.5)	13		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/6.4)	14		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/6.4)	15		0.22 mm²	4 mm²	SCREW TYPE		=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X10						PART Nº	229104
-X10 (&EFS/6.4)	1		0.22 mm²	4 mm²	SCREW TYPE	+	ESD 24VDC
-X10 (&EFS/6.4)	2		0.22 mm²	4 mm²	SCREW TYPE	-	=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X20						PART Nº	229104
-X20 (&EFS/6.5)	1		0.22 mm²	4 mm²	SCREW TYPE	NO	BATTERY MCCB TRIP COMMAND
-X20 (&EFS/6.5)	2		0.22 mm²	4 mm²	SCREW TYPE	C	=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X31						PART Nº	229106
-X31 (&EFS/9.6)			0.2 mm²	6 mm²	SCREW TYPE		Battery symmetry

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC1-X32						PART Nº	229104
-X32 (&EFS/10.8)	1		0.22 mm²	4 mm²	SCREW TYPE		BP INTERCONNECTION
-X32 (&EFS/10.8)	2		0.22 mm²	4 mm²	SCREW TYPE		=

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				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Terminal diagram	= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Rectifier 1	+ REC1 28 / 49
01		22/07/2024	eva.beitia	Checked	JOP			System	& EMA A3 Sheet 2
Stat	Alteration	Date	Name	Standard				ES521464 en	Sheets

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Bill of materials

AEGPSI.V04

Identifier	Quantity	AEG Part Number	Designation		AEG Recomended as Spare Part	Servicetime (Years)
A1	1	GC_ES272500	GCAU BOARD	GCAU	X	
A1-A71	1	ES416161	PCA COMMUNIC. EXT. GCAU 232/485		X	
A7	1	ES277921	ADAPTER		X	
A8	1	ES275962	ISOLATION BOARD		X	
A10	1	215293	BATTERY SIMETRY BOARD A10		X	
A21	1	GC_ES425889	EARTH FAULT BOARD		X	
A30	1	ES417940	CONVERTER BOARD		X	
A30-F1;F5;F12;F13;F22;F23;F31;F73;F100-F100	17	ES274292	FUSE	3,15A/T	X	
A73	1	GC_ES273626	PCA COMMUNIC. TCP/IP		X	
A300-A300	1	ES272501	DISPLAY		X	
A300-A310	1	211921	KEY PAD		X	
A320	1	ES416456	TPC INTERFACE BOARD		X	
CR1-A5	1	228540	RELAYS PCB EXT		X	
CR1-X5	16	221606	TRIPLE TERMINAL	2,5 mm²		
CR1-W1	1	ES275423	WIRES SET			
CR1-X5	1	221607	ENDPLATE			
E50-E1	1	220659	HEATING RESISTOR	100W		
F1;F101;F102	3	223181	FUSE HOLDER	NH 00		
F1	1	213381	FUSE	125A/gL	X	
F5;F13;F23;F25;F32;F73	6	ES417902	DOUBLE FUSE HOLDER	5x20		
F10;F11	2	228018	SURGE PROTECTION			
F12;F22	2	ES417903	TRIPLE FUSE HOLDER	5x20		

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AEGPSI.V04

Identifier	Quantity	AEG Part Number	Designation		AEG Recomended as Spare Part	Servicetime (Years)
F25;F32	4	213368	FUSE	2,5A/M	X	
F31	1	229134	FUSE HOLDER TERMINAL			
F31	1	229334	ENDPLATE			
F101;F102	2	ES275254	FUSE	80A/gL		
FAN1-M1;FAN1-M2	2	BMPU00287000	FAN	220-240 Vac 50-60Hz	X	5
H3	1	228099	LIGHTING SET	LED 4W		
J16	1	ES277638	ETHERNET CABLES	1m		
K3;K4	2	ES271165	AUXILIARY RELAY			
KF	1	ES274796	SECURITY RELAY			
L5;L6	2	228112	FERRITE			
L+;L-	2	226856	BUS	1P 250A.		
PR1-A2;PR2-A2	2	3TN21023AAAA	TPC BOARD		X	
PR1-V1/V2;PR1-V3/V4;PR1-V5/V6;PR2-V1/V2 PR2-V3/V4;PR2-V5/V6	6	214849	SEMIPACK 2 THYRISTORS	90A 1600V		
PR1-W10;PR2-W10	2	ES273576	WIRES SET			
PR1-THF1;PR2-THF1	2	ES212095	THERMOSTAT	100ºC		
PR1-THF2;PR2-THF2	2	ES215170	THERMOSTAT	90ºC		
Q1	1	ES272892	CIRCUIT BREAKER	50A		
Q1	1	BKD001036000	AUXILIARY CONTACT	Posición OF		
Q2;Q3	2	ES274517	DISCONNECTOR	1000V - 160A		
Q2	2	ES229261	AUXILIARY CONTACT			
Q6;Q7	2	224404	CIRCUIT BREAKER	2A-C		
Q10;Q14	2	ES271746	CIRCUIT BREAKER	50A-C		

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Identifier	Quantity	AEG Part Number	Designation		AEG Recomended as Spare Part	Servicetime (Years)
Q10...Q16	7	224157	AUXILIARY CONTACT			
Q11;Q15	2	ES272068	CIRCUIT BREAKER	20A-C		
Q12;Q13;Q16	3	ES271440	CIRCUIT BREAKER	16A-C		
R2;R3	2	212055	SHUNT	100mV 130A		
R2-1;R3-1	4	210012	INSULATOR			
RC1-1	3	ES229059	WASHER			
RC1-2	2	418226	TINNED COPPER CONNECTIONS			
RC1-3	1	213180	CAPACITOR METAL PLATE			
RC1-4;Z1;Z2	6	213787	ADAPTER		X	
RC1-C1	3	219804	CAPACITOR	6800µF 160V	X	7
RC1-R1	1	ES273618	RESISTANCE	15K ±5%		
SD1	1	ES272385	TEMPERATURE PROBE	30m		
T1	1	B00992740040	TRANSFORMER WITH CHOKE	110V/100A 019.6KVA		
TH4	1	220275	THERMOSTAT	0/60ºC		
U+;U-	2	ES273807	TINNED COPPER CONNECTIONS			
V21	1	214872	DIODE	240A 1200V		
V21	2	216359	INSULATOR			
V21	1	410283	HEATSINK	L=100 mm		
W11	1	ES273652	WIRES SET			
X0	1	219059	TINNED COPPER CONNECTIONS			
X1	3	229170	GRAY TERMINAL	70 mm²		
X2	14	229116	GRAY TERMINAL	16 mm²		

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Bill of materials

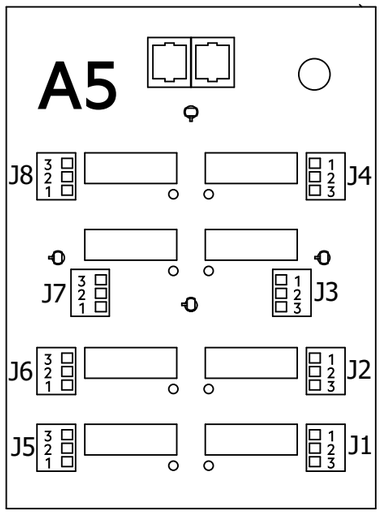
AEGPSI.V04

Identifier	Quantity	AEG Part Number	Designation	AEG Recomended as Spare Part	Servicetime (Years)
X2;X7;X31	5	229106	GRAY TERMINAL 6 mm²		
X2;X4;X7;X8;X20;X31;X32	8	229304	ENDPLATE		
X3;X6	4	ES273150	GRAY TERMINAL 50 mm²		
X4;X8;X10;X20;X32	23	229104	GRAY TERMINAL 4 mm²		
X7	2	227799	JUMPER		
X105	1	ES277127	BUS		
X106	1	ES276860	BUS		
Z1	1	ES229868	PCA FILTER EMC 0/450V	X	
Z1	1	ES273041	PROTECTIÓN COVER	X	
Z2	1	ES229869	PCA FILTER EMC 400V	X	
Z2	1	ES228792	PROTECTIÓN COVER	X	

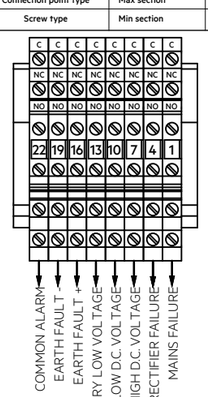
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Relay card detail

CR1



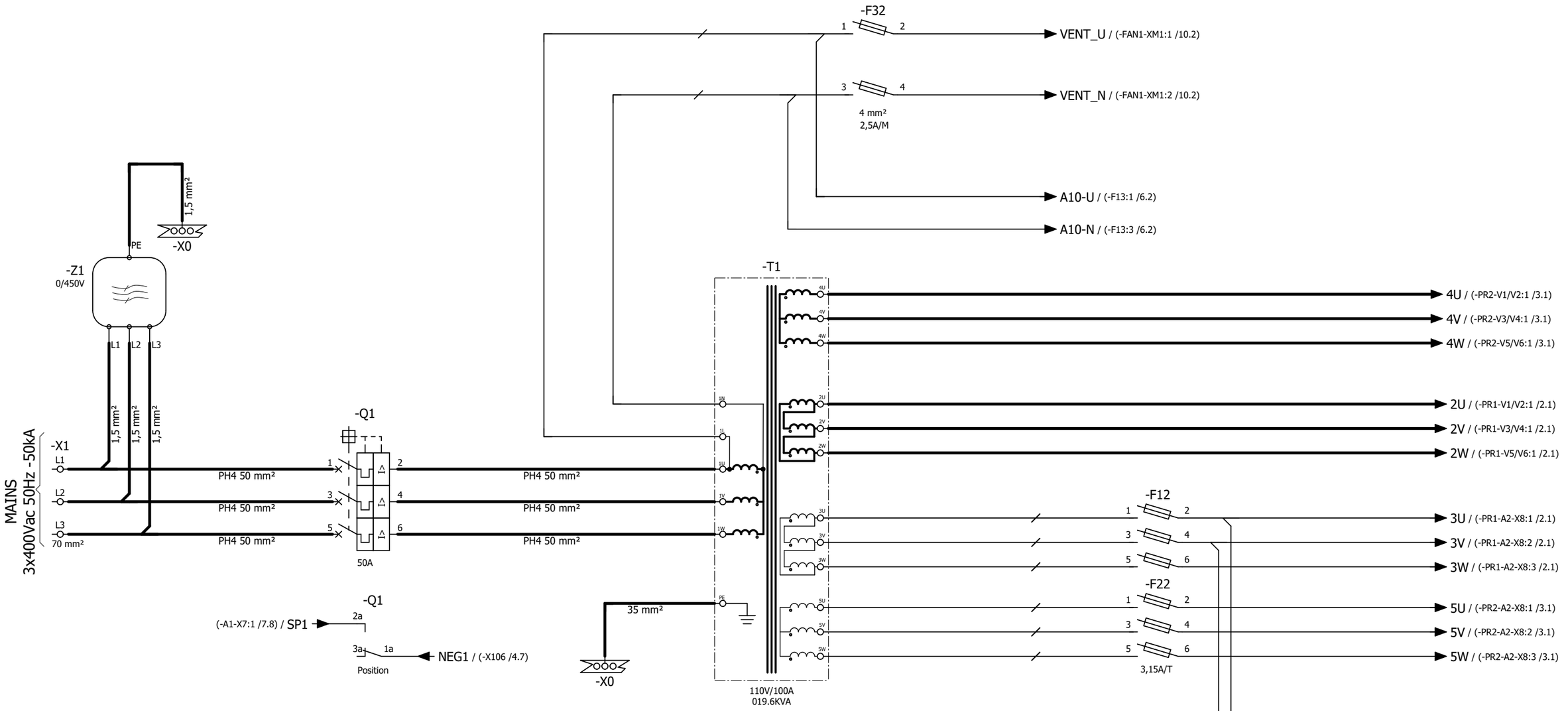
Terminal	Connection point type	Max section	4 mm²
	Screw type	Min section	0.2 mm²



				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Relay card detail
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Rectifier 1
				Checked	JOP			System
Stat	Alteration	Date	Name	Standard			ES521464 en	A3

= System
+ REC1 — 33 / 49
& MTB — Sheet 1
Sheets 1

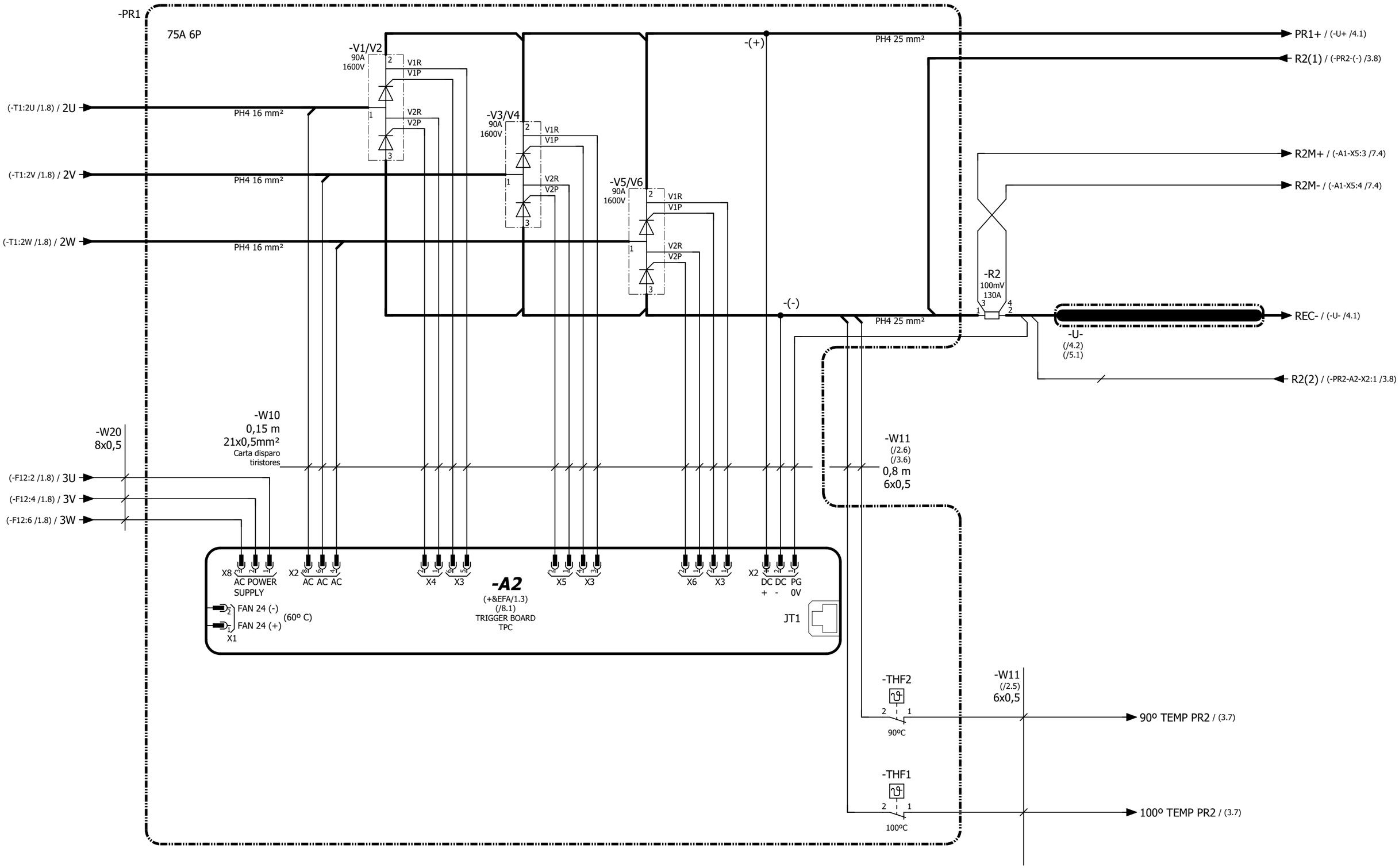
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				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Main supply		= System	
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Rectifier 2		+ REC2	34 / 49
				Checked	JOP			System		& EFS	Sheet 1
Stat	Alteration	Date	Name	Standard					ES521464 en	A3	Sheets 10

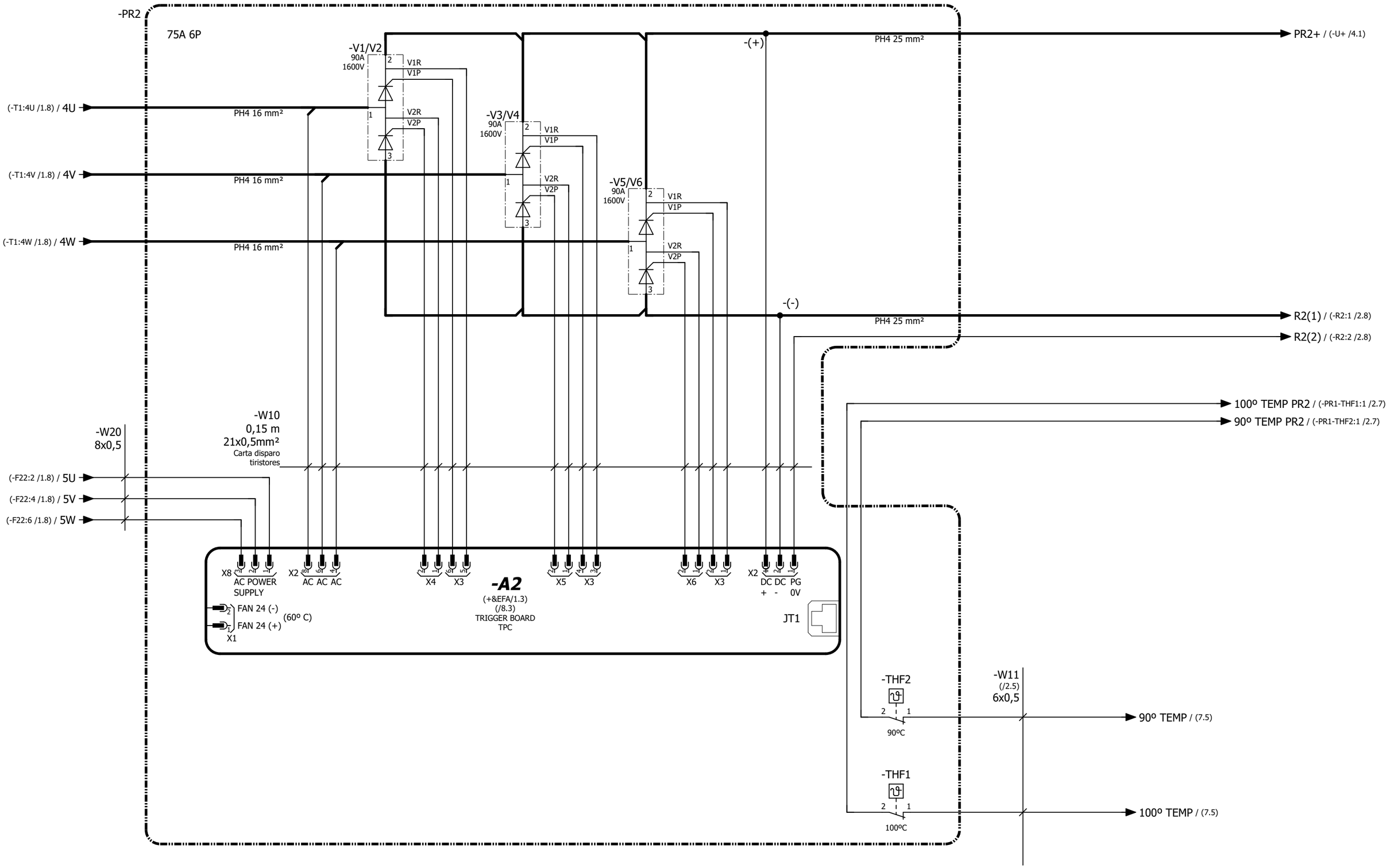
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				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Rectifier Rectifier 2 System	= System + REC2 35 / 49 & EFS
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm			
				Checked	JOP				
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheet 2 Sheets 10

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				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Rectifier Rectifier 2 System		= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm				+ REC2 36 / 49
				Checked	JOP					& EFS
Stat	Alteration	Date	Name	Standard					ES521464 en	A3 Sheet 3 / Sheets 10

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(-PR1-(+) /2.8) / PR1+

(-PR2-(+) /3.8) / PR2+

-U+

PH4 35 mm²

PH4 10 mm²

-RC1
6800µF
160V

-C1
6800µF
160V

-R1
15K
±5%

CAUTION!!!!
CHARGED CAPACITORS INSIDE.
TERMINALS AND COMPONENTS COULD BE
LIVE EVEN WHEN THE EQUIPMENT IS
SWITCHED OFF. INSURE NO VOLTAGE IS PRESSENT
PRIOR TO ANY WORK INSIDE

-F1
1
2
125A/gL
NH00

PH4 35 mm²

REC+ / (-V21:A /5.1)

VBAT+ / (-A1-X2:1 /7.2)

GRD_FAULT / (-A1-X2:3 /7.2)

VPROT / (-A1-X2:4 /7.2)

(0V)_VPS0 / (-A1-X3:4 /7.3)

(-X32:2 /7.8) / NEG8

NEG7 / (-A10-X1:7 /6.3)
NEG6 / (-X8:11 /7.8)
NEG5 / (-X4:2 /7.7)
NEG4 / (-X8:7 /7.8)
NEG2 / (-X8:15 /7.8)
NEG1 / (-Q1:1a /1.3)

-X106
2.5 mm²
(-)

PH4 10 mm²

(-U- /2.8) / REC-

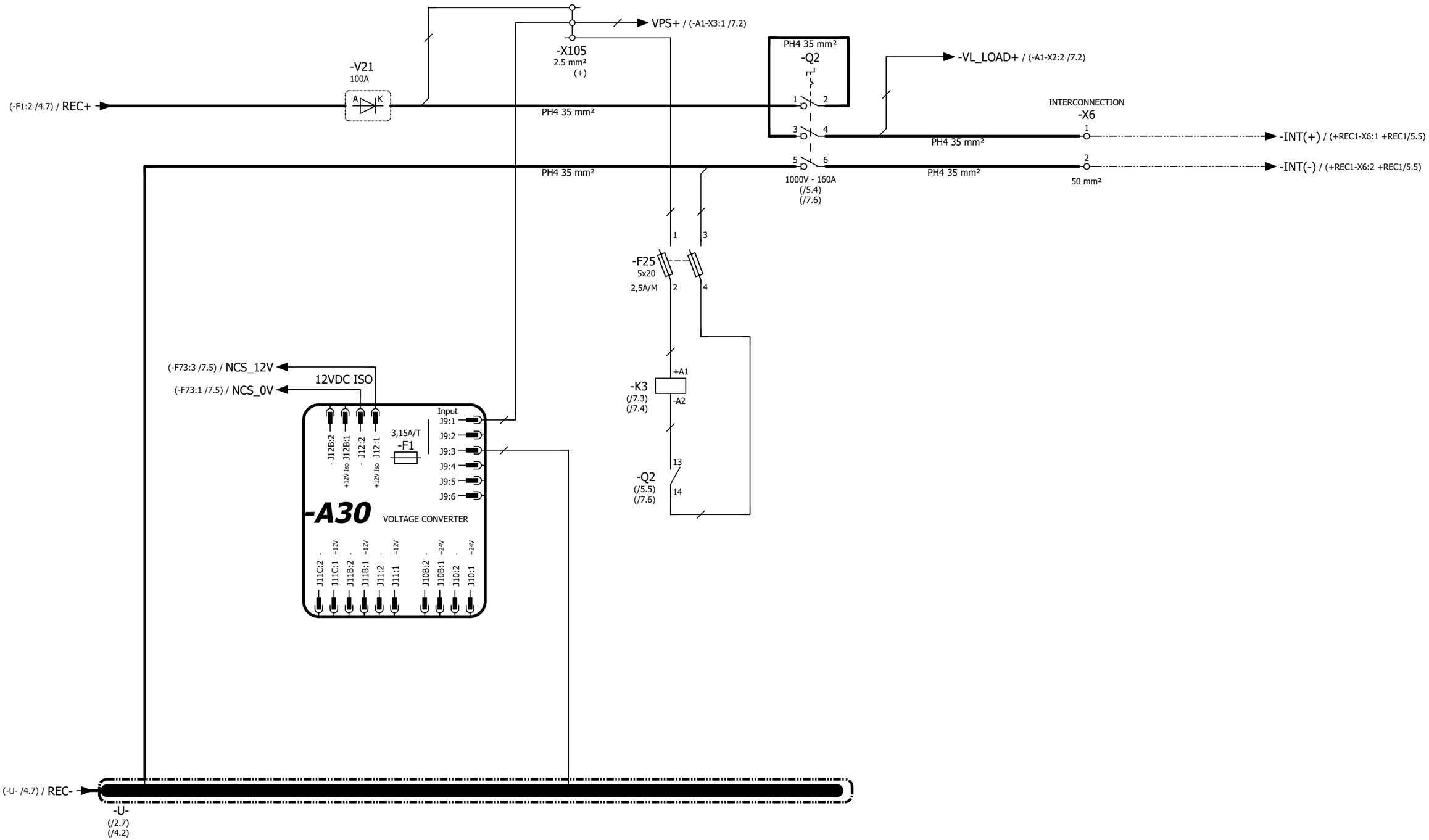
REC- / (-U- /5.1)

-U-
(/2.7)
(/5.1)

ES521464

				Date	21/03/2024	3W POWER S.P.A.				= System	
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Filtering Rectifier 2 System		+ REC2	37 / 49
01		22/07/2024	eva.beitia	Checked	JOP					& EFS	Sheet 4
Stat	Alteration	Date	Name	Standard					ES521464 en		A3 Sheets 10

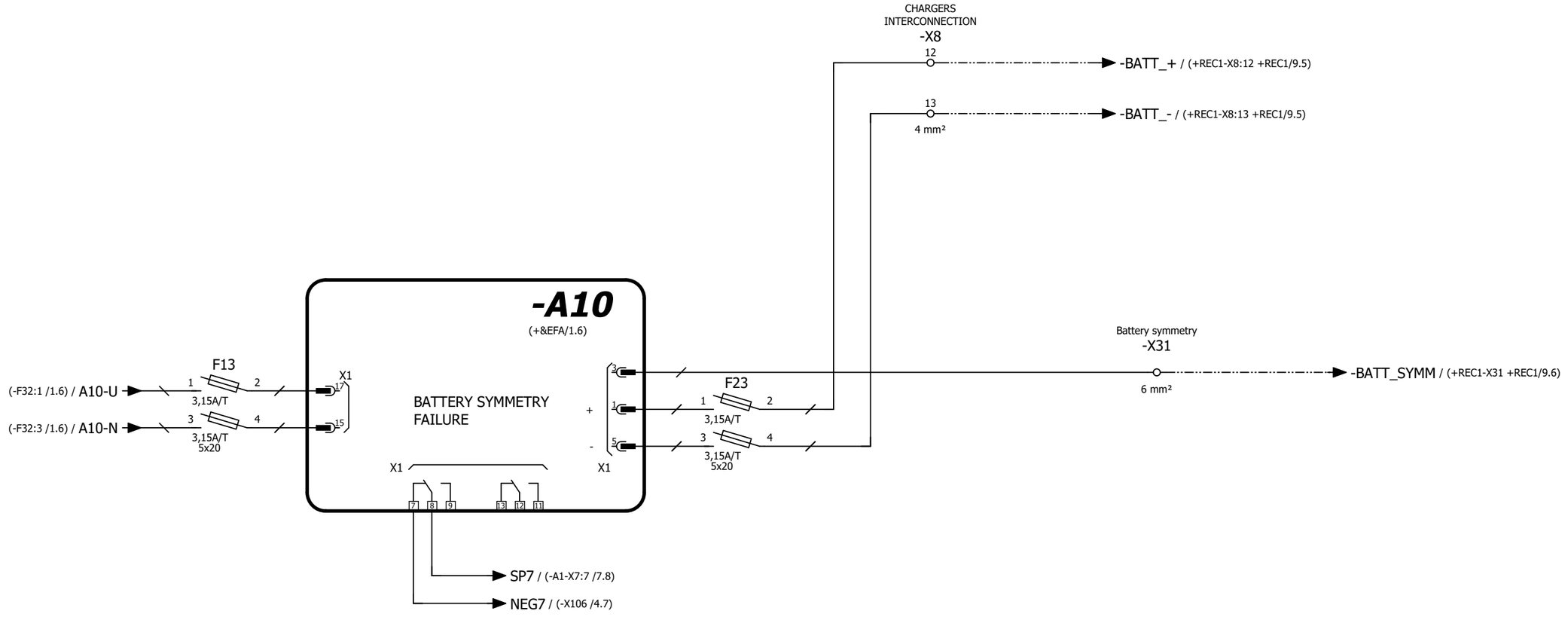
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				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	DC output	= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Rectifier 2	+ REC2 38 / 49
				Checked	JOP			System	& EFS
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheet 5 Sheets 10

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				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Battery Rectifier 2 System	= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm			+ REC2 39 / 49
01		22/07/2024	eva.beitia	Checked	JOP				& EFS Sheet 6
Stat	Alteration	Date	Name	Standard				ES521464 en	A3 Sheets 10

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-A1
(/8.2)
GCAU
CONTROL UNIT

VBAT+ / (-F1:2 /4.7)
VL_LOAD+ / (-Q2:4 /5.6)
GRD_FAULT / (-F1:2 /4.7)
VPROT / (-F1:1 /4.7)
VPS+ / (-X105 /5.4)
(0V)_VPS0 / (-U- /4.7)
R3M- / (+REC1-X8:9 +REC1/9.2)
R3M+ / (+REC1->X8:8 +REC1/9.2)
R2M- / (-R2:3 /2.8)
R2M+ / (-R2:4 /2.8)
100º TEMP / (-PR2-THF1:1 /3.7)
90º TEMP / (-PR2-THF2:1 /3.7)
6U / (-F12:2 /1.8)
6V / (-F12:4 /1.8)

-X8 CHARGERS INTERCONNECTION
4 mm²
-K3
-W20 8x0,5
-Q2 (/5.5) (/5.4)
-F5 3,15A/T 5x20

X1 Thyristor driving gate 1 / Thyristor driving cathode 1 / Thyristor driving gate 2 / Thyristor driving cathode 2
X2 Battery voltage measurement and charger regulation / Load voltage measurement / Ground fault dectection positive connection / Capacitor over voltage protection / Battery symmetry measurement
X3 Positive DC bus power supply / Low Voltage Disconnection contactor output / Negative DC bus power supply
X4 Relay shown in alarm status
X5 Battery shunt positive line / Battery shunt negative line / Charger shunt positive line / Charger shunt negative line
X6 Analog spare input positive line (0-10V) / Analog spare input negative line (0-10V)
X8 Dual Highrate (shared or parallel) / Feedback // high rate / Shutdown for bridge temperature security / Bridge temperature alarm
X9 Alternative power supply (20VAC) / Fan command (+24V)
X10 12V extern power supply + / Gnd & extern power supply -

A10

-A8 Isolated
J1: +12V, 0V
J2: REMOTE (cross)

CHARGERS INTERCONNECTION -X8
+REC2-D / (+REC1-X8:4 +REC1/10.8)
+REC2-C / (+REC1-X8:3 +REC1/10.8)
+REC2-B / (+REC1-X8:2 +REC1/10.8)
+REC2-A / (+REC1-X8:1 +REC1/10.8)
4 mm²

-X8 4 mm² CHARGERS INTERCONNECTION
SP4 / (+REC1-X8:5 +REC1/6.3)
SP5 / (+REC1-X8:6 +REC1/6.3)
NG4 / (+REC1-X8:7 +REC1/6.3)
SP6 / (+REC1-X8:10 +REC1/8.6)
NG6 / (+REC1-X8:11 +REC1/8.6)
SP2 / (+REC1-X8:14 +REC1/6.4)
NG2 / (+REC1-X8:15 +REC1/6.4)

BP INTERCONNECTION -X32
SP8 / (+BP-X30:3 +REC1/9.6)
NG8 / (+BP-X30:4 +REC1/9.6)

NEG8 / (-X106 /4.6)
NEG2 / (-X106 /4.7)
NEG4 / (-X106 /4.7)
NEG6 / (-X106 /4.7)

X7
Q1 OPEN
REMOTE OFF INHIBITION
BATTERY PROTECTION
GROUND FAULT -
GROUND FAULT +
DISTRIBUTION FAILURE
BATT.SYMM.FAULT
VENTILATION FAILURE
SP1 / (-Q1:2a /1.2)
SP7 / (-A10-X1:8 /6.3)

-X4 Floating forced Charger
Normally closed
(-X106 /4.7) / NEG5
Stop boost charging in case of HVAC failure (open de contact)

-A71 EXTERN COMMUNICATION
H1
EIA232 J2
EIA485 J3
X11 DIN-Signal C096MS-4,4C1-2
J1 J2 J3 J4 J5 J7

-J8

-A73 NCS-TCP/IP
PT3 PT4 PT1 PT2
MODBUS-TCP/IP I4
EIA232
+12V
0V
H1

-F73 3,15A/T 5x20
NCS_0V / (-A30-J12:2 /5.2)
NCS_12V / (-A30-J12:1 /5.2)

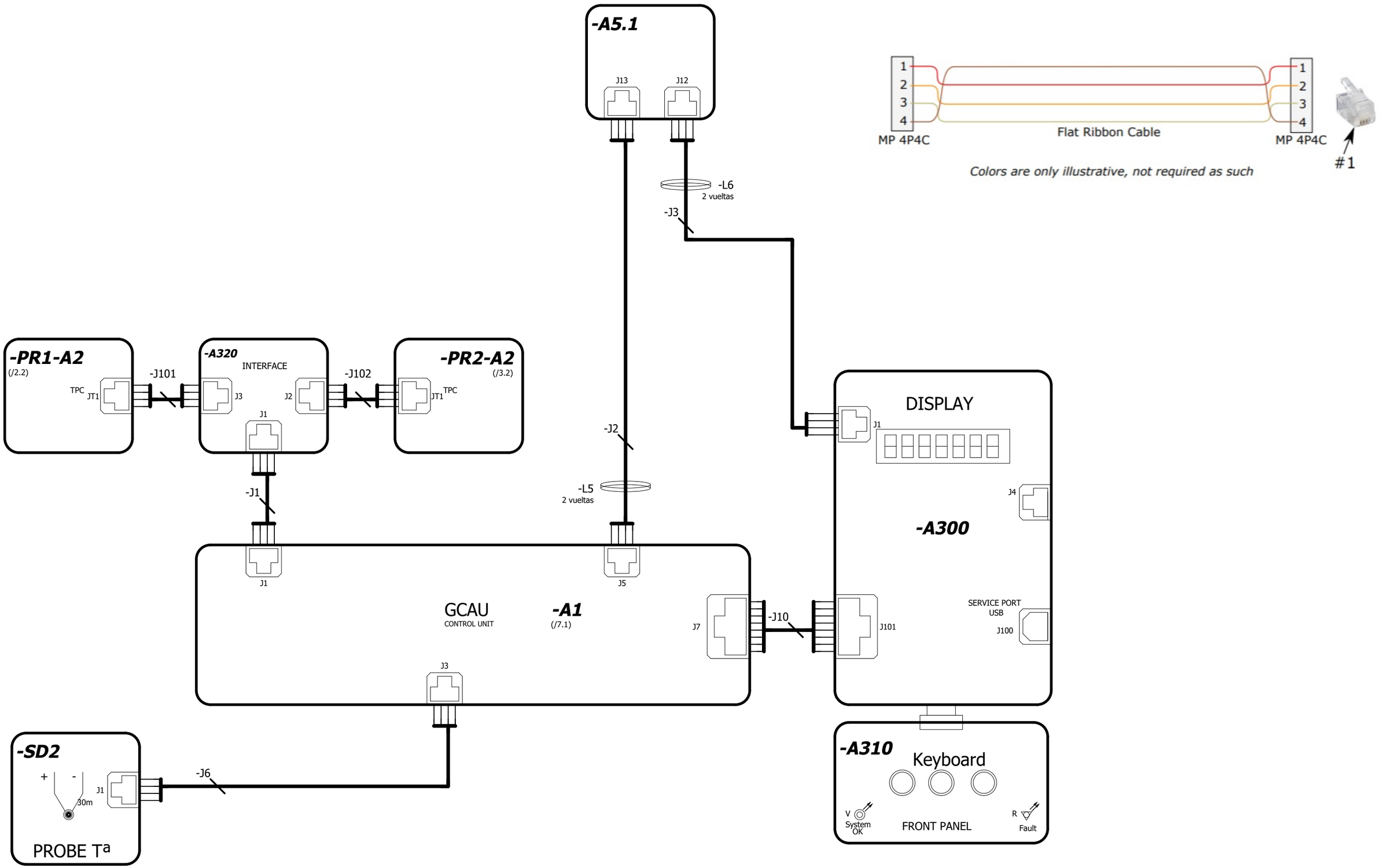
-X
UMK-RJ45/S/8PTDA
-A7
-J16
CAT6A
MODBUS TCP/IP

ES521464

				Date	21/03/2024	3W POWER S.P.A.			= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Control Unit Rectifier 2 System	+ REC2
01		22/07/2024	eva.beitia	Checked	JOP				& EFS
Stat	Alteration	Date	Name	Standard				ES521464 en	A3

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Sheet 7
Sheets 10

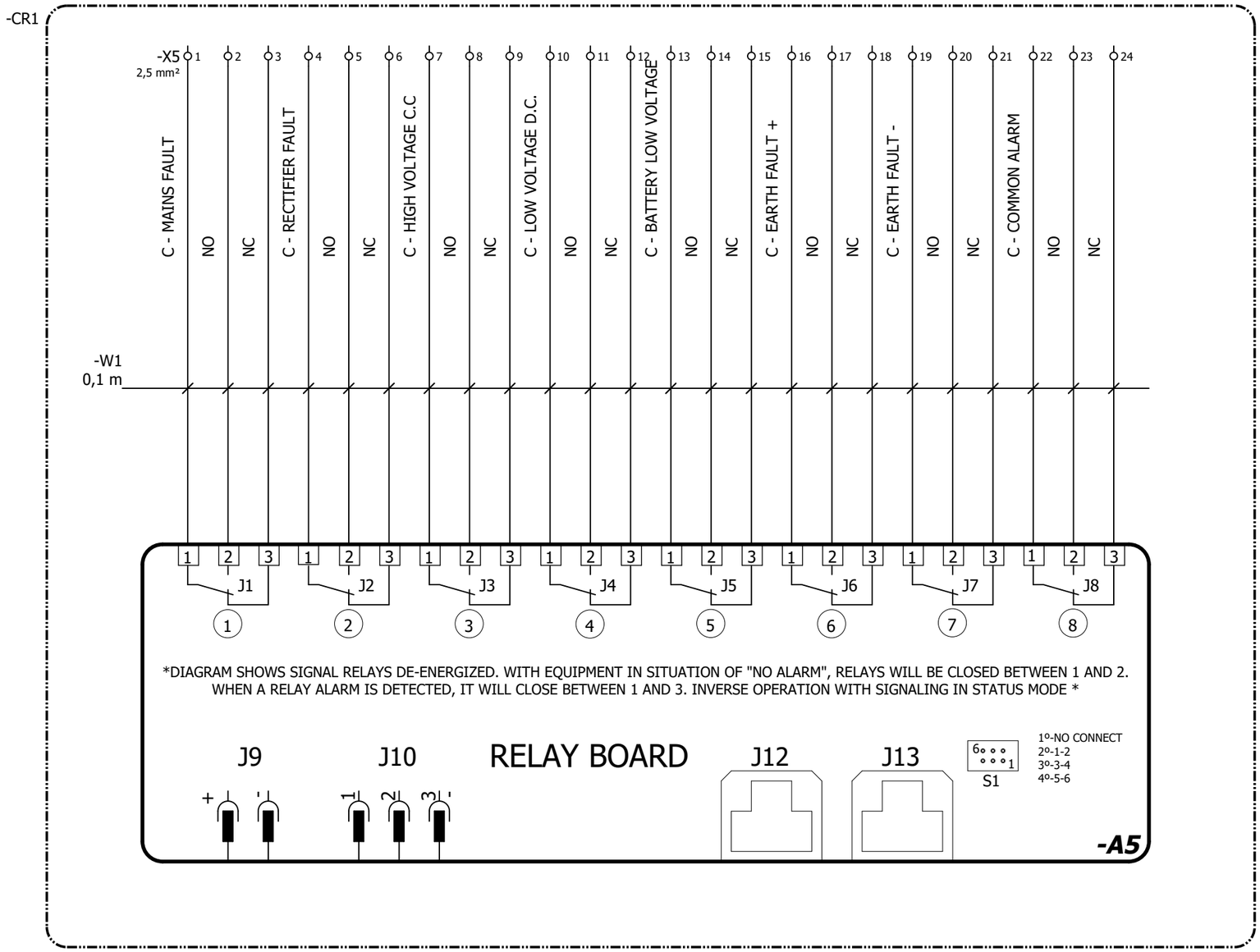
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				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	PCB´s I2C communication buses		= System	
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Rectifier 2		+ REC2	41 / 49
				Checked	JOP			System		& EFS	Sheet 8
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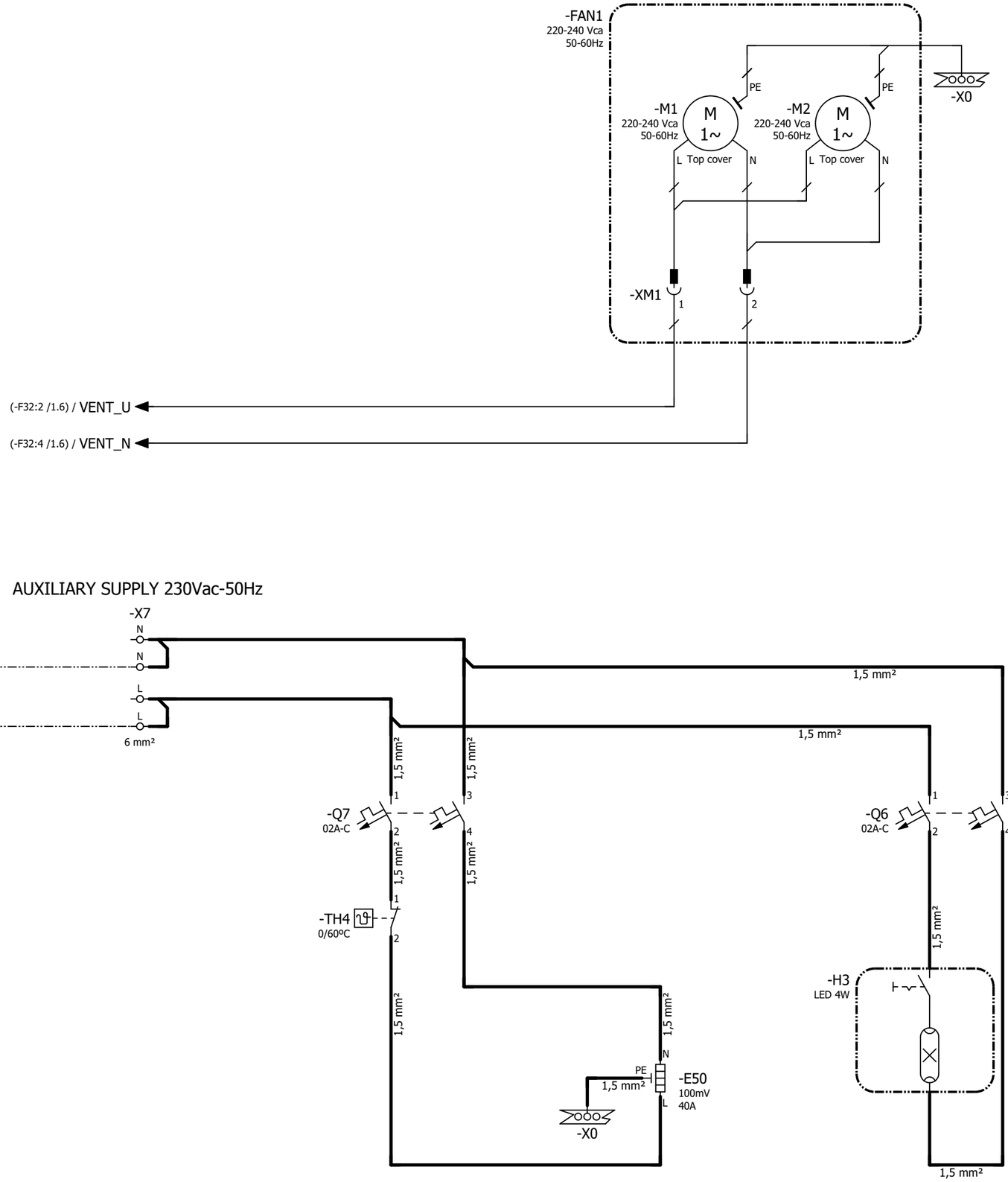
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				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Relay board		= System	
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				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		Rectifier 2	+ REC2 43 / 49
				Checked	JOP			System	& EFS Sheet 10
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Terminal diagram

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Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type	Function	
=System+REC2-X1						PART Nº	
-X1 (&EFS/1.1)	L1		16 mm²	70 mm²	SCREW TYPE	L1	MAINS 3x400Vac 50Hz -50kA
-X1 (&EFS/1.1)	L2		16 mm²	70 mm²	SCREW TYPE	L2	=
-X1 (&EFS/1.1)	L3		16 mm²	70 mm²	SCREW TYPE	L3	=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type	Function	
=System+REC2-X4						PART Nº 229104	
-X4 (&EFS/7.7)	1		0.22 mm²	4 mm²	SCREW TYPE	C	Floating forced Charger
-X4 (&EFS/7.7)	2		0.22 mm²	4 mm²	SCREW TYPE	NC	=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type	Function	
=System+REC2-X6						PART Nº ES273150	
-X6 (&EFS/5.6)	1		1 mm²	50 mm²	SCREW TYPE		INTERCONNECTION
-X6 (&EFS/5.6)	2		1 mm²	50 mm²	SCREW TYPE		=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type	Function	
=System+REC2-X7						PART Nº	
-X7 (&EFS/10.2)	L		0.2 mm²	6 mm²	SCREW TYPE	L	AUXILIARY SUPPLY 230Vac-50Hz
-X7 (&EFS/10.2)	L		0.2 mm²	6 mm²	SCREW TYPE	L	=
-X7 (&EFS/10.2)	N		0.2 mm²	6 mm²	SCREW TYPE	N	=
-X7 (&EFS/10.2)	N		0.2 mm²	6 mm²	SCREW TYPE	N	=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type	Function	
=System+REC2-X8						PART Nº 229104	
-X8 (&EFS/7.7)	1		0.22 mm²	4 mm²	SCREW TYPE		CHARGERS INTERCONNECTION
-X8 (&EFS/7.7)	2		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/7.7)	3		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/7.7)	4		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/7.7)	5		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/7.7)	6		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/7.7)	7		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/7.4)	8		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/7.3)	9		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/7.7)	10		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/7.7)	11		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/6.5)	12		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/6.5)	13		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/7.7)	14		0.22 mm²	4 mm²	SCREW TYPE		=
-X8 (&EFS/7.7)	15		0.22 mm²	4 mm²	SCREW TYPE		=

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type	Function	
=System+REC2-X31						PART Nº 229106	
-X31 (&EFS/6.6)			0.2 mm²	6 mm²	SCREW TYPE		Battery symmetry

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Terminal diagram

Nº Operating medium	Nº Terminal	Jumper connection	Min section	Max section	Connection point type		Function
=System+REC2-X32						PART Nº	229104
-X32 (&EFS/7.8)	1		0.22 mm²	4 mm²	SCREW TYPE		BP INTERCONNECTION
-X32 (&EFS/7.8)	2		0.22 mm²	4 mm²	SCREW TYPE		=

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Bill of materials

AEGPSI.V04

Identifier	Quantity	AEG Part Number	Designation		AEG Recomended as Spare Part	Servicetime (Years)
A1	1	GC_ES272500	GCAU BOARD	GCAU	X	
A1-A71	1	ES416161	PCA COMMUNIC. EXT. GCAU 232/485		X	
A7	1	ES277921	ADAPTER		X	
A8	1	ES275962	ISOLATION BOARD		X	
A10	1	215293	BATTERY SIMETRY BOARD A10		X	
A30	1	ES417940	CONVERTER BOARD		X	
A30-F1;F5;F12;F13;F22;F23;F73	15	ES274292	FUSE	3,15A/T	X	
A73	1	GC_ES273626	PCA COMMUNIC. TCP/IP		X	
A300-A300	1	ES272501	DISPLAY		X	
A300-A310	1	211921	KEY PAD		X	
A320	1	ES416456	TPC INTERFACE BOARD		X	
CR1-A5	1	228540	RELAYS PCB EXT		X	
CR1-X5	16	221606	TRIPLE TERMINAL	2,5 mm²		
CR1-W1	1	ES275423	WIRES SET			
CR1-X5	1	221607	ENDPLATE			
E50-E1	1	220659	HEATING RESISTOR	100W		
F1	1	223181	FUSE HOLDER	NH 00		
F1	1	213381	FUSE	125A/gL	X	
F5;F13;F23;F25;F32;F73	6	ES417902	DOUBLE FUSE HOLDER	5x20		
F12;F22	2	ES417903	TRIPLE FUSE HOLDER	5x20		
F25;F32	4	213368	FUSE	2,5A/M	X	
FAN1-M1;FAN1-M2	2	BMPU00287000	FAN	220-240 Vac 50-60Hz	X	5

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Bill of materials

AEGPSI.V04

Identifier	Quantity	AEG Part Number	Designation		AEG Recomended as Spare Part	Servicetime (Years)
H3	1	228099	LIGHTING SET	LED 4W		
J16	1	ES277638	ETHERNET CABLES	1m		
K3	1	ES271165	AUXILIARY RELAY			
L5;L6	2	228112	FERRITE			
PR1-A2;PR2-A2	2	3TN21023AAAA	TPC BOARD		X	
PR1-V1/V2;PR1-V3/V4;PR1-V5/V6;PR2-V1/V2 PR2-V3/V4;PR2-V5/V6	6	214849	SEMIPACK 2 THYRISTORS	90A 1600V		
PR1-W10;PR2-W10	2	ES273576	WIRES SET			
PR1-THF1;PR2-THF1	2	ES212095	THERMOSTAT	100ºC		
PR1-THF2;PR2-THF2	2	ES215170	THERMOSTAT	90ºC		
Q1	1	GC_ES272892	CIRCUIT BREAKER	50A		
Q1	1	BKD001036000	AUXILIARY CONTACT	Posición OF		
Q2	1	ES274517	DISCONNECTOR	1000V - 160A		
Q2	2	ES229261	AUXILIARY CONTACT			
Q6;Q7	2	224404	CIRCUIT BREAKER	2A-C		
R2	1	212055	SHUNT	100mV 130A		
R2-1	2	210012	INSULATOR			
RC1-1	3	ES229059	WASHER			
RC1-2	2	418226	TINNED COPPER CONNECTIONS			
RC1-3	1	213180	CAPACITOR METAL PLATE			
RC1-4;Z1	4	213787	ADAPTER		X	
RC1-C1	3	219804	CAPACITOR	6800µF 160V	X	7
RC1-R1	1	ES273618	RESISTANCE	15K ±5%		

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Bill of materials

AEGPSI.V04

Identifier	Quantity	AEG Part Number	Designation		AEG Recomended as Spare Part	Servicetime (Years)
SD2	1	ES272385	TEMPERATURE PROBE	30m		
T1	1	B00992740040	TRANSFORMER WITH CHOKE	110V/100A 019.6KVA		
TH4	1	220275	THERMOSTAT	0/60ºC		
U+;U-	2	ES273807	TINNED COPPER CONNECTIONS			
V21	1	214872	DIODE	240A 1200V		
V21	2	216359	INSULATOR			
V21	1	410283	HEATSINK	L=100 mm		
W11	1	ES273652	WIRES SET			
X0	1	219059	TINNED COPPER CONNECTIONS			
X1	3	229170	GRAY TERMINAL	70 mm²		
X4;X8;X32	19	229104	GRAY TERMINAL	4 mm²		
X4;X7;X8;X31;X32	5	229304	ENDPLATE			
X6	2	ES273150	GRAY TERMINAL	50 mm²		
X7;X31	5	229106	GRAY TERMINAL	6 mm²		
X7	2	227799	JUMPER			
X105	1	ES277127	BUS			
X106	1	ES276860	BUS			
Z1	1	ES229868	PCA FILTER EMC	0/450V	X	
Z1	1	ES273041	PROTECTIÓN COVER		X	

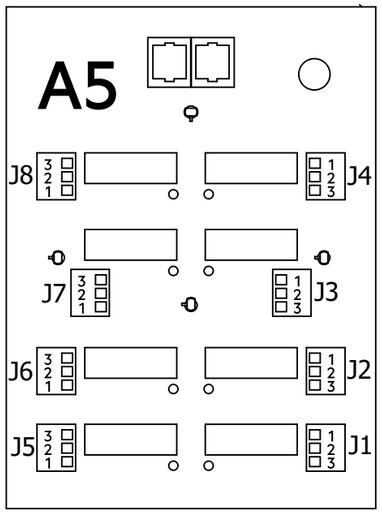
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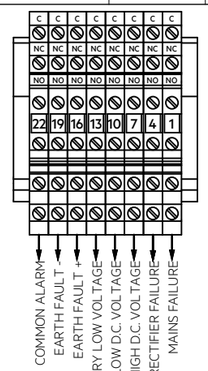
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Relay card detail

CR1



Terminal	Connection point type	Max section	4 mm²
	Screw type	Min section	0.2 mm²



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Base Load Power Hub (BLPH)

AC UPS - WIRING DIAGRAM & TERMINAL SCHEDULE INCLUDING EQUIPMENTS LIST & BILL OF MATERIAL

ıt Number: 1724000372-EL-DG-00009

Document Class: 2

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	09/10/2024

Rev.	Date	Description	Prepared	Reviewed	Approved
03	03/10/2024	As-Built	DA	DA	AD
02	01/10/2024	Accepted for Construction (AFC)	DA	DA	AD
01	28/08/2024	Accepted for Construction (AFC)	DA	DA	AD
00	03/06/2024	Issue for Review (IFR)	DA	DA	AD

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)
03	As-Built

HOLDS LIST

No.	Description
1	
2	
3	
4	

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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3
WIRING DIAGRAM & TERMINAL SCHEDULE

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AEG

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Project name	1000007888_010
Customer	ROSETTI MARINO
Key word	Hollandse Kust Noord (HKN) wind farm

System	AC UPS PAS - TAG: UP-200F3
Systems Type	System 40 kVA
Responsible for project	Ch.Peck

Created on	23.05.2024	from	Beckschäfer
Last Revision	27.08.2024	from	Beckschäfer

Number of pages 153

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				Checked	Ch.Peck			1000007888_010 en	& EAA
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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

System 40 kVA

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	MBC1	27	Terminal diagram	Terminal diagram =+MBC1-X47	Beckschäfer	01	13.08.2024	Beckschäfer
	MBC1	28	Terminal diagram	Terminal diagram =+MBC1-X48	Beckschäfer	01	13.08.2024	Beckschäfer
	MBC1	29	Terminal diagram	Terminal diagram =+MBC1-X49	Beckschäfer	01	13.08.2024	Beckschäfer
	MBC1	30	Terminal diagram	Terminal diagram =+MBC1-X50	Beckschäfer	01	13.08.2024	Beckschäfer

				Date	27.08.2024
01	500000002053	13.08.2024	Beckschäfer	Editor	Beckschäfer
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

System 40 kVA

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CAE EPLAN Electric P8

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System	Installation location	Page	Type of circuit diagram	Page description	Editor	Stat	Date	Editor
	MBC1	31	Terminal diagram	Terminal diagram =+MBC1-X51	Beckschäfer	01	13.08.2024	Beckschäfer
	MBC1	32	Terminal diagram	Terminal diagram =+MBC1-X52	Beckschäfer	01	13.08.2024	Beckschäfer
	MBC1	33	Terminal diagram	Terminal diagram =+MBC1-X91	Beckschäfer	01	13.08.2024	Beckschäfer
	MBC1	34	Terminal diagram	Terminal diagram =+MBC1-X130	Beckschäfer	01	13.08.2024	Beckschäfer
	UPS1	1	Circuit diagram	Rectifier input	EEC			
	UPS1	2	Circuit diagram	Power section rectifier	EEC			
	UPS1	3	Circuit diagram	Power section rectifier	EEC			
	UPS1	4	Circuit diagram	Battery connection	EEC			
	UPS1	5	Circuit diagram	Power section inverter	EEC			
	UPS1	6	Circuit diagram	Inverter output	EEC			
	UPS1	7	Circuit diagram	Inverter output	EEC			
	UPS1	8	Circuit diagram	Load output / SBS circuit	EEC			
	UPS1	9	Circuit diagram	Inverter output contactor	EEC			
	UPS1	10	Circuit diagram	Power section SBS	EEC			
	UPS1	11	Circuit diagram	Fuse boards	EEC			
	UPS1	12	Circuit diagram	Rectifier control	EEC			
	UPS1	13	Circuit diagram	Inverter control	EEC			
	UPS1	14	Circuit diagram	Control SBS	EEC			
	UPS1	15	Circuit diagram	DOU	EEC			
	UPS1	16	Circuit diagram	Control CAN	EEC			
	UPS1	17	Circuit diagram	Fan control/monitoring	EEC			
	UPS1	18	Circuit diagram	Fan control/monitoring	EEC			
	UPS1	19	Circuit diagram	battery charging circuit monitoring	EEC			
	UPS1	20	Circuit diagram	MultiCom	EEC			
	UPS1	21	Circuit diagram	Remote signaling	EEC			
	UPS1	22	Circuit diagram	Remote signaling	Beckschäfer			
	UPS1	23	Circuit diagram	external connection	EEC			
	UPS1	1	Terminal diagram	Terminal diagram =+UPS1-A9-A12-X3	Beckschäfer			

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System	Installation location	Page	Type of circuit diagram	Page description	Editor	Stat	Date	Editor
	UPS1	2	Terminal diagram	Terminal diagram =+UPS1-A9-A12-X4	Beckschäfer			
	UPS1	3	Terminal diagram	Terminal diagram =+UPS1-A9-A12-X5	Beckschäfer			
	UPS1	4	Terminal diagram	Terminal diagram =+UPS1-A9-A12-X6	Beckschäfer			
	UPS1	5	Terminal diagram	Terminal diagram =+UPS1-A9-A29.1-X2	Beckschäfer			
	UPS1	6	Terminal diagram	Terminal diagram =+UPS1-A9-A29.1-X4	Beckschäfer			
	UPS1	7	Terminal diagram	Terminal diagram =+UPS1-A9-A29.1-X5	Beckschäfer			
	UPS1	8	Terminal diagram	Terminal diagram =+UPS1-A20-X3	Beckschäfer			
	UPS1	9	Terminal diagram	Terminal diagram =+UPS1-A20-X4	Beckschäfer			
	UPS1	10	Terminal diagram	Terminal diagram =+UPS1-A20-X5	Beckschäfer			
	UPS1	11	Terminal diagram	Terminal diagram =+UPS1-A20-X6	Beckschäfer			
	UPS1	12	Terminal diagram	Terminal diagram =+UPS1-E1-X1	Beckschäfer			
	UPS1	13	Terminal diagram	Terminal diagram =+UPS1-E2-X2	Beckschäfer			
	UPS1	14	Terminal diagram	Terminal diagram =+UPS1-E3-X3	Beckschäfer			
	UPS1	15	Terminal diagram	Terminal diagram =+UPS1-E4-X4	Beckschäfer			
	UPS1	16	Terminal diagram	Terminal diagram =+UPS1-F120	Beckschäfer			
	UPS1	17	Terminal diagram	Terminal diagram =+UPS1-F121	Beckschäfer			
	UPS1	18	Terminal diagram	Terminal diagram =+UPS1-PE	Beckschäfer			
	UPS1	19	Terminal diagram	Terminal diagram =+UPS1-X12	Beckschäfer			
	UPS1	20	Terminal diagram	Terminal diagram =+UPS1-X13	Beckschäfer			
	UPS1	21	Terminal diagram	Terminal diagram =+UPS1-X14	Beckschäfer			
	UPS1	22	Terminal diagram	Terminal diagram =+UPS1-X15	Beckschäfer			
	UPS1	23	Terminal diagram	Terminal diagram =+UPS1-X120	Beckschäfer			
	UPS2	1	Circuit diagram	Rectifier input	Beckschäfer			
	UPS2	2	Circuit diagram	Power section rectifier	Beckschäfer			
	UPS2	3	Circuit diagram	Power section rectifier	Beckschäfer			
	UPS2	4	Circuit diagram	Battery connection	Beckschäfer			
	UPS2	5	Circuit diagram	Power section inverter	Beckschäfer			
	UPS2	6	Circuit diagram	Inverter output	Beckschäfer			

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System	Installation location	Page	Type of circuit diagram	Page description	Editor	Stat	Date	Editor
	UPS2	7	Circuit diagram	Inverter output	Beckschäfer			
	UPS2	8	Circuit diagram	Load output / SBS circuit	Beckschäfer			
	UPS2	9	Circuit diagram	Inverter output contactor	Beckschäfer			
	UPS2	10	Circuit diagram	Power section SBS	Beckschäfer			
	UPS2	11	Circuit diagram	Fuse boards	Beckschäfer			
	UPS2	12	Circuit diagram	Rectifier control	Beckschäfer			
	UPS2	13	Circuit diagram	Inverter control	Beckschäfer			
	UPS2	14	Circuit diagram	Control SBS	Beckschäfer			
	UPS2	15	Circuit diagram	DOU	Beckschäfer			
	UPS2	16	Circuit diagram	Control CAN	Beckschäfer			
	UPS2	17	Circuit diagram	Fan control/monitoring	Beckschäfer			
	UPS2	18	Circuit diagram	Fan control/monitoring	Beckschäfer			
	UPS2	19	Circuit diagram	battery charging circuit monitoring	Beckschäfer			
	UPS2	20	Circuit diagram	MultiCom	Beckschäfer			
	UPS2	21	Circuit diagram	Remote signaling	Beckschäfer			
	UPS2	22	Circuit diagram	Remote signaling	Beckschäfer			
	UPS2	23	Circuit diagram	external connection	Beckschäfer			
	UPS2	1	Terminal diagram	Terminal diagram =+UPS2-A9-A12-X3	Beckschäfer			
	UPS2	2	Terminal diagram	Terminal diagram =+UPS2-A9-A12-X4	Beckschäfer			
	UPS2	3	Terminal diagram	Terminal diagram =+UPS2-A9-A12-X5	Beckschäfer			
	UPS2	4	Terminal diagram	Terminal diagram =+UPS2-A9-A12-X6	Beckschäfer			
	UPS2	5	Terminal diagram	Terminal diagram =+UPS2-A9-A29.1-X2	Beckschäfer			
	UPS2	6	Terminal diagram	Terminal diagram =+UPS2-A9-A29.1-X4	Beckschäfer			
	UPS2	7	Terminal diagram	Terminal diagram =+UPS2-A9-A29.1-X5	Beckschäfer			
	UPS2	8	Terminal diagram	Terminal diagram =+UPS2-A20-X3	Beckschäfer			
	UPS2	9	Terminal diagram	Terminal diagram =+UPS2-A20-X4	Beckschäfer			
	UPS2	10	Terminal diagram	Terminal diagram =+UPS2-A20-X5	Beckschäfer			
	UPS2	11	Terminal diagram	Terminal diagram =+UPS2-A20-X6	Beckschäfer			

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	UPS2	12	Terminal diagram	Terminal diagram =+UPS2-E1-X1	Beckschäfer			
	UPS2	13	Terminal diagram	Terminal diagram =+UPS2-E2-X2	Beckschäfer			
	UPS2	14	Terminal diagram	Terminal diagram =+UPS2-E3-X3	Beckschäfer			
	UPS2	15	Terminal diagram	Terminal diagram =+UPS2-E4-X4	Beckschäfer			
	UPS2	16	Terminal diagram	Terminal diagram =+UPS2-F120	Beckschäfer			
	UPS2	17	Terminal diagram	Terminal diagram =+UPS2-F121	Beckschäfer			
	UPS2	18	Terminal diagram	Terminal diagram =+UPS2-PE	Beckschäfer			
	UPS2	19	Terminal diagram	Terminal diagram =+UPS2-X12	Beckschäfer			
	UPS2	20	Terminal diagram	Terminal diagram =+UPS2-X13	Beckschäfer			
	UPS2	21	Terminal diagram	Terminal diagram =+UPS2-X14	Beckschäfer			
	UPS2	22	Terminal diagram	Terminal diagram =+UPS2-X15	Beckschäfer			
	UPS2	23	Terminal diagram	Terminal diagram =+UPS2-X114	Beckschäfer			
	UPS2	24	Terminal diagram	Terminal diagram =+UPS2-X120	Beckschäfer			

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Structure identifier overview

Full designation	Labeling	Structure description
+BAT1	Installation location	Battery cabinet
+MBC1	Installation location	Bypass transformer cabinet with manual bypass 40 kVA
+UPS1	Installation location	Protect 8.33 40-400-210-400
+UPS2	Installation location	Protect 8.33 40-400-210-400
&EAA	Document type	Title page/Cover page
&EAB	Document type	Table of contents
&EDB	Document type	Structure identifier overview
&EFA	Document type	Single-line diagram
&EFS	Document type	Circuit diagram
&EMA	Document type	Terminal diagram

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AUXILIARY
From Lighting & Small Power DB BOP DP-200N1
(Cubicle 03-Q41)

100-240V/N/PE~50/60Hz

back-up fuse
gG10A
3G2.5mm2

LINE A
From LV Switchgear SG-200N1
(Cubicle A3/01)

Mains
400V;3/PE~50Hz

gG80A
4G35mm2

From LV Switchgear SG-200N1
(Cubicle A7/02)

Bypass mains
400V;3/PE~50Hz

gG63A
4G35mm2

LINE B
From LV Switchgear SG-200N1
(Cubicle A4/01)

Mains 400V;3/PE~50Hz

gG80A
4G35mm2

Not included in the AEG shipment

Code	Description
Q1	Rectifier input mains breaker
T40	Rectifier input isolation transformer
A1	Rectifier
A2	Inverter
T1	Inverter output isolation transformer
A3-A4	Static by-pass switch
A18	Display control module
A85	Heater
H1	Light

+MBC1
BY-200F3
Bypass transformer cabinet 40 kVA
10000007888.020
10009757

-X1 ◊ 1U,1V,1W,PE
-X10 ◊ U,V,W,PE
-X13 ◊ U,N,PE
-X14 ◊ U,N
-X1 ◊ 3U,3V,3W,PE
1.3 / B
B / 1.8
-A85
-H1
-Q10
L=80/85A
I=0,8kA
Icu=50kA
-T8
400V/400V
40kVA
-Q28.1 NC
-Q28.2 NC
-X1 ◊ 2U,2V,2W,PE
-X4 ◊ 1U,1V,1W,1N,PE
-X4 ◊ 2U,2V,2W,2N,PE
-X1 ◊ 4U,4V,4W,PE

+UPS1
BC-200F3A
Protect 8.33 40-400-210-400
10000007888.010
10009756

+UPS2
BC-200F3B
Protect 8.33 40-400-210-400
10000007888.010
10009756

*2
B / 1.6
1.7 / B
-X13 ◊ U,N,PE
-X14 ◊ U,N
-E1-X1 ◊ U,V,W,PE
-E4-X4 ◊ U,V,W,N,PE
-A85
-H1
-Q1
L=100/85A
I=1,0kA
Icu=50kA
-T40
-A1 REC
-A2 INV
-T1
-F1,-F2,-F3
-A18
Display
-A20
Parallel Adapter
INV CAN -X3 1-3 → 203 / 1.6
INV Sync -X5 1-4 → 205 / 1.6
1.5 / 203
1.5 / 205
-A3 SBS
-A4
-L11,-L12,-L13
Parallel preventive choke coil
-A24.1
BLÜ-PRO
-F91
-A12 ,-A13
Remote signaling
-E2-X2 ◊ L-,L+,PE
-X15 ◊ 2,3
-X130 ◊ 1,2
-E3-X3 ◊ U,V,W,N,PE
-X2 ◊ 1L+,1L-,PE
-X91 ◊ 1M
-X5 ◊ 1U,1V,1W,1N,PE
-X5 ◊ 2U,2V,2W,2N,PE
-X2 ◊ 3L+,3L-,PE
-X15 ◊ 6,7
-X91 ◊ 3M
-Q71 NC
-Q72 NC
1.5 / A
A / 1.6
-Q29
1NV operation
Manual bypass
-F25
DP-200F3
-QF31 B32A 300mA
-QF32 B32A ^^0mA
-QF33 B32A 300mA
-QF34 B16A 300mA
5pc
-QF38 B16A 300mA
-QF39 B10A 300mA
4pc
-QF42 B10A 300mA
-QF43 B10A
8pc
-QF50 B10A
-QF51 B6A
-QF52 B6A
-X2 ◊ 2L+,2L-,PE
-X15 ◊ 4,5
-X91 ◊ 2M
-X130 ◊ 1,2,1PE
-X31 ◊ U,N,PE
-X32 ◊ U,N,PE
-X33 ◊ U,N,PE
-X34 ◊ U,N,PE
-X38 ◊ V,N,PE
-X39 ◊ V,N,PE
-X42 ◊ W,N,PE
-X43 ◊ W,N,PE
-X50 ◊ U,N,PE
-X51 ◊ V,N,PE
-X52 ◊ V,N,PE
-X2 ◊ 4L+,4L-,PE
-X15 ◊ 8,9
-X91 ◊ 4M
-X130 ◊ 3,4,2PE
2(1x70 mm2)
Not included in the AEG shipment
max. gG16A
max. gG16A
Load
400/230V;3/N/PE~50Hz

+BFB1
CB-200F3A
Battery fuse box 200 A
*1
-Q2
L=200A
DC 24V
max. 300W

+BFB2
CB-200F3B
Battery fuse box 200 A

+BAT1
BA-200F3A
Batteries installed on rack
18 x FLG 12-150
Battery voltage 216V
Battery capacity 150Ah
string 1
-R81

+BAT2
BA-200F3B
Batteries installed on rack
18 x FLG 12-150
Battery voltage 216V
Battery capacity 150Ah

*1 Attention! In the event of battery undervoltage < 130 V, the UPS automatically switches off battery isolator Q2.
If this happens, switch X15:3 must be switched into the open position (undervoltage trip blocked).
For restart, please refer to the chapter in the UPS operating instructions (charging the DC link capacitors) attached.
Unlock the tripped switch Q2 by switching to open position.
After charging the DC link capacitors, switch on Q2.
Attention! When the battery voltage reaches > 200 V, switch X15:3 must be switched back to the closed position.

*2 Connection cables are not included.

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1000007888_010

REC mains

UPS1

Top entry

-X1 1U 1V 1W

-PE

PE busbar

Cu 40x5 mm

Door

GNYE
6 mm²

Rack

Rack

BK R16 mm²

BK R16 mm²

BK R16 mm²

GNYE R35 mm²

Bottom entry

-PE

Cu 40x5 mm

-X1 2U 2V 2W

+UPS1
Protect 8.33 40-400-210-400
1000007888.010
10009756

GZ1_1 +UPS1/1.2

GZ1_2 +UPS1/1.2

GZ1_3 +UPS1/1.2

REC mains

UPS2

Top entry

-X1 3U 3V 3W

-PE

BK R16 mm²

BK R16 mm²

BK R16 mm²

Bottom entry

-PE

-X1 4U 4V 4W

+UPS2
Protect 8.33 40-400-210-400
1000007888.010
10009756

GZ1_1 +UPS2/1.2

GZ1_2 +UPS2/1.2

GZ1_3 +UPS2/1.2

				Date	22.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	REC mains Bypass transformer cabinet with manual bypass 40 kVA Circuit diagram	=
				Editor	Beckschäfer				+ MBC1
				Checked	Ch.Peck			1000007888.020 10009757	1000007888_010 en
Stat	Alteration	Date	Name	Norm					& EFS

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1000007888_010

+UPS1
Protect 8.33 40-400-210-400
1000007888.010
10009756

GZ2_1 +UPS1/4.3
GZ2_2 +UPS1/4.2
GZ2_3 +UPS1/4.3
GZ15_2 +UPS1/12.8
GZ15_3 +UPS1/12.8
GZ91_1 +UPS1/19.3
GZ130_1 +UPS1/12.2
GZ130_2 +UPS1/12.2

-W208
LiYCY 3x0,5 mm²
WH
BN

Bottom entry
-X2 1L+
1L-
-PE
-X15 2
3
-X91 1M

BK R70 mm²
BK R70 mm²
BK R2,5 mm²
BK R2,5 mm²
BK R2,5 mm²

Top entry
-X2 2L+
2L-
-PE
-X15 4
5
-X91 2M

Battery fuse

Battery MCCB
Shunt opening release

Battery central tapping

Top entry
-X130 1
2
1PE
OG 1,5 mm²

+BAT1
Battery cabinet
-R81
-X1 1
2

				Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	GR-Ausgang UPS1 Bypass transformer cabinet with manual bypass 40 kVA Circuit diagram	=
				Editor	Beckschäfer				+ MBC1
				Checked	Ch.Peck			1000007888.020 10009757	1000007888_010 en
Stat	Alteration	Date	Name	Norm					& EFS

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1000007888_010

+UPS2
Protect 8.33 40-400-210-400
1000007888.010
10009756

GZ2_1 +UPS2/4.3
GZ2_2 +UPS2/4.2
GZ2_3 +UPS2/4.3
GZ15_2 +UPS2/12.8
GZ15_3 +UPS2/12.8
GZ91_1 +UPS2/19.3
GZ130_1
GZ130_2

-W209
LiYCY 3x0,5 mm²
WH
BN

Bottom entry
-X2 3L+
3L-
-PE
-X15 6
7
-X91 3M

BK R70 mm²
BK R70 mm²
BK R2,5 mm²
BK R2,5 mm²
BK R2,5 mm²

Top entry
-X2 4L+
4L-
-PE
-X15 8
9
-X91 4M

Top entry
-X130 3
4
2PE
OG 1,5 mm²

Battery fuse

Battery MCCB
Shunt opening release

Battery central tapping

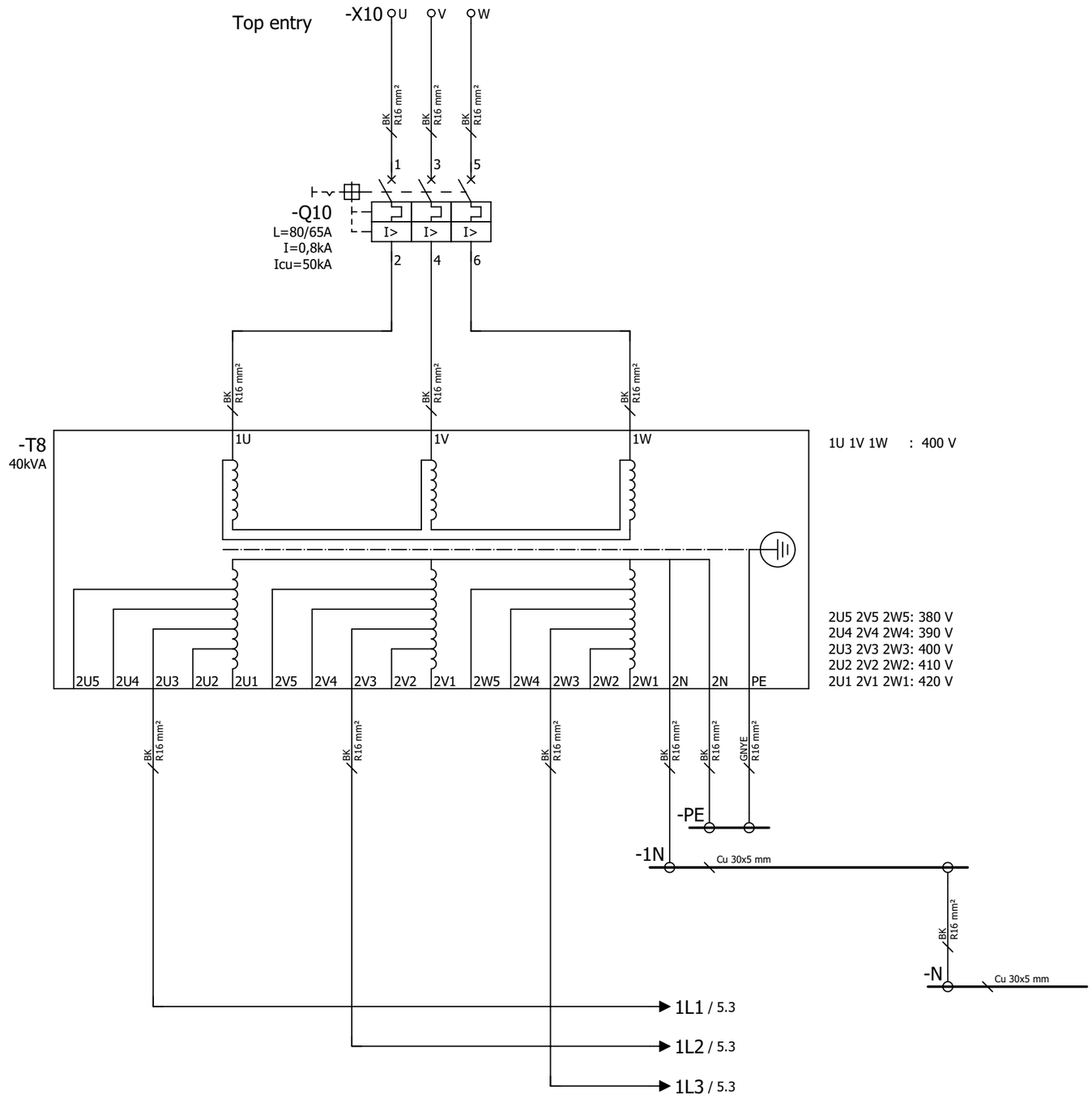
+BAT2
Battery cabinet
-R81
-X1 1
2

				Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	GR-Ausgang UPS2 Bypass transformer cabinet with manual bypass 40 kVA Circuit diagram		=
				Editor	Beckschäfer					+ MBC1
				Checked	Ch.Peck			1000007888.020 10009757	1000007888_010 en	& EFS
Stat	Alteration	Date	Name	Norm						A3 sheet 3 / sheets 17

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Mains
400V;3/PE~50Hz

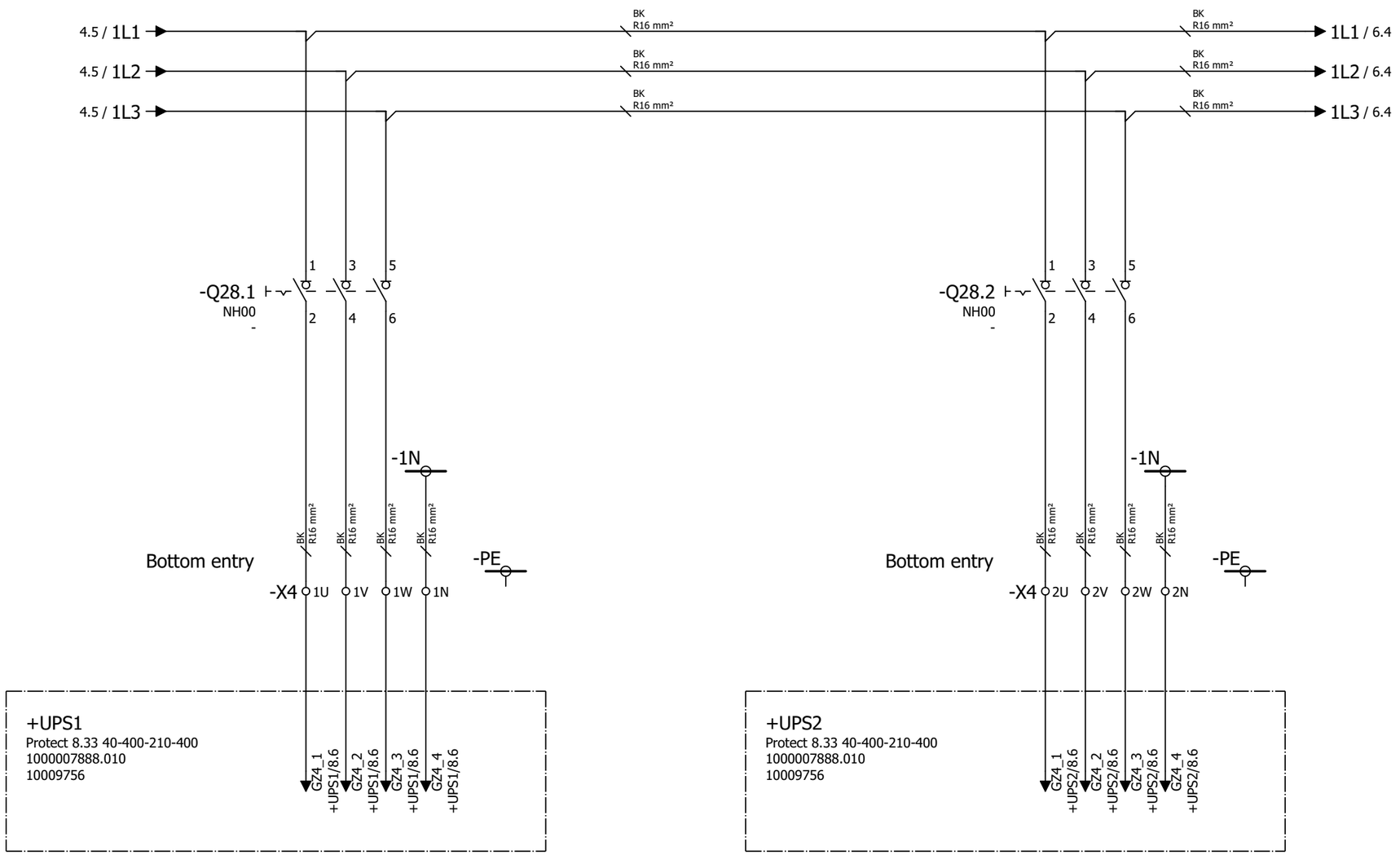


1000007888_010

				Date	17.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Bypass Transformator Bypass transformer cabinet with manual bypass 40 kVA Circuit diagram	=
				Editor	Beckschäfer				+ MBC1
				Checked	Ch.Peck			1000007888.020 10009757	& EFS
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									sheet 4
									sheets 17

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1000007888_010

				Date	22.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	SBS mains Bypass transformer cabinet with manual bypass 40 kVA Circuit diagram	=
				Editor	Beckschäfer				+ MBC1
				Checked	Ch.Peck			1000007888.020 10009757	& EFS
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1000007888_010

+UPS1
Protect 8.33 40-400-210-400
1000007888.010
10009756

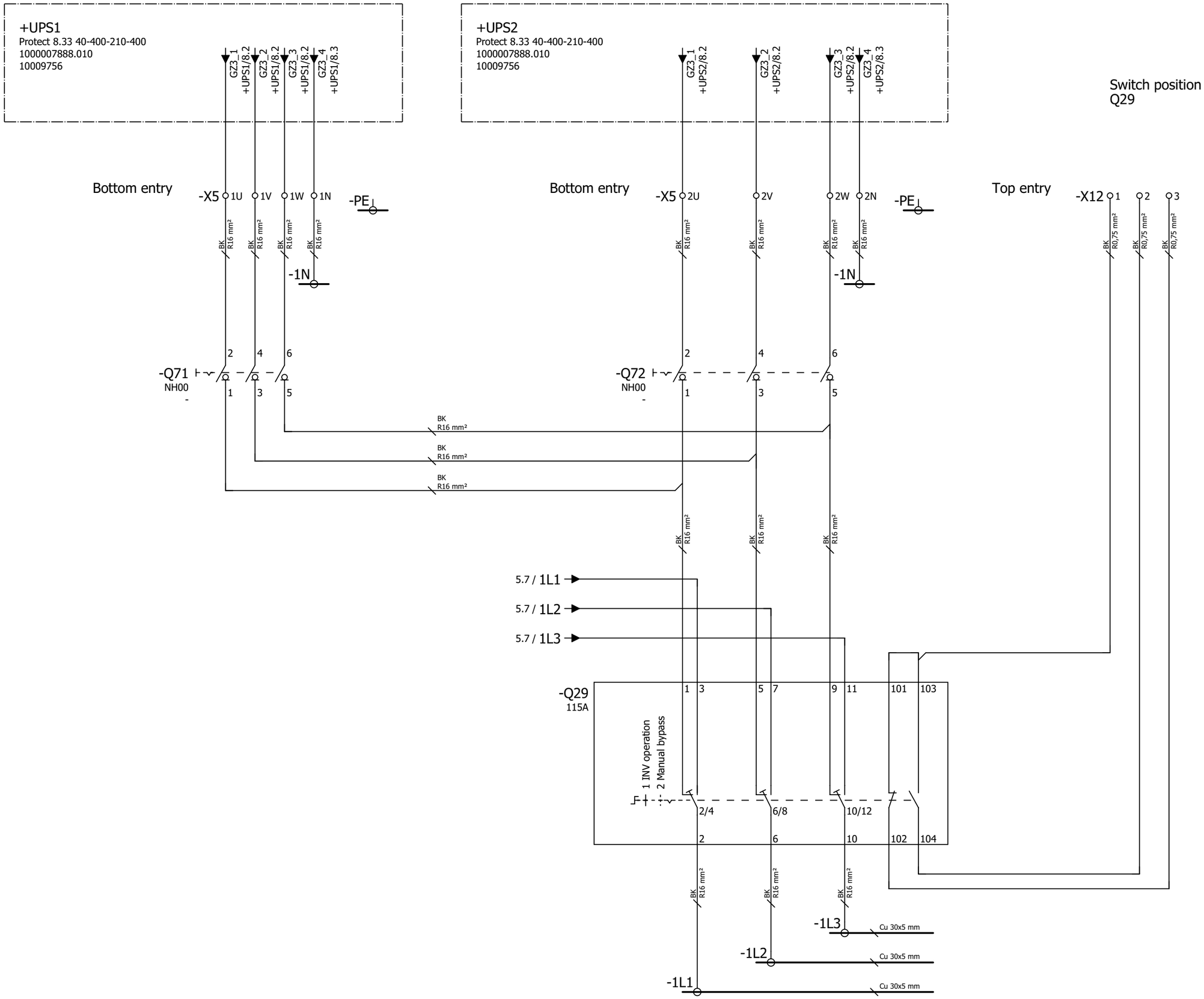
+UPS2
Protect 8.33 40-400-210-400
1000007888.010
10009756

Switch position
Q29

Bottom entry

Bottom entry

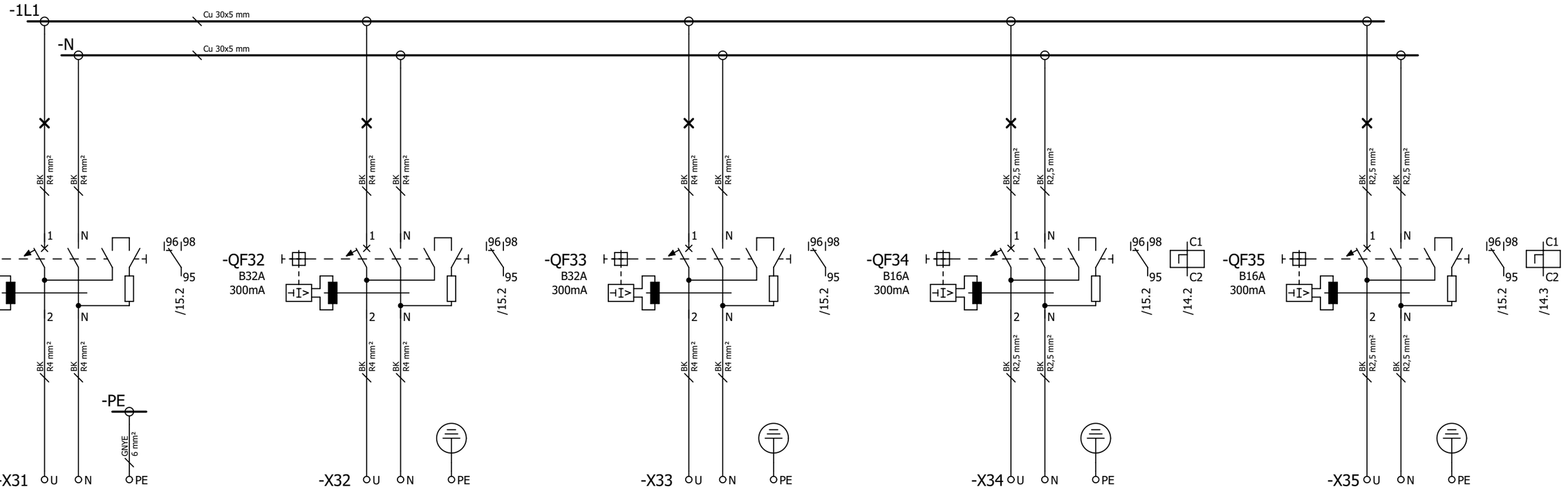
Top entry



				Date	22.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Manual bypass Bypass transformer cabinet with manual bypass 40 kVA Circuit diagram	=
				Editor	Beckschäfer				+ MBC1
01	500000002053	13.08.2024	Beckschäfer	Checked	Ch.Peck			1000007888.020 10009757	1000007888_010 en & EFS
Stat	Alteration	Date	Name	Norm					A3 sheet 6 / sheets 17

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Load
230V/N/PE~50Hz

SPARE

Load
230V/N/PE~50Hz

SPARE

Load
230V/N/PE~50Hz

SPARE

Load
230V/N/PE~50Hz

CP-630-E1
UCP-INSTRUMENT AIR PACKAGE
1.5KW

Load
230V/N/PE~50Hz

CP-640-E1
UCP-N2 PACKAGE
1.5KW

1000007888_010

				Date	23.05.2024
01	500000002053	13.08.2024	Beckschäfer	Editor	Beckschäfer
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Load
Bypass transformer cabinet
with manual bypass 40 kVA
Circuit diagram

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10009757

1000007888_010 en

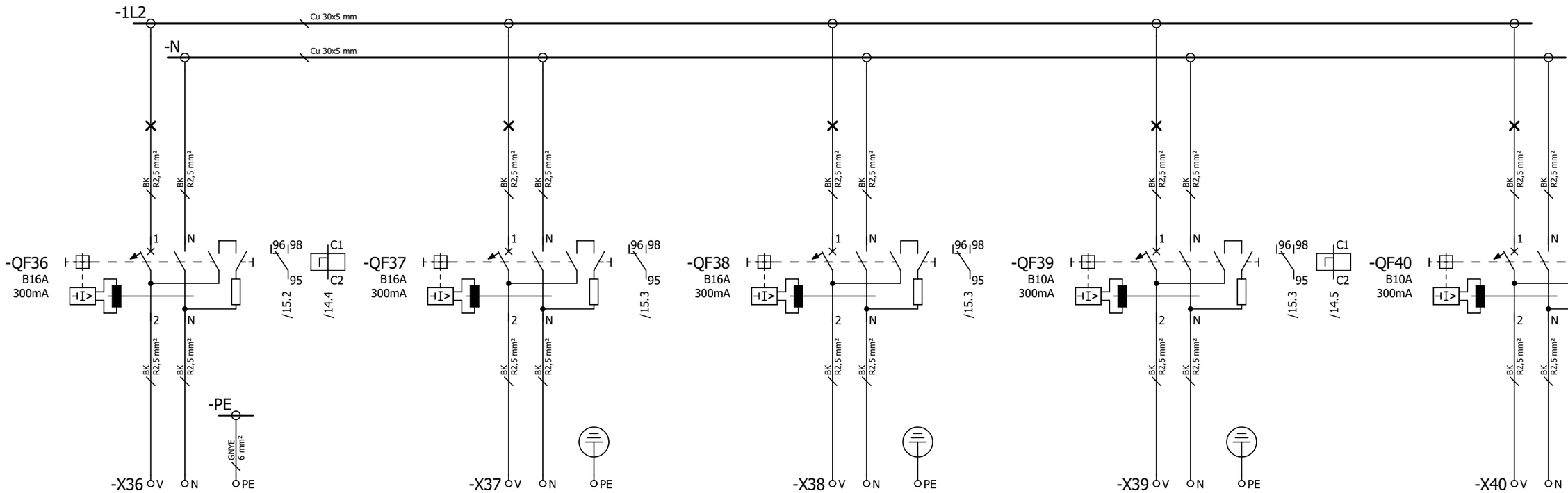
=
+ MBC1
& EFS

A3

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sheets 17

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Load
230V/N/PE~50Hz

JB-500-F8
UCP WATER PACKAGE
2KW

Load
230V/N/PE~50Hz

B400-SRV-001
SERVER CABINET ITER - LINE A

Load
230V/N/PE~50Hz

B400-SRV-001
SERVER CABINET ITER - LINE B

Load
230V/N/PE~50Hz

B100-HSB-001
UCP-HVAC HV ROOM
0.5KW

Load
230V/N/PE~50Hz

B200-HSB-001
UCP-HVAC LV ROOM
0.5KW

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				Date	23.05.2024
01	500000002053	13.08.2024	Beckschäfer	Editor	Beckschäfer
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Load
Bypass transformer cabinet
with manual bypass 40 kVA
Circuit diagram

1000007888.020
10009757

1000007888_010 en

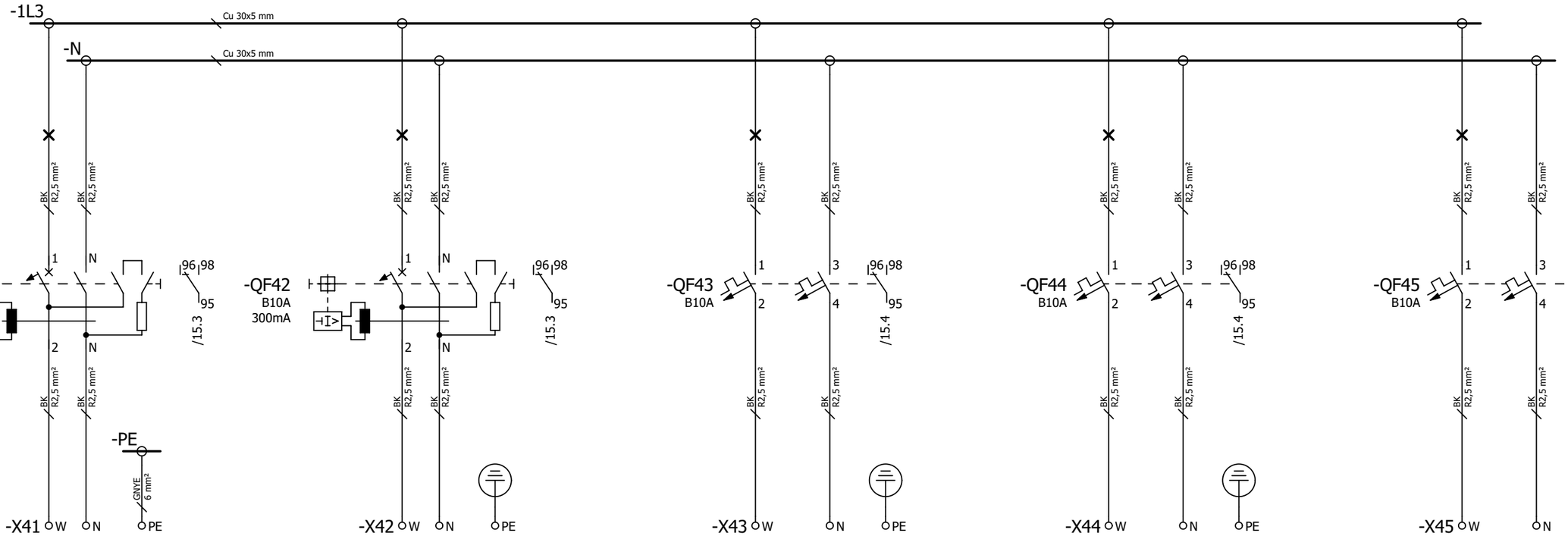
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+ MBC1
& EFS

A3

sheet 8
sheets 17

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Load
230V/N/PE~50Hz

B300-HSB-001
UCP-HVAC UPS ROOM
0.5KW

Load
230V/N/PE~50Hz

B300-HSB-001
UCP-HVAC ITER
0.5KW

Load
230V/N/PE~50Hz

B400-SIS-001
SIS-CONTROLLER AND I/O
CABINET-LINE A - 1KW

Load
230V/N/PE~50Hz

B400-SIS-001
SIS-CONTROLLER AND I/O
CABINET-LINE B - 1KW

Load
230V/N/PE~50Hz

B400-PCS-001
PCS-CONTROLLER AND I/O
CABINET-LINE A - 1.5KW

1000007888_010

				Date	23.05.2024
01	500000002053	13.08.2024	Beckschäfer	Editor	Beckschäfer
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Load
Bypass transformer cabinet
with manual bypass 40 kVA
Circuit diagram

1000007888.020
10009757

1000007888_010 en

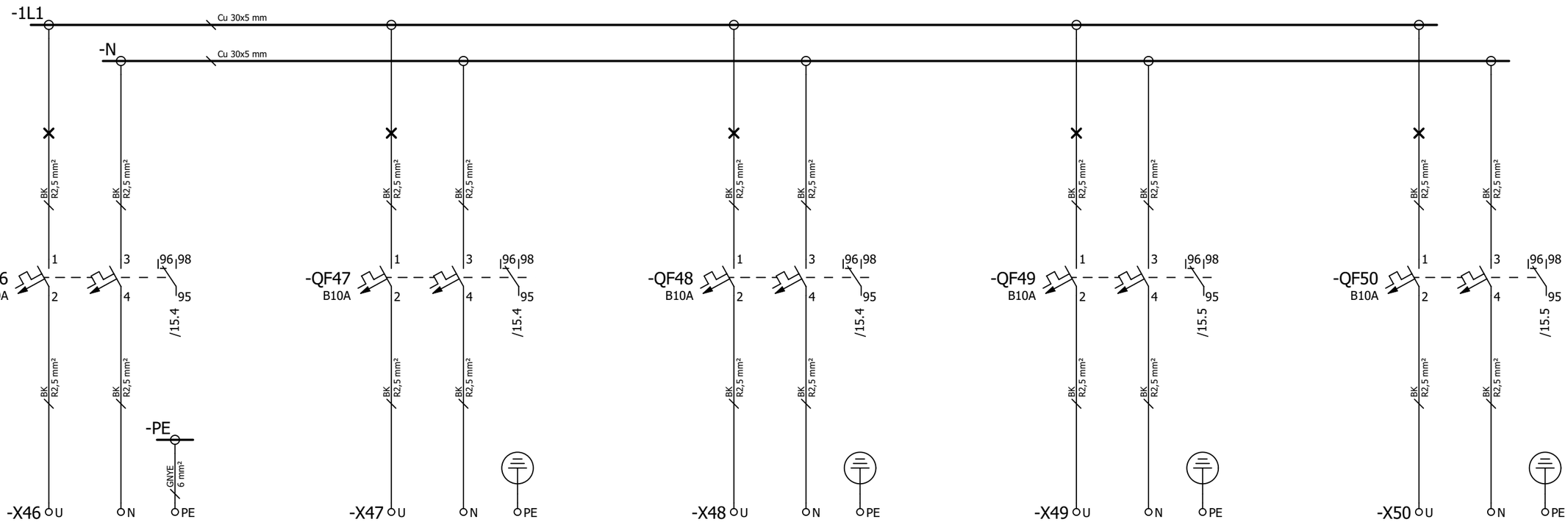
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+ MBC1
& EFS

A3

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sheets 17

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Load
230V/N/PE~50Hz

B400-PCS-001
PCS-CONTROLLER AND I/O
CABINET-LINE B - 1.5KW

Load
230V/N/PE~50Hz

B400-EMCS-001
EMCS-CONTROLLER AND I/O
CABINET-LINE A - 1KW

Load
230V/N/PE~50Hz

B400-EMCS-001
EMCS-CONTROLLER AND I/O
CABINET-LINE B - 1KW

Load
230V/N/PE~50Hz

SG-200-N1
LV SWITCHBOARD AUXILIARY
1KW

Load
230V/N/PE~50Hz

SPARE

1000007888_010

				Date	23.05.2024
01	500000002053	13.08.2024	Beckschäfer	Editor	Beckschäfer
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Load
Bypass transformer cabinet
with manual bypass 40 kVA
Circuit diagram

1000007888.020
10009757

1000007888_010 en

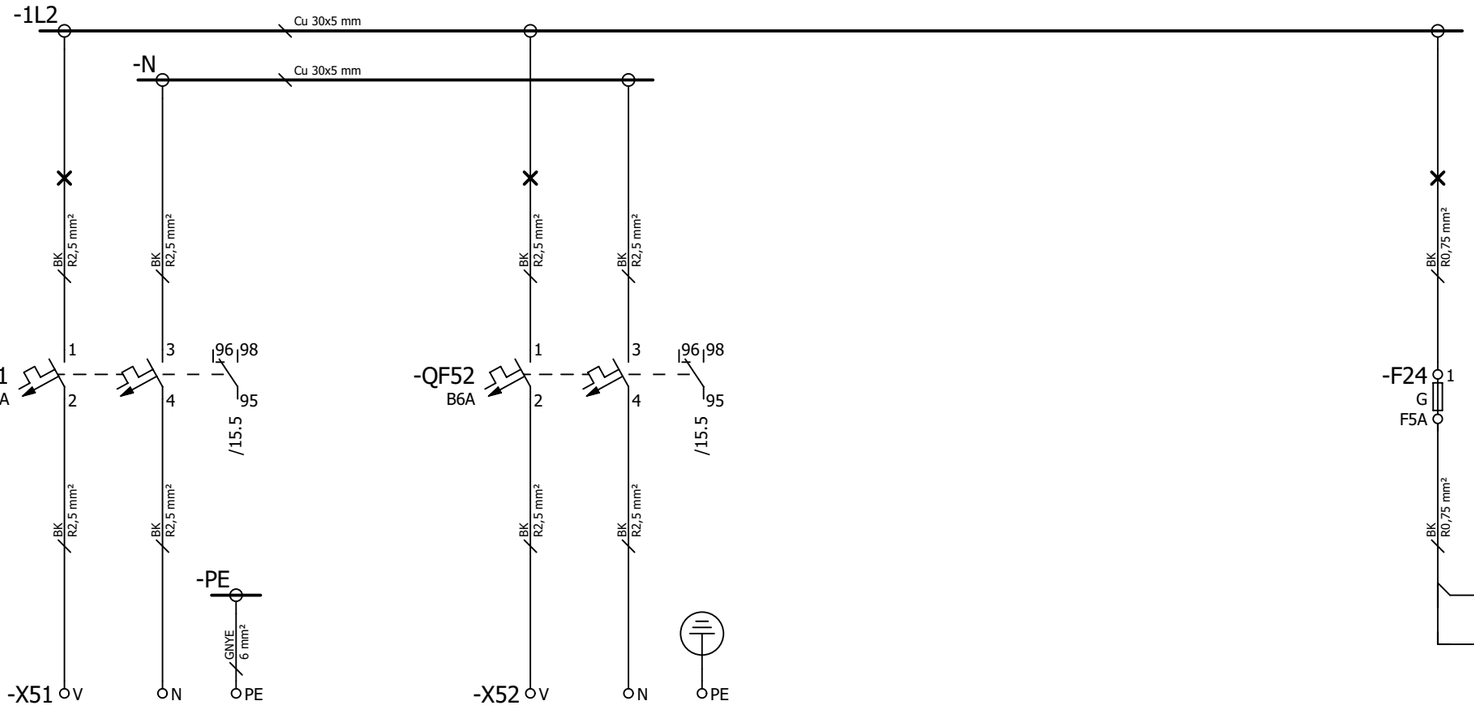
=
+ MBC1
& EFS

A3

sheet 10
sheets 17

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Load
230V/N/PE~50Hz

SG-200-D2
LV SWITCHBOARD
800/460V AUXILIARY

Load
230V/N/PE~50Hz

SPARE
0.5KW

1000007888_010

				Date	13.08.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Load Bypass transformer cabinet with manual bypass 40 kVA Circuit diagram		=
01	500000002053	13.08.2024	Beckschäfer	Editor	Beckschäfer					+ MBC1
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck				1000007888.020	& EFS
Stat	Alteration	Date	Name	Norm					10009757	1000007888_010 en

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1000007888_010

status
Surge arrester

Top entry

-X12 4 5 6

-1L3 Cu 30x5 mm

-1L2 Cu 30x5 mm

-1L1 Cu 30x5 mm

-PE Cu 40x5 mm

BK R16 mm² | BK R16 mm² | BK R16 mm² | GNYE R16 mm²

BK R0,75 mm² | BK R0,75 mm² | BK R0,75 mm²

-F25

L1 L1' L2 L2' L3 L3' PE(N) PE(N)'

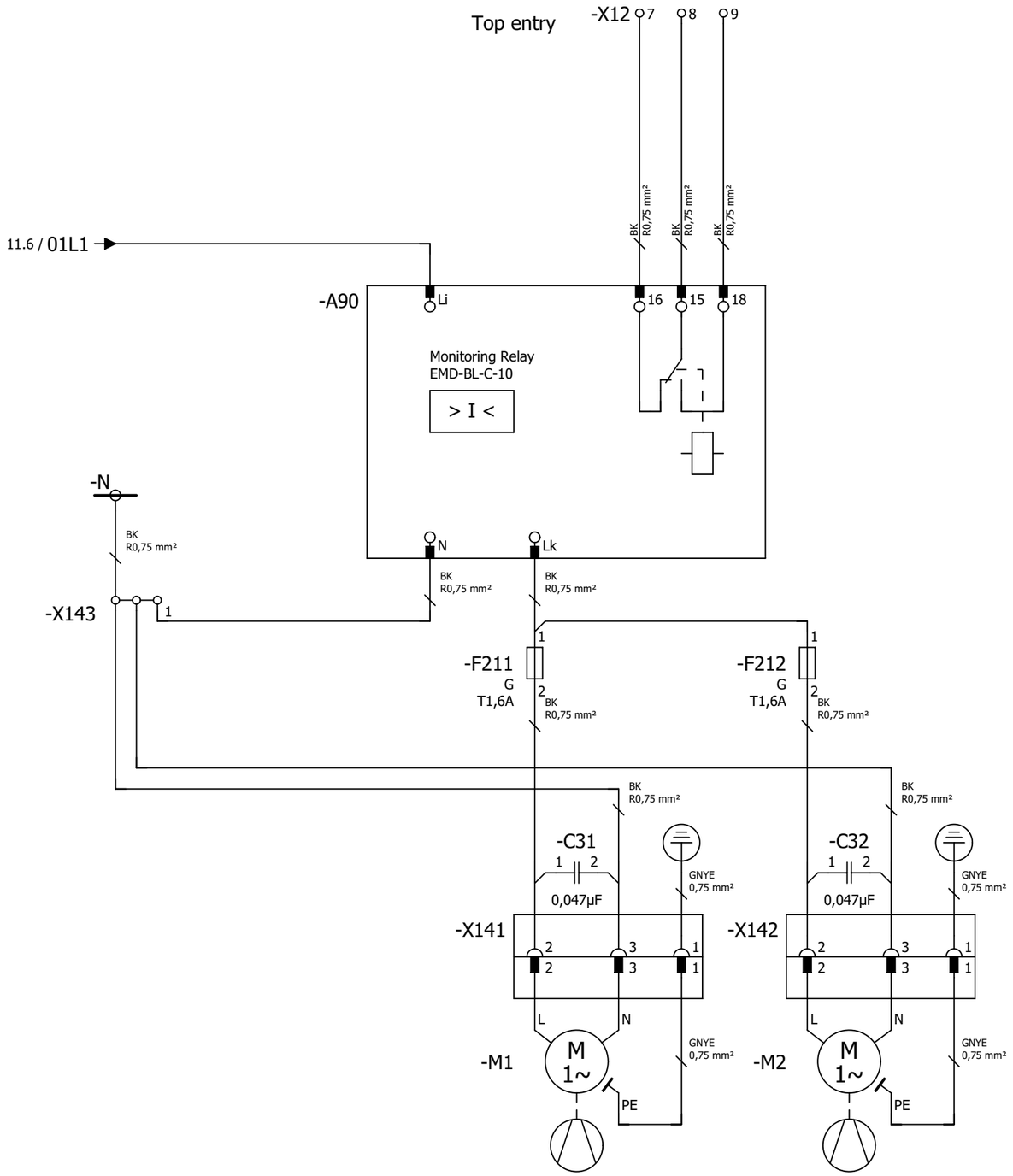
11 12 14

				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Surge arrester Bypass transformer cabinet with manual bypass 40 kVA Circuit diagram	=
				Editor	Beckschäfer				+ MBC1
01	500000002053	13.08.2024	Beckschäfer	Checked	Ch.Peck			1000007888.020 10009757	1000007888_010 en & EFS
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Fan fault



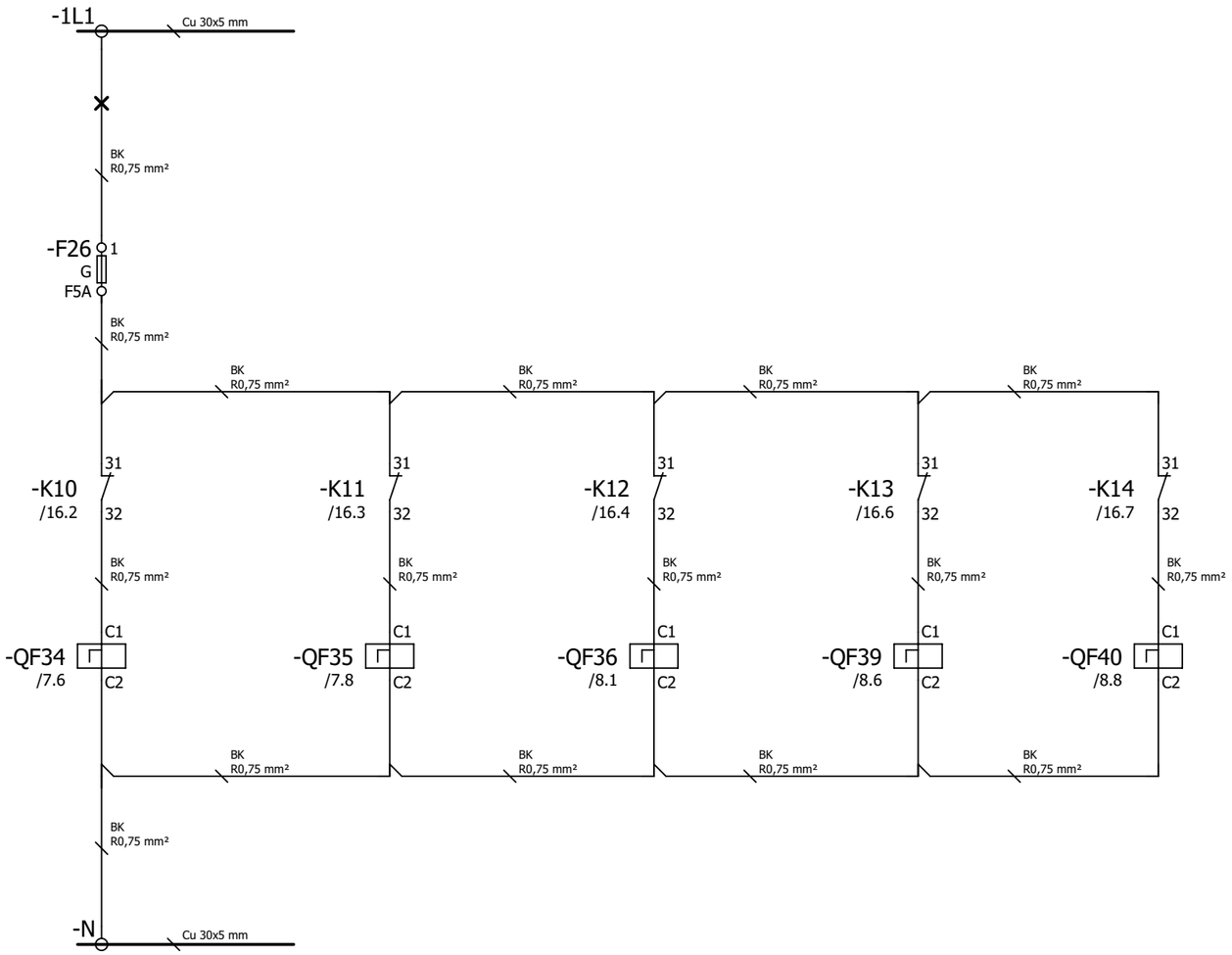
1000007888_010

				Date	22.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Fan control Bypass transformer cabinet with manual bypass 40 kVA Circuit diagram		=
				Editor	Beckschäfer					+ MBC1
01	500000002053	13.08.2024	Beckschäfer	Checked	Ch.Peck				1000007888.020	& EFS
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A3 | sheet 13 | sheets 17

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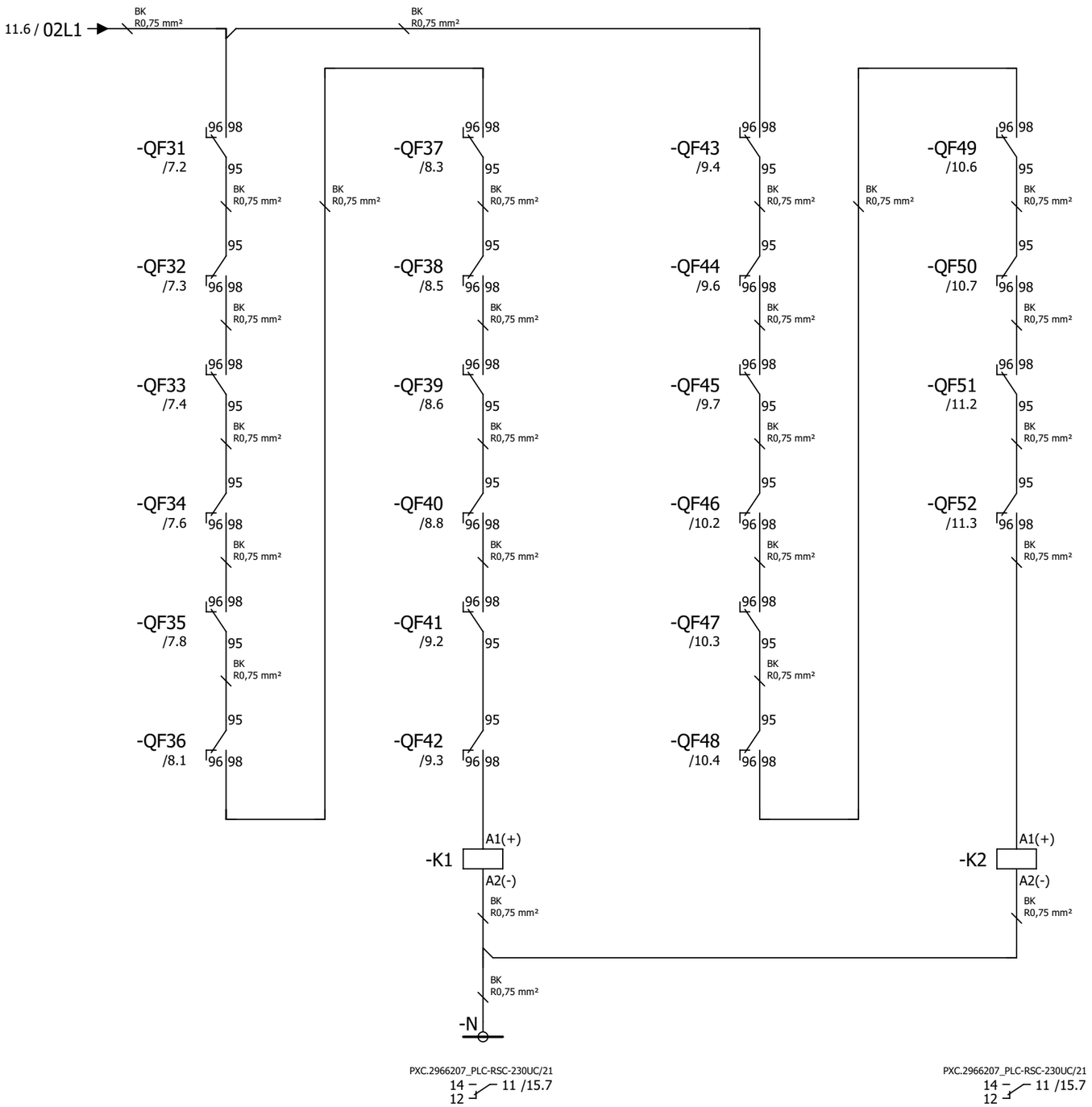
1000007888_010

				Date	03.06.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Tripping Bypass transformer cabinet with manual bypass 40 kVA Circuit diagram
01	500000002053	13.08.2024	Beckschäfer	Editor	Beckschäfer			
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck			
Stat	Alteration	Date	Name	Norm				

			=		
			+ MBC1		
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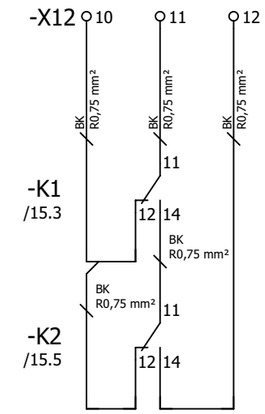
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Common fault

QF31 - QF52

Top entry



1000007888_010

				Date	22.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Common fault Bypass transformer cabinet with manual bypass 40 kVA Circuit diagram	=
				Editor	Beckschäfer				+ MBC1
01	5000000002053	13.08.2024	Beckschäfer	Checked	Ch.Peck			1000007888.020	& EFS
Stat	Alteration	Date	Name	Norm				10009757	1000007888_010 en

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1000007888_010

QF34 (C16A)

24V DC is permanently present in fault-free operation

QF35 (C16A)

24V DC is permanently present in fault-free operation

QF36 (C16A)

24V DC is permanently present in fault-free operation

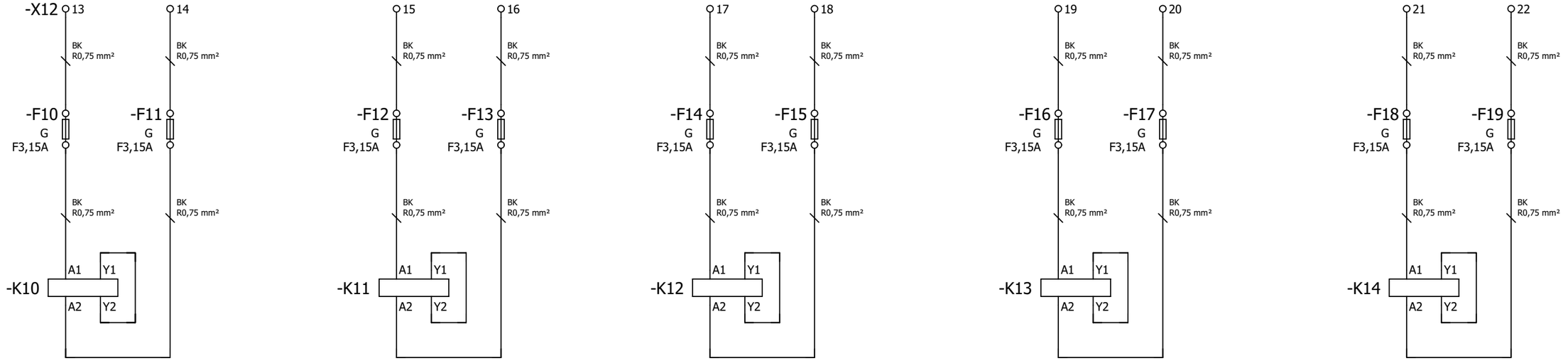
QF39(C10A)

24V DC is permanently present in fault-free operation

QF40(C10A)

24V DC is permanently present in fault-free operation

Top entry



PXC.2981020_PSR-SCP- 24DC/ESP4/2X1/1X2

13 – 14
23 – 24
31 – 32 /14.2

PXC.2981020_PSR-SCP- 24DC/ESP4/2X1/1X2

13 – 14
23 – 24
31 – 32 /14.3

PXC.2981020_PSR-SCP- 24DC/ESP4/2X1/1X2

13 – 14
23 – 24
31 – 32 /14.4

PXC.2981020_PSR-SCP- 24DC/ESP4/2X1/1X2

13 – 14
23 – 24
31 – 32 /14.5

PXC.2981020_PSR-SCP- 24DC/ESP4/2X1/1X2

13 – 14
23 – 24
31 – 32 /14.6

				Date	03.06.2024
01	500000002053	13.08.2024	Beckschäfer	Editor	Beckschäfer
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Remote signaling
Bypass transformer cabinet
with manual bypass 40 kVA
Circuit diagram

1000007888.020
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=
+ MBC1
& EFS

A3

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sheets 17

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+UPS1
Protect 8.33 40-400-210-400
1000007888.010
10009756

GZ13_1 +UPS1/23.7

GZ13_2 +UPS1/23.7

+UPS2
Protect 8.33 40-400-210-400
1000007888.010
10009756

GZ13_1 +UPS2/23.2

GZ13_2 +UPS2/23.3

BK R1,5 mm²

BK R1,5 mm²

Top entry

-X13 U U N N PE PE

BK R0,75 mm²

BK R0,75 mm²

-F100 1 G T6,3A

BK R0,75 mm²

-F85 L I 3 2

BK R0,75 mm²

-A85 -X1 3 2

-R1

Top entry

-X14 U U N N

BK R0,75 mm²

-F110 1 G T6,3A 2

BK R0,75 mm²

BK R0,75 mm²

-X114 U N

-W100
H05VV
2x1 mm²
3 m

L N

-H1
Enclosure light

			Date	22.05.2024	
			Editor	Beckschäfer	
			Checked	Ch.Peck	
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

external connection
Bypass transformer cabinet
with manual bypass 40 kVA
Circuit diagram

1000007888.020
10009757

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=
+ MBC1
& EFS

A3

sheet 17
sheets 17

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1000007888_010

Terminal diagram

bar
=+MBC1-PE

Cable name / Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name / Cable type	Position / Page
			PE					+MBC1&EFS/1.3
			PE					+MBC1&EFS/1.3
			PE					+MBC1&EFS/1.6
			PE					+MBC1&EFS/1.6
	+UPS1-PE	PE	PE					+MBC1&EFS/2.3
			PE					+MBC1&EFS/2.3
	+UPS2-PE	PE	PE					+MBC1&EFS/3.3
			PE					+MBC1&EFS/3.3
			PE					+MBC1&EFS/5.4
			PE					+MBC1&EFS/5.7
			PE					+MBC1&EFS/6.3
			PE					+MBC1&EFS/6.6

CAE EPLAN Electric P8

Terminal diagram

bar

=+MBC1-X1

Cable name / Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name / Cable type	Position / Page
			1U	'	-X1	2U		+MBC1&EFS/1.3
			1V	'	-X1	2V		+MBC1&EFS/1.3
			1W	'	-X1	2W		+MBC1&EFS/1.3
	+UPS1-E1-X1	U	2U	'	-X1	1U		+MBC1&EFS/1.3
	+UPS1-E1-X1	V	2V	'	-X1	1V		+MBC1&EFS/1.3
	+UPS1-E1-X1	W	2W	'	-X1	1W		+MBC1&EFS/1.3
			3U	'	-X1	4U		+MBC1&EFS/1.6
			3V	'	-X1	4V		+MBC1&EFS/1.6
			3W	'	-X1	4W		+MBC1&EFS/1.6
	+UPS2-E1-X1	U	4U	'	-X1	3U		+MBC1&EFS/1.6
	+UPS2-E1-X1	V	4V	'	-X1	3V		+MBC1&EFS/1.6
	+UPS2-E1-X1	W	4W	'	-X1	3W		+MBC1&EFS/1.6

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Terminal diagram

bar

=+MBC1-X2

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-E2-X2	L+	1L+	'	-X2	2L+			+MBC1&EFS/2.2
		+UPS1-E2-X2	L-	1L-	'	-X2	2L-			+MBC1&EFS/2.3
				2L+	'	-X2	1L+			+MBC1&EFS/2.2
				2L-	'	-X2	1L-			+MBC1&EFS/2.3
		+UPS2-E2-X2	L+	3L+	'	-X2	4L+			+MBC1&EFS/3.2
		+UPS2-E2-X2	L-	3L-	'	-X2	4L-			+MBC1&EFS/3.3
				4L+	'	-X2	3L+			+MBC1&EFS/3.2
				4L-	'	-X2	3L-			+MBC1&EFS/3.3

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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X2
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

1000007888_010 en

=
+ MBC1
& EMA

A3

sheet 3
sheets 34

CAE EPLAN Electric P8

Terminal diagram

bar

=+MBC1-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-E4-X4	U	1U	'	-Q28.1	2			+MBC1&EFS/5.3
		+UPS1-E4-X4	V	1V	'	-Q28.1	4			+MBC1&EFS/5.3
		+UPS1-E4-X4	W	1W	'	-Q28.1	6			+MBC1&EFS/5.3
		+UPS1-E4-X4	N	1N	'	-1N				+MBC1&EFS/5.4
		+UPS2-E4-X4	U	2U	'	-Q28.2	2			+MBC1&EFS/5.6
		+UPS2-E4-X4	V	2V	'	-Q28.2	4			+MBC1&EFS/5.6
		+UPS2-E4-X4	W	2W	'	-Q28.2	6			+MBC1&EFS/5.6
		+UPS2-E4-X4	N	2N	'	-1N				+MBC1&EFS/5.6

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CAE EPLAN Electric P8

Terminal diagram

bar

=+MBC1-X5

Cable name / Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name / Cable type	Position / Page
	+UPS1-E3-X3	U	1U	'	-Q71	2		+MBC1&EFS/6.3
	+UPS1-E3-X3	V	1V	'	-Q71	4		+MBC1&EFS/6.3
	+UPS1-E3-X3	W	1W	'	-Q71	6		+MBC1&EFS/6.3
	+UPS1-E3-X3	N	1N	'	-1N			+MBC1&EFS/6.3
	+UPS2-E3-X3	U	2U	'	-Q72	2		+MBC1&EFS/6.5
	+UPS2-E3-X3	V	2V	'	-Q72	4		+MBC1&EFS/6.5
	+UPS2-E3-X3	W	2W	'	-Q72	6		+MBC1&EFS/6.6
	+UPS2-E3-X3	N	2N	'	-1N			+MBC1&EFS/6.6

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CAE EPLAN Electric P8

Terminal diagram

bar
=+MBC1-X10

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U	'	-Q10	1			+MBC1&EFS/4.4
				V	'	-Q10	3			+MBC1&EFS/4.5
				W	'	-Q10	5			+MBC1&EFS/4.5

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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X10
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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=
+ MBC1
& EMA

A3

sheet 6
sheets 34

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Terminal diagram

bar

=+MBC1-X12

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable type	Cable name	Position / Page
				1	'	-Q29	103			+MBC1&EFS/6.7
				2	'	-Q29	104			+MBC1&EFS/6.7
				3	'	-Q29	102			+MBC1&EFS/6.7
				4	'	-F25	11			+MBC1&EFS/12.6
				5	'	-F25	12			+MBC1&EFS/12.6
				6	'	-F25	14			+MBC1&EFS/12.6
				7	'	-A90	16			+MBC1&EFS/13.4
				8	'	-A90	15			+MBC1&EFS/13.4
				9	'	-A90	18			+MBC1&EFS/13.4
				10	'	-K1	12			+MBC1&EFS/15.7
				11	'	-K1	11			+MBC1&EFS/15.7
				12	'	-K2	14			+MBC1&EFS/15.7
				13	'	-F10	1:1			+MBC1&EFS/16.2
				14	'	-F11	1:1			+MBC1&EFS/16.2
				15	'	-F12	1:1			+MBC1&EFS/16.3
				16	'	-F13	1:1			+MBC1&EFS/16.3
				17	'	-F14	1:1			+MBC1&EFS/16.4
				18	'	-F15	1:1			+MBC1&EFS/16.5
				19	'	-F16	1:1			+MBC1&EFS/16.6
				20	'	-F17	1:1			+MBC1&EFS/16.6
				21	'	-F18	1:1			+MBC1&EFS/16.7
				22	'	-F19	1:1			+MBC1&EFS/16.8

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				Date	27.08.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Terminal diagram =+MBC1-X12 Bypass transformer cabinet with manual bypass 40 kVA Terminal diagram	=
01	500000002053	13.08.2024	Beckschäfer	Editor	Beckschäfer				+ MBC1
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck			1000007888_010 en	& EMA
Stat	Alteration	Date	Name	Norm					A3

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CAE EPLAN Electric P8

Terminal diagram

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=+MBC1-X13

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-X14	U	U	●	-F100	1:1			+MBC1&EFS/17.2
		-X14	U	U	●					+MBC1&EFS/17.2
		+UPS1-X14	N	N	●	-A85	-X1:2			+MBC1&EFS/17.3
		-X14	N	N	●					+MBC1&EFS/17.3
				PE	'					+MBC1&EFS/17.3
				PE	'					+MBC1&EFS/17.3

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X13
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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+ MBC1
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sheets 34

CAE EPLAN Electric P8

Terminal diagram

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=+MBC1-X14

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		-X13	U	U		-F110	1:2			+MBC1&EFS/17.6
		+UPS2-X13	U	U						+MBC1&EFS/17.6
		-X13	N	N		-X114	N			+MBC1&EFS/17.7
		+UPS2-X13	N	N						+MBC1&EFS/17.7

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X14
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X15

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable type	Cable name	Position / Page
		+UPS1-X15	2	2	'	-X15	4			+MBC1&EFS/2.4
		+UPS2-X15	2	6	'	-X15	8			+MBC1&EFS/3.4
				4	'	-X15	2			+MBC1&EFS/2.4
				8	'	-X15	6			+MBC1&EFS/3.4
		+UPS1-X15	3	3	'	-X15	5			+MBC1&EFS/2.4
		+UPS2-X15	3	7	'	-X15	9			+MBC1&EFS/3.4
				5	'	-X15	3			+MBC1&EFS/2.4
				9	'	-X15	7			+MBC1&EFS/3.4

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AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X15
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X31

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U	'	-QF31	2			+MBC1&EFS/7.2
				N	'	-QF31	N			+MBC1&EFS/7.2
				PE	'	-PE				+MBC1&EFS/7.2

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X31
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X32

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U	'	-QF32	2			+MBC1&EFS/7.3
				N	'	-QF32	N			+MBC1&EFS/7.3
				PE	'					+MBC1&EFS/7.3

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Terminal diagram =+MBC1-X32
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X33

Cable name / Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name / Cable type	Position / Page
			U	'	-QF33	2		+MBC1&EFS/7.4
			N	'	-QF33	N		+MBC1&EFS/7.5
			PE	'				+MBC1&EFS/7.5

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Terminal diagram

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=+MBC1-X34

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U	'	-QF34	2			+MBC1&EFS/7.6
				N	'	-QF34	N			+MBC1&EFS/7.6
				PE						+MBC1&EFS/7.6

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X34
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X35

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable type	Cable name	Position / Page
				U	'	-QF35	2			+MBC1&EFS/7.8
				N	'	-QF35	N			+MBC1&EFS/7.8
				PE						+MBC1&EFS/7.8

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Terminal diagram =+MBC1-X35
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X36

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				V	'	-QF36	2			+MBC1&EFS/8.1
				N	'	-QF36	N			+MBC1&EFS/8.2
		-PE		PE						+MBC1&EFS/8.2

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X36
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X37

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				V	'	-QF37	2			+MBC1&EFS/8.3
				N	'	-QF37	N			+MBC1&EFS/8.3
				PE						+MBC1&EFS/8.3

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X37
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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+ MBC1
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Terminal diagram

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=+MBC1-X38

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable type	Cable name	Position / Page
				V	'	-QF38	2			+MBC1&EFS/8.5
				N	'	-QF38	N			+MBC1&EFS/8.5
				PE						+MBC1&EFS/8.5

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X38
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X39

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				V	'	-QF39	2			+MBC1&EFS/8.6
				N	'	-QF39	N			+MBC1&EFS/8.6
				PE						+MBC1&EFS/8.6

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X39
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X40

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable type	Cable name	Position / Page
				V	'	-QF40	2			+MBC1&EFS/8.8
				N	'	-QF40	N			+MBC1&EFS/8.8
				PE						+MBC1&EFS/8.8

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AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X40
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X41

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				W	'	-QF41	2			+MBC1&EFS/9.2
				N	'	-QF41	N			+MBC1&EFS/9.2
		-PE		PE						+MBC1&EFS/9.2

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X41
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X42

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				W	'	-QF42	2			+MBC1&EFS/9.3
				N	'	-QF42	N			+MBC1&EFS/9.3
				PE						+MBC1&EFS/9.3

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X42
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X43

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				W	'	-QF43	2			+MBC1&EFS/9.4
				N	'	-QF43	4			+MBC1&EFS/9.5
				PE						+MBC1&EFS/9.5

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X43
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X44

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				W	'	-QF44	2			+MBC1&EFS/9.6
				N	'	-QF44	4			+MBC1&EFS/9.6
				PE						+MBC1&EFS/9.6

				Date	27.08.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Terminal diagram =+MBC1-X44 Bypass transformer cabinet with manual bypass 40 kVA Terminal diagram		=
				Editor	Beckschäfer					+ MBC1
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Terminal diagram

bar

=+MBC1-X45

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable type	Cable name	Position / Page
				W	'	-QF45	2			+MBC1&EFS/9.7
				N	'	-QF45	4			+MBC1&EFS/9.8
				PE						+MBC1&EFS/9.8

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			Date	27.08.2024		=
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AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X45
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X46

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable type	Cable name	Position / Page
				U	'	-QF46	2			+MBC1&EFS/10.2
				N	'	-QF46	4			+MBC1&EFS/10.2
		-PE		PE						+MBC1&EFS/10.2

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			Date	27.08.2024		=
			Editor	Beckschäfer	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	+ MBC1
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Stat	Alteration	Date	Norm			

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X46
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X47

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U	'	-QF47	2			+MBC1&EFS/10.3
				N	'	-QF47	4			+MBC1&EFS/10.3
				PE						+MBC1&EFS/10.4

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X47
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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Terminal diagram

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=+MBC1-X48

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U	'	-QF48	2			+MBC1&EFS/10.4
				N	'	-QF48	4			+MBC1&EFS/10.5
				PE						+MBC1&EFS/10.5

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X48
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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+ MBC1
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Terminal diagram

bar

=+MBC1-X49

Cable name / Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name / Cable type	Position / Page
			U	'	-QF49	2		+MBC1&EFS/10.6
			N	'	-QF49	4		+MBC1&EFS/10.6
			PE					+MBC1&EFS/10.6

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CAE EPLAN Electric P8

Terminal diagram

bar
=+MBC1-X50

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U	'	-QF50	2			+MBC1&EFS/10.7
				N	'	-QF50	4			+MBC1&EFS/10.8
				PE						+MBC1&EFS/10.8

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X50
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

1000007888_010 en

=
+ MBC1
& EMA

A3

sheet 30
sheets 34

CAE EPLAN Electric P8

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Terminal diagram

bar

=+MBC1-X51

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable type	Cable name	Position / Page
				V	'	-QF51	2			+MBC1&EFS/11.2
				N	'	-QF51	4			+MBC1&EFS/11.2
		-PE		PE						+MBC1&EFS/11.2

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Stat	Alteration	Date	Norm			

Terminal diagram =+MBC1-X51
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

1000007888_010 en

= + MBC1 & EMA

A3

sheet 31
sheets 34

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Terminal diagram

bar

=+MBC1-X52

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				V	'	-QF52	2			+MBC1&EFS/11.3
				N	'	-QF52	4			+MBC1&EFS/11.3
				PE						+MBC1&EFS/11.4

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X52
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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=
+ MBC1
& EMA

A3

sheet 32
sheets 34

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Terminal diagram

bar

=+MBC1-X91

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable type	Cable name	Position / Page
		+UPS1-F91	1	1M	'	-X91	2M			+MBC1&EFS/2.5
				2M	'	-X91	1M			+MBC1&EFS/2.5
		+UPS2-F91	1	3M	'	-X91	4M			+MBC1&EFS/3.5
				4M	'	-X91	3M			+MBC1&EFS/3.5

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AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X91
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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=
+ MBC1
& EMA

A3

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sheets 34

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Terminal diagram

bar

=+MBC1-X130

Cable name			-W208	-W100		
Cable type	Destination mark External	Connection	Terminal	Bridge 1 2 3	Destination mark Internal	Connection	Cable type	LiYCY 3x0,5 mm²	H05VV 2x1 mm²		Position / Page
	+BAT1-R81-X1	1	1	'	+UPS1-X130	1		WH			+MBC1&EFS/2.6
	+BAT2-R81-X1	1	3	'							+MBC1&EFS/3.6
	+BAT1-R81-X1	2	2	'	+UPS1-X130	2		BN			+MBC1&EFS/2.6
	+BAT2-R81-X1	2	4	'							+MBC1&EFS/3.6
			1PE	'					OG		+MBC1&EFS/2.6
			2PE	'					OG		+MBC1&EFS/3.6

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AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X130
Bypass transformer cabinet
with manual bypass 40 kVA
Terminal diagram

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= + MBC1 & EMA

A3

sheet 34
sheets 34

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Three-phase input
Attention! Observe sequence of wires, L1, L2, L3 -->
See technical data sheet for required mains fuses

Power section rectifier

mains transformer

Note: Reinforced insulated wire
0,75 mm² unmarked wires

-L61 N=2

Measurement REC Interface -A9-A50-X2
Supply REC Interface -A9-A50-X3

01L1 / 12.6
01L2 / 12.6
01L3 / 12.6
02L1 / 11.1
02L2 / 11.1
02L3 / 11.1

-L22
-T40
-L85.1
-L85.2

1L1 / 2.1
1L2 / 2.1
1L3 / 2.1
2L1 / 3.1
2L2 / 3.1
2L3 / 3.1

-C101.1
-C101.2
-C101.3
-Q3
-Q1
L=100/85A
I=1,0kA
Icu=50kA
/12.3
/12.4
-L23
-L24
-L25
-R23
-R24
-R25
-C23
-C24
-C25
3xR6 mm²

-A80
-A81
Suppression
-R86
-R87
-R88
-R81
-R82
-R83
-V81.1-V81.6
-R84.1
-R84.2
-C84
-C85

-E1
-A2
-A1
EMI capacitor 4-pole 8000022634 STR
-C4
-C5
-C1
-C6
-C2
-C7
-C3
-C8
-C9
-C10
-X1
-X2
-X3
-L92

Mains
400V;3/PE~50Hz

+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757

GZ1_1 +MBC1/1.3
GZ1_2 +MBC1/1.3
GZ1_3 +MBC1/1.3

Rack
PE busbar
-PE
Cu 40x5 mm
GNYE 6 mm²
Tür links
Pivot plate

1000007888_010

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Rectifier input Protect 8.33 40-400-210-400 Circuit diagram	1000007888.010 10009756	1000007888_010 en	= / + UPS1 / & EFS	A3	sheet 1 sheets 23
				Editor	EEC								
				Checked	Ch.Peck								
Stat	Alteration	Date	Name	Norm									

Power section rectifier

CAE EPLAN Electric P8

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-A1
/3.1

4.1 / 2L+ -L+:X2:1 → 1L+ / 3.2

1.8 / 1L1 -L1:X1:1
1.8 / 1L2 -L2:X1:2
1.8 / 1L3 -L3:X1:3

-C85.1 -C85.2 -C85.3

-T80 -T81

-V1 -V2 -V3

-A82 REC suppression 6765463 STR
-K
-AK1
-AK2
-AK3
-A

4.1 / 2L- -L-:X2:2 → 1L- / 3.2

RD

-A80 REC trigger circuit 8000023368 STR
-X6:1
2

-X7 -X8 -X3 -X4 -X5

GR-Strom 15 | GND 16 | V2 4 | V1 2 | V4 8 | V3 6 | V6 12 | V5 10 | GND 1 | GND 3 | +24V 13 | +24V 14 | V12 20 | V11 18 | V14 24 | V13 22 | V16 28 | V15 26 | GND 17 | GND 19 | +24V 29 | +24V 30

V12 4
V11 2
V14 8
V13 6
V16 12
V15 10
GND 1
GND 3
+24V 13
+24V 14

-X2 1-40 → 0FB2 / 3.1 REC triggering -A1-A81-X1

-X9 1 2
-R100
1
2

-X1 1-40

-0FB1
40x

REC interface -A9-A50-X1 → 0FB1 / 12.4

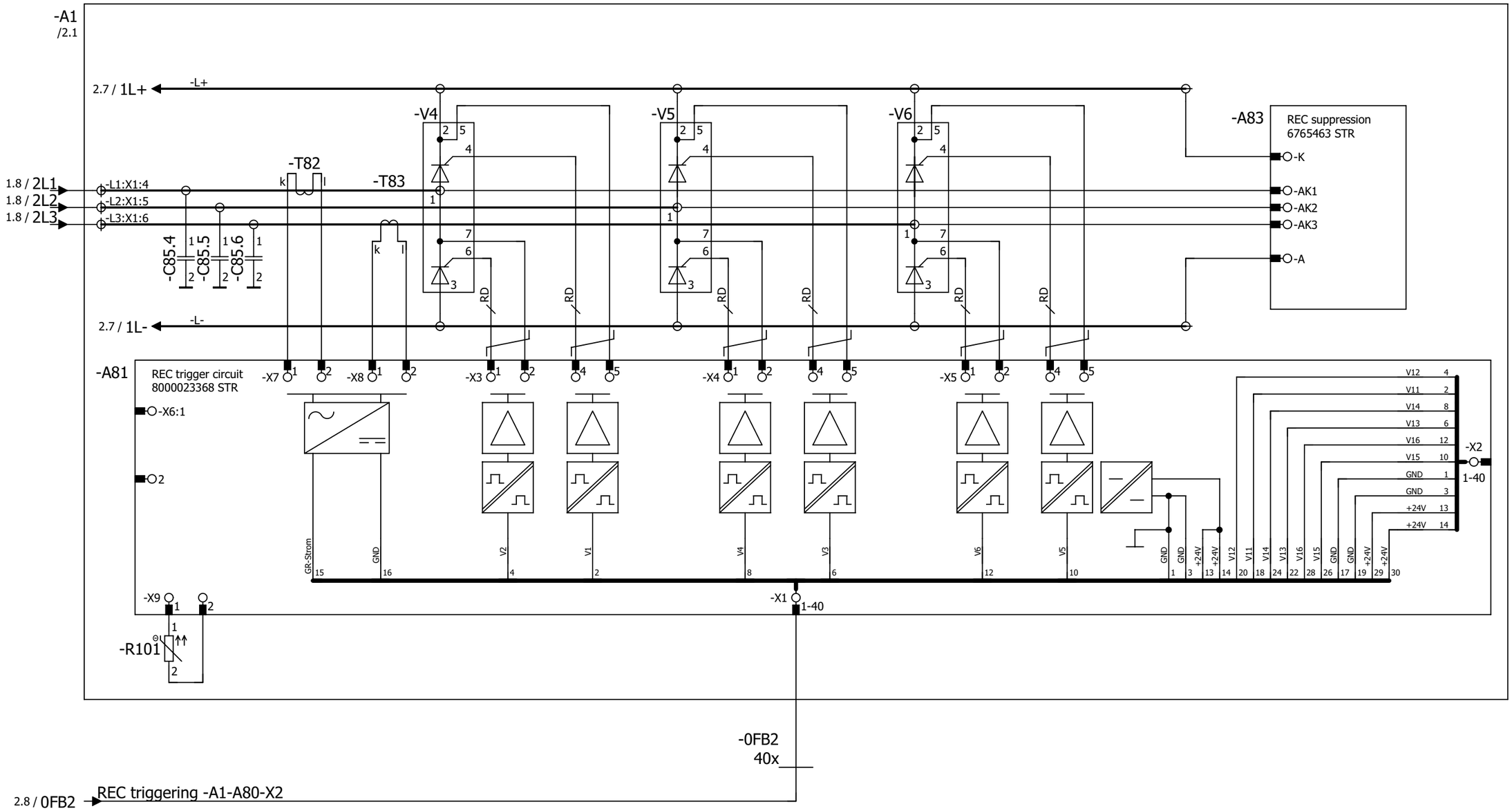
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				Editor	EEC					+ UPS1	
				Checked	Ch.Peck				1000007888.010 10009756	& EFS	A3 sheet 2
Stat	Alteration	Date	Name	Norm					1000007888_010 en		sheets 23

Power section rectifier

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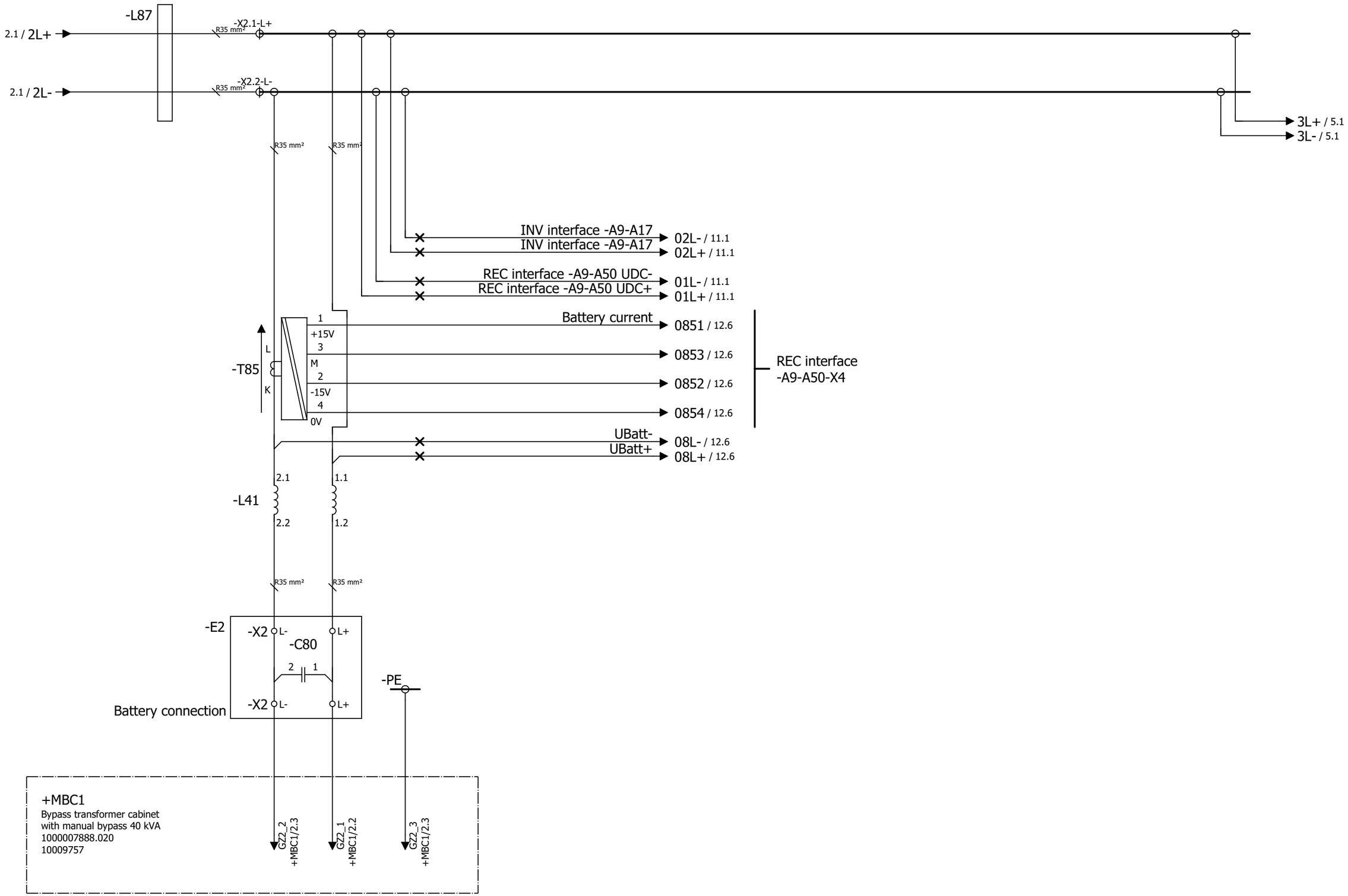
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				Editor	EEC			
				Checked	Ch.Peck			
Stat	Alteration	Date	Name	Norm				

			=	
			+ UPS1	
1000007888.010 10009756	1000007888_010 en		& EFS	A3
			sheet	3
			sheets	23

Power section rectifier
Battery connection

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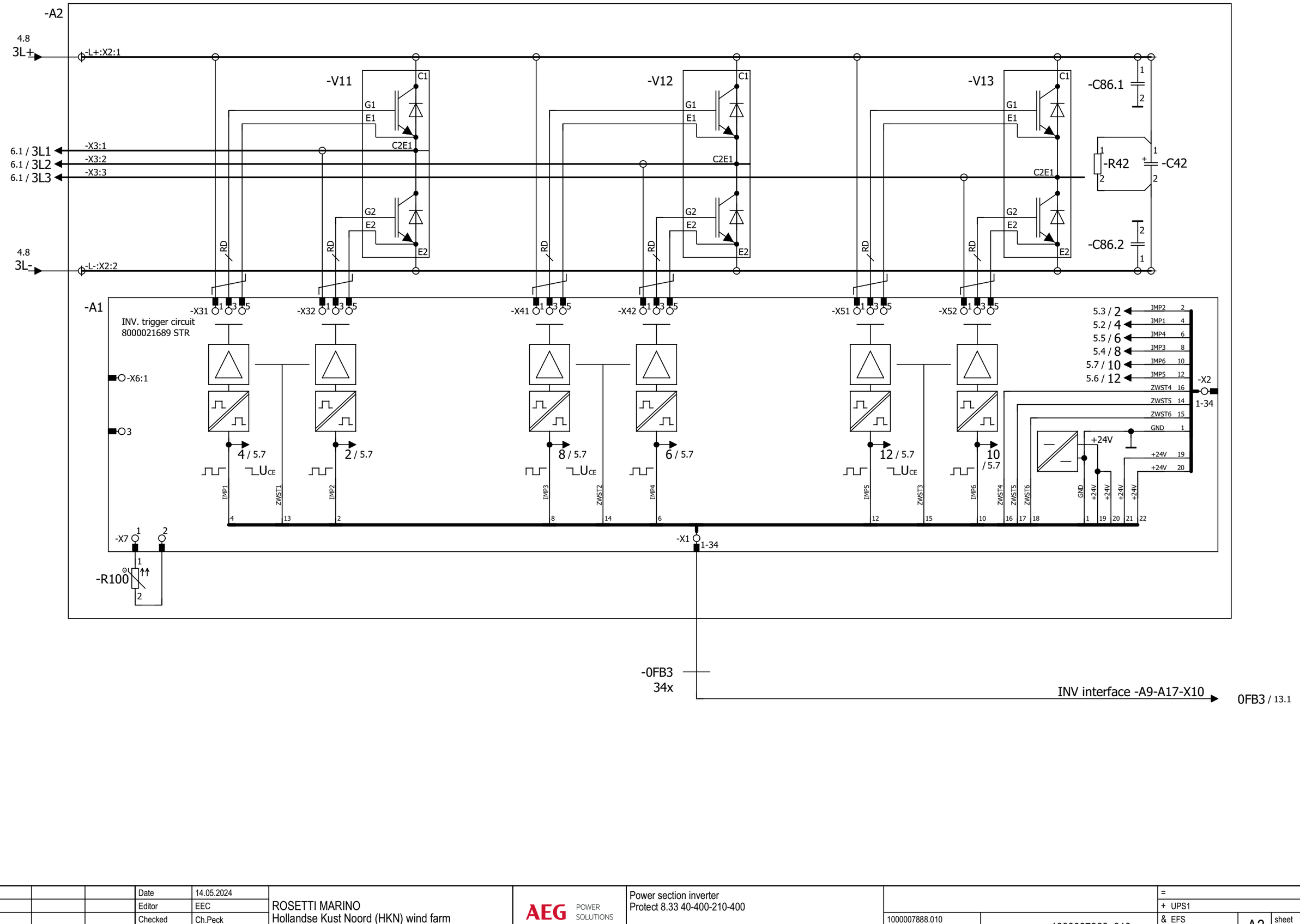
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Stat	Alteration	Date	Name	Norm					

Power section inverter

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Stat	Alteration	Date	Name	Norm							A3 sheet 5 / sheets 23

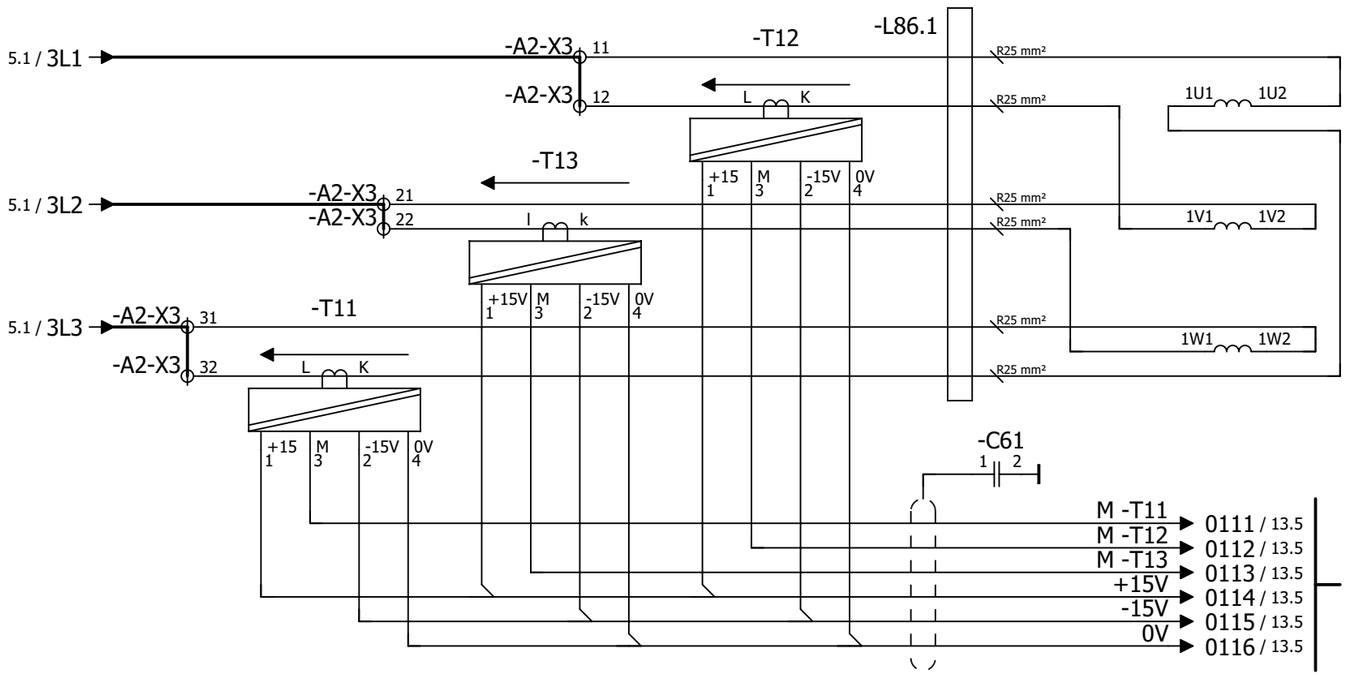
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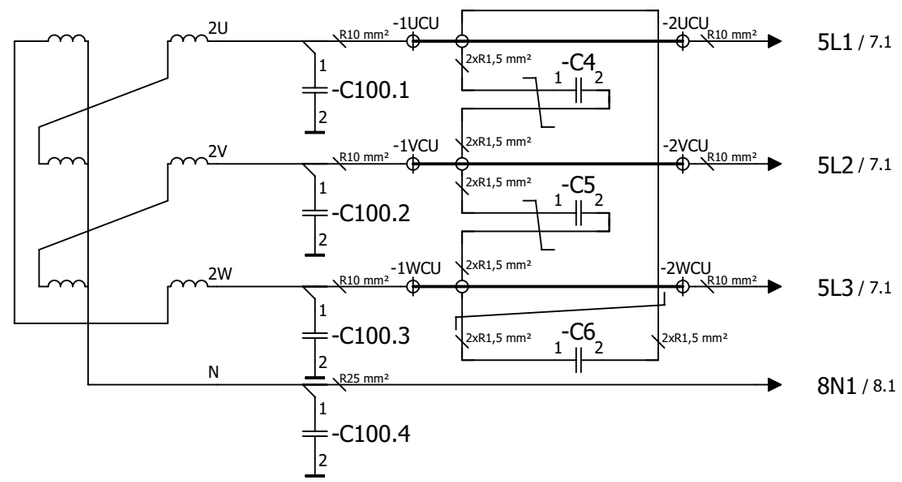
Power section inverter

Measuring INV current dynamic



INV interface
-A9-A17-X19

-T1



				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Inverter output Protect 8.33 40-400-210-400 Circuit diagram			=
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Power section inverter

Measurement INV current static

Output fuse

6.8 / 5L1
6.8 / 5L2
6.8 / 5L3

K -T21 L (k l)
K -T22 L (k l)
K -T23 L (k l)

1 -F1 2
1 -F2 2
1 -F3 2

INV interface -A9-A17-X2
04L1 / 13.5
04L2 / 13.5
04L3 / 13.5

INV interface -A9-A17-X3
05L1 / 13.5
05L2 / 13.5
05L3 / 13.5

8L1 / 8.1
8L2 / 8.1
8L3 / 8.1

Supply fans -A92.1-F6
06L1 / 11.1

Load voltage -A92.2-F1
08L1 / 11.1
-F2
08L2 / 11.1
-F3
08L3 / 11.1

Thyristor contactor -X4
7L1 / 9.1
7L2 / 9.1
7L3 / 9.1

Thyristor contactor -X5
6L3 / 9.1
6L2 / 9.1
6L1 / 9.1

INV interface -A9-A17-X8
023L / 13.1
023K / 13.1
022L / 13.1
022K / 13.1
021L / 13.1
021K / 13.1

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Power section inverter

Parallel preventive choke coil

7.8 / 8L1
7.8 / 8L2
7.8 / 8L3
6.8 / 8N1

SBS Output
10L1 / 10.1
10L2 / 10.1
10L3 / 10.1

-L11 -L12 -L13

-A105
-C56 -C57 -C58
-X1 -X2 -X3 -X4

SBS Input
9L1 / 10.1
9L2 / 10.1
9L3 / 10.1

fan neutral conductor
0451N1 / 17.1

neutral conductor
04N1 / 13.5
-A9

-E3
-X3 U V W N
-A4
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

-L93

-A3
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

Load
400V;3/N/PE~50Hz
-X3 U V W N

-PE

-E4
-X4 U V W N
-A4
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

-L94

-A3
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

Mains
400V;3/N/PE~50Hz
-X4 U V W N

+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757

GZ3_1 +MBC1/6.3
GZ3_2 +MBC1/6.3
GZ3_3 +MBC1/6.3
GZ3_4 +MBC1/6.3
GZ4_1 +MBC1/5.3
GZ4_2 +MBC1/5.3
GZ4_3 +MBC1/5.3
GZ4_4 +MBC1/5.4

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Load output / SBS circuit
Protect 8.33 40-400-210-400

Circuit diagram

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=
+ UPS1
& EFS

A3

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sheets 23

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Power section inverter
Inverter output contactor

-A4

-A37 SBS suppression 8000028996 STR

-A3 -K3 -AK3 -A2 -K2 -AK2 -A1 -K1 -AK1

-V31

-X4:1A
-X4:1
-X4:1K

A K AK G2 K2 K1 G1

-V33

-X4:2A
-X4:2
-X4:2K

-V35

-X4:3A
-X4:3
-X4:3K

RD

-X2 -X3 -X4

-A36 SBS trigger circuit 8000028563 STR

-X5:1
-X5:2

GND EIJE_EIN GND GND +24V +24V

-X6 -X1 1-10

-R100

-0FB10
10x

-X6:5
-X6:6
-X6:3
-X6:4
-X6:1
-X6:2

-X5:3
-X5:2
-X5:1

7.7 / 7L1
7.7 / 7L2
7.7 / 7L3
7.7 / 6L3
7.7 / 6L2
7.7 / 6L1

INV interface -A9-A17-X1 → 0FB10 / 13.1

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Power section SBS

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-A3

SBS mains voltage -A92.2-F6 → 010L1 / 11.1
-A92.2-F7 → 010L2 / 11.1
-A92.2-F8 → 010L3 / 11.1

8.8 / 9L1 SBS mains
8.8 / 9L2 SBS mains
8.8 / 9L3 SBS mains

-A37 SBS suppression 8000028996 STR

-A3 -K3 -AK3 -A2 -K2 -AK2 -A1 -K1 -AK1

-V31 -V33 -V35

-X4:1A -X4:1 -X4:1K
-X4:2A -X4:2 -X4:2K
-X4:3A -X4:3 -X4:3K

A K AK G2 K2 K1 G1 RD

-A36 SBS trigger circuit 8000028563 STR

-X2 -X3 -X4 1 2 5 4

-X5:1
2

SBS interface -A9-A16-X1 → 0FB9 / 14.3

GND EIJE_EIN GND GND +24V +24V
1 2 3 4 5 6 7 8 9 10

-X1 1-10

-X6 1 2

-R100 1 2

-X6 5
-X6 6
-X6 3
-X6 4
-X6 1
-X6 2

UPS Output
8.8 / 10L3 ← -X5:3
8.8 / 10L2 ← -X5:2
8.8 / 10L1 ← -X5:1

SBS interface -A9-A16-X4 → 03151L / 14.3
-A9-A16-X4 → 03151K / 14.3
-A9-A16-X4 → 03352L / 14.3
-A9-A16-X4 → 03352K / 14.3
-A9-A16-X4 → 03553L / 14.3
-A9-A16-X4 → 03553K / 14.3

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Stat	Alteration	Date	Name	Norm			Circuit diagram	1000007888.010 10009756

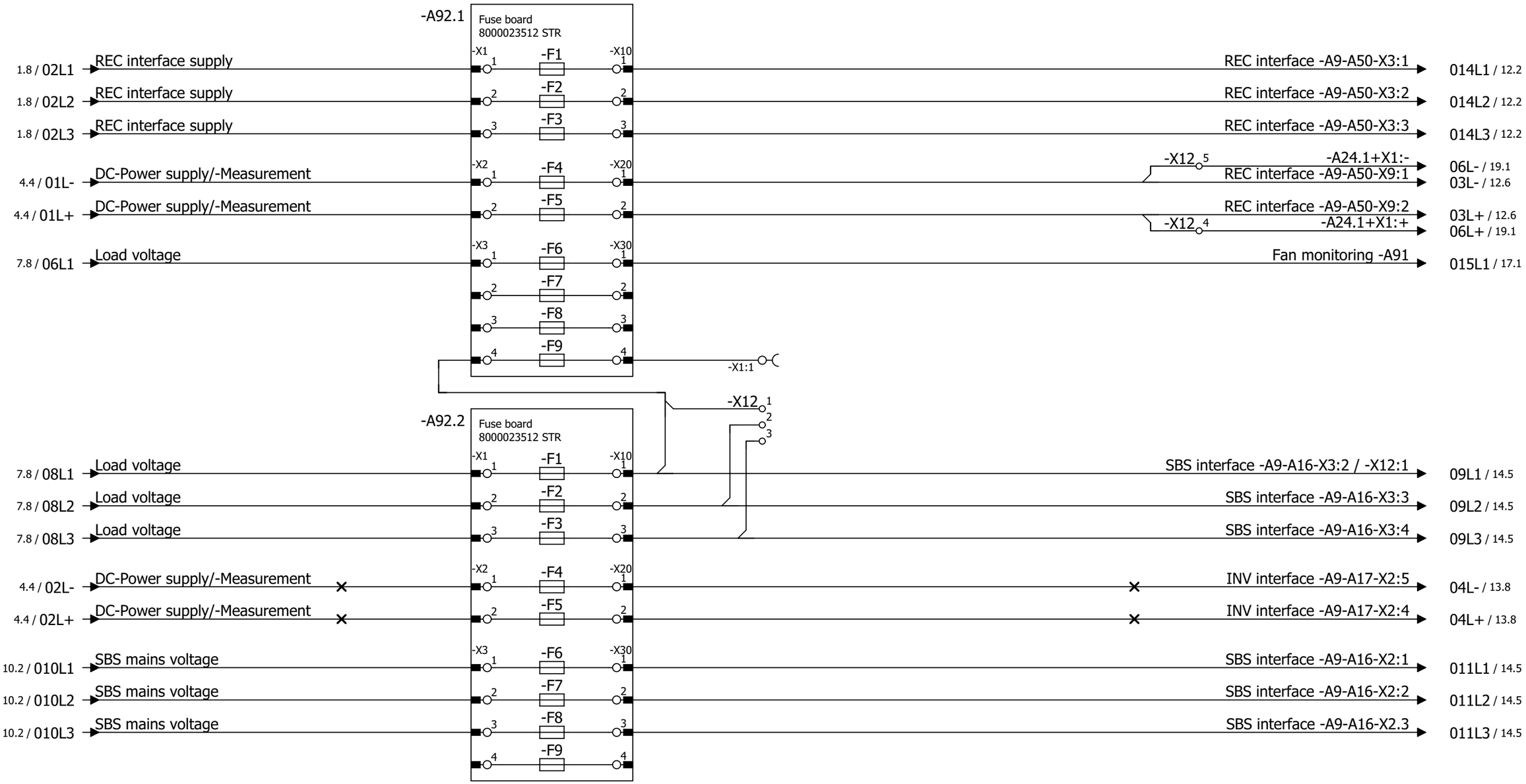
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Fuse boards

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				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.010	& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009756

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Rectifier control

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-A9
/16.1

4.4 / 0854 Battery current transformer -T85
4.4 / 0851
4.4 / 0853
4.4 / 0852

4.4 / 08L+ UBatt+
4.4 / 08L- UBatt-

11.8 / 03L+ UIC+ A92.1-F5
11.8 / 03L- UIC- A92.1-F4

1.8 / 01L3 -Q1 REC input voltage
1.8 / 01L2
1.8 / 01L1

11.8 / 014L3 -T40 sec. supply REC
11.8 / 014L2
11.8 / 014L1

2.8 / 0FB1 REC trigger circuit -A1-A80-X1

-A50
/16.2
REC interface
8000022025 STR

-X3 1 2 3
-X5 7 8
-X1 1-40
-X2 1 3 5
-X9 1 2 3 4
-X4 2 3 1 4
-15V +15V

GND V1 GND V2 V3 V4 V5 V6 +24V +24V GND V11 GND V12 V13 V14 V15 V16 +24V +24V REC current REC current
+24V +24V

-R204 GND -R206 GND
REC current stack A1
REC current stack A2

-X11 1-50
-A50X11 50x
-X12 1-50
-A50X12 50x

-A1
REC control
8000014119 STR

-X19 1 2 3 -X15 1 4 -X8 1 2 3 -X5 3 4 +24V DC
-X8 4 5 6
-X5 5 6

-X130 1 2
-X12 10 11 15
-Q3
/1.4
96 98
95
-Q1 C1 C2

BK R1,5 mm²
-C711 220000µF
-C712 220000µF
BK R2,5 mm²
BK R2,5 mm²
BK R1,5 mm²
BK R1,5 mm²
0V
-X15 1 1
-X15 2 2 (+) (-) 3
*1

+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757

GZ130_1 +MBC1/2.6
GZ130_2 +MBC1/2.6

+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757

GZ15_2 +MBC1/2.4
GZ15_3 +MBC1/2.4

*1 Attention! In the event of battery undervoltage < 130 V, the UPS automatically switches off battery isolator Q2.
If this happens, switch X15:3 must be switched into the open position (undervoltage trip blocked).
For restart, please refer to the chapter in the UPS operating instructions (charging the DC link capacitors).
Unlock the tripped switch Q2 by switching to open position.
After charging the DC link capacitors, switch on Q2.
Attention! When the battery voltage reaches > 200 V, switch X15:3 must be switched back to the closed position.

1000007888_010

				Date	14.05.2024
				Editor	EEC
				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Rectifier control
Protect 8.33 40-400-210-400

Circuit diagram

1000007888.010
10009756

1000007888_010 en

=
+ UPS1
& EFS

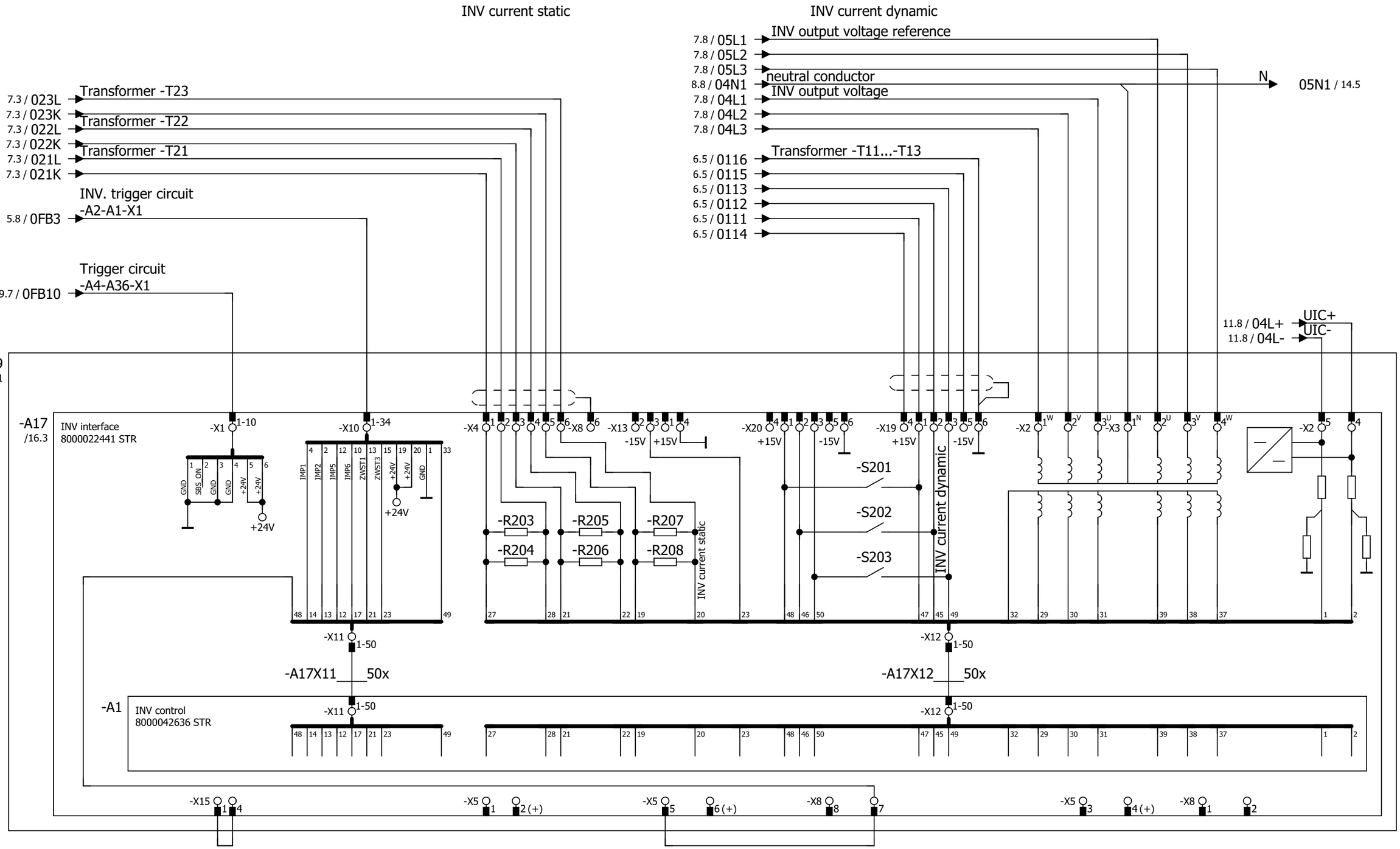
A3

sheet 12
sheets 23

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Inverter control



				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Inverter control Protect 8.33 40-400-210-400 Circuit diagram	1000007888.010 10009756	1000007888_010 en	= / + UPS1 / & EFS	A3	sheet 13 sheets 23
				Editor	EEC								
				Checked	Ch.Peck								
Stat	Alteration	Date	Name	Norm									

Control SBS

CAE EPLAN Electric P8

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-A9 /16.1

10.4 / 03553L Transformer -T35
10.4 / 03553K
10.4 / 03352L Transformer -T33
10.4 / 03352K
10.4 / 03151L Transformer -T31
10.4 / 03151K

11.8 / 09L1 Load voltage
11.8 / 09L2
11.8 / 09L3

13.8 / 05N1 neutral conductor
-X1:3
-X12 6

11.8 / 011L1 SBS mains voltage
11.8 / 011L2
11.8 / 011L3

10.2 / 0FB9 SBS trigger circuit -A3-A36-X1

-L62

-A16 /16.4
SBS interface
8000022378 STR

-X1 1-10: 1 GND, 2 SBS_ON, 3 GND, 4 GND, 5 +24V, 6 +24V, 7, 8, 9, 10
+24V

-X4 1 2 3 4 5 6

SBS current

-X2 1U 2V 3W
-X3 1N 2U 3V 4W

-X12 12
-X8 7

-R201 -R203 -R205
-R202 -R204 -R206

7
8
9
-X18 1
-R120 1 2

5
4
6
2

15 16 26 17
21 29 30 27 45 46 35 36 33 41 42 39

-X11 1-50
-X12 1-50

-A16X11 50x
-A16X12 50x

-A1
SBS control
8000008845 STR

-X11 1-50
-X12 1-50

15 16 26 17
21 29 30 27 45 46 35 36 33 41 42 39

-X15 1 2 3 +24V 4 5

Fan control -A92.1-X6
091.11 / 17.7
091.12 / 17.7
091.13 / 17.7
091.14 / 17.7
091.15 / 17.7

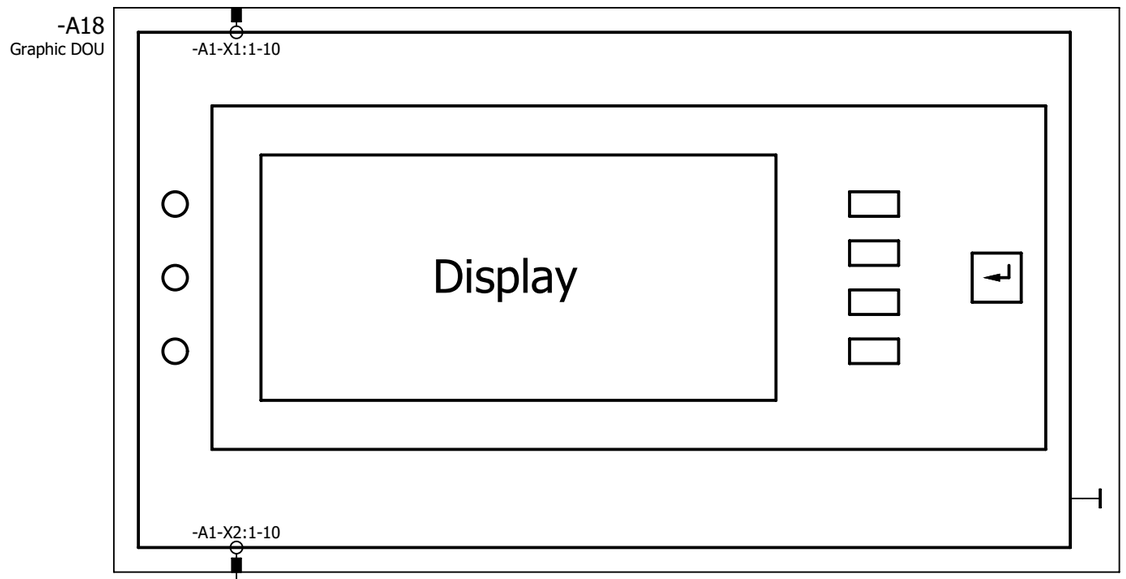
1000007888_010

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Control SBS Protect 8.33 40-400-210-400 Circuit diagram	=
				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.010 10009756	& EFS
Stat	Alteration	Date	Name	Norm				1000007888_010 en	A3 sheet 14 / sheets 23

Control

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DOU-CAN

A / 16.1

1000007888_010

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				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.010 10009756	& EFS
Stat	Alteration	Date	Name	Norm				1000007888_010 en	A3
									sheet 15
									sheets 23

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Control

+UPS2
Protect 8.33 40-400-210-400
1000007888.010
10009756

GZ20_3
+UPS2/16.6

GZ20_5
+UPS2/16.7

INV
-CAN

INV
-sync

-A9
/12.1
/13.1
/14.2
/20.1
/21.1
/22.1

-A50
/12.1
REC interface
8000022025 STR

-X6 1-10
-X7 1-16

-A17
/13.1
INV interface
8000022441 STR

-X6 1-10
-X7 1-16

-A16
/14.2
SBS interface
8000022378 STR

-X6 1-10
-X7 1-16

-A20
Parallel Adapter
8000023378 STR

-X3 1-3
-X4 1-3
-X5 1-4
-X6 1-2

-X1 1-16
-X2 1-16
-X11 1-10
-X12 1-10
-X13 1-10
-X14 1-10

Parallel CAN INV

Parallel CAN REC

15.8 / A

DOU-CAN

A / 20.1

L / 19.1

1000007888_010

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Control CAN Protect 8.33 40-400-210-400 Circuit diagram	1000007888.010 10009756
				Editor	EEC				1000007888_010 en
				Checked	Ch.Peck				
Stat	Alteration	Date	Name	Norm					

= | + UPS1 | & EFS | A3 | sheet 16 | sheets 23

Fan control/monitoring

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11.8 / 015L1 → 016L1 / 18.1

8.8 / 0451N1 → 0452N1 / 18.1

-A91.2-X6 → 091.21 / 18.7; 091.22 / 18.7; 091.23 / 18.7; 091.24 / 18.7; 091.25 / 18.7

-A91.1 Fan control 8000022841 STR

-X5: 1, 2, 3

-R5, -C5

Logical evaluation fan fault

-S1, -S2

= 1

-X7: 1, 2, 3, 4, 5

Fan speed

+24V

-R50 -R51 -R60 -R61 -R70 -R71 -R80 -R81

P1 P2 P3 P4 P5 P6 P7 P8

-R1 PTC, -R2 PTC, -R3 PTC, -R4 PTC

-X1, -X2, -X3, -X4: 2, 1

-X6: 1, 2, 3, 4, 5

-C31, -C32, -C33, -C34

-X91, -X92, -X93, -X94: 1, 2, 3

-M1, -M2, -M3, -M4: M 1~, N, L, PE

14.6 / 091.11 → 091.15 → SBS interface -A9-A16-X15

1000007888_010

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Fan control/monitoring Protect 8.33 40-400-210-400 Circuit diagram	=
				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.010 10009756	& EFS
Stat	Alteration	Date	Name	Norm				1000007888_010 en	A3 sheet 17 / sheets 23

Fan control/monitoring

CAE EPLAN Electric P8

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17.8 / 016L1

17.8 / 0452N1

-A91.2

Fan control
8000022841 STR

-X5 1 2 3

-R5

-C5

-S1

-S2

Logical evaluation
fan fault

-X7 1 2 3 4 5

Fan speed

+24V

= 1

P2 P1 -R50 -R51 =

P4 P3 -R60 -R61 =

P6 P5 -R70 -R71 =

P8 P7 -R80 -R81 =

-R1 PTC -X1 2 1

-R2 PTC -X2 2 1

-R3 PTC -X3 2 1

-R4 PTC -X4 2 1

-X6 1 2 3 4 5

-C35 1 2

-X95 2 3 1

N L

-M5 M 1~ PE

-C36 1 2

-X96 2 3 1

N L

-M6 M 1~ PE

17.8 / 091.21

17.8 / 091.22

17.8 / 091.23

17.8 / 091.24

17.8 / 091.25

-A92.1-X7

1000007888_010

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Fan control/monitoring Protect 8.33 40-400-210-400		=	
				Editor	EEC					+ UPS1	
				Checked	Ch.Peck				1000007888.010	& EFS	A3 sheet 18
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009756	1000007888_010 en	sheets 23

Control

CAE EPLAN Electric P8

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+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757

GZ91_1
+MBC1/2.5

-F91 1
G
F3,15A 2

11.8 / 06L+

-A24.1
Battery charge monitoring
BLÜ-PRO
(Option)

-X1 +
M

0 ... 5V

-X1 -
-X3 1-16
-X4 1-10

16.8 / L

11.8 / 06L-

1000007888_010

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	battery charging circuit monitoring Protect 8.33 40-400-210-400	=
				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.010	& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009756

1000007888_010 en | A3 | sheet 19 | sheets 23

CAE EPLAN Electric P8

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Control

SNMP adapter
CompuWatch
Service Tools
Modbus

Modbus

-ADPT
HARD-WIRED
ADAPTER

-A9
/16.1

-A29.1

-X2 1-9
D-Sub

MultiCanCom2
MCC2

-X5 1-8
A B
RJ45

-X4 1-3

RS232
RS485

Ethernet
10/100

CAN

CAN

-X1 1-10

-X3 1-19

16.8 / A → DOU-CAN → A / 21.1

1000007888_010

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	MultiCom Protect 8.33 40-400-210-400		=	
				Editor	EEC					+ UPS1	
				Checked	Ch.Peck					& EFS	A3
Stat	Alteration	Date	Name	Norm				Circuit diagram	1000007888.010 10009756 1000007888_010 en		sheet 20 sheets 23

CAE EPLAN Electric P8

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Remote signaling

CAN Service

Configuration remote signals
see techn. data sheet

INV remote off

Common fault

Inverter operation

SBS operation

REC fault

REC mains fault

Battery low

-A9
/16.1

-A12
Remote signaling
8000062777 STR

-X6 1-10

-X5 1 2

-X4 1 2 3

-X3 1 2 3 4 5 6 7 8 9 10 11 12

-K25 -K21 -K22 -K23 -K24

-X1 1-10

-X2 1-16

20.8 / A

B / 22.1

1000007888_010

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Remote signaling Protect 8.33 40-400-210-400	=
				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.010	& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009756

1000007888_010 en

A3

sheet 21

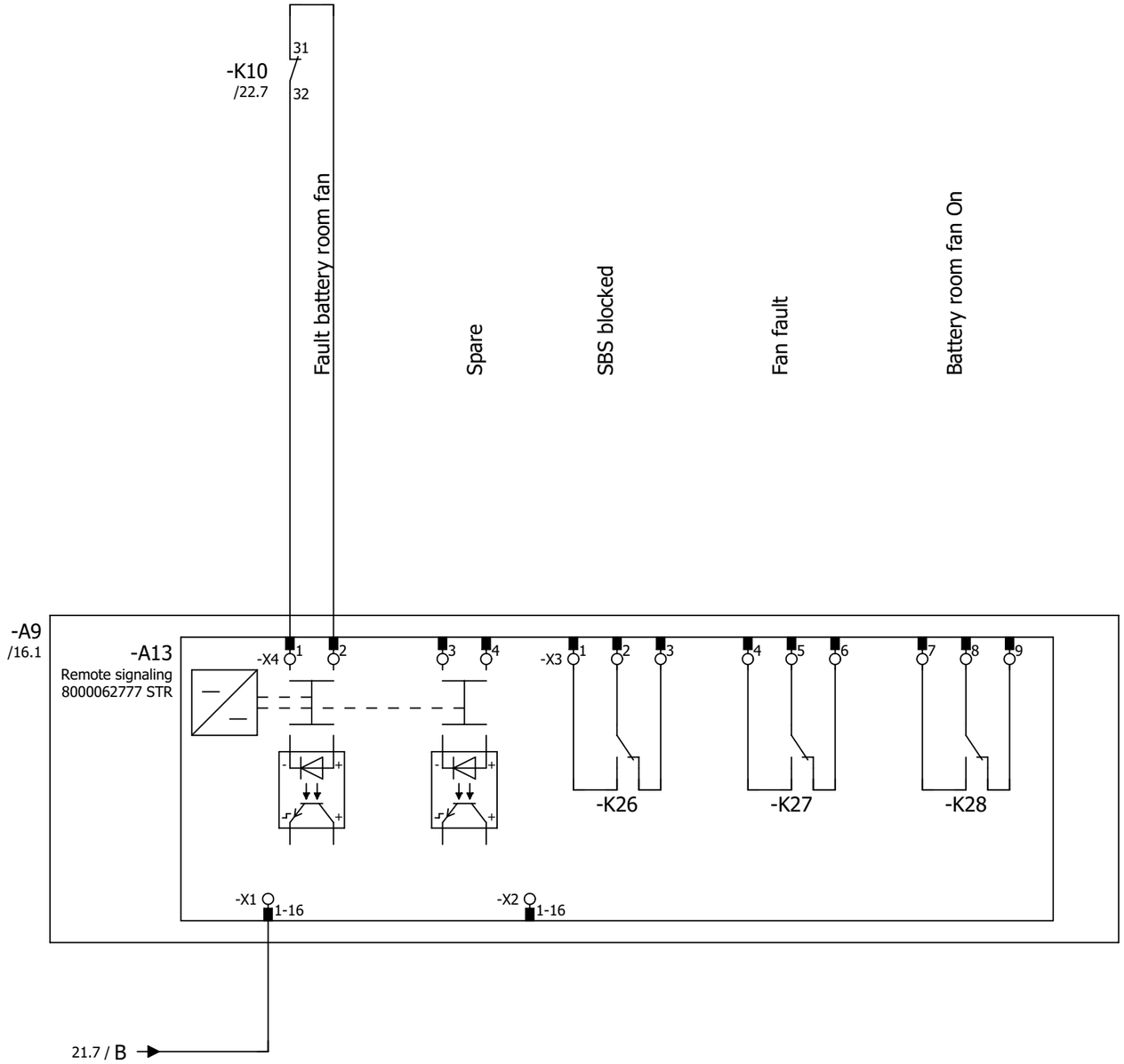
sheets 23

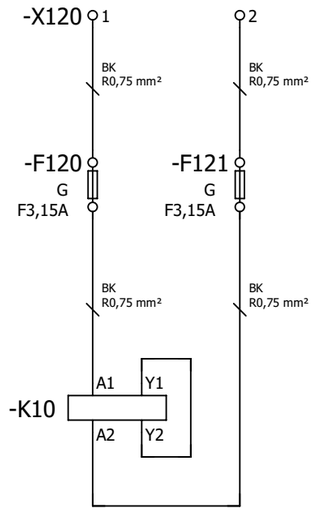
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Configuration remote signals
see techn. data sheet

24V DC is permanently present
in fault-free operation





PXC.2981020_PSR-SCP- 24DC/ESP4/2X1/1X2

13 — 14
23 — 24
31 — 32 /22.2

1000007888_010

				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Remote signaling Protect 8.33 40-400-210-400	=
				Editor	Beckschäfer				+ UPS1
				Checked	Ch.Peck			1000007888.010	& EFS
Stat	Alteration	Date	Name	Norm				10009756	1000007888_010 en

A3 | sheet 22 | sheets 23

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Control cabinet heating
Mains
110-250V/N/PE~50/60Hz

+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757

GZ13_1
+MBC1/17.2

GZ13_2
+MBC1/17.3

back-up fuse
gG 10A

BK
R1,5 mm²

BK
R1,5 mm²

-X13 U U N N PE PE

BK
0,75 mm²

-F100 1
G
T6,3A 2

BK
0,75 mm²

BK
0,75 mm²

L
-F85
I 3 2

-A85
-X1 3 2
-R1

-X14 U U N N

BK
0,75 mm²

-F110 1
G
T6,3A 2

BK
0,75 mm²

BK
0,75 mm²

-X114 U N

-W100
H05VV
2x1 mm²
3 m

L N
-H1
Enclosure light

1000007888_010

				Date	14.05.2024			=		
				Editor	EEC	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	external connection Protect 8.33 40-400-210-400		+ UPS1
				Checked	Ch.Peck				1000007888.010	& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009756	1000007888_010 en

A3 | sheet 23 | sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A9-A12-X3

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1						+UPS1&EFS/21.5
				2						+UPS1&EFS/21.5
				3						+UPS1&EFS/21.5
				4						+UPS1&EFS/21.5
				5						+UPS1&EFS/21.6
				6						+UPS1&EFS/21.6
				7						+UPS1&EFS/21.6
				8						+UPS1&EFS/21.6
				9						+UPS1&EFS/21.6
				10						+UPS1&EFS/21.7
				11						+UPS1&EFS/21.7
				12						+UPS1&EFS/21.7

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				Date	23.05.2024
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				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A12-X3
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 1
sheets 23

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS1-A9-A12-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1						+UPS1&EFS/21.4
				2						+UPS1&EFS/21.4
				3						+UPS1&EFS/21.4

Stat	Alteration	Date	Name		
				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A12-X4
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 2
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A9-A12-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1						+UPS1&EFS/21.3
				2						+UPS1&EFS/21.3

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Stat	Alteration	Date	Name			
				Date	23.05.2024	
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A12-X5
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 3
sheets 23

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS1-A9-A12-X6

Cable name	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Position / Page
Cable type							Cable type	
			1-10		-A9-A12-X1			+UPS1&EFS/21.2

Stat	Alteration	Date	Name			
				Date	23.05.2024	
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A12-X6
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 4
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A9-A29.1-X2

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-9						+UPS1&EFS/20.2

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Stat	Alteration	Date	Name		
				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A29.1-X2
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 5
sheets 23

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS1-A9-A29.1-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-3						+UPS1&EFS/20.3

				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A29.1-X4
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 6
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A9-A29.1-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-8						+UPS1&EFS/20.3

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Stat	Alteration	Date	Name		
				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A29.1-X5
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 7
sheets 23

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Terminal diagram

terminal

=+UPS1-A20-X3

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS2-A20-X3	1-3	1-3						+UPS1&EFS/16.6

Stat	Alteration	Date	Name		
				Date	03.06.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A20-X3
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 8
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A20-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-3						+UPS1&EFS/16.7

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Stat	Alteration	Date	Name		
				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A20-X4
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 9
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A20-X5

Cable name	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Position / Page
Cable type							Cable type	
	+UPS2-A20-X5	1-4	1-4					+UPS1&EFS/16.7

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A20-X5
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 10
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A20-X6

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-2						+UPS1&EFS/16.7

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				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A20-X6
Protect 8.33 40-400-210-400

Terminal diagram

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=
+ UPS1
& EMA

A3

sheet 11
sheets 23

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS1-E1-X1

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-E1-X1	U			+UPS1&EFS/1.2
						-Q1	2			
		+MBC1-X1	2U	U		-E1-X1	U			+UPS1&EFS/1.2
				V		-E1-X1	V			+UPS1&EFS/1.2
						-Q1	4			
		+MBC1-X1	2V	V		-E1-X1	V			+UPS1&EFS/1.2
				W		-E1-X1	W			+UPS1&EFS/1.2
						-Q1	6			
		+MBC1-X1	2W	W		-E1-X1	W			+UPS1&EFS/1.2

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				Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS
				Editor	Beckschäfer		
				Checked	Ch.Peck		
Stat	Alteration	Date	Name	Norm			

Terminal diagram =+UPS1-E1-X1
Protect 8.33 40-400-210-400

Terminal diagram

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= | + UPS1 | & EMA

A3

sheet 12 | sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-E2-X2

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				L+		-L41	1.2			+UPS1&EFS/4.3
		+MBC1-X2	1L+	L+						+UPS1&EFS/4.3
				L-		-L41	2.2			+UPS1&EFS/4.2
		+MBC1-X2	1L-	L-						+UPS1&EFS/4.2

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-E2-X2
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 13
sheets 23

CAE EPLAN Electric P8

Terminal diagram

Cable name	terminal =+UPS1-E3-X3						Cable name			
Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable type			Position / Page
			U		-E3-X3	U				+UPS1&EFS/8.2
					-L11	2				
	+MBC1-X5	1U	U		-E3-X3	U				+UPS1&EFS/8.2
			V		-E3-X3	V				+UPS1&EFS/8.2
					-L12	2				
	+MBC1-X5	1V	V		-E3-X3	V				+UPS1&EFS/8.2
			W		-E3-X3	W				+UPS1&EFS/8.2
					-L13	2				
	+MBC1-X5	1W	W		-E3-X3	W				+UPS1&EFS/8.2
			N		-E3-X3	N				+UPS1&EFS/8.3
	+MBC1-X5	1N	N		-E3-X3	N				+UPS1&EFS/8.3

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				Date	23.05.2024	
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-E3-X3
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 14
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal
=+UPS1-E4-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-E4-X4	U			+UPS1&EFS/8.6
						-A3-X4	1			
		+MBC1-X4	1U	U		-E4-X4	U			+UPS1&EFS/8.6
				V		-E4-X4	V			+UPS1&EFS/8.6
						-A3-X4	2			
		+MBC1-X4	1V	V		-E4-X4	V			+UPS1&EFS/8.6
				W		-E4-X4	W			+UPS1&EFS/8.6
						-A3-X4	3			
		+MBC1-X4	1W	W		-E4-X4	W			+UPS1&EFS/8.6
				N		-E4-X4	N			+UPS1&EFS/8.6
		+MBC1-X4	1N	N		-E4-X4	N			+UPS1&EFS/8.6

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				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-E4-X4
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 15
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-F120

Cable name	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Position / Page
Cable type							Cable type	
	-K10	A1	1		-X120	1		+UPS1&EFS/22.7

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Stat	Alteration	Date	Name			
				Date	03.06.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-F120
Protect 8.33 40-400-210-400

Terminal diagram

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=
+ UPS1
& EMA

A3

sheet 16
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-F121

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		-K10	A2	1		-X120	2			+UPS1&EFS/22.8

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				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-F121
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 17
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-PE

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+MBC1-PE	PE	PE						+UPS1&EFS/4.3
				PE						+UPS1&EFS/8.4
				PE						+UPS1&EFS/1.4

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				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-PE
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 18
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-X12

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1		-A92.1-X3	4			+UPS1&EFS/11.5
				2		-A92.2-X10	2			+UPS1&EFS/11.5
				3		-A92.2-X10	3			+UPS1&EFS/11.5
		-A24.1-X1	+	4	'	-A92.1-X20	2			+UPS1&EFS/11.7
		-A24.1-X1	-	5	'	-A92.1-X20	1			+UPS1&EFS/11.7
				6		-CU	N			+UPS1&EFS/14.7
				7		-A9-A16-X8	5			+UPS1&EFS/14.2
				8		-A9-A16-X8	4			+UPS1&EFS/14.2
				9		-A9-A16-X8	6			+UPS1&EFS/14.2
				10		-A9-A50-X8	1			+UPS1&EFS/12.3
				11		-A9-A50-X8	2			+UPS1&EFS/12.3
						-Q3	96			
				12		-A9-A16-X8	7			+UPS1&EFS/14.2
				15		-A9-A50-X8	3			+UPS1&EFS/12.3
						-Q3	95			

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				Date	03.06.2024
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				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-X12
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 19
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-X13

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-F100	1:2			+UPS1&EFS/23.2
		-X14	U	U						+UPS1&EFS/23.2
				N		-A85-X1	2			+UPS1&EFS/23.2
		-X14	N	N						+UPS1&EFS/23.3
				PE						+UPS1&EFS/23.3
				PE						+UPS1&EFS/23.3

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				Date	03.06.2024
				Editor	Beckschäfer
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				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-X13
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 20
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-X14

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		-X13	U	U		-F110	1:2			+UPS1&EFS/23.7
		+MBC1-X13	U	U						+UPS1&EFS/23.7
		-X13	N	N		-X114	N			+UPS1&EFS/23.7
		+MBC1-X13	N	N						+UPS1&EFS/23.7

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Stat	Alteration	Date	Name			
				Date	03.06.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-X14
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 21
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-X15

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1		-A9-A50-X8	4			+UPS1&EFS/12.6
				1		-C711				+UPS1&EFS/12.7
				2		-C712				+UPS1&EFS/12.7
		+MBC1-X15	2	2		-A9-A50-X5	5			+UPS1&EFS/12.8
		+MBC1-X15	3	3		-A9-A50-X5	6			+UPS1&EFS/12.8

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				Date	03.06.2024
				Editor	Beckschäfer
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				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-X15
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 22
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal
=+UPS1-X120

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1	'	-F120	1:1			+UPS1&EFS/22.7
				2	'	-F121	1:1			+UPS1&EFS/22.8

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				Date	03.06.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-X120
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS1
& EMA

A3

sheet 23
sheets 23

CAE EPLAN Electric P8

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Three-phase input
Attention! Observe sequence of wires, L1, L2, L3 -->
See technical data sheet for required mains fuses

Power section rectifier

mains transformer

Note: Reinforced insulated wire
0,75 mm² unmarked wires

-L61 N=2

Measurement REC Interface -A9-A50-X2
Supply REC Interface -A9-A50-X3

01L1 / 12.6
01L2 / 12.6
01L3 / 12.6
02L1 / 11.1
02L2 / 11.1
02L3 / 11.1

-L22
-T40
-L85.1
-L85.2

1L1 / 2.1
1L2 / 2.1
1L3 / 2.1
2L1 / 3.1
2L2 / 3.1
2L3 / 3.1

-C101.1
-C101.2
-C101.3
-Q3
-Q1
L=100/85A
I=1,0kA
Icu=50kA
C1
C2
/12.4
/12.3
-L23
-L24
-L25
-R23
-R24
-R25
-C23
-C24
-C25
3xR6 mm²

-A80
-A81
Suppression
81
82
83
-R86
-R87
-R88
-R81
-R82
-R83
-V81.1-V81.6
-R84.1
-R84.2
90
89
-C84
-C85

-E1
-X1
-A2
-A1
EMI capacitor 4-pole 8000022634 STR
-C4
-C5
-C1
-C6
-C2
-C7
-C3
-C8
-C9
-C10
-X2
-X3
-L92

Mains
400V;3/PE~50Hz

+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757

GZ1_1 +MBC1/1.6
GZ1_2 +MBC1/1.6
GZ1_3 +MBC1/1.6

Rack
-PE
PE busbar
Cu 40x5 mm
GNYE 6 mm²
Tür links
Pivot plate

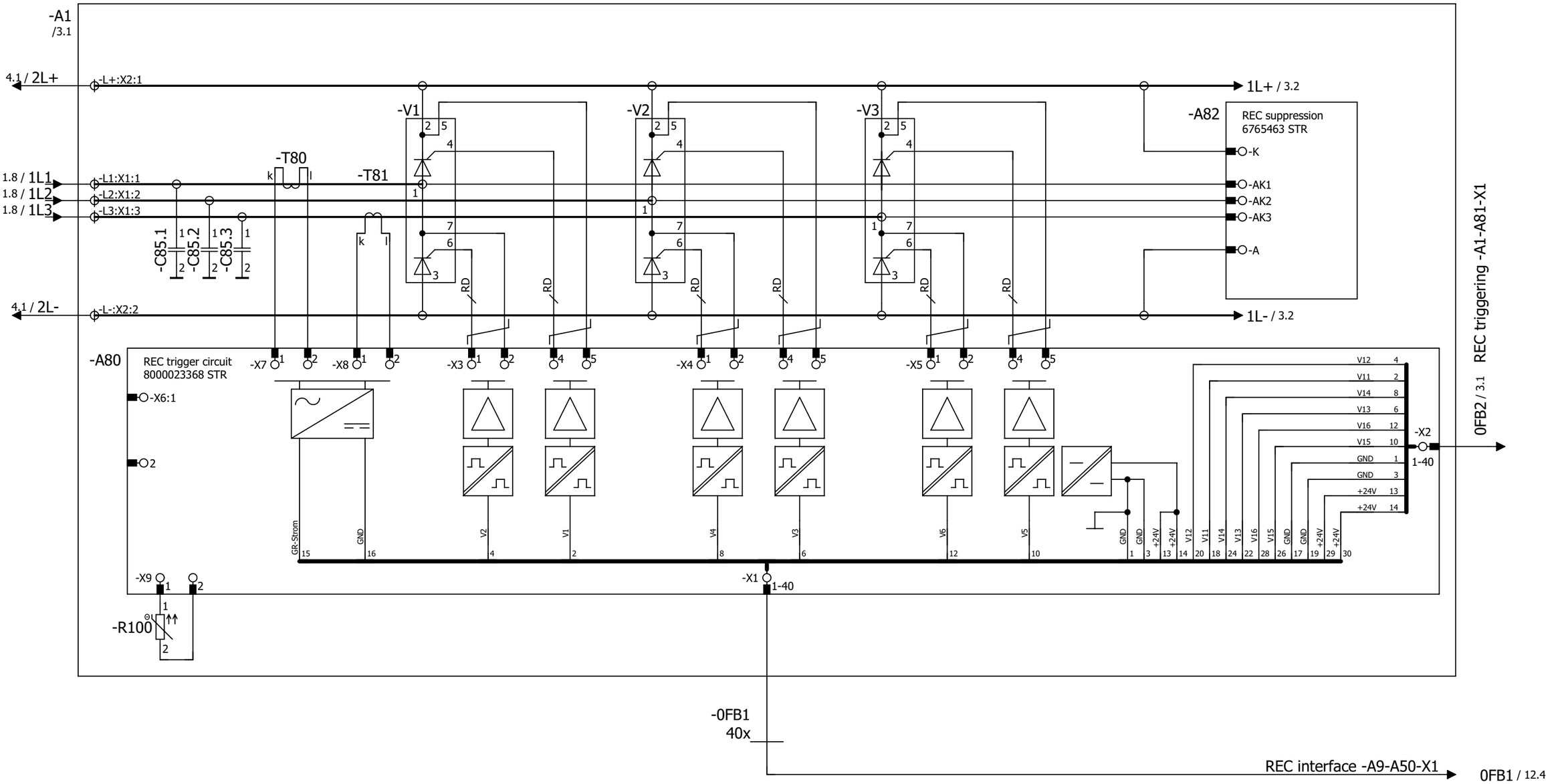
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				Editor	Beckschäfer								
				Checked	Ch.Peck								
Stat	Alteration	Date	Name	Norm									

Power section rectifier

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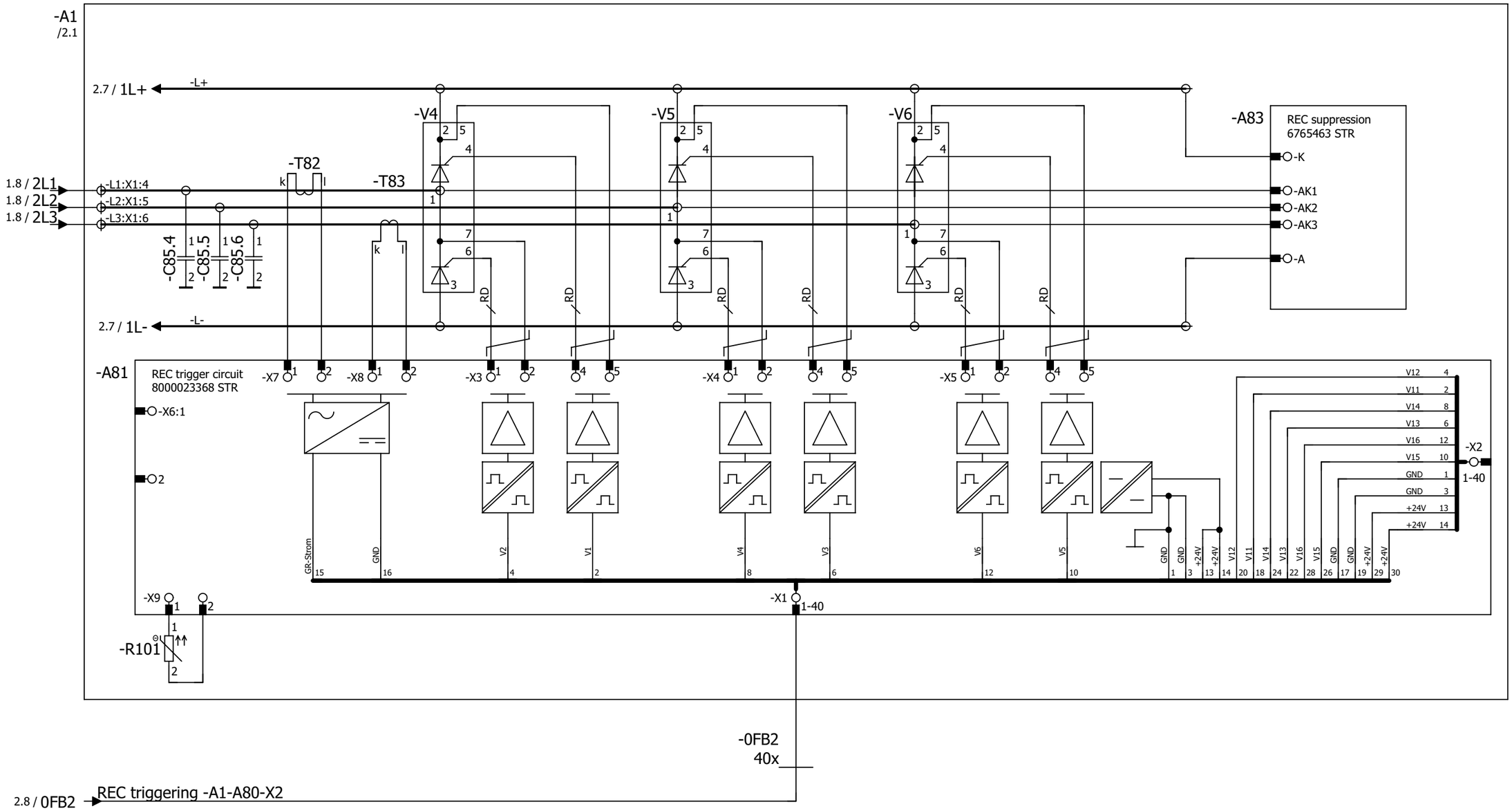
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				Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Power section rectifier Protect 8.33 40-400-210-400 Circuit diagram	=
				Editor	Beckschäfer				+ UPS2
				Checked	Ch.Peck			1000007888.010 10009756	1000007888_010 en	& EFS	A3	sheet 2 sheets 23
Stat	Alteration	Date	Name	Norm					

Power section rectifier

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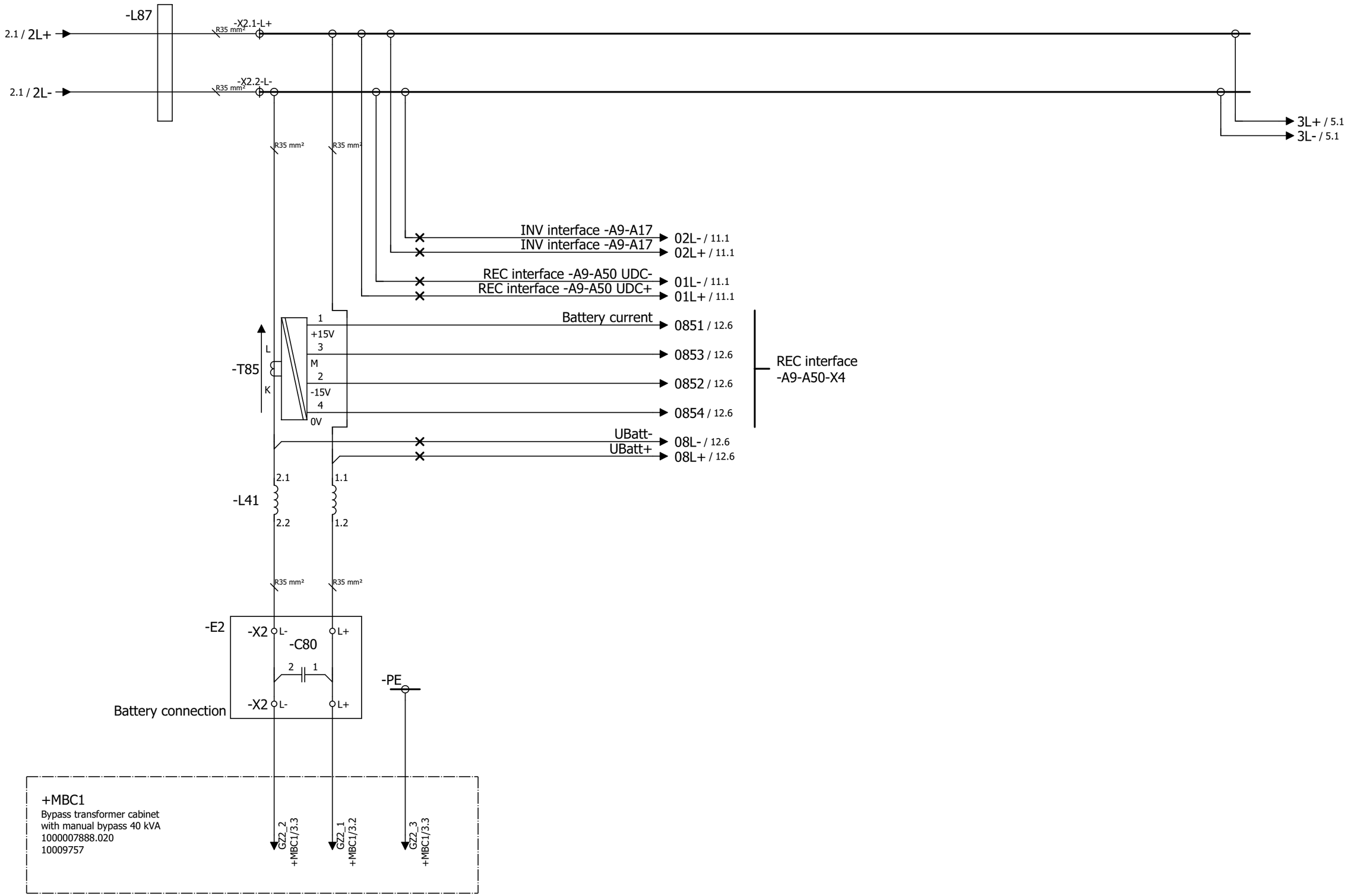
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				Editor	Beckschäfer			
				Checked	Ch.Peck			
Stat	Alteration	Date	Name	Norm				

		=	
		+ UPS2	
1000007888.010 10009756	1000007888_010 en	& EFS	A3 sheet 3 / sheets 23

Power section rectifier
Battery connection

CAE EPLAN Electric P8

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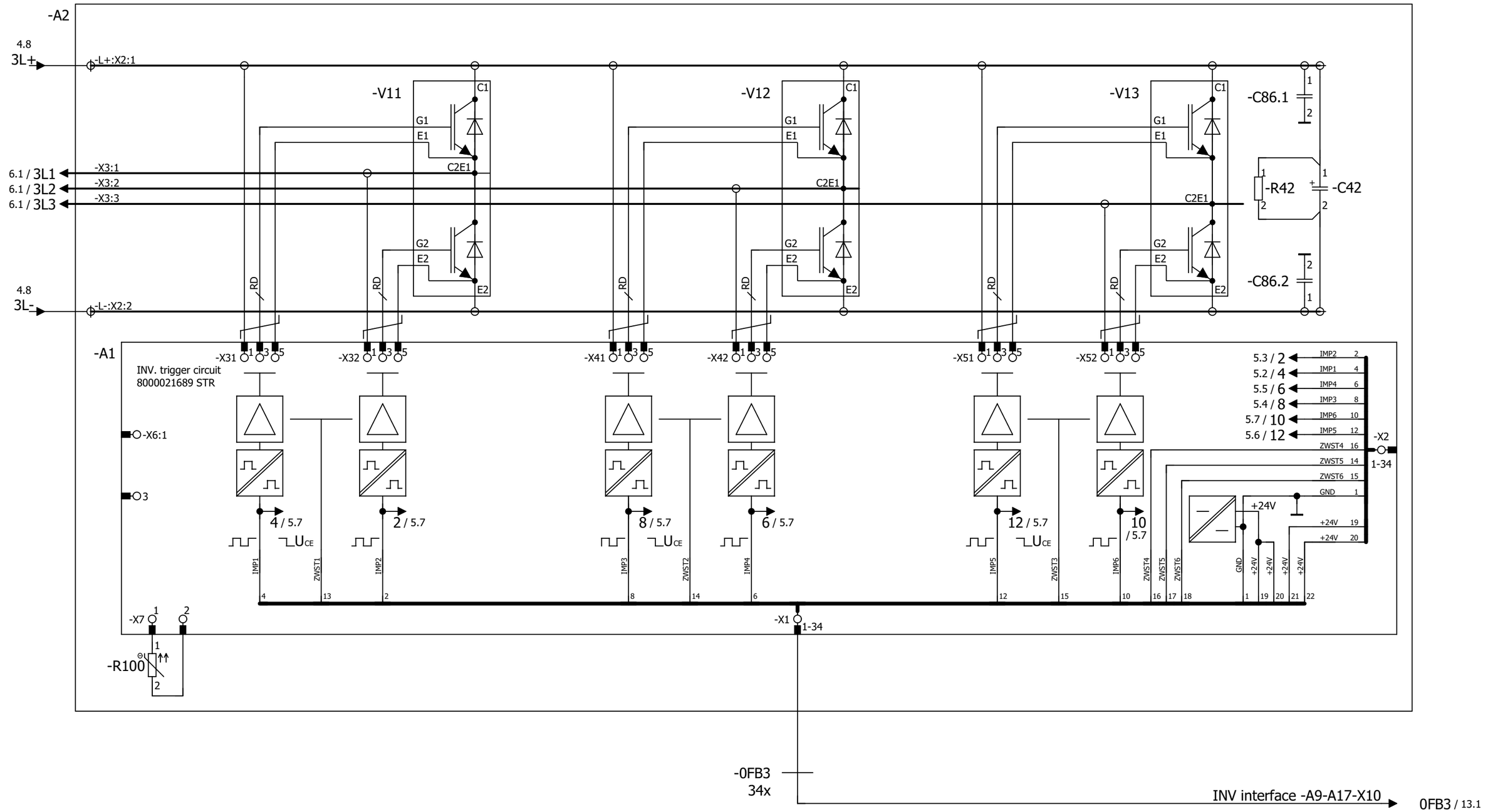
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				Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Battery connection Protect 8.33 40-400-210-400 Circuit diagram	=
				Editor	Beckschäfer				+ UPS2
				Checked	Ch.Peck			1000007888.010 10009756	& EFS
Stat	Alteration	Date	Name	Norm				1000007888_010 en	A3 sheet 4 / sheets 23

Power section inverter

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				Editor	Beckschäfer						+ UPS2
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Stat	Alteration	Date	Name	Norm							A3 sheet 5 / sheets 23

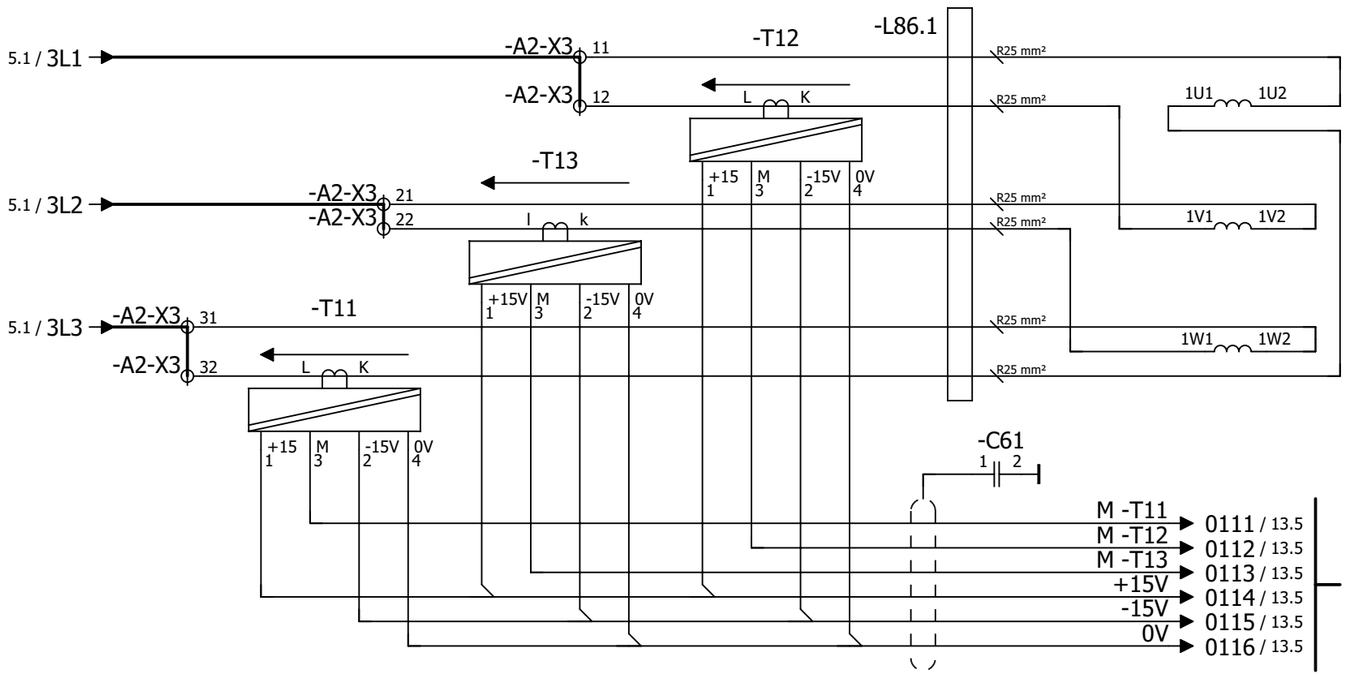
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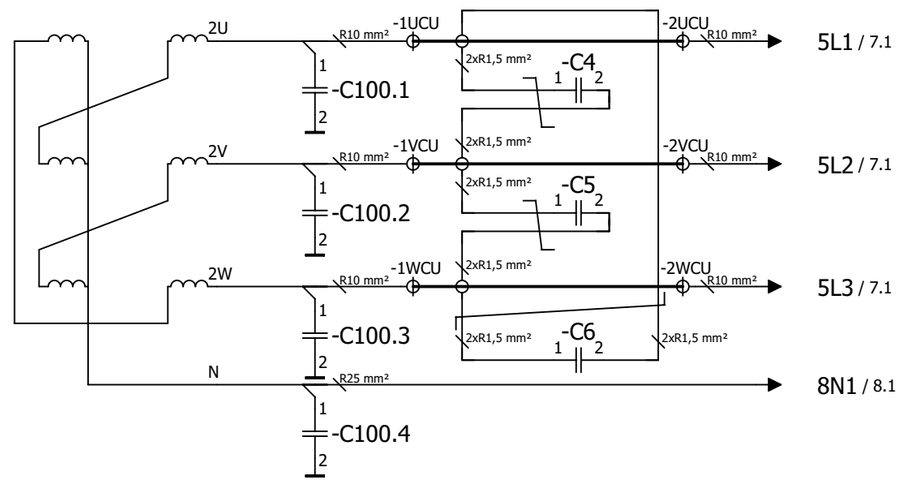
Power section inverter

Measuring INV current dynamic



INV interface
-A9-A17-X19

-T1



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Power section inverter

Measurement INV current static

Output fuse

6.8 / 5L1
6.8 / 5L2
6.8 / 5L3

-T21 K L (k l)
-T22 K L (k l)
-T23 K L (k l)

-F1 1 2
-F2 1 2
-F3 1 2

INV interface -A9-A17-X2
04L1 / 13.5
04L2 / 13.5
04L3 / 13.5

INV interface -A9-A17-X3
05L1 / 13.5
05L2 / 13.5
05L3 / 13.5

8L1 / 8.1
8L2 / 8.1
8L3 / 8.1

Supply fans -A92.1-F6
06L1 / 11.1

Load voltage -A92.2-F1
-F2
-F3
08L1 / 11.1
08L2 / 11.1
08L3 / 11.1

Thyristor contactor -X4
7L1 / 9.1
7L2 / 9.1
7L3 / 9.1

Thyristor contactor -X5
6L3 / 9.1
6L2 / 9.1
6L1 / 9.1

INV interface -A9-A17-X8
023L / 13.1
023K / 13.1
022L / 13.1
022K / 13.1
021L / 13.1
021K / 13.1

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Power section inverter

Parallel preventive choke coil

7.8 / 8L1
7.8 / 8L2
7.8 / 8L3
6.8 / 8N1

SBS Output
10L1 / 10.1
10L2 / 10.1
10L3 / 10.1

-L11 -L12 -L13

-A105
-C56 -C57 -C58
-X1 -X2 -X3 -X4

SBS Input
9L1 / 10.1
9L2 / 10.1
9L3 / 10.1

fan neutral conductor
0451N1 / 17.1

neutral conductor
04N1 / 13.5
-A9

-E3
-X3 U V W N
-A4
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

-L93

-A3
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

Load
400V;3/N/PE~50Hz
-X3 U V W N

-PE

-E4
-X4 U V W N
-A4
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

-L94

-A3
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

Mains
400V;3/N/PE~50Hz
-X4 U V W N

+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757

GZ3_1 +MBC1/6.5
GZ3_2 +MBC1/6.5
GZ3_3 +MBC1/6.6
GZ3_4 +MBC1/6.6
GZ4_1 +MBC1/5.6
GZ4_2 +MBC1/5.6
GZ4_3 +MBC1/5.6
GZ4_4 +MBC1/5.6

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Load output / SBS circuit
Protect 8.33 40-400-210-400

Circuit diagram

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sheets 23

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Power section inverter
Inverter output contactor

-A4

-A37 SBS suppression 8000028996 STR

-A3 -K3 -AK3 -A2 -K2 -AK2 -A1 -K1 -AK1

-V31

-X4:1A
-X4:1
-X4:1K

A K AK G2 K2 K1 G1

-V33

-X4:2A
-X4:2
-X4:2K

-V35

-X4:3A
-X4:3
-X4:3K

RD

-X2 -X3 -X4

-A36 SBS trigger circuit 8000028563 STR

-X5:1
2

GND EIJE_EIN GND GND +24V +24V 1 2 3 4 5 6 7 8 9 10

-X6 1 2
-X1 1-10

-R100

-0FB10
10x

-X6 5
-X6 6
-X6 3
-X6 4
-X6 1
-X6 2

7.7 / 7L1
7.7 / 7L2
7.7 / 7L3
7.7 / 6L3
7.7 / 6L2
7.7 / 6L1

-X5:3
-X5:2
-X5:1

INV interface -A9-A17-X1 → 0FB10 / 13.1

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Power section SBS

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-A3

SBS mains voltage -A92.2-F6 → 010L1 / 11.1
-A92.2-F7 → 010L2 / 11.1
-A92.2-F8 → 010L3 / 11.1

8.8 / 9L1 → SBS mains
8.8 / 9L2 → SBS mains
8.8 / 9L3 → SBS mains

-A37 SBS suppression 8000028996 STR

-A3 -K3 -AK3 -A2 -K2 -AK2 -A1 -K1 -AK1

-V31
-X4:1A -X4:1 -X4:1K
A K AK
G2 K2 K1 G1

-V33
-X4:2A -X4:2 -X4:2K
A K AK
G2 K2 K1 G1

-V35
-X4:3A -X4:3 -X4:3K
A K AK
G2 K2 K1 G1

RD

-A36 SBS trigger circuit 8000028563 STR

-X2 -X3 -X4 1 2 5 4

-X5:1
2

GND 1 | EUE_EIN 2 | GND 3 | GND 4 | +24V 5 | +24V 6 | 7 | 8 | 9 | 10

-X6 1 2
-X1 1-10

-R100 1 2

SBS interface -A9-A16-X1 → 0FB9 / 14.3

-X6 5
-X6 6
-X6 3
-X6 4
-X6 1
-X6 2

UPS Output
8.8 / 10L3 ← -X5:3
8.8 / 10L2 ← -X5:2
8.8 / 10L1 ← -X5:1

SBS interface -A9-A16-X4 → 03151L / 14.3
-A9-A16-X4 → 03151K / 14.3
-A9-A16-X4 → 03352L / 14.3
-A9-A16-X4 → 03352K / 14.3
-A9-A16-X4 → 03553L / 14.3
-A9-A16-X4 → 03553K / 14.3

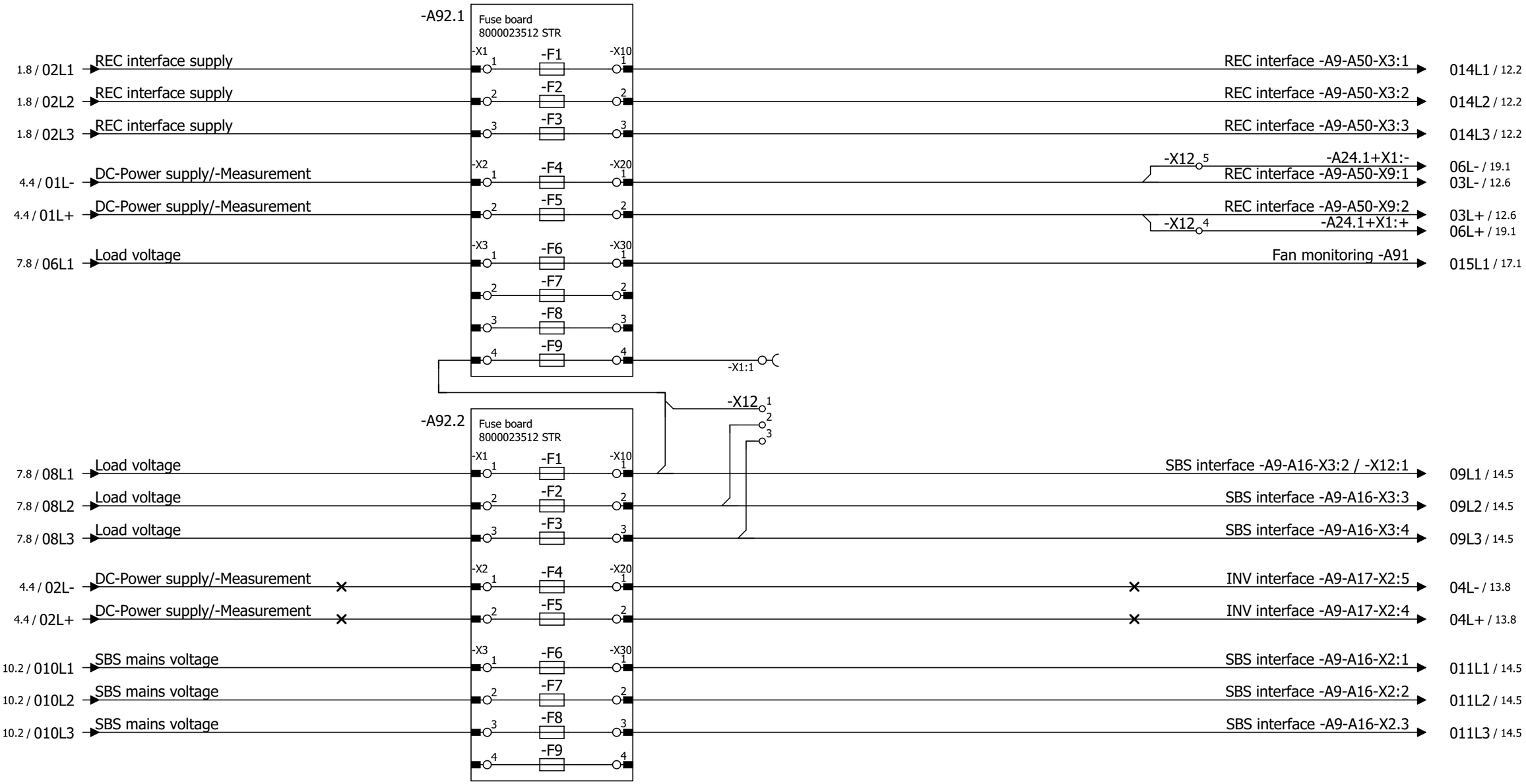
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Fuse boards

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Rectifier control

-A9
/16.1

4.4 / 0854
4.4 / 0851
4.4 / 0853
4.4 / 0852
Battery current transformer -T85

4.4 / 08L+
4.4 / 08L-
UBatt+
UBatt-

11.8 / 03L+
11.8 / 03L-
UIC+ A92.1-F5
UIC- A92.1-F4

1.8 / 01L3
1.8 / 01L2
1.8 / 01L1
-Q1 REC input voltage

11.8 / 014L3
11.8 / 014L2
11.8 / 014L1
-T40 sec. supply REC

2.8 / 0FB1
REC trigger circuit -A1-A80-X1

-A50
/16.2
REC interface
8000022025 STR

-X3 1 2 3
-X5 7 8
-X1 1-40
-X2 1 3 5
-X9 1 2 3 4
-X4 2 3 1 4
-15V +15V

GND V1 GND V2 V3 V4 V5 V6 +24V +24V GND V11 GND V12 V13 V14 V15 V16 +24V +24V REC current REC current
1 2 3 4 6 8 10 12 13 14 17 18 19 20 22 24 26 28 29 30 15 16 31 32

+24V
+24V

-R204
-R206
REC current stack A1
REC current stack A2

15 19 18 31 32 33 34 35 36 39 40 41 42 43 44
40 39 36 35 34 33 44 43 42 41 38

-X11 1-50
-A50X11 50x
-X12 1-50
-A50X12 50x

-A1
REC control
8000014119 STR

-X11 1-50
15 18 19 31 32 33 34 35 36 39 40 41 42 43 44

-X12 1-50
40 39 36 35 34 33 44 43 42 41 38

-X19 1 2 3
-X15 1 4
-X8 1 2 3
-X5 3 4 +24V DC
-X8 4 5 6
-X5 5 6

-X130 1 2
-X12 10 11 15
-Q3
/1.4
96 98
95
-Q1
C1
C2

BK R1,5 mm²
-C711 220000µF
-C712 220000µF
BK R2,5 mm²
BK R2,5 mm²
BK R1,5 mm²
BK R1,5 mm²
0V
BK R2,5 mm²
-X15 1 1
-X15 2 2 (+) (-) 3
*1

+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757
GZ130_1
GZ130_2

+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757
GZ15_2 +MBC1/3.4
GZ15_3 +MBC1/3.4

*1 Attention! In the event of battery undervoltage < 130 V, the UPS automatically switches off battery isolator Q2.
If this happens, switch X15:3 must be switched into the open position (undervoltage trip blocked).
For restart, please refer to the chapter in the UPS operating instructions (charging the DC link capacitors).
Unlock the tripped switch Q2 by switching to open position.
After charging the DC link capacitors, switch on Q2.
Attention! When the battery voltage reaches > 200 V, switch X15:3 must be switched back to the closed position.

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Rectifier control
Protect 8.33 40-400-210-400

Circuit diagram

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& EFS

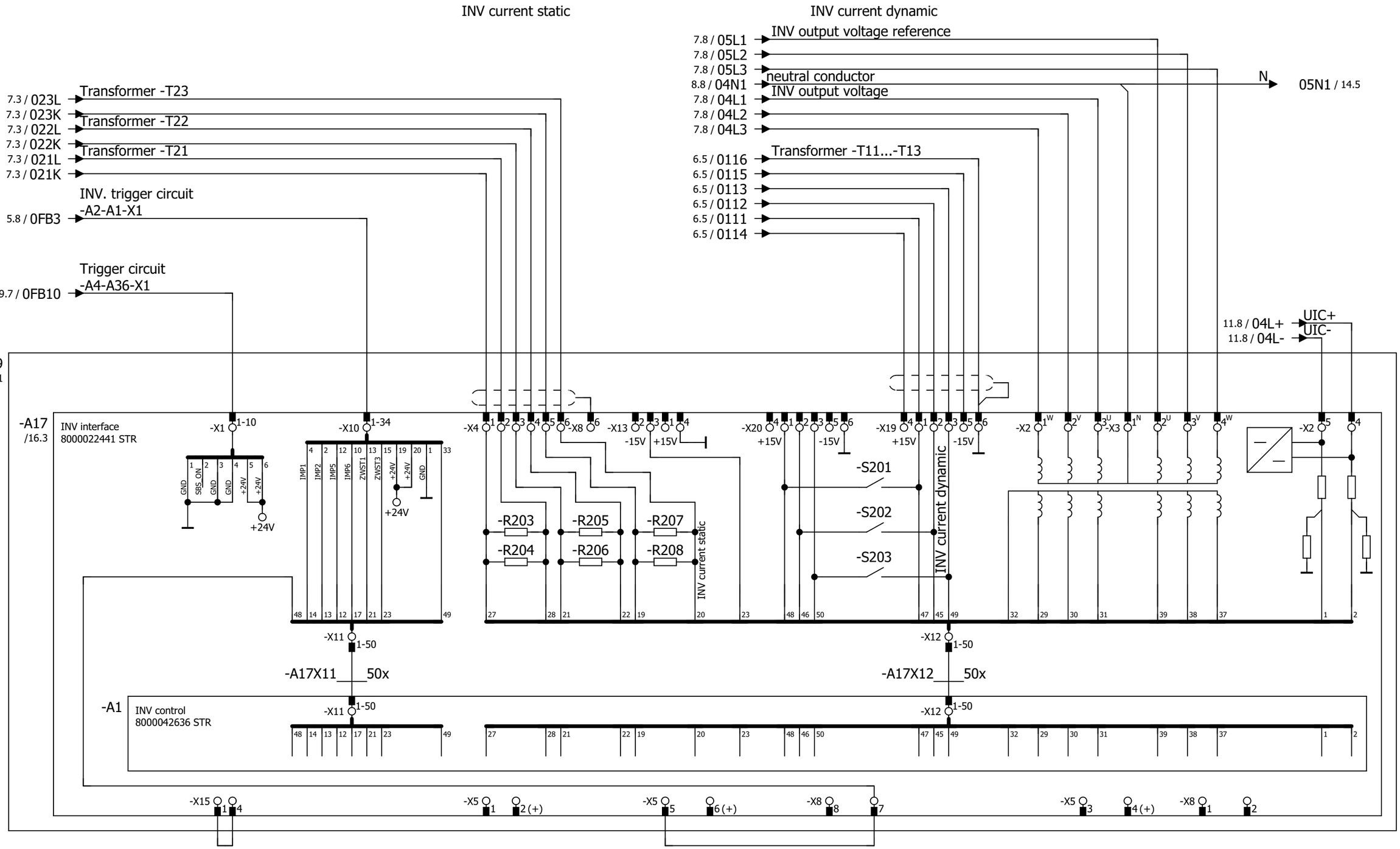
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Inverter control



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Control SBS

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-A9 /16.1

10.4 / 03553L Transformer -T35
10.4 / 03553K
10.4 / 03352L Transformer -T33
10.4 / 03352K
10.4 / 03151L Transformer -T31
10.4 / 03151K

11.8 / 09L1 Load voltage
11.8 / 09L2
11.8 / 09L3

13.8 / 05N1 neutral conductor → -X1:3 → -X12 6

11.8 / 011L1 SBS mains voltage
11.8 / 011L2
11.8 / 011L3

10.2 / 0FB9 SBS trigger circuit -A3-A36-X1

-L62

-A16 /16.4
SBS interface
8000022378 STR

-X1 1-10: 1 GND, 2 SBS_ON, 3 GND, 4 GND, 5 +24V, 6 +24V, 7, 8, 9, 10
+24V

-X4 1 2 3 4 5 6

SBS current

-X2 1U 2V 3W
-X3 1N 2U 3V 4W

-X12 12 → -X8 7

-R201 -R203 -R205
-R202 -R204 -R206

7 → 5
8 → 4
9 → 6
-X18 1 → 1
-R120 1 2 → 2

15 16 26 17 21 29 30 27 45 46 35 36 33 41 42 39

-X11 1-50
-X12 1-50

-A16X11 50x
-A16X12 50x

-A1
SBS control
8000008845 STR

-X15 1 2 3 +24V 4 5

Fan control -A92.1-X6
091.11 / 17.7
091.12 / 17.7
091.13 / 17.7
091.14 / 17.7
091.15 / 17.7

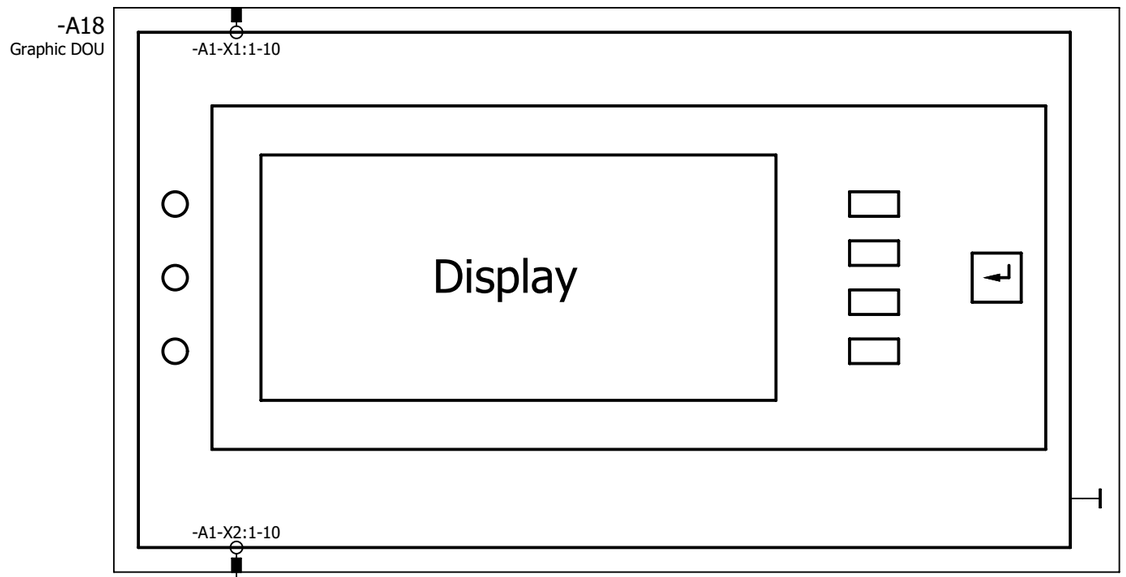
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Control

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DOU-CAN

A / 16.1

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Control

+UPS2
Protect 8.33 40-400-210-400
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GZ20_3
+UPS1/16.6

GZ20_5
+UPS1/16.7

INV
-CAN

INV
-sync

-A9
/12.1
/13.1
/14.2
/20.1
/21.1
/22.1

-A50
/12.1
REC interface
8000022025 STR

-X6 1-10
-X7 1-16

-A17
/13.1
INV interface
8000022441 STR

-X6 1-10
-X7 1-16

-A16
/14.2
SBS interface
8000022378 STR

-X6 1-10
-X7 1-16

-A20
Parallel Adapter
8000023378 STR

-X3 1-3
-X4 1-3
-X5 1-4
-X6 1-2

-X1 1-16
-X2 1-16
-X11 1-10
-X12 1-10
-X13 1-10
-X14 1-10

Parallel CAN INV

Parallel CAN REC

15.8 / A

DOU-CAN

A / 20.1

L / 19.1

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Fan control/monitoring

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11.8 / 015L1 → 016L1 / 18.1

8.8 / 0451N1 → 0452N1 / 18.1

-A91.2-X6 → 091.21 / 18.7; 091.22 / 18.7; 091.23 / 18.7; 091.24 / 18.7; 091.25 / 18.7

-A91.1 Fan control 8000022841 STR

-X5: 1, 2, 3

-R5, -C5

Logical evaluation fan fault

-S1, -S2

= 1

-X7: 1, 2, 3, 4, 5

Fan speed

+24V

-R50 -R51 -R60 -R61 -R70 -R71 -R80 -R81

P1 P2 P3 P4 P5 P6 P7 P8

-R1 PTC, -R2 PTC, -R3 PTC, -R4 PTC

-X1: 2, 1 | -X2: 2, 1 | -X3: 2, 1 | -X4: 2, 1

-X6: 1, 2, 3, 4, 5

-C31, -C32, -C33, -C34

-X91: 2, N, L, 3, 1 | -X92: 2, N, L, 3, 1 | -X93: 2, N, L, 3, 1 | -X94: 2, N, L, 3, 1

-M1 M 1~ PE | -M2 M 1~ PE | -M3 M 1~ PE | -M4 M 1~ PE

14.6 / 091.11
14.6 / 091.12
14.6 / 091.13
14.6 / 091.14
14.6 / 091.15

SBS interface -A9-A16-X15

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Fan control/monitoring
Protect 8.33 40-400-210-400

Circuit diagram

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Fan control/monitoring

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17.8 / 016L1

17.8 / 0452N1

-A91.2

Fan control
8000022841 STR

-X5 1 2 3

-R5

-C5

-S1

-S2

Logical evaluation
fan fault

-X7 1 2 3 4 5

Fan speed

+24V

= 1

P2 P4 P6 P8

-R50 -R51 -R60 -R61 -R70 -R71 -R80 -R81

P1 P3 P5 P7

-R1 PTC

-R2 PTC

-R3 PTC

-R4 PTC

-X1 2 1

-X2 2 1

-X3 2 1

-X4 2 1

-X6 1 2 3 4 5

-C35

-C36

-X95 2 3 1

-X96 2 3 1

N L

-M5 M 1~ PE

-M6 M 1~ PE

17.8 / 091.21

17.8 / 091.22

17.8 / 091.23

17.8 / 091.24

17.8 / 091.25

-A92.1-X7

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Control

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+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757

GZ91_1
+MBC1/3.5

-F91 1
G
F3,15A 2

11.8 / 06L+

-A24.1
Battery charge monitoring
BLÜ-PRO
(Option)

-X1 +
M

0 ... 5V

-X1 -
-X3 1-16
-X4 1-10

16.8 / L

11.8 / 06L-

1000007888_010

				Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	battery charging circuit monitoring Protect 8.33 40-400-210-400	=
				Editor	Beckschäfer				+ UPS2
				Checked	Ch.Peck			1000007888.010	& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009756

1000007888_010 en | A3 | sheet 19 | sheets 23

CAE EPLAN Electric P8

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Control

SNMP adapter
CompuWatch
Service Tools
Modbus

Modbus

-ADPT
HARD-WIRED
ADAPTER

-A9
/16.1

-A29.1

-X2 1-9
D-Sub

MultiCanCom2
MCC2

-X5 1-8
A B
RJ45

-X4 1-3

RS232
RS485

Ethernet
10/100

CAN

CAN

-X1 1-10

-X3 1-19

16.8 / A → DOU-CAN → A / 21.1

1000007888_010

				Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	MultiCom Protect 8.33 40-400-210-400		=	
				Editor	Beckschäfer					+ UPS2	
				Checked	Ch.Peck					& EFS	
Stat	Alteration	Date	Name	Norm				Circuit diagram	1000007888.010 10009756	1000007888_010 en	A3 sheet 20 sheets 23

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CAE EPLAN Electric P8

Remote signaling

CAN Service

Configuration remote signals
see techn. data sheet

INV remote off

Common fault

Inverter operation

SBS operation

REC fault

REC mains fault

Battery low

-A9
/16.1

-A12
Remote signaling
8000062777 STR

-X6 1-10

-X5 1 2

-X4 1 2 3

-X3 1 2 3

4 5 6

7 8 9

10 11 12

-K25

-K21

-K22

-K23

-K24

-X1 1-10

-X2 1-16

20.8 / A

B / 22.1

1000007888_010

				Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Remote signaling Protect 8.33 40-400-210-400	=
				Editor	Beckschäfer				+ UPS2
				Checked	Ch.Peck			1000007888.010	& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009756

1000007888_010 en

A3

sheet 21

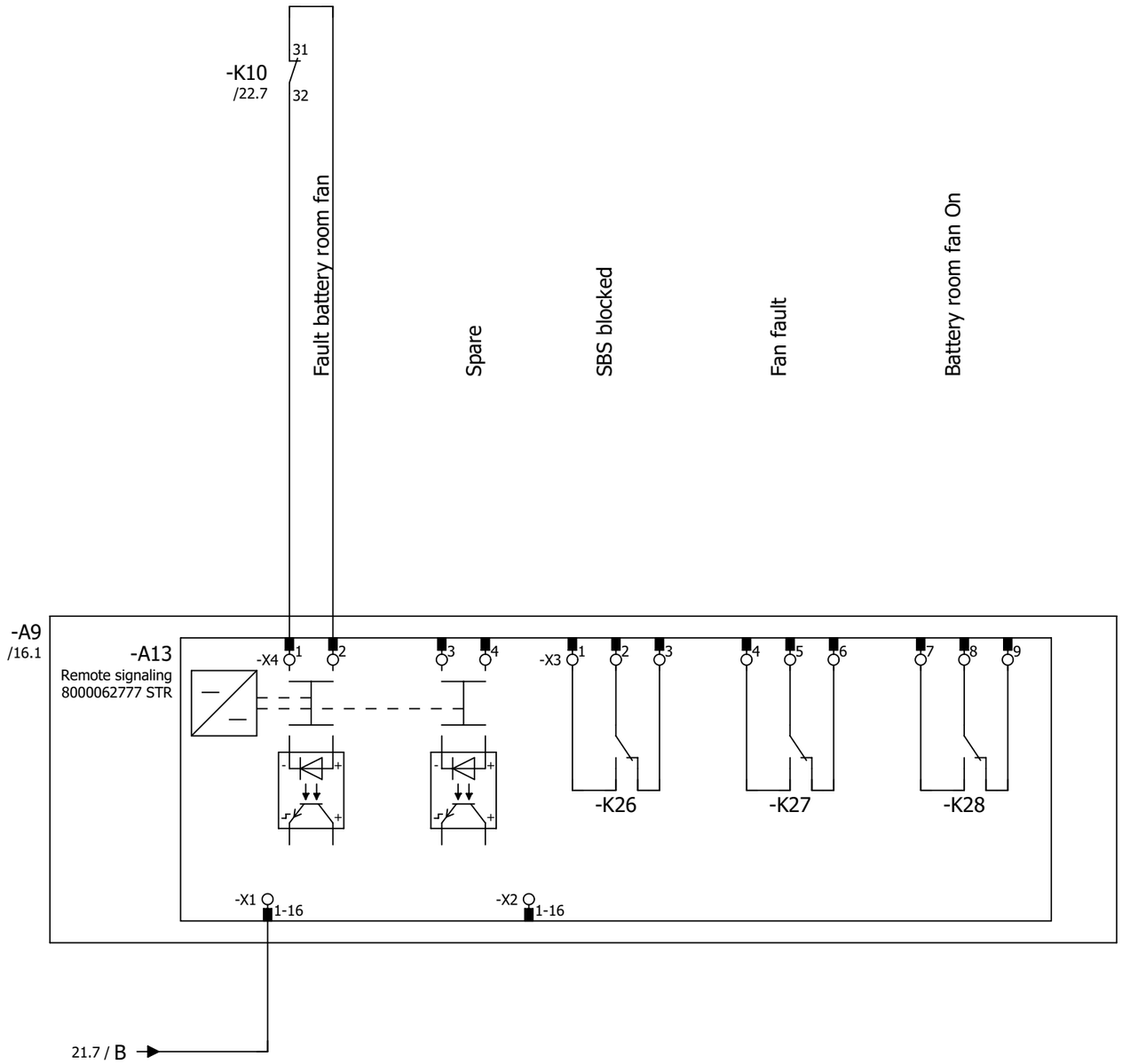
sheets 23

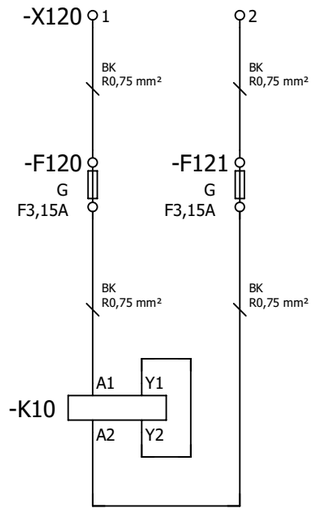
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Configuration remote signals
see techn. data sheet

24V DC is permanently present
in fault-free operation





PXC.2981020_PSR-SCP- 24DC/ESP4/2X1/1X2

13 — 14
23 — 24
31 — 32 /22.2

1000007888_010

				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Remote signaling Protect 8.33 40-400-210-400	=
				Editor	Beckschäfer				+ UPS2
				Checked	Ch.Peck			1000007888.010	& EFS
Stat	Alteration	Date	Name	Norm				10009756	1000007888_010 en

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+MBC1
Bypass transformer cabinet
with manual bypass 40 kVA
1000007888.020
10009757

GZ13_1
+MBC1/17.6

GZ13_2
+MBC1/17.7

BK
R1,5 mm²

BK
R1,5 mm²

-X13 U U N N PE PE

BK
0,75 mm²

-F100 1
G
T6,3A 2

BK
0,75 mm²

BK
0,75 mm²

L
-F85
3 2

-A85 -X1 3 2
-R1

-X14 U U N N

BK
0,75 mm²

-F110 1
G
T6,3A 2

BK
0,75 mm²

BK
0,75 mm²

-X114 U N

-W100
H05VV
2x1 mm²
3 m

L N
-H1
Enclosure light

1000007888_010

				Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	external connection Protect 8.33 40-400-210-400		=	
				Editor	Beckschäfer					+ UPS2	
				Checked	Ch.Peck				1000007888.010	& EFS	A3 sheet 23
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009756	1000007888_010 en	sheets 23

CAE EPLAN Electric P8

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1000007888_010

Terminal diagram

terminal

=+UPS2-A9-A12-X3

Cable name / Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name / Cable type	Position / Page
			1					+UPS2&EFS/21.5
			2					+UPS2&EFS/21.5
			3					+UPS2&EFS/21.5
			4					+UPS2&EFS/21.5
			5					+UPS2&EFS/21.6
			6					+UPS2&EFS/21.6
			7					+UPS2&EFS/21.6
			8					+UPS2&EFS/21.6
			9					+UPS2&EFS/21.6
			10					+UPS2&EFS/21.7
			11					+UPS2&EFS/21.7
			12					+UPS2&EFS/21.7

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS2-A9-A12-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1						+UPS2&EFS/21.4
				2						+UPS2&EFS/21.4
				3						+UPS2&EFS/21.4

1000007888_010

			Date	23.05.2024	
			Editor	Beckschäfer	
			Checked	Ch.Peck	
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A9-A12-X4
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS2
& EMA

A3

sheet 2
sheets 24

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS2-A9-A12-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1						+UPS2&EFS/21.3
				2						+UPS2&EFS/21.3

Stat	Alteration	Date	Name		
				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A9-A12-X5
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS2
& EMA

A3

sheet 3
sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-A9-A12-X6

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-10		-A9-A12-X1				+UPS2&EFS/21.2

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Stat	Alteration	Date	Name			
				Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A9-A12-X6
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

= + UPS2 & EMA

A3

sheet 4
sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-A9-A29.1-X2

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-9						+UPS2&EFS/20.2

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				Date	23.05.2024
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				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A9-A29.1-X2
Protect 8.33 40-400-210-400

Terminal diagram

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=
+ UPS2
& EMA

A3

sheet 5
sheets 24

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Terminal diagram

terminal

=+UPS2-A9-A29.1-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-3						+UPS2&EFS/20.3

				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A9-A29.1-X4
Protect 8.33 40-400-210-400

Terminal diagram

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A3

sheet 6
sheets 24

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Terminal diagram

terminal

=+UPS2-A9-A29.1-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-8						+UPS2&EFS/20.3

Stat	Alteration	Date	Name		
				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A9-A29.1-X5
Protect 8.33 40-400-210-400

Terminal diagram

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=
+ UPS2
& EMA

A3

sheet 7
sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-A20-X3

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-A20-X3	1-3	1-3						+UPS2&EFS/16.6

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Stat	Alteration	Date	Name			
				Date	03.06.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A20-X3
Protect 8.33 40-400-210-400

Terminal diagram

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=
+ UPS2
& EMA

A3

sheet 8
sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-A20-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-3						+UPS2&EFS/16.7

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Stat	Alteration	Date	Name		
				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A20-X4
Protect 8.33 40-400-210-400

Terminal diagram

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+ UPS2
& EMA

A3

sheet 9
sheets 24

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Terminal diagram

terminal

=+UPS2-A20-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-A20-X5	1-4	1-4						+UPS2&EFS/16.7

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Stat	Alteration	Date	Name			
				Date	03.06.2024	
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A20-X5
Protect 8.33 40-400-210-400

Terminal diagram

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+ UPS2
& EMA

A3

sheet 10
sheets 24

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Terminal diagram

terminal

=+UPS2-A20-X6

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-2						+UPS2&EFS/16.7

				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A20-X6
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS2
& EMA

A3

sheet 11
sheets 24

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS2-E1-X1

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-E1-X1	U			+UPS2&EFS/1.2
						-Q1	2			
		+MBC1-X1	4U	U		-E1-X1	U			+UPS2&EFS/1.2
				V		-E1-X1	V			+UPS2&EFS/1.2
						-Q1	4			
		+MBC1-X1	4V	V		-E1-X1	V			+UPS2&EFS/1.2
				W		-E1-X1	W			+UPS2&EFS/1.2
						-Q1	6			
		+MBC1-X1	4W	W		-E1-X1	W			+UPS2&EFS/1.2

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				Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS
				Editor	Beckschäfer		
				Checked	Ch.Peck		
Stat	Alteration	Date	Name	Norm			

Terminal diagram =+UPS2-E1-X1
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

= | + UPS2 | & EMA

A3

sheet 12
sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal
=+UPS2-E2-X2

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				L+		-L41	1.2			+UPS2&EFS/4.3
		+MBC1-X2	3L+	L+						+UPS2&EFS/4.3
				L-		-L41	2.2			+UPS2&EFS/4.2
		+MBC1-X2	3L-	L-						+UPS2&EFS/4.2

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				Date	03.06.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-E2-X2
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS2
& EMA

A3

sheet 13
sheets 24

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS2-E3-X3

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-E3-X3	U			+UPS2&EFS/8.2
						-L11	2			
		+MBC1-X5	2U	U		-E3-X3	U			+UPS2&EFS/8.2
				V		-E3-X3	V			+UPS2&EFS/8.2
						-L12	2			
		+MBC1-X5	2V	V		-E3-X3	V			+UPS2&EFS/8.2
				W		-E3-X3	W			+UPS2&EFS/8.2
						-L13	2			
		+MBC1-X5	2W	W		-E3-X3	W			+UPS2&EFS/8.2
				N		-E3-X3	N			+UPS2&EFS/8.3
		+MBC1-X5	2N	N		-E3-X3	N			+UPS2&EFS/8.3

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			Date	23.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm
			Editor	Beckschäfer	
			Checked	Ch.Peck	
Stat	Alteration	Date	Name	Norm	

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-E3-X3
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

= | + UPS2 | & EMA

A3

sheet 14
sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-E4-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-E4-X4	U			+UPS2&EFS/8.6
						-A3-X4	1			
		+MBC1-X4	2U	U		-E4-X4	U			+UPS2&EFS/8.6
				V		-E4-X4	V			+UPS2&EFS/8.6
						-A3-X4	2			
		+MBC1-X4	2V	V		-E4-X4	V			+UPS2&EFS/8.6
				W		-E4-X4	W			+UPS2&EFS/8.6
						-A3-X4	3			
		+MBC1-X4	2W	W		-E4-X4	W			+UPS2&EFS/8.6
				N		-E4-X4	N			+UPS2&EFS/8.6
		+MBC1-X4	2N	N		-E4-X4	N			+UPS2&EFS/8.6

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				Date	23.05.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-E4-X4
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS2
& EMA

A3

sheet 15
sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-F120

Cable name	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Position / Page
Cable type							Cable type	
	-K10	A1	1		-X120	1		+UPS2&EFS/22.7

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Stat	Alteration	Date	Name			
				Date	03.06.2024	
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-F120
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS2
& EMA

A3

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sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-F121

Cable name	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Position / Page
Cable type							Cable type	
	-K10	A2	1		-X120	2		+UPS2&EFS/22.8

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Stat	Alteration	Date	Name			
				Date	03.06.2024	
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-F121
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS2
& EMA

A3

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sheets 24

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS2-PE

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+MBC1-PE	PE	PE						+UPS2&EFS/4.3
				PE						+UPS2&EFS/8.4
				PE						+UPS2&EFS/1.4

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS2-X12

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1		-A92.1-X3	4			+UPS2&EFS/11.5
				2		-A92.2-X10	2			+UPS2&EFS/11.5
				3		-A92.2-X10	3			+UPS2&EFS/11.5
		-A24.1-X1	+	4	'	-A92.1-X20	2			+UPS2&EFS/11.7
		-A24.1-X1	-	5	'	-A92.1-X20	1			+UPS2&EFS/11.7
				6		-CU	N			+UPS2&EFS/14.7
				7		-A9-A16-X8	5			+UPS2&EFS/14.2
				8		-A9-A16-X8	4			+UPS2&EFS/14.2
				9		-A9-A16-X8	6			+UPS2&EFS/14.2
				10		-A9-A50-X8	1			+UPS2&EFS/12.3
				11		-A9-A50-X8	2			+UPS2&EFS/12.3
						-Q3	96			
				12		-A9-A16-X8	7			+UPS2&EFS/14.2
				15		-A9-A50-X8	3			+UPS2&EFS/12.3
						-Q3	95			

1000007888_010

				Date	03.06.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-X12
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS2
& EMA

A3

sheet 19
sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-X13

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+MBC1-X14	U	U		-F100	1:2			+UPS2&EFS/23.2
		-X14	U	U						+UPS2&EFS/23.3
		+MBC1-X14	N	N		-A85-X1	2			+UPS2&EFS/23.3
		-X14	N	N						+UPS2&EFS/23.3
				PE						+UPS2&EFS/23.3
				PE						+UPS2&EFS/23.3

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				Date	03.06.2024	
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-X13
Protect 8.33 40-400-210-400

Terminal diagram

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=
+ UPS2
& EMA

A3

sheet 20
sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-X14

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		-X13	U	U		-F110	1:2			+UPS2&EFS/23.7
				U						+UPS2&EFS/23.7
		-X13	N	N		-X114	N			+UPS2&EFS/23.7
				N						+UPS2&EFS/23.7

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				Date	03.06.2024	
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-X14
Protect 8.33 40-400-210-400

Terminal diagram

1000007888_010 en

=
+ UPS2
& EMA

A3

sheet 21
sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-X15

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1		-A9-A50-X8	4			+UPS2&EFS/12.6
				1		-C711				+UPS2&EFS/12.7
				2		-C712				+UPS2&EFS/12.7
		+MBC1-X15	6	2		-A9-A50-X5	5			+UPS2&EFS/12.8
		+MBC1-X15	7	3		-A9-A50-X5	6			+UPS2&EFS/12.8

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				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-X15
Protect 8.33 40-400-210-400

Terminal diagram

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=
+ UPS2
& EMA

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sheets 24

CAE EPLAN Electric P8

Terminal diagram

terminal
=+UPS2-X114

Cable name: -W100

Cable type: H05VV 2x1 mm²

Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Position / Page
		N		-H1	N	+UPS2&EFS/23.7
				-X14	N	
		U		-H1	L	+UPS2&EFS/23.7
				-F110	1	

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-X114
Protect 8.33 40-400-210-400

Terminal diagram

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=
+ UPS2
& EMA

A3

sheet 23
sheets 24

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS2-X120

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1	'	-F120	1:1			+UPS2&EFS/22.7
				2	'	-F121	1:1			+UPS2&EFS/22.8

Stat	Alteration	Date	Name		
				Date	03.06.2024
				Editor	Beckschäfer
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				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-X120
Protect 8.33 40-400-210-400

Terminal diagram

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& EMA

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sheet 24
sheets 24

Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3
EQUIPMENTS LIST & BILL OF MATERIAL

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Position	Mat.-No.	Quantity	Description
A2-C86.1 A2-C86.2 A9-A17-C303 A9-A17-C304	40000055 old: 0015709	7	Capa 0,01µF 20% 250VAC R15 UL
A1-C85.1 A1-C85.2 A1-C85.3 A1-C85.4 A1-C85.5 A1-C85.6	40000065 old: 8000011087	7	Kond Y2 0,047µF 300VAC RM20,3 UL
A105-A105	20001913 old: 8000016184	1	261 SBS Voltage matching 3ph.
A10-K7	40000468 old: 8000032332	1	Auxiliary switch CAL4-11 f.AF09-AF96 KTA
A10-K7	40002624 old: 8000053782	1	TP-cont. AF40-30-00-11 24-60VUC
A10-T21 A10-T22 A10-T23	40000340 old: 0047690	3	Transformer through WSW 60/0,06 A
A11-C101	40007994 old: 0015558	3	CAPA 0,47µF 440VAC/600VDC GPF axial
A11-Q1	40000469 old: 8000044745	1	Disconnector XT1D160 3-pol. 160A
A11-Q1	40000471 old: 8000044747	1	Shunt opening release 24-30VUC f.XT1-XT4
A13	20001839 old: 1000002579	1	619 Add.Remote signal. option-2 f. UPS
A18-A18	40000227 old: 8000024183	1	Graphic-DOU 2B
A1-A80 A1-A81	20001090 old: 8000023368	2	261 Rectifier-Trigger
A1-A82 A1-A83	20001091 old: 8000025394	2	261 PCB Rectifier/SBS Snubber
A1-R100 A1-R101 A2-R100 A3-R100 A4-R100	40000389 old: 8000001495	5	Temperature Sensor 10 kOHM NTC KTA
A1-T80 A1-T81 A1-T82 A1-T83	40000166 old: 0016902	4	Current transf. WSW150 150/0,1A KTA/UL

Position	Mat.-No.	Quantity	Description
A1-V1 A1-V2 A1-V3 A1-V4 A1-V5 A1-V6 A3-V31 A3-V33 A3-V35 A4-V31 A4-V33 A4-V35	40000388 old: 8000001373	12	TT-MODULE 92 N 16 KOF UL
A20-A20	20000244 old: 8000023378	1	261 parallel adapter - P8
A24.1-A24.x	20000414 old: 8000057818	1	261 BLÜ-PRO 110 - 480V (Assembly)
A24.1-F9x F120 F121	40008113 old: 0014094	3	Fuse 6,3x32 F 3,15 440V
A2-A1	20000234 old: 8000021689	1	261 Trigger circuit-3ph. P8
A2-C42	40000418 old: 8000022371	6	CAPA AL 6000µF 315VDC77x105 M12 KTA
A2-R42 ETHDI-R23 ETHDI-R24 ETHDI-R25	40000363 old: 05507	9	resistor 47K 5% DC 9X38 UL KTA
A2-V11 A2-V12 A2-V13	40000413 old: 8000014874	3	TRANS..IGBT 400A 600V TAB-0,5
A3-A36 A4-A36	20001092 old: 8000028563	2	261 SBS-trigger circuit 3p NPP
A3-A37 A4-A37	20000289 old: 8000028996	2	261 SBS Snubber 3-Ph.
A6-E1	20000255 old: 8000024856	1	EMC-Filter E1 P8 3-pole 350A o. N
A6-E2	20000204 old: 8000018882	1	EMC-Filter E2 P8 2-pol. 400A f. middelr.
A6-E3 A6-E4	20000287 old: 8000028669	2	EMC-Filter E3/E4 P8.33 4-pole 350A w/N
A7-C4-C6	40000170 old: 0022847	3	Capa 57 µF -5..+15% 440VAC M12
A7-C4-C6	40000295 old: 0016765	3	Capa 33 µF 10% 400VAC 45x145+14 M12
A80-A8x A81-A8x	20000495 old: 8104070	2	261 suppression 500V 6P UL
A80-C8x A81-C8x	40006967 old: 05318	2	CAPA 4µF850VDC HSF30x85/97 6,3x0,8 M8
A85-A85	40020098	1	Heater 100W 110-250VAC/DC 50/60Hz NPP

Position	Mat.-No.	Quantity	Description
A85-F100 H1-F110	40007171 old: 0048663	2	G-fuse link 6,3x32 M/T 6,3 A 500VAC
A85-F85	40007478 old: 0027233	1	Thermostat 10°C up to 60°C
A8-A91.1+2	20000243 old: 8000022841	2	261 Fan Control - P8
A8-A92.1+2	20000245 old: 8000023512	2	261 Fuseboard - P8 KTA
A8-A92.1-F1 A8-A92.1-F2 A8-A92.1-F3 A8-A92.2-F1 A8-A92.2-F2 A8-A92.2-F3 A8-A92.2-F6 A8-A92.2-F7 A8-A92.2-F8	40000167 old: 0017037	9	Fuse 6,3X32 F 5 A 500VAC
A8-A92.1-F4 A8-A92.1-F5 A8-A92.2-F4 A8-A92.2-F5	40000185 old: 0050038	4	G-fuse 6,3X32 F 4 A 440 V KTA/UL
A8-A92.1-F6	40003889 old: 8000030370	1	Fuse 6,3X32 T 8 A 500 VAC KTA
A8-A92.1-F9	40007485 old: 0027059	1	G-fuse link 6,3x32 M 2 A 500V
A8-M1-M6	40000171 old: 0028612	6	Fan 230VAC 50/60Hz W2S130-AA03-21 UL
A9-A12	20000440 old: 8000062777	1	261 Remote Signalling 2 4xPanel
A9-A16	20000239 old: 8000022378	1	261 SBS Interface P8 3-Phase
A9-A16-A1	20004879 old: 8000066264	1	261 SBS ControllerBoard STM32 V2018
A9-A17	20000240 old: 8000022441	1	261 Inverter Interface P8 3-Phase
A9-A17-A1	20004877 old: 8000066260	1	261 Inv. ControllerBoard STM32 V2018
A9-A29.1	20004850 old: 8000065585	1	261 Multi CAN-Communication 2 *4xPanel*
A9-A50	20000235 old: 8000022025	1	261 Rectifier Interface P8
A9-A50-A1	20004878 old: 8000066262	1	261 Rec. ControllerBoard STM32 V2018
C100.1 C100.2 C100.3 C100.4	40000168 old: 0018271	4	CAPA 2µF 440VAC/600VDC FAPB 40X50 M8 KTA
ETHDI	20011618 old: 8000059823	1	THDI-Filter-L20 P8-S10 40kVA 400V/50Hz

Position	Mat.-No.	Quantity	Description
ETHDI-C23 ETHDI-C24 ETHDI-C25	40007583 old: 0023326	3	CAPA 32 µF -5..+10 % 525 VAC
ETHDI-L22 (S10)	40011044 old: 8000061064	1	Choke TP 4,7kVA
ETHDI-L23 ETHDI-L24 ETHDI-L25	40011043 old: 8000061063	3	922 Choke P040/550Hz/2,62mH
ETHDI-Q3	40004801 old: 8000020429	1	Circuit breaker 3-pole 25A S203 C25
ETHDI-Q3	40005215 old: 8000015407	1	Signal cont. /auxil. ABB S200 1cha. over
ExBatterySensor	40013096 old: 8000062749	1	EX d Temperature Sensor NTC10k
F1 F2 F3	20000023 old: 1000001482	3	Option UPS output fuse 63A-C2
H1-H1	40002071 old: 8000062885	1	Magnet cubicle light 100-240V 50-60Hz 4W
K10	40013233 old: 8000068651	1	Relay PSR-SCP- 24DC/ESP4/2X1/1X2
L11 L12 L13	40000273 old: 9096652	3	AC-parallelchoke 60A LV6007
L41	40000226 old: 8000022103	1	DC-choke L41 P8.31/40-216
L85.1 L85.2 L87.1 L87.2	40000176 old: 0047653	4	Toro. core 42X26X25 10000nH
L86.1	40000182 old: 0047828	2	Toroidal core 61X 40X 18 5400nH KTA/UL
Q1MCCB	40002120 old: 8000062259	1	CB XT1S160 3P 100A TMD #067434
T1	40000243 old: 8000028383	1	910 Transf. 3~ T1 P8.33/040-216-400
T11 T12 T13 T85	40000175 old: 0047197	4	Current transducer HTA-200S
T40	40013398 old: 8000070910	1	TP-transf. T40 P8.31/040-400-216 VE
Trip Battery MCCB- C711,C712	40000213 old: 8000008820	2	CAPA AL220000µF 25VDC M12 Stud

AEG POWER SOLUTIONS	**Parts list** Bypass Trans. Cabinet 40kVA 400/400V	BY-200F3 DP-200F3	Rev. 02 Page 1 of 1

Position	Mat.-No.	Quantity	Description
A85	40020098	1	Heater 100W 110-250VAC/DC 50/60Hz NPP
A90	40002519 old: 8000055525	1	current.meas. relay >I< 5/10A EMD-BL-C10
C31,C32	40007201 old: 0048405	2	CAPA X2 0,047µF 250VAC radial UL
F10...F19	40008113 old: 0014094	10	Fuse 6,3x32 F 3,15 440V
F100,F110	40007171 old: 0048663	2	G-fuse link 6,3x32 M/T 6,3 A 500VAC
F100,F110,F211,F212	40007024 old: 0087200	4	terminal fuse UK 6,3-HESI 6,3x32 10A
F211,F212	40006024 old: 8000005364	2	G-FUSE LINK 6,3X32 M/T 1,6A 500VUL
F24,F26	40000167 old: 0017037	2	Fuse 6,3X32 F 5 A 500VAC
F24,F26	40005363 old: 8000013962	10	Terminal fuse UK 10-DREHSI 6,3x32 10A
F25	40020351	1	lightning current arrestor VPU I3 R 400V
F85	40007478 old: 0027233	1	Thermostat 10°C up to 60°C
H1	40002071 old: 8000062885	1	Magnet cubicle light 100-240V 50-60Hz 4W
K1,K2	40005511 old: 8000011691	2	Relay PLC 230VUC 1W 6mm NR2966207
K10...K14	40013233 old: 8000068651	5	Relay PSR-SCP- 24DC/ESP4/2X1/1X2
M1,M2	40015035	2	Fan 230VAC 50/60Hz 148VK0281030 UL
Q10	40001344 old: 8000068250	1	CB XT1S160 3P 80A TMD
Q28.1,Q28.2,Q71,Q72	40002052 old: 8000063609	4	Fuse ld. sw. 3 pole size NH00 160 A KETO
Q28.1,Q28.2,Q71,Q72	40012684 old: 8000069685	12	KNIFE LINK NH00 250A NPP
Q29	40014823 old: 8000019447	1	3-P.CHANGE-OVER SWITCH NO ZERO POS. C 80
QF31...QF33	40021027	3	RCBO 1P+N 32A B 300mA 10kA DS201A
QF31...QF52	40005215 old: 8000015407	22	Signal cont. /auxil. ABB S200 1cha. over
QF34...QF36 QF39,QF40	40019348	5	Shunt trip 110-415VAC/250VDC F2C-A2
QF34...QF38	40021028	5	RCBO 1P+N 16A B 300mA 10kA DS201A
QF39...QF42	40021029	4	RCBO 1P+N 10A B 300mA 10kA DS201A
QF43...QF50	40004921 old: 8000019136	8	Circuit breaker 2-pole 10A S202 B10
QF51,QF52	40006202 old: 8000002872	2	Circuit breaker 2-pole 6A B S202
T8	40012492 old: 8000062054	1	TP-Isol. Transf. 415/415V 40kVA ±2,5%

27.08.2024 **Schrewe**			

Base Load Power Hub (BLPH)

AC UPS F&G - TAG: UP-200F4
WIRING DIAGRAM & TERMINAL SCHEDULE

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AEG

POWER SOLUTIONS

Manufacturer (company)	AEG Power Solutions GmbH
Manufacturer (address)	Emil-Siepmann-Straße 32 59581 Warstein
Phone	+49(0)2902/763-0 www.aegps.com

Project name	1000007888_080
Customer	ROSETTI MARINO
Key word	Hollandse Kust Noord (HKN) wind farm

System	AC UPS F&G - TAG: UP-200F4
Systems Type	System 20 kVA
Responsible for project	Ch.Peck

Created on	03.06.2024	from	Beckschäfer
Last Revision	27.08.2024	from	Beckschäfer

Number of pages 133

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		3	Table of contents	System 20 kVA	Beckschäfer	01	13.08.2024	Beckschäfer
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		1	Single-line diagram	System 20 kVA	EEC	02	27.08.2024	Beckschäfer
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	MBC1	5	Circuit diagram	SBS mains	Beckschäfer			
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	UPS1	2	Circuit diagram	Power section rectifier	EEC			
	UPS1	3	Circuit diagram	Power section rectifier	EEC			
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	UPS1	5	Circuit diagram	Power section inverter	EEC			
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	UPS1	7	Circuit diagram	Inverter output	EEC			
	UPS1	8	Circuit diagram	Load output / SBS circuit	EEC			
	UPS1	9	Circuit diagram	Inverter output contactor	EEC			
	UPS1	10	Circuit diagram	Power section SBS	EEC			
	UPS1	11	Circuit diagram	Fuse boards	EEC			
	UPS1	12	Circuit diagram	Rectifier control	EEC			
	UPS1	13	Circuit diagram	Inverter control	EEC			
	UPS1	14	Circuit diagram	Control SBS	EEC			
	UPS1	15	Circuit diagram	DOU	EEC			

1000007888_080

CAE EPLAN Electric P8

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System	Installation location	Page	Type of circuit diagram	Page description	Editor	Stat	Date	Editor
	UPS1	16	Circuit diagram	Control CAN	EEC			
	UPS1	17	Circuit diagram	Fan control/monitoring	EEC			
	UPS1	18	Circuit diagram	battery charging circuit monitoring	EEC			
	UPS1	19	Circuit diagram	battery charging circuit monitoring	EEC			
	UPS1	20	Circuit diagram	MultiCom	EEC			
	UPS1	21	Circuit diagram	Remote signaling	EEC			
	UPS1	22	Circuit diagram	Remote signaling	Beckschäfer			
	UPS1	23	Circuit diagram	external connection	EEC			
	UPS1	1	Terminal diagram	Terminal diagram =+UPS1-A9-A12-X3	Beckschäfer			
	UPS1	2	Terminal diagram	Terminal diagram =+UPS1-A9-A12-X4	Beckschäfer			
	UPS1	3	Terminal diagram	Terminal diagram =+UPS1-A9-A12-X5	Beckschäfer			
	UPS1	4	Terminal diagram	Terminal diagram =+UPS1-A9-A12-X6	Beckschäfer			
	UPS1	5	Terminal diagram	Terminal diagram =+UPS1-A9-A29.1-X2	Beckschäfer			
	UPS1	6	Terminal diagram	Terminal diagram =+UPS1-A9-A29.1-X4	Beckschäfer			
	UPS1	7	Terminal diagram	Terminal diagram =+UPS1-A9-A29.1-X5	Beckschäfer			
	UPS1	8	Terminal diagram	Terminal diagram =+UPS1-A20-X3	Beckschäfer			
	UPS1	9	Terminal diagram	Terminal diagram =+UPS1-A20-X4	Beckschäfer			
	UPS1	10	Terminal diagram	Terminal diagram =+UPS1-A20-X5	Beckschäfer			
	UPS1	11	Terminal diagram	Terminal diagram =+UPS1-A20-X6	Beckschäfer			
	UPS1	12	Terminal diagram	Terminal diagram =+UPS1-E1-X1	Beckschäfer			
	UPS1	13	Terminal diagram	Terminal diagram =+UPS1-E2-X2	Beckschäfer			
	UPS1	14	Terminal diagram	Terminal diagram =+UPS1-E3-X3	Beckschäfer			
	UPS1	15	Terminal diagram	Terminal diagram =+UPS1-E4-X4	Beckschäfer			
	UPS1	16	Terminal diagram	Terminal diagram =+UPS1-F120	Beckschäfer			
	UPS1	17	Terminal diagram	Terminal diagram =+UPS1-F121	Beckschäfer			
	UPS1	18	Terminal diagram	Terminal diagram =+UPS1-PE	Beckschäfer			
	UPS1	19	Terminal diagram	Terminal diagram =+UPS1-X12	Beckschäfer			
	UPS1	20	Terminal diagram	Terminal diagram =+UPS1-X13	Beckschäfer			

				Date	13.08.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	System 20 kVA Table of contents	=
				Editor	Beckschäfer				+
01	500000002053	13.08.2024	Beckschäfer	Checked	Ch.Peck			1000007888_080 en	& EAB
Stat	Alteration	Date	Name	Norm					A3
									sheet 3
									sheets 5

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System	Installation location	Page	Type of circuit diagram	Page description	Editor	Stat	Date	Editor
	UPS1	21	Terminal diagram	Terminal diagram =+UPS1-X14	Beckschäfer			
	UPS1	22	Terminal diagram	Terminal diagram =+UPS1-X15	Beckschäfer			
	UPS1	23	Terminal diagram	Terminal diagram =+UPS1-X120	Beckschäfer			
	UPS2	1	Circuit diagram	Rectifier input	Beckschäfer			
	UPS2	2	Circuit diagram	Power section rectifier	Beckschäfer			
	UPS2	3	Circuit diagram	Power section rectifier	Beckschäfer			
	UPS2	4	Circuit diagram	Battery connection	Beckschäfer			
	UPS2	5	Circuit diagram	Power section inverter	Beckschäfer			
	UPS2	6	Circuit diagram	Inverter output	Beckschäfer			
	UPS2	7	Circuit diagram	Inverter output	Beckschäfer			
	UPS2	8	Circuit diagram	Load output / SBS circuit	Beckschäfer			
	UPS2	9	Circuit diagram	Inverter output contactor	Beckschäfer			
	UPS2	10	Circuit diagram	Power section SBS	Beckschäfer			
	UPS2	11	Circuit diagram	Fuse boards	Beckschäfer			
	UPS2	12	Circuit diagram	Rectifier control	Beckschäfer			
	UPS2	13	Circuit diagram	Inverter control	Beckschäfer			
	UPS2	14	Circuit diagram	Control SBS	Beckschäfer			
	UPS2	15	Circuit diagram	DOU	Beckschäfer			
	UPS2	16	Circuit diagram	Control CAN	Beckschäfer			
	UPS2	17	Circuit diagram	Fan control/monitoring	Beckschäfer			
	UPS2	18	Circuit diagram	battery charging circuit monitoring	Beckschäfer			
	UPS2	19	Circuit diagram	battery charging circuit monitoring	Beckschäfer			
	UPS2	20	Circuit diagram	MultiCom	Beckschäfer			
	UPS2	21	Circuit diagram	Remote signaling	Beckschäfer			
	UPS2	22	Circuit diagram	Remote signaling	Beckschäfer			
	UPS2	23	Circuit diagram	external connection	Beckschäfer			
	UPS2	1	Terminal diagram	Terminal diagram =+UPS2-A9-A12-X3	Beckschäfer			
	UPS2	2	Terminal diagram	Terminal diagram =+UPS2-A9-A12-X4	Beckschäfer			

				Date	13.08.2024			=	
				Editor	Beckschäfer	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	System 20 kVA	+
01	500000002053	13.08.2024	Beckschäfer	Checked	Ch.Peck				& EAB
Stat	Alteration	Date	Name	Norm				Table of contents	1000007888_080 en

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	UPS2	3	Terminal diagram	Terminal diagram =+UPS2-A9-A12-X5	Beckschäfer			
	UPS2	4	Terminal diagram	Terminal diagram =+UPS2-A9-A12-X6	Beckschäfer			
	UPS2	5	Terminal diagram	Terminal diagram =+UPS2-A9-A29.1-X2	Beckschäfer			
	UPS2	6	Terminal diagram	Terminal diagram =+UPS2-A9-A29.1-X4	Beckschäfer			
	UPS2	7	Terminal diagram	Terminal diagram =+UPS2-A9-A29.1-X5	Beckschäfer			
	UPS2	8	Terminal diagram	Terminal diagram =+UPS2-A20-X3	Beckschäfer			
	UPS2	9	Terminal diagram	Terminal diagram =+UPS2-A20-X4	Beckschäfer			
	UPS2	10	Terminal diagram	Terminal diagram =+UPS2-A20-X5	Beckschäfer			
	UPS2	11	Terminal diagram	Terminal diagram =+UPS2-A20-X6	Beckschäfer			
	UPS2	12	Terminal diagram	Terminal diagram =+UPS2-E1-X1	Beckschäfer			
	UPS2	13	Terminal diagram	Terminal diagram =+UPS2-E2-X2	Beckschäfer			
	UPS2	14	Terminal diagram	Terminal diagram =+UPS2-E3-X3	Beckschäfer			
	UPS2	15	Terminal diagram	Terminal diagram =+UPS2-E4-X4	Beckschäfer			
	UPS2	16	Terminal diagram	Terminal diagram =+UPS2-F120	Beckschäfer			
	UPS2	17	Terminal diagram	Terminal diagram =+UPS2-F121	Beckschäfer			
	UPS2	18	Terminal diagram	Terminal diagram =+UPS2-PE	Beckschäfer			
	UPS2	19	Terminal diagram	Terminal diagram =+UPS2-X12	Beckschäfer			
	UPS2	20	Terminal diagram	Terminal diagram =+UPS2-X13	Beckschäfer			
	UPS2	21	Terminal diagram	Terminal diagram =+UPS2-X14	Beckschäfer			
	UPS2	22	Terminal diagram	Terminal diagram =+UPS2-X15	Beckschäfer			
	UPS2	23	Terminal diagram	Terminal diagram =+UPS2-X120	Beckschäfer			

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Structure identifier overview

Full designation	Labeling	Structure description
+BAT1	Installation location	Battery cabinet
+BAT2	Installation location	Battery cabinet
+MBC1	Installation location	Bypass transformer cabinet with manual bypass 20 kVA
+UPS1	Installation location	Protect 8.33 20-400-204-400
+UPS2	Installation location	Protect 8.33 20-400-204-400
&EAA	Document type	Title page/Cover page
&EAB	Document type	Table of contents
&EDB	Document type	Structure identifier overview
&EFA	Document type	Single-line diagram
&EFS	Document type	Circuit diagram
&EMA	Document type	Terminal diagram

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AUXILIARY
From Lighting & Small Power DB BOP DP-200N1 (Cubicle 03-Q42)
100-240V/N/PE~50/60Hz

back-up fuse
gG10A
3G2.5mm2

LINE A
From LV Switchgear SG-200N1 (Cubicle A6/05)
Mains
400V;3/PE~50Hz

gG80A
4G35mm2

From LV Switchgear SG-200N1 (Cubicle A2/04)
Bypass mains
400V;3/PE~50Hz

gG63A
4G35mm2

LINE B
From LV Switchgear SG-200N1 (Cubicle A6/06)
Mains
400V;3/PE~50Hz

gG80A
4G35mm2

Not included in the AEG shipment

+MBC1
BY-200F4
Bypass-Trafoschrank mit HU 20 kVA
1000007888.090
10009760

-X1 1U,1V,1W,PE
-X10 U,V,W,PE
-X13 U,N,PE
-X14 U,N
-X1 3U,3V,3PE
-A85
-H1
-Q10
L=50/35A
I=0,5kA
Icu=50kA
-T8
400V/400V
20kVA
-Q28.1
NC
-Q28.2
NC
-X1 2U,2V,2W,PE
-X4 1U,1V,1W,1N,PE
-X4 2U,2V,2W,2N,PE
-X1 4U,4V,4W,PE

Code	Description
Q1	Rectifier input mains breaker
T40	Rectifier input isolation transformer
A1	Rectifier
A2	Inverter
T1	Inverter output isolation transformer
A3-A4	Static by-pass switch
A18	Display control module
A85	Heater
H1	Light

+UPS1
BC-200F4A
Protect 8.33 20-400-204-400
1000007888.080
10009759

-X13 U,N,PE
-X14 U,N
-A85
-H1
-E1-X1 U,V,W,PE
-E4-X4 U,V,W,N,PE
-Q1
L=100/85A
I=1,0kA
Icu=50kA
-T40
-A1
REC
-A2
INV
-T1
-F1,-F2,-F3
-A3
SBS
-A18
Display
-A20
Parallel Adapter
INV CAN
-X3
1-3
203 / 1.6
INV Sync
-X5
1-4
205 / 1.6
-A4
-L11,-L12,-L13
Parallel preventive choke coil
-A12 ,-A13
Remote signaling
-A24.1
BLÜ-PRO
-A24.2
BLÜ-PRO
-A24.3
BLÜ-PRO
-F91
-F92
-F93
-E2-X2 L-,L+,PE
-X15 2,3
-X130 1,2
-E3-X3 U,V,W,N,PE

+UPS2
BC-200F4B
Protect 8.33 20-400-204-400
1000007888.080
10009759

-E4-X4 U,V,W,N,PE
-E1-X1 U,V,W,PE
-X13 U,N,PE
-X14 U,N
-A85
-H1
-Q1
L=100/85A
I=1,0kA
Icu=50kA
-T40
-A1
REC
-A2
INV
-T1
-F1,-F2,-F3
-A3
SBS
-A18
Display
-A20
Parallel Adapter
INV CAN
-X3
1-3
1.5 / 203
INV Sync
-X5
1-4
1.5 / 205
-A4
-L11,-L12,-L13
Parallel preventive choke coil
-A12 ,-A13
Remote signaling
-A24.1
BLÜ-PRO
-A24.2
BLÜ-PRO
-A24.3
BLÜ-PRO
-F91
-F92
-F93
-E3-X3 U,V,W,N,PE
-E2-X2 L-,L+,PE
-X15 2,3
-X130 1,2

-X2 1L+,1L-,PE
-X15 2,3
-X91 1M
-X92 1M
-X93 1M
-X5 1U,1V,1W,1N,PE
-X5 2U,2V,2W,2N,PE
-X2 3L+,3L-,PE
-X15 6,7
-X91 3M
-X92 3M
-X93 3M
-Q71
NC
-Q72
NC
A / 1.6
1.5 / A
INV operation
Manual bypass
-Q29
-F25
DP-200F4
-QF31
B16A
300mA
5pc
-QF35
B16A
300mA
-QF36
B10A
3pc
-QF38
B10A
-X2 2L+,2L-,PE
-X15 4,5
-X91 2M
-X92 2M
-X93 2M
-X130 1,2,1PE
-X31 U,N,PE
-X35 V,N,PE
-X36 W,N,PE
-X38 V,N,PE
-X2 4L+,4L-,PE
-X15 8,9
-X91 4M
-X92 4M
-X93 4M
-X130 3,4,2PE

Not included in the AEG shipment

max. gG10A
max. gG10A
Load
400/230V;3/N/PE~50Hz

2(1x70 mm2)

+BFB1
CB-200F4A
Battery fuse box 200 A
*1
-Q2
L=200A
DC 24V
max. 300W

+BFB2
CB-200F4B
Battery fuse box 200 A
*1
-Q2
L=200A
DC 24V
max. 300W

2(1x70 mm2)

+BAT1
BA-200F4A
Batteries installed on rack
3 x 18 x FTG 12-120
Battery voltage 216V
Battery capacity 360Ah
string 1
String 2
String 3
-R81

+BAT2
BA-200F4B
Batteries installed on rack
3 x 18 x FTG 12-120
Battery voltage 216V
Battery capacity 360Ah
string 1
String 2
String 3
-R81

*1 Attention! In the event of battery undervoltage < 130 V, the UPS automatically switches off battery isolator Q2.
If this happens, switch X15:3 must be switched into the open position (undervoltage trip blocked).
For restart, please refer to the chapter in the UPS operating instructions (charging the DC link capacitors) attached.
Unlock the tripped switch Q2 by switching to open position.
After charging the DC link capacitors, switch on Q2.
Attention! When the battery voltage reaches > 200 V, switch X15:3 must be switched back to the closed position.

*2 Connection cables are not included.

1000007888_080

				Date	14.05.2024	
01	500000002053	13.08.2024	Beckschäfer	Editor	EEC	ROSETTI MARINO
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck	Hollandse Kust Noord (HKN) wind farm
Stat	Alteration	Date	Name	Norm		

AEG POWER SOLUTIONS

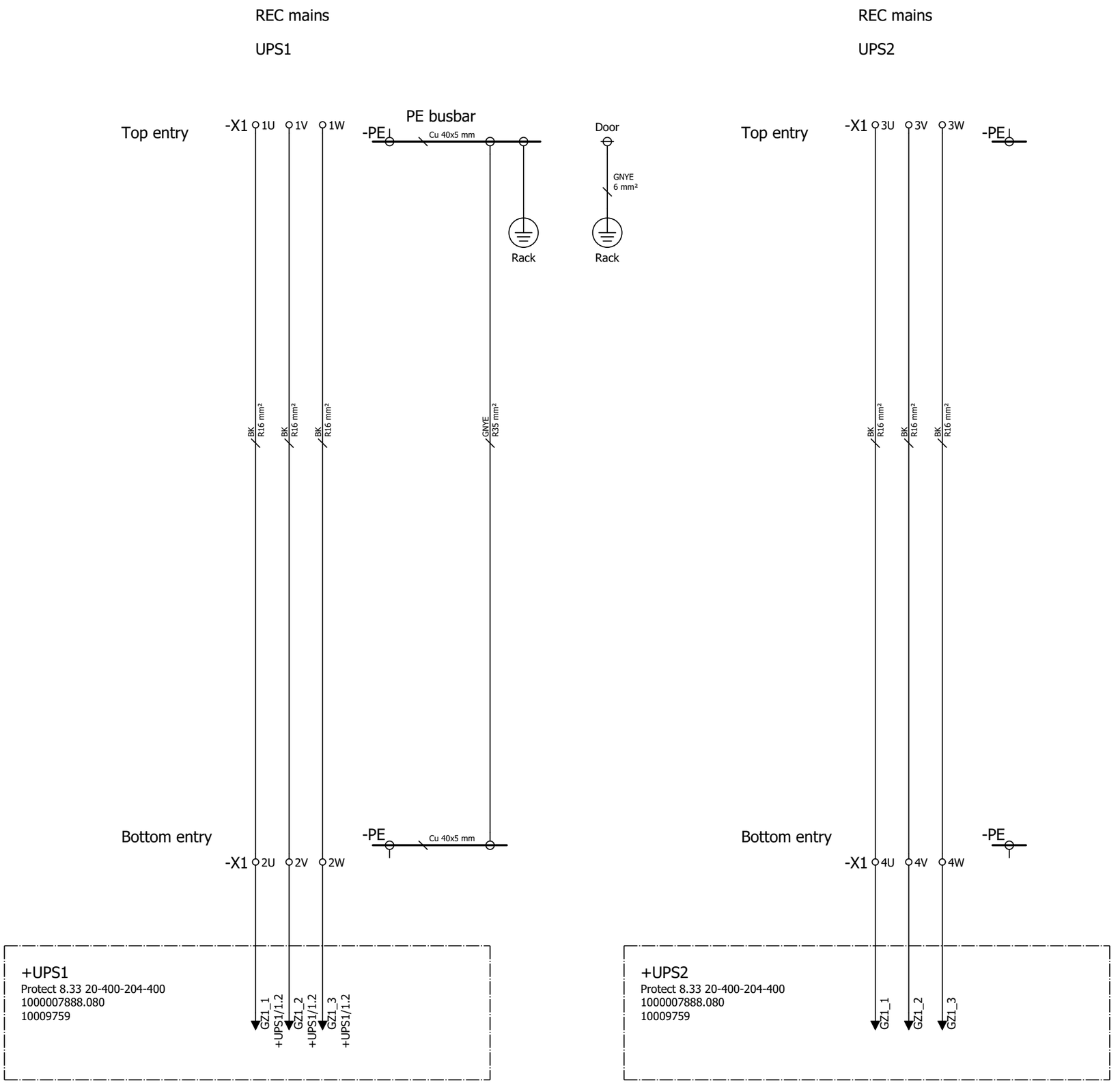
System 20 kVA
Single-line diagram

1000007888_080 en

A0 sheet 1 sheets 1

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1000007888_080

				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	REC mains Bypass transformer cabinet with manual bypass 20 kVA Circuit diagram	=
				Editor	Beckschäfer				+ MBC1
				Checked	Ch.Peck			1000007888.090 10009760	1000007888_080 en	& EFS	A3	sheet 1 sheets 11
Stat	Alteration	Date	Name	Norm					

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1000007888_080

+UPS1
Protect 8.33 20-400-204-400
1000007888.080
10009759

GZ2_1 +UPS1/4.3
GZ2_2 +UPS1/4.2
GZ2_3 +UPS1/4.3
GZ15_2 +UPS1/12.8
GZ15_3 +UPS1/12.8
GZ91_1 +UPS1/18.3
GZ92_1 +UPS1/18.7
GZ93_1 +UPS1/19.3
GZ130_1 +UPS1/12.2
GZ130_2 +UPS1/12.2

-W208
LiYCY 3x0,5 mm²
WH
BN

Bottom entry
-X2 1L+
1L-
-PE
-X15 2
3
-X91 1M
-X92 1M
-X93 1M

BK R70 mm²
BK R70 mm²
BK R2,5 mm²
BK R2,5 mm²
BK R2,5 mm²
BK R2,5 mm²
BK R2,5 mm²

Top entry
-X2 2L+
2L-
-PE
-X15 4
5
-X91 2M
-X92 2M
-X93 2M

Battery fuse

Battery MCCB
Shunt opening release

Battery central tapping

Top entry
-X130 1
2
1PE

OG 1,5 mm²

+BAT1
Battery cabinet
-R81
-X1 1
2

				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	GR-Ausgang UPS1 Bypass transformer cabinet with manual bypass 20 kVA Circuit diagram		=	
				Editor	Beckschäfer					+ MBC1	
				Checked	Ch.Peck				1000007888.090 10009760	1000007888_080 en	& EFS
Stat	Alteration	Date	Name	Norm							A3 sheet 2 / sheets 11

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1000007888_080

+UPS2
Protect 8.33 20-400-204-400
1000007888.080
10009759

GZ2_1 | GZ2_2 | GZ2_3 | GZ15_2 +UPS2/12.8 | GZ15_3 +UPS2/12.8 | GZ91_1 +UPS2/18.3 | GZ92_1 +UPS2/18.7 | GZ93_1 +UPS2/19.3 | GZ130_1 +UPS2/12.2 | GZ130_2 +UPS2/12.2

-W209
LiYCY 3x0,5 mm²
WH | BN

Bottom entry
-X2 3L+ | 3L- | -PE
-X15 6 | 7
-X91 3M
-X92 3M
-X93 3M

BK R70 mm² | BK R70 mm² | BK R2,5 mm² | BK R2,5 mm² | BK R2,5 mm² | BK R2,5 mm² | BK R2,5 mm²

Top entry
-X2 4L+ | 4L- | -PE
-X15 8 | 9
-X91 4M
-X92 4M
-X93 4M

Battery fuse

Battery MCCB
Shunt opening release

Battery central tapping

Top entry
-X130 3 | 4 | 2PE
OG 1,5 mm²

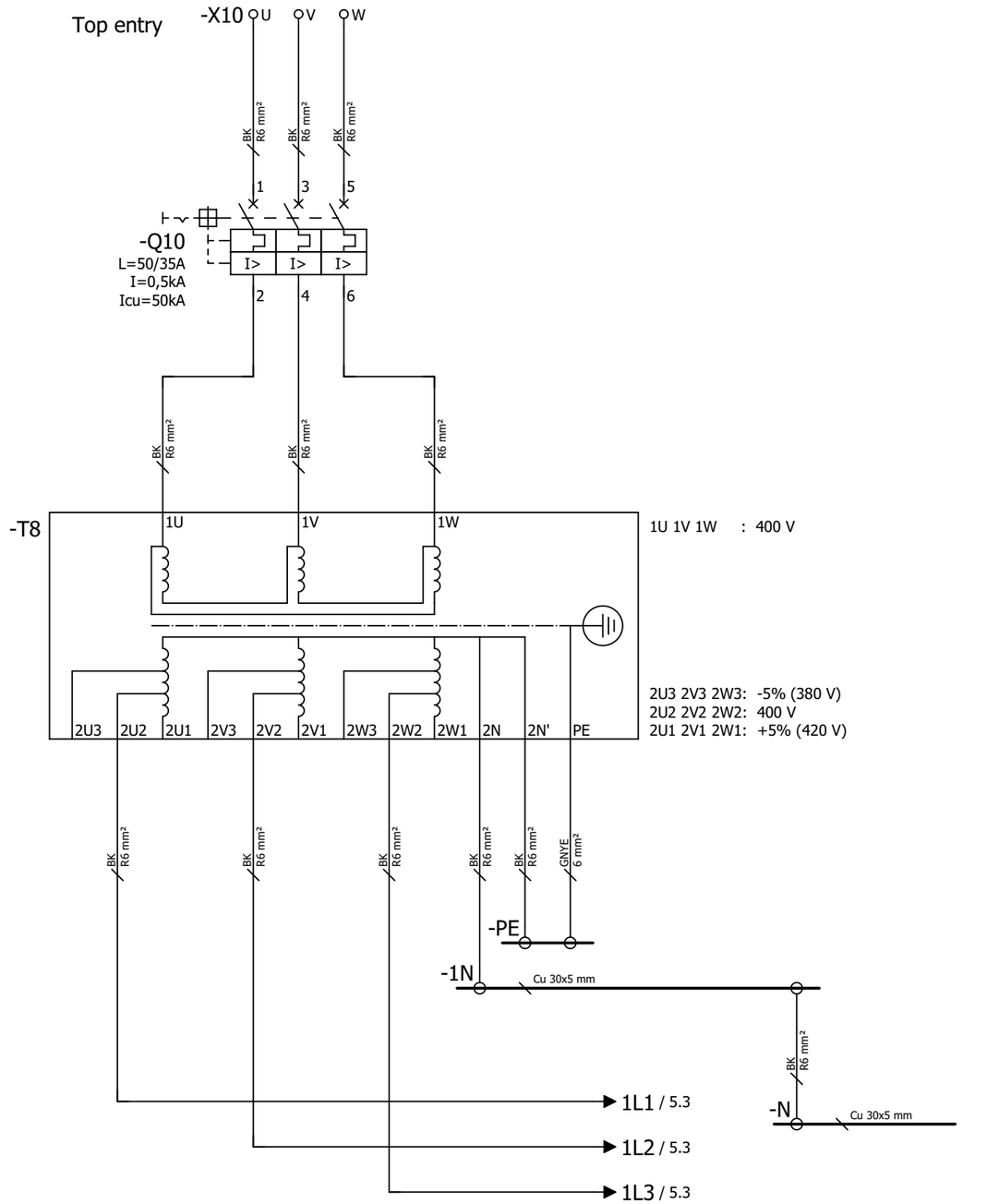
+BAT2
Battery cabinet
-R81
-X1 1 | 2

				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	GR-Ausgang UPS2 Bypass transformer cabinet with manual bypass 20 kVA Circuit diagram		=	
				Editor	Beckschäfer					+ MBC1	
				Checked	Ch.Peck				1000007888.090 10009760	1000007888_080 en	& EFS
Stat	Alteration	Date	Name	Norm							A3 sheet 3 / sheets 11

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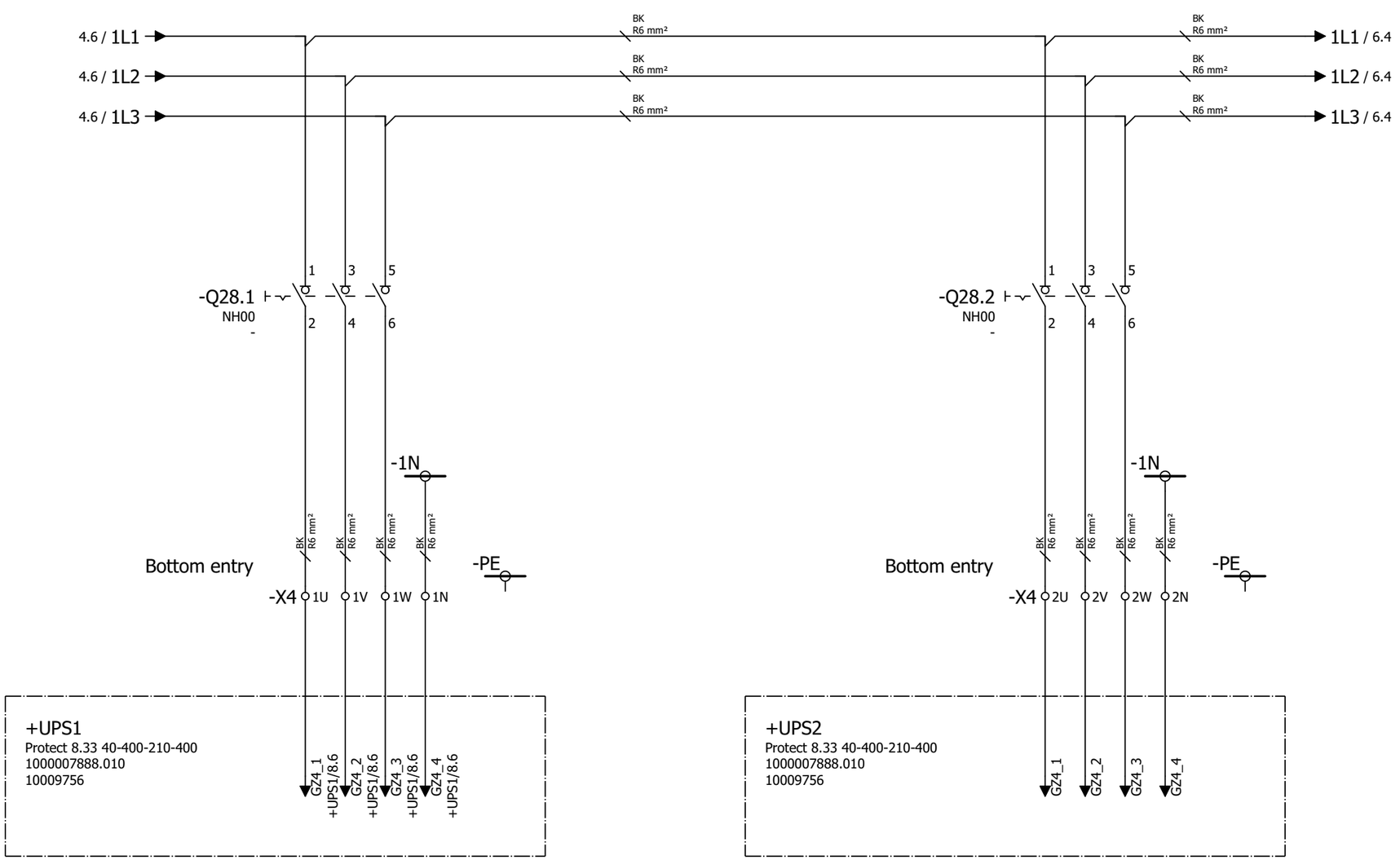
Mains
400V;3/PE~50Hz



				Date	28.05.2024			=	
				Editor	Beckschäfer	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Bypass Transformator Bypass transformer cabinet with manual bypass 20 kVA Circuit diagram	+ MBC1
				Checked	Ch.Peck			1000007888.090 10009760	& EFS
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									sheet 4
									sheets 11

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1000007888_080

				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	SBS mains Bypass transformer cabinet with manual bypass 20 kVA Circuit diagram	=
				Editor	Beckschäfer				+ MBC1
				Checked	Ch.Peck			1000007888.090 10009760	1000007888_080 en	& EFS	A3	sheet 5 sheets 11
Stat	Alteration	Date	Name	Norm					

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1000007888_080

+UPS1
Protect 8.33 40-400-210-400
1000007888.010
10009756

GZ3_1 +UPS1/8.2
GZ3_2 +UPS1/8.2
GZ3_3 +UPS1/8.2
GZ3_4 +UPS1/8.3

Bottom entry

-X5 1U 1V 1W 1N -PE

BK R6 mm²

-1N

-Q71
NH00
-

2 4 6
1 3 5

+UPS2
Protect 8.33 40-400-210-400
1000007888.010
10009756

GZ3_1
GZ3_2
GZ3_3
GZ3_4

Bottom entry

-X5 2U 2V 2W 2N -PE

BK R6 mm²

-1N

-Q72
NH00
-

2 4 6
1 3 5

Switch position
Q29

Top entry

-X12 1 2 3

BK R0,75 mm²

BK R6 mm²

5.7 / 1L1
5.7 / 1L2
5.7 / 1L3

-Q29
115A

1 INV operation
2 Manual bypass

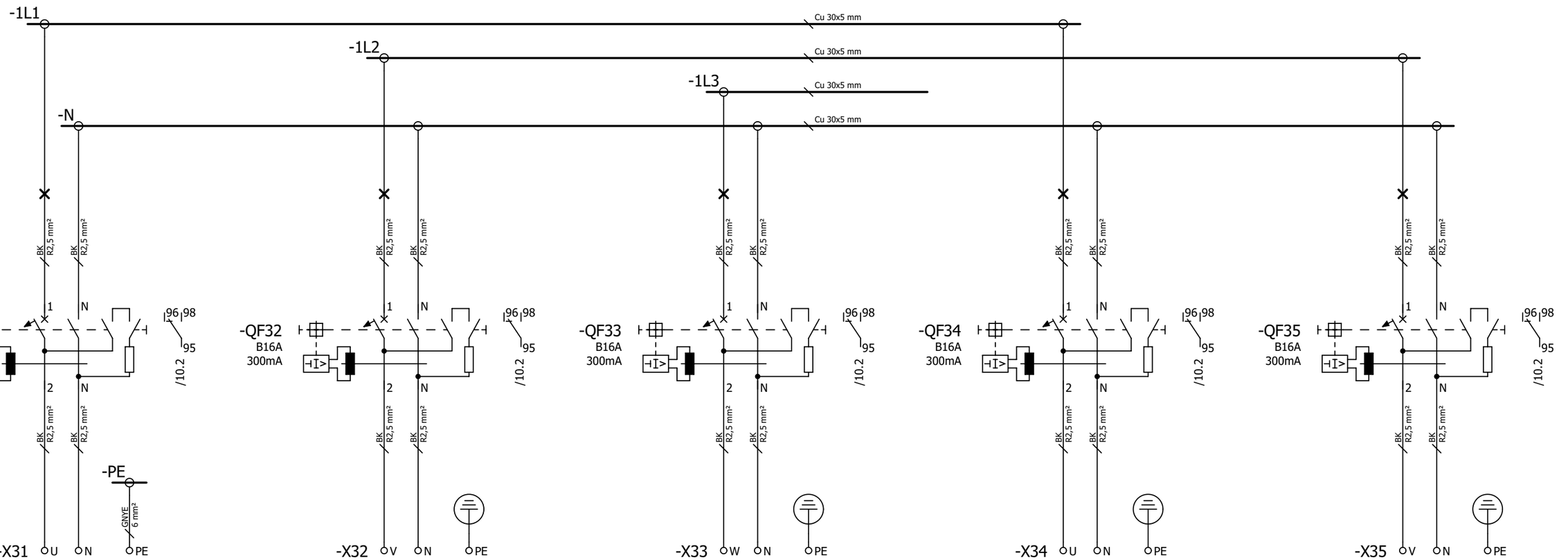
1 3 5 7 9 11 101 103
2/4 6/8 10/12
2 6 10 102 104

-1L3 Cu 30x5 mm
-1L2 Cu 30x5 mm
-1L1 Cu 30x5 mm

				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Manual bypass Bypass transformer cabinet with manual bypass 20 kVA Circuit diagram	=
				Editor	Beckschäfer				+ MBC1
				Checked	Ch.Peck			1000007888.090 10009760	1000007888_080 en	& EFS	A3	sheet 6 sheets 11
Stat	Alteration	Date	Name	Norm					

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Load
230V/N/PE~50Hz

B400-FGS-001
FGS PANEL LINE A
2KW

Load
230V/N/PE~50Hz

B400-FGS-001
FGS PANEL LINE B
2KW

Load
230V/N/PE~50Hz

SPARE
2KW

Load
230V/N/PE~50Hz

SPARE
2KW

Load
230V/N/PE~50Hz

SPARE
2KW

1000007888_080

				Date	28.05.2024
01	500000002053	13.08.2024	Beckschäfer	Editor	Beckschäfer
02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Load
Bypass transformer cabinet
with manual bypass 20 kVA
Circuit diagram

1000007888.090
10009760

1000007888_080 en

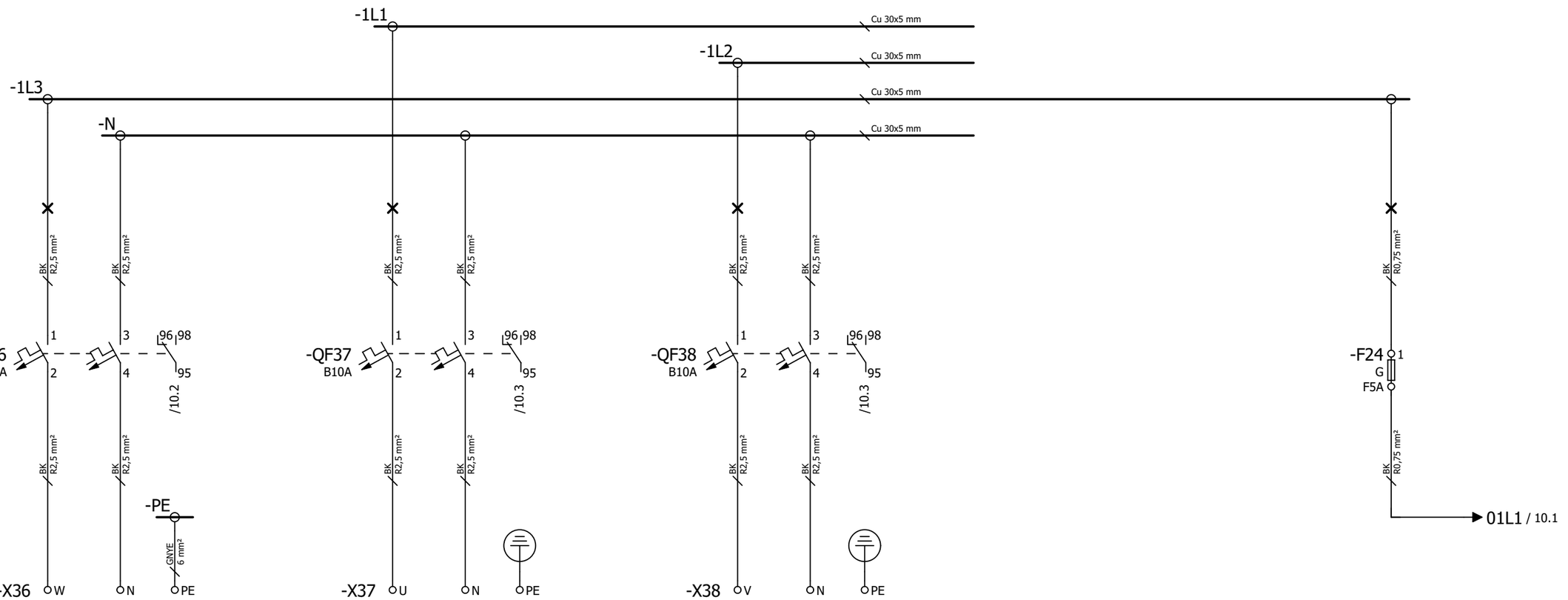
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+ MBC1
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A3

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sheets 11

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Load
230V/N/PE~50Hz

B400-NET-01
NETWORK CABINET LINE A
1KW

Load
230V/N/PE~50Hz

B400-NET-01
NETWORK CABINET LINE B
1KW

Load
230V/N/PE~50Hz

SPARE
1KW

1000007888_080

				Date	28.05.2024
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02	500000002089	27.08.2024	Beckschäfer	Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Load
Bypass transformer cabinet
with manual bypass 20 kVA
Circuit diagram

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10009760

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+ MBC1
& EFS

A3

sheet 8
sheets 11

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status
Surge arrester

Top entry

-X12 4 5 6

-1L3 Cu 30x5 mm
-1L2 Cu 30x5 mm
-1L1 Cu 30x5 mm
-PE Cu 40x5 mm

BK R6 mm²
BK R6 mm²
BK R6 mm²
GNYE 6 mm²

BK R0,75 mm²
BK R0,75 mm²
BK R0,75 mm²

-F25

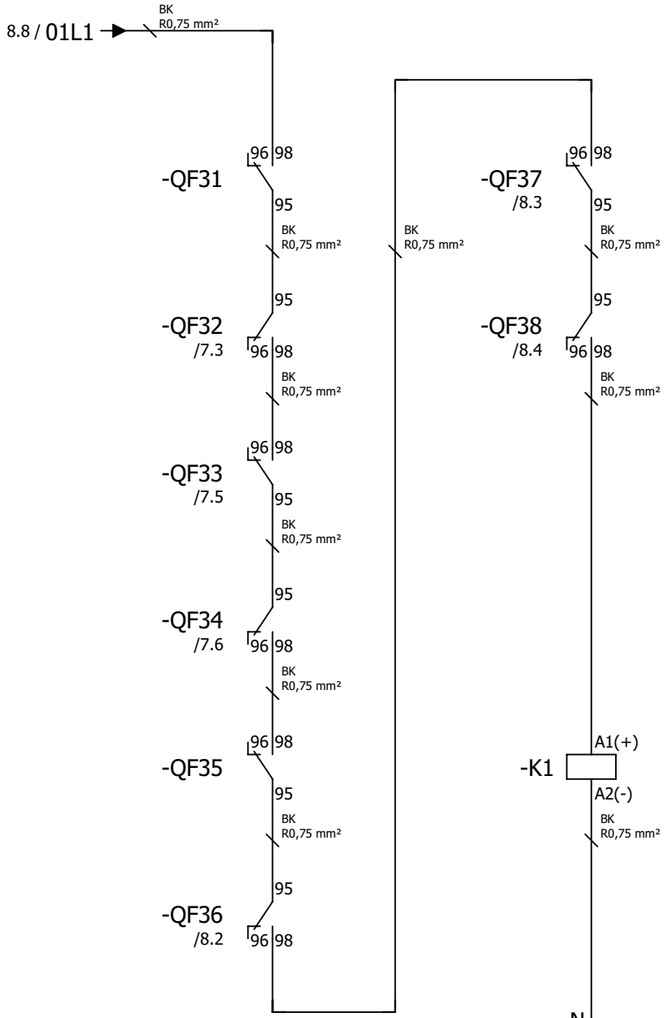
L1 L1' L2 L2' L3 L3' PE(N) PE(N)'

11 12 14

				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Surge arrester Bypass transformer cabinet with manual bypass 20 kVA Circuit diagram		=
				Editor	Beckschäfer					+ MBC1
				Checked	Ch.Peck			1000007888.090 10009760	1000007888_080 en	& EFS
Stat	Alteration	Date	Name	Norm					A3	sheet 9 sheets 11

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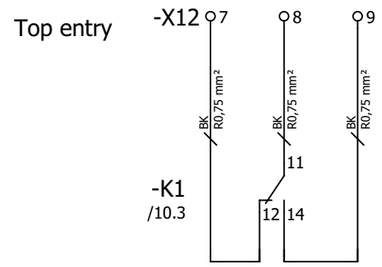
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Common fault

QF31 - QF38

Top entry



PXC.2966207_PLC-RSC-230UC/21
14 – 11 /10.7
12

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				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Common fault Bypass transformer cabinet with manual bypass 20 kVA Circuit diagram
				Editor	Beckschäfer			
01	500000002053	13.08.2024	Beckschäfer	Checked	Ch.Peck			1000007888.090 10009760
Stat	Alteration	Date	Name	Norm				1000007888_080 en

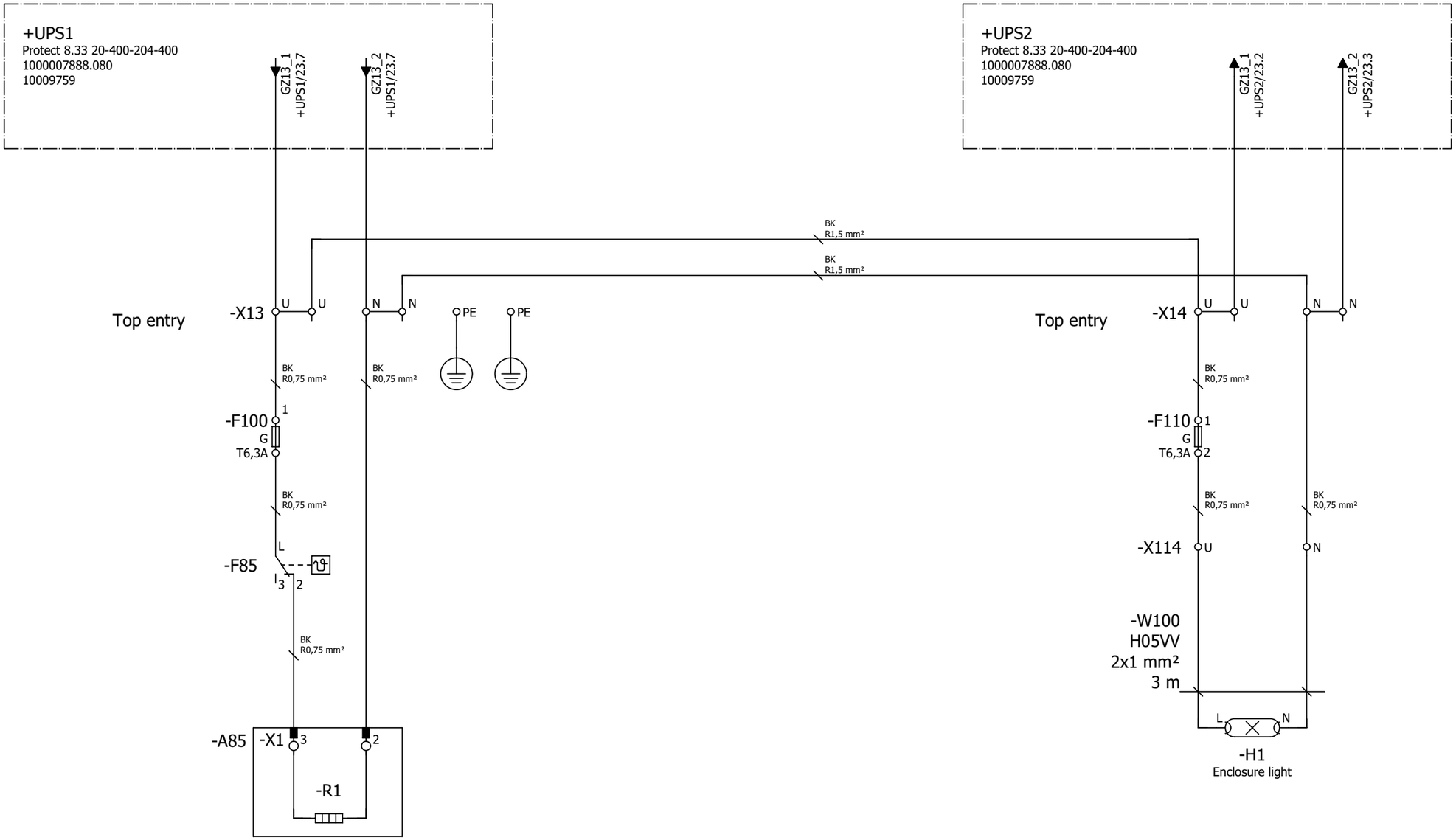
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+ MBC1
& EFS

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sheets 11

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				Editor	Beckschäfer				+ MBC1
				Checked	Ch.Peck			1000007888.090 10009760	& EFS
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Terminal diagram

terminal

=+MBC1-PE

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				PE						+MBC1&EFS/1.3
				PE						+MBC1&EFS/1.3
				PE						+MBC1&EFS/1.6
				PE						+MBC1&EFS/1.6
		+UPS1-PE	PE	PE						+MBC1&EFS/2.3
				PE						+MBC1&EFS/2.3
				PE						+MBC1&EFS/3.3
				PE						+MBC1&EFS/3.3
				PE						+MBC1&EFS/5.4
				PE						+MBC1&EFS/5.7
				PE						+MBC1&EFS/6.3
				PE						+MBC1&EFS/6.6

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				Date	13.08.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS
				Editor	Beckschäfer		
01	500000002053	13.08.2024	Beckschäfer	Checked	Ch.Peck		
Stat	Alteration	Date	Name	Norm			

Terminal diagram =+MBC1-PE
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 1
sheets 22

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+MBC1-X1

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1U	'	-X1	2U			+MBC1&EFS/1.3
				1V	'	-X1	2V			+MBC1&EFS/1.3
				1W	'	-X1	2W			+MBC1&EFS/1.3
		+UPS1-E1-X1	U	2U	'	-X1	1U			+MBC1&EFS/1.3
		+UPS1-E1-X1	V	2V	'	-X1	1V			+MBC1&EFS/1.3
		+UPS1-E1-X1	W	2W	'	-X1	1W			+MBC1&EFS/1.3
				3U	'	-X1	4U			+MBC1&EFS/1.6
				3V	'	-X1	4V			+MBC1&EFS/1.6
				3W	'	-X1	4W			+MBC1&EFS/1.6
				4U	'	-X1	3U			+MBC1&EFS/1.6
				4V	'	-X1	3V			+MBC1&EFS/1.6
				4W	'	-X1	3W			+MBC1&EFS/1.6

1000007888_080

				Date	13.08.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Terminal diagram =+MBC1-X1 Bypass transformer cabinet with manual bypass 20 kVA Terminal diagram		=	
				Editor	Beckschäfer					+ MBC1	
01	500000002053	13.08.2024	Beckschäfer	Checked	Ch.Peck				1000007888_080 en	& EMA	A3 sheet 2
Stat	Alteration	Date	Name	Norm							sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal
=+MBC1-X2

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-E2-X2	L+	1L+	'	-X2	2L+			+MBC1&EFS/2.2
		+UPS1-E2-X2	L-	1L-	'	-X2	2L-			+MBC1&EFS/2.3
				2L+	'	-X2	1L+			+MBC1&EFS/2.2
				2L-	'	-X2	1L-			+MBC1&EFS/2.3
				3L+	'	-X2	4L+			+MBC1&EFS/3.2
				3L-	'	-X2	4L-			+MBC1&EFS/3.3
				4L+	'	-X2	3L+			+MBC1&EFS/3.2
				4L-	'	-X2	3L-			+MBC1&EFS/3.3

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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X2
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 3
sheets 22

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+MBC1-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-E4-X4	U	1U	'	-Q28.1	2			+MBC1&EFS/5.3
		+UPS1-E4-X4	V	1V	'	-Q28.1	4			+MBC1&EFS/5.3
		+UPS1-E4-X4	W	1W	'	-Q28.1	6			+MBC1&EFS/5.3
		+UPS1-E4-X4	N	1N	'	-1N				+MBC1&EFS/5.4
				2U	'	-Q28.2	2			+MBC1&EFS/5.6
				2V	'	-Q28.2	4			+MBC1&EFS/5.6
				2W	'	-Q28.2	6			+MBC1&EFS/5.6
				2N	'	-1N				+MBC1&EFS/5.6

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				Date	13.08.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm
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Stat	Alteration	Date	Name	Norm		

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X4
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 4
sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal
=+MBC1-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-E3-X3	U	1U	'	-Q71	2			+MBC1&EFS/6.3
		+UPS1-E3-X3	V	1V	'	-Q71	4			+MBC1&EFS/6.3
		+UPS1-E3-X3	W	1W	'	-Q71	6			+MBC1&EFS/6.3
		+UPS1-E3-X3	N	1N	'	-1N				+MBC1&EFS/6.3
				2U	'	-Q72	2			+MBC1&EFS/6.5
				2V	'	-Q72	4			+MBC1&EFS/6.5
				2W	'	-Q72	6			+MBC1&EFS/6.6
				2N	'	-1N				+MBC1&EFS/6.6

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X5
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

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=
+ MBC1
& EMA

A3

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sheets 22

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+MBC1-X10

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U	'	-Q10	1			+MBC1&EFS/4.4
				V	'	-Q10	3			+MBC1&EFS/4.5
				W	'	-Q10	5			+MBC1&EFS/4.5

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X10
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

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=
+ MBC1
& EMA

A3

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sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal

=+MBC1-X12

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1	'	-Q29	103			+MBC1&EFS/6.7
				2	'	-Q29	104			+MBC1&EFS/6.7
				3	'	-Q29	102			+MBC1&EFS/6.7
				4	'	-F25	11			+MBC1&EFS/9.6
				5	'	-F25	12			+MBC1&EFS/9.6
				6	'	-F25	14			+MBC1&EFS/9.6
				7	'	-K1	12			+MBC1&EFS/10.7
				8	'	-K1	11			+MBC1&EFS/10.7
				9	'	-K1	14			+MBC1&EFS/10.7

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X12
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 7
sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal

=+MBC1-X13

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-X14	U	U		-F100	1:1			+MBC1&EFS/11.2
		-X14	U	U						+MBC1&EFS/11.2
		+UPS1-X14	N	N		-A85	-X1:2			+MBC1&EFS/11.3
		-X14	N	N						+MBC1&EFS/11.3
				PE						+MBC1&EFS/11.3
				PE						+MBC1&EFS/11.3

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X13
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 8
sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal

=+MBC1-X14

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		-X13	U	U		-F110	1:2			+MBC1&EFS/11.6
		+UPS2-X13	U	U						+MBC1&EFS/11.6
		-X13	N	N		-X114	N			+MBC1&EFS/11.7
		+UPS2-X13	N	N						+MBC1&EFS/11.7

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X14
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

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=
+ MBC1
& EMA

A3

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sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal
=+MBC1-X15

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-X15	2	2	'	-X15	4			+MBC1&EFS/2.4
		+UPS1-X15	3	3	'	-X15	5			+MBC1&EFS/2.4
				4	'	-X15	2			+MBC1&EFS/2.4
				5	'	-X15	3			+MBC1&EFS/2.4
		+UPS2-X15	2	6	'	-X15	8			+MBC1&EFS/3.4
		+UPS2-X15	3	7	'	-X15	9			+MBC1&EFS/3.4
				8	'	-X15	6			+MBC1&EFS/3.4
				9	'	-X15	7			+MBC1&EFS/3.4

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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X15
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

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=
+ MBC1
& EMA

A3

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sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal
=+MBC1-X31

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U	'	-QF31	2			+MBC1&EFS/7.2
				N	'	-QF31	N			+MBC1&EFS/7.2
				PE	'	-PE				+MBC1&EFS/7.2

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X31
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

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sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal
=+MBC1-X32

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				V	'	-QF32	2			+MBC1&EFS/7.3
				N	'	-QF32	N			+MBC1&EFS/7.3
				PE	'					+MBC1&EFS/7.3

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X32
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 12
sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal

=+MBC1-X33

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				W	'	-QF33	2			+MBC1&EFS/7.5
				N	'	-QF33	N			+MBC1&EFS/7.5
				PE	'					+MBC1&EFS/7.5

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X33
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

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=
+ MBC1
& EMA

A3

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sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal

=+MBC1-X34

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U	'	-QF34	2			+MBC1&EFS/7.6
				N	'	-QF34	N			+MBC1&EFS/7.6
				PE	'					+MBC1&EFS/7.7

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				Date	13.08.2024
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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X34
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 14
sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal
=+MBC1-X35

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				V	'	-QF35	2			+MBC1&EFS/7.8
				N	'	-QF35	N			+MBC1&EFS/7.8
				PE	'					+MBC1&EFS/7.8

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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X35
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 15
sheets 22

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+MBC1-X36

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				W	'	-QF36	2			+MBC1&EFS/8.2
				N	'	-QF36	4			+MBC1&EFS/8.2
				PE	'	-PE				+MBC1&EFS/8.2

				Date	13.08.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Terminal diagram =+MBC1-X36 Bypass transformer cabinet with manual bypass 20 kVA Terminal diagram		=
				Editor	Beckschäfer					+ MBC1
01	500000002053	13.08.2024	Beckschäfer	Checked	Ch.Peck				1000007888_080 en	& EMA
Stat	Alteration	Date	Name	Norm						A3 sheet 16 / sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal
=+MBC1-X37

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U	'	-QF37	2			+MBC1&EFS/8.3
				N	'	-QF37	4			+MBC1&EFS/8.3
				PE	'					+MBC1&EFS/8.4

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X37
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 17
sheets 22

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+MBC1-X38

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				V	'	-QF38	2			+MBC1&EFS/8.4
				N	'	-QF38	4			+MBC1&EFS/8.5
				PE	'					+MBC1&EFS/8.5

				Date	13.08.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Terminal diagram =+MBC1-X38 Bypass transformer cabinet with manual bypass 20 kVA Terminal diagram		=	
				Editor	Beckschäfer					+ MBC1	
01	500000002053	13.08.2024	Beckschäfer	Checked	Ch.Peck				1000007888_080 en	& EMA	A3 sheet 18
Stat	Alteration	Date	Name	Norm							sheets 22

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Terminal diagram

terminal

=+MBC1-X91

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-F91	1	1M	'	-X91	2M			+MBC1&EFS/2.5
				2M	'	-X91	1M			+MBC1&EFS/2.5
		+UPS2-F91	1	3M	'	-X91	4M			+MBC1&EFS/3.5
				4M	'	-X91	3M			+MBC1&EFS/3.5

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Stat	Alteration	Date	Name	Norm		

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X91
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 19
sheets 22

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+MBC1-X92

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-F92	1	1M	'	-X92	2M			+MBC1&EFS/2.5
				2M	'	-X92	1M			+MBC1&EFS/2.5
		+UPS2-F92	1	3M	'	-X92	4M			+MBC1&EFS/3.5
				4M	'	-X92	3M			+MBC1&EFS/3.5

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AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X92
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 20
sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal

=+MBC1-X93

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-F93	1	1M	'	-X93	2M			+MBC1&EFS/2.6
				2M	'	-X93	1M			+MBC1&EFS/2.6
		+UPS2-F93	1	3M	'	-X93	4M			+MBC1&EFS/3.6
				4M	'	-X93	3M			+MBC1&EFS/3.6

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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X93
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 21
sheets 22

CAE EPLAN Electric P8

Terminal diagram

terminal
=+MBC1-X130

Cable name			-W100
Cable type		LiYCY 3x0,5 mm²	H05VV 2x1 mm²
Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	-W208	-W209	Position / Page
---	---	---	---	---	---	---	---	---
+BAT1-R81-X1	1	1	'	+UPS1-X130	1	WH		+MBC1&EFS/2.7
+BAT2-R81-X1	1	3	'	+UPS2-X130	1		WH	+MBC1&EFS/3.7
+BAT1-R81-X1	2	2	'	+UPS1-X130	2	BN		+MBC1&EFS/2.7
+BAT2-R81-X1	2	4	'	+UPS2-X130	2		BN	+MBC1&EFS/3.7
		1PE	'					+MBC1&EFS/2.7
		2PE	'					+MBC1&EFS/3.7

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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+MBC1-X130
Bypass transformer cabinet
with manual bypass 20 kVA
Terminal diagram

1000007888_080 en

=
+ MBC1
& EMA

A3

sheet 22
sheets 22

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Three-phase input
Attention! Observe sequence of wires, L1, L2, L3 -->
See technical data sheet for required mains fuses

Power section rectifier

mains transformer

Note: Reinforced insulated wire
0,75 mm² unmarked wires

-L61 N=2

Measurement REC Interface -A9-A50-X2
Supply REC Interface -A9-A50-X3

01L1 / 12.6
01L2 / 12.6
01L3 / 12.6
02L1 / 11.1
02L2 / 11.1
02L3 / 11.1

-L22
-T40
-L85.1
-L85.2

1L1 / 2.1
1L2 / 2.1
1L3 / 2.1
2L1 / 3.1
2L2 / 3.1
2L3 / 3.1

-C101.1
-C101.2
-C101.3
-Q3
-Q1
L=100/85A
I=1,0kA
Icu=50kA
/12.4
/12.3
-L23 -L24 -L25
-R23 -R24 -R25
-C23 -C24 -C25
3xR6 mm²

-A80
-A81
Suppression
-R86 -R87 -R88
-R81 -R82 -R83
-V81.1-V81.6
-R84.1 -R84.2
-C84
-C85

-E1
-A2
-A1
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3 -X4
-L92

Mains
400V;3/PE~50Hz

Rack
PE busbar
-PE
Cu 40x5 mm
GNYE 6 mm²
Tür links
Pivot plate

+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

GZ1_1 +MBC1/1.3
GZ1_2 +MBC1/1.3
GZ1_3 +MBC1/1.3

1000007888_080

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Rectifier input Protect 8.33 20-400-204-400 Circuit diagram	=
				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.080 10009759	1000007888_080 en	& EFS	A3	sheet 1 sheets 23
Stat	Alteration	Date	Name	Norm					

Power section rectifier

CAE EPLAN Electric P8

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-A1
/3.1

4.1 / 2L+ -L+:X2:1 → 1L+ / 3.2

1.8 / 1L1 -L1:X1:1
1.8 / 1L2 -L2:X1:2
1.8 / 1L3 -L3:X1:3

-C85.1 -C85.2 -C85.3

-T80 -T81

-V1 -V2 -V3

-A82 REC suppression 6765463 STR
-K
-AK1
-AK2
-AK3
-A

4.1 / 2L- -L-:X2:2 → 1L- / 3.2

RD

-A80 REC trigger circuit 8000023368 STR
-X6:1
2

-X7 -X8 -X3 -X4 -X5

GR-Strom 15 | GND 16 | V2 4 | V1 2 | V4 8 | V3 6 | V6 12 | V5 10 | GND 1 | GND 3 | +24V 13 | +24V 14 | V12 20 | V11 18 | V14 24 | V13 22 | V16 28 | V15 26 | GND 17 | GND 19 | +24V 29 | +24V 30

V12 4
V11 2
V14 8
V13 6
V16 12
V15 10
GND 1
GND 3
+24V 13
+24V 14

-X2 1-40 → 0FB2 / 3.1 REC triggering -A1-A81-X1

-X9 1 2
-R100
1
2

-X1 1-40

-0FB1
40x

REC interface -A9-A50-X1 → 0FB1 / 12.4

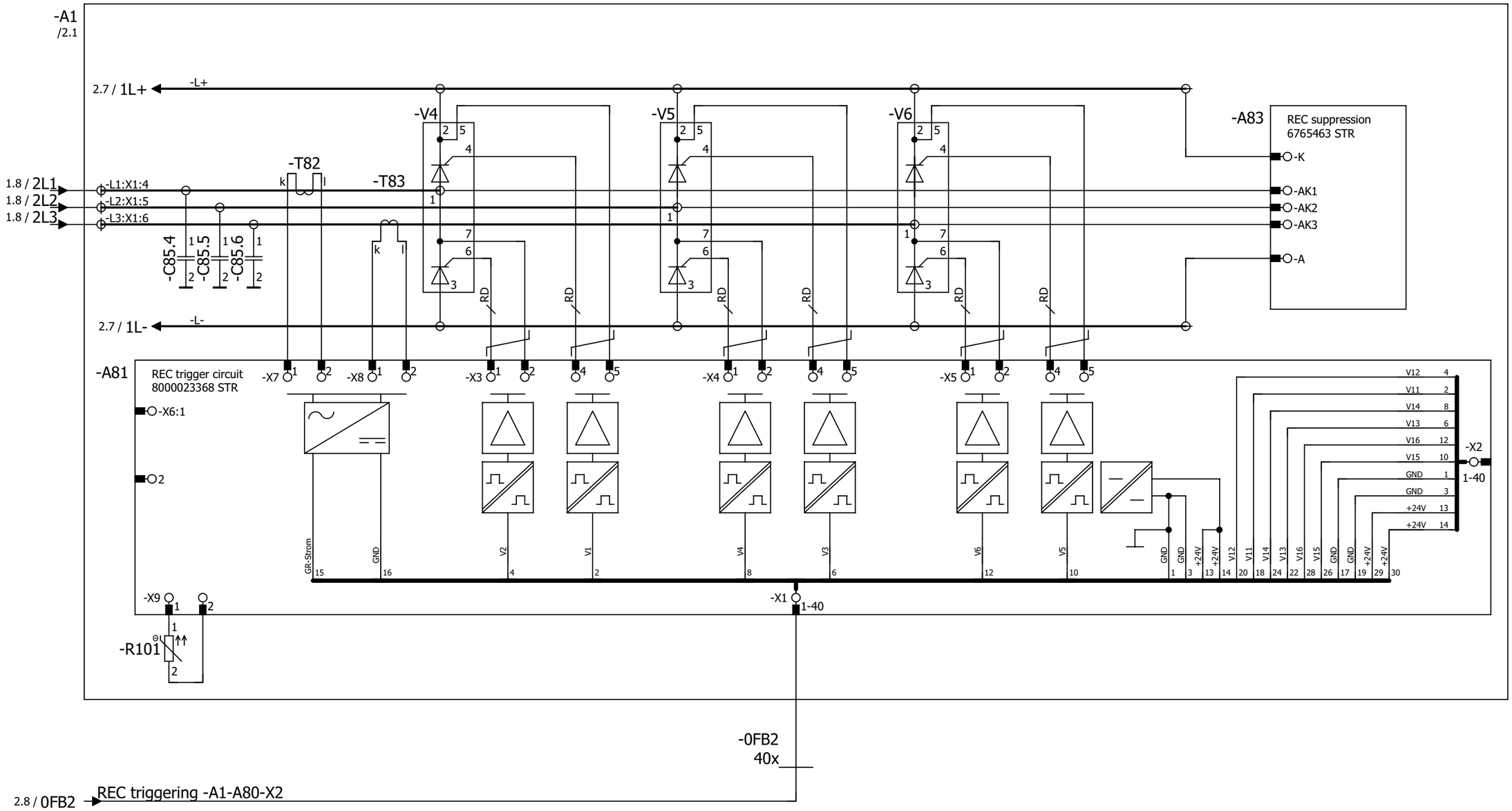
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				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Power section rectifier Protect 8.33 20-400-204-400 Circuit diagram		=	
				Editor	EEC					+ UPS1	
				Checked	Ch.Peck				1000007888.080 10009759	1000007888_080 en	& EFS
Stat	Alteration	Date	Name	Norm							A3 sheet 2 / sheets 23

Power section rectifier

CAE EPLAN Electric P8

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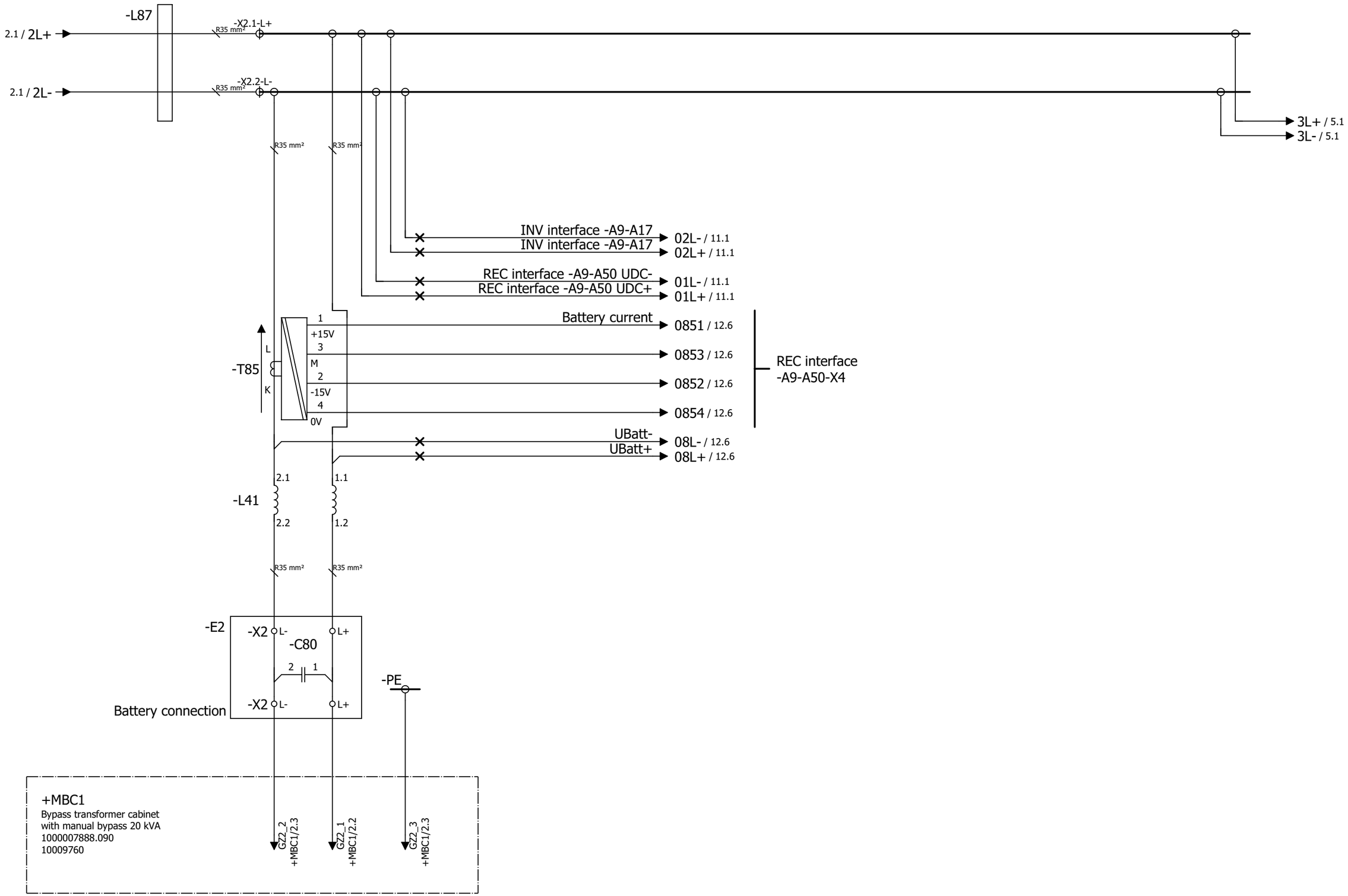
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				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Power section rectifier Protect 8.33 20-400-204-400 Circuit diagram	=
				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.080 10009759	1000007888_080 en	& EFS	A3	sheet 3 sheets 23
Stat	Alteration	Date	Name	Norm					

Power section rectifier
Battery connection

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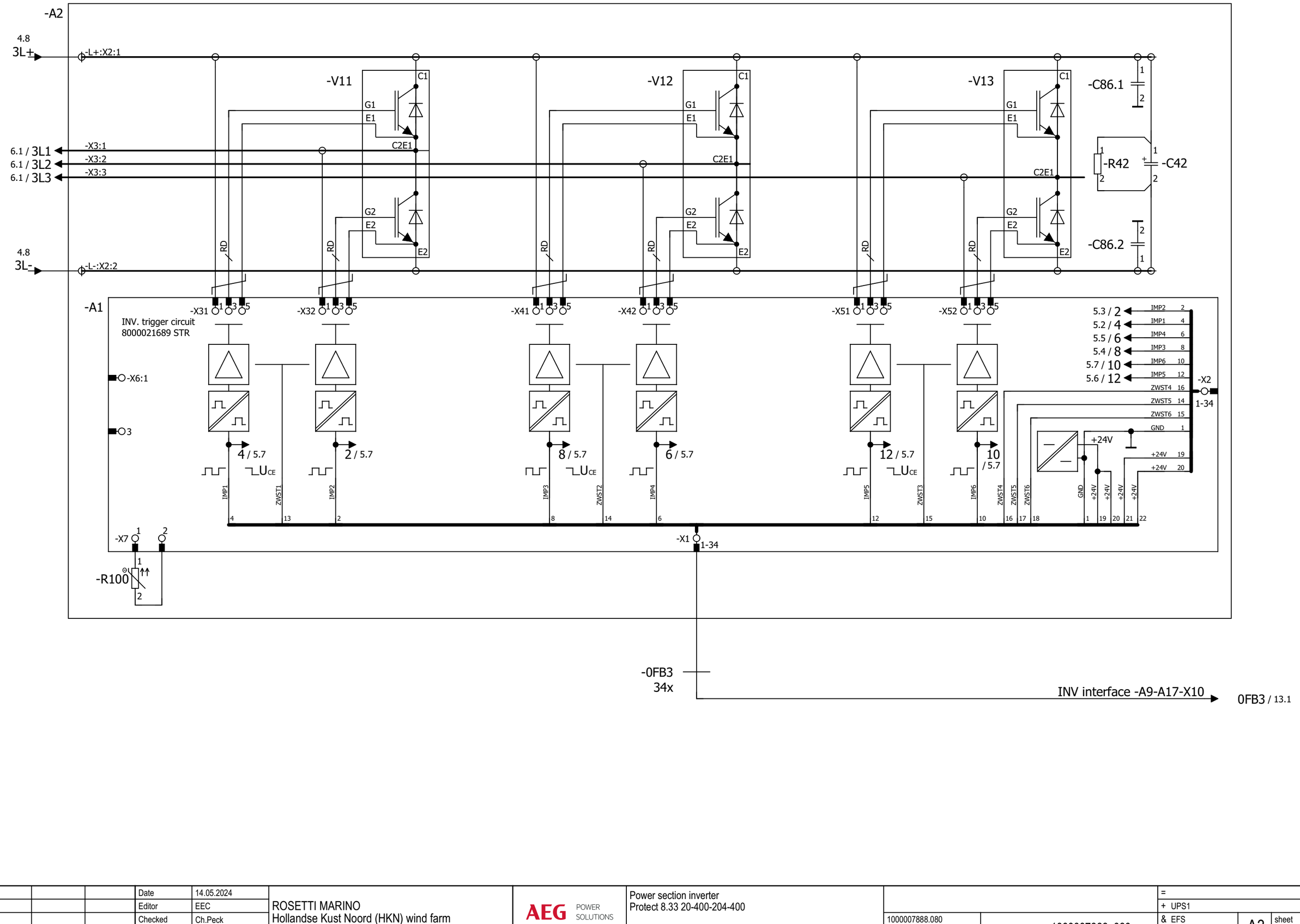
				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Battery connection Protect 8.33 20-400-204-400		=
				Editor	EEC					+ UPS1
				Checked	Ch.Peck				1000007888.080	& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009759	1000007888_080 en

A3 | sheet 4 | sheets 23

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Power section inverter



1000007888_080

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				Editor	EEC						+ UPS1
				Checked	Ch.Peck						& EFS
Stat	Alteration	Date	Name	Norm							A3 sheet 5 / sheets 23

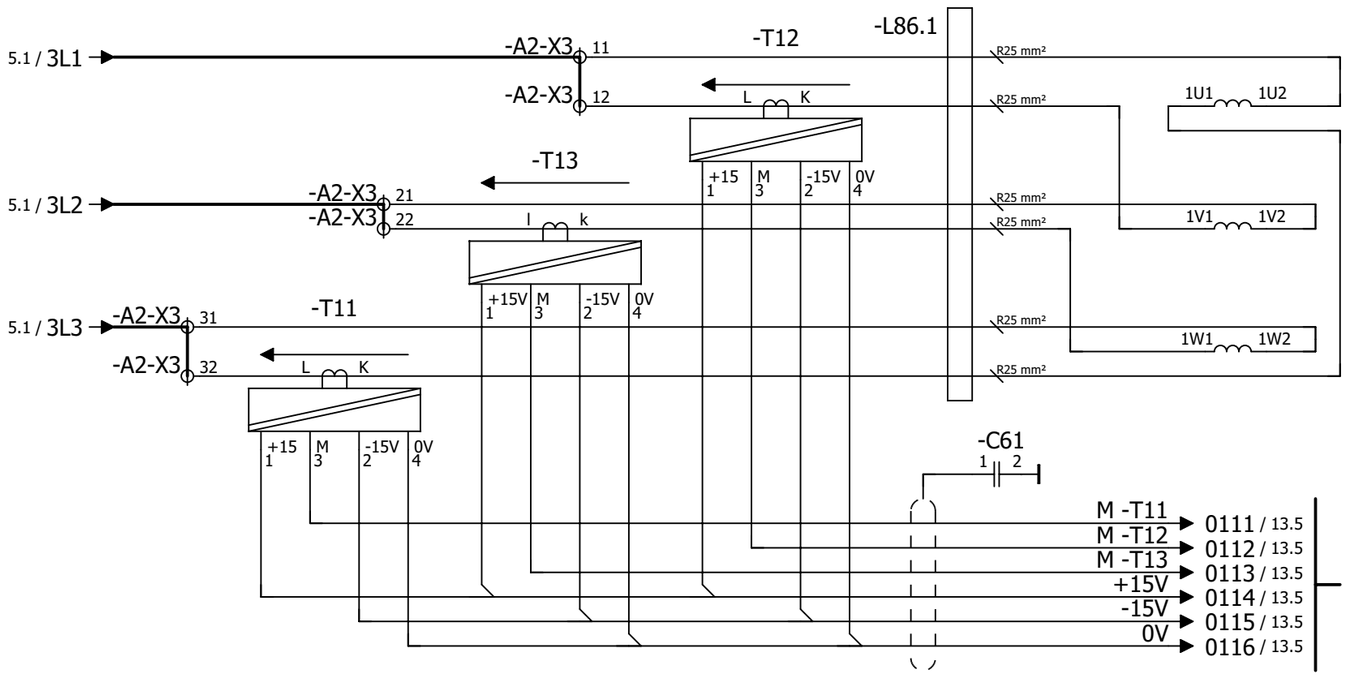
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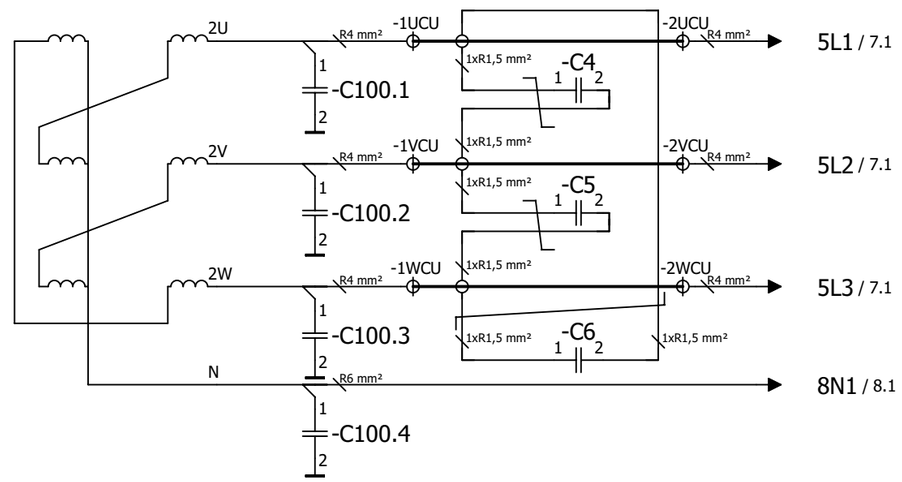
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Power section inverter

Measuring INV current dynamic



-T1



				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Inverter output Protect 8.33 20-400-204-400 Circuit diagram		=
				Editor	EEC					+ UPS1
				Checked	Ch.Peck			1000007888.080 10009759	1000007888_080 en	& EFS
Stat	Alteration	Date	Name	Norm						A3 sheet 6 / sheets 23

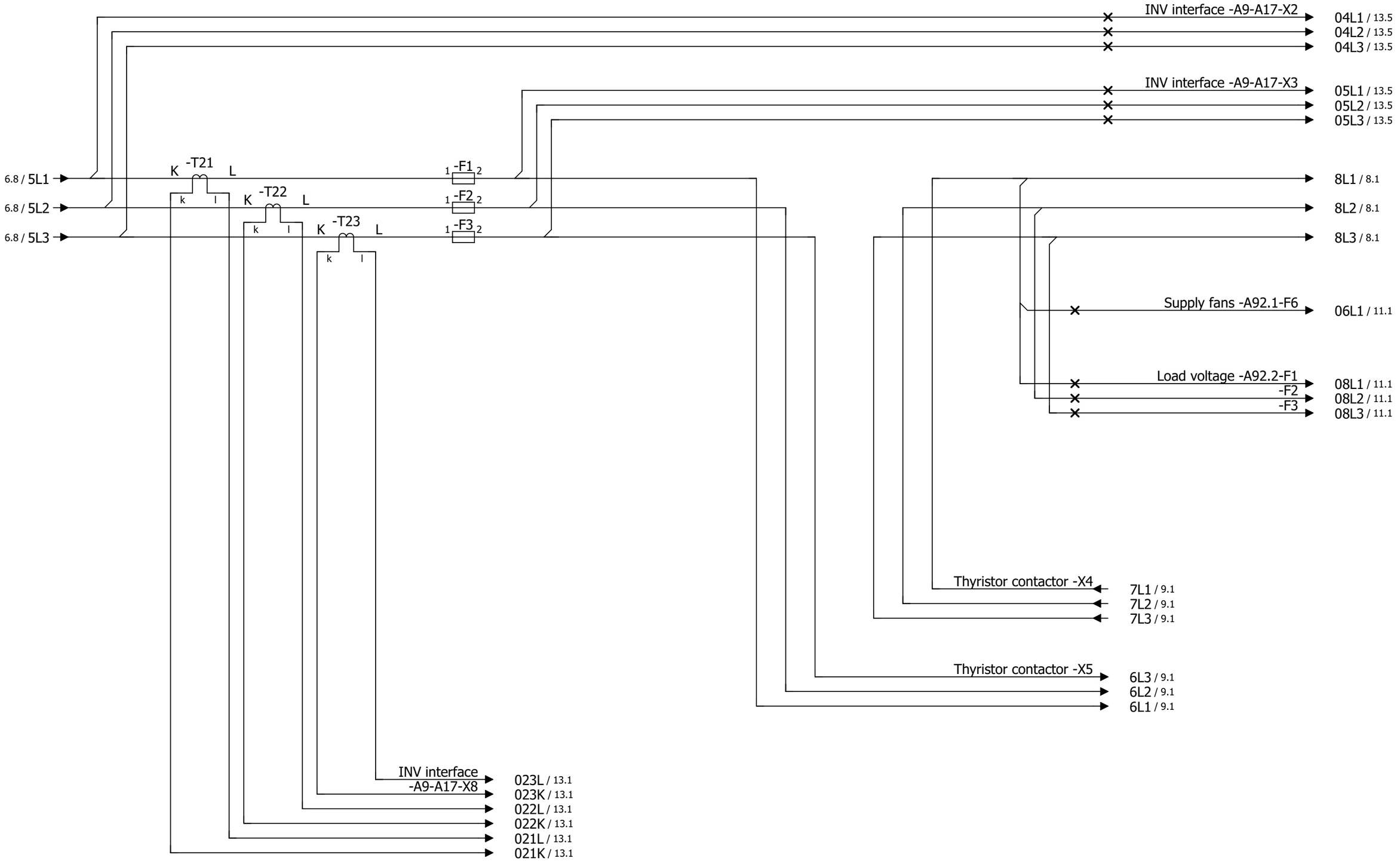
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Power section inverter

Measurement INV current static

Output fuse



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				Checked	Ch.Peck			& EFS
Stat	Alteration	Date	Name	Norm			Circuit diagram	1000007888.080 10009759

1000007888_080 en

A3

sheet 7

sheets 23

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Power section inverter

Parallel preventive choke coil

7.8 / 8L1
7.8 / 8L2
7.8 / 8L3
6.8 / 8N1

-L11 -L12 -L13

R4 mm² R25 mm² 2xR35 mm²

SBS Output
10L1 / 10.1
10L2 / 10.1
10L3 / 10.1

SBS Input
9L1 / 10.1
9L2 / 10.1
9L3 / 10.1

-A105
-C56 -C57 -C58
-X1 -X2 -X3 -X4

fan neutral conductor
0451N1 / 17.1

neutral conductor
04N1 / 13.5
-A9

-E3
-X3 U V W N
-A4
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

-L93

-A3
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

Load
400V;3/N/PE~50Hz
-X3 U V W N

-PE

-E4
-X4 U V W N
-A4
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

-L94

-A3
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

Mains
400V;3/N/PE~50Hz
-X4 U V W N

GZ3_1 +MBC1/6.3
GZ3_2 +MBC1/6.3
GZ3_3 +MBC1/6.3
GZ3_4 +MBC1/6.3

GZ4_1 +MBC1/5.3
GZ4_2 +MBC1/5.3
GZ4_3 +MBC1/5.3
GZ4_4 +MBC1/5.4

+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

1000007888_080

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Load output / SBS circuit
Protect 8.33 20-400-204-400

Circuit diagram

1000007888.080
10009759

1000007888_080 en

=
+ UPS1
& EFS

A3

sheet 8
sheets 23

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Power section inverter
Inverter output contactor

-A4

-A37 SBS suppression 8000028996 STR

-A3 -K3 -AK3 -A2 -K2 -AK2 -A1 -K1 -AK1

-V31

-X4:1A
-X4:1
-X4:1K

A K AK G2 K2 K1 G1

-V33

-X4:2A
-X4:2
-X4:2K

-V35

-X4:3A
-X4:3
-X4:3K

7.7 / 7L1
7.7 / 7L2
7.7 / 7L3

RD

-X2 -X3 -X4 1 2 5 4

-A36 SBS trigger circuit 8000028563 STR

-X5:1
2

GND EUE_EIN GND GND +24V +24V
1 2 3 4 5 6 7 8 9 10

-X6 1 2
-X1 1-10

-R100

-0FB10
10x

-X6 5
-X6 6
-X6 3
-X6 4
-X6 1
-X6 2

7.7 / 6L3
7.7 / 6L2
7.7 / 6L1

-X5:3
-X5:2
-X5:1

INV interface -A9-A17-X1 → 0FB10 / 13.1

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				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Inverter output contactor Protect 8.33 20-400-204-400	=
				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.080	& EFS
Stat	Alteration	Date	Name	Norm				10009759	1000007888_080 en
								Circuit diagram	A3 sheet 9 / sheets 23

Power section SBS

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-A3

SBS mains voltage -A92.2-F6 → 010L1 / 11.1
-A92.2-F7 → 010L2 / 11.1
-A92.2-F8 → 010L3 / 11.1

8.8 / 9L1 SBS mains
8.8 / 9L2 SBS mains
8.8 / 9L3 SBS mains

-A37 SBS suppression 8000028996 STR

-A3 -K3 -AK3 -A2 -K2 -AK2 -A1 -K1 -AK1

-V31
-X4:1A -X4:1 -X4:1K
A K AK
G2 K2 K1 G1

-V33
-X4:2A -X4:2 -X4:2K
A K AK
G2 K2 K1 G1

-V35
-X4:3A -X4:3 -X4:3K
A K AK
G2 K2 K1 G1

RD

-A36 SBS trigger circuit 8000028563 STR

-X2 -X3 -X4 1 2 5 4

-X5:1
2

SBS interface -A9-A16-X1 → 0FB9 / 14.3

GND 1 | EUE_EIN 2 | GND 3 | GND 4 | +24V 5 | +24V 6 | 7 | 8 | 9 | 10

-X1 1-10

-X6 1 2

-R100 1 2

-X6 5
-X6 6
-X6 3
-X6 4
-X6 1
-X6 2

8.8 / 10L3 UPS Output
8.8 / 10L2
8.8 / 10L1

-X5:3
-X5:2
-X5:1

SBS interface -A9-A16-X4 → 03151L / 14.3
-A9-A16-X4 → 03151K / 14.3
-A9-A16-X4 → 03352L / 14.3
-A9-A16-X4 → 03352K / 14.3
-A9-A16-X4 → 03553L / 14.3
-A9-A16-X4 → 03553K / 14.3

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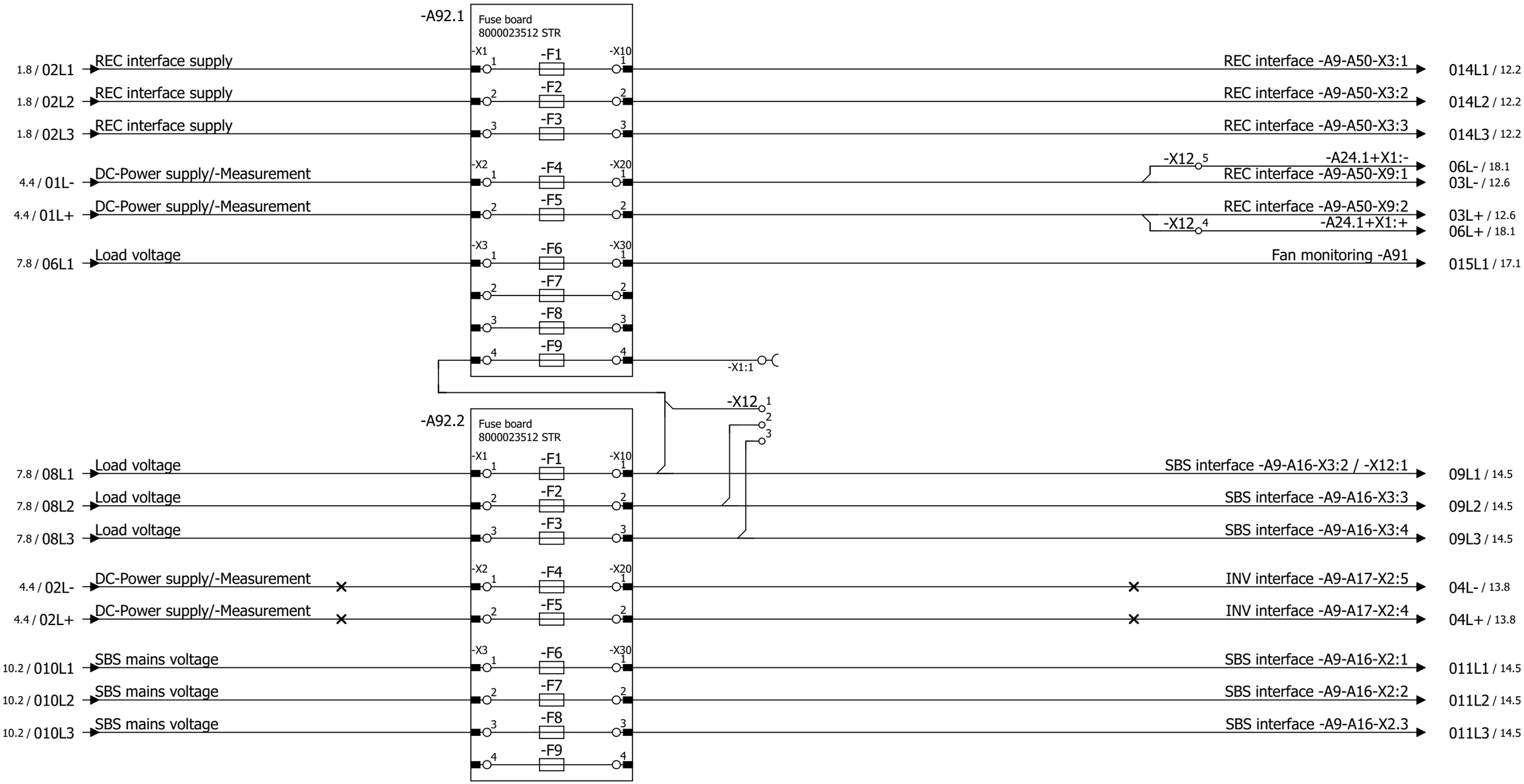
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				Checked	Ch.Peck				& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	1000007888.080 10009759

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Fuse boards

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				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.080 10009759	1000007888_080 en
Stat	Alteration	Date	Name	Norm					& EFS

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Rectifier control

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-A9
/16.1

4.4 / 0854 Battery current transformer -T85
4.4 / 0851
4.4 / 0853
4.4 / 0852

4.4 / 08L+ UBatt+
4.4 / 08L- UBatt-

11.8 / 03L+ UIC+ A92.1-F5
11.8 / 03L- UIC- A92.1-F4

1.8 / 01L3 -Q1 REC input voltage
1.8 / 01L2
1.8 / 01L1

11.8 / 014L3 -T40 sec. supply REC
11.8 / 014L2
11.8 / 014L1

2.8 / 0FB1 REC trigger circuit -A1-A80-X1

-A50
/16.2
REC interface
8000022025 STR

-X3 1 2 3
-X5 7 8
-X1 1-40
-X2 1 3 5
-X9 1 2 3 4
-X4 2 3 1 4
-15V +15V

GND V1 GND V2 V3 V4 V5 V6 +24V +24V GND V11 GND V12 V13 V14 V15 V16 +24V +24V REC current REC current
+24V +24V
-R204 -R206
REC current stack A1
REC current stack A2

-X11 1-50
-A50X11 50x
-X12 1-50
-A50X12 50x

-A1
REC control
8000014119 STR

-X19 1 2 3 -X15 1 4 -X8 1 2 3 -X5 3 4 +24V DC -X8 5 6 -X8 4 5 6 -X5 5 6

-X130 1 2
-X12 10 11 15
-Q3
/1.4
96 98
95
-Q1 C1 C2

BK R1,5 mm²
-C711 220000µF
-C712 220000µF
BK R2,5 mm²
BK R2,5 mm²
BK R1,5 mm²
BK R1,5 mm²
0V
-X15 1 1
-X15 2 2 (+) 3 (-)
*1

+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

GZ130_1 +MBC1/2.7
GZ130_2 +MBC1/2.7

+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

GZ15_2 +MBC1/2.4
GZ15_3 +MBC1/2.4

*1 Attention! In the event of battery undervoltage < 130 V, the UPS automatically switches off battery isolator Q2.
If this happens, switch X15:3 must be switched into the open position (undervoltage trip blocked).
For restart, please refer to the chapter in the UPS operating instructions (charging the DC link capacitors).
Unlock the tripped switch Q2 by switching to open position.
After charging the DC link capacitors, switch on Q2.
Attention! When the battery voltage reaches > 200 V, switch X15:3 must be switched back to the closed position.

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Stat	Alteration	Date	Name		
				Date	14.05.2024
				Editor	EEC
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Rectifier control
Protect 8.33 20-400-204-400

Circuit diagram

1000007888.080
10009759

1000007888_080 en

=
+ UPS1
& EFS

A3

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sheets 23

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Inverter control

INV current static

7.3 / 023L Transformer -T23
7.3 / 023K
7.3 / 022L Transformer -T22
7.3 / 022K
7.3 / 021L Transformer -T21
7.3 / 021K

INV. trigger circuit
-A2-A1-X1
5.8 / 0FB3

Trigger circuit
-A4-A36-X1
9.7 / 0FB10

INV current dynamic

INV output voltage reference
7.8 / 05L1
7.8 / 05L2
7.8 / 05L3
neutral conductor
8.8 / 04N1 → N → 05N1 / 14.5
INV output voltage
7.8 / 04L1
7.8 / 04L2
7.8 / 04L3

Transformer -T11...-T13
6.5 / 0116
6.5 / 0115
6.5 / 0113
6.5 / 0112
6.5 / 0111
6.5 / 0114

11.8 / 04L+ UIC+
11.8 / 04L- UIC-

-A9
/16.1

-A17
/16.3
INV interface
8000022441 STR

-X1 1-10: GND, SBS_ON, GND, GND, +24V, +24V → +24V
-X10 1-34: IMP1, IMP2, IMP5, IMP6, ZWST1, ZWST3, +24V, +24V, GND → +24V
-X4 1 2 3 4 5 6 -X8 6
-X13 2 3 1 4 -15V +15V
-X20 4 1 2 3 5 6 +15V -15V
-X19 4 1 2 3 5 6 +15V -15V
-X2 1W 2V 3U -X3 1N 2U 3V 4W
-X2 5 4

-R203 -R205 -R207
-R204 -R206 -R208
INV current static

-S201
-S202
-S203
INV current dynamic

-X11 1-50
48 14 13 12 17 21 23 49
27 28 21 22 19 20 23 48 46 50 47 45 49 32 29 30 31 39 38 37 1 2
-X12 1-50

-A17X11____50x
-A17X12____50x

-A1
INV control
8000042636 STR

-X11 1-50
48 14 13 12 17 21 23 49
27 28 21 22 19 20 23 48 46 50 47 45 49 32 29 30 31 39 38 37 1 2
-X12 1-50

-X15 1 4
-X5 1 2 (+)
-X5 5 6 (+)
-X8 8 7
-X5 3 4 (+)
-X8 1 2

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				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Inverter control Protect 8.33 20-400-204-400 Circuit diagram	1000007888.080 10009759
				Editor	EEC				
				Checked	Ch.Peck				
Stat	Alteration	Date	Name	Norm					

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= | + UPS1 | & EFS | A3 | sheet 13 | sheets 23

Control SBS

CAE EPLAN Electric P8

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-A9 /16.1

10.4 / 03553L Transformer -T35
10.4 / 03553K
10.4 / 03352L Transformer -T33
10.4 / 03352K
10.4 / 03151L Transformer -T31
10.4 / 03151K

11.8 / 09L1 Load voltage
11.8 / 09L2
11.8 / 09L3

13.8 / 05N1 neutral conductor → -X1:3 → -X12 6

11.8 / 011L1 SBS mains voltage
11.8 / 011L2
11.8 / 011L3

10.2 / 0FB9 SBS trigger circuit -A3-A36-X1

-L62

-A16 /16.4
SBS interface
8000022378 STR

-X1 1-10: 1 GND, 2 SBS_ON, 3 GND, 4 GND, 5 +24V, 6 +24V, 7, 8, 9, 10
+24V

-X4 1 2 3 4 5 6

SBS current

-X2 1U 2V 3W
-X3 1N 2U 3V 4W

-X12 12 → -X8 7

-R201 -R203 -R205
-R202 -R204 -R206

7 → 5
8 → 4
9 → 6
-X18 1 → 1
-R120 1 2 → 2

15 16 26 17 21 29 30 27 45 46 35 36 33 41 42 39

-X11 1-50 → -A16X11 50x
-X12 1-50 → -A16X12 50x

-A1
SBS control
8000008845 STR
-X11 1-50
-X12 1-50

-X15 1 2 3 +24V 4 5

Fan control -A92.1-X6
091.11 / 17.7
091.12 / 17.7
091.13 / 17.7
091.14 / 17.7
091.15 / 17.7

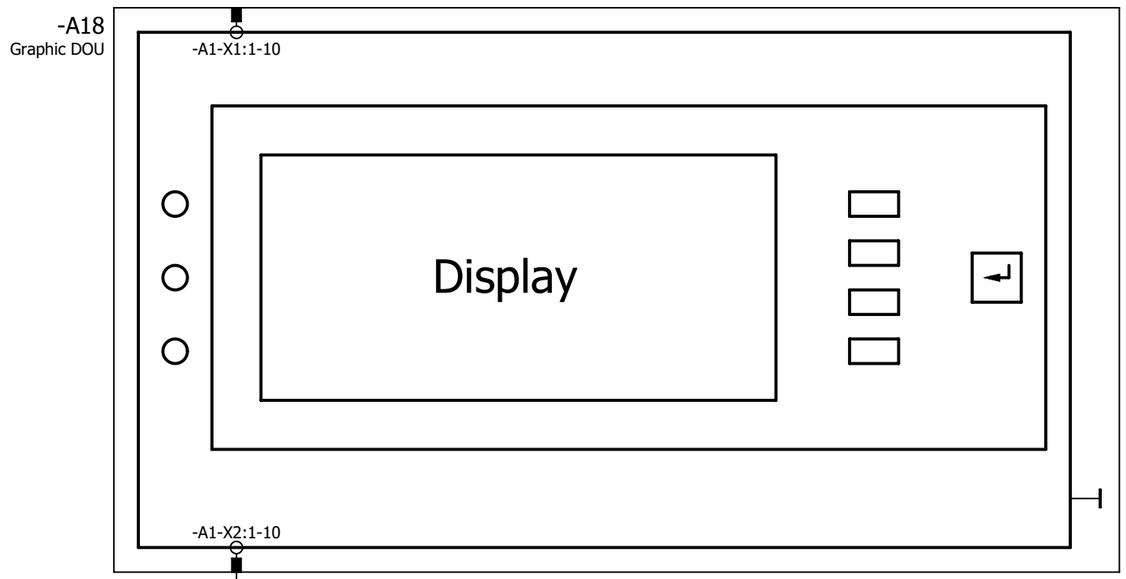
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				Checked	Ch.Peck			1000007888.080 10009759	& EFS
Stat	Alteration	Date	Name	Norm				1000007888_080 en	A3 sheet 14 / sheets 23

Control

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DOU-CAN

A / 16.1

1000007888_080

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				Checked	Ch.Peck			1000007888.080 10009759	& EFS
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Control

+UPS2
Protect 8.33 20-400-204-400
1000007888.080
10009759

GZ20_3
+UPS2/16.6

GZ20_5
+UPS2/16.7

INV
-CAN

INV
-sync

-A9
/12.1
/13.1
/14.2
/20.1
/21.1
/22.1

-A50
/12.1
REC interface
8000022025 STR

-X6 1-10
-X7 1-16

-A17
/13.1
INV interface
8000022441 STR

-X6 1-10
-X7 1-16

-A16
/14.2
SBS interface
8000022378 STR

-X6 1-10
-X7 1-16

-A20
Parallel Adapter
8000023378 STR

-X3 1-3
-X4 1-3
-X5 1-4
-X6 1-2

-X1 1-16
-X2 1-16
-X11 1-10
-X12 1-10
-X13 1-10
-X14 1-10

Parallel CAN INV

Parallel CAN REC

15.8 / A

DOU-CAN

A / 20.1

O / 19.1
K / 18.1
L / 18.1

1000007888_080

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Control CAN Protect 8.33 20-400-204-400 Circuit diagram	=
				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.080 10009759	1000007888_080 en
Stat	Alteration	Date	Name	Norm					& EFS

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Fan control/monitoring

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11.8 / 015L1

8.8 / 0451N1

-A91.1 Fan control 8000022841 STR

-X5 1 2 3

-R5

-C5

-S1

-S2

Logical evaluation fan fault

-X7 1 2 3 4 5

Fan speed

+24V

= 1

P2 P4 P6 P8

-R50 -R51 -R60 -R61 -R70 -R71 -R80 -R81

P1 P3 P5 P7

-R1 PTC -R2 PTC -R3 PTC -R4 PTC

-X1 -X2 -X3 -X4 2 1

-X6 1 2 3 4 5

-C31 -C32 -C33 -C34

-X91 -X92 -X93 -X94 1 2 3

N L

-M1 -M2 -M3 -M4 M 1~

PE

14.6 / 091.11
14.6 / 091.12
14.6 / 091.13
14.6 / 091.14
14.6 / 091.15

SBS interface -A9-A16-X15

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				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Fan control/monitoring Protect 8.33 20-400-204-400 Circuit diagram	=
				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.080 10009759	& EFS
Stat	Alteration	Date	Name	Norm				1000007888_080 en	A3 sheet 17 / sheets 23

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+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

GZ91_1
+MBC1/2.5

GZ92_1
+MBC1/2.5

-F91 1
G
F3,15A 2

-F92 1
G
F3,15A 2

11.8 / 06L+

07L+ / 19.1

-A24.1
Battery charge monitoring
BLÜ-PRO
(Option)

-X1 +
M
-
-
-
-
0 ... 5V
-X1 -
-X3 1-16
-X4 1-10

-A24.2
Battery charge monitoring
BLÜ-PRO
(Option)

-X1 +
M
-
-
-
-
0 ... 5V
-X1 -
-X3 1-16
-X4 1-10

16.8 / L

16.8 / K

11.8 / 06L-

07L- / 19.1

1000007888_080

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	battery charging circuit monitoring Protect 8.33 20-400-204-400	=
				Editor	EEC				+ UPS1
				Checked	Ch.Peck			1000007888.080	& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009759

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Control

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+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

GZ93_1
+MBC1/2.6

-F93 1
G
F3,15A 2

18.8 / 07L+

-A24.3
BLÜ-PRO battery charging circuit
monitoring system

-X1 +
M
-
-
-
-
0 ... 5V
-X1 -
-X3 1-16
-X4 1-10

16.8 / O

18.8 / 07L-

1000007888_080

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	battery charging circuit monitoring Protect 8.33 20-400-204-400 Circuit diagram	1000007888.080 10009759	1000007888_080 en
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				Checked	Ch.Peck					
Stat	Alteration	Date	Name	Norm						

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+ UPS1
& EFS

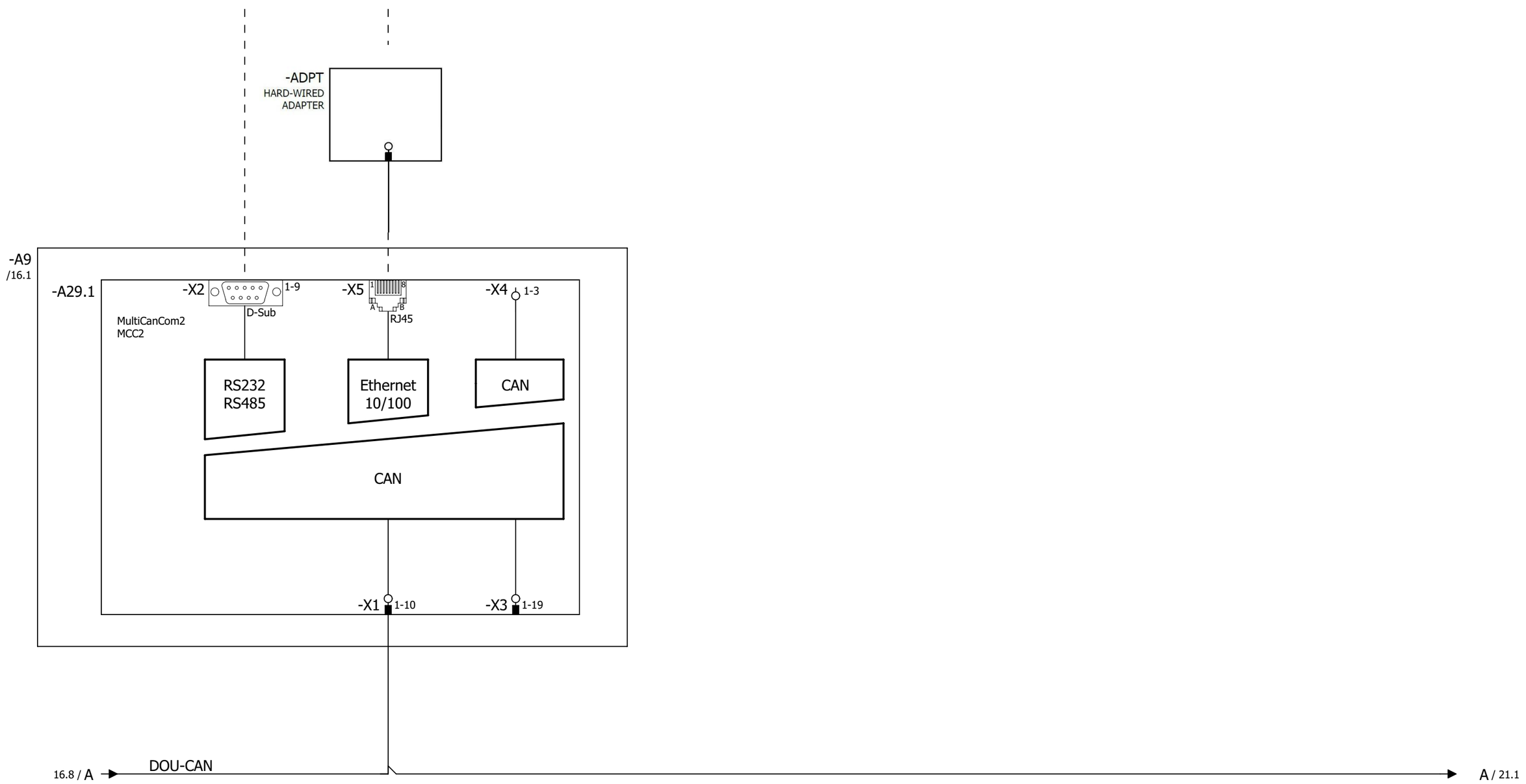
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Control

SNMP adapter
CompuWatch
Service Tools
Modbus

Modbus



16.8 / A → DOU-CAN → A / 21.1

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				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	MultiCom Protect 8.33 20-400-204-400		=	
				Editor	EEC					+ UPS1	
				Checked	Ch.Peck					& EFS	A3
Stat	Alteration	Date	Name	Norm				Circuit diagram	1000007888.080 10009759 1000007888_080 en		sheet 20 sheets 23

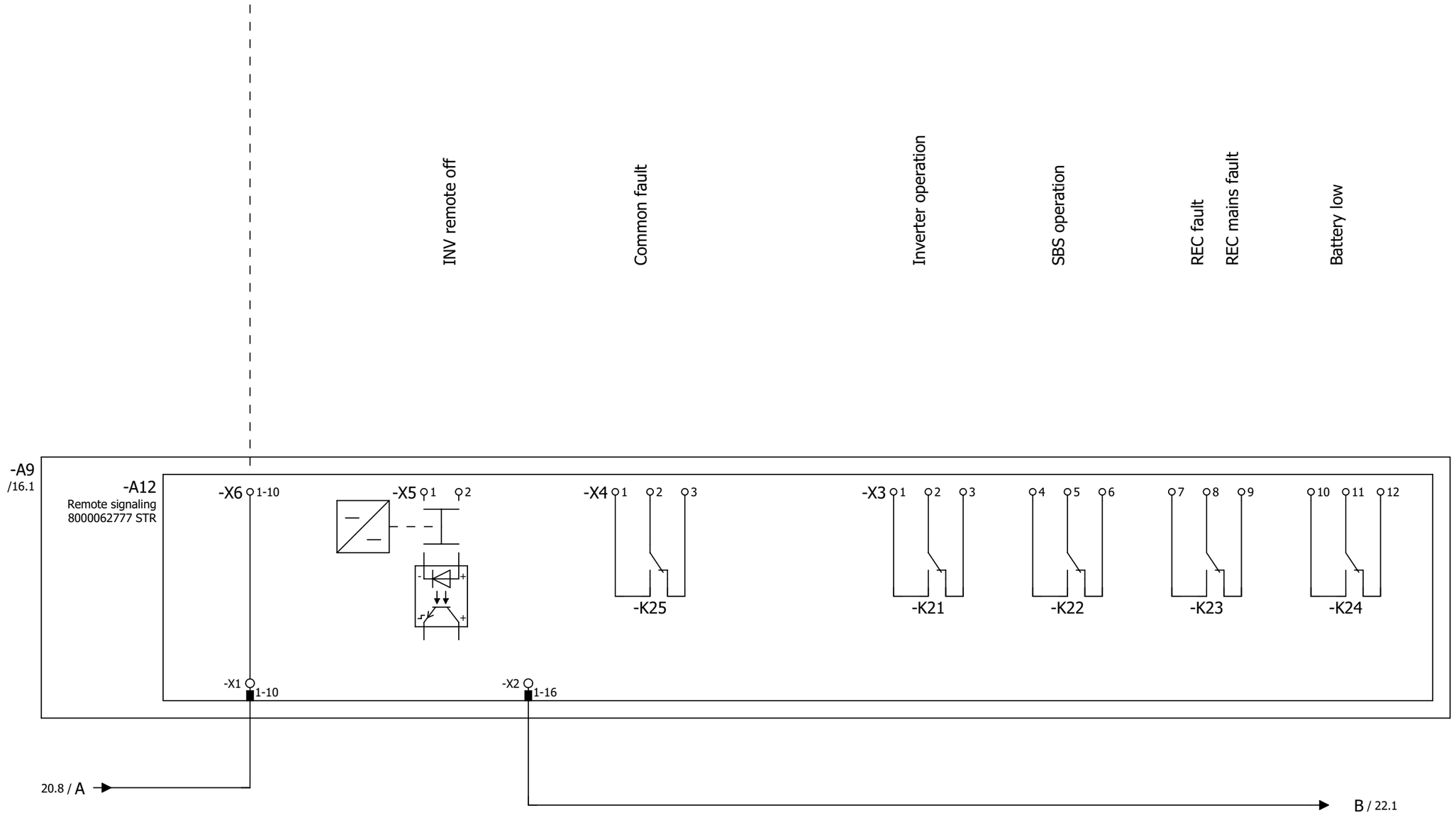
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Remote signaling

CAN Service

Configuration remote signals
see techn. data sheet



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				Editor	EEC				+ UPS1
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Stat	Alteration	Date	Name	Norm				Circuit diagram	10009759

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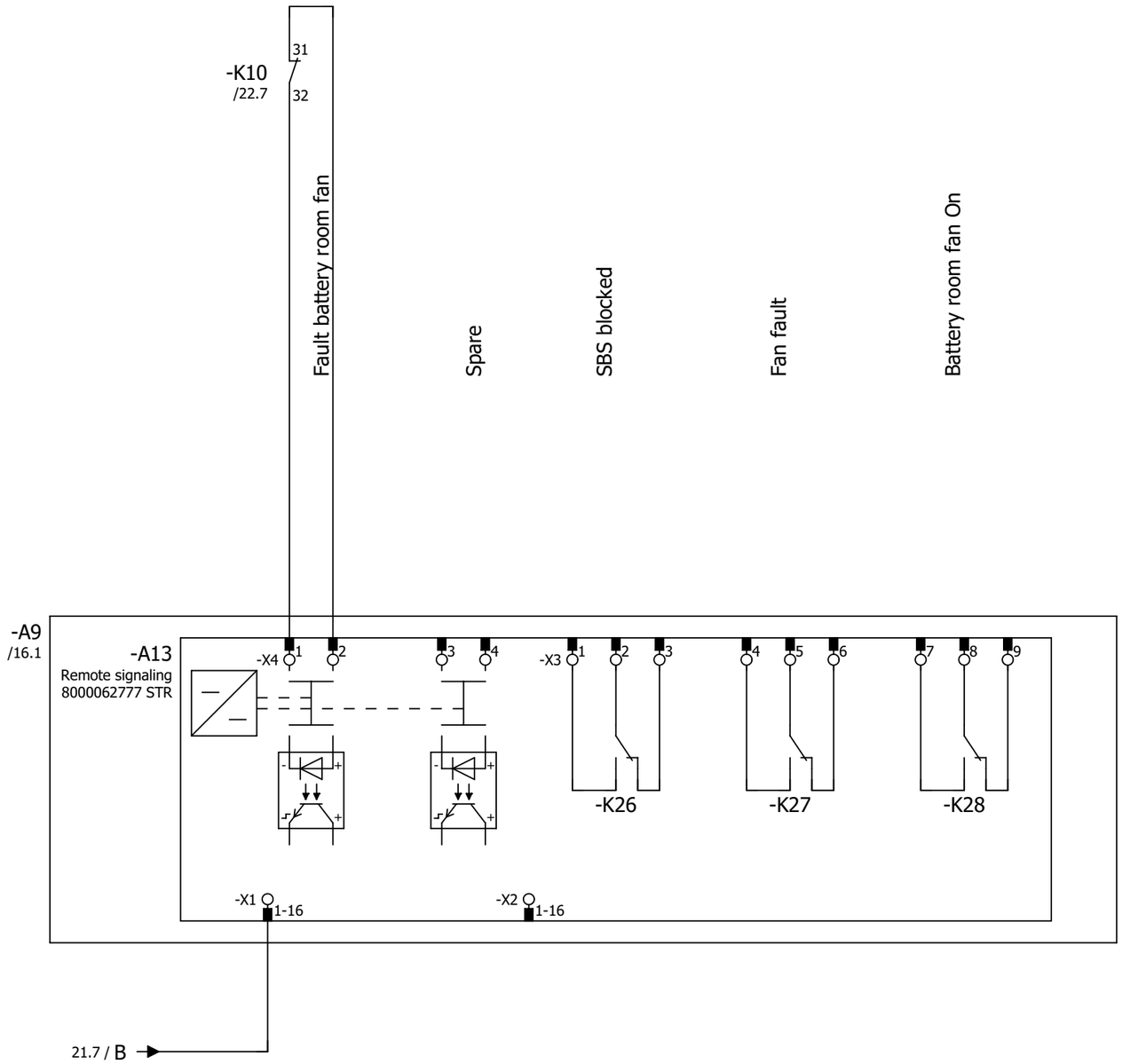
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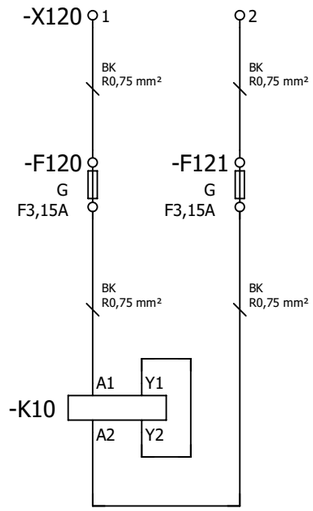
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Configuration remote signals
see techn. data sheet

24V DC is permanently present
in fault-free operation





PXC.2981020_PSR-SCP- 24DC/ESP4/2X1/1X2

13 — 14
23 — 24
31 — 32 /22.2

				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Remote signaling Protect 8.33 20-400-204-400	=
				Editor	Beckschäfer				+ UPS1
				Checked	Ch.Peck			1000007888.080	& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009759

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+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

GZ13_1
+MBC1/11.2

GZ13_2
+MBC1/11.3

Control cabinet heating
Mains
110-250V/N/PE~50/60Hz

back-up fuse
gG 10A

BK
R1,5 mm²

BK
R1,5 mm²

-X13 U U N N PE PE

BK
0,75 mm²

-F100 1
G
T6,3A 2

BK
0,75 mm²

BK
0,75 mm²

L
-F85
I 3 2

-A85
-X1 3 2
-R1

-X14 U U N N

BK
0,75 mm²

-F110 1
G
T6,3A 2

BK
0,75 mm²

BK
0,75 mm²

-X114 U N

-W100
H05VV
2x1 mm²
3 m

L N
-H1
Enclosure light

1000007888_080

				Date	14.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	external connection Protect 8.33 20-400-204-400 Circuit diagram		=
				Editor	EEC					+ UPS1
				Checked	Ch.Peck			1000007888.080 10009759	1000007888_080 en	& EFS
Stat	Alteration	Date	Name	Norm						A3

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Terminal diagram

terminal

=+UPS1-A9-A12-X3

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1						+UPS1&EFS/21.5
				2						+UPS1&EFS/21.5
				3						+UPS1&EFS/21.5
				4						+UPS1&EFS/21.5
				5						+UPS1&EFS/21.6
				6						+UPS1&EFS/21.6
				7						+UPS1&EFS/21.6
				8						+UPS1&EFS/21.6
				9						+UPS1&EFS/21.6
				10						+UPS1&EFS/21.7
				11						+UPS1&EFS/21.7
				12						+UPS1&EFS/21.7

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Terminal diagram

terminal

=+UPS1-A9-A12-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1						+UPS1&EFS/21.4
				2						+UPS1&EFS/21.4
				3						+UPS1&EFS/21.4

Stat	Alteration	Date	Name		
				Date	03.06.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A12-X4
Protect 8.33 20-400-204-400

Terminal diagram

1000007888_080 en

=
+ UPS1
& EMA

A3

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CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A9-A12-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1						+UPS1&EFS/21.3
				2						+UPS1&EFS/21.3

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Stat	Alteration	Date	Name			
				Date	03.06.2024	
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A12-X5
Protect 8.33 20-400-204-400

Terminal diagram

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+ UPS1
& EMA

A3

sheet 3
sheets 23

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS1-A9-A12-X6

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-10		-A9-A12-X1				+UPS1&EFS/21.2

Stat	Alteration	Date	Name		
				Date	03.06.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A12-X6
Protect 8.33 20-400-204-400

Terminal diagram

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& EMA

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sheet 4
sheets 23

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS1-A9-A29.1-X2

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-9						+UPS1&EFS/20.2

				Date	03.06.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A29.1-X2
Protect 8.33 20-400-204-400

Terminal diagram

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+ UPS1
& EMA

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sheet 5
sheets 23

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS1-A9-A29.1-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-3						+UPS1&EFS/20.3

				Date	03.06.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A29.1-X4
Protect 8.33 20-400-204-400

Terminal diagram

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sheet 6
sheets 23

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS1-A9-A29.1-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-8						+UPS1&EFS/20.3

				Date	03.06.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A9-A29.1-X5
Protect 8.33 20-400-204-400

Terminal diagram

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+ UPS1
& EMA

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sheet 7
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A20-X3

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS2-A20-X3	1-3	1-3						+UPS1&EFS/16.6

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				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A20-X3
Protect 8.33 20-400-204-400

Terminal diagram

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= + UPS1 & EMA

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sheet 8
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A20-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-3						+UPS1&EFS/16.7

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				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A20-X4
Protect 8.33 20-400-204-400

Terminal diagram

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+ UPS1
& EMA

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sheet 9
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A20-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS2-A20-X5	1-4	1-4						+UPS1&EFS/16.7

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				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A20-X5
Protect 8.33 20-400-204-400

Terminal diagram

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sheet 10
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-A20-X6

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-2						+UPS1&EFS/16.7

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-A20-X6
Protect 8.33 20-400-204-400

Terminal diagram

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+ UPS1
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sheet 11
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-E1-X1

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-E1-X1	U			+UPS1&EFS/1.2
						-Q1	2			
		+MBC1-X1	2U	U		-E1-X1	U			+UPS1&EFS/1.2
				V		-E1-X1	V			+UPS1&EFS/1.2
						-Q1	4			
		+MBC1-X1	2V	V		-E1-X1	V			+UPS1&EFS/1.2
				W		-E1-X1	W			+UPS1&EFS/1.2
						-Q1	6			
		+MBC1-X1	2W	W		-E1-X1	W			+UPS1&EFS/1.2

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-E1-X1
Protect 8.33 20-400-204-400

Terminal diagram

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+ UPS1
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sheet 12
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-E2-X2

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				L+		-L41	1.2			+UPS1&EFS/4.3
		+MBC1-X2	1L+	L+						+UPS1&EFS/4.3
				L-		-L41	2.2			+UPS1&EFS/4.2
		+MBC1-X2	1L-	L-						+UPS1&EFS/4.2

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-E2-X2
Protect 8.33 20-400-204-400

Terminal diagram

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sheet 13
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-E3-X3

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-E3-X3	U			+UPS1&EFS/8.2
						-L11	2			
		+MBC1-X5	1U	U		-E3-X3	U			+UPS1&EFS/8.2
				V		-E3-X3	V			+UPS1&EFS/8.2
						-L12	2			
		+MBC1-X5	1V	V		-E3-X3	V			+UPS1&EFS/8.2
				W		-E3-X3	W			+UPS1&EFS/8.2
						-L13	2			
		+MBC1-X5	1W	W		-E3-X3	W			+UPS1&EFS/8.2
				N		-E3-X3	N			+UPS1&EFS/8.3
		+MBC1-X5	1N	N		-E3-X3	N			+UPS1&EFS/8.3

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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-E3-X3
Protect 8.33 20-400-204-400

Terminal diagram

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sheet 14
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal
=+UPS1-E4-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-E4-X4	U			+UPS1&EFS/8.6
						-A3-X4	1			
		+MBC1-X4	1U	U		-E4-X4	U			+UPS1&EFS/8.6
				V		-E4-X4	V			+UPS1&EFS/8.6
						-A3-X4	2			
		+MBC1-X4	1V	V		-E4-X4	V			+UPS1&EFS/8.6
				W		-E4-X4	W			+UPS1&EFS/8.6
						-A3-X4	3			
		+MBC1-X4	1W	W		-E4-X4	W			+UPS1&EFS/8.6
				N		-E4-X4	N			+UPS1&EFS/8.6
		+MBC1-X4	1N	N		-E4-X4	N			+UPS1&EFS/8.6

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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-E4-X4
Protect 8.33 20-400-204-400

Terminal diagram

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+ UPS1
& EMA

A3

sheet 15
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-F120

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		-K10	A1	1		-X120	1			+UPS1&EFS/22.7

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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-F120
Protect 8.33 20-400-204-400

Terminal diagram

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sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-F121

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		-K10	A2	1		-X120	2			+UPS1&EFS/22.8

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-F121
Protect 8.33 20-400-204-400

Terminal diagram

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sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-PE

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+MBC1-PE	PE	PE						+UPS1&EFS/4.3
				PE						+UPS1&EFS/8.4
				PE						+UPS1&EFS/1.4

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				Date	03.06.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm
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				Norm		

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-PE
Protect 8.33 20-400-204-400

Terminal diagram

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= +UPS1 & EMA

A3

sheet 18
sheets 23

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS1-X12

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1		-A92.1-X3	4			+UPS1&EFS/11.5
				2		-A92.2-X10	2			+UPS1&EFS/11.5
				3		-A92.2-X10	3			+UPS1&EFS/11.5
		-A24.1-X1	+	4	'	-A92.1-X20	2			+UPS1&EFS/11.7
		-A24.1-X1	-	5	'	-A92.1-X20	1			+UPS1&EFS/11.7
				6		-CU	N			+UPS1&EFS/14.7
				7		-A9-A16-X8	5			+UPS1&EFS/14.2
				8		-A9-A16-X8	4			+UPS1&EFS/14.2
				9		-A9-A16-X8	6			+UPS1&EFS/14.2
				10		-A9-A50-X8	1			+UPS1&EFS/12.3
				11		-A9-A50-X8	2			+UPS1&EFS/12.3
						-Q3	96			
				12		-A9-A16-X8	7			+UPS1&EFS/14.2
				15		-A9-A50-X8	3			+UPS1&EFS/12.3
						-Q3	95			

	Date	03.06.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Terminal diagram =+UPS1-X12 Protect 8.33 20-400-204-400 Terminal diagram
	Editor	Beckschäfer			
	Checked	Ch.Peck			
Stat / Alteration / Date / Name	Norm				1000007888_080 en

= | + UPS1 | & EMA | A3 | sheet 19 | sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-X13

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-F100	1:2			+UPS1&EFS/23.2
		-X14	U	U						+UPS1&EFS/23.2
				N		-A85-X1	2			+UPS1&EFS/23.2
		-X14	N	N						+UPS1&EFS/23.3
				PE						+UPS1&EFS/23.3
				PE						+UPS1&EFS/23.3

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				Date	03.06.2024
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				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-X13
Protect 8.33 20-400-204-400

Terminal diagram

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& EMA

A3

sheet 20
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-X14

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		-X13	U	U		-F110	1:2			+UPS1&EFS/23.7
		+MBC1-X13	U	U						+UPS1&EFS/23.7
		-X13	N	N		-X114	N			+UPS1&EFS/23.7
		+MBC1-X13	N	N						+UPS1&EFS/23.7

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Stat	Alteration	Date	Name			
				Date	03.06.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-X14
Protect 8.33 20-400-204-400

Terminal diagram

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sheet 21
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-X15

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1		-A9-A50-X8	4			+UPS1&EFS/12.6
				1		-C711				+UPS1&EFS/12.7
				2		-C712				+UPS1&EFS/12.7
		+MBC1-X15	2	2		-A9-A50-X5	5			+UPS1&EFS/12.8
		+MBC1-X15	3	3		-A9-A50-X5	6			+UPS1&EFS/12.8

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				Date	03.06.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-X15
Protect 8.33 20-400-204-400

Terminal diagram

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& EMA

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sheet 22
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS1-X120

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1	'	-F120	1:1			+UPS1&EFS/22.7
				2	'	-F121	1:1			+UPS1&EFS/22.8

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				Date	03.06.2024
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				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS1-X120
Protect 8.33 20-400-204-400

Terminal diagram

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sheet 23
sheets 23

CAE EPLAN Electric P8

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Three-phase input
Attention! Observe sequence of wires, L1, L2, L3 -->
See technical data sheet for required mains fuses

Power section rectifier

mains transformer

Note: Reinforced insulated wire
0,75 mm² unmarked wires

-L61 N=2

Measurement REC Interface -A9-A50-X2
01L1 / 12.6
01L2 / 12.6
01L3 / 12.6
Supply REC Interface -A9-A50-X3
02L1 / 11.1
02L2 / 11.1
02L3 / 11.1

-L22 -T40 -L85.1 -L85.2

-C101.1 -C101.2 -C101.3 -Q3 -Q1
L=100/85A
I=1,0kA
Icu=50kA
/12.4
/12.3
3xR6 mm²

-L23 -L24 -L25 -R23 -R24 -R25 -C23 -C24 -C25

1L1 / 2.1
1L2 / 2.1
1L3 / 2.1
2L1 / 3.1
2L2 / 3.1
2L3 / 3.1

-A80 -A81
Suppression 81 82 83
-R86 -R87 -R88
-R81 -R82 -R83
-V81.1-V81.6
-R84.1 -R84.2
90 89
-C84 -C85

-E1 -X1 U V W
-A2 EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3
-L92
-A1 EMI capacitor 4-pole 8000022634 STR

Mains
400V;3/PE~50Hz

PE busbar
-PE
Cu 40x5 mm

Rack
Rack GNYE 6 mm²
Tür links
Rack GNYE 6 mm²
Pivot plate

+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

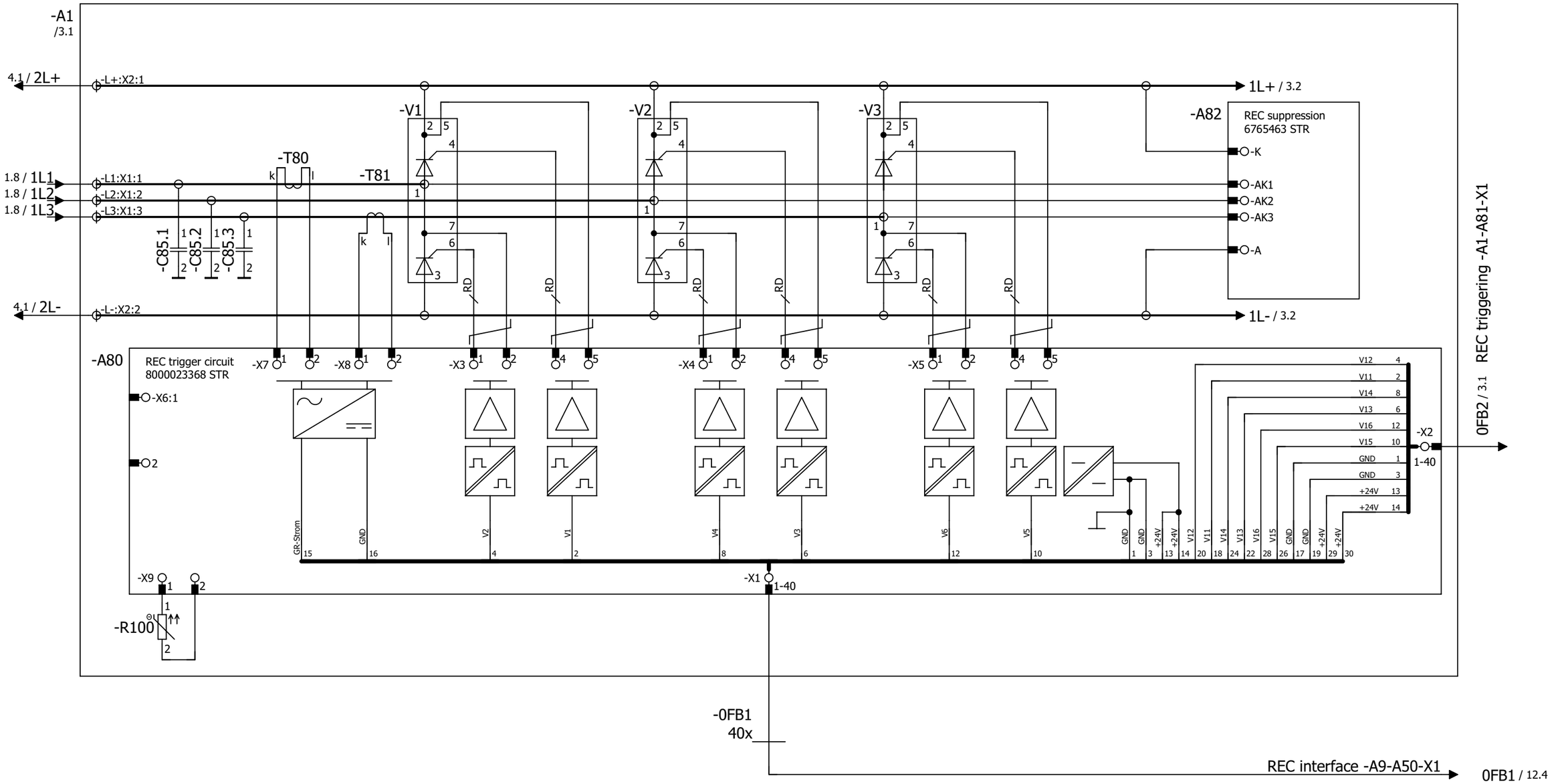
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				Date	27.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Rectifier input Protect 8.33 20-400-204-400 Circuit diagram	1000007888.080 10009759	1000007888_080 en	= + UPS2 & EFS	A3	sheet 1 sheets 23
				Editor	Beckschäfer								
				Checked	Ch.Peck								
Stat	Alteration	Date	Name	Norm									

Power section rectifier

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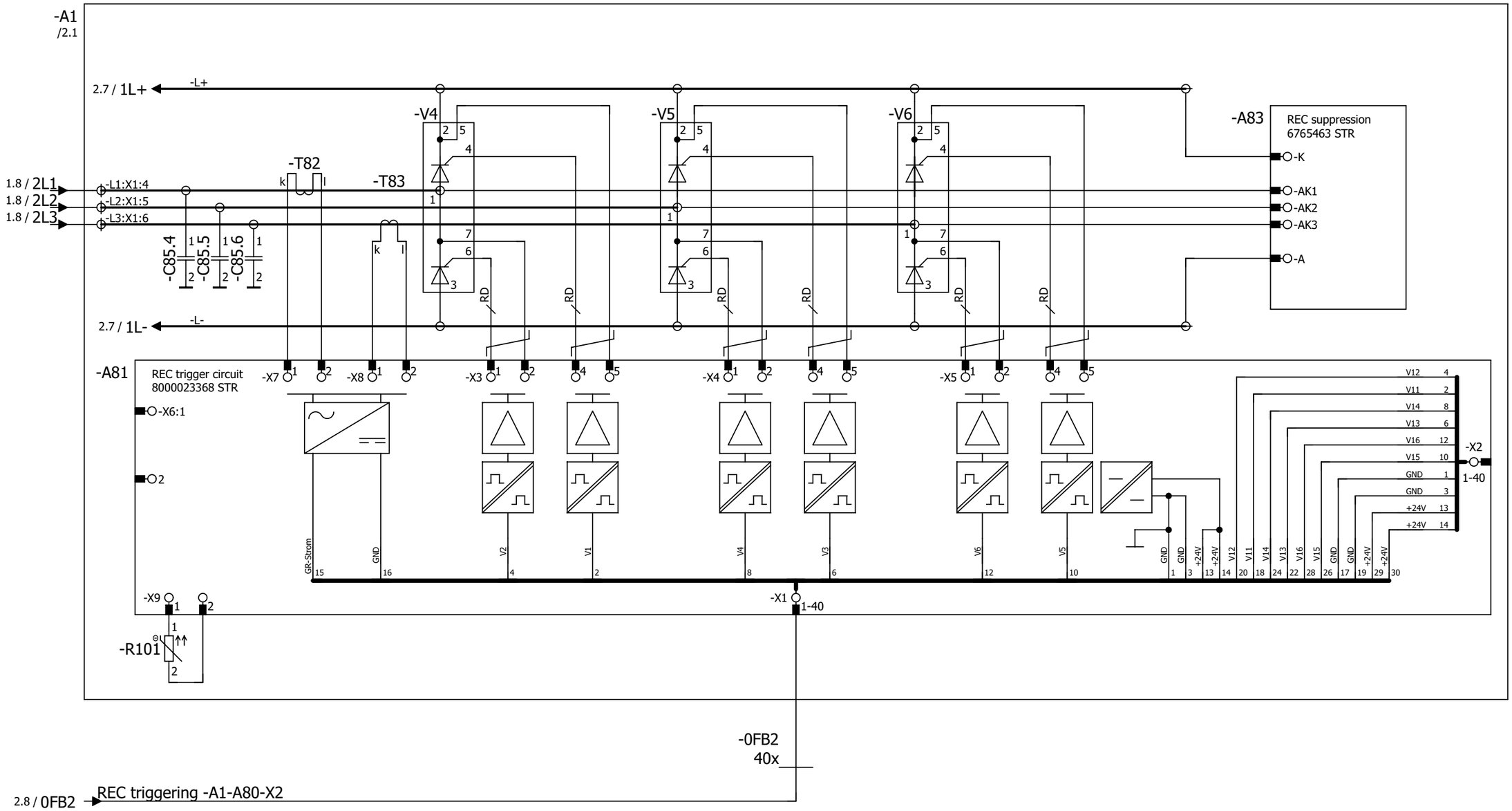
1000007888_080

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Power section rectifier

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-0FB2
40x

2.8 / 0FB2 REC triggering -A1-A80-X2

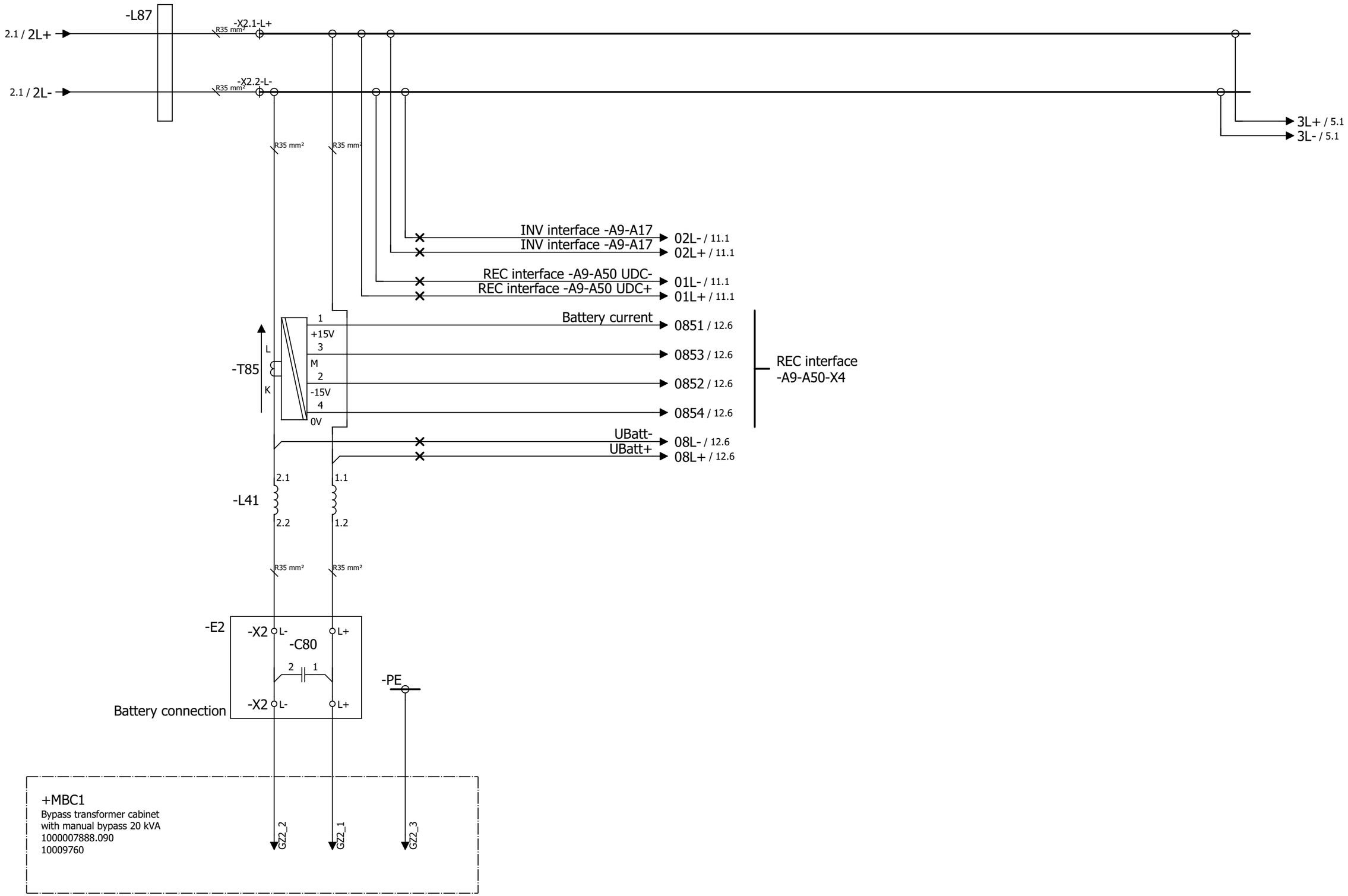
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Power section rectifier
Battery connection

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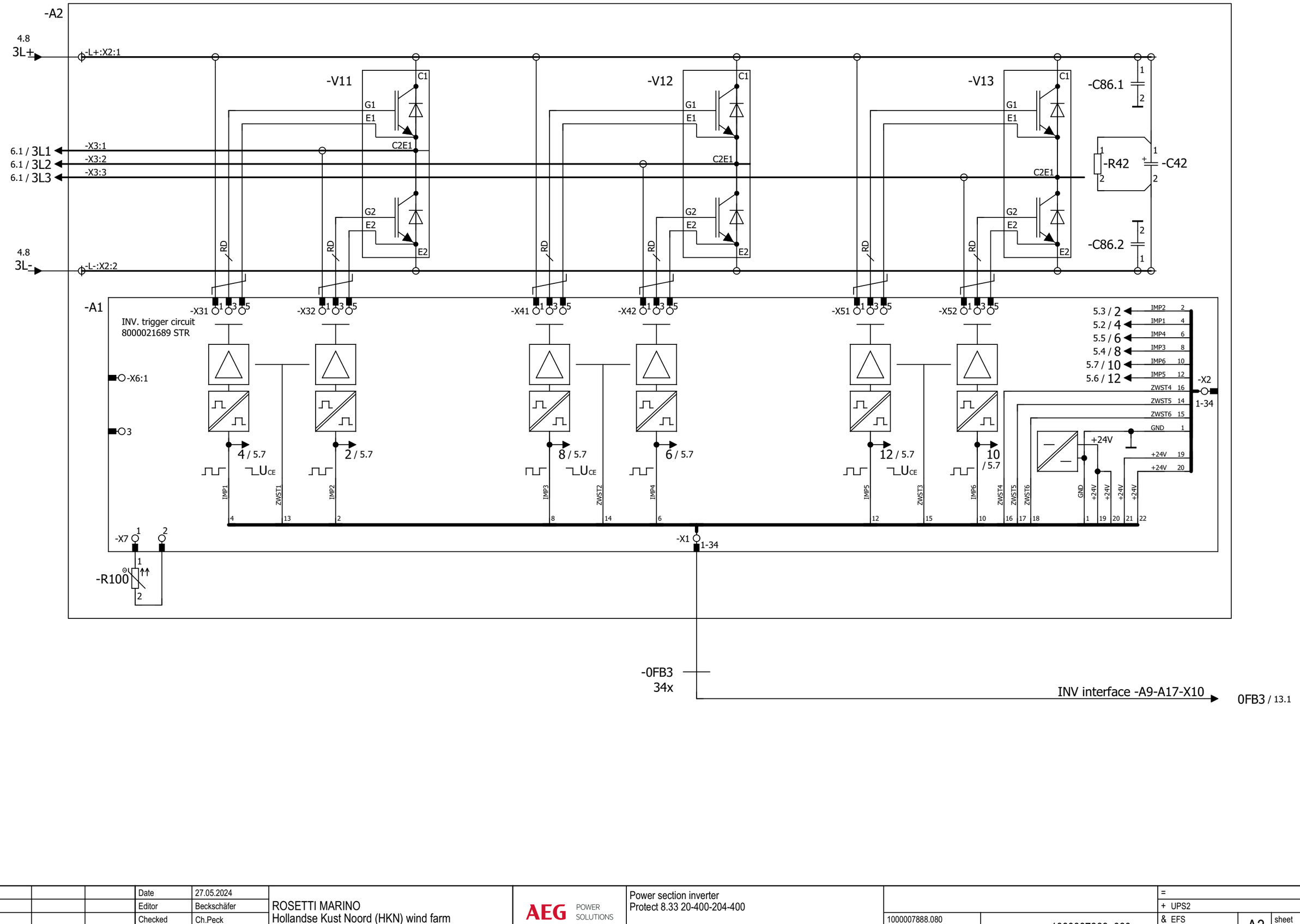
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Power section inverter



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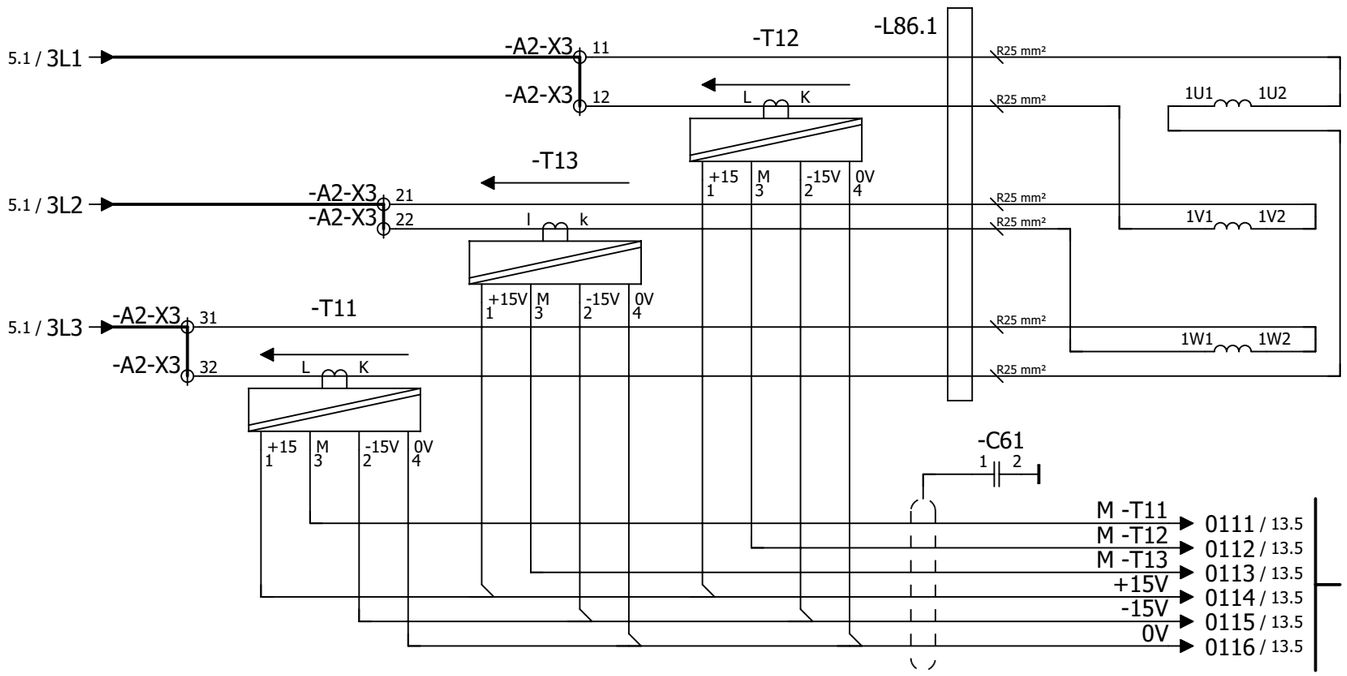
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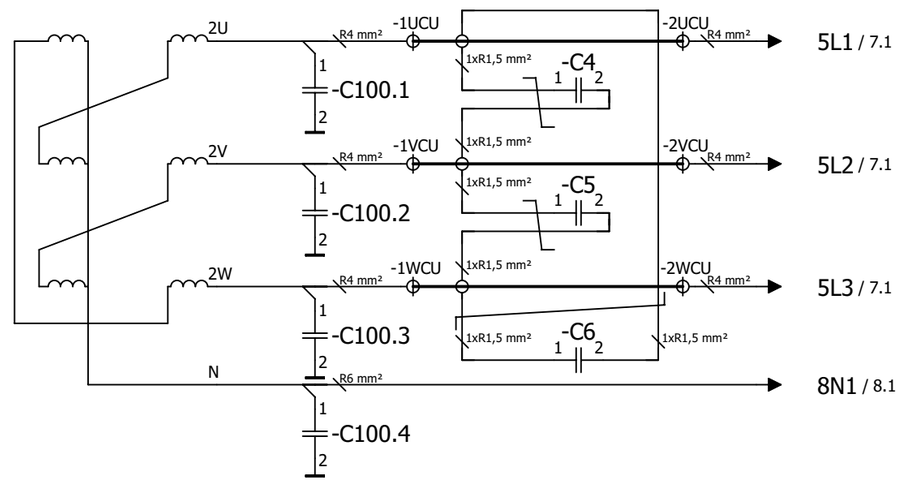
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Power section inverter

Measuring INV current dynamic



-T1



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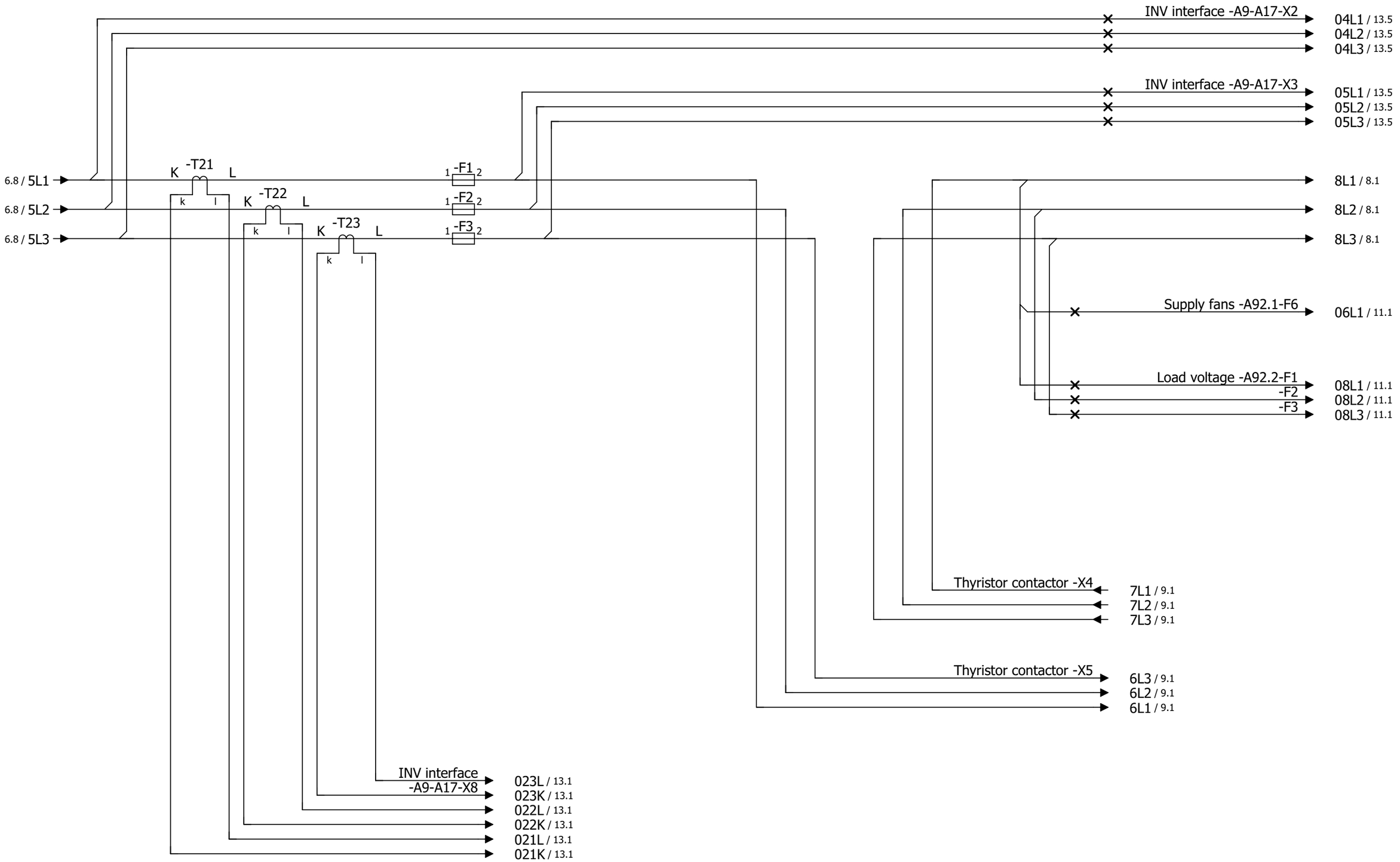
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Power section inverter

Measurement INV current static

Output fuse



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Power section inverter

Parallel preventive choke coil

7.8 / 8L1
7.8 / 8L2
7.8 / 8L3
6.8 / 8N1

-L11 -L12 -L13

R4 mm² R25 mm² 2xR35 mm²

SBS Output → 10L1 / 10.1, 10L2 / 10.1, 10L3 / 10.1

SBS Input → 9L1 / 10.1, 9L2 / 10.1, 9L3 / 10.1

-A105
-C56 -C57 -C58
-X1 -X2 -X3 -X4

fan neutral conductor → 0451N1 / 17.1

neutral conductor → 04N1 / 13.5
-A9

-E3
-X3 U V W N
-A4
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

-L93

-A3
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

Load
400V;3/N/PE~50Hz
-X3 U V W N

-PE

-E4
-X4 U V W N
-A4
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

-L94

-A3
-X4
EMI capacitor 4-pole 8000022634 STR
-C4 -C5 -C1 -C6 -C2 -C7 -C3 -C8 -C9 -C10
-X1 -X2 -X3

Mains
400V;3/N/PE~50Hz
-X4 U V W N

GZ3_1 GZ3_2 GZ3_3 GZ3_4
GZ4_1 GZ4_2 GZ4_3 GZ4_4

+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

1000007888_080

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ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Load output / SBS circuit
Protect 8.33 20-400-204-400

Circuit diagram

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Power section inverter
Inverter output contactor

-A4

-A37 SBS suppression 8000028996 STR

-A3 -K3 -AK3 -A2 -K2 -AK2 -A1 -K1 -AK1

-V31

-X4:1A
-X4:1
-X4:1K

A K AK G2 K2 K1 G1

-V33

-X4:2A
-X4:2
-X4:2K

-V35

-X4:3A
-X4:3
-X4:3K

7.7 / 7L1
7.7 / 7L2
7.7 / 7L3

RD

-X2 -X3 -X4 1 2 5 4

-A36 SBS trigger circuit 8000028563 STR

-X5:1
2

GND 1 | EUE_EIN 2 | GND 3 | GND 4 | +24V 5 | +24V 6 | 7 | 8 | 9 | 10

-X6 1 2
-X1 1-10

-R100

-0FB10
10x

-X6 5
-X6 6
-X6 3
-X6 4
-X6 1
-X6 2

7.7 / 6L3
7.7 / 6L2
7.7 / 6L1

-X5:3
-X5:2
-X5:1

INV interface -A9-A17-X1 → 0FB10 / 13.1

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Power section SBS

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-A3

SBS mains voltage -A92.2-F6 → 010L1 / 11.1
-A92.2-F7 → 010L2 / 11.1
-A92.2-F8 → 010L3 / 11.1

8.8 / 9L1 SBS mains
8.8 / 9L2 SBS mains
8.8 / 9L3 SBS mains

-A37 SBS suppression 8000028996 STR

-A3 -K3 -AK3 -A2 -K2 -AK2 -A1 -K1 -AK1

-V31
-X4:1A -X4:1 -X4:1K
A K AK
G2 K2 K1 G1

-V33
-X4:2A -X4:2 -X4:2K
A K AK
G2 K2 K1 G1

-V35
-X4:3A -X4:3 -X4:3K
A K AK
G2 K2 K1 G1

RD

-A36 SBS trigger circuit 8000028563 STR

-X2 -X3 -X4 1 2 5 4

-X5:1
2

SBS interface -A9-A16-X1 → 0FB9 / 14.3

GND 1 | EUE_EIN 2 | GND 3 | GND 4 | +24V 5 | +24V 6 | 7 | 8 | 9 | 10

-X6 1 2
-X1 1-10

-R100 1 2

-X6:5
-X6:6
-X6:3
-X6:4
-X6:1
-X6:2

8.8 / 10L3 UPS Output
8.8 / 10L2
8.8 / 10L1
-X5:3
-X5:2
-X5:1

SBS interface -A9-A16-X4 → 03151L / 14.3
-A9-A16-X4 → 03151K / 14.3
-A9-A16-X4 → 03352L / 14.3
-A9-A16-X4 → 03352K / 14.3
-A9-A16-X4 → 03553L / 14.3
-A9-A16-X4 → 03553K / 14.3

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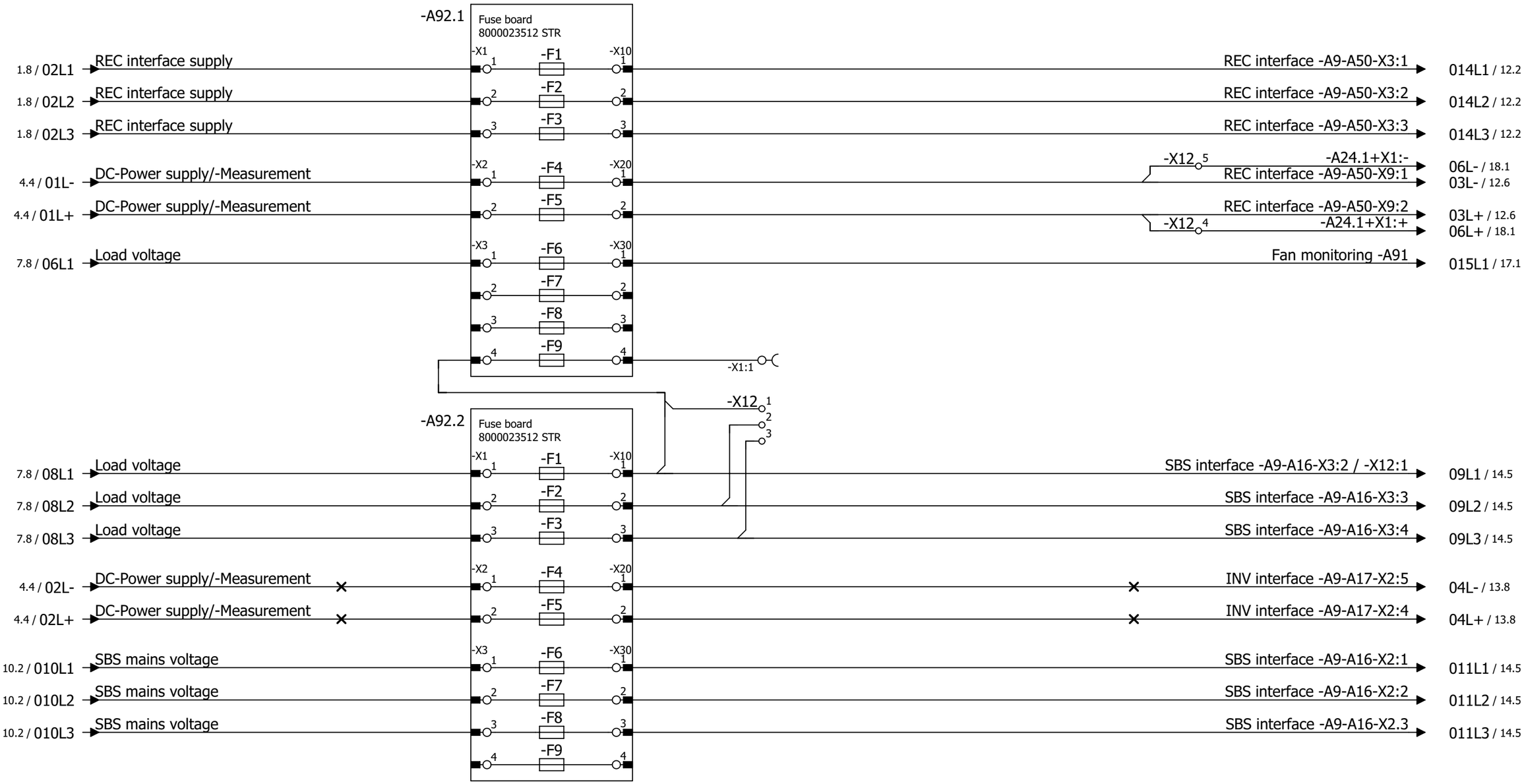
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Fuse boards

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Rectifier control

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-A9
/16.1

4.4 / 0854 Battery current transformer -T85
4.4 / 0851
4.4 / 0853
4.4 / 0852

4.4 / 08L+ UBatt+
4.4 / 08L- UBatt-

11.8 / 03L+ UIC+ A92.1-F5
11.8 / 03L- UIC- A92.1-F4

1.8 / 01L3 -Q1 REC input voltage
1.8 / 01L2
1.8 / 01L1

11.8 / 014L3 -T40 sec. supply REC
11.8 / 014L2
11.8 / 014L1

2.8 / 0FB1 REC trigger circuit -A1-A80-X1

-A50
/16.2
REC interface
8000022025 STR

-X3 1 2 3
-X5 7 8
-X1 1-40
-X2 1 3 5
-X9 1 2 3 4
-X4 2 3 1 4
-15V +15V

GND V1 GND V2 V3 V4 V5 V6 +24V +24V GND V11 GND V12 V13 V14 V15 V16 +24V +24V REC current REC current
+24V +24V
-R204 -R206
REC current stack A1
REC current stack A2

-X11 1-50
-A50X11__50x
-X12 1-50
-A50X12__50x

-A1
REC control
8000014119 STR

-X19 1 2 3 -X15 1 4 -X8 1 2 3 -X5 3 4 +24V DC -X8 5 6 -X8 4 5 6 -X5 5 6

-X130 1 2
-X12 10 11 15
-Q3
/1.4
96 98
95
-Q1 C1 C2

BK R1,5 mm²
-C711 220000µF
-C712 220000µF
BK R2,5 mm²
BK R2,5 mm²
BK R1,5 mm²
BK R1,5 mm²
0V
-X15 1 1
-X15 2 2 (+) 3 (-)
*1

GZ130_1 +MBC1/3.7
GZ130_2 +MBC1/3.7

+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

GZ15_2 +MBC1/3.4
GZ15_3 +MBC1/3.4

+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

*1 Attention! In the event of battery undervoltage < 130 V, the UPS automatically switches off battery isolator Q2.
If this happens, switch X15:3 must be switched into the open position (undervoltage trip blocked).
For restart, please refer to the chapter in the UPS operating instructions (charging the DC link capacitors).
Unlock the tripped switch Q2 by switching to open position.
After charging the DC link capacitors, switch on Q2.
Attention! When the battery voltage reaches > 200 V, switch X15:3 must be switched back to the closed position.

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Inverter control

INV current static

7.3 / 023L Transformer -T23
7.3 / 023K
7.3 / 022L Transformer -T22
7.3 / 022K
7.3 / 021L Transformer -T21
7.3 / 021K

INV. trigger circuit
-A2-A1-X1
5.8 / 0FB3

Trigger circuit
-A4-A36-X1
9.7 / 0FB10

INV current dynamic

INV output voltage reference
7.8 / 05L1
7.8 / 05L2
7.8 / 05L3
neutral conductor
8.8 / 04N1 → N → 05N1 / 14.5
INV output voltage
7.8 / 04L1
7.8 / 04L2
7.8 / 04L3

Transformer -T11...-T13
6.5 / 0116
6.5 / 0115
6.5 / 0113
6.5 / 0112
6.5 / 0111
6.5 / 0114

11.8 / 04L+ UIC+
11.8 / 04L- UIC-

-A9
/16.1

-A17
/16.3
INV interface
8000022441 STR

-X1 1-10: GND, SBS_ON, GND, GND, +24V, +24V → +24V
-X10 1-34: IMP1, IMP2, IMP5, IMP6, ZWST1, ZWST3, +24V, +24V, GND → +24V
-X4 1-6, -X8 6
-X13 2-4: -15V, +15V
-X20 4-6: +15V, -15V
-X19 4-6: +15V, -15V
-X2 1W 2V 3U 3V 4W
-X3 1N 2U
-X2 5, 4

-R203 -R205 -R207
-R204 -R206 -R208

-S201
-S202
-S203

INV current static
INV current dynamic

-X11 1-50: 48 14 13 12 17 21 23 49
-X12 1-50: 47 45 49 32 29 30 31 39 38 37 1 2
27 28 21 22 19 20 23 48 46 50

-A17X11____50x
-A17X12____50x

-A1
INV control
8000042636 STR

-X11 1-50: 48 14 13 12 17 21 23 49
-X12 1-50: 47 45 49 32 29 30 31 39 38 37 1 2
27 28 21 22 19 20 23 48 46 50

-X15 1 4
-X5 1 2 (+)
-X5 5 6 (+)
-X8 8 7
-X5 3 4 (+)
-X8 1 2

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Control SBS

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-A9
/16.1

10.4 / 03553L Transformer -T35
10.4 / 03553K
10.4 / 03352L Transformer -T33
10.4 / 03352K
10.4 / 03151L Transformer -T31
10.4 / 03151K

11.8 / 09L1 Load voltage
11.8 / 09L2
11.8 / 09L3

13.8 / 05N1 neutral conductor
-X1:3
-X12 6

11.8 / 011L1 SBS mains voltage
11.8 / 011L2
11.8 / 011L3

10.2 / 0FB9 SBS trigger circuit -A3-A36-X1

-L62

-A16
/16.4
SBS interface
8000022378 STR

-X1 1-10: 1 GND, 2 SBS_ON, 3 GND, 4 GND, 5 +24V, 6 +24V, 7, 8, 9, 10
+24V

-X4 1 2 3 4 5 6

SBS current

-X2 1U 2V 3W
-X3 1N 2U 3V 4W

-X12 12
-X8 7

-R201 -R203 -R205
-R202 -R204 -R206

7
8
5
4
9
6
-X18 1
1
-R120
2
2

15 16 26 17 21 29 30 27 45 46 35 36 33 41 42 39

-X11 1-50
-X12 1-50

-A16X11 50x
-A16X12 50x

-A1
SBS control
8000008845 STR

-X11 1-50
-X12 1-50

15 16 26 17 21 29 30 27 45 46 35 36 33 41 42 39

-X15 1 2 3 +24V 4 5

Fan control -A92.1-X6
091.11 / 17.7
091.12 / 17.7
091.13 / 17.7
091.14 / 17.7
091.15 / 17.7

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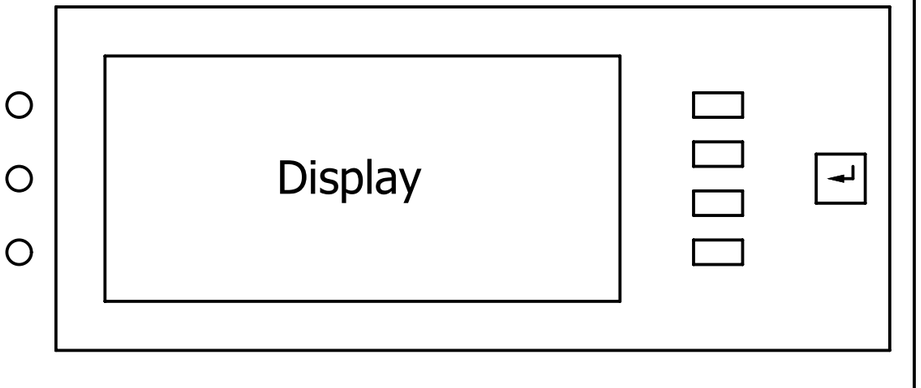
Control

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-A18
Graphic DOU

-A1-X1:1-10



-A1-X2:1-10

DOU-CAN

A / 16.1

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Control

+UPS1
Protect 8.33 20-400-204-400
1000007888.080
10009759

GZ20_3
+UPS1/16.6

GZ20_5
+UPS1/16.7

-A9
/12.1
/13.1
/14.2
/20.1
/21.1
/22.1

-A50
/12.1
REC interface
8000022025 STR

-X6 1-10
-X7 1-16

-A17
/13.1
INV interface
8000022441 STR

-X6 1-10
-X7 1-16

-A16
/14.2
SBS interface
8000022378 STR

-X6 1-10
-X7 1-16

INV
-CAN

INV
-sync

-A20
Parallel Adapter
8000023378 STR

-X3 1-3
-X4 1-3
-X5 1-4
-X6 1-2

-X1 1-16
-X2 1-16
-X11 1-10
-X12 1-10
-X13 1-10
-X14 1-10

Parallel CAN INV

Parallel CAN REC

15.8 / A

DOU-CAN

A / 20.1

O / 19.1
K / 18.1
L / 18.1

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Fan control/monitoring

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11.8 / 015L1

8.8 / 0451N1

-A91.1 Fan control 8000022841 STR

-X5 1 2 3

-R5 -C5

-S1 -S2

= 1

Logical evaluation fan fault

-X7 1 2 3 4 5

Fan speed

+24V

P2 P4 P6 P8

-R50 -R51 -R60 -R61 -R70 -R71 -R80 -R81

P1 P3 P5 P7

-R1 PTC -R2 PTC -R3 PTC -R4 PTC

-X1 -X2 -X3 -X4 2 1

-X6 1 2 3 4 5

-C31 -C32 -C33 -C34

-X91 -X92 -X93 -X94 1 2 3

N L

-M1 -M2 -M3 -M4 M 1~ PE

14.6 / 091.11

14.6 / 091.12

14.6 / 091.13

14.6 / 091.14

14.6 / 091.15

SBS interface -A9-A16-X15

1000007888_080

				Date	27.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Fan control/monitoring Protect 8.33 20-400-204-400 Circuit diagram	=
				Editor	Beckschäfer				+ UPS2
				Checked	Ch.Peck			1000007888.080 10009759	& EFS
Stat	Alteration	Date	Name	Norm				1000007888_080 en	A3 sheet 17 / sheets 23

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+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

GZ91_1
+MBC1/3.5

GZ92_1
+MBC1/3.5

-F91 1
G
F3,15A 2

-F92 1
G
F3,15A 2

11.8 / 06L+

07L+ / 19.1

-A24.1
Battery charge monitoring
BLÜ-PRO
(Option)

-X1 +
M
-
-
-
-
0 ... 5V
-X1 -
-X3 1-16
-X4 1-10

-A24.2
Battery charge monitoring
BLÜ-PRO
(Option)

-X1 +
M
-
-
-
-
0 ... 5V
-X1 -
-X3 1-16
-X4 1-10

16.8 / L

16.8 / K

11.8 / 06L-

07L- / 19.1

1000007888_080

				Date	27.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	battery charging circuit monitoring Protect 8.33 20-400-204-400	=
				Editor	Beckschäfer				+ UPS2
				Checked	Ch.Peck			1000007888.080	& EFS
Stat	Alteration	Date	Name	Norm				10009759	1000007888_080 en
								Circuit diagram	A3 sheet 18 / sheets 23

Control

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+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

GZ93_1
+MBC1/3.6

-F93 1
G
F3,15A 2

18.8 / 07L+

-A24.3
BLÜ-PRO battery charging circuit
monitoring system

-X1 +
M
-
-
-
-
0 ... 5V
-X1 -
-X3 1-16
-X4 1-10

16.8 / O

18.8 / 07L-

1000007888_080

				Date	27.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	battery charging circuit monitoring Protect 8.33 20-400-204-400		=
				Editor	Beckschäfer					+ UPS2
				Checked	Ch.Peck				1000007888.080	& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009759	1000007888_080 en

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Control

SNMP adapter
CompuWatch
Service Tools
Modbus

Modbus

-ADPT
HARD-WIRED
ADAPTER

-A9
/16.1

-A29.1

-X2 1-9
D-Sub
MultiCanCom2
MCC2

-X5 1-8
A B
RJ45

-X4 1-3

RS232
RS485

Ethernet
10/100

CAN

CAN

-X1 1-10

-X3 1-19

16.8 / A → DOU-CAN → A / 21.1

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Remote signaling

CAN Service

Configuration remote signals
see techn. data sheet

INV remote off

Common fault

Inverter operation

SBS operation

REC fault

REC mains fault

Battery low

-A9
/16.1

-A12
Remote signaling
8000062777 STR

-X6 1-10

-X5 1 2

-X4 1 2 3

-X3 1 2 3

4 5 6

7 8 9

10 11 12

-K25

-K21

-K22

-K23

-K24

-X1 1-10

-X2 1-16

20.8 / A

B / 22.1

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				Date	27.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Remote signaling Protect 8.33 20-400-204-400	=
				Editor	Beckschäfer				+ UPS2
				Checked	Ch.Peck			1000007888.080	& EFS
Stat	Alteration	Date	Name	Norm				Circuit diagram	10009759

1000007888_080 en

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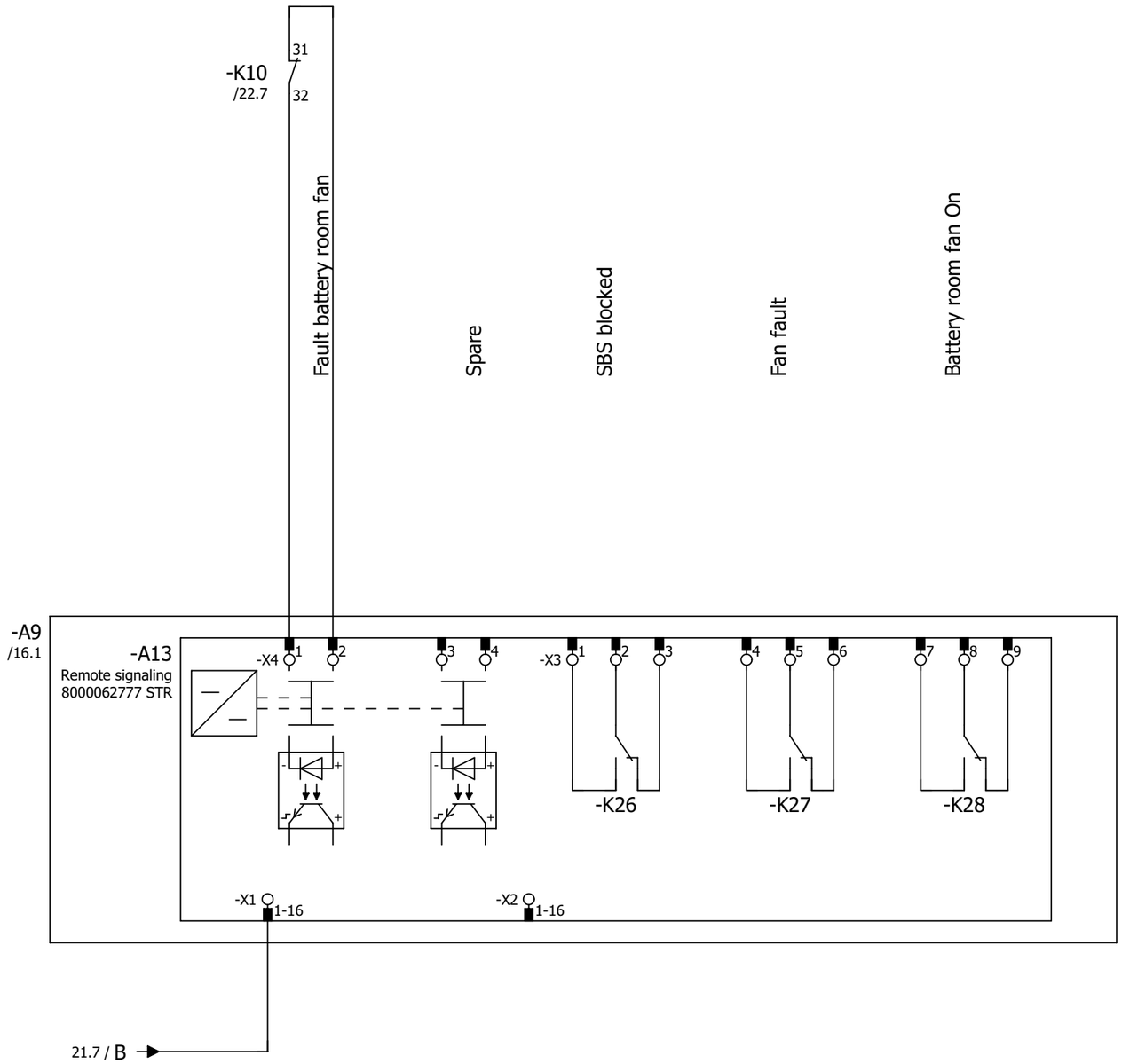
sheets 23

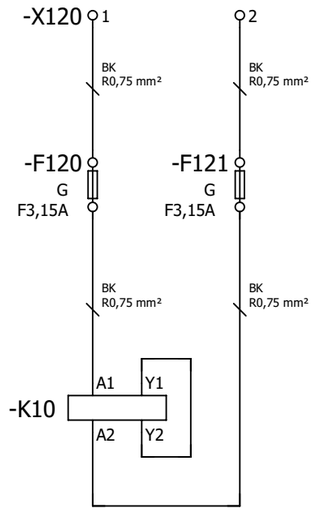
CAE EPLAN Electric P8

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Configuration remote signals
see techn. data sheet

24V DC is permanently present
in fault-free operation





PXC.2981020_PSR-SCP- 24DC/ESP4/2X1/1X2

13 — 14
23 — 24
31 — 32 /22.2

1000007888_080

				Date	28.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Remote signaling Protect 8.33 20-400-204-400 Circuit diagram	=
				Editor	Beckschäfer				+ UPS2
				Checked	Ch.Peck			1000007888.080 10009759	1000007888_080 en	& EFS	A3	sheet 22 sheets 23
Stat	Alteration	Date	Name	Norm					

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+MBC1
Bypass transformer cabinet
with manual bypass 20 kVA
1000007888.090
10009760

GZ13_1
+MBC1/11.6

GZ13_2
+MBC1/11.7

BK
R1,5 mm²

BK
R1,5 mm²

-X13 U U N N PE PE

-X14 U U N N

BK
0,75 mm²

-F100 1
G
T6,3A 2

BK
0,75 mm²

BK
0,75 mm²

BK
0,75 mm²

-F110 1
G
T6,3A 2

BK
0,75 mm²

BK
0,75 mm²

-X114 U N

L

-F85
3 2

-W100
H05VV
2x1 mm²
3 m

L N

-H1
Enclosure light

-A85
-X1 3 2

-R1

1000007888_080

				Date	27.05.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	external connection Protect 8.33 20-400-204-400 Circuit diagram			=
				Editor	Beckschäfer						+ UPS2
				Checked	Ch.Peck				1000007888.080 10009759	1000007888_080 en	& EFS
Stat	Alteration	Date	Name	Norm							A3 sheet 23 / sheets 23

Terminal diagram

terminal
=+UPS2-A9-A12-X3

Cable name / Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name / Cable type	Position / Page
			1					+UPS2&EFS/21.5
			2					+UPS2&EFS/21.5
			3					+UPS2&EFS/21.5
			4					+UPS2&EFS/21.5
			5					+UPS2&EFS/21.6
			6					+UPS2&EFS/21.6
			7					+UPS2&EFS/21.6
			8					+UPS2&EFS/21.6
			9					+UPS2&EFS/21.6
			10					+UPS2&EFS/21.7
			11					+UPS2&EFS/21.7
			12					+UPS2&EFS/21.7

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Terminal diagram

terminal

=+UPS2-A9-A12-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1						+UPS2&EFS/21.4
				2						+UPS2&EFS/21.4
				3						+UPS2&EFS/21.4

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			Date	03.06.2024	
			Editor	Beckschäfer	
			Checked	Ch.Peck	
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A9-A12-X4
Protect 8.33 20-400-204-400

Terminal diagram

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+ UPS2
& EMA

A3

sheet 2
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-A9-A12-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1						+UPS2&EFS/21.3
				2						+UPS2&EFS/21.3

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				Editor	Beckschäfer	
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				Norm		

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A9-A12-X5
Protect 8.33 20-400-204-400

Terminal diagram

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= UPS2
& EMA

A3

sheet 3
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-A9-A12-X6

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-10		-A9-A12-X1				+UPS2&EFS/21.2

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Hollandse Kust Noord (HKN) wind farm

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Terminal diagram =+UPS2-A9-A12-X6
Protect 8.33 20-400-204-400

Terminal diagram

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& EMA

A3

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sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-A9-A29.1-X2

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-9						+UPS2&EFS/20.2

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				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

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Terminal diagram =+UPS2-A9-A29.1-X2
Protect 8.33 20-400-204-400

Terminal diagram

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+ UPS2
& EMA

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sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal
=+UPS2-A9-A29.1-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-3						+UPS2&EFS/20.3

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Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A9-A29.1-X4
Protect 8.33 20-400-204-400

Terminal diagram

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sheets 23

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Terminal diagram

terminal

=+UPS2-A9-A29.1-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-8						+UPS2&EFS/20.3

Date	03.06.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS	Terminal diagram =+UPS2-A9-A29.1-X5 Protect 8.33 20-400-204-400 Terminal diagram	=
Editor	Beckschäfer				+ UPS2
Checked	Ch.Peck				& EMA
Norm				1000007888_080 en	A3
Stat / Alteration / Date / Name					sheet 7 / sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-A20-X3

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-A20-X3	1-3	1-3						+UPS2&EFS/16.6

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				Checked	Ch.Peck	
				Norm		

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A20-X3
Protect 8.33 20-400-204-400

Terminal diagram

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=
+ UPS2
& EMA

A3

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sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-A20-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-3						+UPS2&EFS/16.7

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				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A20-X4
Protect 8.33 20-400-204-400

Terminal diagram

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& EMA

A3

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sheets 23

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Terminal diagram

terminal

=+UPS2-A20-X5

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+UPS1-A20-X5	1-4	1-4						+UPS2&EFS/16.7

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Stat	Alteration	Date	Name			
				Date	03.06.2024	
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A20-X5
Protect 8.33 20-400-204-400

Terminal diagram

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=
+ UPS2
& EMA

A3

sheet 10
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-A20-X6

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1-2						+UPS2&EFS/16.7

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				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-A20-X6
Protect 8.33 20-400-204-400

Terminal diagram

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=
+ UPS2
& EMA

A3

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sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal
=+UPS2-E1-X1

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-E1-X1	U			+UPS2&EFS/1.2
						-Q1	2			
				U		-E1-X1	U			+UPS2&EFS/1.2
				V		-E1-X1	V			+UPS2&EFS/1.2
						-Q1	4			
				V		-E1-X1	V			+UPS2&EFS/1.2
				W		-E1-X1	W			+UPS2&EFS/1.2
						-Q1	6			
				W		-E1-X1	W			+UPS2&EFS/1.2

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				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-E1-X1
Protect 8.33 20-400-204-400

Terminal diagram

1000007888_080 en

=
+ UPS2
& EMA

A3

sheet 12
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal
=+UPS2-E2-X2

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				L+		-L41	1.2			+UPS2&EFS/4.3
				L+						+UPS2&EFS/4.3
				L-		-L41	2.2			+UPS2&EFS/4.2
				L-						+UPS2&EFS/4.2

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Stat	Alteration	Date	Name			
				Date	03.06.2024	
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				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-E2-X2
Protect 8.33 20-400-204-400

Terminal diagram

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+ UPS2
& EMA

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sheets 23

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Terminal diagram

terminal

=+UPS2-E3-X3

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-E3-X3	U			+UPS2&EFS/8.2
						-L11	2			
				U		-E3-X3	U			+UPS2&EFS/8.2
				V		-E3-X3	V			+UPS2&EFS/8.2
						-L12	2			
				V		-E3-X3	V			+UPS2&EFS/8.2
				W		-E3-X3	W			+UPS2&EFS/8.2
						-L13	2			
				W		-E3-X3	W			+UPS2&EFS/8.2
				N		-E3-X3	N			+UPS2&EFS/8.3
				N		-E3-X3	N			+UPS2&EFS/8.3

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				Date	03.06.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS
				Editor	Beckschäfer		
				Checked	Ch.Peck		
Stat	Alteration	Date	Name	Norm			

Terminal diagram =+UPS2-E3-X3
Protect 8.33 20-400-204-400

Terminal diagram

1000007888_080 en

=
+ UPS2
& EMA

A3

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sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-E4-X4

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				U		-E4-X4	U			+UPS2&EFS/8.6
						-A3-X4	1			
				U		-E4-X4	U			+UPS2&EFS/8.6
				V		-E4-X4	V			+UPS2&EFS/8.6
						-A3-X4	2			
				V		-E4-X4	V			+UPS2&EFS/8.6
				W		-E4-X4	W			+UPS2&EFS/8.6
						-A3-X4	3			
				W		-E4-X4	W			+UPS2&EFS/8.6
				N		-E4-X4	N			+UPS2&EFS/8.6
				N		-E4-X4	N			+UPS2&EFS/8.6

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Stat	Alteration	Date	Name				
				Date	03.06.2024	ROSETTI MARINO Hollandse Kust Noord (HKN) wind farm	AEG POWER SOLUTIONS
				Editor	Beckschäfer		
				Checked	Ch.Peck		
				Norm			

Terminal diagram =+UPS2-E4-X4
Protect 8.33 20-400-204-400

Terminal diagram

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= | + UPS2 | & EMA

A3

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CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-F120

Cable name	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Position / Page
Cable type							Cable type	
	-K10	A1	1		-X120	1		+UPS2&EFS/22.7

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				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-F120
Protect 8.33 20-400-204-400

Terminal diagram

1000007888_080 en

=
+ UPS2
& EMA

A3

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CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-F121

Cable name	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Position / Page
Cable type							Cable type	
	-K10	A2	1		-X120	2		+UPS2&EFS/22.8

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Stat	Alteration	Date	Name			
				Date	03.06.2024	
				Editor	Beckschäfer	
				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-F121
Protect 8.33 20-400-204-400

Terminal diagram

1000007888_080 en

=
+ UPS2
& EMA

A3

sheet 17
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal
=+UPS2-PE

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				PE						+UPS2&EFS/4.3
				PE						+UPS2&EFS/8.4
				PE						+UPS2&EFS/1.4

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				Date	03.06.2024
				Editor	Beckschäfer
				Checked	Ch.Peck
				Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-PE
Protect 8.33 20-400-204-400

Terminal diagram

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=
+ UPS2
& EMA

A3

sheet 18
sheets 23

CAE EPLAN Electric P8

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Terminal diagram

terminal

=+UPS2-X12

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1		-A92.1-X3	4			+UPS2&EFS/11.5
				2		-A92.2-X10	2			+UPS2&EFS/11.5
				3		-A92.2-X10	3			+UPS2&EFS/11.5
		-A24.1-X1	+	4	'	-A92.1-X20	2			+UPS2&EFS/11.7
		-A24.1-X1	-	5	'	-A92.1-X20	1			+UPS2&EFS/11.7
				6		-CU	N			+UPS2&EFS/14.7
				7		-A9-A16-X8	5			+UPS2&EFS/14.2
				8		-A9-A16-X8	4			+UPS2&EFS/14.2
				9		-A9-A16-X8	6			+UPS2&EFS/14.2
				10		-A9-A50-X8	1			+UPS2&EFS/12.3
				11		-A9-A50-X8	2			+UPS2&EFS/12.3
						-Q3	96			
				12		-A9-A16-X8	7			+UPS2&EFS/14.2
				15		-A9-A50-X8	3			+UPS2&EFS/12.3
						-Q3	95			

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				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-X12
Protect 8.33 20-400-204-400

Terminal diagram

1000007888_080 en

=
+ UPS2
& EMA

A3

sheet 19
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-X13

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		+MBC1-X14	U	U		-F100	1:2			+UPS2&EFS/23.2
		-X14	U	U						+UPS2&EFS/23.2
		+MBC1-X14	N	N		-A85-X1	2			+UPS2&EFS/23.3
		-X14	N	N						+UPS2&EFS/23.3
				PE						+UPS2&EFS/23.3
				PE						+UPS2&EFS/23.3

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				Editor	Beckschäfer
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Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-X13
Protect 8.33 20-400-204-400

Terminal diagram

1000007888_080 en

=
+ UPS2
& EMA

A3

sheet 20
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-X14

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
		-X13	U	U		-F110	1:2			+UPS2&EFS/23.6
				U						+UPS2&EFS/23.6
		-X13	N	N		-X114	N			+UPS2&EFS/23.7
				N						+UPS2&EFS/23.7

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				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-X14
Protect 8.33 20-400-204-400

Terminal diagram

1000007888_080 en

=
+ UPS2
& EMA

A3

sheet 21
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-X15

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1		-A9-A50-X8	4			+UPS2&EFS/12.6
				1		-C711				+UPS2&EFS/12.7
				2		-C712				+UPS2&EFS/12.7
		+MBC1-X15	6	2		-A9-A50-X5	5			+UPS2&EFS/12.8
		+MBC1-X15	7	3		-A9-A50-X5	6			+UPS2&EFS/12.8

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			Date	03.06.2024	
			Editor	Beckschäfer	
			Checked	Ch.Peck	
Stat	Alteration	Date	Name	Norm	

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-X15
Protect 8.33 20-400-204-400

Terminal diagram

1000007888_080 en

=
+ UPS2
& EMA

A3

sheet 22
sheets 23

CAE EPLAN Electric P8

Terminal diagram

terminal

=+UPS2-X120

Cable name	Cable type	Destination mark External	Connection	Terminal	Bridge	Destination mark Internal	Connection	Cable name	Cable type	Position / Page
				1	'	-F120	1:1			+UPS2&EFS/22.7
				2	'	-F121	1:1			+UPS2&EFS/22.8

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				Checked	Ch.Peck	
				Norm		

ROSETTI MARINO
Hollandse Kust Noord (HKN) wind farm

AEG POWER SOLUTIONS

Terminal diagram =+UPS2-X120
Protect 8.33 20-400-204-400

Terminal diagram

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& EMA

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sheet 23
sheets 23

Base Load Power Hub (BLPH)

AC UPS F&G - TAG: UP-200F4
EQUIPMENTS LIST & BILL OF MATERIAL

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Position	Mat.-No.	Quantity	Description
A2-C86.1 A2-C86.2 A9-A17-C303 A9-A17-C304	40000055 old: 0015709	7	Capa 0,01µF 20% 250VAC R15 UL
A1-C85.1 A1-C85.2 A1-C85.3 A1-C85.4 A1-C85.5 A1-C85.6	40000065 old: 8000011087	7	Kond Y2 0,047µF 300VAC RM20,3 UL
A105-A105	20001913 old: 8000016184	1	261 SBS Voltage matching 3ph.
A10-K7	40000468 old: 8000032332	1	Auxiliary switch CAL4-11 f.AF09-AF96 KTA
A10-K7	40003242 old: 8000043376	1	TP-Contactor AF26-30-00-11 24-60VUC
A10-T21-T23	40000340 old: 0047690	3	Transformer through WSW 60/0,06 A
A11-C101	40007994 old: 0015558	3	CAPA 0,47µF 440VAC/600VDC GPF axial
A11-Q1	40000469 old: 8000044745	1	Disconnector XT1D160 3-pol. 160A
A11-Q1	40000471 old: 8000044747	1	Shunt opening release 24-30VUC f.XT1-XT4
A18-A18	40000227 old: 8000024183	1	Graphic-DOU 2B
A1-A80 A1-A81	20001090 old: 8000023368	2	261 Rectifier-Trigger
A1-A82 A1-A83	20001091 old: 8000025394	2	261 PCB Rectifier/SBS Snubber
A1-R100 A1-R101 A2-R100 A3-R100 A4-R100	40000389 old: 8000001495	5	Temperature Sensor 10 kOHM NTC KTA
A1-T80 A1-T81 A1-T82 A1-T83	40000166 old: 0016902	4	Current transf. WSW150 150/0,1A KTA/UL

Position	Mat.-No.	Quantity	Description
A1-V1 A1-V2 A1-V3 A1-V4 A1-V5 A1-V6 A3-V31 A3-V33 A3-V35 A4-V31 A4-V33 A4-V35	40000388 old: 8000001373	12	TT-MODULE 92 N 16 KOF UL
A20-A20	20000244 old: 8000023378	1	261 parallel adapter - P8
A24.1-A24.x A24.2-A24.x A24.3-A24.x	20000414 old: 8000057818	3	261 BLÜ-PRO 110 - 480V (Assembly)
A24.1-F9x A24.2-F9x A24.3-F9x F120 F121	40008113 old: 0014094	5	Fuse 6,3x32 F 3,15 440V
A2-A1	20000234 old: 8000021689	1	261 Trigger circuit-3ph. P8
A2-C42	40000418 old: 8000022371	3	CAPA AL 6000µF 315VDC77x105 M12 KTA
A2-R42 ETHDI-R23 ETHDI-R24 ETHDI-R25	40000363 old: 05507	6	resistor 47K 5% DC 9X38 UL KTA
A2-V11 A2-V12 A2-V13	40008776 old: 8000014872	3	TRANSISTOR IGBT 200A 600V
A3-A36 A4-A36	20001092 old: 8000028563	2	261 SBS-trigger circuit 3p NPP
A3-A37 A4-A37	20000289 old: 8000028996	2	261 SBS Snubber 3-Ph.
A6-E1	20000255 old: 8000024856	1	EMC-Filter E1 P8 3-pole 350A o. N
A6-E1-L92 L86.1	40000182 old: 0047828	5	Toroidal core 61X 40X 18 5400nH KTA/UL
A6-E2	20000204 old: 8000018882	1	EMC-Filter E2 P8 2-pol. 400A f. middelr.
A6-E3 A6-E4	20000287 old: 8000028669	2	EMC-Filter E3/E4 P8.33 4-pole 350A w/N
A80-A8x A81-A8x	20000495 old: 8104070	2	261 suppression 500V 6P UL
A80-C8x A81-C8x	40006967 old: 05318	2	CAPA 4µF850VDC HSF30x85/97 6,3x0,8 M8
A85-A85	40020098	1	Heater 100W 110-250VAC/DC 50/60Hz NPP

Position	Mat.-No.	Quantity	Description
A85-F100 H1-F110	40007171 old: 0048663	2	G-fuse link 6,3x32 M/T 6,3 A 500VAC
A85-F85	40007478 old: 0027233	1	Thermostat 10°C up to 60°C
A8-A91.1	20000243 old: 8000022841	1	261 Fan Control - P8
A8-A92.1+2	20000245 old: 8000023512	2	261 Fuseboard - P8 KTA
A8-A92.1-F1 A8-A92.1-F2 A8-A92.1-F3 A8-A92.2-F1 A8-A92.2-F2 A8-A92.2-F3 A8-A92.2-F6 A8-A92.2-F7 A8-A92.2-F8	40000167 old: 0017037	9	Fuse 6,3X32 F 5 A 500VAC
A8-A92.1-F4 A8-A92.1-F5 A8-A92.2-F4 A8-A92.2-F5	40000185 old: 0050038	4	G-fuse 6,3X32 F 4 A 440 V KTA/UL
A8-A92.1-F6	40003889 old: 8000030370	1	Fuse 6,3X32 T 8 A 500 VAC KTA
A8-A92.1-F9	40007485 old: 0027059	1	G-fuse link 6,3x32 M 2 A 500V
A8-M1-M4	40000171 old: 0028612	4	Fan 230VAC 50/60Hz W2S130-AA03-21 UL
A9-A12	20000440 old: 8000062777	1	261 Remote Signalling 2 4xPanel
A9-A16	20000239 old: 8000022378	1	261 SBS Interface P8 3-Phase
A9-A16-A1	20004879 old: 8000066264	1	261 SBS ControllerBoard STM32 V2018
A9-A17	20000240 old: 8000022441	1	261 Inverter Interface P8 3-Phase
A9-A17-A1	20004877 old: 8000066260	1	261 Inv. ControllerBoard STM32 V2018
A9-A29.1	20004850 old: 8000065585	1	261 Multi CAN-Communication 2 *4xPanel*
A9-A50	20000235 old: 8000022025	1	261 Rectifier Interface P8
A9-A50-A1	20004878 old: 8000066262	1	261 Rec. ControllerBoard STM32 V2018
C100.1 C100.2 C100.3 C100.4	40000168 old: 0018271	4	CAPA 2µF 440VAC/600VDC FAPB 40X50 M8 KTA
C4-C6	40000170 old: 0022847	3	Capa 57 µF -5..+15% 440VAC M12

Position	Mat.-No.	Quantity	Description
ETHDI-C23 ETHDI-C24 ETHDI-C25	40007583 old: 0023326	3	CAPA 32 µF -5..+10 % 525 VAC
ETHDI-L22 (S10)	40011044 old: 8000061064	1	Choke TP 4,7kVA
ETHDI-L23 ETHDI-L24 ETHDI-L25	40011043 old: 8000061063	3	922 Choke P040/550Hz/2,62mH
ETHDI-Q3	40004801 old: 8000020429	1	Circuit breaker 3-pole 25A S203 C25
ETHDI-Q3	40005215 old: 8000015407	1	Signal cont. /auxil. ABB S200 1cha. over
ExBatterySensor	40013096 old: 8000062749	1	EX d Temperature Sensor NTC10k
F1 F2 F3	20001818 old: 1000001480	3	Option UPS output fuse 40A-C2
H1-H1	40002071 old: 8000062885	1	Magnet cubicle light 100-240V 50-60Hz 4W
K10	40013233 old: 8000068651	1	Relay PSR-SCP- 24DC/ESP4/2X1/1X2
L11 L12 L13	40000856 old: 9096650	3	AC-parallelchoke 30A LV6007
L41	40010349 old: 8000022102	1	DC-choke L41 P8.31/20-216
L85.1 L85.2 L87.1 L87.2	40000176 old: 0047653	4	Toro. core 42X26X25 10000nH
Q1MCCB	40002120 old: 8000062259	1	CB XT1S160 3P 100A TMD #067434
T1	40004031 old: 8000028382	1	910 Transf. 3~ T1 P8.33/020-216-400
T11 T12 T13	40010348 old: 0047198	3	Current transformer HTA-100S
T40	40013398 old: 8000070910	1	TP-transf. T40 P8.31/040-400-216 VE
T85	40000175 old: 0047197	1	Current transducer HTA-200S
Trip Battery MCCB- C711,C712	40000213 old: 8000008820	2	CAPA AL220000µF 25VDC M12 Stud

AEG POWER SOLUTIONS	**Parts list** Bypass Trans. Cabinet 20kVA 400/400V	BY-200F4 DP-200F4	Rev. 02 Page 1 of 1

Position	Mat.-No.	Quantity	Description
A85	40020098	1	Heater 100W 110-250VAC/DC 50/60Hz NPP
F100,F110	40007024 old: 0087200	2	terminal fuse UK 6,3-HESI 6,3x32 10A
F100,F110	40007171 old: 0048663	2	G-fuse link 6,3x32 M/T 6,3 A 500VAC
F24	40000167 old: 0017037	1	Fuse 6,3X32 F 5 A 500VAC
F24	40005363 old: 8000013962	1	Terminal fuse UK 10-DREHSI 6,3x32 10A
F25	40020351	1	lightning current arrestor VPU I3 R 400V
F85	40007478 old: 0027233	1	Thermostat 10°C up to 60°C
H1	40002071 old: 8000062885	1	Magnet cubicle light 100-240V 50-60Hz 4W
K1	40005511 old: 8000011691	1	Relay PLC 230VUC 1W 6mm NR2966207
Q10	40002121 old: 8000062258	1	CB XT1S160 3P 50A TMD #067431
Q28.1,Q28.2,Q71,Q72	40002052 old: 8000063609	4	Fuse ld. sw. 3 pole size NH00 160 A KETO
Q28.1,Q28.2,Q71,Q72	40012684 old: 8000069685	12	KNIFE LINK NH00 250A NPP
Q29	40014823 old: 8000019447	1	3-P.CHANGE-OVER SWITCH NO ZERO POS. C 80
QF31...QF35	40021028	5	RCBO 1P+N 16A B 300mA 10kA DS201A
QF31...QF38	40005215 old: 8000015407	8	Signal cont. /auxil. ABB S200 1cha. over
QF36...QF38	40004921 old: 8000019136	3	Circuit breaker 2-pole 10A S202 B10
T8	40012612 old: 8000067110	1	TP-Isol.-Transf. 415/415V 20kVA ±5%

27.08.2024 **Schrewe**			

Base Load Power Hub (BLPH)

DC UPS - BATTERY LAYOUT AND INTERCONNECTION DIAGRAM

umber: 1724000372-EL-DG-00010

Document Class: 2

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	27/02/2025

Rev.	Date	Description	Prepared	Reviewed	Approved
06	27/02/2025	As Built (ASB)	DA	DA	AD
05	17/12/2024	As Built (ASB)	DA	DA	AD
04	05/10/2024	Accepted for Construction (AFC)	DA	DA	AD
03	04/08/2024	Accepted for Construction (AFC)	DA	DA	AD
02	01/06/2024	Accepted for Construction (AFC)	DA	DA	AD
01	15/05/2024	Accepted for Construction (AFC)	DA	DA	AD
00	21/04/2024	Issue for Review (IFR)	DA	DA	AD

3W power | a company of AEG POWER SOLUTIONS

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)
04	Accepted for Construction (AFC)
05	As Built (ASB)
06	As Built (ASB)

HOLDS LIST

No.	Description
1	
2	
3	
4	

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Description — Sheet

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REVISION / CHANGE LOG 2

HOLDS LIST 2

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DC UPS - TAG: UP-200F1 - BATTERY PROTECTION BOX 7

DC UPS - TAG: UP-200F1 - BLACK START PROCEDURE 10

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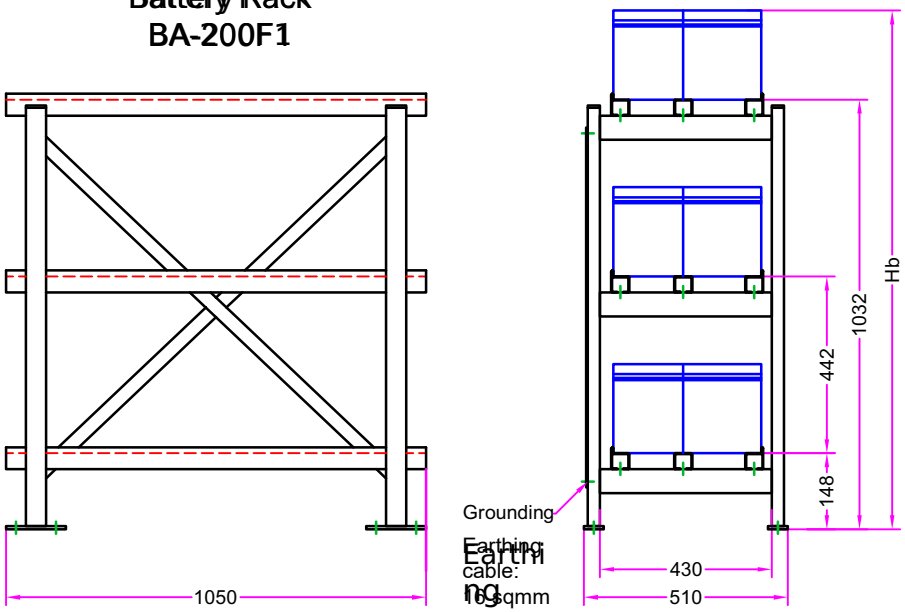
Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1

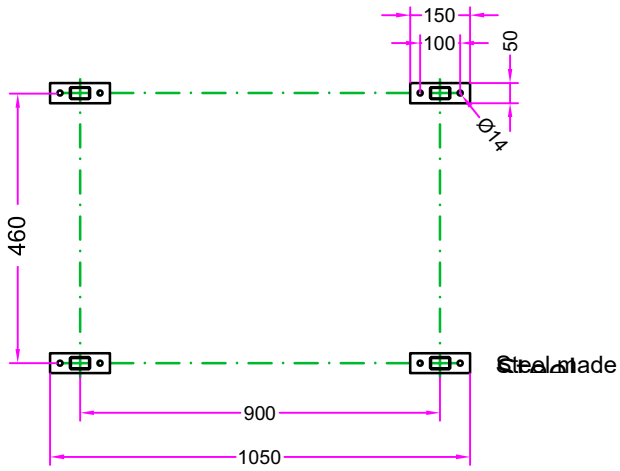
BATTERY LAYOUT AND INTERCONNECTION DIAGRAM

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Battery Rack
BA-200F1



Foot-Print:



Steel made

Rack weight : 44,4 kg
Battery weight : 475,0 kg
Total weight : 519,4 kg

Material:	S235 JR EN 10025 (St-37-2)
Coating:	Plastic Coated
Tolerance:	DIN ISO 2768 "C"
Battery:	

Date	Name	Checked
16/24	Riedel	St.Selig

Scale: none

Execution: Rack, Standard

Drawing-/Article No: 3L2115

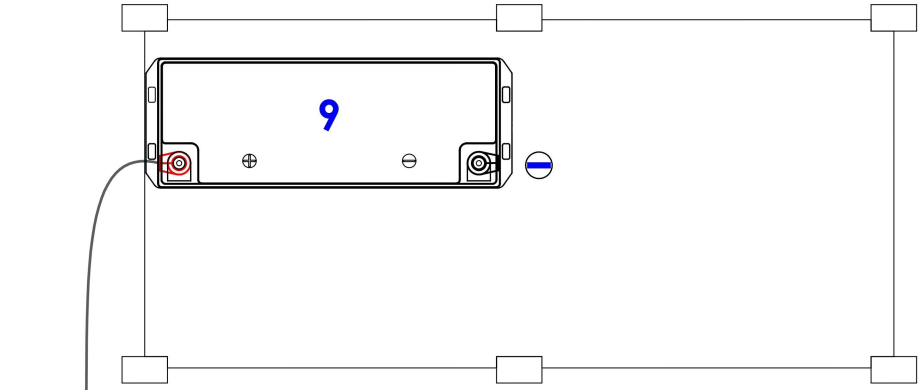
Rev: 00

Type: 3E-PGL 2-11 with FIX002

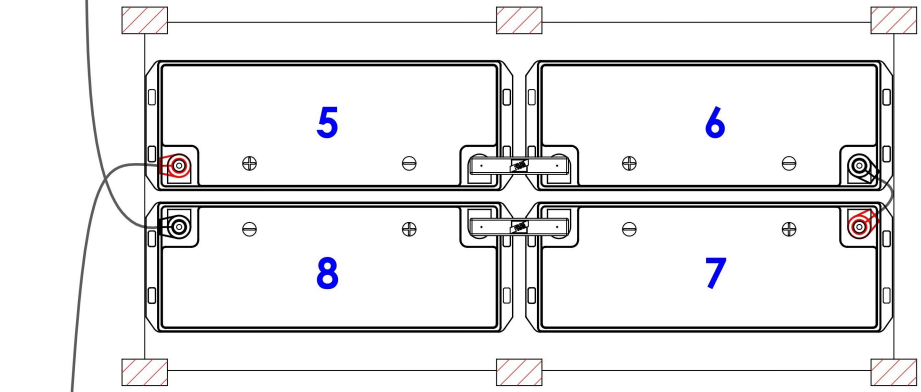
Production Details:

Welding execution according to

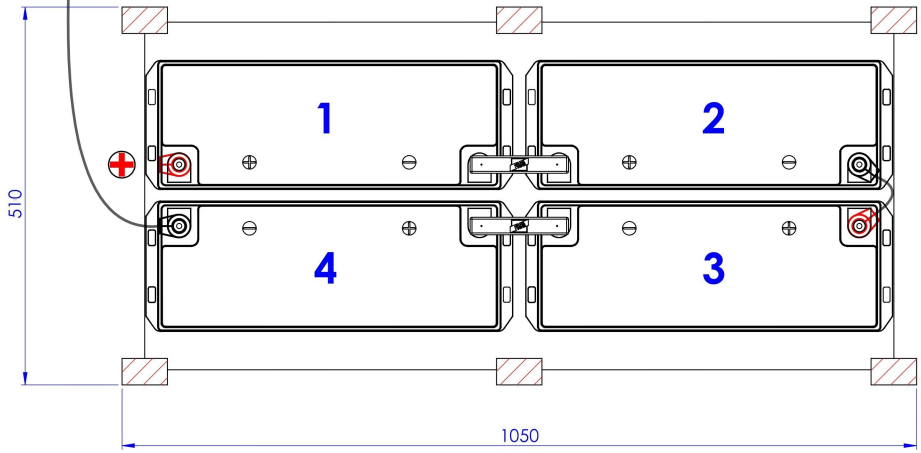
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Tier 3

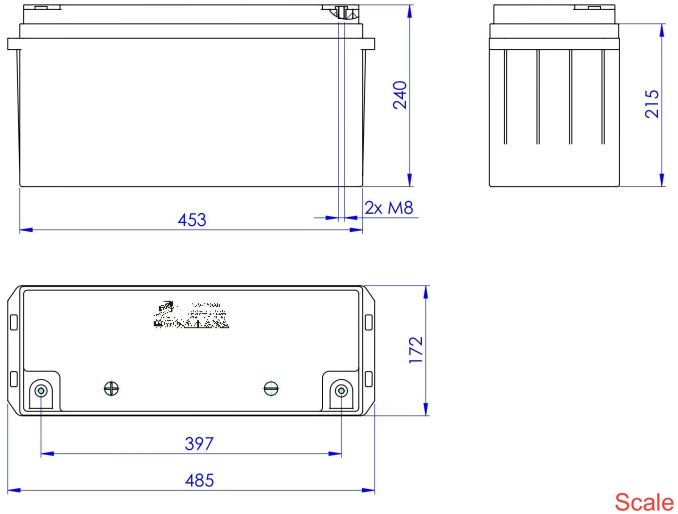


Tier 2



Tier 1

Battery block : FLG12-150



Scale 1:5

BILL OF MATERIALS	CODE	WEIGHT (kg)	Q.TY
CELL FLG 12-150	11000495	47,50	9
COPPER TIN STRIP FLL-FHP serie	41000222	0,04	4
CONNECTION AND AGM COVER CENTER DISTANCE 100	41000251	0,01	4
CELLS CONNECTION CABLE 50 mm	21000191	0,5	4 m
CABLE LUG F8 X 50	41005167	0,3	10
CABLE LUG COVER BLACK 50040	41000243	0,008	5
CABLE LUG COVER RED 50039	41000244	0,008	5

NOTE:

n.1 Battery block FLG 12-150
is supplied as spare part

TOLLERANZE GENERALI/GENERAL ALLOWANCES: NORMA UNI EN 22768-mk		TOTAL BATCH WEIGHT: 475.24 kg	PROGETTISTA/DESIGNER: P. VECCHIARELLI
NORMA UNI ISO 1302		TARE PLASTICS WEIGHT: 47.50 kg	DISEGNATO/DRAWN: P. VECCHIARELLI
NORMA UNI ISO 1101	10 FLG12-150		CONTROLLATO/CHECKED: F. PAGLIARINI
SCALA/SCALE: 1:5	FORMATO/SHEET SIZE: A2	CODICE BAT.TA/ASSY. BAT. CODE: 11000495	DATA/DATE: 10/04/2024
DESCRIZIONE/DESCRIPTION:			FILE - DISEGNO/FILE - DRAWING: layout
			FOGLIO/SHEET: 1

FAAM

1724000372-EL-DG-00010

DC UPS 10kW - 9 x FLG 12-150

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Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1

BATTERY PROTECTION BOX

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MODEL C-225 REV.1

GENERAL NOTES:

-ENCLOSURE: EJBC-5
-MATERIAL: COPPER FREE ALUMINIUM ALLOY
-EXTERNAL PAINTING: RAL7035
-INTERNAL PAINTING: /
-ALL DIMENSION ARE IN mm
-WEIGHT: ≈55kg

BATTERY PROTECTION BOX

CB-200F1

SELECTOR SWITCHES DETAIL



TRUE TABLE

POSITION	CONTACT	
	1-2	3-4
OFF	O	O
ON	X	X

O	CONTACT OPEN
X	CONTACT CLOSED

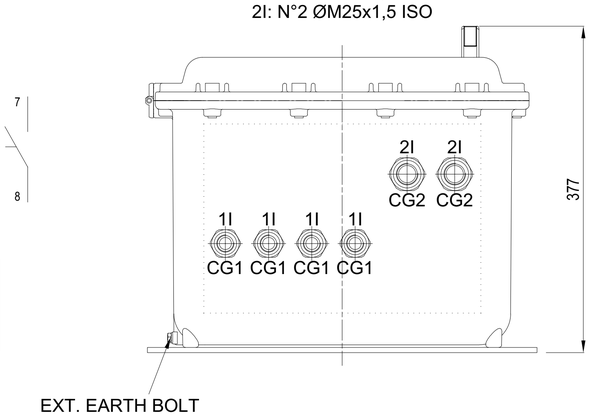
TRUE TABLE

POSITION	CONTACT			
	1-2	3-4	5-6	7-8
NORMAL	X	O	X	O
OVERRIDE	O	X	O	X

O	CONTACT OPEN
X	CONTACT CLOSED

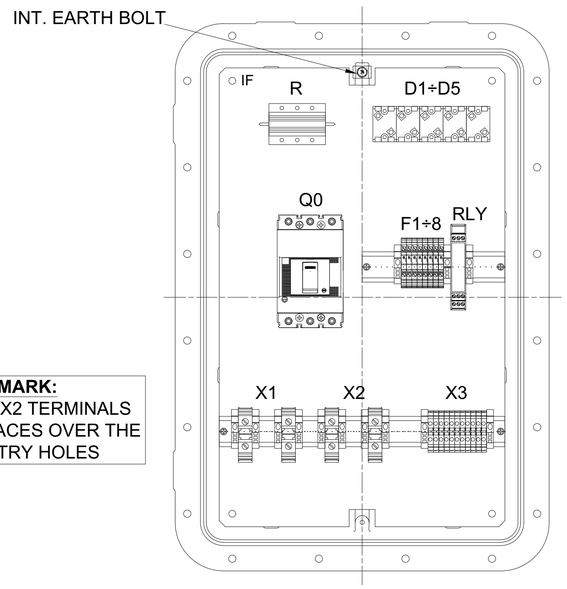
BOTTOM VIEW

1I: N°4 ØM20x1,5 ISO
2I: N°2 ØM25x1,5 ISO



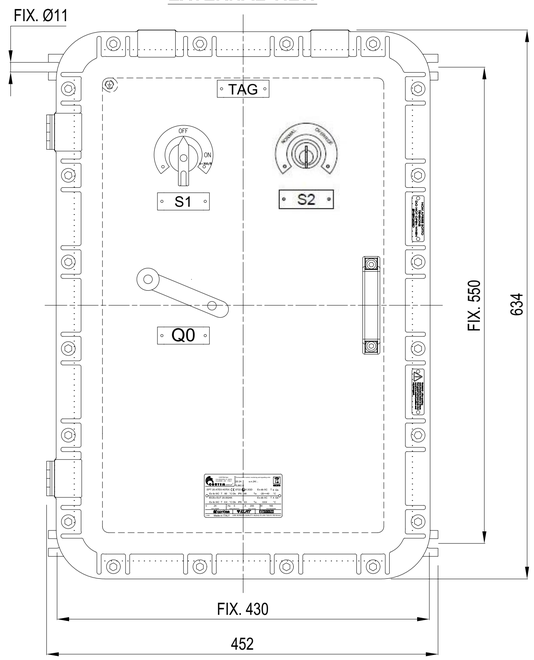
N°	Q.TY	CODE	DESCRIPTION
IF	1	BFE-5	ALUMINIUM INTERNAL FRAME
X1	2	UT35	PHOENIX TERMINALS SUITABLE FOR 35mm^2 CABLE
X2	2	UT35	PHOENIX TERMINALS SUITABLE FOR 35mm^2 CABLE
X3	11	UT4	PHOENIX TERMINALS SUITABLE FOR 4mm^2 CABLE
Q0	1	XT1B125TMD3	ABB XT1 MCCB, 3P, 125A, 18kA
	1	1SDA066399R1	220-240Vac/dc UNDERVOLTAGE RELEASE COIL
	2	1SDA066423R1	2NO AS PER TBE AUX CONTACTS FREE VOLTAGE
	1	M-0439/V1 + M-1044	PADLOCKABLE EXTERNAL HANDLE
F1,F2	2	UT4-HESI	PHOENIX FUSE HOLDER TERMINALS SUITABLE FOR 4mm^2 CABLE WITH 4A FUSE
	2	FUS5X20/4	
F3÷F8	6	UT4-HESI	PHOENIX FUSE HOLDER TERMINALS SUITABLE FOR 4mm^2 CABLE WITH 2,5A FUSE
	6	FUS5X20/2,5	
RLY	1	PHO2986575	PHOENIX SECURITY RELAY, 24Vcc, 3 EXCHANGE CONTACTS
R	1	RS1752429	47Ω RESISTOR, 95W, NOT ADJUSTABLE
D1÷D5	5	RS3959141	40A, 1000V, DIODES
S1	1	A2-10E/R	SELECTOR SWITCH, 2P, 16A, SCHEME I "OFF-ON"
	1	M-0553	EXTERNAL HANDLE
S2	1	WS2-10E/R	SELECTOR SWITCH, 4P, 16A, SCHEME 2Z "NORMAL-OVERRIDE"
	1	M-093/CF	KEY LOCK EXTERNAL HANDLE
CG1	4	NEV20IB	NICKEL PLATED BRASS CABLE GLANDS ØM20 FOR ARMORED CABLE Øint. 6,5-14mm Øext. 12,5-21mm, ARMOR THICKNESS 0,2-1,4mm
CG2	2	NAV25IB	NICKEL PLATED BRASS CABLE GLANDS ØM25 FOR NOT-ARMORED CABLE Ø11-20mm

INTERNAL VIEW

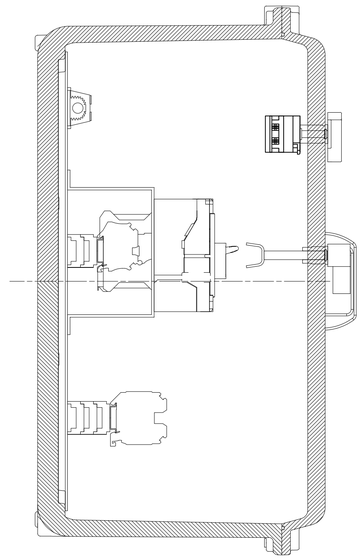


REMARK:
X1/X2 TERMINALS PLACES OVER THE ENTRY HOLES

EXTERNAL VIEW



INT. LEFT SIDE VIEW



CERTIFICATE NAMEPLATE

CORTEM SpA
VIA AQUILEIA,10 34070
VILLESSE - GO ITALY
CORTEM GROUP
Enclosures for control, monitoring and signalling units:
20 24 s.n.24/...
EJBC-5
EPT 20 ATEX 4075X 0722 II 2GD Ex db IIC T 6 Gb
Ex tb IIIC T 85 °C Db IP6 66 Ta -20÷+40 °C
IECEx EUT 20.0024X Ex db IIC T X Gb
Ex tb IIIC T XX °C Db IP6 XX Ta XXX °C
V 240 max voltage | Hz 0 rated frequency | A 125 max current | W 160 max dissipated
U-606 Made in ITALY USE SCREWS QUALITY A2(A4)-70 UNI 7323 R 700 N/mm²

TAG NAMEPLATE

MATERIAL: TRAPHOLITE
DIMENSIONS: 60X20
BLACK TEXT ON WHITE BACKGROUND

N°	TAG N°
TAG	CB-200F1
S1	S1
S2	S2
Q0	Q0

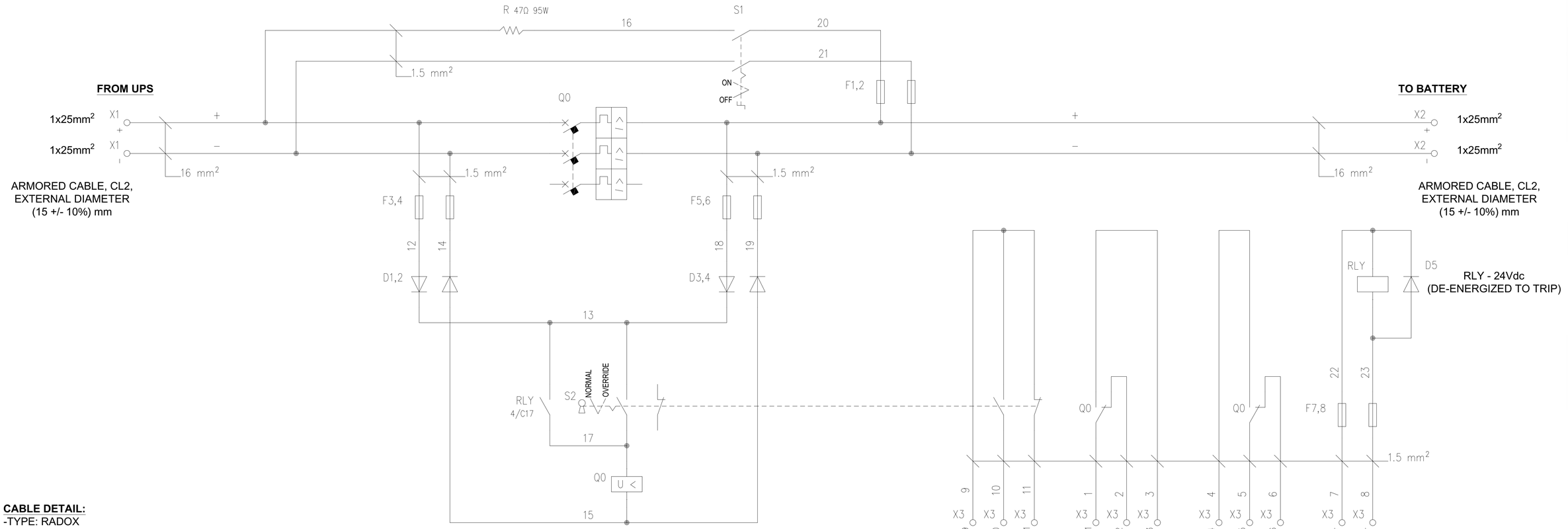
THIS DRAWING IS PROPERTY OF CORTEM SPA
AND IT CANNOT BE REPRODUCED WITHOUT CORTEM'S AUTHORIZATION

REV.	DATE	PREP'D	CHK'D	APP'D	DESCRIPTION
1	24/05/2024	GRATTON	GIUSTI	GRATTON	MODIFIED AND REISSUED FOR APPROVAL
0	13/05/2024	BOGAR	GIUSTI	GRATTON	ISSUED FOR APPROVAL

DRAWING TITLE: DC UPS - TAG: UP-200F1
002 EJBC-5/C2401778/20.
ITEM 20
EXT/INT. LAYOUT

CORTEM JOB: COV2401778
DRAWING SCALE: /
DRAWING NUMBER: A3-C 27438
SHEET 3 NEXT 4 TOT. 4

Smart Professional R. 2012



CABLE DETAIL:
-TYPE: RADOX
-COLORS: BLACK FOR (+) AND AUX
WHITE FOR (-)

CIRCUIT	DESCRIPTION			F3,4		Q0		F5,6		F1,2							F7,8						
	NUMBER																						
	PHASE	POWER	kW	+ -		+ -		+ -		+ -							+ -						
SWITCH	MANUFACTURER					ABB																	
	TYPE					XT3N200TMD3																	
	POLE N.	In	A			3	125																
	Idn A	CURVE																					
	Pdi kA	JUNCTION BOX N°				36kA																	
FUSE	TYPE			FUS5X20				FUS5X20		FUS5X20							FUS5X20						
	CURRENT		A	2,5				2,5		4							2,5						
CONTACTOR	TYPE																						
	In A	Pn	kW																				
THERMAL RELAY	TYPE																						
	CURRENT		A																				
TERMINALS CABLES	TERMINAL TYPE											UT				UT				UT			
	TERMINAL SECTION		mm²									4				4				4			
	TERMINAL NUMBER																						
	CABLE SECTION		mm²																				

REV.	DATE	PREP'D	CHK'D	APP'D	DESCRIPTION
1	24/05/2024	GRATTON	GIUSTI	GRATTON	MODIFIED AND REISSUED FOR APPROVAL
0	13/05/2024	BOGAR	GIUSTI	GRATTON	ISSUED FOR APPROVAL

DRAWING TITLE

DC UPS - TAG: UP-200F1

002 EJBC-5/C2401778/20.
ITEM 20
INTERNAL WIRING

CORTEM JOB: COV2401778
DRAWING SCALE: /
DRAWING NUMBER: A3-C 27438
SHEET 2 NEXT 3
TOT. 4

CORTEM GROUP
contem
FONDISONZO
ELFIT

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Smart Professional R. 2012

Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1

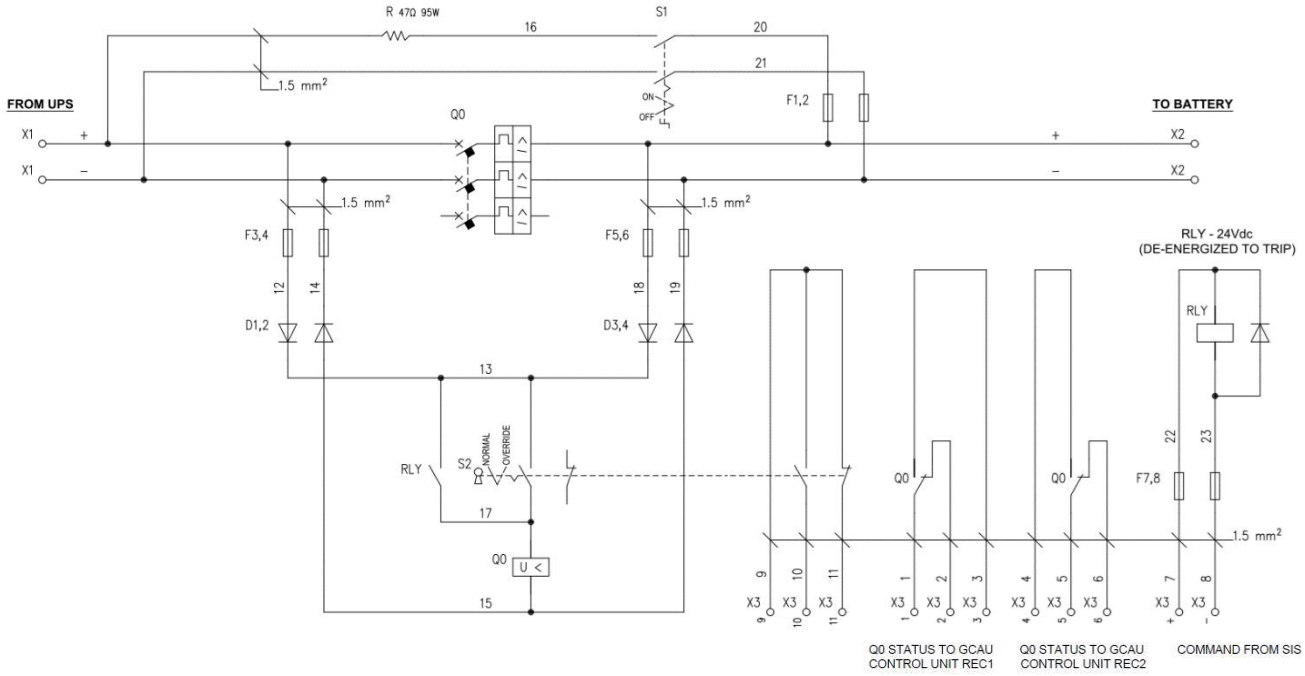
BLACK START PROCEDURE

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AEG

POWER
SOLUTIONS

BLACK START PROCEDURE



Black Start procedure

The target is to allow the energization of the loads from the battery, while the battery charger being still de-energized.

- The operator shall put the selector S2 on "override" position (contact closed)
- The operator shall close the selector S1 to pre-charge the charger output DC capacitors
- Once the charger DC capacitors are charged and the voltage across Q0 power contacts is close to 0V (and at least >80% of the system DC nominal voltage), the operator shall close the breaker Q0
- The operator shall open the selector S1
- The site safety and SCADA systems restart and the RLY relay is automatically energized when all safety conditions are fulfilled. The charger is energized through its AC supply and then it can restart
- The operator shall put the selector S2 on "normal" position (contact open)
- The system returns to normal working conditions

Base Load Power Hub (BLPH)

AC UPS - BATTERY LAYOUT AND INTERCONNECTION DIAGRAM

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
Andrea Padoschi	05/02/2025

umber: 1724000372-EL-DG-00011

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
06	02/02/2025	As-Built (ASB)	DA	DA	AD
05	17/12/2024	As-Built (ASB)	DA	DA	AD
04	05/10/2024	Accepted for Construction (AFC)	DA	DA	AD
03	04/08/2024	Accepted for Construction (AFC)	DA	DA	AD
02	01/06/2024	Accepted for Construction (AFC)	DA	DA	AD
01	15/05/2024	Accepted for Construction (AFC)	DA	DA	AD
00	20/04/2024	Issue for Review (IFR)	DA	DA	AD

3W power | a company of AEG POWER SOLUTIONS

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)
04	Accepted for Construction (AFC)
05	As-Built (ASB)
06	As-Built (ASB)

HOLDS LIST

No.	Description
1	
2	
3	
4	

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Description	Sheet
COVER	1
REVISION / CHANGE LOG	2
HOLDS LIST	2
TABLE OF CONTENTS	3
AC UPS PAS - TAG: UP-200F3	4
AC UPS F&G - TAG: UP-200F4	7
AC UPS PAS - TAG: UP-200F3 - BATTERY PROTECTION BOX	10
AC UPS PAS - TAG: UP-200F3 - BLACK START PROCEDURE	13
AC UPS F&G - TAG: UP-200F4 - BATTERY PROTECTION BOX	15
AC UPS F&G - TAG: UP-200F4 - BLACK START PROCEDURE	18

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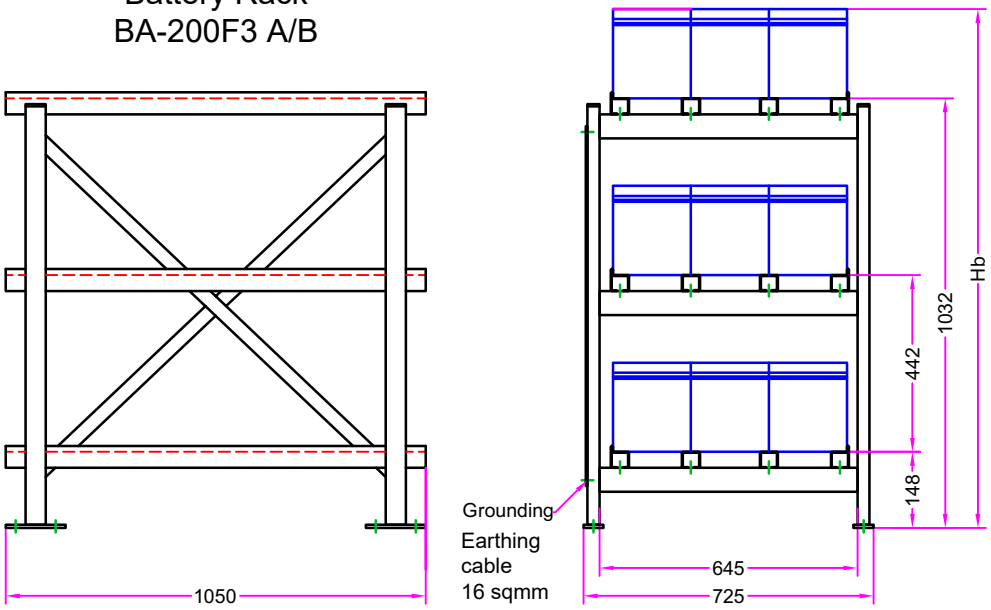
Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

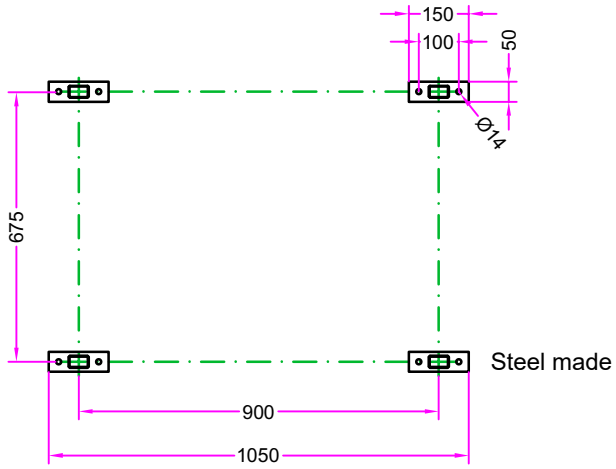
BATTERY LAYOUT AND INTERCONNECTION DIAGRAM

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Battery Rack
BA-200F3 A/B



Foot-Print:



Rack weight : 54,7 kg
Battery weight : 855,0 kg
Total weight : 909,7 kg

Material:	S235 JR EN 10025 (St-37-2)
Coating:	Plastic Coated
Tolerance:	DIN ISO 2768 "C"
Battery:	

Date	Name	Checked
16/24	Riedel	St.Selig

Execution: Rack, Standard

Drawing-/Article No: 3L3115

Rev: 00

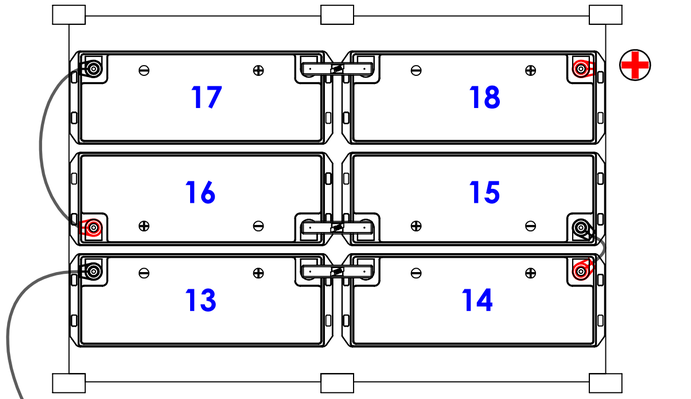
Type: 3E-PGL 3-17 with FIX002

Scale: none

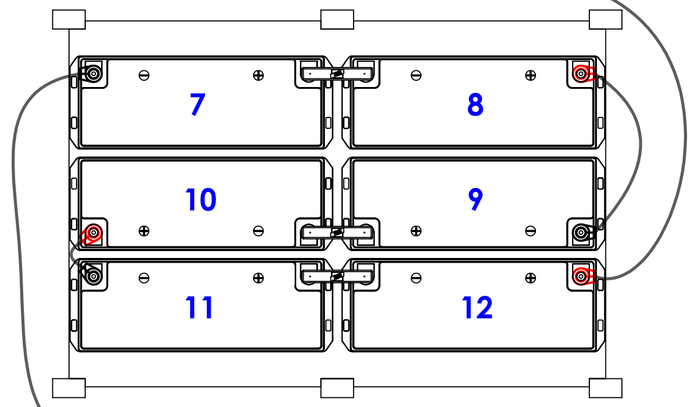
Production Details:

Welding execution according to

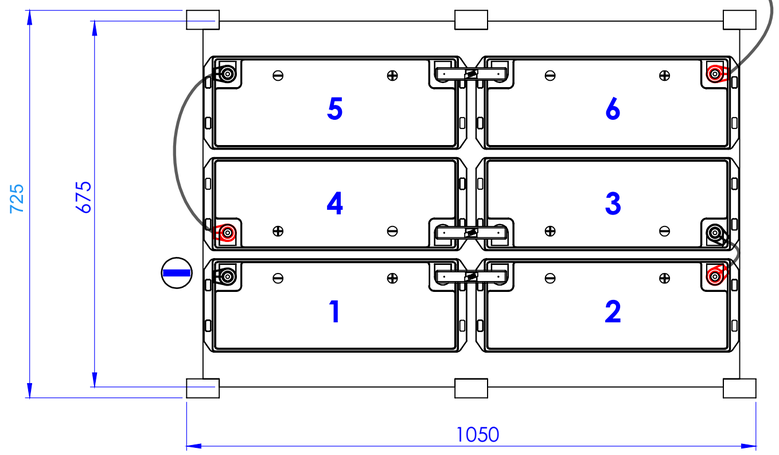
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TIER 3

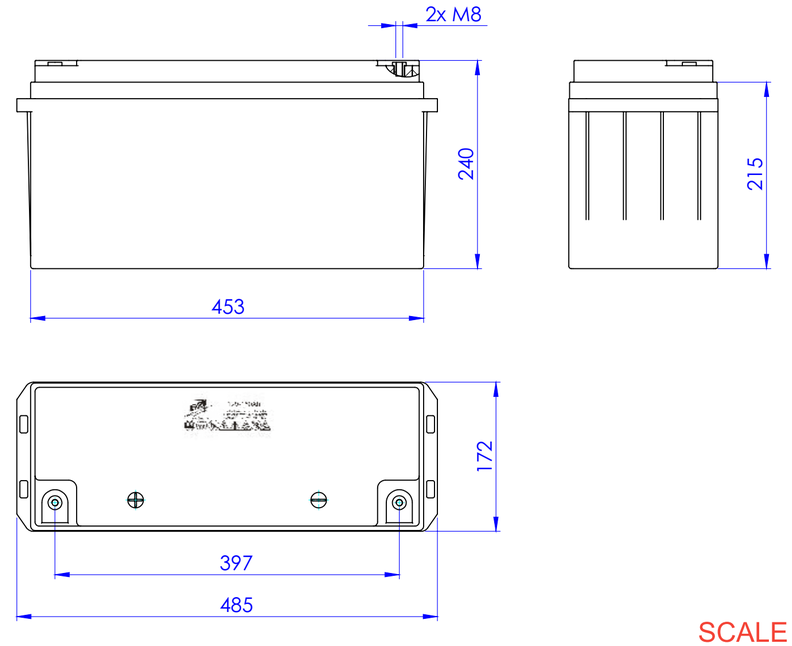


TIER 2



TIER 1

BATTERY BLOCK : FLG12-150



SCALE 1:5

BILL OF MATERIALS	CODE	WEIGHT (kg)	Q.TY
CELL FLG 12-150	11000495	47,50	18
COPPER TIN STRIP FLL-FHP serie	41000222	0,04	9
CONNECTION AND AGM COVER CENTER DISTANCE 100	41000251	0,01	9
CELLS CONNECTION CABLE 50 mm 2	21000191	0,5	7 m
CABLE LUG F8 X 50	41005167	0,3	18
CABLE LUG COVER BLACK 50040	41000243	0,008	9
CABLE LUG COVER RED 50039	41000244	0,008	9

REV./REV.	DATA/DATE	PROGETTISTA/DESIGNER	DISEGNATO/DRAWN	APPROVATO/APPROVED	DESCRIZIONE MODIFICHE/DESCRIPTION, REVISIONS

TOLLERANZE GENERALI/GENERAL ALLOWANCES: NORMA UNI EN 22768-mk	CARATTERISTICHE ELETTRICHE/ELETTRIC CHARACTERISTICS:	PESO BATT./BTR. WEIGHT: 855.42 kg	PROGETTISTA/DESIGNER: P. VECCHIARELLI
FINITURA SUPERFICIALE/SURFACE FINISHES: NORMA UNI ISO 1302	TIPO ELEMENTO/CELL TYPE: 18 FLG12-150	PESO EL./CELL WEIGHT: 47.50 kg	DISEGNATO/DRAWN: P. VECCHIARELLI
FORME E POSIZIONE/FORMS AND POSITION: NORMA UNI ISO 1101			APPROVATO/APPROVED: F. PAGLIARINI
SCALA/SCALE: 1:8	PROIEZIONE/PROJECTION	FOGLIO/SHEET: A2	CODICE SAP EL./CELL SAP CODE: 11000495	DATA/DATE: 10/04/2024
DESCRIZIONE/DESCRIPTION:				FILE-DISEGNO/FILE-DRAWING: layout 18 x FLG 12-150	TAV./TAB. 1

FAAM

1724000372-EL-DG-00011

AC UPS 35kVA - 18 x FLG 12-150

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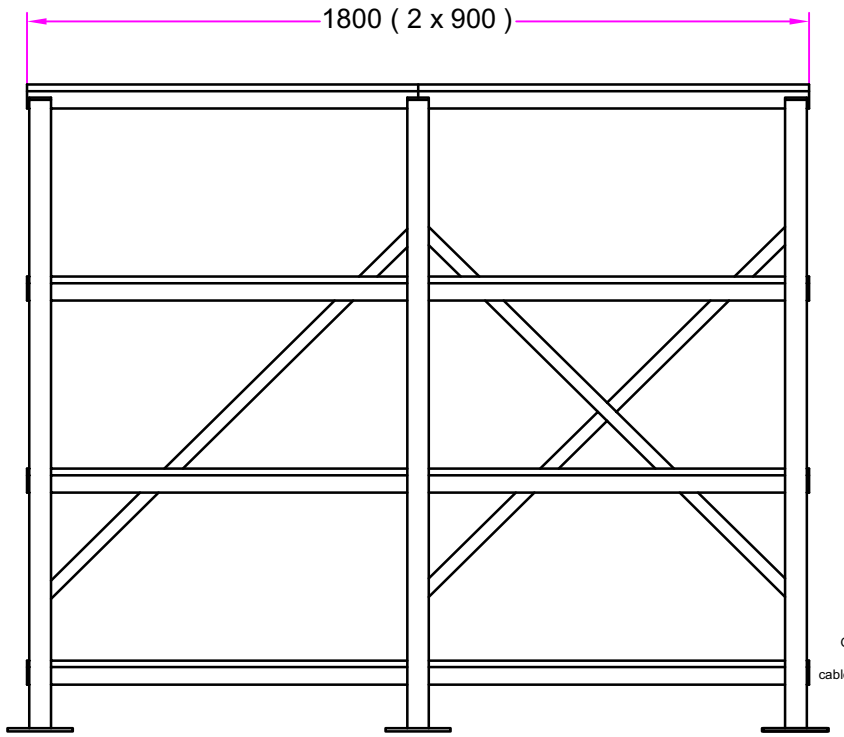
Base Load Power Hub (BLPH)

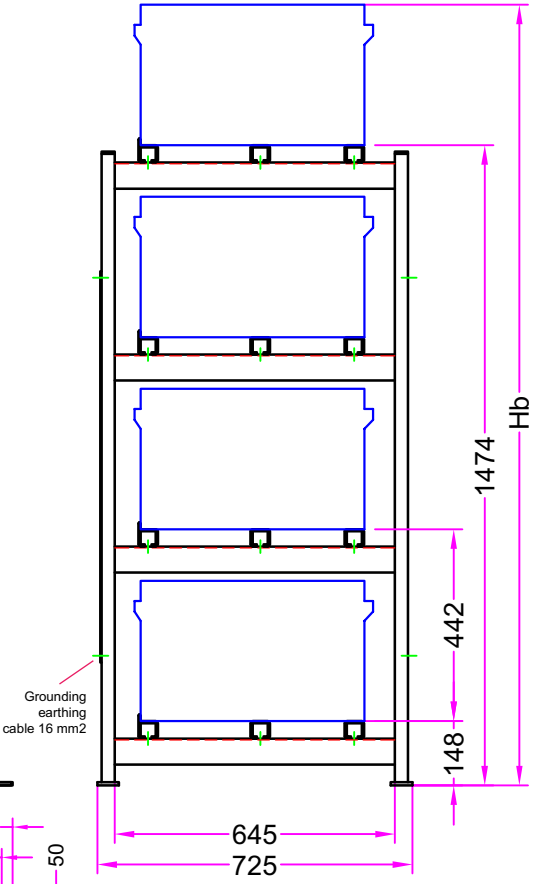
AC UPS F&G - TAG: UP-200F4

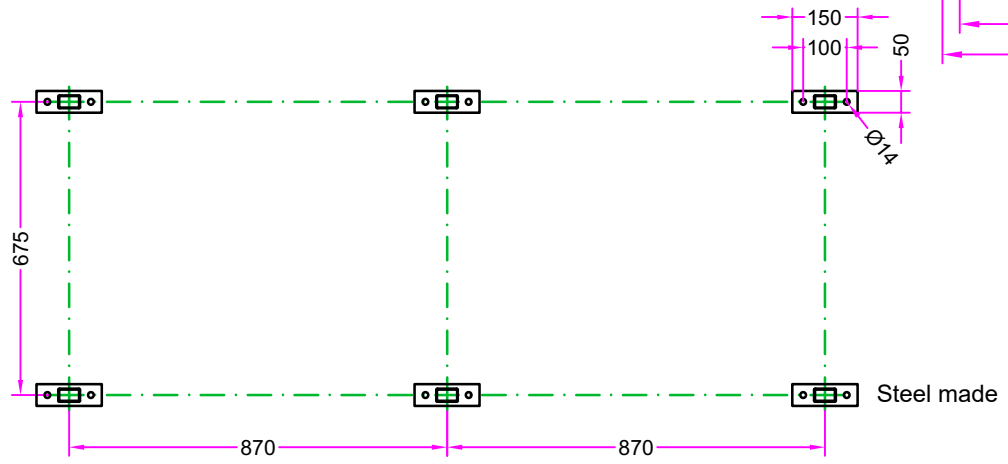
BATTERY LAYOUT AND INTERCONNECTION DIAGRAM

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Battery Rack
BA-200F4 A/B







Steel made

Rack weight : 100,6 kg
Battery weight : 2.295,0 kg
Total weight : 2.395,6 kg

Material:	S235 JR EN 10025 (St-37-2)
Coating:	Plastic Coated
Tolerance:	DIN ISO 2768 "C"
Battery:	

Date	Name	Checked
16/24	Riedel	St.Selig

Scale: none

Execution: Rack, Standard

Drawing-/Article No: 4U1187FT

Rev: 00

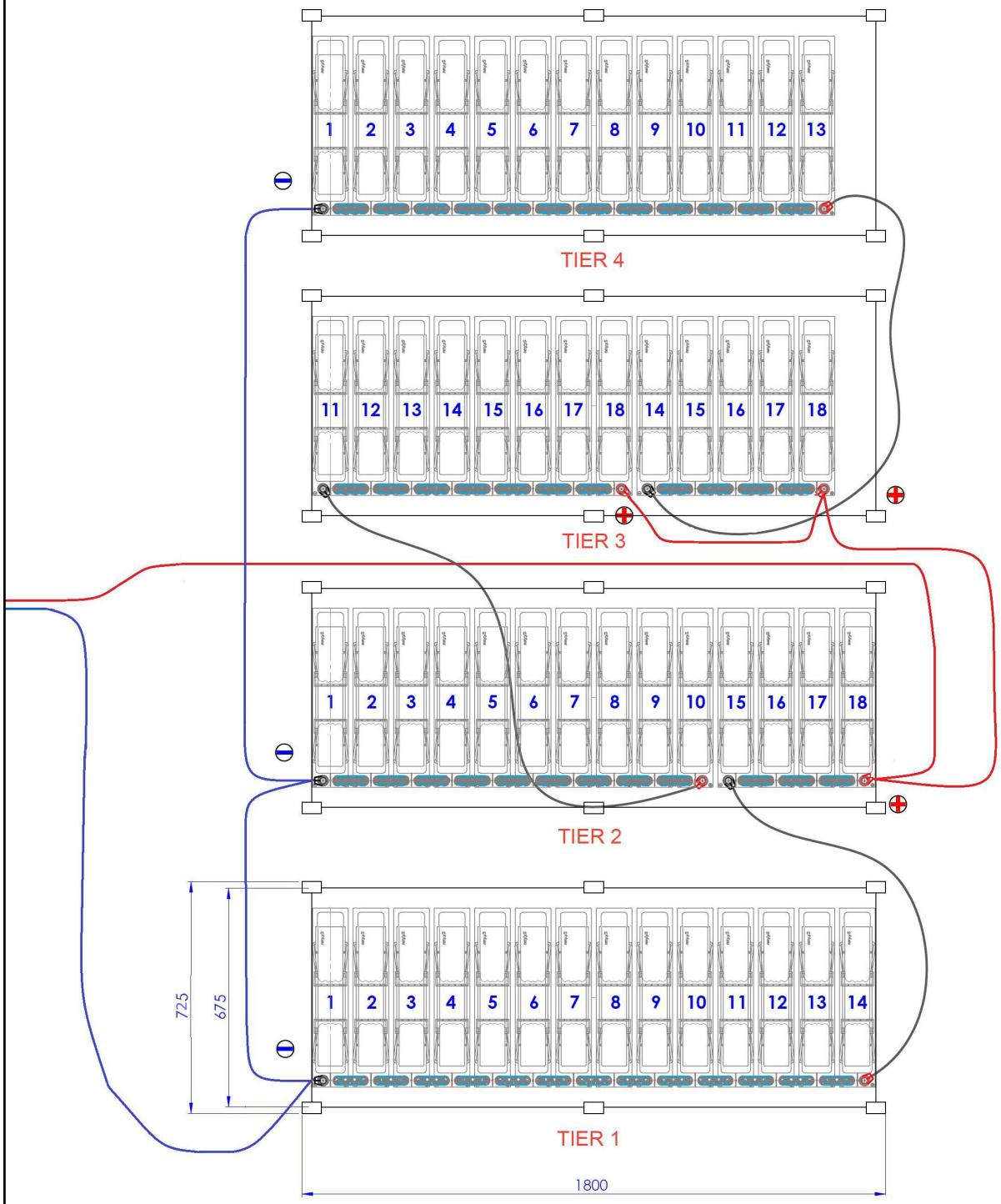
Type: 4E-PGU 1-18 HH FT with FIX002

Production Details: PPCS-01 rev. 0

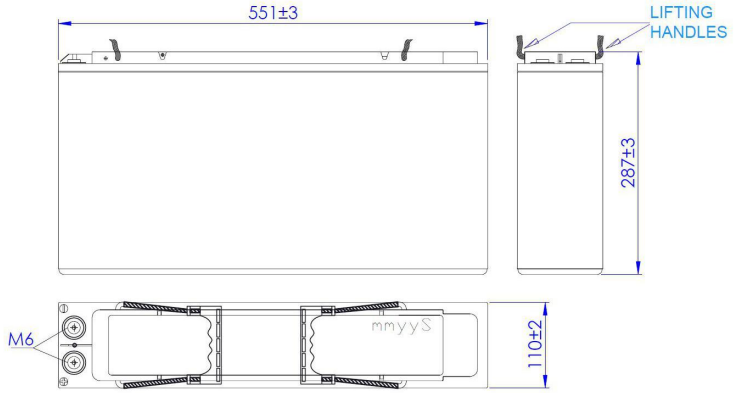
Welding execution according to WD0002

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EN 1090 EXC 3



BATTERY BLOCK : FTG12-120



SCALA 1 : 5

BILL OF MATERIALS	CODE	WEIGHT (kg)	Q.TY
CELL FTG12-120	11017386	42,5	54
CELLS CONNECTION CABLE 50mm2	21000191	0,5	15 m
CABLE LUG F6 X 50	41005168	0,3	12
CABLE LUG COVER BLACK 50040	41000243	0,008	6
CABLE LUG COVER RED 50039	41000244	0,008	6

REV./REV.	DATA/DATE	PROGETTISTA/DESIGNER	DISEGNATO/DRAWN	APPROVATO/APPROVED	DESCRIZIONE MODIFICHE/DESCRIPTION REVISIONS

TOLLERANCE GENERALI/GENERAL ALLOWANCES: NORMA UNI EN 22768-mk	CARATTERISTICHE ELETTRICHE/ELETTRIC CHARACTERISTICS:	PESO BATT./BTR. WEIGHT: 2295 kg	PROGETTISTA/DESIGNER: P. VECCHIARELLI
RUGOSITA' SUPERFICIALE/SUPERFICIAL ROUGHNESS: NORMA UNI ISO 1302	TIPO ELEMENTO/CELL TYPE: 3x18 FTG12-120	PESO EL./CELL WEIGHT: 42,5 kg	DISEGNATO/DRAWN: P. VECCHIARELLI
FORME E POSIZIONE/FORMS AND POSITION: NORMA UNI ISO 1101	CODICE SAP EL./CELL SAP CODE: 11017386		APPROVATO/APPROVED: F. PAGLIARINI
SCALA/SCALE: 1:10	PROIEZIONE/PROJECTION:	FOGLIO/SHEET: A2	DATA/DATE: 09/04/2024
DESCRIZIONE/DESCRIPTION:			FILE=DISEGNO/FILE=DRAWING: layout 3x18 FTG 12-120 — TAV./TAB.: 1

FAAM

1724000372-EL-DG-00011

AC UPS 15kVA - 3 x 18 x FTG 12-120

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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

BATTERY PROTECTION BOX

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MODEL C-225 REV.1

GENERAL NOTES:

-ENCLOSURE: EJBC-5
-MATERIAL: COPPER FREE ALUMINIUM ALLOY
-EXTERNAL PAINTING: RAL7035
-INTERNAL PAINTING: /
-ALL DIMENSION ARE IN mm
-WEIGHT: ≈57kg

BATTERY PROTECTION BOX

CB-200F3 A/B

N°	Q.TY	CODE	DESCRIPTION
IF	1	BFE-5	ALUMINIUM INTERNAL FRAME
X1	2	UKH70	PHOENIX TERMINALS SUITABLE FOR 70mm² CABLE
X2	2	UKH70	PHOENIX TERMINALS SUITABLE FOR 70mm² CABLE
X3	11	UT4	PHOENIX TERMINALS SUITABLE FOR 4mm² CABLE
Q0	1	XT3N200TMD3	ABB XT3 MCCB, 3P, 200A, 36kA
	1	1SDA066399R1	220-240Vac/dc UNDERVOLTAGE RELEASE COIL
	2	1SDA066423R1	2NO AS PER TBE AUX CONTACTS FREE VOLTAGE
	1	M-0439/V1 + M-1044	PADLOCKABLE EXTERNAL HANDLE
F1,F2	2	UT4-HESI	PHOENIX FUSE HOLDER TERMINALS SUITABLE FOR 4mm² CABLE WITH 4A FUSE
	2	FUS5X20/4	
F3÷F8	6	UT4-HESI	PHOENIX FUSE HOLDER TERMINALS SUITABLE FOR 4mm² CABLE WITH 2,5A FUSE
	6	FUS5X20/2,5	
RLY	1	PHO2986575	PHOENIX SECURITY RELAY, 24Vcc, 3 EXCHANGE CONTACTS
R	1	RS1752429	47Ω RESISTOR, 95W, NOT ADJUSTABLE
D1÷D5	5	RS3959141	40A, 1000V, DIODES
S1	1	A2-10E/R	SELECTOR SWITCH, 2P, 16A, SCHEME I "OFF-ON"
	1	M-0553	EXTERNAL HANDLE
S2	1	WS2-10E/R	SELECTOR SWITCH, 4P, 16A, SCHEME 2Z "NORMAL-OVERRIDE"
	1	M-093/CF	KEY LOCK EXTERNAL HANDLE
CG2*	4	NEV25IB	NICKEL PLATED BRASS CABLE GLANDS ØM25 FOR ARMORED CABLE Øint. 11-20mm Øext. 20-27,5mm, ARMOR THICKNESS 0,2-1,6mm
CG2	2	NAV25IB	NICKEL PLATED BRASS CABLE GLANDS ØM25 FOR NOT-ARMORED CABLE Ø11-20mm

SELECTOR SWITCHES DETAIL



TRUE TABLE

POSITION	CONTACT	
	1-2	3-4
OFF	O	O
ON	X	X

O	CONTACT OPEN
X	CONTACT CLOSED

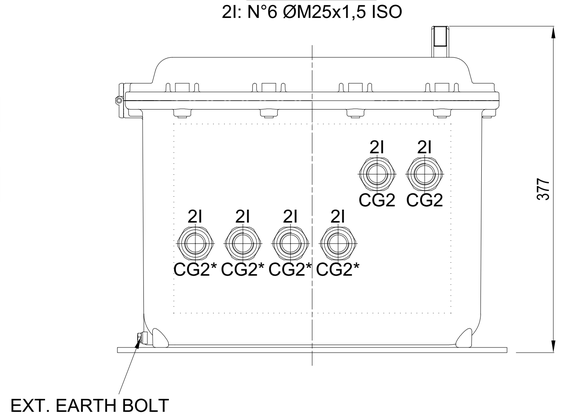
TRUE TABLE

POSITION	CONTACT			
	1-2	3-4	5-6	7-8
NORMAL	X	O	X	O
OVERRIDE	O	X	O	X

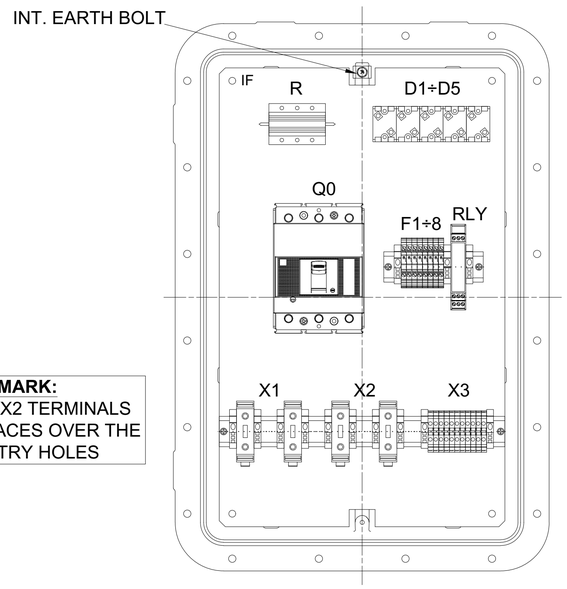
O	CONTACT OPEN
X	CONTACT CLOSED

BOTTOM VIEW

2I: N°6 ØM25x1,5 ISO

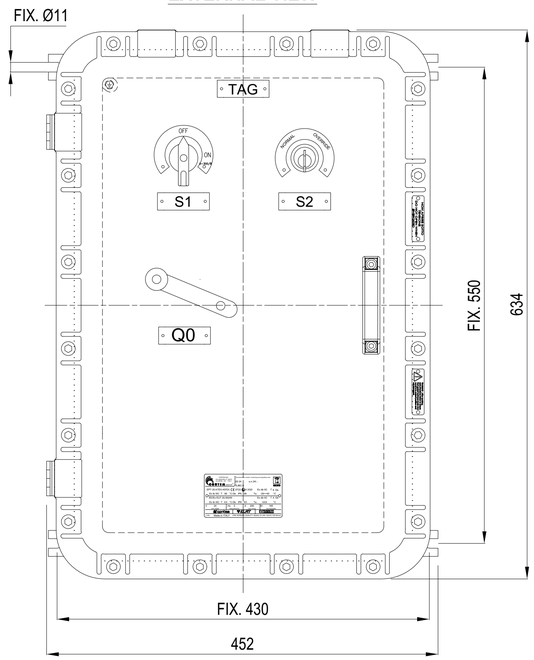


INTERNAL VIEW

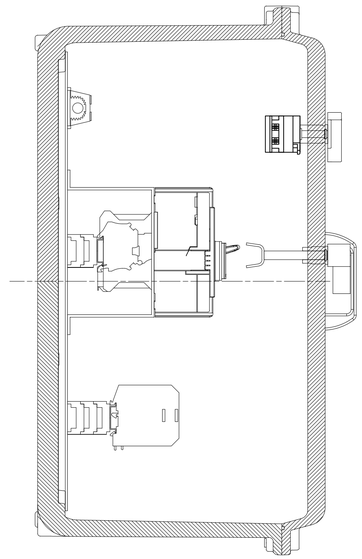


REMARK:
X1/X2 TERMINALS PLACES OVER THE ENTRY HOLES

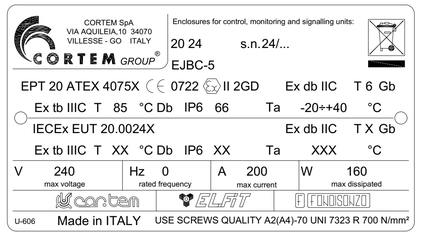
EXTERNAL VIEW



INT. LEFT SIDE VIEW



CERTIFICATE NAMEPLATE



TAG NAMEPLATE

MATERIAL: TRAPHOLITE
DIMENSIONS: 60X20
BLACK TEXT ON WHITE BACKGROUND

N°	TAG N°
TAG	CB-200F4 A
	CB-200F4 B
	CB-200F3 A
	CB-200F3 B
S1	S1
S2	S2
Q0	Q0

REV.	DATE	PREP'D	CHK'D	APP'D	DESCRIPTION
1	24/05/2024	GRATTON	GIUSTI	GRATTON	MODIFIED AND REISSUED FOR APPROVAL
0	13/05/2024	BOGAR	GIUSTI	GRATTON	ISSUED FOR APPROVAL

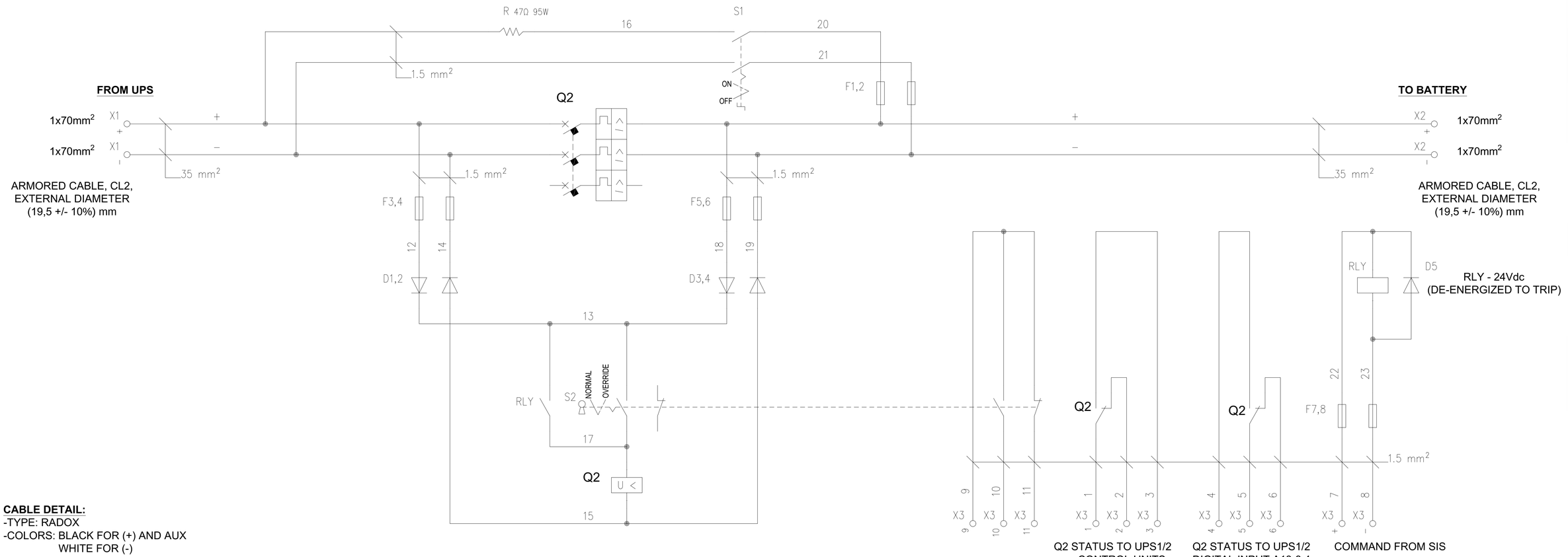
DRAWING TITLE: AC UPS - TAG: UP-200F3

001 EJBC-5/C2401778/10.
ITEM 10
EXT/INT. LAYOUT

CORTEM JOB: COV2401778
DRAWING SCALE: /
DRAWING NUMBER: A3-C 27438
SHEET 1 NEXT 2 TOT. 4

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CABLE DETAIL:
-TYPE: RADOX
-COLORS: BLACK FOR (+) AND AUX
WHITE FOR (-)

CIRCUIT	DESCRIPTION			F3,4		Q2		F5,6		F1,2							F7,8						
	NUMBER																						
	PHASE	POWER	kW	+ -		+ -		+ -		+ -							+ -						
SWITCH	MANUFACTURER					ABB																	
	TYPE					XT3N200TMD3																	
	POLE N.	In	A			3	200																
	Idn A	CURVE																					
	Pdi kA	JUNCTION BOX N°				36kA																	
FUSE	TYPE			FUS5X20				FUS5X20		FUS5X20							FUS5X20						
	CURRENT		A	2,5				2,5		4							2,5						
CONTACTOR	TYPE																						
	In A	Pn	kW																				
THERMAL RELAY	TYPE																						
	CURRENT		A																				
TERMINALS CABLES	TERMINAL TYPE											UT				UT				UT			
	TERMINAL SECTION		mm²									4				4				4			
	TERMINAL NUMBER																						
	CABLE SECTION		mm²																				

REV.	DATE	PREP'D	CHK'D	APP'D	DESCRIPTION
1	24/05/2024	GRATTON	GIUSTI	GRATTON	MODIFIED AND REISSUED FOR APPROVAL
0	13/05/2024	BOGAR	GIUSTI	GRATTON	ISSUED FOR APPROVAL

DRAWING TITLE

AC UPS - TAG: UP-200F3

001 EJBC-5/C2401778/10.
ITEM 10
INTERNAL WIRING

CORTEM GROUP

CORTEM JOB: COV2401778
DRAWING SCALE: /
DRAWING NUMBER: A3-C 27438
SHEET 2 | NEXT 3 | TOT. 4

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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

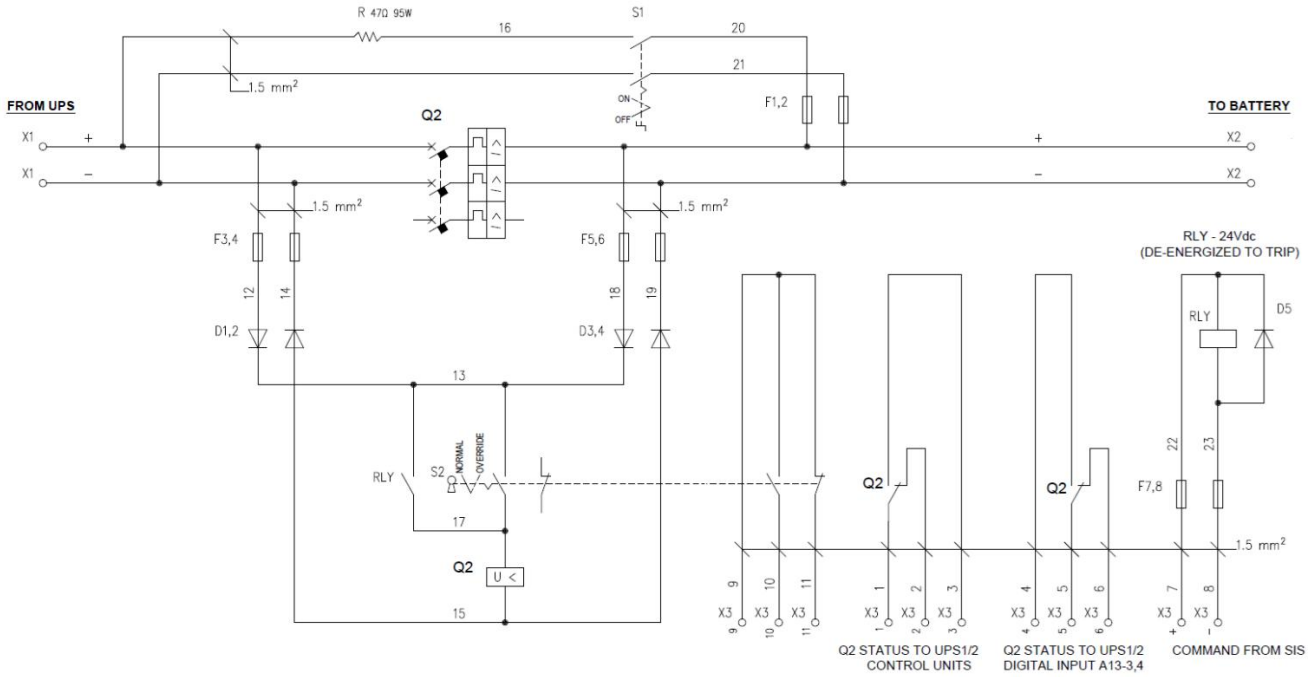
BLACK START PROCEDURE

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AEG

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SOLUTIONS

BLACK START PROCEDURE



Black Start procedure

The target is to allow the energization of the loads from the battery, while the battery charger being still de-energized.

- The operator shall put the selector S2 on "override" position (contact closed)
- The operator shall close the selector S1 to pre-charge the charger output DC capacitors
- Once the charger DC capacitors are charged and the voltage across Q2 power contacts is close to 0V (and at least >80% of the system DC nominal voltage), the operator shall close the breaker Q2
- The operator shall open the selector S1
- The site safety and SCADA systems restart and the RLY relay is automatically energized when all safety conditions are fulfilled. The charger is energized through its AC supply and then it can restart
- The operator shall put the selector S2 on "normal" position (contact open)
- The system returns to normal working conditions

Base Load Power Hub (BLPH)

AC UPS F&G - TAG: UP-200F4

BATTERY PROTECTION BOX

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MODEL C-225 REV.1

GENERAL NOTES:

-ENCLOSURE: EJBC-5
-MATERIAL: COPPER FREE ALUMINIUM ALLOY
-EXTERNAL PAINTING: RAL7035
-INTERNAL PAINTING: /
-ALL DIMENSION ARE IN mm
-WEIGHT: ≈57kg

BATTERY PROTECTION BOX

CB-200F4 A/B

N°	Q.TY	CODE	DESCRIPTION
IF	1	BFE-5	ALUMINIUM INTERNAL FRAME
X1	2	UKH95	PHOENIX TERMINALS SUITABLE FOR 70mm² CABLE
X2	2	UKH95	PHOENIX TERMINALS SUITABLE FOR 70mm² CABLE
X3	11	UT4	PHOENIX TERMINALS SUITABLE FOR 4mm² CABLE
Q0	1	XT3N200TMD3	ABB XT3 MCCB, 3P, 200A, 36kA
	1	1SDA066399R1	220-240Vac/dc UNDERVOLTAGE RELEASE COIL
	2	1SDA066423R1	2NO AS PER TBE AUX CONTACTS FREE VOLTAGE
	1	M-0439/V1 + M-1044	PADLOCKABLE EXTERNAL HANDLE
F1,F2	2	UT4-HESI	PHOENIX FUSE HOLDER TERMINALS SUITABLE FOR 4mm² CABLE WITH 4A FUSE
	2	FUS5X20/4	
F3÷F8	6	UT4-HESI	PHOENIX FUSE HOLDER TERMINALS SUITABLE FOR 4mm² CABLE WITH 2,5A FUSE
	6	FUS5X20/2,5	
RLY	1	PHO2986575	PHOENIX SECURITY RELAY, 24Vcc, 3 EXCHANGE CONTACTS
R	1	RS1752429	47Ω RESISTOR, 95W, NOT ADJUSTABLE
D1÷D5	5	RS3959141	40A, 1000V, DIODES
S1	1	A2-10E/R	SELECTOR SWITCH, 2P, 16A, SCHEME I "OFF-ON"
	1	M-0553	EXTERNAL HANDLE
S2	1	WS2-10E/R	SELECTOR SWITCH, 4P, 16A, SCHEME 2Z "NORMAL-OVERRIDE"
	1	M-093/CF	KEY LOCK EXTERNAL HANDLE
CG2*	4	NEV25IB	NICKEL PLATED BRASS CABLE GLANDS ØM25 FOR ARMORED CABLE Øint. 11-20mm Øext. 20-27,5mm, ARMOR THICKNESS 0,2-1,6mm
CG2	2	NAV25IB	NICKEL PLATED BRASS CABLE GLANDS ØM25 FOR NOT-ARMORED CABLE Ø11-20mm

SELECTOR SWITCHES DETAIL



TRUE TABLE

POSITION	CONTACT	
	1-2	3-4
OFF	O	O
ON	X	X

O	CONTACT OPEN
X	CONTACT CLOSED

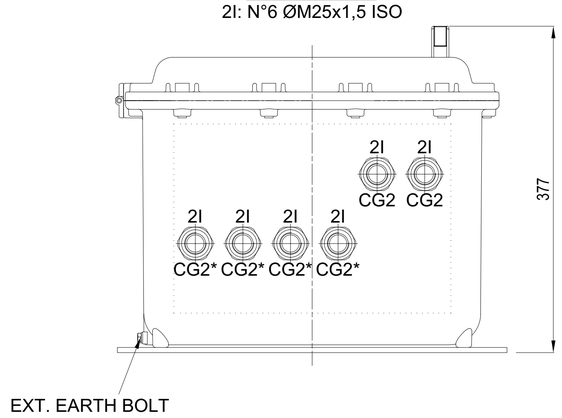
TRUE TABLE

POSITION	CONTACT			
	1-2	3-4	5-6	7-8
NORMAL	X	O	X	O
OVERRIDE	O	X	O	X

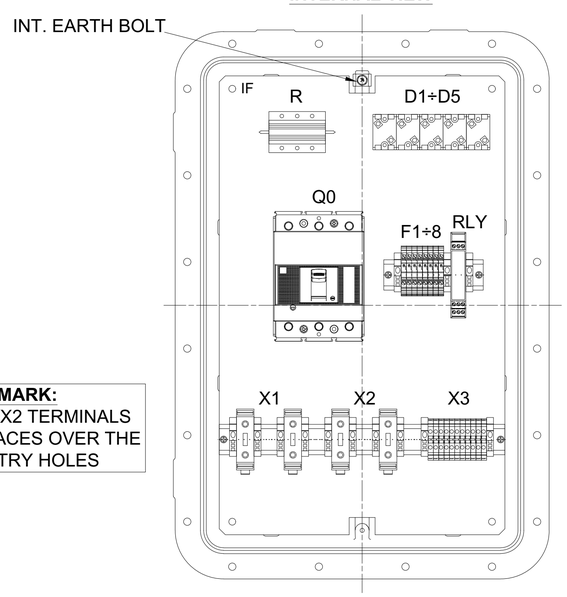
O	CONTACT OPEN
X	CONTACT CLOSED

BOTTOM VIEW

2I: N°6 ØM25x1,5 ISO

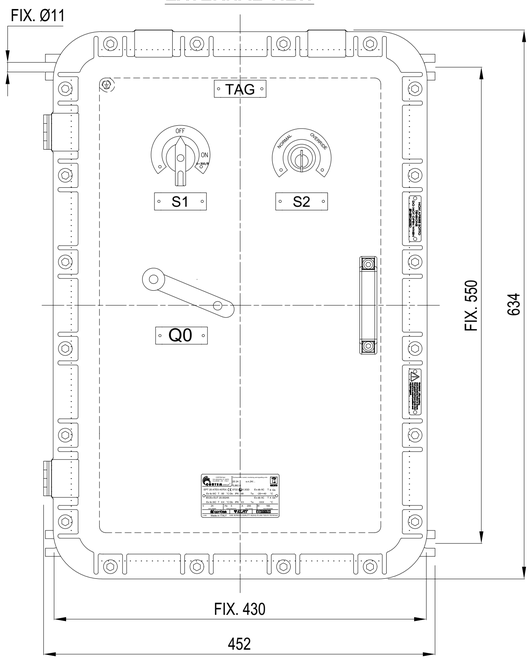


INTERNAL VIEW

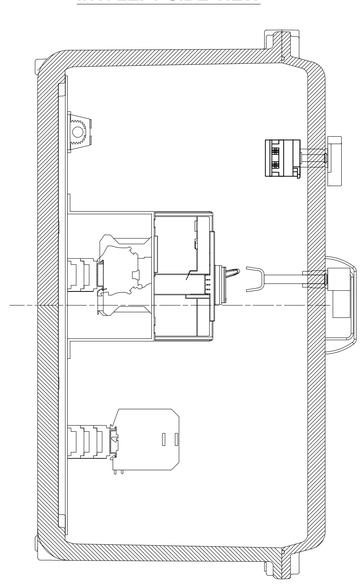


REMARK:
X1/X2 TERMINALS PLACES OVER THE ENTRY HOLES

EXTERNAL VIEW



INT. LEFT SIDE VIEW



CERTIFICATE NAMEPLATE



TAG NAMEPLATE

MATERIAL: TRAPHOLITE
DIMENSIONS: 60X20
BLACK TEXT ON WHITE BACKGROUND

N°	TAG N°
TAG	CB-200F4 A
	CB-200F4 B
	CB-200F3 A
	CB-200F3 B
S1	S1
S2	S2
Q0	Q0

REV.	DATE	PREP'D	CHK'D	APP'D	DESCRIPTION
1	24/05/2024	GRATTON	GIUSTI	GRATTON	MODIFIED AND REISSUED FOR APPROVAL
0	13/05/2024	BOGAR	GIUSTI	GRATTON	ISSUED FOR APPROVAL

DRAWING TITLE: AC UPS TAG: UP-200F4

001 EJBC-5/C2401778/10.
ITEM 10
EXT/INT. LAYOUT

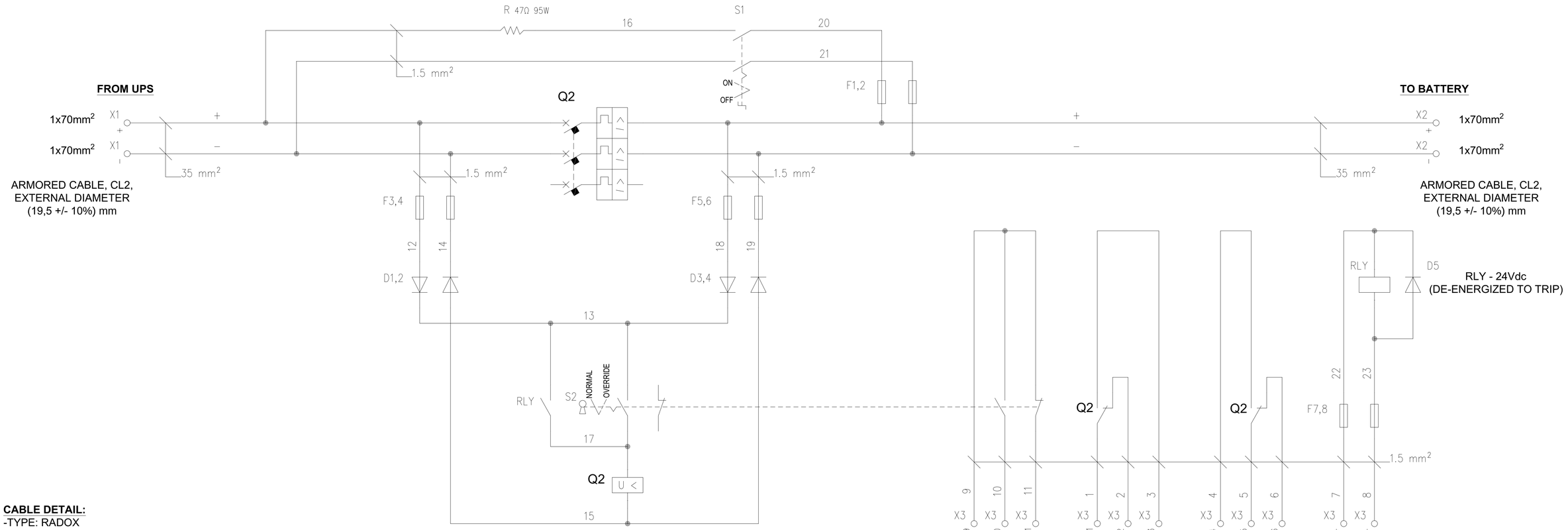
CORTEM JOB: COV2401778
DRAWING SCALE: /
DRAWING NUMBER: A3-C 27438
SHEET 1 NEXT 2 TOT. 4

CORTEM GROUP
cortem
FONDISONZO
ELFIT

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MODEL C-225 REV.1



CABLE DETAIL:
-TYPE: RADOX
-COLORS: BLACK FOR (+) AND AUX
WHITE FOR (-)

CIRCUIT	DESCRIPTION			F3,4		Q2		F5,6		F1,2							F7,8						
	NUMBER																						
	PHASE	POWER	kW	+ -		+ -		+ -		+ -							+ -						
SWITCH	MANUFACTURER					ABB																	
	TYPE					XT3N200TMD3																	
	POLE N.	In	A			3	200																
	Idn A	CURVE																					
	Pdi kA	JUNCTION BOX N°				36kA																	
FUSE	TYPE			FUS5X20				FUS5X20		FUS5X20							FUS5X20						
	CURRENT		A	2,5				2,5		4							2,5						
CONTACTOR	TYPE																						
	In A	Pn	kW																				
THERMAL RELAY	TYPE																						
	CURRENT		A																				
TERMINALS CABLES	TERMINAL TYPE											UT				UT				UT			
	TERMINAL SECTION		mm²									4				4				4			
	TERMINAL NUMBER																						
	CABLE SECTION		mm²																				

REV.	DATE	PREP'D	CHK'D	APP'D	DESCRIPTION
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DRAWING TITLE

AC UPS - TAG: UP-200F4

001 EJBC-5/C2401778/10.
ITEM 10
INTERNAL WIRING

CORTEM JOB: COV2401778
DRAWING SCALE: /
DRAWING NUMBER: A3-C 27438
SHEET 2 NEXT 3
TOT. 4

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Base Load Power Hub (BLPH)

AC UPS F&G - TAG: UP-200F4

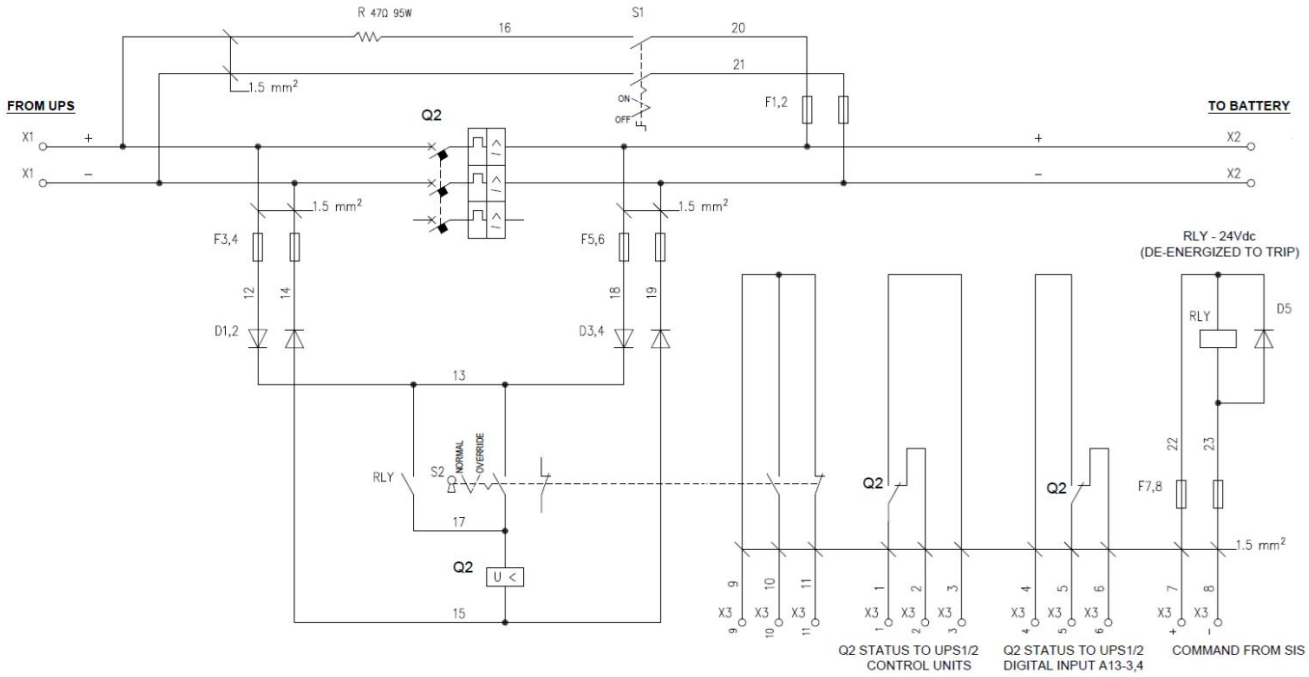
BLACK START PROCEDURE

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AEG

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SOLUTIONS

BLACK START PROCEDURE



Black Start procedure

The target is to allow the energization of the loads from the battery, while the battery charger being still de-energized.

- The operator shall put the selector S2 on "override" position (contact closed)
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Base Load Power Hub (BLPH)

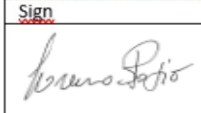
I/O LIST

Document Number: 1724000372-EL-LIS-00014

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	26/08/2024

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
02	23/08/2024	Accepted for Construction (AFC)	DA	DA	AD
01	10/07/2024	Issue fro Review (IFR)	DA	DA	AD
00	25/06/2024	Issue for Review (IFR)	DA	DA	AD

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Issue for Review (IFR)
02	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

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COVER 1

REVISION / CHANGE LOG 2

HOLDS LIST 2

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DC UPS - TAG: UP-200F1 - MODBUS REGISTER LIST 6

AC UPS PAS - TAG: UP-200F3 - DIGITAL I/O LIST 13

AC UPS PAS - TAG: UP-200F3 - MODBUS REGISTER LIST 15

AC UPS F&G - TAG: UP-200F4 - DIGITAL I/O LIST 21

AC UPS F&G - TAG: UP-200F4 - MODBUS REGISTER LIST 23

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Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1

DIGITAL I/O LIST

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DIGITAL I/O

Cabinet	Designation	Type	Terminals	Component
CHARGER A/B	Mains fault	DO	X5 | 1-2-3	A5
CHARGER A/B	Rectifier fault	DO	X5 | 4-5-6	A5
CHARGER A/B	Output DC overvoltage	DO	X5 | 7-8-9	A5
CHARGER A/B	Output DC undervoltage	DO	X5 | 10-11-12	A5
CHARGER A/B	Battery low voltage	DO	X5 | 13-14-15	A5
CHARGER A/B	Earth fault positive polarity	DO	X5 | 16-17-18	A5
CHARGER A/B	Earth fault negative polarity	DO	X5 | 19-20-21	A5
CHARGER A/B	General cumulative fault	DO	X5 | 22-23-24	A5
CHARGER A/B	Distribution earth fault +/-	DO	X8 | 5-6-7	A21
CHARGER A/B	Common distribution fault	DO	X8 | 10-11	K4
CHARGER A/B	Battery simmetry fault	DO	X8 | 12-13	A10

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Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1

MODBUS REGISTER LIST

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Register locations

- ***Modbus mapping (version 4)***

  Note about numbering and addressing registers:

  The Modbus numbering scheme for holding registers starts from 40,001. In addition to Modbus holding register number (nMbHR), two other schemes of interest should be defined the Jbus register number (nJbR) and the actual register address that is encoded in Modbus message over the network (aRN). Here are the equations related these three schemes:

  nMbHR = 40,001 + aRN,

  nJbR = aRN.

  Also, the JBUS usage imposes nJbR > 0.

- ***Register tables***

Alarm and event table:

Modbus Register (nMbHR)	Jbus Register (nJbR)	aRN (hex)	Variable	Range
40,002	1	0x1	High Mains Voltage	0 = No alarm, 1 = Alarm
40,003	2	0x2	Low Mains Voltage	
40,004	3	0x3	Charger Failure	
40,005	4	0x4	High Battery Voltage	
40,006	5	0x5	Low Battery Voltage	
40,007	6	0x6	High DC Voltage	
40,008	7	0x7	Low DC Voltage	
40,009	8	0x8	Ground Fault +	
40,010	9	0x9	Ground Fault -	
40,011	10	0xa	Spare 1	
40,012	11	0xb	Spare 2	
40,013	12	0xc	Spare 3	
40,014	13	0xd	Spare 4	
40,015	14	0xe	Spare 5	
40,016	15	0xf	Spare 6	
40,017	16	0x10	Spare 7	
40,018	17	0x11	Spare 8	
40,019	18	0x12	Charger Current Limit Indicator	
40,020	19	0x13	Battery Current Limit Indicator	
40,021	20	0x14	High Charger Current	
40,022	21	0x15	High Battery Current	
40,023	22	0x16	High Temperature	
40,024	23	0x17	Temperature Sensor Error	
40,025	24	0x18	Internal Communication Error	
40,026	25	0x19	Battery Test Fail	
40,027	26	0x1a	Battery Test Aborted	
40,028	27	0x1b	High Battery Temperature	
40,029	28	0x1c	High Float Current	
40,030	29	0x1d	Long Charge Time	
40,031	30	0x1e	No Power Supply Voltage	
40,032	31	0x1f	Battery in Operation	
40,033	32	0x20	Battery Symmetry Fault	
40,034	33	0x21	Equation 1	
40,035	34	0x22	Equation 2	
40,036	35	0x23	Equation 3	
40,037	36	0x24	Equation 4	
40,038	37	0x25	Equation 5	
40,039	38	0x26	Equation 6	
40,040	39	0x27	Equation 7	
40,041	40	0x28	Equation 8	
40,042	41	0x29	Equation 9	
40,043	42	0x2a	Equation 10	
40,044	43	0x2b	Equation 11	
40,045	44	0x2c	Equation 12	
40,046	45	0x2d	Equation 13	
40,047	46	0x2e	Equation 14	
40,048	47	0x2f	Equation 15	
40,049	48	0x30	Equation 16	

All holding registers in this table have a read-only access.

Measurements and status:

Modbus Register (nMbHR)	Modbus register (nJbR)	aRN (hex)	Variable	Range
40,100	99	0x63	Mains Voltage	VAC / 10
40,101	100	0x64	Battery Voltage	VDC / 10
40,102	101	0x65	Load Voltage	VDC / 10
40,103	102	0x66	Charger Current	Positive Amps / 10
40,104	103	0x67	Battery Current	Signed Amps / 10
40,105	104	0x68	Ambient Temperature	Signed Celsius
40,106	105	0x69	Battery Temperature	Signed Celsius
40,107	106	0x6a	Battery Symmetry Voltage	VDC/10
40,108	107	0x6b	Common Alarm Relay	0: negated, 1: asserted
40,109	108	0x6c	Earth Fault Impedance	Signed earth fault in k-Ohm/10
40,110	109	0x6d	Charge Status	0: Float 1: Highrate 2: Commissioning 3: Battery test 4: Charger Off
40,111	110	0x6e	Remaining Charge Time	Minutes
40,112	111	0x6f	AhMeter	%
40,113	112	0x70	Equation 1	16-bit signed integer value of equation result this result is multiplied by a factor defined by EQ configuration parameter 'ModbusMultiplier ' , rounded to nearest integer value and clamped to [-32,768, 32,767]
40,114	113	0x71	Equation 2	
40,115	114	0x72	Equation 3	
40,116	115	0x73	Equation 4	
40,117	116	0x74	Equation 5	
40,118	117	0x75	Equation 6	
40,119	118	0x76	Equation 7	
40,120	119	0x77	Equation 8	
40,121	120	0x78	Equation 9	
40,122	121	0x79	Equation 10	
40,123	122	0x7a	Equation 11	
40,124	123	0x7b	Equation 12	
40,125	124	0x7c	Equation 13	
40,126	125	0x7d	Equation 14	
40,127	126	0x7e	Equation 15	
40,128	127	0x7f	Equation 16	

All holding registers in this table have a read-only access.

History access:

Modbus Register (nMbHR)	Jbus register (nJbR)	aRN (hex)	Variable	Range
40,150	149	0x95	Request/confirm history entry	1: most recent
40,151	150	0x96	Number of items in history list	Number of events
40,152	151	0x97	Year - Month	MSB: Actual Year-2000 LSB: Month (1-12)
40,153	152	0x98	Day - Hour	MSB: Day (1-31) LSB: Hours (0-23)
40,154	153	0x99	Minute - Second	MSB: Minutes (0-59) LSB: Seconds (0-59)
40,155	154	0x9A	Code of alarm/event	
40,156	155	0x9B	Setpoint or data value	

All holding registers except first one in this table have a read-only access.
First register in this table must be preset for the other to be updated.

Commands:

Modbus Register (nMbHR)	Jbus register (nJbR)	aRN (hex)	Variable	Value definition
40,200	199	0xC7	Charge highrate/float	2 = highrate, 1 = float 0 = ineffective
40,201	200	0xC8	Alarm acknowledgment	1 = proceed 0; 2 = ineffective
40,202	201	0xC9	Rectifier shut down/start up	1 = shut down 2 = start up 0 = ineffective
40,203	202	0xCA	Clear history list	1 = proceed 0; 2 = ineffective
40,204	203	0xCB	Start/Stop battery test	1 = Stop 2 = Start 0 = ineffective
40,205	204	0xCC	Set Ah meter to 100%	1 = Set to 100% 0; 2 = ineffective
40,206	205	0xCD	Commissioning/Float	1 = float 2 = Commissioning 0 = ineffective

All holding registers in this table are write only.
Writing to more than one holding register in this table is not allowed and will result in an explicit error.
For commands to be executed, a protection mechanism exists based on a special configuration parameter. CmdCookie (defined in configuration object COMMUN2).
The command will be taken into account if the value in the Modbus frame less the Modbus CmdCookie equals one of possible definition values for the command at stake. For example, if we want to initiate a highrate charge (value 1 for this) and if Modbus CmdCookie equals 1234, then we must set the proper holding register to 1235.

Modbus is often a middleware to other industrial protocols such as Profibus-DP, etc…
In this case, outputs are virtualized values that are constantly updated in refresh cycles.
Then we must ensure commands, constantly written to in these circumstances, do not constantly trigger actions.

Some precautions have been implemented to allow pass commands through such automations:

- There always exists an "ineffective" value for each command that enables the client to constantly assert they don't want to start any command,
- As network and process latencies always exist it is difficult to make sure that no two successive commands with an active value (for example: start battery test) will trigger two equivalent actions (and then fill the history list with worthless events, etc…). In order to avoid this, a time filter (Configuration parameter COMMUN2.ModbusCmdTimeFilter), ensures that a given command appearing with the same value within this time frame will be accepted and will have no effect on the system. It is then reasonable to set COMMUN2.ModbusCmdTimeFilter beyond the known refresh delay.

Note: setting COMMUN2.ModbusCmdTimeFilter to zero completely disables this time filter.

Software versions:

Modbus Register (nMbHR)	Jbus register (nJbR)	aRN (hex)	Variable	Value definition
40,250-40,256	249-255	0xf9-0xff	Software version of the control processor	16 characters, zero terminated
40,257	256	0x100	Software version of the regulation co-coprocessor	MSB: major version LSB: minor version
40,248	257	0x101	Modbus table version	

All holding registers in this table have a read-only access.

Setup time and date:

Modbus Register (nMbHR)	Jbus register (nJbR)	aRN (hex)	Variable	Value definition
40,259	258	0x102	Preload command	In order to set time and date, this register must be set to value of COMMUN2.ModbusCmdCookie When read it always returns zero
40,260-40,261	259-260	0x103-0x104	Date and time in local time given in seconds since 2000/1/1 at 00:00:00	This 32- bit value is coded as Most Significant Word at first address and Less Significant Value at second address

Input variables for equations:

Modbus Register (nMbHR)	Jbus register (nJbR)	aRN (hex)	Variable	Value definition
40, 262	261	0x105	First input register for equations	0 to 65,535
40, 263	262	0x106	Second input register for equations	0 to 65,535

- These registers can be read by equations as MB1, MB2 variables.
- They are not stored in flash by the GCAU: after a reset, equations will read them as zero prior to being written through Modbus.
- All holding registers in this table have read-write access.

Reserved registers:

The following registers are reserved. They are accessible but still unused. The reason for them is to implement Modbus gateways (such as Profibus) that map these registers in addition to the registers above. This allows those gateways to be compatible with future mappings.

Modbus Register (nMbHR)	Jbus register (nJbR)	aRN (hex)	Variable	Value definition
40,050-40,065	49-64	0x31-0x40	Reserved	Read only – returns 0xffff
40,129-40,149	128-148	0x80-0x94		
40,157-40,158	156-157	0x9c-0x9d		
40,207-40,209	206-208	0xce-0xd0		Read/write Accepts all Returns 0xffff
40,264-40,275	263-274	0x107-0x112		
40,300-40,331	299-330	0x12b - 0x14a		Read only – returns 0xffff

Note: Modbus registers 40,207-40,209 can only be written to, one by one.

Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

I/O LIST

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DIGITAL I/O

Cabinet	Designation	Type	Terminals	Component
BY-PASS	Cabinet fan fault	DO	X12 | 7-8-9	A90
BY-PASS	Common fault distribution breakers	DO	X12 | 10-11-12	QF31 ... QF49
BY-PASS	Manual by-pass switch position	DO	X12 | 1-2-3	Q29
BY-PASS	Surge arrester status	DO	X12 | 4-5-6	F25
UPS A/B	Inverter operation	DO	X3 | 1-2-3	A12
UPS A/B	Static switch operation	DO	X3 | 4-5-6	A12
UPS A/B	Rectifier fault or mains fault	DO	X3 | 7-8-9	A12
UPS A/B	Minimum battery voltage	DO	X3 | 10-11-12	A12
UPS A/B	General cumulative UPS fault	DO	X4 | 1-2-3	A12
UPS A/B	Static switch blocked	DO	X3 | 1-2-3	A13
UPS A/B	Fan fault	DO	X3 | 4-5-6	A13
UPS A/B	Battery room fan on	DO	X3 | 7-8-9	A13
UPS A/B	Inverter remote off command	DI	X5 | 1-2	A12
UPS A/B	Battery room fan fault - charge inhibit	DI	X4 | 1-2	A13
UPS A/B	Spare	DI	X4 | 3-4	A13

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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

MODBUS REGISTER LIST

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LEGENDA	
W	Warning
A	Alarm
I	Information

Device profile of a three-phase UPS

Status:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Reg.	Bit no.	Type	Name	Description
1	3-0	WORD	UPSStatus	UPS status: 1=Normal mode 2=Bypass mode 3=Battery mode 4=Eco mode **"O"** 6=Deactivation is imminent 7=Off

Alarms:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Reg.	Bit no.	Type	Name	Description (1=active)
2	0	WORD	NonCriticalFault	W: Collective warning
3	0	WORD	CriticalFault	A: Collective alarm
4	0	WORD	Userdef_DigIn1Active	W: **"O"**
5	0	WORD	Userdef_DigIn2Active	W: **"O"**
6	0	WORD	Userdef_DigIn3Active	W: **"O"**
7	0	WORD	EmergencySwitchOff	A: UPS output off **"O"**
8	0	WORD	DouCanFault	W: DOU CAN fault
9	0	WORD	MainsFault	W: Rectifier/bypass mains fault
10	0	WORD	RectifierWarning	W: Rectifier warning
11	0	WORD	RectifierFault	A: Rectifier fault
12	0	WORD	BatteryAlarm	A: Battery fault
13	0	WORD	InverterWarning	W: Inverter warning
14	0	WORD	InverterFault	A: Inverter fault
15	0	WORD	SBSWarning	W: Bypass warning
16	0	WORD	SBSFault	A: Bypass fault
17	0	WORD	EqualisingCharge	I: Charger status – equalising charging
18	0	WORD	Charge	I: Charger status – charging
19	0	WORD	TrickleCharge	I: Charger status – trickle charging
20	0	WORD	GenSetOperation	I: Charger status: Em. power supply **"O"**
21	0	WORD	BattTemp.SensFault	W: Battery temp. sensor **"O"**
22	0	WORD	BatteryTemp.ToHigh	W: Battery temp. too high **"O"**
23	0	WORD	CircuitBreaker	W: Circuit-breaker tripped **"O"**
24	0	WORD	BatteryWarning	W: Battery warning
25	0	WORD	BatteryLow	W: Battery undervoltage
26	0	WORD	Overload	W: Inverter overload
27	0	WORD	FanFault	W: Fan fault
28	0	WORD	Overload	A: Inverter overload
29	0	WORD	ShortCircuit	A: Inverter short-circuit
30	0	WORD	DcUnderVoltage	A: Inverter DC undervoltage
31	0	WORD	DcOverVoltage	A: Inverter DC overvoltage
32	0	WORD	PowerStackOverTemp	A: Inverter stack fault
33	0	WORD	SBSReady	I: Bypass ready
34	0	WORD	SBSMainsFault	W: Bypass mains fault
35	0	WORD	SBSBlocked	W: Bypass blocked
36	0	WORD	RectifierOn	I: Rectifier on
37	0	WORD	InverterOn	I: Inverter on
38	0	WORD	SBSOn	I: Bypass on

Device profile of a three-phase UPS

Measured values:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Rectifier mains:

Register	Bit no.	Type	Name	Value range
39	15-0	WORD10	RectMainsFreq.	0.0 - 99.0 Hz
40	15-0	WORD	RectMainsVoltL1	0 - 999 V
41	15-0	WORD	RectMainsVoltL2	0 - 999 V
42	15-0	WORD	RectMainsVoltL3	0 - 999 V

Bypass mains:

Register	Bit no.	Type	Name	Value range
43	15-0	WORD10	SBSMainsFreq.	0.0 – 99.9 Hz
44	15-0	WORD	SBSMainsVoltL1	0 – 999 V
45	15-0	WORD	SBSMainsVoltL2	0 – 999 V
46	15-0	WORD	SBSMainsVoltL3	0 – 999 V

Battery values:

Register	Bit no.	Type	Name	Value range
47	15-0	WORD	BatteryVoltage	0 - 999 V
48	15-0	INT10	BatteryCurrent	+- 0.0 - 3000.0 A
49	15-0	WORD10	AutonomyTime	0.0 – 999.0 min
50	15-0	WORD	BatteryCapacity	0 - 100%
51	15-0	INT10	BatteryTemperature	+- 0.0 - 99.9 °C **"O"**

UPS output:

Register	Bit no.	Type	Name	Value range
52	15-0	WORD10	OutputFreq.	0.0 – 99.0 Hz
53	15-0	WORD	OutputVoltageL1	0 – 999 V
54	15-0	WORD	OutputLoadL1	0 – 100 %
55	15-0	WORD	OutputCurrentL1	0 – 9999 A
56	15-0	WORD10	OutputPowerL1	0.0 – 1000.0 kW
57	15-0	WORD	OutputVoltageL2	0 – 999 V
58	15-0	WORD	OutputLoadL2	0 – 100 %
59	15-0	WORD	OutputCurrentL2	0 – 9999 A
60	15-0	WORD10	OutputPowerL2	0.0 – 1000.0 kW
61	15-0	WORD	OutputVoltageL3	0 – 999 V
62	15-0	WORD	OutputLoadL3	0 – 100 %
63	15-0	WORD	OutputCurrentL3	0 – 9999 A
64	15-0	WORD10	OutputPowerL3	0.0 – 1000.0 kW

LifeCheck:

Register	Bit no.	Type	Name	Value range
65	0	WORD	LifeCheck	Bit 0-1 toggled 1x per minute

Device profile of a three-phase UPS

Auxiliary signals (for units with user-definable signals):

Reg.	Bit no.	Type	Name	Description
66	0	WORD	Userdef_AUX1 – Rect.	**"O"**
67	0	WORD	Userdef_AUX2 – Rect.	**"O"**
68	0	WORD	Userdef_AUX3 – Rect.	**"O"**
69	0	WORD	Userdef_AUX4 – Rect.	**"O"**
70	0	WORD	Userdef_AUX5 – Rect.	**"O"**
71	0	WORD	Userdef_AUX6 – Rect.	**"O"**
72	0	WORD	Userdef_AUX7– Rect.	**"O"**
73	0	WORD	Userdef_AUX1 – Inv.	**"O"**
74	0	WORD	Userdef_AUX2 – Inv.	**"O"**
75	0	WORD	Userdef_AUX3 – Inv.	**"O"**
76	0	WORD	Userdef_AUX4 – Inv.	**"O"**
77	0	WORD	Userdef_AUX5 – Inv.	**"O"**
78	0	WORD	Userdef_AUX6 – Inv.	**"O"**
79	0	WORD	Userdef_AUX7 – Inv.	**"O"**
80	0	WORD	Userdef_AUX1 – SBS	**"O"**
81	0	WORD	Userdef_AUX2 – SBS	**"O"**
82	0	WORD	Userdef_AUX3 – SBS	**"O"**
83	0	WORD	Userdef_AUX4 – SBS	**"O"**
84	0	WORD	Userdef_AUX5 – SBS	**"O"**
85	0	WORD	Userdef_AUX6 – SBS	**"O"**
86	0	WORD	Userdef_AUX7 – SBS	**"O"**

Date/time:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Write: Fct.-Code 6 (Write single Holding Register) or Fct.-Code 16 (Write multiple Holding Register)

Reg.	Bit no.	Type	Name	Description
150	15-0	WORD	Real time (decimal)	Year (20xx)
151	15-0	WORD		Day (0-31)
152	15-0	WORD		Month (1-12)
153	15-0	WORD		Hour (0-23)
154	15-0	WORD		Minute (0-59)
155	15-0	WORD		Second (0-59)
156	15-0	WORD		Millisecond (0-999)
157	15-0	WORD		Weekday 1 = Monday, 2 = Tuesday, …

Device profile of a three-phase UPS

Unit control:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Write: Fct.-Code 6 (Write single Holding Register)

Reg.	Bit no.	Type	Name	Description
1000	15-0	WORD	Rectifier Control	0 = - 1 = ON 2 = OFF 9 = acknowledge fault 10 = equalising charging 11 = charge 12 = trickle charging
1001	15-0	WORD	Inverter Control	0 = - 1 = ON 2 = OFF 3 = Eco mode "**O**" 9 = acknowledge fault
1002	15-0	WORD	SBS Control	0 = - 9 = acknowledge fault
1003	15-0	WORD	**Battery Quick Test** – Control (LB) | Status (HB)	Control (LB) : 0x__00 = - 0x__01 = Start test 0x__02 = Cancel test Status (HB) : 0x00__ = Test not implemented 0x01__ = Test impl., waiting for approval 0x02__ = Test approved 0x03__ = Test running 0x04__ = Test successful 0x05__ = Test cancelled 0x06__ = Test warning 0x07__ = Test error
1004	15-0	WORD	**Battery Capacity Test** (with current load or constant current) – Control (LB) | Status (HB)	Control (LB) : 0x__00 = - 0x__01 = Start test 0x__02 = Cancel test Status (HB) : 0x00__ = Test not implemented 0x01__ = Test impl., waiting for approval 0x02__ = Test approved 0x03__ = Test running 0x04__ = Test successful 0x05__ = Test cancelled 0x06__ = Test warning 0x07__ = Test error
1005	15-0	WORD10	**Battery Capacity Test - RemainingTime**	0.0-6553.0 min

Control: The last accepted control command is read out; if the command failed, the read-out is 0.



In order to guarantee high availability of the load supply, some control commands are only executed if the system meets certain requirements:

Rectifier off => inverter must be off
Inverter off => switching to bypass must be guaranteed
Battery test => the entire system must be in a normal state

Device profile of a three-phase UPS

Battery tests:

In low byte, the battery test registers contain the control commands and in high byte, the associated statuses of the battery tests. Depending on the unit configuration, different battery tests can be initiated:

The **Battery Quick Test** consists of briefly testing the battery charging circuit. This test is also performed cyclically by the unit.

The **Battery Capacity Test** consists of testing the battery capacity. For this purpose, the battery is discharged with the connected load or by a constant current and the battery status is evaluated.
The remaining time of the capacity test can be read in the **Remaining Time** register.

Control battery test (LB):
0x00: The test has never been started via Modbus.
0x01/2: The test has been started/cancelled (the control command remains in place until the next command).
Battery test status (HB):
0x00: The test is not implemented in the unit.
0x01: The test is implemented, but is presently not approved, or the start conditions to execute the test are lacking.
0x02: The test is approved and can be started.
0x03-7: The test result remains in place for a short time until another test is approved.

Example of battery cap. test 1004/1005:
0x0000 0000 Test not implemented, no cap. test approved
0x0100 1000 Test is implemented, not approved, waiting for approval, max. runtime 100.0min
0x0200 1000 Test is approved, max. runtime 100.0min
0x0301 805 Test running; max. remaining runtime 80.5min
0x0401 0000 Test successful, new test not possible
0x0201 1000 Test is re-approved (after approx. 30s)

For further information on the battery tests, see the unit operating instructions.

Base Load Power Hub (BLPH)

AC UPS F&G - TAG: UP-200F4

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Cabinet	Designation	Type	Terminals	Component
BY-PASS	Common fault distribution breakers	DO	X12 | 10-11-12	QF31 ... QF47
BY-PASS	Manual by-pass switch position	DO	X12 | 1-2-3	Q29
BY-PASS	Surge arrester status	DO	X12 | 4-5-6	F25
UPS A/B	Inverter operation	DO	X3 | 1-2-3	A12
UPS A/B	Static switch operation	DO	X3 | 4-5-6	A12
UPS A/B	Rectifier fault or mains fault	DO	X3 | 7-8-9	A12
UPS A/B	Minimum battery voltage	DO	X3 | 10-11-12	A12
UPS A/B	General cumulative UPS fault	DO	X4 | 1-2-3	A12
UPS A/B	Static switch blocked	DO	X3 | 1-2-3	A13
UPS A/B	Fan fault	DO	X3 | 4-5-6	A13
UPS A/B	Battery room fan on	DO	X3 | 7-8-9	A13
UPS A/B	Inverter remote off command	DI	X5 | 1-2	A12
UPS A/B	Battery room fan fault - charge inhibit	DI	X4 | 1-2	A13
UPS A/B	Spare	DI	X4 | 3-4	A13

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Base Load Power Hub (BLPH)

AC UPS F&G - TAG: UP-200F4

MODBUS REGISTER LIST

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LEGENDA	
W	Warning
A	Alarm
I	Information

Device profile of a three-phase UPS

Status:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Reg.	Bit no.	Type	Name	Description
1	3-0	WORD	UPSStatus	UPS status: 1=Normal mode 2=Bypass mode 3=Battery mode 4=Eco mode **"O"** 6=Deactivation is imminent 7=Off

Alarms:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Reg.	Bit no.	Type	Name	Description (1=active)
2	0	WORD	NonCriticalFault	W: Collective warning
3	0	WORD	CriticalFault	A: Collective alarm
4	0	WORD	Userdef_DigIn1Active	W: **"O"**
5	0	WORD	Userdef_DigIn2Active	W: **"O"**
6	0	WORD	Userdef_DigIn3Active	W: **"O"**
7	0	WORD	EmergencySwitchOff	A: UPS output off **"O"**
8	0	WORD	DouCanFault	W: DOU CAN fault
9	0	WORD	MainsFault	W: Rectifier/bypass mains fault
10	0	WORD	RectifierWarning	W: Rectifier warning
11	0	WORD	RectifierFault	A: Rectifier fault
12	0	WORD	BatteryAlarm	A: Battery fault
13	0	WORD	InverterWarning	W: Inverter warning
14	0	WORD	InverterFault	A: Inverter fault
15	0	WORD	SBSWarning	W: Bypass warning
16	0	WORD	SBSFault	A: Bypass fault
17	0	WORD	EqualisingCharge	I: Charger status – equalising charging
18	0	WORD	Charge	I: Charger status – charging
19	0	WORD	TrickleCharge	I: Charger status – trickle charging
20	0	WORD	GenSetOperation	I: Charger status: Em. power supply **"O"**
21	0	WORD	BattTemp.SensFault	W: Battery temp. sensor **"O"**
22	0	WORD	BatteryTemp.ToHigh	W: Battery temp. too high **"O"**
23	0	WORD	CircuitBreaker	W: Circuit-breaker tripped **"O"**
24	0	WORD	BatteryWarning	W: Battery warning
25	0	WORD	BatteryLow	W: Battery undervoltage
26	0	WORD	Overload	W: Inverter overload
27	0	WORD	FanFault	W: Fan fault
28	0	WORD	Overload	A: Inverter overload
29	0	WORD	ShortCircuit	A: Inverter short-circuit
30	0	WORD	DcUnderVoltage	A: Inverter DC undervoltage
31	0	WORD	DcOverVoltage	A: Inverter DC overvoltage
32	0	WORD	PowerStackOverTemp	A: Inverter stack fault
33	0	WORD	SBSReady	I: Bypass ready
34	0	WORD	SBSMainsFault	W: Bypass mains fault
35	0	WORD	SBSBlocked	W: Bypass blocked
36	0	WORD	RectifierOn	I: Rectifier on
37	0	WORD	InverterOn	I: Inverter on
38	0	WORD	SBSOn	I: Bypass on

Device profile of a three-phase UPS

Measured values:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Rectifier mains:

Register	Bit no.	Type	Name	Value range
39	15-0	WORD10	RectMainsFreq.	0.0 - 99.0 Hz
40	15-0	WORD	RectMainsVoltL1	0 - 999 V
41	15-0	WORD	RectMainsVoltL2	0 - 999 V
42	15-0	WORD	RectMainsVoltL3	0 - 999 V

Bypass mains:

Register	Bit no.	Type	Name	Value range
43	15-0	WORD10	SBSMainsFreq.	0.0 – 99.9 Hz
44	15-0	WORD	SBSMainsVoltL1	0 – 999 V
45	15-0	WORD	SBSMainsVoltL2	0 – 999 V
46	15-0	WORD	SBSMainsVoltL3	0 – 999 V

Battery values:

Register	Bit no.	Type	Name	Value range
47	15-0	WORD	BatteryVoltage	0 - 999 V
48	15-0	INT10	BatteryCurrent	+- 0.0 - 3000.0 A
49	15-0	WORD10	AutonomyTime	0.0 – 999.0 min
50	15-0	WORD	BatteryCapacity	0 - 100%
51	15-0	INT10	BatteryTemperature	+- 0.0 - 99.9 °C **"O"**

UPS output:

Register	Bit no.	Type	Name	Value range
52	15-0	WORD10	OutputFreq.	0.0 – 99.0 Hz
53	15-0	WORD	OutputVoltageL1	0 – 999 V
54	15-0	WORD	OutputLoadL1	0 – 100 %
55	15-0	WORD	OutputCurrentL1	0 – 9999 A
56	15-0	WORD10	OutputPowerL1	0.0 – 1000.0 kW
57	15-0	WORD	OutputVoltageL2	0 – 999 V
58	15-0	WORD	OutputLoadL2	0 – 100 %
59	15-0	WORD	OutputCurrentL2	0 – 9999 A
60	15-0	WORD10	OutputPowerL2	0.0 – 1000.0 kW
61	15-0	WORD	OutputVoltageL3	0 – 999 V
62	15-0	WORD	OutputLoadL3	0 – 100 %
63	15-0	WORD	OutputCurrentL3	0 – 9999 A
64	15-0	WORD10	OutputPowerL3	0.0 – 1000.0 kW

LifeCheck:

Register	Bit no.	Type	Name	Value range
65	0	WORD	LifeCheck	Bit 0-1 toggled 1x per minute

Device profile of a three-phase UPS

Auxiliary signals (for units with user-definable signals):

Reg.	Bit no.	Type	Name	Description
66	0	WORD	Userdef_AUX1 – Rect.	**"O"**
67	0	WORD	Userdef_AUX2 – Rect.	**"O"**
68	0	WORD	Userdef_AUX3 – Rect.	**"O"**
69	0	WORD	Userdef_AUX4 – Rect.	**"O"**
70	0	WORD	Userdef_AUX5 – Rect.	**"O"**
71	0	WORD	Userdef_AUX6 – Rect.	**"O"**
72	0	WORD	Userdef_AUX7– Rect.	**"O"**
73	0	WORD	Userdef_AUX1 – Inv.	**"O"**
74	0	WORD	Userdef_AUX2 – Inv.	**"O"**
75	0	WORD	Userdef_AUX3 – Inv.	**"O"**
76	0	WORD	Userdef_AUX4 – Inv.	**"O"**
77	0	WORD	Userdef_AUX5 – Inv.	**"O"**
78	0	WORD	Userdef_AUX6 – Inv.	**"O"**
79	0	WORD	Userdef_AUX7 – Inv.	**"O"**
80	0	WORD	Userdef_AUX1 – SBS	**"O"**
81	0	WORD	Userdef_AUX2 – SBS	**"O"**
82	0	WORD	Userdef_AUX3 – SBS	**"O"**
83	0	WORD	Userdef_AUX4 – SBS	**"O"**
84	0	WORD	Userdef_AUX5 – SBS	**"O"**
85	0	WORD	Userdef_AUX6 – SBS	**"O"**
86	0	WORD	Userdef_AUX7 – SBS	**"O"**

Date/time:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Write: Fct.-Code 6 (Write single Holding Register) or Fct.-Code 16 (Write multiple Holding Register)

Reg.	Bit no.	Type	Name	Description
150	15-0	WORD	Real time (decimal)	Year (20xx)
151	15-0	WORD		Day (0-31)
152	15-0	WORD		Month (1-12)
153	15-0	WORD		Hour (0-23)
154	15-0	WORD		Minute (0-59)
155	15-0	WORD		Second (0-59)
156	15-0	WORD		Millisecond (0-999)
157	15-0	WORD		Weekday 1 = Monday, 2 = Tuesday, …

Device profile of a three-phase UPS

Unit control:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Write: Fct.-Code 6 (Write single Holding Register)

Reg.	Bit no.	Type	Name	Description
1000	15-0	WORD	Rectifier Control	0 = - 1 = ON 2 = OFF 9 = acknowledge fault 10 = equalising charging 11 = charge 12 = trickle charging
1001	15-0	WORD	Inverter Control	0 = - 1 = ON 2 = OFF 3 = Eco mode "**O**" 9 = acknowledge fault
1002	15-0	WORD	SBS Control	0 = - 9 = acknowledge fault
1003	15-0	WORD	**Battery Quick Test** – Control (LB) | Status (HB)	Control (LB) : 0x__00 = - 0x__01 = Start test 0x__02 = Cancel test Status (HB) : 0x00__ = Test not implemented 0x01__ = Test impl., waiting for approval 0x02__ = Test approved 0x03__ = Test running 0x04__ = Test successful 0x05__ = Test cancelled 0x06__ = Test warning 0x07__ = Test error
1004	15-0	WORD	**Battery Capacity Test** (with current load or constant current) – Control (LB) | Status (HB)	Control (LB) : 0x__00 = - 0x__01 = Start test 0x__02 = Cancel test Status (HB) : 0x00__ = Test not implemented 0x01__ = Test impl., waiting for approval 0x02__ = Test approved 0x03__ = Test running 0x04__ = Test successful 0x05__ = Test cancelled 0x06__ = Test warning 0x07__ = Test error
1005	15-0	WORD10	**Battery Capacity Test - RemainingTime**	0.0-6553.0 min

Control: The last accepted control command is read out; if the command failed, the read-out is 0.



In order to guarantee high availability of the load supply, some control commands are only executed if the system meets certain requirements:

Rectifier off => inverter must be off
Inverter off => switching to bypass must be guaranteed
Battery test => the entire system must be in a normal state

Device profile of a three-phase UPS

Battery tests:

In low byte, the battery test registers contain the control commands and in high byte, the associated statuses of the battery tests. Depending on the unit configuration, different battery tests can be initiated:

The **Battery Quick Test** consists of briefly testing the battery charging circuit. This test is also performed cyclically by the unit.

The **Battery Capacity Test** consists of testing the battery capacity. For this purpose, the battery is discharged with the connected load or by a constant current and the battery status is evaluated.
The remaining time of the capacity test can be read in the **Remaining Time** register.

Control battery test (LB):
0x00: The test has never been started via Modbus.
0x01/2: The test has been started/cancelled (the control command remains in place until the next command).
Battery test status (HB):
0x00: The test is not implemented in the unit.
0x01: The test is implemented, but is presently not approved, or the start conditions to execute the test are lacking.
0x02: The test is approved and can be started.
0x03-7: The test result remains in place for a short time until another test is approved.

Example of battery cap. test 1004/1005:
0x0000 0000 Test not implemented, no cap. test approved
0x0100 1000 Test is implemented, not approved, waiting for approval, max. runtime 100.0min
0x0200 1000 Test is approved, max. runtime 100.0min
0x0301 805 Test running; max. remaining runtime 80.5min
0x0401 0000 Test successful, new test not possible
0x0201 1000 Test is re-approved (after approx. 30s)

For further information on the battery tests, see the unit operating instructions.

Base Load Power Hub (BLPH)

SPARE PART INDEX REGISTER
(COMMISSIONING, 2-YEAR's OPERATION, INSURANCE)

Document Number: 1724000372-EL-LIS-00026

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
Andrea Fadoschi	04/02/2025

Document Class: 3

01	29/01/2025	Issue for Information (IFI)	DA	DA	AD
00	10/10/2024	Issue for Information (IFI)	DA	DA	AD
Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)

HOLDS LIST

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Base Load Power Hub (BLPH)

AC UPS - TAG: UP-200F3

AC UPS - TAG: UP-200F4

DC UPS - TAG: UP-200F1

COMMISSIONING AND 2-YEARS SPARE PARTS

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SPARE PARTS LIST

CROSSWIND

Document Title	COMMISSIONING AND 2-YEARS SPARE PARTS LIST				
The document relates to	HOLLANDSE KUST NOORD WIND PARK Project - Base Load Power Hub (BLPH)				Contract: CW-I-WP4-2023-05
Project ID	123A90	Doc. n°	1724000372-EL-LIS-00026	Rev.: ISSUED FOR REVIEW (IFR)	Rev. Date: 00 - 10/10/2024	Status: IFR	Class: 2

The equipment consists of the following units/components

1	Tag no.	UP-200F3 A/B	UP-200F4 A/B	UP-200F1 A/B		
2	Tag description	PROTECT 8.33 S10 40KVA IP43	PROTECT 8.33 S10 20KVA IP43	PROTECT RCS TPRE 110V-100A		
3	Manufacturer model/type no.	PROTECT 8.33 S10 40KVA	PROTECT 8.33 S10 20KVA	PROTECT RCS TPRE 110V-100A		
4	Manufacturer serial no.					
5	No. of units	2	2	2		
6	Quantity of parts FITTED / INSTALLED per unit/component					

Supplier: **AEG POWER SOLUTIONS / 3W POWER S.p.A.** PO Number: **1724000372 123A90A** PO description: **AC AND DC UPS SYSTEMS** Contact name: **Mr. ALBERTO DALL'ASTA**

Address: **VIA ROMA 108**, **CASSINA DE' PECCHI (MI)**, **ITALY** Supplier telephone no: **+39 348 1567 197** Contact mobile no:

E-mail: alberto.dall_asta@aegps.com WEBSITE www.aegps.com

General Information:

Item Number	Total number of identical spares installed	MATERIALS DATA: Description of recommended spare parts	Parts/drawing ref.: Project Datasheet no.	Parts/drawing ref.: Project Detail dwg. no.	Parts/drawing ref.: Item ref.	Material	Certicate Type (if applicable)	Certicate Reference (if applicable)	Shelf life (years)	Weight (net)	Weight (gross)	Volume	HS Code	ECCN Code	% US Content	Country of origin	Supplier part no.	Manufacturer part no.	Manufacturername	Commissioning spares: Quantity ordered	2 Years spares: Quantity ordered	Remarks
7		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	36	FUSE 6,3 X 32 F5A 500VAC	1724000372-EL-DS-00005	1724000372-EL-DG-00009	-	FUSE	-		5								40000167	40000167	AEG POWER SOLUTIONS	20	-	REF: A8-A92.1-F1/F2/F3 - A8-A92.2-F1/F2/F3/F6/F7/F8
2	16	G-FUSE 6,3 X 32 F4A 440V KTA/UL	1724000372-EL-DS-00005	1724000372-EL-DG-00009	-	FUSE	-		5								40000185	40000185	AEG POWER SOLUTIONS	20	-	REF: A8-A92.1-F4/F5 - A8-A92.2-F4/F5
3	4	FUSE 6,3 X 32 T8A 500VAC KTA	1724000372-EL-DS-00005	1724000372-EL-DG-00009	-	FUSE	-		5								40003889	40003889	AEG POWER SOLUTIONS	20	-	REF: A8-A92.1-F6
4	4	G-FUSE 6,3 X 32 M2A 500V	1724000372-EL-DS-00005	1724000372-EL-DG-00009	-	FUSE	-		5								40007485	40007485	AEG POWER SOLUTIONS	20	-	REF: A8-A92.1-F9
5	4	619 ADD. REMOTE SIGNAL. OPTION-2 F UPS	1724000372-EL-DS-00005	1724000372-EL-DG-00009	-	BOARD	-		5								20001839	20001839	AEG POWER SOLUTIONS	-	2	REF: A13
6	4	261 SBS INTERFACE P8 3-PHASE	1724000372-EL-DS-00005	1724000372-EL-DG-00009	-	BOARD	-		5								20000239	20000239	AEG POWER SOLUTIONS	-	2	REF: A16
7	4	261 INVERTER INTERFACE P8 3-PHASE	1724000372-EL-DS-00005	1724000372-EL-DG-00009	-	BOARD	-		5								20000240	20000240	AEG POWER SOLUTIONS	-	2	REF: A17
8	4	261 RECTIFIER INTERFACE P8	1724000372-EL-DS-00005	1724000372-EL-DG-00009	-	BOARD	-		5								20000235	20000235	AEG POWER SOLUTIONS	-	2	REF: A20
9	32	FUSE CER. 5 X 20 T3,15A 250VAC	1724000372-EL-DS-00005	1724000372-EL-DG-00008	-	FUSE	-		5								ES274292	ES274292	AEG POWER SOLUTIONS	10	-	REF: A30-F1/F5/F12/F13/F22/F23/F31/F73/F100
10	8	CYL. FUSE 5 X 20 2,5A SP 380V S	1724000372-EL-DS-00005	1724000372-EL-DG-00008	-	FUSE	-		5								ES213368	ES213368	AEG POWER SOLUTIONS	10	-	REF: F25/F32
11	2	PCB EQUIP. GCAU V3 VERNISH	1724000372-EL-DS-00005	1724000372-EL-DG-00008	-	BOARD	-		5								ES272500	ES272500	AEG POWER SOLUTIONS	-	1	REF: A1
12	2	PCB RELAY PROTECT RCS VARNISH	1724000372-EL-DS-00005	1724000372-EL-DG-00008	-	BOARD	-		5								ES228540	ES228540	AEG POWER SOLUTIONS	-	1	REF: CR1-A5
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Base Load Power Hub (BLPH)

INSPECTION AND TEST PLAN

Document Number: 1724000372-QC-ITP-00002

Document Class: 2

ROSETTI MARINO	
1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED
NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.	
Sign	Date
ROSETTI MARINO S.p.A. Technical Office Quality Control Dept.	10/07/2024

01	08/06/2024	Accepted for Construction (AFC)	DA	DA	AD
00	25/03/2024	Issue for Review (IFR)	DA	DA	AD
Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)

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INSPECTION AND TEST PLAN 4

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Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1
AC UPS PAS - TAG: UP-200F3
AC UPS F&G - TAG: UP-200F4
INSPECTION AND TEST PLAN

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

ROSETTI MARINO	PLAN OF INSPECTIONS AND TESTS	Identification Code	
		1724000372-QC-ITP-00002	
	AC AND DC UPS SYSTEMS	Page **1** of **6**	Rev. 01

3W power a company of AEG POWER SOLUTIONS	**Design norms:**	IEC/EN 62040 - 2022 IEC/EN 60146 - 2019 IEC/EN 60896 - 2020	**Inspection level:**			
	Materials:	AC AND DC UPS SYSTEMS				
	Supplier:	3W Power S.p.A.			No of Supplier's project:	NI-1584

Stage	Position	Works connected with quality provision	Reference documents	Acceptance criteria / confirming documents	Necessity of report (yes/no)	**Participation**					**Note**
						Sub-supplier	Supplier	Contractor	Company / Owner	AI / NB	

Inspection method:

I - monitoring the progress of a process or control operation

V - performance of inspection or verification of implementation of the technological process

R - documentation verification (records, reports, protocols, certificates)

W - inspection and testing shall be carried out only in the presence of an inspector

H - waiting point, the work can be continued only with the approval of the inspector

S - during the operation subcontractor's services will be used

(*) In case of participation of the supplier all the validation performed on the plant should be treated as "H" (the CONTROL WITH the SUSPENSION of WORK) for sub-supplier.

(**) The Supplier's participation in the sub-Supplier inspection shall be at least the same as that of the Contractor/Customer.

Columns related to "Company/Owner" should be filled in with participation of the project office of Customer and Contractor. Any changes in the participation type should go through the preliminary approval with the design group of Contractor and Project office of the Customer. "NB" means "notified body". Contents of the column should be agreed with the project group of Contractor and project office of Customer.

At the end of inspection activities, all parties involved must sign and date all types of checks performed through inspection or monitoring.

Abbreviations:

ED - engineering documentation;

NTD - normative and technical documents;

VMC - visual and measuring control;

SPA - spare parts and accessories;

Item: AC UPS					TAG: UP-200F3, UP-200F4						
Stage	**Position**	**Works connected with quality provision**	**Reference documents**	**Acceptance criteria / Confirming documents**	**Need for a report (Yes/No)**	**Sub-supplier**	**3W Power**	**Rosetti Marino**	**CrossWind**	**AI / NB**	**Note**
Before manufacture	A1.1	**Material Purchase** - Sub-Supplier assessment by Quality and Supply-History with SAP - Raw material test / assessment / release by R&D Department regarding technical data - Raw materials are described with IT-System No. (SAP/R3)	AEG Standard Procedures	General AEG Instruction Material Management	No	-	R	R	R		
	A1.2	**Incoming Material Inspection** - Identification test regarding technical data - Test Instruction described in SAP QM-Module	AEG Standard Procedures	AEG Standard	No	-	R	R	R		
	A1.3	**Pre-Inspection Meeting (PIM)**	PIM Agenda	PIM Report	Yes	-	W	W	R		
During manufacture	A2.1	**Internal Routine Test of UPS** - Visual check for missing parts (Check Parts List) - Check of labels - Check of Cabinet Design - Routing of cables - Mechanical Construction - Check of Screws / Bolts / Nuts - Check of protection of electrical shock hazard (IP)	IEC 62040 IEC 60146 1724000372-EL-DA-00004 1724000372-EL-DG-00007 1724000372-EL-DG-00009	Visual Inspection	Yes	-	R	R	R		
	A2.2	**Internal Routine Test of UPS** - Functional tests	IEC 62040 IEC 60146 1724000372-EL-DA-00004 1724000372-EL-DG-00007 1724000372-EL-DG-00009	Functional Inspection	Yes	-	R	R	R		
Final testing	A3.1	**Factory Acceptance Test** - General design - Dimensional check - Installation of technical components (easy accessibility and removal of components) - Check of good practice construction - Wiring check - Protection against touching - Nameplate / Painting / Marking	1724000372-QC-PRO-00017 1724000372-EL-DA-00004 1724000372-EL-DG-00007 1724000372-EL-DG-00009 IEC 62040 IEC 60146	Visual Acceptance Test	Yes	-	H	W	W		
	A3.2	**Factory Acceptance Test** - Functional tests	1724000372-QC-PRO-00017 1724000372-EL-DA-00004 1724000372-EL-DG-00007 1724000372-EL-DG-00009 IEC 62040 IEC 60146	Electrical Acceptance test	Yes	-	H	W	W		
	A3.3	**Review all test report and certificate** including Type Tests released by External Body	FAT report Routine Test report Type Test report Type Test certficate CE certificate	Visual check	No	-	R	R	R		
Doc	A4.1	**Packing, Shipping and Preservation Inspection**	1724000372-QC-PRO-00027	Final Acceptance	Yes	-	R	R	R		
	A4.2	**Issue release note**	Approved documentation	Signed note from Inspector	Yes	-	H	H	R		

REFERENCE PROJECT DOCUMENTS :

1724000372-EL-DA-00004	-	AC UPS - GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS
1724000372-EL-DG-00007	-	AC UPS - SINGLE LINE DIAGRAM and INTERCONNECTING DIAGRAM
1724000372-EL-DG-00009	-	AC UPS - WIRING DIAGRAM & TERMINAL SCHEDULE INCLUDING EQUIPMENTS LIST & BILL OF MATERIAL
1724000372-QC-PRO-00017	-	AC UPS - FACTORY ACCEPTANCE TEST PROCEDURE
1724000372-QC-PRO-00027	-	PACKING, PREPARATION FOR SHIPPING + HANDLING AND STORAGE PROCEDURES

Item: DC UPS					TAG: UP-200F1						
Stage	**Position**	**Works connected with quality provision**	**Reference documents**	**Acceptance criteria / Confirming documents**	**Need for a report (Yes/No)**	**Sub-supplier**	**3W Power**	**Rosetti Marino**	**CrossWind**	**AI / NB**	**Note**
Before manufacture	A1.1	**Material Purchase** - Sub-Supplier assessment by Quality and Supply-History with SAP - Raw material test / assessment / release by R&D Department regarding technical data - Raw materials are described with IT-System No. (SAP/R3)	AEG Standard Procedures	General AEG Instruction Material Management	No	-	R	R	R		
	A1.2	**Incoming Material Inspection** - Identification test regarding technical data - Test Instruction described in SAP QM-Module	AEG Standard Procedures	AEG Standard	No	-	R	R	R		
	A1.3	**Pre-Inspection Meeting (PIM)**	PIM Agenda	PIM Report	Yes	-	W	W	R		
During manufacture	A2.1	**Internal Routine Test of UPS** - Visual check for missing parts (Check Parts List) - Check of labels - Check of Cabinet Design - Routing of cables - Mechanical Construction - Check of Screws / Bolts / Nuts - Check of protection of electrical shock hazard (IP)	IEC 62040 IEC 60146 1724000372-EL-DA-00003 1724000372-EL-DG-00006 1724000372-EL-DG-00008	Visual Inspection	Yes	-	R	R	R		
	A2.2	**Internal Routine Test of UPS** - Functional tests	IEC 62040 IEC 60146 1724000372-EL-DA-00003 1724000372-EL-DG-00006 1724000372-EL-DG-00008	Functional Inspection	Yes	-	R	R	R		
Final testing	A3.1	**Factory Acceptance Test** - General design - Dimensional check - Installation of technical components (easy accessibility and removal of components) - Check of good practice construction - Wiring check - Protection against touching - Nameplate / Painting / Marking	1724000372-QC-PRO-00017 1724000372-EL-DA-00003 1724000372-EL-DG-00006 1724000372-EL-DG-00008 IEC 62040 IEC 60146	Visual Acceptance Test	Yes	-	H	W	W		
	A3.2	**Factory Acceptance Test** - Functional tests	1724000372-QC-PRO-00016 1724000372-EL-DA-00003 1724000372-EL-DG-00006 1724000372-EL-DG-00008 IEC 62040 IEC 60146	Electrical Acceptance test	Yes	-	H	W	W		
	A3.3	**Review all test report and certificate** including Type Tests released by External Body	FAT report Routine Test report Type Test report Type Test certficate CE certificate	Visual check	No	-	R	R	R		
Doc	A4.1	**Packing, Shipping and Preservation Inspection**	1724000372-QC-PRO-00027	Final Acceptance	Yes	-	R	R	R		
	A4.2	**Issue release note**	Approved documentation	Signed note from Inspector	Yes	-	H	H	R		

REFERENCE PROJECT DOCUMENTS :

1724000372-EL-DA-00003	-	DC UPS - GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS
1724000372-EL-DG-00006	-	DC UPS - SINGLE LINE DIAGRAM and INTERCONNECTING DIAGRAM
1724000372-EL-DG-00008	-	DC UPS - WIRING DIAGRAM & TERMINAL SCHEDULE INCLUDING EQUIPMENTS LIST & BILL OF MATERIAL
1724000372-QC-PRO-00016	-	DC UPS - FACTORY ACCEPTANCE TEST PROCEDURE
1724000372-QC-PRO-00027	-	PACKING, PREPARATION FOR SHIPPING + HANDLING AND STORAGE PROCEDURES

Item: BATTERY AND BATTERY PROTECTION BOX					TAG: BA-200F1, CB-200F1, BA-200F3, CB-200F3, BA-200F4, CB-200F4						
Stage	**Position**	**Works connected with quality provision**	**Reference documents**	**Acceptance criteria / Confirming documents**	**Need for a report (Yes/No)**	**Sub-supplier**	**3W Power**	**Rosetti Marino**	**CrossWind**	**AI / NB**	**Note**
	A1.1	**Pre-Inspection Meeting (PIM)**	PIM Agenda	PIM Report	Yes	-	W	W	R		
During manufacture	A2.1	**Internal Routine Test** - Visual check for missing parts (Check Parts List) - Check of labels - Check of Cabinet Design - Routing of cables - Mechanical Construction - Check of Screws / Bolts / Nuts - Check of protection of electrical shock hazard (IP)	IEC 60896 1724000372-EL-DG-00010 1724000372-EL-DG-00011	Visual Inspection	Yes	-	R	R	R		
Final testing	A3.1	**Factory Acceptance Test** - General design - Dimensional check - Installation of technical components (easy accessibility and removal of components) - Check of good practice construction - Wiring check - Protection against touching - Nameplate / Painting / Marking	IEC 60896 1724000372-EL-DG-00010 1724000372-EL-DG-00011	Visual Acceptance Test	Yes	-	H	W	W		
	A3.2	**Review all test report and certificate** including Type Tests released by External Body	FAT report Routine Test report Type Test certficate CE certificate	Visual check	No	-	R	R	R		
Doc	A4.1	**Packing, Shipping and Preservation Inspection**	1724000372-QC-PRO-00027	Final Acceptance	Yes	-	R	R	R		
	A4.2	**Issue release note**	Approved documentation	Signed note from Inspector	Yes	-	H	H	R		

REFERENCE PROJECT DOCUMENTS :

1724000372-EL-DG-00010 - DC UPS - BATTERY LAYOUT AND INTERCONNECTION DIAGRAM

1724000372-EL-DG-00011 - AC UPS - BATTERY LAYOUT AND INTERCONNECTION DIAGRAM

1724000372-QC-PRO-00027 - PACKING, PREPARATION FOR SHIPPING + HANDLING AND STORAGE PROCEDURES

Base Load Power Hub (BLPH)

DC UPS - FACTORY ACCEPTANCE TEST PROCEDURE

Document Number: 1724000372-QC-PRO-00016

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

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DC UPS - FACTORY ACCEPTANCE TEST PROCEDURE 4

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Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1
FACTORY ACCEPTANCE TEST PROCEDURE

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Project	Hollandse Kust Noord (HKN) wind farm
Client	ROSETTI MARINO
Equipment/s to be tested during FAT	1 x 2TPRE 110V 100A 10x FLG12-150 (CHARG.1) 1 x 2TPRE 110V 100A 10x FLG12-150 (CHARG.2)
Serial number	TPRE 3855/01 TPRE 3855/02
Order number	4400007526 (OV59193)

Participants:

TESTED BY	WITNESSED BY	DATE

Name	Company	Signature

☐ ACCEPTED ☐ ACCEPTED WITH COMMENTS ☐ REFUSED

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AEG POWER SOLUTIONS

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1. SCOPE

The scope of this document is to describe the test procedure to follow during the factory acceptance test of the system, and to record the values measured during the tests.

List of equipment within the scope of the PO:

EQUIPMENTS			
TAG	***Serial Number***	***Code***	***Description***
	TPRE3855/01	*ES521464A1*	*2x TPRE 110V 100A 10x FLG12-150 (CHARG.1)*
	TPRE3855/02	*ES521464A2*	*2x TPRE 110V 100A 10x FLG12-150 (CHARG.2)*
		ES521464R1	*SPARES 2x TPRE 110V 100A 10x FLG12-150*
		ES521464R2	*SPA.2YEARS 2x TPRE 110V 100A 10x FLG12-150*

List of equipment subjected to FAT:

EQUIPMENTS			
TAG	***Serial Number***	***Code***	***Description***
	TPRE3855/01	*ES521464A1*	*2x TPRE 110V 100A 10x FLG12-150 (CHARG.1)*
	TPRE3855/02	*ES521464A2*	*2x TPRE 110V 100A 10x FLG12-150 (CHARG.2)*

2. REFERENCE DOCUMENTS

ref. **1724000372-EL-DA-00003** DC UPS - GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS
ref. **1724000372-EL-DG-00006** DC UPS - SINGLE LINE DIAGRAM and INTERCONNECTING DIAGRAM
ref. **1724000372-EL-DG-00008** DC UPS - WIRING DIAGRAM & TERMINAL SCHEDULE

These documents include the electrical values, single line drawing, electrical drawing, internal mechanical layout and general arrangement drawing.

3. TESTING EQUIPMENT

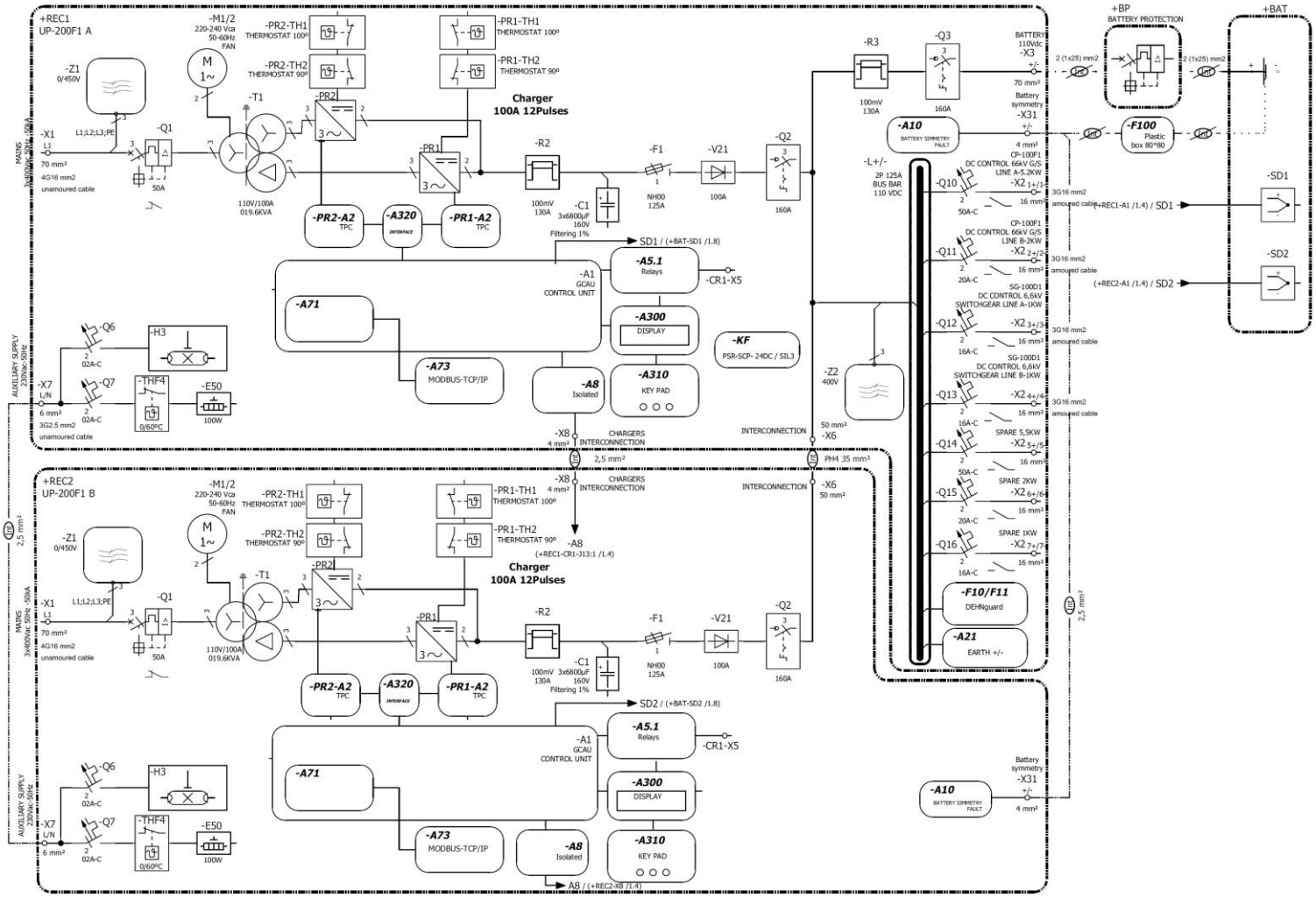
MEASURING DEVICE	SERIAL NUMBER	CALIBRATED UNTIL
MULTIMETER		
MULTIMETER		
CURRENT CLAMP		
OSCILLOSCOPE		
MAINS VOLTAGE VARIATOR		
RESISTIVE ADJUSTABLE LOAD		

AEG internal testing battery bank: The client's batteries are never subjected to tests. Therefore, they are never connected for FAT development.

Calibration certificates can be provided upon request for all testing equipment.

AEG POWER SOLUTIONS

4. CONNECTION DIAGRAM



5. VISUAL INSPECTION

5.1. General construction

Check	Conformity with drawings
Location and labelling components identifications	
Cabinet TAGs labelling	
Cabinet name plate	
Paint (RAL7035)	
Protection degree (IP43)	
Dimensional check	
Cabling (numbering, crimping) & assembly (connection torque)	

5.2. Protections

Check	Conformity with drawings
Mains protections	
Load protections	
Battery switch/Breaker/Fuse	
Auxiliary devices protections	
Provision for cabinet earthing (bar X0, ground cabling)	

6. FUNCTIONAL INSPECTION

6.1. Static test

Ambient temperature during the tests: ……. °C

6.2. Functional test

Initial state : Charger is OFF
Input circuit breaker Q1 is open
Output switch (Q2) and battery switch (Q3) are open

Starting : Charger is powered ON by closing the input circuit breaker Q1
Output switch (Q2) and battery switch (Q3) are closed
Only the charger subject to the test is ON
The mains is adjusted to its nominal value

Test description : The load is adjusted to 10, 50 and 100% of the system nominal load
The input and output electrical values are recorded and shall remain within the acceptance criteria
The tests are done in floating and high rate mode

Rectifier and load output voltage : CHARGER 1

Mode	Rectifier output power	AC mains voltage	Rectifier output current	Rectifier output voltage to obtain (VBAT)	Measured rectifier output voltage	Load output voltage to obtain (VBAT-V21)	Measured load output voltage	Conformity (Yes/No)
Floating	10%	3x400Vac	10A	136,8V +/-1%	V	136,1V+/-1%	V	
Floating	50%	3x400Vac	50A	136,8V +/-1%	V	136,1V+/-1%	V	
Floating	100%	3x400Vac	100A	136,8V +/-1%	V	136,1V+/-1%	V	
High rate	10%	3x400Vac	10A	136,8V +/-1%	V	136,1V+/-1%	V	
High rate	50%	3x400Vac	50A	136,8V +/-1%	V	136,1V+/-1%	V	
High rate	100%	3x400Vac	100A	136,8V +/-1%	V	136,1V+/-1%	V	

(*) The rectifier voltage shall be corrected with the temperature compensation ratio if applicable.

Rectifier output ripple voltage: CHARGER1

Mode	Rectifier output power	AC mains voltage	Rectifier output current	Ripple voltage to obtain	Measured ripple voltage	Conformity (Yes/No)
Floating	100%	3x400V	100A	<5% of U nominal DC without battery		

Rectifier and load output voltage : CHARGER 2

Mode	Rectifier output power	AC mains voltage	Rectifier output current	Rectifier output voltage to obtain (VBAT)	Measured rectifier output voltage	Load output voltage to obtain (VBAT-V21)	Measured load output voltage	Conformity (Yes/No)
Floating	10%	3x400Vac	10A	136,8V +/-1%	V	136,1V+/-1%	V	
Floating	50%	3x400Vac	50A	136,8V +/-1%	V	136,1V+/-1%	V	
Floating	100%	3x400Vac	100A	136,8V +/-1%	V	136,1V+/-1%	V	
High rate	10%	3x400Vac	10A	136,8V +/-1%	V	136,1V+/-1%	V	
High rate	50%	3x400Vac	50A	136,8V +/-1%	V	136,1V+/-1%	V	
High rate	100%	3x400Vac	100A	136,8V +/-1%	V	136,1V+/-1%	V	

(*) The rectifier voltage shall be corrected with the temperature compensation ratio if applicable.

Rectifier output ripple voltage: CHARGER 2

Mode	Rectifier output power	AC mains voltage	Rectifier output current	Ripple voltage to obtain	Measured ripple voltage	Conformity (Yes/No)
Floating	100%	3x400V	100A	<5% of U nominal DC without battery		

6.3. Alarm test

Description	*Relay*	*Display*	*LED Box*	*Result (OK/NOK/Not applicable)*	
				CH 1	**CH 2**
MAINS FAULT					
RECTIFIER FAULT					
HIGH VOLTAGE C.C					
LOW VOLTAGE D.C.					
BATTERY LOW VOLTAGE					
EARTH FAULT +					
EARTH FAULT -					
COMMON ALARM					

7. ADDITIONAL TESTS

7.1. Parallel redundancy tests

Initial state : Both chargers are OFF
Input breakers Q1 are open
Output switches (Q2) and battery switch (Q3) are open

Starting : Chargers are powered ON by closing input breakers Q1
Output switches Q1 are closed to put the two chargers in parallel
Battery switch Q3 remains open to simulate the worst condition (no battery)
The 2x chargers are now working and connected in parallel (floating mode)
The load is adjusted to 100% of the system nominal load
The mains is adjusted to its nominal value

Test description : To initiate the load transfer from redundant chargers to one charger, the relevant charger is stopped from mains
To initiate the load transfer to initial state, the relevant charger is turned ON from mains

Load transfer between the 2 chargers

Test	*Load transfer to charger 2*	*Recovery to initial state*	*Load transfer to charger 1*	*Recovery to initial state*
Acceptance criteria	No load supply interruption, the second charger takes 100% of the load	No load supply interruption. Return to dual redundant mode	No load supply interruption, the second charger takes 100% of the load	No load supply interruption. Return to dual redundant mode
Conclusion the test (OK/NOK)				

7.2. Performance tests

Check	Conformity with drawings
Insulation test (review of the routine test reports)	
Rectifier Current limitation	
Battery Current limitation	
Burn in test 24 hours to 1 charger	

8. COMMENTS

9. APPENDICES

Document	Document reference
CHARGER 1 routine test reports	
CHARGER 2 routine test reports	

Base Load Power Hub (BLPH)

AC UPS - FACTORY ACCEPTANCE TEST PROCEDURE

Document Number: 1724000372-QC-PRO-00017

Document Class: 2

ROSETTI MARINO

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Sign	Date
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AC UPS F&G - TAG: UP-200F4 32

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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3
FACTORY ACCEPTANCE TEST PROCEDURE

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Configuration No.: 1000007888_010 1000007888_020	**Order-No.:** 4400007525
Serial No.: 100XYZX/001-002 Protect 8.33/40-400-216-400-RP-IP43 100XYZX/001 Bypass Trans. Cabinet 40kVA 400/400V	**Project name:** Hollandse Kust Noord (HKN) wind farm

Participants:	Company:	Date/Signature:
1.		
2.		
3.		
4.		

Remark:

Both UPS with the serial numbers respectively ending with 001 and 002 are electrically tested at the FAT.

Note:

For the start-up step-by-step procedure and for the shut-down step-by-step procedure please refer to the SAT procedure document.

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Content:

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Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

1. Overview:

SCOPE This procedure describes the methods for inspecting and checking the UPS system to ensure that it meets the operational requirements and specification.
REFERENCE DOCUMENT Engineering Documents IEC 62040-3 Routine test report 14188_FAT_1
TESTING EQUIPMENT & ACCESSORIES Digital Multimeter, Oscilloscope and Clamp-meter. Calibration certificates are available for review during FAT session
DIELECTRIC AND INSULATION TEST according EN / IEC 62040-3:2021 Clause 5.2.3.4 See Test Report from AEG PS (Internal Test Report) Not tested during FAT
LOAD DURATION TEST (Optional) See Separate Test Report from AEG PS Not tested during FAT

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

2. Visual Inspection
Reference to EN IEC 62040-3:2021 Clause 6.2.2.2

1.) General construction	**Check**
• Complete arrangement	
• Degree of Protection	
• Dimensions	
• Coating	
2.) Labels	
• Nameplate / Rating Plate	
• Tag Plate	
• Warning labels	
• Components Labelling of Instruments and Lamps	
3.) Installation of technical components	
• Arrangement and accessibility	
• Exchange of PCB	
• Terminals	
• Wiring	
4.) Protection against touching	
• Installation and connection of protective conductors	
• Covers, Shrouding	
5.) Check the arrangement of measuring apparatus	

***) See separate Punch List**

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

3 .Static Test (Load Characteristic):

Reference to EN / IEC 62040-3:2021 Clause 6.4.2.3

Incorporates Tests for:

Inverter I/P Voltage Tolerance,
0%, 50% and 100% Inverter Load Tests,
Inverter O/P Voltage and Frequency Regulation,
Quality of the Inverter Output Voltage (THDv Measurement).

This test is carried out using a test rectifier (in order to demonstrate the I/P tolerance of the Inverter.)
Please note that "Inverter Load" relates to the Protect 8 rating (40kVA) with a power factor of 0.8 lag.

Test field Rectifier is connected to the terminals X2 of the UPS

Acceptance Criteria:

Inverter I/P Voltage Tolerance:	max 259 Vdc, min 184 Vdc
Inverter O/P Voltage Tolerance:	230.9 V +/-1% (max 233.2 Vac, min 228.6 Vac)
Inverter Frequency Regulation:	50 Hz +/-0.2% (max 50.1 Hz, min 49.9 Hz)
Inverter O/P Voltage Distortion (THDv):	<3% (linear load)

U_{DC} [V]		I_{DC} [A]	I_{L1} [A]	I_{L2} [A]	I_{L3} [A]	U_{L1-N} [V]	U_{L2-N} [V]	U_{L3-N} [V]	THDv [%]	f [Hz]
		X2	X3	X3	X3	X3	X3	X3	X3	X3
U_{nom}	Leerlauf no load		0	0	0					
-15%	0,5*I_n*cos φ 0,8									
184 V	1,0*I_n*cos φ 0,8									
U_{nom}	Leerlauf no load		0	0	0					
216 V	0,5*I_n*cos φ 0,8									
	1,0*I_n*cos φ 0,8									
U_{nom}	Leerlauf no load		0	0	0					
+20%	0,5*I_n*cos φ 0,8									
259 V	1,0*I_n*cos φ 0,8									

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

4 .Dynamic Test:

Reference to EN / IEC 62040-3: 2011 Clause 6.4.2.11.4

Incorporates Tests for:

Load Application (100%): Inverter
Load Removal (100%): Inverter.
40 kVA cos phi 0.8, U = 216 Vdc

Please note that “Inverter Load” relates to the Protect 8 rating (40 kVA) with a power factor of 0.8 lag.

Acceptance Criteria:

Inverter O/P Voltage Tolerance:	230.9V +/-1% (max 233.2 Vac, min 228.6 Vac)
Response time: ≤ 2ms	According EN/IEC 62040-3 5.3.1 Figure1

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Load switched on
Connecting load from test field switch board
Test 0 to 100 % cos φ = 0.8 ind.
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Load switched off
Disconnecting load from test field switch board
Test 100 to 0 % cos φ = 0.8 ind.
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

5. Short Circuit Test:

Reference to EN / IEC 62040-3: 2021 Clause 6.4.2.9.2

Incorporates Tests for:

O/P Short Circuit via Fuse, without Bypass Mains available,
O/P Short Circuit via Fuse, with Bypass Mains available,
O/P Short Circuit @ terminals, with Inverter only.

Please note that “Inverter Load” relates to the Protect 8 rating (40 kVA) with a power factor of 0.8 lag.

Acceptance Criteria:

Fuse Characteristic Curves
Short circuit without bypass → Inverter trips fuse without switching OFF.
Short circuit with bypass → Inverter switch over to mains without gap and trip the fuse. Terminal short circuit without Bypass mains → Inverter switches off after a certain time (Dynamic Current Limit Duration).
The Dynamic Current Limit Duration is approx. 500 ms Recording of AC load voltage and AC load current
Short circuit current to be measured and recorded

For all the test that cause alarm assertion, check the activation of the related hard-wired alarm

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Short circuit without Bypass mains with fuse
Fuse is tripped by Inverter
Test on 100 % Load = 40 kVA cos φ = 0.8 ind.
Protection: 16 A fuse gG
Measured tripping time of the Fuse: **XYZ ms**
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Short circuit with Bypass mains with fuse
Transfer to SBS. Fuse is tripped by SBS. Retransfer to Inverter
Test on 100 % Load = 40 kVA cos φ = 0.8 ind.
Protection: 16 A fuse gG
Measured tripping time of the Fuse/MCB: **XYZ ms**
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Terminal short circuit without Bypass mains
Inverter is supplying appox. 2 x Inom (3 phase) for measured time and then switched off
Test on 100 % Load = 40 kVA cos φ = 0.8 ind.
Measured switch off time Inverter: **XYZ ms**
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

6. Overload Test:

Reference to EN / IEC 62040-3: 2021 Clause 6.4.2.9.1

Incorporates Tests for:

150% Load Capability Test

Please note that “Inverter Load” relates to the Protect 8 rating (40 kVA) with a power factor of 0.8 lag.

Acceptance Criteria:

The Inverter swithes off after a certain time (Minimum Overlad Duration)

Inverter O/P Voltage Tolerance:	230.9V +/-1% (max 233.2 Vac, min 228.6 Vac)
Inverter Frequency Regulation:	50 Hz +/-0.2% (max 50.1 Hz, min 49.9 Hz)
Inverter O/P Voltage Distortion:	<3% (linear load)
Minimum Overload Duration:	approx. 60 seconds

Load connected from test field switch board
Load: 150% / cos φ = 0.8 ind. = 60 kVA
Measured Switch off time: **XYZ sec.**
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

7. Functional tests UPS / Load Transfer Tests:

Reference to EN / IEC 62040-3:2021 Clause 6.2.2.7 / 6.2.2.8 / 6.2.2.9

Incorporates Tests for:

Rectifier Mains Failure – continued Inverter operation via Battery
Rectifier Mains Return – auto start of the rectifier
Inverter Failure – transfer of load from Inverter to Bypass Mains
Inverter Restoration – transfer of load from Bypass Mains to Inverter
Manual Bypass Switch – transfer of load directly to Bypass Mains

The tests are performed at Inverter full load.

Please note that “Inverter Load” relates to the Protect 8 rating with a power factor of 0.8 lag.

Acceptance Criteria:

Rectifier Mains Failure:	No disruption to the Inverter operation.
Rectifier Mains Return:	Auto start of the rectifier and charging of the Battery
Transfer Inverter to Static Bypass:	No-break transfers

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

A) Rectifier Mains Failure

Switch OFF rectifier Mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

B) Rectifier Mains Return

Switch ON rectifier mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

Result:

C) Transfer inverter-SBS mains

Switch OFF Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

D) Transfer SBS mains-inverter

Switch ON Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

Result:

E) Parallel Operation (load transfer test)

Parallel operation UPS n.1 and UPS n.2 - Switching OFF UPS n.2 via Display A18 on the door of the UPS

UPS n.1 takes over 100% Load
AC load voltage and AC load current and SBS current by screen shot.

and in addition repeat the test as following indicated:

Parallel operation UPS n.1 and UPS n.2 - Switching OFF UPS n.2 via de-energization of its upstream power supply

UPS n.1 takes over 100% Load
AC load voltage and AC load current and SBS current by screen shot.

Switching OFF UPS n.1 via Display A18 on the door of the UPS

Transfer to Bypass operation
AC load voltage and AC load current and SBS current by screen shot.

and in addition repeat the test as following indicated:

Switching OFF UPS n.1 via de-energization of its upstream power supply

Transfer to Bypass operation
AC load voltage and AC load current and SBS current by screen shot.

Bypass operation - Switching ON UPS n.2 via Display A18 on the door of of the UPS

UPS n.2 takes over 100% load
AC load voltage and AC load current and SBS current by screen shot.

and in addition repeat the test as following indicated:

Bypass operation - Switching ON UPS n.2 via re-energization of its upstream power supply

UPS n.2 takes over 100% load
AC load voltage and AC load current and SBS current by screen shot.

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Switching ON UPS n.1 via Display A18 on the door of of the UPS
Load sharing 50%

Parallel operation with load sharing 50% of UPS n.1 and UPS n.2
AC load voltage and AC load current and SBS current by screen shot.

and in addition repeat the test as following indicated:

Switching ON UPS n.1 via re-energization of its upstream power supply
Load sharing 50%

Parallel operation with load sharing 50% of UPS n.1 and UPS n.2
AC load voltage and AC load current and SBS current by screen shot.

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

F) Parallel Operation (functional sequence test)

Starting condition: UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.2
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.1 at the correct load
4. Re-energize upstream power supply to Rectifier input n.2
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

G) Parallel Operation (functional sequence test)

Starting condition: UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.1
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.2 at the correct load
4. Re-energize upstream power supply to Rectifier input n.1
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

8. DC Ripple Current Measurement

with Test field battery

Reference to EN / IEC 62040-3:2021 Clause 6.4.3.3

Acceptance Criteria:

Current ripple of less than 5 A rms for every 100 Ah / Measured with test field battery with screen shot

The capacity of the test field battery is 300Ah.

The measured value is **XYZ A** rms / 1 V = 1 A

Result:

9. MODBUS Adapter (Demonstration)

Incorporates Tests for:
A29.1 MODBUS Adapter

Test to be performed for chosen failure messages, status messages and measuring values.

Designation	Source	Terminals	Checked
MODBUS Adapter	A29.1	A29.1	

10. Alarm Test:

Reference to EN IEC 62040-3:2021 Clause 6.2.2.3

Incorporates Tests for:

Remote Alarm signalling on Boards A12/A13
System Operational Check

Acceptance Criteria:

Technical datasheet (TD)

Designation	Terminals	Relay/Opto	Result
Inverter operation 1)	UPS A12-X3: 1, 2, 3	**A12K21**	
SBS operation 1)	UPS A12-X3: 4, 5, 6	**A12K22**	
Rec Fault / Rec mains fault 1)	UPS A12-X3: 7, 8, 9	**A12K23**	
Battery undervoltage 1)	UPS A12-X3: 10, 11, 12	**A12K24**	
Common fault 2)	UPS A12-X4: 1, 2, 3	**A12K25**	
SBS blocked 1)	UPS A13-X3: 1, 2, 3	**A13K26**	
Fan fault 1)	UPS A13-X3: 4, 5, 6	**A13K27**	
BAT room fan on 1)	UPS A13-X3: 7, 8, 9	**A13K28**	
INV remote off 3)	UPS A12-X5: 1, 2	**A12Opto1**	
BAT room fan fault 3)	UPS A13-X4: 1, 2	**A13Opto2**	
Not parameterised 3)	UPS A13-X4: 3, 4	**A13Opto3**	
Fan fault 1)	Bypass X12: 7, 8, 9	**N/A**	
Common fault 1)	Bypass X12: 10, 11, 12	**N/A**	

1) Remote signal / close on the terminals with the lower number
2) Remote signal / close on the terminals with the higher number

OPTO Input test

Check battery boost charge inhibit (external signal) in case of high battery temperature

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_1_00_updated
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

11. Measuring Devices:

AEG internal Measuring device No.:	Measuring device name	Seriel number:	Calibrated until:

12. Remarks:

Base Load Power Hub (BLPH)

AC UPS F&G - TAG: UP-200F4
FACTORY ACCEPTANCE TEST PROCEDURE

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AEG POWER SOLUTIONS

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Configuration No.: 1000007888_080 1000007888_090	**Order-No.:** 4400007525
Serial No.: 100XYZX/001-002 Protect 8.33/20-400-216-400-RP-IP43 100XYZX/001 Bypass Trans. Cabinet 20kVA 400/400V	**Project name:** Hollandse Kust Noord (HKN) wind farm

Participants:	Company:	Date/Signature:
1.		
2.		
3.		
4.		

Remark:

Both UPS with the serial numbers respectively ending with 001 and 002 are electrically tested at the FAT.

Note:

For the start-up step-by-step procedure and for the shut-down step-by-step procedure please refer to the SAT procedure document.

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

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Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

1. Overview:

SCOPE
This procedure describes the methods for inspecting and checking the UPS system to ensure that it meets the operational requirements and specification.

REFERENCE DOCUMENT
Engineering Documents
IEC 62040-3
Routine test report
14188_FAT_2

TESTING EQUIPMENT & ACCESSORIES
Digital Multimeter, Oscilloscope and Clamp-meter.
Calibration certificates are available for review during FAT session

DIELECTRIC AND INSULATION TEST
according EN / IEC 62040-3:2021 Clause 5.2.3.4
See Test Report from AEG PS (Internal Test Report)
Not tested during FAT

LOAD DURATION TEST (Optional)
See Separate Test Report from AEG PS
Not tested during FAT

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

2. Visual Inspection
Reference to EN IEC 62040-3:2021 Clause 6.2.2.2

1.) General construction	**Check**
• Complete arrangement	
• Degree of Protection	
• Dimensions	
• Coating	
2.) Labels	
• Nameplate / Rating Plate	
• Tag Plate	
• Warning labels	
• Components Labelling of Instruments and Lamps	
3.) Installation of technical components	
• Arrangement and accessibility	
• Exchange of PCB	
• Terminals	
• Wiring	
4.) Protection against touching	
• Installation and connection of protective conductors	
• Covers, Shrouding	
5.) Check the arrangement of measuring apparatus	

***) See separate Punch List**

3 .Static Test (Load Characteristic):

Reference to EN / IEC 62040-3:2021 Clause 6.4.2.3

Incorporates Tests for:

Inverter I/P Voltage Tolerance,
0%, 50% and 100% Inverter Load Tests,
Inverter O/P Voltage and Frequency Regulation,
Quality of the Inverter Output Voltage (THDv Measurement).

This test is carried out using a test rectifier (in order to demonstrate the I/P tolerance of the Inverter.)
Please note that "Inverter Load" relates to the Protect 8 rating (20kVA) with a power factor of 0.8 lag.

Test field Rectifier is connected to the terminals X2 of the UPS

Acceptance Criteria:

Inverter I/P Voltage Tolerance:	max 259 Vdc, min 184 Vdc
Inverter O/P Voltage Tolerance:	230.9 V +/-1% (max 233.2 Vac, min 228.6 Vac)
Inverter Frequency Regulation:	50 Hz +/-0.2% (max 50.1 Hz, min 49.9 Hz)
Inverter O/P Voltage Distortion (THDv):	<3% (linear load)

U_{DC} [V]		I_{DC} [A]	I_{L1} [A]	I_{L2} [A]	I_{L3} [A]	U_{L1-N} [V]	U_{L2-N} [V]	U_{L3-N} [V]	THDv [%]	f [Hz]
		X2	X3	X3	X3	X3	X3	X3	X3	X3
U_{nom}	Leerlauf no load		0	0	0					
-15%	0,5*I_n*cos φ 0,8									
184 V	1,0*I_n*cos φ 0,8									
U_{nom}	Leerlauf no load		0	0	0					
216 V	0,5*I_n*cos φ 0,8									
	1,0*I_n*cos φ 0,8									
U_{nom}	Leerlauf no load		0	0	0					
+20%	0,5*I_n*cos φ 0,8									
259 V	1,0*I_n*cos φ 0,8									

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

4 .Dynamic Test:

Reference to EN / IEC 62040-3: 2011 Clause 6.4.2.11.4

Incorporates Tests for:

Load Application (100%): Inverter
Load Removal (100%): Inverter.
20 kVA cos phi 0.8, U = 216 Vdc

Please note that “Inverter Load” relates to the Protect 8 rating (20kVA) with a power factor of 0.8 lag.

Acceptance Criteria:

Inverter O/P Voltage Tolerance:	230.9V +/-1% (max 233.2 Vac, min 228.6 Vac)
Response time: ≤ 2ms	According EN/IEC 62040-3 5.3.1 Figure1

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Load switched on
Connecting load from test field switch board
Test 0 to 100 % cos φ = 0.8 ind.
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Load switched off
Disconnecting load from test field switch board
Test 100 to 0 % cos φ = 0.8 ind.
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

5. Short Circuit Test:

Reference to EN / IEC 62040-3: 2021 Clause 6.4.2.9.2

Incorporates Tests for:

O/P Short Circuit via Fuse, without Bypass Mains available,
O/P Short Circuit via Fuse, with Bypass Mains available,
O/P Short Circuit @ terminals, with Inverter only.

Please note that “Inverter Load” relates to the Protect 8 rating (20 kVA) with a power factor of 0.8 lag.

Acceptance Criteria:

Fuse Characteristic Curves
Short circuit without bypass → Inverter trips fuse without switching OFF.
Short circuit with bypass → Inverter switch over to mains without gap and trip the fuse. Terminal short circuit without Bypass mains → Inverter switches off after a certain time (Dynamic Current Limit Duration).
The Dynamic Current Limit Duration is approx. 500 ms Recording of AC load voltage and AC load current
Short circuit current to be measured and recorded

For all the test that cause alarm assertion, check the activation of the related hard-wired alarm

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Short circuit without Bypass mains with fuse
Fuse is tripped by Inverter
Test on 100 % Load = 20 kVA cos φ = 0.8 ind.
Protection: 10 A fuse gG
Measured tripping time of the Fuse: **XYZ ms**
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Short circuit with Bypass mains with fuse
Transfer to SBS. Fuse is tripped by SBS. Retransfer to Inverter
Test on 100 % Load = 20 kVA cos φ = 0.8 ind.
Protection: 10 A fuse gG
Measured tripping time of the Fuse/MCB: **XYZ ms**
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Terminal short circuit without Bypass mains
Inverter is supplying appox. 2 x Inom (3 phase) for measured time and then switched off
Test on 100 % Load = 20 kVA cos φ = 0.8 ind.
Measured switch off time Inverter: **XYZ ms**
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

6. Overload Test:

Reference to EN / IEC 62040-3: 2021 Clause 6.4.2.9.1

Incorporates Tests for:

150% Load Capability Test

Please note that “Inverter Load” relates to the Protect 8 rating (20 kVA) with a power factor of 0.8 lag.

Acceptance Criteria:

The Inverter swithes off after a certain time (Minimum Overlad Duration)

Inverter O/P Voltage Tolerance:	230.9V +/-1% (max 233.2 Vac, min 228.6 Vac)
Inverter Frequency Regulation:	50 Hz +/-0.2% (max 50.1 Hz, min 49.9 Hz)
Inverter O/P Voltage Distortion:	<3% (linear load)
Minimum Overload Duration:	approx. 60 seconds

Load connected from test field switch board
Load: 150% / cos φ = 0.8 ind. = 30 kVA
Measured Switch off time: **XYZ sec.**
Recording of AC load voltage and AC load current at X3 **with screen shot**

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

7. Functional tests UPS / Load Transfer Tests:

Reference to EN / IEC 62040-3:2021 Clause 6.2.2.7 / 6.2.2.8 / 6.2.2.9

Incorporates Tests for:

Rectifier Mains Failure – continued Inverter operation via Battery
Rectifier Mains Return – auto start of the rectifier
Inverter Failure – transfer of load from Inverter to Bypass Mains
Inverter Restoration – transfer of load from Bypass Mains to Inverter
Manual Bypass Switch – transfer of load directly to Bypass Mains

The tests are performed at Inverter full load.

Please note that “Inverter Load” relates to the Protect 8 rating (20 kVA) with a power factor of 0.8 lag.

Acceptance Criteria:

Rectifier Mains Failure:	No disruption to the Inverter operation.
Rectifier Mains Return:	Auto start of the rectifier and charging of the Battery
Transfer Inverter to Static Bypass:	No-break transfers

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

A) Rectifier Mains Failure

Switch OFF rectifier Mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

Result:

B) Rectifier Mains Return

Switch ON rectifier mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

Result:

C) Transfer inverter-SBS mains

Switch OFF Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

D) Transfer SBS mains-inverter

Switch ON Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

Result:

E) Parallel Operation (load transfer test)

Parallel operation UPS n.1 and UPS n.2 - Switching OFF UPS n.2 via Display A18 on the door of the UPS

UPS n.1 takes over 100% Load
AC load voltage and AC load current and SBS current by screen shot.

and in addition repeat the test as following indicated:

Parallel operation UPS n.1 and UPS n.2 - Switching OFF UPS n.2 via de-energization of its upstream power supply

UPS n.1 takes over 100% Load
AC load voltage and AC load current and SBS current by screen shot.

Switching OFF UPS n.1 via Display A18 on the door of the UPS

Transfer to Bypass operation
AC load voltage and AC load current and SBS current by screen shot.

and in addition repeat the test as following indicated:

Switching OFF UPS n.1 via de-energization of its upstream power supply

Transfer to Bypass operation
AC load voltage and AC load current and SBS current by screen shot.

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Bypass operation - Switching ON UPS n.2 via Display A18 on the door of of the UPS

UPS n.2 takes over 100% load
AC load voltage and AC load current and SBS current by screen shot.

and in addition repeat the test as following indicated:

Bypass operation - Switching ON UPS n.2 via re-energization of its upstream power supply

UPS n.2 takes over 100% load
AC load voltage and AC load current and SBS current by screen shot.

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Switching ON UPS n.1 via Display A18 on the door of of the UPS
Load sharing 50%

Parallel operation with load sharing 50% of UPS n.1 and UPS n.2
AC load voltage and AC load current and SBS current by screen shot.

and in addition repeat the test as following indicated:

Switching ON UPS n.1 via re-energization of its upstream power supply
Load sharing 50%

Parallel operation with load sharing 50% of UPS n.1 and UPS n.2
AC load voltage and AC load current and SBS current by screen shot.

Result:

F) Parallel Operation (functional sequence test)

Starting condition: UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.2
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.1 at the correct load
4. Re-energize upstream power supply to Rectifier input n.2
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

G) Parallel Operation (functional sequence test)

Starting condition: UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.1
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.2 at the correct load
4. Re-energize upstream power supply to Rectifier input n.1
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

8. DC Ripple Current Measurement

with Test field battery

Reference to EN / IEC 62040-3:2021 Clause 6.4.3.3

Acceptance Criteria:

Current ripple of less than 5 A rms for every 100 Ah / Measured with test field battery with screen shot

The capacity of the test field battery is 300Ah.

The measured value is **XYZ A** rms / 1 V = 1 A

Result:

9. MODBUS Adapter (Demonstration)

Incorporates Tests for:
A29.1 MODBUS Adapter

Test to be performed for chosen failure messages, status messages and measuring values.

Designation	Source	Terminals	Checked
MODBUS Adapter	A29.1	A29.1	

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

10. Alarm Test:

Reference to EN IEC 62040-3:2021 Clause 6.2.2.3

Incorporates Tests for:

Remote Alarm signalling on Boards A12/A13
System Operational Check

Acceptance Criteria:

Technical datasheet (TD)

Designation	Terminals	Relay/Opto	Result
Inverter operation 1)	UPS A12-X3: 1, 2, 3	**A12K21**	
SBS operation 1)	UPS A12-X3: 4, 5, 6	**A12K22**	
Rec Fault / Rec mains fault 1)	UPS A12-X3: 7, 8, 9	**A12K23**	
Battery undervoltage 1)	UPS A12-X3: 10, 11, 12	**A12K24**	
Common fault 2)	UPS A12-X4: 1, 2, 3	**A12K25**	
SBS blocked 1)	UPS A13-X3: 1, 2, 3	**A13K26**	
Fan fault 1)	UPS A13-X3: 4, 5, 6	**A13K27**	
BAT room fan on 1)	UPS A13-X3: 7, 8, 9	**A13K28**	
INV remote off 3)	UPS A12-X5: 1, 2	**A12Opto1**	
BAT room fan fault 3)	UPS A13-X4: 1, 2	**A13Opto2**	
Not parameterised 3)	UPS A13-X4: 3, 4	**A13Opto3**	
Fan fault 1)	Bypass X12: 7, 8, 9	**N/A**	
Common fault 1)	Bypass X12: 10, 11, 12	**N/A**	

1) Remote signal / close on the terminals with the lower number
2) Remote signal / close on the terminals with the higher number

OPTO Input test

Check battery boost charge inhibit (external signal) in case of high battery temperature

Result:

Factory Acceptance Test Report		Document-No.: 14188_FAT_2_00_updated
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

11. Measuring Devices:

AEG internal Measuring device No.:	Measuring device name	Seriel number:	Calibrated until:

12. Remarks:

Base Load Power Hub (BLPH)

DC UPS - SITE ACCEPTANCE TEST PROCEDURE / PRE-COMMISSIONING / COMMISSIONING PROCEDURES

Document Number: 1724000372-QC-PRO-00018

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
C.Giunchi	04/07/2025

Document Class: 2

01	31/01/2025	Accepted for Construction (AFC)	DA	DA	AD
00	21/10/2024	Issue for Review (IFR)	DA	DA	AD
Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)

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1	
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Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1

SITE ACCEPTANCE TEST / PRE-COMMISSIONING / COMMISSIONING PROCEDURE

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AEG POWER SOLUTIONS

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

Project name: Hollandse Kust Noord (HKN) wind farm	**Order-No.:** 4400007525

Configuration and Serial No.: **Installed:**

UP-200F1-A - Protect RCS TPRe 110V-100A - Serial No.: …….. ☐

UP-200F1-B - Protect RCS TPRe 110V-100A - Serial No.: …….. ☐

CB-200F1 - Battery Fuse Box 125A - Serial No.: …….. ☐

BA-200F1 - Battery 110V-150Ah 10 x FLG12-150 …….. ☐

Participants:	Company:	Date / Signature:
1.		
2.		
3.		
4.		
5.		

Remark:

Site Acceptance Test must be performed by a skilled AEG technician.

Josè Cuneo	Rev. 00	Cassina de' Pecchi	21.10.2024

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

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Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

1. Informations and Basic Datas:

SCOPE
This procedure describes the methods for checking the DC UPS system, once installed on site, to ensure that it works correctly and it meets the operational requirements

REFERENCE DOCUMENTS
1724000372-EL-DA-00003 DC UPS - GENERAL ARRANGEMENT
1724000372-EL-DG-00006 DC UPS - SINGLE LINE DIAGRAM
1724000372-EL-DG-00008 DC UPS - WIRING DIAGRAM & TERMINAL SCHEDULE
1724000372-EL-DG-00010 DC UPS - BATTERY LAYOUT AND INTERCONNECTION

TESTING EQUIPMENT & ACCESSORIES
Digital Multimeter, Clamp-meter and Dummy Load

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

CHARGER A

RECTIFIER

Input voltage (V) …… Frequency (Hz) …… Number of phases ……...

Float voltage (V) …… Charge voltage (V) ……

Output current (A) …… Battery current limit (A) …….

CONFIGURATION

Single unit ☐ Redundant system ☐ Redundant parallel system ☐

CHARGER B

RECTIFIER

Input voltage (V) …… Frequency (Hz) …… Number of phases ……...

Float voltage (V) …… Charge voltage (V) ……

Output current (A) …… Battery current limit (A) …….

CONFIGURATION

Single unit ☐ Redundant system ☐ Redundant parallel system ☐

BATTERY

BATTERY

Type ……..…… Capacity (Ah) ……. Number of strings / cells ……...

Autonomy …… @ Load ……..

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

2. Visual Inspection

1) Visual Check	Check
• Equipment installation aspects and details	
• Cleanliness of cabinets (internally and externally)	
• Fuses and Circuit breakers rating and related connection cables	
• Control switches and push-buttons	
• Components identification	
• Alarms identification	
• All connections fully tightened	
• Grounding connection	
• All labels correct	
2) Pre-Energization Check	
• Electronic cards and related connections	
• Relays	
• Cooling fans	
• Wiring and plugs connections	
• Fuses and fuse alarm contacts	
• Instruments	
• Power switches, circuit breakers and contacts	
• Marking of components	
• Cable polarity marking	
• Input phase marking	

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

3. Starting

Rectifier start	**Result**
Input phase sequence	.....
Float voltage correct setting	.....
High-rate voltage correct setting	.....

Starting procedure

Initial state : Charger is OFF
Input circuit breaker Q1 is open
Output switch (Q2) and battery switch (Q3) are open

Starting : Close output switch Q2
Charger is powered ON by closing the input circuit breaker Q1
Then close battery switch Q3
Only the charger subject to the test is ON
The mains is adjusted to its nominal value

Shut-down procedure

Initial state : Charger is ON
Input circuit breaker Q1 is closed
Output switch (Q2) and battery switch (Q3) are closed

Shut-down : Open input circuit breaker Q1
Charger is powered OFF
Then open the output switch Q2
The load is still connected to the battery through the switch Q3
Open the battery protection breaker (if the battery is connected)
Open the battery switch Q3

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

4. Functional tests:

Initial state : Charger is OFF
Input circuit breaker Q1 is open
Output switch (Q2) and battery switch (Q3) are open

Starting : Close output switch Q2
Charger is powered ON by closing the input circuit breaker Q1
Then close battery switch Q3
Only the charger subject to the test is ON
The mains is adjusted to its nominal value

Test description : The load is applied through a dummy load
The input and output electrical values shall remain within the acceptance criteria
The tests are done in floating and high rate mode

Rectifier and load output voltage : CHARGER 1

Mode	Rectifier output power	AC mains voltage	Rectifier output current	Rectifier output voltage to obtain (VBAT)	Measured rectifier output voltage	Load output voltage to obtain (VBAT-V21)	Measured load output voltage	Conformity (Yes/No)
Floating	.....	3x400Vac	.....	136,8V +/-1%	V	136,1V+/-1%	V	
High rate	.....	3x400Vac	.....	136,8V +/-1%	V	136,1V+/-1%	V	

(*) The rectifier voltage shall be corrected with the temperature compensation ratio if applicable.

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

Rectifier and load output voltage : CHARGER 2

Mode	Rectifier output power	AC mains voltage	Rectifier output current	Rectifier output voltage to obtain (VBAT)	Measured rectifier output voltage	Load output voltage to obtain (VBAT-V21)	Measured load output voltage	Conformity (Yes/No)
Floating	……...	3x400Vac	……	136,8V +/-1%	V	136,1V+/-1%	V	
High rate	……...	3x400Vac	……	136,8V +/-1%	V	136,1V+/-1%	V	

(*) The rectifier voltage shall be corrected with the temperature compensation ratio if applicable.

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

Parallel Operation (load transfer test)

Initial state : Both chargers are OFF
Input breakers (Q1) are open
Output switches (Q2) and battery switch (Q3) are open

Starting : Close output switches Q2
Chargers are powered ON by closing input breakers Q1
Battery switch Q3 remains open to simulate the worst condition (no battery)
The 2x chargers are now working and connected in parallel (floating mode)
The load is adjusted to 100% of the system nominal load
The mains is adjusted to its nominal value

Test description : To initiate the load transfer from redundant chargers to one charger, the relevant charger is stopped from mains
To initiate the load transfer to initial state, the relevant charger is turned ON from mains

Load transfer between the 2 chargers

Test	*Load transfer to charger 2*	*Recovery to initial state*	*Load transfer to charger 1*	*Recovery to initial state*
Acceptance criteria	No load supply interruption, the second charger takes 100% of the load	No load supply interruption. Return to dual redundant mode	No load supply interruption, the second charger takes 100% of the load	No load supply interruption. Return to dual redundant mode
Conclusion the test (OK/NOK)				

Load sharing between the 2 chargers

Switching ON CHARGER 1 and CHARGER 2
Load sharing approx. 50%

Parallel operation with load sharing 50% of CHARGER 1 and CHARGER 2

Result:

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

5. MODBUS Adapter

Incorporates Tests for:
MODBUS Adapter

Test to be performed for chosen failure messages, status messages and measuring values.

Designation	Checked
MODBUS Adapter	

MODBUS parameter table:

Label Lang. 1	Function	Value	Delay	Rel #	Rel. Qty	R. Latch	Led #	D. Latch	ShtDwn	Common	Label Lang. 2	ModBus Reg
HIGH MAINS VOLTS	Alarm	460,0 VAC	4s	1	1	---	0	---	---	Yes	V RED AC ALTA	40002
LOW MAINS VOLTS	Alarm	340,0 VAC	4s	1	1	---	0	---	---	Yes	V RED AC BAJA	40003
CHARGER FAULT	Alarm	NA	30s	2	1	---	0	---	---	Yes	FALLO CARGADOR	40004
HIGH BATT.VOLTS	Alarm	141,0 VDC	30s	0	1	---	0	---	---	Yes	V MAX BATERIA	40005
LOW BATT.VOLTS	Alarm	117,0 VDC	30s	5	1	---	0	---	---	Yes	V MIN BATERIA	40006
HIGH DC VOLTAGE	Alarm	147,0 VDC	10s	3	1	Yes	0	Yes	Yes	Yes	V MAX DC	40007
LOW DC VOLTAGE	Alarm	111,0 VDC	10s	4	1	---	0	---	---	Yes	V MIN DC	40008
Q1 OPEN	Alarm	0	4s	0	1	---	0	---	---	Yes	Q1 ABIERTO	40011
CTRL FLOATING	Forced Float	0	0s	0	1	---	0	---	---	---	CTRL FLOATING	40012
GROUND FAULT -	Alarm	0	4s	7	1	---	0	---	---	Yes	FALLO TIERRA -	40014
GROUND FAULT +	Alarm	0	4s	6	1	---	0	---	---	Yes	FALLO TIERRA +	40015
DISTRIB FAILURE	Alarm	0	4s	0	1	---	0	---	---	Yes	FALLO DISTRIB	40016
BATT SYMM FAULT	Alarm	0	4s	0	1	---	0	---	---	Yes	FALLO SIM. BAT.	40017
VENTILATION FAIL	Alarm	0	4s	0	1	---	0	---	---	Yes	FALLO VENTIL.	40018
CHARGER CURR.LIM	Alarm	NA	30s	0	1	---	0	---	---	Yes	I LIMIT. RECTIF	40019
HIGH CHARGR CURR	Alarm	110,0 A	10s	0	1	Yes	0	Yes	Yes	Yes	I RECTIFIC ALTA	40021
HIGH BATT. CURR	Alarm	16,5 A	10s	0	1	---	0	---	---	Yes	I BATERIA ALTA	40022
HIGH TEMPERATURE	Alarm	NA	0s	0	1	---	0	---	---	Yes	TEMPERATURA ALTA	40023
TEMP SENSE ERROR	Alarm	NA	0s	0	1	---	0	---	---	Yes	FALLO SONDA TEMP	40024
INTERNAL CHECK	Alarm	NA	0s	0	1	---	0	---	---	Yes	VERIF. INTERNA	40025
HIGH BATT. TEMP.	Alarm	45 °C	30s	0	1	---	0	---	---	Yes	TEMP. BAT. ALTA	40028
LONG CHARGE TIME	Alarm	NA	0s	0	1	---	0	---	---	Yes	TEMP CARGA LARGO	40030
NO PS VOLTAGE	Alarm	NA	0s	0	1	---	0	---	---	Yes	SIN ALIMENTACION	40031
CTRL FLOATING	Forced Float	0	0s	0	1	---	0	---	---	---	CTRL FLOATING	40034
ESD STOP BOOST	Alarm	4096	1s	0	1	---	0	---	---	Yes	ESD STOP BOOST	40035

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

6. Alarm Test:

Description	*Relay*	*Display*	*LED Box*	*Result (OK/NOK/Not applicable)*	
				CH 1	**CH 2**
MAINS FAULT	Yes	Yes	n.a.		
RECTIFIER FAULT	Yes	Yes	n.a.		
HIGH VOLTAGE C.C (147 Vdc)	Yes	Yes	n.a.		
LOW VOLTAGE D.C. (111 Vdc)	Yes	Yes	n.a.		
BATTERY LOW VOLTAGE (117 Vdc)	Yes	Yes	n.a.		
EARTH FAULT +	Yes	Yes	n.a.		
EARTH FAULT -	Yes	Yes	n.a.		
COMMON ALARM	Yes	Yes	n.a.		

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	DC UPS System	Tag No.: UP-200F1

7. Battery test:

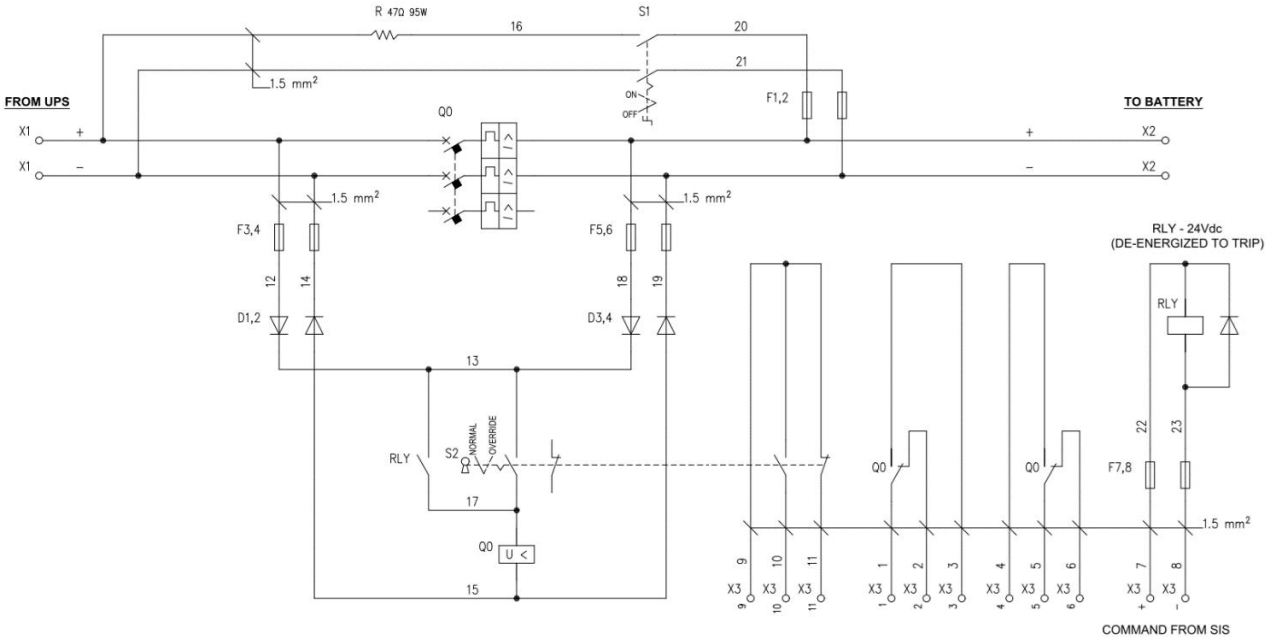
BATTERY		SHEET 1 / NR.:	REV.	OUR. RIF.:
CUSTOMER: Rosetti Marino	DISCHARGE TEST (Capacity test)	BATTERY TYPE:		CAPACITY Ah
		ELECTROLYTE TYPE:		DENSITY:
Nr. of blocks	Type :			

TIME (hour : min)	00:00	00:20	00:40	01:00	01:20	01:40	02:00	02:20	02:40	03:00	03:20	03:40	04:00	04:20	04:40	05:00
BLOCK N°	BLOCK / VOLTAGE															
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
TEMP. ELE. °C																

TIME (hour : min)	05:00	05:20	05:40	06:00	06:20	06:40	07:00	07:20	07:40	08:00	08:20	08:40	09:00	09:20	09:40	10:00
BLOCK N°	BLOCK / VOLTAGE															
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
TEMP. ELE. °C																

Site Acceptance Test Report		Document-No.: 14189_SAT_1_00
Type:	**DC UPS System**	**Tag No.: UP-200F1**

8. Black start procedure validation test:



Black Start procedure

The target is to allow the energization of the loads from the battery, while the battery charger being still de-energized.

- The operator shall put the selector S2 on "override" position (contact closed)
- The operator shall close the selector S1 to pre-charge the charger output DC capacitors
- Once the charger DC capacitors are charged and the voltage across Q0 power contacts is close to 0V (and at least >80% of the system DC nominal voltage), the operator shall close the breaker Q0
- The operator shall open the selector S1
- The site safety and SCADA systems restart and the RLY relay is automatically energized when all safety conditions are fulfilled. The charger is energized through its AC supply and then it can restart
- The operator shall put the selector S2 on "normal" position (contact open)
- The system returns to normal working conditions

Designation	Checked
BLACK START procedure	

Base Load Power Hub (BLPH)

AC UPS - SITE ACCEPTANCE TEST PROCEDURE / PRE-COMMISSIONING / COMMISSIONING PROCEDURES

Document Number: 1724000372-QC-PRO-00019

ROSETTI MARINO	
1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED
NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.	
Sign	Date
	04/02/2025

Document Class: 2

01	01/02/2025	Accepted for Construction (AFC)	DA	DA	AD
00	21/10/2024	Issue for Review (IFR)	DA	DA	AD
Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

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REVISION / CHANGE LOG	2
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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

SITE ACCEPTANCE TEST / PRE-COMMISSIONING / COMMISSIONING PROCEDURE

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AEG POWER SOLUTIONS

Site Acceptance Test Report		Document-No.: 14188_SAT_1_00
Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

Project name: Hollandse Kust Noord (HKN) wind farm	**Order-No.:** 4400007525

Configuration and Serial No.: **Installed:**

BC-200F3-A - UPS Protect 8.33 / 40-400-216-400-RP-IP43 - Serial No.: ..... ☐

BC-200F3-B - UPS Protect 8.33 / 40-400-216-400-RP-IP43 - Serial No.: ..... ☐

BY-200F3 - By-Pass Transformer Cabinet 40 kVA 400/400V - Serial No.: ..... ☐

CB-200F3-A - Battery Fuse Box 200A - Serial No.: ..... ☐

CB-200F3-B - Battery Fuse Box 200A - Serial No.: ..... ☐

BA-200F3-A - Battery 216V-150Ah 18 x FLG12-150 ..... ☐

BA-200F3-B - Battery 216V-150Ah 18 x FLG12-150 ..... ☐

Participants:	Company:	Date / Signature:
1.		
2.		
3.		
4.		
5.		

Remark:

Site Acceptance Test must be performed by a skilled AEG technician.

Josè Cuneo	Rev. 00	Cassina de' Pecchi	21.10.2024

Site Acceptance Test Report		Document-No.: 14188_SAT_1_00
Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

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8. Black start procedure validation test: 31

Site Acceptance Test Report		Document-No.: 14188_SAT_1_00
Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

1. Informations and Basic Datas:

SCOPE This procedure describes the methods for checking the AC UPS system, once installed on site, to ensure that it works correctly and it meets the operational requirements
REFERENCE DOCUMENTS 1724000372-EL-DA-00004 AC UPS - GENERAL ARRANGEMENT 1724000372-EL-DG-00007 AC UPS - SINGLE LINE DIAGRAM 1724000372-EL-DG-00009 AC UPS - WIRING DIAGRAM & TERMINAL SCHEDULE 1724000372-EL-DG-00011 AC UPS - BATTERY LAYOUT AND INTERCONNECTION
TESTING EQUIPMENT & ACCESSORIES Digital Multimeter, Clamp-meter and Dummy Load

Site Acceptance Test Report		Document-No.: 14188_SAT_1_00
Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

UPS A

RECTIFIER

Input voltage (V) …… Frequency (Hz) …… Number of phases ……...

Float voltage (V) …… Charge voltage (V) ……

Output current (A) …… Battery current limit (A) ……

INVERTER

DC Input range (V) …… AC Output voltage (V) ……

Output frequency (Hz) ……..…… Number of phases ……..……

Rated power (kVA) …… Power factor ……

ALTERNATIVE LINE

Input voltage (V) …… Frequency (Hz) …… Number of phases ……...

BATTERY

Type ……..…… Capacity (Ah) …… Number of strings / cells ……...

Autonomy …… @ Load ……..

CONFIGURATION

Single unit ☐ Redundant system ☐ Redundant parallel system ☐

Site Acceptance Test Report		Document-No.: 14188_SAT_1_00
Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

UPS B

RECTIFIER

Input voltage (V) …… Frequency (Hz) …… Number of phases ……...

Float voltage (V) …… Charge voltage (V) ……

Output current (A) …… Battery current limit (A) …….

INVERTER

DC Input range (V) …… AC Output voltage (V) ……

Output frequency (Hz) ……..…… Number of phases ……..……

Rated power (kVA) …… Power factor ……

ALTERNATIVE LINE

Input voltage (V) …… Frequency (Hz) …… Number of phases ……...

BATTERY

Type ……..…… Capacity (Ah) ……. Number of strings / cells ……...

Autonomy …… @ Load ……..

CONFIGURATION

Single unit ☐ Redundant system ☐ Redundant parallel system ☐

Site Acceptance Test Report		Document-No.: 14188_SAT_1_00
Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

2. Visual Inspection

1) Visual Check	Check
• Equipment installation aspects and details	
• Cleanliness of cabinets (internally and externally)	
• Fuses and Circuit breakers rating and related connection cables	
• Control switches and push-buttons	
• Components identification	
• Alarms identification	
• All connections fully tightened	
• Grounding connection	
• All labels correct	
2) Pre-Energization Check	
• Electronic cards and related connections	
• Relays	
• Cooling fans	
• Wiring and plugs connections	
• Fuses and fuse alarm contacts	
• Instruments	
• Power switches, circuit breakers and contacts	
• Marking of components	
• Cable polarity marking	
• Input phase marking	

Site Acceptance Test Report		Document-No.: 14188_SAT_1_00
Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

3. Starting

Rectifier start	**Result**
Input phase sequence	.....
Float voltage correct setting	.....
High-rate voltage correct setting	.....

Inverter start	**Result**
DC input voltage	.....
AC output voltage	.....
Frequency	.....

Alternate mains start	**Result**
AC output voltage	.....
Frequency	.....

For the starting and shut-down procedure please refer to the following pages.

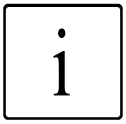
INITIAL START-UP

Prior to starting the unit, check whether the preset unit data complies with the system data by referring to the technical data sheet.

Parallel units are adjusted by the factory with regard to their current distribution. Since the local cabling affects the current distribution of the parallel units (cable cross-sections, cable lengths, cable routing and inductivities of the load distribution board), a new adjustment can be required following installation. The equalizing current of idle parallel units should be less than 5% of the inverter's nominal current. The current distribution must be controlled during start-up. Any adjustment necessary must only be carried out by appropriately trained expert personnel.



ATTENTION:
Improperly adjusted systems can in certain circumstances (individual batteries charged, i.e. 100% capacity and idle inverter) damage the battery.



NOTE:
The start-up instructions of the battery manufacturer must be complied with. Any necessary parameter modifications must be made by our service personnel or via the DOU. If changing the parameters via the DOU, ensure that these changes are applied to all units.

A phase-rotation indicator and a voltmeter are required for the following steps.



CAUTION:
When the mains is connected, potentially fatal voltages are applied to the terminals.
Always observe the safety regulations!

5.1 Preparing Initial Start-Up of a Parallel System

Step	ID No.	Action
1	1 to 2	Input breaker Q1, SBS circuit and battery isolator MCCB (external) to the "**OFF**" position.
2	1 to 2	Open Q71, Q72 inverter output isolators.
3	1 to 2	Distribution breakers to the "OFF" position, Q29 (manual by-pass) to the "OFF" position.
4	1 to 2	Remove connection cover.
5	1 to 2	Check the cable cross sections and fuse protection (refer to the operating instructions of the individual unit). Check the proper earthing of the units (all cubicles must be screwed to one another and earthed).
6	1 to 2	Connect the mains voltage for the rectifier circuit and SBS circuit.
7	1 to 2	Measure the mains voltage at terminals X1 and X4 (X1 phase-to-phase and X4 phase/zero). Refer to the technical data sheet for the nominal voltage.
8	1 to 2	Check the rotating fields at terminals X1 and X4. L1, L2 and L3 clockwise rotation.
9	1 to 2	Switch on input breaker Q1 and wait until the DC nominal voltage is reached.
10	1 to 2	Switch on the inverters.
11	1 to 2	Check the voltage between the parallel units at the inverter output isolators Q71, Q72. The voltage difference of the inverters should not be more than 2 V. (If you measure more than 2 V then adjustment is required which can only be performed by trained expert personnel.)
12	1 to 2	Switch off the inverters.
13	1 to 2	Switch off the mains voltage for the rectifier circuit and SBS circuit.
14	1 to 2	Rectify any errors if necessary and repeat the steps.
15	1 to 2	Replace the connection cover.

5.2 Initial Start-Up of a Parallel System

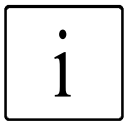
Step	ID No. 1 to n	Action	DOU	
			LED	Display
1	1 to 2	Input breaker Q1, SBS circuit and battery isolator MCCB (external) to the **"OFF"** position. INV output isolators Q71 and Q72 set to **"ON"**.	None	OFF
2	1 to 2	Load breakers to the "OFF" position, Q29 (manual by-pass) to the "OFF" position.		
3	1 to 2	Connect the mains voltage for the rectifier circuit and SBS circuit.		
4	1 to 2	Move Q1 to the **"ON"** position. The rectifier starts automatically. In systems with a central battery it only starts when the necessary number of rectifiers for the required capacity are switched on. The DC voltage increases.	Red/yellow/ green changing	Self-test
5	1 to 2	The DC voltage reaches its final value and the inverter is supplied with power. (In systems with a central battery the voltage of 2V/Pb cell or 1.2V/NiCd can be present at the output terminals of the individual RECs (safety operation), as the battery isolators are not yet closed).	Yellow flashing	Current flow symbol via REC to INV ON (black)
6	1 to 2	When the polarity on the battery isolator (REC voltage – battery voltage) has been checked, the battery isolator MCCB (external) in the **"ON"** position. The batteries are charged.		
7	1 to 2	Connect the SBS circuit. The SBS only fire when the necessary number for the required capacity are supplied with power.	Green, flashing	Current flow symbol via SBS to loads ON (black)
8	1 to 2	Switch on inverter.		INV symbol flashes
9	1 to 2	The respective AC voltage reaches its final value. As soon as the necessary number of INVs for the required capacity are switched on, the INV output contactors close.	Green ON	Current flow symbol via INV to loads ON (black), via SBS OFF
		There is no fault indication.		
11	1 to 2	Compare equalizing currents of the INVs. The equalizing currents of the INVs when idle should be less than 5% of the INV nominal current.		
12	1 to 2	Switch off INV.		
13	1 to 2	Load breakers to the "ON" position, Q29 (manual by-pass) to the "OFF" position.		
14	1 to 2	Switch on the INV and supply the loads.		

NOTE:
For all additional functions and operating modes please refer to the operating instructions of the individual units.

6 DISCONNECTING

6.1 Disconnecting the Parallel System

In order to extend, service or repair a parallel system, it may be necessary to disconnect this entire parallel system. dDuring this time the loads can be supplied via the manual bypass. The switchover of the loads from the parallel system to the manual bypass and back takes place without any interruption.



NOTE:
Maintenance and repair work must only be performed by authorised expert personnel.

6.1.1 Disconnecting a Parallel System

Step	ID No. 1 to n	Action	DOU	
			LED	Display
1	1 to 2	Control availability of the SBS (SBS ready).	Green	SBS symbol static
2	1 to 2	Switch off the inverter with the **"~0"** key on the DOU and confirm with "yes". As soon as the remaining number of INVs falls below the specified redundancy, the entire parallel system is switched over to the SBS.	Green, flashing	Current flow symbol via SBS
3		Manual bypass switch Q29 to the "ON" position		
4		Load breakers to the **"OFF"** position.		
5	1 to 2	Switch off the rectifier using the **"=0"** key on the DOU and confirm with "yes".	Yellow, green flashing	
6	1 to 2	Rectifier input breaker Q1 to the **"OFF"** position.		
7	1 to 2	Battery isolator MCCB (external) to the **"OFF"** position.	Red, yellow, green flashing	
8	1 to 2	SBS circuit "OFF"	None	OFF



CAUTION:

Even when disconnected, capacitors in the unit can still carry voltage. **Always observe the safety regulations!**

Site Acceptance Test Report		Document-No.: 14188_SAT_1_00
Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

4. Functional tests UPS / Load Transfer Tests:

Incorporates Tests for:

Rectifier Mains Failure – continued Inverter operation via Battery
Rectifier Mains Return – auto start of the rectifier
Inverter Failure – transfer of load from Inverter to Bypass Mains
Inverter Restoration – transfer of load from Bypass Mains to Inverter
Manual Bypass Switch – transfer of load directly to Bypass Mains

The tests are performed with dummy load.

Acceptance Criteria:

Rectifier Mains Failure:	No disruption to the Inverter operation.
Rectifier Mains Return:	Auto start of the rectifier and charging of the Battery
Transfer Inverter to Static Bypass:	No-break transfers

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A) Rectifier Mains Failure

Switch OFF rectifier Mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

Result

B) Rectifier Mains Return

Switch ON rectifier mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

Result

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C) Transfer inverter-SBS mains

Switch OFF Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

Result:

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D) Transfer SBS mains-inverter

Switch ON Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

Result:

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Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

E) Parallel Operation (load transfer test)

Parallel operation UPS n.1 and UPS n.2 - Switching OFF UPS n.2 via Display A18 on the door of the UPS

UPS n.1 takes over 100% Load

and in addition repeat the test as following indicated:

Parallel operation UPS n.1 and UPS n.2

Switching OFF UPS n.2 via de-energization of its upstream power supply

UPS n.1 takes over 100% Load

Result

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Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

Switching OFF UPS n.1 via Display A18 on the door of the UPS

Transfer to Bypass operation

and in addition repeat the test as following indicated:

Switching OFF UPS n.1 via de-energization of its upstream power supply

Transfer to Bypass operation

Result

.

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Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

Bypass operation - Switching ON UPS n.2 via Display A18 on the door of of the UPS

UPS n.2 takes over 100% load

and in addition repeat the test as following indicated:

Bypass operation - Switching ON UPS n.2 via re-energization of its upstream power supply

UPS n.2 takes over 100% load

Result

Site Acceptance Test Report		Document-No.: 14188_SAT_1_00
Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

Switching ON UPS n.1 via Display A18 on the door of of the UPS
Load sharing 50%

Parallel operation with load sharing 50% of UPS n.1 and UPS n.2

and in addition repeat the test as following indicated:

Switching ON UPS n.1 via re-energization of its upstream power supply
Load sharing 50%

Parallel operation with load sharing 50% of UPS n.1 and UPS n.2

Result:

F) Parallel Operation (functional sequence test)

Starting condition: UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.2
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.1 at the correct load
4. Re-energize upstream power supply to Rectifier input n.2
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

G) Parallel Operation (functional sequence test)

Starting condition: UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.1
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.2 at the correct load
4. Re-energize upstream power supply to Rectifier input n.1
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

Result:

5. MODBUS Adapter

Incorporates Tests for:
A29.1 MODBUS Adapter

Test to be performed for chosen failure messages, status messages and measuring values.

Designation	Source	Terminals	Checked
MODBUS Adapter	A29.1	A29.1	

For the Modbus Registers please refer to the following pages.

Unit profile of a three-phase UPS

Status: Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Reg.	Bit no.	Type	Name	Description
1	3-0	WORD	UPSStatus	UPS status: 1=Normal mode 2=Bypass mode 3=Battery mode 4=Eco mode **"O"** 6=Deactivation is imminent 7=Off

Alarms:
Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Reg.	Bit no.	Type	Name	Description (1=active)
2	0	WORD	NonCriticalFault	W: Collective warning
3	0	WORD	CriticalFault	A: Collective alarm
4	0	WORD	Userdef_DigIn1Active	W: **"O"**
5	0	WORD	Userdef_DigIn2Active	W: **"O"**
6	0	WORD	Userdef_DigIn3Active	W: **"O"**
7	0	WORD	EmergencySwitchOff	A: UPS output off **"O"**
8	0	WORD	DouCanFault	W: DOU CAN fault
9	0	WORD	MainsFault	W: Rectifier/bypass mains fault
10	0	WORD	RectifierWarning	W: Rectifier warning
11	0	WORD	RectifierFault	A: Rectifier fault
12	0	WORD	BatteryAlarm	A: Battery fault
13	0	WORD	InverterWarning	W: Inverter warning
14	0	WORD	InverterFault	W: Inverter fault
15	0	WORD	SBSWarning	W: Bypass warning
16	0	WORD	SBSFault	A: Bypass fault
17	0	WORD	EqualisingCharge	I: Charger status – equalising charging
18	0	WORD	Charge	I: Charger status – charging
19	0	WORD	TrickleCharge	I: Charger status – trickle charging
20	0	WORD	GenSetOperation	I: Charger status: Em. power supply **"O"**
21	0	WORD	BattTemp.SensFault	W: Battery temp. sensor **"O"**
22	0	WORD	BatteryTemp.ToHigh	W: Battery temp. too high **"O"**
23	0	WORD	CircuitBreaker	W: Circuit-breaker tripped **"O"**
24	0	WORD	BatteryWarning	W: Battery warning
25	0	WORD	BatteryLow	W: Battery undervoltage
26	0	WORD	Overload	W: Inverter overload
27	0	WORD	FanFault	W: Fan fault
28	0	WORD	Overload	A: Inverter overload
29	0	WORD	ShortCircuit	A: Inverter short-circuit
30	0	WORD	DcUnderVoltage	A: Inverter DC undervoltage
31	0	WORD	DcOverVoltage	A: Inverter DC overvoltage
32	0	WORD	PowerStackOverTemp	A: Inverter stack fault
33	0	WORD	SBSReady	I: Bypass ready
34	0	WORD	SBSMainsFault	W: Bypass mains fault
35	0	WORD	SBSBlocked	W: Bypass blocked
36	0	WORD	RectifierOn	I: Rectifier on
37	0	WORD	InverterOn	I: Inverter on
38	0	WORD	SBSOn	I: Bypass on

- Unit profile of a three-phase UPS

Measured values:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Rectifier mains:

Register	Bit no.	Type	Name	Value range
39	15-0	WORD10	RectMainsFreq.	0.0 - 99.0 Hz
40	15-0	WORD	RectMainsVoltL1	0 - 999 V
41	15-0	WORD	RectMainsVoltL2	0 - 999 V
42	15-0	WORD	RectMainsVoltL3	0 - 999 V

Bypass mains:

Register	Bit no.	Type	Name	Value range
43	15-0	WORD10	SBSMainsFreq.	0.0 – 99.9 Hz
44	15-0	WORD	SBSMainsVoltL1	0 – 999 V
45	15-0	WORD	SBSMainsVoltL2	0 – 999 V
46	15-0	WORD	SBSMainsVoltL3	0 – 999 V

Battery values:

Register	Bit no.	Type	Name	Value range
47	15-0	WORD	BatteryVoltage	0 - 999 V
48	15-0	INT10	BatteryCurrent	+- 0.0 - 3000.0 A
49	15-0	WORD10	AutonomyTime	0.0 – 999.0 min
50	15-0	WORD	BatteryCapacity	0 - 100%
51	15-0	INT10	BatteryTemperature	+- 0.0 - 99.9 °C "**O**"

UPS output:

Register	Bit no.	Type	Name	Value range
52	15-0	WORD10	OutputFreq.	0.0 – 99.0 Hz
53	15-0	WORD	OutputVoltageL1	0 – 999 V
54	15-0	WORD	OutputLoadL1	0 – 100 %
55	15-0	WORD	OutputCurrentL1	0 – 9999 A
56	15-0	WORD10	OutputPowerL1	0.0 – 1000.0 kW
57	15-0	WORD	OutputVoltageL2	0 – 999 V
58	15-0	WORD	OutputLoadL2	0 – 100 %
59	15-0	WORD	OutputCurrentL2	0 – 9999 A
60	15-0	WORD10	OutputPowerL2	0.0 – 1000.0 kW
61	15-0	WORD	OutputVoltageL3	0 – 999 V
62	15-0	WORD	OutputLoadL3	0 – 100 %
63	15-0	WORD	OutputCurrentL3	0 – 9999 A
64	15-0	WORD10	OutputPowerL3	0.0 – 1000.0 kW

LifeCheck:

Register	Bit no.	Type	Name	Value range
65	0	WORD	LifeCheck	Bit 0-1 toggled 1x per minute

- **Unit profile of a three-phase UPS**

Auxiliary signals (for units with user-definable signals):

Reg.	Bit no.	Type	Name	Description
66	0	WORD	Userdef_AUX1 – Rect.	**"O"**
67	0	WORD	Userdef_AUX2 – Rect.	**"O"**
68	0	WORD	Userdef_AUX3 – Rect.	**"O"**
69	0	WORD	Userdef_AUX4 – Rect.	**"O"**
70	0	WORD	Userdef_AUX5 – Rect.	**"O"**
71	0	WORD	Userdef_AUX6 – Rect.	**"O"**
72	0	WORD	Userdef_AUX7– Rect.	**"O"**
73	0	WORD	Userdef_AUX1 – Inv.	**"O"**
74	0	WORD	Userdef_AUX2 – Inv.	**"O"**
75	0	WORD	Userdef_AUX3 – Inv.	**"O"**
76	0	WORD	Userdef_AUX4 – Inv.	**"O"**
77	0	WORD	Userdef_AUX5 – Inv.	**"O"**
78	0	WORD	Userdef_AUX6 – Inv.	**"O"**
79	0	WORD	Userdef_AUX7 – Inv.	**"O"**
80	0	WORD	Userdef_AUX1 – SBS	**"O"**
81	0	WORD	Userdef_AUX2 – SBS	**"O"**
82	0	WORD	Userdef_AUX3 – SBS	**"O"**
83	0	WORD	Userdef_AUX4 – SBS	**"O"**
84	0	WORD	Userdef_AUX5 – SBS	**"O"**
85	0	WORD	Userdef_AUX6 – SBS	**"O"**
86	0	WORD	Userdef_AUX7 – SBS	**"O"**

Date/time:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Write: Fct.-Code 6 (Write single Holding Register) or Fct.-Code 16 (Write multiple Holding Register)

Reg.	Bit no.	Type	Name	Description
150	15-0	WORD	Real time (decimal)	Year (20xx)
151	15-0	WORD		Day (0-31)
152	15-0	WORD		Month (1-12)
153	15-0	WORD		Hour (0-23)
154	15-0	WORD		Minute (0-59)
155	15-0	WORD		Second (0-59)
156	15-0	WORD		Millisecond (0-999)
157	15-0	WORD		Weekday 1 = Monday, 2 = Tuesday, …

- Unit profile of a three-phase UPS

Unit control:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Write: Fct.-Code 6 (Write single Holding Register)

Reg.	Bit no.	Type	Name	Description
1000	15-0	WORD	Rectifier Control	0 = - 1 = ON 2 = OFF 9 = acknowledge fault 10 = equalising charging 11 = charge 12 = trickle charging
1001	15-0	WORD	Inverter Control	0 = - 1 = ON 2 = OFF 3 = Eco mode "**O**" 9 = acknowledge fault
1002	15-0	WORD	SBS Control	0 = - 9 = acknowledge fault
1003	15-0	WORD	**Battery Quick Test** – Control (LB) | Status (HB)	Control (LB) : 0x__00 = - 0x__01 = Start test 0x__02 = Cancel test Status (HB) : 0x00__ = Test not implemented 0x01__ = Test impl., waiting for approval 0x02__ = Test approved 0x03__ = Test running 0x04__ = Test successful 0x05__ = Test cancelled 0x06__ = Test warning 0x07__ = Test error
1004	15-0	WORD	**Battery Capacity Test** (with current load or constant current) – Control (LB) | Status (HB)	Control (LB) : 0x__00 = - 0x__01 = Start test 0x__02 = Cancel test Status (HB) : 0x00__ = Test not implemented 0x01__ = Test impl., waiting for approval 0x02__ = Test approved 0x03__ = Test running 0x04__ = Test successful 0x05__ = Test cancelled 0x06__ = Test warning 0x07__ = Test error
1005	15-0	WORD10	**Battery Capacity Test - RemainingTime**	0.0-6553.0 min

Control: The last accepted control command is read out; if the command failed, the read-out is 0.



In order to guarantee high availability of the load supply, some control commands are only executed if the system meets certain requirements:

Rectifier off => inverter must be off

Inverter off => switching to bypass must be guaranteed

Battery test => the entire system must be in a normal state

- Unit profile of a three-phase UPS

Battery tests:

In low byte, the battery test registers contain the control commands and in high byte, the associated statuses of the battery tests. Depending on the unit configuration, different battery tests can be initiated:

The **Battery Quick Test** consists of briefly testing the battery charging circuit. This test is also performed cyclically by the unit.

The **Battery Capacity Test** consists of testing the battery capacity. For this purpose, the battery is discharged with the connected load or by a constant current and the battery status is evaluated.
The remaining time of the capacity test can be read in the **Remaining Time** register.

Control battery test (LB):
0x00: The test has never been started via Modbus.
0x01/2: The test has been started/cancelled (the control command remains in place until the next command).
Battery test status (HB):
0x00: The test is not implemented in the unit.
0x01: The test is implemented, but is presently not approved, or the start conditions to execute the test are lacking.
0x02: The test is approved and can be started.
0x03-7: The test result remains in place for a short time until another test is approved.

Example of battery cap. test 1004/1005:
0x0000 0000 Test not implemented, no cap. test approved
0x0100 1000 Test is implemented, not approved, waiting for approval, max. runtime 100.0min
0x0200 1000 Test is approved, max. runtime 100.0min
0x0301 805 Test running; max. remaining runtime 80.5min
0x0401 0000 Test successful, new test not possible
0x0201 1000 Test is re-approved (after approx. 30s)

For further information on the battery tests, see the unit operating instructions.

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Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

6. Alarm Test:

Incorporates Tests for:

Remote Alarm signalling on Boards A12/A13
System Operational Check

Acceptance Criteria:

Technical datasheet (TD)

Designation	Terminals	Relay/Opto	Result
Inverter operation 1)	UPS A12-X3: 1, 2, 3	**A12K21**	
SBS operation 1)	UPS A12-X3: 4, 5, 6	**A12K22**	
Rec Fault / Rec mains fault 1)	UPS A12-X3: 7, 8, 9	**A12K23**	
Battery undervoltage 1)	UPS A12-X3: 10, 11, 12	**A12K24**	
Common fault 2)	UPS A12-X4: 1, 2, 3	**A12K25**	
SBS blocked 1)	UPS A13-X3: 1, 2, 3	**A13K26**	
Fan fault 1)	UPS A13-X3: 4, 5, 6	**A13K27**	
BAT room fan on 1)	UPS A13-X3: 7, 8, 9	**A13K28**	
INV remote off 3)	UPS A12-X5: 1, 2	**A12Opto1**	
BAT room fan fault 3)	UPS A13-X4: 1, 2	**A13Opto2**	
Not parameterised 3)	UPS A13-X4: 3, 4	**A13Opto3**	
Fan fault 1)	Bypass X12: 7, 8, 9	**N/A**	
Common fault 1)	Bypass X12: 10, 11, 12	**N/A**	

1) Remote signal / close on the terminals with the lower number
2) Remote signal / close on the terminals with the higher number

OPTO Input test

Check battery boost charge inhibit (external signal) in case of high battery temperature

Result:

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7. Battery test:

BATTERY UPS A	UP-200F3	SHEET 1 REV.	OUR. RIF.:
		NR.:	
CUSTOMER: Rosetti Marino	DISCHARGE TEST (Capacity test)	BATTERY TYPE:	CAPACITY Ah
		ELECTROLYTE TYPE:	DENSITY:
Nr. of blocks	Type :		

TIME (hour : min)	00:00	00:20	00:40	01:00	01:20	01:40	02:00	02:20	02:40	03:00	03:20	03:40	04:00	04:20	04:40	05:00
BLOCK N°	BLOCK / VOLTAGE															
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3																
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18																
TEMP. ELE. °C																

TIME (hour : min)	05:00	05:20	05:40	06:00	06:20	06:40	07:00	07:20	07:40	08:00	08:20	08:40	09:00	09:20	09:40	10:00
BLOCK N°	BLOCK / VOLTAGE															
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Site Acceptance Test Report		Document-No.: 14188_SAT_1_00
Type:	AC UPS System PAS	Tag No.: UP-200F3

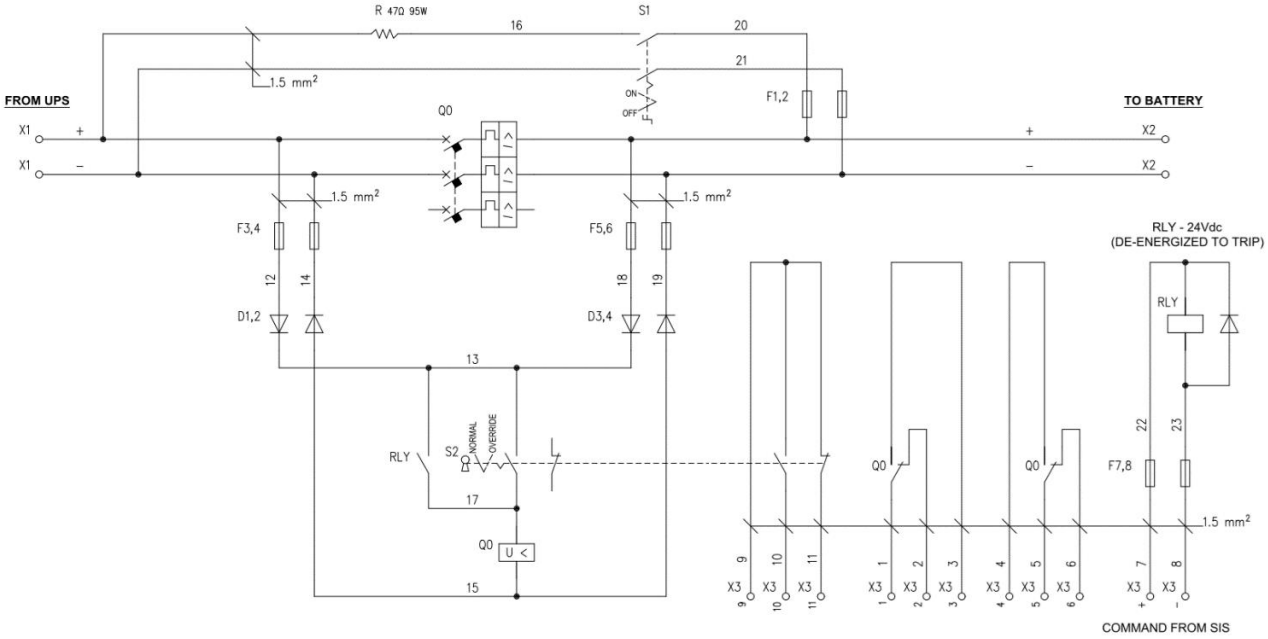
BATTERY UPS B	UP-200F3	SHEET 1 REV. NR.:	OUR. RIF.:
CUSTOMER: Rosetti Marino	DISCHARGE TEST (Capacity test)	BATTERY TYPE:	CAPACITY Ah
		ELECTROLYTE TYPE:	DENSITY:
Nr. of blocks	Type :		

TIME (hour : min)	00:00	00:20	00:40	01:00	01:20	01:40	02:00	02:20	02:40	03:00	03:20	03:40	04:00	04:20	04:40	05:00
BLOCK N°	BLOCK / VOLTAGE															
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17																
18																
TEMP. ELE. °C																

TIME (hour : min)	05:00	05:20	05:40	06:00	06:20	06:40	07:00	07:20	07:40	08:00	08:20	08:40	09:00	09:20	09:40	10:00
BLOCK N°	BLOCK / VOLTAGE															
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TEMP. ELE. °C																

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Type:	**AC UPS System PAS**	**Tag No.: UP-200F3**

8. Black start procedure validation test:



Black Start procedure

The target is to allow the energization of the loads from the battery, while the battery charger being still de-energized.

- The operator shall put the selector S2 on "override" position (contact closed)
- The operator shall close the selector S1 to pre-charge the charger output DC capacitors
- Once the charger DC capacitors are charged and the voltage across Q0 power contacts is close to 0V (and at least >80% of the system DC nominal voltage), the operator shall close the breaker Q0
- The operator shall open the selector S1
- The site safety and SCADA systems restart and the RLY relay is automatically energized when all safety conditions are fulfilled. The charger is energized through its AC supply and then it can restart
- The operator shall put the selector S2 on "normal" position (contact open)
- The system returns to normal working conditions

Designation	Checked
BLACK START procedure UPS-A	
BLACK START procedure UPS-B	

Base Load Power Hub (BLPH)

AC UPS F&G - TAG: UP-200F4

SITE ACCEPTANCE TEST / PRE-COMMISSIONING / COMMISSIONING PROCEDURE

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AEG POWER SOLUTIONS

Site Acceptance Test Report		Document-No.: 14188_SAT_2_00
Type:	**AC UPS System F&G**	**Tag No.: UP-200F4**

Project name: Hollandse Kust Noord (HKN) wind farm	**Order-No.:** 4400007525

Configuration and Serial No.: **Installed:**

BC-200F4-A - UPS Protect 8.33 / 20-400-216-400-RP-IP43 - Serial No.: …….. ☐

BC-200F4-B - UPS Protect 8.33 / 20-400-216-400-RP-IP43 - Serial No.: …….. ☐

BY-200F4 - By-Pass Transformer Cabinet 20 kVA 400/400V - Serial No.: …….. ☐

CB-200F4-A - Battery Fuse Box 200A - Serial No.: …….. ☐

CB-200F4-B - Battery Fuse Box 200A - Serial No.: …….. ☐

BA-200F4-A - Battery 216V-360Ah 3 x 18 x FLG12-150 …….. ☐

BA-200F4-B - Battery 216V-360Ah 3 x 18 x FLG12-150 …….. ☐

Participants:	Company:	Date / Signature:
1.		
2.		
3.		
4.		
5.		

Remark:

Site Acceptance Test must be performed by a skilled AEG technician.

Josè Cuneo	Rev. 00	Cassina de' Pecchi	21.10.2024

Site Acceptance Test Report		Document-No.: 14188_SAT_2_00
Type:	**AC UPS System F&G**	**Tag No.: UP-200F4**

Content:

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1. Informations and Basic Datas:

SCOPE
This procedure describes the methods for checking the AC UPS system, once installed on site, to ensure that it works correctly and it meets the operational requirements

REFERENCE DOCUMENTS
1724000372-EL-DA-00004 AC UPS - GENERAL ARRANGEMENT
1724000372-EL-DG-00007 AC UPS - SINGLE LINE DIAGRAM
1724000372-EL-DG-00009 AC UPS - WIRING DIAGRAM & TERMINAL SCHEDULE
1724000372-EL-DG-00011 AC UPS - BATTERY LAYOUT AND INTERCONNECTION

TESTING EQUIPMENT & ACCESSORIES
Digital Multimeter, Clamp-meter and Dummy Load

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UPS A

RECTIFIER

Input voltage (V) …… Frequency (Hz) …… Number of phases ……...

Float voltage (V) …… Charge voltage (V) ……

Output current (A) …… Battery current limit (A) ……

INVERTER

DC Input range (V) …… AC Output voltage (V) ……

Output frequency (Hz) ……..…… Number of phases ……..……

Rated power (kVA) …… Power factor ……

ALTERNATIVE LINE

Input voltage (V) …… Frequency (Hz) …… Number of phases ……...

BATTERY

Type ……..…… Capacity (Ah) …… Number of strings / cells ……...

Autonomy …… @ Load ……..

CONFIGURATION

Single unit ☐ Redundant system ☐ Redundant parallel system ☐

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UPS B

RECTIFIER

Input voltage (V) …… Frequency (Hz) …… Number of phases ……...

Float voltage (V) …… Charge voltage (V) ……

Output current (A) …… Battery current limit (A) …….

INVERTER

DC Input range (V) …… AC Output voltage (V) ……

Output frequency (Hz) ……..…… Number of phases ……..……

Rated power (kVA) …… Power factor ……

ALTERNATIVE LINE

Input voltage (V) …… Frequency (Hz) …… Number of phases ……...

BATTERY

Type ……..…… Capacity (Ah) ……. Number of strings / cells ……...

Autonomy …… @ Load ……..

CONFIGURATION

Single unit ☐ Redundant system ☐ Redundant parallel system ☐

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2. Visual Inspection

1) Visual Check	Check
• Equipment installation aspects and details	
• Cleanliness of cabinets (internally and externally)	
• Fuses and Circuit breakers rating and related connection cables	
• Control switches and push-buttons	
• Components identification	
• Alarms identification	
• All connections fully tightened	
• Grounding connection	
• All labels correct	
2) Pre-Energization Check	
• Electronic cards and related connections	
• Relays	
• Cooling fans	
• Wiring and plugs connections	
• Fuses and fuse alarm contacts	
• Instruments	
• Power switches, circuit breakers and contacts	
• Marking of components	
• Cable polarity marking	
• Input phase marking	

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3. Starting

Rectifier start	**Result**
Input phase sequence	.....
Float voltage correct setting	.....
High-rate voltage correct setting	.....

Inverter start	**Result**
DC input voltage	.....
AC output voltage	.....
Frequency	.....

Alternate mains start	**Result**
AC output voltage	.....
Frequency	.....

For the starting and shut-down procedure please refer to the following pages.

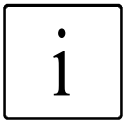
INITIAL START-UP

Prior to starting the unit, check whether the preset unit data complies with the system data by referring to the technical data sheet.

Parallel units are adjusted by the factory with regard to their current distribution. Since the local cabling affects the current distribution of the parallel units (cable cross-sections, cable lengths, cable routing and inductivities of the load distribution board), a new adjustment can be required following installation. The equalizing current of idle parallel units should be less than 5% of the inverter's nominal current. The current distribution must be controlled during start-up. Any adjustment necessary must only be carried out by appropriately trained expert personnel.



ATTENTION:
Improperly adjusted systems can in certain circumstances (individual batteries charged, i.e. 100% capacity and idle inverter) damage the battery.



NOTE:
The start-up instructions of the battery manufacturer must be complied with. Any necessary parameter modifications must be made by our service personnel or via the DOU. If changing the parameters via the DOU, ensure that these changes are applied to all units.

A phase-rotation indicator and a voltmeter are required for the following steps.



CAUTION:
When the mains is connected, potentially fatal voltages are applied to the terminals.
Always observe the safety regulations!

5.1 Preparing Initial Start-Up of a Parallel System

Step	ID No.	Action
1	1 to 2	Input breaker Q1, SBS circuit and battery isolator MCCB (external) to the "**OFF**" position.
2	1 to 2	Open Q71, Q72 inverter output isolators.
3	1 to 2	Distribution breakers to the "OFF" position, Q29 (manual by-pass) to the "OFF" position.
4	1 to 2	Remove connection cover.
5	1 to 2	Check the cable cross sections and fuse protection (refer to the operating instructions of the individual unit). Check the proper earthing of the units (all cubicles must be screwed to one another and earthed).
6	1 to 2	Connect the mains voltage for the rectifier circuit and SBS circuit.
7	1 to 2	Measure the mains voltage at terminals X1 and X4 (X1 phase-to-phase and X4 phase/zero). Refer to the technical data sheet for the nominal voltage.
8	1 to 2	Check the rotating fields at terminals X1 and X4. L1, L2 and L3 clockwise rotation.
9	1 to 2	Switch on input breaker Q1 and wait until the DC nominal voltage is reached.
10	1 to 2	Switch on the inverters.
11	1 to 2	Check the voltage between the parallel units at the inverter output isolators Q71, Q72. The voltage difference of the inverters should not be more than 2 V. (If you measure more than 2 V then adjustment is required which can only be performed by trained expert personnel.)
12	1 to 2	Switch off the inverters.
13	1 to 2	Switch off the mains voltage for the rectifier circuit and SBS circuit.
14	1 to 2	Rectify any errors if necessary and repeat the steps.
15	1 to 2	Replace the connection cover.

5.2 Initial Start-Up of a Parallel System

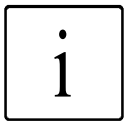
Step	ID No. 1 to n	Action	DOU	
			LED	Display
1	1 to 2	Input breaker Q1, SBS circuit and battery isolator MCCB (external) to the **"OFF"** position. INV output isolators Q71 and Q72 set to **"ON"**.	None	OFF
2	1 to 2	Load breakers to the "OFF" position, Q29 (manual by-pass) to the "OFF" position.		
3	1 to 2	Connect the mains voltage for the rectifier circuit and SBS circuit.		
4	1 to 2	Move Q1 to the **"ON"** position. The rectifier starts automatically. In systems with a central battery it only starts when the necessary number of rectifiers for the required capacity are switched on. The DC voltage increases.	Red/yellow/ green changing	Self-test
5	1 to 2	The DC voltage reaches its final value and the inverter is supplied with power. (In systems with a central battery the voltage of 2V/Pb cell or 1.2V/NiCd can be present at the output terminals of the individual RECs (safety operation), as the battery isolators are not yet closed).	Yellow flashing	Current flow symbol via REC to INV ON (black)
6	1 to 2	When the polarity on the battery isolator (REC voltage – battery voltage) has been checked, the battery isolator MCCB (external) in the **"ON"** position. The batteries are charged.		
7	1 to 2	Connect the SBS circuit. The SBS only fire when the necessary number for the required capacity are supplied with power.	Green, flashing	Current flow symbol via SBS to loads ON (black)
8	1 to 2	Switch on inverter.		INV symbol flashes
9	1 to 2	The respective AC voltage reaches its final value. As soon as the necessary number of INVs for the required capacity are switched on, the INV output contactors close.	Green ON	Current flow symbol via INV to loads ON (black), via SBS OFF
		There is no fault indication.		
11	1 to 2	Compare equalizing currents of the INVs. The equalizing currents of the INVs when idle should be less than 5% of the INV nominal current.		
12	1 to 2	Switch off INV.		
13	1 to 2	Load breakers to the "ON" position, Q29 (manual by-pass) to the "OFF" position.		
14	1 to 2	Switch on the INV and supply the loads.		

NOTE:
For all additional functions and operating modes please refer to the operating instructions of the individual units.

6 DISCONNECTING

6.1 Disconnecting the Parallel System

In order to extend, service or repair a parallel system, it may be necessary to disconnect this entire parallel system. dDuring this time the loads can be supplied via the manual bypass. The switchover of the loads from the parallel system to the manual bypass and back takes place without any interruption.



NOTE:
Maintenance and repair work must only be performed by authorised expert personnel.

6.1.1 Disconnecting a Parallel System

Step	ID No. 1 to n	Action	DOU	
			LED	Display
1	1 to 2	Control availability of the SBS (SBS ready).	Green	SBS symbol static
2	1 to 2	Switch off the inverter with the **"~0"** key on the DOU and confirm with "yes". As soon as the remaining number of INVs falls below the specified redundancy, the entire parallel system is switched over to the SBS.	Green, flashing	Current flow symbol via SBS
3		Manual bypass switch Q29 to the "ON" position		
4		Load breakers to the **"OFF"** position.		
5	1 to 2	Switch off the rectifier using the **"=0"** key on the DOU and confirm with "yes".	Yellow, green flashing	
6	1 to 2	Rectifier input breaker Q1 to the **"OFF"** position.		
7	1 to 2	Battery isolator MCCB (external) to the **"OFF"** position.	Red, yellow, green flashing	
8	1 to 2	SBS circuit "OFF"	None	OFF



CAUTION:

Even when disconnected, capacitors in the unit can still carry voltage. **Always observe the safety regulations!**

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4. Functional tests UPS / Load Transfer Tests:

Incorporates Tests for:

Rectifier Mains Failure – continued Inverter operation via Battery
Rectifier Mains Return – auto start of the rectifier
Inverter Failure – transfer of load from Inverter to Bypass Mains
Inverter Restoration – transfer of load from Bypass Mains to Inverter
Manual Bypass Switch – transfer of load directly to Bypass Mains

The tests are performed with dummy load.

Acceptance Criteria:

Rectifier Mains Failure:	No disruption to the Inverter operation.
Rectifier Mains Return:	Auto start of the rectifier and charging of the Battery
Transfer Inverter to Static Bypass:	No-break transfers

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A) Rectifier Mains Failure

Switch OFF rectifier Mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

Result

B) Rectifier Mains Return

Switch ON rectifier mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

Result

C) Transfer inverter-SBS mains

Switch OFF Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

Result:

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D) Transfer SBS mains-inverter

Switch ON Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

Result:

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E) Parallel Operation (load transfer test)

Parallel operation UPS n.1 and UPS n.2 - Switching OFF UPS n.2 via Display A18 on the door of the UPS

UPS n.1 takes over 100% Load

and in addition repeat the test as following indicated:

Parallel operation UPS n.1 and UPS n.2

Switching OFF UPS n.2 via de-energization of its upstream power supply

UPS n.1 takes over 100% Load

Result

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Switching OFF UPS n.1 via Display A18 on the door of the UPS

Transfer to Bypass operation

and in addition repeat the test as following indicated:

Switching OFF UPS n.1 via de-energization of its upstream power supply

Transfer to Bypass operation

Result

.

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Bypass operation - Switching ON UPS n.2 via Display A18 on the door of of the UPS

UPS n.2 takes over 100% load

and in addition repeat the test as following indicated:

Bypass operation - Switching ON UPS n.2 via re-energization of its upstream power supply

UPS n.2 takes over 100% load

Result

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Switching ON UPS n.1 via Display A18 on the door of of the UPS
Load sharing 50%

Parallel operation with load sharing 50% of UPS n.1 and UPS n.2

and in addition repeat the test as following indicated:

Switching ON UPS n.1 via re-energization of its upstream power supply
Load sharing 50%

Parallel operation with load sharing 50% of UPS n.1 and UPS n.2

Result:

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F) Parallel Operation (functional sequence test)

Starting condition: UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.2
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.1 at the correct load
4. Re-energize upstream power supply to Rectifier input n.2
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

G) Parallel Operation (functional sequence test)

Starting condition: UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.1
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.2 at the correct load
4. Re-energize upstream power supply to Rectifier input n.1
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

Result:

5. MODBUS Adapter

Incorporates Tests for:
A29.1 MODBUS Adapter

Test to be performed for chosen failure messages, status messages and measuring values.

Designation	Source	Terminals	Checked
MODBUS Adapter	A29.1	A29.1	

For the Modbus Registers please refer to the following pages.

Unit profile of a three-phase UPS

Status: Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Reg.	Bit no.	Type	Name	Description
1	3-0	WORD	UPSStatus	UPS status: 1=Normal mode 2=Bypass mode 3=Battery mode 4=Eco mode **"O"** 6=Deactivation is imminent 7=Off

Alarms:
Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Reg.	Bit no.	Type	Name	Description (1=active)
2	0	WORD	NonCriticalFault	W: Collective warning
3	0	WORD	CriticalFault	A: Collective alarm
4	0	WORD	Userdef_DigIn1Active	W: **"O"**
5	0	WORD	Userdef_DigIn2Active	W: **"O"**
6	0	WORD	Userdef_DigIn3Active	W: **"O"**
7	0	WORD	EmergencySwitchOff	A: UPS output off **"O"**
8	0	WORD	DouCanFault	W: DOU CAN fault
9	0	WORD	MainsFault	W: Rectifier/bypass mains fault
10	0	WORD	RectifierWarning	W: Rectifier warning
11	0	WORD	RectifierFault	A: Rectifier fault
12	0	WORD	BatteryAlarm	A: Battery fault
13	0	WORD	InverterWarning	W: Inverter warning
14	0	WORD	InverterFault	W: Inverter fault
15	0	WORD	SBSWarning	W: Bypass warning
16	0	WORD	SBSFault	A: Bypass fault
17	0	WORD	EqualisingCharge	I: Charger status – equalising charging
18	0	WORD	Charge	I: Charger status – charging
19	0	WORD	TrickleCharge	I: Charger status – trickle charging
20	0	WORD	GenSetOperation	I: Charger status: Em. power supply **"O"**
21	0	WORD	BattTemp.SensFault	W: Battery temp. sensor **"O"**
22	0	WORD	BatteryTemp.ToHigh	W: Battery temp. too high **"O"**
23	0	WORD	CircuitBreaker	W: Circuit-breaker tripped **"O"**
24	0	WORD	BatteryWarning	W: Battery warning
25	0	WORD	BatteryLow	W: Battery undervoltage
26	0	WORD	Overload	W: Inverter overload
27	0	WORD	FanFault	W: Fan fault
28	0	WORD	Overload	A: Inverter overload
29	0	WORD	ShortCircuit	A: Inverter short-circuit
30	0	WORD	DcUnderVoltage	A: Inverter DC undervoltage
31	0	WORD	DcOverVoltage	A: Inverter DC overvoltage
32	0	WORD	PowerStackOverTemp	A: Inverter stack fault
33	0	WORD	SBSReady	I: Bypass ready
34	0	WORD	SBSMainsFault	W: Bypass mains fault
35	0	WORD	SBSBlocked	W: Bypass blocked
36	0	WORD	RectifierOn	I: Rectifier on
37	0	WORD	InverterOn	I: Inverter on
38	0	WORD	SBSOn	I: Bypass on

- Unit profile of a three-phase UPS

Measured values:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Rectifier mains:

Register	Bit no.	Type	Name	Value range
39	15-0	WORD10	RectMainsFreq.	0.0 - 99.0 Hz
40	15-0	WORD	RectMainsVoltL1	0 - 999 V
41	15-0	WORD	RectMainsVoltL2	0 - 999 V
42	15-0	WORD	RectMainsVoltL3	0 - 999 V

Bypass mains:

Register	Bit no.	Type	Name	Value range
43	15-0	WORD10	SBSMainsFreq.	0.0 – 99.9 Hz
44	15-0	WORD	SBSMainsVoltL1	0 – 999 V
45	15-0	WORD	SBSMainsVoltL2	0 – 999 V
46	15-0	WORD	SBSMainsVoltL3	0 – 999 V

Battery values:

Register	Bit no.	Type	Name	Value range
47	15-0	WORD	BatteryVoltage	0 - 999 V
48	15-0	INT10	BatteryCurrent	+- 0.0 - 3000.0 A
49	15-0	WORD10	AutonomyTime	0.0 – 999.0 min
50	15-0	WORD	BatteryCapacity	0 - 100%
51	15-0	INT10	BatteryTemperature	+- 0.0 - 99.9 °C "**O**"

UPS output:

Register	Bit no.	Type	Name	Value range
52	15-0	WORD10	OutputFreq.	0.0 – 99.0 Hz
53	15-0	WORD	OutputVoltageL1	0 – 999 V
54	15-0	WORD	OutputLoadL1	0 – 100 %
55	15-0	WORD	OutputCurrentL1	0 – 9999 A
56	15-0	WORD10	OutputPowerL1	0.0 – 1000.0 kW
57	15-0	WORD	OutputVoltageL2	0 – 999 V
58	15-0	WORD	OutputLoadL2	0 – 100 %
59	15-0	WORD	OutputCurrentL2	0 – 9999 A
60	15-0	WORD10	OutputPowerL2	0.0 – 1000.0 kW
61	15-0	WORD	OutputVoltageL3	0 – 999 V
62	15-0	WORD	OutputLoadL3	0 – 100 %
63	15-0	WORD	OutputCurrentL3	0 – 9999 A
64	15-0	WORD10	OutputPowerL3	0.0 – 1000.0 kW

LifeCheck:

Register	Bit no.	Type	Name	Value range
65	0	WORD	LifeCheck	Bit 0-1 toggled 1x per minute

- **Unit profile of a three-phase UPS**

Auxiliary signals (for units with user-definable signals):

Reg.	Bit no.	Type	Name	Description
66	0	WORD	Userdef_AUX1 – Rect.	**"O"**
67	0	WORD	Userdef_AUX2 – Rect.	**"O"**
68	0	WORD	Userdef_AUX3 – Rect.	**"O"**
69	0	WORD	Userdef_AUX4 – Rect.	**"O"**
70	0	WORD	Userdef_AUX5 – Rect.	**"O"**
71	0	WORD	Userdef_AUX6 – Rect.	**"O"**
72	0	WORD	Userdef_AUX7– Rect.	**"O"**
73	0	WORD	Userdef_AUX1 – Inv.	**"O"**
74	0	WORD	Userdef_AUX2 – Inv.	**"O"**
75	0	WORD	Userdef_AUX3 – Inv.	**"O"**
76	0	WORD	Userdef_AUX4 – Inv.	**"O"**
77	0	WORD	Userdef_AUX5 – Inv.	**"O"**
78	0	WORD	Userdef_AUX6 – Inv.	**"O"**
79	0	WORD	Userdef_AUX7 – Inv.	**"O"**
80	0	WORD	Userdef_AUX1 – SBS	**"O"**
81	0	WORD	Userdef_AUX2 – SBS	**"O"**
82	0	WORD	Userdef_AUX3 – SBS	**"O"**
83	0	WORD	Userdef_AUX4 – SBS	**"O"**
84	0	WORD	Userdef_AUX5 – SBS	**"O"**
85	0	WORD	Userdef_AUX6 – SBS	**"O"**
86	0	WORD	Userdef_AUX7 – SBS	**"O"**

Date/time:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Write: Fct.-Code 6 (Write single Holding Register) or Fct.-Code 16 (Write multiple Holding Register)

Reg.	Bit no.	Type	Name	Description
150	15-0	WORD	Real time (decimal)	Year (20xx)
151	15-0	WORD		Day (0-31)
152	15-0	WORD		Month (1-12)
153	15-0	WORD		Hour (0-23)
154	15-0	WORD		Minute (0-59)
155	15-0	WORD		Second (0-59)
156	15-0	WORD		Millisecond (0-999)
157	15-0	WORD		Weekday 1 = Monday, 2 = Tuesday, …

- Unit profile of a three-phase UPS

Unit control:

Read: Fct.-Code 3 (Read Holding Register) or Fct.-Code 4 (Read Input Register)

Write: Fct.-Code 6 (Write single Holding Register)

Reg.	Bit no.	Type	Name	Description
1000	15-0	WORD	Rectifier Control	0 = - 1 = ON 2 = OFF 9 = acknowledge fault 10 = equalising charging 11 = charge 12 = trickle charging
1001	15-0	WORD	Inverter Control	0 = - 1 = ON 2 = OFF 3 = Eco mode "**O**" 9 = acknowledge fault
1002	15-0	WORD	SBS Control	0 = - 9 = acknowledge fault
1003	15-0	WORD	**Battery Quick Test** – Control (LB) | Status (HB)	Control (LB) : 0x__00 = - 0x__01 = Start test 0x__02 = Cancel test Status (HB) : 0x00__ = Test not implemented 0x01__ = Test impl., waiting for approval 0x02__ = Test approved 0x03__ = Test running 0x04__ = Test successful 0x05__ = Test cancelled 0x06__ = Test warning 0x07__ = Test error
1004	15-0	WORD	**Battery Capacity Test** (with current load or constant current) – Control (LB) | Status (HB)	Control (LB) : 0x__00 = - 0x__01 = Start test 0x__02 = Cancel test Status (HB) : 0x00__ = Test not implemented 0x01__ = Test impl., waiting for approval 0x02__ = Test approved 0x03__ = Test running 0x04__ = Test successful 0x05__ = Test cancelled 0x06__ = Test warning 0x07__ = Test error
1005	15-0	WORD10	**Battery Capacity Test - RemainingTime**	0.0-6553.0 min

Control: The last accepted control command is read out; if the command failed, the read-out is 0.



In order to guarantee high availability of the load supply, some control commands are only executed if the system meets certain requirements:

Rectifier off => inverter must be off

Inverter off => switching to bypass must be guaranteed

Battery test => the entire system must be in a normal state

- Unit profile of a three-phase UPS

Battery tests:

In low byte, the battery test registers contain the control commands and in high byte, the associated statuses of the battery tests. Depending on the unit configuration, different battery tests can be initiated:

The **Battery Quick Test** consists of briefly testing the battery charging circuit. This test is also performed cyclically by the unit.

The **Battery Capacity Test** consists of testing the battery capacity. For this purpose, the battery is discharged with the connected load or by a constant current and the battery status is evaluated.
The remaining time of the capacity test can be read in the **Remaining Time** register.

Control battery test (LB):
0x00: The test has never been started via Modbus.
0x01/2: The test has been started/cancelled (the control command remains in place until the next command).
Battery test status (HB):
0x00: The test is not implemented in the unit.
0x01: The test is implemented, but is presently not approved, or the start conditions to execute the test are lacking.
0x02: The test is approved and can be started.
0x03-7: The test result remains in place for a short time until another test is approved.

Example of battery cap. test 1004/1005:
0x0000 0000 Test not implemented, no cap. test approved
0x0100 1000 Test is implemented, not approved, waiting for approval, max. runtime 100.0min
0x0200 1000 Test is approved, max. runtime 100.0min
0x0301 805 Test running; max. remaining runtime 80.5min
0x0401 0000 Test successful, new test not possible
0x0201 1000 Test is re-approved (after approx. 30s)

For further information on the battery tests, see the unit operating instructions.

Site Acceptance Test Report		Document-No.: 14188_SAT_2_00
Type:	**AC UPS System F&G**	**Tag No.: UP-200F4**

6. Alarm Test:

Incorporates Tests for:

Remote Alarm signalling on Boards A12/A13
System Operational Check

Acceptance Criteria:

Technical datasheet (TD)

Designation	Terminals	Relay/Opto	Result
Inverter operation 1)	UPS A12-X3: 1, 2, 3	**A12K21**	
SBS operation 1)	UPS A12-X3: 4, 5, 6	**A12K22**	
Rec Fault / Rec mains fault 1)	UPS A12-X3: 7, 8, 9	**A12K23**	
Battery undervoltage 1)	UPS A12-X3: 10, 11, 12	**A12K24**	
Common fault 2)	UPS A12-X4: 1, 2, 3	**A12K25**	
SBS blocked 1)	UPS A13-X3: 1, 2, 3	**A13K26**	
Fan fault 1)	UPS A13-X3: 4, 5, 6	**A13K27**	
BAT room fan on 1)	UPS A13-X3: 7, 8, 9	**A13K28**	
INV remote off 3)	UPS A12-X5: 1, 2	**A12Opto1**	
BAT room fan fault 3)	UPS A13-X4: 1, 2	**A13Opto2**	
Not parameterised 3)	UPS A13-X4: 3, 4	**A13Opto3**	
Fan fault 1)	Bypass X12: 7, 8, 9	**N/A**	
Common fault 1)	Bypass X12: 10, 11, 12	**N/A**	

1) Remote signal / close on the terminals with the lower number
2) Remote signal / close on the terminals with the higher number

OPTO Input test

Check battery boost charge inhibit (external signal) in case of high battery temperature

Result:

Site Acceptance Test Report		Document-No.: 14188_SAT_2_00
Type:	AC UPS System F&G	Tag No.: UP-200F4

7. Battery test:

BATTERY UPS A	UP-200F4	SHEET 1 NR.:	REV.	OUR. RIF.:
CUSTOMER: Rosetti Marino	DISCHARGE TEST (Capacity test)	BATTERY TYPE:		CAPACITY Ah
		ELECTROLYTE TYPE:		DENSITY:
Nr. of blocks	Type :			

TIME (hour : min)	00:00	00:20	00:40	01:00	01:20	01:40	02:00	02:20	02:40	03:00	03:20	03:40	04:00	04:20	04:40	05:00
BLOCK N°	BLOCK / VOLTAGE															
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Site Acceptance Test Report		Document-No.: 14188_SAT_2_00
Type:	AC UPS System F&G	Tag No.: UP-200F4

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BLOCK N°	BLOCK / VOLTAGE															
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Site Acceptance Test Report		Document-No.: 14188_SAT_2_00
Type:	AC UPS System F&G	Tag No.: UP-200F4

BATTERY UPS B	UP-200F4	SHEET 1 / NR.:	REV.	OUR. RIF.:
CUSTOMER: Rosetti Marino	DISCHARGE TEST (Capacity test)	BATTERY TYPE:		CAPACITY Ah
		ELECTROLYTE TYPE:		DENSITY:
Nr. of blocks	Type :			

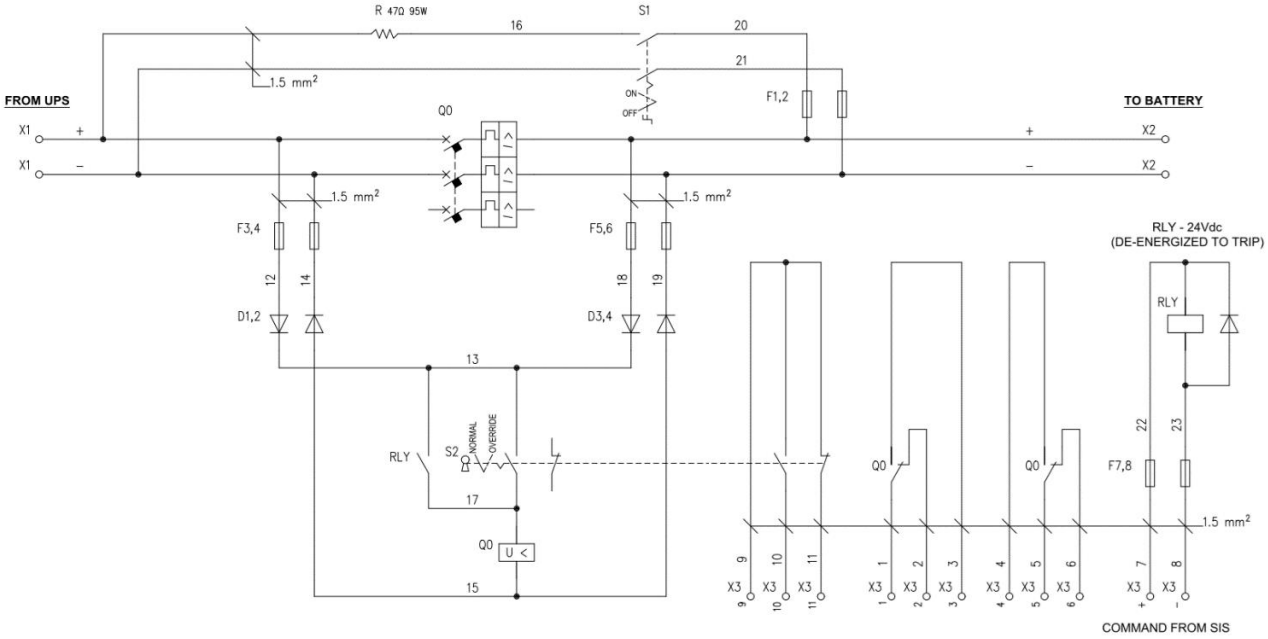
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Site Acceptance Test Report		Document-No.: 14188_SAT_2_00
Type:	AC UPS System F&G	Tag No.: UP-200F4

TIME (hour : min)	05:00	05:20	05:40	06:00	06:20	06:40	07:00	07:20	07:40	08:00	08:20	08:40	09:00	09:20	09:40	10:00
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Site Acceptance Test Report		Document-No.: 14188_SAT_2_00
Type:	**AC UPS System F&G**	**Tag No.: UP-200F4**

8. Black start procedure validation test:



Black Start procedure

The target is to allow the energization of the loads from the battery, while the battery charger being still de-energized.

- The operator shall put the selector S2 on "override" position (contact closed)
- The operator shall close the selector S1 to pre-charge the charger output DC capacitors
- Once the charger DC capacitors are charged and the voltage across Q0 power contacts is close to 0V (and at least >80% of the system DC nominal voltage), the operator shall close the breaker Q0
- The operator shall open the selector S1
- The site safety and SCADA systems restart and the RLY relay is automatically energized when all safety conditions are fulfilled. The charger is energized through its AC supply and then it can restart
- The operator shall put the selector S2 on "normal" position (contact open)
- The system returns to normal working conditions

Designation	Checked
BLACK START procedure UPS-A	
BLACK START procedure UPS-B	

Base Load Power Hub (BLPH)

PACKING, PREPARATION FOR SHIPPING AND HANDLING AND STORAGE PROCEDURES

Document Number: 1724000372-QC-PRO-00027

ROSETTI MARINO

1	APPROVED - WORK MAY PROCEED
2N	REVISE AND RE-SUBMIT - DO NOT PROCEED
2Y	REVISE AND RE-SUBMIT - WORK MAY PROCEED
3	REJECTED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	18/12/2024

Document Class: 3

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00	09/10/2024	Issue for Information (IFI)	DA	DA	AD
Rev.	Date	Description	Prepared	Reviewed	Approved

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01	Issue for Information (IFI)

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Base Load Power Hub (BLPH)

PACKING PROCEDURE

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Packaging specifications and procedures for shipping goods

	Created		Release
Name	PL / D. Frei		P / M. Hitzegrad
Date	06.11.2018 gez. D. Frei		gez. M. Hitzegrad

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2. Scope 1
3. Terms, abbreviations and definitions 1
4. Responsibility and procedures 1
4.1. General informations 1
4.2. Types of packaging 3
5. Other applicable documents 5
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1. Purpose

These work instructions regulate the type of packaging for the corresponding ways of transportation.

2. Scope

These work instructions apply to the PL WHS area of AEG Power Solutions.

3. Terms, abbreviations and definitions

See IMS manual terms, abbreviations and definitions.

4. Responsibility and procedures

4.1. General informations

Depending on the nature of the goods to be shipped, different types of packaging must be chosen depending on the way of transportation chosen.

Implementation:

Depending on the type, the packaging of the respective goods is carried out by the shipping staff or by a service provider commissioned by the shipping department (special wooden packaging). The packaging chosen depends, on the one hand, on the properties of the goods and, on the other hand, on the way of transportation chosen. The employees are informed of the selected route via the picking list, so that the correct allocation of the packaging can be made using the following matrix.

AEG

POWER SOLUTIONS

Verpackungsvorgabe anhand der Routen auf den Kommissionierlisten

Route		IPS - PV - POC - Grid & Storage Systems - P10/Blue	SNT
AB	Abholbereit	Palette / Ecken / Folie	Karton / Palette m. Folie
ABHOL	Selbstabholung	Palette / Ecken / Folie	Karton / Palette m. Folie
VB	Versandbereit melden	Palette / Ecken / Folie	Karton / Palette m. Folie
EX 000	TNT - 1 Tag	Palette / Ecken / Folie	Karton / Palette m. Folie
EX 001	DHL EG	Palette / Ecken / Folie	Karton / Palette m. Folie
EX 002	DHL EWR	Palette / Ecken / Folie	Karton / Palette m. Folie
EX 003	TNT - 2/3 Tag	Palette / Ecken / Folie	Karton / Palette m. Folie
EX 004	TNT - 4 Tag	Palette / Ecken / Folie	Karton / Palette m. Folie
EX 005	Luftfracht	Kiste	Karton / Palette m. Folie
EX 006	Seemäßig Verpackt	Kiste	Kiste
EX 010	Standard Export	Palette / Ecken / Folie	Karton / Palette m. Folie
EX 025	Seefracht	Kiste	Kiste
Ex 035	Seefracht Asien/Fernost	Kiste	Kiste
IN 000	Spedition Sonderfahrt	Palette / Ecken / Folie	Karton / Palette m. Folie
IN 001	1 Tag, über Nacht Zustellung	Palette / Ecken / Folie	Karton / Palette m. Folie
IN 0012	1 Tag, 9 Uhr Zustellung	Palette / Ecken / Folie	Karton / Palette m. Folie
IN 0013	1 Tag, 10 Uhr Zustellung	Palette / Ecken / Folie	Karton / Palette m. Folie
IN 0014	1 Tag, 12 Uhr Zustellung	Palette / Ecken / Folie	Karton / Palette m. Folie
IN 002	2 Tage Zustellung	Palette / Ecken / Folie	Karton / Palette m. Folie
IN 004	Standard Inland	Palette / Ecken / Folie	Karton / Palette m. Folie
IN 005	Mididata	Palette / Ecken / Folie	-
IN 006	Seemäßig Verpackt	Kiste	Kiste
IN 008	Bahnaufträge	-	Karton / Palette m. Folie
MITNAH	Mitnahme	Nach bedarf	Nach Bedarf
Kurier	Zustellung per Kurier	Palette / Ecken / Folie	Karton / Palette m. Folie

31.10.2018

D. Frei

S. Wille

K.-H- Luig

4.2. Types of packaging

When it comes to cabinets, a distinction is made between two standard types of packaging.

For domestic packaging, the cabinet on the pallet is provided with 4 corner protectors (blue colour) and wrapped in stretch film and provided with tipping indicators (red arrow).



For sea or air freight packaging, the cabinets are welded into an aluminum composite film using desiccants and a wooden box is built around the cabinet and provided with tipping indicators. (The HPE packaging guidelines must be observed).



5. Other applicable documents

See IMS manual applicable documents.

Co-applicable documents: See IMS manual applicable documents.

List of attachments: --

Revision history

ED 0.0: First edition
ED 0.1: New format, document in the appendix updated to October 26, 2016
ED 1.1: Content 4.2 added and adapted to new template.

Base Load Power Hub (BLPH)

STORAGE PROCEDURE

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PROCEDURES

Storage and preservation procedures

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6. Treacebility 4

1. Document purpose

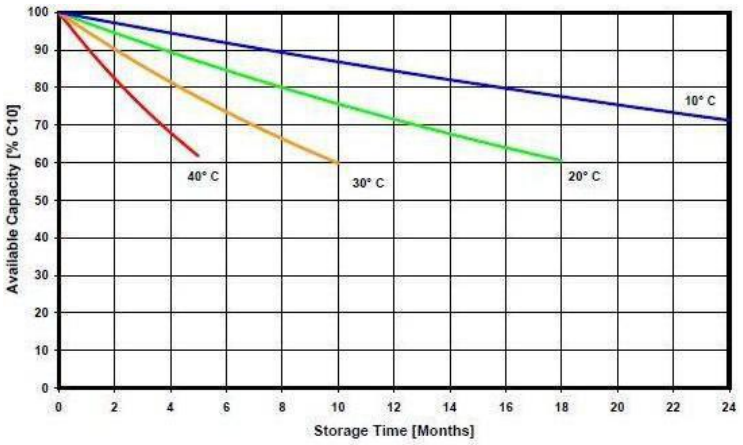
This document is intended to provide the correct procedure to storage and preserve the UPS system that is inside the AEG scope of supply. This procedure has to be applied to all items included in the scope of supply.

2. Storage modality

2.1. Warehouse

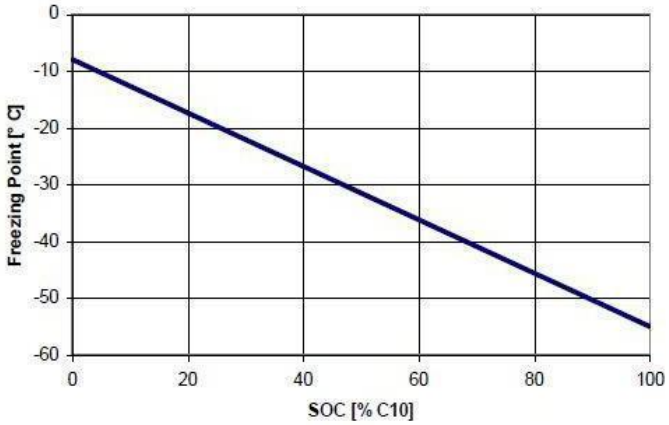
The warehouse must be a closed and covered place, with floor isolated from natural, covered with a roof to protect and attenuate the solar radiation. It is recommended an ambient ventilation to keep the room dry. Only for UPS and related auxiliary panels, the room's temperature should be between -25°C and +70°C. The relative air humidity should be between 15% and 85% not condensing.

2.2. Environmental conditions of battery



To store battery blocks for a long period of time, they should be fully charged and stored in a dry frost-free room. Don't store the battery under direct sunlight and don't expose to excessive heat. Storage of filled battery at temperatures above +30°C (+86°F) for long time can result in a permanent change and loss of product performances, depending on the duration of the storage above the maximum recommended temperature. The effect of the battery auto-discharge process will be as per table above.

Do not expose the battery to low temperature in order to avoid freezing of the electrolyte. Below the table of the freezing point of the electrolyte compared with the charging status of the battery:



2.3. Refreshing charge of battery

The maximum storage period before energization, without any refreshing charge, is 6 (six) months at 20°C. The maximum recommended storage period before energization, with periodic refreshing charge, is 18 (eighteeen) months at 20°C. Every 3 months it will be necessary to check the open circuit voltage of each battery block. If the voltage of the block is less than 12,60 Vpc a refreshing charge is needed, according to the battery manufacturer recommendations.

For the battery in our scope of supply the refreshing charge can be carried out with a voltage of 2,40 Vpc for up to 24 hours and with limited current. During the charging process the cells/blocks temperature must never exceed 40°C. If it happens, please stop charging or change to float charge to allow the temperature to drop down.

2.4. Environmental conditions of UPS

For a safe storage in case of seaworthy packing:

- select a dry and ventilated room with a stable protective roof for the storage of equipments. The temperature of the room should be between -25°C and +70°C. The relative air humidity should be between 15% and 85%
- the equipments may only be stored for a maximum period of 12 months in the original packaging.

2.5. Environmental conditions monitoring

Monitoring procedure:

- temperature and humidity recorded periodically inside the storage place. This measurement has to be done each month
- packing integrity to be checked every 3 (three) month

CHECK LIST		
Description	**Result: OK / not OK**	**Date**
Visual check of integrity case		
Visual check of eventual presence of molds and cracks		
Check of integrity of all external labels		

PROCEDURES

3. Packaging removal

The packing protects the equipment during transportation. A pallet is screwed to the underside of the equipment. It makes the transportation easier and protects the equipment whilst on the move. The housing is protected by corner and edge mouldings. It is wrapped in stretch plastic film. The film provides protection against damage caused by leaks, dust and rain.

AEG Power Solutions recommendations:

- do not remove the packing until immediately before start-up. (This to avoid unnecessary damages to the equipment)
- remove carefully any condensation that may have occurred inside and outside the equipment. The condensation is caused by variations in pressure and in temperature between where the equipment was manufactured, stored and where it is finally installed. Condensation can be volatilised by storing the equipment at the installation site for 48 hours. Remove seaworthy packaging after that period.

4. Preservation activities after the installation

4.1 Battery

Keep the battery clean and dry to avoid creeping currents. Plastic parts of the battery, especially containers, must be cleaned with pure water without additives.

At least every 6 (six) months please measure and record:
- Battery voltage
- Float voltage of some cells/blocks (as sample)
- Surface temperature of some cells/blocks (as sample)
- Battery room temperature

At least every 12 (twelve) months please measure and record:
- Battery voltage
- Float voltage of all cells / blocks
- Surface temperature of all cells/blocks
- Battery room temperature
- Insulation resistance acc. to DIN 43539 part1

At least every 12 (twelve) months please check:
- Screw connections
- Screw connections without locking devices have to be checked for tightness
- Battery installation and arrangement
- Ventilation

4.2 UPS and auxiliary cabinets

Many maintenance tasks must be carried out at periodic intervals. The following table shows the maintenance tasks to be carried out and the corresponding maintenance intervals:

Maintenance interval	Maintenance Task
3 months	Check block battery voltage
3 months	Check battery voltage
6 months	Carry out functional test
12 months	Check battery screw connections
40.000 hours	Replace fan (*)
10 years	Replace electrolytic capacitors for AC UPS
7 years	Replace electrolytic capacitors for DC UPS
5 years	Replace input filter

(*) The maintenance interval for "Replace fan" depends upon the ambient conditions. If large quantities of dust have accumulated, clean the equipment at regular intervals using dry compressed air.

5. Responsability

The customer is responsible of the storage and preservation of the items according to the conditions mentioned above. Periodically a report shall be issued in order to record the storage and the environmental conditions.

6. Treacebility

Marking-Cases: the items will be packed according to project specification and identified in the related packing list. Each case will be identified by a tag-mark.

Final Storage Documentation: after the storage period (before the installation) all the cases will be photographed highlighting the related mark of the case. This document will be shared between the customer and AEG PS.

Communications: the customer will guarantee that will communicate to AEG PS if any event compromising the integrity of the equipment will happen. AEG PS will reserve the right to organize and expediting to check the packing status of the items held in storage.

Storage Limits: the equipment must be stored with original whole packing.
If for any reason the cases and the barrier-bag will be open before the installation a short period.
In case of prolonged period before installation the packaging must be restored to ensure the conservation of storage till the installation

Base Load Power Hub (BLPH)

DC UPS - INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

Document Number: 1724000372-EL-MAN-00024

ROSETTI MARINO	
1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED
NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.	
Sign	Date
	04/02/2025

Document Class: 3

Rev.	Date	Description	Prepared	Reviewed	Approved
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Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1

INSTALLATION, OPERATING AND MAINTENANCE MANUAL

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AEG

POWER
SOLUTIONS

PROTECT RCS

Operation manual

Installation, Operation and Maintenance manual

Battery charger

SPRe - TPRe
Building Blocks

BN 092495/01/03 – 03/03/2019

EN

 AEG Power Solutions is a world specialist in AC and DC power conversion.

 The company designs and manufactures rectifiers, inverters and power electronics systems associated with all types of batteries.

 The applications range from Oil & Gas, Petrochemicals, Transport, Power, Manufacturing and Telecommunications Industries through to Military applications.

 AEG Power Solutions makes available to its customers its theoretical and practical training centre at various locations.

CE

This equipment has been designed to meet the requirements of the European Directives applicable to the product concerned, i.e. Directive on Electromagnetic compatibility (EMC) N° 2014/30/EU of 18-04-2014. To comply the units are equipped with the necessary input filters where applicable. Together with the compliance to Low Voltage Directive N° 2014/35/EU of 18-04-2014, the systems have the CE mark.
The delivered equipment is conform with these Directives as long as the user does not change its electrical and mechanical characteristics.

This equipment is designed to be used in an industrial environment.

WARNING :
THIS PRODUCT IS FOR RESTRICTED DISTRIBUTION TO INFORMED INSTALLERS OR USERS. INSTALLATION RESTRICTIONS OR ADDITIONAL MEASURES MAY BE NECESSARY TO AVOID DISTURBANCES.

The units equipped with an EMI suppression filter have high leakage currents to the chassis. Always connect the earth connection first before any other connection. Danger to the operator can occur if the units are not firmly connected to earth.

The units contain DC capacitors on the output of the DC line. Allow 5 minutes for the discharge of the capacitor bank when the system is completely powered down and in any case, always check the absence of voltage on the system terminals and at capacitors terminals prior to maintenance operations.

This equipment has been designed to be connected to class II power supplies with over voltages not exceeding 2500 V peak. All precautions should be taken to stay within these limits.

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1 INTRODUCTION

This manual is designed to familiarize the user with the operating principles, use and maintenance of the PROTECT RCS range of rectifiers fitted in floor mounted cabinets. The Protect RCS range comprises the SPRe and TPRe. SPR means Single Phase Rectifier, TPR means Three Phase Rectifier and "e" means "evolution" brought by the GCAU control card.

To use the system properly, the user should first read this manual carefully.

AEG is not be responsible for damage due to improper use, neglect, alterations, or use of other than original parts without our written consent.

Equipment access areas:
- Operator: door closed.
- Maintenance personnel: door open.

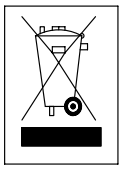
IMPORTANT RECOMMENDATIONS:

ANY OPERATION ON THE EQUIPMENT SHOULD BE CARRIED OUT BY QUALIFIED PERSONNEL, AWARE OF SPECIFIC ELECTRICAL HAZARDS AND PRECAUTIONS TO BE TAKEN.

LETHAL VOLTAGES EXIST PERMANENTLY ACROSS THE BATTERY TERMINALS.

DO NOT MAKE ASSUMPTIONS AS TO THE PRESENCE OR ABSENCE OF A VOLTAGE: CHECK USING A VOLTMETER OR AN ELECTRICAL SAFETY TESTER.

WEEE INFORMATION



The disposal of this product is covered by a selective processing of some components. For this provision of services, please contact our Customer Service.
Refer to standards 2002/95/EC (LSDEEE or RoHS) and 2002/96/EC (WEEE)

For general information about operating principles of the charger: please refer first to Chapter 7 "Functional description".

CUSTOMER DRAWINGS:

This manual, covering standard equipment, comes with a customer drawing package specific to your equipment.
These documents will be needed for any on-site action by our Customer Service Department.

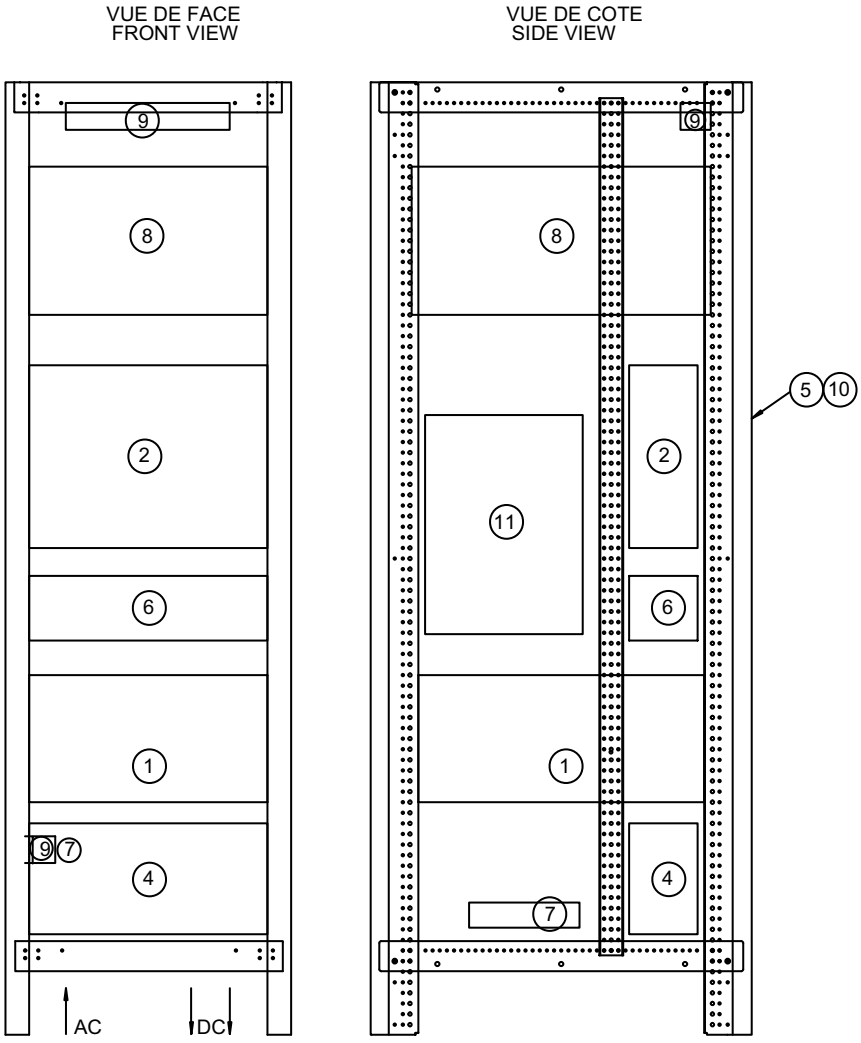
2 PRESENTATION OF THE SYSTEM

The aim of the building block system is to identify the different functions of the system and to integrate them into the cabinet at fixed positions.
This ergonomics facilitates access and maintenance of the system while optimizing security.

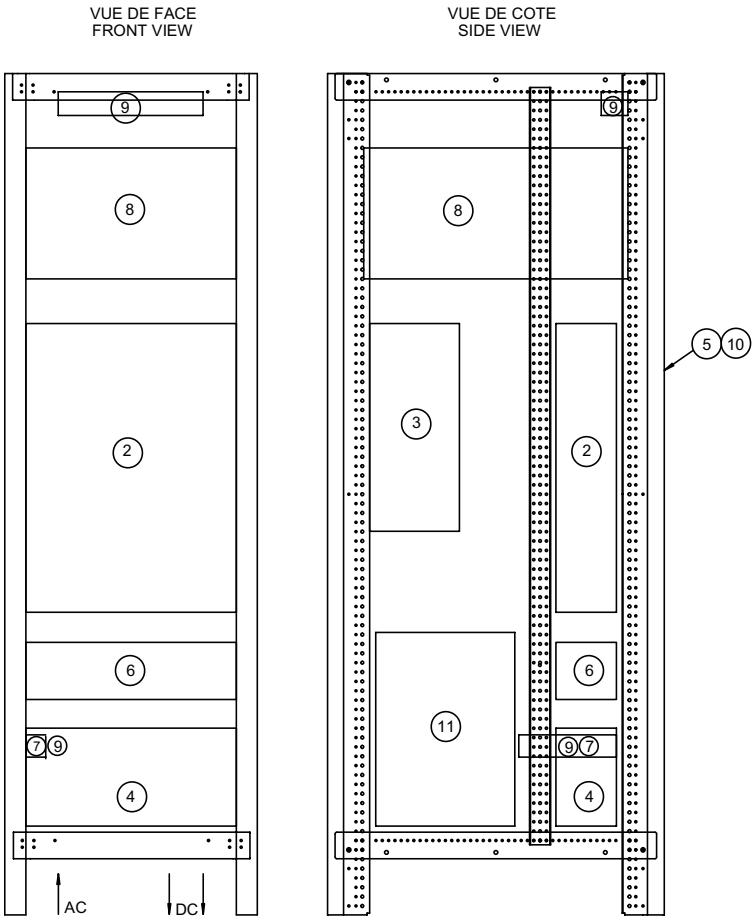
Depending on the delivered configuration, the system can be equipped with the following building-blocks (refer to the specific drawings):

1. Battery building block
2. Distribution building block
3. Diode dropper building block
4. Inputs/outputs building block
5. Display building block (Man/machine interface front panel)
6. Load protections building block
7. Heating resistor building block
8. Rectifier building block
9. AC mains socket and light building block
10. Structure building block
11. Transformer building block

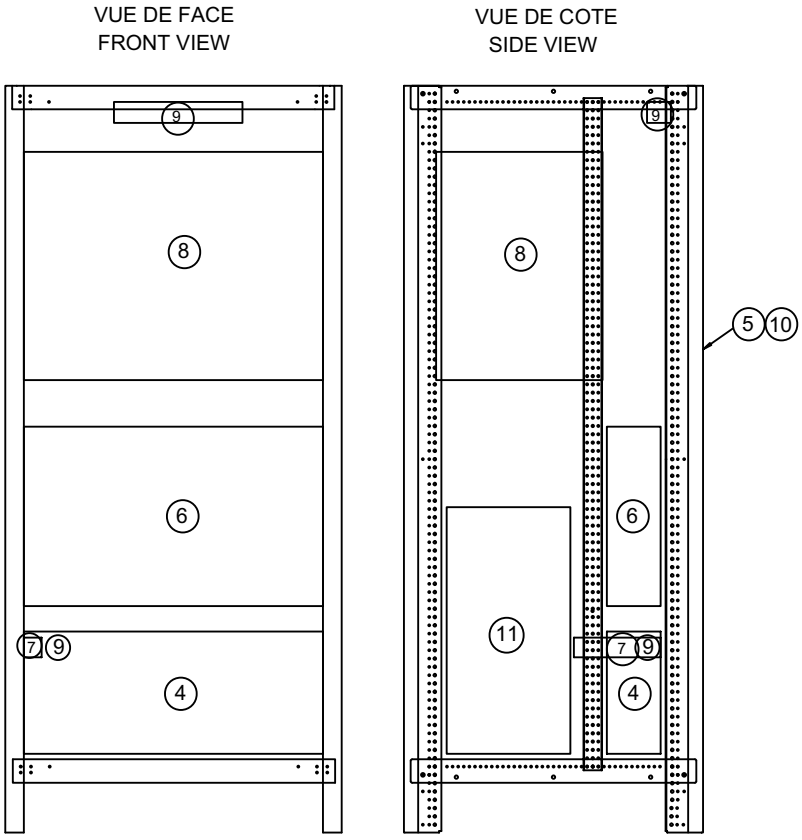
The door of the cabinet is equipped with the man-machine interface (MMI) allowing the operation and monitoring of the system.



Position of the blocks for rectifier range up to 200 A with integrated battery



Position of the blocks for rectifier range up to 200 A without integrated battery



Position of the blocks for rectifier range > 200 A

The PROTECT RCS range offers the following standard and extended ratings:

SPRe

Battery Voltage (V DC)	24	48/60	110/125
Output Current (A)	25	25	25
	50	50	50
	75	75	
	100	100	

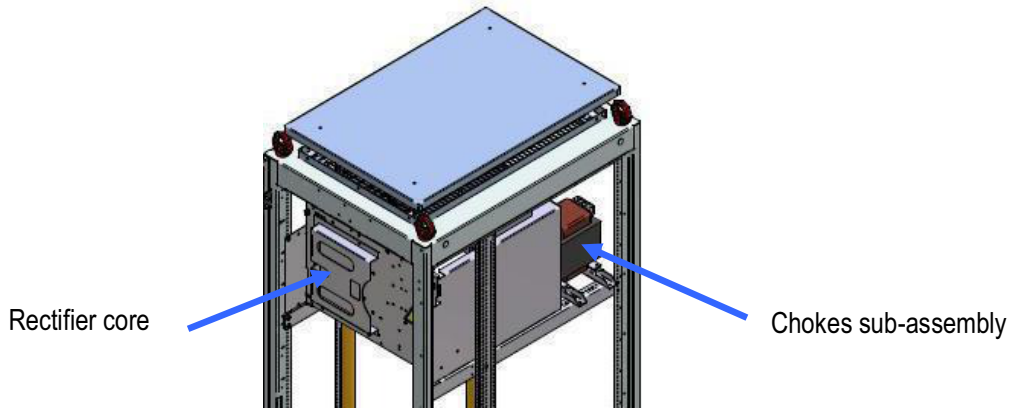
TPRe

Battery Voltage (V DC)	24	48/60	110/125	220
Output Current (A)	25	25	25	25
	50	50	50	50
	75	75	75	75
	100	100	100	100
	150	150	150	150
	200	200	200	200
	300	300	300	300
	400	400	400	400
	500	500	500	500
		600	600	
		700	700	
		800	800	
		1000	1000	
		1200	1200	

Other ratings available on request.

2.1 RECTIFIER RACK

The rectifier rack is located in the upper part of the cabinet.



The bars set is the same for all systems (three-phase or single-phase) up to 100 A.
It can be modified via the filter function.

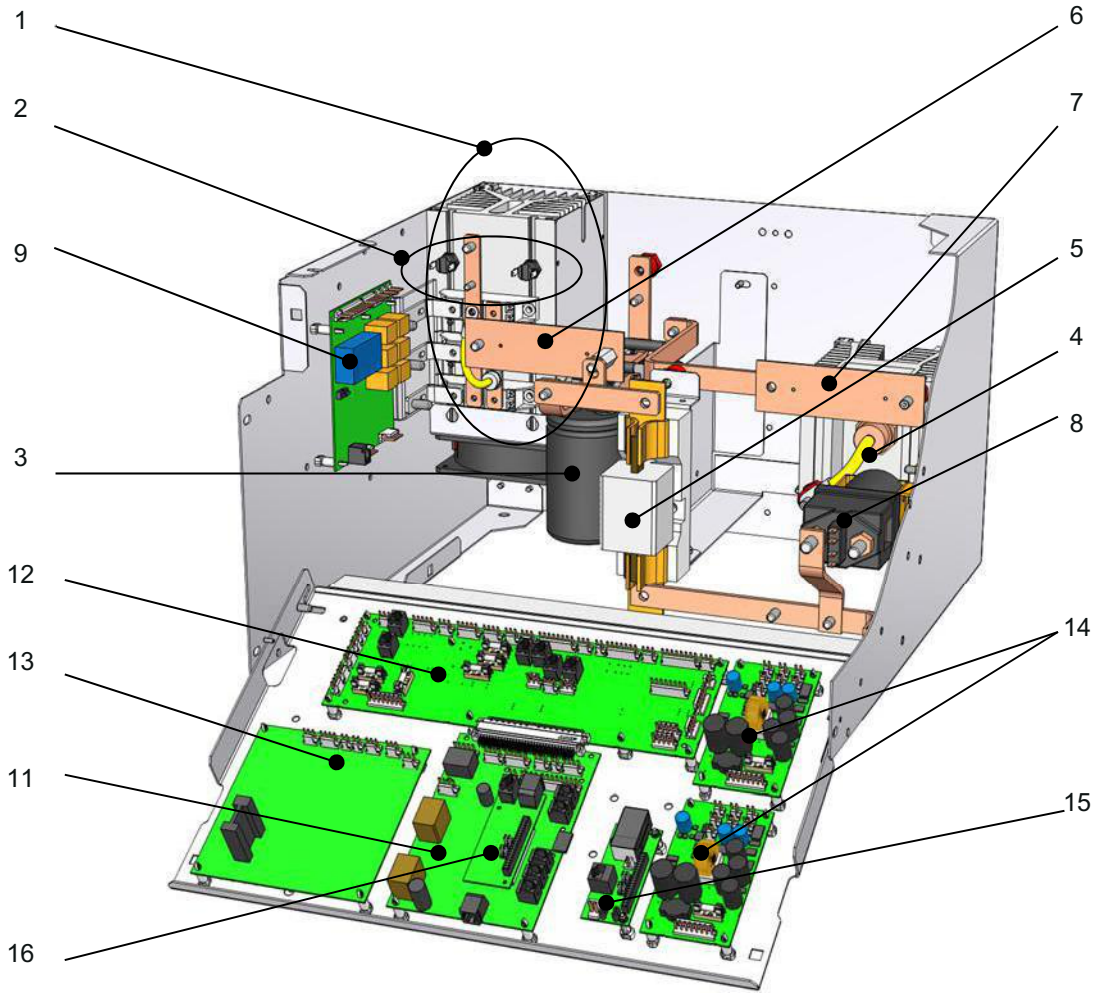
The rack can be equipped with additional options.

The aim of the rectifier building block is to gather the following elements in a volume easily transportable, testable, and repairable (refer to the following drawings) :

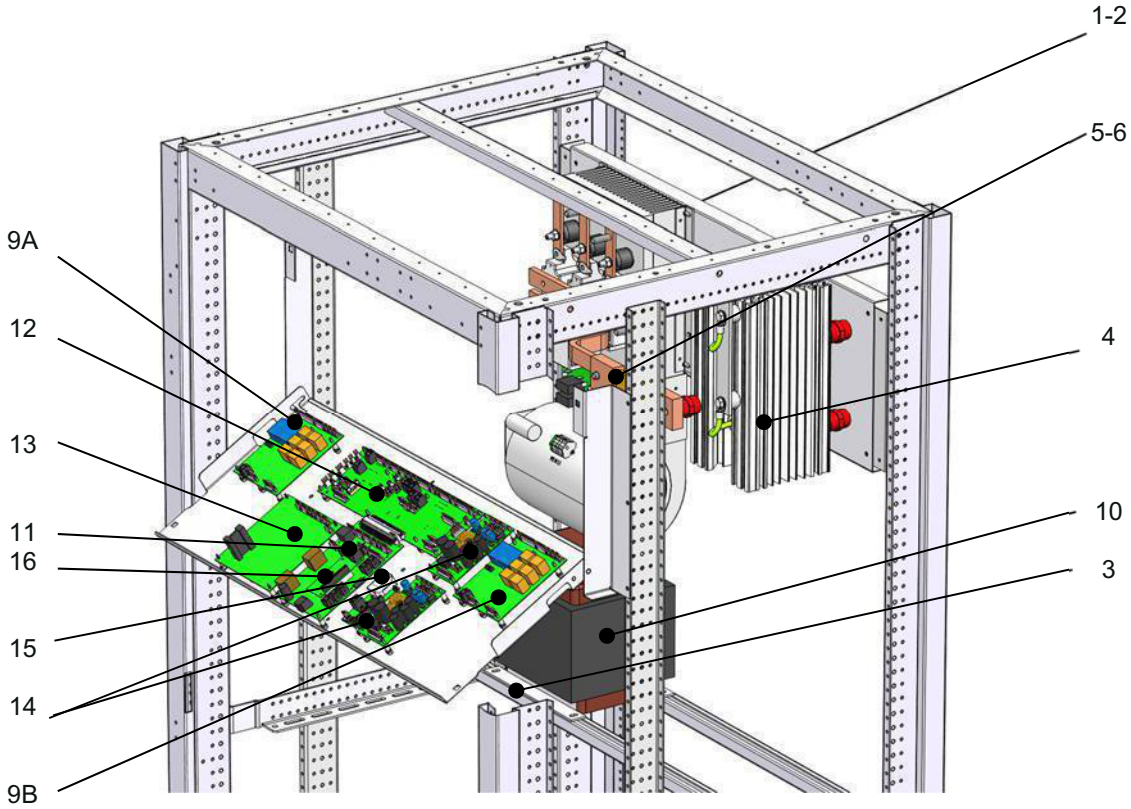
- **1**. Rectifier bridge sub-assembly,
- **2**. Thermoswitches,
- **3**. Capacitor for DC filtering,
- **4**. Blocking diode,
- **5**. Rectifier output fuse,
- **6**. Rectifier shunt,
- **7**. Battery shunt (option),
- **8**. End of discharge contactor (option),
- **9**. TPC three-phase interface board,
- **10**. A choke is installed behind the rack for DC filtering. Some products references depending on the design version may not be equipped with a separate choke. The filter choke is then integrated inside the transformer.

The rack pivoting panel receives the following elements while providing optimum protection of the assembly:

- **11**. GCAU control and alarm board,
- **12**. Interface board,
- **13**. C15-100 battery monitoring board (option),
- **14**. Converter board (depending on the equipment),
- **15**. TCP/IP communication board (option),
- **16**. EIA485 / RS232 A71 interface board (option).



Rectifier range up to 200 A



Note: 9B present only for 12-pulse rectifiers.

Rectifier range > 200 A

3 INSTALLATION

The system is delivered as shown hereafter.



IP21 cabinet example *IP42 cabinet example*

The equipment is fixed onto the pallet. Its fittings such as the front and rear panel plates are not fitted and stowed inside the cabinet.
Before setting up the cabinet, install the rear panel plate.
Remember to install the front panel plate after making the connections. This panel can be non-perforated.

3.1 HANDLING

The equipment must be handled with care, always in a vertical position. Labels on the outside of the package show the top and bottom.



CAUTION:
The transport of the system can be performed as follows:
- **on pallet,**
- **by crane (in presence of lifting eye bolts),**
- **by forklift truck.**

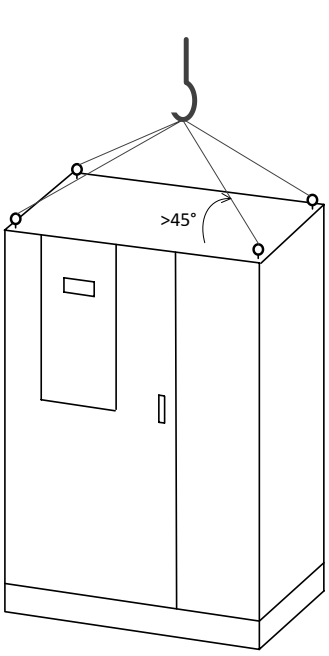
The SPRe/TPRe rectifiers and the batteries are delivered on pallets for easy handling using a pallet truck.
For the transport of cabinets, always watch for the center of gravity.
Check that the eye bolts are screwed fully home. The length of the slings calculated so that a minimum angle is given between the cable and the top edge of the cabinet. The total weight shall be equally balanced between all the slings. The minimum capacity of each sling must be ≥ 0.5 times the weight of the cabinet. One sling must be used for each eyelet.
The lifting capacity of the handling equipment used must always be greater than the weight of the cabinets (specified on the packages).
In case of vermin proof plate on the floor, the cabinet must be installed using slings.



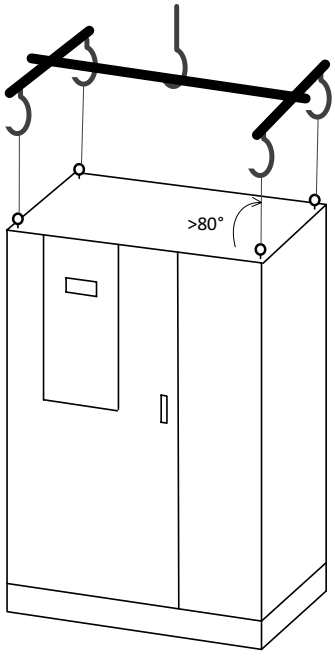


CAUTION:
- Only transport the cabinets in an upright position!
- Never tilt or cant, always observe the centre of gravity!
- Always keep the battery cells in a vertical position.
- Never lift a battery cell by its connections.
- Do not put or drop objects on the battery.
- Do not stay or walk under suspended loads.
- Always wear protective clothings and accessories.

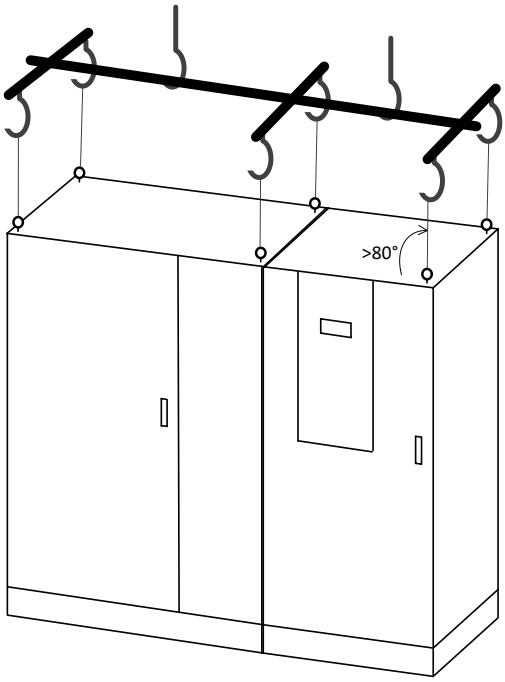
Instuctions for lifting using the eye bolts :



Single cabinets <300kg



Single cabinets ≥300kg

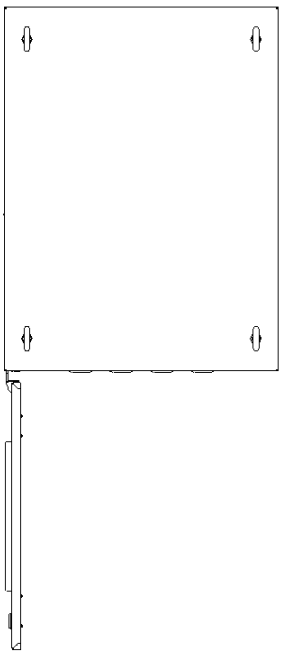


Coupled cabinets

3.2 INSTALLING AND SECURING THE RECTIFIER CHARGER

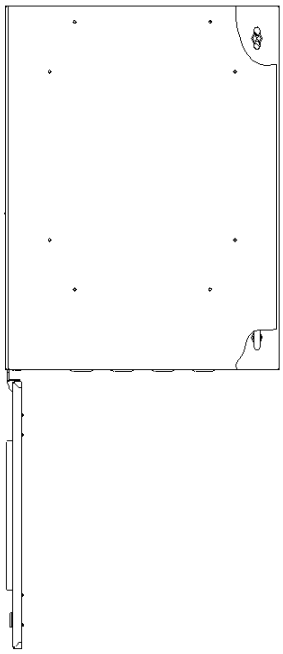
Select an installation site with the following characteristics:

- Ambient temperature and relative humidity as specified in section 3.4.
- Ambient air free from dust and corrosive gases.
- Floor sufficiently flat.
- Floor sufficiently strong to carry the weight of the equipment.
- Sufficient space at the front to open the door (see picture below).
- So that the cabinet will not be distorted, some wedges can be used to ensure the mechanical interface between the floor and cabinet fixations. This ensures a correct tightening torque.
- For the distances between hole centre, the location and the diameter of the fixing holes, refer to the customer drawings.



IP21 cabinet with open door top view

The maximum door opening is 180°.
The minimum door opening in order to carry out the maintenance tasks is 120°.



IP42 cabinet with open door top view



CAUTION:
Securing the cabinets to the floor is required if the equipment has integrated batteries and is recommended otherwise.



CAUTION:
Do not touch the metal section near the heating resistor.
Do not touch neither the rectifier bridge nor blocking diode heatsinks.

A. Installing a single cabinet

- For the distances between hole centers, the location and the diameter of the fixing holes, refer to the customer drawings.
- Mark the cabinet position on the floor.
- Perform the drillings (four holes).
- Position the cabinet.
- Fix the cabinet to the floor.

B. Installing a single cabinet with a gland plate

Refer to the instructions indicated in paragraph A.
In this case, the gland plate is used as drilling gauge and must be positionned between the floor and the cabinet, the removable gland plate windows shall be placed just below the terminal blocks.

C. Installing and coupling the cabinets on site

- Refer to the drawings to know the cabinets positions.
- To install and fix the cabinets to the floor, depending on the delivered configuration refer to the instructions given in paragraph A or B.
- On each cabinet, on the coupling side, unscrew and remove the eye bolts, if present, or the fixing screws of the roof.
- Between each cabinet, install the intermediate roof.
- Mount back the eye bolts or the screws to fix the intermediate roof.

D. Installing a cabinet with IP2x rear panel

In some cases, the rear panel can be perforated with IP2x holes (refer to project drawing) and in this case it's necessary to leave 100 mm space at the back of the cabinet. Refer to the instructions given in paragraph A, B or C.

E. Installing a cabinet with forced cooling

For systems equipped with fans, depending on the configuration, refer to the instructions given in paragraph A, B or C.

3.3 INSTALLING THE BATTERY

The ground or floor must be strong enough to carry the weight of the batteries and/or stands or cabinets in which they are mounted.

3.4 ENVIRONMENTAL REQUIREMENTS (EXCLUDING THE BATTERY)

Storage in standard carboard packing box

Temperature:	- 25°C to +70°C
Relative humidity:	15% to 90% in the original package.
Maximum storage period:	3 months.

Storage in seaworthy packing

Temperature:	- 25°C to +70°C
Relative humidity:	15% to 90% in the original package.
Maximum storage period:	12 months.

For a storage period exceeding the values recommended above, contact the factory in order to know the required environmental conditions and the maximum storage duration.

Operating

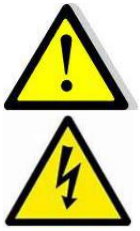
Temperature:	0°C to +40°C Above 40°C and up to 55°C, the output current must be de-rated (1.25% per °C).
Relative humidity:	20% to 95 % (non-condensing).

Altitude

≤ 1000 m

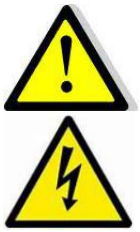
Above 1000 m and up to 4000 m, the output current must be de-rated (7% per 1000 m).

4 CONNECTIONS (*REFER TO THE CUSTOMER DRAWING PACKAGE*)



ANY OPERATION ON THE EQUIPMENT SHALL BE CARRIED OUT BY QUALIFIED PERSONNEL AWARE OF SPECIFIC ELECTRICAL HAZARDS AND PRECAUTIONS TO BE TAKEN. NEVER ASSUME THE ABSENCE OF VOLTAGE, ALWAYS CHECK WITH A VOLTMETER BEFORE ANY OPERATION ON A SYSTEM.

Always make the connections with power off and the circuit-opening devices in the **"open"** position:
- Mains and load protective devices open.
- Battery protective device or disconnecting switch open.
- Power switch to "OFF" *(option)*.



If an external protection or cut-off device is mounted between the charger output and the battery shunt, it is necessary to provide an auxiliary contact "position open" of this device to open the battery current measurement to avoid damaging the control system.
The external battery shunt must be inserted on the negative polatity of the battery, never on the positive polarity as this will damage the charger control board.
Please contact AEG Power Solutions Customer Service Department.

4.1 MAINS INPUT CONNECTION



DANGER, IF THE RECTIFIER IS EQUIPPED WITH AN OPTIONAL INPUT FILTER:
MAINS INPUT: HIGH LEAKAGE CURRENT.
EARTH CONNECTION IS MANDATORY BEFORE CONNECTING THE MAINS SUPPLY.

It is mandatory to install a mains input protection in the mains switchboard, upstream the charger.

Recommended rating: 2 x charger nominal input current.
- The nominal input current is specified on the electrical characteristics page of the customer drawing package.
- As standard, the inrush current is less than 20 times the input current.

Connect the mains input to the terminal block located in the connection area.

In case of TPRe, the units are not phase rotation sensitive.

Remember to connect the earth bar to the site reference earth.

4.2 BATTERY CONNECTION







IMPORTANT RECOMMENDATIONS

REFER TO THE BATTERY MANUAL.
Refer to the battery manufacturer's instructions for the storage conditions.
Never short-circuit a battery.

Allow no flame nor sparks in the battery room. Never smoke in the battery room.
Never disconnect a battery being charged.

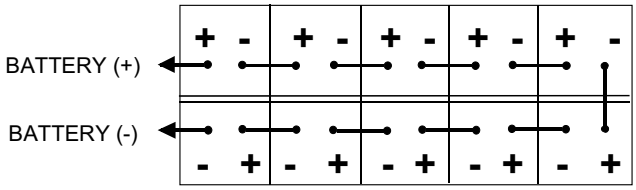
To handle the electrolyte, use gloves and safety goggles.
The electrolyte contained in a battery is dangerous to the skin and clothes.
Before doing work on a battery, make sure that there is an accessible supply of water nearby. If electrolyte is splashed, wash immediately with water and refer to battery safety data sheets.

Use tools with insulated handles.

Remove the shipping plugs from "open" Ni-Cd batteries. Always use maintenance accessories (especially electrolyte handling tools) suited to the batteries.

Reminder

Battery cells must be connected in series, i.e. the (+) pole of each cell must be connected to the (-) pole of the next cell.



Series connection of battery cells

Battery on stand

. Position the battery cells and connect them in series.
. Check that no cell is missing.
. Check that the connections are tight.
. Connect the battery (-) to the (-) BATT terminal of the charger (via the fuse box if applicable).
Do not connect the positive cable until start-up time.

Battery in cabinet

Case 1: Battery delivered separated from the charger system :

. Connect the battery cells in series using the connecting cables supplied with the equipment, starting from the lowest tray.
. Position the battery trays so that:
- the tray with the largest number of cells is located at the lowest position inside the cabinet,
- the tray with the smallest number of cells is located at the highest position inside the cabinet.
. After connecting in series all the cells of each tray, connect the trays in series.
. Check that the connections are tight.
. Connect the battery (-) to the (-) BATT terminal of the charger (via the fuse box if applicable).
Do not connect the positive cable until start-up time.

Case 2: Battery delivered already installed in the cabinet :
In this case, before start-up, perform the following operations:

. Remove the straps (or clamps).
. Check that the connections are tight.
. Connect the battery (-) to the (-) BATT terminal of the charger (via the fuse box if applicable).
Do not connect the positive cable until start-up time.

IN ANY CASE, a battery short-circuit and overcurrent protection must be connected between the battery and the charger if the charger is not equipped with such a protective device.

4.3 CONNECTING THE OPTIONS

Refer to the customer drawing package.

4.4 CONNECTING THE REMOTE ALARM OUTPUTS

Refer to the customer drawing package.

4.5 CONNECTING THE LOAD

Connect the load (+) to the load (+) terminal of the equipment.
Connect the load (-) to the load (-) terminal of the equipment.

5 START-UP (*REFER TO THE CUSTOMER DRAWING PACKAGE*)

5.1 PRELIMINARY CHECKS

All circuit-opening devices must be in the "open" position.
Check that the mains line protective device rating has the appropriate rating *(see section 4.1)*.
Check that the mains voltage and frequency are compatible with the equipment (see equipment nameplate).
Check that the mains, battery and load connections are tight.
Check the polarities and that the battery cells are correctly connected in series.

5.2 SWITCHING ON

- **Leave the positive side of the battery open,** either through protective or opening device *(e.g. fuse F13: case 1 below)* or through the battery cable not connected to the (+) BATT terminal of the charger *(case 2 below)*.

- Close the negative side of the battery (-) (fuse, protective device, etc …).
- Close the mains protective devices. Turn on the mains input and the rectifier.

The rectifier starts and the display shows:

≂ v x.y.z

V x.y.z = software version of the display controller

After a few seconds, the display shows:

AEG PS-GCAU
Vxx.yy/aa.bb

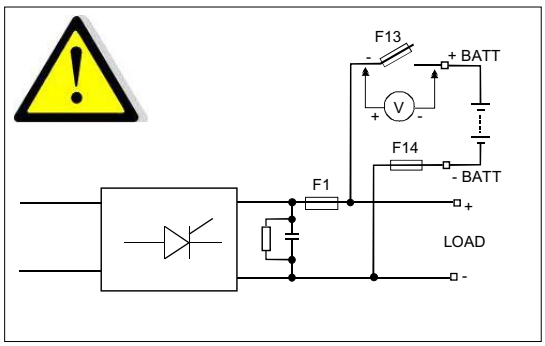
Vxx.yy and aa.bb are the software versions of the two micro controllers of the GCAU board

After a few seconds, the display shows the floating voltage and the rectifier current (at no-load).

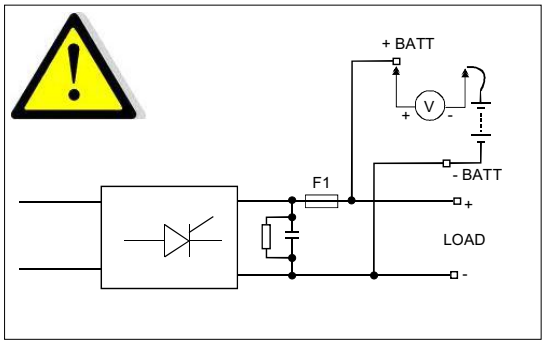
DC:xx.xV	0.5A
Alarms:	

NOTA: The current value can be around 0.5 A.

To check that the battery polarities are correct, take a voltage reading using a DC voltmeter as shown below:



- Case 1 -
Configuration with battery fuse F13



- Case 2 -
Configuration without opening device

The voltage reading must not exceed 30% of the nominal voltage (refer to the customer drawings).

. If the voltage is outside of this tolerance, check the battery cables for correct polarity.

. If the voltage is correct, close fuse F13 or connect the battery (+) cable to the rectifier terminal. The rectifier will charge the battery. During this operation, arcing may develop across the actuated device.

- Check that the displayed current increases (current to the battery).

DC:xx.xV
3.0A



Dangerous voltages exist across the battery and/or load terminals. Take the necessary safety precautions.



We recommend to change "user" and "supervisor" passwords to prevent bad handlings. Refer to paragraph 6.7.3.

5.3 START-UP PROCEDURE OF SPRE/TPRE PARALLELED SYSTEMS

In the case of SPRe/TPRe units with battery (each one) connected in parallel for redundancy, respect the following instructions :

- **Check that the output protective device of each unit is open.**
- Start-up the rectifier-battery assembly n°1 according to the previous paragraph 5.2.
- Start-up the rectifier-battery assembly n°2 according to the previous paragraph 5.2

Then close the output protective device of each unit.

5.4 BATTERY COMMISSIONING CHARGE

For open lead-acid and Nickel-Cadmium batteries, at initial start-up, a commissioning charge can be performed according to the battery manufacturer's instructions (refer to the battery manual).
Open load circuit.
From the command menu, set the rectifier to the commissioning charge (refer to paragraph 6.6.2).
The initial start-up current and time are factory set. Refer to the "System setup" menu (refer to paragraph 6.7.3.2) to see the adjustment value.

NOTE: If the A3 board (C15-100 rectifier monitoring board) is fitted, the overvoltage control of the card shall be disabled. With analog A3 board, remember to enable the overvoltage control once the commissioning charge is completed. This overvoltage control is enables automatically with digital A3 board.

At the end of the commissioning charge:
- **from the "Alarm" menu, reset the "HIGH DC VOLTAGE" alarm. This alarm can be triggered when returning from commissioning charge to floating charge.**

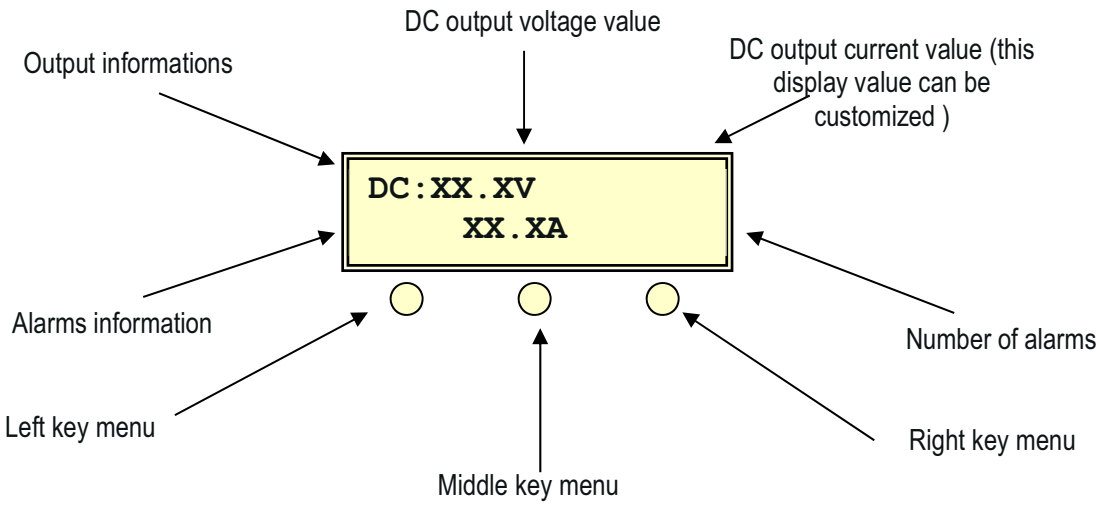
6 OPERATING INSTRUCTIONS

The following section explains the basic operator menu structure of your system. It allows you to access all necessary functions in order to operate your system.
The menus, indications and controls available depend on the system configuration.

The keyboard assembly has two LEDs indicators:
- green LED: "System OK" (indicates proper operation).
- red LED: "Fault" (a fault is present).

The green LED is always on in case no alarms are present.
In case an alarm is present, the red LED comes on and flashes.
If the alarm is acknowledged, the red LED is on permanently provided the alarm is still active.
If no alarms are active after an acknowledgement, the red LED will be switched off and the green LED comes on again.

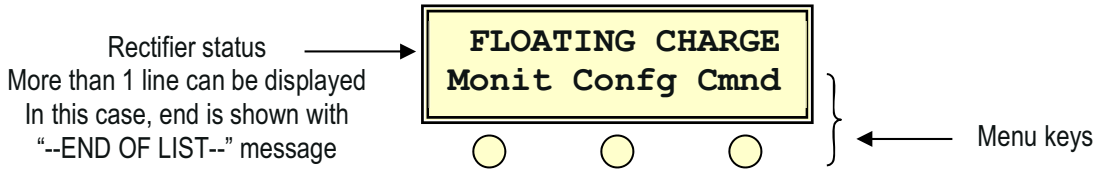
6.1 DEFAULT MENU



The top line ("DC") will display the charger voltage and the load current with battery shunt or the total charger current (battery + load) when the battery shunt is not active.

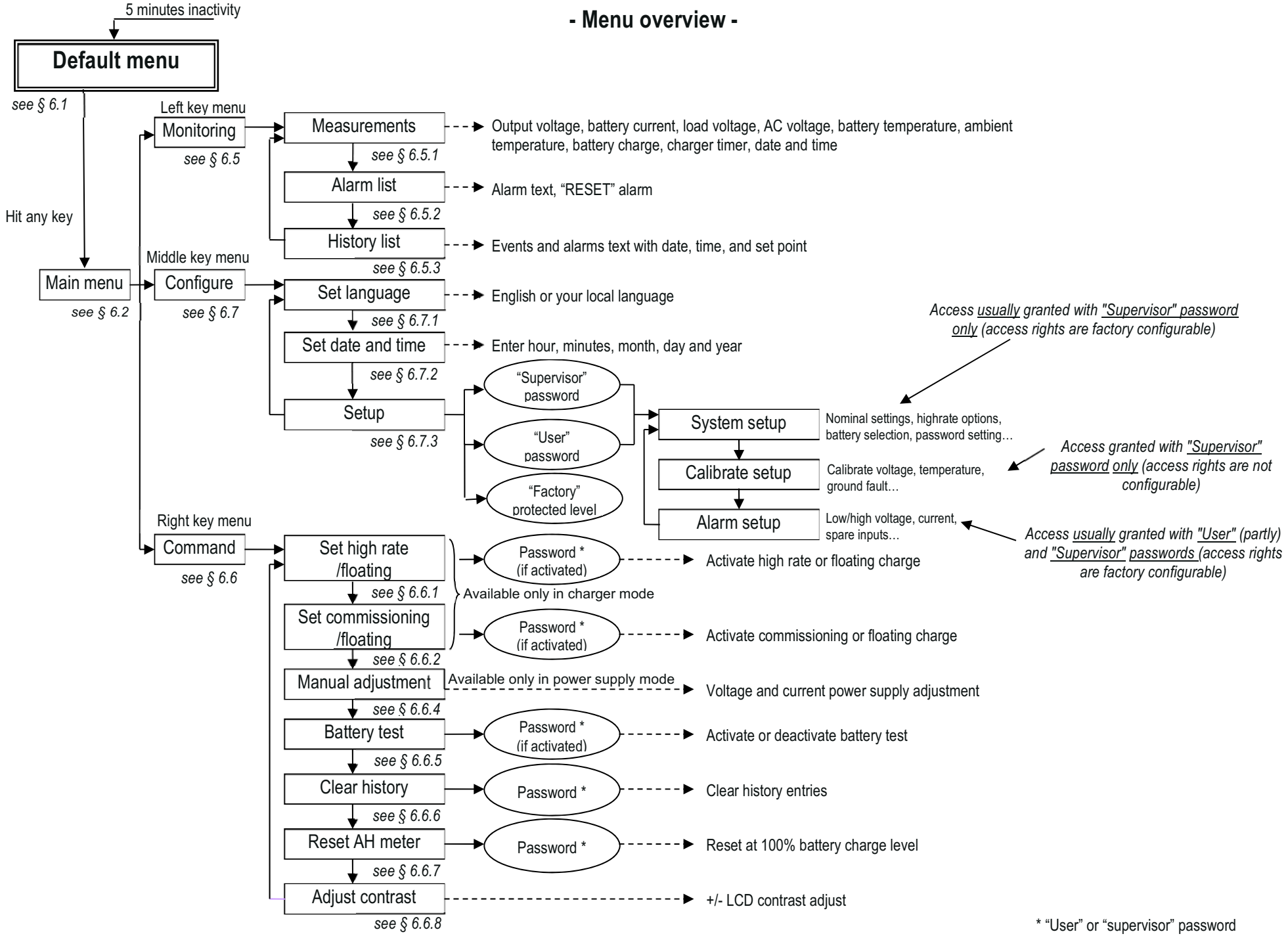
Hit any key to go to main menu

6.2 MAIN MENU



The different rectifier statuses are:
- FLOATING CHARGE
- HIGHRATE CHARGE
- COMMISSIONING
- CHARGER OFF (see Chapter 11 "ELEMENTARY TROUBLESHOOTING for more explanations)
- BATTERY TEST.

- Menu overview -

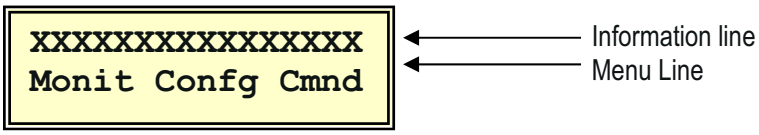


Note: According to your equipment configuration, some menus may be inactivated.

6.3 HUMAN INTERFACE STRUCTURE

The human interface is based on consistency in operation. Consistency means that the functions are grouped logically within the menu structure and will provide ease of use for the operator.

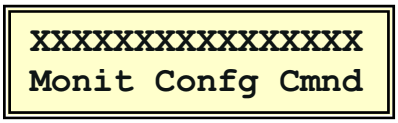
The LCD Display has 2 lines by 16 characters. The top line is always used to indicate information while the bottom line is used for the menu structure indication.



There are three major menu groups under which all functions are located.

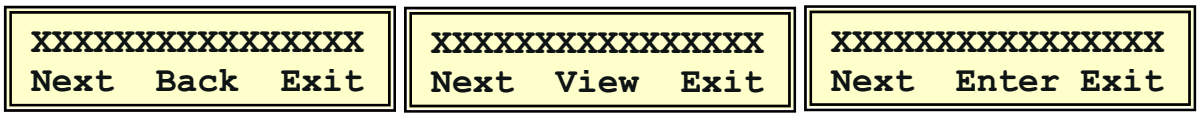
These groups are defined as:

- **Monitoring** Displaying analog measurements and alarms
- **Configuration** Configuring the system
- **Commands** Manually activated functions (High rate, Battery test etc.)



The menu indication uses five basic menu functions with the following functions:

- **Next** One step forward in the menu
- **Back** One step back in the menu
- **View** Display a selection
- **Enter** Acknowledge an entry
- **Exit** Always return to default menu



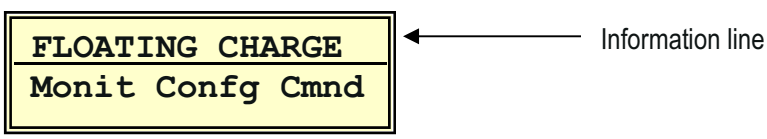
The following sections will clearly explain how you can access the various functions.

6.4 STATUS INDICATION DISPLAY

As explained in the previous chapter the top line of the display will indicate information about the status of the system. If more than one message is active, the messages are displayed in sequence. Each message is displayed for 1 second before the next message is displayed.

The following messages are displayed:

- Alarm texts of the active alarms
- Charge status messages
- Events



The messages are dynamic meaning they are updated continuously. If the alarm texts are latched you must go into the alarm menu to clear the text from the display. Refer to section 6.5.2 for details.

6.5 MONITORING FUNCTION

6.5.1 How to Display the Measurements

You will find the measurements menus under the Monitoring function. The Monitoring function will display all relative meter indications on the top line of the LCD.

Follow the instructions below.

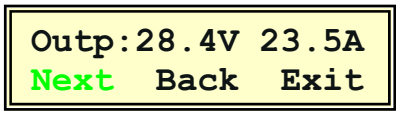
From the main menu select **'Monit'**.



Select **'View'**.



The top line ("Outp") will display the battery voltage and the total charger current (battery + load).
Display resolution is 1 decimal for V and A <100 and no decimal for values > 100.



The **'Next'** key can be used to scroll through all available measurements.

In order of appearance the following measurements can be displayed:

- Load voltage and current*
- Battery current (charge and discharge)*
- Battery voltage and total charger current
- AC input voltage*
- Battery temperature*
- Ambient temperature*
- AH Meter*
- Remaining charge time* (if in High rate or Commissioning charge)
- Date and Time
- Customized measurements (depends on system configuration)

* Menu can be disabled on customer demand.

Note about the ambient temperature in VO battery mode:
The ambient temperature read on the LCD display is particular in case of a VO battery is used. The first value indicates the instantaneous ambient temperature and the second value, between brackets, indicates the integrated ambient temperature. The integrated value is an average temperature calculation on several hours. This function works to absorb fast thermal changes.

6.5.2 How to Display the Alarm List

You will find the Alarm list indication under the Monitoring function. This Alarm List indication will display all active alarms on the top line of the LCD.

Follow the instructions below.



From the main menu select **'Monit'**.

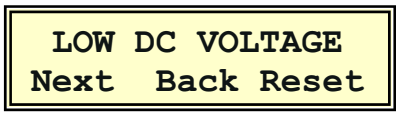


Select **'Next'.**



The display indication XX shows you how many alarms are in the alarm list. The list shows Active alarms and Non-acknowledged (Reset) alarms based on the alarm configuration. If a "LCD Latch" function is selected for an alarm, it will remain in the alarm list even if the alarm condition has disappeared. In this case, a manual alarm reset will clear it from the alarm list.

Select **'View'**.



The alarm is shown in clear text on the top line. Pressing **'Next'** will show you the next alarm in the list and pressing **'Back'** will show you the previous alarm in the list.

If an alarm has not been acknowledged the text **'Reset'** will flash. If the alarm is acknowledged and the alarm option "LCD latch" was activated (see Alarm Setup for details), the alarm will be removed from the list provided the condition of the alarm has been cleared.

If an alarm is associated with a signalling relay with latching, the display of this alarm is imperatively "latch" set. The acknowledgment of the alarm using the display causes the acknowledgment of the associated relay too.

6.5.3 How to Read the Alarm and Event Memory List (History List)

The control board GCAU in your system is equipped with an Alarm and Event list. The GCAU board stores the alarm and events, in order of appearance, in a non-volatile memory (permanent storage). Events in this context means indicating if the system has been switched to High rate, Float or Commissioning, Entering the setup mode, Clearing the history etc.
The memory is based on a FIFO mechanism (**F**irst **I**n **F**irst **O**ut), which means that if the memory is full the oldest event or alarm will be removed from the list.
The alarm and events are time/date stamped using an RTC (Real Time Clock).

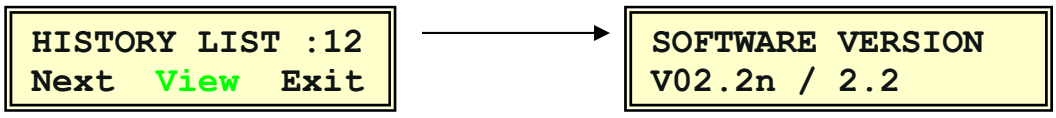
Follow the instructions below.



From the main menu select **'Monit'.**

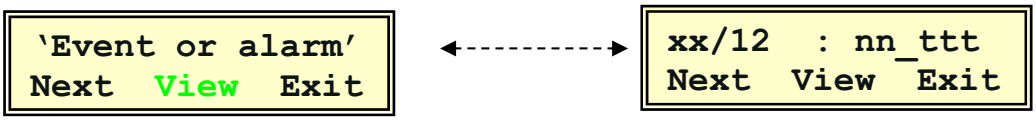


Select **'Next'** until the top line shows below text.



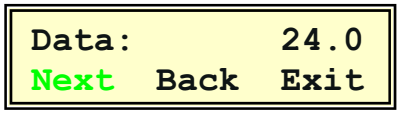
Select '**View**' *Example*

The "history list" screen indicates the quantity of Alarm and Event in the list.
Viewing the "history list" will display first the internal software versions of the GCAU board for reference. This message is displayed for two seconds. After two seconds the display will show:



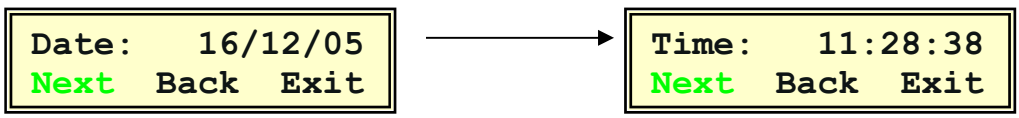
Top line shows "event or alarm" text.
A non permanent screen will indicate during 1 s the place (xx) of the "alarm and event" in the history list, its internal code (xx) and its internal acronym (ttt).

Select **'View'**



Top line shows set point (alarm level) if valid (analog alarms only)

Pressing **'Next'** will show the date and time of the Alarm/Event:



Date format is dd/mm/yy (if temperatures unit is °C) or mm/dd/yy (if temperatures unit is °F).

6.6 COMMAND FUNCTION

According to the factory set configuration, your system can have several specific command functions. All these commands are accessible through the Command function **'Cmnd'**.

The different command functions are:
- Manual High rate Charge
- Manual Commissioning Charge
- Manual floating Charge
- Manual Adjustment of Voltage and/or Current
- Battery Test Function
- Clear History List
- Set Display Contrast
- Reset Ah meter.

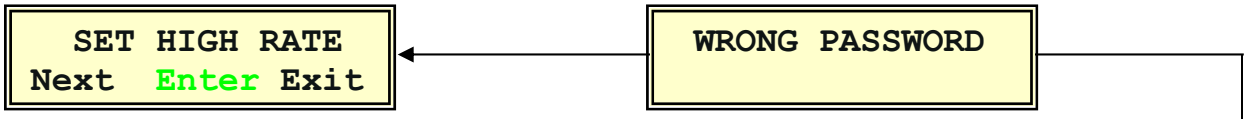
6.6.1 How to Activate Manual High rate Charge

The Manual High rate charge is a command function and is located under the Command (**'Cmnd'**) key. To prevent accidental activation, this command can be password protected if required. Follow the instructions below.

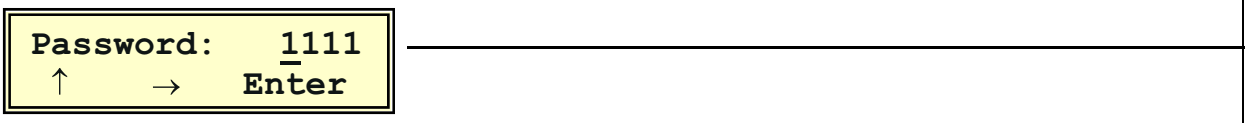


Starting from the main menu, select **'Cmnd'**.

Press **'Next'** until the following indication is displayed:

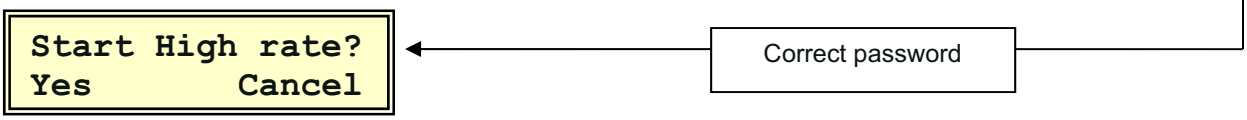


Press '**Enter**'



With the right pointing arrow '→' the digit position can be selected and with the arrow up '↑' an alphanumeric character between 0 and 9 or between A and Z can be set. When all four characters are set, press **'Enter'**.
If the password is correct, the display switches to the High rate on/off selection.
Incorrect passwords will cause a jump of two positions back in the menu tree and a message **'WRONG PASSWORD'** is displayed.

If no password is activated the High rate selection menu will be shown directly.



The high rate charge can be switched on by pressing the "Yes" key.

To stop the high rate charge, the user can manually put the rectifier in floating charge mode via the command menu (see the 6.6.3 paragraph) or wait for the timer times out. In this last case, the rectifier switches automatically in floating charge mode.
The remaining high rate charge time can be read on the LCD display via the measurements menu.
See paragraph 6.5.1.

6.6.2 How to Activate Manual Commissioning Charge

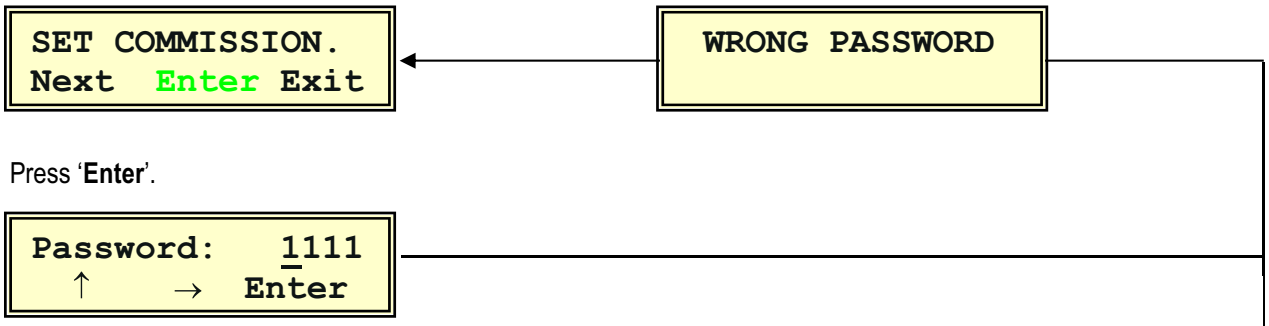
The Manual Commissioning charge is a command function and is located under the Command (**'Cmnd'**) key. To prevent accidental activation, this command can be password protected if required.

Follow the instructions below.



Starting from the main menu, select **'Cmnd'**.

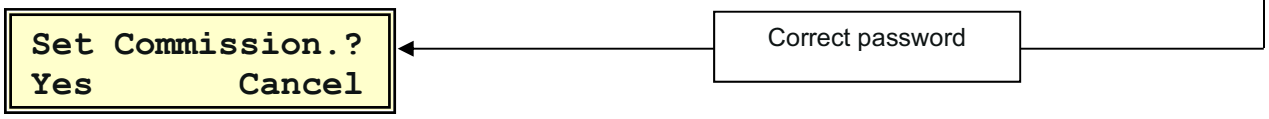
Press **'Next'** until the following indication is displayed:



Press '**Enter**'.

With the right pointing arrow '→' the digit position can be selected and with the arrow up '↑' an alphanumeric character between 0 and 9 or between A and Z can be set. When all four characters are set, press **'Enter'**.
If the password is correct the display switches to the Commissioning on/off selection.
Incorrect passwords will cause a jump of one position back in the menu tree and a message **'WRONG PASSWORD'** is displayed.

If no password is activated the Commissioning selection menu will be shown directly.



With **'Yes'**, the Commissioning charge can be switched on.

To stop the commissioning charge, the user can manually put the rectifier in floating charge mode via the command menu (see paragraph 6.6.3) or wait for the timer times out. In this last case, the rectifier switches automatically in floating charge mode.

The remaining commissioning charge time can be read on the LCD display via the measurements menu. See paragraph 6.5.1.

6.6.3 How to activate Manual Floating Charge

When you are in high rate or commissioning charge mode, you can manually switch the rectifier in the floating charge mode. Follow the instructions below.



or

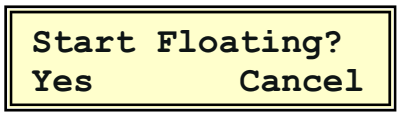


Starting from the main menu, select **'Cmnd'**.

Press **'Next'** until the following indication is displayed:



Press **'Enter'**.



Floating charge can be switched on by hitting the **'Yes'** key.

6.6.4 Manual Voltage and Current adjustment (OPTION)

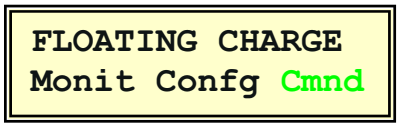
If required, your system can be programmed as a power supply. It allows you to adjust the output voltage and output current over a wide range. Both functions can be activated independently.
When only the output current adjustment is activated, the output voltage is the voltage of the current charge (floating, highrate, commissioning).

Warning:
Do not activate this option when the charger is used for normal battery charging. Consult the nearest agent of your system if you want to use this option. Activating this option without the necessary system knowledge can damage the connected battery.

The rectifier operates as a power supply only. It delivers the adjusted voltage and, if activated, the manually adjusted current. If the manual current adjustment is not activated the current limit is as specified on the nameplate of your system.
The voltage adjustment is configured to operate within a window.

6.6.4.1 How to Adjust the Voltage and Current (Manual Adjustment)

The procedure below explains how to adjust the voltage and current if the manual Voltage and/or Current option is activated.



Current adjustment only activated

or



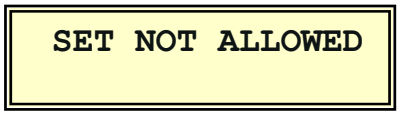
Voltage adjustment activated
(current adjustment activated or no).

Starting from the main menu, select **'Cmnd'**.



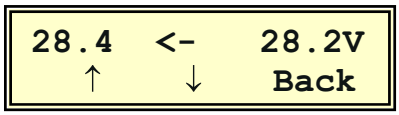
Press **'Next'** until the text 'ADJUSTMENT' is displayed and press **'Enter'**.

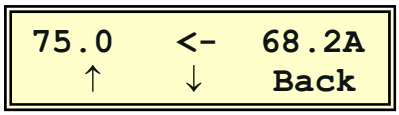




From this menu, the Voltage or Current adjustment can be selected. If one of these options is not active and the function is selected, a message **'SET. NOT ALLOWED'** is displayed for two seconds.

If you need to set the voltage, press **'Volts'**. If you need to set the current press **'Amps'**.





Left: display of setpoint value (change with up or down arrow key).
Right: display of actual value (measurement).
When you press the arrow up '↑' the voltage or current increases. The arrow down '↓' will decrease the voltage or current.
The values are saved in the system memory ensuring the values are permanently stored. Adjustment Resolution is 1 decimal V or A <100 and no decimal for values >100.

6.6.5 Battery capacity test Function (OPTION)

The Battery Test feature can be used to test the battery performance. The test can be initiated manually or automatically.

Three programmable parameters define the battery test:

- Discharge Current
- End Voltage
- Tolerance percentage.

Warning:
Contact the nearest agent of your equipment for details of the above settings.

Wrong settings can cause mis-interpreted battery performance or loss of DC power.

6.6.5.1 How to Activate the Battery Test

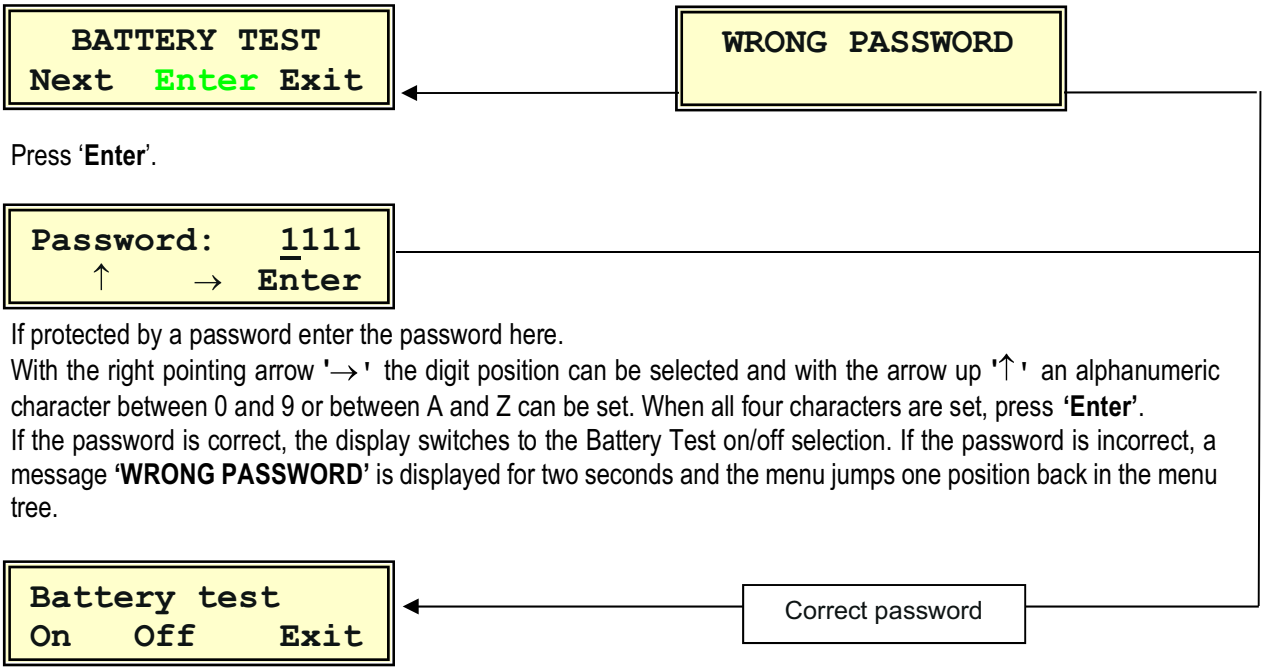
Before activating this test, make sure you are familiar with the Battery Test Operation as further-described in paragraph 8.6.13 BATTERY CAPACITY TEST.

Follow the instructions below.



Starting from the main menu, select **'Cmnd'**.

Select '**Next**' until the following menu is displayed.



Press '**Enter**'.

If protected by a password enter the password here.
With the right pointing arrow '→' the digit position can be selected and with the arrow up '↑' an alphanumeric character between 0 and 9 or between A and Z can be set. When all four characters are set, press **'Enter'**.
If the password is correct, the display switches to the Battery Test on/off selection. If the password is incorrect, a message **'WRONG PASSWORD'** is displayed for two seconds and the menu jumps one position back in the menu tree.

Activate or de-activate the Battery Test by selecting **'On'** or **'Off'**.
The display will show if the battery test is on or off.

6.6.6 How to Clear the Event and Alarm History List

If required, the event and alarm history list of your system can be cleared from the front panel. A password on Supervisor or User level is mandatory to clear the list.

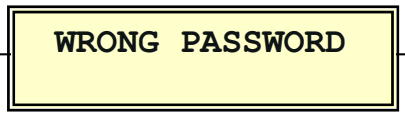
Follow the instructions below.



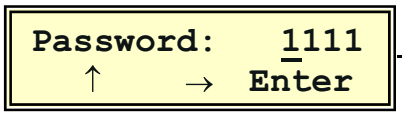
Starting from the main menu, select **'Cmnd'**.

Select '**Next**' until the following menu is displayed.





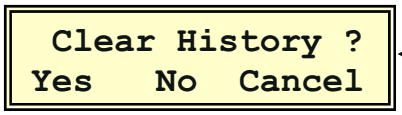
Press '**Enter**'.

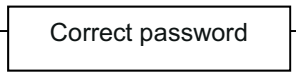


A Supervisor or User level password is required to continue.

With the right pointing arrow '→' the digit position can be selected and with the arrow up '↑' an alphanumeric character between 0 and 9 or between A and Z can be set. If all four characters are set, press **'Enter'**.

When the password is correct, the display switches to the Clear History Yes/No selection. If the password is incorrect, a message **'WRONG PASSWORD'** is displayed for two seconds and the menu jumps one position back in the menu tree.





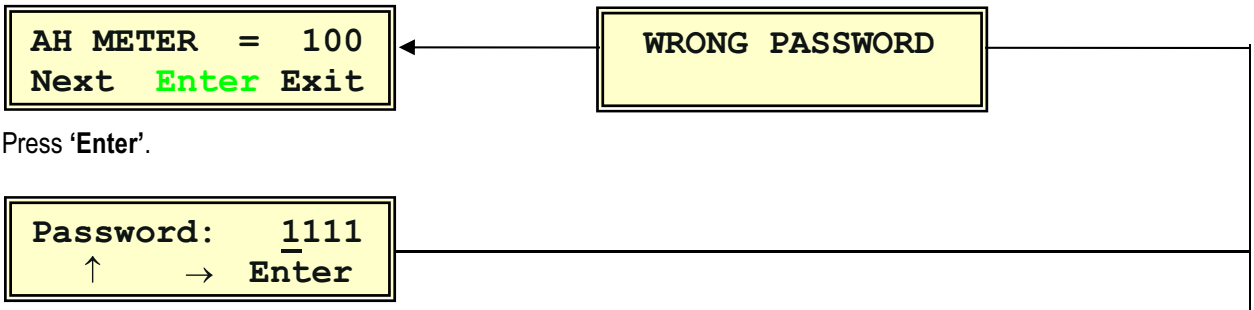
Clear the History list by pressing the **'Yes'** key. Pressing **'No'** will cause a jump two menus back.

6.6.7 How to reset Ah Meter



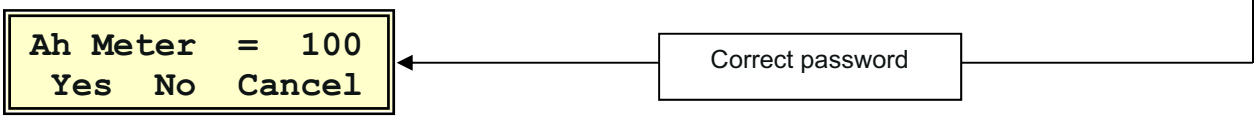
Starting from the main menu, select **'Cmnd'**.

Select '**Next**' until the following menu is displayed.



Press **'Enter'**.

A Supervisor or User level password is required to continue.
With the right pointing arrow '→' the digit position can be selected and with the arrow up '↑' an alphanumeric character between 0 and 9 or between A and Z can be set. If all four characters are set, press **'Enter'**.
When the password is correct, the display switches to the **'Ah Meter = 100'** Yes/No selection. If the password is incorrect a message **'WRONG PASSWORD'** is displayed for two seconds and the menu jumps one position back in the menu tree.



Reset Ah meter by pressing the **'Yes'** key initiates the battery Ah counter to 100% and causes a jump to the default menu. Pressing **'No'** or **'Cancel'** will cause a jump to **'AH METER = 100'** menu.
This manipulation must be always done before a manual battery test.

6.6.8 How to Adjust the Display Contrast

The display contrast can be adjusted in two ways:

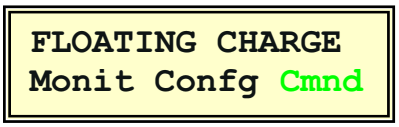
- From the default menu directly
- Using the Command function.

6.6.8.1 Adjusting the Contrast from the Default Menu

When the contrast is too low to read the display, the contrast can be adjusted directly from the default menu. If the leftmost button from the default menu is held, the contrast will be decreased. If the rightmost button from the default menu is held, the contrast will be increased. If you are not sure whether the default menu is displayed, do not touch any button for 5 minutes. This will automatically activate the default menu.

6.6.8.2 Adjusting the Contrast using the Command Function

To adjust the display contrast using the Command function, follow the instructions below:

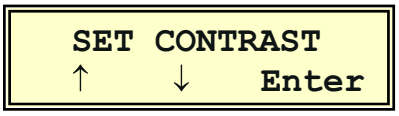


Starting from the main menu select '**Cmnd**'.

Select '**Next**' until the following menu is displayed.



Press '**Enter**'.



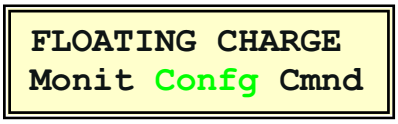
Use the arrow keys to adjust the contrast.

6.7 CONFIGURATION FUNCTIONS

6.7.1 How to Change the Language

Two languages are available in your GCAU board: the standard language (English) and a second one: the one you specified when you ordered your equipment.

To change the language, follow the instructions below:

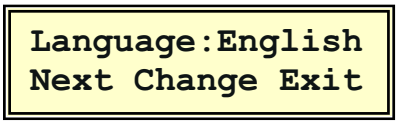


Starting from the main menu select '**Confg**'.

Select '**Next**' until the following menu is displayed.

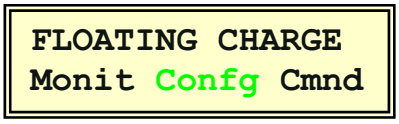


Press '**Enter**'.



Press '**Next**' until the desired language is shown.
Pressing the '**Change**' key will update the selected language.

6.7.2 How to set Date and Time

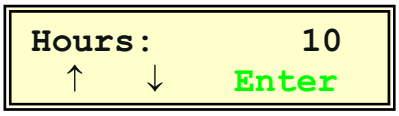


Starting from the main menu, select **'Confg'**.

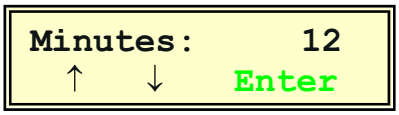
Select **'Next'** until the following menu is displayed.



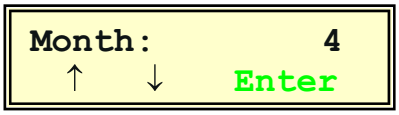
Select **'Enter'**.



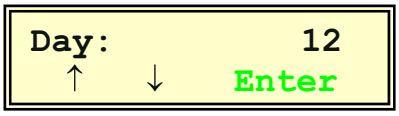
Use the up/down arrows to select the set point of hours. Hit **'Enter'** key to go to next menu.



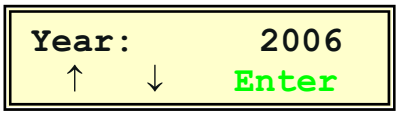
Use the up/down arrows to select the set point of minutes. Hit **'Enter'** key to go to next menu.



Use the up/down arrows to select the set point of month. Hit **'Enter'** key to go to next menu.



Use the up/down arrows to select your the set point of day. Hit **'Enter'** key to go to next menu.



Use the up/down arrows to select the set point of year. Hit **'Enter'** key to come back to the **'SET DATE & TIME'** menu.

6.7.3 Setup



The setup menu is accessible with a “user” or “supervisor” password and it allows the modification of your system configuration. The default “user” password is 1111. For supervisor access password please contact factory. Any modification of your system configuration is your responsibility. You risk damages on your battery or equipment if the modification is done by a non specialized staff.

According to the factory setting configuration, the access to the "alarms" and "system" setup menus can differ. The following paragraphs describe the menus access usual setup for a standard equipment. When a menu is not accessible to the user, it is not displayed. When there is no menu accessible to the user, the message "SET NOT ALLOWED" is displayed.

6.7.3.1 How to change “user” and “supervisor” password

Enter the Password setting as follows:

```
FLOATING CHARGE
Monit Confg Cmnd
```

Starting from the main menu, select **‘Confg’**.

Select **‘Next’** until the following menu is displayed.

```
SETUP
Next  Enter Exit
```

Select **‘Enter’**.

```
Password:   1111
  ↑    →   Enter
```

With arrow keys, select the “supervisor” password and hit **‘Enter’** key.

```
SYSTEM SETUP
Next  Enter Exit
```

Enter the system setup by hitting **‘Enter’** key.

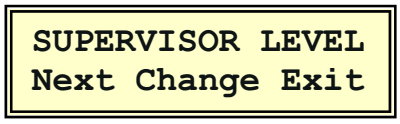
```
BATT.SELECTION
Next Enter Exit
```

Select **‘Next’** until the above menu is displayed.

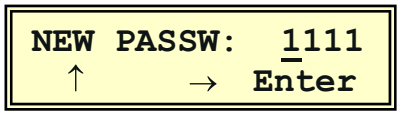
```
PASSWORD SETTING
Next Change Exit
```

Select **‘Change’** to enter the password setting menu.

The first menu is to change the “supervisor” password.



Select ‘Change’.

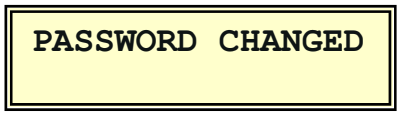


With arrow keys, enter the new “supervisor” password and hit **‘Enter’** key.

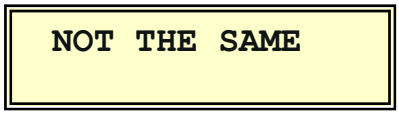


With arrow keys, confirm the new password and hit **‘Enter’** key.

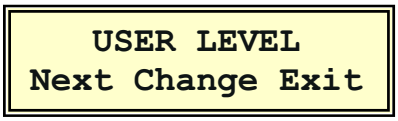
We can distinguish 2 scenarios:



or



In the second case, you must start again.



For the user level, apply the same procedure.

6.7.3.2 System setup

With the “supervisor” password, you have access to the following setup:

- Battery selection: to select battery type, number of cells etc…
- Nominal settings: to select mains, floating or high rate voltages, limit currents etc…
- Meter selection: to select °C or °F.
- High rate options: to allow manual high rate charge, activate the password protection etc…
- Commissioning options: to allow manual, activate password, select commissioning parameters.
- Manual adjustment: to switch the rectifier in the power supply mode.
- VO application: to specify VO battery parameters.
- Battery test options: to select battery test parameters.
- LVD function: to select Low Voltage Disconnect parameters.
- Diode regulator: to select output diode regulator parameters (option).
- Temperature compensation: to implement the battery voltage temperature compensation (option).
- Communication options: to select serial communication parameters.
- Charge protections: to set battery charge limits.
- “User” and “supervisor” passwords setting: to change “user” or “supervisor” passwords.
- Battery symmetry

6.7.3.3 Alarms and events setup

The alarms setup menus are available with the “user” password and enable to set up the thresholds and the time-delay of the accessible alarms.
The "supervisor" password enables to set up all parameters of the accessible alarms and events.

Alarms list:

- High mains voltage alarm parameters.
- Low mains voltage alarm parameters.
- Charge fault alarm parameters.
- High battery voltage alarm parameters.
- Low battery voltage alarm parameters.
- High DC voltage alarm parameters.
- Low DC voltage alarm parameters.
- Ground fault + alarm parameters.
- Ground fault – alarm parameters.
- Spare 1 digital input alarm parameters.
- Spare 2 digital input alarm parameters.
- Spare 3 digital input alarm parameters.
- Spare 4 digital input alarm parameters.
- Spare 5 digital input alarm parameters.
- Spare 6 digital input alarm parameters.
- Spare 7 digital input alarm parameters.
- Spare 8 digital input alarm parameters.
- Charger current limit alarm parameters.
- Battery current limit alarm parameters.
- High charger current alarm parameters.
- High battery current alarm parameters.
- High temperature alarm parameters.
- Temperature sensor error alarm parameters.
- Internal communication error alarm parameters.
- Battery test failed alarm parameters.
- Battery test abort alarm parameters.
- High battery temperature alarm parameters.
- Long charge time alarm parameters.
- No power supply voltage alarm parameters.
- Battery operation alarm parameters.
- Battery symmetry alarm parameters.
- Service alarms parameters (if applicable and activated at factory).

6.7.3.4 Calibration setup

All these setup menus are available with a “supervisor” password.

- Battery voltage.
- Positive battery current.
- Negative battery current.
- Charger current.
- Earth impedance.
- Load voltage.
- Mains voltage.
- Ambient temperature.
- Battery temperature.
- Battery symmetry

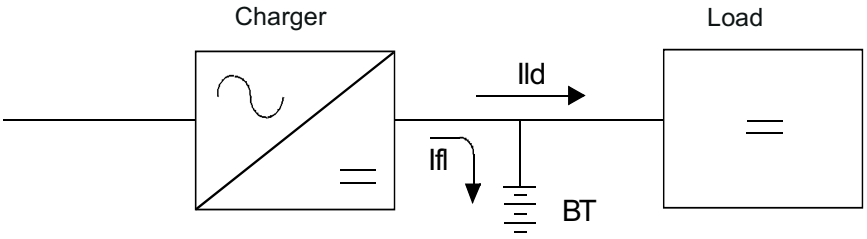
7 FUNCTIONAL DESCRIPTION

The SPRe/TPRe rectifiers are thyristor-controlled rectifiers suitable for charging nickel-cadmium or lead-acid batteries while supplying DC loads. The rectifier can be also used without batteries as direct power supplies.

7.1 OPERATING SEQUENCES

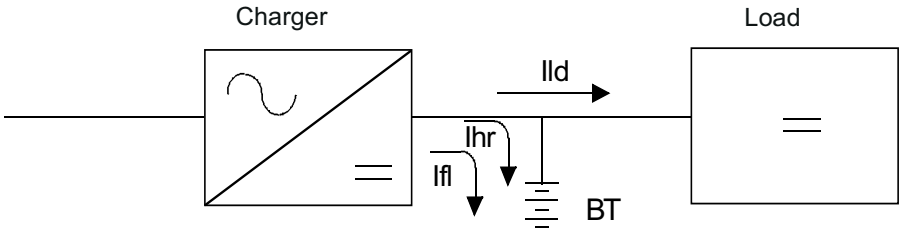
Rectifier with associated battery

Mains power ON – battery on floating



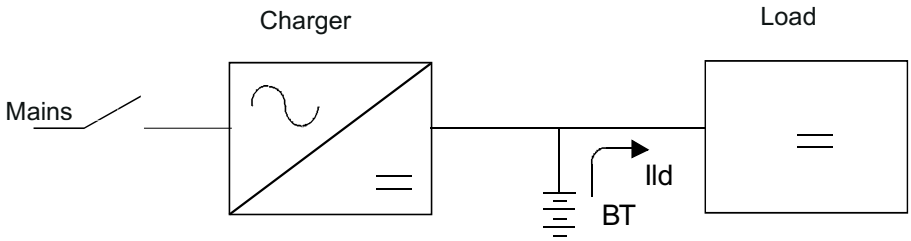
The charger supplies the load (Ild) and delivers a "floating" charge current (Ifl) to battery BT.

Mains power ON – battery recharging



The charger recharges battery BT at a high rate (Ihr) and supplies the load (Ild). The charger automatically switches to "floating" charge (Ifl) when the battery is fully charged.
Thereafter the battery is kept in floating (Ifl).

Mains power OFF



The battery immediately substitutes for the charger in supplying the load (Ild).

7.2 CHARGE MODES

The following battery charge modes are available (depending on the equipment):

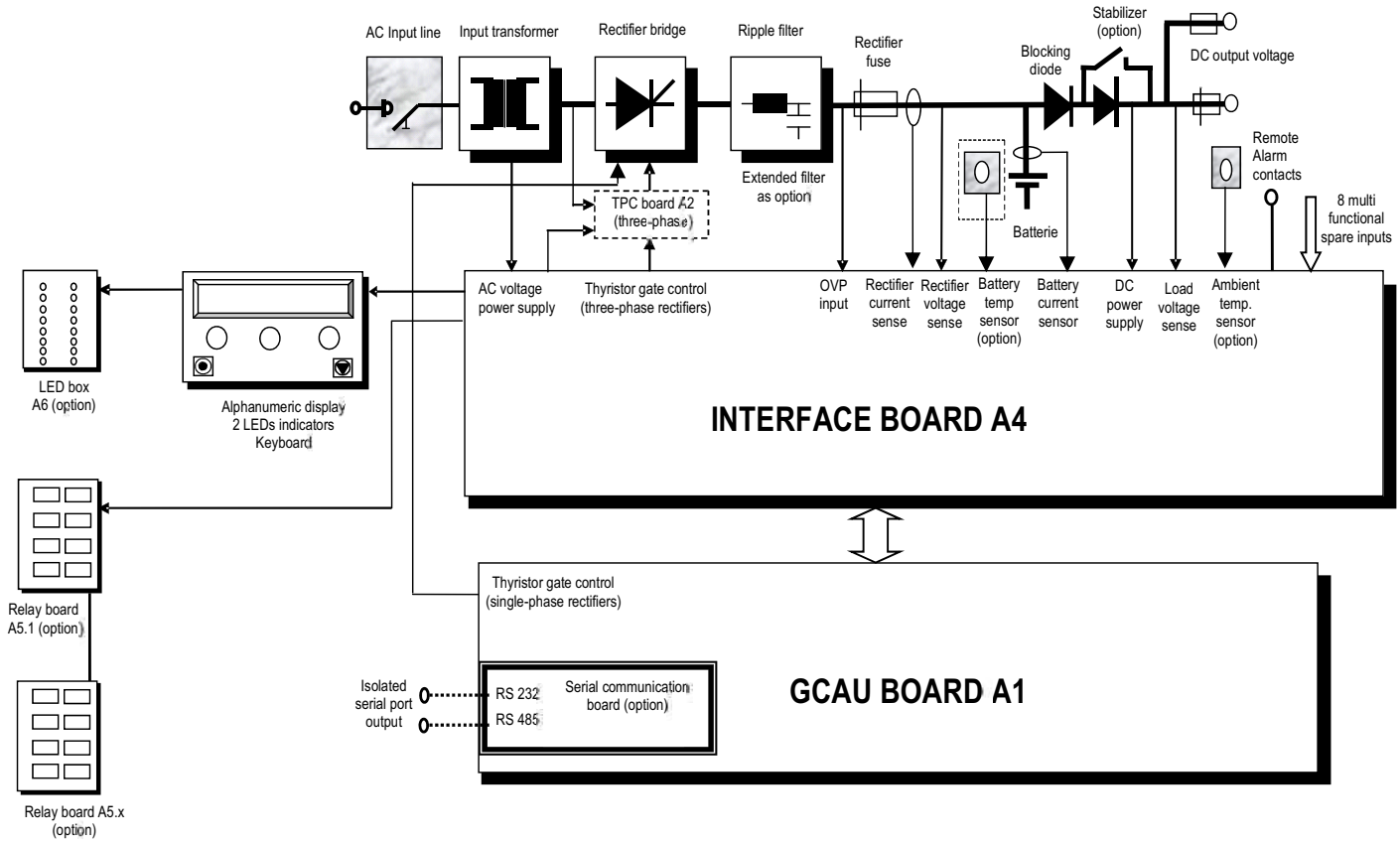
Floating charge
Floating charge compensates for the self-discharge of the battery and, in normal operation, maintains the battery in a fully charged condition.

High rate charge (or equalizing charge)
High rate charge restores the battery to full capacity.
Depending on the equipment, it can be activated:
- manually from the keyboard,
- automatically by the system which monitors the state of charge of the battery (mains off or rectifier in current-limiting mode or on Ah drop),
- periodically by the system at fixed intervals (1 month, 6 months, 1 year: depending on factory setting).

The high rate charge time is factory-set to a value in the range from 0 to 99 hours.
During high rate charge, the remaining charge time can be displayed.

Commissioning charge (or boost charge) ***(option)***
This mode can be used for initial battery charging and is manually activated from the front display.

7.3 PRINCIPLE OF OPERATION



The mains voltage is applied to the primary winding of the power transformer via the standard mains input switch or other optional circuit-opening devices. The rectifier is then in service, provided no fault has been detected and/or stored by the monitoring systems.
The power converter rectifies the transformer secondary voltage.
The single-phase power converter consists of a mixed diode/thyristor bridge; the three-phase power converter consists of a full thyristor bridge.
The rectifier current is smoothed by an inductor and the voltage is filtered by capacitors.
The rectifier current is sensed across a rectifier shunt. A blocking diode is connected to the rectifier output and is used to isolate a faulty unit while the rectifiers are in the parallel configuration.

The GCAU control board is supplied via the interface board A4, either by an auxiliary secondary winding of the transformer or from the battery. The GCAU board controls the power converter from internal references (which depend on the battery type and the current charge mode) to regulate the rectifier output voltage and/or current. There is a protective fuse inserted in the positive output polarity of the rectifier.

The battery current is sensed across a battery shunt *(option)*.
A temperature sensor senses the battery temperature and compensates the rectifier output voltage according to the temperature *(option)*.

7.4 "GCAU" GENERIC CONTROL AND ALARM UNIT (A1)

This board has two dedicated microcontrollers, memories for the microcontroller and all necessary analog interface circuits to measure and control. The board is mounted inside the cabinet, on the pivot panel.

The board consists of two major functional blocks:

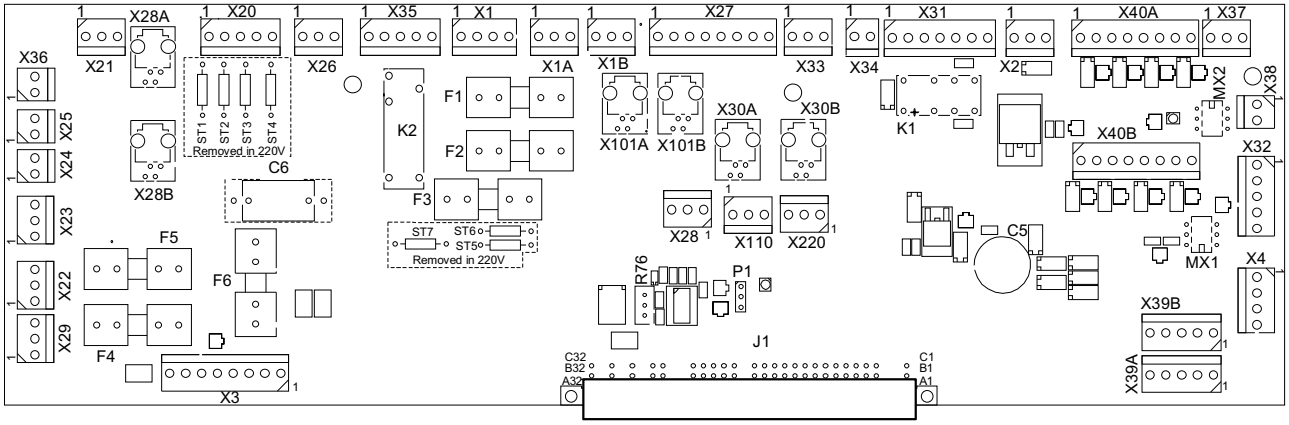
- an **analog** block providing the following main functions:
  . analog signal (current and voltage) matching,
  . synchronisation (in case of single phase),
  . power converter thyristor gate firing by electrically isolated pulses (for single-phase only),
  . electronic circuits power supply ,
  . analog control signal 0-10V.

- a **digital** block with two micro controllers providing the following main functions:
  . analog input (voltage, current and temperature) measurement,
  . digital input/output monitoring,
  . system operating and monitoring sequences controlled by a program stored in memory,
  . setpoint (reference) generation for the analog regulators,
  . full digital control algorithm (separate micro controller),
  . serial communication for remote monitoring/programming,
  . serial communication for display unit,
  . on- board Flash memory and EEPROM.

The fuses for GCAU and TPC boards protection are integrated on the interface board A4.

7.5 INTERFACE BOARD A4

The board A4 is an interface between the GCAU control board and the system, which includes voltage adaptation and protection via fuses for GCAU and options.



J1 : Control board GCAU A1 connection.

X1 : Connection to auxiliary secondary winding of the transformer T1 (fuses F1-F2-F3).
X2 : End of discharge contactor connection (option).
X3 : C15-100 board connection (option that uses Spare 8 input).
X4 : Connection of the earth to enable the insulation fault measurement (option).

X20 : Connection of the DC voltage measurement inputs.
X21 : Connection of the load voltage measurement for display on analog meter (option).
X22 : Connection of the display for load voltage measurement (option).
X23 : Connection of the display for charger voltage measurement (option).
X24 : Connection of the display for battery current measurement (option).
X25 : Connection of the display for charger current measurement (option).
X26 : Outputs protected by fuses for power supply of options.
X27 : Connection of the thermostats and the rectifier bridge fan (option).
X28 : Choice of the insulation fault measurement point (battery or load).
X28.A : Connection of the display-keyboard assembly.
X28.B : Connection of the relay boards (option).
X29 : Connection to buzzer (option).
X30A : Connection of the battery temperature probe (option).
X30B : Connection of the ambient temperature probe (option).
X31 : Connection of the battery shunt (for dual systems).
X32 : Connection to charger 2. Simultaneous Highrate / Sequential Highrate (for dual systems).
X33 : Connection to rectifier shunt.
X34 : Connection to standard battery shunt.
X35 : “Volt-free” contact output of the common alarm relay.
X36 : Output of the GCAU auxiliary 12 V.
X37 : Spare input for V measurement.
X38 : Output for watchdog option.
X39A : Connection of the auxiliary power supply board 1.
X39B : Connection of the auxiliary power supply board 2.
X40A : Digital inputs - spares 1 to 4.
X40B : Digital inputs - spares 5 to 8.
X101A : Connection to the TPC1 (three-phase charger).
X101B : Connection to the TPC2 (three-phase 12 pulses charger).
X110 : GCAU power supply configuration for V batt max. up to 200 VDC.
X220 : GCAU power supply configuration for V batt max. higher than 200 VDC.

ST1 to ST7 : Voltage adaptation.
P1 : Activation of the integrated high ripple detection (option that uses Spare7 input).
F1-F2-F3 : Protection of auxiliary secondary winding of transformer T1 (in single-phase configurations, only F1 and F2 are applicable).
F4 : Protection of load voltmeter.
F5 : Protection of charger voltmeter and auxiliary power supplies connected to X39A and X39B.
F6 : Protection of the end of discharge contactor output.

Fuses characteristics : 3.15 A 300 VDC 5 x 20 – time-delayed.

7.6 "TPC" THREE- PHASE CONTROL BOARD (A2)

The TPC board is used in case of a three-phase system and is mounted close to the bridge assembly.
The board is controlled via a link cable connected to the GCAU board.
The TPC has all necessary electronics to synchronise to the secondary transformer voltage and to control the thyristors.
The board is phase insensitive meaning it will operate with all possible phase rotations.

7.7 DISPLAY BOARD (A300) AND KEYBOARD ASSEMBLY (A310)

The display board is mounted on the front of the system and is controlled by the GCAU board, via the interface board A4. It is a plug-in device and is connected through two RJ 4-4 connectors with a 4-wire cable. All data and necessary power supply voltages are transferred over this cable. The display is a 9mm character height two line by sixteen-character alpha numeric LCD with LED backlight.
The Keyboard is connected to the display unit which decodes the three operating buttons and controls the two indicator LEDs.
The display board is equipped with an USB type B port, which offers an insulated communication port for maintenance purpose.

8 OPTIONS

The equipment has these options fitted only if they have been specified in the initial order. Refer to the customer drawings.

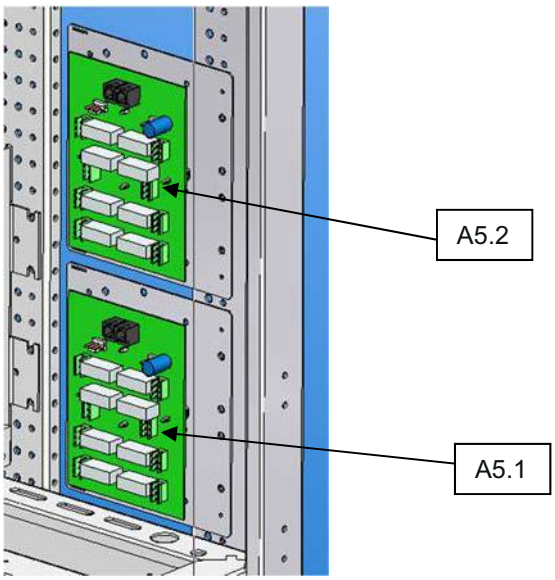
8.1 ALARM/SIGNALLING/MEASUREMENT OPTIONS

8.1.1 LED box (A6)

The front door of the rectifier can be equipped with 16 electroluminescent diodes and related texts.
The LEDs indicate alarm or events as configured in the GCAU board.
The lighting of the LEDs can be tested through a long press (5 seconds) on the middle key (in default menu) of the display/keyboard.

8.1.2 Relay boards (A5)

Relay boards A5 provide remote signalling of individual alarms. Each board has eight relays.
A maximum of 8 relay boards can be connected to the GCAU board. Note that only one board can be powered from the GCAU, via the interface board A4. All other relay boards must be powered separately.
The A5-1 board has two additional spare input alarms.



8.1.3 Temperature alarm

SPRe-TPRe up to 50 A (rectifier bridge natural cooling)
A thermoswitch TH2 is mounted on the rectifier bridge for a "high temperature" alarm signalling. A second thermoswitch TH1, mounted on the rectifier bridge, causes the electronically shutdown of the rectifier by inhibiting the thyristor gate signals.

SPRe-TPRe from 75 A (rectifier bridge forced cooling)
The thermoswitches TH1 and TH2 are included in the base of the equipment.

NOTE: Refer to the drawings for the temperature detection values.

8.1.4 Supplementary meter functions

As standard, load voltage and current, date and time are displayed in the measurements menu.

Your equipment can have supplementary meter functions:
"AC Meter", "Ibatt meter", "Ah meter", "Ambient Temp" and "Battery Temp".
These options can be activated or deactivated on customer demand.

"AC Meter"
This option allows reading the mains input voltage in the measurements menu.

"Ibatt Meter"
If the system is equipped with the battery shunt option and "Ibatt Meter" is activated, the battery charge and discharge currents can be displayed. The "-" sign preceding the displayed value indicates a discharge condition. In this case, the load current will correspond to the rectifier current minus the battery current.

"Ah Meter"
The ampere-hour meter measures the battery charge and discharge Ahs. This value is displayed as a percentage of the initial battery capacity.
The ampere-hour meter reads 100% in the following cases:
- the counting reaches 100%,
- the system has been operating in the floating mode for at least 100 hours.

NOTE:
During battery recharging, only 80% of Ahs are taken into account (battery average efficiency when recharging). (Note: Efficiency factor is programmable).

"Ambient Temp" and "Battery Temp"
When these options are activated and temperature sensors are installed, you can read the battery and ambient temperatures on measurements menu. Temperature unit can be set in °C or °F on customer demand.

8.1.5 Analog meters

The digital measurements can be associated with needle analog meters (on the front panel). These meters provide a direct reading of voltage and current.
These options are available for:
- Mains input voltage and current (with phase selector switch for three-phase system).
- Charger voltage and current.
- Battery voltage and current.
- Load voltage and current.

8.1.6 Spare inputs

The GCAU board has 8 multifunctional digital inputs, some can be used for option signalling purpose (e.g.: low electrolyte level, battery symmetry fault detection ...). Depending on the option configuration, some spare inputs are free and they can be used as user alarms centralization. Inputs are not isolated: they are provided to be exclusively connected to the 0 V (negative polarity) typically via a dry contact of relay or switch. A free displayed text can be associated to each input.

8.1.7 Audible alarm

To alert the operator of a malfunction, the common alarm (when activated) generates an audible signal. Associated with the audible alarm is a switch used to stop the buzzer. When the common alarm is acknowledged, the switch can be turned to its original position. The switch is located on the front door of the rectifier.

8.1.8 Ground fault detection

1 - Case of a single SPRe/TPRe rectifier

The option is integrated into the GCAU board.
The ground fault detection circuit monitors the impedance of the connection between ground and the positive and negative polarities of the DC output.
An alarm is delivered on detection of a leakage current ≈ 10 mA between ground and one of the output polarities.

2 - Case of two SPRe/TPRe rectifiers connected in parallel

In case of two redundant systems with individual battery banks the ground fault detection is realized by GCAU control board in the similar way as for single systems

In case of two redundant systems with common battery bank the option is realized with a separate board installed on the DC output common bus.
This board provides dual insulation fault detection between the positive and negative polarities with reference to ground.
The alarm (Ground + or Ground -) is delivered either:

- directly on free-voltage loops, or
- to the GCAU board using (on each rectifier) : 1 spare input (Ground fault)
  or 2 spare inputs (Ground + fault, Ground – fault).

8.1.9 Electrolyte level alarm

The electrolyte level in the battery cells can be checked using an external probe.
On the outside surface of a pilot cell, a capacitive probe is positioned between the minimum and maximum electrolyte level marks on the cell.
If the electrolyte level in the cell drops below the minimum level, the probe sends a signal to control board A1 through a digital spare input and the corresponding alarm is displayed.
The probe comes with a bracket and straps for securing it to the battery cell.

8.1.10 Battery symmetry fault detection circuit

1 - Case of a single SPRe/TPRe rectifier

The option is integrated into the GCAU board.
The battery symmetry alarm is generated when a battery cell is shorted, has an open circuit or when asymmetrical cell voltage is detected.

The detection is independent of the charge state of the battery (float charge, high rate charge or commissioning charge).
In order to detect one of the above fault conditions, a battery centre tap input is present.
Cell numbers can be odd or even since the adjustment allows compensation for odd cell numbers.

The alarm is displayed on the front panel LCD.

2 - Case of two SPRe/TPRe rectifiers connected in parallel

In case of two redundant systems with individual battery banks the battery symmetry fault is realized by GCAU control board in the similar way as for single systems.

In case of two redundant systems with common battery bank the option is realized either with GCAU card in a similar way as single systems or with a separate board A10 installed on the DC output common bus.

In case of multiple battery banks, each bank needs to be monitored with a separate board A10, the alarm is transmitted to the GCAU card A1 through digital inputs.

3 - Wires and system protection for battery symmetry fault detection option

F100 box protects the cables and the system against short circuits. In the event of a short circuit between the battery middle point and one of the DC polarity of the battery, the F100 fuse will open the circuit. The F100 box must be located as close as possible to the battery middle point connection.

8.2 COMMUNICATION OPTIONS

Depending on configuration the Protect RCS rectifier charger can be equipped with the following communication options.

8.2.1 RS232 interface connection

This option is a piggy-back board (A71) connected to the extension bus of the GCAU control board. It allows to communicate locally or remotely with a PC computer.
This RS232 interface connection is used in the configuration when only one charger has to be connected to a PC computer.

A 2 m cable with SUB-D connector is supplied with this option.

The communication port is fully isolated from the charger output and/or internal control.

8.2.2 RS485 interface connection

This option includes is a piggy-back board (A71) connected to the extension bus of the GCAU control board and additional EIA485 interface & connecting board (A72). It allows to connect several rectifier systems on one common communication bus (centralized supervision of the rectifers) to communicate locally or remotely with a computer.

The rectifiers are acting as slaves and the central computer as the master. By giving the different rectifiers different slave numbers, it is possible to control each individual rectifier.

A 2,5 m cable with RJ (6/6) is supplied with this option to connect A71 and A72 boards.

The communication port is fully isolated from the charger output and/or internal control.

8.2.3 IEC 61850 Server interface

The IEC 61850 Server interface option is also available for PROTECT RCS range.

Rectifier Alarms / Status and Analog measurements are cyclically polled from the rectifier supervision control board GCAU A1 by the gateway and translated to IEC 61850 protocol available at the RJ45 Ethernet port.

The detail description is available in the separate IEC 61850 Server interface manual document.

8.2.4 MODBUS communication

The Protect RCS rectifiers support the Modbus (Jbus) protocol (RTU or ASCII based), an user SCADA system with MODBUS protocol can be used for supervision.
The connection to the charger(s) can be RS232 (one equipment monitored) or RS485 (more than one charger or equipments on the bus), the same hardware equipment is supplied than the one with WINSPARC supervision software.
The complete MODBUS mapping of the various parameters are available.
The Communication speed is 2400, 4800, 9600, 19200 or 38400 Bauds.

For more details please refer to separate Modbus manual document.

8.2.5 TCP/IP Communication

This option includes a NCS board connected to A71 (RS232 board) and allowing TCP/IP communication with the GCAU control board.
The board provides the following protocols: HTTP (Web navigator), SNMP, connection to Winsparc via a network, Modbus TCP.

For more details please refer to separate NCS manual document.

8.2.6 WINSPARC GCAU supervision software

The software WINSPARC (WINDOWS based) is an application designed as local and remote supervision on the entire GCAU configuration in order to control, monitor and configure the system.
This software interacts with the GCAU control board locally through a serial port RS232, RS485 or TCP/IP interfaces described above. As minimum requirements the system has to be equipped with RS232 option. For details please refer to the options described above.

For details please contact AEG Power Solutions representative.

The WINSPARC GCAU software allows visualizing the system data on the PC screen such alarms, measurements, charge modes, history log. Remote commands can be sent also to the system.

The two access levels are available:

- User: this first level is used for monitoring only. The system measurements, statuses and alarms are available for user.

- Super User: this second level allows to send command and also to modify some parameters of the system. This level requires additional training. Please contact AEG Power Solutions Service Department for more details.

8.3 CONTROL/COMMAND OPTIONS

8.3.1 Manual voltage and/or current adjustments

Option reserved for systems without batteries

When the rectifier is configured in this operation mode, the rectifier output voltage and current are set by the operator, the charger operates as an adjustable power supply.

Rectifier output voltage and current adjustment is made through the "Manual adjustment" menu (refer to § 6.6.4).
The voltage can be set between an upper limit (max) and a lower limit (min) set in the system set-up *(factory setting)*.
The current can be set between 0 and the maximum current of the rectifier.

8.3.2 Remote rectifier shutdown

The remote rectifier shut down option is a function used to switch the rectifier off via a normally closed (NC) contact. The charger does not restart automatically when the remote contact is back to the initial “ON” position, the operator needs to acknowledge the alarm “rectifier shutdown” locally for safety purposes.
The option uses one spare input .

8.3.3 Remote alarm reset

The remote alarm reset/acknowledgement command option is a function used to reset the alarms remotely. The option uses one spare input.

8.3.4 Remote high rate charge

This option is used to put the rectifier in high rate charge via a normally open (NO) contact from remote control panel. The option uses one spare input .

8.3.5 Remote fan control room & remote forced floating charge

This combined remote option allows to control the ventilation of the battery room for air renewal. The signal to ventilation fan is sent via one contact of the alarm card once the rectifier is in the high rate charge mode.

The remote forced floating charger option prevents also the manual and automatic high rate charge mode of the rectifier to be initiated. It is used when high rate charge is not allowed if the load is connected or in case of fan failure in the battery room. This funtion is activated by an external dry contact and uses one spare input.

8.4 AC INPUT OPTIONS

8.4.1 EMI filter

The rectifier is equipped as standard with an input EMI filter that smoothes mains interference in accordance with the EN 61000-6-4 standard (EN 55011 class A). To avoid undesirable disturbances, the rectifier cabinet must be properly earthed and the doors must be closed.

8.4.2 Supplementary protective devices

The protective devices (fuses or circuit breakers) can be provided for the mains input protection.
For alarm purposes, auxiliary contacts of protective devices are available as additional option.

8.4.3 Input contactor

An input contactor replaces the standard input switch to isolate the AC input from the mains.
An ON/OFF switch is available on the front of the rectifier.

8.5 LOAD OPTIONS

8.5.1 Supplementary protective devices

The protective devices (fuses or circuit breakers) can be provided for the load lines protection.
For alarm purposes, auxiliary contacts of protective devices are available as additional option.

8.5.2 Additional DC filtering

Additional DC filtering (additional capacitor or/and chokes) provides low voltage ripple on DC output without battery.
When the battery is connected, the ripple current of the battery is minimized by the additional filter.
1 % filter or 0.1% filter are available.

8.5.3 Load switch

A switch isolates the load from the DC bus.

8.5.4 Diode stabilizer

A diode stabilizer is used if the DC output voltage is too high for the load. The GCAU board has a specific function built in which controls the diode stabilizer through the relay board.
The number of diodes depends on the required voltage drop.
For a small load voltage range, the diode stabilizer must be turned on in steps. The switching in or out of a step is controlled by a contactor energized by the relay board.

8.5.5 High DC voltage mechanical trip

As standard, the rectifier is electronically shut down by inhibiting the thyristor gate drive signals.

The high DC voltage mechanical trip option is used when the output DC load of a rectifier system must be protected against too high DC voltages generated by an uncontrolled fault condition of the rectifier. The high DC voltage alarm is used to disconnect the rectifier from the AC input by a contactor.
To control the contactor of the AC input, a 8 relay board A5-1 is used. The relay contact of the dedicated alarm will de-energize the input contactor.

The function is "latching" meaning a manual reset (using the display keyboard) must be initiated before the system can operate again.

8.6 BATTERY OPTIONS

8.6.1 Supplementary internal protective devices

The protective devices (fuses or circuit breakers) can be provided inside the rectifier for the battery protection.
For alarm purposes, auxiliary contacts of protective devices are available as additional option.

8.6.2 External battery protection devices

A battery protection box can be fitted with the equipment, according to the customer requirements.

8.6.3 Battery switch

A switch isolates the battery from the DC bus.

8.6.4 Battery temperature compensation

The SPRe and TPRe rectifiers can sense the battery ambient temperature. The sensor is located in a metal lug and can be mounted to the wall, on the battery rack or inside the battery cabinet by a screw. The connection from sensor to board is a 4 wire telephone cable. The sensor is used to compensate the floating voltage or the high rate voltage if necessary.
The temperature coefficient with reference to the battery ambient temperature can be defined by software in the system set-up *(factory setting)*.

Note: The SPRe and TPRe rectifiers can sense both ambient and battery temperature for special applications (as VO battery charging).

8.6.5 Battery current limit/display

Battery branch is equipped with a shunt or a hall effect current transducer. Battery current is displayed and battery charging current can be limited to a configured value (*factory setting)*.

8.6.6 Low-Voltage Disconnect *(end-of-discharge contactor)*

To protect the battery from over-discharging and the load from too low a DC voltage, the battery is disconnected from the load at a set voltage level. This level is just below the one corresponding to the end of the battery backup time. The battery is disconnected by a contactor in the battery line.
When the mains voltage returns, the rectifier supplies the load, the low voltage alarm is automatically reset, and the battery is reconnected.

8.6.7 Reverse battery protection

This option protects the rectifier against reversed connection of battery and must be associated with a battery protection against short-circuit. The protection is realized either by a diode connected with the cathode on the positive side and the anode on the negative side, or by a tripping coil on the battery breaker if applicable.

8.6.8 VO battery charging (recombination batteries)

This option is reserved to systems equipped with VO (sealed Ni-Cd) batteries, and is used with:

- C15-100 rectifier monitoring board and input contactor,
- Battery and ambient temperature sensors,
- Battery current limit,
- 1% filter,
- Relay board.

The batteries are charged at constant voltage at two levels and limited current. Voltage levels are depending on the battery temperature (temperature coefficient is -2,5 mV/°C/cell, factory setting).
The battery recharge is controlled following the difference between the battery temperature and the ambient temperature.

Battery temperature increase (from ambient) and charging time are monitored.
C15-100 independent board monitors permanently battery parameters (voltage, current and temperature). 1% filters insure low ripple voltage and current to the battery and DC output.

8.6.9 C15-100 analog monitoring board

This option is composed of a board that monitors the battery charge parameters independently of the charger GCAU control board. This option allows the system to comply with standard C15-100 that recommends the conditions of implementation and use of batteries.

This board shuts down the rectifier when any of the followings fault are detected :
- high battery voltage (temperature-compensated value)
- high battery charging current
- battery temperature higher than +60°C (this fault is inhibited on mains power return if the rectifier is in the floating mode).

The fault must be reset locally by pressing push-button S2 (only if the fault has disappeared).

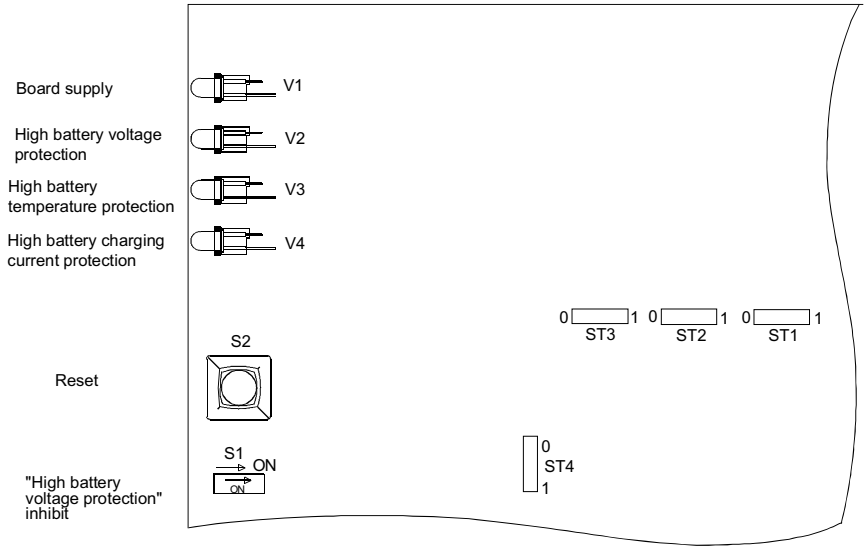
Standard settings :

	ST3	ST2	ST1
220V	0	0	0
110V	0	0	1
48V	0	1	1
24V	1	1	1

ST4	Slope adjustment
0	Inhibition
1	Compensation : 0.17%/°C

NOTE: During commissioning charge, set S1 on the position ON ("high battery voltage" detection inhibited).

Components location
C15-100 board



8.6.10 C15-100 digital monitoring board

This option is composed of a board that monitors the battery charge parameters independently of the charger GCAU control board. This option allows the system to comply with standard NFC15-100 and NFC58-311 that recommends the conditions of implementation and use of batteries.

This board shuts down the rectifier when any of the followings fault are detected :

- high battery voltage (temperature-compensated value)
- high battery charging current
- battery temperature higher than +60°C (if the card is on dual charge rate mode, this fault is inhibited on mains power return if the rectifier is in the floating mode).

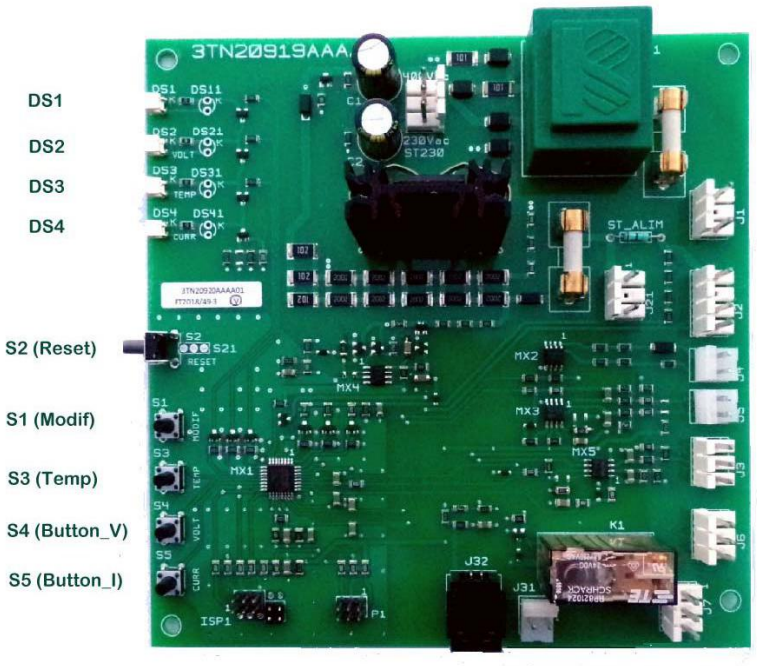
The relay and alarm signal, once tripped are latched.
They must be manually reset by pressing the Reset button S2.
This operation can be done only if the measurements are below the threshold limit.

In monitoring mode :

- The LED DS2 is ON if the voltage is above threshold.
- The LED DS2 is blinking if the voltage is below the threshold but the relay/alarm tripped on voltage condition.
- The LED DS4 is ON if the current is above threshold.
- The LED DS4 is blinking if the current is below the threshold but the relay/alarm tripped on battery current condition.
- The LED DS3 is ON if the temperature is above threshold.
- The LED DS3 is blinking if the temperature(s) is/are below the threshold but the relay/alarm tripped on battery temperature condition.

When operators needs to set charger in battery commissioning elevated voltage, the Commissioning mode shall be activated.
When Commissioning is active, the control of overvoltage is disabled.
In “Monitoring” mode (ex: after a power on), make a long push on button S4 (Button_V) until LEDs start blinking. Confirm by a short pulse on button S1 (Button_Modif). Blinking of LED’s stops.

Components location
C15-100 board



8.6.11 Cable drop compensation

The rectifiers can be programmed (cable drop parameter) to compensate for cable drop between the system and the battery without the need of remote sensing.

If battery current limit/display option is present:

The output voltage will be increased as a function of the battery recharge current.

If battery current limit/display option is not present:

The output voltage will be increased as a function of the load current.

This option is mainly used when load cables are connected directly to the battery.

Voltage measurements on the display:

"Outp" (measurement menu): compensated voltage (value from calculation).

"DC" (default menu) and Load (measurement menu): actual voltage

Note: the cable drop parameter is the reverse function of "droop" factor used for passive load sharing.

8.6.12 High rate charge interlock *(Forced float charge)*

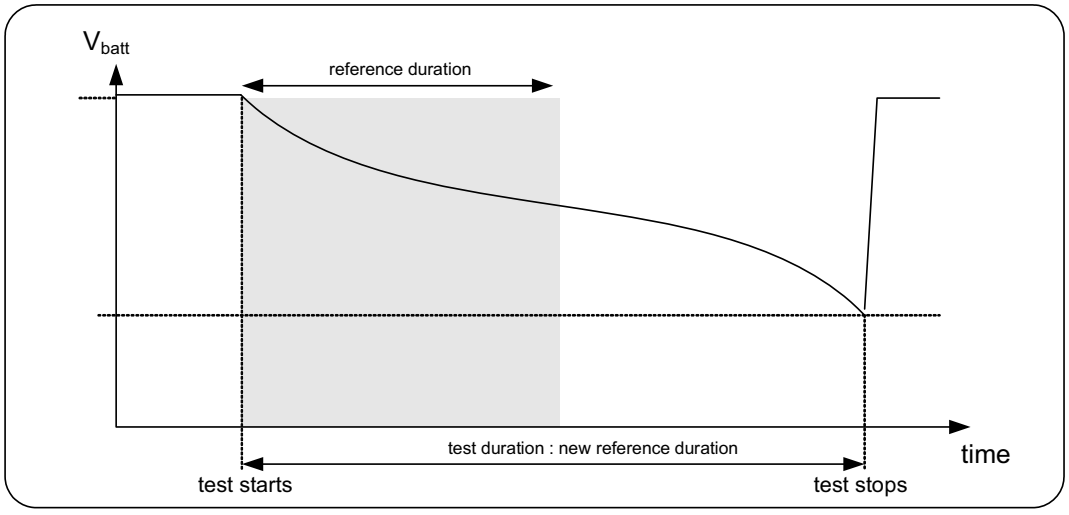
This option is used when high rate charge is not allowed if the load is connected for voltage level reasons. In this case, an auxiliary contact of the DC load protective device is wired to the spare input configured for forced floating.

8.6.13 Battery capacity test

Battery current display option is necessary for this option.

In order to check the battery performance, a battery test can be activated. The battery test discharges the battery until a predefined voltage. It discharges the battery with a constant current. To achieve this, the charger output voltage is slowly decreased until the battery discharge current reaches the desired level. Both charger and battery will deliver current. This ensures you do not loose system performance in case a battery is in a bad condition or has an open cell.

The battery test can only be performed on a 100% charged battery and should discharge the battery up to 60%.



The Battery test can be activated by the operator/serial command or can be initiated periodically.

If initiated periodically but the conditions to start the battery test is not met (see below), the battery test will be postponed 24 hours and a new try is given. After three retries the test will be terminated until the next periodic cycle. During the three retries the periodic counter is stopped and started again after the battery test is initiated.

If the battery test is manually initiated and periodic battery test is active as well, the periodic timer is reset upon selecting manual battery test to prevent sequential battery tests.

The time needed to reach the End Voltage level is compared to the time of the previous battery test. This previous time is multiplied with a tolerance factor to compensate for battery performance. If the time is shorter than this reference time, an alarm **"BATT.TEST FAILED"** is generated. If the time is longer than the predefined time, or within the defined percentage, a text **"BATT.TEST PASSED"** is generated. This is not an alarm situation but only a message. It will disappear from the screen as soon as another function is selected from the front panel. In both cases this event is written to the history list. If the time is longer than the predefined time, this new time is updated and will be used as the reference for the next battery test.

The first time the battery test is performed the reference time is 0. This ensures that the first battery test logs a time greater than the reference time.

Note:
If required, you can manually set the reference time to 0. Go to the Battery Test Setup in the System Setup and select the discharge current. If you change this setting, the reference time will be set to 0 once you leave the setup. (If you do not want to change the value, just go up and down with the setting until you have the previous setting. This will have the same effect).

The Battery test is not allowed under the following conditions:
- AC Failure
- Standing load < discharge current
- Battery capacity < 100%
- Battery current is negative (Discharge)
- System in High rate or commissioning charge

If you try to activate the battery test manually from the front panel and any of the above conditions is detected, the top line will show the message **"TEST NOT ALLOWED"** for two seconds.
If an AC failure occurs during the battery test, the test will be cancelled and the system will return to normal operation when the mains return.

The Battery test is aborted under the following conditions:
- AC Failure
- Manual Stop (From display, serial port or external digital input).
- Discharge current is lower than the required current for 5 minutes.

In any of these cases, the battery test will be aborted and an alarm **"BATT.TEST ABORT"** is generated. This alarm can be acknowledged (reset).

8.7 CABINET OPTIONS

8.7.1 IP ratings

The cabinet standard IP rating is IP21*. IP43 is available as option and higher are available on special request (IP5x*, IP6x*).
* (according to standard EN 60529)

8.7.2 Eye bolts

For transporting the system, the cabinet can be equipped with four eye bolts and nuts (provided separately or mounted on the cabinet).

8.7.3 Cabinet heater

The cabinets are fitted with heating resistors supplied via a circuit breaker.
The heater circuit must be supplied with an auxiliary mains of 110 VAC to 230 VAC during storage, before system energization and during periods when the rectifier is not operating.

8.7.4 Interior lighting and AC socket outlet

The cabinet can be fitted with a light turning on automatically when the door is opened.
An AC socket outlet is mounted on the terminal block. It delivers a voltage corresponding to the auxiliary supply voltage.

9 PARALLEL OPERATION

The Protect RCS rectifier charger can operate also as parallel system. The following configuration are available:

System:
Redundant - for a charger and/or battery redundancy.
Parallel - to increase the power or to increase the battery capacity.

Battery :
No battery supply mode.
Individual each charger manages its own battery.
Common two chargers, a single battery.

Depending on the configuration the different options can be used in the system. Please refer to the customer drawings for the details.

9.1 REDUNDANT SYSTEM CONFIGURATION

The purpose of a redundant system is to obtain maximum availability of the load supply, including any fault of a source (charger and/or battery) or a component (output capacitor, diode regulator etc.). The redundant configuration facilitates also the on-site maintenance operation.

In a redundant system, the aim is to limit the “common mode failures” between the 2 chargers: avoid anything that could lead to the spread of a fault, of a process or a component failure, of a power source failure (charger, battery etc.) to another, in order to ensure permanent supply of the load.

The “decoupling” method chosen in the Protect RCS is the most reliable one.

9.2 PARALLEL SYSTEM CONFIGURATION

The paralleling of the systems in not redundant configuration is used to increase of the power of the chargers.

The paralleling of the systems is used also for increasing the battery capacity when the direct paralleling of the battery strings is not authorised (e.g.: VO battery). In this case, the management of each battery string is independent. This topology system ensures optimum management of each battery string in terms of availability (recharging), monitoring and ageing.

9.3 OPTIONS FOR PARALLEL SYSTEM CONFIGURATIONS

The options described below are used depending on the system configuration

9.3.1 Sequential High Rate (parallel)

The option is a function of the GCAU control board that allows the start-up of two chargers in high rate mode in a sequential way (one after the other).

With this function, two chargers can be switch to High Rate Mode sequentially and will switch back sequentially to Floating Charge Mode whenever one of the two charge modes is selected on one charger.

9.3.2 Passive Load sharing *("droop" factor) function*

The option is a function of the GCAU control bard. It is used when two rectifiers are connected in the parallel configuration and load sharing is required.

The load sharing is passive and is based upon changing the slope ("droop" factor parameter) of the rectifier output voltage according to its output current. The droop factor reduces the output voltage if the system current rises.

The on-site installation must as far as possible minimize connection or installation dissymmetry (thermal conditions, lengths and wire sections, protections etc.) of the chargers towards the batteries and the load.

9.3.3 Simultaneous High Rate (shared)

This option is a function of the GCAU control board that allows the start-up of two chargers in high rate mode in a simultaneous way.

With this function, two chargers can be switched to High Rate Mode simultaneously and will switch back simultaneously to Floating Charge Mode whenever one of the two charge modes is selected on one charger.

Both chargers are able to stop and start the High Rate Mode charge cycle of the other one.

10 MAINTENANCE

AEG Power Solutions can provide a Global Service capability through regional Service Centres.



Electronic boards are sensitive to E.S.D. (electrostatic discharge).
When not installed in the equipment, they are delivered in antistatic bags.
Before handling a board, the operator must take care to be at the same potential as the equipment to be worked on and take all customary precautions.





ANY OPERATION ON THE EQUIPMENT SHOULD BE CARRIED OUT BY QUALIFIED PERSONNEL AWARE OF SPECIFIC ELECTRICAL HAZARDS AND PRECAUTIONS TO BE TAKEN. NEVER ASSUME THE ABSENCE OF VOLTAGE, ALWAYS CHECK WITH A VOLTMETER BEFORE ANY OPERATION ON A SYSTEM.

THE DC OUTPUT IS EQUIPPED WITH FILTERING CAPACITORS, DANGEROUS VOLTAGES CAN REMAIN EVEN IF THE CHARGER IS STOPPED AND THE BATTERY DISCONNECTED. ALWAYS CHECK THE ABSENCE OF VOLTAGE ON THE DC CIRCUITS BEFORE TO START ANY WORKS ON THE SYSTEM.

DANGEROUS VOLTAGES CAN REMAIN ON THE SYSTEM EVEN IF IT IS SWITCHED OFF AND INSULATED FROM MAINS AS LONG AS BATTERY IS CONNECTED.

10.1 PREVENTIVE MAINTENANCE VISIT

It is recommended to perform a maintenance visit every year.

10.1.1 Rectifier maintenance

Remove dust.

Carry out an inspection including the following:

1 - Disconnect the mains input line and the battery.

2 - Examine the components and the wiring. Pay special attention to signs of overheating and melted insulation. Check all connections. Check for loose wires.

3 - Check that the cooling air flow is not impeded, clean the fans, the air inlets and outlets in case of presence of dust.

4 - For rectifiers with air inlet filters (on the door and/or on the roof), check the filters for cleanliness.

5 - Check the operation of the rectifier and the voltage levels *(see customer drawings)*.

6 - The GCAU board is equipped with a lithium battery for the Real Time Clock (RTC). This component has a life time of about 10 years. Its replacement must be done by specialized personnel.

IMPORTANT
This component, mounted on a support, must be recycled in compliance with the European Directive n° 91/157/EEC of 18.03.91. You can also apply to AEG Power Solutions by shipping back the used board (prepaid shipment).

10.1.2 Battery maintenance

For the recommended battery maintenance procedures, refer to the battery manufacturer's manual.
At the end of their service life, the batteries must be recycled in compliance with the European Directive n° 91/157/EEC of 18.03.91 and WEEE directive. You can also apply to the battery manufacturer as indicated in the battery manual.

10.2 FAN MAINTENANCE

Rectifier bridge and cabinet fans:
It is recommended to replace the fans every five years. This operation must be done by specialized personnel.
A "FAN REPLACEMENT" message can be displayed if the alarm is activated on the system.

10.3 CAPACITORS MAINTENANCE

It is recommended to replace the DC capacitors every seven years. This operation must be done by specialized personnel.
A "CAPA REPLACEMENT" message can be displayed if the alarm is activated on the system.

11 ELEMENTARY TROUBLESHOOTING

When an alarm is activated, the green light is out and the red light flashes on the charger display. The "ALARM" message can be displayed by hitting any key to go to main menu.

Note the descriptions of the alarms present (see Chapter 6 - OPERATING INSTRUCTIONS).

If pressing RESET (in the alarm menu) does not turn off the red light, refer to the following troubleshooting table for the corrective action to be taken.

NOTE:
This elementary troubleshooting guide assumes that the usual protective options are fitted.
Your equipment may be different and some of alarms can be deactivated. Refer to the customer drawings.

ALARM or EVENT	PROBABLE CAUSE	CORRECTIVE ACTION
The display is white	Contrast problem	Do not touch any button for 5 minutes. This will automatically activate the default menu. Held the rightmost button, the contrast will be increased.
"HIGH MAINS VOLTS"	Mains voltage out of limits. Programmable threshold: default value or customer demand value.	. Check the mains voltage. The voltage must as per the specified value on the customer drawing package.
"LOW MAINS VOLTS"	. Rectifier off. . Mains protection opened. . TPRe : fuses F1 to F3 on the interface board A4 blown . SPRe: fuses F1-F2 on the interface board A4 blown. Programmable threshold: default value or customer demand value.	. Switch on the rectifier. . Check the fuse(s). Replace if necessary. Check the input breaker/switch. . Check the fuses. Replace the defective fuses
"CHARGER FAULT"	. Low floating voltage with the rectifier not in current-limiting mode. . Fuse F1 blown.	. Check the F1 fuse Call the Customer Service Department. . Check the mains voltage and the proper operation of the fans.
"HIGH BATT.VOLTS"	The rectifier output voltage is higher than the maximum allowable value. Programmable threshold: default value or customer demand value.	. Call the Customer Service Department.

ALARM or EVENT	PROBABLE CAUSE	CORRECTIVE ACTION
“LOW BATT.VOLTS”	Battery in discharge resulting from: . rectifier off. . mains absence or low mains voltage. . missing phase (TPRe). Programmable threshold: default value or customer demand value.	 . Switch on the rectifier. . Check the mains.
"HIGH DC VOLTAGE"	The rectifier output voltage is higher than the maximum allowable value. Programmable threshold: default value or customer demand value.	. Call the Customer Service Department.
"LOW DC VOLTAGE"	Low load voltage resulting from: . rectifier off. . mains absence or low mains voltage. . missing phase (TPRe). Programmable threshold: default value or customer demand value.	 . Switch on the rectifier. . Check the mains.
“GROUND FAULT +”	Low resistance between positive output and cabinet ground. Programmable threshold: default value or customer demand value.	. Check for the insulation fault.
“GROUND FAULT –“	Low resistance between negative output and cabinet ground. Programmable threshold: default value or customer demand value.	. Check for the insulation fault.
"HIGH TEMPERATURE"	High temperature on the bridge. Detection by thermo switch mounted on the heat sink.	. Check the fan(s). . Check if no obstacles are blocking the airflow. . Check the ambient temperature. . Check the thermo switch.
“TEMP SENSE ERROR”	. Short or open circuit temperature sensor. . GCAU board fault (ADC)	. Check the sensor connection. . Call the Customer Service Department.
“HIGH BATT. TEMP.”	High battery temperature. Programmable threshold: default value or customer demand value.	. Check the battery cabinet temperature.

ALARM or EVENT	PROBABLE CAUSE	CORRECTIVE ACTION
"CHARGER CURR.LIM"	Charger current limit indicator. It appears when the rectifier cannot supply the necessary power for the load. In this case, the rectifier operates in current-limiting mode.	. Check that load isn't higher than your customer drawings specifications
"BATTERY CURR.LIM"	Battery current limit indicator. It appears after battery discharge. When the mains power supply comes back, the battery is in current-limiting mode.	. This alarm is a warning. It should not stay more than the usual time charge. . Otherwise, call the Customer Service Department.
"HIGH CHARGR CURR"	High charger current.	. Call the customer service department
"HIGH BATT. CURR"	High battery current. Programmable threshold: default value or customer demand value.	. If battery current limit option is activated, this alarm should not appear. . Call the customer service department.
"BATT.TEST FAILED"	Appears after a battery test. . Battery blackout. . Battery in end of life.	. Call the customer service department
"BATT.TEST ABORT"	Appears during a battery test. . Discharge battery current is not sufficient . Battery charge was not initialized before the test. . Battery test appears during high rate or commissioning charge.	. Stop high rate or commissioning charge manually . Initialize battery charge at 100% (in command menus "reset AH meter"). . Restart the battery test manually.
"BATT. OPERATION"	Battery in discharge resulting from: . rectifier off. . mains absence or low mains voltage.	. Switch on the rectifier. . Check the mains.

ALARM or EVENT	PROBABLE CAUSE	CORRECTIVE ACTION
"INTERNAL CHECK"	Communication error between the microcontrollers or internal system error (e.g.: DC overvoltage protection, synchro pulse missed, TPC board error … etc.)	Call the customer service department.
"LONG CHARGE TIME"	High rate charge time too long.	Call the customer service department.
"NO PS VOLTAGE"	No more DC power supply to the board: rectifier output voltage out of order	. Check the fuse F1. . Call the customer service department.
"CHARGER OFF" It can be due to a normal system operation.	. Alarm activation. . Serial information input. . Manual shutdown. . Initialising delay.	. Put the rectifier in floating charge mode. . Call the customer service department to identify bad system configuration.
"BATT SYMM FAULT"	Battery cell is shorted, or has an open circuit or when asymmetrical cell voltage is detected. Fuses on measurement wires protection damaged.	Check the battery and replace the defective cells. Correct the fault leading to breakage and change the fuse if necessary.
"OUT OF WARRANTY" This alarm is not systematically programmed	The rectifier warranty period has finished. This alarm is not systematically programmed	Call the customer service department.* This alarm can be acknowledged by the user.
"MAINT. REQUIRED" This alarm is not systematically programmed	The rectifier required maintenance. This alarm is protected and cannot be acknowledged by the user.	Call the customer service department.*
"FAN REPLACEMENT" This alarm is not systematically programmed	The fans has to be replaced. This alarm is protected and cannot be acknowledged by the user.	Call the customer service department*
"CAPA REPLACEMENT" This alarm is not systematically programmed	The DC filtering capacitors have to be replaced. This alarm is protected and cannot be acknowledged by the user	Call the customer service department.*
"BATT. LIFE CHECK" This alarm is not systematically programmed	The connected batteries have to be checked. This alarm is protected and cannot be acknowledged by the user.	Call the customer service department.*

**** The Customer Service Department phone number is displayed with the alarm message, if activated on the charger.***

Data in this document is subject to change without notice and becomes contractual only after confirmation. Photos are not contractual.

Operation manual
BN 09 2495/01/03

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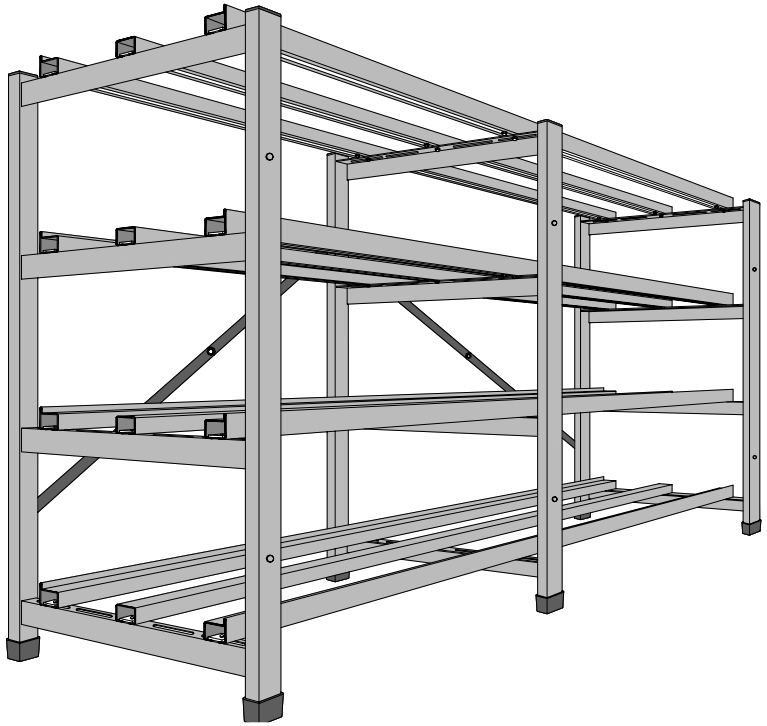
Base Load Power Hub (BLPH)

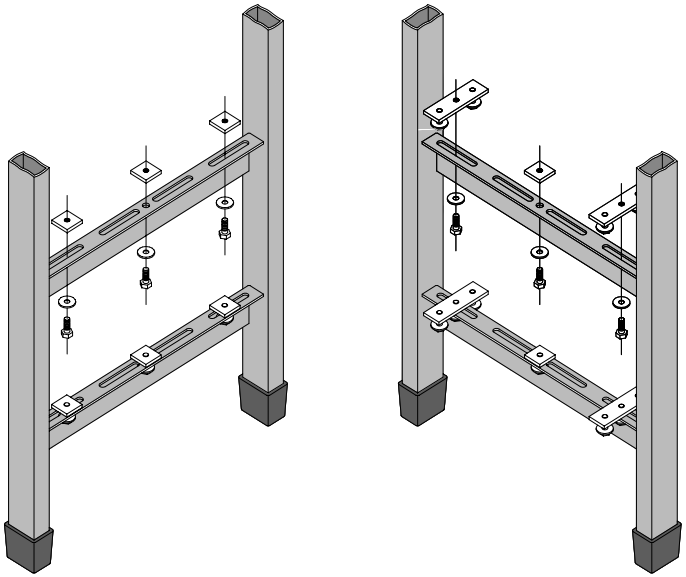
DC UPS BATTERY RACK - TAG: BA-200F1
MOUNTING AND INSTALLATION INSTRUCTIONS

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Assembly instructions - Montageanleitung - Instructions de montage - Instruzione di montaggio - Instucciones de montaje

Applicable to BA-200F1 battery rack





Racks for VRLA Batteries

GB

The procedure for assembly can be clear seen in the illustrations.

- Pre-assemble the supports, note left and right side parts in this case.
- In the case of racks that consist of several elements, connecting plates are to be employed at the jointing points.

NOTE

Before you start with the assembly of the rack, check the packages delivered to ensure you have received the correct number and items.

In case of damage to the coating, this must be repaired immediately.

Gestelle für VRLA Batterien

D

Aus den Abbildungen ist die Vorgehensweise der Montage ersichtlich.

- Seitenteile vormontieren, dabei auf linke und rechte Seitenteile achten.
- Bei Gestellen, die aus mehreren Elementen bestehen, sind an den Stoßstellen Klemmleisten zu verwenden

NOTIZ

Bevor Sie mit dem Aufbau des Gestells beginnen, überprüfen Sie die angelieferten Packstücke auf Vollständigkeit.

Im Falle einer Beschädigung der Beschichtung muss diese sofort repariert werden.

Chantier pour montage de batteries sans entretien

F

Les dessins illustrent les différentes étapes du montage.

- Procéder au montage préalable des échelles tenant compte de leur disposition gauche et droite.
- Pour les chantiers composés de plusieurs éléments, on utilisera à leur point de réunion les plaques de raccordement.

NOTE

Avant le montage du chantier, vérifier l'intégralité du matériel livré.

Un endommagement de la plastification doit être réparé immédiatement.

Scaffali per batterie ermetiche

I

Dalle illustrazioni si possono desumere le modalitá di procedura per il monaggio.

- Preassemblare gli elementi laterali. Tenere conto della disposizione degli elementi laterali destri e sinistri.
- In occasione del montaggio di telai che sono composti da piú elementi, presso i giunti devono essere utilizzate le piastre di connessione.

NOTA

Prima di iniziare a montare l´intelaiatura, controllare che la confezione di imballaggio contenga tutti i pezzi.

In caso di danneggiamento del rivestimento, quest´ultimo deve essere immediatamente riparato.

Estanteria para baterias hermeticas

E

De las ilustraciones se deduce la manera de proceder en el montaje.

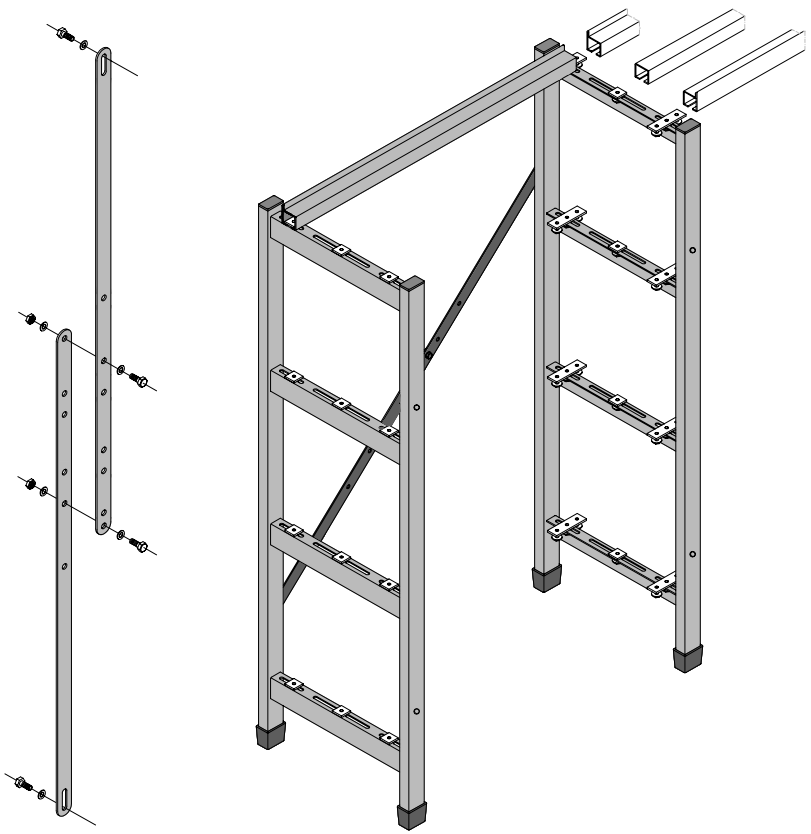
- Montar previamente las partes laterales, prestando atención a la vez a la parte lateral de la izquierda y de la derecha.
- En caso de marcos que se compongan de varios elementos hay que utilizar regleta de bornes en las junturas.

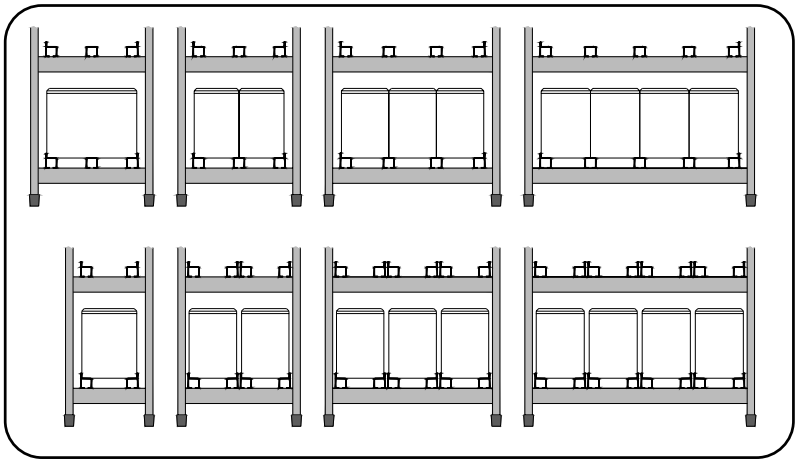
NOTA

Antes de empezar con el montaje del marco examine las piezas del paquete para ver si están completas.

En caso de que haya algún daño en el recubrimiento, éste tiene que ser reparado enseguida

Assembly instructions - Montageanleitung - Instructions de montage - Instruzione di montaggio - Instucciones de montaje





GB

- Place supports and fix with rail.
- Pre-assemble diagonal bracings according to drawing or length of the rails, and attach to the supports. Do not tighten up bolts.
- Insert rails between anchor / clamping plates and align support rails. Tighten bolts lightly only.
- Align racks. In case of irregularities in the floor, employ level-equalizing disks. Tighten all bolts.

NOTE

All bolts must be tightened to a torque of 8 Nm [11 ft·lb]. Do not over tighten.

For additional information, please refer to AlphaSYS® *drawings and assembly instructions.*

D

- Ständer hinstellen und mit einer Auflageschiene fixieren.
- Diagonalverstrebungen entsprechend der Zeichnung bzw. Länge der Auflageschienen vormontieren und am Ständer anbringen. Schrauben nicht festziehen.
- Auflageschiene zwischen Klemmplatten bzw. Klemmleisten einführen und ausrichten. Schrauben nur leicht anziehen.
- Gestell ausrichten. Bei Unebenheiten im Boden Ausgleichsscheiben verwenden. Alle Schrauben anziehen.

NOTIZ

Alle Schrauben sind mit einem Drehmoment von 8Nm anzuziehen.

Für zusätzliche Informationen sehen Sie bitte AlphaSYS®*-Zeichnungen und Montageanleitung.*

F

- Placer le support et le fixer à l'aide d'un longeron.
- Prémonter les renforts selon le dessin ou en fonction des longerons. Les visser à l'échelle. Ne pas serrer les vis.
- Introduire et centrer les longerons entre les plaques de serrage et de raccordement. Serrer les vis légèrement.
- Centrer le chantier. Si le sol présente des inégalités, on utilisera les épaisseurs. Serrer maintenant toutes les vis.

NOTE

Serrer toutes les vis avec un couple de serrage de 8 Nm.

Pour toute information supplémentaire, veuillez vous reporter aux dessins AlphaSYS® *et au manuel d'utilisation.*

I

- Piazzare i montanti e fissarli per mezzo di un longherone.
- Preassemblare le diagonali in corrispondenza della lunghezza dei longheroni e poi applicarle ai montanti. Non serrare ancora le viti.
- Introdurre i longheroni tra le piastre di fissaggio e le piastre di connessione ed allinearle. Serrare leggermente le viti.
- Allineare lo scaffale. Se il pavimento presenta dislivelli, utilizzare i dischi spessore. Serrare tutte le viti.

NOTA

Tutte le viti devono essere serrate con un momento di coppia di 8 Nm.

Per ulteriori informazioni, consultare i disegni e le istruzioni per il montaggio AlphaSYS®.

E

- Colocar el soporte y fijarlo con una guía de asiento.
- Montar previamente los puntales diagonales de acorde con el dibujo o, respectivamente, con el largo de las guías de asiento e instalarlo en el soporte. No fijar los tornillos.
- Introducir y ajustar las guías de asiento entre las placas de bornes o, respectivamente, las regletas de bornes.
- Ajustar el marco. En caso de desigualdades en el suelo emplear guías compensadoras. Apretar todos los tornillos.

NOTA

Todos los tornillos tienen que ser apretados con un momento de giro de 8 nanómetros.

Para más informaciones mire los dibujos de AlphaSYS® *y las instrucciones de montaje.*

CROSSWIND	HOLLANDSE KUST NOORD WIND PARK Project Contract No. CW-I-WP4-2023-05	ROSETTI MARINO
Document Title:	AC UPS - INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)	Sheet 1 of 130 Date: 31/01/2025 Rev: 02

Base Load Power Hub (BLPH)

AC UPS - INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

Number: 1724000372-EL-MAN-00025

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Andrea Sadocchi	05/02/2025

Rev.	Date	Description	Prepared	Reviewed	Approved
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Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)
02	Issue for Information (IFI)

HOLDS LIST

No.	Description
1	
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AC UPS BATTERY RACK - TAG: BA-200F4	128

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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

AC UPS F&G - TAG: UP-200F4

INSTALLATION, OPERATING AND MAINTENANCE MANUAL

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GENERAL NOTE

With reference to the paragraph 10.3 "Maintenance schedule" of the Installation, Operating and Maintenance Manual, please note that the maintenance activities recommended every 3 months are related to the batteries only. See below:

	Maintenance interval	Maintenance task
1)	3 months	**Check condition of battery electrolyte**
2)	3 months	**Check block battery voltage**
3)	3 months	**Check battery voltage**
4)	3 months	**Check electrolyte temperature** (open batteries)

In details the activities 1 and 4 are relevant only to open batteries and so are not applicable for this project where VRLA AGM batteries are used.

Each AC UPS has been equipped with the AEG Blue-Pro Battery Monitoring System. This feature is able to constantly check the voltage symmetry of each battery string and raise an alarm if an abnormal voltage share is detected. For that we can suggest to perform the maintenance activities on points 2) and 3) every 6 months.

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POWER
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Protect 8.33-S10

Protect 8.33 10 kVA
Protect 8.33 20 kVA
Protect 8.33 30 kVA
Protect 8.33 40 kVA
Protect 8.33 60 kVA
Protect 8.33 80 kVA
Protect 8.33 100 kVA
Protect 8.33 120 kVA

Operating Instructions

Installation, Operation and Maintenance manual



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1 ABOUT THESE INSTRUCTIONS

This chapter describes the structure of the operating instructions. All of the symbols, typography and abbreviations that appear in them are described below.

Every care has been taken in drafting these operating instructions. However, should you notice any errors, please contact the manufacturer immediately.

To ensure that the operating instructions remain up to date, make sure you add any supplements you receive from AEG Power Solutions GmbH to them.

1.1 Target group for these operating instructions

These operating instructions are intended for:

- The operator of the equipment
- Skilled personnel responsible for start-up and operation as well as maintenance and repairs
- Personnel responsible for transporting the equipment to the installation site

1.2 Where to keep the operating instructions

Keep the operating instructions inside the pull-out document compartment. The pull-out document compartment is located on the inside of the left-hand door. The operating instructions must be stored together with the equipment.

Should the equipment change hands, include the operating instructions when handing it over to the new operator.

1.3 Liability and warranty

These operating instructions relate to the technical specifications of the equipment at the time of publication. The contents do not constitute a subject matter of the contract, but serve for information purposes only. Legal claims arising from this contractual relationship shall only be recognised by AEG Power Solutions GmbH subject to the terms agreed under the warranty obligation in the main contract.

Modifications

AEG Power Solutions GmbH reserves the right to make modifications with regard to the content and technical data in these operating instructions without prior notice. AEG Power Solutions GmbH cannot be held liable for any inaccuracies or inapplicable information in these operating instructions, as no obligation to continuously update the data and maintain their validity has been entered into.

The warranty shall be invalidated by:

- Failure to read and follow the operating instructions
- Failure to understand and comply with the safety regulations in these operating instructions
- Unintended use of the equipment
- Lack of the necessary skills and training on the part of the personnel selected to operate the equipment
- Modifications being made to the equipment without the approval of AEG Power Solutions GmbH
- The use of spare parts and replacement parts not approved by AEG Power Solutions GmbH
- Removing or tampering with protection devices
- Noncompliance with specifications when carrying out maintenance work
- Noncompliance with the maintenance schedule

Deliveries

Our goods and services are subject to the general conditions of supply for products of the electrical industry, and our general sales conditions.

Complaints

Claims in connection with supplied goods must be submitted within eight days of receipt, along with the packing slip. Any claims submitted after this point cannot be considered.

1.4 Typographical conventions

1.4.1 Instruction and warning symbols

This section describes the symbols used in the operating instructions.

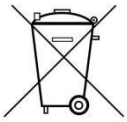
Symbol	Meaning
	Hazard symbols are triangular and feature a yellow background, black border and corresponding symbol.
	Mandatory signs are round and have a blue background with a white symbol.
	Notes are identified by a red pin. They contain important information about the phases of the equipment's service life.
	Instructions relating to the environment are identified by a wheelie bin. Instructions relating to the environment make reference to mandatory requirements set out by regional or national authorities which are of particular relevance when disposing of materials used during operation, for example.

Table 1 - Instruction and warning symbols in these operating instructions

1.4.2 List of abbreviations

This section tells you about the abbreviations used in these operating instructions.

Abbreviation	Meaning
DOU	Display and operation unit
Equ	Equalising charging
BGV	Regulation set out by Employer's Liability Insurance Association (Germany)
CAN	Controller area network
CNF	Production order number
Tri	Trickle charging
SBS	Static bypass switch
BTD	Battery time of discharge parameter
REC	Rectifier
IEC	International Electrotechnical Commission
Sta	Start-up charging
Cha	Charging
EPS	Emergency power charging
PPE	Personal protective equipment
SNMP	Simple Network Management Protocol
UPS	Uninterruptible power supply
INV	Inverter

Table 2 - List of abbreviations

1.4.3 Typographical elements

This section describes the typographical elements used in these operating instructions.

Typographical element	Meaning
E=mc²	Passages of text which are of particular importance and mathematical formulae are highlighted in bold.
●	This symbol is used for bulleted lists.
➔	This symbol is used for action instructions.
▬	Action instructions which have to be followed in a specific sequence are numbered like this.
✓	This symbol is used to indicate the result of an action instruction.
Status messages	Status messages are shown in italics.
→	References to figures, chapters or tables are shown using the symbol on the left.
📪	This symbol is used to identify postal addresses.
☎	Telephone numbers are shown using the symbol on the left.
©	This is the copyright symbol.

Table 3 - Typographical elements

2 SAFETY REGULATIONS

This chapter introduces you to all aspects relevant to safety. It describes all safety measures, safety devices and residual hazards associated with the equipment. Read it in full and carefully before commencing any work with or on the equipment.

2.1 Intended use

Protect 8.33 uninterruptible power supplies are used to safeguard a continuous power supply to critical electrical loads in the event of faults affecting the mains supply. The Protect series supports a power range from 10 kVA to 120 kVA.

Intended purpose

The equipment may only be used for the purpose of providing an uninterruptible power supply and subject to compliance with the prescribed connection values and setting values.

Any other use or modification is considered unintended. Unintended use can cause serious or fatal personal injury.

Unauthorised repairs, manipulations or changes made to the equipment and its safety devices without the manufacturer's approval are not permitted. The manufacturer cannot be held liable for damage resulting from such repairs, manipulations or changes.

Equipment safety

The equipment will operate reliably and safely subject to compliance with the operating instructions, the operating and equipment specifications and regulations set out by the Employer's Liability Insurance Association.

Residual hazards

When in operation, the equipment poses residual hazards which cannot be countered by design. To restrict such risks, follow the instructions in the section entitled "Residual hazards" (→ chapter 0).

Installation site

The equipment may only be installed in areas with restricted access. The ambient conditions must be dry and frost-free.

2.2 Symbols and signal words used

This section describes the symbols and warnings that are important for safety.

2.2.1 Warnings associated with operator actions in these operating instructions

Warnings associated with operator actions provide information about hazards associated with certain activities. To avoid personal injury and damage to property, ensure compliance with all warnings associated with operator actions. They are formulated as follows:

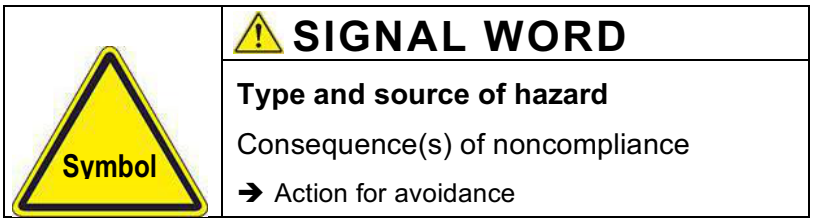


Figure 1 - Warning associated with operator action

2.2.2 Signal words used

The following signals words are used in warnings associated with operator actions.

DANGER	warns of a situation posing an **immediate** hazard which will lead to death or serious injury.
WARNING	warns of a situation posing a **possible** hazard which may lead to death or serious injury.
CAUTION	warns of a situation posing a **possible** hazard which may lead to minor injury.
ATTENTION	warns of **possible** damage to property which could interrupt operation.

2.2.3 Hazard symbols used

The following hazard symbols are used to illustrate hazards in warnings associated with operator actions.

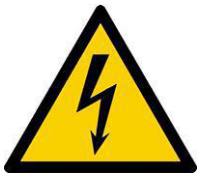
Symbol	Meaning
	General hazard source
	Electrical hazard
	Risk of falling loads
	Flammable material
	Risk posed by corrosive vapours and liquids
	Risk posed by explosive material

Table 4 - Hazard symbols

2.2.4 Mandatory signs for personal protective equipment

The following mandatory signs relate to the use of personal protective equipment. You are required to comply with them.

Symbol	Meaning for transport personnel	Meaning for skilled personnel
		Wear goggles
		Wear a mask
	Wear a safety helmet	Wear an electrician's safety helmet
	Wear protective footwear	Wear insulated boots
		Wear insulating overalls
		Wear a face shield
	Wear a hand shield	Wear insulating gloves

Table 5 - Mandatory signs for PPE

2.3 Safety signs and warning notices on the equipment

Safety signs and warning notices provide information about electrical hazards and residual hazards associated with working on and with the equipment. You must comply with them.

2.3.1 Position of safety signs and warning notices

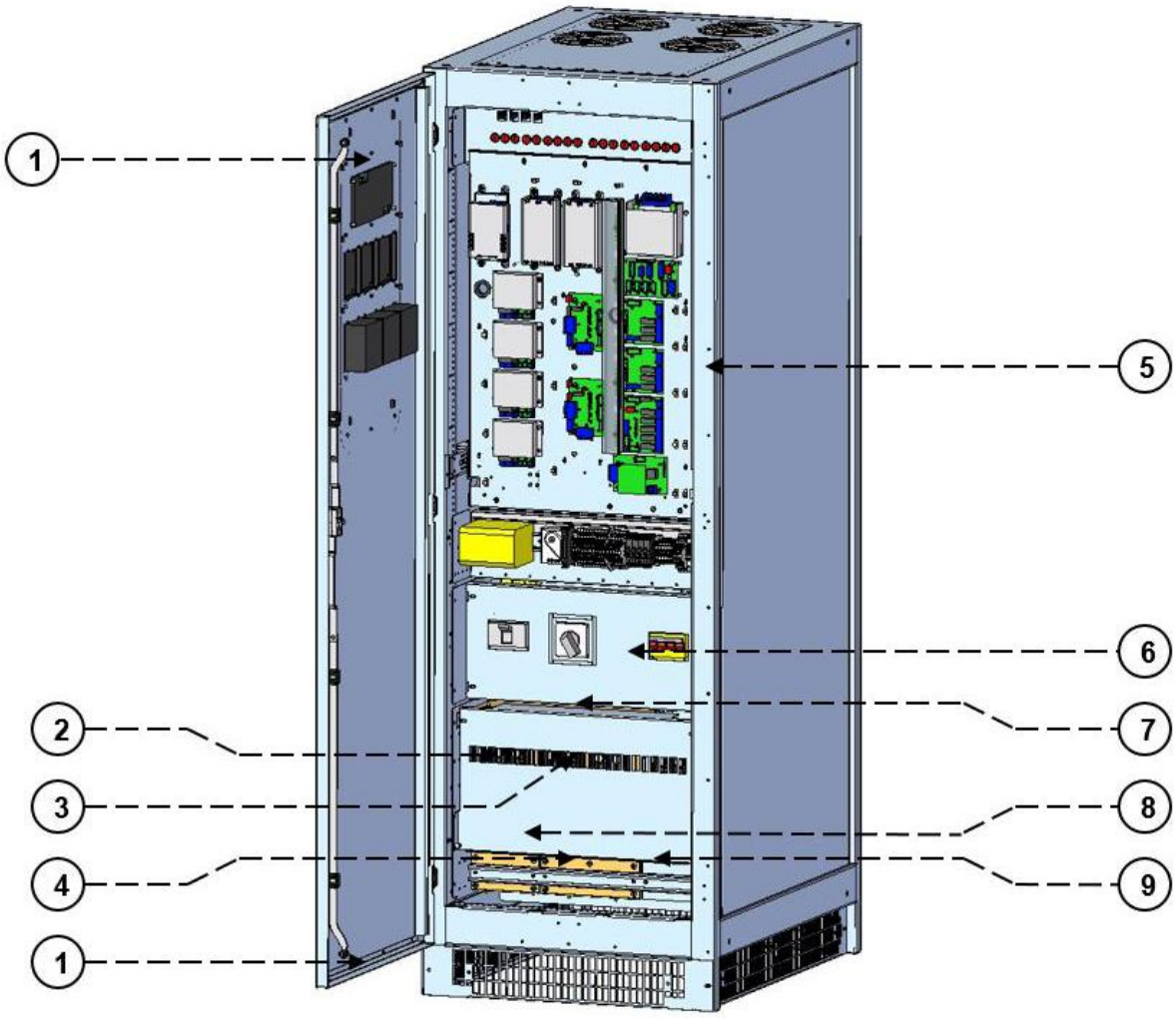


Figure 2 - Position of safety signs and warning notices

2.3.2 Description of safety signs and warning notices

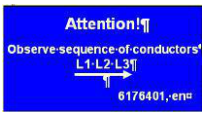
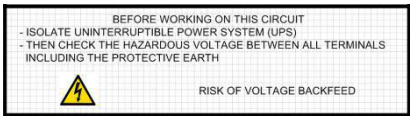
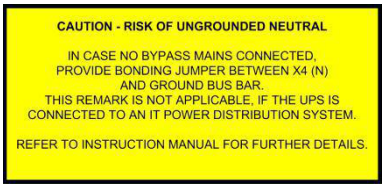
No.	Sign	Sign name	Exact position
1		Shock hazard	Inside of equipment door
2		Phase sequence	Behind protective cover
3		Voltage	Protective cover
4		Mains fuses required	Behind protective cover
5		Disconnect safely	Behind control unit pivot arm
6		Circuit breaker Q29	To the right of Q29
7		Leakage current	Underneath Q29
8		Back feeding protection	Protective cover
9		Neutral conductor	Protective cover

Table 6 - Safety signs and warning notices

2.4 Safety and protection devices for the equipment

This section describes all safety and protection devices. Safety and protection devices protect personnel against hazards which cannot be countered by inherently safe design.

Safety and protection devices must always be in perfect order.

2.4.1 Emergency switching device

The equipment is fitted with an emergency switching device. In the event of critical faults which put personnel and the equipment at risk, the acoustic signal generator sounds and the emergency switching device shuts down the equipment. Furthermore, fault indications appear on the display and operation unit and are forwarded to the control room.

The emergency switching unit can be triggered directly from the control room. This prevents power from being supplied to the load in any operating mode.

Faults must be dealt with as quickly as possible and remedied by skilled personnel.



Shutting down the equipment via the emergency switching unit does not disconnect all poles!

2.4.2 Protective covers

Protective covers are fastened over live parts of the equipment. The protective covers provide protection against accidental contact with live parts. Such protection may only be removed for start-up and for maintenance or repair work.

The covers must be replaced immediately on completion of such work and checked to ensure that they are in perfect working order.

2.4.3 Safety signs and warning notices on the equipment

Safety signs and warning notices are located in the vicinity of danger spots. They provide information about electrical hazards and residual hazards associated with working on and with the equipment.

Safety signs and warning notices must always be in perfect order and clearly legible. You must comply with safety signs and warning notices whenever you are working on or with the equipment.

2.4.4 Lockable equipment door

The equipment door is fitted with a switch cubicle lock to prevent access by unauthorised personnel. The equipment door must be locked at all times.

It may be opened for maintenance and repair work.



When the equipment door is open, the area leading up to it must be made secure.

The equipment door must be locked again once maintenance and repair work is complete.

2.4.5 Guard

The equipment housing acts as a guard, providing protection against unauthorised contact with live parts and electromagnetic beams.

It may be removed for maintenance and repair work.



The area around the equipment must be made secure when the guard is removed.

The guard must be replaced on completion of maintenance and repair work and checked to ensure that it is in perfect working order.

2.5 Obligations on the part of the owner of the equipment

The safety of personnel and the safety, function and availability of the equipment depend upon compliance with the safety instructions. Compliance with the safety instructions is required at all times.

Safety of personnel

- ➔ Personnel must be selected on the basis of skills and training (→ chapter 0).
- ➔ Personnel must be made aware of the need for compliance with specifications (→ chapter 0).
- ➔ Skilled personnel and transport personnel must be provided with personal protective equipment and taught how to use it.
- ➔ Skilled personnel must receive regular briefings about all safety measures and a record kept of such briefings.
- ➔ Skilled personnel must be made aware of where fire extinguishers are located and how to use them.

Safety of the equipment

- ➔ The equipment must only be operated in perfect working order and in accordance with good electrical engineering practice. If the equipment starts to behave differently, check for faults immediately.
- ➔ All safety signs and warning notices on the equipment must be kept in a complete and clearly legible condition (→ Table 6 - Safety signs and warning notices).
- ➔ Connect the emergency switching unit with the control room via remote signalling.
- ➔ Install a suitable and easily accessible means of back feeding protection (a disconnector) in the fixed cabling.
- ➔ Attach warning notice no. 8 to the external upstream disconnectors for the primary power supply (→ Table 6 - Safety signs and warning notices).
- ➔ Install fire extinguishers in the immediate vicinity of the equipment.
- ➔ Protect the equipment against external influences such as moisture, shavings, and similar.
- ➔ Maintain access to the equipment at all times.

2.6 Requirements of personnel

Skills and training

Only trained and qualified skilled personnel may perform the work described, using tools, equipment and test equipment intended for the purpose and in perfect working order.

Skilled personnel are electricians who, on account of their specialist training, knowledge and experience, along with their knowledge of applicable regulations, are able to assess the work assigned to them and can detect potential hazards.

The transport and storage of the equipment may be assigned to transport personnel. Transport personnel are personnel working specifically in the area of transport who can exhibit the necessary training and knowledge.

Compliance with the safety instructions described is essential for the protection of personnel and the equipment. Skilled personnel and transport personnel must be aware of and follow these safety instructions.

Obligations on the part of skilled personnel

Observe the following safety instructions.

➔ Work on and in electrical equipment is governed by strict rules in order to avoid electrical accidents. The rules are summarised in the five rules of safety. Ensure compliance with the five rules of safety:

- Disconnect safely
- Secure the unit against being switched back on
- Verify that all poles are de-energised
- Earth and short-circuit the equipment
- Provide protection in the form of covers or barriers for any neighbouring live parts

➔ Once work is complete, reverse the five safety rules starting at number 5 and working back to number 1.

➔ Read the operating instructions. Commit the safety regulations to memory (→ chapter 0).

➔ Ensure compliance with the following regulations:

- BGV A1 (Prevention principles)
- BGV A3 (Electrical systems and equipment)
- BGV A8 (Safety and health protection warnings in the workplace)

➔ Report damage to the equipment and electrical installations to the owner.

➔ Only use spare parts approved by the manufacturer for maintenance
and repair work.

➔ Use personal protective equipment (PPA) as intended.

➔ Check that PPE is in perfect order and report any defects you notice to the owner.

➔ Wear a hair net if you have long hair. Do not wear loose clothing or jewellery.

➔ Reinstate protection devices (including covers) on completion of all work on or with the equipment.

➔ Keep the operating instructions in the pull-out document compartment.

Obligations on the part of transport personnel

Observe the following safety instructions during transport.

➔ Read the operating instructions. Commit the safety regulations to memory (→ chapter 0).

➔ Ensure compliance with the following regulations:

- BGV D8 (Hoists, lifting gear and traction gear)
- BGV D27 (Industrial trucks)

➔ Use personal protective equipment (PPA) as intended.

➔ Check that PPE is in perfect order and report any defects you notice to the owner.

➔ Report transport damage to the equipment to the owner.

2.6.1 Safe disconnection of the equipment

This section describes the safe disconnection of the equipment at all poles. In emergencies, hazardous situations and before certain maintenance and repair work is carried out, the equipment must be disconnected safely at all poles.

➔ Disconnect all poles of the equipment safely:

- Inform the control room: disconnect load power supply
- Shut down the inverter
- Open the battery isolator
- Remove the power supply fuses
- Disconnect the monitoring equipment cables
- Check the connection terminals of the equipment and the PE conductors for hazardous voltage

✓ All poles of the equipment are safely disconnected from the power supply.

2.7 Hazardous materials and substances

This section describes the hazardous materials and substances used.

Batteries are toxic

Dangerous gases are released when battery cells are opened. Battery gases are corrosive. Battery electrolyte is extremely toxic and causes serious chemical burns. Noncompliance can lead to death or serious injuries. Follow the safety instructions below.

➔ Ensure that battery spaces are ventilated sufficiently.

➔ Only use batteries that are in perfect working order.

➔ Follow the safety instructions issued by the battery manufacturer.

Batteries are electrical energy sources

Anyone who touches battery contacts is at risk of electric shock. Batteries have a high short-circuit current. Noncompliance with safety instructions can lead to death or serious injuries. When working with batteries, ensure compliance with the following safety instructions.

➔ Remove watches, rings and other metal objects.

➔ Wear rubber gloves and rubber boots.

➔ Use tools with insulated handles.

➔ Never touch batteries with tools or metal parts.

➔ Ensure safe disconnection of the equipment before connecting and disconnecting batteries.

➔ Remove accidental battery earths.

2.8 Residual hazards

This section describes residual hazards. Despite the measures taken to ensure safety and protection, the equipment poses residual hazards which cannot be countered by design.

Observe warnings at all times whilst you are working.

2.8.1 Electrical hazards



DANGER

Contact with voltage!

Risk to life due to electric shock

➔ Use dry insulating material to remove the victim from the live parts.

➔ Seek medical assistance and inform the control room.

➔ Disconnect the equipment safely.



DANGER

Electric shock despite emergency switching device!

Parts of the equipment remain live after the emergency switching device has been activated.

Risk to life due to electric shock

➔ Disconnect the equipment safely.



DANGER

Electric shock caused by inverter!

Parts of the equipment remain live after the inverter has been shut down.

Risk to life due to electric shock

➔ Disconnect the equipment safely.



DANGER

Electric shock caused by back feeding protection!

Once the incoming power supply has been interrupted, the input terminals of the equipment may remain live due to load errors.

Risk to life due to electric shock

➔ Disconnect the equipment safely.

➔ Install back feeding protection (a disconnector) in the load circuit.



DANGER

Electric shock caused by residual voltage!

Batteries conduct a residual voltage following disconnection.

Risk to life due to electric shock

➔ Check the battery poles for hazardous voltages.

➔ Cover the battery poles.

➔ Follow the safety instructions issued by the battery manufacturer.



DANGER

Electric shock caused by leakage currents!

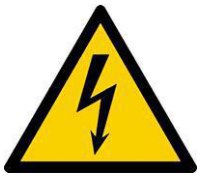
The capacitors generate high leakage currents in the equipment. Conductive parts may be live in the event of connection errors.

Risk to life due to electric shock

➔ Establish a PE conductor connection prior to start-up.



Using residual-current-operated circuit breakers alone is not permitted (→ chapter 0, warning notice 7).



ATTENTION

Faults caused by the SBS circuit

An unconnected SBS circuit can cause the equipment to operate asynchronously.

Malfunctions

➔ Connect the neutral conductor terminal X4 to the frame earth.

This warning notice does not apply if the equipment is connected to an IT system (→ chapter 0, warning notice 9).

2.8.2 Hazards due to explosions



WARNING

Risk of explosion caused by the use of water to fight fires!

Using water to fight fires can lead to explosions.

Risk to life due to explosions

➔ Use class D fire extinguishers (metal powder/D powder, dry sand, dry salt/ cattle salt, dry cement or cast-iron shavings).



CAUTION

Risk of explosion after prolonged operation!

There is a risk of the electrolytic capacitors failing after 10 years of operation.

Risk of injury due to explosive noise level

Malfunctions

➔ Replace the electrolytic capacitors once they have been in operation for 10 years.

2.8.3 Risks posed by corrosive fluids



⚠ CAUTION

Chemical burns caused by battery electrolyte

Eye or skin contact with battery electrolyte can cause blindness and serious injuries.

➔ In the event of **skin contact**:

1. Rinse the affected area in plenty of water
2. Bandage the affected area with gauze
3. Throw away all clothing affected by the spillage

➔ In the event of **eye contact**, rinse the eyes with an eye wash or plenty of running water.

➔ In the event of **swallowing**:

- Drink as much water or milk as you can
- Try not to vomit

2.8.4 Risks due to loss of control



⚠ ATTENTION

Failure of remote signalling

If remote signalling fails or the signal lines are interrupted, the control room can no longer control the equipment.

Malfunctions

The emergency switching device fails.

➔ Disconnect the equipment safely.



⚠ ATTENTION

Failure of the display and operation unit

If the display and operation unit fails, the skilled personnel will no longer be able to control the equipment.

Malfunctions

➔ Inform the control room.

3 SCOPE OF DELIVERY

Check that the following components are delivered with the equipment:

- Operating instructions
- Brief instructions
- Technical data
- Key for the control cabinet

Optional

Dependent upon the equipment configuration, the following components may or may not be included in the scope of delivery:

- Safety instructions from the battery manufacturer
- Communication interface cable

Available to order

AEG Service can also provide the following documents:

- Spare parts list
- Service book

To place an order, please contact:

AEG Power Solutions GmbH
Emil-Siepmann-Straße 32
59581 Warstein
Germany

☎ +49 2902 763 100
Fax: +49 2902 763 645
e-mail: service.aegpss@aeg.com
Internet: http://www.aegps.com

4 NAMEPLATE

The following information appears on the nameplate:

- Type of equipment
- Equipment power rating
- Nominal values
- Efficiency
- Year of construction
- CNF number
- Unit number



Figure 3 - Nameplate

he nameplate is attached to the inside of the left-hand equipment door.

5 DESCRIPTION OF THE EQUIPMENT

This chapter describes the equipment. Gaining a better understanding of the relationship between components will enable you to use the equipment more intelligently, avoid errors and increase your understanding of safety.

If you understand how the equipment works, you can carry out maintenance and repairs more efficiently. You will be able to locate the sources of errors more quickly and reduce downtimes. Last but by no means least, you will feel more comfortable with the technology.

Read this chapter carefully to gain a better understanding of the equipment.

5.1 Performance features of the equipment

Characteristics

The UPS equipment developed by AEG Power Solutions GmbH has been protecting oil and gas infrastructures, electricity plants and other industrial installations for more than 60 years.

Protect 8.33 is the new comprehensive generation of our Protect product range: a true online double-conversion UPS classified as VFI SS 111 in accordance with IEC 62040-3.

Protect 8.33 has been developed with a modular building block architecture for maximum flexibility where adaptation to specific customer requirements is concerned.

As the customer, you define:

- The required mechanical degree of protection
- The input and output voltages
- The individual battery type/the available time
- The scope of documentation and the language
- The components of the equipment

Microcontrollers have been used exclusively for the equipment's control electronics. The primary components of the equipment are distributed in modular assemblies.

Special features

The equipment sets itself apart from the market with the following special features:

- Maximum electrical and mechanical resistance
- Modular design to meet the requirements of individual customers
- High reliability thanks to redundant control
- High efficiency even at low output power
- Compatibility with all types of battery
- Incredibly short lead times
- Full digital control
- First-class communication platform

The equipment is fully compatible with the DC systems and telecommunication systems offered by AEG Power Solutions GmbH.

Optional components

The equipment can be customised to meet specific requirements with the following components.

- Remote signalling
- Explosion-proof battery disconnector housing
- Bypass switch for maintenance work
- Bypass transformer
- Voltage stabiliser
- AC distribution boards
- Battery housing
- Monitoring equipment

For additional information material, please contact AEG Power Solutions GmbH.

5.2 Structure of the equipment

This section describes the parts of the equipment which are relevant for skilled personnel.

5.2.1 Position of parts that are relevant to users

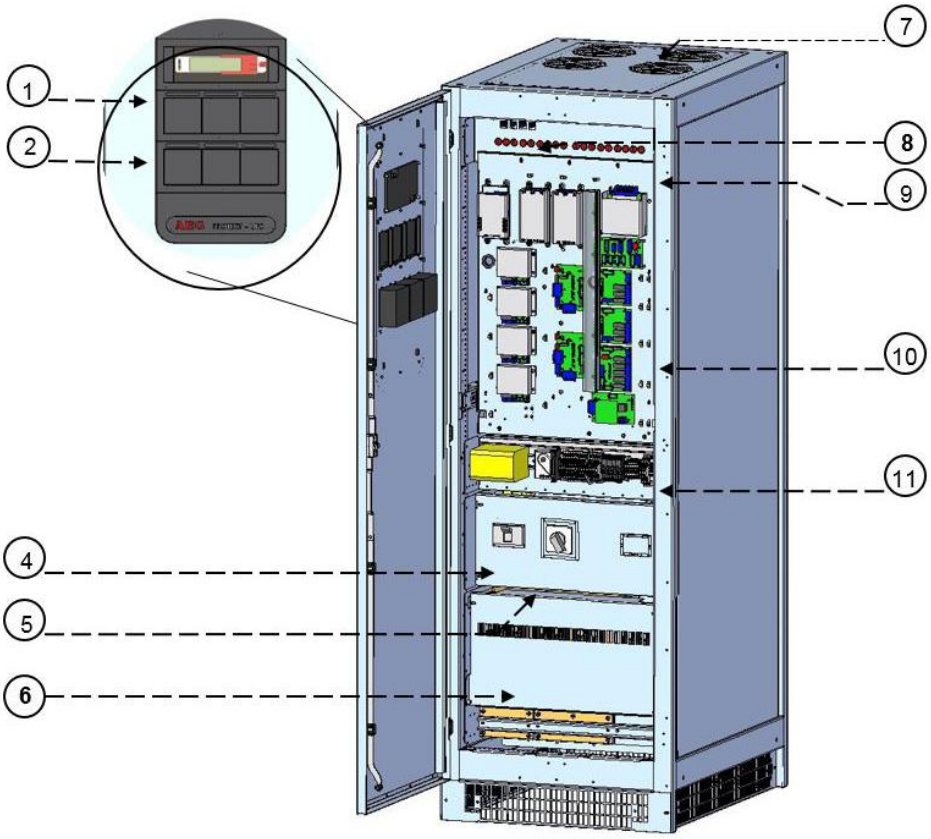


Figure 4 - Position of parts that are relevant to users

5.2.2 Description of parts that are relevant to users

No.	Part relevant to user
1	Display and operation unit (DOU for short; signalling and visualisation of data plus system control and parameterisation.
2	Display instruments (placeholder for additional display instruments for optional components)
4	Load interrupter switch Q1 (connects the rectifier to the input circuit)
5	Manual bypass switch Q29 (switches the load to the SBS circuit without interrupting the power supply; optional component which can also be located outside the system)
6	Connection terminals (terminals for input circuit, SBS circuit, battery circuit and load circuit)
7	Fan (dissipates the exhaust air from the equipment)
8	Fan terminals (for the fan power supply)
9	Internal fuses (fuses for control unit and fans)
10	Control unit pivot arm (space for optional monitoring equipment)
11	Terminal strip X12 (connects the equipment to the control room via remote signalling; can be used to connect other optional components)
◯	Acoustic signal generator (sounds in the event of critical faults; not visible)
◯	Battery isolator (disconnects the battery supply from the equipment; located externally)

Table 7 - Description of parts that are relevant to users

5.3 Modular structure

The most important modular components of the equipment are:

- The rectifier
- The inverter
- The static bypass switch (SBS)

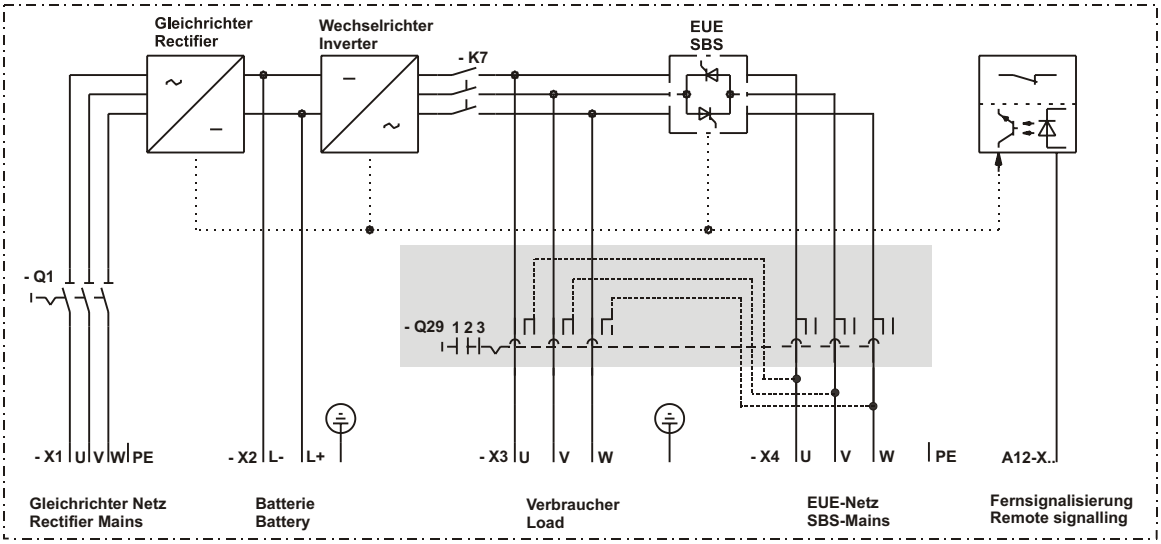


Figure 5 - Connection terminals

The **rectifier** converts the 3-phase AC voltage from the mains into a DC voltage internally. The DC voltage supplies power to the inverter and the batteries.

The **inverter** converts the DC voltage from the rectifier into a 1-phase AC voltage. In the event of mains faults, e.g. a power failure, the load is switched over to battery power supply without interruption.

The **static bypass switch** further increases supply reliability. In the event of faults affecting the inverter, the load is switched to power supply from the SBS circuit without interruption.

5.4 Arrangement of the assemblies

The assemblies are logically integrated into and linked with the equipment's overall system. Internal communication takes place via a CAN bus. The parameters of the assemblies can be adapted using the equipment software.

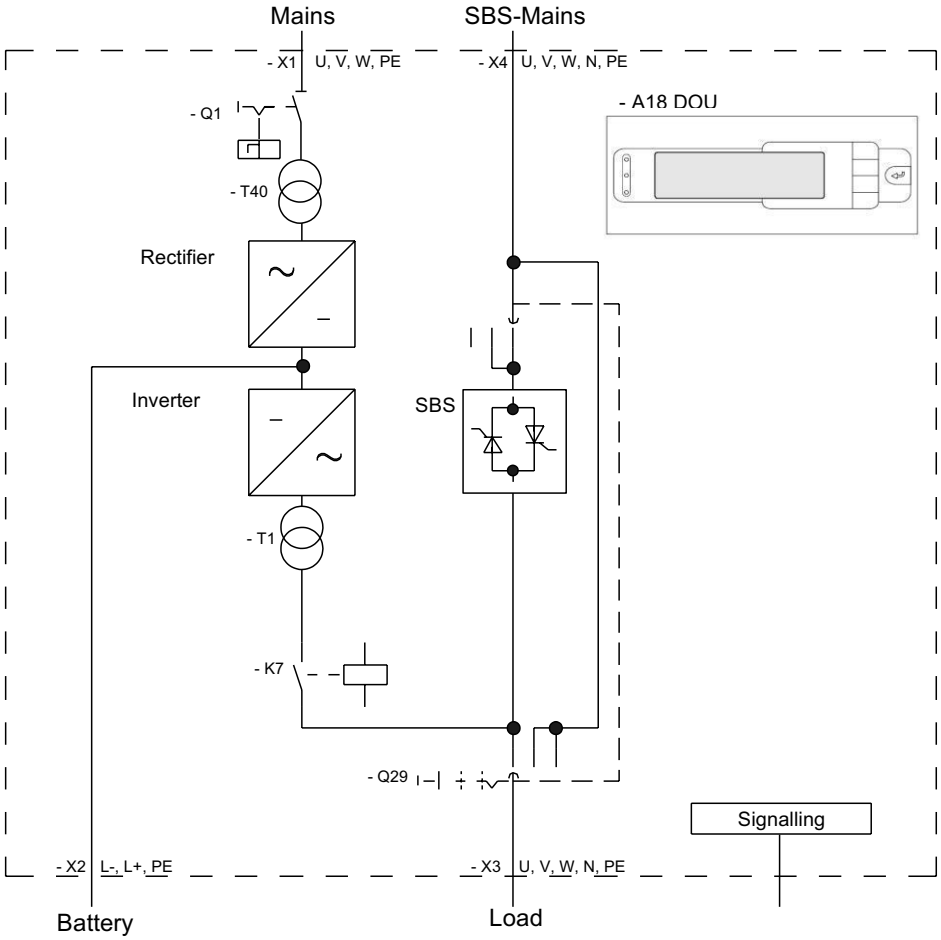


Figure 6 Arangement of the assemblies

5.5 Signalling switch

5.5.1 Load interrupter switch Q1 and circuit breaker Q29 are used for manual control of the assemblies.

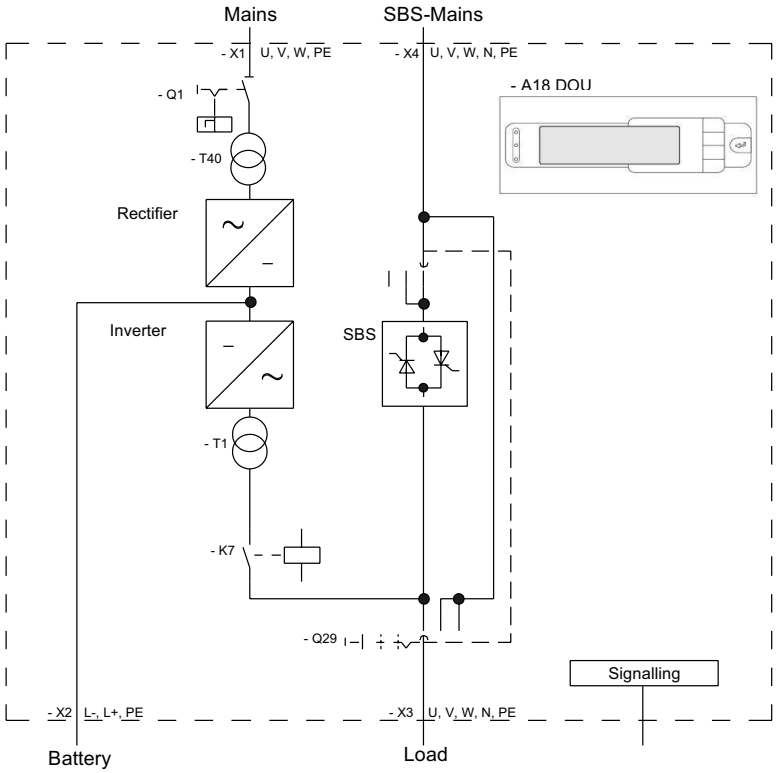


Figure 6 - Circuit breaker

5.5.2 Load interrupter switch Q1

The load interrupter switch Q1 connects the rectifier to the mains supply.

When the load interrupter switch Q1 is closed (ON position), voltage is supplied to the rectifier. The rectifier charges the batteries and supplies DC voltage to the inverter.

Opening the load interrupter switch Q1 (OFF position) shuts down the rectifier. The batteries are no longer charged and the inverter is no longer supplied with DC voltage.

A fault in the mains supply, e.g. a short circuit, triggers the open-circuit shunt release of the load interrupter switch Q1. The connection between the rectifier and the mains supply is interrupted.



The inverter can be disconnected for maintenance and repair purposes by opening the load interrupter switch Q1 and the battery isolator.

5.5.3 Manual bypass switch Q29

The manual bypass switch Q29 is used to change over between three of the four operating modes. The operating mode is selected by setting the position of the manual bypass switch Q29 accordingly.

The manual bypass switch Q29 is usually located outside the equipment. It can be installed directly in the equipment if required.

Switch position	Name of the switch position	Operating mode
1	Inverter operation	Operation with mains supply available (normal operation)
2	Service mode	Operation with a defective inverter
3	Manual bypass	Operation with manual bypass

Table 8 - Q29 switch positions



When an operating mode is selected, the manual bypass switch Q29 does not take the current status of the assemblies into account. The assemblies must be activated or deactivated manually first.

Switch position 1

The equipment is delivered with the switch set to position 1. This operating mode corresponds to normal operation: power (mains voltage) is supplied to the load via the rectifier and the inverter (→ chapter 5.7.1).

Switch position 2

Switch position 2 switches the equipment to "Operation with a defective inverter" operating mode. Power is supplied to the load from the SBS circuit via the static bypass switch (→ chapter 0).

Before selecting switch position 2, the inverter must be deactivated and the static bypass switch activated.

Switch position 3

Setting the switch to position 3 selects "Operation with manual bypass" operating mode. This mode, which is used primarily for maintenance and repair work, supplies power to the load directly via the SBS circuit (→ chapter 0).

Before selecting switch position 3, the inverter must be deactivated.



The power supply to the load is not interrupted when the operating modes are changed using the manual bypass switch Q29.

5.5.4 Inverter output contactor K7

The inverter output contactor K7 switches the output voltage of the inverter to the load.

The inverter output contactor K7 adopts its working position as soon as it is actuated, and the output voltage of the inverter is switched to the load.

5.6 How the static bypass switch works

The **static bypass switch** (SBS) further increases supply reliability. In the event of faults affecting the inverter, the load is switched to power supply from the SBS circuit without interruption.

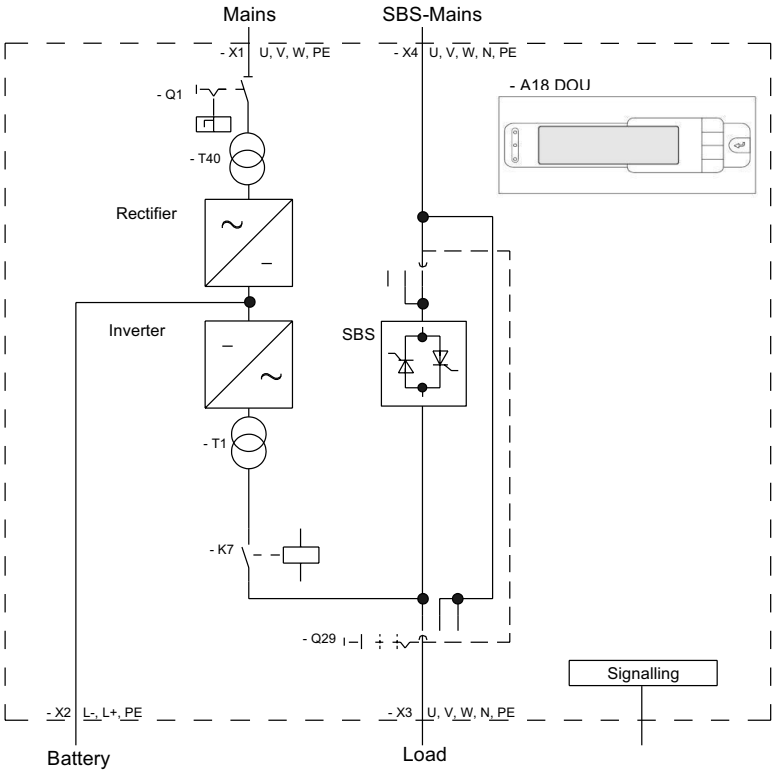


Figure 7 - Static bypass switch

The SBS comprises a thyristor contactor and a control unit.

Control unit

The SBS control unit monitors the voltages of the SBS circuit and the load circuit as well as the output voltage of the inverter. It also ensures permanent synchronisation of the output voltages of the inverter and of the SBS circuit.

In the event of an overload or a fault affecting the inverter, the load is switched to power supply from the SBS circuit without interruption. The SBS circuit must be within the tolerance range for operation via the SBS in order for this to happen. The equipment works in "Operation with a defective inverter" operating mode.

Thyristor contactor

In "Operation with a defective inverter" operating mode, power is supplied to the load via the SBS thyristor contactor (→ chapter 0).

Failure

If the SBS circuit goes out of tolerance, "Operation with a defective inverter" operating mode is blocked.

If the inverter fails also, power can no longer be supplied to the load. The SBS and the inverter must be deactivated and activated manually in order to restore power to the load.



The SBS can be activated and deactivated with circuit breaker Q28 (→ external document: circuit diagram).

The inverter can be deactivated by opening the circuit breaker Q1 and the battery isolator and reactivated in reverse order.

Phase deviation

If the two AC voltages are not synchronised, the message "Phase deviation" is displayed on the display and operation unit.

If the inverter fails during a "phase deviation", e.g. due to a fault in the inverter, the load with a voltage gap is supplied with power by the SBS circuit.

Voltage gap

Supply with a voltage gap can be blocked from within the equipment software for particularly sensitive loads which would otherwise always be damaged by a voltage gap.

As soon as the output voltage of the inverter is within the tolerance range for normal operation, the load is switched back to power supply from the inverter without interruption.

5.7 Equipment operating modes

The equipment can be operated in four modes:

- Operation with mains supply available (normal operation)
- Operation with defective mains supply
- Operation with a defective Inverter
- Operation with manual bypass

5.7.1 Operation with mains supply available (normal operation)

During operation with mains supply available (normal operation), the rectifier and inverter supply mains voltage to the load

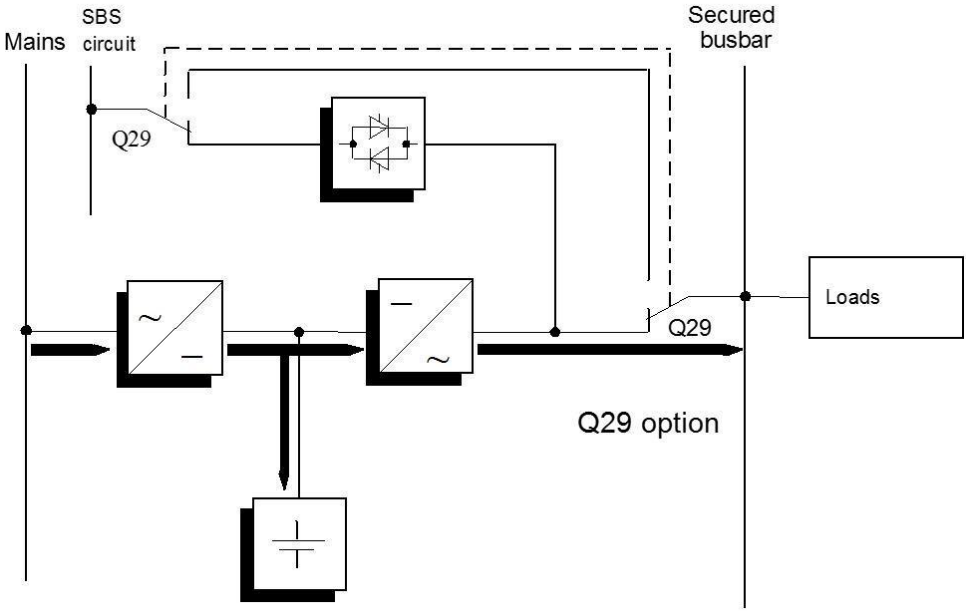


Figure 8 - Operation with mains supply available

The **rectifier** is powered from the mains and converts the AC voltage statically into a stabilised DC voltage. The DC voltage is used to charge the **batteries**. This ensures that the batteries are always fully charged. The **inverter** converts the DC voltage into an AC voltage and supplies power to the connected load.

Batteries

Once the batteries are fully charged, their charge is maintained automatically via trickle charging: the charging current and voltage are continuously adapted to the current battery charge. This ensures maximum battery life at maximum capacity.

5.7.2 Operation with defective mains supply

If the mains supply is defective, the load is supplied with power by the batteries via the inverter.

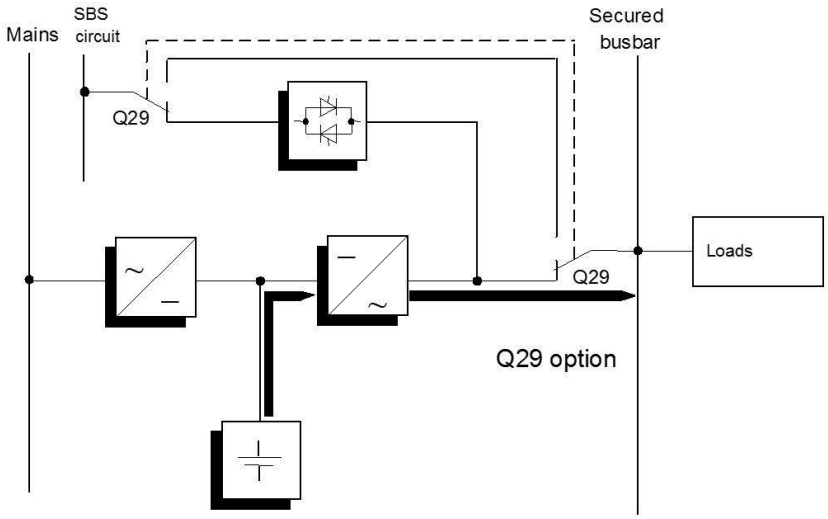


Figure 9 - Operation with defective mains supply

In the event of faults in the mains supply or if the mains supply fails, the voltage supplied to the **rectifier** will not be sufficient. The rectifier shuts down. In both cases the load is switched to power supply from the **batteries** via the **inverter** without interruption. As long as the battery voltage is in the permissible range, the batteries will supply power to the load.

Rectifier

The rectifier starts up when the voltage and frequency of the mains supply are restored to permissible values. The inverter and the batteries are supplied with power by the rectifier again.



The amount of time for which the batteries are able to supply power depends upon the battery capacity and the power consumption of the load.

5.7.3 Operation with a defective Inverter

In the event of a fault in the inverter, the load is supplied with power by the SBS circuit.

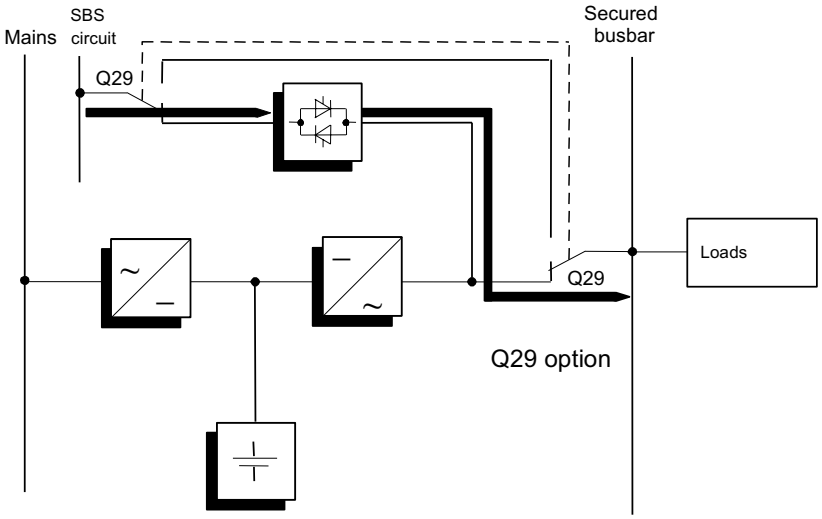


Figure 10 - Operation with a defective inverter

If the **inverter** is faulty, e.g. due to a malfunction, the rectifier and the inverter shut down. The **static bypass switch** switches the load to the SBS circuit without interruption. Power is supplied to the load from the SBS circuit via the static bypass switch.

Synchronisation unit

The synchronisation unit in the static bypass switch ensures that the phase and frequency of the SBS circuit are permanently synchronised with the last known voltage of the inverter.

Inverter

Once the inverter returns to the permissible values tolerance range, the inverter can be restored as the source of the load power supply.



If the SBS circuit fails in this operating mode, the load power supply will collapse.

5.7.4 Operation with manual bypass

The assemblies can be bypassed during active operation so that maintenance and repair work can be carried out.

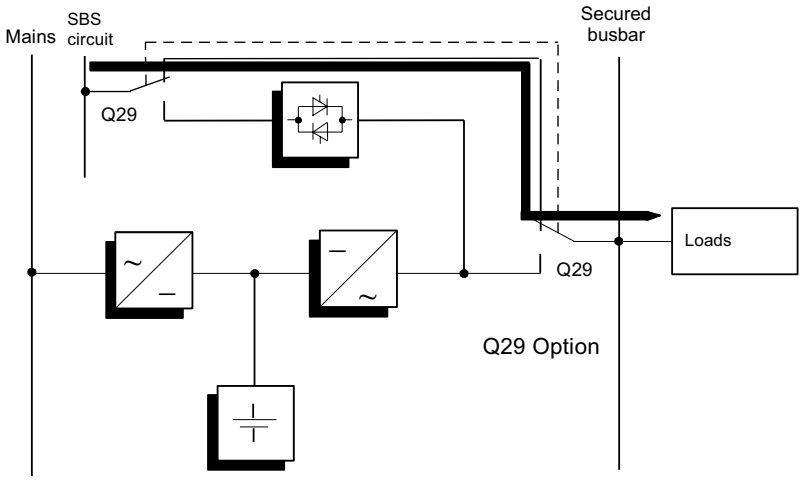


Figure 11 - Operation with manual bypass

Should maintenance and repair work be required, operation with manual bypass can be activated with the manual bypass switch Q29. The load is supplied with power directly by the SBS circuit. Maintenance and repair work on the assemblies can then be carried out in active operation.

The manual bypass switch Q29 may only be actuated when the inverter is switched off.

If the SBS circuit fails in this operating mode, the load power supply will collapse.

5.8 Batteries

The equipment offers numerous connection options for external components. The batteries are an essential external component and thus a permanent feature of the equipment.

Charging procedure

The batteries are charged in accordance with a CVCC curve to DIN 41772. Battery charging is electronically controlled and monitored. Faults during the charging procedure are detected automatically and charging is interrupted as a result. These measures ensure that the batteries are fully charged as quickly as possible and provide protection against overcharging and other faults.

Battery care

In normal operation, once the batteries are fully charged, their charge is maintained automatically via trickle charging. The charging current and voltage are continuously adapted to the current battery charge. This ensures maximum battery life at maximum capacity.

Rectifier

The rectifier is responsible for battery care and charging. The operating mode of the inverter is selected in order to ensure optimum charging of every battery type. The ideal operating mode is selected via the display and operation unit (DOU). The DOU also provides a means of transferring the battery parameters to the rectifier (→ chapter 0).

Rectifier operating modes

The rectifier works in the following operating modes:

Charging: the battery is charged with a constant charging current. When the charging voltage is reached, this value is kept constant with a tolerance of ± 1%. At the same time, the charging current drops. Once the calculated charging time has elapsed, switchover to trickle charging takes place.

Trickle charging: Trickle charging follows charging. It compensates automatic battery discharge, ensuring that the batteries are kept fully charged.

Equalising charging: Equalising charging takes place in accordance with a CVCC curve. The characteristic curve values correspond to the charge values. The charging voltage can be adjusted separately from other characteristic curves. Switching back to trickle charging occurs automatically after 8 hours.

Start-up charging: Equalising charging takes place in accordance with a CVCC curve. The charging current and the charging voltage can be adjusted separately from other characteristic curves. Switching back to trickle charging occurs automatically after 8 hours.

Battery test

The battery tests for the equipment offer a variety of ways to test the function of the batteries. The yellow LED on the DOU flashes to indicate that a battery test is in progress.

Battery tests are started via the DOU. They can be aborted at any time by pressing the function keys. Status messages and measured values relating to battery tests are indicated on the LCD.

The parameters for the battery tests (min. battery voltage, discharge time, discharge current and final discharge voltage) can be changed in the "Service" menu on the DOU.

Before a battery test commences, the date and time of the last battery test are indicated on the DOU LCD. **During** a battery test, the:

- Battery voltage
- Battery current
- Battery test duration
- Battery capacity drawn

are displayed. **After** a battery test, the:

- Battery voltage
- Battery current
- Battery test duration
- Battery capacity drawn at the end of the test

are displayed.

The battery tests are described in detail below.



Some battery tests are optional and thus cannot be run for all items of equipment.

Battery charging circuit test: this battery test checks the batteries by running a current analysis whilst constantly reducing the DC voltage. Line interruptions or defective fuses in the battery circuit are also detected. The test takes just 1 second to complete.



The battery charging circuit test runs automatically at weekly intervals.

Capacity check: this battery test checks the batteries by drawing a constant current. The DC voltage is reduced until the batteries give off the set discharge current. The discharge current must be less than the inverter load. The capacity check aborts the battery test as soon as the inverter load is too small.

The capacity check is terminated as soon as the final discharge voltage or the max. discharge time is reached. Switching back to normal operation occurs automatically once the battery test is complete. The batteries are charged.

Capacity test: this battery test checks the availability of the batteries. It uses the currently connected inverter load for this purpose. The battery test represents operation with defective mains supply; in other words, it simulates the failure of the rectifier (→ chapter 0).

The DC voltage of the rectifier is reduced. The battery voltage should at this point compensate the reduced DC voltage and supply the full current for the inverter. If the capacity test causes the batteries to fail, the inverter is automatically restored to power supply from the rectifier.

The capacity test is terminated as soon as the final discharge voltage or the max. discharge time is reached. Switching back to normal operation occurs automatically once the battery test is complete. The batteries are charged.

5.9 Interfaces

The equipment supports a variety of communication options. The interfaces are part of the communication system. They provide options for connecting to external components such as IT systems, control rooms, etc.

5.9.1 Remote signaling

General

The remote signalling board is an assembly for signalling messages and controlling AEG power supply devices via contacts. It consists of the master board (A12) with 5 potential-free signalling contacts (bypass switches) and a control input, as well as optionally up to 2 expansion boards (A13/A14) with 3 signalling contacts and 2 control inputs each.

The contacts of the master board have been assigned device-specific default signals; the expansion boards can be individually configured.

Design

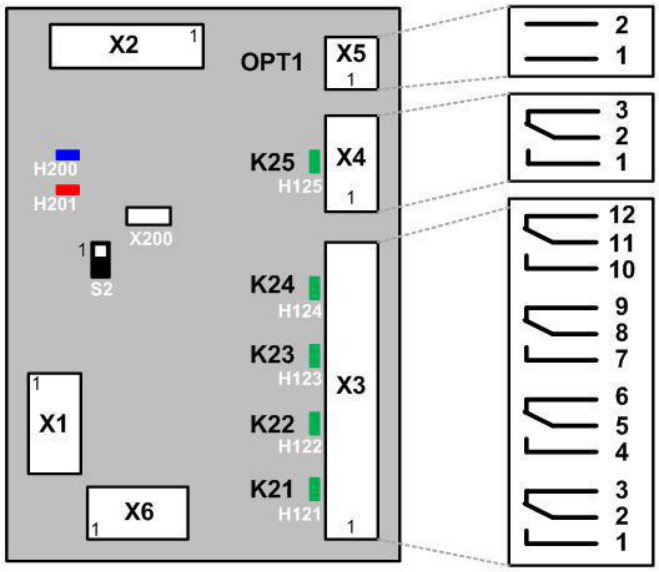


Figure 12 - Remote signalling master A12 (top view)

There are various status LEDs on the PCBs:

H20x: <u>System status:</u>

RED (H200)	BLUE (H201)	Meaning
Flashing	Flashing	Start-up phase
ON/flashing	OFF	Internal communication fault
OFF	ON/flickering	Normal operation/internal communication
OFF	OFF	No power supply

H12x: <u>Signalling of the signalling contacts:</u>

GN (H12x)	Meaning
ON	Relay K2x picked up (contact between the two contact points with the lower numbers)

5.9.2 Serial interfaces

Two potential-free serial interfaces are provided for the purpose of connecting the equipment to external IT systems.

Protocol

Both interfaces use the AEG protocol CBSER to communicate with their environment. The second interface is multiprotocol-capable. A licence can be purchased to facilitate operation with additional protocols. A selection of the available protocols can be obtained on request from the manufacturer of this UPS equipment.

The AEG protocol CBSER can be obtained as a detailed protocol description on request.

Expansion board

The serial interfaces take the form of a retrofittable A30 expansion board. The expansion board is designated "Modem UPS". It is retrofitted to the control unit pivot arm (→ chapter 0).

5.10 Control unit pivot arm

The control unit pivot arm (→ chapter 0 accommodates the monitoring equipment. The monitoring equipment is retrofitted to the control unit pivot arm. The control and signal lines are routed through the cable duct in the centre of the unit.

The figure below illustrates the control unit pivot arm with all monitoring equipment mounted.

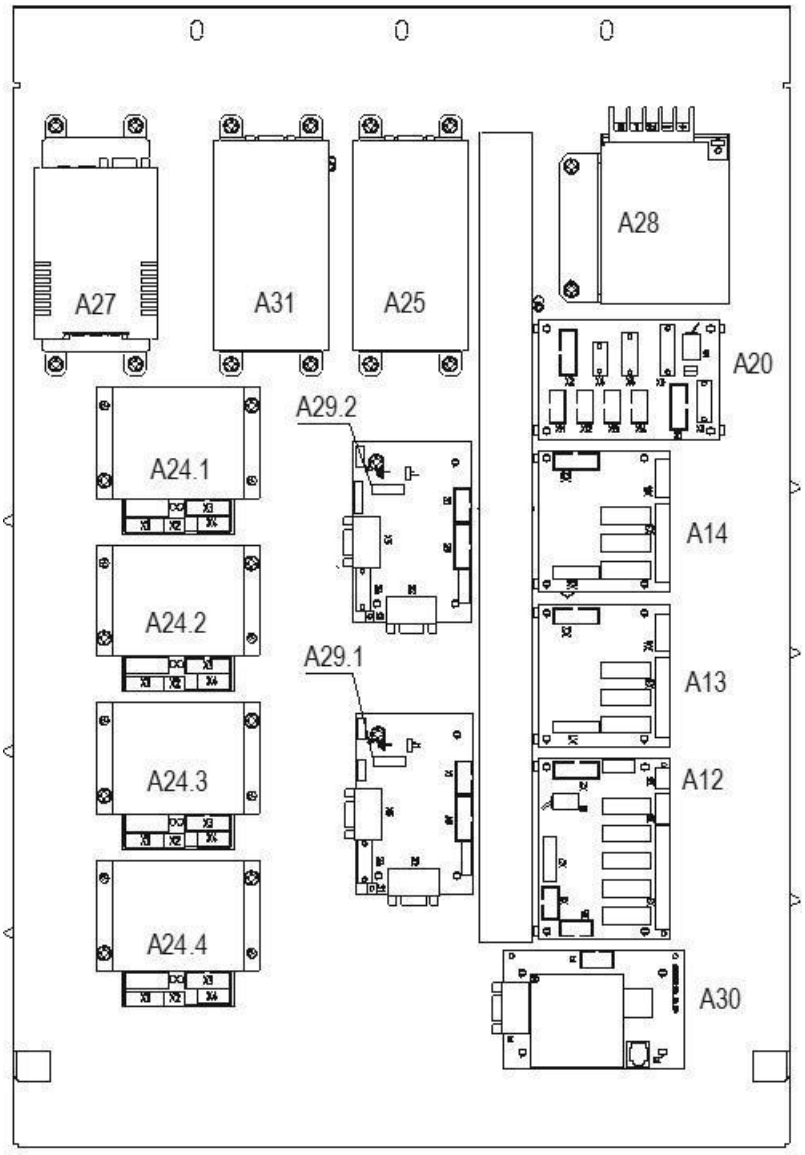


Figure 13 - Control unit pivot arm

A separate technical data sheet describes all monitoring equipment retrofitted to the equipment.

5.10.1 Available monitoring equipment

All currently available monitoring equipment is listed in the table below.

Slot	Designation
A12	Remote signalling master board
A13	Remote signalling expansion board 1
A14	Remote signalling expansion board 2
A20	Parallel operation adapter
A23	Power supply $U_{\sim}$ = 24 V (Option, Pos. A28 or A20)
A24.n	BLÜ-PRO battery charging circuit monitoring system
A25	SNMP adapter (RFC1628)
A27	COM-Server
A28	Power supply 12 VDC
A29.n	Multicom CAN / COM
A30	Modem UPS
A31	Enviroment Manager

Table 9 - Available monitoring equipment

6 TRANSPORT

This chapter describes the safety measures during transport, transport personnel and equipment transport.

6.1 Safety during transport

6.1.1 Safety instructions



WARNING

Risk of accident due to suspended loads!

Possibility of death or very serious injury.

➔ Never stand under suspended loads.

➔ Make sure that nobody stands under suspended loads.

➔ Secure the danger zone.



WARNING

Risk of accident due to equipment tilting or turning on edges!

Possibility of death or very serious injury.

➔ Be aware of the equipment's centre of gravity.

➔ Never tilt the equipment or turn it on its edges.



WARNING

Risk of accident due to transport with industrial trucks!

Possibility of death or very serious injury.

➔ Use a crane to transport the equipment.

➔ Only use industrial trucks if it is not possible to use a crane.

6.1.2 Personal protective equipment

Use the following personal protective equipment to avoid injury:



Wear a safety helmet



Wear protective footwear



Wear a hand shield

Check that personal protective equipment is in perfect order and report any defects you notice to the owner.

6.2 Requirements of personnel

Transport personnel are permitted to transport the equipment.

Transport personnel are defined as personnel who have the necessary skills, training and knowledge in the field of transport.

6.3 Transporting the equipment

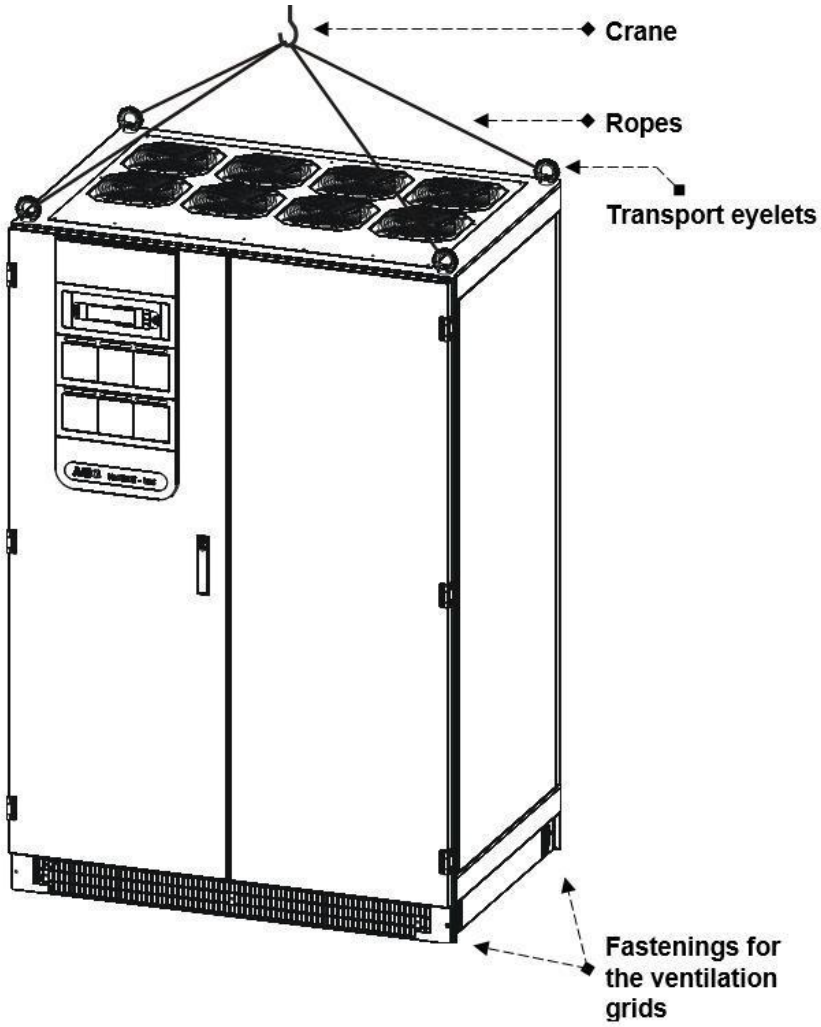


Figure 14 - Transporting the equipment

6.3.1 Selecting a means of transport

Please note the following before commencing transport:

- Use a crane to transport the equipment if possible
- Only use industrial trucks if the ambient conditions mean that it is not possible to use a crane

The equipment can easily tilt or turn on its edges when transported using industrial trucks.

6.3.2 Using a crane to transport the equipment

Preparations

Please note the following before transport:

- Only use ropes which allow an angle of at least 45° between rope and cabinet roof.
- Do not exceed the permissible load-bearing capacity of each rope. The load-bearing capacity must be dimensioned as follows:

  Load-bearing capacity per rope ≥ 0.5 x total weight of equipment

  The total weight of the equipment is specified in the technical data sheet.
- Do not exceed the permissible weight that can be carried by the crane. The total weight of the equipment is specified in the technical data sheet.

Transporting the equipment

➔ To transport the equipment:

- Screw the transport eyelets into the threaded bores provided on the top of the cabinet.
- Attach the ropes to the transport eyelets and to the crane.
- Check that the transport eyelets and ropes are fastened tight.
- Unscrew the equipment from the pallet.
- Lift the equipment, move it to the installation site and set it down.
- Check that the equipment is stable.
- Remove the ropes and transport eyelets.

✓ Transport of the equipment is now complete.

6.3.3 Using industrial trucks to transport the equipment

Preparations

Please note the following before transport:

- Do not exceed the permissible weight that can be carried by the industrial truck. The total weight of the equipment is specified in the technical data sheet.
- Be aware of the equipment's centre of gravity. The centre of gravity is indicated on the transport packaging.
- Use industrial trucks with lifting arms which are long enough and wide enough.

Transporting the equipment

➔ To transport the equipment:

- Remove the ventilation grids.
- Unscrew the equipment from the pallet.
- Insert the lifting arms between the pallet and the equipment.
- Lift the equipment, move it to the installation site and set it down.
- Check that the equipment is stable.
- Replace the ventilation grids.

✓ Transport of the equipment is now complete.

6.4 Packaging

The packaging protects the equipment during transport by road and rail.

A pallet is screwed to the underside of the equipment. It makes transport easier and protects the equipment whilst on the move.

The housing is protected by corner and edge mouldings. It is wrapped in stretch plastic film. The film provides protection against damage caused by leaks, dust and rain.

Removing the packaging

Proceed as follows:

- Do not remove the moulded parts and stretch plastic film until immediately before start-up. (This is to avoid unnecessary damage to the equipment.)
- Remove any condensation that may have occurred inside and outside the equipment. Condensation is caused by variations in pressure and temperature between where the equipment was manufactured and where it is installed.



Condensation can be volatilised by storing the equipment at the installation site for 48 hours.

- If you intend to store the equipment for this purpose, remove the stretch plastic film and the pallet first.



The stretch plastic film and the moulded parts made from polyethylene foam are chemically inactive and can be disposed of with normal industrial waste or recycled.

7 INSTALLATION AND START-UP

This chapter describes the safety measures for installation and start-up, the requirements to be met by personnel and the installation and start-up procedures.

7.1 Safety during installation and start-up

7.1.1 Safety instructions



DANGER

Contact with voltage!

Risk to life due to electric shock

➔ Disconnect the equipment safely.

➔ Check that the supply lines are de-energised.



DANGER

Electric shock caused by leakage currents!

The capacitors generate high leakage currents in the equipment. Conductive parts may be live in the event of connection errors.

Risk to life due to electric shock

➔ Establish a PE conductor connection prior to start-up.



Using residual-current-operated circuit breakers alone is not permitted (→ chapter 0, warning notice 7).



WARNING

Risk of accident due to insufficiently qualified personnel!

Possibility of death or very serious injury.

➔ Work on the equipment may only be carried out by skilled personnel.



ATTENTION

Equipment failure

The equipment may fail if its waste heat is not dissipated.

Malfunctions

➔ Ensure that a sufficiently dimensioned means of dissipating exhaust air from the equipment is provided.



ATTENTION

Equipment failure

If the polarity of the supply lines is reversed, the equipment will fail during start-up.

Malfunctions

➔ Ensure the correct polarity when connecting the supply lines.

7.1.2 Personal protective equipment

Wear the following personal protective equipment to avoid injury:



Wear a safety helmet



Wear protective footwear



Wear a hand shield

Check that personal protective equipment is in perfect order and report any defects you notice to the owner.

7.2 Requirements of personnel

Installation and start-up may only be carried out by skilled personnel.

Skilled personnel are electricians who, on account of their specialist training, knowledge and experience, along with their knowledge of applicable regulations, are able to assess the work assigned to them and can detect potential hazards.

7.3 Installing the equipment

This section describes the mechanical installation of the equipment.

7.3.1 Tightening torques for Screw Connections

These values apply to the electrical and mechanical connections.

They do not apply to bottom attachment of the units with dynamic force application.

Torque values for electrical screw connections				
Screw size	**General unit connection**		**Cu busbar connections**	
	Nominal torque [Nm] acc. N57 2205		**Nominal torque [Nm]** acc. N57 2201	
	Cheese head srew strength category 5.8	**Hexagon** screw strength category 8.8	**Hexagon screw strength category 8.8** **min.**	**max.**
M2,5	0,21 - 0,42	0,33 - 0,65		
M3	0,37 - 0,74	0,58 - 1,2		
M3,5	0,57 - 1,15	0,9 - 1,85		
M4	0,85 - 1,7	1,35 - 2,7	2	2,7
M5	1,75 - 2,65	2,8 - 5,5	3	5,5
M6	2,95 - 4,4	4,7 - 9,3	5,5	9,3
M8	7,0 - 14,0	11,5 - 22,5	15	22,5
M10		22 – 44	30	44
M12		38 – 75	60	75
M16		90 – 180	120	180
M20		174 - 347		

Table 10 - Tightening torques

7.3.2 Equipment installation site

The equipment installation site must meet certain criteria in order to ensure a long service life and reliable operation. Proceed as follows.

Fire protection requirements

If the equipment is installed in rooms with flammable floors (e.g. textile, wood or PVC) or in computer centres, a floor plate must be fitted between it and the floor.

Ambient conditions

The environment in which the equipment is installed:

- Must be free from conductive dust
- Must be free from acid vapours
- Must have a maximum room temperature of 40°C

Space requirements

The equipment is suitable for installation in confined spaces. The dimensions of the installation site must facilitate unrestricted operation, maintenance and repairs.

The following minimum dimensions must be met:

- At least 1000 mm in front of the unit to ensure an escape route
- 400 mm above the unit so that air can be vented



The waste heat from the equipment must be dissipated in all operating modes.

Floor

The equipment may be installed on the following types of floor:

- On double floors
- Above cable ducts
- On level surfaces



The weight of the equipment must not exceed the maximum floor bearing capacity.



Observe the bending radius of the supply lines. The cable clamp rail is located 185 mm above the floor. With one bend:
bending radius = 10 x diameter of supply line

7.3.3 Attaching the equipment to the floor

Preparations

The equipment is attached to the floor with four fixing bolts. There are four holes in its base frame for the bolts.

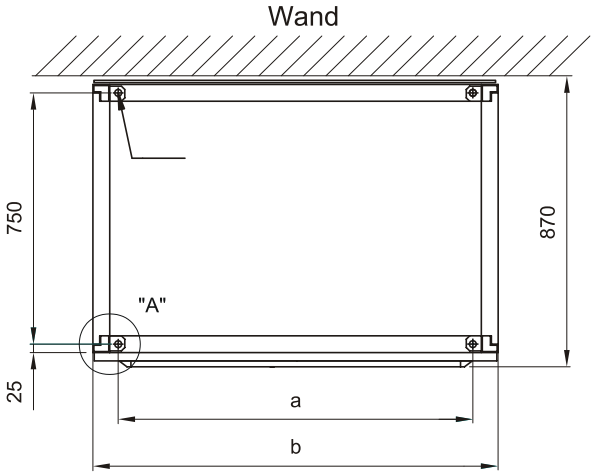


Figure 15 - Floor attachment

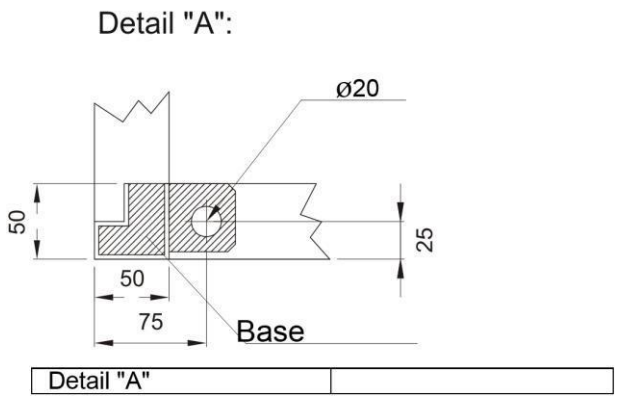


Figure 16 - Floor attachment in detail

The hole spacings are determined by the power rating of the equipment. Please refer to the following table.

Power (kVA)	a (mm)	b (mm)
10	450	600
20	750	900
30/40	750	900
60	1050	1200
80	1350	1500
100/120	1650	1800

Table 11 - Floor attachment

Attaching the equipment to the floor

➔ To attach the equipment to the floor:

- Check that the floor is even.
- Use metal wedges to compensate for any unevenness.
- Select hole spacings in accordance with Table 11 - Floor attachment.
- Mark hole spacings on the floor.
- Drill holes for fixing bolts.
- Align floor plate with holes.
- Position equipment on floor plate.
- Align equipment vertically.
- Screw fixing bolts into holes.

✓ The equipment is now attached to the floor.

7.4 Wiring the equipment

This section describes how the input circuit, SBS circuit, battery circuit and load circuit are connected, as well as the lines for remote signalling.

The circuit diagram illustrates the basic structure of the equipment and shows the connection terminal assignments. Table 12 - Connection terminals lists the assignments between mains and connection terminals.

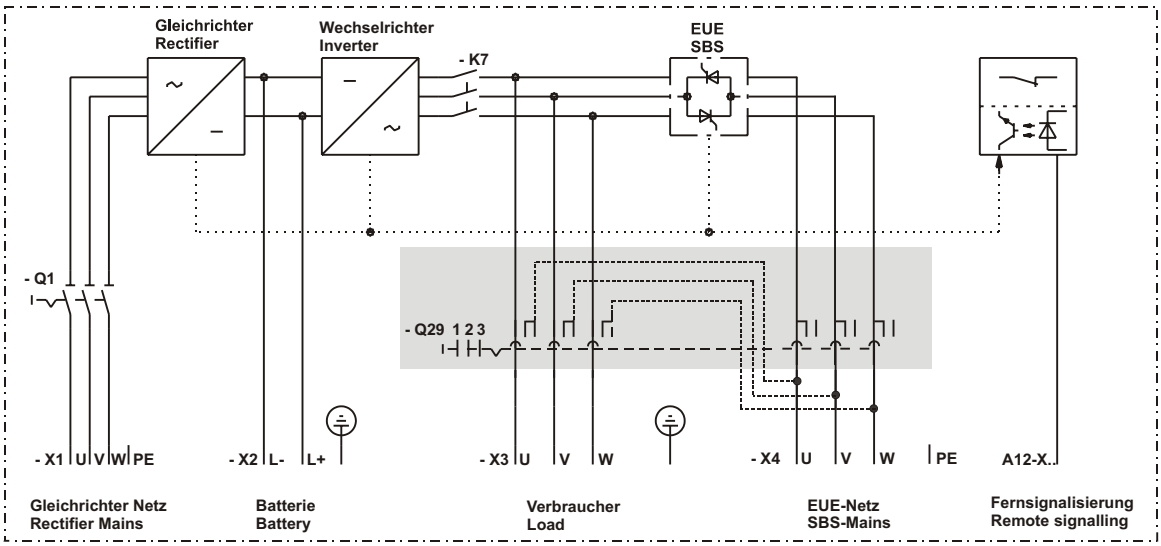


Figure 17 - Connection terminals

Connection terminal	Mains	Note
X1	Rectifier Mains	Input circuit 1
X2	Battery circuit	
X3	Load circuit	
X4	SBS Mains	Input circuit 2
X12	Remote signalling	Implemented as terminal strip

Table 12 - Connection terminals

7.4.1 Using overvoltage protection

The equipment is dimensioned for connection to an AC mains, overvoltage category II. If it is to be exposed to higher transient overvoltages, additional protective measures will need to be put in place.



Use a suitable means of external overvoltage protection.

7.4.2 Connecting supply lines

Preparations

Proceed as follows when **installing disconnection devices**:

- In the case of connection to a TN system (normal circumstances) the disconnection devices **must not** interrupt the neutral conductor.
- In the case of connection to an IT system the disconnection devices **must** interrupt the neutral conductor.

Proceed as follows when **tightening clamping screws**:

- Grip the supply line firmly with your left hand
- Tighten the clamping screw with your right hand

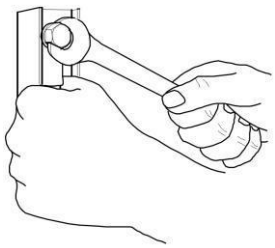


Figure 18 - Clamping screw

This avoids deformation of the supporting rail and protects the base of the connection terminal against torsional forces.

Connecting supply lines

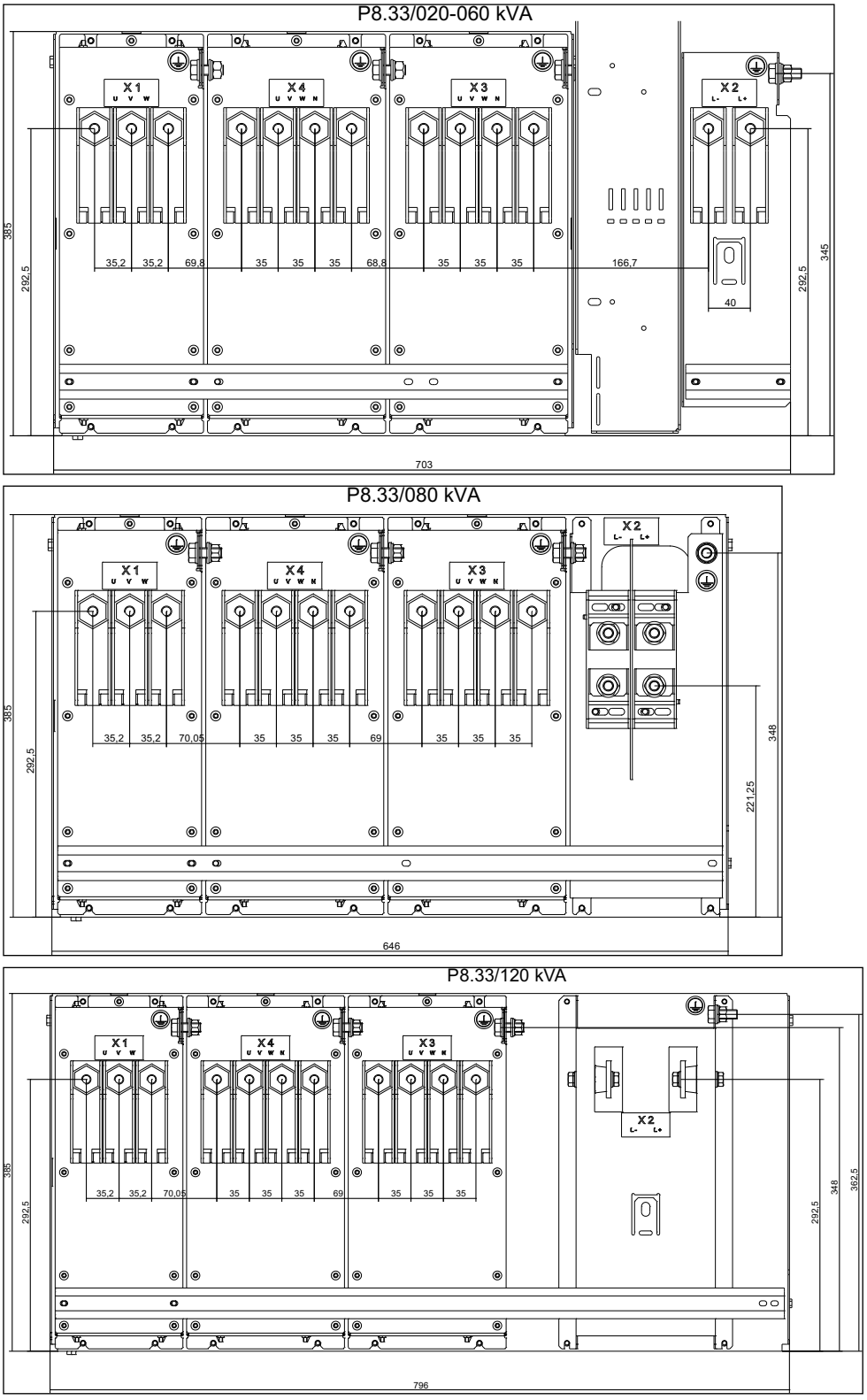


Figure 19 - Connection panel

➔ To connect the supply lines:

- Remove the protective cover from the connection panel.
- Insert the supply lines into the equipment from below or behind.



Supply lines inserted from above must first be routed down next to the equipment.



Lay a PE conductor to VDE 0100 T540, Table 6.

- Connect the PE conductor to the PE conductor terminals.



Also possible as an **option**: Connect the PE conductor to the equipment's earth bar.

- Use cable lugs to connect the supply lines to the connection terminals.



The Rectifier Mains (X1) and the SBS Mains (X4) can be supplied with power from the same source or from two separate sources.

- Connect the shield of the battery line to the PE conductor connection.



You only need to do this if you are using a shielded battery line. Shielding the battery line improves the equipment's EMC.

- Attach the supply lines and PE conductor to the cable clamp rail.
- Check the polarity of the supply lines.
- Remove unused cable, tools, etc. from the equipment.
- Replace the protective cover on the connection panel.

✓ The supply lines are now connected.

7.4.3 Connecting the remote signaling

Prerequisites

Shielded control and signal lines should be used to connect the remote signalling board. Shielded lines can have a positive effect on the EMC behaviour of the system. In the device, the line shield has to be connected to device potential, in other words to the PE conductor.

The **signalling contacts (X3/X4)** are designed for the following maximum ohmic load range:

AC:

400 V	250 V	200 V
5 A	8 A	10 A

DC:

300 V	50 V	10 V
100 mA	1 A	8 A



If the specified maximum power has been applied to the signalling contacts once, those contacts can no longer reliably switch an extra-low voltage!

The **control input (X5)** has an **independent 24 V** DC power supply. The control signal is activated by bridging the input.

Connection

➔ To connect the control and signal lines:

- Lay the control and signal lines in the provided duct.
- Use a 3 mm screwdriver to connect the control and signal lines to terminal strip X12 (if present) or to A12.
- When using shielded control and signal lines, use shield terminals to connect the shield with the device potential or PE conductor in the device connection area.

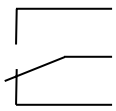
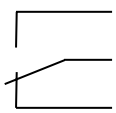
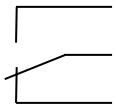
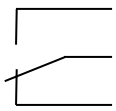


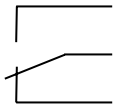
Connecting the shield improves the EMC behaviour and thus the availability of the system.

- Fasten control and signal lines.
- Remove unused cable, tools, etc. from the equipment.

✓ The control and signal lines are now connected.

Contact assignment

Assignment	A12-X3	X12	Signal
	1	19	Inverter operation (NO)
	2	20	
	3	21	
	4	22	Mains operation (NO)
	5	23	
	6	24	
	7	25	Rectifier fault (NO)
	8	26	
	9	27	
	10	28	Battery undervoltage (NO)
	11	29	
	12	30	

Assignment	A12-X4	X12	Signal
	1	16	Collective fault (NC)
	2	17	
	3	18	

Assignment	A12-X5	X12	Signal
	1	52	Inverter remote switch-off (NO)
	2	53	

Table 13 - Assignment of the connection terminals

The following **signal types** are used:

A12-X3: **Normally open (NO): When a signal is received**, the **contact** between the two contact points with the lower numbers **closes**.

A12-X4: **Normally closed (NC): When a signal is received**, the **contact** between the two contact points with the lower numbers **opens**.

A12-X5: **Normally open (NO):** The **control signal is active** when the **input is bridged**.

This shows the normally closed contact in the state that applies when the signal is not active normally open (NO) or the voltage is zero.

Please consult the system technical data sheet for the current assignment.

7.5 Starting up the equipment

This section describes starting up the equipment. Follow the instructions and comply with the requirements described.

Preparations

Please note the following before start-up:

- If you are using several units in parallel, refer to the additional description of parallel operation.
- Before start-up, check that the default equipment data tallies with the battery data (see Technical Data Sheet).
- Before start-up, check that the equipment is earthed in accordance with regulations (VDE 0100).
- Make sure that the ventilation grids are never covered during operation.
- Ensure compliance with the start-up requirements set out by the battery manufacturer.



Changes to parameters can be made via the DOU or by AEG Service.

➔ To prepare the equipment for start-up:

- Open the battery isolator.
- Set the load interrupter switch Q1 to the "OFF" position.
- Set the manual bypass switch Q29 to position "3 - Manual bypass".



You only need to do this if a manual bypass switch Q29 is installed in your equipment.

- Remove the protective cover from the connection panel
- Connect the mains voltage for the rectifier.
- Connect the mains voltage for the SBS circuit.
- Measure the mains voltage at connection terminal X1 (outer conductor/outer conductor): the mains voltage is $U_{\sim}$ = 400 V.
- Measure the mains voltage at connection terminal X4 (outer conductor/neutral conductor): the mains voltage is $U_{\sim}$ = 230 V.
- Check the rotating field at connection terminal X1: L1, L2 and L3 clockwise rotation.
- Disconnect the mains voltage for the SBS circuit.
- Disconnect the mains voltage for the rectifier.
- Rectify any problems identified.
- Replace the protective cover on the connection panel.

✓ You have prepared the equipment for start-up.

7.5 Starting up the equipment

➔ To start up the equipment:

- Open the battery isolator.
- Set the load interrupter switch Q1 to the "OFF" position.
- Set the manual bypass switch Q29 to position "2 - Service operation".(optional)
- Connect the mains voltage for the rectifier.
- Connect the mains voltage for the SBS circuit.
- Check status: The SBS is starting up,
  the green and yellow LEDs are flashing.
  LCD: "Main menu" is displayed.
- Wait for status: The SBS is ready,
  the green LED is flashing.
  LCD: "SBS symbol OK" is displayed.
- Set the manual bypass switch Q29 to position "1 - Inverter operation".
  The green and yellow LEDs flash.(optional)
- Select the DOU display language.
- Set the load interrupter switch Q1 to the "ON" position.
- Wait for status: The REC is ready,
  the green LED is flashing.
  LCD: "INV symbol OK" is displayed.
- Check the battery isolator voltage and polarity.
- Close the battery isolator.
- Press the "~I" key on the DOU.
  LCD: "INV symbol" flashes.
- Wait for status: SBS switches to normal operation,
  green LED lights up.
  LCD: "Energy flow display via INV" is displayed.

✓ You have started up the equipment.

8 OPERATION

The equipment can be controlled using the operating elements and via remote signalling from a control room.

The operating elements are located on the front of the unit. The display and operation unit is integrated in the door of the control cabinet. The load interrupter switch Q1 and the manual bypass switch Q29 can only be accessed by opening the door of the control cabinet.

8.1 Load interrupter switch Q1

The load interrupter switch Q1 connects the rectifier to the mains supply.

A fault in the mains supply, e.g. a short circuit, triggers the open-circuit shunt release of the load interrupter switch Q1. The connection between the rectifier and the mains supply is interrupted.



The inverter can be disconnected for maintenance and repair purposes by opening the load interrupter switch Q1 and the battery isolator.

8.2 Manual bypass switch Q29

The manual bypass switch Q29 is used to change over between three of the four operating modes.

The manual bypass switch Q29 is usually located outside the equipment. It can be installed directly in the equipment if required.

Switch position	Name of the switch position	Operating mode
1	Inverter operation	Operation with mains supply available (normal operation)
2	Service mode	Operation with a defective Inverter
3	Manual bypass	Operation with manual bypass

Table 14 - Q29 switch positions



When an operating mode is selected, the manual bypass switch Q29 does not take the current status of the assemblies into account. The assemblies must be activated or deactivated manually first.

8.3 Display and operation unit

The display and operation unit (DOU) is used for data signalling and visualisation as well as for equipment control and parameterisation. The DOU is divided into two display elements and two operating elements:

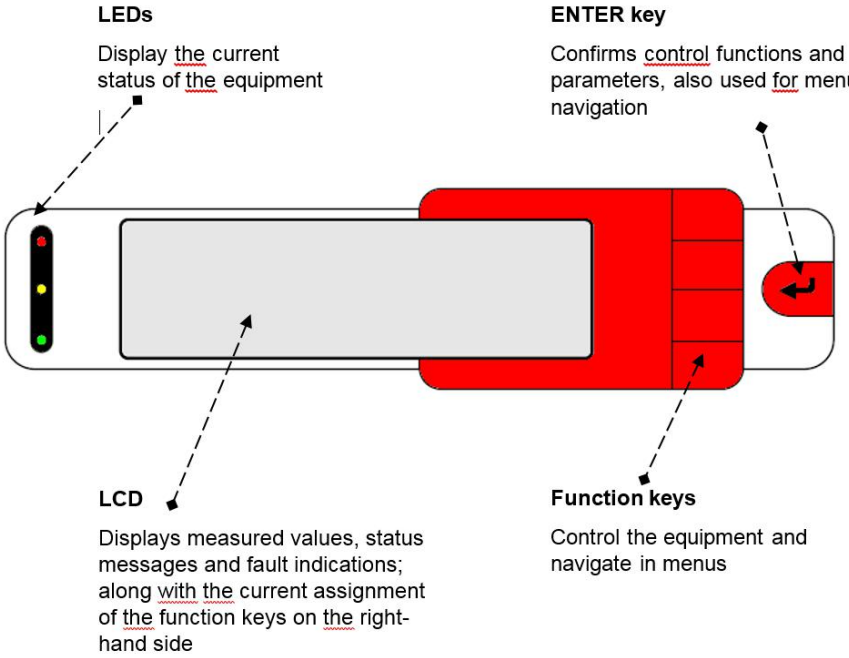


Figure 20 - Display and operation unit

The display elements (**LEDs and LCD**) indicate the status of the equipment and measured values. The operating elements (**function keys and the ENTER key**) are used to navigate in menus and control the equipment.



Communication errors are rare when using the DOU. If they do occur, repeat the operation.

8.3.1 LEDs

The three LEDs (green, yellow and red) provide information about the status of the equipment at a glance (→ chapter 0).

8.3.2 LCD

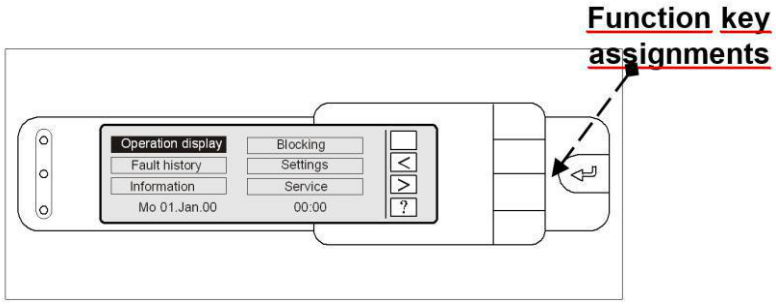


Figure 21 - Main menu

The LCD displays menus, measured values and messages. The function key assignments are displayed on the right-hand side.

8.3.3 Function keys

There are four placeholders for the function keys on the right-hand side of the LCD. Dependent upon which menu you are in, a different function is assigned to each function key. The various functions have fixed symbols. These symbols appear on the function keys.

The symbols and their functions are listed in the table below.

Symbol	Function
	Switch off inverter
	Switch on inverter
	Switch off rectifier
	Switch on rectifier
	Acknowledge acoustic signal generator
	Move cursor up/increase value
	Move cursor down/decrease value
	Move cursor to the right
	Move cursor to the left
	Call status and measured values menu
	Acknowledge fault
	Select module
	Call help menu
	Function key blocked
	Function key without function/placeholder

Table 15 - Function key symbols

8.3.4 ENTER key

You can use the ENTER key to acknowledge control functions and parameters, and to confirm menu selections. Press the ENTER key to exit submenus.

8.4 Menu structure

The DOU menus are illustrated in the tree structure below. The menus are displayed on the LCD.

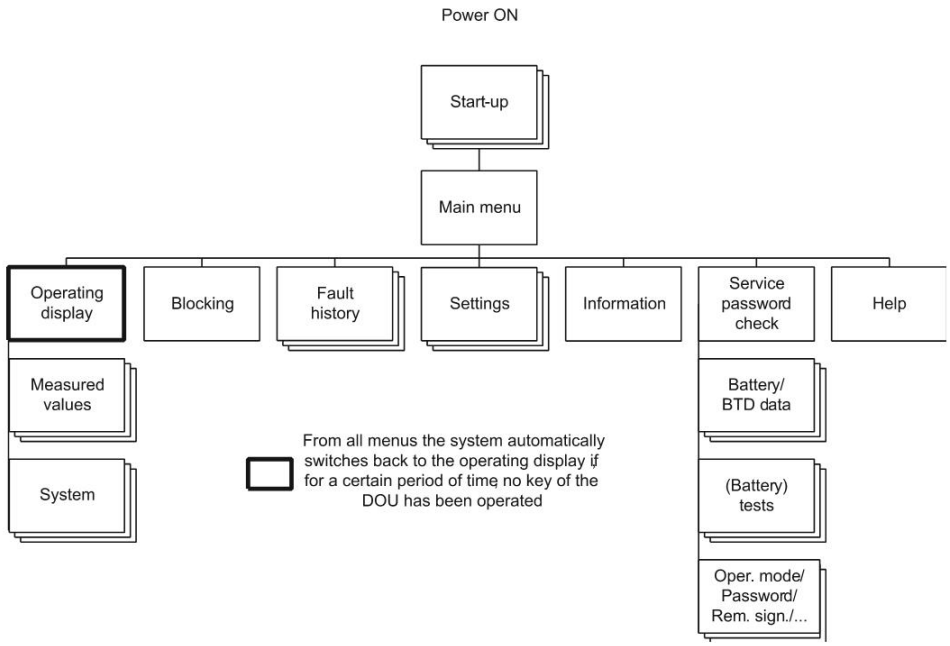


Figure 22 - Menu structure tree

8.4.1 Main menu

The **main menu** is displayed after start-up.

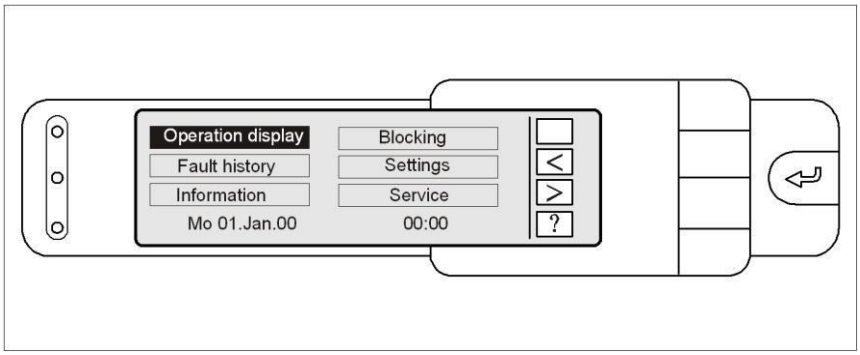


Figure 23 - Main menu

The current selection is displayed inverted (see Figure 23: Operating display). Use the function keys to change the position of the selection. Use the ENTER key to switch to one of the submenus.

You can correct the time and the date in the **Settings**.

8.4.2 Operating display

You can call up the **Operating display** menu from the main menu. The operating display indicates the status of the equipment and the measured values.

The operating display appears automatically if the DOU is idle for a prolonged period.

The **equipment status** displays symbols for the inverter, the rectifier, the batteries and the SBS. The corresponding symbol flashes in the event of a fault affecting one of these components. The energy flow of the components is represented by black bars.

The current capacity utilisation in percent and the standby time in minutes are displayed as **measured values**.

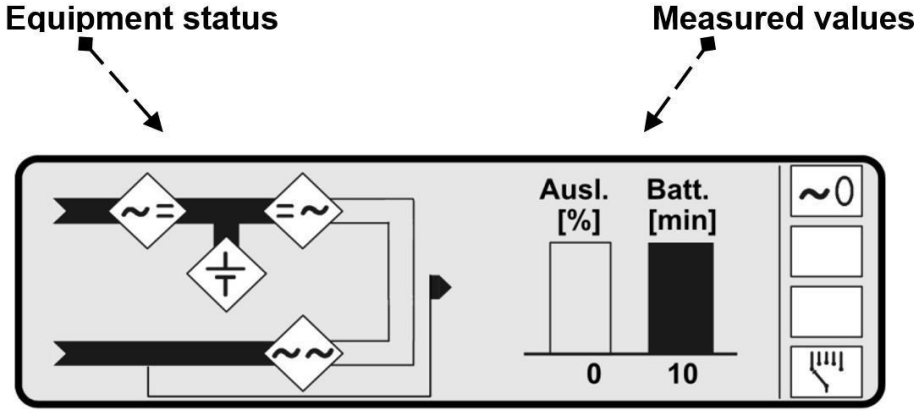


Figure 24 - Operating display menu

Operation with manual bypass is activated in **Fehler! Verweisquelle konnte nicht gefunden werden.**. It is required for maintenance and repair work.

Measured values

To access the **Measured values** menu, press the following function key in the operating display:

 Status and measured values menu

The menu contains status messages and measured values for the:

- Mains
- Batteries
- Loads
- Remote signalling

In the event of a fault, a detailed description of it is displayed here.

System

The **System** submenu contains information about the status of the equipment and the components. In the event of a fault, a detailed description of it is displayed here.

Once a fault has been rectified, it must be acknowledged in the System submenu.

COM interface (optional)

The **COM interface** submenu contains information about the status of the monitoring equipment.

The COM interface menu is only displayed if optional monitoring equipment has been installed.

AUX signals (optional)

The **AUX signals** submenu displays information about the status of general signals.

The AUX signals submenu is only displayed if general signals have been programmed into the remote signalling function.

8.4.3 Blocking

You can call up the **Blocking** menu from the main menu. You block the function keys to prevent unauthorised access in the Blocking menu.

Blocking the function keys prevents:

- Unauthorised attempts to control the equipment
- The acknowledgement of fault indications

Blocked function keys are displayed as follows:

 Function key blocked

Function keys are unblocked by entering a password.

The default password is **1201**. You can change the password in the **Service** menu, **Password** submenu.

8.4.4 Fault history

You can call up the **Fault history** menu from the main menu. In the Fault history menu, you can call up the last 20 fault indications for the:

- Equipment
- Mains
- Batteries

Fault indications are displayed starting from the current date or from a date of your choosing.

8.4.5 Settings

You can call up the **Settings** menu from the main menu. The Settings menu is where you change the:

- LCD contrast
- Language for menus and messages
- Real-time parameters
- Behaviour of the acoustic signal generator for faults and keyboard operations

8.4.6 Information

You can call up the **Information** menu from the main menu. The Information menu displays the following internal equipment information:

- Type of equipment
- Firmware version
- Communication options

Communication options can vary from one unit to another and are dependent upon the optional components selected in each cas

8.4.7 Service

You can call up the **Service** menu from the main menu. You can perform the following actions in the Service menu:

- Set component parameters
- Test batteries
- Log the equipment out of a group in parallel operation
- Change the password

The Service menu can only be opened subject to entering a password. The default password is **1201**. You can change the password in the **Password** submenu.

Rectifier operating mode

You set the rectifier operating mode in the **Rectifier operating mode** submenu. The selected mode changes the way in which the batteries are charged. The current operating mode of the inverter is displayed on the LCD.

The following operating modes are possible:

- Charging
- Trickle charging
- Equalising charging
- Start-up charging



Equalising charging and start-up charging are optional and thus cannot be run for all items of equipment.

Battery test

The batteries are tested against various criteria in the **Battery test** submenu. The yellow LED on the DOU indicates that a battery test is in progress. Status messages and measured values relating to battery tests are indicated on the LCD.

You can change the parameters for the battery test (min. battery voltage, max. discharge time and discharge current) in the **Battery values** submenu.

Before a new battery test gets underway, the last battery test is displayed with date stamp and time stamp.

The following battery tests are available for selection:

- Battery charging circuit test
- Capacity check
- Capacity test



Some battery tests are optional and thus cannot be run for all items of equipment.

Maintenance

You log parallel units out of a group in the **Maintenance** submenu. A unit is logged out of a group for maintenance and repair work; this does not affect the function of the other units in the group.

If you are using several units in parallel, refer to the additional description of parallel operation.

Battery values

You change the default parameters for the batteries in the **Battery values** submenu. It is also where the parameters for the battery tests are changed.



The parameters for the batteries are listed in the data sheets issued by the battery manufacturer. The setting ranges for the parameters vary dependent upon the unit.

All parameters and their setting ranges are listed in the table below.

Parameter	Battery type Pb	Battery type NiCd
(Number of) cells *),)**	90 - 120 ***)	155 - 190 ***)
Cap(acity)	0 – 9999 Ah	
U Tri/cell *), **)	2.13 - 2.32 V/cell	1.33 - 1.50 V/cell
U Cha/cell *), **)	2.23 - 2.43 V/cell	1.37 - 1.70 V/cell
U Equ/cell *), **)	2.23 - 2.58 V/cell	1.37 - 1.75 V/cell
U EPS/cell *)	1.90 - 2.32 V/cell	1.10 - 1.50 V/cell
U Sta/cell *)	1.00 - 2.86 V/cell	0.50 - 1.95 V/cell
I(bat) limit(ation) Tri/Cha/Equ of xxA	1 - 110% v. I_{nom}	
I (bat) limit(ation) Sta of xxA	1 - 110% v. I_{nom}	
(Charging) time Equ/Sta	1 - 1999 min	
Final disch. voltage/cell **)**	1.6 - 2.0 V/cell	0.65 - 1.20 V/cell
Disch. (max. batt. test) time **)**	1 - 1200 min	
Disch. current (%) of xxA **)**	5 - 90% v. I_{nom}	

Table 16 - Setting ranges of the battery parameters

*) The maximum value may deviate from this as there is a maximum DC voltage that must not be exceeded. The maximum value can be parameterised.

**) The minimum value may deviate from this as there is a minimum DC voltage that must not be undershot. The minimum value can be parameterised.

***) The setting range can be parameterised.

****) The parameters are determined by the battery tests.

You can use the table to calculate the following values for a final discharge voltage of approx. 80% of the nominal battery voltage (lead batteries: 1.6 v/cell):

- The discharge powers for two different standby times
- The discharge currents for two different standby times

The standby times are calculated by comparing the battery currents.

Use the following table to calculate the discharge currents.

Discharge currents	Associated discharge times
I_1: 1 - 9999 A	t_1: 1 - 999 min
I_2: 1 - 9999 A	t_2: 1 - 999 min

Table 17 - Discharge currents

The discharge currents and standby times must also comply with the following conditions:

$t_2/I_1 > t_1/I_2$
$t_2 > t_1$
$I_1 > I_2$

BTD values

You set the battery time of discharge parameters in the **BTD values** submenu.

Password

You change the password in the **Password** submenu. The default password is **1201**. Select a 4-digit numerical sequence as the new password.



Keep the password secure. A forgotten password can only be reset by AEG service subject to payment of a fee.

INV voltage

You set the inverter output voltage in the **INV voltage** submenu. The output voltage can be set with a tolerance of ± 3%.

8.4.8 Help

To access the **Help** menu, press the following function key in the operating display:



Call help menu

Dependent upon which menu you are in, a different function is assigned to each function key. The various functions have fixed symbols. These symbols appear on the function keys.

You can look up the meanings of the symbols in the Help menu.

9 FAULTS

This chapter describes the safety measures, the requirements to be met by personnel and how to troubleshoot faults.

9.1 Safety in the event of faults

9.1.1 Safety instructions



DANGER

Electric shock caused by live parts!

Risk to life due to electric shock

➔ Disconnect the equipment safely.



DANGER

Electric shock caused by residual voltage!

Batteries conduct a residual voltage following disconnection.

Risk to life due to electric shock

➔ Check the battery poles for hazardous voltages.

➔ Cover the battery poles.

➔ Follow the safety instructions issued by the battery manufacturer.

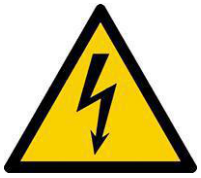


WARNING

Risk of accident due to insufficiently qualified personnel!

Possibility of death or very serious injury.

➔ Work on the equipment may only be carried out by skilled personnel.



ATTENTION

Malfunction caused by Q29

The manual bypass switch Q29 does not take the current status of the assemblies into account during switching procedures.

Malfunctions

➔ Before moving the switch to position 2:

1. Switch off the inverter (→ chapter 0)
2. Switch on the static bypass switch (→ chapter 0)

9.1.2 Personal protective equipment

Wear the following personal protective equipment to avoid injury:



Wear an electrician's safety helmet



Wear insulated boots



Wear insulating gloves with long sleeves



Wear insulating overalls



Wear a face shield

Check that personal protective equipment is in perfect order and report any defects you notice to the owner.

9.2 Requirements of personnel

Only skilled personnel may troubleshoot faults.

Skilled personnel are electricians who, on account of their specialist training, knowledge and experience, along with their knowledge of applicable regulations, are able to assess the work assigned to them and can detect potential hazards.

9.3 Fault messages

Faults during active operation are displayed on the DOU. In the event of critical equipment states, the **acoustic signal generator** will sound.

Fault indications are saved by the **data logger** (optional). The data logger saves the measured data and parameters of the following with every fault indication:

- The rectifier
- The inverter
- The static bypass switch

The data can then be read out for evaluation.

From the time at which the equipment is switched on, the (optional) **self-diagnosis** function monitors:

- The bus system
- The expansion boards
- The sensors

The difference between normal operation and fault scenarios is described in the table.

LED	Acoustic signal generator	Condition
Lights up	**--**	Normal operation: the load is supplied by the inverter.
Flashes	**--**	Fault: the load is supplied via the SBS circuit.
Flashes	**Sounds**	Fault: faults are acknowledged automatically after a short period of time.
Flashes	**Sounds**	Critical fault: the equipment ceases to function. Maintenance/repairs required.

Table 18 - Fault indications

9.4 Fault table

You can use the fault table below to identify the sources of problems. It also provides information about troubleshooting.

Fault	Clarify cause	Rectify fault
Load interrupter switch Q1 open	Earth fault or short circuit on the battery side	● Replace faulty fuses ● Close Q1 (if Q1 opens again: contact AEG Service) ● Carry out equipment maintenance and repairs
REC not working	● Q1 open ● Fuses –A92.1 F1 – F3 are defective	
SBS not working	● Fault in the SBS circuit ● Fuses –A92.2 F1 - F3, F6 – F8 are defective	● Check the SBS circuit ● Replace faulty fuses
INV not working	● INV switched off ● Fuses –A92.1 F4 - F5 are defective ● INV power supply has failed ● Battery voltage tolerance range exceeded	● Replace faulty fuses ● Check: Q1 open ● X2: Check voltage
Load is de-energised	Defective load fuse (external)	● X3: Check voltage ● Check load fuses (external)
Battery connection is faulty	● Battery isolator open ● Fuses F24 - F25 are defective	● Close the battery isolator ● Replace faulty fuses
Fan not working	● Defective fan fuse ● Loose contact in fan connector ● Fan is defective	● Replace faulty fuses ● Unlock and lock fan connector several times ● Replace fan
Equipment overload	Load consumption too high	● Wait (equipment will switch over to SBS circuit after 1 minute) ● Reduce the load

Table 19 - Fault table

9.5 Troubleshooting

Prerequisites

Fault indications are displayed to you via the DOU:

- The LEDs show the current status of the equipment
- The LCD displays the type of fault

This information enables you to categorise and rectify faults more quickly.



A fault switch-off does not disconnect the equipment all poles!

Troubleshooting

The following function key flashes in the **operating display**:


Status and measured values menu

➔ Rectify the fault:

- Press the


Status and measured values menu function key;

detailed information about the fault is displayed.

- Press the


Acoustic signal generator key;

the acoustic signal generator is acknowledged.

- Rectify the fault.
- Acknowledge the rectified fault in the **System** submenu.

✓ You have rectified the fault.



The DOU background illumination is lit until the fault is acknowledged.

10 MAINTENANCE AND REPAIRS

This chapter describes the safety measures, the requirements to be met by personnel and how to carry out maintenance and repairs.

10.1 Safety during maintenance and repairs

10.1.1 Safety instructions



DANGER

Electric shock caused by live parts!

Risk to life due to electric shock

➔ Disconnect the equipment safely.



DANGER

Electric shock caused by residual voltage!

Batteries conduct a residual voltage following disconnection.

Risk to life due to electric shock

➔ Check the battery poles for hazardous voltages.

➔ Cover the battery poles.

➔ Follow the safety instructions issued by the battery manufacturer.



WARNING

Risk of accident due to insufficiently qualified personnel!

Possibility of death or very serious injury.

➔ Work on the equipment may only be carried out by skilled personnel.



⚠ CAUTION

Risk of explosion after prolonged operation!

There is a risk of the electrolytic capacitors failing after 10 years of operation.

Risk of injury due to explosive noise level

Malfunctions

➔ Replace the electrolytic capacitors once they have been in operation for 10 years.



⚠ ATTENTION

Malfunction caused by Q29

The manual bypass switch Q29 does not take the current status of the assemblies into account during switching procedures.

Malfunctions

➔ Before moving the switch to position 2:

1. Switch off the inverter (→ chapter 0)
2. Switch on the static bypass switch (→ chapter 0)



⚠ ATTENTION

Malfunction caused by spare parts

Incorrect or poor quality spare parts invalidate the manufacturer's warranty.

Invalidated warranty.

Malfunctions

➔ Only use spare parts and wear parts approved by the manufacturer.



⚠ ATTENTION

Malfunction caused by batteries

The batteries have a reduced standby time whilst a battery test is in progress.

Malfunctions

➔ Think carefully before starting a battery test.

➔ Avoid mains failure.

10.1.2 Personal protective equipment

Wear the following personal protective equipment to avoid injury:



Wear an electrician's safety helmet



Wear insulated boots



Wear insulating gloves with long sleeves



Wear insulating overalls



Wear a face shield

Check that personal protective equipment is in perfect order and report any defects you notice to the owner.

10.2 Requirements of personnel

Maintenance and repairs may only be carried out by skilled personnel.

Skilled personnel are electricians who, on account of their specialist training, knowledge and experience, along with their knowledge of applicable regulations, are able to assess the work assigned to them and can detect potential hazards.

10.3 Maintenance schedule

Many maintenance tasks must be carried out at fixed intervals. The following table lists the maintenance tasks to be carried out and the corresponding maintenance intervals.

Maintenance interval	Maintenance task	Chapter
3 months	**Check condition of battery electrolyte**	-
3 months	**Check block battery voltage**	-
3 months	**Check battery voltage**	-
3 months	**Check electrolyte temperature** (open batteries)	-
6 months	**Carry out visual inspection**	10.4.2
6 months	**Carry out functional test**	10.4.3
12 months	**Check electrolyte density**(open batteries)	-
12 months	**Check battery screw connections**	-
40,000 hours	**Replace fan** *)	10.4.1
10 years	**Replace electrolytic capacitors**	10.4.7

Table 20 - Maintenance schedule

*) The maintenance interval for "Replace fan" depends upon the ambient conditions. If large quantities of dust have accumulated, clean the equipment at regular intervals using dry compressed air.



Adapt the maintenance intervals to the prevailing ambient conditions.



Keep a maintenance log recording all maintenance tasks carried out and when.

10.4 Carrying out maintenance and repairs

10.4.1 Fan replacement

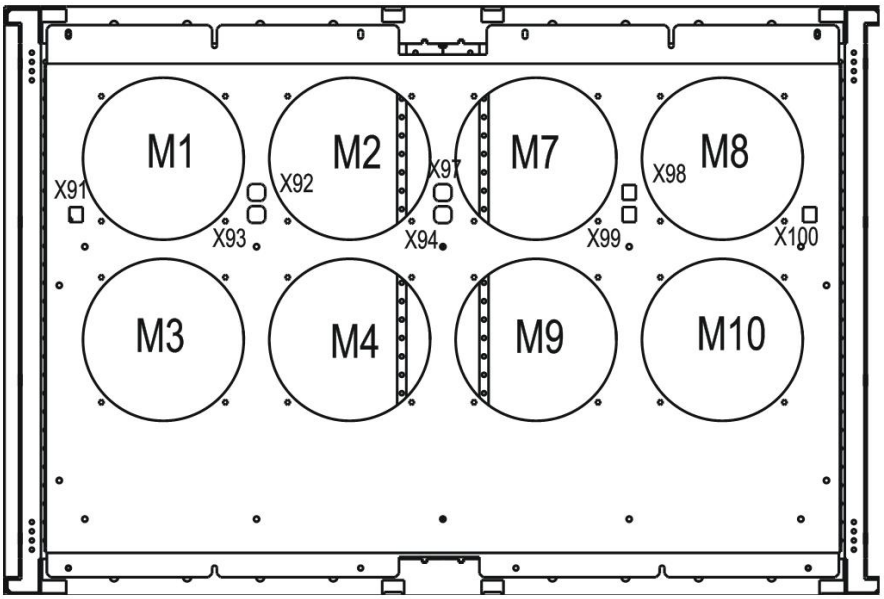


Figure 25 - Fan position

Preparations

Before replacing fans, please note:

- You must follow the safety instructions for changing fans in normal operation (→ chapter 0)

Removing a fan

➔ To remove a fan:

- Unscrew the fixing bolts on the fan cover
- Remove the fan cover
- Unlock the fan connector
- Unplug the fan connector
- Remove the fan

✓ You have removed the fan.

Installing a fan

➔ To install a fan:

- Assemble the fan
- Fit the fan cover
- Tighten the fixing bolts to 1.3 Nm
- Plug in the fan connector
- Lock the fan connector
- Check the function of the fan

✓ You have installed the fan.

10.4.2 Carrying out a visual inspection

➔ To inspect the equipment:

- Disconnect the equipment safely (→ chapter 0)
- Check that all screw connections and plug connections are secure
- Check the equipment for conductive soiling and damage
- Check safety devices and warning notices for soiling and damage

✓ You have completed the visual inspection of the equipment.

10.4.3 Carrying out a functional test

➔ To check the function of the equipment:

- Set the manual bypass switch Q29 to position "3 - Manual bypass".
- Disconnect the equipment safely (→ chapter 0)
- Restart the equipment (→ chapter 0)
- Check the LEDs
- Check rectifier and inverter start-up
- Check the REC and INV output voltages
- Check the SBS
- Check the SBS output voltage
- Check the battery charging voltage

✓ You have checked the function of the equipment.

10.4.4 Checking batteries

Preparations

Please note the following before checking batteries:

- Ensure compliance with standards DIN 43539 Part 1 and DIN VDE 0108
- Ensure compliance with standard DIN 43530 Part 3 before refilling battery electrolyte
- Automatic test equipment must not be used without the written approval of the battery manufacturer

Checking batteries

Check the batteries in accordance with the manufacturer specifications. Please also note:

- Avoid creepage currents; keep batteries clean and dry
- Only use pure water without additives for cleaning the plastic battery components
- Refill open batteries with distilled water as soon as the battery electrolyte reaches the lower marker



The battery charge is checked automatically every week.



Contact AEG Service if the battery voltage does not comply with specified values and the batteries are charging without errors.

10.4.5 Starting battery tests

Preparations

Please note the following before testing batteries:

- Run the equipment in "Operation with mains supply available" mode (normal operation)
- Check the connection between the batteries and the equipment
- Wait at least 1 minute between battery tests



Some battery tests are optional and thus cannot be run for all items of equipment.

Preparations for the capacity check

Please note the following before starting the battery test:

- Rectifier operating mode: charging or trickle charging
- Battery voltage > 2.2 V/cell (for lead-acid cells)
- Rectifier current < 90% of I_{nom}
- Rectifier current > battery discharge current setpoint +5%

Preparations for the capacity test

Please note the following before starting the battery test:

- Rectifier operating mode: trickle charging

Starting the battery test

➔ Start the battery test from the DOU:

- Select "Service" in the main menu
- Select the "Battery test" submenu
- Select battery charging circuit test, capacity check or capacity test
- Modify the parameters in the "Battery values" submenu
- Start the battery test.
  The yellow LED flashes.

✓ You have started a battery test.



The battery charging circuit test runs automatically at weekly intervals.



The batteries may fail during a battery test. If this happens, switchover to "Operation with a defective inverter" occurs. The load is supplied via the SBS circuit.

10.4.6 Replacing fuses

The fuses are entered in the following table.

Fuse	Fuse value	Purpose of the fuse
A92.1-F1	5 A (fast)	Rectifier circuit
A92.1-F2	5 A (fast)	Rectifier circuit
A92.1-F3	5 A (fast)	Rectifier circuit
A92.1-F4	4 A (fast)	Rectifier DC
A92.1-F5	4 A (fast)	Rectifier DC
A92.1-F6	8 A (slow)	Load circuit
A92.1-F7	Free	
A92.1-F8	Free	
A92.1-F9	2 A (fast)	Options
A92.2-F1	5 A (fast)	Load circuit
A92.2-F2	5 A (fast)	Load circuit
A92.2-F3	5 A (fast)	Load circuit
A92.2-F4	4 A (fast)	Inverter DC
A92.2-F5	4 A (fast)	Inverter DC
A92.2-F6	5 A (fast)	Bypass circuit
A92.2-F7	5 A (fast)	Bypass circuit
A92.2-F8	5 A (fast)	Bypass circuit
A92.2-F9	Free	

Table 21 - Fuses

Inside the equipment, the fuses are identified as follows.

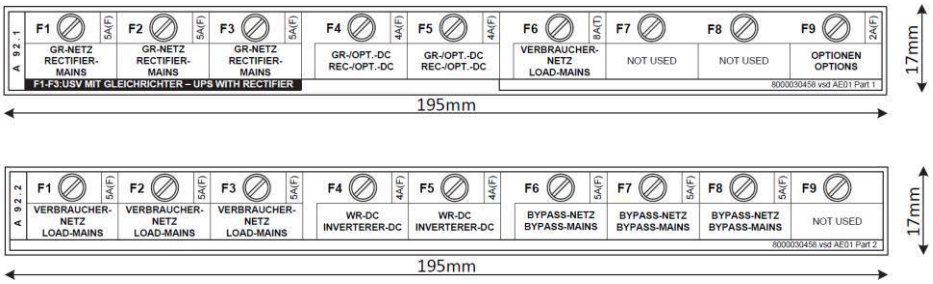


Figure 26 - Position of fuses

10.4.7 Replacing electrolytic capacitors

Contact AEG Service if you need to replace electrolytic capacitors.

11 TAKING OUT OF SERVICE AND DISPOSAL

This chapter describes the safety measures, the requirements to be met by personnel and how to take the equipment out of service, mothballing, restarting, storage and disposal.

11.1 Safety during taking out of service and disposal

11.1.1 Safety instructions



DANGER

Electric shock caused by live parts!

Risk to life due to electric shock

➔ Disconnect the equipment safely.



DANGER

Electric shock caused by residual voltage!

Batteries conduct a residual voltage following disconnection.

Risk to life due to electric shock

➔ Check the battery poles for hazardous voltages.

➔ Cover the battery poles.

➔ Follow the safety instructions issued by the battery manufacturer.



WARNING

Risk of accident due to insufficiently qualified personnel!

Possibility of death or very serious injury.

➔ Work on the equipment may only be carried out by skilled personnel.



⚠ CAUTION

Chemical burns caused by battery electrolyte

Eye or skin contact with battery electrolyte can cause blindness and serious injuries.

➔ In the event of **skin contact**:

1. Rinse the affected area in plenty of water
2. Bandage the affected area with gauze
3. Throw away all clothing affected by the spillage

➔ In the event of **eye contact**, rinse the eyes with an eye wash or plenty of running water.

➔ In the event of **swallowing**:

- Drink as much water or milk as you can
- Try not to vomit

11.1.2 Personal protective equipment

Wear the following personal protective equipment to avoid injury:

Skilled personnel



Wear an electrician's safety helmet



Wear insulated boots



Wear insulating gloves with long sleeves



Wear insulating overalls



Wear a face shield

Check that personal protective equipment is in perfect order and report any defects you notice to the owner.

Transport personnel



Wear a safety helmet



Wear protective footwear



Wear a hand shield

Check that personal protective equipment is in perfect order and report any defects you notice to the owner.

11.2 Requirements of personnel

Taking out of service, mothballing, restarting and disposal

Taking out of service, mothballing, restarting and disposal may only be carried out by skilled personnel.

Skilled personnel are electricians who, on account of their specialist training, knowledge and experience, along with their knowledge of applicable regulations, are able to assess the work assigned to them and can detect potential hazards.

Storage

Transport personnel are permitted to put the equipment into storage.

Transport personnel are defined as personnel who have the necessary skills, training and knowledge in the field of transport.

11.3 Taking the equipment out of service

Preparations

Please note the following before taking the equipment out of service:

- Make sure that the equipment has been disconnected safety (→ chapter 0)
- Make sure that the capacitors are discharged

Taking the equipment out of service

➔ To take the equipment out of service:

- Press the "~0" key on the DOU and acknowledge the message; *the green LED flashes.*
- Press the "=0" key on the DOU and acknowledge the message; *The green and yellow LEDs flash.*
- Set the manual bypass switch Q29 to position "2 - Service operation", *LCD: "Manual bypass symbol" is displayed.*



You only need to do this if a manual bypass switch Q29 is installed in your equipment.

- Open the battery isolator.
  The red, green and yellow LEDs flash.
- Set the load interrupter switch Q1 to the "OFF" position.
- Set the manual bypass switch Q29 to position "3 - Manual bypass".

✓ You have taken the equipment out of service.



If you take the equipment out of service for a prolonged period, the batteries must be fully charged approximately every 3 months. Follow the instructions issued by the battery manufacturer.

11.4 Mothballing the equipment

Preparations

Please note the following before mothballing the equipment:

- Make sure that the equipment has been disconnected safety (→ chapter 0)
- Make sure that the equipment has been taken out of service (→ chapter 0)
- Make sure that the capacitors are discharged

Mothballing the equipment

➔ To mothball the equipment:

- Remove the protective cover from the connection panel
- Disconnect the supply lines and PE conductor from the cable clamp rail
- Disconnect the shield of the battery line from the PE conductor connection
- Disconnect the supply lines from the connection terminals
- Disconnect the PE conductor from the PE conductor terminals
- Remove the supply lines from the equipment
- Replace the protective cover on the connection panel.

✓ You have mothballed the equipment.



When you mothball the equipment, the batteries must be fully charged approximately every 3 months. Follow the instructions issued by the battery manufacturer.

11.5 Restarting the equipment

Preparations

Please note the following before restarting:

- Check that the equipment and the batteries are in perfect order
- Check that the load interrupter switch Q1 is in the "OFF" position
- Check that the battery isolator is open
- Check that the manual bypass switch Q29 is in position "3 - Manual bypass"

Restarting the equipment

➔ To restart the equipment:

- Connect the mains voltage for the rectifier.
- Connect the mains voltage for the SBS circuit.
- Set the manual bypass switch Q29 to position "2 - Service operation".(optional)
  The red, yellow and green LEDs light up.
  LCD: "Self-test" is displayed.
- Check status: The SBS is starting up,
  the green and yellow LEDs are flashing.
  LCD: "Main menu" is displayed.
- Wait for status: The SBS is ready,
  the green LED is flashing.
  LCD: "SBS symbol OK" is displayed.
- Set the manual bypass switch Q29 to position "1 - Inverter operation".(optional)
  The green and yellow LEDs flash.
- Set the load interrupter switch Q1 to the "ON" position.
- Wait for status: The INV is ready,
  the green LED is flashing.
  LCD: "INV symbol OK" is displayed.
- Close the battery isolator.
- Press the "~I" key on the DOU.
  LCD: "INV symbol" flashes.
- Wait for status: SBS switches to normal operation,
  green LED lights up.
  LCD: "Energy flow display via INV" is displayed.

✓ You have restarted the equipment.

Putting the equipment intostorage

For safe storage, proceed as follows:

- Select a dry, ventilated room with a stable protective roof as the storage location. The room temperature must be between -35°C and +70°C. The relative air humidity should be ≤ 85%.
- The equipment may only be stored for a maximum period of six months in the original packaging.
- If it has to be stored for longer than six months:
  - Add normal desiccant
  - Seal airtight in plastic film
- The documentation issued by the battery manufacturer sets out specific storage conditions for the batteries.

11.6 Disposing of the equipment

This section tells you how to dispose of the individual components of the equipment.

- **Packaging**: Dispose of the stretch plastic film and the moulded parts made from polyethylene foam with normal industrial waste. They are chemically inactive and can be disposed of or recycled.
- **Metal parts**: Take metal parts to a scrap metal dealer. The equipment housing, the lines, the inverter, the rectifier and the transformers can be recycled via normal routes.
- **Electronics components**: Take the electronics components to a recycling company which specialises in disposing of electronics components.
- **Batteries**: Follow the specifications set out by the battery manufacturer for toxic and hazardous substances.

  Batteries must be removed from all parts of the equipment and disposed of in accordance with the regulations for toxic and hazardous substances.
- **Other components**: Dispose of rubber seals and plastic parts with industrial waste. They can be disposed of or recycled.



Electrical and electronics waste must only be disposed of in compliance with local legislation and regulations.



Never dispose of used **batteries or battery material** with refuse. Ensure compliance with local legislation and regulations governing the storage, handling and disposal of batteries and battery material.

12 APPENDIX

12.1 Spare parts

To ensure high equipment availability, keep a stock of the following spare parts.

Item	Spare part
F1 - F10	Fuse, 2 A, slow-blow
F13 - F22	Fuse, 5 A, fast
F24 - F27	Fuse, 4 A, fast
F28	Fuse, 2 A, fast
F31 - F33	Fuse, 5 A, fast
M1 - M10	Fan
K7	Inverter output contactor
Q1	Load interrupter switch
Q29	Manual bypass switch

Table 22 - Spare parts



Have the unit number of the equipment handy when ordering spare parts.

12.1.1 Exclusion of liability

AEG Power Solutions GmbH will rescind all obligations such as warranty agreements, service contracts, etc. entered into by AEG Power Solutions GmbH or its representatives without prior notice in the event of maintenance and repair work being carried out with anything other than original AEG Power Solutions GmbH spare parts or spare parts purchased from AEG Power Solutions GmbH.

12.1.2 Ordering spare parts

To order spare parts for Protect 8 units, please contact AEG Power Solutions GmbH in Warstein-Belecke, Germany.

To speed up processing of your order, have your CNF number handy.

12.2 Standards and directives

This section lists the legislation, standards, directives and regulations used in drafting the operating instructions and designing and building the equipment.

12.2.1 Drafting of the operating instructions

The operating instructions have been drafted in accordance with:

- European Directive 2006/42/EC
- DIN EN ISO 12100-1:2003 - Safety of machinery
- DIN EN ISO 12100-2:2003 - Safety of machinery
- DIN EN 62040-1:2009 - Uninterruptible power systems
- DIN EN 62079:2001 - Preparation of instructions
- ANSI Z535.6-2006 - Product Safety Information

12.2.2 Equipment design and build

The equipment has been designed and built in accordance with:

- DIN EN 50274 - Low-voltage switchgear and controlgear assemblies
- DIN VDE 0100-410 - Low-voltage electrical installations
- DIN EN 62040-1:2009 - Uninterruptible power systems

The CE marking on the equipment confirms compliance with the EC framework directives:

- 2014/35/EC - Low Voltage Directive
- 2004/108/EC - Electromagnetic Compatibility

12.3 Glossary

EMC

Electromagnetic compatibility describes the capability of a unit to function without restrictions when installed in the vicinity of other units. It is assessed by measuring the interference emitted by each unit and the sensitivity levels of each unit to the interference emitted by others.

EN

Europäische Norm (European standard). In the field of electrical and electronic equipment, these are the European standards issued by CENELEC.

EU Directive

A regulation issued by the European Union which the member states are duty-bound to adopt in national law. A distinction is drawn between horizontal directives, which affect all types of product, and vertical directives, which only apply to certain types of product. At present, manufacturers of electrical equipment must comply with the applicable editions of the EMC Directive and the Low Voltage Directive.

SNMP

The Simple Network Management Protocol is a network protocol which is used for data transfer over Ethernet type computer networks.

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12.6 Addresses

Do you have any suggestions for improving these operating instructions?

Do you have any questions on any of the subjects dealt with in these operating instructions?

Our service department is available on the hotline number given below:

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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

AC UPS F&G - TAG: UP-200F4

BLUE PRO BATTERY MONITORING MANUAL

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

AEG

POWER SOLUTIONS

Battery Charging Circuit Monitoring

BLÜ PRO

Operating Instructions

AEG Power Solutions GmbH, Warstein-Belecke
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EN

Revision

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1. APPLICATION AND CONDITIONS OF APPLICATION

The task of BLÜ-PRO battery charging circuit monitoring is to monitor the correct operating status of a battery in conjunction with the charger of a UPS.

Monitoring covers the following faults:

- Failure of one or both battery fuses
- Failure of one or more cell connectors
- Failure of one or more battery cells
- Interruption of the charging cables or the cables to BLÜ-PRO
- Battery faults leading to a voltage asymmetry

Figure 1 shows the general principle of operation as well as how BLÜ-PRO is electrically integrated into the Protect series UPS units.

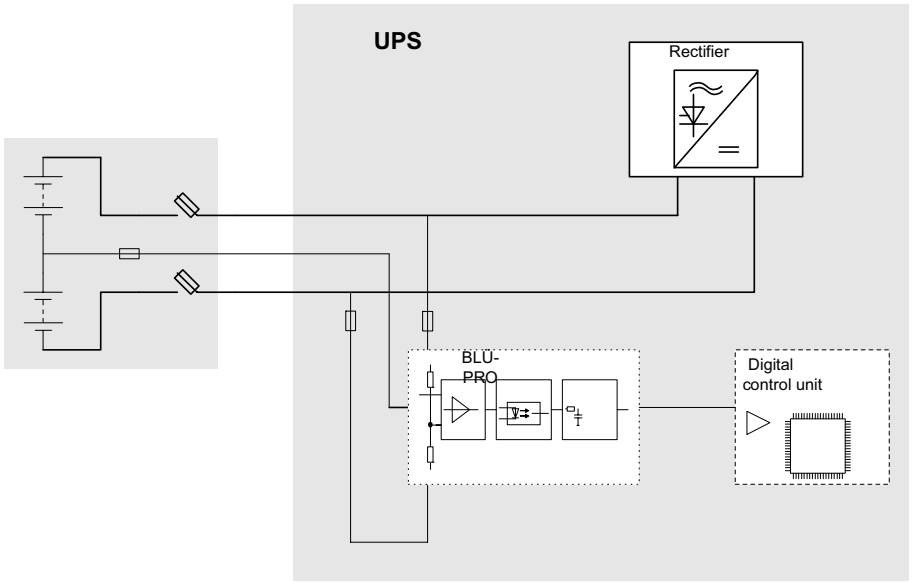


Figure 1

The electrical power supply to BLÜ-PRO comes via the measuring lines. It is adapted to the corresponding operating voltage by means of matching resistors on soldering tags and via Dip-Fix switches or via jumpers, which connect 2 pins with one another on the PCB.
The assembly can be used for the following voltage ranges:

480 V in conjunction with Protect Blue

384 V in conjunction with Protect 3, Protect 4 and Protect 8

216 V in conjunction with Protect 5 and Protect 8

108 V in conjunction with Protect 5 and Protect 8

A maximum of 2 assemblies can be connected to a UPS in the Protect 3, Protect 4, Protect 5 and
Protect 8-S14 series. This makes monitoring of a two-phase battery possible. Adjustment for use as a second assembly is made via the S6 switch.

A maximum of 4 assemblies can be connected to a UPS in the Protect 8 and Protect Blue series. This makes monitoring of a four-line battery possible.

2. PRINCIPLE OF OPERATION

BLÜ-PRO battery charging circuit monitoring measures the voltage differential between the battery central pick-off and a theoretical neutral point formed by resistors. It sends an equivalent, zero-potential analog signal of 0 – 5 V to the digital rectifier control unit of the UPS. There, the signal is processed by the software and the voltage differential [udm = (U1 – U2) /2] is displayed on the DOU. In addition, a fault message is displayed if the permitted limit values are violated. The limit values are stored in the EEPROM of the rectifier control unit and are programmed at the factory. They can be modified using a PC if necessary.

2.1 Signalling

The software-based monitoring system has a 3-level structure.

Level 1
DOU display:

- Battery asymmetry
- Yellow LED flashes

Level 2
DOU display:

- Battery asymmetry fault
- Yellow and red LEDs flash

Level 3 (line break or fuse defective; hardware fault)
DOU display:

- Battery centre volt. Monit. error
- Red LED flashes

All 3 malfunction levels activate the collective fault message via relay K25 on the remote signalling unit

3. SETUP AND CONNECTION

The assembly is built into a housing.
The connections for the measuring lines and for the signal lines to the digital control unit are directly accessible. The setting potentiometers, switches and matching resistors can be accessed by removing the housing cover.

DANGER

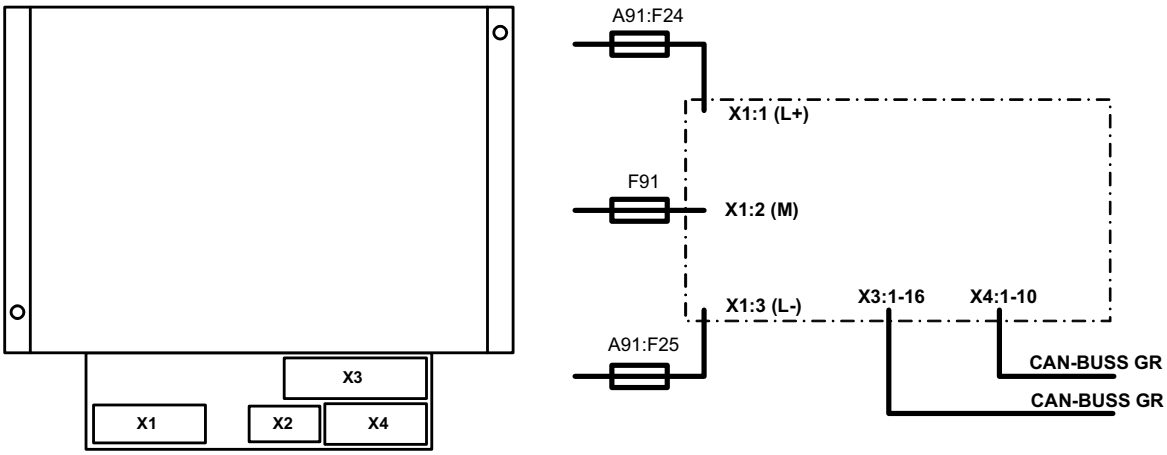
Electric voltage!

Risk to life due to electric shock.

➔ After the housing has been removed, some components with dangerous levels of voltage are freely accessible.

➔ The housing may therefore only be removed by trained electricians.

3.1 Connection Diagram



X1	3-pin Combicon GMBST 7.67	**L- , M , L+**
X2	only with 8000011505 (not in use)	
X3	16-pin DIN 40651	**CAN-BUSS LR**
X4	10-pin DIN 40651	**CAN-BUSS LR**

Figure 2

3.2 Setting Values

The response thresholds for the malfunction levels are stored in the EEPROM of the rectifier control unit in the UPS.

Factory set values:

Protect 3 / Protect 4 / Protect 8 with 384 V battery voltage:

	Level 1	Level 2	Level 3
Udm	> 2 V	> 3.5 V	
Uo			< 0.1 V or > 4.5 V

Protect 5 / Protect 8 with 216 V battery voltage:

	Level 1	Level 2	Level 3
Udm	> 1.6 V	> 3 V	
Uo			< 0.1 V or > 4.5 V

Protect 5 / Protect 8 with 108 V battery voltage:

	Level 1	Level 2	Level 3
Udm	> 1.2 V	> 2.5 V	
Uo			< 0.1 V or > 4.5 V

Protect Blue with 480 V battery voltage:

	Level 1	Level 2	Level 3
Udm	> 3.2 V	> 4.2 V	
Uo			< 0.1 V or > 4.5 V

4. SERVICE NOTES

4.1 General Setting Notes

The assembly is factory-set and calibrated for units with a 480 / 384 V battery voltage. If the assembly is factory-installed in a UPS as an option, it is adapted to the system in question.

Note the following points if the assembly is retrofitted by the customer as an option:

480V battery voltage, Protect Blue

Jumper	Jumper position	Older version with Dip-Fix position	Remark
S1	2-3	Open	
S2	1-2	Open	Service switch
S3	1-2	Open	
S4	1-2	Open	
S5	1-2	Open	
S6	1-2	Closed	
S7	2-3	-	Special function

384V battery voltage
Protect 3, Protect 4 and Protect 8-S14:

Jumper	Jumper position	Older version with Dip-Fix position	Remark
S1	2-3	Open	
S2	1-2	Open	Service switch
S3	1-2	Open	
S4	1-2	Open	
S5	1-2	Open	
S6	1-2	Closed	1. Assembly
S6	3-4	Closed	2. Assembly
S7	2-3	-	Special function

108V / 216V battery voltage Protect 5

Jumper	Jumper position	Older version with Dip-Fix position	Remark
S1	2-3	Open	
S2	1-2	Open	Service switch
S3	2-3	Closed	
S4	1-2	Open	
S5	1-2	Open	
S6	1-2	Closed	1. Assembly
S6	3-4	Closed	2. Assembly
S7	2-3	-	Special function

108V / 216V battery voltage Protect 8-S10

Jumper	Jumper position	Older version with Dip-Fix position	Remark
S1	2-3	Open	
S2	1-2	Open	Service switch
S3	2-3	Closed	
S4	1-2	Open	
S5	1-2	Open	
S6	1-2	Closed	
S7	2-3	-	Special function

4.2 Centre Setting with Symmetrical Numbers of Blocks

The voltage position of the theoretical neutral point can be calibrated to zero voltage using a potentiometer.

The name of the potentiometer follows the assembly version:
R 45 for assemblies with numbers 8000047045, 8000057501 and 8000065431

R43 for assemblies with number 8000011505

The assembly number can be seen once the housing cover has been removed.

In the rest of these operating instructions, the potentiometer is called R4x.

The centre connection to the battery must be opened in this case and jumper S2 must be connected to 2 and 3. (In older versions, close S2.). A voltmeter connected between S3.1 (ground) and S2.1 (Ud) shows the voltage differential. Adjust R4x until voltage Ud = 0 V. The alternating illumination of the 2 LEDs provides general assistance in doing this.

After the S2 calibration, return to the initial setting.

Note: Calibration with switch S2 inactive and the centre connection closed is only possible if the two halves of the battery have the same voltage position. Otherwise, calibration occurs to an existing asymmetry.

4.3 Centre Setting with Asymmetrical Number of Blocks

If there is an odd number of blocks, the centre connection of the battery must be positioned asymmetrically one block up or down. So that the complete range of supply voltage is also available in this case, it is necessary to use potentiometer R62 to calibrate the position of the supply voltage.
The jumpers of S4 and S5 should be connected to 2 and 3 in Protect 5 / Protect 8 (108V/216V battery voltage).
(In older versions: Dip-Fix switches S5 and S4 must be closed in Protect 5 / Protect 8 (108 V / 216 V battery voltage).)

The following measuring set-up is required:

For assemblies with numbers 8000057501, 8000047054 and 8000065431

Voltmeter 1 (V1)

Com to S3 (ground)
Input to S2 (Ud)

Voltmeter 2 (V2)

Com to S3 (ground)
Input to C202 plus (with measuring tip)

For assemblies with number 8000011505

Voltmeter 1: (V1)

Com to S3 (ground)
Input to S2 (Udm)

Voltmeter 2: (V2)

Com to V21/5 (ground)
Input to V28 cathode (supply voltage)

Setting the supply voltage:

1. Use potentiometer R4x to set V1 to 0 V
2. Use potentiometer R62 to set V2 to +12 V
3. Use potentiometer R4x to set V1 to 0 V
4. Use potentiometer R62 to set V2 to +12 V

Setting the ideal centre

1. Start rectifier
2. Connect the battery and centre connection to the UPS
3. Wait until constant conditions have been established.
4. Measure the voltage of the negative half of the battery. (U2)
5. Measure the total voltage. (Ug)
   Zg Total number of cells
   Z2 Number of cells in neg. half
6. Calculate the voltage differential:
   Udm = U2 - Ug*Z2/zg
7. Use potentiometer R4x to set the calculated Udm value, observing the correct sign.

5. TECHNICAL DATA

Degree of protection..... IP 20

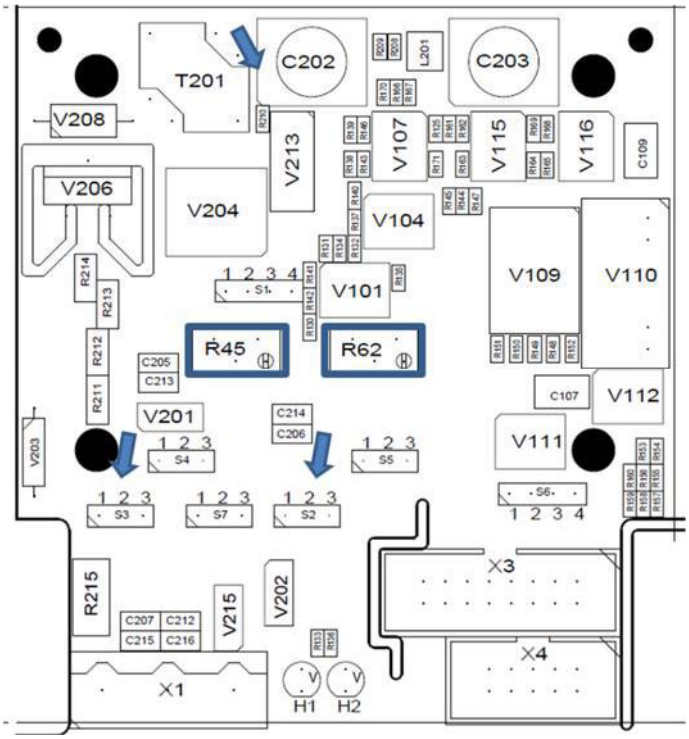
Temperature range..... -10 °C to +45 °C

Storage temperature ..... -10 °C to +70 °C

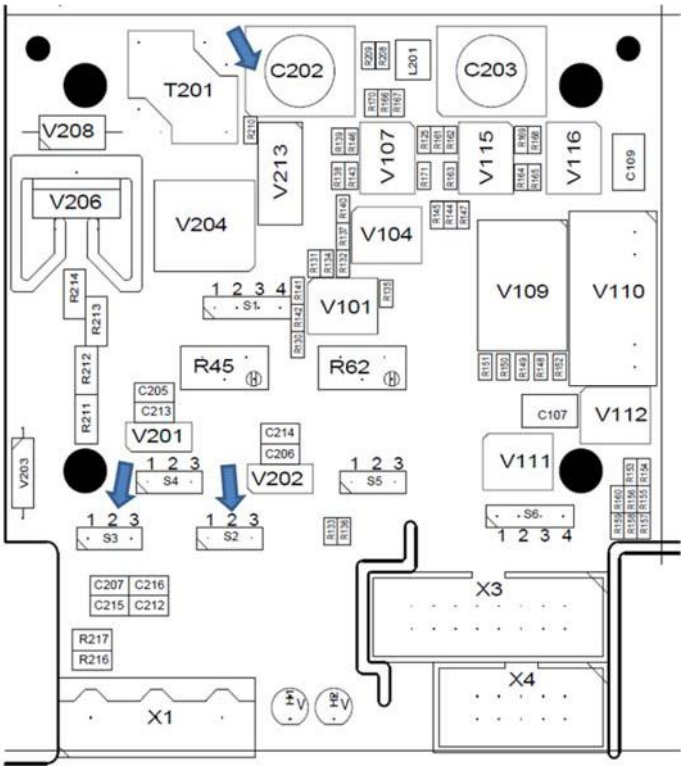
Climatic category..... F

6. APPENDIX

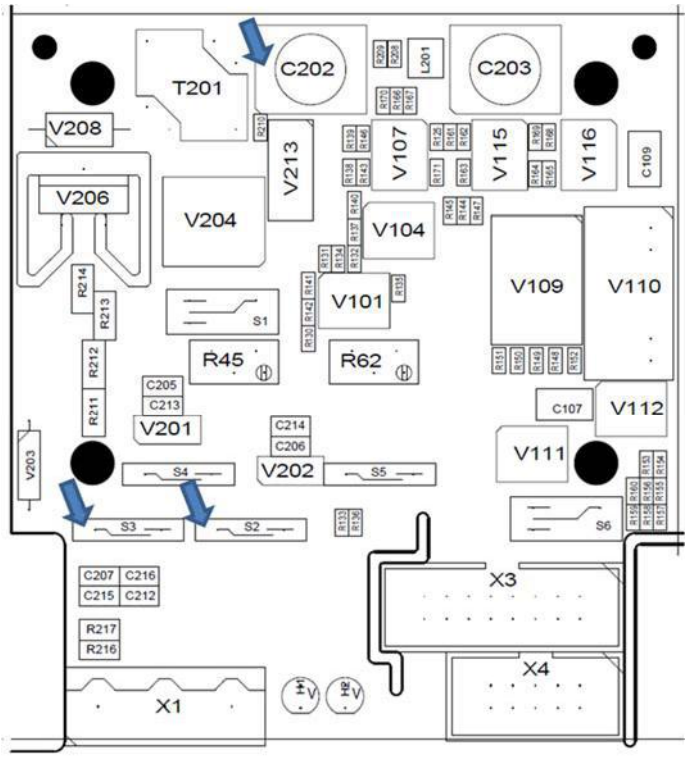
6.1a Position of Setting Elements and Measuring Points for Assemblies 8000065431AE00



6.1b Position of Setting Elements and Measuring Points for Assemblies 8000057501AE>=03

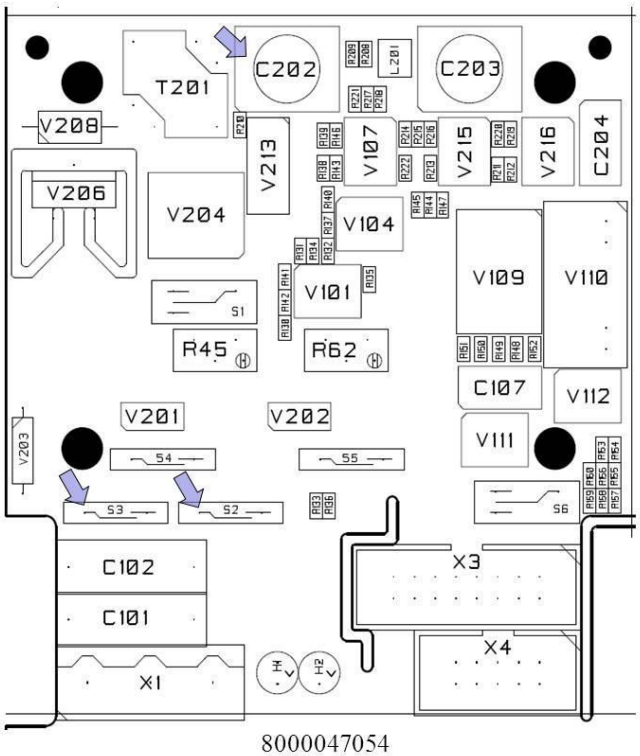


6.2 Position of Setting Elements and Measuring Points for Assemblies 8000057501AE<=02



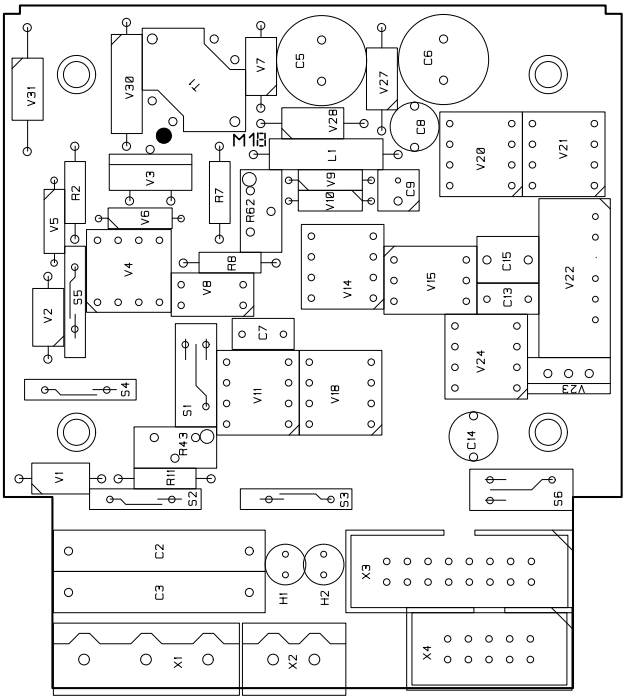
8000057501

6.3 Position of Setting Elements and Measuring Points for Assemblies 8000047054



8000047054

6.4 Position of Setting Elements and Measuring Points for Assemblies 8000011505



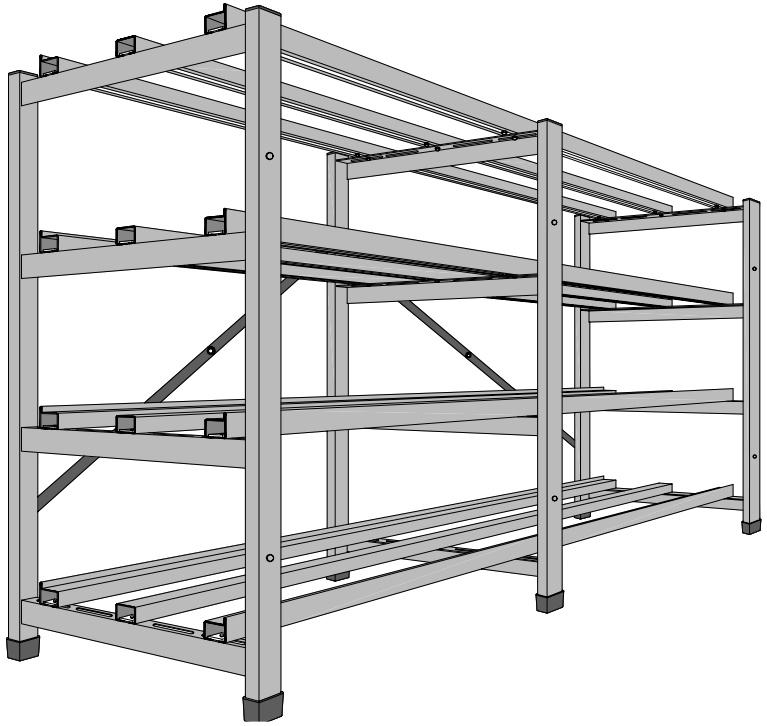
Base Load Power Hub (BLPH)

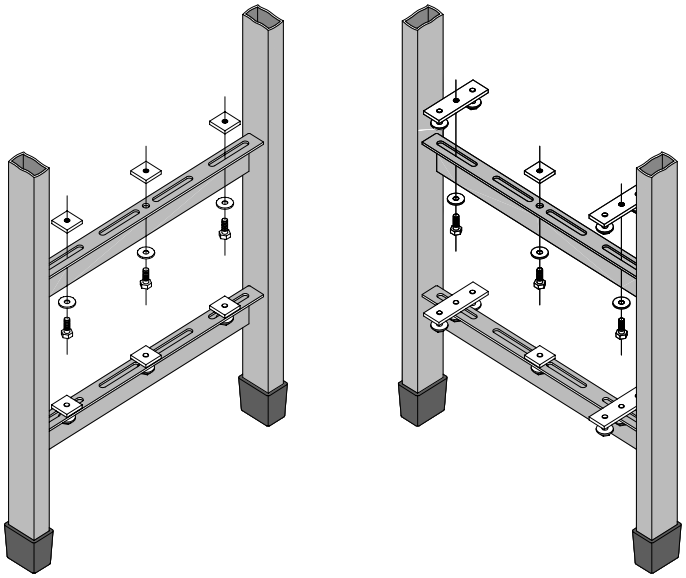
AC UPS BATTERY RACK - TAG: BA-200F3
MOUNTING AND INSTALLATION INSTRUCTIONS

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Assembly instructions - Montageanleitung - Instructions de montage - Instruzione di montaggio - Instucciones de montaje

Applicable to BA-200F3 A/B battery racks





Racks for VRLA Batteries

GB

The procedure for assembly can be clear seen in the illustrations.

- Pre-assemble the supports, note left and right side parts in this case.
- In the case of racks that consist of several elements, connecting plates are to be employed at the jointing points.

NOTE

Before you start with the assembly of the rack, check the packages delivered to ensure you have received the correct number and items.

In case of damage to the coating, this must be repaired immediately.

Gestelle für VRLA Batterien

D

Aus den Abbildungen ist die Vorgehensweise der Montage ersichtlich.

- Seitenteile vormontieren, dabei auf linke und rechte Seitenteile achten.
- Bei Gestellen, die aus mehreren Elementen bestehen, sind an den Stoßstellen Klemmleisten zu verwenden

NOTIZ

Bevor Sie mit dem Aufbau des Gestells beginnen, überprüfen Sie die angelieferten Packstücke auf Vollständigkeit.

Im Falle einer Beschädigung der Beschichtung muss diese sofort repariert werden.

Chantier pour montage de batteries sans entretien

F

Les dessins illustrent les différentes étapes du montage.

- Procéder au montage préalable des échelles tenant compte de leur disposition gauche et droite.
- Pour les chantiers composés de plusieurs éléments, on utilisera à leur point de réunion les plaques de raccordement.

NOTE

Avant le montage du chantier, vérifier l'intégralité du matériel livré.

Un endommagement de la plastification doit être réparé immédiatement.

Scaffali per batterie ermetiche

I

Dalle illustrazioni si possono desumere le modalitá di procedura per il monaggio.

- Preassemblare gli elementi laterali. Tenere conto della disposizione degli elementi laterali destri e sinistri.
- In occasione del montaggio di telai che sono composti da piú elementi, presso i giunti devono essere utilizzate le piastre di connessione.

NOTA

Prima di iniziare a montare l´intelaiatura, controllare che la confezione di imballaggio contenga tutti i pezzi.

In caso di danneggiamento del rivestimento, quest´ultimo deve essere immediatamente riparato.

Estanteria para baterias hermeticas

E

De las ilustraciones se deduce la manera de proceder en el montaje.

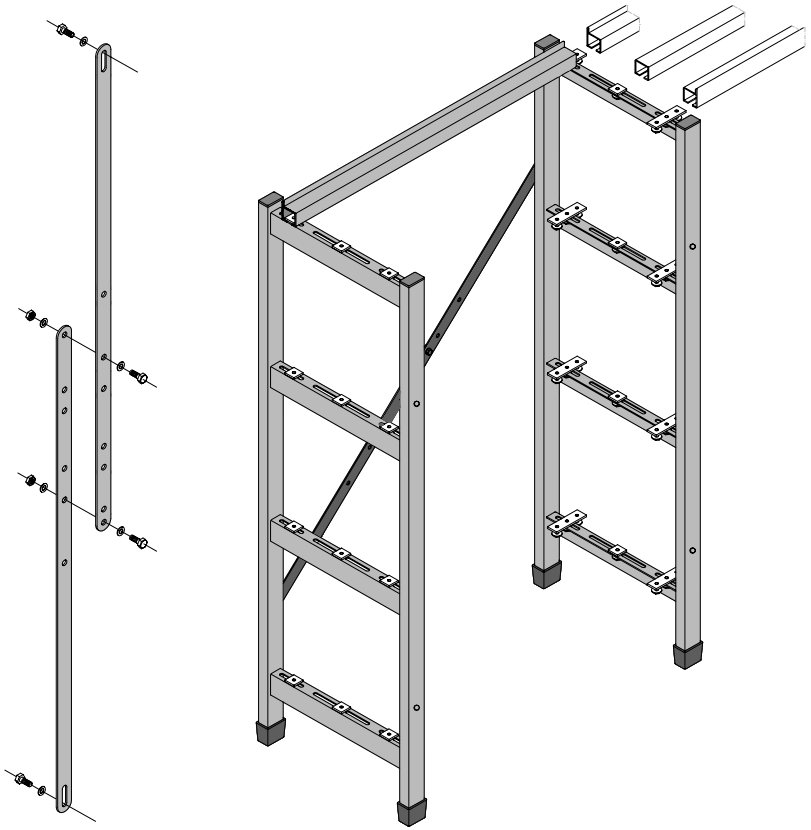
- Montar previamente las partes laterales, prestando atención a la vez a la parte lateral de la izquierda y de la derecha.
- En caso de marcos que se compongan de varios elementos hay que utilizar regleta de bornes en las junturas.

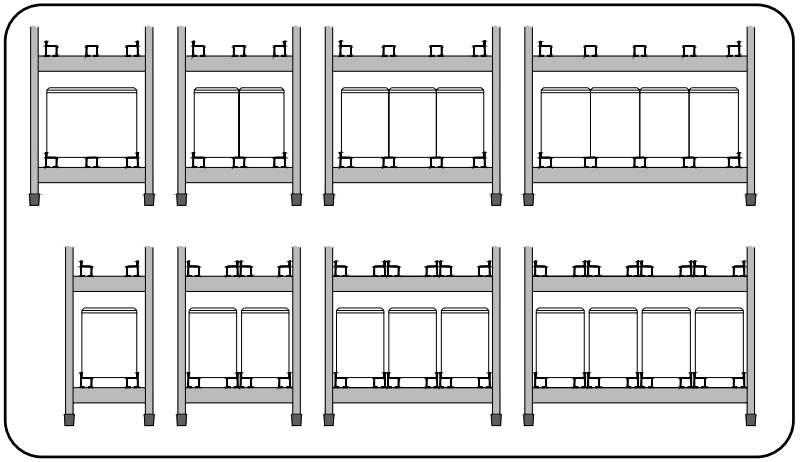
NOTA

Antes de empezar con el montaje del marco examine las piezas del paquete para ver si están completas.

En caso de que haya algún daño en el recubrimiento, éste tiene que ser reparado enseguida

Assembly instructions - Montageanleitung - Instructions de montage - Instruzione di montaggio - Instucciones de montaje





GB

- Place supports and fix with rail.
- Pre-assemble diagonal bracings according to drawing or length of the rails, and attach to the supports. Do not tighten up bolts.
- Insert rails between anchor / clamping plates and align support rails. Tighten bolts lightly only.
- Align racks. In case of irregularities in the floor, employ level-equalizing disks. Tighten all bolts.

NOTE

All bolts must be tightened to a torque of 8 Nm [11 ft·lb]. Do not over tighten.

For additional information, please refer to AlphaSYS® *drawings and assembly instructions.*

D

- Ständer hinstellen und mit einer Auflageschiene fixieren.
- Diagonalverstrebungen entsprechend der Zeichnung bzw. Länge der Auflageschienen vormontieren und am Ständer anbringen. Schrauben nicht festziehen.
- Auflageschiene zwischen Klemmplatten bzw. Klemmleisten einführen und ausrichten. Schrauben nur leicht anziehen.
- Gestell ausrichten. Bei Unebenheiten im Boden Ausgleichsscheiben verwenden. Alle Schrauben anziehen.

NOTIZ

Alle Schrauben sind mit einem Drehmoment von 8Nm anzuziehen.

Für zusätzliche Informationen sehen Sie bitte AlphaSYS®*-Zeichnungen und Montageanleitung.*

F

- Placer le support et le fixer à l'aide d'un longeron.
- Prémonter les renforts selon le dessin ou en fonction des longerons. Les visser à l'échelle. Ne pas serrer les vis.
- Introduire et centrer les longerons entre les plaques de serrage et de raccordement. Serrer les vis légèrement.
- Centrer le chantier. Si le sol présente des inégalités, on utilisera les épaisseurs. Serrer maintenant toutes les vis.

NOTE

Serrer toutes les vis avec un couple de serrage de 8 Nm.

Pour toute information supplémentaire, veuillez vous reporter aux dessins AlphaSYS® *et au manuel d'utilisation.*

I

- Piazzare i montanti e fissarli per mezzo di un longherone.
- Preassemblare le diagonali in corrispondenza della lunghezza dei longheroni e poi applicarle ai montanti. Non serrare ancora le viti.
- Introdurre i longheroni tra le piastre di fissaggio e le piastre di connessione ed allinearle. Serrare leggermente le viti.
- Allineare lo scaffale. Se il pavimento presenta dislivelli, utilizzare i dischi spessore. Serrare tutte le viti.

NOTA

Tutte le viti devono essere serrate con un momento di coppia di 8 Nm.

Per ulteriori informazioni, consultare i disegni e le istruzioni per il montaggio AlphaSYS®.

E

- Colocar el soporte y fijarlo con una guía de asiento.
- Montar previamente los puntales diagonales de acorde con el dibujo o, respectivamente, con el largo de las guías de asiento e instalarlo en el soporte. No fijar los tornillos.
- Introducir y ajustar las guías de asiento entre las placas de bornes o, respectivamente, las regletas de bornes.
- Ajustar el marco. En caso de desigualdades en el suelo emplear guías compensadoras. Apretar todos los tornillos.

NOTA

Todos los tornillos tienen que ser apretados con un momento de giro de 8 nanómetros.

Para más informaciones mire los dibujos de AlphaSYS® *y las instrucciones de montaje.*

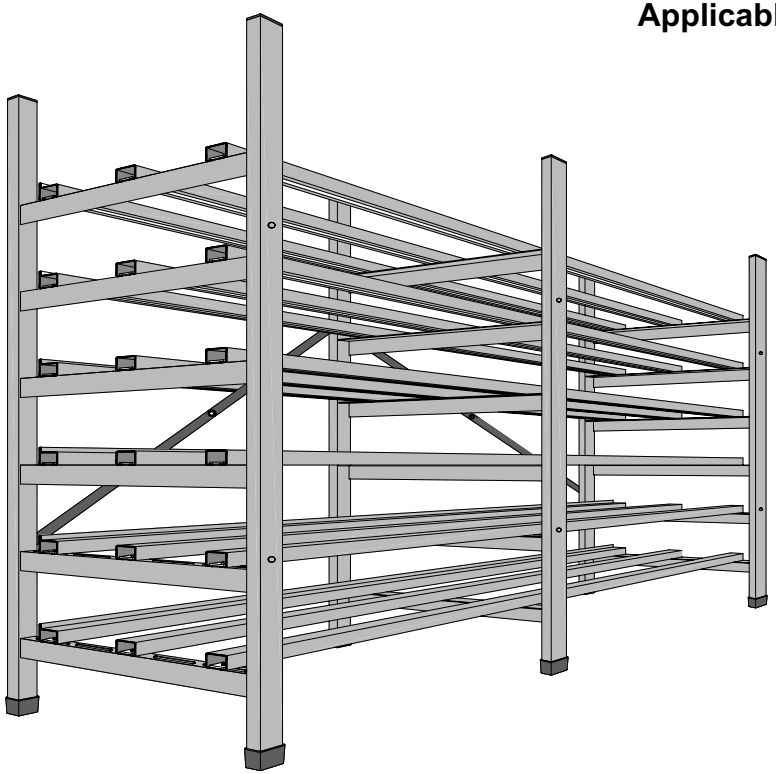
Base Load Power Hub (BLPH)

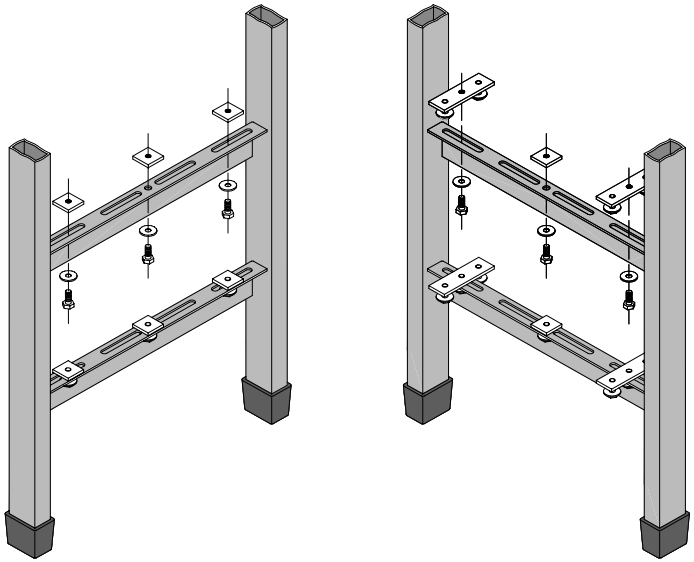
AC UPS BATTERY RACK - TAG: BA-200F4
MOUNTING AND INSTALLATION INSTRUCTIONS

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Assembly instructions - Montageanleitung - Instructions de montage - Instruzione di montaggio - Instucciones de montaje

Applicable to BA-200F4 A/B battery racks





Racks for horizontal battery installation

GB

The procedure for assembly can be clear seen in the illustrations.

- Pre-assemble the supports, note left and right side parts in this case.
- In the case of racks that consist of several elements, connecting plates are to be employed at the jointing points.

NOTE

Before you start with the assembly of the rack, check the packages delivered to ensure you have received the correct number and items.

In case of damage to the coating, this must be repaired immediately.

Gestelle für horizontalen Batterieeinbau

D

Aus den Abbildungen ist die Vorgehensweise der Montage ersichtlich.

- Seitenteile vormontieren, dabei auf linke und rechte Seitenteile achten.
- Bei Gestellen, die aus mehreren Elementen bestehen, sind an den Stoßstellen Klemmleisten zu verwenden

NOTIZ

Bevor Sie mit dem Aufbau des Gestells beginnen, überprüfen Sie die angelieferten Packstücke auf Vollständigkeit.

Im Falle einer Beschädigung der Beschichtung muss diese sofort repariert werden.

Chantier pour montage horizontal de batteries sans entretien

F

Les dessins illustrent les différentes étapes du montage.

- Procéder au montage préalable des échelles tenant compte de leur disposition gauche et droite.
- Pour les chantiers composés de plusieurs éléments, on utilisera à leur point de réunion les plaques de raccordement.

NOTE

Avant le montage du chantier, vérifier l'intégralité du matériel livré.

Un endommagement de la plastification doit être réparé immédiatement.

Scaffali per batterie ermetiche orizzontali

I

Dalle illustrazioni si possono desumere le modalitá di procedura per il monaggio.

- Preassemblare gli elementi laterali. Tenere conto della disposizione degli elementi laterali destri e sinistri.
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Prima di iniziare a montare l´intelaiatura, controllare che la confezione di imballaggio contenga tutti i pezzi.

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Estanteria para baterias hermeticas horizontaes

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De las ilustraciones se deduce la manera de proceder en el montaje.

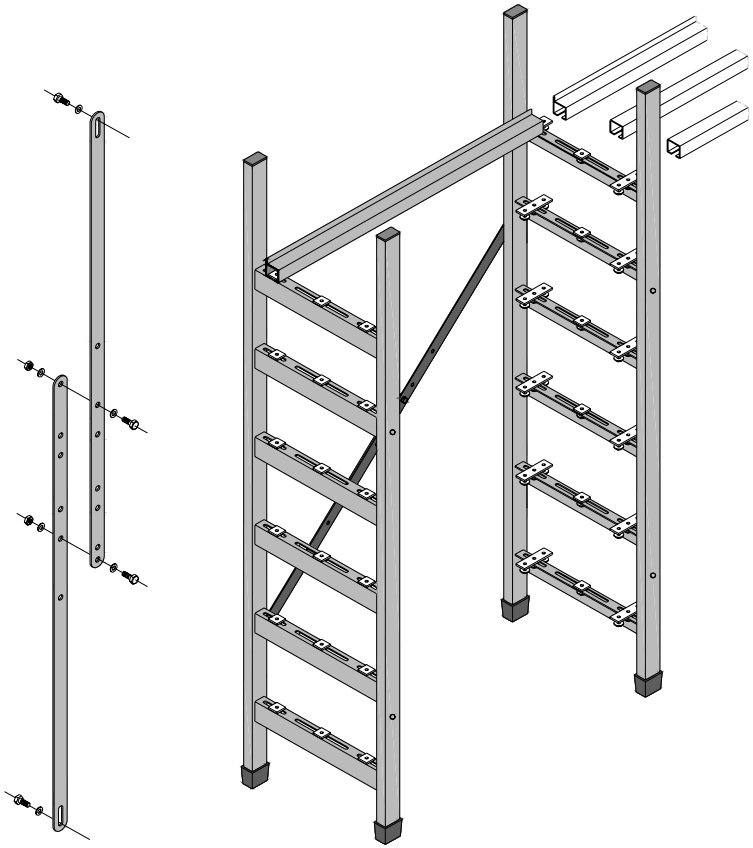
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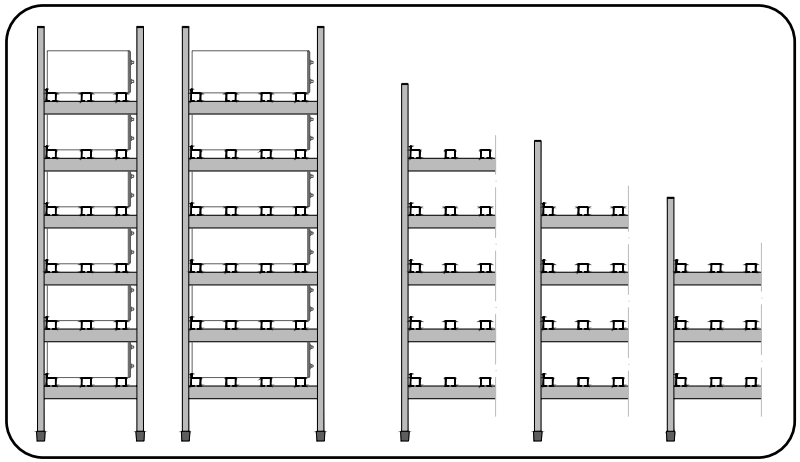
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- Ajustar el marco. En caso de desigualdades en el suelo emplear guías compensadoras. Apretar todos los tornillos.

NOTA

Todos los tornillos tienen que ser apretados con un momento de giro de 8 nanómetros.

Para más informaciones mire los dibujos de AlphaSYS® *y las instrucciones de montaje.*

Base Load Power Hub (BLPH)

PAINTING PROCEDURE

Document Number: 1724000372-MAT-PRO-00015

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
Michele Sacchi	14-10-2024

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
03	07/10/2024	Accepted for Construction (AFC)	DA	DA	AD
02	06/07/2024	Accepted for Construction (AFC)	DA	DA	AD
01	01/06/2024	Issue for Review (IFR)	DA	DA	AD
00	04/04/2024	Issue for Review (IFR)	DA	DA	AD

3W power | a company of AEG POWER SOLUTIONS

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Issue for Review (IFR)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

AC UPS F&G - TAG: UP-200F4

DC UPS - TAG: UP-200F1

PAINTING SPECIFICATION AND PROCEDURE

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AEG

POWER
SOLUTIONS

Painting Specification and Procedure

Double layer Surface Coating

AEG Power Solutions GmbH, Warstein-Belecke

Department: **PS AE**
Revision: **02**
Editor: **06.09.2021 / Schrewe**
Release: **06.09.2021 / Röthig-Ewald**

Document No. **8000068155 BAL, en**



EN

Revision

Status	Change	Date	Name
00	Created CN30011589	28.03.2019	Schenuit
01	CN30013288	22.07.2021	Schrewe
02	CN30013367	06.09.2021	Röthig-Ewald

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INHALTSVERZEICHNIS

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4. REPAIR OF PAINT DAMAGE 6

1. COLOR STRUCTURE

1.1 Pre-treatment

- degreasing
- iron phosphating
- rinse
- drying

1.2 Varnish Zinc Primer

Processing and Oven Temperature	**According to technical data sheet of manufacturer**
Type:	**Brillux EP 5815**
Nominal dry film thickness (NDFT)**	**70 µm**

**NDFT = nominal dry film thickness

1.3 Varnish coat (Coarse Texture Powder –Polyester)

Processing and Oven Temperature	**According to technical data sheet of manufacturer**
Colour	**Defined by customer order**
Cover varnish - nominal dry film thickness (NDFT)**	**80 µm**
Total - nominal dry film thickness (NDFT)**	**150 µm**
• Surfaces (doors, walls etc.) *DFT	150 µm (+150 µm / -30 µm) 120 µm … 300 µm
• At edges and outside corners *DFT	120 µm … 450 µm

*DFT = dry film thickness

**NDFT = nominal dry film thickness

2. SPECIFICATION

2.1 Properties of the coating

General characteristics

- Overcoat ability (wet on powder) possible

Mechanical characteristics

- Gross hatch Gt 0 C according to DIN EN ISO 2409
- Erichsen cupping test ≥3 mm according to DIN EN ISO 1520

Chemical characteristics

- H_2O-storage ok.
- H_2SO_4-storage ok.
- Solvent resistance moderate

Varnish coat incl. Zinc Primer

• Corrosivity category acc. to DIN 55633-1:2021	C1, C2	C3	C4	C5
• Protection duration range acc. to DIN 55633-1:2021	VH > 25Y	H 15-25Y	M 7-15Y	L 7Y

3 TESTS FOR SHEET METAL

(AEG PS proposals for process monitoring)

Inspection of the varnish quality

- Sheet metal approx. 100 mm x 70 mm x 1 mm
- Layer thickness min. 120 – 300 µm

Grid test according to DIN EN ISO 2409

- Test results: Gt 0
- Test frequency: 1 x a day

Depth test according to DIN EN ISO 1520

- Test results: Coating may not show chippings
- Test frequency: 1 x a day

The supplier can carry out equivalent tests to ensure process safety.

4. REPAIR OF PAINT DAMAGE

A standard acrylic paint spray can be used to repair minor defects on powder-coated parts.

If necessary, follow the manufacturer’s instructions.

Repair with a paint roller or brush is also possible.

Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

AC UPS F&G - TAG: UP-200F4

DC UPS - TAG: UP-200F1

5815 - TECHNICAL AND SAFETY DATASHEET

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Zinc Priming Powder EP 5815



Zinc epoxy primer for ultimate corrosion protection for use on sand-blasted steel and passivated aluminum

Field of application

In combination with weather-resistant powder coating systems for all areas where long-term corrosion protection with immaculate aesthetics is required, e.g., structural sections/elements, construction and agricultural machinery, vehicle components, steel cylinders, etc. Single layers are not suitable for exterior use.

Properties

- excellent corrosion protection properties
- very good protective effect against filiform corrosion on suitably passivated aluminum
- high chemical resistance
- very good mechanical values
- after pre-treatment suitable for sand-blasted steel as well as passivated aluminium
- once fully cured, the paint film is physiologically safe

Approvals/permits

Test certificate in accordance with DIN EN ISO 129446 part 6, corrosivity category C5 high; tested in two-layer build-up with Brillux Universal Polyester Powder 5940 or 5910 (Institut für Korrosionsschutz Dresden GmbH).

Technical Data

Basis	Epoxy resin
Color	Dark gray
Degree of gloss	Glossy
Density	2.64 to 2.70 g/cm³ (in accordance with DIN ISO 8130-2)
Theoretical coverage	approx. 370 m²/kg (with 1 µm dry film thickness)
Grain distribution	< 28 % < 10 µm 54 % < 32 µm > 94 % < 90 µm (laser measuring)

Technical Data

Cross-hatch test	Gt 0 C (in accordance with DIN EN ISO 2409)
Erichsen cupping	≥ 6 mm (in accordance with DIN EN ISO 1520)
Buchholz hardness	≥ 90 (in accordance with DIN EN ISO 2815)
Pencil hardness	2 H (Wolff Wilborn type 291)
Salt spray test	Corrosion at the scribe ≤ 1 mm (in accordance with DIN EN ISO 4628-8), on SA 2 1/2 sand-blasted steel[1)] > 1.440 h (in accordance with DIN EN ISO 9227-NSS)
Condensation water test	Degree of blistering 0 (S0) (in accordance with DIN EN ISO 4628-2) on SA 2 1/2 sand-blasted steel[1)] > 1.000 h (in accordance with DIN EN ISO 6270-2)
Impact test	reverse: ≥ 60 ip direct: ≥ 60 ip (in accordance with ASTM D 2794-69)
Labeling	See current safety data sheet.

[1)] In conjunction with a suitable top coat

Coating suggestion

Substrates[2)]	**Prime coat[3)]**	**Top coat[4)]**
Steel Sand-blasted (degree of cleanliness min. SA 2 ½ in accordance with DIN EN ISO 12944, part 4) **Aluminium** Suitably passivated	Zinc Primer Powder EP 5815 (Dark gray) 60-80 µm	Industrial Polyester Powder 5900, 5901, 5902 approx. 60 µm
		Industrial Polyester Powder 5903, 5905 approx. 80 µm
		Industrial Polyester Powder 5904. approx. 60 µm
		Universal Polyester Powder 5940, 5941, 5910, 5911 approx. 60 µm

[2)] Generally, the substrate shall be free from grease, oil, separating and drawing agents as well as corrosion products and other impurities and pretreated according to the corrosion protection requirements.

[3)] When using a directly heated gas oven, the intercoat adhesion on the top coat can be reduced due to pressurized combustion products. The adhesion must therefore be tested in a representative pretest.

[4)] depending on color

Process

Compatibility	Different batches or powder coat qualities cannot always be mixed/ are not always compatible to one another. Surface defects such as gloss reduction, specks, crater, orange peel effect, etc., may result from incompatibility. To be sure, appropriate tests shall be carried out before application.
Application temperature	15 to 25 °C
Humidity	< 75 % relative humidity

Application

Generally, make sure the substrate is grounded properly. The fluidizing, conveying and dosing air must be free from oil and condensation water. In order to obtain a uniform coating quality, a constant fresh/ recovered powder ratio should be maintained. The recovery powder portion in the circulation system should normally be less than 35 %.

Corona application

Using appropriate coating programs depending on the parts' geometry and application situation (if applicable, using the current flow restriction). For application systems without current flow restriction:
Voltage:
70 to 100 kV (for the first coating)
40 to 50 kV (for overcoating)

Tribo application

possible

Curing conditions

Curing of the prime coating before application of the final coating:

Duration	Object temperature
15 to 30 min.	at 170 °C
10 to 20 min.	at 180 °C
7 to 12 min.	at 200 °C

Alternatively, complete curing can take place after application of the final coating, if the primer was gelated beforehand (110–130 °C object temperature, with a holding time of 8–10 min.). The curing must then be carried out in accordance with the specifications for the top coat, but at least applied in accordance with the stoving conditions of the primer.

Container sizes

20 kg, 500 kg (25 polyethylene bags of 20 kg each)
Further container sizes available on request.

Shelf life

6 months after receipt.
Store in a sealed container in a dry place and at room temperature (at most 25 °C). Protect from heat sources and direct sunlight.

Minimum shelf life

Refer to label

Remark

This Technical Data Sheet is based on intense development work and many years of practical experience. The contents do not constitute any contractual relationship. The user/buyer is not released from his/her obligation to test our products for suitability for the intended application. In addition, our General Terms and Conditions shall apply.

As soon as a new edition of this Technical Data Sheet is issued, the previous specifications become invalid. If you need the current version, please contact your Brillux consultant, Version 8.

Brillux GmbH & Co. KG Industrielack
Otto-Hahn-Straße 14
59423 Unna
Tel. +49 2303 8805-0
Fax +49 2303 8805-119
info@brillux-industrielack.de
www.brillux-industrielack.de

SECTION 1: Identification of the substance/mixture and of the company/ undertaking

1.1 Product identifier

Zink-Grundierpulver EP 5815, Dunkelgrau (5815.-.7100)

1.2 Relevant identified uses of the substance or mixture and uses advised against

Powder coating. Intended purpose see technical data sheet.

Relevant identified uses

Products Category [PC]

Coatings and paints, thinners, paint removers

Remark

The product is intended for professional use.

1.3 Details of the supplier of the safety data sheet

Supplier (manufacturer/importer/only representative/downstream user/distributor)

Brillux GmbH & Co. KG, Industrielack
www.brillux-industrielack.de

Street : Otto-Hahn-Straße 14

Postal code/city : D-59423 Unna

Telephone : +49 2303 8805-0

Telefax : +49 2303 8805-119

Information contact : E-mail address of the competent person for safety data sheets: sdb@brillux-industrielack.de

1.4 Emergency telephone number

Giftinformationszentrum-Nord (poisons centre), consultation in german and english
Telephone: +49 551 19 24 0

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP]

Eye Irrit. 2 ; H319 - Serious eye damage/eye irritation : Category 2 ; Causes serious eye irritation.

Skin Sens. 1 ; H317 - Skin sensitisation : Category 1 ; May cause an allergic skin reaction.

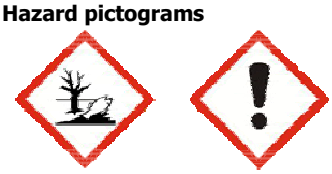
Aquatic Acute 1 ; H400 - Hazardous to the aquatic environment : Acute 1 ; Very toxic to aquatic life.

Aquatic Chronic 1 ; H410 - Hazardous to the aquatic environment : Chronic 1 ; Very toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms



Environment (GHS09) · Exclamation mark (GHS07)

Signal word

Warning

Hazard components for labelling

1-o-tolylbiguanide ; CAS No. : 93-69-6

Hazard statements

H317 May cause an allergic skin reaction.

H319	Causes serious eye irritation.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statements

P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P333+P313	If skin irritation or rash occurs: Get medical advice/attention.
P337+P313	If eye irritation persists: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.

2.3 Other hazards

None

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Hazardous ingredients

ZINC POWDER - ZINC DUST (STABILIZED) ; REACH No. : 01-2119467174-37 ; EC No. : 231-175-3; CAS No. : 7440-66-6

Weight fraction : ≥ 60 - < 65 %

Classification 1272/2008 [CLP] : Aquatic Acute 1 ; H400 Aquatic Chronic 1 ; H410

Aluminium dihydrogen triphosphate ; REACH No. : 01-2119970565-28 ; EC No. : 237-714-9; CAS No. : 13939-25-8

Weight fraction : ≥ 1 - < 5 %

Classification 1272/2008 [CLP] : Eye Irrit. 2 ; H319

1-o-tolylbiguanide ; REACH No. : 01-2119976311-39 ; EC No. : 202-268-6; CAS No. : 93-69-6

Weight fraction : ≥ 1 - < 3 %

Classification 1272/2008 [CLP] : Eye Dam. 1 ; H318 Skin Sens. 1 ; H317 Aquatic Chronic 3 ; H412

Additional information

Full text of H- and EUH-phrases: see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General information

When in doubt or if symptoms are observed, get medical advice. Change contaminated, saturated clothing. If unconscious place in recovery position and seek medical advice.

Following inhalation

Remove casualty to fresh air and keep warm and at rest. If breathing is irregular or stopped, administer artificial respiration. In case of respiratory tract irritation, consult a physician.

In case of skin contact

Wash immediately with: Water and soap Do not wash with: Solvents/Thinner

After eye contact

Rinse immediately carefully and thoroughly with eye-bath or water. In case of eye irritation consult an ophthalmologist.

After ingestion

Induce vomiting if patient is conscious, seek medical advice. Rinse out mouth and give plenty of water to drink. Administer activated charcoal. No direct artificial respiration to be given by first aider.

4.2 Most important symptoms and effects, both acute and delayed

Fever; Nausea; Vomiting.

4.3 Indication of any immediate medical attention and special treatment needed

None

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Extinguishing powder, alcohol resistant foam, carbon dioxide (CO_2), water spray. The fire fighting for manuell and self-acting powder coating systems conformable BGI 764 the extingshent agent CO_2 can be used by movable tool and fight fire extingquishing system. For using other extingshent agent than CO_2 the effectiveness must be proved.

Unsuitable extinguishing media

Full water jet, inert gas with high pressure.

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products

In case of fire may be liberated: Nitrogen oxides (NOx), carbon monoxide (CO), carbon dioxide (CO_2) and pyrolysis products, toxic. Nitrogen oxides (NOx), carbon monoxide (CO), carbon dioxide (CO_2), zinc oxide fume and pyrolysis products, toxic.

5.3 Advice for firefighters

Special protective equipment for firefighters

Use suitable breathing apparatus.

5.4 Additional information

Burning produces heavy smoke. Use water spray jet to protect personnel and to cool endangered containers. Do not allow run-off from fire-fighting to enter drains or water courses.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Remove all sources of ignition. See protective measures under point 7 and 8. Avoid dust formation. Do not inhale product dusts.

6.2 Environmental precautions

Do not allow to enter into surface water or drains.

6.3 Methods and material for containment and cleaning up

For cleaning up

Contain and collect spillage with a vacuum cleaner (conducting type) and place in container for disposal according to local regulations. (See section 13). Use approved industrial vacuum cleaner for removal. Treat the recovered material as prescribed in the section on waste disposal.

6.4 Reference to other sections

None

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures

Avoid: Generation/formation of dust, dust deposits, inhalation of dust/particles. Only use the material in places where open light, fire and other flammable sources can be kept away. If handled uncovered, arrangements with local exhaust ventilation should be used if possible. If local exhaust ventilation is not possible or not sufficient, the entire working area must be ventilated by technical means.

Measures to prevent fire

Dust can form an explosive mixture with air. Take precautionary measures against static discharges. Wear anti-static footwear and clothing Use only antistatically equipped (spark-free) tools.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels

Floors should be impervious and easy to clean.

Hints on joint storage

Storage class (TRGS 510) : 11

Do not store together with

Strong acid, strong alkali, oxidising agent, food and feedingstuffs.

Further information on storage conditions

Do not store at temperatures above : 25 °C

Protect against : Humidity.

7.3 Specific end use(s)

Powder coating. Intended purpose see technical data sheet.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limit values

GENERAL LIMIT VALUE FOR DUST

Limit value type (country of origin) :	TRGS 900 (D)
Parameter :	A: respirable fraction
Limit value :	1,25 mg/m^3
Peak limitation :	2(II)
Version :	29.03.2019
Limit value type (country of origin) :	TRGS 900 (D)
Parameter :	E: inhalable fraction
Limit value :	10 mg/m^3
Peak limitation :	2(II)
Version :	29.03.2019

DNEL-/PNEC-values

PNEC

ZINC POWDER - ZINC DUST (STABILIZED) ; CAS No. : 7440-66-6

Limit value type :	PNEC (Aquatic, freshwater)
Exposure route :	Water (Including sewage plant)
Limit value :	0,0206 mg/l
Limit value type :	PNEC (Aquatic, marine water)
Exposure route :	Water (Including sewage plant)
Limit value :	0,0061 mg/l
Limit value type :	PNEC (Sediment, freshwater)
Exposure route :	Soil
Limit value :	117,8 mg/kg
Limit value type :	PNEC (Sediment, marine water)
Exposure route :	Soil
Limit value :	56,5 mg/kg
Limit value type :	PNEC soil
Exposure route :	Soil
Limit value :	35,6 mg/kg
Limit value type :	PNEC (Sewage treatment plant)
Exposure route :	Water (Including sewage plant)
Limit value :	0,052 mg/l

8.2 Exposure controls

Personal protection equipment

Eye/face protection

Suitable eye protection

Dust protection eye glasses

Remark

Note DGUV-Rule 112-192.

Skin protection

Hand protection

Suitable gloves type : Disposable gloves. Gloves with long cuffs

Required properties : dust-tight. antistatic.

Remark : After washing hands replace lost skin fat by fat containing skin creams. Note DGUV-Rule 112-195. Note TRGS 401.

Body protection

Personel should wear protective clothings and all parts of the body should be washed after contact. Care should be taken in the selection of protective clothing to ensure that inflammation and irritation of the skin at neck and wrists through contact with the powder is avoided.

Recommended material : Natural fibres (e.g. cotton), heat-resistant synthetic fibres.

Remark : Note DGUV-Rule 112-189. Note TRGS 401.

Respiratory protection

Respiratory protection necessary at: insufficient exhaust

Suitable respiratory protection apparatus

Use breathing filter P2 (particle).
European Committee for Standardization (CEN) standards EN 136, 140 and 405 provide respirator masks and EN 149 and 143 provide filter recommendations.

Remark

Observe the wear time limits according GefStoffV in combination with the rules for using respiratory protection apparatus (BGR 190). Note TRGS 402.

General information

Used working clothes should not be worn outside the work area.

Other protection measures

Technical measures and the application of suitable work processes have priority over personal protection equipment.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state : Powder (1-150 µm)

Colour : According to product identification.

Odour

Poor, characteristic.

Safety characteristics

Melting point/freezing point :		>	50	°C
Initial boiling point and boiling range :	(1013 hPa)		not applicable	
Decomposition temperature :		>	250	°C
Flash point :			not applicable	
Auto-ignition temperature :		>	450	°C
Lower explosion limit :		approx.	50 - 70	g/m³
Upper explosion limit :			No data available	
Vapour pressure :	(50 °C)		not applicable	
Density :	(20 °C)		2,6 - 2,8	g/cm³
Water solubility :	(20 °C)		practically insoluble	
pH :			No data available	
log P O/W :			not relevant	
Cinematic viscosity :	(40 °C)		not applicable	
Solid content :			100	Wt %
Odour threshold :			not relevant	
Relative vapour density :	(20 °C)		not applicable	

Vapourisation rate :	not applicable
Flammable solids :	Not highly flammable.
Oxidising solids :	Not oxidising.

9.2 Other information

The physical specifications are approximate values and refer to the used safety relevant component(s).

SECTION 10: Stability and reactivity

10.1 Reactivity

No information available.

10.2 Chemical stability

Stable under recommended storage and handling conditions (see section 7).

10.3 Possibility of hazardous reactions

Reacts with water.

10.4 Conditions to avoid

No information available.

10.5 Incompatible materials

Exothermic reaction with: Alkali (lye). Acid Oxidizing agent. Water.

10.6 Hazardous decomposition products

After contact with water: Hydrogen

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Acute oral toxicity

Parameter :	ATEmix calculated
Exposure route :	Oral
Effective dose :	not relevant
Parameter :	LD50 (ZINC POWDER - ZINC DUST (STABILIZED) ; CAS No. : 7440-66-6)
Exposure route :	Oral
Species :	Rat
Effective dose :	> 2000 mg/kg
Parameter :	LD50 (Aluminium dihydrogen triphosphate ; CAS No. : 13939-25-8)
Exposure route :	Oral
Species :	Rat
Effective dose :	> 2000 mg/kg
Parameter :	LD50 (1-o-tolylbiguanide ; CAS No. : 93-69-6)
Exposure route :	Oral
Species :	Rat
Effective dose :	> 2000 mg/kg

Acute dermal toxicity

Parameter :	ATEmix calculated
Exposure route :	Dermal
Effective dose :	not relevant

Acute inhalation toxicity

Parameter :	ATEmix calculated
Exposure route :	Inhalation (dust/mist)
Effective dose :	not relevant
Parameter :	LC50 (ZINC POWDER - ZINC DUST (STABILIZED) ; CAS No. : 7440-66-6)
Exposure route :	Inhalation
Species :	Rat

Effective dose : 5,41 mg/l
Exposure time : 4 h

Practical experience/human evidence

Inhalation of zinc oxide fumes can cause fever, muscle pains, shivering and nausea. In general these troubles last only 24 hours without any after-effect (zinc fever).

11.3 Symptoms related to the physical, chemical and toxicological characteristics

In case of skin contact

Powder coatings can cause localised skin irritation in folds of the skin or in contact with tight clothing.

SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity

Acute (short-term) fish toxicity

Parameter : LC50 (1-o-tolylbiguanide ; CAS No. : 93-69-6)
Species : Oncorhynchus mykiss (Rainbow trout)
Effective dose : 150 mg/l
Exposure time : 96 h
Method : OECD 203

Acute (short-term) toxicity to crustacea

Parameter : EC50 (1-o-tolylbiguanide ; CAS No. : 93-69-6)
Species : Daphnia magna (Big water flea)
Effective dose : 15 mg/l
Exposure time : 48 h
Method : OECD 202

Acute (short-term) toxicity to aquatic algae and cyanobacteria

Parameter : EC50 (1-o-tolylbiguanide ; CAS No. : 93-69-6)
Species : Desmodesmus subspicatus
Effective dose : 26 mg/l
Exposure time : 72 h
Method : OECD 201

Toxicity to microorganisms

Parameter : EL50 (Aluminium dihydrogen triphosphate ; CAS No. : 13939-25-8)
Species : Mysidopsis bahia
Effective dose : 0,1 mg/l
Exposure time : 4 h

12.2 Persistence and degradability

Abiotic degradation

Mechanical separation in a suitable sewage plant is possible.

Biodegradation

In accordance with the required stability the product is poorly biodegradable.

12.3 Bioaccumulative potential

No information available.

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

The substances in the mixture do not meet the PBT/vPvB criteria according to REACH, annex XIII.

12.6 Other adverse effects

No information available.

12.7 Additional ecotoxicological information

Additional information

Do not allow uncontrolled discharge of product into the environment.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process. Dispose of waste according to applicable legislation.

Directive 2008/98/EC (Waste Framework Directive)

Before intended use

Waste codes/waste designations according to EWC/AVV

08 02 01 (Waste coating powders)

Other disposal recommendations

Completely emptied packages can be recycled. Handle contaminated packages in the same way as the substance itself.

13.2 Additional information

Note sections 7 and 8.

SECTION 14: Transport information

14.1 UN number

UN 3077

14.2 UN proper shipping name

Land transport (ADR/RID)

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (ZINC POWDER)

Sea transport (IMDG)

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (ZINC POWDER)

Air transport (ICAO-TI / IATA-DGR)

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (ZINC POWDER)

14.3 Transport hazard class(es)

Land transport (ADR/RID)

Class(es) :	9
Classification code :	M7
Hazard identification number (Kemler No.) :	90
Tunnel restriction code :	-
Special provisions :	LQ 5 kg · E 1 · ADR : - (SP 375 <= 5 l/kg)
Hazard label(s) :	9 / N

Sea transport (IMDG)

Class(es) :	9
EmS-No. :	F-A / S-F
Special provisions :	LQ 5 kg · E 1 · IMDG : - (SP 2.10.2.7 <= 5 l/kg)
Hazard label(s) :	9 / N

Air transport (ICAO-TI / IATA-DGR)

Class(es) :	9
Special provisions :	E 1 · IATA : - (SP A197 <= 5 l/kg)
Hazard label(s) :	9 / N

14.4 Packing group

III

14.5 Environmental hazards

Land transport (ADR/RID) : Yes

Sea transport (IMDG) : Yes (P)

Air transport (ICAO-TI / IATA-DGR) : Yes

14.6 Special precautions for user

None

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU legislation

Authorisations and/or restrictions on use

Restrictions of occupation

Observe restrictions to employment for juvenils according to the 'juvenile work protection guideline' (94/33/EC). Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers.

National regulations

Water hazard class (WGK)

Classification according to AwSV - Class : 2 (Obviously hazardous to water)

Other regulations, restrictions and prohibition regulations

Note TRGS 001. Note TRGS 400.

15.2 Chemical safety assessment

A chemical safety assessment has not been carried out.

SECTION 16: Other information

16.1 Indication of changes

15. Restrictions on use

16.2 Abbreviations and acronyms

AwSV: Ordinance on plants for the handling of substances hazardous to water. BGR(I): Rule (Information) from the german employers liability insurance association. DGUV: German Statutory Accident Insurance. EWC: European Waste Catalogue. TRGS: German Technical Rule for Hazardous Substances. VCI: German chemical industry association.

16.3 Key literature references and sources for data

None

16.4 Classification for mixtures and used evaluation method according to regulation (EC) No 1272/2008 [CLP]

Calculation method.

16.5 Relevant H- and EUH-phrases (Number and full text)

H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.

16.6 Training advice

None

16.7 Additional information

None

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

AC UPS F&G - TAG: UP-200F4

DC UPS - TAG: UP-200F1

5903 - TECHNICAL AND SAFETY DATASHEET

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Industrial Polyester Powder 5903



Coarse-texture coating powder for both interior and exterior use, silk-gloss to gloss

Field of application

Interior and exterior coatings meeting the highest qualitative and optical demands, e.g. construction machines, fence systems, fire-proof doors, fire extinguishers, garden furniture, sound insulation walls, hospital beds, lamps, cash boxes, safes, vending machines etc.

Properties

- good weather resistance
- high gloss and color stability
- good corrosion protection
- high degree of surface hardness
- good to very good mechanical values
- covers uneven areas and substrate defects
- very good adhesion on all common metallic substrates
- after corresponding pre-treatment suitable for all common metal substrate as well as partly glass
- once fully cured the paint film is physiologically safe

Technical Data

Basis	Polyester resin
Color	All common color systems
Degree of gloss	Silk gloss to gloss
Density	1.30 to 1.85 g/cm³ [1)] (in accordance with DIN ISO 8130-2)
Theoretical coverage	approx. 635 m²/kg [1)] (with 1 µm dry film thickness)
Grain distribution	< 11 % < 10 µm 35 to 50 % < 32 µm > 85 % < 90 µm (laser measuring)
Cross-hatch test	Gt 0 (in accordance with DIN EN ISO 2409)
Erichsen cupping	≥ 3 mm (in accordance with DIN EN ISO 1520)

[1)] depending on color

Brillux Industrielack

Technical Data

Salt spray test	Delamination at the scribe ≤ 2 mm (in accordance with DIN EN ISO 4628-8), On zinc-phosphated steel > 1.000 h (in accordance with DIN EN ISO 9227-NSS)
Condensation water test	Degree of blistering 0 (S0) (in accordance with DIN EN ISO 4628-2) On zinc-phosphated steel > 1.000 h (in accordance with DIN EN ISO 6270-2)
Accelerated weathering QUV-B/SE	after 200 h: residual gloss ≥ 50 % of initial gloss (according to DIN EN ISO 16474-3)[2)]
Impact test	reverse: ≥ 10 ip direct: ≥ 20 ip (in accordance with ASTM D 2794-69)
Labeling	See current safety data sheet.

[2)] The measured degree of gloss of structure powder paint depends on texturing. Therefore a visual assessment is necessary.

Coating suggestion

Substrates[3)]	**Prime coat**	**Top coat[4)]**
Aluminium preferably yellow- or green-chromated (according to DIN EN 12487) or chromium-free no-rinse pretreatment **Steel** preferably iron or zinc-phosphated **Cast iron** **Galvanized steel** **etc.**	Corro Protect EP 5816 (light-gray) 60 to 80 µm	Industrial Polyester Powder 5903 70 to 100 µm [5)]

[3)] Generally, the substrate shall be free from grease, oil, separating and drawing agents as well as corrosion products and other impurities (that especially applies to the use of directly fired gasovens) and pretreated according to the corrosion protection requirements.

[4)] Or single layer, provided that substrate has been pre-treated accordingly.

[5)] Depending on color

Process

Compatibility	Different batches or powder coat qualities cannot always be mixed/ are not always compatible to one another. Surface defects such as gloss reduction, specks, crater, orange peel effect etc. may result from incompatibility. To be sure, appropriate tests shall be carried out before application.
Application temperature	15 to 25 °C
Humidity	< 75 % relative humidity

Application

Generally, make sure the substrate is grounded properly. The fluidizing, conveying and dosing air must be free from oil and condensation water. In order to obtain a uniform coating quality, a constant fresh/ recovered powder ratio should be maintained. The recovery powder portion in the circulation system should normally be less than 35 %. Please note our Technical Information “Textured coating powders – Important information on use of textured coating powders”. When processing metallic powder coats, special processing instructions must be followed. Also refer to "Processing Instructions for Brillux Metallic - Powder Coats".

Corona application

Using appropriate coating programs depending on the parts' geometry and application situation (if applicable, using the current flow restriction).
For application systems without current flow restriction:
Voltage:
70 to 100 KV (for the first coating)
40 to 50 KV (for overcoating)

Tribo application

possible

Curing conditions

Duration	Object temperature
15 to 35 min.	at 170 °C
10 to 25 min.	at 180 °C
8 to 20 min.	at 190 °C
5 to 15 min.	at 200 °C

Container sizes

20 kg, 500 kg (25 polyethylene bags of 20 kg each)
Further container sizes available on request.

Shelf life

24 months for solid colors, 12 month for clearcoat, glazes and effect colors after receipt of the goods in the original sealed container.
Store in a sealed container in a dry place and at room temperature (at most 25 °C). Protect from heat sources and direct sunlight. Always keep the containers tightly sealed.

Minimum shelf life

Refer to label

Remark

This Technical Data Sheet is based on intense development work and many years of practical experience. The contents do not constitute any contractual relationship. The user/buyer is not released from his/her obligation to test our products for suitability for the intended application. In addition, our General Terms and Conditions shall apply.
As soon as a new edition of this Technical Data Sheet is issued, the previous specifications become invalid. If you need the current version, please contact your Brillux consultant, Version 7.

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SECTION 1: Identification of the substance/mixture and of the company/ undertaking

1.1 Product identifier

Industrie-Polyesterpulver 5903,
pigmentiert (SORTE 5903 FARBIG)

1.2 Relevant identified uses of the substance or mixture and uses advised against

Powder coating. Intended purpose see technical data sheet.

Relevant identified uses

Product Categories [PC]

PC9 - Coatings and paints, fillers, putties, thinners

Remark

The product is intended for professional use.

1.3 Details of the supplier of the safety data sheet

Supplier (manufacturer/importer/only representative/downstream user/distributor)

Brillux GmbH & Co. KG, Industrielack
www.brillux-industrielack.de

Street : Otto-Hahn-Straße 14

Postal code/city : D-59423 Unna

Telephone : +49 2303 8805-0

Telefax : +49 2303 8805-119

Information contact : E-mail address of the competent person for safety data sheets: sdb@brillux-industrielack.de

1.4 Emergency telephone number

Giftinformationszentrum-Nord (poisons centre), consultation in german and english
Telephone: +49 551 19 24 0

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP]

Aquatic Chronic 3 ; H412 - Hazardous to the aquatic environment : Chronic 3 ; Harmful to aquatic life with long lasting effects.

Eye Dam. 1 ; H318 - Serious eye damage/eye irritation : Category 1 ; Causes serious eye damage.

2.2 Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms



Corrosion (GHS05)

Signal word

Danger

Hazard components for labelling

Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate

Hazard statements

H318 Causes serious eye damage.

H412	Harmful to aquatic life with long lasting effects.

Precautionary statements

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P284	Wear respiratory protection.
P310	Immediately call a POISON CENTER or a doctor.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Special rules for supplemental label elements for certain mixtures

EUH205	Contains epoxy constituents. May produce an allergic reaction.
EUH208	Contains Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate.May produce an allergic reaction.

2.3 Other hazards

None

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Hazardous ingredients

Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate ; REACH registration No. : 01-2120065788-39 ; EC No. : 940-592-6

Weight fraction :	≥ 3 - < 5 %
Classification 1272/2008 [CLP] :	STOT RE 2 ; H373 Eye Dam. 1 ; H318 Acute Tox. 4 ; H302 Skin Irrit. 2 ; H315 Skin Sens. 1 ; H317 Aquatic Chronic 2 ; H411

Additional information

Full text of H- and EUH-phrases: see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General information

When in doubt or if symptoms are observed, get medical advice. Change contaminated, saturated clothing. If unconscious place in recovery position and seek medical advice.

Following inhalation

Remove casualty to fresh air and keep warm and at rest. If breathing is irregular or stopped, administer artificial respiration. In case of respiratory tract irritation, consult a physician.

In case of skin contact

Wash immediately with: Water and soap Do not wash with: Solvents/Thinner

After eye contact

Rinse immediately carefully and thoroughly with eye-bath or water. In case of eye irritation consult an ophthalmologist.

After ingestion

If accidentally swallowed rinse the mouth with plenty of water (only if the person is conscious) and obtain immediate medical attention. Keep at rest. Do NOT induce vomiting. No direct artificial respiration to be given by first aider.

4.2 Most important symptoms and effects, both acute and delayed

No information available.

4.3 Indication of any immediate medical attention and special treatment needed

None

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Extinguishing powder, alcohol resistant foam, carbon dioxide (CO_2), water spray. The fire fighting for manuell and self-acting powder coating systems conformable BGI 764 the extingshent agent CO_2 can be used by movable tool and fight fire extingquishing system. For using other extingshent agent than CO_2 the effectiveness must be proved.

Unsuitable extinguishing media

Full water jet, inert gas with high pressure.

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products

In case of fire may be liberated: Nitrogen oxides (NOx), carbon monoxide (CO), carbon dioxide (CO_2) and pyrolysis products, toxic.

5.3 Advice for firefighters

Special protective equipment for firefighters

Use suitable breathing apparatus.

5.4 Additional information

Burning produces heavy smoke. Use water spray jet to protect personnel and to cool endangered containers. Do not allow run-off from fire-fighting to enter drains or water courses.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Remove all sources of ignition. See protective measures under point 7 and 8. Avoid dust formation. Do not inhale product dusts.

6.2 Environmental precautions

Do not allow to enter into surface water or drains.

6.3 Methods and material for containment and cleaning up

For cleaning up

Take up dust-free and set down dust-free. Use approved industrial vacuum cleaner for removal. (Vacuum cleaner construction B1, appropriate to suck up combustible dust). Treat the recovered material as prescribed in the section on waste disposal.

6.4 Reference to other sections

None

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures

Avoid: Generation/formation of dust, dust deposits, inhalation of dust/particles. Only use the material in places where open light, fire and other flammable sources can be kept away. If handled uncovered, arrangements with local exhaust ventilation should be used if possible. If local exhaust ventilation is not possible or not sufficient, the entire working area must be ventilated by technical means.

Measures to prevent fire

Dust can form an explosive mixture with air. Take precautionary measures against static discharges. Wear anti-static footwear and clothing Use only antistatically equipped (spark-free) tools.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels

Floors should be impervious, resistant to liquids and easy to clean.

Hints on joint storage

Storage class (TRGS 510) : 11

Do not store together with
Strong acid, strong alkali, oxidising agent, food and feedingstuffs.

Further information on storage conditions

Do not store at temperatures above : 25 °C
Protect against : Humidity.

7.3 Specific end use(s)

Powder coating. Intended purpose see technical data sheet.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limit values

GENERAL LIMIT VALUE FOR DUST

Limit value type (country of origin) :	TRGS 900 (D)
Parameter :	A: respirable fraction
Limit value :	1,25 mg/m^3
Peak limitation :	2(II)
Version :	17.10.2017
Limit value type (country of origin) :	TRGS 900 (D)
Parameter :	E: inhalable fraction
Limit value :	10 mg/m^3
Peak limitation :	2(II)
Version :	17.10.2017

DNEL/DMEL and PNEC values

DNEL/DMEL

Limit value type :	DNEL/DMEL (Industrial) (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Exposure route :	Dermal
Exposure frequency :	Long-term (repeated)
Limit value :	0,25 mg/kg
Limit value type :	DNEL/DMEL (Industrial) (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Exposure route :	Inhalation
Exposure frequency :	Long-term (repeated)
Limit value :	0,88 mg/m^3

PNEC

Limit value type :	PNEC (Aquatic, freshwater) (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Limit value :	0,00272 mg/l
Limit value type :	PNEC Intermittierende Einleitung (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Limit value :	0,0272 mg/l
Limit value type :	PNEC (Soil) (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Limit value :	0,00721 mg/kg
Limit value type :	PNEC (Sewage treatment plant) (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Limit value :	32 mg/l

8.2 Exposure controls

Personal protection equipment

Eye/face protection

Suitable eye protection
Dust protection eye glasses

Remark
Note DGUV-Rule 112-192.

Skin protection

Hand protection

Suitable gloves type : Disposable gloves. Gloves with long cuffs

Required properties : dust-tight.

Remark : After washing hands replace lost skin fat by fat containing skin creams. Note DGUV-Rule 112-195. Note TRGS 401.

Body protection

Personel should wear protective clothings and all parts of the body should be washed after contact. Care should be taken in the selection of protective clothing to ensure that inflammation and irritation of the skin at neck and wrists through contact with the powder is avoided.

Recommended material : Natural fibres (e.g. cotton), heat-resistant synthetic fibres.

Remark : Note DGUV-Rule 112-189. Note TRGS 401.

Respiratory protection

Respiratory protection necessary at: insufficient exhaust

Suitable respiratory protection apparatus

Use breathing filter P2 (particle).
European Committee for Standardization (CEN) standards EN 136, 140 and 405 provide respirator masks and EN 149 and 143 provide filter recommendations.

Remark

Observe the wear time limits according GefStoffV in combination with the rules for using respiratory protection apparatus (BGR 190). Note TRGS 402.

General health and safety measures

Used working clothes should not be worn outside the work area.

Occupational exposure controls

Technical measures to prevent exposure

Technical measures and the application of suitable work processes have priority over personal protection equipment.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state : Powder (1-150 µm)

Colour : According to product identification.

Odour

Poor, characteristic.

Safety relevant basis data

Melting point/melting range :		>	50	°C
Initial boiling point and boiling range :	(1013 hPa)		not applicable	
Decomposition temperature :			No data available	
Flash point :			not applicable	
Ignition temperature :		>	450	°C
Lower explosion limit :		approx.	50 - 70	g/m³
Upper explosion limit :			No data available	
Vapour pressure :	(50 °C)		not applicable	
Density :	(23 °C)		1,2 - 1,9	g/cm³
Water solubility :	(20 °C)		insoluble	
pH :			No data available	
log P O/W :			not relevant	
Viscosity :	(23 °C)		not applicable	

Cinematic viscosity :	(40 °C)	not applicable	
Solid content :		100	Wt %
Odour threshold :		not relevant	
Relative vapour density :	(20 °C)	not applicable	
Vapourisation rate :		not applicable	
Flammable solids :	Not highly flammable.		
Oxidising solids :	Not oxidising.		

9.2 Other information

The physical specifications are approximate values and refer to the used safety relevant component(s).

SECTION 10: Stability and reactivity

10.1 Reactivity

No information available.

10.2 Chemical stability

Stable under recommended storage and handling conditions (see section 7).

10.3 Possibility of hazardous reactions

No information available.

10.4 Conditions to avoid

No information available.

10.5 Incompatible materials

No information available.

10.6 Hazardous decomposition products

Does not decompose when used for intended uses.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute effects

Acute oral toxicity

Parameter :	ATEmix calculated
Exposure route :	Oral
Effective dose :	11364 mg/kg
Parameter :	LD50 (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Exposure route :	Oral
Species :	Rat
Effective dose :	300 - 2000 mg/kg

Acute dermal toxicity

Parameter :	ATEmix calculated
Exposure route :	Dermal
Effective dose :	not relevant
Parameter :	LD50 (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Exposure route :	Dermal
Species :	Rat
Effective dose :	> 2000 mg/kg

Acute inhalation toxicity

Parameter :	ATEmix calculated
Exposure route :	Inhalative (dust, mist)
Effective dose :	not relevant

Sensitisation

According to information given by the manufacturer the ingredient "Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate" are not sensitising in a concentration of less than 5.5 %.

In case of skin contact

Practical experience/human evidence

Once sensitized on epoxy constituents, a severe allergic reaction may occur when subsequently exposed to very low levels.

Repeated dose toxicity (subacute, subchronic, chronic)

Subacute oral toxicity

Parameter :	NOAEL(C) (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Exposure route :	Oral
Species :	Rat
Effective dose :	75 mg/kg
Parameter :	NOEL(C) (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Exposure route :	Oral
Species :	Rat
Effective dose :	75 mg/kg

11.3 Symptoms related to the physical, chemical and toxicological characteristics

In case of skin contact

Powder coatings can cause localised skin irritation in folds of the skin or in contact with tight clothing.

SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity

Acute (short-term) fish toxicity

Parameter :	LC50 (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Effective dose :	8,8 mg/l
Exposure time :	96 h
Method :	OECD 203

Acute (short-term) daphnia toxicity

Parameter :	EC50 (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Effective dose :	81 mg/l
Exposure time :	48 h
Method :	OECD 202

Acute (short-term) algae toxicity

Parameter :	EC50 (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Effective dose :	2,72 mg/l
Exposure time :	72 h
Parameter :	ErC50 (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Effective dose :	2,94 mg/l
Exposure time :	72 h
Method :	OECD 201

Chronic (long-term) algae toxicity

Parameter :	NOEC (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Effective dose :	0,368 mg/l
Exposure time :	72 h
Parameter :	NOEC (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl)

benzene-1,2,4-tricarboxylate)

Effective dose : 0,327 mg/l
Exposure time : 72 h
Method : OECD 201

Bacteria toxicity

Parameter : EC50 (Reaction mass of bis(2,3-epoxypropyl) terephthalate and tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate)
Effective dose : > 1000 mg/l
Exposure time : 3 h

12.2 Persistence and degradability

Abiotic degradation

Mechanical separation in a suitable sewage plant is possible.

Biodegradation

In accordance with the required stability the product is poorly biodegradable.

12.3 Bioaccumulative potential

No information available.

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

The substances in the mixture do not meet the PBT/vPvB criteria according to REACH, annex XIII.

12.6 Other adverse effects

No information available.

12.7 Additional ecotoxicological information

Additional information

Do not allow uncontrolled discharge of product into the environment.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process. Dispose according to legislation.

Product/Packaging disposal

Waste codes/waste designations according to EWC/AVV

Waste code product

EWC-Code: 08 02 01.

Waste treatment options

Appropriate disposal / Package

Completely emptied packages can be recycled. Handle contaminated packages in the same way as the substance itself.

13.2 Additional information

Note sections 7 and 8.

SECTION 14: Transport information

14.1 UN number

No dangerous good in sense of these transport regulations.

14.2 UN proper shipping name

No dangerous good in sense of these transport regulations.

14.3 Transport hazard class(es)

No dangerous good in sense of these transport regulations.

14.4 Packing group

No dangerous good in sense of these transport regulations.

14.5 Environmental hazards

No dangerous good in sense of these transport regulations.

14.6 Special precautions for user

None

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU legislation

Other regulations (EU)

Restrictions of occupation

Observe restrictions to employment for juvenils according to the 'juvenile work protection guideline' (94/33/EC). Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers.

National regulations

Water hazard class (WGK)

Class : 1 (Slightly hazardous to water) Classification according to AwSV

Other regulations, restrictions and prohibition regulations

Note TRGS 001. Note TRGS 400.

15.2 Chemical safety assessment

A chemical safety assessment has not been carried out.

SECTION 16: Other information

16.1 Indication of changes

02. Classification of the substance or mixture · 02. Label elements · 02. Labelling according to Regulation (EC) No. 1272/2008 [CLP] - Hazard components for labelling · 02. Special rules for supplemental label elements for certain mixtures · 15. Water hazard class (WGK)

16.2 Abbreviations and acronyms

TRGS: German Technical Rule for Hazardous Substances. BGR(I): Rule (Information) from the german employers liability insurance association. DGUV: German Statutory Accident Insurance. AwSV: Ordinance on plants for the handling of substances hazardous to water. VCI: German chemical industry association. EWC: European Waste Catalogue.

16.3 Key literature references and sources for data

None

16.4 Classification for mixtures and used evaluation method according to regulation (EC) No 1272/2008 [CLP]

Calculation method.

16.5 Relevant H- and EUH-phrases (Number and full text)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

16.6 Training advice

None

16.7 Additional information

None

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

Base Load Power Hub (BLPH)

BATTERY SIZING CALCULATION

Document Number: 1724000372-EL-CA-00012

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	05/06/2024

Document Class: 2

02	04/06/2024	Accepted for Construction (AFC)	DA	DA	AD
01	04/04/2024	Accepted for Construction (AFC)	DA	DA	AD
00	25/03/2024	Issue for Review (IFR)	DA	DA	AD
Rev.	Date	Description	Prepared	Reviewed	Approved

3W power | a company of AEG POWER SOLUTIONS

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

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REVISION / CHANGE LOG 2

HOLDS LIST 2

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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3
BATTERY SIZING CALCULATION

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IEEE STD 485

Project: 3W Power - UPS 35kVA – 108 cells

Date: 19/02/2024

Nom. temperature 5°C (lowest-8,4°C, highest 40°C)	Minimum Cell Voltage: 1,65	Cell Mfg: FAAM	Cell Type: FLG 12-150	Sized By: FAAM

1	2	3	4	5	6	7
Period	Load (Watt)	Change in Load (Watt)	Duration of Period (minutes)	Time to End Of Section (minutes)	Capacity at T min Rate (Ktp)	Required Section Size 3*6b= Rated Ah Pos. Value / Neg. Value

Section 1 -First 1 period(s) Only if A2 is greater than A1, go to section 2

1	A1=	30534,00	A1-A0=	30534,00	M1=	15,00	t=	15,00	0,33		10076,2	0,0
									Sec	Sub Total	10076,2	0,0
									1	Total	10076,2	0,0

Section 2- First 2 period(s) Only-if A3 is greater than A2, go to section 3

2	A1=	30534,00	A1-A0=	30534,00	M1=	15,00	t=	15,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-30534,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									2	Total	0,0	

Section 3- First 3 period(s) Only-if A4 is greater than A3, go to section 4

3	A1=	30534,00	A1-A0=	30534,00	M1=	15,00	t=	15,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-30534,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									3	Total	0,0	0,0

Section 4- First 4 period(s) Only-if A5 is greater than A4, go to section 5

4	A1=	30534,00	A1-A0=	30534,00	M1=	15,00	t=	15,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-30534,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									4	Total	0,0	0,0

Section 5- First 5 period(s) Only-if A6 is greater than A5, go to section 6

5	A1=	30534,00	A1-A0=	30534,00	M1=	15,00	t=	15,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-30534,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									5	Total	0,0	0,0

Section 6- First 6 period(s) Only-if A7 is greater than A6, go to section 7

6	A1=	30534,00	A1-A0=	30534,00	M1=	15,00	t=	15,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-30534,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A6=	0,00	A6-A5=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									6	Total	0,0	0,0

Section 7- First 7 period(s) Only-if A8 is greater than A7, go to section 8

7	A1=	30534,00	A1-A0=	30534,00	M1=	15,00	t=	15,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-30534,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A6=	0,00	A6-A5=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A7=	0,00	A7-A6=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									7	Total	0,0	0,0

Section 8- First 8 period(s) Only-if A9 is greater than A8, go to section 9

8	A1=	30534,00	A1-A0=	30534,00	M1=	15,00	t=	15,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-30534,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A6=	0,00	A6-A5=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A7=	0,00	A7-A6=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A8=	0,00	A8-A7=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									8	Total	0,0	0,0

Random Equipment Load Only (if needed)

R	AR=	0	AR-0=	0,00	Mr=	0	T=	0,00	0,0	0,0	0,0

Maximum Section size (8) = 10076,2 Random Section Size (9) = 0,0 Uncorrected Size US (10) 10076,2

US (11) 10076,2 x T. Corr(12) **1.214** x Design Marg (13) **1** x Ag Factor (14) **1** 12232,5

When the cell size (15) is greater than a standard cell size, the next larger cell is required.

(A) - Positive plates

12232,5 W required

(B) Ampere Hours Therefore cell (17) 137,3 Ah/10h is required

FAAM Battery required: 18 x FLG 12-150 (12V monoblocks)

Base Load Power Hub (BLPH)

AC UPS F&G - TAG: UP-200F4
BATTERY SIZING CALCULATION

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IEEE STD 485

Project: 3W Power - UPS 15kVA – 108 cells

Date: 19/02/2024

Nom. temperature 5°C (lowest-8,4°C, highest 40°C)	Minimum Cell Voltage: 1,65	Cell Mfg: FAAM	Cell Type: FTG 12-120	Sized By: FAAM

1	2	3	4	5	6	7
Period	Load (Watt)	Change in Load (Watt)	Duration of Period (minutes)	Time to End Of Section (minutes)	Capacity at T min Rate (Ktp)	Required Section Size 3*6b= Rated Ah Pos. Value / Neg. Value

Section 1 -First 1 period(s) Only if A2 is greater than A1, go to section 2

1	A1=	13172,00	A1-A0=	13172,00	M1=	240,00	t=	240,00	2,15		28319,8	0,0
									Sec	Sub Total	28319,8	0,0
									1	Total	28319,8	0,0

Section 2- First 2 period(s) Only-if A3 is greater than A2, go to section 3

2	A1=	13172,00	A1-A0=	13172,00	M1=	240,00	t=	240,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-13172,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									2	Total	0,0	

Section 3- First 3 period(s) Only-if A4 is greater than A3, go to section 4

3	A1=	13172,00	A1-A0=	13172,00	M1=	240,00	t=	240,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-13172,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									3	Total	0,0	0,0

Section 4- First 4 period(s) Only-if A5 is greater than A4, go to section 5

4	A1=	13172,00	A1-A0=	13172,00	M1=	240,00	t=	240,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-13172,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									4	Total	0,0	0,0

Section 5- First 5 period(s) Only-if A6 is greater than A5, go to section 6

5	A1=	13172,00	A1-A0=	13172,00	M1=	240,00	t=	240,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-13172,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									5	Total	0,0	0,0

Section 6- First 6 period(s) Only-if A7 is greater than A6, go to section 7

6	A1=	13172,00	A1-A0=	13172,00	M1=	240,00	t=	240,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-13172,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A6=	0,00	A6-A5=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									6	Total	0,0	0,0

Section 7- First 7 period(s) Only-if A8 is greater than A7, go to section 8

7	A1=	13172,00	A1-A0=	13172,00	M1=	240,00	t=	240,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-13172,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A6=	0,00	A6-A5=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A7=	0,00	A7-A6=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									7	Total	0,0	0,0

Section 8- First 8 period(s) Only-if A9 is greater than A8, go to section 9

8	A1=	13172,00	A1-A0=	13172,00	M1=	240,00	t=	240,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-13172,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A6=	0,00	A6-A5=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A7=	0,00	A7-A6=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A8=	0,00	A8-A7=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									8	Total	0,0	0,0

Random Equipment Load Only (if needed)

R	AR=	0	AR-0=	0,00	Mr=	0	T=	0,00	0,0	0,0	0,0

Maximum Section size (8) = 28319,8 Random Section Size (9) = 0,0 Uncorrected Size US (10) 28319,8

US (11) 28319,8 x T. Corr(12) **1.214** x Design Marg (13) **1** x Ag Factor (14) **1** 34380,2

When the cell size (15) is greater than a standard cell size, the next larger cell is required.

(A) - Positive plates

34380,2 W required

(B) Ampere Hours Therefore cell (17) 353,7 Ah/10h is required

FAAM Battery required: 3 x 18 x FTG 12-120 (12V monoblocks in parallel)

Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1
BATTERY SIZING CALCULATION

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IEEE STD 485

Project: 3W Power - DC 10kW – 60 cells

Date: 19/02/2024

Nom. temperature 5°C (lowest-8,4°C, highest 40°C)	Minimum Cell Voltage: 1,65	Cell Mfg: FAAM	Cell Type: FLG 12-150	Sized By: FAAM

1	2	3	4	5	6	7
Period	Load (Watt)	Change in Load (Watt)	Duration of Period (minutes)	Time to End Of Section (minutes)	Capacity at T min Rate (Ktp)	Required Section Size 3*6b= Rated Ah Pos. Value / Neg. Value

Section 1 -First 1 period(s) Only if A2 is greater than A1, go to section 2

1	A1=	10000,00	A1-A0=	10000,00	M1=	30,00	t=	30,00	0,49		4920,0	0,0
									Sec	Sub Total	4920,0	0,0
									1	Total	4920,0	0,0

Section 2- First 2 period(s) Only-if A3 is greater than A2, go to section 3

2	A1=	10000,00	A1-A0=	10000,00	M1=	30,00	t=	30,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-10000,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									2	Total	0,0	

Section 3- First 3 period(s) Only-if A4 is greater than A3, go to section 4

3	A1=	10000,00	A1-A0=	10000,00	M1=	30,00	t=	30,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-10000,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									3	Total	0,0	0,0

Section 4- First 4 period(s) Only-if A5 is greater than A4, go to section 5

4	A1=	10000,00	A1-A0=	10000,00	M1=	30,00	t=	30,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-10000,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									4	Total	0,0	0,0

Section 5- First 5 period(s) Only-if A6 is greater than A5, go to section 6

5	A1=	10000,00	A1-A0=	10000,00	M1=	30,00	t=	30,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-10000,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									5	Total	0,0	0,0

Section 6- First 6 period(s) Only-if A7 is greater than A6, go to section 7

6	A1=	10000,00	A1-A0=	10000,00	M1=	30,00	t=	30,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-10000,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A6=	0,00	A6-A5=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									6	Total	0,0	0,0

Section 7- First 7 period(s) Only-if A8 is greater than A7, go to section 8

7	A1=	10000,00	A1-A0=	10000,00	M1=	30,00	t=	30,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-10000,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A6=	0,00	A6-A5=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A7=	0,00	A7-A6=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									7	Total	0,0	0,0

Section 8- First 8 period(s) Only-if A9 is greater than A8, go to section 9

8	A1=	10000,00	A1-A0=	10000,00	M1=	30,00	t=	30,00	0,00		0,0	0,0
	A2=	0,00	A2-A1=	-10000,00	M2=	0,00	t=	0,00	0,00		0,0	0,0
	A3=	0,00	A3-A2=	0,00	M3=	0,00	t=	0,00	0,00		0,0	0,0
	A4=	0,00	A4-A3=	0,00	M4=	0,00	t=	0,00	0,00		0,0	0,0
	A5=	0,00	A5-A4=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A6=	0,00	A6-A5=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A7=	0,00	A7-A6=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
	A8=	0,00	A8-A7=	0,00	M5=	0,00	t=	0,00	0,00		0,0	0,0
									Sec	Sub Total	0,0	0,0
									8	Total	0,0	0,0

Random Equipment Load Only (if needed)

R	AR=	0	AR-0=	0,00	Mr=	0	T=	0,00	0,0	0,0	0,0

Maximum Section size (8) = 4920,0 Random Section Size (9) = 0,0 Uncorrected Size US (10) 4920,0

US (11) 4920,0 x T. Corr(12) **1,214** x Design Marg (13) **1** x Ag Factor (14) **1** 5972,9

When the cell size (15) is greater than a standard cell size, the next larger cell is required.

(A) - Positive plates

5972,9 W required

(B) Ampere Hours Therefore cell (17) 120,7 Ah/10h is required

FAAM Battery required: 10 x FLG 12-150 (12V monoblocks)

Base Load Power Hub (BLPH)

AC and DC UPS system
HEAT DISSIPATION

Document Number : 1724000372-EL-CA-00013

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
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	10/04/2024

Document Class : 3

02	09/04/2024	Issue for Information (IFI)	DA	DA	AD
01	04/04/2024	Issue for Information (IFI)	DA	DA	AD
00	25/03/2024	Issue for Information (IFI)	DA	DA	AD
Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)
02	Issue for Information (IFI)

HOLDS LIST

No.	Description
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3	
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HEAT LOSS CALCULATION

GENERAL

The heat loss calculation has been made considering the real UPS system load (defined as "normal running" load in the updated document AC UPS Load rev1) and are referred to the worst working condition (load shared between the two UPSs belonging to the redundant system). The heat loss of the By-Pass Transformer is the typical value considering the normal no-load condition. The heat loss of the battery is referred to the worst case (discharging).

TAG number	Description	Typical estimated heat losses
UP-200F3	AC UPS Protect 8.33 40kVA	3.878 W
35 kVA	AC UPS By-Pass Transformer 35kVA	250 W
	AC UPS Battery MCCB box 200A	120 W
	AC UPS Battery 18 x FLG 12-150	1.755 W

TAG number	Description	Typical estimated heat losses
UP-200F4	AC UPS Protect 8.33 20kVA	2.645 W
15 kVA	AC UPS By-Pass Transformer 15kVA	120 W
	AC UPS Battery MCCB box 200A	120 W
	AC UPS Battery 3 x 18 x FTG 12-120	985 W

TAG number	Description	Typical estimated heat losses
UP-200F1	DC UPS Protect TPRe 110V 100A	1.509 W
10 kW	DC UPS Battery MCCB box 125A	75 W
	DC UPS Battery 10 x FLG 12-150	339 W

The battery typical estimated heat losses, shown in the present document, have been calculated in the worst case.

CALCULATIONS

AC UPS 35KVA UP-200F3 system

a	Nominal load power	16.720	W	
b	UPS efficiency AC/AC	83,8	%	
c	UPS input power	19.952	W	a / b
d	Calculated heat dissipation	3.232	W	c - a
e	Calculation margin	20	%	
	Heat dissipation	3.878	W	d x e

AC UPS 15KVA UP-200E4 system

a	Nominal load power	3.120	W	
b	UPS efficiency AC/AC	58,6	%	
c	UPS input power	5.324	W	a / b
d	Calculated heat dissipation	2.204	W	c - a
e	Calculation margin	20	%	
	Heat dissipation	2.645	W	d x e

BATTERY AC UPS 35KVA UP-200F3 system

a	Nominal load power	28.000	W	
b	UPS efficiency DC/AC	91,7	%	
c	Battery load during discharging	30.534	W	a / b
d	Battery current during discharging	141,4	A	c / f / 2 (Pb)
e	Battery string number	1		
f	Battery cell number per string	108		
g	Battery internal resistance per cell	0,65	mΩ	
h	Calculated heat dissipation	1.404	W	g x (d / e)^2 x f x e
i	Calculation margin	25	%	
	Heat dissipation	1.755	W	h x i

BATTERY AC UPS 15KVA UP-200F4 system

a	Nominal load power	12.000	W	
b	UPS efficiency DC/AC	91,1	%	
c	Battery load during discharging	13.172	W	a / b
d	Battery current during discharging	122,0	A	c / f / 2 (Pb)
e	Battery string number	3		
f	Battery cell number per string	108		
g	Battery internal resistance per cell	1,47	mΩ	
h	Calculated heat dissipation	788	W	g x (d / e)^2 x f x e
i	Calculation margin	25	%	
	Heat dissipation	985	W	h x i

BATTERY DC UPS 10KW UP-200F1 system

a	Nominal load power	10.000	W	
b	UPS efficiency DC/AC	-	%	
c	Battery load during discharging	10.000	W	a / b
d	Battery current during discharging	83,3	A	c / f / 2 (Pb)
e	Battery string number	1		
f	Battery cell number per string	60		
g	Battery internal resistance per cell	0,65	mΩ	
h	Calculated heat dissipation	271	W	g x (d / e)^2 x f x e
i	Calculation margin	25	%	
	Heat dissipation	339	W	h x i

Base Load Power Hub (BLPH)

UPS AND BATTERIES TECHNICAL DATA SHEET

Document Number: 1724000372-EL-DS-00005

Document Class: 2

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4	APPROVAL NOT REQUIRED
NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.	
Sign	Date
	10/10/2024

Rev.	Date	Description	Prepared	Reviewed	Approved
01	09/10/2024	Accepted for Construction (AFC)	DA	DA	AD
00	09/07/2024	Issue for Review (IFR)	DA	DA	AD

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Revision / Change Log

Rev.	Description
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01	Accepted for Construction (AFC)

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Base Load Power Hub (BLPH)

AC UPS PAS - TAG: UP-200F3

UPS AND BATTERIES TECHNICAL DATA SHEET

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S-701D Data Sheet for
AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

JIP33 JOINT INDUSTRY PROGRAMME

Row							Issue
2	Tag No. :	UP-200F3					
3	Service :	AC UPS PAS					
4	Ref. Clause	Description	Project Requirement	Manufacturer Declared Values	Unit	Additional notes	
5		**GENERAL**					
6	5.1.2	Vendor :	Input Data	AEG Power Solutions			
7	5.1.2	Order status :	for purchase	Noted			
8	5.1.2	Purchase order number, date :	1724000372 123A90A rev1 dated 22/4/2024	Noted			
9	5.1.2	Manufacturer :	Input Data	AEG Power Solutions			
10	5.1.2	Model number :	Input Data	2 x Protect 8.33 S10 40kVA			
11	5.1.2	Serial number :	Input Data	Released after production			
12	5.2.3	Application :	industrial	Noted			
13	5.3.3	Purchaser specified rated output power :	35	40kVA	kVA		
14	5.1.1	Quantity :	1	Confirmed. Redundant system			
15		Conformity assessment system (CAS) level :	D	Noted			
16		**CONFIGURATION**					
17	5.1.1, A.1, Figure A.2, Figure A.3A, Figure A.3B, Figure A.6	UPS configuration :	simplified parallel UPS with common bypass & common output-Figure A.3A	Confirmed			
18	5.1.1, B.1	UPS topology :	double conversion	Confirmed			
19	5.1.1	Static switch configuration :	in both inverter and bypass path	Confirmed			
20	5.4.2.3	Battery configuration :	2 x 50%	Confirmed. 15 min. autonomy each battery			
21	5.3.2, 5.3.4	Performance classification :	manufacturer to advise	-			
22	8.1.1.3	Bi-directional rectifier :	No	Not applicable			
23	8.4.2.11	Remote access required :	Yes (read only)	Confirmed. Modbus TCP			
24	8.4.2.11	Hardware (adapters, connectors, cables, etc.) required for remote access :	manufacturer to advise	Confirmed			
25	8.1.1.5, 8.1.1.6	On-line battery monitoring facility required :	string monitoring	Confirmed			
26	8.1.1.4	On-line battery testing feature required :	No	Noted			
27	8.1.1.4	Battery test load interface :	No	Noted			
28	5.4.2.3	DC earth leakage monitoring required :	No	Noted			
29	7.4.14	Single line diagram and status display :	on HMI	LCD display with synoptic			
30	8.1.2.11	Black start feature required :	Yes	Confirmed			
31	8.1.1.1	Earth screen required for isolation transformer :	manufacturer to advise	Confirmed on the by-pass isolation transformer			
32		**PHYSICAL ASPECTS**					
33	7.2.1	Mounting :	floor mounting	Confirmed			
34	7.2.1	Overall cabinet dimensions - length :	manufacturer to advise	900 + 600 + 900 mm	mm		
35	7.2.1	Overall cabinet dimensions - depth :	manufacturer to advise	860 mm	mm		
36	7.2.1	Overall cabinet dimensions - height :	manufacturer to advise	1915 mm	mm		
37	7.2.1	Reference outline drawing number :	Input Data	1724000372-EL-DA-00004			
38	7.2.1	Total UPS cabinet mass :	manufacturer to advise	2258 kg	kg		
39	7.2.1	Total UPS mass with batteries (if integrated) :	manufacturer to advise	Batteries not integrated	kg		
40	7.2.4, 7.2.5	Cable entry location :	top	Confirmed. Through by-pass cabinet by means of cable glands			
41	7.2.4, 7.2.5	Cable entry type :	removable - undrilled plate	Confirmed			
42	7.2.4, 7.2.5	Gland plate material :	manufacturer standard	Steel			
43	7.2.1	Paint colour :	supplier standard	RAL7035			
44	7.2.1	Canopy for cabinet required :	No	Noted			
45	7.3.9	Document holder :	Yes	Confirmed			
46		**INSTALLATION**					
47	4,1	Site :	offshore - fixed	Noted. Painting class C3-H			
48	4,1	Location of UPS cabinet installation :	indoor	Noted			
49	7.3.1, 7.3.2	Front access clearance dimensions for operation and maintenance :	800	Noted	mm		
50	7.3.2	Side clearance for ventilation (if required) :	manufacturer to advise	0	mm		
51	7.3.2	Rear clearance for ventilation (if required) :	manufacturer to advise	100 mm	mm		
52	7.2.3, 7.9.3	Installed location of battery :	inside UPS room	Battery housed on rack			
53	7.2.3	Maximum battery assembly dimensions (L x D x H):	manufacturer to advise	Battery rack 1050 x 725 x 1032	mm		
54		**SAFETY**					
55	5.1.1	Accessibility :	operator access area	Front access			
56	5.1.1	Key required for cabinet :	Yes	Confirmed			
57	7.2.2	Degree of protection (with closed doors) :	IP31	IP43			
58	7.2.2	Degree of protection (with open doors) :	IP2X	Confirmed			
59	7.7.5	Cooling fan replacement while UPS in service :	No	Noted			
60	5.1.2	Local language for caution/danger/warning labels :	English	Confirmed			
61		**ELECTROMAGNETIC COMPATIBLITY**					
62	5.1.4	Emission :	UPS Cat C3	Confirmed			
63	5.1.4	Immunity :	UPS Cat C3	Confirmed			
64		**ENVIRONMENTAL CONDITIONS**					
65	4.2.1.1	Minimum ambient temperature (operation) :	-8,4	Confirmed with heater option included	°C		
66	4.2.1.1	Maximum ambient temperature (operation) :	40	Confirmed	°C		
67	4.2.1.1	Maximum relative humidity (operation) :	95	Confirmed. Not condensing	%		
68	4.2.1.1	Temperature at which relative humidity is specified (operation) :	Input Data	-	°C		
69	4.2.1.2	Maximum altitude (operation) :	Sea level	Noted	m		
70	4.2.2.1	Minimum ambient temperature (storage and transportation) :	-5	Noted	°C		
71	4.2.2.1	Maximum ambient temperature (storage and transportation) :	40	Noted	°C		
72	4.2.2.1	Maximum relative humidity (storage and transportation) :	95	Noted	%		
73	4.2.2.1	Temperature at which relative humidity is specified (storage and transportation) :	Input Data	-	°C		
74	4.3.2	Seismic requirement data :	Zone 2	Noted			
75	4.2.2.1	Storage site of UPS :	indoor – natural ventilation	Noted			
76	4.3.2	Additional or unusual conditions (operation) :	Input Data	Not applicable			
77	4.3.3	Additional or unusual conditions (storage and transportation) :	Input Data	Not applicable			
78	5.1.5	Acoustic noise at 1 m - normal mode :	70	< 65 dB(A)	dBA		
79	5.1.5	Acoustic noise at 1 m - stored energy mode :	70	< 65 dB(A)	dBA		
80		**COMMUNICATION INTERFACE(S)**					
81	5,6	(1) Interface media for SCADA (ICSS / DCS) :	serial	Modbus TCP + relays			
82	5,6	(1) Maximum allowable length of communication cable (for copper) :	Input Data	25 m	m		

Row		S-701D Data Sheet for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)					Issue
2	Tag No. :	UP-200F3					
3	Service :	AC UPS PAS					
4	Ref. Clause	Description	Project Requirement	Manufacturer Declared Values	Unit	Additional notes	
83	5,6	(1) Interface protocol for SCADA (ICSS / DCS) :	Modbus	Modbus TCP + relays			
84	5,6	(2) Interface media for electrical management / control system :	serial	Modbus TCP + relays			
85	5,6	(2) Maximum allowable length of communication cable (for copper) :	Input Data	25 m	m		
86	5,6	(2) Interface protocol for electrical management / control system :	Modbus	Modbus TCP + relays			
87	5,6	(3) Remote access / monitoring software required:	Yes	Noted			
88	5,6	(3) Interface media for remote access / monitoring:	ethernet (fiber)	Noted			
89	5,6	(3) Maximum allowable length of communication cable (for copper) :	Input Data	25 m	m		
90	5,6	(3) Interface protocol for remote access / monitoring :	Modbus	Modbus TCP + relays			
91		**AC INPUT SPECIFICATIONS**					
92	5.2.1	Voltage (steady state, R.M.S) - rated :	400	Confirmed	V		
93	5.2.1	Voltage (steady state, R.M.S) - tolerance :	+/- 10	Confirmed	%		
94	5.2.1	Frequency - rated :	50 Hz	Confirmed			
95	5.2.1	Frequency - tolerance :	+/- 2	Confirmed	%		
96	5.2.2	Phases required :	3	3			
97	5.2.2	Neutral required :	Yes	Confirmed. Neutral not required for the rectifier supply			
98	5.2.2	Current (R.M.S) - rated (with the energy storage device charged) :	manufacturer to advise	71,2A	A		
99	5.2.2	Power factor :	manufacturer to advise	Data not characterized by the factory. Measurable on request			
100	5.2.2	In-rush (% of rated current) :	manufacturer to advise	Typically 10 x In	%		
101	5.2.2	In-rush (time) :	manufacturer to advise	Data not characterized by the factory. Measurable on request	s		
102	5.2.2	Maximum current (with low input volt and energy storage device charging) :	manufacturer to advise	92A at 400Vac	A		
103	5.2.2	Time for overload (125 % of rated current) :	10	Confirmed	min		
104	5.2.2	Time for overload (150 % of rated current) :	1	Confirmed	min		
105	5.2.2	Total harmonic distortion - current (THD p.u.) :	8	Confirmed. The AC UPS works with an input voltage harmonic distortion ≤ 8%	%		
106	5.2.3	Short circuit current of the input supply (Minimum and Maximum) :	50	Confirmed. The charger is equipped with an input MCCB (Q1) with Isc = 50kA	kA		
107	5.2.2	Minimum short circuit current :	Input Data	Data not characterized by the factory. Measurable on request	kA		
108	5.2.2	Earth leakage current :	Input Data	Data not characterized by the factory. Measurable on request	mA		
109	5.2.2	AC power distribution system - compatibility :	TN-S	Confirmed			
110	5.2.3	Additional or unusual conditions :	Input Data	Not applicable			
111	5.2.3, 7.5.4	Cable size (cross-section area) - input mains :	Input Data	min 50 sqmm - max 2x95 sqmm	sq.mm.		
112	5.2.3, 7.5.4	Cable size (cross-section area) - input bypass :	Input Data	min 16 sqmm - max 2x95 sqmm	sq.mm.		
113	5.2.3, 7.5.4	Cable size (cross-section area) - input maintenance bypass :	Input Data	min 16 sqmm - max 2x95 sqmm	sq.mm.		
114	7.4.8, 8.1.1.1	Input isolation transformer required :	Yes	Confirmed			
115	7.4.10	Input isolation transformer winding :	supplier standard	Aluminium			
116		**DC AND BATTERY SPECIFICATIONS**					
117	5.4.2.2	DC voltage level :	220	Confirmed	V d.c.		
118	5.4.2.2	Design life :	5	> 12 years	years		
119	5.4.2.2	Float service life :	manufacturer to advise	Dependent from temperature	years		
120	5.4.2.2	Shelf life of battery :	manufacturer to advise	3 months	months		
121	5.4.2.2	Quantity of cells and strings :	manufacturer to advise	18 blocks - 1 string	nos.		
122	5.4.2.2	Nominal voltage (total) :	manufacturer to advise	216V	V d.c.		
123	5.4.2.2	Battery technology :	sealed nickel cadmium	Lead-Acid VRLA GEL			
124	5.4.2.2	Nominal AH capacity :	manufacturer to advise	150Ah	AH		
125	5.4.2.2	Discharge rate (C-rate) :	Select	C20			
126	5.4.2.2	Electrolyte fill status :	manufacturer standard	Not applicable			
127	8.1.2.3	Purchaser's requirement (% of battery recharge level - 1) :	80	Confirmed with charging current limited to 0,1C	%		
128	8.1.2.3	Purchaser's requirement (time for battery recharge level - 1) :	10	Confirmed	Hours		
129	8.1.2.3	Purchaser's requirement (% of battery recharge level - 2) :	100	Data not characterized by the factory. Measurable on request	%		
130	8.1.2.3	Purchaser's requirement (time for battery recharge level - 2) :	24	Data not characterized by the factory. Measurable on request	Hours		
131	5.4.2.2	Stored energy time (Autonomy time at 100% rated load) :	30	Confirmed with both batteries	min		
132	5.4.2.2	Restored energy time (recharge time to 80% capacity):	manufacturer to advise	10h	hours		
133	5.4.2.2	Ambient reference temperature :	40	Confirmed	°C		
134	5.4.2.2	Earth condition/isolation :	manufacturer to advise	floating			
135	5.4.2.2	Ripple current (R.M.S) :	manufacturer to advise	< 2% RMS	%		
136	5.4.2.2	Nominal discharge current (stored energy mode):	manufacturer to advise	-	A		
137	5.4.2.2	DC Fault current rating :	manufacturer to advise	Data not characterized by the factory. Measurable on request	A d.c.		
138	5.4.2.2	Cable volt drop recommendation (≤ % at nominal discharge current) :	manufacturer to advise	2%	%		
139	5.4.2.2	Charging regime :	manufacturer to advise	Constant voltage, current limited			
140	5.4.2.2	Charge voltage (float) and tolerance band :	manufacturer to advise	2,28Vcell - 13,5 / 13,8 Vblock	V d.c.		
141	5.4.2.2	Charge voltage (boost) and tolerance band :	manufacturer to advise	2,28Vcell - 13,5 / 13,8 Vblock	V d.c.		
142	5.4.2.2	Charge voltage (equalising) and tolerance band :	manufacturer to advise	Not applicable to VRLA batteries	V d.c.		
143	5.4.2.2	Minimum end of discharge voltage :	manufacturer to advise	178,2V	V d.c.		
144	5.4.2.2	Charge current limit (or range) :	limitation of batteries charging to 30% of the UPS sizing	15A (0,1C)	A d.c.		
145	5.4.2.2	Temperature compensated charging required:	Yes	Confirmed			
146	5.4.2.3	Battery isolation box required :	Yes	Confirmed			
147	5.4.2.3	Additional or unusual conditions :	Input Data	Not applicable			
148	5.4.2.3	Load profile for battery design, attached :	No	Noted			
150		**BATTERY ROOM**					
151	4.2.1.1	Minimum ambient reference temperature :	-8,4	-8,4°C (used for battery sizing)	°C		

S-701D Data Sheet for
AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

JIP33 JOINT INDUSTRY PROGRAMME

Row							Issue
2	Tag No. :	UP-200F3					
3	Service :	AC UPS PAS					
4	Ref. Clause	Description	Project Requirement	Manufacturer Declared Values	Unit	Additional notes	
152	4.2.1.1	Maximum ambient reference temperature :	40	+40°C (used for battery sizing)	°C		
153	5.4.2.1	Area classification :	safe	Noted			
154	5.4.2.1	Hazardous area classification :	Zone 2	Noted			
155	5.4.2.1	Minimum gas subdivision and temperature class (for equipment in battery room) :	Select	-			
156	8.1.2.10	Temperature sensor (for VRLA / partial gas recombination batteries) :	Yes	Confirmed. Standard sensor			
157		**BATTERY ISOLATOR BOX SPECIFICATIONS**					
158	7.9.1	Enclosure material :	manufacturer standard	Aluminium alloy			
159	7.9.1	Mounting :	Select	Wall mounting			
160	7.9.1	Breathing valve required :	manufacturer to advise	No			
161	7.9.1	Internal earth bar :	tinned copper	-			
162	7.9.3	Minimum design temperature :	-8,4	Noted	°C		
163	7.9.3	Maximum design temperature :	40	Noted	°C		
164	7.9.3	Maximum relative humidity :	95	Noted	%		
165	7.9.3	Temperature at which relative humidity is specified:	Input Data	-	°C		
166	7.9.4	Degree of protection :	IP 31	IP65			
167	7.9.5	Area classification :	safe	Noted			
168	7.9.5	Hazardous area certification required :	none	-			
169	7.9.5	Hazardous area classification :	N/A	Not applicable			
170	7.9.5	Hazardous area level of protection :	N/A	Not applicable			
171	7.9.6	Cable entry :	top	Bottom with cable glands			
172	7.9.6	Cable indirect entry via 'ex e' enclosure :	No	Not applicable			
173	7.9.6	Battery cable size (cross-section area) :	Input Data	70 sqmm armored cable class-2	sq.mm.		
174	7.9.6	Cable entry diameter in battery box (ISO metric) :	Input Data	22,6 mm			
175	7.9.7	Battery isolator type :	MCCB	Confirmed			
176	7.9.8	Rated current of breaker / switch fuse unit :	manufacturer to advise	200A	A		
177	7.9.8	Rated breaking current (Icu) - (if breaker used) :	manufacturer to advise	36kA	kA		
178	7.9.10	Breaker status potential free contact (NO) :	two	Confirmed			
179	7.9.9	Under voltage trip feature required :	Yes	Confirmed			
180	7.9.9	Under voltage trip coil for :	black start reserve	Confirmed			
181	8.1.2.12	ESD trip required :	Yes - via shunt trip	Yes - through SIL relay			
182	8.1.2.12	ESD override key switch :	key captive in overridden position and with status contact	Confirmed			
183	7.9.9	Over voltage trip required :	Yes	Not applicable			
184		**AC OUTPUT SPECIFICATIONS**					
185	5.3.2	Rated output power (apparent) :	35	40kVA	kVA		
186	5.3.2	Rated output power (active) :	28	32kW	kW		
187	5.3.2	AC power distribution system - compatibility :	TN-S	Noted			
188	5.3.2	Phases available :	3	Confirmed			
189	5.3.2	Neutral available :	Yes	Confirmed			
190	5.3.2	Voltage (steady state, R.M.S) - rated :	400	Confirmed	V		
191	5.3.2	Voltage - normal mode variation :	manufacturer to advise	+/- 1%	%		
192	5.3.2	Voltage - storage energy mode variation :	manufacturer to advise	+/- 1%	%		
193	5.3.2, 8.2.3	Total harmonic distortion (V), 100% load - normal mode - linear :	5	< 3%	%		
194	5.3.2, 8.2.3	Total harmonic distortion (V), 100% load - normal mode - non linear :	5	Confirmed	%		
195	5.3.2, 8.2.3	Total harmonic distortion (V), 100% load - storage energy mode - linear :	5	< 3%	%		
196	5.3.2, 8.2.3	Total harmonic distortion (V), 100% load - storage energy mode - non linear :	5	Confirmed	%		
197	5.3.2	% Voltage unbalance, 100% load unbalance :	manufacturer to advise	Data not characterized by the factory. Measurable on request	%		
198	5.3.2	Phase angle displacement, 100% load unbalance:	manufacturer to advise	Data not characterized by the factory. Measurable on request	°		
199	5.3.2	% Voltage transient, 100% step load - linear :	manufacturer to advise	+/- 2%	%		
200	5.3.2	Voltage transient recovery time, 100% step load - linear :	manufacturer to advise	2 ms	s		
201	5.3.2	% Voltage transient, 100% step load - non linear :	manufacturer to advise	Data not characterized by the factory. Measurable on request	%		
202	5.3.2	Voltage transient recovery time, 100% step load - non linear :	manufacturer to advise	Data not characterized by the factory. Measurable on request	s		
203	5.3.2	% Voltage transient, 100% step load - transfer normal mode to storage energy mode :	manufacturer to advise	Data not characterized by the factory. Measurable on request	%		
204	5.3.2	Voltage transient recovery time, 100% step load - transfer normal mode to storage energy mode :	manufacturer to advise	Data not characterized by the factory. Measurable on request	s		
205	5.3.2	% Voltage transient, 100% step load -transfer storage energy mode to normal mode :	manufacturer to advise	Data not characterized by the factory. Measurable on request	%		
206	5.3.2	Voltage transient recovery time, 100% step load -transfer storage energy mode to normal mode :	manufacturer to advise	Data not characterized by the factory. Measurable on request	s		
207	5.3.2	Frequency (steady state) - rated :	50	Confirmed	Hz		
208	5.3.2	Frequency (steady state) - normal mode variation:	2	+/- 0,1%	%		
209	5.3.2	Frequency (steady state) - storage energy mode variation :	2	+/- 0,1%	%		
210	5.3.2	Frequency (steady state) - free running variation:	2	+/- 0,1%	%		
211	5.3.2	Synchronization (maximum ± % range of rated frequency) :	manufacturer to advise	-	%		
212	5.3.2	Maximum synchronism phase error (referred to 360° cycle) :	manufacturer to advise	-	%		
213	5.3.2	Maximum slew rate :	manufacturer to advise	-	Hz/s		
214	5.3.2	Current (R.M.S) - rated :	manufacturer to advise	58A	A		
215	5.1.8.1, 5.3.2	Current (R.M.S) - overload capability (% of rated current for ten minutes) :	manufacturer to advise	125%	%		
216	5.1.8.2, 5.3.2	Current (R.M.S) - overload capability (% of rated current for one minute) :	manufacturer to advise	150%	%		
217	5.1.8.3, 5.1.8.4	Current (R.M.S) - short circuit capability (% of rated current) :	manufacturer to advise	3,68 x In (1ph) - 2,02 x In (3ph)	%		
218	5.1.8.3, 5.1.8.4	Current (R.M.S) - short circuit capability (time duration) :	manufacturer to advise	500 ms	s		
219	5.3.2	Current (R.M.S) - limitation (% of rated current) :	manufacturer to advise	-	%		
220	5.3.2	Current (R.M.S) - limitation (time duration) :	manufacturer to advise	-	s		

Row		S-701D Data Sheet for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)					Issue
2	Tag No. :	UP-200F3					
3	Service :	AC UPS PAS					
4	Ref. Clause	Description	Project Requirement	Manufacturer Declared Values	Unit	Additional notes	
221	5.3.2	Current (R.M.S) - fault clearing capability (normal mode) :	manufacturer to advise	-	A		
222	5.3.2	Current (R.M.S) - fault clearing capability (stored energy mode) :	manufacturer to advise	-	A		
223	5.3.2	Load power factor - rated :	manufacturer to advise	0,8			
224	5.3.2	Load power factor - displacement (permissible limit lead) :	manufacturer to advise	Cap - 1 - Ind			
225	5.3.2	Load power factor - displacement (permissible limit lag) :	manufacturer to advise	Cap - 1 - Ind			
226	5.3.2	Efficiency in normal mode - 100% load :	manufacturer to advise	86,4%	%		
227	5.3.2	Efficiency in normal mode - 75% load :	manufacturer to advise	87,3%	%		
228	5.3.2	Efficiency in normal mode - 50% load :	manufacturer to advise	87,2%	%		
229	5.3.2	Efficiency in normal mode - 25% load :	manufacturer to advise	83,8%	%		
230	7.4.8	Output isolation transformer required :	No	Yes. Output transformer is included in AEG standard design			
231	7.4.10	Output isolation transformer winding :	Select	Aluminium			
232	7.6.5	AC output neutral earth link :	earthed	Noted. Externally			
233	7.1.6	Reference document to AC output distribution board :	To see Electrical Load List	Noted			
234	5.3.3	Integrated AC output distribution board with MCBs:	Yes	Confirmed			
235	5.3.3	Cable size (cross-section area) - output:	manufacturer to advise	min 16 sqmm - max 2x95 sqmm	sq.mm.		
236		**BYPASS SPECIFICATIONS**					
237	C.3	Bypass transfer time :	manufacturer to advise	0	msec		
238	C.3	Bypass static switch rated current :	manufacturer to advise	40kVA - 58A	A		
239	C.3	Bypass protection fuse or circuit breaker rating :	manufacturer to advise	MCCB 65A	A		
240	7.4.8	Bypass transformer required :	Yes	Confirmed			
241	7.4.10	Bypass transformer winding :	copper or aluminum	Aluminium			
242	7.3.5	Maintenance bypass and bypass transformer location:	integrated	Manual by-pass integrated			
243	8.3.6, C.5	Overall maintenance bypass :	internal	Q29 manual by-pass integrated			

Base Load Power Hub (BLPH)

AC UPS F&G - TAG: UP-200F4

UPS AND BATTERIES TECHNICAL DATA SHEET

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S-701D Data Sheet for
AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

JIP33 JOINT INDUSTRY PROGRAMME

Row							Issue
2	Tag No. :	UP-200F4					
3	Service :	AC UPS F&G					
4	Ref. Clause	Description	Project Requirement	Manufacturer Declared Values	Unit	Additional notes	
5		**GENERAL**					
6	5.1.2	Vendor :	Input Data	AEG Power Solutions			
7	5.1.2	Order status :	for enquiry	Noted			
8	5.1.2	Purchase order number, date :	Input Data	Noted			
9	5.1.2	Manufacturer :	Input Data	AEG Power Solutions			
10	5.1.2	Model number :	Input Data	2 x Protect 8.33 S10 20kVA			
11	5.1.2	Serial number :	Input Data	Released after production			
12	5.2.3	Application :	industrial	Noted			
13	5.3.3	Purchaser specified rated output power :	15	20kVA	kVA		
14	5.1.1	Quantity :	1	Confirmed. Redundant system			
15		Conformity assessment system (CAS) level :	D	Noted			
16		**CONFIGURATION**					
17	5.1.1, A.1, Figure A.2, Figure A.3A, Figure A.3B, Figure A.6	UPS configuration :	simplified parallel UPS with common bypass & common output-Figure A.3A	Confirmed			
18	5.1.1, B.1	UPS topology :	double conversion	Confirmed			
19	5.1.1	Static switch configuration :	in both inverter and bypass path	Confirmed			
20	5.4.2.3	Battery configuration :	2 x 50%	Confirmed. 240 min. autonomy each battery			
21	5.3.2, 5.3.4	Performance classification :	manufacturer to advise	-			
22	8.1.1.3	Bi-directional rectifier :	No	Not applicable			
23	8.4.2.11	Remote access required :	Yes (read only)	Confirmed. Modbus TCP			
24	8.4.2.11	Hardware (adapters, connectors, cables, etc.) required for remote access :	manufacturer to advise	Confirmed			
25	8.1.1.5, 8.1.1.6	On-line battery monitoring facility required :	string monitoring	Confirmed			
26	8.1.1.4	On-line battery testing feature required :	No	Noted			
27	8.1.1.4	Battery test load interface :	No	Noted			
28	5.4.2.3	DC earth leakage monitoring required :	No	Noted			
29	7.4.14	Single line diagram and status display :	on HMI	LCD display with synoptic			
30	8.1.2.11	Black start feature required :	Yes	Confirmed			
31	8.1.1.1	Earth screen required for isolation transformer :	manufacturer to advise	Confirmed on the by-pass isolation transformer			
32		**PHYSICAL ASPECTS**					
33	7.2.1	Mounting :	floor mounting	Confirmed			
34	7.2.1	Overall cabinet dimensions - length :	manufacturer to advise	900 + 600 + 900 mm	mm		
35	7.2.1	Overall cabinet dimensions - depth :	manufacturer to advise	860 mm	mm		
36	7.2.1	Overall cabinet dimensions - height :	manufacturer to advise	1915 mm	mm		
37	7.2.1	Reference outline drawing number :	Input Data	1724000372-EL-DA-00004			
38	7.2.1	Total UPS cabinet mass :	manufacturer to advise	1530 kg	kg		
39	7.2.1	Total UPS mass with batteries (if integrated) :	manufacturer to advise	Batteries not integrated	kg		
40	7.2.4, 7.2.5	Cable entry location :	top	Confirmed. Through by-pass cabinet by means of cable glands			
41	7.2.4, 7.2.5	Cable entry type :	removable - undrilled plate	Confirmed			
42	7.2.4, 7.2.5	Gland plate material :	manufacturer standard	Steel			
43	7.2.1	Paint colour :	supplier standard	RAL7035			
44	7.2.1	Canopy for cabinet required :	No	Noted			
45	7.3.9	Document holder :	Yes	Confirmed			
46		**INSTALLATION**					
47	4,1	Site :	offshore - fixed	Noted. Painting class C3-H			
48	4,1	Location of UPS cabinet installation :	indoor	Noted			
49	7.3.1, 7.3.2	Front access clearance dimensions for operation and maintenance :	800	Noted	mm		
50	7.3.2	Side clearance for ventilation (if required) :	manufacturer to advise	0	mm		
51	7.3.2	Rear clearance for ventilation (if required) :	manufacturer to advise	100 mm	mm		
52	7.2.3, 7.9.3	Installed location of battery :	inside UPS room	Battery housed on rack			
53	7.2.3	Maximum battery assembly dimensions (L x D x H) :	manufacturer to advise	Battery rack 1800 x 725 x 1474	mm		
54		**SAFETY**					
55	5.1.1	Accessibility :	operator access area	Front access			
56	5.1.1	Key required for cabinet :	Yes	Confirmed			
57	7.2.2	Degree of protection (with closed doors) :	IP31	IP43			
58	7.2.2	Degree of protection (with open doors) :	IP2X	Confirmed			
59	7.7.5	Cooling fan replacement while UPS in service :	No	Noted			
60	5.1.2	Local language for caution/danger/warning labels:	English	Confirmed			
61		**ELECTROMAGNETIC COMPATIBLITY**					
62	5.1.4	Emission :	UPS Cat C3	Confirmed			
63	5.1.4	Immunity :	UPS Cat C3	Confirmed			
64		**ENVIRONMENTAL CONDITIONS**					
65	4.2.1.1	Minimum ambient temperature (operation) :	-8,4	Confirmed with heater option included	°C		
66	4.2.1.1	Maximum ambient temperature (operation) :	40	Confirmed	°C		
67	4.2.1.1	Maximum relative humidity (operation) :	95	Confirmed. Not condensing	%		
68	4.2.1.1	Temperature at which relative humidity is specified (operation) :	Input Data	-	°C		
69	4.2.1.2	Maximum altitude (operation) :	Sea level	Noted	m		
70	4.2.2.1	Minimum ambient temperature (storage and transportation) :	-5	Noted	°C		
71	4.2.2.1	Maximum ambient temperature (storage and transportation) :	40	Noted	°C		
72	4.2.2.1	Maximum relative humidity (storage and transportation) :	95	Noted	%		
73	4.2.2.1	Temperature at which relative humidity is specified (storage and transportation) :	Input Data	-	°C		
74	4.3.2	Seismic requirement data :	Zone 2	Noted			
75	4.2.2.1	Storage site of UPS :	indoor – natural ventilation	Noted			
76	4.3.2	Additional or unusual conditions (operation) :	Input Data	Not applicable			
77	4.3.3	Additional or unusual conditions (storage and transportation) :	Input Data	Not applicable			
78	5.1.5	Acoustic noise at 1 m - normal mode :	70	< 65 dB(A)	dBA		
79	5.1.5	Acoustic noise at 1 m - stored energy mode :	70	< 65 dB(A)	dBA		
80		**COMMUNICATION INTERFACE(S)**					
81	5,6	(1) Interface media for SCADA (ICSS / DCS) :	serial	Modbus TCP + relays			

S-701D Data Sheet for
AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

JIP33 JOINT INDUSTRY PROGRAMME

Row							Issue
2	Tag No. :	UP-200F4					
3	Service :	AC UPS F&G					
4	Ref. Clause	Description	Project Requirement	Manufacturer Declared Values	Unit	Additional notes	
82	5,6	(1) Maximum allowable length of communication cable (for copper) :	Input Data	25 m	m		
83	5,6	(1) Interface protocol for SCADA (ICSS / DCS) :	Modbus	Modbus TCP + relays			
84	5,6	(2) Interface media for electrical management / control system :	serial	Modbus TCP + relays			
85	5,6	(2) Maximum allowable length of communication cable (for copper) :	Input Data	25 m	m		
86	5,6	(2) Interface protocol for electrical management / control system :	Modbus	Modbus TCP + relays			
87	5,6	(3) Remote access / monitoring software required :	Yes	Noted			
88	5,6	(3) Interface media for remote access / monitoring :	ethernet (fiber)	Noted			
89	5,6	(3) Maximum allowable length of communication cable (for copper) :	Input Data	25 m	m		
90	5,6	(3) Interface protocol for remote access / monitoring :	Modbus	Modbus TCP + relays			
91		**AC INPUT SPECIFICATIONS**					
92	5.2.1	Voltage (steady state, R.M.S) - rated :	400	Confirmed	V		
93	5.2.1	Voltage (steady state, R.M.S) - tolerance :	+/- 10	Confirmed	%		
94	5.2.1	Frequency - rated :	50 Hz	Confirmed			
95	5.2.1	Frequency - tolerance :	+/- 2	Confirmed	%		
96	5.2.2	Phases required :	3	3			
97	5.2.2	Neutral required :	Yes	Confirmed. Neutral not required for the rectifier supply			
98	5.2.2	Current (R.M.S) - rated (with the energy storage device charged) :	manufacturer to advise	35A	A		
99	5.2.2	Power factor :	manufacturer to advise	Data not characterized by the factory. Measurable on request			
100	5.2.2	In-rush (% of rated current) :	manufacturer to advise	Typically 10 x In	%		
101	5.2.2	In-rush (time) :	manufacturer to advise	Data not characterized by the factory. Measurable on request	s		
102	5.2.2	Maximum current (with low input volt and energy storage device charging) :	manufacturer to advise	43A at 400Vac	A		
103	5.2.2	Time for overload (125 % of rated current) :	10	Confirmed	min		
104	5.2.2	Time for overload (150 % of rated current) :	1	Confirmed	min		
105	5.2.2	Total harmonic distortion - current (THD p.u.) :	8	Confirmed. The AC UPS works with an input voltage harmonic distortion ≤ 8%	%		
106	5.2.3	Short circuit current of the input supply (Minimum and Maximum) :	50	Confirmed. The charger is equipped with an input MCCB (Q1) with Isc = 50kA	kA		
107	5.2.2	Minimum short circuit current :	Input Data	Data not characterized by the factory. Measurable on request	kA		
108	5.2.2	Earth leakage current :	Input Data	Data not characterized by the factory. Measurable on request	mA		
109	5.2.2	AC power distribution system - compatibility :	TN-S	Confirmed			
110	5.2.3	Additional or unusual conditions :	Input Data	Not applicable			
111	5.2.3, 7.5.4	Cable size (cross-section area) - input mains :	Input Data	min 25 sqmm - max 2x95 sqmm	sq.mm.		
112	5.2.3, 7.5.4	Cable size (cross-section area) - input bypass:	Input Data	min 10 sqmm - max 2x95 sqmm	sq.mm.		
113	5.2.3, 7.5.4	Cable size (cross-section area) - input maintenance bypass :	Input Data	min 10 sqmm - max 2x95 sqmm	sq.mm.		
114	7.4.8, 8.1.1.1	Input isolation transformer required :	Yes	Confirmed			
115	7.4.10	Input isolation transformer winding :	supplier standard	Aluminium			
116		**DC AND BATTERY SPECIFICATIONS**					
117	5.4.2.2	DC voltage level :	Select	Confirmed	V d.c.		
118	5.4.2.2	Design life :	5	10 years	years		
119	5.4.2.2	Float service life :	manufacturer to advise	Dependent from temperature	years		
120	5.4.2.2	Shelf life of battery :	manufacturer to advise	3 months	months		
121	5.4.2.2	Quantity of cells and strings :	manufacturer to advise	18 blocks - 3 strings	nos.		
122	5.4.2.2	Nominal voltage (total) :	manufacturer to advise	216V	V d.c.		
123	5.4.2.2	Battery technology :	sealed nickel cadmium	Lead-Acid VRLA GEL			
124	5.4.2.2	Nominal AH capacity :	manufacturer to advise	360Ah	AH		
125	5.4.2.2	Discharge rate (C-rate) :	Select	C10			
126	5.4.2.2	Electrolyte fill status :	manufacturer standard	Not applicable			
127	8.1.2.3	Purchaser's requirement (% of battery recharge level - 1) :	80	Confirmed with charging current limited to 0,1C	%		
128	8.1.2.3	Purchaser's requirement (time for battery recharge level - 1) :	10	Confirmed	Hours		
129	8.1.2.3	Purchaser's requirement (% of battery recharge level - 2) :	100	Data not characterized by the factory. Measurable on request	%		
130	8.1.2.3	Purchaser's requirement (time for battery recharge level - 2) :	24	Data not characterized by the factory. Measurable on request	Hours		
131	5.4.2.2	Stored energy time (Autonomy time at 100% rated load) :	8	Confirmed with both batteries	hours		
132	5.4.2.2	Restored energy time (recharge time to 80% capacity) :	manufacturer to advise	10h	hours		
133	5.4.2.2	Ambient reference temperature :	40	Confirmed	°C		
134	5.4.2.2	Earth condition/isolation :	manufacturer to advise	floating			
135	5.4.2.2	Ripple current (R.M.S) :	manufacturer to advise	< 2% RMS	%		
136	5.4.2.2	Nominal discharge current (stored energy mode):	manufacturer to advise	-	A		
137	5.4.2.2	DC Fault current rating :	manufacturer to advise	Data not characterized by the factory. Measurable on request	A d.c.		
138	5.4.2.2	Cable volt drop recommendation (≤ % at nominal discharge current) :	manufacturer to advise	2%	%		
139	5.4.2.2	Charging regime :	manufacturer to advise	Constant voltage, current limited			
140	5.4.2.2	Charge voltage (float) and tolerance band :	manufacturer to advise	2,28Vcell - 13,5 / 13,8 Vblock	V d.c.		
141	5.4.2.2	Charge voltage (boost) and tolerance band :	manufacturer to advise	2,28Vcell - 13,5 / 13,8 Vblock	V d.c.		
142	5.4.2.2	Charge voltage (equalising) and tolerance band :	manufacturer to advise	Not applicable to VRLA batteries	V d.c.		
143	5.4.2.2	Minimum end of discharge voltage :	manufacturer to advise	178,2V	V d.c.		
144	5.4.2.2	Charge current limit (or range) :	limitation of batteries charging to 30% of the UPS sizing	36A (0,1C)	A d.c.		
145	5.4.2.2	Temperature compensated chargingrequired:	Yes	Confirmed			
146	5.4.2.3	Battery isolation box required :	Yes	Confirmed			
147	5.4.2.3	Additional or unusual conditions :	Input Data	Not applicable			
148	5.4.2.3	Load profile for battery design, attached :	No	Noted			

S-701D Data Sheet for
AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

JIP33 JOINT INDUSTRY PROGRAMME

Row							Issue
2	Tag No. :	UP-200F4					
3	Service :	AC UPS F&G					
4	Ref. Clause	Description	Project Requirement	Manufacturer Declared Values	Unit	Additional notes	
150		**BATTERY ROOM**					
151	4.2.1.1	Minimum ambient reference temperature :	-8,4	-8,4°C (used for battery sizing)	°C		
152	4.2.1.1	Maximum ambient reference temperature :	40	+40°C (used for battery sizing)	°C		
153	5.4.2.1	Area classification :	safe	Noted			
154	5.4.2.1	Hazardous area classification :	Zone 2	Noted			
155	5.4.2.1	Minimum gas subdivision and temperature class (for equipment in battery room) :	Select	-			
156	8.1.2.10	Temperature sensor (for VRLA / partial gas recombination batteries) :	Yes	Confirmed. Standard sensor			
157		**BATTERY ISOLATOR BOX SPECIFICATIONS**					
158	7.9.1	Enclosure material :	manufacturer standard	Aluminium alloy			
159	7.9.1	Mounting :	Select	Wall mounting			
160	7.9.1	Breathing valve required :	manufacturer to advise	No			
161	7.9.1	Internal earth bar :	tinned copper	-			
162	7.9.3	Minimum design temperature :	-8,4	Noted	°C		
163	7.9.3	Maximum design temperature :	40	Noted	°C		
164	7.9.3	Maximum relative humidity :	95	Noted	%		
165	7.9.3	Temperature at which relative humidity is specified:	Input Data	-	°C		
166	7.9.4	Degree of protection :	IP 31	IP65			
167	7.9.5	Area classification :	safe	Noted			
168	7.9.5	Hazardous area certification required :	none	-			
169	7.9.5	Hazardous area classification :	N/A	Not applicable			
170	7.9.5	Hazardous area level of protection :	N/A	Not applicable			
171	7.9.6	Cable entry :	top	Bottom with cable glands			
172	7.9.6	Cable indirect entry via 'ex e' enclosure :	No	Not applicable			
173	7.9.6	Battery cable size (cross-section area):	Input Data	70 sqmm armored cable class-2	sq.mm.		
174	7.9.6	Cable entry diameter in isolator box (ISO metric) :	Input Data	22,6 mm			
175	7.9.7	Battery isolator type :	MCCB	Confirmed			
176	7.9.8	Rated current of breaker / switch fuse unit :	manufacturer to advise	200A	A		
177	7.9.8	Rated breaking current (Icu) - (if breaker used) :	manufacturer to advise	36kA	kA		
178	7.9.10	Breaker status potential free contact (NO) :	two	Confirmed			
179	7.9.9	Under voltage trip feature required :	Yes	Confirmed			
180	7.9.9	Under voltage trip coil for :	black start reserve	Confirmed			
181	8.1.2.12	ESD trip required :	Yes - via shunt trip	Yes - through SIL relay			
182	8.1.2.12	ESD override key switch :	key captive in overridden position and with status contact	Confirmed			
183	7.9.9	Over voltage trip required :	Yes	Not applicable			
184		**AC OUTPUT SPECIFICATIONS**					
185	5.3.2	Rated output power (apparent) :	20	20kVA	kVA		
186	5.3.2	Rated output power (active) :	16	16kW	kW		
187	5.3.2	AC power distribution system - compatibility :	TN-S	Noted			
188	5.3.2	Phases available :	3	Confirmed			
189	5.3.2	Neutral available :	Yes	Confirmed			
190	5.3.2	Voltage (steady state, R.M.S) - rated :	400	Confirmed	V		
191	5.3.2	Voltage - normal mode variation :	manufacturer to advise	+/- 1%	%		
192	5.3.2	Voltage - storage energy mode variation :	manufacturer to advise	+/- 1%	%		
193	5.3.2, 8.2.3	Total harmonic distortion (V), 100% load - normal mode - linear :	5	< 3%	%		
194	5.3.2, 8.2.3	Total harmonic distortion (V), 100% load - normal mode - non linear :	5	Confirmed	%		
195	5.3.2, 8.2.3	Total harmonic distortion (V), 100% load - storage energy mode - linear :	5	< 3%	%		
196	5.3.2, 8.2.3	Total harmonic distortion (V), 100% load - storage energy mode - non linear :	5	Confirmed	%		
197	5.3.2	% Voltage unbalance, 100% load unbalance :	manufacturer to advise	Data not characterized by the factory. Measurable on request	%		
198	5.3.2	Phase angle displacement, 100% load unbalance :	manufacturer to advise	Data not characterized by the factory. Measurable on request	°		
199	5.3.2	% Voltage transient, 100% step load - linear :	manufacturer to advise	+/- 2%	%		
200	5.3.2	Voltage transient recovery time, 100% step load - linear :	manufacturer to advise	2 ms	s		
201	5.3.2	% Voltage transient, 100% step load - non linear :	manufacturer to advise	Data not characterized by the factory. Measurable on request	%		
202	5.3.2	Voltage transient recovery time, 100% step load - non linear :	manufacturer to advise	Data not characterized by the factory. Measurable on request	s		
203	5.3.2	% Voltage transient, 100% step load - transfer normal mode to storage energy mode :	manufacturer to advise	Data not characterized by the factory. Measurable on request	%		
204	5.3.2	Voltage transient recovery time, 100% step load - transfer normal mode to storage energy mode :	manufacturer to advise	Data not characterized by the factory. Measurable on request	s		
205	5.3.2	% Voltage transient, 100% step load -transfer storage energy mode to normal mode :	manufacturer to advise	Data not characterized by the factory. Measurable on request	%		
206	5.3.2	Voltage transient recovery time, 100% step load -transfer storage energy mode to normal mode :	manufacturer to advise	Data not characterized by the factory. Measurable on request	s		
207	5.3.2	Frequency (steady state) - rated :	50	Confirmed	Hz		
208	5.3.2	Frequency (steady state) - normal mode variation :	2	+/- 0,1%	%		
209	5.3.2	Frequency (steady state) - storage energy mode variation :	2	+/- 0,1%	%		
210	5.3.2	Frequency (steady state) - free running variation :	2	+/- 0,1%	%		
211	5.3.2	Synchronization (maximum ± % range of rated frequency) :	manufacturer to advise	-	%		
212	5.3.2	Maximum synchronism phase error (referred to 360° cycle) :	manufacturer to advise	-	%		
213	5.3.2	Maximum slew rate :	manufacturer to advise	-	Hz/s		
214	5.3.2	Current (R.M.S) - rated :	manufacturer to advise	29A	A		
215	5.1.8.1, 5.3.2	Current (R.M.S) - overload capability (% of rated current for ten minutes) :	manufacturer to advise	125%	%		
216	5.1.8.2, 5.3.2	Current (R.M.S) - overload capability (% of rated current for one minute) :	manufacturer to advise	150%	%		
217	5.1.8.3, 5.1.8.4	Current (R.M.S) - short circuit capability (% of rated current) :	manufacturer to advise	3,75 x In (1ph) - 2,15 x In (3ph)	%		
218	5.1.8.3, 5.1.8.4	Current (R.M.S) - short circuit capability (time duration) :	manufacturer to advise	500 ms	s		
219	5.3.2	Current (R.M.S) - limitation (% of rated current) :	manufacturer to advise	-	%		

Row		S-701D Data Sheet for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)					Issue
2	Tag No. :	UP-200F4					
3	Service :	AC UPS F&G					
4	Ref. Clause	Description	Project Requirement	Manufacturer Declared Values	Unit	Additional notes	
220	5.3.2	Current (R.M.S) - limitation (time duration) :	manufacturer to advise	-	s		
221	5.3.2	Current (R.M.S) - fault clearing capability (normal mode) :	manufacturer to advise	-	A		
222	5.3.2	Current (R.M.S) - fault clearing capability (stored energy mode) :	manufacturer to advise	-	A		
223	5.3.2	Load power factor - rated :	manufacturer to advise	0,8			
224	5.3.2	Load power factor - displacement (permissible limit lead) :	manufacturer to advise	Cap - 1 - Ind			
225	5.3.2	Load power factor - displacement (permissible limit lag) :	manufacturer to advise	Cap - 1 - Ind			
226	5.3.2	Efficiency in normal mode - 100% load :	manufacturer to advise	85,6%	%		
227	5.3.2	Efficiency in normal mode - 75% load :	manufacturer to advise	85,8%	%		
228	5.3.2	Efficiency in normal mode - 50% load :	manufacturer to advise	85%	%		
229	5.3.2	Efficiency in normal mode - 25% load :	manufacturer to advise	79,3%	%		
230	7.4.8	Output isolation transformer required :	No	Yes. Output transformer is included in AEG standard design			
231	7.4.10	Output isolation transformer winding :	Select	Aluminium			
232	7.6.5	AC output neutral earth link :	earthed	Noted. Externally			
233	7.1.6	Reference document to AC output distribution board:	To see Electrical Load List	Noted			
234	5.3.3	Integrated AC output distribution board with MCBs :	Yes	Confirmed			
235	5.3.3	Cable size (cross-section area) - output :	manufacturer to advise	min 10 sqmm - max 2x95 sqmm	sq.mm.		
236		**BYPASS SPECIFICATIONS**					
237	C.3	Bypass transfer time :	manufacturer to advise	0	msec		
238	C.3	Bypass static switch rated current :	manufacturer to advise	20kVA - 29A	A		
239	C.3	Bypass protection fuse or circuit breaker rating :	manufacturer to advise	MCCB 35A	A		
240	7.4.8	Bypass transformer required :	Yes	Confirmed			
241	7.4.10	Bypass transformer winding :	copper or aluminum	Aluminium			
242	7.3.5	Maintenance bypass and bypass transformer location :	integrated	Manual by-pass integrated			
243	8.3.6, C.5	Overall maintenance bypass :	internal	Q29 manual by-pass integrated			

Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1

UPS AND BATTERIES TECHNICAL DATA SHEET

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Row		S-702D Data Sheet for DC Uninterruptible Power Systems (UPS) (IEC 62040-5-3)					Issue
2	Tag No. :	UP-200F1					
3	Service :	DC UPS					
4	Ref. Clause	Description	Project Requirement	Manufacturer Declared Values	Unit	Additional notes	
5		**GENERAL**					
6	5.1.2	Vendor :	Input Data	AEG Power Solutions			
7	5.1.2	Order status :	for purchase	Noted			
8	5.1.2	Purchase order number, date :	1724000372 123A90A rev1 dated 22/4/2024	Noted			
9	5.1.2	Manufacturer :	Input Data	AEG Power Solutions			
10	5.1.2	Model number :	Input Data	2 x Protect RCS 110Vdc 100A			
11	5.1.2	Serial number :	Input Data	Released after production			
12	5.2.3	Application :	Industrial - Offshore	Noted			
13	5.3.2	Purchaser specified rated output power :	10	Confirmed	kVA		
14	5.1.1	Quantity :	1	Confirmed. Redundant system			
15		Conformity assessment system (CAS) level :	D	Noted			
16		**CONFIGURATION**					
17	5.1.1, A.1, Figure A.1, Figure A.3, Figure A.5	DC UPS configuration :	Two (2) 100% rated rectifiers connected to a common (shared) battery rated for the full rated load for the autonomy time	Confirmed			
18	A.2.2	Blocking diode required at output of single DC UPS :	Yes	Confirmed. Diode V21			
19	A.2.3	Scalability :	manufacturer standard	-			
20	5.1.1	DC UPS topology :	direct energy storage connect	Noted			
21	B.2.3	Series converter connect option :	manufacturer standard	Not applicable			
22	5.4.2.3	Battery configuration :	1 x 100%	Confirmed. 30 min autonomy			
23	5.3.2, 5.3.4	Performance classification :	manufacturer standard	-			
24	8.1.1.3	Bi-directional rectifier :	No	Not applicable			
25	8.2.2.11	Remote access required :	Yes (read only)	Confirmed. Modbus TCP			
26	8.2.2.11	Hardware (adapters, connectors, cables, etc.) required for remote monitor :	Yes	Confirmed			
27	8.1.1.5, 8.1.1.6	On-line battery monitoring facility required :	string monitoring	Confirmed			
28	8.1.1.4	On-line battery testing feature required :	No	Noted			
29	8.1.1.4	Battery test load interface :	No	Noted			
30	5.4.2.3	DC earth leakage monitoring required :	Yes	Confirmed			
31	7.4.14	Single line diagram and status display :	on HMI	LCD display without synoptic			
32	8.1.2.11	Black Start feature required :	Yes	Confirmed			
33	8.1.1.1	Earth screen required for isolation transformer :	manufacturer to advise	Confirmed			
34		**PHYSICAL ASPECTS**					
35	7.2.1	Mounting :	floor mounting	Confirmed			
36	7.2.1	Overall cabinet dimensions - length :	Input Data	600 (each charger)	mm		
37	7.2.1	Overall cabinet dimensions - depth :	Input Data	840	mm		
38	7.2.1	Overall cabinet dimensions - height :	Input Data	2105	mm		
39	7.2.1	Reference Outline Drawing number :	Input Data	1724000372-EL-DA-00003			
40	7.2.1	Total DC UPS cabinet mass :	Input Data	250 (each charger)	kg		
41	7.2.1	Total DC UPS mass with batteries (if integrated) :	Input Data	Batteries not integrated	kg		
42	7.2.4, 7.2.5	Cable entry location :	top	Confirmed. By means of cable glands			
43	7.2.4, 7.2.5	Cable entry type :	removable - undrilled plate	Confirmed			
44	7.2.4, 7.2.5	Gland plate material :	manufacturer standard	Steel			
45	7.2.1	Paint colour :	supplier standard	RAL7035			
46	7.2.1	Canopy for cabinet required :	No	Noted			
47	7.3.5	Document holder :	Yes	Confirmed			
48		**INSTALLATION**					
49	4,1	Site :	offshore - fixed	Noted. Painting class C3-H			
50	4,1	Location of DC UPS cabinet installation :	indoor	Noted			
51	7.3.1, 7.3.2	Front access clearance dimensions for operation and maintenance :	800	Noted	mm		
52	7.3.2	Side clearance for ventilation (if required) :	manufacturer to advise	0	mm		
53	7.3.2	Rear clearance for ventilation (if required) :	manufacturer to advise	100 mm	mm		
54	7.2.3, 7.9.3	Installed location of battery :	inside DC UPS enclosure	Battery housed on rack			
55	7.2.3	Maximum battery assembly dimensions (L x D x H) :	Input Data	Battery rack 1050 x 510 x 1032	mm		
56		**SAFETY**					
57	5.1.1	Accessibility :	operator access area	Front access			
58	5.1.1	Key required for cabinet :	Yes	Confirmed			
59	7.2.2	Degree of protection (with closed doors) :	IP31	IP43			
60	7.2.2	Degree of protection (with open doors) :	IP2X	IP20			
61	4.3.2	Area classification :	safe	Noted			
62	4.3.2	Hazardous area certification required :	none	Noted			
63	4.3.2	Level of protection :	N/A	Not applicable			
64	4.3.2	Gas group :	manufacturer to advise	Not applicable			
65	4.3.2	Temperature class :	manufacturer to advise	Not applicable			
66	4.3.2	Equipment protection level :	manufacturer to advise	Not applicable			
67	7.7.5	Cooling fan replacement while DC UPS in service :	No	Noted			
68	5.1.2	Local language for caution/danger/warning labels :	English	Confirmed			
69		**ELECTROMAGNETIC COMPATIBLITY**					
70	5.1.4	Emission :	UPS Cat C3	Confirmed			
71	5.1.4	Immunity :	UPS Cat C3	Confirmed			
72		**ENVIRONMENTAL CONDITIONS**					
73	4.2.1.1	Minimum ambient temperature (operation) :	-8,4	Confirmed with heater option included	°C		
74	4.2.1.1	Maximum ambient temperature (operation) :	40	Confirmed	°C		
75	4.2.1.1	Maximum relative humidity (operation) :	95	Confirmed. Not condensing	%		
76	4.2.1.1	Temperature at which relative humidity is specified (operation) :	Input Data	-	°C		
77	4.2.1.2	Maximum altitude (operation) :	Sea Level	Noted	m		
78	4.2.2	Minimum ambient temperature (storage and transportation) :	-5	Noted	°C		
79	4.2.2	Maximum ambient temperature (storage and transportation) :	40	Noted	°C		
80	4.2.2	Maximum relative humidity (storage and transportation) :	85	Noted	%		

Row		S-702D Data Sheet for DC Uninterruptible Power Systems (UPS) (IEC 62040-5-3)					Issue
2	Tag No. :	UP-200F1					
3	Service :	DC UPS					
4	Ref. Clause	Description	Project Requirement	Manufacturer Declared Values	Unit	Additional notes	
81	4.2.2	Temperature at which relative humidity is specified (storage and transportation) :	Input Data	-	°C		
82	4.3.2	Seismic requirement data :	Zone 2	Noted			
83	4.2.2	Storage site of DC UPS :	indoor – natural ventilation	Noted			
84	4.3.2	Additional or unusual conditions (operation) :	Input Data	Not applicable			
85	4.3.3	Additional or unusual conditions (storage and transportation) :	Input Data	Not applicable			
86	5.1.5	Acoustic noise at 1 m - normal mode :	70	66 dB(A)	dBA		
87	5.1.5	Acoustic noise at 1 m - stored energy mode :	70	66 dB(A)	dBA		
88		**COMMUNICATION INTERFACE(S)**					
89	5,6	(1) Interface media for SCADA (ICSS / DCS) :	serial	Modbus TCP + relays			
90	5,6	(1) Maximum allowable length of communication cable (for copper) :	25	Noted	m		
91	5,6	(1) Interface protocol for SCADA (ICSS / DCS) :	Modbus	Modbus TCP + relays			
92	5,6	(2) Interface media for Electrical Management / Control System :	serial	Modbus TCP + relays			
93	5,6	(2) Maximum allowable length of communication cable (for copper) :	25	Noted	m		
94	5,6	(2) Interface protocol for Electrical Management / Control System :	Modbus	Modbus TCP + relays			
95	5,6	(3) Remote access / monitoring software required :	Yes	Noted			
96	5,6	(3) Interface media for Remote access / monitoring :	ethernet (fiber)	Noted			
97	5,6	(3) Maximum allowable length of communication cable (for copper) :	25	Noted	m		
98	5,6	(3) Interface protocol for Remote access / monitoring :	Modbus	Modbus TCP + relays			
99		**AC INPUT SPECIFICATIONS**					
100	5.2.1	Voltage (steady state, R.M.S) - rated :	400	Confirmed	V		
101	5.2.1	Voltage (steady state, R.M.S - tolerance :	+/- 10	Confirmed	%		
102	5.2.1	Frequency - rated :	50 Hz	Confirmed			
103	5.2.1	Frequency - tolerance :	+/- 2	Confirmed	%		
104	5.2.2	Phases required :	3	3			
105	5.2.2	Neutral required :	Yes	No			
106	5.2.2	Current (R.M.S) - rated (with the energy storage device charged) :	manufacturer to advise	28A max	A		
107	5.2.2	Power factor :	manufacturer to advise	0,81			
108	5.2.2	In-rush (% of rated current) :	manufacturer to advise	Slow-start function included	%		
109	5.2.2	In-rush (time) :	manufacturer to advise	Data not characterized by the factory. Measurable on request	s		
110	5.2.2	Maximum current (with low input volt and energy storage device charging) :	manufacturer to advise	28A max	A		
111	5.2.2	Time for overload (125 % of rated current) :	manufacturer to advise	Not applicable	s		
112	5.2.2	Time for overload (150 % of rated current) :	manufacturer to advise	Not applicable	s		
113	5.2.2	Total harmonic distortion (THD p.u.) :	8	Confirmed. The DC UPS works with an input voltage harmonic distortion ≤ 8%	%		
114	5.2.3	Short circuit current of the input supply :	50	Confirmed. The charger is equipped with an input MCCB (Q1) with Isc = 50kA	kA		
115	5.2.2	Minimum prospective short circuit current :	Input Data	Data not characterized by the factory. Measurable on request	kA		
116	5.2.2	Earth leakage current :	Input Data	Data not characterized by the factory. Measurable on request	mA		
117	5.2.2	AC power distribution system - compatibility :	TN-S	Confirmed			
118	5.2.3	Additional or unusual conditions :	Input Data	Not applicable			
119	5.2.3, 7.5.4	Cable Size (cross-section area) - input mains (Float) :	Input Data	70 sqmm	sq.mm.		
120	7.5.4	Cable Size (cross-section area) - input mains (Boost) :	Input Data	70 sqmm	sq.mm.		
121	7.4.8, 8.1.1.1	Input isolation transformer required :	Select	Confirmed			
122	7.4.10	Input isolation transformer winding :	copper or aluminum	Aluminium			
123		**DC AND BATTERY SPECIFICATIONS**					
124	5.4.2.2	DC voltage level :	110	Confirmed	V d.c.		
125	5.4.2.2	Design life :	5	>12 years	years		
126	5.4.2.2	Float service life :	manufacturer to advise	Dependent from temperature	years		
127	5.4.2.2	Shelf life of battery :	manufacturer to advise	3	months		
128	5.4.2.2	Quantity of cells and strings :	manufacturer to advise	10 blocks - 1 string	nos.		
129	5.4.2.2	Nominal voltage (total) :	manufacturer to advise	120	V d.c.		
130	5.4.2.2	Battery technology :	sealed nickel cadmium	VRLA GEL technology			
131	5.4.2.2	Nominal AH capacity :	manufacturer to advise	150	AH		
132	5.4.2.2	Discharge rate (C-rate) :	manufacturer to advise	C20			
133	5.4.2.2	Electrolyte fill status :	manufacturer standard	Not applicable to VRLA battery			
134	8.1.2.3	Purchaser's requirement (% of battery recharge level - 1) :	80	Confirmed with charging current limited to 0,1C	%		
135	8.1.2.3	Purchaser's requirement (time for battery recharge level - 1) :	10	Confirmed	Hours		
136	8.1.2.3	Purchaser's requirement (% of battery recharge level - 2) :	100	Data not characterized by the factory. Measurable on request	%		
137	8.1.2.3	Purchaser's requirement (time for battery recharge level - 2) :	24	Data not characterized by the factory. Measurable on request	Hours		
138	5.4.2.2	Stored energy time (back-up time at 100% rated load) :	60	30 min @ 10kW load	min		
139	5.4.2.2	Restored energy time (recharge time to 80% capacity) :	manufacturer to advise	10h	hours		
140	5.4.2.2	Ambient reference temperature :	40	Confirmed	°C		
141	5.4.2.2	Earth condition/isolation :	manufacturer to advise	floating			
142	5.4.2.2	Ripple current (R.M.S) :	manufacturer to advise	1% ripple voltage RMS	%		
143	5.4.2.2	Maximum discharge current :	manufacturer to advise	Data not characterized by the factory. Measurable on request	A		
144	5.4.2.2	DC Fault current rating :	manufacturer to advise	Data not characterized by the factory. Measurable on request	A d.c.		
145	5.4.2.2	Cable volt drop recommendation (≤ % at nominal discharge current) :	manufacturer to advise	1	%		
146	5.4.2.2	Charging regime :	manufacturer to advise	Constant voltage, current limited			
147	5.4.2.2	Charge voltage (float) and tolerance band :	manufacturer to advise	2,28Vcell - 13,5 / 13,8 Vblock	V d.c.		
148	5.4.2.2	Charge voltage (boost) and tolerance band :	manufacturer to advise	2,28Vcell - 13,5 / 13,8 Vblock	V d.c.		

Row		S-702D Data Sheet for DC Uninterruptible Power Systems (UPS) (IEC 62040-5-3)					Issue
2	Tag No. :	UP-200F1					
3	Service :	DC UPS					
4	Ref. Clause	Description	Project Requirement	Manufacturer Declared Values	Unit	Additional notes	
149	5.4.2.2	Charge voltage (equalising) and tolerance band :	manufacturer to advise	Not applicable to VRLA battery	V d.c.		
150	5.4.2.2	Minimum end of discharge voltage :	manufacturer to advise	99	V d.c.		
151	5.4.2.2	Charge current limit (or range) :	manufacturer to advise	15A (0,1C)	A d.c.		
152	5.4.2.2	Temperature compensated charging required :	Yes	Confirmed			
153	5.4.2.3	Battery isolation box required :	manufacturer standard	Noted			
154	5.4.2.3	Additional or unusual conditions :	Input Data	Not applicable			
155	5.4.2.3	Load profile for battery design, attached :	Yes	Noted			
156	5.4.2.3	Battery rack design :	Batteries integrated inside UPS Cabinet	Battery housed on rack			
157		**BATTERY ROOM**					
158	4.2.1.1	Minimum ambient reference temperature :	Input Data	-8,4°C (used for battery sizing)	°C		
159	4.2.1.1	Maximum ambient reference temperature :	40	+40°C (used for battery sizing)	°C		
160	5.4.2.1	Area classification :	safe	Noted			
161	5.4.2.1	Hazardous area classification :	N/A	Not applicable			
162	5.4.2.1	Minimum Gas Subdivision and Temperature Class (for equipment in Battery room) :	N/A	Not applicable			
163	8.1.2.10	Temperature sensor (for VRLA / partial gas recombination batteries) :	Yes	Confirmed. Standard sensor			
164		**BATTERY ISOLATOR BOX SPECIFICATIONS**					
165	7.9.1	Enclosure material :	manufacturer standard	Aluminium alloy			
166	7.9.1	Mounting :	manufacturer standard	Wall mounting			
167	7.9.1	Breathing valve required :	manufacturer to advise	No			
168	7.9.1	Internal earth bar :	tinned copper	-			
169	7.9.3	Minimum design temperature :	-8,4	Noted	°C		
170	7.9.3	Maximum design temperature :	40	Noted	°C		
171	7.9.3	Maximum relative humidity :	95	Noted	%		
172	7.9.3	Temperature at which relative humidity is specified :	Input Data	-	°C		
173	7.9.4	Degree of protection :	IP 31	IP65			
174	7.9.5	Area classification :	safe	Noted			
175	7.9.5	Hazardous Area Certification required :	none	-			
176	7.9.5	Hazardous area classification :	N/A	Not applicable			
177	7.9.5	Hazardous area level of protection :	N/A	Not applicable			
178	7.9.6	Cable entry :	top	Bottom with cable glands			
179	7.9.6	Cable indirect entry via 'ex e' enclosure :	Select	Not applicable			
180	7.9.6	Battery cable size (cross-section area) :	No	25 sqmm armored cable class-2	sq.mm.		
181	7.9.6	Cable entry diameter in battery box (ISO metric) :	Input Data	17 mm			
182	7.9.7	Battery isolator type :	MCCB	Confirmed			
183	7.9.8	Rated current of breaker / switch fuse unit :	manufacturer to advise	125A	A		
184	7.9.8	Rated breaking current (Icu) - (if breaker used) :	manufacturer to advise	18kA	kA		
185	7.9.10	Breaker status potential free contact (NO) :	two	Confirmed			
186	7.9.9	Under Voltage trip feature required :	Yes	Confirmed			
187	7.9.9	Under Voltage trip coil for :	black start reserve	Confirmed			
188	8.1.2.12	ESD trip required :	Yes - via shunt trip	Yes - through SIL relay			
189	8.1.2.12	ESD override key switch :	key captive in overridden position and with status contact	Confirmed			
190	7.9.9	Over voltage trip required :	Yes	Not applicable			
191		**DC OUTPUT SPECIFICATIONS**					
192	5.3.2	DC power distribution system - compatibility :	IT	TN-S			
193	5.3.2	Voltage (steady state) - rated :	110	Confirmed	V d.c.		
194	5.3.2	Voltage - normal mode variation at no load :	manufacturer to advise	+/- 1% static stability	%		
195	5.3.2	Voltage - normal mode variation at full load :	manufacturer to advise	+/- 1% static stability	%		
196	5.3.2	Voltage - storage energy mode variation at no load :	manufacturer to advise	Min. voltage 1,65 Vcell = 99Vdc	%		
197	5.3.2	Voltage - storage energy mode variation at full load :	manufacturer to advise	Min. voltage 1,65 Vcell = 99Vdc	%		
198	5.3.2	% Voltage transient - transfer normal mode to storage energy mode :	manufacturer to advise	-	%		
199	5.3.2	Voltage transient time - transfer normal mode to storage energy mode :	manufacturer to advise	0	s		
200	5.3.2	% Voltage transient - transfer storage energy mode to normal mode :	manufacturer to advise	-	%		
201	5.3.2	Voltage transient time - transfer storage energy mode to normal mode :	manufacturer to advise	0	s		
202	5.3.2	% Voltage variation - normal mode at step load :	manufacturer to advise	-5% (10% to 90%) +8% (back)	%		
203	5.3.2	Duration of voltage variation - normal mode at step load :	manufacturer to advise	Data not characterized by the factory. Measurable on request	s		
204	5.3.2	% Voltage variation - storage energy mode at step load :	manufacturer to advise	Data not characterized by the factory. Measurable on request	%		
205	5.3.2	Duration of voltage variation - storage energy mode at step load :	manufacturer to advise	-	s		
206	5.3.2	Current - rated :	manufacturer to advise	100A	A d.c.		
207	5.3.2	Current - overload capability (% of rated current for ten minutes) :	manufacturer to advise	100% - Limited at 100A	%		
208	5.3.2	Current - overload capability (% of rated current for one minute) :	manufacturer to advise	100% - Limited at 100A	%		
209	5.3.2	Current - short circuit capability (% of rated current) :	manufacturer to advise	100A	%		
210	5.3.2	Current - short circuit capability (time duration):	manufacturer to advise	-	s		
211	5.3.2	Current - limitation (% of rated current) :	manufacturer to advise	100%	%		
212	5.3.2	Current - limitation (time duration) :	manufacturer to advise	-	s		
213	5.3.2	Current - fault clearing capability (normal mode) :	manufacturer to advise	100A	A		
214	5.3.2	Current - fault clearing capability (stored energy mode) :	manufacturer to advise	3250A +/- 10%	A		
215	5.3.2	AC / DC efficiency in normal mode - 100% load :	manufacturer to advise	88%	%		
216	5.3.2	AC / DC efficiency in normal mode - 75% load :	manufacturer to advise	86%	%		
217	5.3.2	AC / DC efficiency in normal mode - 50% load :	manufacturer to advise	87%	%		
218	5.3.2	AC / DC efficiency in normal mode - 25% load :	manufacturer to advise	Data not characterized by the factory. Measurable on request	%		
219	5.3.2	No load losses :	manufacturer to advise	Data not characterized by the factory. Measurable on request	W		
220	7.1.6	Reference document to DC output distribution board :	To see Electical Load List	Noted			
221	5.3.3	Additional or unusual conditions :	Input Data	Not applicable			
222	5.3.3	Cable size (cross-section area) - output :	manufacturer to advise	-	sq.mm.		

Base Load Power Hub (BLPH)

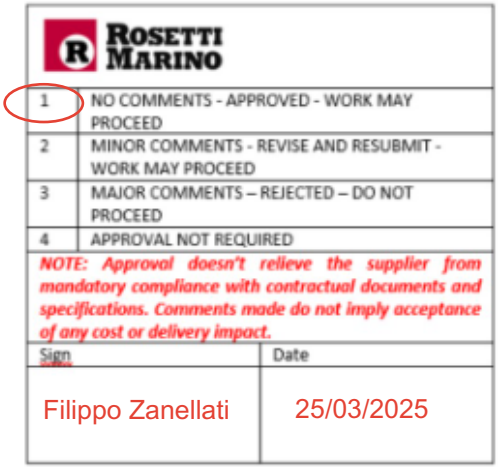
CERTIFICATION DOSSIER

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Base Load Power Hub (BLPH)

EX CERTIFICATION LIST

Document Number: 1724000372-QC-LIS-00021



ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
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Sign	Date
Filippo Zanellati	25/03/2025

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
02	03/03/2025	Accepted for Construction (AFC)	DA	DA	AD
01	20/12/2024	Accepted for Construction (AFC)	DA	DA	AD
00	09/10/2024	Issue for Review (IFR)	DA	DA	AD

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
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Base Load Power Hub (BLPH)

AC UPS - TAG: UP-200F3

AC UPS - TAG: UP-200F4

DC UPS - TAG: UP-200F1

EX CERTIFICATE LIST

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EX CERTIFICATE LIST

BATTERY PROTECTION BOX TAG NUMBER	CERTIFICATE
CB-200F3 A/B CB-200F4 A/B CB-200F1	EPT 20 ATEX 4075X

METAL CABLE GLANDS – NEV*** series	CERTIFICATE
CB-200F3 A/B CB-200F4 A/B CB-200F1	IMQ 17 ATEX 016 X

TEMPERATURE PROBE FOR AC UPS	CERTIFICATE
BA-200F3 A/B BA-200F4 A/B	PTB 06 ATEX 1077

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eurofins | Product Testing

[1] # EU-TYPE EXAMINATION CERTIFICATE

[2] **Equipment intended for use in potentially explosive atmospheres**
Directive 2014/34/EU – Annex III

[3] Certificate Number: **EPT 20 ATEX 4075 X** **issue 0**

[4] Equipment: **Explosion proof command, control, signaling and interfaces units**

Series: **EJBC**

[5] Manufacturer: **CORTEM S.P.A.**

[6] Address: Via Aquileia, 10 – 34070 Villesse (Go) - Italy

[7] This equipment and its accepted variations are specified in the annex to this Certificate.

[8] Eurofins Product Testing Italy S.r.l., Notified Body n. 0477 in accordance with Article 21 of the Directive 2014/34/EU of the European Parliament and of the Council of 26th February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II of the Directive.
The examination and test results are recorded in the confidential Report N° EPT.20.REL.01/ 2013057.

[9] Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the harmonized standards:

EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-11:2012, EN 60079-31:2014

[10] If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the exam and the tests of the specified equipment.
Further requirements of the Directive 2014/34/EU apply to the manufacture and supply of this equipment.
These requirements are not object of this Certificate.

[12] The equipment shall include the sign Ex and at least one of the following strings:

II 2G Ex db IIC T6...T4 Gb **-60/-40°C < Tamb< +40/55°C**
II 2G Ex db [ia Ga] IIC T6...T5 Gb
II 2D Ex tb IIIC T85°C...T135°C Db
II 2D Ex tb [ia Da] IIIC T85°C...T100°C Db
I M2 Ex db I Mb
I M2 Ex db [ia Ma] I Mb

CE

Place and date of issue:
Torino, 2020-11-30

Dionisio Bucchieri
Directive Responsible

Paolo Trisoglio
Managing Director

Eurofins Product Testing Italy eurofins Notified Body N. 0477

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO

PRD N° 119B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

This Certificate has 6 pages and it is reproducible only in its entirely. Conditions of validity are reported below.

[13] [14] **ANNEX**
EU-TYPE EXAMINATION CERTIFICATE N. EPT 20 ATEX 4075 X issue 0

[15] Equipment description

The command, control, signaling and interface units EJBC... series are made of Ex-d enclosures (already certificated IECEX EUT 20.0023U, EPT 20 ATEX 4074U) with electrical devices. The command, control, signaling and interface units EJBC series can have installed on their walls signal, control operators and maneuvers series M-0... with lamps 3W, 5W or electronic led up to 240V (certificate IECEX CES 14.0030U / CESI 01 ATEX 025U), monoled M-0487 (certificates IECEX CES 11.0030U / CESI 00 ATEX 060U). Inside the enclosure switches, indicators, contactors, transformers, analogue and digital components can be installed. Small cells or batteries, eventually connected in series, are installable inside the enclosure according to the requirements of the § 23 of IEC 60079-0. A transmitting/receiving antenna with an IECEx/ATEX full compliance certificate, suitable for the maximum internal pressure and service temperature, can be also installed on the wall of the equipment.

The EJBC series are manufactured in copper free aluminum alloys EN AB 43000 or EN AB 44100 or EN AB 42000 according to UNI EN 1676. The EJBCX series are manufactured in stainless steel AISI 303, AISI 304, AISI 316, AISI 316L. The products can be supplied with external painting with surface resistance lower than 10^8 Ω, having minimum thickness of 60 µm and maximum thickness of 200 µm, color grey RAL 7035, with or without the coating named CORALUM to protect the box against corrosion. CORALUM is a surface protection treatment based on an electro-ceramic coating applied by electrolytic deposition method directly on the aluminum alloy. Alternatively it is possible the use of other types of painting made in non-metallic materials according to customer specification; various kind of colors are allowed. In this case a warning label is added regarding the risk of electrostatic charge.

Drain and breather valves, manufactured by Elfit, ECD-2... series, certified CESI 01 ATEX 081U, IECEx CES 14.0016U with types of protection Ex d, Ex tb can be installed in accordance with their own specific limitations. The EJBC can also be used with only terminal blocks installed inside.

Type Code:

EJBC- ☐ ☐ ☐ ☐ ☐

- Code of the series (EJBCX for the stainless-steel versions)
- SIZE: **45 - 5**
- HEIGH: BLANK for standard, B for low height
- Not relevant for explosion protection
- Not relevant for explosion protection
- Not relevant for explosion protection

Equipment characteristics:

Nominal voltage: 12-250 V dc / 24-1000 V ac

Nominal frequency: 0/50/60 Hz

Max. current 650 A

Rated voltage: up to 750Vdc

[13] ANNEX
[14] EU-TYPE EXAMINATION CERTIFICATE N. EPT 20 ATEX 4075 X issue 0

Maximum electrical equipment ratings inside the boxes:

Description	V	Output dissipated (W)	A
Analogic digital instruments	660	10	5
Electronic gear case	400	10	-
Plc, multiplexer, amplifier	240	80	-
Control and gauging device	240	100	-
Automatic breakers	660	-	650
Fuses	660	-	400
Air thermal relays	500	12	10
Alectronic control device	660	100	-
Air contactors	660	30	650
Sequence timer	240	5	10
Photoelectrical cell	240	2	-
Capacitors (discharge time)	660	-	-
Transformers	660	200	-
Resistors	240	300	-
Terminals	660	-	-
Ballasts	277	40	7,5

Maximum dissipated power:

Type	Maximum dissipated power inside enclosures			
	Tamb. = +40°C (+55°C)			
	No signaling lamps, only LED are allowed		With signaling lamps and/or LED	Without signaling lamps and LED
	T6 / T85°C	T5 / T100°C	T5 / T100°C	T4 / 135°C
EJBC 45	140 W (105 W)	240 W (180 W)	140 W (105 W)	480 W (360 W)
EJBC 45 B	120 W (90 W)	210 W (160 W)	120 W (90 W)	430 W (320 W)
EJBC 5	210 W (160 W)	315 W (235 W)	210 W (160 W)	600 W (450 W)
EJBC 5 B	170 W (130 W)	250 W (190 W)	170 W (130 W)	480 W (360 W)

[13]
[14]

ANNEX
EU-TYPE EXAMINATION CERTIFICATE N. EPT 20 ATEX 4075 X issue 0

Boxes are suitable for installation of motor inverter units complete with internal cooling fan having the following characteristics in terms of power and size of the enclosure dimensions:

Box size	Motor inverter maximum power for Ta +40°C (+55°C)	Maximum dissipated power	Cooling fan maximum capacity
EJBC-45 / EJBC-45B	2,2 (1,5) kW	73W	44m³/h
EJBC-5 / EJBC-5B	5,5 (4,0) kW	172W	44m³/h

Boxes are suitable for ignition transformer with following electrical characteristics: max primary voltage 1000 V - max secondary voltage 20 kV (impulse 25 kV max for 3 ms) – max secondary current 50 mA.

The radio frequency source for continuous transmissions and for pulsed transmissions inside the enclosures shall not exceed the following values: max threshold power, effective output power of the transmitter multiplied by the antenna gain 2W - thermal initiation time 20µs. For pulsed radar and other transmissions where the pulses are not short compared with the thermal initiation time, the threshold energy values shall not exceed 50µJ.

Boxes are suitable for incoming and outgoing fiber optics cables; the limits of irradiated power and irradiance are:
temperature class T6, power 15 mW, irradiance 5 mW/mm²;
temperature class T4, power 35 mW, irradiance 5 mW/mm².

Cable entries

The entries into the enclosures are provided with threaded holes in the walls of the enclosure.

The cable glands to be used with the equipment must be Ex db and Ex tb (IP66) in compliance with the requirements of EN/IEC 60079-0 and EN/IEC 60079-1 / EN/IEC 60079-31.

Warning label

"Use screws of quality A2-70 according UNI 7323 with tensile strength of at least 700 N/mm2"

"Warning - do not open when energized"

For equipment with capacitors:

"After de-energizing. Wait 10 minutes before opening".

For enclosures with batteries or cells:

"Warning – Do not open when an explosive atmosphere is present".

For equipment with temperature class T5:

"Use cables suitable for temperature of 90°C".

For equipment with temperature class T4:

"Use cables suitable for temperature of 100°C".

For equipment without standard painting:

"Potential electrostatic charging hazards".

[13] [14] **ANNEX**
EU-TYPE EXAMINATION CERTIFICATE N. EPT 20 ATEX 4075 X issue 0

Routine tests
Overpressure tests at 19,1 bar (for equipment with minimum T amb -60°C) or at 17,1 bar (for equipment with minimum T amb - 40°C), according to § 15.2.3.2 of IEC 60079-1 standard, must be carried out on each enclosure, including (also separately from the enclosure) all the following components not type tested at least at 51 bar (for equipment with minimum T amb -60°C) or at 46,5 bar (for equipment with minimum T amb - 40°C): control and signal operators series M-0... CESI 01 ATEX 025U with lamps 3W, 5W or electronic led up to 240V; monoled M-0487, CESI 00 ATEX 060U.

[16] **Assessment Report n° EPT.20.REL.01/2013057.**

This EU-Type Examination Certificate is released after the positive result of the conformity assessment of the Council Directive 2014/34/EU and to harmonized technical standards listed in this certificate performed by the Notified Body Eurofins Product Testing Italy S.r.l., and reported in the Assessment Report above cited.

[17] **Specific condition of use**

The flameproof joints of the enclosures are not intended to be repaired.

The accessories used for cable entries and for closing unused openings shall be certified according to EN/IEC 60079-0, EN/IEC 60079-1 and EN/IEC 60079-31. A minimum degree of protection IP66/67 shall be guaranteed according to IEC 60529 standard.

[13] ANNEX
[14] EU-TYPE EXAMINATION CERTIFICATE N. EPT 20 ATEX 4075 X issue 0

[18] **Essential Health and Safety Requirements**

Assured by compliance with harmonized standards.

[19] **Descriptive documents**

The equipment object of this Certificate are described by the following documents that are scheduled documents and therefore they cannot be modified without the explicit authorization of the Notified Body.

Type of document	Document identification	Rev.	Date
Technical note	"TECHNICAL NOTE A4-7540"	00	2020-06-08
Safety instructions	"F-472 R0: enclosures series EJBC.. safety, maintenance and mounting instruction"	00	2020-06-08
Dimensional drawing	Drawing code "A1-7538".	00	2020-06-08

[20] **Terms and conditions**

The product liability rests with the Manufacturer, his representative or, in the absence of a representative, with the importer, in accordance with the General Product Safety Directive 2001/95/EC.

The following conditions may render this certificate invalid:

- changes in the design or construction of the product;
- changes or amendments to the Directive;
- changes or amendments in the standards which form the basis for documenting compliance with the essential requirements of the 2014/34/EU Directive.

[21] **History**

This Certificate is at its first issue.

Dionisio Bucchieri
Directive Responsible

End of Certificate

[1] # EU-TYPE EXAMINATION CERTIFICATE

[2] **Equipment or Protective System intended for use in potentially explosive atmospheres - Directive 2014/34/EU – Annex III – MODULE B: EU-TYPE EXAMINATION**

[3] EU-type Examination Certificate number: **IMQ 17 ATEX 016 X**

[4] PRODUCT: **Metal cable glands for armoured and not armoured cables**

TYPE/SERIES: **NAV***; NAVN***; NAVF***; NEV***; NEVX***; NEVL***;NAVNS***;NAVFS***

[5] MANUFACTURER: **CORTEM S.p.A.**

[6] ADDRESS: Via Aquileia, 10 - 34070 Villesse (GO) - Italy

[7] This equipment and any acceptable variation thereto are specified in the annex to this certificate and the documents therein referred to.

[8] IMQ, notified body N° 0051, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in Report No.: **AT19-0042694-01_A**

[9] Compliance with Essential Health and Safety Requirements, except in respect of those listed at item 18 of the annex, has been assured by compliance with:

EN IEC 60079-0:2018; EN 60079-1:2014; EN IEC 60079-7:2015 + A1:2018; EN 60079-31:2014

[10] If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

[12] The marking of the equipment or protective system shall include the following:

II 2G	**Ex db IIC Gb**
II 2G	**Ex eb IIC Gb**
II 2D	**Ex tb IIIC Db**

THIS CERTIFICATE CANCELS AND REPLACES THE PREVIOUS ONE. IT INCLUDES 1 ANNEX.

FIRST ISSUE	2017/10/17
CURRENT ISSUE	2022/01/31
PREVIOUS ISSUE	2017/10/17
EXPIRING DATE	2032/01/30

B.U. PRODUCT CONFORMITY ASSESSMENT
CERTIFICATION SECTOR - MANAGER

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PRD N° 005 B
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[13] # Annex

[14] EU-type Examination Certificate number: **IMQ 17 ATEX 016 X**

[15] **Description of product:**

The cable glands series NAV…, NEV… are designed for the type of protection flameproof enclosures Ex db IIC and for the type of protection increased safety Ex eb IIC, Ex nR IIC.
The cable glands of the series are also protected against the risk of explosion for the presence of combustible dust Ex tb IIIC.
These cable glands can be used in Ex i intrinsic safety circuits. In this case the cable gland have a part painted in light blue
The cable glands series NAV ***; NAVN ***; NAVF ***; NAVNS***; NAVFS** are suitable for not armoured cables, with circular section either with not-circular section (typically for use with flat "heating" cables).

The cable glands series NEV ***; NEVX ***; NEVL *** are suitable for armoured cables, with circular section.
Cable glands are made of metal body (nickel plated brass; galvanized steel; stainless steel), sealing rings are made of silicon for all types.

The cable gland for not-armoured cables comprises: a main metallic body with silicone lower gasket (flameproof joint), a metallic/not-metallic made compression ring, a metallic clamping nut with silicone upper gasket.

The cable gland for armoured cables comprises: a main metallic body with silicone lower gasket (flameproof joint), armoured tightening nuts, a metallic intermediate body, a metallic clamping nut with silicone upper gasket.

Additional details on compression rings, O-ring for IP, spacers and rings are detailed in Table 2.

Cable glands are provided, on the side attached to enclosure, with the following main mounting threads type:
- NPT ANSI ASME B1.20.1
- ISO METRIC pitch 1.5.
Other types of thread are permitted, according to details listed in key code.

Protection degree IP66/68 is guaranteed by usage of suitable sealant put at least on two complete threads engaged of the threaded coupling, according to manufacturer's instructions.

IPx8 is achieved at the following conditions: 3 bar for 12 hours.

Cable glands are suitable for high mechanical risk (7J).

Trademark: CORTEM; ELFIT; CORTEM Group

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[13] # Annex

[14] EU-type Examination Certificate number**: IMQ 17 ATEX 016 X**

[15.1] **Models/Series Identification:**

Table 1: Rated ambient temperature range (°C) and cables		
Serie:	**Rated ambient temperature**	**Cable type**
NAV *** NAVN *** NAVF ***	-60 ÷ 130 °C	Circular, not-armoured Flat (i.e. heating cables), not-armoured
NEV *** NEVX ***	-60 ÷ 130 °C	Circular, armoured
NEVL ***	-60 ÷ 130 °C	Circular, armoured (lead sheath)
NAVNS *** NAVFS ***	-60 ÷ 130 °C	Swivel, not armoured

Table 2: Materials [1]						
Series	Body materials	Sealing rings material	O-ring gasket	Compression ring	Conical armour rings	Spacers/internal rings
NAV*** NAVN *** NAVF ***	Nickel plated brass Galvanized steel Stainless steel	Silicone	Silicone	Nickel plated brass Galvanized steel Stainless steel Aluminium Plastic (PPS)	-	Teflon
NEV *** NEVX ***	Nickel plated brass Galvanized steel Stainless steel	Silicone	Silicone	-	Nickel plated brass Galvanized steel Stainless steel	Teflon
NEVL ***	Nickel plated brass Galvanized steel Stainless steel	Silicone	Silicone	-	Nickel plated brass Galvanized steel Stainless steel	Teflon Steel/Brass for connection to lead sheath
NAVNS *** NAVFS ***	Nickel plated brass Galvanized steel Stainless steel	Silicone	Silicone	-	-	-
[1] Non-metallic materials are suitable for declared service temperature of cable glands: -60 ÷ 130 °C						

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[13] # Annex

[14] EU-type Examination Certificate number: **IMQ 17 ATEX 016 X**

Table 3.1[2]: Cable glands for circular, not-armoured cables - Series: NAV ***; NAVN ***; NAVF ***						
Model (Metric)	**Metric thread pitch 1.5**	**Model (NPT)**	**NPT thread**	**Clamping range min-max cable Ød mm**	**Torque value [Nm]**	**Clamping limitation (X)**
NAV 12 I * NAVN 12 I * NAVF 12 I *	M12x1.5	NAV 02 N * NAVN 02 N * NAVF 02 N *	1/4"	3.0-6.0	25	Yes
NAV 16 I * NAVN 16 I * NAVF 16 I *	M16x1.5	NAV 01 N * NAVN 01 N * NAVF 01 N *	3/8"	3.5-8.6	25	Yes
				4-8.6		No
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	6.3-11.6	35	No
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	6.5-14	35	No
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	11-20	45	Yes
				12-20		No
NAV 32 I * NAVN 32 I * NAVF 32 I *	M32x1.5	NAV 3 N * NAVN 3 N * NAVF 3 N *	1"	17-27	85	Yes
				20-27		No
NAV 40 I * NAVN 40 I * NAVF 40 I *	M40x1.5	NAV 4 N * NAVN 4 N * NAVF 4 N *	1" ¼	22-32	85	Yes
				24-32		No
NAV 50S I * NAVN 50S I * NAVF 50S I *	M50x1.5	NAV 5S N * NAVN 5S N * NAVF 5S N *	1" ½	29.5-38	90	No
NAV 50 I * NAVN 50 I * NAVF 50 I *	M50x1.5	NAV 5 N * NAVN 5 N * NAVF 5 N *	1" ½	35.5-44	90	No
NAV 63S I * NAVN 63S I * NAVF 63S I *	M63x1.5	NAV 6S N * NAVN 6S N * NAVF 6S N *	2"	40-50	95	No
NAV 63 I * NAVN 63 I * NAVF 63 I *	M63x1.5	NAV 6 N * NAVN 6 N * NAVF 6 N *	2"	47-56	95	No
NAV 75S I * NAVN 75S I * NAVF 75S I *	M75x1.5	NAV 7S N * NAVN 7S N * NAVF 7S N *	2" ½	53-62	100	No
NAV 75 I * NAVN 75 I * NAVF 75 I *	M75x1.5	NAV 7 N * NAVN 7 N * NAVF 7 N *	2" ½	59-68	110	No
NAV 90 I * NAVN 90 I * NAVF 90 I *	M90x1.5	NAV 8 N * NAVN 8 N * NAVF 8 N *	3"	66-79	120	No
NAV 100 I * NAVN 100 I * NAVF 100 I *	M100x1.5	NAV 9 N * NAVN 9 N * NAVF 9 N *	3" ½	76-91	150	No
NAV 115 I * NAVN 115 I * NAVF 115 I *	M115x1.5	NAV 10 N * NAVN 10 N * NAVF 10 N *	4"	86-98	170	No

[2] metric pitch 1.5 and NPT threads cable glands sizes are shown; models with other threads, as detailed in Key Code, are available. Full list in drawings listed to Certificate

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[13] # Annex

[14] EU-type Examination Certificate number: **IMQ 17 ATEX 016 X**

Table 3.2[2]: Cable glands for not-circular (flat), not-armoured cables - Series: NAV ***; NAVN ***; NAVF ***						
Model (Metric)	**Metric thread pitch 1.5**	**Model (NPT)**	**NPT thread**	**Cable dimensions axb (mm)**	**Torque value [Nm]**	**Clamping limitation (X)**
NAV 16 I * NAVN 16 I * NAVF 16 I *	M16x1.5	NAV 01 N * NAVN 01 N * NAVF 01 N *	3/8"	7.7x5.5	20	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	7.7x5.5	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	8.7x3.5	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	9.7x4.1	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	10.2x4.1	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	10.7x4.6	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	10.7x5.1	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	10.7x6.1	30	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	7.7x5.5	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	8.7x3.5	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	9.7x4.1	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	10.2x4.1	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	10.7x4.6	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	10.7x5.1	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	10.7x6.1	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	11.7x5.6	25	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	7.7x5.5	40	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	8.7x3.5	40	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	9.7x4.1	40	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	10.2x4.1	40	Yes
NAV 25 I *	M25x1.5	NAV 2 N *	3/4"	10.7x4.6	40	Yes

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NAVN 25 I * NAVF 25 I *		NAVN 2 N * NAVF 2 N *				
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	10.7x5.1	40	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	10.7x6.1	40	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	11.7x5.6	40	Yes

Table 3.3[2]: Cable glands for circular, armoured cables - Series: NEV *; NEVL *****

Model (Metric)	Metric thread pitch 1.5	Model (NPT)	NPT thread	Clamping range inner sealing ring min-max cable Ød mm	Torque value inner sealing ring [Nm]	Clamping range outer sealing ring min-max cable ØD mm	Torque value outer sealing ring [Nm]	Clamping limitation (X)
NEV 12 I * NEVL 12 I *	M12x1.5	NEV 02 N * NEVL 02 N *	1/4"	3.0-6.0	25	6-10	Nut to be tightened until the cable gland gasket touches the outer cable sheath, then tighten one more turn of the nut	No
NEV 16 I * NEVL 16 I *	M16x1.5	NEV 01 N * NEVL 01 N *	3/8"	3.5-8.6	25	6-13.2		Yes
				4-8.6				No
NEV 20S I * NEVL 20S I *	M20x1.5	NEV 1S N * NEVL 1S N *	1/2"	6.3-11.6	35	9.5-16		No
NEV 20 I * NEVL 20 I *	M20x1.5	NEV 1 N * NEVL 1 N *	1/2"	6.5-14	35	12.5-21		No
NEV 25 I * NEVL 25 I *	M25x1.5	NEV 2 N * NEVL 2 N *	3/4"	11-20	45	20-27.5		Yes
				12-20				No
NEV 32 I * NEVL 32 I *	M32x1.5	NEV 3 N * NEVL 3 N *	1"	17-27	85	23.5-34		Yes
				20-27				No
NEV 40 I * NEVL 40 I *	M40x1.5	NEV 4 N * NEVL 4 N *	1" ¼	22-32	85	26-40		Yes
				24-32				No
NEV 50S I * NEVL 50S I *	M50x1.5	NEV 5S N * NEVL 5S N *	1" ½	29.5-38	90	35-46.5		No
NEV 50 I * NEVL 50 I *	M50x1.5	NEV 5 N * NEVL 5 N *	1" ½	35.5-44	90	38-53		No
NEV 63S I * NEVL 63S I *	M63x1.5	NEV 6S N * NEVL 6S N *	2"	40-50	95	45.5-59.5		No
NEV 63 I * NEVL 63 I *	M63x1.5	NEV 6 N * NEVL 6 N *	2"	47-56	95	54.5-66		No
NEV 75S I * NEVL 75S I *	M75x1.5	NEV 7S N * NEVL 7S N *	2" ½	53-62	100	57-72		No
NEV 75 I * NEVL 75 I *	M75x1.5	NEV 7 N * NEVL 7 N *	2" ½	59-68	110	66.5-78.5		No
NEV 90 I * NEVL 90 I *	M90x1.5	NEV 8 N * NEVL 8 N *	3"	66-79	120	76.5-90		No
NEV 100 I * NEVL 100 I *	M100x1.5	NEV 9 N * NEVL 9 N *	3" ½	76-91	150	86-101		No
NEV 115 I * NEVL 115 I *	M115x1.5	NEV 10 N * NEVL 10 N *	4"	86-98	170	100-110		No

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[13] # Annex

[14] EU-type Examination Certificate number: **IMQ 17 ATEX 016 X**

Table 3.4[2]: Cable glands for circular, armoured cables - Serie: NEVX ***								
Model (Metric)	**Metric thread pitch 1.5**	**Model (NPT)**	**NPT thread**	**Clamping range inner sealing ring min-max cable Ød mm**	**Torque value inner sealing ring [Nm]**	**Clamping range outer sealing ring min-max cable ØD mm**	**Torque value outer sealing ring [Nm]**	**Clamping limitation (X)**
NEVX 20S I *	M20x1.5	NEVX 1S N *	1/2"	3.5-8.6	35	9.5-16	Nut to be tightened until the cable gland gasket touches the outer cable sheath, then tighten one more turn of the nut	Yes
				4-8.6				No
NEVX 20 I *	M20x1.5	NEVX 1 N *	1/2"	6.3-11.6	35	12.5-21		No
NEVX 25 I *	M25x1.5	NEVX 2 N *	3/4"	6.5-14	45	20-27.5		No
NEVX 32 I *	M32x1.5	NEVX 3 N *	1"	11-20	85	23.5-34		Yes
				12-20				No
NEVX 40 I *	M40x1.5	NEVX 4 N *	1" ¼	17-27	85	26-40		Yes
				20-27				No
NEVX 50S I *	M50x1.5	NEVX 5S N *	1" ½	22-32	90	35-46.5		Yes
				24-32				No
NEVX 50 I *	M50x1.5	NEVX 5 N *	1" ½	29.5-38	90	38-53		No
NEVX 63S I *	M63x1.5	NEVX 6S N *	2"	35.5-44	95	45.5-59.5		No
NEVX 63 I *	M63x1.5	NEVX 6 N *	2"	40-50	95	54.5-66		No
NEVX 75S I *	M75x1.5	NEVX 7S N *	2" ½	47-56	100	57-72		No
NEVX 75 I *	M75x1.5	NEVX 7 N *	2" ½	53-62	110	66.5-78.5		No
NEVX 90 I *	M90x1.5	NEVX 8 N *	3"	59-68	120	76.5-90		No
NEVX 100 I *	M100x1.5	NEVX 9 N *	3" ½	66-79	150	86-101		No
NEVX 115 I *	M115x1.5	NEVX 10 N *	4"	76-91	170	100-110		No

Table 3.5[2] Cable glands for circular, not-armoured cables + swivel metallic ring male hub- Serie: NAVNS *** - NAVFS***					
Model (Metric)	**Metric thread pitch 1.5**	**Model (NPT)**	**NPT thread**	**Cable dimensions axb (mm)**	**Torque value [Nm]**
NAVNS 12 I * NAVFS 12 I *	M12x1.5	NAVNS 02 N * NAVFS 02 N *	1/4"	3.0-6.0	25
NAVNS 16 I * NAVFS 16 I *	M16x1.5	NAVNS 01 N * NAVFS 01 N *	3/8"	3.5-8.6	25
NAVNS 20S I * NAVFS 20S I *	M20x1.5	NAVNS 1S N * NAVFS 1S N *	1/2"	6.3-11.6	35
NAVNS 20 I * NAVFS 20 I *	M20x1.5	NAVNS 1 N * NAVFS 1 N *	1/2"	6.5-14	35
NAVNS 25 I * NAVFS 25 I *	M25x1.5	NAVNS 2 N * NAVFS 2 N *	3/4"	11-20	45
NAVNS 32 I * NAVFS 32 I *	M32x1.5	NAVNS 3 N * NAVFS 3 N *	1"	17-27	85
NAVNS 40 I * NAVFS 40 I *	M40x1.5	NAVNS 4 N * NAVFS 4 N *	1" ¼	22-32	85
NAVNS 50S I * NAVFS 50S I *	M50x1.5	NAVNS 5S N * NAVFS 5S N *	1" ½	29.5-38	90
NAVNS 50 I * NAVFS 50 I *	M50x1.5	NAVNS 5 N * NAVFS 5 N *	1" ½	35.5-44	90
NAVNS 63S I * NAVFS 63S I *	M63x1.5	NAVNS 6S N * NAVFS 6S N *	2"	40-50	95
NAVNS 63 I * NAVFS 63 I *	M63x1.5	NAVNS 6 N * NAVFS 6 N *	2"	47-56	95
NAVNS 75S I * NAVFS 75S I *	M75x1.5	NAVNS 7S N * NAVFS 7S N *	2" ½	53-62	100
NAVNS 75 I * NAVFS 75 I *	M75x1.5	NAVNS 7 N * NAVFS 7 N *	2" ½	59-68	110

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ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO

PRD N° 005 B

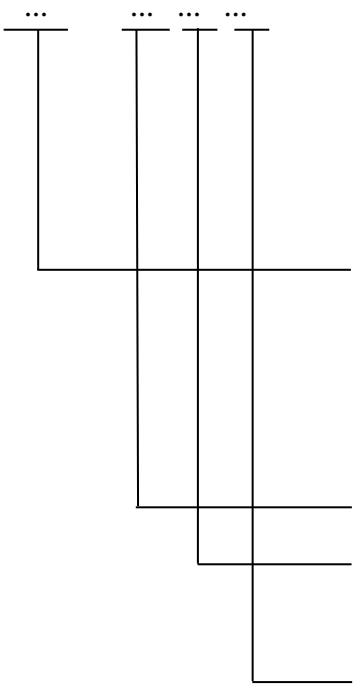
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

[13] # Annex

[14] EU-type Examination Certificate number: **IMQ 17 ATEX 016 X**

NAVNS 90 I * NAVFS 90 I *	M90x1.5	NAVNS 8 N * NAVFS 8 N *	3”	66-79	120
NAVNS 100 I * NAVFS 100 I *	M100x1.5	NAVNS 9 N * NAVFS 9 N *	3” ½	76-91	150
NAVNS 115 I * NAVFS 115 I *	M115x1.5	NAVNS 10 N * NAVFS 10 N *	4”	86-98	170

Key code (if present)



Cable gland type

NAV Cable gland for non armoured cable
NAVN Cable gland for non armoured cable, male thread
NAVF Cable gland for non armoured cable, female thread
NEV Cable gland for armoured cable
NEVX Cable gland for armoured cable “special”
NEVL Cable gland for lead sheath (new code)
NAVNS Cable gland for non armoured cable, male thread, swivel version
NAVFS Cable gland for non armoured cable, female thread, swivel version

Size (ISO: 12, 16, 20, 63S; NPT: 2, 5, 5S ecc.)

Thread (I=ISO pitch 1,5, IX1=ISO pitch 1, IX2=ISO pitch2 , N=NPT, NULL=ISO7/1, OTHER CODES)

Material (B=BRASS nichel plated, S=INOX, G=STEEL galvanized)

[15.2] **Ratings:**

For more details see drawings and instructions manual listed in DL- AT19-0042694-01_A

[15.3] **Safety Ratings:**

-

[15.4] **Ambient temperature and temperature classes:**

From -60 °C to +130 °C (silicone sealing rings) - Refers to Technical Note A4-6746 rev.2

[15.5] **Degree of protection (IP code):**

IP66/67/68

[15.6] **Warnings:**

-

[16] **Report:** AT19-0042694-01_A

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[13] # Annex

[14] EU-type Examination Certificate number: **IMQ 17 ATEX 016 X**

[16.1] **Routine (factory) tests:**
The manufacturer shall carry out the routine test prescribed at clauses 27 of the EN 60079-0.

[16.2] **Conformity with the documentation:**
The manufacturer shall carry out the verifications or tests necessary to ensure that the product complies with the documentation.
Marking the equipment in accordance with Clause 29 of EN 60079-0, the manufacturer attests on his own responsibility that:

- the equipment has been constructed in accordance with the applicable requirements of the relevant standards in safety matters;
- the routine verifications and routine tests in 28.1 of EN 60079-0 have been successfully completed with positive results.

[16.3] **Installation conditions:**
Above referred equipment is foreseen to be installed in locations where there are environmental conditions, as clearly specified at clause 1, par. 2 of EN 60079-0.
Installation and use in atmospheric and environmental conditions that are out of above-mentioned intervals request special considerations and additional measures by the side of installer or user.
These should be specified to the manufacturer by the user;
It is not a required by applicable standard listed in [9] that the certification body confirm suitability for the adverse conditions.
Installation of equipment has to proceed according to EN 60079-14.
The installation shall be done according to safety manufacturer instructions to maintain degree of protection.

[17] **Special Condition of use (X):**

- The cable glands are only suitable for fixed installations.
- Where specified in relevant Table 3, cables shall be effectively clamped to prevent pulling or twisting.

[18] **Essential Health and safety Requirements:**
This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed in [9].
This Certificate **does not** cover hazards coming from environmental conditions different from those clearly and precisely indicated and covered in clause 1 of EN 60079-0.

ESHR 1.2.7 According Annex VIII of the Directive
ESHR 1.4 Not verified.
ESHR 1.5 Not verified.
ESHR 3 Not applied.

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at [9], the following are considered relevant to this product, and conformity is demonstrated in the report:

N/A

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Signatory of EA, IAF and ILAC Mutual Recognition Agreements

[13] # Annex

[14] EU-type Examination Certificate number**: IMQ 17 ATEX 016 X**

[19] **Descriptive documents:**

DL- AT19-0042694-01_A

[20] **Certification Validity Conditions:**

The use of this Certificate is subject to the Certification Scheme and to the Regulation applicable to holders of IMQ Certificates.

The validity of this certificate is subject to the condition that the manufacturer complies with the results of the document review and of the pertinent requirement if any included, recorded in the relevant copy of documentation as per 19.

One copy of the mentioned documentation is kept in IMQ file.

[21] **Variations**

Issue 0, October 2017

Issue 1, January 2022

- Update new standards
- Add new size ISO M12 (NPT 1/4")
- Add new slot size for flat cable
- Add new version NAVNS and NAVFS: Swivel type
- Rename NEVP in NEVL

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Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

(1) # EU-Baumusterprüfbescheinigung

(2) Geräte oder Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 2014/34/EU**

(3) EU-Baumusterprüfbescheinigungsnummer

PTB 06 ATEX 1077 **Ausgabe: 1**

(4) Produkt: Steuerung Typ 8265/5*(-*)

(5) Hersteller: R. STAHL Schaltgeräte GmbH

(6) Anschrift: Am Bahnhof 30, 74638 Waldenburg, Deutschland

(7) Die Bauart dieses Produkts sowie die verschiedenen zulässigen Ausführungen sind in der Anlage und den darin aufgeführten Unterlagen zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Physikalisch-Technische Bundesanstalt, notifizierte Stelle Nr. 0102 gemäß Artikel 17 der Richtlinie 2014/34/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014, bescheinigt, dass dieses Produkt die grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Produkten zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie erfüllt.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht PTB Ex 22-11052 festgehalten.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit
EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-7:2015+A1:2018, EN 60079-11:2012, IEC 60079-31:2022-01

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Produkts in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EU-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Prüfung des festgelegten Produkts gemäß Richtlinie 2014/34/EU. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Bereitstellen auf dem Markt. Diese Anforderungen werden nicht durch diese Bescheinigung abgedeckt.

(12) Die Kennzeichnung des Produkts muss die folgenden Angaben enthalten:

II 2 G Ex db eb ia [ia Ga] ib IIC T6...T4 Gb

II 2 D Ex tb IIIC T 80 °C, T 95 °C, T 130 °C Db

Konformitätsbewertungsstelle, Sektor Explosionsschutz Braunschweig, 4. Mai 2022
Im Auftrag

Dr.-Ing. D. Markus
Direktor und Professor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT

ZSEx10100d c

EU-Baumusterprüfbescheinigungen ohne Unterschrift und ohne Siegel haben keine Gültigkeit.
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(13) # Anlage

(14) **EU-Baumusterprüfbescheinigung PTB 06 ATEX 1077 , Ausgabe: 1**

(15) Beschreibung des Produkts

Die Steuerung Typ 8265/5*(-*) besteht aus einem separat bescheinigten Gehäuse in der Zündschutzart Druckfeste Kapselung "db" und Schutz durch Gehäuse "tb" aus Aluminium mit Verschraubungsdeckel.
Die Steuerung kann mit Klemmenkästen in der Zündschutzart Erhöhte Sicherheit "eb" und Schutz durch Gehäuse "tb" kombiniert werden. Der Anschluss erfolgt über Ex d-Leitungseinführungen, Ex d-Rohrleitungseinführungen, Ex d-Durchführungen oder andere geeignete Einführungsvorrichtungen, die für den Anwendungsfall zugelassen und geeignet sind.
Der Deckel und die Wände des explosionsgeschützten Gehäuses können mit druckfest eingebauten Kontrollachsen, z. B. Kupplung, Verschluss, Kontrolldurchführung oder Achsdurchführung und Sichtfenster, ausgestattet werden.

Typschlüssel:

8265	/	5	*	(-*)
1	/	2	3	4

1) Typenreihe
2) Ausführung
   5 = Steuerung
3) Gehäusegröße (L x B x H)
   1 = 125 x 125 x 132 mm
   2 = 155 x 155 x 132 mm
   3 = 195 x 195 x 172 mm
   4 = 236 x 236 x 227 mm
   5 = 285 x 285 x 230 mm
   6 = 335 x 335 x 281 mm
4) Zusätzliche Parameter, die sich nicht auf den Explosionsschutz von Geräten auswirken.
   (-*) Kann zusätzliche Ziffern oder Zeichen enthalten, einschließlich "-", "/" oder " . ".

Technische Daten:

Bemessungsspannung	max.	690V	1.000 V	11.000 V
Bemessungsstrom	max.	250 A		
Bemessungsanschlussquerschnitt	max.	120 mm²		
Umgebungstemperaturbereich	°C	-60 °C bis +60 °C		

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Schutz durch Gehäuse nach IEC EN 60079-0, EN 60079-7 und EN 60079-31:
abhängig von den verbauten Ex-Komponenten oder Ex Geräten

Die Nennwerte sind Maximalwerte, die tatsächlichen elektrischen Werte hängen von den eingebauten elektrischen Betriebsmitteln ab. Im Rahmen dieser maximal zulässigen Werte und unter Berücksichtigung der Normen legt der Hersteller die endgültigen Bemessungswerte in Abhängigkeit von den Anlagenbedingungen, der Betriebsart, der Gebrauchskategorie usw. fest. Die Kennwerte der eigensicheren Stromkreise sind vom Hersteller in eigener Verantwortung anzugeben.

Der maximal zulässige Umgebungstemperaturbereich des Steuer- und Verteilerkastens kann durch die maximal zulässigen Betriebstemperaturbereiche der separat bescheinigten Komponenten begrenzt werden.

Die Zusammensetzung der Kennzeichnung der Schutzart richtet sich nach den Schutzarten der tatsächlich verwendeten Bauteile.

Die Steuerung darf miteinander und/oder mit Klemmenkästen in den Zündschutzarten Erhöhte Sicherheit "eb" und Schutz durch Gehäuse "tb" kombiniert werden.

Hinweise für die Herstellung und Betrieb

Für den Ein- und Anbau von Komponenten sind nur solche zugelassen, die auf dem Deckblatt angegebenen Normenstand technischen entsprechen, für die Einsatzbedingungen geeignet sind und eine gesonderte Bescheinigung besitzen. Die besonderen Bedingungen der Komponenten sind zu beachten und die Komponenten sind ggf. mit in die Typprüfung einzubeziehen. Dies gilt auch für die bereits in der technischen Beschreibung genannten Komponenten.

Um den IP-Schutzgrad zu gewährleisten, müssen der Deckel des Leergehäuses, das Flanschgehäuse, der Dichtungsrahmen und andere Ex-Komponenten ordnungsgemäß installiert und mit dem entsprechenden Drehmoment montiert werden.

Der Einbau der Betriebsmittel in der Zündschutzart Eigensicherheit "i" muss so erfolgen, dass die nach EN 60079-11 geforderten Abstände sowie die Luft- und Kriechstrecken zwischen eigensicheren und nichteigensicheren Stromkreisen eingehalten sind.
Bei Verwendung von mehr als einem eigensicheren Stromkreis sind die Regeln der Zusammenschaltung zu beachten.

Wenn Komponenten in das Leergehäuse eingebaut werden, müssen die Luft- und Kriechstrecken nach der Norm EN 60079-7 und EN 60079-11 eingehalten werden.

Der Steuer- und Verteilerkasten mit einer Beschichtung aus Polyester-Pulverlack darf nicht in Bereichen eingesetzt werden, in denen stark ladungserzeugende Prozesse, maschinelle Reib- und Trennprozesse, das Sprühen von Elektronen (z.B. im Umfeld von elektrostatischen Lackiereinrichtungen) stattfinden sowie pneumatisch geförderter Staub austritt.

Änderungen:

1) Zusätzliche Ex-Komponenten zur Komponentenliste hinzugefügt

2) Normen-Update auf den neuesten ATEX Normenstand

3) Neue Zertifizierungsbetriebsanleitung

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Anlage zur EU-Baumusterprüfbescheinigung PTB 06 ATEX 1077 , Ausgabe: 1

(16) Prüfbericht PTB Ex 22-11052

(17) Besondere Bedingungen

Keine

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

Erfüllt durch Übereinstimmung mit den vorgenannten Normen.

Nach Artikel 41 der Richtlinie 2014/34/EU dürfen EG-Baumusterprüfbescheinigungen nach Richtlinie 94/9/EG, die bereits vor dem Datum der Anwendung von Richtlinie 2014/34/EU (20. April 2016) bestanden, so betrachtet werden, als wenn sie bereits in Übereinstimmung mit der Richtlinie 2014/34/EU ausgestellt wurden. Mit Genehmigung der Europäischen Kommission dürfen Ergänzungen zu solchen EG-Baumusterprüfbescheinigungen und neue Ausgaben solcher Zertifikate weiterhin die vor dem 20. April 2016 ausgestellte originale Zertifikatsnummer tragen.

Konformitätsbewertungsstelle, Sektor Explosionsschutz — Braunschweig, 4. Mai 2022
Im Auftrag

Dr.-Ing. D. Markus
Direktor und Professor

EU-Baumusterprüfbescheinigungen ohne Unterschrift und ohne Siegel haben keine Gültigkeit.
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Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

(1) # EU-TYPE EXAMINATION CERTIFICATE

(Translation)

(2) Equipment or Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number:

PTB 06 ATEX 1077 **Issue: 1**

(4) Product: Control Panel type 8265/5*(-*)

(5) Manufacturer: R. STAHL Schaltgeräte GmbH

(6) Address: Am Bahnhof 30, 74638 Waldenburg, Germany

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential Test Report PTB Ex 22-11052.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-7:2015+A1:2018, EN 60079-11:2012, IEC 60079-31:2022-01

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

II 2 G Ex db eb ia [ia Ga] ib IIC T6...T4 Gb

II 2 D Ex tb IIIC T 80 °C, T 95 °C, T 130 °C Db

Konformitätsbewertungsstelle, Sektor Explosionsschutz Braunschweig, May 4, 2022
On behalf of PTB:

Dr.-Ing. D. Markus
Direktor und Professor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT

ZSEx001e c

EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
In case of dispute, the German text shall prevail.

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(13) # SCHEDULE

(14) **EU-Type Examination Certificate Number PTB 06 ATEX 1077 , Issue: 1**

(15) Description of Product

The control panel type 8265/5*(-*) is made of a separately certified enclosure in the type of protection Flameproof Enclosure "db" and Protection by Enclosure "tb" out of aluminium with threaded joint cover.
The control panel can be combined with terminal boxes in type of protection Increased Safety "eb" and Protection by Enclosure "tb". Connection is made by means of Ex d cable entries, Ex d conduit entries, Ex d bushings or other suitable entry devices, certified and suit-able for the application. The cover and walls of the explosion-proof enclosure can be equipped with flameproof built-in control axles, for example coupler, lock, control bushing or axle bushing and inspection window.

Nomenclature:

8265	/	5	*	(-*)
1	/	2	3	4

1) type series
2) design
   5 = control panel
3) enclosure size (L x W x H)
   1 = 125 x 125 x 132 mm
   2 = 155 x 155 x 132 mm
   3 = 195 x 195 x 172 mm
   4 = 236 x 236 x 227 mm
   5 = 285 x 285 x 230 mm
   6 = 335 x 335 x 281 mm
4) Additional parameters that do not affect the explosion protection of devices.
   (-*) May contain additional digits or characters, including "-", "/" or " . ".

Technical data:

Rated insulation voltage	max.	690V	1.000 V	11.000 V
Rated current	max.	250 A		
Rated cross section	max.	120 mm²		
Ambient temperature range	°C	-60 °C to +60 °C		

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SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 06 ATEX 1077 , Issue: 1

Ingress protection according to EN IEC 60079-0, EN 60079-7 and EN 60079-31:
depends on the assembled Ex components or Ex equipments

The rated values are maximum values, the actual electrical values depend on the electrical equipment incorporated. Within the scope of these maximum permissible values and with due regard to the standards, the manufacturer specifies the final rated values dependent on the system conditions, mode of operation, utilization category, etc. The characteristic values of the intrinsically safe circuits are to be given by the manufacturer on his own responsibility.

The maximum permissible ambient temperature range of the control and distribution box can be limited by the maximum permissible service temperature ranges of the separately certified components.

The composition of the type of protection marking will be based on the types of protection of components actually used.

The control panel may be combined with each other and/or with terminal boxes designed to type of protection Increased Safety "eb" and Protection by Enclosure "tb".

Notes for manufacturing and operation

Components attached or installed have to be of a technical standard that complies with the specifications on the cover sheet. They must be suited for the operating conditions and have a separate examination certificate. The special conditions specified for the components must be complied with and may have to be included in the type test. This also applies to components already specified in the technical description.

In order to ensure the ingress protection IP, the cover of the empty enclosure, the flange enclosure, the sealing frame and other Ex-components must be properly installed and with the appropriate torque.

Equipment of the type of protection intrinsic safety "i" is to be installed in such a way that the distances, creepage distances and clearances between intrinsically safe circuits and non-intrinsically safe circuits comply with the requirements of EN 60079-11. When more than one intrinsically safe circuit is used, the rules for interconnection are to be observed.

When components are installed into the empty enclosure, clearance and creepage distances specified in the standard EN 60079-7 and EN 60079-11 shall duly be complied with.

The control and distribution box with a coating of polyester powder must not be used in areas affected by charge-producing processes, mechanical friction and separation processes, electron emission (e.g. in the vicinity of electrostatic coating equipment), and pneumatically conveyed dust.

Changes:
1) Additional Ex components added to list of components
2) Standard update to latest ATEX standards
3) New Certification Instruction

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SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 06 ATEX 1077 , Issue: 1

(16) Test Report PTB Ex 22-11052

(17) Specific conditions of use

None

(18) Essential health and safety requirements

Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, May 4, 2022

Dr.-Ing. D. Mark
Direktor und Professor

EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
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Base Load Power Hub (BLPH)

ATEX DOCUMENTATION

Document Number: 1724000372-EL-LIS-00022

ROSETTI MARINO

1	APPROVED - WORK MAY PROCEED
2N	REVISE AND RE-SUBMIT - DO NOT PROCEED
2Y	REVISE AND RE-SUBMIT - WORK MAY PROCEED
3	REJECTED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
Filippo Zanellati	06/03/2025

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
03	03/03/2025	Accepted for Construction (AFC)	DA	DA	AD
02	29/01/2025	Accepted for Construction (AFC)	DA	DA	AD
01	20/12/2024	Accepted for Construction (AFC)	DA	DA	AD
00	09/10/2024	Issue for Review (IFR)	DA	DA	AD

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

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ATEX REGISTER 31

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Base Load Power Hub (BLPH)

AC UPS - TAG: UP-200F3

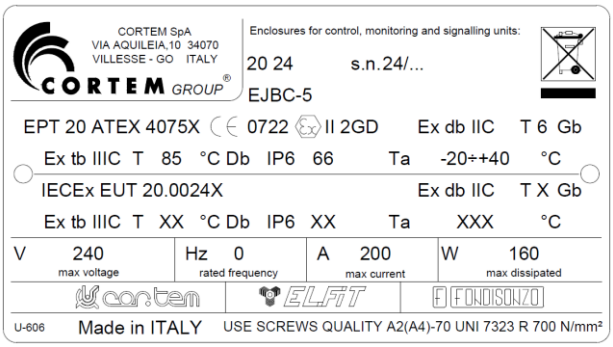
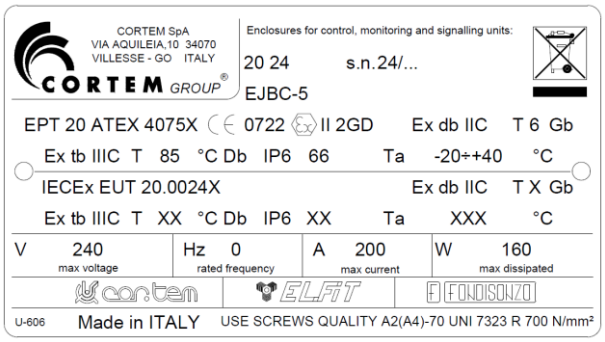
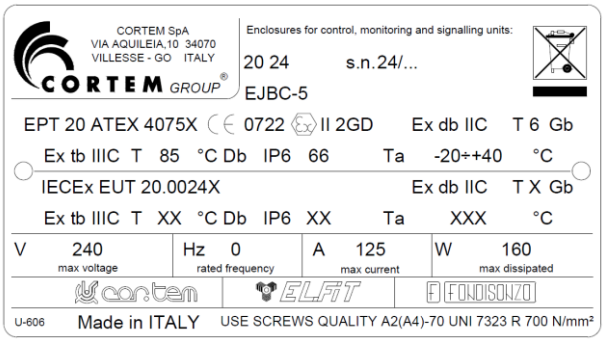
AC UPS - TAG: UP-200F4

DC UPS - TAG: UP-200F1

ATEX DOCUMENTATION FOR BATTERY PROTECTION BOX

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BATTERY PROTECTION BOX MODEL

BATTERY PROTECTION BOX TAG NUMBER	RATING PLATE	MODEL AND CERTIFICATE REFERENCE
BATTERY PROTECTION BOX TAG: CB-200F3 A/B Serial numbers: 24/86529-1 EJBC-5/C2401778/10 24/86529-2 EJBC-5/C2401778/10		Model EJBC Certificate EPT 20 ATEX 4075X
BATTERY PROTECTION BOX TAG: CB-200F4 A/B Serial numbers: 24/86529-3 EJBC-5/C2401778/10 24/86529-4 EJBC-5/C2401778/10		Model EJBC Certificate EPT 20 ATEX 4075X
BATTERY PROTECTION BOX TAG: CB-200F1 Serial number: 24/86530 EJBC-5/C2401778/20		Model EJBC Certificate EPT 20 ATEX 4075X

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eurofins | Product Testing

[1] # EU-TYPE EXAMINATION CERTIFICATE

[2] **Equipment intended for use in potentially explosive atmospheres**
Directive 2014/34/EU – Annex III

[3] Certificate Number: **EPT 20 ATEX 4075 X** **issue 0**

[4] Equipment: **Explosion proof command, control, signaling and interfaces units**

Series: **EJBC**

[5] Manufacturer: **CORTEM S.P.A.**

[6] Address: Via Aquileia, 10 – 34070 Villesse (Go) - Italy

[7] This equipment and its accepted variations are specified in the annex to this Certificate.

[8] Eurofins Product Testing Italy S.r.l., Notified Body n. 0477 in accordance with Article 21 of the Directive 2014/34/EU of the European Parliament and of the Council of 26th February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II of the Directive.
The examination and test results are recorded in the confidential Report N° EPT.20.REL.01/ 2013057.

[9] Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the harmonized standards:

EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-11:2012, EN 60079-31:2014

[10] If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the exam and the tests of the specified equipment.
Further requirements of the Directive 2014/34/EU apply to the manufacture and supply of this equipment.
These requirements are not object of this Certificate.

[12] The equipment shall include the sign Ex and at least one of the following strings:

II 2G Ex db IIC T6...T4 Gb **-60/-40°C < Tamb< +40/55°C**
II 2G Ex db [ia Ga] IIC T6...T5 Gb
II 2D Ex tb IIIC T85°C...T135°C Db
II 2D Ex tb [ia Da] IIIC T85°C...T100°C Db
I M2 Ex db I Mb
I M2 Ex db [ia Ma] I Mb

CE

Place and date of issue:
Torino, 2020-11-30

Dionisio Bucchieri
Directive Responsible

Paolo Trisoglio
Managing Director

Eurofins Product Testing Italy eurofins Notified Body N. 0477

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO

PRD N° 119B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

This Certificate has 6 pages and it is reproducible only in its entirely. Conditions of validity are reported below.

[13] [14] **ANNEX**
EU-TYPE EXAMINATION CERTIFICATE N. EPT 20 ATEX 4075 X issue 0

[15] Equipment description

The command, control, signaling and interface units EJBC... series are made of Ex-d enclosures (already certificated IECEX EUT 20.0023U, EPT 20 ATEX 4074U) with electrical devices. The command, control, signaling and interface units EJBC series can have installed on their walls signal, control operators and maneuvers series M-0... with lamps 3W, 5W or electronic led up to 240V (certificate IECEX CES 14.0030U / CESI 01 ATEX 025U), monoled M-0487 (certificates IECEX CES 11.0030U / CESI 00 ATEX 060U). Inside the enclosure switches, indicators, contactors, transformers, analogue and digital components can be installed. Small cells or batteries, eventually connected in series, are installable inside the enclosure according to the requirements of the § 23 of IEC 60079-0. A transmitting/receiving antenna with an IECEx/ATEX full compliance certificate, suitable for the maximum internal pressure and service temperature, can be also installed on the wall of the equipment.

The EJBC series are manufactured in copper free aluminum alloys EN AB 43000 or EN AB 44100 or EN AB 42000 according to UNI EN 1676. The EJBCX series are manufactured in stainless steel AISI 303, AISI 304, AISI 316, AISI 316L. The products can be supplied with external painting with surface resistance lower than 10^8 Ω, having minimum thickness of 60 µm and maximum thickness of 200 µm, color grey RAL 7035, with or without the coating named CORALUM to protect the box against corrosion. CORALUM is a surface protection treatment based on an electro-ceramic coating applied by electrolytic deposition method directly on the aluminum alloy. Alternatively it is possible the use of other types of painting made in non-metallic materials according to customer specification; various kind of colors are allowed. In this case a warning label is added regarding the risk of electrostatic charge.

Drain and breather valves, manufactured by Elfit, ECD-2... series, certified CESI 01 ATEX 081U, IECEx CES 14.0016U with types of protection Ex d, Ex tb can be installed in accordance with their own specific limitations. The EJBC can also be used with only terminal blocks installed inside.

Type Code:

EJBC- ☐ ☐ ☐ ☐ ☐

- Code of the series (EJBCX for the stainless-steel versions)
- SIZE: **45 - 5**
- HEIGH: BLANK for standard, B for low height
- Not relevant for explosion protection
- Not relevant for explosion protection
- Not relevant for explosion protection

Equipment characteristics:

Nominal voltage: 12-250 V dc / 24-1000 V ac

Nominal frequency: 0/50/60 Hz

Max. current 650 A

Rated voltage: up to 750Vdc

[13] ANNEX
[14] EU-TYPE EXAMINATION CERTIFICATE N. EPT 20 ATEX 4075 X issue 0

Maximum electrical equipment ratings inside the boxes:

Description	V	Output dissipated (W)	A
Analogic digital instruments	660	10	5
Electronic gear case	400	10	-
Plc, multiplexer, amplifier	240	80	-
Control and gauging device	240	100	-
Automatic breakers	660	-	650
Fuses	660	-	400
Air thermal relays	500	12	10
Alectronic control device	660	100	-
Air contactors	660	30	650
Sequence timer	240	5	10
Photoelectrical cell	240	2	-
Capacitors (discharge time)	660	-	-
Transformers	660	200	-
Resistors	240	300	-
Terminals	660	-	-
Ballasts	277	40	7,5

Maximum dissipated power:

Type	Maximum dissipated power inside enclosures			
	Tamb. = +40°C (+55°C)			
	No signaling lamps, only LED are allowed		With signaling lamps and/or LED	Without signaling lamps and LED
	T6 / T85°C	T5 / T100°C	T5 / T100°C	T4 / 135°C
EJBC 45	140 W (105 W)	240 W (180 W)	140 W (105 W)	480 W (360 W)
EJBC 45 B	120 W (90 W)	210 W (160 W)	120 W (90 W)	430 W (320 W)
EJBC 5	210 W (160 W)	315 W (235 W)	210 W (160 W)	600 W (450 W)
EJBC 5 B	170 W (130 W)	250 W (190 W)	170 W (130 W)	480 W (360 W)

[13]
[14]

ANNEX
EU-TYPE EXAMINATION CERTIFICATE N. EPT 20 ATEX 4075 X issue 0

Boxes are suitable for installation of motor inverter units complete with internal cooling fan having the following characteristics in terms of power and size of the enclosure dimensions:

Box size	Motor inverter maximum power for Ta +40°C (+55°C)	Maximum dissipated power	Cooling fan maximum capacity
EJBC-45 / EJBC-45B	2,2 (1,5) kW	73W	44m³/h
EJBC-5 / EJBC-5B	5,5 (4,0) kW	172W	44m³/h

Boxes are suitable for ignition transformer with following electrical characteristics: max primary voltage 1000 V - max secondary voltage 20 kV (impulse 25 kV max for 3 ms) – max secondary current 50 mA.

The radio frequency source for continuous transmissions and for pulsed transmissions inside the enclosures shall not exceed the following values: max threshold power, effective output power of the transmitter multiplied by the antenna gain 2W - thermal initiation time 20µs. For pulsed radar and other transmissions where the pulses are not short compared with the thermal initiation time, the threshold energy values shall not exceed 50µJ.

Boxes are suitable for incoming and outgoing fiber optics cables; the limits of irradiated power and irradiance are:
temperature class T6, power 15 mW, irradiance 5 mW/mm²;
temperature class T4, power 35 mW, irradiance 5 mW/mm².

Cable entries

The entries into the enclosures are provided with threaded holes in the walls of the enclosure.

The cable glands to be used with the equipment must be Ex db and Ex tb (IP66) in compliance with the requirements of EN/IEC 60079-0 and EN/IEC 60079-1 / EN/IEC 60079-31.

Warning label

"Use screws of quality A2-70 according UNI 7323 with tensile strength of at least 700 N/mm2"

"Warning - do not open when energized"

For equipment with capacitors:

"After de-energizing. Wait 10 minutes before opening".

For enclosures with batteries or cells:

"Warning – Do not open when an explosive atmosphere is present".

For equipment with temperature class T5:

"Use cables suitable for temperature of 90°C".

For equipment with temperature class T4:

"Use cables suitable for temperature of 100°C".

For equipment without standard painting:

"Potential electrostatic charging hazards".

[13] [14] **ANNEX**
EU-TYPE EXAMINATION CERTIFICATE N. EPT 20 ATEX 4075 X issue 0

Routine tests
Overpressure tests at 19,1 bar (for equipment with minimum T amb -60°C) or at 17,1 bar (for equipment with minimum T amb - 40°C), according to § 15.2.3.2 of IEC 60079-1 standard, must be carried out on each enclosure, including (also separately from the enclosure) all the following components not type tested at least at 51 bar (for equipment with minimum T amb -60°C) or at 46,5 bar (for equipment with minimum T amb - 40°C): control and signal operators series M-0... CESI 01 ATEX 025U with lamps 3W, 5W or electronic led up to 240V; monoled M-0487, CESI 00 ATEX 060U.

[16] **Assessment Report n° EPT.20.REL.01/2013057.**

This EU-Type Examination Certificate is released after the positive result of the conformity assessment of the Council Directive 2014/34/EU and to harmonized technical standards listed in this certificate performed by the Notified Body Eurofins Product Testing Italy S.r.l., and reported in the Assessment Report above cited.

[17] **Specific condition of use**

The flameproof joints of the enclosures are not intended to be repaired.

The accessories used for cable entries and for closing unused openings shall be certified according to EN/IEC 60079-0, EN/IEC 60079-1 and EN/IEC 60079-31. A minimum degree of protection IP66/67 shall be guaranteed according to IEC 60529 standard.

[13] ANNEX
[14] EU-TYPE EXAMINATION CERTIFICATE N. EPT 20 ATEX 4075 X issue 0

[18] **Essential Health and Safety Requirements**

Assured by compliance with harmonized standards.

[19] **Descriptive documents**

The equipment object of this Certificate are described by the following documents that are scheduled documents and therefore they cannot be modified without the explicit authorization of the Notified Body.

Type of document	Document identification	Rev.	Date
Technical note	"TECHNICAL NOTE A4-7540"	00	2020-06-08
Safety instructions	"F-472 R0: enclosures series EJBC.. safety, maintenance and mounting instruction"	00	2020-06-08
Dimensional drawing	Drawing code "A1-7538".	00	2020-06-08

[20] **Terms and conditions**

The product liability rests with the Manufacturer, his representative or, in the absence of a representative, with the importer, in accordance with the General Product Safety Directive 2001/95/EC.

The following conditions may render this certificate invalid:

- changes in the design or construction of the product;
- changes or amendments to the Directive;
- changes or amendments in the standards which form the basis for documenting compliance with the essential requirements of the 2014/34/EU Directive.

[21] **History**

This Certificate is at its first issue.

Dionisio Bucchieri
Directive Responsible

End of Certificate

[1] # EU-TYPE EXAMINATION CERTIFICATE

[2] **Equipment or Protective System intended for use in potentially explosive atmospheres - Directive 2014/34/EU – Annex III – MODULE B: EU-TYPE EXAMINATION**

[3] EU-type Examination Certificate number: **IMQ 17 ATEX 016 X**

[4] PRODUCT: **Metal cable glands for armoured and not armoured cables**

TYPE/SERIES: **NAV***; NAVN***; NAVF***; NEV***; NEVX***; NEVL***;NAVNS***;NAVFS***

[5] MANUFACTURER: **CORTEM S.p.A.**

[6] ADDRESS: Via Aquileia, 10 - 34070 Villesse (GO) - Italy

[7] This equipment and any acceptable variation thereto are specified in the annex to this certificate and the documents therein referred to.

[8] IMQ, notified body N° 0051, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in Report No.: **AT19-0042694-01_A**

[9] Compliance with Essential Health and Safety Requirements, except in respect of those listed at item 18 of the annex, has been assured by compliance with:

EN IEC 60079-0:2018; EN 60079-1:2014; EN IEC 60079-7:2015 + A1:2018; EN 60079-31:2014

[10] If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

[12] The marking of the equipment or protective system shall include the following:

II 2G	**Ex db IIC Gb**
II 2G	**Ex eb IIC Gb**
II 2D	**Ex tb IIIC Db**

THIS CERTIFICATE CANCELS AND REPLACES THE PREVIOUS ONE. IT INCLUDES 1 ANNEX.

FIRST ISSUE	2017/10/17
CURRENT ISSUE	2022/01/31
PREVIOUS ISSUE	2017/10/17
EXPIRING DATE	2032/01/30

B.U. PRODUCT CONFORMITY ASSESSMENT
CERTIFICATION SECTOR - MANAGER

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[13] # Annex

[14] EU-type Examination Certificate number: **IMQ 17 ATEX 016 X**

[15] **Description of product:**

The cable glands series NAV…, NEV… are designed for the type of protection flameproof enclosures Ex db IIC and for the type of protection increased safety Ex eb IIC, Ex nR IIC.
The cable glands of the series are also protected against the risk of explosion for the presence of combustible dust Ex tb IIIC.
These cable glands can be used in Ex i intrinsic safety circuits. In this case the cable gland have a part painted in light blue
The cable glands series NAV ***; NAVN ***; NAVF ***; NAVNS***; NAVFS** are suitable for not armoured cables, with circular section either with not-circular section (typically for use with flat "heating" cables).

The cable glands series NEV ***; NEVX ***; NEVL *** are suitable for armoured cables, with circular section.
Cable glands are made of metal body (nickel plated brass; galvanized steel; stainless steel), sealing rings are made of silicon for all types.

The cable gland for not-armoured cables comprises: a main metallic body with silicone lower gasket (flameproof joint), a metallic/not-metallic made compression ring, a metallic clamping nut with silicone upper gasket.

The cable gland for armoured cables comprises: a main metallic body with silicone lower gasket (flameproof joint), armoured tightening nuts, a metallic intermediate body, a metallic clamping nut with silicone upper gasket.

Additional details on compression rings, O-ring for IP, spacers and rings are detailed in Table 2.

Cable glands are provided, on the side attached to enclosure, with the following main mounting threads type:
- NPT ANSI ASME B1.20.1
- ISO METRIC pitch 1.5.
Other types of thread are permitted, according to details listed in key code.

Protection degree IP66/68 is guaranteed by usage of suitable sealant put at least on two complete threads engaged of the threaded coupling, according to manufacturer's instructions.

IPx8 is achieved at the following conditions: 3 bar for 12 hours.

Cable glands are suitable for high mechanical risk (7J).

Trademark: CORTEM; ELFIT; CORTEM Group

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[13] # Annex

[14] EU-type Examination Certificate number**: IMQ 17 ATEX 016 X**

[15.1] **Models/Series Identification:**

Table 1: Rated ambient temperature range (°C) and cables		
Serie:	**Rated ambient temperature**	**Cable type**
NAV *** NAVN *** NAVF ***	-60 ÷ 130 °C	Circular, not-armoured Flat (i.e. heating cables), not-armoured
NEV *** NEVX ***	-60 ÷ 130 °C	Circular, armoured
NEVL ***	-60 ÷ 130 °C	Circular, armoured (lead sheath)
NAVNS *** NAVFS ***	-60 ÷ 130 °C	Swivel, not armoured

Table 2: Materials [1]						
Series	Body materials	Sealing rings material	O-ring gasket	Compression ring	Conical armour rings	Spacers/internal rings
NAV*** NAVN *** NAVF ***	Nickel plated brass Galvanized steel Stainless steel	Silicone	Silicone	Nickel plated brass Galvanized steel Stainless steel Aluminium Plastic (PPS)	-	Teflon
NEV *** NEVX ***	Nickel plated brass Galvanized steel Stainless steel	Silicone	Silicone	-	Nickel plated brass Galvanized steel Stainless steel	Teflon
NEVL ***	Nickel plated brass Galvanized steel Stainless steel	Silicone	Silicone	-	Nickel plated brass Galvanized steel Stainless steel	Teflon Steel/Brass for connection to lead sheath
NAVNS *** NAVFS ***	Nickel plated brass Galvanized steel Stainless steel	Silicone	Silicone	-	-	-
[1] Non-metallic materials are suitable for declared service temperature of cable glands: -60 ÷ 130 °C						

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[13] # Annex

[14] EU-type Examination Certificate number: **IMQ 17 ATEX 016 X**

Table 3.1[2]: Cable glands for circular, not-armoured cables - Series: NAV ***; NAVN ***; NAVF ***						
Model (Metric)	**Metric thread pitch 1.5**	**Model (NPT)**	**NPT thread**	**Clamping range min-max cable Ød mm**	**Torque value [Nm]**	**Clamping limitation (X)**
NAV 12 I * NAVN 12 I * NAVF 12 I *	M12x1.5	NAV 02 N * NAVN 02 N * NAVF 02 N *	1/4"	3.0-6.0	25	Yes
NAV 16 I * NAVN 16 I * NAVF 16 I *	M16x1.5	NAV 01 N * NAVN 01 N * NAVF 01 N *	3/8"	3.5-8.6	25	Yes
				4-8.6		No
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	6.3-11.6	35	No
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	6.5-14	35	No
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	11-20	45	Yes
				12-20		No
NAV 32 I * NAVN 32 I * NAVF 32 I *	M32x1.5	NAV 3 N * NAVN 3 N * NAVF 3 N *	1"	17-27	85	Yes
				20-27		No
NAV 40 I * NAVN 40 I * NAVF 40 I *	M40x1.5	NAV 4 N * NAVN 4 N * NAVF 4 N *	1" ¼	22-32	85	Yes
				24-32		No
NAV 50S I * NAVN 50S I * NAVF 50S I *	M50x1.5	NAV 5S N * NAVN 5S N * NAVF 5S N *	1" ½	29.5-38	90	No
NAV 50 I * NAVN 50 I * NAVF 50 I *	M50x1.5	NAV 5 N * NAVN 5 N * NAVF 5 N *	1" ½	35.5-44	90	No
NAV 63S I * NAVN 63S I * NAVF 63S I *	M63x1.5	NAV 6S N * NAVN 6S N * NAVF 6S N *	2"	40-50	95	No
NAV 63 I * NAVN 63 I * NAVF 63 I *	M63x1.5	NAV 6 N * NAVN 6 N * NAVF 6 N *	2"	47-56	95	No
NAV 75S I * NAVN 75S I * NAVF 75S I *	M75x1.5	NAV 7S N * NAVN 7S N * NAVF 7S N *	2" ½	53-62	100	No
NAV 75 I * NAVN 75 I * NAVF 75 I *	M75x1.5	NAV 7 N * NAVN 7 N * NAVF 7 N *	2" ½	59-68	110	No
NAV 90 I * NAVN 90 I * NAVF 90 I *	M90x1.5	NAV 8 N * NAVN 8 N * NAVF 8 N *	3"	66-79	120	No
NAV 100 I * NAVN 100 I * NAVF 100 I *	M100x1.5	NAV 9 N * NAVN 9 N * NAVF 9 N *	3" ½	76-91	150	No
NAV 115 I * NAVN 115 I * NAVF 115 I *	M115x1.5	NAV 10 N * NAVN 10 N * NAVF 10 N *	4"	86-98	170	No

[2] metric pitch 1.5 and NPT threads cable glands sizes are shown; models with other threads, as detailed in Key Code, are available. Full list in drawings listed to Certificate

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[13] # Annex

[14] EU-type Examination Certificate number: **IMQ 17 ATEX 016 X**

Table 3.2[2]: Cable glands for not-circular (flat), not-armoured cables - Series: NAV ***; NAVN ***; NAVF ***						
Model (Metric)	**Metric thread pitch 1.5**	**Model (NPT)**	**NPT thread**	**Cable dimensions axb (mm)**	**Torque value [Nm]**	**Clamping limitation (X)**
NAV 16 I * NAVN 16 I * NAVF 16 I *	M16x1.5	NAV 01 N * NAVN 01 N * NAVF 01 N *	3/8"	7.7x5.5	20	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	7.7x5.5	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	8.7x3.5	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	9.7x4.1	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	10.2x4.1	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	10.7x4.6	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	10.7x5.1	30	Yes
NAV 20 I * NAVN 20 I * NAVF 20 I *	M20x1.5	NAV 1 N * NAVN 1 N * NAVF 1 N *	1/2"	10.7x6.1	30	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	7.7x5.5	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	8.7x3.5	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	9.7x4.1	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	10.2x4.1	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	10.7x4.6	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	10.7x5.1	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	10.7x6.1	25	Yes
NAV 20S I * NAVN 20S I * NAVF 20S I *	M20x1.5	NAV 1S N * NAVN 1S N * NAVF 1S N *	1/2"	11.7x5.6	25	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	7.7x5.5	40	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	8.7x3.5	40	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	9.7x4.1	40	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	10.2x4.1	40	Yes
NAV 25 I *	M25x1.5	NAV 2 N *	3/4"	10.7x4.6	40	Yes

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NAVN 25 I * NAVF 25 I *		NAVN 2 N * NAVF 2 N *				
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	10.7x5.1	40	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	10.7x6.1	40	Yes
NAV 25 I * NAVN 25 I * NAVF 25 I *	M25x1.5	NAV 2 N * NAVN 2 N * NAVF 2 N *	3/4"	11.7x5.6	40	Yes

Table 3.3[2]: Cable glands for circular, armoured cables - Series: NEV *; NEVL *****

Model (Metric)	Metric thread pitch 1.5	Model (NPT)	NPT thread	Clamping range inner sealing ring min-max cable Ød mm	Torque value inner sealing ring [Nm]	Clamping range outer sealing ring min-max cable ØD mm	Torque value outer sealing ring [Nm]	Clamping limitation (X)
NEV 12 I * NEVL 12 I *	M12x1.5	NEV 02 N * NEVL 02 N *	1/4"	3.0-6.0	25	6-10	Nut to be tightened until the cable gland gasket touches the outer cable sheath, then tighten one more turn of the nut	No
NEV 16 I * NEVL 16 I *	M16x1.5	NEV 01 N * NEVL 01 N *	3/8"	3.5-8.6	25	6-13.2		Yes
				4-8.6				No
NEV 20S I * NEVL 20S I *	M20x1.5	NEV 1S N * NEVL 1S N *	1/2"	6.3-11.6	35	9.5-16		No
NEV 20 I * NEVL 20 I *	M20x1.5	NEV 1 N * NEVL 1 N *	1/2"	6.5-14	35	12.5-21		No
NEV 25 I * NEVL 25 I *	M25x1.5	NEV 2 N * NEVL 2 N *	3/4"	11-20	45	20-27.5		Yes
				12-20				No
NEV 32 I * NEVL 32 I *	M32x1.5	NEV 3 N * NEVL 3 N *	1"	17-27	85	23.5-34		Yes
				20-27				No
NEV 40 I * NEVL 40 I *	M40x1.5	NEV 4 N * NEVL 4 N *	1" ¼	22-32	85	26-40		Yes
				24-32				No
NEV 50S I * NEVL 50S I *	M50x1.5	NEV 5S N * NEVL 5S N *	1" ½	29.5-38	90	35-46.5		No
NEV 50 I * NEVL 50 I *	M50x1.5	NEV 5 N * NEVL 5 N *	1" ½	35.5-44	90	38-53		No
NEV 63S I * NEVL 63S I *	M63x1.5	NEV 6S N * NEVL 6S N *	2"	40-50	95	45.5-59.5		No
NEV 63 I * NEVL 63 I *	M63x1.5	NEV 6 N * NEVL 6 N *	2"	47-56	95	54.5-66		No
NEV 75S I * NEVL 75S I *	M75x1.5	NEV 7S N * NEVL 7S N *	2" ½	53-62	100	57-72		No
NEV 75 I * NEVL 75 I *	M75x1.5	NEV 7 N * NEVL 7 N *	2" ½	59-68	110	66.5-78.5		No
NEV 90 I * NEVL 90 I *	M90x1.5	NEV 8 N * NEVL 8 N *	3"	66-79	120	76.5-90		No
NEV 100 I * NEVL 100 I *	M100x1.5	NEV 9 N * NEVL 9 N *	3" ½	76-91	150	86-101		No
NEV 115 I * NEVL 115 I *	M115x1.5	NEV 10 N * NEVL 10 N *	4"	86-98	170	100-110		No

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Table 3.4[2]: Cable glands for circular, armoured cables - Serie: NEVX ***								
Model (Metric)	**Metric thread pitch 1.5**	**Model (NPT)**	**NPT thread**	**Clamping range inner sealing ring min-max cable Ød mm**	**Torque value inner sealing ring [Nm]**	**Clamping range outer sealing ring min-max cable ØD mm**	**Torque value outer sealing ring [Nm]**	**Clamping limitation (X)**
NEVX 20S I *	M20x1.5	NEVX 1S N *	1/2"	3.5-8.6	35	9.5-16	Nut to be tightened until the cable gland gasket touches the outer cable sheath, then tighten one more turn of the nut	Yes
				4-8.6				No
NEVX 20 I *	M20x1.5	NEVX 1 N *	1/2"	6.3-11.6	35	12.5-21		No
NEVX 25 I *	M25x1.5	NEVX 2 N *	3/4"	6.5-14	45	20-27.5		No
NEVX 32 I *	M32x1.5	NEVX 3 N *	1"	11-20	85	23.5-34		Yes
				12-20				No
NEVX 40 I *	M40x1.5	NEVX 4 N *	1" ¼	17-27	85	26-40		Yes
				20-27				No
NEVX 50S I *	M50x1.5	NEVX 5S N *	1" ½	22-32	90	35-46.5		Yes
				24-32				No
NEVX 50 I *	M50x1.5	NEVX 5 N *	1" ½	29.5-38	90	38-53		No
NEVX 63S I *	M63x1.5	NEVX 6S N *	2"	35.5-44	95	45.5-59.5		No
NEVX 63 I *	M63x1.5	NEVX 6 N *	2"	40-50	95	54.5-66		No
NEVX 75S I *	M75x1.5	NEVX 7S N *	2" ½	47-56	100	57-72		No
NEVX 75 I *	M75x1.5	NEVX 7 N *	2" ½	53-62	110	66.5-78.5		No
NEVX 90 I *	M90x1.5	NEVX 8 N *	3"	59-68	120	76.5-90		No
NEVX 100 I *	M100x1.5	NEVX 9 N *	3" ½	66-79	150	86-101		No
NEVX 115 I *	M115x1.5	NEVX 10 N *	4"	76-91	170	100-110		No

Table 3.5[2] Cable glands for circular, not-armoured cables + swivel metallic ring male hub- Serie: NAVNS *** - NAVFS***					
Model (Metric)	**Metric thread pitch 1.5**	**Model (NPT)**	**NPT thread**	**Cable dimensions axb (mm)**	**Torque value [Nm]**
NAVNS 12 I * NAVFS 12 I *	M12x1.5	NAVNS 02 N * NAVFS 02 N *	1/4"	3.0-6.0	25
NAVNS 16 I * NAVFS 16 I *	M16x1.5	NAVNS 01 N * NAVFS 01 N *	3/8"	3.5-8.6	25
NAVNS 20S I * NAVFS 20S I *	M20x1.5	NAVNS 1S N * NAVFS 1S N *	1/2"	6.3-11.6	35
NAVNS 20 I * NAVFS 20 I *	M20x1.5	NAVNS 1 N * NAVFS 1 N *	1/2"	6.5-14	35
NAVNS 25 I * NAVFS 25 I *	M25x1.5	NAVNS 2 N * NAVFS 2 N *	3/4"	11-20	45
NAVNS 32 I * NAVFS 32 I *	M32x1.5	NAVNS 3 N * NAVFS 3 N *	1"	17-27	85
NAVNS 40 I * NAVFS 40 I *	M40x1.5	NAVNS 4 N * NAVFS 4 N *	1" ¼	22-32	85
NAVNS 50S I * NAVFS 50S I *	M50x1.5	NAVNS 5S N * NAVFS 5S N *	1" ½	29.5-38	90
NAVNS 50 I * NAVFS 50 I *	M50x1.5	NAVNS 5 N * NAVFS 5 N *	1" ½	35.5-44	90
NAVNS 63S I * NAVFS 63S I *	M63x1.5	NAVNS 6S N * NAVFS 6S N *	2"	40-50	95
NAVNS 63 I * NAVFS 63 I *	M63x1.5	NAVNS 6 N * NAVFS 6 N *	2"	47-56	95
NAVNS 75S I * NAVFS 75S I *	M75x1.5	NAVNS 7S N * NAVFS 7S N *	2" ½	53-62	100
NAVNS 75 I * NAVFS 75 I *	M75x1.5	NAVNS 7 N * NAVFS 7 N *	2" ½	59-68	110

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PRD N° 005 B

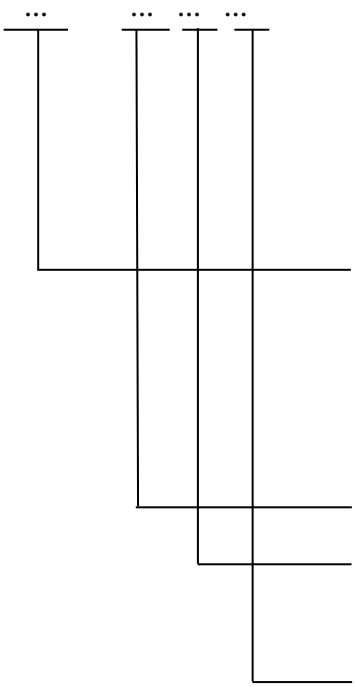
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NAVNS 90 I * NAVFS 90 I *	M90x1.5	NAVNS 8 N * NAVFS 8 N *	3”	66-79	120
NAVNS 100 I * NAVFS 100 I *	M100x1.5	NAVNS 9 N * NAVFS 9 N *	3” ½	76-91	150
NAVNS 115 I * NAVFS 115 I *	M115x1.5	NAVNS 10 N * NAVFS 10 N *	4”	86-98	170

Key code (if present)



Cable gland type

NAV Cable gland for non armoured cable
NAVN Cable gland for non armoured cable, male thread
NAVF Cable gland for non armoured cable, female thread
NEV Cable gland for armoured cable
NEVX Cable gland for armoured cable “special”
NEVL Cable gland for lead sheath (new code)
NAVNS Cable gland for non armoured cable, male thread, swivel version
NAVFS Cable gland for non armoured cable, female thread, swivel version

Size (ISO: 12, 16, 20, 63S; NPT: 2, 5, 5S ecc.)

Thread (I=ISO pitch 1,5, IX1=ISO pitch 1, IX2=ISO pitch2 , N=NPT, NULL=ISO7/1, OTHER CODES)

Material (B=BRASS nichel plated, S=INOX, G=STEEL galvanized)

[15.2] **Ratings:**

For more details see drawings and instructions manual listed in DL- AT19-0042694-01_A

[15.3] **Safety Ratings:**

-

[15.4] **Ambient temperature and temperature classes:**

From -60 °C to +130 °C (silicone sealing rings) - Refers to Technical Note A4-6746 rev.2

[15.5] **Degree of protection (IP code):**

IP66/67/68

[15.6] **Warnings:**

-

[16] **Report:** AT19-0042694-01_A

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[16.1] **Routine (factory) tests:**
The manufacturer shall carry out the routine test prescribed at clauses 27 of the EN 60079-0.

[16.2] **Conformity with the documentation:**
The manufacturer shall carry out the verifications or tests necessary to ensure that the product complies with the documentation.
Marking the equipment in accordance with Clause 29 of EN 60079-0, the manufacturer attests on his own responsibility that:

- the equipment has been constructed in accordance with the applicable requirements of the relevant standards in safety matters;
- the routine verifications and routine tests in 28.1 of EN 60079-0 have been successfully completed with positive results.

[16.3] **Installation conditions:**
Above referred equipment is foreseen to be installed in locations where there are environmental conditions, as clearly specified at clause 1, par. 2 of EN 60079-0.
Installation and use in atmospheric and environmental conditions that are out of above-mentioned intervals request special considerations and additional measures by the side of installer or user.
These should be specified to the manufacturer by the user;
It is not a required by applicable standard listed in [9] that the certification body confirm suitability for the adverse conditions.
Installation of equipment has to proceed according to EN 60079-14.
The installation shall be done according to safety manufacturer instructions to maintain degree of protection.

[17] **Special Condition of use (X):**

- The cable glands are only suitable for fixed installations.
- Where specified in relevant Table 3, cables shall be effectively clamped to prevent pulling or twisting.

[18] **Essential Health and safety Requirements:**
This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed in [9].
This Certificate **does not** cover hazards coming from environmental conditions different from those clearly and precisely indicated and covered in clause 1 of EN 60079-0.

ESHR 1.2.7 According Annex VIII of the Directive
ESHR 1.4 Not verified.
ESHR 1.5 Not verified.
ESHR 3 Not applied.

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at [9], the following are considered relevant to this product, and conformity is demonstrated in the report:

N/A

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[19] **Descriptive documents:**

DL- AT19-0042694-01_A

[20] **Certification Validity Conditions:**

The use of this Certificate is subject to the Certification Scheme and to the Regulation applicable to holders of IMQ Certificates.

The validity of this certificate is subject to the condition that the manufacturer complies with the results of the document review and of the pertinent requirement if any included, recorded in the relevant copy of documentation as per 19.

One copy of the mentioned documentation is kept in IMQ file.

[21] **Variations**

Issue 0, October 2017

Issue 1, January 2022

- Update new standards
- Add new size ISO M12 (NPT 1/4")
- Add new slot size for flat cable
- Add new version NAVNS and NAVFS: Swivel type
- Rename NEVP in NEVL

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Base Load Power Hub (BLPH)

AC UPS - TAG: UP-200F3

AC UPS - TAG: UP-200F4

ATEX DOCUMENTATION FOR BATTERY TEMPERATURE PROBE

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Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

(1) # EU-Baumusterprüfbescheinigung

(2) Geräte oder Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 2014/34/EU**

(3) EU-Baumusterprüfbescheinigungsnummer

PTB 06 ATEX 1077 **Ausgabe: 1**

(4) Produkt: Steuerung Typ 8265/5*(-*)

(5) Hersteller: R. STAHL Schaltgeräte GmbH

(6) Anschrift: Am Bahnhof 30, 74638 Waldenburg, Deutschland

(7) Die Bauart dieses Produkts sowie die verschiedenen zulässigen Ausführungen sind in der Anlage und den darin aufgeführten Unterlagen zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Physikalisch-Technische Bundesanstalt, notifizierte Stelle Nr. 0102 gemäß Artikel 17 der Richtlinie 2014/34/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014, bescheinigt, dass dieses Produkt die grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Produkten zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie erfüllt.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht PTB Ex 22-11052 festgehalten.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit
EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-7:2015+A1:2018, EN 60079-11:2012, IEC 60079-31:2022-01

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Produkts in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EU-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Prüfung des festgelegten Produkts gemäß Richtlinie 2014/34/EU. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Bereitstellen auf dem Markt. Diese Anforderungen werden nicht durch diese Bescheinigung abgedeckt.

(12) Die Kennzeichnung des Produkts muss die folgenden Angaben enthalten:

II 2 G Ex db eb ia [ia Ga] ib IIC T6...T4 Gb

II 2 D Ex tb IIIC T 80 °C, T 95 °C, T 130 °C Db

Konformitätsbewertungsstelle, Sektor Explosionsschutz Braunschweig, 4. Mai 2022
Im Auftrag

Dr.-Ing. D. Markus
Direktor und Professor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT

ZSEx10100d c

EU-Baumusterprüfbescheinigungen ohne Unterschrift und ohne Siegel haben keine Gültigkeit.
Diese EU-Baumusterprüfbescheinigung darf nur unverändert weiterverbreitet werden.
Auszüge oder Änderungen bedürfen der Genehmigung der Physikalisch-Technischen Bundesanstalt.

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(13) # Anlage

(14) **EU-Baumusterprüfbescheinigung PTB 06 ATEX 1077 , Ausgabe: 1**

(15) Beschreibung des Produkts

Die Steuerung Typ 8265/5*(-*) besteht aus einem separat bescheinigten Gehäuse in der Zündschutzart Druckfeste Kapselung "db" und Schutz durch Gehäuse "tb" aus Aluminium mit Verschraubungsdeckel.
Die Steuerung kann mit Klemmenkästen in der Zündschutzart Erhöhte Sicherheit "eb" und Schutz durch Gehäuse "tb" kombiniert werden. Der Anschluss erfolgt über Ex d-Leitungseinführungen, Ex d-Rohrleitungseinführungen, Ex d-Durchführungen oder andere geeignete Einführungsvorrichtungen, die für den Anwendungsfall zugelassen und geeignet sind.
Der Deckel und die Wände des explosionsgeschützten Gehäuses können mit druckfest eingebauten Kontrollachsen, z. B. Kupplung, Verschluss, Kontrolldurchführung oder Achsdurchführung und Sichtfenster, ausgestattet werden.

Typschlüssel:

8265	/	5	*	(-*)
1	/	2	3	4

1) Typenreihe
2) Ausführung
   5 = Steuerung
3) Gehäusegröße (L x B x H)
   1 = 125 x 125 x 132 mm
   2 = 155 x 155 x 132 mm
   3 = 195 x 195 x 172 mm
   4 = 236 x 236 x 227 mm
   5 = 285 x 285 x 230 mm
   6 = 335 x 335 x 281 mm
4) Zusätzliche Parameter, die sich nicht auf den Explosionsschutz von Geräten auswirken.
   (-*) Kann zusätzliche Ziffern oder Zeichen enthalten, einschließlich "-", "/" oder " . ".

Technische Daten:

Bemessungsspannung	max.	690V	1.000 V	11.000 V
Bemessungsstrom	max.	250 A		
Bemessungsanschlussquerschnitt	max.	120 mm²		
Umgebungstemperaturbereich	°C	-60 °C bis +60 °C		

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Schutz durch Gehäuse nach IEC EN 60079-0, EN 60079-7 und EN 60079-31:
abhängig von den verbauten Ex-Komponenten oder Ex Geräten

Die Nennwerte sind Maximalwerte, die tatsächlichen elektrischen Werte hängen von den eingebauten elektrischen Betriebsmitteln ab. Im Rahmen dieser maximal zulässigen Werte und unter Berücksichtigung der Normen legt der Hersteller die endgültigen Bemessungswerte in Abhängigkeit von den Anlagenbedingungen, der Betriebsart, der Gebrauchskategorie usw. fest. Die Kennwerte der eigensicheren Stromkreise sind vom Hersteller in eigener Verantwortung anzugeben.

Der maximal zulässige Umgebungstemperaturbereich des Steuer- und Verteilerkastens kann durch die maximal zulässigen Betriebstemperaturbereiche der separat bescheinigten Komponenten begrenzt werden.

Die Zusammensetzung der Kennzeichnung der Schutzart richtet sich nach den Schutzarten der tatsächlich verwendeten Bauteile.

Die Steuerung darf miteinander und/oder mit Klemmenkästen in den Zündschutzarten Erhöhte Sicherheit "eb" und Schutz durch Gehäuse "tb" kombiniert werden.

Hinweise für die Herstellung und Betrieb

Für den Ein- und Anbau von Komponenten sind nur solche zugelassen, die auf dem Deckblatt angegebenen Normenstand technischen entsprechen, für die Einsatzbedingungen geeignet sind und eine gesonderte Bescheinigung besitzen. Die besonderen Bedingungen der Komponenten sind zu beachten und die Komponenten sind ggf. mit in die Typprüfung einzubeziehen. Dies gilt auch für die bereits in der technischen Beschreibung genannten Komponenten.

Um den IP-Schutzgrad zu gewährleisten, müssen der Deckel des Leergehäuses, das Flanschgehäuse, der Dichtungsrahmen und andere Ex-Komponenten ordnungsgemäß installiert und mit dem entsprechenden Drehmoment montiert werden.

Der Einbau der Betriebsmittel in der Zündschutzart Eigensicherheit "i" muss so erfolgen, dass die nach EN 60079-11 geforderten Abstände sowie die Luft- und Kriechstrecken zwischen eigensicheren und nichteigensicheren Stromkreisen eingehalten sind.
Bei Verwendung von mehr als einem eigensicheren Stromkreis sind die Regeln der Zusammenschaltung zu beachten.

Wenn Komponenten in das Leergehäuse eingebaut werden, müssen die Luft- und Kriechstrecken nach der Norm EN 60079-7 und EN 60079-11 eingehalten werden.

Der Steuer- und Verteilerkasten mit einer Beschichtung aus Polyester-Pulverlack darf nicht in Bereichen eingesetzt werden, in denen stark ladungserzeugende Prozesse, maschinelle Reib- und Trennprozesse, das Sprühen von Elektronen (z.B. im Umfeld von elektrostatischen Lackiereinrichtungen) stattfinden sowie pneumatisch geförderter Staub austritt.

Änderungen:

1) Zusätzliche Ex-Komponenten zur Komponentenliste hinzugefügt

2) Normen-Update auf den neuesten ATEX Normenstand

3) Neue Zertifizierungsbetriebsanleitung

EU-Baumusterprüfbescheinigungen ohne Unterschrift und ohne Siegel haben keine Gültigkeit.
Diese EU-Baumusterprüfbescheinigung darf nur unverändert weiterverbreitet werden.
Auszüge oder Änderungen bedürfen der Genehmigung der Physikalisch-Technischen Bundesanstalt.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • 38116 Braunschweig • DEUTSCHLAND

Anlage zur EU-Baumusterprüfbescheinigung PTB 06 ATEX 1077 , Ausgabe: 1

(16) Prüfbericht PTB Ex 22-11052

(17) Besondere Bedingungen

Keine

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

Erfüllt durch Übereinstimmung mit den vorgenannten Normen.

Nach Artikel 41 der Richtlinie 2014/34/EU dürfen EG-Baumusterprüfbescheinigungen nach Richtlinie 94/9/EG, die bereits vor dem Datum der Anwendung von Richtlinie 2014/34/EU (20. April 2016) bestanden, so betrachtet werden, als wenn sie bereits in Übereinstimmung mit der Richtlinie 2014/34/EU ausgestellt wurden. Mit Genehmigung der Europäischen Kommission dürfen Ergänzungen zu solchen EG-Baumusterprüfbescheinigungen und neue Ausgaben solcher Zertifikate weiterhin die vor dem 20. April 2016 ausgestellte originale Zertifikatsnummer tragen.

Konformitätsbewertungsstelle, Sektor Explosionsschutz — Braunschweig, 4. Mai 2022
Im Auftrag

Dr.-Ing. D. Markus
Direktor und Professor

EU-Baumusterprüfbescheinigungen ohne Unterschrift und ohne Siegel haben keine Gültigkeit.
Diese EU-Baumusterprüfbescheinigung darf nur unverändert weiterverbreitet werden.
Auszüge oder Änderungen bedürfen der Genehmigung der Physikalisch-Technischen Bundesanstalt.

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Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

(1) # EU-TYPE EXAMINATION CERTIFICATE

(Translation)

(2) Equipment or Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number:

PTB 06 ATEX 1077 **Issue: 1**

(4) Product: Control Panel type 8265/5*(-*)

(5) Manufacturer: R. STAHL Schaltgeräte GmbH

(6) Address: Am Bahnhof 30, 74638 Waldenburg, Germany

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential Test Report PTB Ex 22-11052.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-7:2015+A1:2018, EN 60079-11:2012, IEC 60079-31:2022-01

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

II 2 G Ex db eb ia [ia Ga] ib IIC T6...T4 Gb

II 2 D Ex tb IIIC T 80 °C, T 95 °C, T 130 °C Db

Konformitätsbewertungsstelle, Sektor Explosionsschutz Braunschweig, May 4, 2022
On behalf of PTB:

Dr.-Ing. D. Markus
Direktor und Professor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT

ZSEx001e c

EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
In case of dispute, the German text shall prevail.

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(13) # SCHEDULE

(14) **EU-Type Examination Certificate Number PTB 06 ATEX 1077 , Issue: 1**

(15) Description of Product

The control panel type 8265/5*(-*) is made of a separately certified enclosure in the type of protection Flameproof Enclosure "db" and Protection by Enclosure "tb" out of aluminium with threaded joint cover.
The control panel can be combined with terminal boxes in type of protection Increased Safety "eb" and Protection by Enclosure "tb". Connection is made by means of Ex d cable entries, Ex d conduit entries, Ex d bushings or other suitable entry devices, certified and suit-able for the application. The cover and walls of the explosion-proof enclosure can be equipped with flameproof built-in control axles, for example coupler, lock, control bushing or axle bushing and inspection window.

Nomenclature:

8265	/	5	*	(-*)
1	/	2	3	4

1) type series
2) design
   5 = control panel
3) enclosure size (L x W x H)
   1 = 125 x 125 x 132 mm
   2 = 155 x 155 x 132 mm
   3 = 195 x 195 x 172 mm
   4 = 236 x 236 x 227 mm
   5 = 285 x 285 x 230 mm
   6 = 335 x 335 x 281 mm
4) Additional parameters that do not affect the explosion protection of devices.
   (-*) May contain additional digits or characters, including "-", "/" or " . ".

Technical data:

Rated insulation voltage	max.	690V	1.000 V	11.000 V
Rated current	max.	250 A		
Rated cross section	max.	120 mm²		
Ambient temperature range	°C	-60 °C to +60 °C		

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In case of dispute, the German text shall prevail.

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SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 06 ATEX 1077 , Issue: 1

Ingress protection according to EN IEC 60079-0, EN 60079-7 and EN 60079-31:
depends on the assembled Ex components or Ex equipments

The rated values are maximum values, the actual electrical values depend on the electrical equipment incorporated. Within the scope of these maximum permissible values and with due regard to the standards, the manufacturer specifies the final rated values dependent on the system conditions, mode of operation, utilization category, etc. The characteristic values of the intrinsically safe circuits are to be given by the manufacturer on his own responsibility.

The maximum permissible ambient temperature range of the control and distribution box can be limited by the maximum permissible service temperature ranges of the separately certified components.

The composition of the type of protection marking will be based on the types of protection of components actually used.

The control panel may be combined with each other and/or with terminal boxes designed to type of protection Increased Safety "eb" and Protection by Enclosure "tb".

Notes for manufacturing and operation

Components attached or installed have to be of a technical standard that complies with the specifications on the cover sheet. They must be suited for the operating conditions and have a separate examination certificate. The special conditions specified for the components must be complied with and may have to be included in the type test. This also applies to components already specified in the technical description.

In order to ensure the ingress protection IP, the cover of the empty enclosure, the flange enclosure, the sealing frame and other Ex-components must be properly installed and with the appropriate torque.

Equipment of the type of protection intrinsic safety "i" is to be installed in such a way that the distances, creepage distances and clearances between intrinsically safe circuits and non-intrinsically safe circuits comply with the requirements of EN 60079-11. When more than one intrinsically safe circuit is used, the rules for interconnection are to be observed.

When components are installed into the empty enclosure, clearance and creepage distances specified in the standard EN 60079-7 and EN 60079-11 shall duly be complied with.

The control and distribution box with a coating of polyester powder must not be used in areas affected by charge-producing processes, mechanical friction and separation processes, electron emission (e.g. in the vicinity of electrostatic coating equipment), and pneumatically conveyed dust.

Changes:
1) Additional Ex components added to list of components
2) Standard update to latest ATEX standards
3) New Certification Instruction

EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
In case of dispute, the German text shall prevail.

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SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 06 ATEX 1077 , Issue: 1

(16) Test Report PTB Ex 22-11052

(17) Specific conditions of use

None

(18) Essential health and safety requirements

Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, May 4, 2022

Dr.-Ing. D. Mark
Direktor und Professor

EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • 38116 Braunschweig • GERMANY

Base Load Power Hub (BLPH)

AC UPS - TAG: UP-200F3

AC UPS - TAG: UP-200F4

DC UPS - TAG: UP-200F1

ATEX REGISTER

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

No.	Revision	Tag Number	Description	Location	Manufacturer	Model Type Catalogue Number	Serial Number	ATEX Certification Marking	Reference Document	ATEX Certificate Number	Installation Zone	Notes / Comments	P.O.	Vendor	Skid / Package	Barrier Calculation Ref.	Non-Electrical Equipment	Special Conditions of safe use Applicable
1	01	CB-200F1	Battery protection box	B100 - HV Switchroom	Cortem Group	EJBC-5	24/86530	II2GD Ex db IIC T6 Gb Ex tb IIIC 85°C Db IP66 Ta -20°C - +40°C	1724000372-EL-DS-00005	EPT 20 ATEX 4075X	Safe Area	N.A.	1724000372	3W POWER	N.A.	N.A.	NO	YES
2	01	CB-200F3A	Battery protection box	B300 - UPS & Batteries Switchroom	Cortem Group	EJBC-5	24/86529-1	II2GD Ex db IIC T6 Gb Ex tb IIIC 85°C Db IP66 Ta -20°C - +40°C	1724000372-EL-DS-00005	EPT 20 ATEX 4075X	Safe Area	N.A.	1724000372	3W POWER	N.A.	N.A.	NO	YES
3	01	CB-200F3B	Battery protection box	B300 - UPS & Batteries Switchroom	Cortem Group	EJBC-5	24/86529-2	II2GD Ex db IIC T6 Gb Ex tb IIIC 85°C Db IP66 Ta -20°C - +40°C	1724000372-EL-DS-00005	EPT 20 ATEX 4075X	Safe Area	N.A.	1724000372	3W POWER	N.A.	N.A.	NO	YES
4	01	CB-200F4A	Battery protection box	B300 - UPS & Batteries Switchroom	Cortem Group	EJBC-5	24/86529-3	II2GD Ex db IIC T6 Gb Ex tb IIIC 85°C Db IP66 Ta -20°C - +40°C	1724000372-EL-DS-00005	EPT 20 ATEX 4075X	Safe Area	N.A.	1724000372	3W POWER	N.A.	N.A.	NO	YES
5	01	CB-200F4B	Battery protection box	B300 - UPS & Batteries Switchroom	Cortem Group	EJBC-5	24/86529-4	II2GD Ex db IIC T6 Gb Ex tb IIIC 85°C Db IP66 Ta -20°C - +40°C	1724000372-EL-DS-00005	EPT 20 ATEX 4075X	Safe Area	N.A.	1724000372	3W POWER	N.A.	N.A.	NO	YES
6	02	BA-200F3A	Battery temperature probe	B300 - UPS & Batteries Switchroom	R. STAHL	8265/51	40013096-1	II2G Ex de[ia/ib] IIC T6, T5 and T4 II2D Ex tD A21 IP66 T 80°C, 95°C and 130°C	1724000372-EL-DS-00006	PTB 06 ATEX 1077	Safe Area	N.A.	1724000372	3W POWER	N.A.	N.A.	NO	YES
7	02	BA-200F3B	Battery temperature probe	B300 - UPS & Batteries Switchroom	R. STAHL	8265/51	40013096-2	II2G Ex de[ia/ib] IIC T6, T5 and T4 II2D Ex tD A21 IP66 T 80°C, 95°C and 130°C	1724000372-EL-DS-00007	PTB 06 ATEX 1077	Safe Area	N.A.	1724000372	3W POWER	N.A.	N.A.	NO	YES
8	02	BA-200F4A	Battery temperature probe	B300 - UPS & Batteries Switchroom	R. STAHL	8265/51	40013096-3	II2G Ex de[ia/ib] IIC T6, T5 and T4 II2D Ex tD A21 IP66 T 80°C, 95°C and 130°C	1724000372-EL-DS-00008	PTB 06 ATEX 1077	Safe Area	N.A.	1724000372	3W POWER	N.A.	N.A.	NO	YES
9	02	BA-200F4B	Battery temperature probe	B300 - UPS & Batteries Switchroom	R. STAHL	8265/51	40013096-4	II2G Ex de[ia/ib] IIC T6, T5 and T4 II2D Ex tD A21 IP66 T 80°C, 95°C and 130°C	1724000372-EL-DS-00009	PTB 06 ATEX 1077	Safe Area	N.A.	1724000372	3W POWER	N.A.	N.A.	NO	YES

CE

AEG
POWER SOLUTIONS

CE and EU declaration

We
AEG Power Solutions GmbH
Emil-Siepmann-Straße 32,
59581 Warstein-Belecke

declare under our sole responsibility that the product

Uninterruptable Power Systems (UPS)
Type: PROTECT 8.31 / 8.33
10 - 120 kVA

is in accordance with the European directive

2014 / 30 / EU EMC- guideline
2014 / 35 / EU Low voltage – guideline
2011 / 65 / EU RoHS guideline (out of scope)

is in conformity with the related standards

EN 62040-2: 2006 (Class C2)
EN 62040-1: 2008+A1:2013

Warstein

Quality Management
Date | Datum 11.10.2016

M. Wloka

CE und EU Erklärung

Wir
AEG Power Solutions GmbH
Emil-Siepmann-Straße 32,
59581 Warstein-Belecke

erklären in alleiniger Verantwortung, dass das Produkt

Unterbrechungsfreie Stromversorgungssysteme (USV)
Typ: PROTECT 8.31 / 8.33
10 - 120 kVA

gemäß den Bestimmungen der Richtlinie

2014 / 30 / EU EMV- Richtlinie
2014 / 35 / EU Niederspannungs – Richtlinie
2011 / 65 / EU RoHS-Richtlinie (nicht im Anwendungsbereich)

mit den folgenden Normen übereinstimmt

EN 62040-2: 2006 (Class C2)
EN 62040-1: 2008+A1:2013

Warstein

R&D
Date | Datum 11.10.2016

Dr. Z. Cao

AEG Power Solutions GmbH
Emil-Siepmann-Straße 32
D – 59581 Warstein - Belecke
Tel: + 49 (0) 2902 763 100 - Fax: +49 (0) 2902 763 645
HRB: 3619 - DE: 136639442

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AEG

POWER
SOLUTIONS

QUALITY DOCUMENT

D1002-E

	Created by		Approved by
Department **Name**	Product management Pierre Larue	R&D management Eneko Mardones	Quality management Susana Martin
Date **Signature**	18/07/2024	18/07/2024	22/07/2024

CE and EU declaration

We, AEG Power Solution Iberica
Albert Einstein, 31
01510 Vitoria - Spain

Declare under our sole responsibility that the following products :

Product technical definition : GlobalCNF
Name : Protect RCS SPRe & TPRe
Protect RCS TPRe high power
Protect RCS TPRe outdoor

Are in accordance with the European directives
2014 / 30 / EU EMC- guideline
2014 / 35 / EU Low voltage – guideline
2011 / 65 / EU RoHS guideline

Are in conformity with the related standards and normative documents :
EN 50178 (10/1999)
IEC/EN 62477-1 (2022/05) – PC4B type
EN 61000–6.1 (2019/02),
EN 61000–6-2 (2016/08),
EN 61000–6-3 (2021/03),
EN 61000-6-4 (2018/02)

Reference of the CE/EU file:
CE 10042 – CE 2312 (SPRe)
CE 10030 – CE 2312 (TPRe)
CE 18020 (TPRe high power)
CE 18021 (Protect RCS TPRe outdoor)

AEG Power Solutions Iberica, S.A.
Albert Einstein, 31
01510 Vitoria - Spain

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ROSETTI MARINO	**RELEASE NOTE**	**Nr.** RN-0372-3WP-01	Sheet **1** of **2**
		DATA *Date* 01/08/2024	**Rev**. 00

PROGETTO *Project*	**CLIENTE** *Client*	**COMMESSA** *Job*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	***123A90***

FORNITORE *Vendor*	**NUMERO D' ORDINE** *Purchase Order No.*
3W Power AEG	1724000372

Release Note	☐ FOR PAYMENT	☒ FOR SHIPMENT

RELEASE NOTE FOR PAYMENT

PO Art.	

RELEASE NOTE FOR SHIPMENT

POS. *Item*	**Q.TA'** *Quantity*	**DESCRIZIONE** *Description*	**Nr. TAG** *TAG No.*	**TIPO DI ISPEZIONE** *Kind of Inspection*	**ESITO** *Result*
70	1	DC UPS SYSTEM - 10kVA	UP-200F1	N/A	N/A
90	N/A	Spare Parts – Commissioning	UP-200F1	N/A	N/A
100	N/A	Spare Parts – 2Y Operation	UP-200F1	N/A	N/A

Warehouse open Monday to Friday from 08.00 to12.00 and from 13.00 to 17.00.
Contact Mr Rota +39 3451608099

DOCUMENTI APPLICABILI / *APPLICABLE DOCUMENTS*

POSIZIONE *Items*	**TIPO DI DOCUMENTO** *Type of Document*	**NUMERO DI DOCUMENTO** *Document Number*	**Rev.**	**COD. DI APPROV.** *Approv. Code*
N/A	PO	1724000372	N/A	N/A
N/A	Punch List	Punch_List_OV59193_20240719_rev1_signed_AEG	01	N/A
N/A	Packing List	DDT 411 NI1584 - ROSETTI MARINO	N/A	N/A

PUNCH LIST:
☒ **SI** / *YES* **VEDI PUNCH LIST ALLEGATA N°** / *REFER TO ATTACHED PUNCH LIST N°*
☐ **NO**/ *NO*

CONTROLLO VALIDITA' FIDEJUSSIONE / *PERFORMANCE or WARRANTY BOND expiration date check*
Estensione Fidejussione Richiesta / *Performance or Warranty Bond Extension of Validity required*
☐ **SI** / *YES* ☒ **NO**/ *NO*
Acceptance Method: Performance or Warranty Bond valid if actual delivery date it's not greater than two weeks from contractual delivery date.

RELEASE NOTE

RISULTATO *RESULT*	**FORNITURA** *SUPPLY*	**DISTRIBUZIONE A** *DISTRIBUTION TO:*	
☒ POSITIVO / *POSITIVE*	☐ COMPLETA / *COMPLETE*	☒ Project Manager	☒ Administration
☐ NEGATIVO / *NEGATIVE*	☒ PARZIALE / *PARTIAL*	☒ Project Quality Manager	☒ Project Eng-/Procurement Coord
☐ PUNTI PENDENTI / *PUNCH-LIST*	☐ ULTIMA / *FINAL*	☒ Warehouse	☐ Supplier

NOTE / *NOTES*

None

INCARICATO *Person in charge* **ROSETTI MARINO** *Supply Management dept.*		**RAPPR. DEL CLIENTE** *Client Representative*	**FORNITORE** *Vendor*	**CONSTRUCTION MANAGER** *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Leonardo PASQUALI		N/A	N/A	N/A

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*

ROSETTI MARINO	RELEASE NOTE	**Nr.** RN-0372-3WP-01	Sheet **2** of **2**
		DATA *Date* 01/08/2024	**Rev**. 00
PROGETTO *Project* **HOLLANDSE KUST NOORD WIND PARK**	**CLIENTE** *Client* CROSSWIND	**COMMESSA** *Job* ***123A90***	
FORNITORE *Vendor* 3W Power AEG	**NUMERO D' ORDINE** *Purchase Order No.* 1724000372		

INCARICATO *Person in charge* **ROSETTI MARINO** *Supply Management dept.*		**RAPPR. DEL CLIENTE** *Client Representative*	**FORNITORE** *Vendor*	**CONSTRUCTION MANAGER** *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Leonardo PASQUALI		N/A	N/A	N/A

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*

ROSETTI MARINO	**RELEASE NOTE**	**Nr.** RN-0372-3WP-02	Sheet **1** of **2**
		DATA *Date* 03/09/2024	**Rev**. 01

PROGETTO *Project*	**CLIENTE** *Client*	**COMMESSA** *Job*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	***123A90***

FORNITORE *Vendor*	**NUMERO D' ORDINE** *Purchase Order No.*
3W Power	1724000372

Release Note	☐ FOR PAYMENT	☒ FOR SHIPMENT

RELEASE NOTE FOR PAYMENT

PO Art.	

RELEASE NOTE FOR SHIPMENT

POS. *Item*	**QTÀ** *Quantity*	**DESCRIZIONE** *Description*	**Nr. TAG** *TAG No.*	**TIPO DI ISPEZIONE** *Kind of Inspection*	**ESITO** *Result*
10 20	4	AC UPS Isolation Battery Box 200A	UPS TAG: UP-200F1	N/A	N/A
70	1	DC UPS Isolation Battery Box 125A	UPS TAG: UP-200F1	N/A	N/A

Warehouse open Monday to Friday from 08.00 to12.00 and from 13.00 to 17.00.
Contact Mr Rota +39 3451608099

DOCUMENTI APPLICABILI / *APPLICABLE DOCUMENTS*

POSIZIONE *Items*	**TIPO DI DOCUMENTO** *Type of Document*	**NUMERO DI DOCUMENTO** *Document Number*	**Rev.**	**COD. DI APPROV.** *Approval Code*
N/A	PO	1724000372	01	N/A
N/A	Packing List	DDT 442 NI1584 - ROSETTI MARINO	N/A	N/A

PUNCH LIST:
☐ **SI** / *YES* **VEDI PUNCH LIST ALLEGATA N°** / *REFER TO ATTACHED PUNCH LIST N°*
☒ **NO**/ *NO*

CONTROLLO VALIDITA' FIDEJUSSIONE / *PERFORMANCE or WARRANTY BOND expiration date check*
Estensione Fidejussione Richiesta / *Performance or Warranty Bond Extension of Validity required*
☐ **SI** / *YES* ☒ **NO**/ *NO*
Acceptance Method: Performance or Warranty Bond valid if actually delivery date it's not greater than two weeks from contractual delivery date.

INCARICATO *Person in charge* **ROSETTI MARINO** *Supply Management dept.*		**RAPPR. DEL CLIENTE** *Client Representative*	**FORNITORE** *Vendor*	**CONSTRUCTION MANAGER** *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Leonardo PASQUALI		N/A	N/A	N/A

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*

ROSETTI MARINO	RELEASE NOTE	Nr. RN-0372-3WP-02	Sheet **2** of **2**
		DATA *Date* 03/09/2024	**Rev**. 01
PROGETTO *Project* **HOLLANDSE KUST NOORD WIND PARK**	**CLIENTE** *Client* CROSSWIND	**COMMESSA** *Job* ***123A90***	
FORNITORE *Vendor* 3W Power	**NUMERO D' ORDINE** *Purchase Order No.* 1724000372		

RELEASE NOTE

RISULTATO *RESULT*	**FORNITURA** *SUPPLY*	**DISTRIBUZIONE A** *DISTRIBUTION TO:*	
☒POSITIVO / *POSITIVE*	☐COMPLETA / *COMPLETE*	☒Project Manager	☒Administration
☐ NEGATIVO / *NEGATIVE*	☒ PARZIALE / *PARTIAL*	☒ Project Quality Manager	☒ Project Eng-/Procurement Coord
☐PUNTI PENDENTI / *PUNCH-LIST*	☐ ULTIMA / *FINAL*	☐ Warehouse	☐ Supplier

NOTE / *NOTES*

This Release Note refers only to the Isolation Battery Boxes relevant to the UPSs and not the UPSs themselves.

INCARICATO *Person in charge* **ROSETTI MARINO** *Supply Management dept.*		**RAPPR. DEL CLIENTE** *Client Representative*	**FORNITORE** *Vendor*	**CONSTRUCTION MANAGER** *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Leonardo PASQUALI		N/A	N/A	N/A

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*

ROSETTI MARINO	**RELEASE NOTE**	**Nr.** RN-0372-3WP-03	Sheet **1** of **2**
		DATA *Date* 19/09/2024	**Rev**. 01

PROGETTO *Project*	**CLIENTE** *Client*	**COMMESSA** *Job*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	***123A90***

FORNITORE *Vendor*	**NUMERO D' ORDINE** *Purchase Order No.*
3W Power	1724000372

Release Note	☐ FOR PAYMENT	☒ FOR SHIPMENT

RELEASE NOTE FOR PAYMENT

PO Art.	

RELEASE NOTE FOR SHIPMENT

POS. *Item*	**QTÀ** *Quantity*	**DESCRIZIONE** *Description*	**Nr. TAG** *TAG No.*	**TIPO DI ISPEZIONE** *Kind of Inspection*	**ESITO** *Result*
10	2	AC UPS SYSTEM - 35kVA Battery Racks	UPS TAG: UP-200F3	N/A	N/A
20	2	AC UPS SYSTEM - 15kVA Battery Racks	UPS TAG: UP-200F4	N/A	N/A
70	1	DC UPS SYSTEM - 10kVA Battery Racks	UPS TAG: UP-200F1	N/A	N/A

Warehouse open Monday to Friday from 08.00 to12.00 and from 13.00 to 17.00.
Contact Mr Rota +39 3451608099

DOCUMENTI APPLICABILI / *APPLICABLE DOCUMENTS*

POSIZIONE *Items*	**TIPO DI DOCUMENTO** *Type of Document*	**NUMERO DI DOCUMENTO** *Document Number*	**Rev.**	**COD. DI APPROV.** *Approval Code*
N/A	PO	1724000372	01	N/A
N/A	Packing List	DDT 499 NI1584 - ROSETTI MARINO	N/A	N/A

PUNCH LIST:
☐ **SI** / *YES* **VEDI PUNCH LIST ALLEGATA N°** / *REFER TO ATTACHED PUNCH LIST N°*
☒ **NO**/ *NO*

CONTROLLO VALIDITA' FIDEJUSSIONE / *PERFORMANCE or WARRANTY BOND expiration date check*
Estensione Fidejussione Richiesta / *Performance or Warranty Bond Extension of Validity required*
☐ **SI** / *YES* ☒ **NO**/ *NO*
Acceptance Method: Performance or Warranty Bond valid if actuall delivery date it's not greater than two weeks from contractual delivery date.

INCARICATO *Person in charge* **ROSETTI MARINO** *Supply Management dept.*		**RAPPR. DEL CLIENTE** *Client Representative*	**FORNITORE** *Vendor*	**CONSTRUCTION MANAGER** *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Leonardo PASQUALI		N/A	N/A	N/A

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*

ROSETTI MARINO	**RELEASE NOTE**	**Nr.** RN-0372-3WP-03	Sheet **2** of **2**
		DATA *Date* 19/09/2024	**Rev**. 01

PROGETTO *Project*	**CLIENTE** *Client*	**COMMESSA** *Job*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	***123A90***

FORNITORE *Vendor*	**NUMERO D' ORDINE** *Purchase Order No.*
3W Power	1724000372

RELEASE NOTE

RISULTATO *RESULT*	**FORNITURA** *SUPPLY*	**DISTRIBUZIONE A** *DISTRIBUTION TO:*	
☒POSITIVO / *POSITIVE*	☐COMPLETA / *COMPLETE*	☒Project Manager	☒Administration
☐ NEGATIVO / *NEGATIVE*	☒ PARZIALE / *PARTIAL*	☒ Project Quality Manager	☒ Project Eng-/Procurement Coord
☐PUNTI PENDENTI / *PUNCH-LIST*	☐ ULTIMA / *FINAL*	☒ Warehouse	☐ Supplier

NOTE / *NOTES*

This Release Note refers only to the Battery Racks relevant to the UPSs and not the UPSs themselves.

INCARICATO *Person in charge* **ROSETTI MARINO** *Supply Management dept.*		**RAPPR. DEL CLIENTE** *Client Representative*	**FORNITORE** *Vendor*	**CONSTRUCTION MANAGER** *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Leonardo PASQUALI		N/A	N/A	N/A

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*

ROSETTI MARINO	**RELEASE NOTE**	**Nr.** RN-0372-3WP-04	Sheet **1** of **2**
		DATA *Date* 24/09/2024	**Rev**. 01

PROGETTO *Project*	**CLIENTE** *Client*	**COMMESSA** *Job*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	***123A90***

FORNITORE *Vendor*	**NUMERO D' ORDINE** *Purchase Order No.*
3W Power	1724000372

Release Note	☐ FOR PAYMENT	☒ FOR SHIPMENT

RELEASE NOTE FOR PAYMENT

PO Art.	

RELEASE NOTE FOR SHIPMENT

POS. *Item*	**QTÀ** *Quantity*	**DESCRIZIONE** *Description*	**Nr. TAG** *TAG No.*	**TIPO DI ISPEZIONE** *Kind of Inspection*	**ESITO** *Result*
30	1	BATTERY BANK FOR AC UPS SYSTEM - 35kVA	UPS TAG: UP-200F3	N/A	N/A
40	1	BATTERY BANK FOR AC UPS SYSTEM - 15kVA	UPS TAG: UP-200F4	N/A	N/A
80	1	BATTERY BANK FOR DC UPS SYSTEM - 10kVA	UPS TAG: UP-200F1	N/A	N/A

Warehouse open Monday to Friday from 08.00 to12.00 and from 13.00 to 17.00.
Contact Mr Rota +39 3451608099

DOCUMENTI APPLICABILI / *APPLICABLE DOCUMENTS*

POSIZIONE *Items*	**TIPO DI DOCUMENTO** *Type of Document*	**NUMERO DI DOCUMENTO** *Document Number*	**Rev.**	**COD. DI APPROV.** *Approval Code*
N/A	PO	1724000372	01	N/A
N/A	Packing List	DDT 508 NI1584 - ROSETTI MARINO	N/A	N/A

PUNCH LIST:
☐ **SI** / *YES* **VEDI PUNCH LIST ALLEGATA N°** / *REFER TO ATTACHED PUNCH LIST N°*
☒ **NO**/ *NO*

CONTROLLO VALIDITA' FIDEJUSSIONE / *PERFORMANCE or WARRANTY BOND expiration date check*
Estensione Fidejussione Richiesta / *Performance or Warranty Bond Extension of Validity required*
☐ **SI** / *YES* ☒ **NO**/ *NO*
Acceptance Method: Performance or Warranty Bond valid if actuall delivery date it's not greater than two weeks from contractual delivery date.

INCARICATO *Person in charge* **ROSETTI MARINO** *Supply Management dept.*		**RAPPR. DEL CLIENTE** *Client Representative*	**FORNITORE** *Vendor*	**CONSTRUCTION MANAGER** *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Leonardo PASQUALI		N/A	N/A	N/A

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*

ROSETTI MARINO	**RELEASE NOTE**	**Nr.** RN-0372-3WP-04	Sheet **2** of **2**
		DATA *Date* 24/09/2024	**Rev**. 01

PROGETTO *Project*	**CLIENTE** *Client*	**COMMESSA** *Job*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	***123A90***

FORNITORE *Vendor*	**NUMERO D' ORDINE** *Purchase Order No.*
3W Power	1724000372

RELEASE NOTE

RISULTATO *RESULT*	**FORNITURA** *SUPPLY*	**DISTRIBUZIONE A** *DISTRIBUTION TO:*	
☒POSITIVO / *POSITIVE*	☐COMPLETA / *COMPLETE*	☒Project Manager	☒Administration
☐ NEGATIVO / *NEGATIVE*	☒ PARZIALE / *PARTIAL*	☒ Project Quality Manager	☒ Project Eng-/Procurement Coord
☐PUNTI PENDENTI / *PUNCH-LIST*	☐ ULTIMA / *FINAL*	☒ Warehouse	☐ Supplier

NOTE / *NOTES*

None.

INCARICATO *Person in charge* **ROSETTI MARINO** *Supply Management dept.*		**RAPPR. DEL CLIENTE** *Client Representative*	**FORNITORE** *Vendor*	**CONSTRUCTION MANAGER** *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Leonardo PASQUALI		N/A	N/A	N/A

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*

ROSETTI MARINO	**RELEASE NOTE**	**Nr.** RN-0372-3WP-05	Sheet **1** of **2**
		DATA *Date* 02/10/2024	**Rev**. 01

PROGETTO *Project*	**CLIENTE** *Client*	**COMMESSA** *Job*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	***123A90***

FORNITORE *Vendor*	**NUMERO D' ORDINE** *Purchase Order No.*
3W Power	1724000372

Release Note	☐ FOR PAYMENT	☒ FOR SHIPMENT

RELEASE NOTE FOR PAYMENT

PO Art.	

RELEASE NOTE FOR SHIPMENT

POS. *Item*	**QTÀ** *Quantity*	**DESCRIZIONE** *Description*	**Nr. TAG** *TAG No.*	**TIPO DI ISPEZIONE** *Kind of Inspection*	**ESITO** *Result*
10	1	AC UPS SYSTEM - 35kVA	UP-200F3	N/A	N/A
20	1	AC UPS SYSTEM - 15kVA	UP-200F4	N/A	N/A
50	N/A	SPARE PARTS – Start-Up and Commissioning	UP-200F3/4	N/A	N/A
60	N/A	SPARE PARTS – 2y Operation	UP-200F3/4	N/A	N/A

Warehouse open Monday to Friday from 08.00 to12.00 and from 13.00 to 17.00.
Contact Mr Rota +39 3451608099

DOCUMENTI APPLICABILI / *APPLICABLE DOCUMENTS*

POSIZIONE *Items*	**TIPO DI DOCUMENTO** *Type of Document*	**NUMERO DI DOCUMENTO** *Document Number*	**Rev.**	**COD. DI APPROV.** *Approval Code*
N/A	PO	1724000372	01	N/A
N/A	Packing List	PL-NI1584_AC-UPS_signed	N/A	N/A

PUNCH LIST:

☐ **SI** / *YES* **VEDI PUNCH LIST ALLEGATA N°** / *REFER TO ATTACHED PUNCH LIST N°*
☒ **NO**/ *NO*

CONTROLLO VALIDITA' FIDEJUSSIONE / *PERFORMANCE or WARRANTY BOND expiration date check*

Estensione Fidejussione Richiesta / *Performance or Warranty Bond Extension of Validity required*

☐ **SI** / *YES* ☒ **NO**/ *NO*

Acceptance Method: Performance or Warranty Bond valid if actuall delivery date it's not greater than two weeks from contractual delivery date.

INCARICATO *Person in charge* **ROSETTI MARINO** *Supply Management dept.*		**RAPPR. DEL CLIENTE** *Client Representative*	**FORNITORE** *Vendor*	**CONSTRUCTION MANAGER** *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Leonardo PASQUALI		N/A	N/A	N/A

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*

ROSETTI MARINO	**RELEASE NOTE**	**Nr.** RN-0372-3WP-05	Sheet **2** of **2**
		DATA *Date* 02/10/2024	**Rev**. 01
PROGETTO *Project* **HOLLANDSE KUST NOORD WIND PARK**	**CLIENTE** *Client* CROSSWIND	**COMMESSA** *Job* ***123A90***	
FORNITORE *Vendor* 3W Power	**NUMERO D' ORDINE** *Purchase Order No.* 1724000372		

RELEASE NOTE

RISULTATO *RESULT*	**FORNITURA** *SUPPLY*	**DISTRIBUZIONE A** *DISTRIBUTION TO:*	
☒POSITIVO / *POSITIVE*	☒COMPLETA / *COMPLETE*	☒Project Manager	☒Administration
☐ NEGATIVO / *NEGATIVE*	☐ PARZIALE / *PARTIAL*	☒ Project Quality Manager	☒ Project Eng-/Procurement Coord
☐PUNTI PENDENTI / *PUNCH-LIST*	☐ ULTIMA / *FINAL*	☒ Warehouse	☐ Supplier

NOTE / *NOTES*

None.

INCARICATO *Person in charge* **ROSETTI MARINO** *Supply Management dept.*		**RAPPR. DEL CLIENTE** *Client Representative*	**FORNITORE** *Vendor*	**CONSTRUCTION MANAGER** *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Leonardo PASQUALI		N/A	N/A	N/A

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*

AEG

POWER
SOLUTIONS

01/12/2020

REF. TYPE TEST

To whom it may concern,

I hereby confirm that AEG Power Solutions liaised with KEMA High Voltage Laboratory to obtain 3rd party Type Test Certificate on the AC UPS Protect 8.31 & Protect 8.33 with DC battery voltage link 216V & 384 V DC.

The test was conducted on selected models from the range and the results are available in KEMA's inspection reports with reference TIC 1383-13 & TIC 1384-13.

As manufacturer, AEG Power Solutions guaranty that all the products listed below conform to the same standards as the tested equipment by KEMA and passed all AEG Power Solutions internal tests successfully.

Product range:

AC UPS Protect 8.31 (216 & 384 VDC)	10kVA, 20kVA, 30kVA, 40kVA, 60kVA, 80kVA, 100kVA, 120kVA, 160kVA
AC UPS Protect 8.33 (216 & 384 VDC) and Protect 4.33 (384 VDC)	10kVA, 20kVA, 30kVA, 40kVA, 60kVA, 80kVA, 100kVA, 120kVA, 160kVA, 220kVA, 300kVA, 400kVA, 500kVA and 600kVA

Best regards,

Henrique Baldin Braga
Product Manager
AEG Power Solutions

AEG is a registered trademark used under license from AB Electrolux

INSPECTION REPORT TIC 1383-13

OBJECT	Industrial UPS Protect 8		
TYPE	Protect 8.31 20-400-216-230	**SERIAL No.**	70151774/001
	3 x 400 V / 35 A / 45-66 Hz / 3Ph – 230 V / 87 A / 50 Hz		
MANUFACTURER	AEG Power Solutions GmbH, Warstein-Belecke, Germany		
CLIENT	AEG Power Solutions, Chambray-Lès-Tours, France		
REFERENCE	3010034912 of 10.01.2013		
TESTED BY	KEMA HIGH-VOLTAGE LABORATORY, Arnhem, the Netherlands		
DATE OF TESTS	18 to 22 February 2013		
TEST PROGRAMME	Selected type tests in accordance with IEC 62040-3 (2009). (see chapter 2)		
SUMMARY AND CONCLUSION	The tests were passed.		

This Inspection Report applies only to the object selected from the range of products. The responsibility for conformity of any object having the same designations with that tested rests with the Manufacturer.

This report consists of 114 pages in total.

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KEMA Nederland B.V.

S.A.M. Verhoeven
Director Testing, Inspections & Certification The Netherlands

Arnhem, 9 July 2013

Order No: 72121253

Version: 2

3.2 Test program

The following tests in accordance with IEC 60146-1-1 are selected by the manufacturer and are conducted on the UPS:

No.	test description	routine test	type test	sub clause	performed [Y/N]
1	cable and interconnection check	X	X	6.2.2.2	Y
2	control device(s)	X	X	6.2.2.3.a	Y
3	protective device(s)	X	X	6.2.2.3.b	Y
4	auxiliary devices(s)	X	X	6.2.2.3.c	Y
5	supervisory, monitoring, signaling devices(s)	X	X	6.2.2.3.d	Y
6	auto transfer tot stored energy mode and back to normal	X	X	6.2.2.3.e	Y
7	auto transfer to bypass / isolation mode and back to normal	X	X	6.2.2.3.f	Y
8	Manual transfer to bypass / isolation mode and back to normal	X	X	6.2.2.3.g	Y
9	no load	X	X	6.2.2.4	Y
10	full load	X	X	6.2.2.5	Y
11	synchronization		X	6.2.2.6	n.a.
12	AC input failure	X	X	6.2.2.7	Y
13	AC input return	X	X	6.2.2.8	Y
14	parallel redundant UPS fault		X	6.4.2.12	n.a.
15	transfer test to bypass	X	X	6.2.2.9	Y
	input supply compatibility				
16	steady-state input voltage tolerance		X	6.4.1.1	Y
17	input frequency tolerance		X	6.4.1.2	N
18	input inrush current		X	6.4.1.3	Y
19	harmonic distortion on input current		X	6.4.1.4	Y
20	power factor		X	6.4.1.5	Y
21	efficiency		X	6.4.1.6	Y
22	stand-by generator compatibility		X	6.4.1.9	N
	output – Linear load				
23	normal mode – no load		X	6.4.2.1	Y
24	normal mode – full load		X	6.4.2.2	Y
25	storage energy mode – no load		X	6.4.2.3	Y
26	storage energy mode – full load		X	6.2.4.4	N
27	3-phase voltage unbalance		X	6.4.2.5	n.a.
28	DC voltage component		X	6.2.4.6	Y

No.	test description	routine test	type test	sub clause	performed [Y/N]
29	current division across parallel UPS		X	6.2.4.7	n.a.
30	output overvoltage test		X	6.2.4.8	N
31	periodic output voltage variation test (modulation)		X	6.4.2.9	Y
32	overload – normal mode		X	6.4.2.10.1	Y
33	overload – stored energy mode		X	6.4.2.10.2	N
34	fault clearing capability – normal mode		X	6.4.2.10.3	Y
35	fault clearing capability – stored energy mode		X	6.4.2.10.4	N
36	dynamic performance – normal to stored energy mode		X	6.4.2.11.1	N
37	dynamic performance – stored energy to normal mode		X	6.4.2.11.2	N
38	dynamic performance – normal to bypass mode – overload		X	6.4.2.11.3	Y
39	dynamic performance – step load – normal mode		X	6.4.2.11.4	Y
40	dynamic performance – step load – stored energy mode		X	6.4.2.11.5	N
	output – Non-linear load				
41	normal mode – full load		X	6.4.3.1	N
42	stored energy mode – full load		X	6.4.3.2	N
43	dynamic performance – normal to stored energy mode		X	6.4.3.3.1	N
44	dynamic performance – stored energy to normal mode		X	6.4.3.3.2	N
45	dynamic performance – step load – normal mode		X	6.4.3.3.3	N
46	dynamic performance – step load – stored energy mode		X	6.4.3.3.4	N
	stored and restored energy times				
47	stored energy time		X	6.4.4.1	N
48	restored energy time		X	6.4.4.2	N
49	battery ripple current		X	6.4.4.3	N
50	restart test		X	6.4.4.4	N
	environmental				
51	repetitive shock during transportation		X	6.5.2.1	N
52	free-fall during transportation		X	6.5.2.2	n.a.
53	storage in dry-heat, damp heat and cold		X	6.5.3	N

No.	test description	routine test	type test	sub clause	performed [Y/N]
	environments				
54	operation in dry-heat, damp heat and cold environments		X	6.5.4	N
55	acoustic noise		X	6.5.5	Y
56	**safety (IEC 62040-1)**				
	markings and instructions		X	4.7	Y
	protection against electric shock and energy hazards		X	5.1	Y
	auxiliary circuits		X	5.2	Y
	protective earthing and bonding		X	5.3	Y
	AC and DC power isolation		X	5.4	Y
	overcurrent and earth fault protection		X	5.5	Y
	protection of personnel – safety interlocks		X	5.6	Y
	clearances, creepage distances and distances through insulation		X	5.7	Y
	wiring, connections and supply		X	6	Y
	enclosure		X	7.1	Y
	stability		X	7.2	Y
	mechanical strength		X	7.3	Y
	construction		X	7.4	Y
	resistance to fire		X	7.5	Y
	battery location		X	7.6	Y
	temperature rise		X	7.7	N
	earth leakage		X	8.1	Y
	electrical strength		X	8.2	Y
	abnormal operating and fault conditions		X	8.3	Y
	connection to telecommunication networks		X	9	n.a.
57	**EMC Immunity test IEC 62040-2**				
	electrostatic discharges		X	7.3.3	Y
	radio-frequency electromagnetic field, amplitude modulated		X	7.3.3	Y
	fast transient		X	7.3.3	Y
	surge		X	7.3.3	Y
	conducted radio-frequency common mode		X	7.3.3	Y
	low frequency signals		X	7.4	N
	power frequency magnetic field		X	7.5	Y
	voltage dips, short interruptions and voltage variations		X	7.6	Y

No.	test description	routine test	type test	sub clause	performed [Y/N]
58	**EMC emission test IEC 62040-2**				
	conducted emissions		X	6.4	Y
	radiated emissions		X	6.5	Y

3.3 Performance criteria

According to IEC 61000-6-2 the equipment shall be considered to have passed the tests if - during or as a result of the tests - all of the following conditions are met for the equipment and the connected devices:
Performance class A & B & C:

- No hardware damage may occur.
- No change in calibration beyond normal tolerance may be caused by the test.
- No loss or corruption of stored memory or data may occur, including active or stored settings.
- System resets do not occur, and manual resetting is not required.
- Established communications are not permanently lost.
- Communication errors, if they occur, do not jeopardize the protective or control functions.
- No erroneous, permanent change of state of the visual, audible, or message outputs may occur. Momentary changes in these outputs during the tests are permitted.

Performance class A:
The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance class B:
The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance class C:
Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

INSPECTION REPORT TIC 1384-13

OBJECT	Industrial UPS Protect 8		
TYPE	Protect 8.33 40-400-384-400	**SERIAL No.**	70152034/002
	3 x 400 V / 66 A / 45-66 Hz / 3Ph – 3 x 400 V / 58 A / 50 Hz / 3Ph		
MANUFACTURER	AEG Power Solutions GmbH, Warstein-Belecke, Germany		
CLIENT	AEG Power Solutions, Chambray-Lès-Tours, France		
REFERENCE	3010034912 of 10.01.2013		
TESTED BY	KEMA HIGH-VOLTAGE LABORATORY, Arnhem, the Netherlands		
DATE OF TESTS	18 to 22 February 2013		
TEST PROGRAMME	Selected type tests in accordance with IEC 62040-3 (2009). (see chapter 3.2)		
SUMMARY AND CONCLUSION	The tests were passed.		

This Inspection Report applies only to the object selected from the range of products. The responsibility for conformity of any object having the same designations with that tested rests with the Manufacturer.

This report consists of 120 pages in total.

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KEMA Nederland B.V.

S.A.M. Verhoeven
Director Testing, Inspections &
Certification The Netherlands

Arnhem, 9 July 2013

Order No: 72121253

Version: 2

3.2 Test programme

The following tests in accordance with IEC 60146-1-1 are selected by the manufacturer and are conducted on the UPS:

No.	test description	routine test	type test	sub clause	performed [Y/N]
1	table and interconnection check	X	X	6.2.2.2	Y
2	control device(s)	X	X	6.2.2.3.a	Y
3	protective device(s)	X	X	6.2.2.3.b	Y
4	auxiliary devices(s)	X	X	6.2.2.3.c	Y
5	supervisory, monitoring, signaling devices(s)	X	X	6.2.2.3.d	Y
6	auto transfer tot stored energy mode and back to normal	X	X	6.2.2.3.e	Y
7	auto transfer to bypass / isolation mode and back to normal	X	X	6.2.2.3.f	Y
8	manual transfer to bypass / isolation mode and back to normal	X	X	6.2.2.3.g	Y
9	no load	X	X	6.2.2.4	Y
10	full load	X	X	6.2.2.5	Y
11	synchronization		X	6.2.2.6	n.a.
12	AC input failure	X	X	6.2.2.7	Y
13	AC input return	X	X	6.2.2.8	Y
14	parallel redundant UPS fault		X	6.4.2.12	n.a.
15	transfer test to bypass	X	X	6.2.2.9	Y
	input supply compatibility				
16	steady-state input voltage tolerance		X	6.4.1.1	Y
17	input frequency tolerance		X	6.4.1.2	N
18	input inrush current		X	6.4.1.3	Y
19	harmonic distortion on input current		X	6.4.1.4	Y
20	power factor		X	6.4.1.5	Y
21	efficiency		X	6.4.1.6	Y
22	stand-by generator compatibility		X	6.4.1.9	N
	output – Linear load				
23	normal mode – no load		X	6.4.2.1	Y
24	normal mode – full load		X	6.4.2.2	Y
25	storage energy mode – no load		X	6.4.2.3	Y
26	storage energy mode – full load		X	6.2.4.4	N
27	3-phase voltage unbalance		X	6.4.2.5	Y
28	DC voltage component		X	6.2.4.6	Y
29	current division across parallel UPS		X	6.2.4.7	n.a.

No.	test description	routine test	type test	sub clause	performed [Y/N]
30	output overvoltage test		X	6.2.4.8	N
31	periodic output voltage variation test (modulation)		X	6.4.2.9	Y
32	overload – normal mode		X	6.4.2.10.1	Y
33	overload – stored energy mode		X	6.4.2.10.2	N
34	fault clearing capability – normal mode		X	6.4.2.10.3	Y
35	fault clearing capability – stored energy mode		X	6.4.2.10.4	N
36	dynamic performance – normal to stored energy mode		X	6.4.2.11.1	N
37	dynamic performance – stored energy to normal mode		X	6.4.2.11.2	N
38	dynamic performance – normal to bypass mode – overload		X	6.4.2.11.3	Y
39	dynamic performance – step load – normal mode		X	6.4.2.11.4	Y
40	dynamic performance – step load – stored energy mode		X	6.4.2.11.5	N
	output – Non-linear load				
41	normal mode – full load		X	6.4.3.1	N
42	stored energy mode – full load		X	6.4.3.2	N
43	dynamic performance – normal to stored energy mode		X	6.4.3.3.1	N
44	dynamic performance – stored energy to normal mode		X	6.4.3.3.2	N
45	dynamic performance – step load – normal mode		X	6.4.3.3.3	N
46	dynamic performance – step load – stored energy mode		X	6.4.3.3.4	N
	stored and restored energy times				
47	stored energy time		X	6.4.4.1	N
48	restored energy time		X	6.4.4.2	N
49	battery ripple current		X	6.4.4.3	N
50	restart test		X	6.4.4.4	N
	environmental				
	repetitive shock during transportation		X	6.5.2.1	N
52	free-fall during transportation		X	6.5.2.2	n.a.
53	storage in dry-heat, damp heat and cold environments		X	6.5.3	N
54	operation in dry-heat, damp heat and cold		X	6.5.4	N

AEG

POWER
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Type test certificate for DC chargers range
Protect RCS – SPRe-TPRe PC4B

	Created by		
Department Name	Product management Pierre Larue	R&D management Eneko Mardones	Quality management Susana Martin
Date **Signature**	10/02/2025		

To whom it may concern,

We hereby confirm that AEG Power Solutions R&D laboratory and CERE third party laboratory have conducted type tests in order to check the compliance of battery charger and rectifier systems Protect RCS SPRe-TPRe PC4B range with applicable standards as follows :

Test standard	AEG Power Solutions R&D laboratory	CERE third party laboratory
IEC/EN 62040-5-3 international standard (Uninterruptible power systems (UPS) - Part 5-3: DC output UPS - Performance and test requirements	Report:Type_Test_PC4B_48V_50A_01_EQC1 Date : 19/02/2022 Report:Type_Test_PC4B_110V_100A_01_EQC1 Date : 19/02/2022 Report:Type_Test_PC4B_110V_200A_01_EQC1 Date : 03/11/2022 Report:Type_Test_PC4B_220V_300A_01_EQC1 Date : 04/01/2023	Report : 231103-2-TR Date : 01/08/2024
IEC/EN 61000-6.2 for EMC immunity standards	Report : CEM23017A Date : 04/05/2023 Report : CEM23018A Date : 04/05/2023	/
IEC/EN 61000-6.4 for EMC emission standards		/
IEC/EN 62477-1 Safety requirements for power electronic converter systems and equipment – Part 1 : general	Report : RDTF230005 Date : 23/01/2023	Report : 231103-1-TR Date : 01/08/2024

The tests have been conducted on selected models and passed AEG Power Solutions internal tests successfully.

AEG Power Solutions guarantees that all products listed below comply to the same standards as equipment tested :

Product range	Type
Protect RCS SPRe-TPRe PC4B	**24VDC nominal output voltage :** 24V SPRe 25A to 100A – 24V TPRe 25A to 300A **48VDC nominal output voltage :** 48V SPRe 25A to 100A – 48V TPRe 25A to 300A **110VDC nominal output voltage :** 110V SPRe 25A to 50A – 110V TPRe 25A to 300A **220VDC nominal output voltage :** 220V TPRe 25A to 300A

AEG Power Solutions Iberica, S.A.
Albert Einstein, 31
01510 Vitoria - Spain

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Test Report issued under the responsibility of:

TEST REPORT
IEC 62040-5-3
Uninterruptible power systems (UPS) –
Part 5-3: DC output UPS – Performance and test requirements

Report Number..... :	**231103-2-TR**
Date of issue ..... :	**2024/08/01**
Total number of pages ..... :	**59**
Name of Testing Laboratory preparing the Report ..... :	Certification Entity for Renewable Energies, S.L
Applicant's name ..... :	AEG POWER SOLUTIONS IBÉRICA, S.A.
Address ..... :	Albert Einstein 31 (01510) Vitoria-Gasteiz Álava- España
Standard ..... :	IEC 62040-5-3:2016
Test procedure..... :	Partial Safety Examination
Non-standard test method..... :	N/A
TRF template used ..... :	IECEE OD-2020-F1:2022, Ed.1.5
Test Report Form No. ..... :	IEC62040_5_3A
Test Report Form(s) Originator.... :	CERE by UL Solutions
Master TRF ..... :	Dated 2024-01-15

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General disclaimer:

The test results presented in this report relate only to the object tested.

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Note: Accredited activities can be found into the accreditation scope.

Test item description .....:	Modular commutator rectifier
Trade Mark .....:	AEG
Manufacturer.....:	AEG
Model/Type reference .....:	SPRe ES520211A1 - (SPR4B0001/1) and ES520211A2 (SPR4B0001/2)
Ratings .....:	Input: (X1) Main 230 Vac; ±10 %; 24.66 A (X7) Aux 230 Vac; ±10 %; 16.5 A Outputs: (1)X2 (24Vdc; 0/100 A) (1)X3 (24Vdc; 0/10 A) X20 (230 Vac / 16.5 A) (1) Maximum total power 100A including X2 and X3

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☐	**Testing Laboratory:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) .. :			
☒	**Testing procedure: CTF Stage 1:**	AEG POWER SOLUTIONS IBÉRICA, S.A.	
Testing location/ address ..... :		Albert Einstein 31 (01510) Vitoria-Gasteiz Álava- España	
Tested by (name, function, signature) ..... :		Antonio Valor (Project Handler II)	
Approved by (name, function, signature) .. :		J. Antonio Díaz (Staff Engineer)	
☐	**Testing procedure: CTF Stage 2:**		
☐	**Testing procedure: CTF Stage 3:**	N/A	
☐	**Testing procedure: CTF Stage 4:**	N/A	

Test report history This report may consist of more than one report and is only valid with additional or previous issued reports:		
Report No.	**Date**	**Modification of the appliances /comment**
231103-2-TR	01/08/2024	Final Version

List of Attachments (including a total number of pages in each attachment):

1) Pictures (8 Pags)

Summary of testing:

Tests performed (name of test, test clause and date test performed):	**Testing location:**
By requirement of the applicant two samples of the equipment AEG / SPRe with serial numbers SPR4B0001/1 and SPR4B0001/2 has been evaluated according to the reference Standard: IEC 62040-5-3:2016 and including the following tests: • 6.2.2.4 No load • 6.2.2.5 Full Load • 6.2.2.6 AC Input failure • 6.2.2.7 AC Input Return • 6.4.1.2 Steady-state input voltage tolerance • 6.4.1.3 Input frequency tolerance • 6.4.1.4 Inrush current • 6.4.1.5 Harmonic distortion of input current • 6.4.1.6 Power factor • 6.4.1.7 Efficiency • 6.4.2.1 Normal mode – No load • 6.4.2.2 Normal mode – Full load • 6.4.2.5 Load sharing test • 6.4.2.6 Output overvoltage test • 6.4.2.8.1 Overload – Normal mode • 6.4.2.8.3 Fault clearing capability – Normal mode • 6.4.2.8.4 Fault clearing capability – Stored energy mode • 6.4.2.9.1 Normal to stored energy mode • 6.4.2.9.2 Stored energy to normal mode • 6.4.2.9.3 Step load – Normal mode • 6.4.2.9.4 Step load – Stored energy mode • 6.4.2.10 Simulation of parallel redundant DC UPS fault • 6.5.4 Acoustic noise	AEG POWER SOLUTIONS IBÉRICA, S.A. Albert Einstein 31 (01510) Vitoria-Gasteiz Álava- España

Summary of compliance with National Differences (List of countries addressed):

N/A

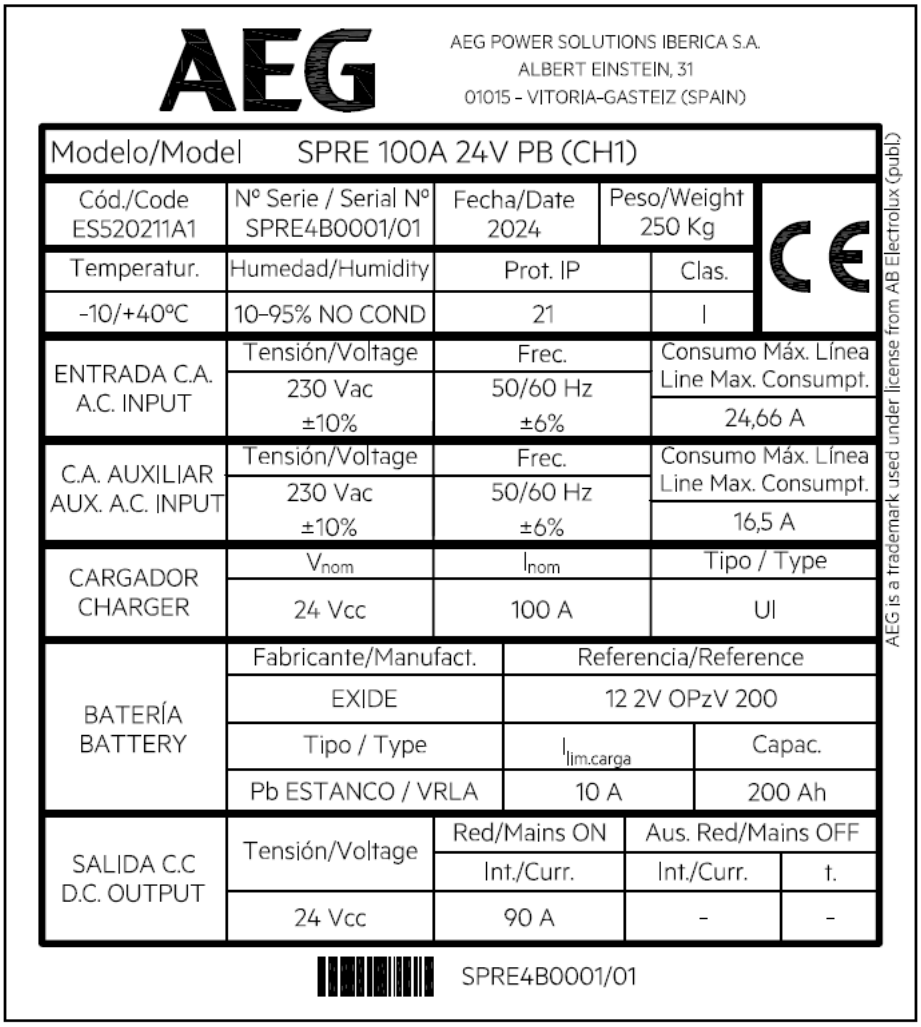
Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other: … (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.
IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.
Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

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IEC 62040-5-3			
Clause	Requirement + Test	Result - Remark	Verdict

Test item particulars.....:	
Classification of installation and use :	Permanently connected.
Supply Connection.....:	Main: 230 Vac ±10 % / 24.66 A; 50/60 Hz Auxiliary: 230 Vac ±10 % / 16.5 A; 50/60 Hz
Possible test case verdicts: **- test case does not apply to the test object :**	N/A
- test object does meet the requirement :	P (Pass)
- test object does not meet the requirement	F (Fail)
- test case no evaluated to the test object	N/E
Testing : **Date of receipt of test item :** **Date (s) of performance of tests.....:**	 13/03/2024 17/06/2024 to 20/06/2024
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) ..... :	AEG POWER SOLUTIONS IBÉRICA, S.A. Albert Einstein 31 01510 Vitoria-Gasteiz, Álava- España
General product information and other remarks: The equipment is composed of two SPRe battery chargers working in parallel, each of them composed of two voltage inputs and three outputs. The first input is the main input (X1) of 230Vac and 24.6A, the other input is an auxiliary input (X7) of 230Vac and 16.5A. The outputs of the equipment are: (X2) from 0 to 100A for loads, (X3) from 0 to 10A for battery charging and (X20) as output of the auxiliary input of 230Vac and 16A. The total current of the equipment is 100A adding both outputs. The batteries used by the equipment are those included in the Sonnenschein A600 family according to the customer's needs. The functionality of the parallel operation increases the total output current of the system.	

IEC 62040-5-3			
Clause	Requirement + Test	Result - Remark	Verdict

Additional test item particulars :

Equipment mobility :	☐ movable ☐ hand-held ☒ stationary ☐ fixed ☐ transportable ☐ for building-in
Connection to the mains:	☐ pluggable equipment ☐ direct plug-in ☒ permanent connection ☐ for building-in
Environmental category :	☐ outdoor ☐ indoor unconditional ☒ indoor conditional
Over voltage category Mains :	☐ OVC I ☐ OVC II ☒ OVC III ☐ OVC IV
Over voltage category PV :	~~☐ OVC I ☐ OVC II ☐ OVC III ☐ OVC IV~~
Mains supply tolerance (%) :	-90 / +110 %
Tested for power systems :	Yes
IT testing, phase-phase voltage (V) :	230 Vac
Class of equipment:	☒ Class I ☐ Class II ☐ Class III ☐ Not classified
Mass of equipment (kg) :	500 without battery's (2 SPRe equipment)
Pollution degree :	2
IP protection class :	21 (IPX1 not tested by requirement of the applicant)

IEC 62040-5-3			
Clause	Requirement + Test	Result - Remark	Verdict

This test report includes the following Appendixes:		
Appendix No.	Description	Page(s)

Test Report issued under the responsibility of:

TEST REPORT
IEC 62477-1
Safety requirements for power electronic converter systems. and equipment
Part 1: General

Report Reference No. ..... :	**231103-1-TR**
Date of issue..... :	2024/08/01
Total number of pages ..... :	114
Name of Testing Laboratory preparing the Report ..... :	Certification Entity for Renewable Energies, S.L
Applicant's name ..... :	AEG POWER SOLUTIONS IBÉRICA, S.A.
Address..... :	Albert Einstein 31 (01510) Vitoria-Gasteiz Álava- España
TRF template used..... :	IECEE OD-2020-F1:2022, Ed.1.5
Standard..... :	IEC 62477-1:2022
Test procedure ..... :	Partial Safety Examination
Non-standard test method……..:	N/A
Test Report Form No. ..... :	IEC62477_1E
Test Report Form(s) Originator .... :	VDE Prüf- und Zertifizierungsinstitut GmbH
Master TRF ..... :	Dated 2022-10-14

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General disclaimer:

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Note: Accredited activities can be found into the accreditation scope.

Test item description .....:	Modular commutator rectifier
Trade Mark .....:	AEG
Manufacturer .....:	AEG
Model/Type reference .....:	SPRe ES520211A1 - (SPR4B0001/1)
Ratings .....:	Input: X1 Main (230 Vac; ±10 %; 24.66 A) X7 Aux (230 Vac; ±10 %; 16.5 A) Outputs: (1)X2 (24Vdc; 0/100 A) (1)X3 (24Vdc; 0/10 A) X20 (230 Vac / 16.5 A) (1) Maximum total power 100A including X2 and X3

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☐	**Testing Laboratory:**	Certification Entity for Renewable Energies, S.L	
Testing location/ address.....:		C/ Monturiol 15. 28906. Getafe - Madrid - España.	
Tested by (name, function, signature).....:		Antonio Valor (Project Handler II)	
Approved by (name, function, signature)...:		Antonio Díaz (Staff Engineer)	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature).....:			
Witnessed by (name, function, signature)..:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		

Test report history This report may consist of more than one report and is only valid with additional or previous issued reports:		
Report No.	**Date**	**Modification of the appliances /comment**
231103-1-TR	01/08/2024	Final Version

List of Attachments (including a total number of pages in each attachment):

1) Schematics (4 Pags)

2) Pictures (8 Pags)

Summary of testing:

Tests performed (name of test and test clause):

By requirement of the applicant the equipment has been evaluated according to the reference Standard: IEC 62477-1:2022 and including the following tests:

- 5.2.1 Visual Inspection
- 5.2.2.1Clearance and creepage distances test
- 5.2.2.2. Non-accessibility test
- 5.2.3.2 Impulse voltage test
- 5.2.3.4 A.C. or D.C. voltage test
- 5.2.3.7 Touch current measurement test
- 5.2.3.8 Capacitor discharge test
- 5.2.3.10 Temperature rise test
- 5.2.3.12 Input Test
- 5.2.4.5 Output overload test
- 5.2.4.9.2 Inoperative blower test
- 5.2.4.9.5 Covering of openings for cooling
- 5.2.5.8 Durability, legibility and permanence of marking test
- 5.2.6.3.1 Dry heat test
- 5.2.6.3.2 Damp heat test

Testing location:

Certification Entity for Renewable Energies, S.L.

C/ Monturiol 15. (28906). Getafe

Madrid - España.

- 5.2.4.4 Output Short circuit test
- 5.2.4.6 Breakdown of components test

AEG POWER SOLUTIONS IBÉRICA, S.A.

Albert Einstein 31 (01510) Vitoria-Gasteiz

Álava- España

Summary of compliance with National Differences (List of countries addressed):

N/A

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other:… (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:

The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Copy of marking plate:

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AEG POWER SOLUTIONS IBERICA S.A.
ALBERT EINSTEIN, 31
01015 - VITORIA-GASTEIZ (SPAIN)

Modelo/Model	SPRE 100A 24V PB (CH1)			
Cód./Code ES520211A1	Nº Serie / Serial Nº SPRE4B0001/01	Fecha/Date 2024	Peso/Weight 250 Kg	CE
Temperatur.	Humedad/Humidity	Prot. IP	Clas.	
-10/+40ºC	10-95% NO COND	21	I	
ENTRADA C.A. A.C. INPUT	Tensión/Voltage	Frec.	Consumo Máx. Línea Line Max. Consumpt.	
	230 Vac ±10%	50/60 Hz ±6%	24,66 A	
C.A. AUXILIAR AUX. A.C. INPUT	Tensión/Voltage	Frec.	Consumo Máx. Línea Line Max. Consumpt.	
	230 Vac ±10%	50/60 Hz ±6%	16,5 A	
CARGADOR CHARGER	V_{nom}	I_{nom}	Tipo / Type	
	24 Vcc	100 A	UI	
BATERÍA BATTERY	Fabricante/Manufact.	Referencia/Reference		
	EXIDE	12 2V OPzV 200		
	Tipo / Type	$I_{lim.carga}$	Capac.	
	Pb ESTANCO / VRLA	10 A	200 Ah	
SALIDA C.C D.C. OUTPUT	Tensión/Voltage	Red/Mains ON	Aus. Red/Mains OFF	
		Int./Curr.	Int./Curr.	t.
	24 Vcc	90 A	-	-

SPRE4B0001/01

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Test item particulars..... :	
Classification of installation and use..... :	Permanently connected;
Supply Connection ..... :	Main: 230 Vac ±10 % / 24.66 A; 50/60 Hz Auxiliary: 230 Vac ±10 % / 16.5 A; 50/60 Hz
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	13/03/2024
Date (s) of performance of tests.....:	16/05/2024 to 20/06/2024
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory .....:	AEG POWER SOLUTIONS IBÉRICA, S.A. Albert Einstein 31 (01510) Vitoria-Gasteiz Álava- España

General product information and other remarks:

The equipment is a battery charger, consisting of two voltage inputs and three outputs.

The first input is the main input (X1) with a rating of 230Vac and 24.6A, the other input is an auxiliary input (X7) of 230Vac and 16.5A.

The outputs of the equipment are: (X2) with a rating of 0 to 100A for loads, (X3) with a rating of 0 to 10A for battery charging and (X20) as output of the auxiliary socket with a rating of 230Vac and 16A.

The total current of the equipment is 100A adding both outputs.

The batteries used by the equipment are those included in the Sonnenschein A600 family according to the customer's needs.

Additional test item particulars :	
Equipment mobility:	☐ movable ☐ hand-held ☒ stationary ☐ fixed ☐ transportable ☐ for building-in
Connection to the mains :	☐ pluggable equipment ☐ direct plug-in ☒ permanent connection ☐ for building-in
Environmental category :	☐ outdoor ☐ indoor unconditional ☒ indoor conditional
Over voltage category Mains :	☐ OVC I ☐ OVC II ☒ OVC III ☐ OVC IV
Over voltage category PV :	~~☐ OVC I ☐ OVC II ☐ OVC III ☐ OVC IV~~
Mains supply tolerance (%) :	-90 / +110 %
Tested for power systems :	Yes
IT testing, phase-phase voltage (V) :	230 Vac
Class of equipment :	☒ Class I ☐ Class II ☐ Class III ☐ Not classified
Mass of equipment (kg) :	250 without battery's
Pollution degree :	2
IP protection class : For more information: see table 4 :	21 (IPX1 not tested by requirement of the applicant) --

IEC 62477-1			
Clause	Requirement – Test	Result – Remark	Verdict

This test report includes the following Appendixes:		
Appendix No.	Description	Page(s)

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Manufacturer Declaration

Project:	**HOLLANDSE KUST NOORD WIND PARK Project - CROSSWIND**
Contractor:	**ROSETTI MARINO S.p.A.**
AEG PO number:	**7000014188**

Cabinet surface coating

Dear Sir or Madam,

We, AEG Power Solutions, confirm that the panels, provided for this project, are painted with a double layer surface coating, which meets the corrosivity category C3 and the protection duration range H.

Please let us know if you need further information.

AEG Power Solutions GmbH,

Best regards

Christian Peck
Project Engineer/CMO Factory

Warstein, 12.11.2025

AEG Power Solutions GmbH • Emil-Siepmann-Str. 32
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AEG POWER SOLUTIONS

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Configuration No.: 1000007888_010 1000007888_020	**Order-No.:** 4400007525
Serial No.: 1010863/001-002 Protect 8.33/40-400-216-400-RP-IP43 1010864/001 Bypass Trans. Cabinet 40kVA 400/400V	**Project name:** Hollandse Kust Noord (HKN) wind farm

Participants:	Company:	Date/Signature:
1. Anthony Ivenson	Rosetti Marino	27-Sep-2024
2. Andrea Lambertini	Rosetti Marino	27/9/24
3. Vahe Avetisyan	On behalf of Crosswind	FTR Fulkrum Technical Resources.
4. Alberto Dall'asta	AEG Power Solutions	
5. Daniela Antenori	AEG Power Solutions	
6. Stephan Wrede	AEG Power Solutions	
7. Christian Peck	AEG Power Solutions	27/09/2024 i.V. C. Pe

Remark:
Both UPS with the serial numbers respectively ending with 001 and 002 are electrically tested at the FAT.

Note:
For the start-up step-by-step procedure and for the shut-down step-by-step procedure please refer to the SAT procedure document.

Ch.Peck	Rev. 00	Warstein,	20.06.2024
Ch.Peck	Rev. 01	Warstein,	26.09.2024

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

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Factory Acceptance Test Report		Document-No.: 14188_FAT_1
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1. Overview:

SCOPE This procedure describes the methods for inspecting and checking the UPS system to ensure that it meets the operational requirements and specification.
REFERENCE DOCUMENT Engineering Documents IEC 62040-3 Routine test report 14188_FAT_1
TESTING EQUIPMENT & ACCESSORIES Digital Multimeter, Oscilloscope and Clamp-meter. Calibration certificates are available for review.
DIELECTRIC AND INSULATION TEST according EN / IEC 62040-3:2021 Clause 5.2.3.4 See Test Report from AEG PS (Internal Test Report) Not tested during FAT
LOAD DURATION TEST (Optional) See Separate Test Report from AEG PS Not tested during FAT

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
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2. Visual Inspection

Reference to EN IEC 62040-3:2021 Clause 6.2.2.2

1.) General construction	**Check**
• Complete arrangement	Okay
• Degree of Protection (IP43)	Okay
• Dimensions	Okay
• Coating (RAL7035)	Okay
2.) Labels	
• Nameplate / Rating Plate	Okay
• Tag Plate	Okay
• Warning labels	Okay
• Components Labelling of Instruments and Lamps	Okay
3.) Installation of technical components	
• Arrangement and accessibility	Okay
• Exchange of PCB	Okay
• Terminals	Okay
• Wiring	Okay
4.) Protection against touching	
• Installation and connection of protective conductors	Okay
• Covers, Shrouding	Okay
5.) Check the arrangement Of measuring apparatus	Okay

***) See separate Punch List**

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
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3 .Static Test (Load Characteristic):

Reference to EN / IEC 62040-3:2021 Clause 6.4.2.3

Incorporates Tests for:

Inverter I/P Voltage Tolerance,
0%, 50% and 100% Inverter Load Tests,
Inverter O/P Voltage and Frequency Regulation,
Quality of the Inverter Output Voltage (THDv Measurement).

This test is carried out using a test rectifier (in order to demonstrate the I/P tolerance of the Inverter.)
Please note that “Inverter Load” relates to the Protect 8 rating with a power factor of 0.8 lag.

Test field Rectifier is connected to the terminals X2 of the UPS

Acceptance Criteria:

Inverter I/P Voltage Tolerance:	max 259 Vdc, min 184 Vdc
Inverter O/P Voltage Tolerance:	230.9 V +/-1% (max 233.2 Vac, min 228.6 Vac)
Inverter Frequency Regulation:	50 Hz +/-0.2% (max 50.1 Hz, min 49.9 Hz)
Inverter O/P Voltage Distortion (THDv):	<3% (linear load)

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

UPS1 Serial-No.: 1010863/001

U_{DC} [V]		I_{DC} [A]	I_{L1} [A]	I_{L2} [A]	I_{L3} [A]	U_{L1-N} [V]	U_{L2-N} [V]	U_{L3-N} [V]	THDv [%]	f [Hz]
		X2	X3	X3	X3	X3	X3	X3	X3	X3
U_{nom}	no load	6.9	0	0	0	232.4	232.5	232.5	0.3	50
-15%	0,5*I_n*cos φ 0,8	96.1	28.7	29.0	29.0	231.6	230.8	230.9	0.2	50
184 V	1,0*I_n*cos φ 0,8	189.6	57.7	57.9	57.6	230.7	229.9	230.0	0.4	50
U_{nom}	no load	6.1	0	0	0	232.4	232.5	232.5	0.3	50
216 V	0,5*I_n*cos φ 0,8	82.3	28.7	29.0	29.1	231.6	230.8	230.8	0.2	50
	1,0*I_n*cos φ 0,8	160.4	57.3	57.6	57.4	230.7	230.0	230.0	0.4	50
U_{nom}	no load	5.4	0	0	0	232.4	232.5	232.5	0.3	50
+20%	0,5*I_n*cos φ 0,8	69.6	28.9	29.2	29.2	231.6	230.8	230.8	0.2	50
259 V	1,0*I_n*cos φ 0,8	133.5	57.2	57.5	57.2	230.7	230.0	230.0	0.5	50

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

UPS2 Serial-No.: 1010863/002

U_{DC} [V]		I_{DC} [A]	I_{L1} [A]	I_{L2} [A]	I_{L3} [A]	U_{L1-N} [V]	U_{L2-N} [V]	U_{L3-N} [V]	THDv [%]	f [Hz]
		X2	X3	X3	X3	X3	X3	X3	X3	X3
U_{nom}	no load	6.9	0	0	0	232.6	232.7	232.7	0.3	50
-15%	0,5*I_n*cos φ 0,8	95.8	28.8	29.1	29.2	231.7	231.1	231.1	0.2	50
184 V	1,0*I_n*cos φ 0,8	187.9	57.4	57.6	57.3	230.8	230.3	230.1	0.4	50
U_{nom}	no load	6.1	0	0	0	232.6	232.7	232.7	0.3	50
216 V	0,5*I_n*cos φ 0,8	82.0	28.9	29.1	29.3	231.6	231.1	231.1	0.2	50
	1,0*I_n*cos φ 0,8	161.4	57.6	57.8	57.6	230.8	230.3	230.2	0.4	50
U_{nom}	no load	5.3	0	0	0	232.6	232.7	232.7	0.3	50
+20%	0,5*I_n*cos φ 0,8	69.4	29.1	29.3	29.4	231.6	231.1	231.1	0.2	50
259 V	1,0*I_n*cos φ 0,8	134.1	57.4	57.7	57.4	230.8	230.3	230.1	0.5	50

Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

4 .Dynamic Test:

Reference to EN / IEC 62040-3: 2011 Clause 6.4.2.11.4

Incorporates Tests for:

Load Application (100%): Inverter
Load Removal (100%): Inverter.
40 kVA cos phi 0.8, U = 216 Vdc

Please note that “Inverter Load” relates to the Protect 8 rating with a power factor of 0.8 lag.

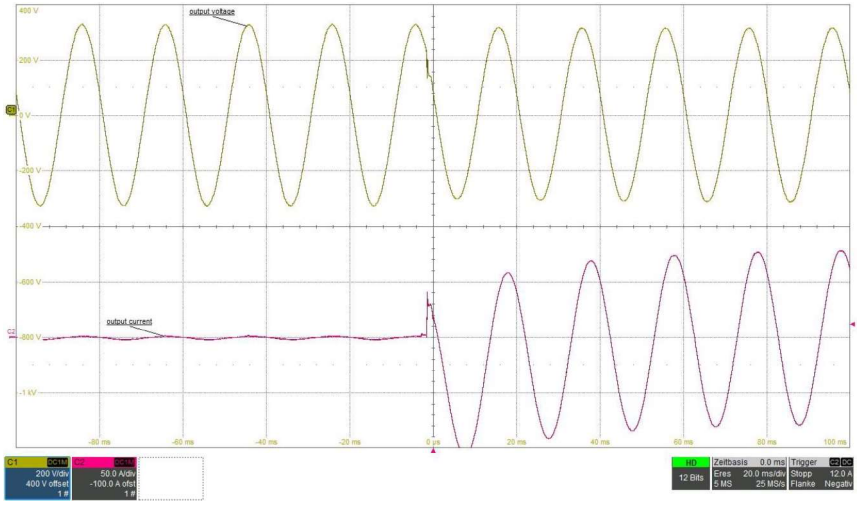
Acceptance Criteria:

Inverter O/P Voltage Tolerance:	230.9V +/-1% (max 233.2 Vac, min 228.6 Vac)
Response time: ≤ 2ms	According EN/IEC 62040-3 5.3.1 Figure1

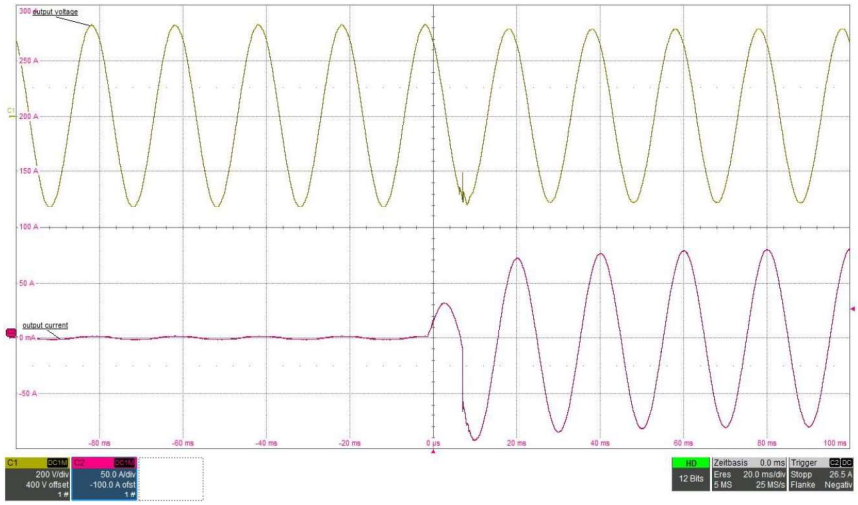
Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Load switched on
Connecting load from test field switch board
Test 0 to 100 % cos φ = 0.8 ind.
Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010863/001



UPS2 Serial-No.: 1010863/002

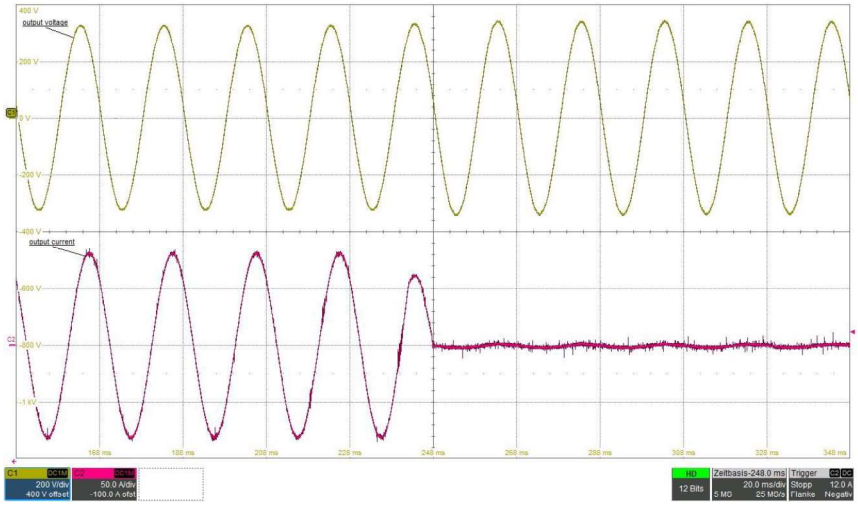


Result: Passed

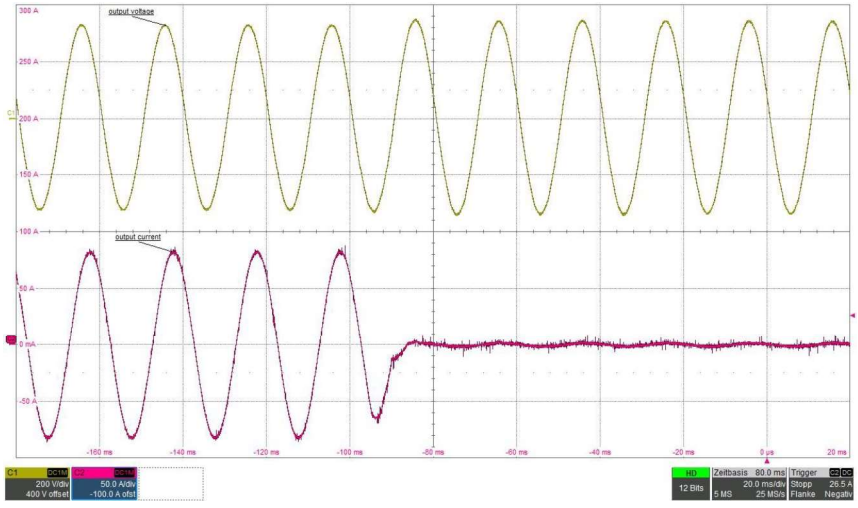
Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Load switched off
Disconnecting load from test field switch board
Test 100 to 0 % cos φ = 0.8 ind.
Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010863/001



UPS2 Serial-No.: 1010863/002



Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

5. Short Circuit Test:

Reference to EN / IEC 62040-3: 2021 Clause 6.4.2.9.2

Incorporates Tests for:

O/P Short Circuit via Fuse/MCB, without Bypass Mains available,
O/P Short Circuit via Fuse/MCB, with Bypass Mains available,
O/P Short Circuit @ terminals, with Inverter only.

Please note that “Inverter Load” relates to the Protect 8 rating with a power factor of 0.8 lag.

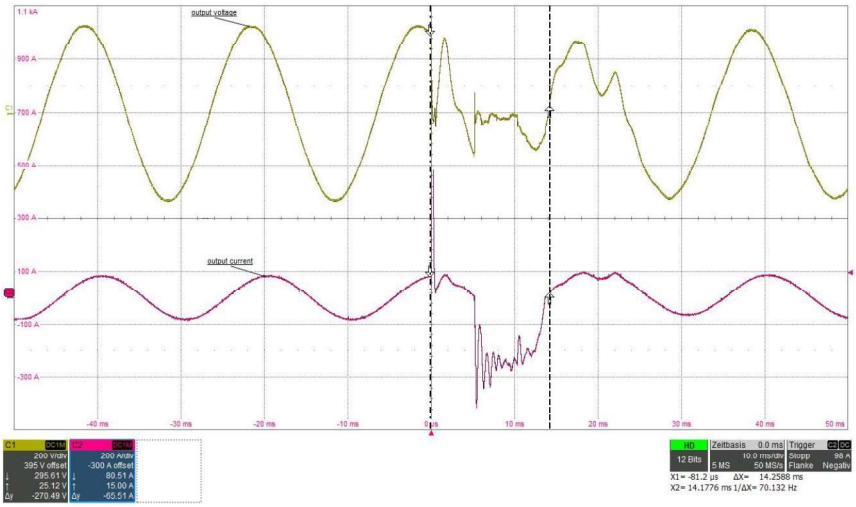
Acceptance Criteria:

Fuse Characteristic Curves
Short circuit without bypass → Inverter trips fuse without switching OFF.
Short circuit with bypass → Inverter switch over to mains without gap and trip the fuse.
Terminal short circuit without Bypass mains → Inverter switches off after a certain time (Dynamic Current Limit Duration).
The Dynamic Current Limit Duration is approx. 500 ms
Recording of AC load voltage and AC load current

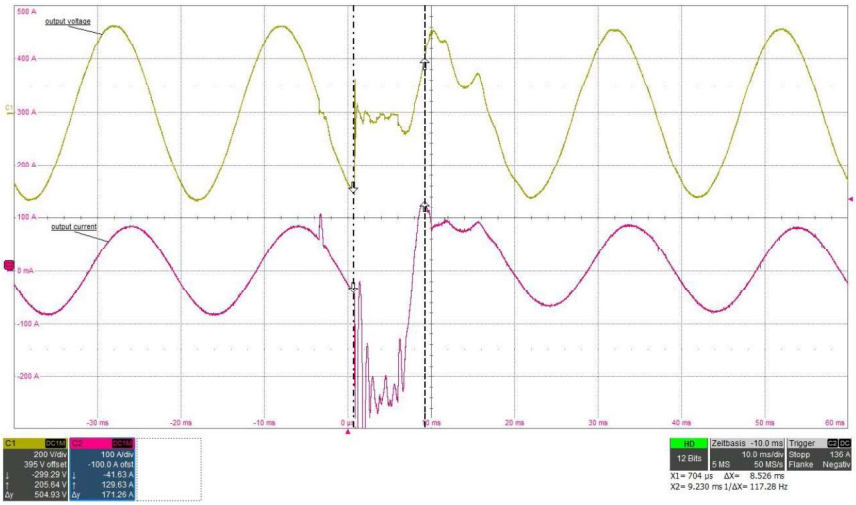
Short circuit without Bypass mains with fuse/MCB
Fuse is tripped by Inverter
Test on 100 % Load = 40 kVA cos φ = 0.8 ind.
Protection: 16 A fuse gG
Measured tripping time of the Fuse:
14.3 ms UPS1 Serial-No.: 1010863/001
8.5 ms UPS2 Serial-No.: 1010863/002

Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010863/001



UPS2 Serial-No.: 1010863/002

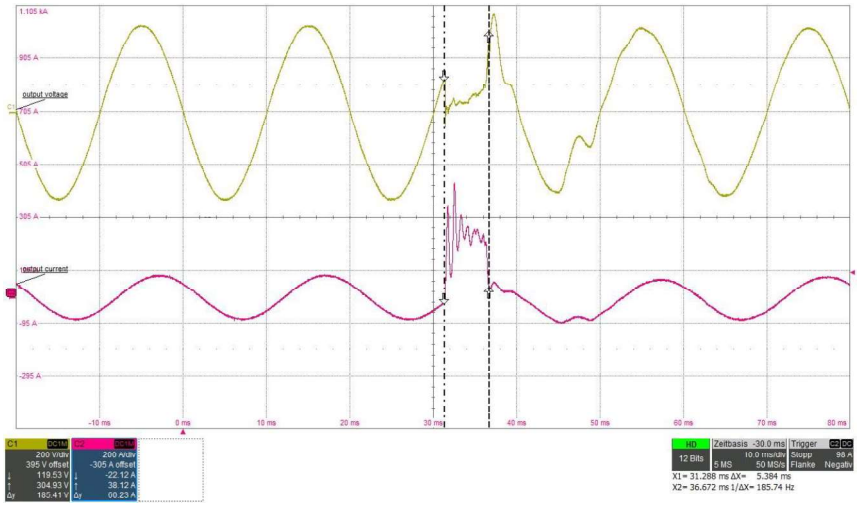


Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

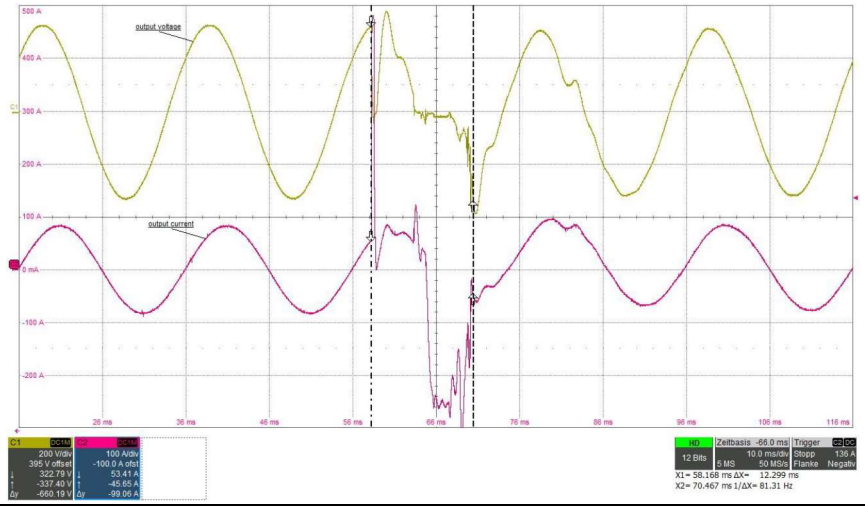
MCB is tripped by Inverter
Test on 100 % Load = 40 kVA cos φ = 0.8 ind.
Protection: 32 A MCB B-curve
Measured tripping time of the Fuse:
5.4 ms UPS1 Serial-No.: 1010863/001
12.3 ms UPS2 Serial-No.: 1010863/002

Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010863/001



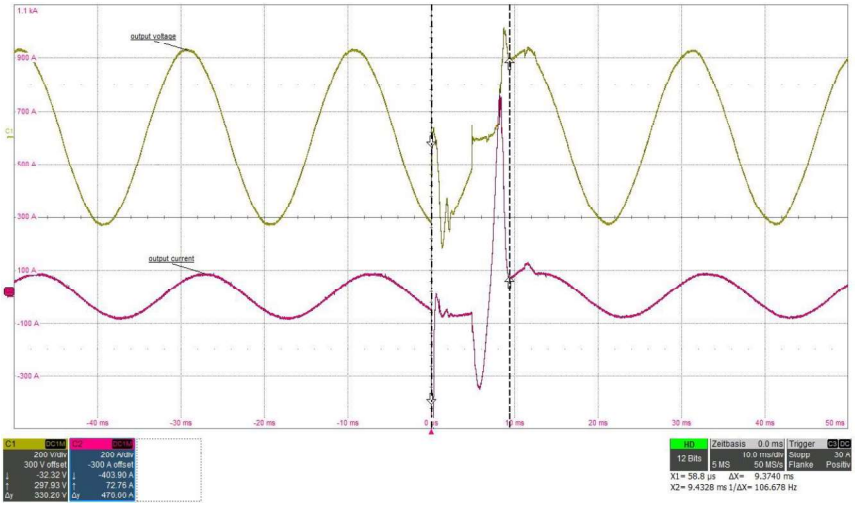
UPS2 Serial-No.: 1010863/002



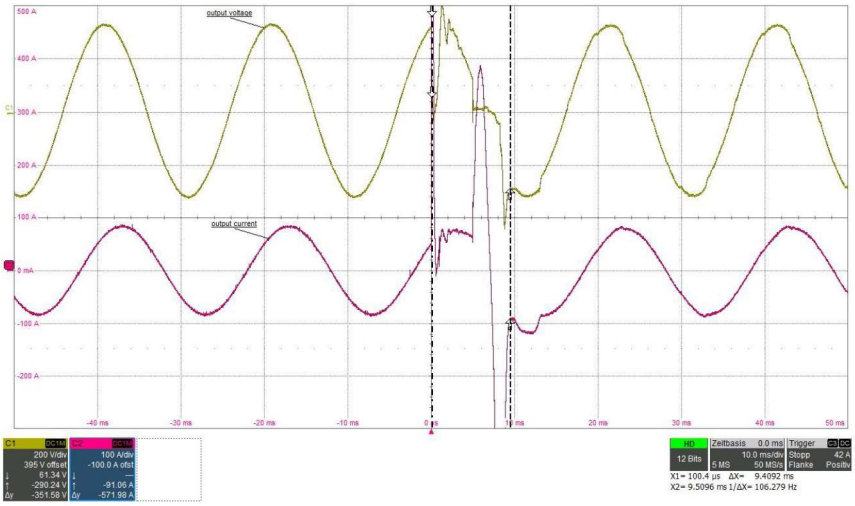
Result: Passed

Short circuit with Bypass mains with fuse
Transfer to SBS. Fuse is tripped by SBS. Retransfer to Inverter
Test on 100 % Load = 40 kVA cos φ = 0.8 ind.
Protection: 16 A fuse gG
Measured tripping time of the Fuse/MCB:
9.4 ms UPS1 Serial-No.: 1010863/001
9.4 ms UPS2 Serial-No.: 1010863/002
Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010863/001



UPS2 Serial-No.: 1010863/002

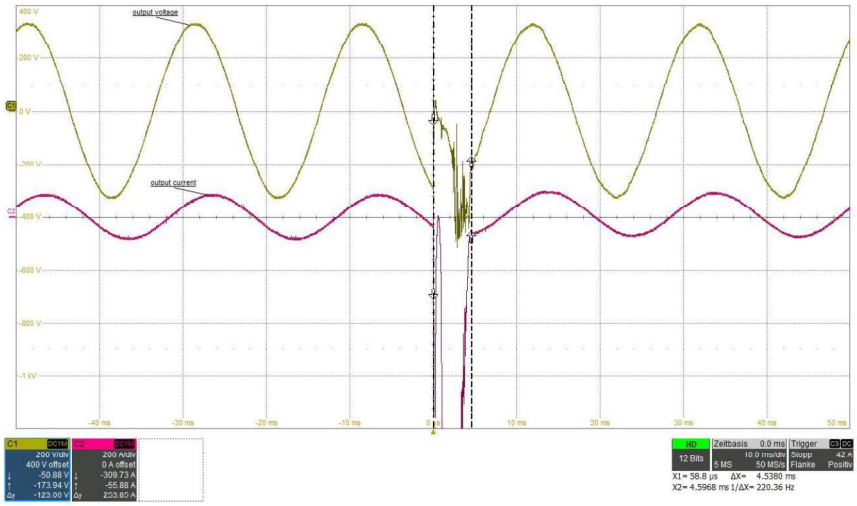


Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

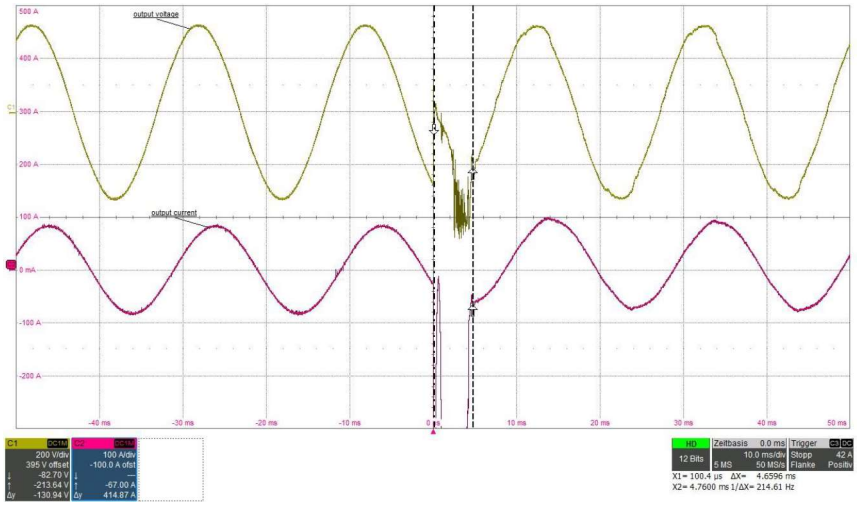
MCB is tripped by Inverter
Test on 100 % Load = 40 kVA cos φ = 0.8 ind.
Protection: 32 A MCB B-curve
Measured tripping time of the Fuse:
4.5 ms UPS1 Serial-No.: 1010863/001
4.7 ms UPS2 Serial-No.: 1010863/002

Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010863/001



UPS2 Serial-No.: 1010863/002



Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Terminal short circuit without Bypass mains

Inverter is supplying appox. 2 x Inom (3 phase) for measured time and then switched off

Test on 100 % Load = 40 kVA cos φ = 0.8 ind.

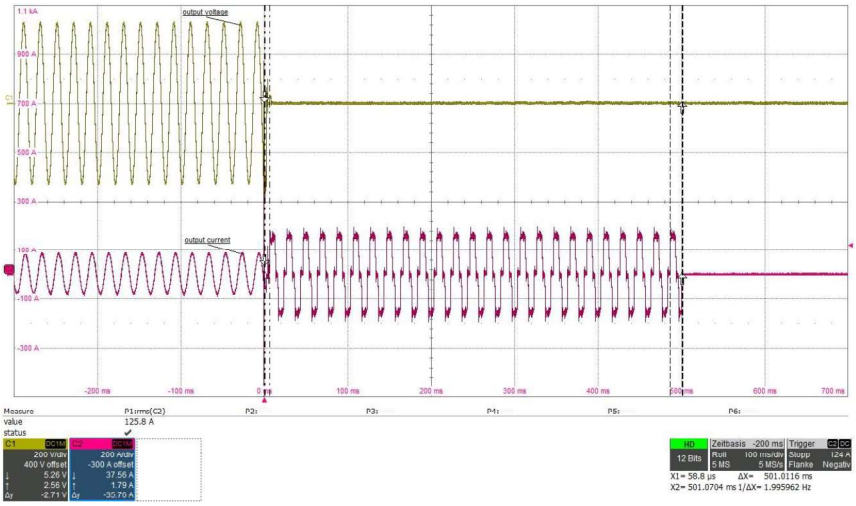
Measured switch off time and short circuit current of Inverter:

501 ms / **125.8** A UPS1 Serial-No.: 1010863/001

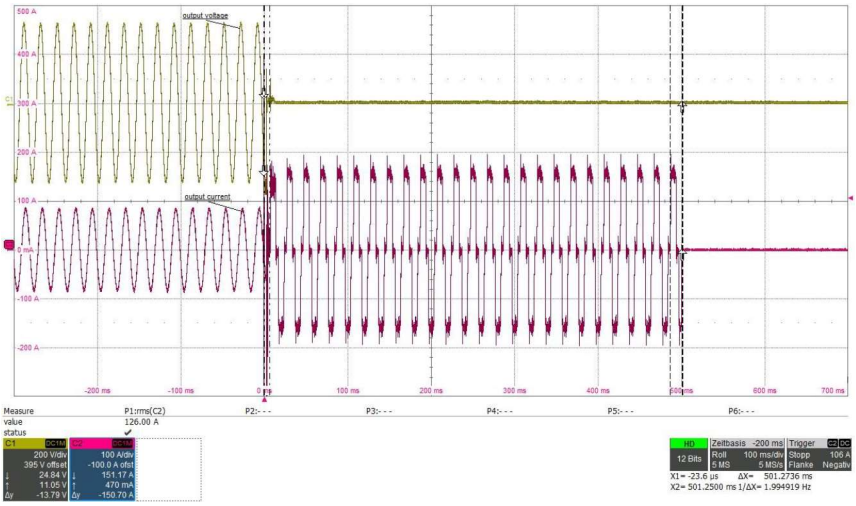
501 ms / **126 A** UPS2 Serial-No.: 1010863/002

Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010863/001



UPS2 Serial-No.: 1010863/002



Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

6. Overload Test:

Reference to EN / IEC 62040-3: 2021 Clause 6.4.2.9.1

Incorporates Tests for:

150% Load Capability Test

Please note that “Inverter Load” relates to the Protect 8 rating with a power factor of 0.8 lag.

Acceptance Criteria:

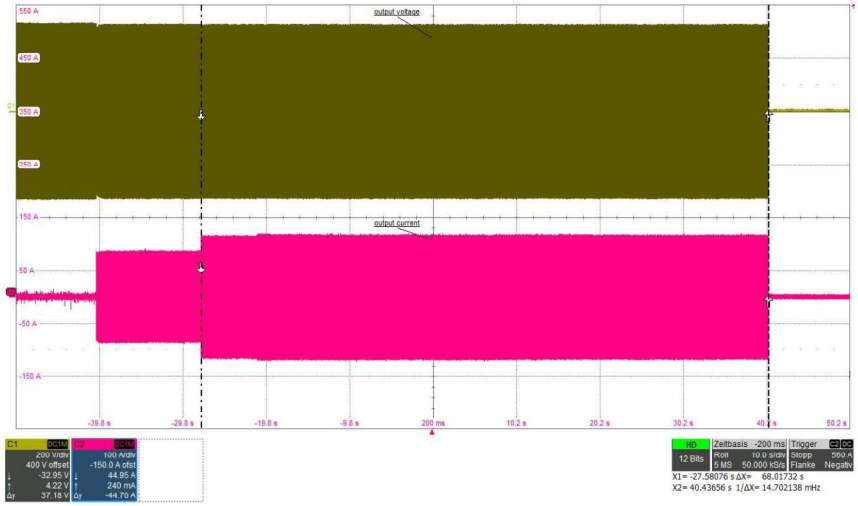
The Inverter swithes off after a certain time (Minimum Overlad Duration)

Inverter O/P Voltage Tolerance:	230.9V +/-1% (max 233.2 Vac, min 228.6 Vac)
Inverter Frequency Regulation:	50 Hz +/-0.2% (max 50.1 Hz, min 49.9 Hz)
Inverter O/P Voltage Distortion:	<3% (linear load)
Minimum Overload Duration:	approx. 60 seconds

Load connected from test field switch board
Load: 150% / cos φ = 0.8 ind. = 60 kVA
68 s UPS1 Serial-No.: 1010863/001
70 s UPS2 Serial-No.: 1010863/002

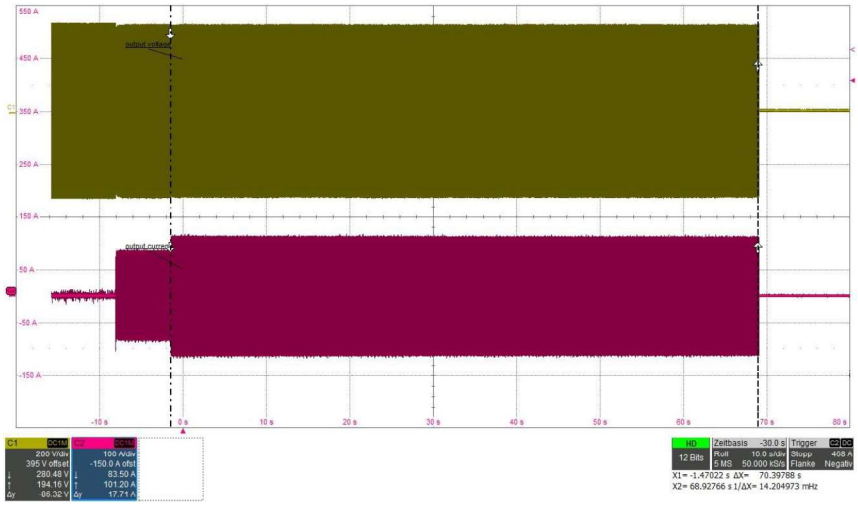
Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010863/001



UPS2 Serial-No.: 1010863/002

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	UPS System Protect 8.33/40kVA-S10	Tag No.: BC-200F3A, BC-200F3B, BY-200F3



Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

7. Functional tests UPS / Load Transfer Tests:

Reference to EN / IEC 62040-3:2021 Clause 6.2.2.7 / 6.2.2.8 / 6.2.2.9

Incorporates Tests for:

Rectifier Mains Failure – continued Inverter operation via Battery
Rectifier Mains Return – auto start of the rectifier
Inverter Failure – transfer of load from Inverter to Bypass Mains
Inverter Restoration – transfer of load from Bypass Mains to Inverter

The tests are performed at Inverter full load.

Please note that “Inverter Load” relates to the Protect 8 rating with a power factor of 0.8 lag.

Acceptance Criteria:

Rectifier Mains Failure:	No disruption to the Inverter operation.
Rectifier Mains Return:	Auto start of the rectifier and charging of the Battery
Transfer Inverter to Static Bypass:	No-break transfers
Re transfer Static Bypass to Inverter:	No-break transfers

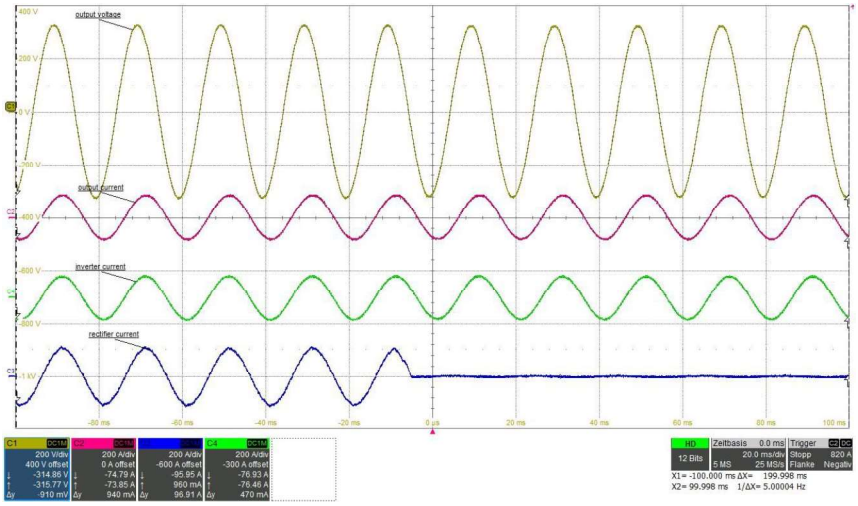
Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

A) Rectifier Mains Failure

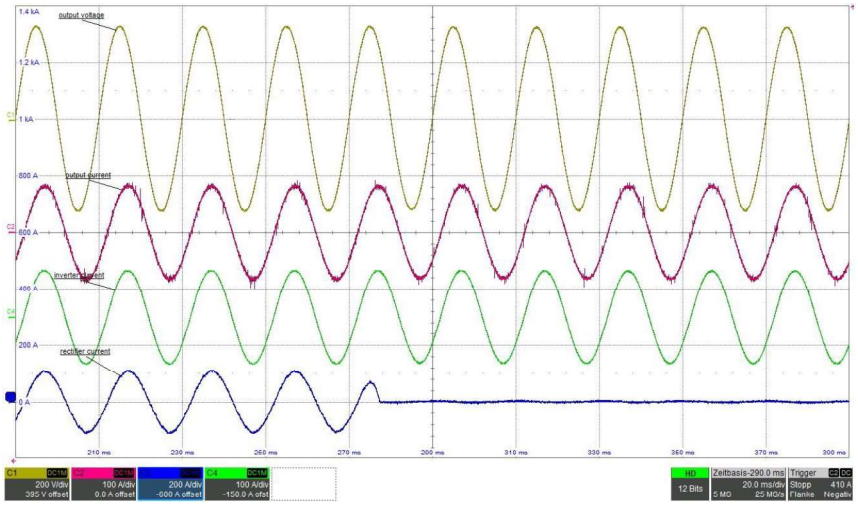
Switch OFF rectifier Mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

UPS1 Serial-No.: 1010863/001



UPS2 Serial-No.: 1010863/002



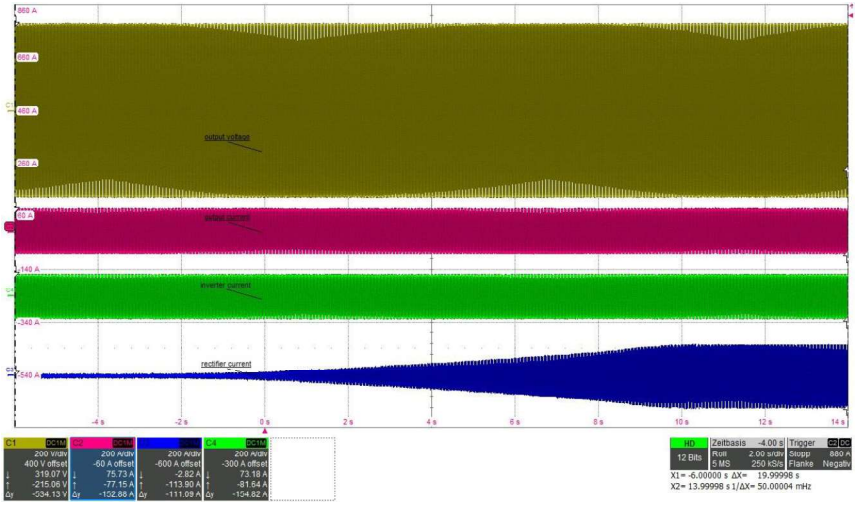
Result: Passed

B) Rectifier Mains Return

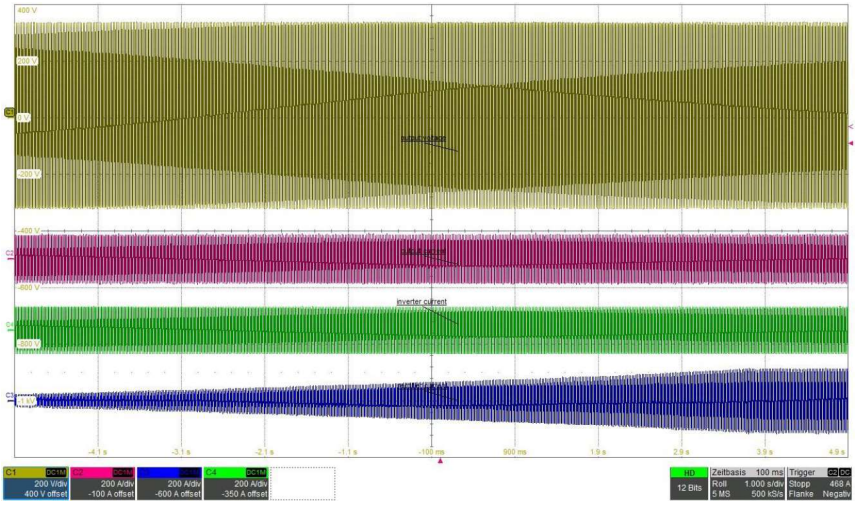
Switch ON rectifier mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

UPS1 Serial-No.: 1010863/001



UPS2 Serial-No.: 1010863/002



Result: Passed

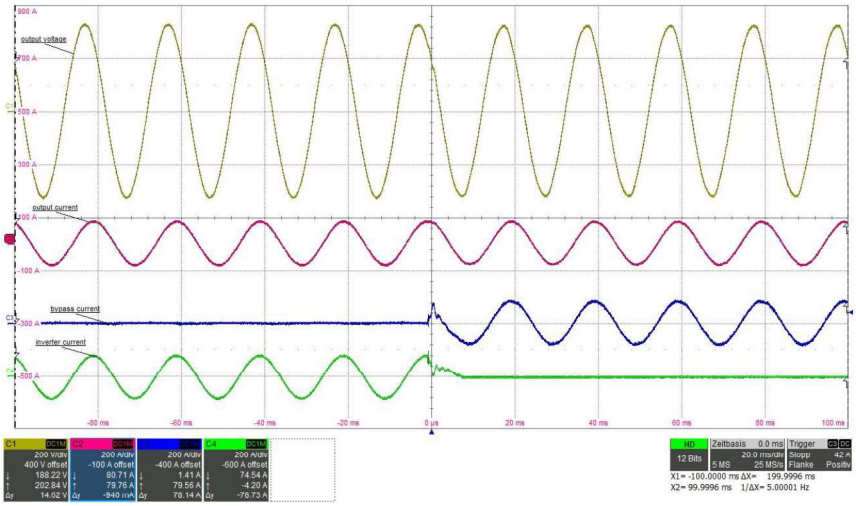
Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

C) Transfer inverter-SBS mains

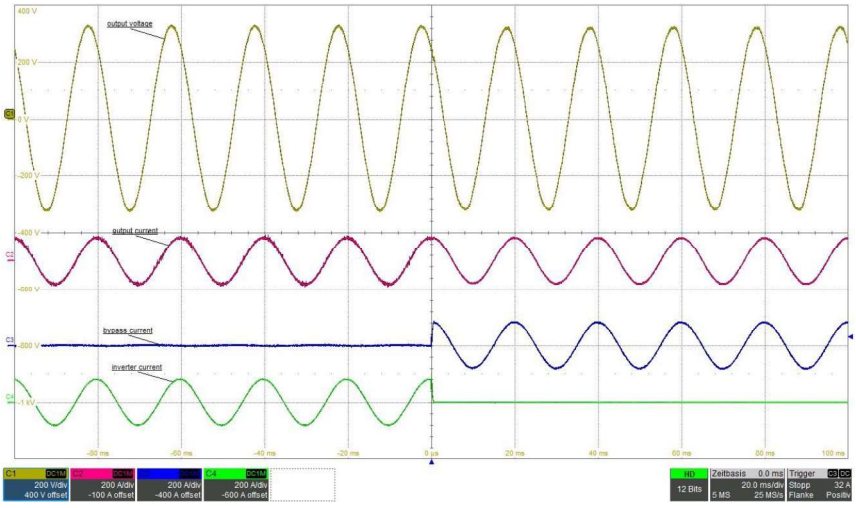
Switch OFF Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

UPS1 Serial-No.: 1010863/001



UPS2 Serial-No.: 1010863/002



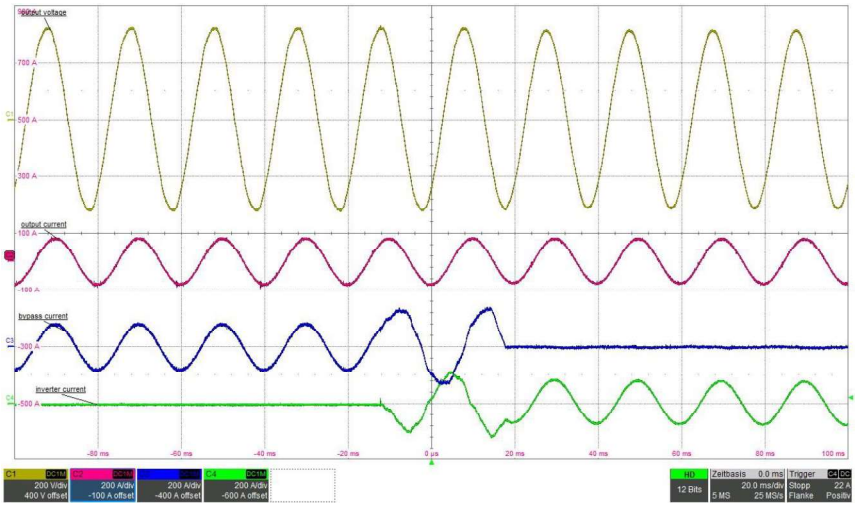
Result: Passed

D) Transfer SBS mains-inverter

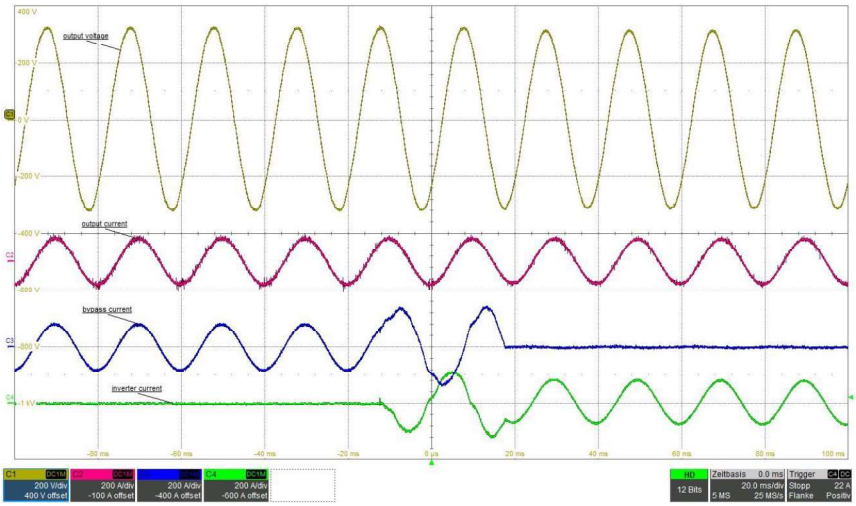
Switch ON Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

UPS1 Serial-No.: 1010863/001



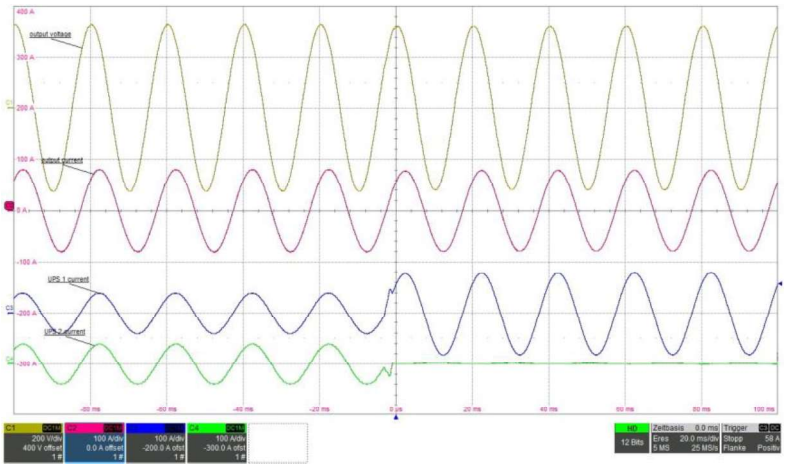
UPS2 Serial-No.: 1010863/002



Result: Passed

E) Parallel Operation

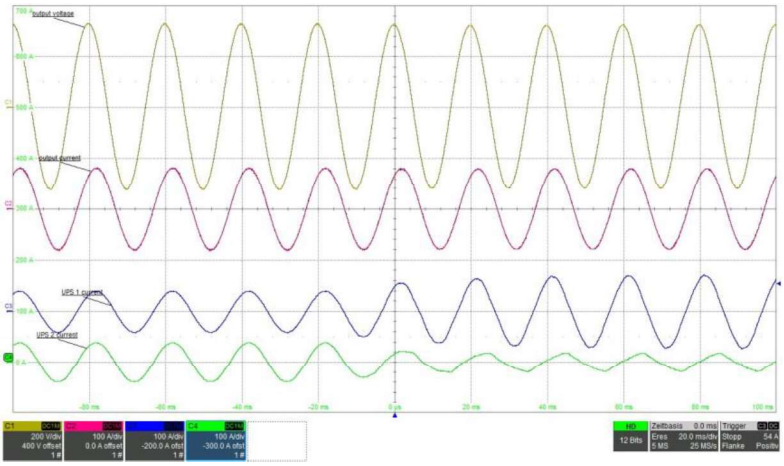
Parallel operation UPS n.1 and UPS n.2 - Switching OFF UPS n.2 via Display A18 on the door of the UPS
UPS n.1 takes over 100% Load
AC load voltage and AC load current and SBS current by screen shot.



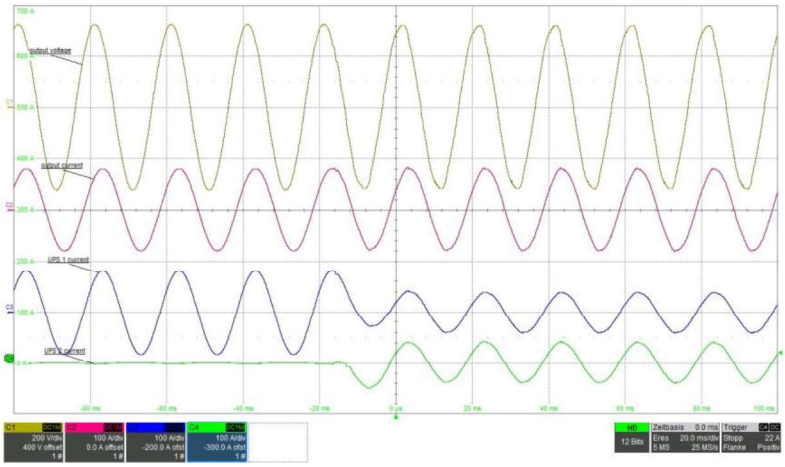
and in addition repeat the test as following indicated:

Parallel operation UPS n.1 and UPS n.2 - Switching OFF UPS n.2 via de-energization of its upstream power supply

UPS n.1 takes over 100% Load
AC load voltage and AC load current and SBS current by screen shot.

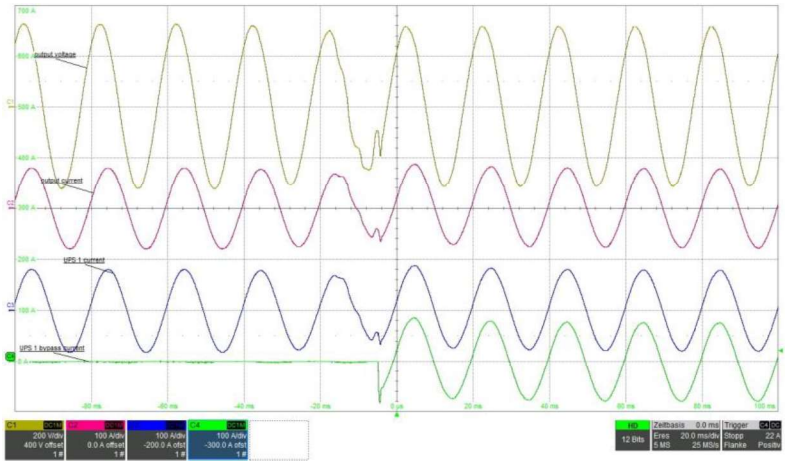


Switching OFF UPS n.1 via Display A18 on the door of the UPS
Transfer to Bypass operation
AC load voltage and AC load current and SBS current by screen shot.

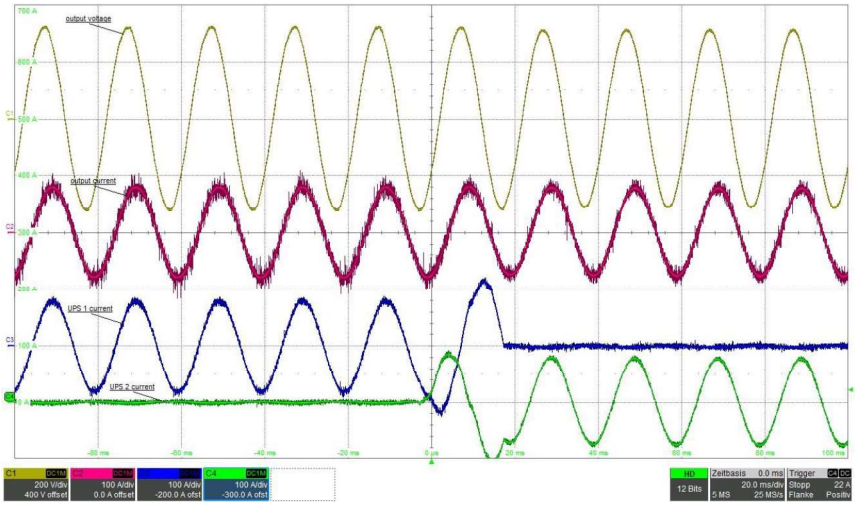


and in addition repeat the test as following indicated:

Switching OFF UPS n.1 via de-energization of its upstream power supply
Transfer to Bypass operation
AC load voltage and AC load current and SBS current by screen shot.



Bypass operation - Switching ON UPS n.2 via Display A18 on the door of of the UPS
UPS n.2 takes over 100% load
AC load voltage and AC load current and SBS current by screen shot.



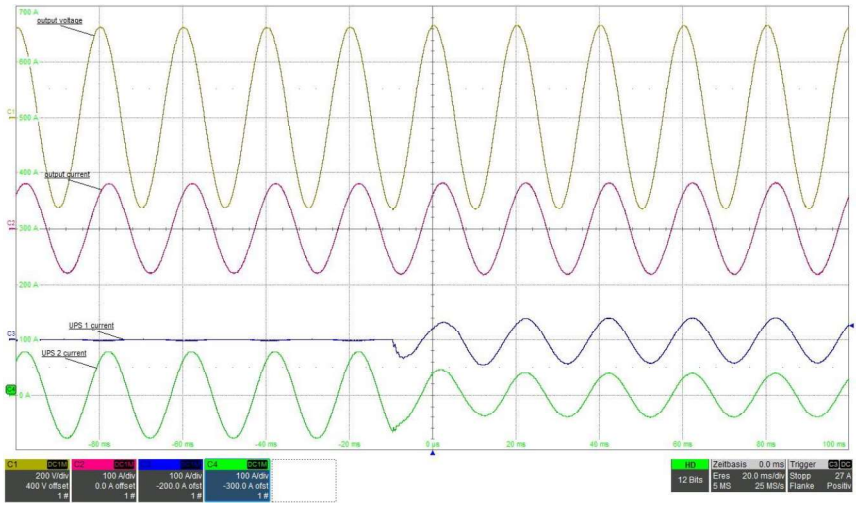
and in addition repeat the test as following indicated:

Bypass operation - Switching ON UPS n.2 via re-energization of its upstream power supply
UPS n.2 takes over 100% load
AC load voltage and AC load current and SBS current by screen shot

NA, because after switch on Q1, the INV must be started via display. → Same as previous step.

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

Switching ON UPS n.1 via Display A18 on the door of of the UPS
Load sharing 50%
Parallel operation with load sharing 50% of UPS n.1 and UPS n.2
AC load voltage and AC load current and SBS current by screen shot.



and in addition repeat the test as following indicated:

Switching ON UPS n.1 via re-energization of its upstream power supply
Load sharing 50%
Parallel operation with load sharing 50% of UPS n.1 and UPS n.2
AC load voltage and AC load current and SBS current by screen shot.

NA, because after switch on Q1, the INV must be started via display. → Same as previous step.

Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

F) Parallel Operation (functional sequence test)
Starting condition:
UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.2
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.1 at the correct load
4. Re-energize upstream power supply to Rectifier input n.2
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

G) Parallel Operation (functional sequence test)
Starting condition:
UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.1
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.2 at the correct load
4. Re-energize upstream power supply to Rectifier input n.1
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

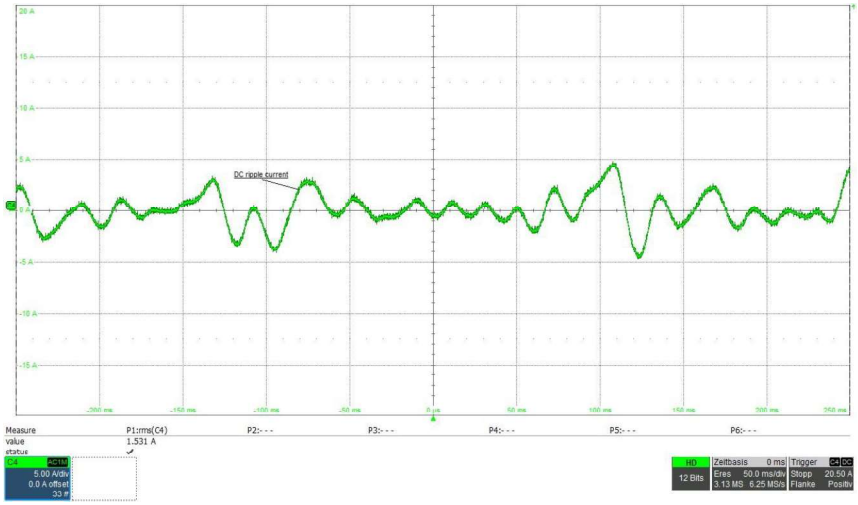
Result: Passed

8. DC Ripple Current Measurement
with Test field battery

Reference to EN / IEC 62040-3:2021 Clause 6.4.3.3

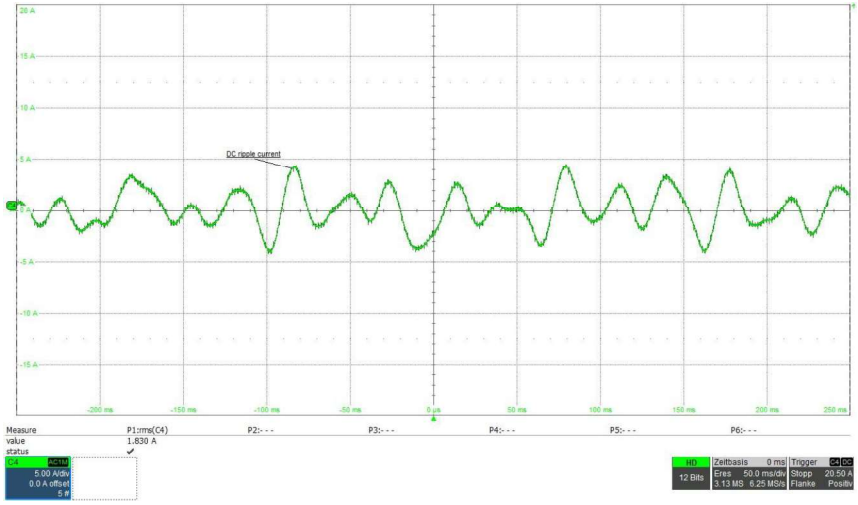
Acceptance Criteria:
Current ripple of less than 5 A rms for every 100 Ah / Measured with test field battery with **screen shot**
The capacity of the test field battery is 300Ah.
The measured value is (1 V = 1 A)
1.5 A rms UPS1 Serial-No.: 1010863/001
1.8 A rms UPS2 Serial-No.: 1010863/002

UPS1 Serial-No.: 1010863/001



Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

UPS2 Serial-No.: 1010863/002



Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

9. MODBUS Adapter (Demonstration)

Incorporates Tests for:
A29.1 MODBUS Adapter

Test to be performed for chosen failure messages, status messages and measuring values.

Designation	Source	Terminals	Checked
MODBUS Adapter	A29.1	A29.1	**Okay**

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

10. Alarm Test:

Reference to EN IEC 62040-3:2021 Clause 6.2.2.3

Incorporates Tests for:

Remote Alarm signalling on Boards A12/A13
System Operational Check

Acceptance Criteria:

Technical datasheet (TD)

Designation	Terminals	Relay/Opto	Result
Inverter operation 1)	UPS A12-X3: 1, 2, 3	**A12K21**	**Okay**
SBS operation 1)	UPS A12-X3: 4, 5, 6	**A12K22**	**Okay**
Rec Fault / Rec mains fault 1)	UPS A12-X3: 7, 8, 9	**A12K23**	**Okay**
Battery undervoltage 1)	UPS A12-X3: 10, 11, 12	**A12K24**	**Okay**
Common fault 2)	UPS A12-X4: 1, 2, 3	**A12K25**	**Okay**
SBS blocked 1)	UPS A13-X3: 1, 2, 3	**A13K26**	**Okay**
DC voltage < 178 V 1)	UPS A13-X3: 4, 5, 6	**A13K27**	**Okay**
BAT room fan on 1)	UPS A13-X3: 7, 8, 9	**A13K28**	**Okay**
INV remote off 3)	UPS A12-X5: 1, 2	**A12Opto1**	**Okay**
BAT room fan fault 3)	UPS A13-X4: 1, 2	**A13Opto2**	**Okay**
BAT MCCB open 3)	UPS A13-X4: 3, 4	**A13Opto3**	**Okay**
Fan fault 1)	Bypass X12: 7, 8, 9	**N/A**	**Okay**
Common fault 1)	Bypass X12: 10, 11, 12	**N/A**	**Okay**

1) Remote signal / close on the terminals with the lower number
2) Remote signal / close on the terminals with the higher number
3) OPTO Input

Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_1
Type:	**UPS System Protect 8.33/40kVA-S10**	**Tag No.: BC-200F3A, BC-200F3B, BY-200F3**

11. Measuring Devices:

AEG internal Measuring device No.:	Measuring device name	Seriel number:	Calibrated until:
24740	LeCroy WS4024HD	LCRY4903C18666	Sep 25
23265	TesTec TT-SI 9010	112048	Dez 24
22263	Fluke 8846 A	9718026	Dez 24
23188	Fluke 8846 A	1586024	Dez 24
23187	Fluke 8846 A	1586003	Nov 24
23346	Fluke 43 B	16880401	Mrz 26
23373	Shunt 600/60mV/A	-	Dez 25
23987	Fluke I 400 S	20690042	Dez 24
24214	Fluke I 1000 S	98261327	Jul 25
20996	Fluke I 1000 S	932684033	Nov 24

12. Remarks:

1. TAG tag plates must be engraved and mounted → Done → Closed
2. The cover in front of the power terminals in the UPS unit must be closed at the top. → Done → Closed.
3. Assembly drawing of the bypass cabinet must be updated to 'as built'.
4. Start-up and shut-down instructions must be prepared by AEG for the specific system and handed over to Rosetti Marino.

AEG POWER SOLUTIONS

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Configuration No.: 1000007888_080 1000007888_090	**Order-No.:** 4400007525
Serial No.: 1010849/001-002 Protect 8.33/20-400-216-400-RP-IP43 1010865/001 Bypass Trans. Cabinet 20kVA 400/400V	**Project name:** Hollandse Kust Noord (HKN) wind farm

Participants:	Company:	Date/Signature:
1. Anthony Ivenson	Rosetti Marino	27-Sep-2024
2. Andrea Lambertini	Rosetti Marino	27/9/24
3. Vahe Avetisyan	On behalf of Crosswind	FTR Fulkrum Technical Resources
4. Stephan Wrede	AEG Power Solutions	
5. Christian Peck	AEG Power Solutions	27/09/2024 i.V. C. P.

Remark:
Both UPS with the serial numbers respectively ending with 001 and 002 are electrically tested at the FAT.

Note:
For the start-up step-by-step procedure and for the shut-down step-by-step procedure please refer to the SAT procedure document.

Ch.Peck	Rev. 00	Warstein,	20.06.2024
Ch.Peck	Rev. 01	Warstein,	26.09.2024

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Content:

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10. Alarm Test: 32
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Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

1. Overview:

SCOPE This procedure describes the methods for inspecting and checking the UPS system to ensure that it meets the operational requirements and specification.
REFERENCE DOCUMENT Engineering Documents IEC 62040-3 Routine test report 14188_FAT_2
TESTING EQUIPMENT & ACCESSORIES Digital Multimeter, Oscilloscope and Clamp-meter. Calibration certificates are available for review.
DIELECTRIC AND INSULATION TEST according EN / IEC 62040-3:2021 Clause 5.2.3.4 See Test Report from AEG PS (Internal Test Report) Not tested during FAT
LOAD DURATION TEST (Optional) See Separate Test Report from AEG PS Not tested during FAT

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

2. Visual Inspection

Reference to EN IEC 62040-3:2021 Clause 6.2.2.2

1.) General construction	**Check**
• Complete arrangement	Okay
• Degree of Protection (IP43)	Okay
• Dimensions	Okay
• Coating (RAL7035)	Okay
2.) Labels	
• Nameplate / Rating Plate	Okay
• Tag Plate	Okay
• Warning labels	Okay
• Components Labelling of Instruments and Lamps	Okay
3.) Installation of technical components	
• Arrangement and accessibility	Okay
• Exchange of PCB	Okay
• Terminals	Okay
• Wiring	Okay
4.) Protection against touching	
• Installation and connection of protective conductors	Okay
• Covers, Shrouding	Okay
5.) Check the arrangement Of measuring apparatus	Okay

***) See separate Punch List**

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

3 .Static Test (Load Characteristic):

Reference to EN / IEC 62040-3:2021 Clause 6.4.2.3

Incorporates Tests for:

Inverter I/P Voltage Tolerance,
0%, 50% and 100% Inverter Load Tests,
Inverter O/P Voltage and Frequency Regulation,
Quality of the Inverter Output Voltage (THDv Measurement).

This test is carried out using a test rectifier (in order to demonstrate the I/P tolerance of the Inverter.)
Please note that “Inverter Load” relates to the Protect 8 rating with a power factor of 0.8 lag.

Test field Rectifier is connected to the terminals X2 of the UPS

Acceptance Criteria:

Inverter I/P Voltage Tolerance:	max 259 Vdc, min 184 Vdc
Inverter O/P Voltage Tolerance:	230.9 V +/-1% (max 233.2 Vac, min 228.6 Vac)
Inverter Frequency Regulation:	50 Hz +/-0.2% (max 50.1 Hz, min 49.9 Hz)
Inverter O/P Voltage Distortion (THDv):	<3% (linear load)

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

UPS1 Serial-No.: 1010849/001

U_{DC} [V]		I_{DC} [A]	I_{L1} [A]	I_{L2} [A]	I_{L3} [A]	U_{L1-N} [V]	U_{L2-N} [V]	U_{L3-N} [V]	THDv [%]	f [Hz]
		X2	X3	X3	X3	X3	X3	X3	X3	X3
U_{nom}	no load	5.5	0	0	0	231.9	233.0	232.6	0.2	50
-15%	0,5*I_n*cos φ 0,8	47.9	14.0	13.9	14.1	231.2	231.4	231.9	0.3	50
184 V	1,0*I_n*cos φ 0,8	92.2	28.5	28.8	28.6	230.1	230.4	229.9	0.2	50
U_{nom}	no load	4.9	0	0	0	232.0	233.0	232.6	0.2	50
216 V	0,5*I_n*cos φ 0,8	40.9	14.0	13.8	14.1	231.2	231.4	230.9	0.3	50
	1,0*I_n*cos φ 0,8	79.0	28.5	28.8	28.6	230.1	230.4	229.9	0.2	50
U_{nom}	no load	4.2	0	0	0	232.0	233.0	232.6	0.3	50
+20%	0,5*I_n*cos φ 0,8	34.3	14.0	13.8	14.1	231.2	231.4	230.9	0.3	50
259 V	1,0*I_n*cos φ 0,8	66.3	28.5	28.8	28.6	230.1	230.4	229.9	0.3	50

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

UPS2 Serial-No.: 1010849/002

U_{DC} [V]		I_{DC} [A]	I_{L1} [A]	I_{L2} [A]	I_{L3} [A]	U_{L1-N} [V]	U_{L2-N} [V]	U_{L3-N} [V]	THDv [%]	f [Hz]
		X2	X3	X3	X3	X3	X3	X3	X3	X3
U_{nom}	no load	5.5	0	0	0	232.1	232.9	232.3	0.2	50
-15%	0,5*I_n*cos φ 0,8	47.7	14.0	14.3	14.1	231.3	231.3	230.7	0.2	50
184 V	1,0*I_n*cos φ 0,8	93.8	28.7	28.6	28.4	230.3	230.3	229.7	0.3	50
U_{nom}	no load	4.9	0	0	0	232.1	232.9	232.3	0.3	50
216 V	0,5*I_n*cos φ 0,8	41.2	14.0	14.4	14.1	231.3	231.3	230.7	0.2	50
	1,0*I_n*cos φ 0,8	80.0	28.6	28.5	28.2	230.3	230.3	229.7	0.2	50
U_{nom}	no load	4.2	0	0	0	232.1	232.9	232.4	0.2	50
+20%	0,5*I_n*cos φ 0,8	34.8	14.1	14.4	14.2	231.3	231.3	230.7	0.3	50
259 V	1,0*I_n*cos φ 0,8	66.6	28.6	28.4	28.2	230.3	230.3	229.7	0.2	50

Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

4 .Dynamic Test:

Reference to EN / IEC 62040-3: 2011 Clause 6.4.2.11.4

Incorporates Tests for:

Load Application (100%): Inverter
Load Removal (100%): Inverter.
20 kVA cos phi 0.8, U = 216 Vdc

Please note that “Inverter Load” relates to the Protect 8 rating with a power factor of 0.8 lag.

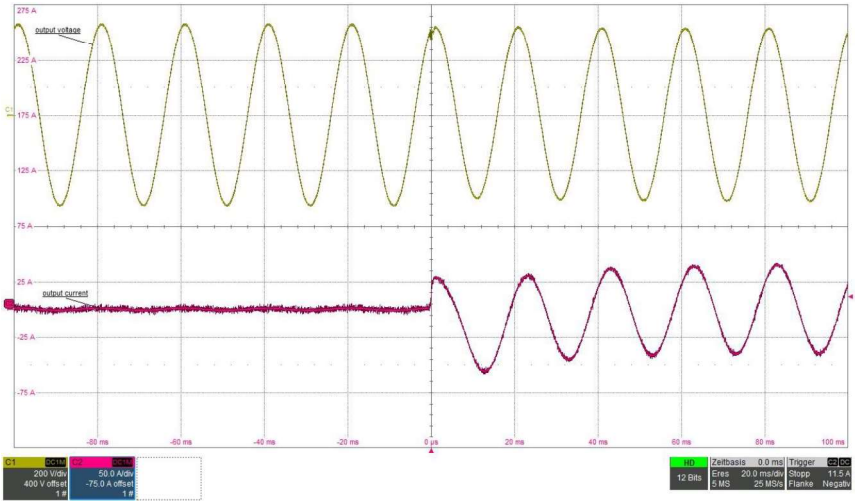
Acceptance Criteria:

Inverter O/P Voltage Tolerance:	230.9V +/-1% (max 233.2 Vac, min 228.6 Vac)
Response time: ≤ 2ms	According EN/IEC 62040-3 5.3.1 Figure1

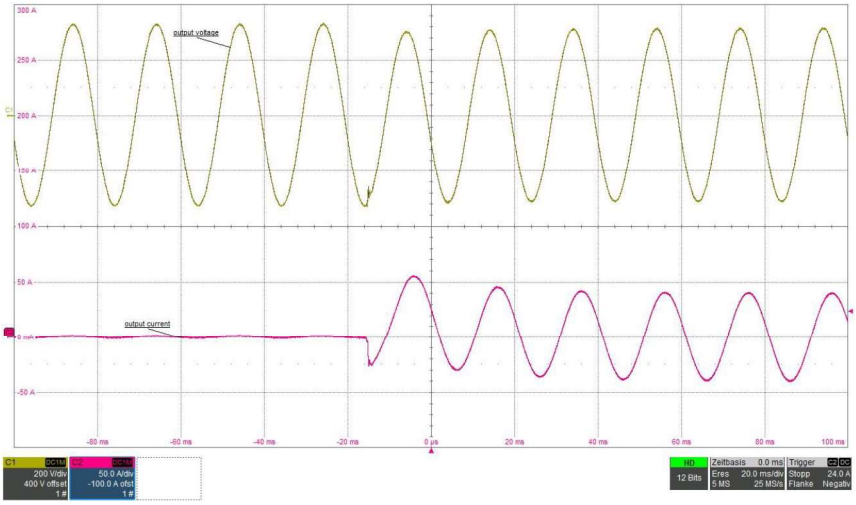
Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Load switched on
Connecting load from test field switch board
Test 0 to 100 % cos φ = 0.8 ind.
Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010849/001



UPS2 Serial-No.: 1010849/002

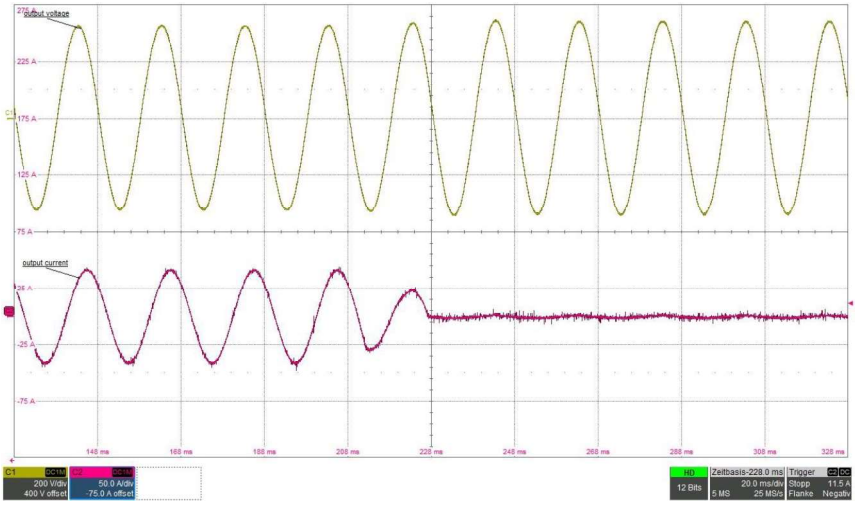


Result: Passed

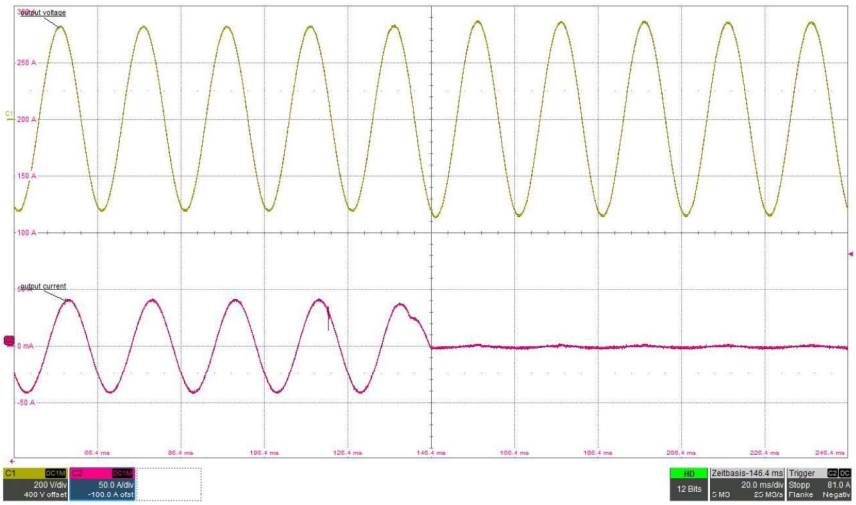
Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Load switched off
Disconnecting load from test field switch board
Test 100 to 0 % cos φ = 0.8 ind.
Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010849/001



UPS2 Serial-No.: 1010849/002



Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

5. Short Circuit Test:

Reference to EN / IEC 62040-3: 2021 Clause 6.4.2.9.2

Incorporates Tests for:

O/P Short Circuit via Fuse/MCB, without Bypass Mains available,
O/P Short Circuit via Fuse/MCB, with Bypass Mains available,
O/P Short Circuit @ terminals, with Inverter only.

Please note that “Inverter Load” relates to the Protect 8 rating with a power factor of 0.8 lag.

Acceptance Criteria:

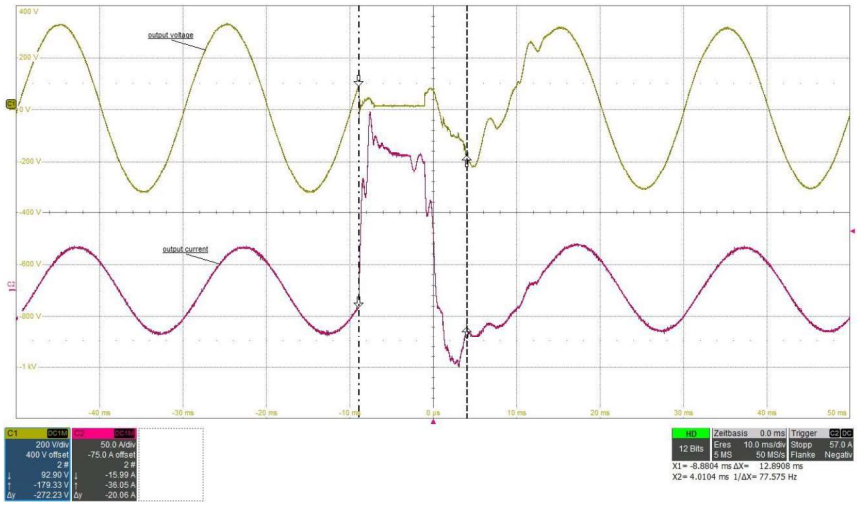
Fuse Characteristic Curves
Short circuit without bypass → Inverter trips fuse without switching OFF.
Short circuit with bypass → Inverter switch over to mains without gap and trip the fuse.
Terminal short circuit without Bypass mains → Inverter switches off after a certain time (Dynamic Current Limit Duration).
The Dynamic Current Limit Duration is approx. 500 ms
Recording of AC load voltage and AC load current

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

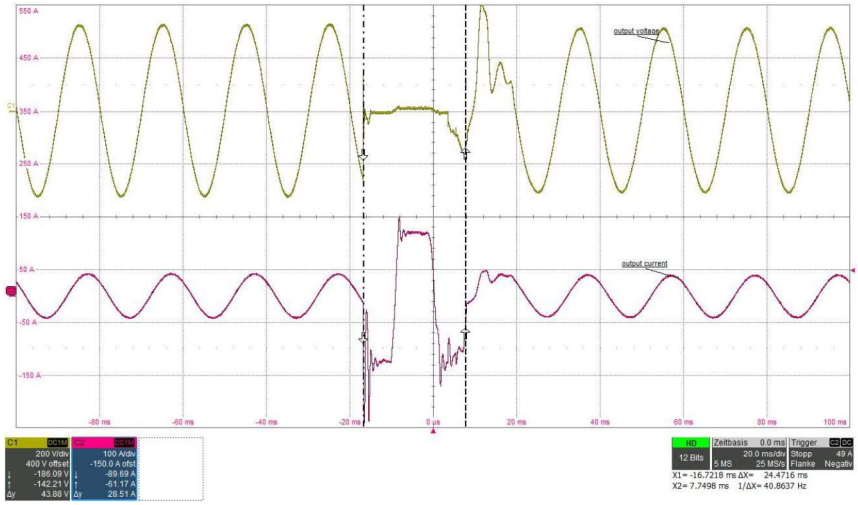
Short circuit without Bypass mains with fuse/MCB
Fuse is tripped by Inverter
Test on 100 % Load = 40 kVA cos φ = 0.8 ind.
Protection: 10 A fuse gG
Measured tripping time of the Fuse:
12.9 ms UPS1 Serial-No.: 1010849/001
24.5 ms UPS2 Serial-No.: 1010849/002

Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010849/001



UPS2 Serial-No.: 1010849/002

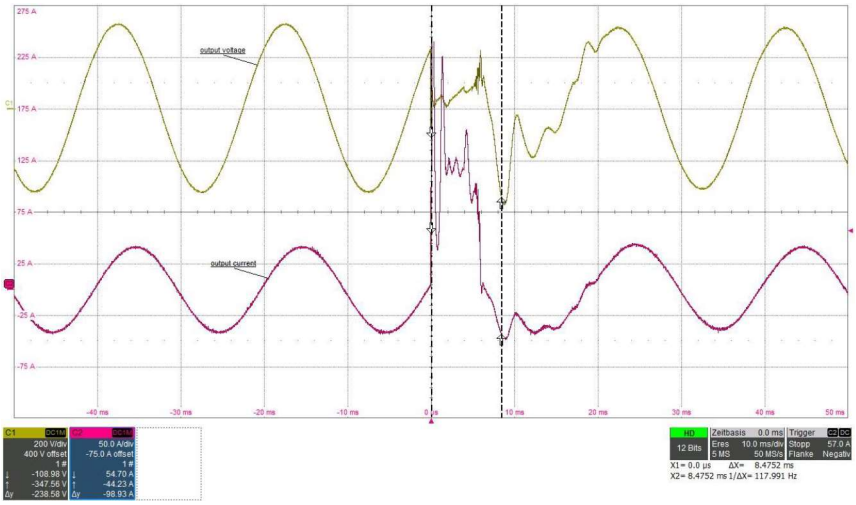


Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

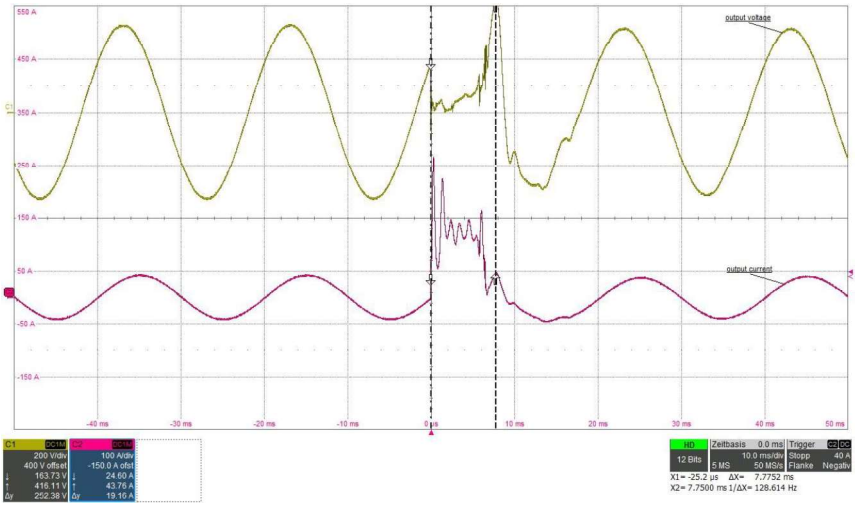
MCB is tripped by Inverter
Test on 100 % Load = 20 kVA cos φ = 0.8 ind.
Protection: 16 A MCB B-curve
Measured tripping time of the Fuse:
8.5 ms UPS1 Serial-No.: 1010849/001
7.8 ms UPS2 Serial-No.: 1010849/002

Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010849/001



UPS2 Serial-No.: 1010849/002

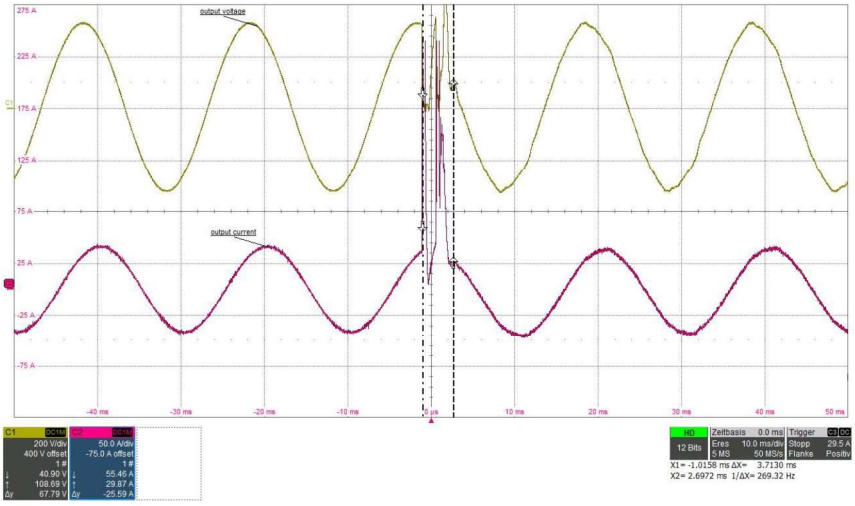


Result: Passed

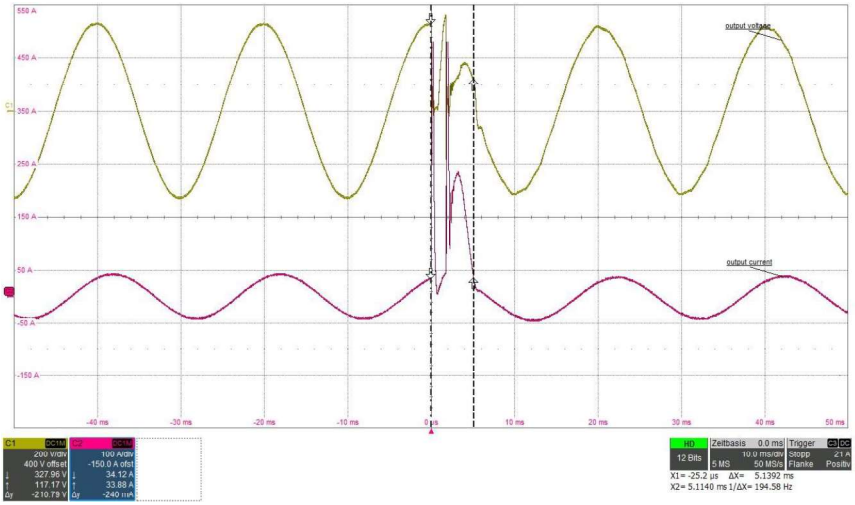
Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Short circuit with Bypass mains with fuse/MCB
Transfer to SBS. Fuse is tripped by SBS. Retransfer to Inverter
Test on 100 % Load = 40 kVA cos φ = 0.8 ind.
Protection: 10 A fuse gG
Measured tripping time of the Fuse/MCB:
3.7 ms UPS1 Serial-No.: 1010849/001
5.1 ms UPS2 Serial-No.: 1010849/002
Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010849/001



UPS2 Serial-No.: 1010849/002

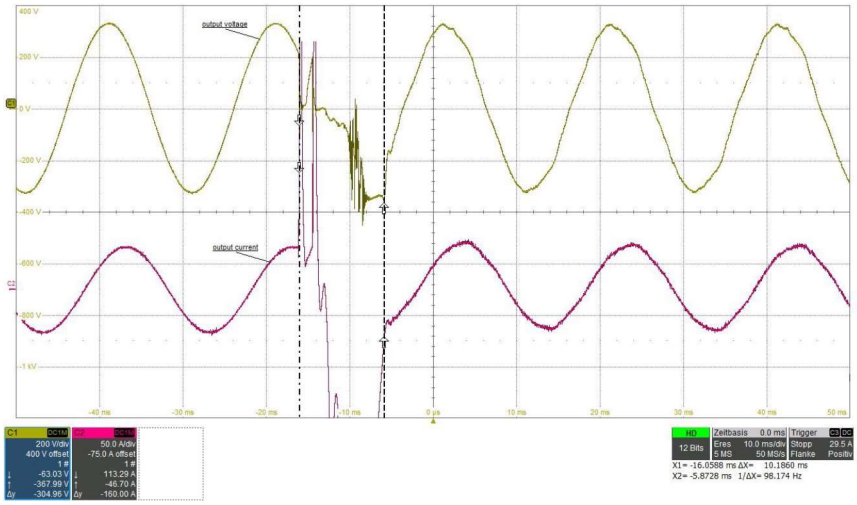


Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

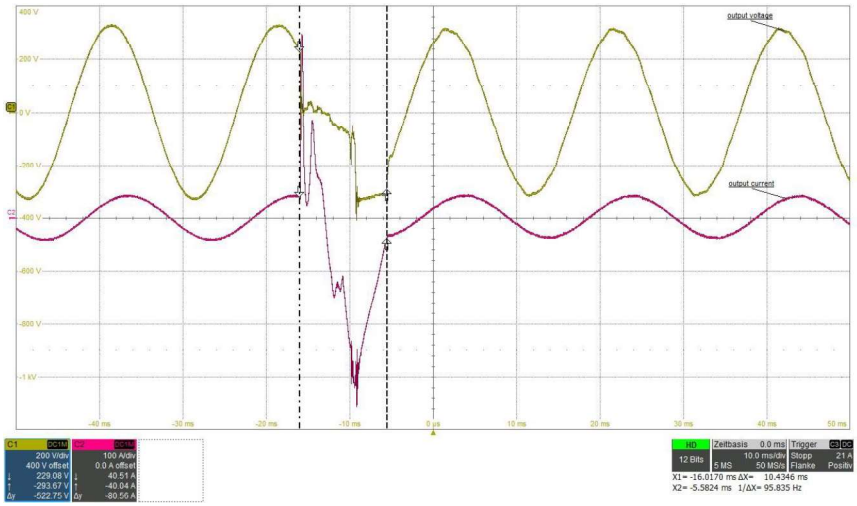
MCB is tripped by Inverter
Test on 100 % Load = 20 kVA cos φ = 0.8 ind.
Protection: 16 A MCB B-curve
Measured tripping time of the Fuse:
10.2 ms UPS1 Serial-No.: 1010849/001
10.4 ms UPS2 Serial-No.: 1010849/002

Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010849/001



UPS2 Serial-No.: 1010849/002



Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Terminal short circuit without Bypass mains

Inverter is supplying appox. 2.1 x Inom (3 phase) for measured time and then switched off

Test on 100 % Load = 20 kVA cos φ = 0.8 ind.

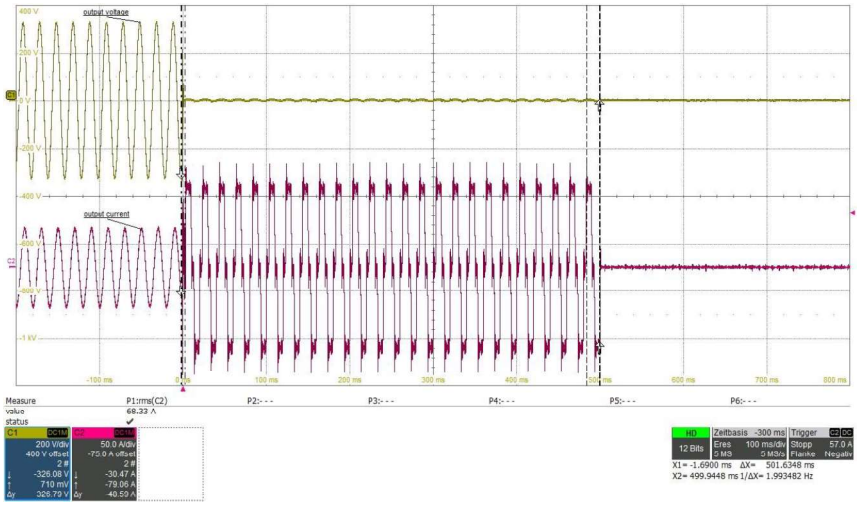
Measured switch off time Inverter:

502 ms / **68.3** A UPS1 Serial-No.: 1010849/001

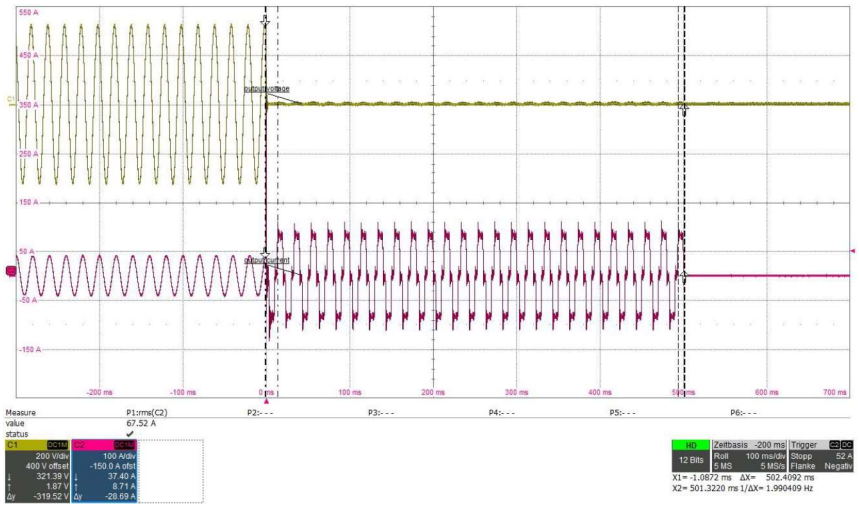
502 ms / **67.5** A UPS2 Serial-No.: 1010849/002

Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010849/001



UPS2 Serial-No.: 1010849/002



Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

6. Overload Test:

Reference to EN / IEC 62040-3: 2021 Clause 6.4.2.9.1

Incorporates Tests for:

150% Load Capability Test

Please note that “Inverter Load” relates to the Protect 8 rating with a power factor of 0.8 lag.

Acceptance Criteria:

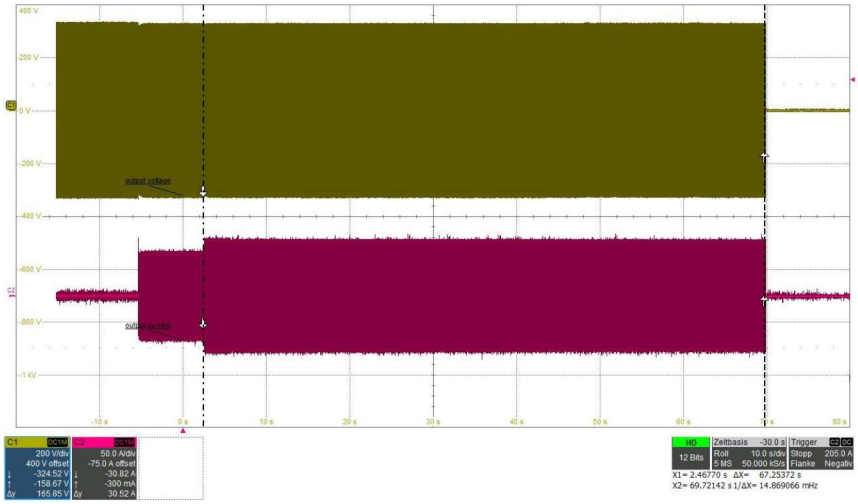
The Inverter swithes off after a certain time (Minimum Overlad Duration)

Inverter O/P Voltage Tolerance:	230.9V +/-1% (max 233.2 Vac, min 228.6 Vac)
Inverter Frequency Regulation:	50 Hz +/-0.2% (max 50.1 Hz, min 49.9 Hz)
Inverter O/P Voltage Distortion:	<3% (linear load)
Minimum Overload Duration:	approx. 60 seconds

Load connected from test field switch board
Load: 150% / cos φ = 0.8 ind. = 30 kVA
67 s UPS1 Serial-No.: 1010849/001
81 s UPS2 Serial-No.: 1010849/002

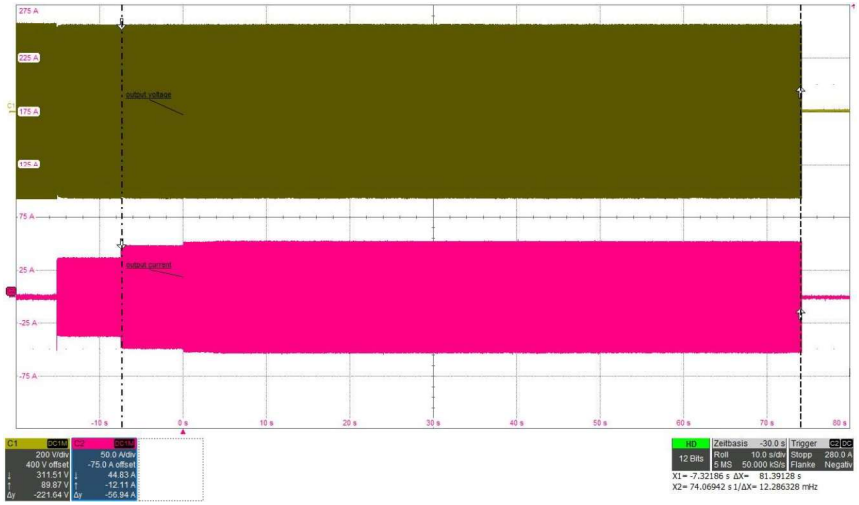
Recording of AC load voltage and AC load current at X3 **with screen shot**

UPS1 Serial-No.: 1010849/001



Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

UPS2 Serial-No.: 1010849/002



Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

7. Functional tests UPS / Load Transfer Tests:

Reference to EN / IEC 62040-3:2021 Clause 6.2.2.7 / 6.2.2.8 / 6.2.2.9

Incorporates Tests for:

Rectifier Mains Failure – continued Inverter operation via Battery
Rectifier Mains Return – auto start of the rectifier
Inverter Failure – transfer of load from Inverter to Bypass Mains
Inverter Restoration – transfer of load from Bypass Mains to Inverter

The tests are performed at Inverter full load.

Please note that “Inverter Load” relates to the Protect 8 rating with a power factor of 0.8 lag.

Acceptance Criteria:

Rectifier Mains Failure:	No disruption to the Inverter operation.
Rectifier Mains Return:	Auto start of the rectifier and charging of the Battery
Transfer Inverter to Static Bypass:	No-break transfers
Re transfer Static Bypass to Inverter:	No-break transfers

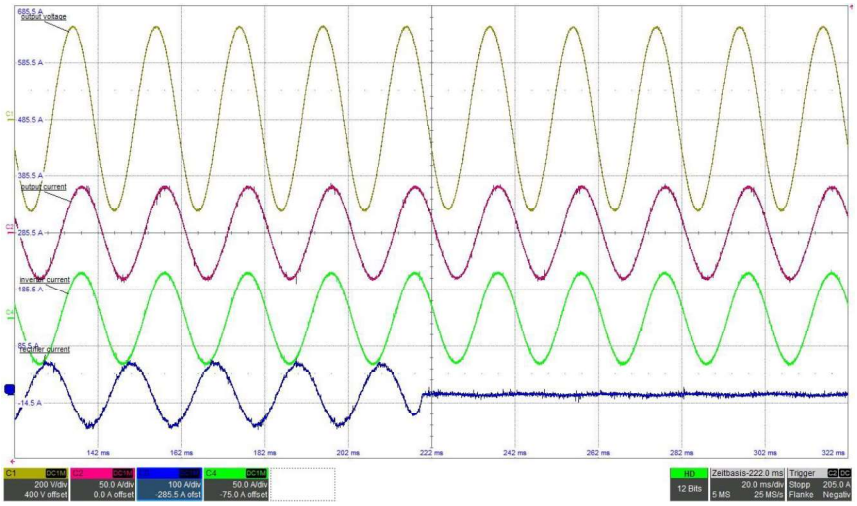
Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

A) Rectifier Mains Failure

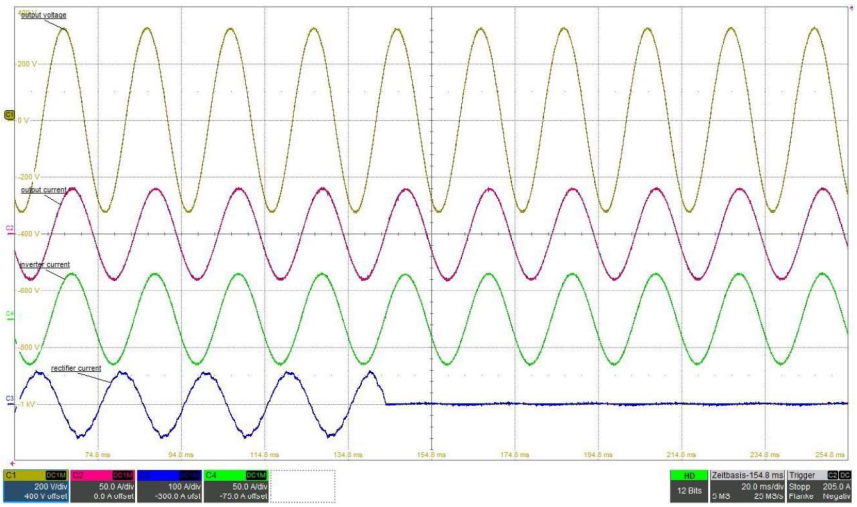
Switch OFF rectifier Mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

UPS1 Serial-No.: 1010849/001



UPS2 Serial-No.: 1010849/002



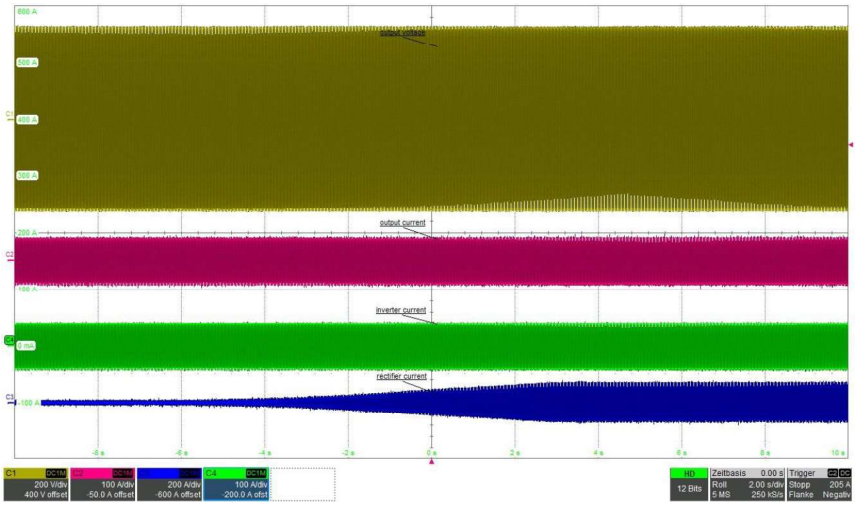
Result: Passed

B) Rectifier Mains Return

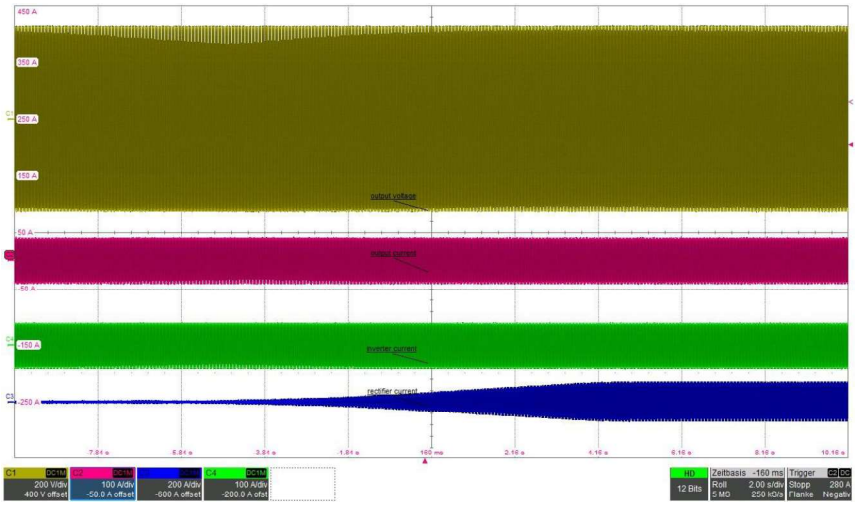
Switch ON rectifier mains via Rectifier input isolator Q1

Recording of Rectifier AC current at X1 and AC load voltage and AC load current at X3

UPS1 Serial-No.: 1010849/001



UPS2 Serial-No.: 1010849/002



Result: Passed

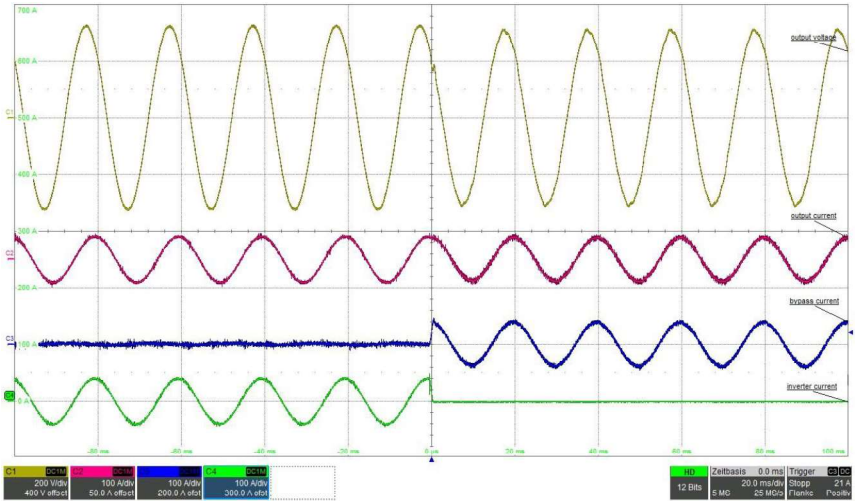
Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

C) Transfer inverter-SBS mains

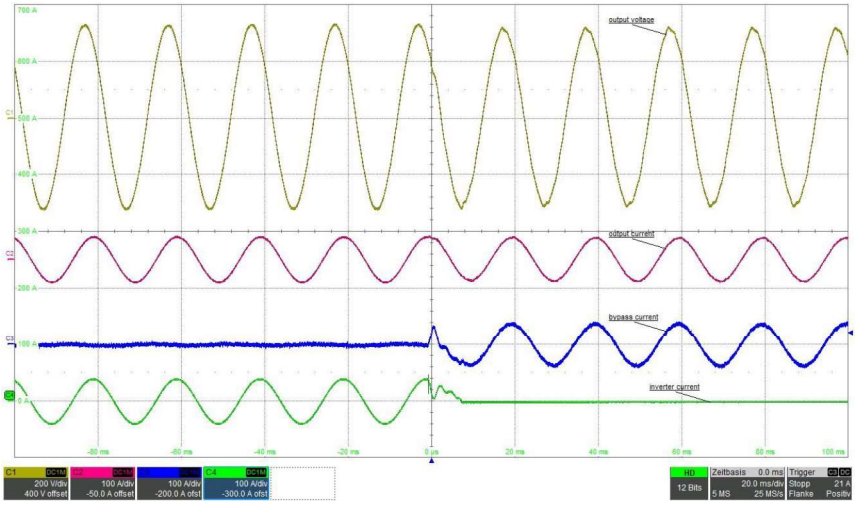
Switch OFF Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

UPS1 Serial-No.: 1010849/001



UPS2 Serial-No.: 1010849/002



Result: Passed

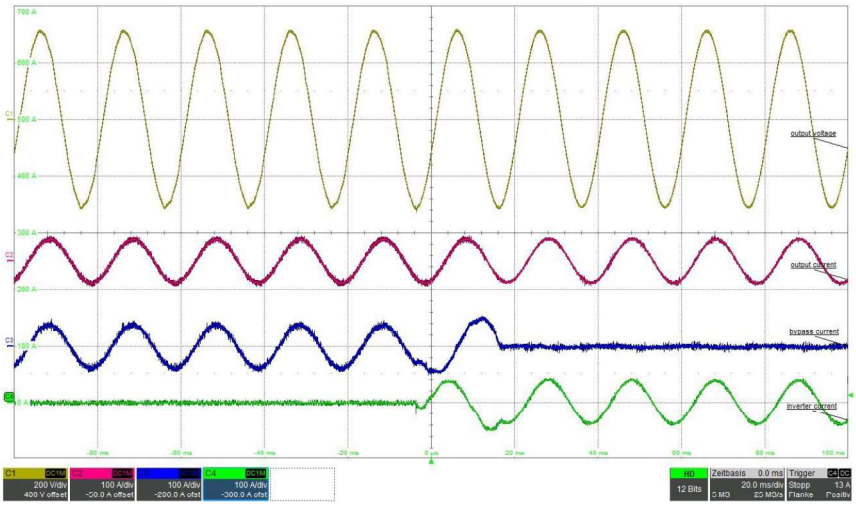
Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

D) Transfer SBS mains-inverter

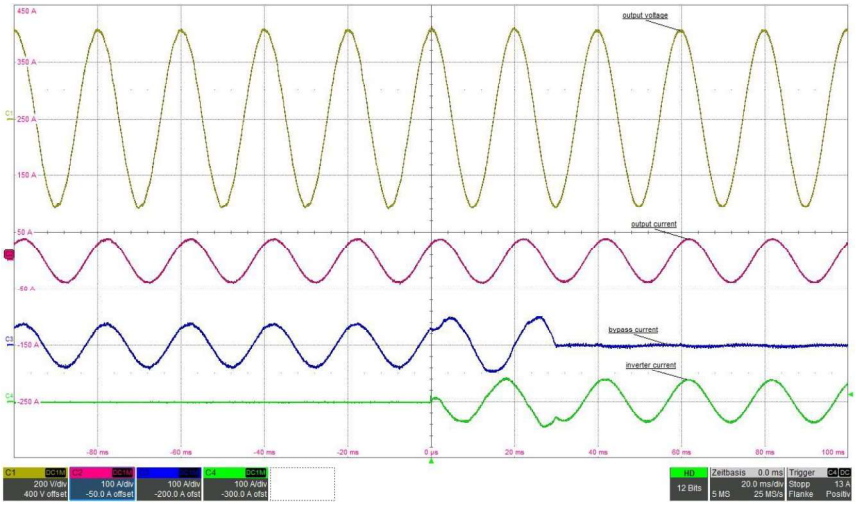
Switch ON Inverter via Display

Recording of AC load voltage and AC load current at X3 and Bypass current at X4

UPS1 Serial-No.: 1010849/001



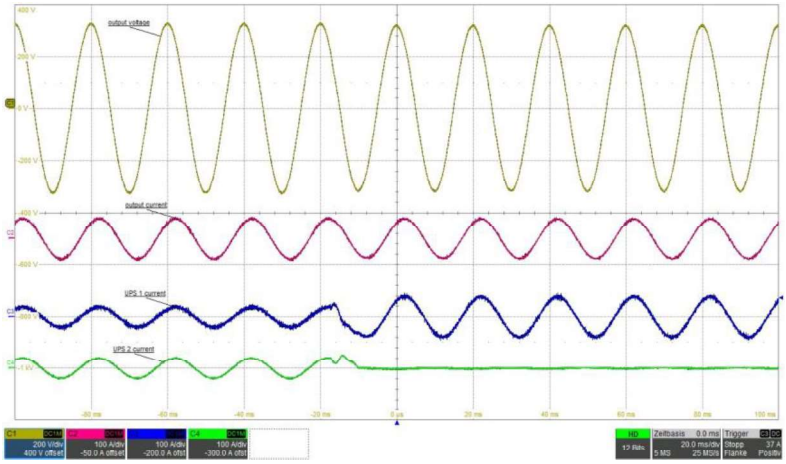
UPS2 Serial-No.: 1010849/002



Result: Passed

E) Parallel Operation

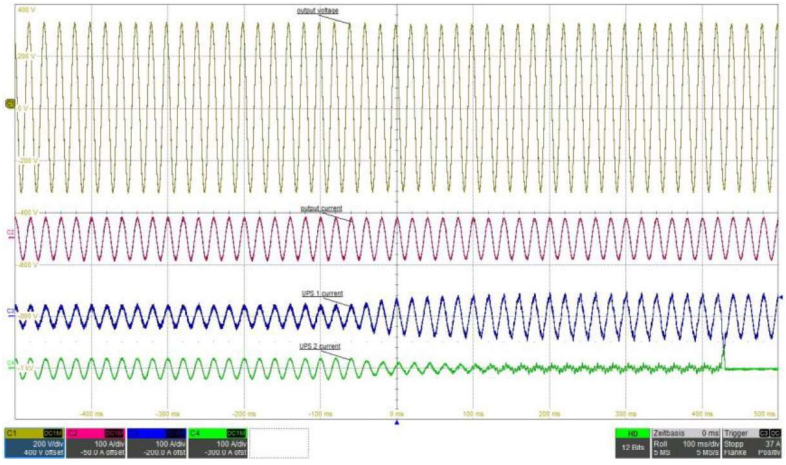
Parallel operation UPS n.1 and UPS n.2 - Switching OFF UPS n.2 via Display A18 on the door of the UPS
UPS n.1 takes over 100% Load
AC load voltage and AC load current and SBS current by screen shot.



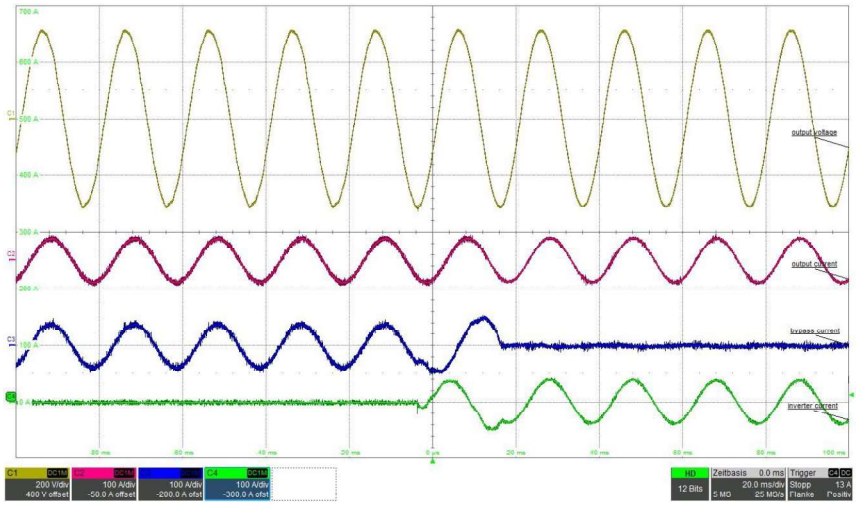
and in addition repeat the test as following indicated:

Parallel operation UPS n.1 and UPS n.2 - Switching OFF UPS n.2 via de-energization of its upstream power supply

UPS n.1 takes over 100% Load
AC load voltage and AC load current and SBS current by screen shot.

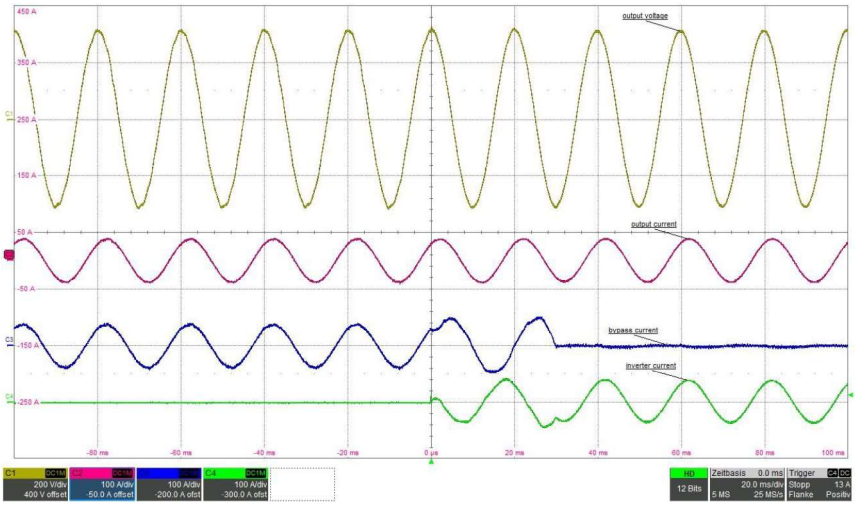


Switching OFF UPS n.1 via Display A18 on the door of the UPS
Transfer to Bypass operation
AC load voltage and AC load current and SBS current by screen shot.



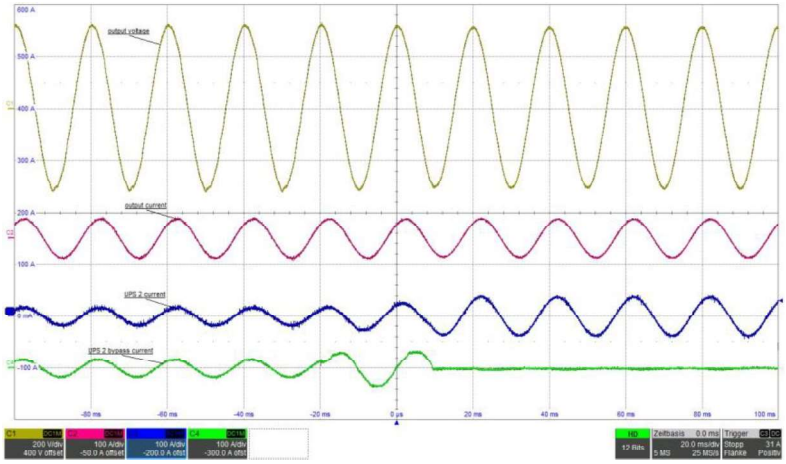
and in addition repeat the test as following indicated:

Switching OFF UPS n.1 via de-energization of its upstream power supply
Transfer to Bypass operation
AC load voltage and AC load current and SBS current by screen shot.



Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Bypass operation - Switching ON UPS n.2 via Display A18 on the door of of the UPS
UPS n.2 takes over 100% load
AC load voltage and AC load current and SBS current by screen shot.



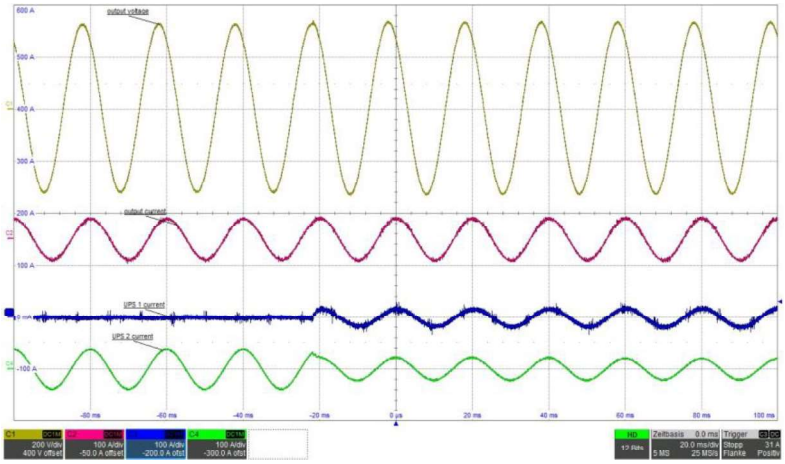
<u>and in addition repeat the test as following indicated:</u>

Bypass operation - Switching ON UPS n.2 via re-energization of its upstream power supply
UPS n.2 takes over 100% load
AC load voltage and AC load current and SBS current by screen shot

NA, because after switch on Q1, the INV must be started via display. → Same as previous step.

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

Switching ON UPS n.1 via Display A18 on the door of of the UPS
Load sharing 50%
Parallel operation with load sharing 50% of UPS n.1 and UPS n.2
AC load voltage and AC load current and SBS current by screen shot.



and in addition repeat the test as following indicated:

Switching ON UPS n.1 via re-energization of its upstream power supply
Load sharing 50%
Parallel operation with load sharing 50% of UPS n.1 and UPS n.2
AC load voltage and AC load current and SBS current by screen shot.

NA, because after switch on Q1, the INV must be started via display. → Same as previous step.

Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

F) Parallel Operation (functional sequence test)
Starting condition:
UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.2
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.1 at the correct load
4. Re-energize upstream power supply to Rectifier input n.2
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

G) Parallel Operation (functional sequence test)
Starting condition:
UPS redundant system working in normal operation with By-Pass input and both Rectifier inputs n.1 and n.2 all energized. UPS n.1 and UPS n.2 synchronized with the By-Pass

1. De-energize upstream power supply to Rectifier input n.1
2. De-energize upstream power supply to By-Pass
3. Confirm the normal operation of UPS n.2 at the correct load
4. Re-energize upstream power supply to Rectifier input n.1
5. Confirm the correct synchronization and normal operation of both UPS n.1 and n.2 with load sharing activated
6. Re-energize upstream power supply to By-Pass
7. Confirm reinstatement and normal operation of all UPS unit functions.
8. At each test step, validate correct functioning of hardwired I/O signals

Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

8. DC Ripple Current Measurement

with Test field battery

Reference to EN / IEC 62040-3:2021 Clause 6.4.3.3

Acceptance Criteria:

Current ripple of less than 5 A rms for every 100 Ah / Measured with test field battery with **screen shot**

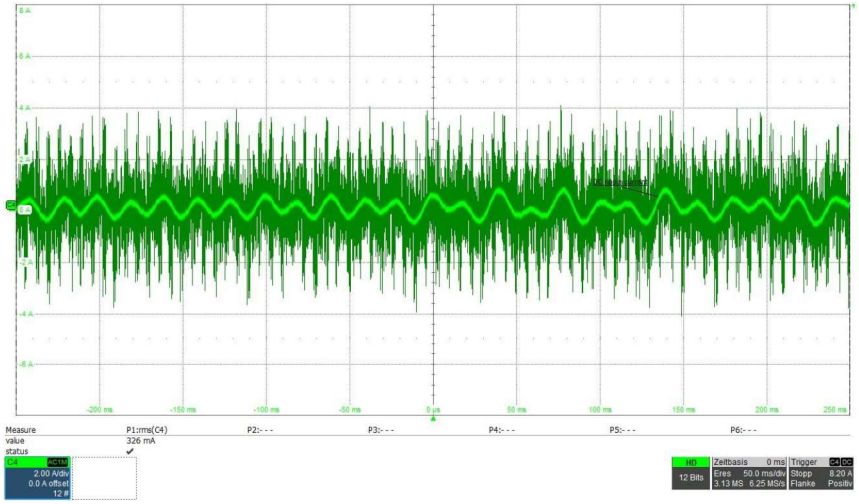
The capacity of the test field battery is 300Ah.

The measured value is (1 V = 1 A)

0.3 A rms UPS1 Serial-No.: 1010849/001

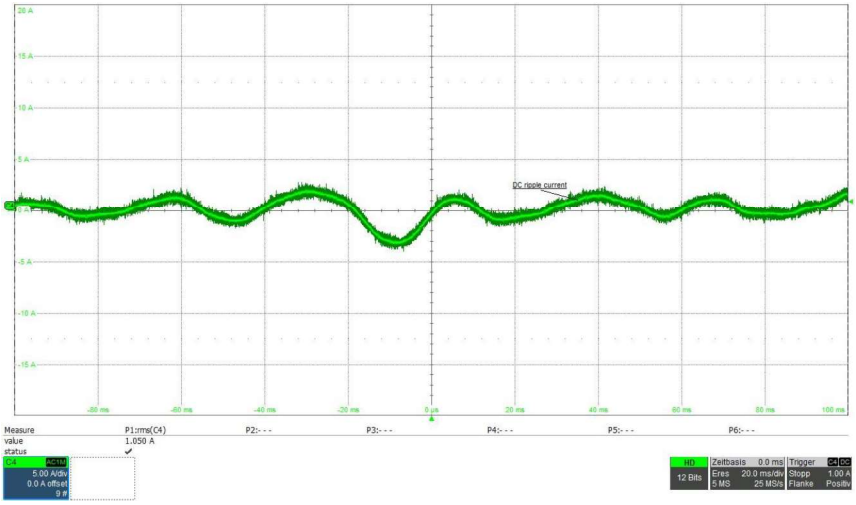
1.1 A rms UPS2 Serial-No.: 1010849/002

UPS1 Serial-No.: 1010849/001



Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

UPS2 Serial-No.: 1010849/002



Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

9. MODBUS Adapter (Demonstration)

Incorporates Tests for:
A29.1 MODBUS Adapter

Test to be performed for chosen failure messages, status messages and measuring values.

Designation	Source	Terminals	Checked
MODBUS Adapter	A29.1	A29.1	**Okay**

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

10. Alarm Test:

Reference to EN IEC 62040-3:2021 Clause 6.2.2.3

Incorporates Tests for:

Remote Alarm signalling on Boards A12/A13
System Operational Check

Acceptance Criteria:

Technical datasheet (TD)

Designation	Terminals	Relay/Opto	Result
Inverter operation 1)	UPS A12-X3: 1, 2, 3	**A12K21**	**Okay**
SBS operation 1)	UPS A12-X3: 4, 5, 6	**A12K22**	**Okay**
Rec Fault / Rec mains fault 1)	UPS A12-X3: 7, 8, 9	**A12K23**	**Okay**
Battery undervoltage 1)	UPS A12-X3: 10, 11, 12	**A12K24**	**Okay**
Common fault 2)	UPS A12-X4: 1, 2, 3	**A12K25**	**Okay**
SBS blocked 1)	UPS A13-X3: 1, 2, 3	**A13K26**	**Okay**
DC voltage < 178 V 1)	UPS A13-X3: 4, 5, 6	**A13K27**	**Okay**
BAT room fan on 1)	UPS A13-X3: 7, 8, 9	**A13K28**	**Okay**
INV remote off 3)	UPS A12-X5: 1, 2	**A12Opto1**	**Okay**
BAT room fan fault 3)	UPS A13-X4: 1, 2	**A13Opto2**	**Okay**
BAT MCCB open 3)	UPS A13-X4: 3, 4	**A13Opto3**	**Okay**
Fan fault 1)	Bypass X12: 7, 8, 9	**N/A**	**Okay**
Common fault 1)	Bypass X12: 10, 11, 12	**N/A**	**Okay**

1) Remote signal / close on the terminals with the lower number
2) Remote signal / close on the terminals with the higher number
3) OPTO Input

Result: Passed

Factory Acceptance Test Report		Document-No.: 14188_FAT_2
Type:	**UPS System Protect 8.33/20kVA-S10**	**Tag No.: BC-200F4A, BC-200F4B, BY-200F4**

11. Measuring Devices:

AEG internal Measuring device No.:	Measuring device name	Seriel number:	Calibrated until:
24740	LeCroy WS4024HD	LCRY4903C18666	Sep 25
23265	TesTec TT-SI 9010	112048	Dez 24
22263	Fluke 8846 A	9718026	Dez 24
23188	Fluke 8846 A	1586024	Dez 24
23187	Fluke 8846 A	1586003	Nov 24
23346	Fluke 43 B	16880401	Mrz 26
23373	Shunt 600/60mV/A	-	Dez 25
23987	Fluke I 400 S	20690042	Dez 24
24214	Fluke I 1000 S	98261327	Jul 25
20996	Fluke I 1000 S	932684033	Nov 24

12. Remarks:

1. TAG tag plates must be engraved and mounted → Done → Closed
2. The cover in front of the power terminals in the UPS units must be closed at the top. → Done → Closed.
3. Assembly drawing of the bypass cabinet must be updated to 'as built'.
4. Start-up and shut-down instructions must be prepared by AEG for this specific system and handed over to Rosetti Marino.

Base Load Power Hub (BLPH)

DC UPS - TAG: UP-200F1
FACTORY ACCEPTANCE TEST PROCEDURE

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Base Load Power Hub (BLPH)

DC UPS - FACTORY ACCEPTANCE TEST PROCEDURE

Document Number: 1724000372-QC-PRO-00016

Document Class: 2

01	13/07/2024	Issue for Review (IFR)	DA	DA	AD
00	01/06/2024	Issue for Review (IFR)	DA	DA	AD
Rev.	Date	Description	Prepared	Reviewed	Approved

3W power | a company of AEG POWER SOLUTIONS

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Issue for Review (IFR)

HOLDS LIST

No.	Description
1	
2	
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Description	Sheet
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DC UPS - FACTORY ACCEPTANCE TEST PROCEDURE	4

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AEG POWER SOLUTIONS

Project	Hollandse Kust Noord (HKN) wind farm
Client	ROSETTI MARINO
Equipment/s to be tested during FAT	1 x 2TPRE 110V 100A 10x FLG12-150 (CHARG.1) 1 x 2TPRE 110V 100A 10x FLG12-150 (CHARG.2)
Serial number	TPRE 3855/01 TPRE 3855/02
Order number	4400007526 (OV59193)

Participants:	Company:
ALBERTO DALL'ASTA	3W POWER - AEG ITALY
Alberto Trujillo	AEGPS (PM)
Teo Salgado	AEGPS (Q)
STEFANO LINARI	ROSETTI MARINO (SQL)
ANTHONY VESSON	Rosetti Marino (Comm Mgr)

☐ ACCEPTED ☐ ACCEPTED WITH COMMENTS ☐ REFUSED

For the Customer:
Date, Name, Signature:
17/07/2024
LINARI STEFANO
17 July 2024

For AEG Power Solutions:
Date, Name, Signature: 17/07/2024
AEG POWER SOLUTIONS
Calidad / Quality

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1. SCOPE

The scope of this document is to describe the test procedure to follow during the factory acceptance test of the system, and to record the values measured during the tests.

List of equipment within the scope of the PO:

EQUIPMENTS			
TAG	**Serial Number**	**Code**	**Description**
	TPRE3855/01	ES521464A1	2x TPRE 110V 100A 10x FLG12-150 (CHARG.1)
	TPRE3855/02	ES521464A2	2x TPRE 110V 100A 10x FLG12-150 (CHARG.2)
		ES521464R1	SPARES 2x TPRE 110V 100A 10x FLG12-150
		ES521464R2	SPA.2YEARS 2x TPRE 110V 100A 10x FLG12-150

List of equipment subjected to FAT:

EQUIPMENTS			
TAG	**Serial Number**	**Code**	**Description**
	TPRE3855/01	ES521464A1	2x TPRE 110V 100A 10x FLG12-150 (CHARG.1)
	TPRE3855/02	ES521464A2	2x TPRE 110V 100A 10x FLG12-150 (CHARG.2)

2. REFERENCE DOCUMENTS

ref. **1724000372-EL-DA-00003** DC UPS - GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS
ref. **1724000372-EL-DG-00006** DC UPS - SINGLE LINE DIAGRAM and INTERCONNECTING DIAGRAM
ref. **1724000372-EL-DG-00008** DC UPS - WIRING DIAGRAM & TERMINAL SCHEDULE
ref. **ES521464_SCH**

These documents include the electrical values, single line drawing, electrical drawing, internal mechanical layout and general arrangement drawing.

3. TESTING EQUIPMENT

Multimeters

Current clamp

Oscilloscope (If needed)

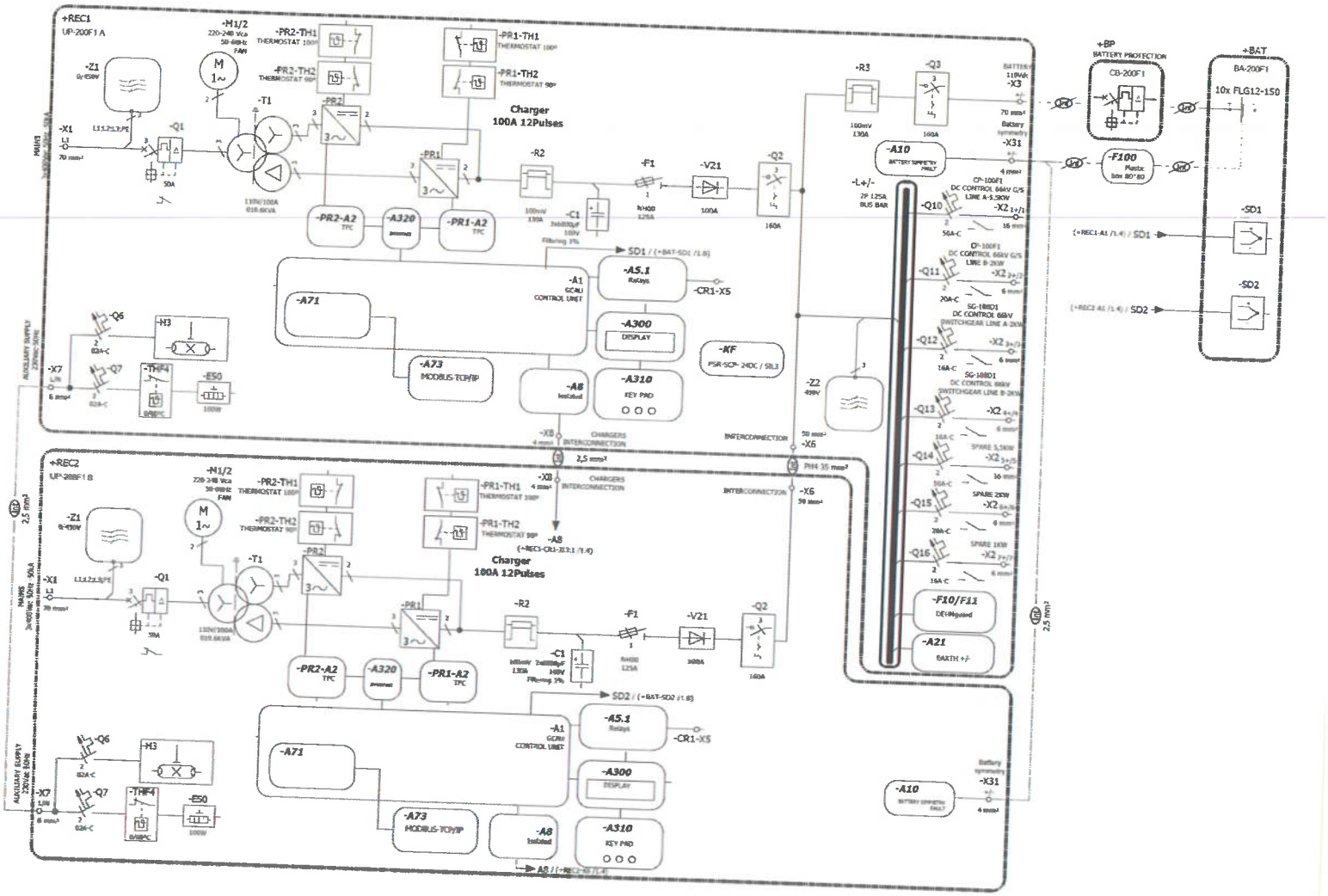
Mains voltage variator

Resistive adjustable load (100% of nominal power)

AEG internal testing battery bank: The client's batteries are never subjected to tests. Therefore, they are never connected for FAT development.

Calibration certificates can be provided upon request for all testing equipment.

4. CONNECTION DIAGRAM



5. VISUAL INSPECTION

5.1. General construction

Check	Conformity with drawings
Location and labelling components identifications	OK
Cabinet TAGs labelling	UP-200F1A UP-200 F1B
Cabinet name plate	OK
Paint (RAL7035)	OK
Protection degree (IP43)	OK
Dimensional check	(600x300x2000)x2 OK
Cabling (numbering, crimping) & assembly (connection torque)	OK

5.2. Protections

Check	Conformity with drawings
Mains protections	Q1 50A
Load protections	Q2 160A
Battery switch/Breaker/Fuse	Q3 160A
Auxiliary devices protections	Q6-2A / Q7-2A
Provision for cabinet earthing (bar X0, ground cabling)	OK **

* Complete plastic protection?

** Q10 .... Q16 → OK as per drawing

*** Possibility of additional ground bar for instrumentation

6. FUNCTIONAL INSPECTION

6.1. Static test

Ambient temperature during the tests: 20 °C

6.2. Functional test

Initial state : Charger is OFF
Input circuit breaker Q1 is open
Output switch (Q2) and battery switch (Q3) are open

Starting : Close Q2
Charger is powered ON by closing the input circuit breaker Q1
Output switch (Q2) and battery switch (Q3) are closed
Only the charger subject to the test is ON
The mains is adjusted to its nominal value

Test description : The load is adjusted to 10, 50 and 100% of the system nominal load
The input and output electrical values are recorded and shall remain within the acceptance criteria
The tests are done in floating and high rate mode

Rectifier and load output voltage : CHARGER 1

Mode	Rectifier output power	AC mains voltage	Rectifier output current	Rectifier output voltage to obtain (VBAT)	Measured rectifier output voltage	Load output voltage to obtain (VBAT-V21)	Measured load output voltage	Conformity (Yes/No)
Floating (2'25)	10%	3x400Vac	10A	136,8V +/-1%	137'1 V	136,8V+/-1%	137'1 V	OK
Floating	50%	3x400Vac	50A	136,8V +/-1%	136'9 V	136,8V+/-1%	136'9 V	OK
Floating	100%	3x400Vac	100A	136,8V +/-1%	136'7 V	136,8V+/-1%	136'7 V	OK
High rate (2'30)	10%	3x400Vac	10A	136,8V +/-1%	— V	136,1V+/-1%	— V	—
High rate	50%	3x400Vac	50A	136,8V +/-1%	— V	136,1V+/-1%	— V	—
High rate	100%	3x400Vac	100A	136,8V +/-1%	— V	136,1V+/-1%	— V	—

(*) The rectifier voltage shall be corrected with the temperature compensation ratio if applicable.

Rectifier output ripple voltage: CHARGER1

Mode	Rectifier output power	AC mains voltage	Rectifier output current	Ripple voltage to obtain	Measured ripple voltage	Conformity (Yes/No)
Floating	100%	3x400V	100A	<5% of U nominal DC without battery	20'2 Vrms	OK

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Rectifier and load output voltage : CHARGER 2

Mode	Rectifier output power	AC mains voltage	Rectifier output current	Rectifier output voltage to obtain (VBAT)	Measured rectifier output voltage	Load output voltage to obtain (VBAT-V21)	Measured load output voltage	Conformity (Yes/No)
Floating 135	10%	3x400Vac	10A	~~136,8~~V +/-1%	135'8 V	136,1V+/-1%	135'8 V	OK
Floating 135	50%	3x400Vac	50A	~~136,8~~V +/-1%	135'5 V	136,1V+/-1%	135'5 V	OK
Floating 135	100%	3x400Vac	100A	~~136,8~~V +/-1%	135'2 V	136,1V+/-1%	135'2 V	OK
High rate 138	10%	3x400Vac	10A	~~136,8~~V +/-1%	138'8 V	136,1V+/-1%	138'8 V	OK
High rate 138	50%	3x400Vac	50A	~~136,8~~V +/-1%	138'6 V	136,1V+/-1%	138'6 V	OK
High rate 138	100%	3x400Vac	100A	~~136,8~~V +/-1%	138'2 V	136,1V+/-1%	138'2 V	OK

(*) The rectifier voltage shall be corrected with the temperature compensation ratio if applicable.

Rectifier output ripple voltage: CHARGER 2

Mode	Rectifier output power	AC mains voltage	Rectifier output current	Ripple voltage to obtain	Measured ripple voltage	Conformity (Yes/No)
Floating	100%	3x400V	100A	<5% of U nominal DC without battery	<0'22	OK

6.3. Alarm test

Description	Relay	Display	LED Box	Result (OK/NOK/Not applicable)	
				CH 1	CH 2
MAINS FAULT	OK	OK	—	OK	
RECTIFIER FAULT	OK	Ok	—	OK	
HIGH VOLTAGE C.C 147 V	Ok	Ok	—	OK	
LOW VOLTAGE D.C. 111 V	OK	OK	—	Ok	
BATTERY LOW VOLTAGE 117 V	OK	Ok	—	Ok	
EARTH FAULT +	OK	ok	—	0	
EARTH FAULT -	OK	ok	—	OK	
COMMON ALARM	OK	ok	—	OK	

ok Battery ~~breaker~~ box breaker (not supplied by ~~AEG~~)
~~So~~ signal to implement incharger

7. ADDITIONAL TESTS

7.1. Parallel redundancy tests

Initial state : Both chargers are OFF
Input breakers Q1 are open
Output switches (Q2) and battery switch (Q3) are open

Starting : Chargers are powered ON by closing input breakers Q1 Q2 then Q1
Output switches Q1 are closed to put the two chargers in parallel
Battery switch Q3 remains open to simulate the worst condition (no battery)
The 2x chargers are now working and connected in parallel (floating mode)
The load is adjusted to 100% of the system nominal load
The mains is adjusted to its nominal value

Test description : To initiate the load transfer from redundant chargers to one charger, the relevant charger is stopped from mains
To initiate the load transfer to initial state, the relevant charger is turned ON from mains

Load transfer between the 2 chargers

Test	*Load transfer to charger 2*	*Recovery to initial state*	*Load transfer to charger 1*	*Recovery to initial state*
Acceptance criteria	No load supply interruption, the second charger takes 100% of the load	No load supply interruption. Return to dual redundant mode	No load supply interruption, the second charger takes 100% of the load	No load supply interruption. Return to dual redundant mode
Conclusion the test (OK/NOK)				

7.2. Performance tests

Check	Conformity with drawings
Insulation test (review of the routine test reports)	
Rectifier Current limitation 100A	OK, we get the alarm
Battery Current limitation 15A	OK, current of bat. limited to max 15A.
Burn in test 24 hours to 1 charger	

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8. COMMENTS

* Factory routine test to be updated with customer new requirements
  - 2 level of charge (Floating 2'25V + HR 2'30V)
  - Alarm for ESD STOP BOOST
* Updating of drawing for all changes
* ~~- Complete~~ safety protection already mounted IP2x ~~but customer ask for additional~~ mechanical protection inside door more
  ~~- Additional ground bar for instrumentation~~
* To add hardware for battery box breaker (not supplied by AEG) alarm and communications
*

9. APPENDICES

Document	Document reference
CHARGER 1 routine test reports	
CHARGER 2 routine test reports	

* AEG to sure all the parts fulfil IP2x
* Converter/adapter RJ45 to screw terminals requested additionally by customer (to be study/quoted)
* Burning test report to be attached
* CE declaration to provide
* Packing list to include clear information about interconnections
* Photos of the Spare parts and interconnection before shipping.

AEGPS_DOC_REV01
CAE EPLAN Electric P8
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+REC1

-M1/2
220-240 Vca
50-60Hz
FAN

-PR2-TH1
THERMOSTAT 100°

-PR2-TH2
THERMOSTAT 90°

-PR1-TH1
THERMOSTAT 100°

-PR1-TH2
THERMOSTAT 90°

Charger
100A 12Pulses

-Z1
0/450V

-X1
L1
70 mm²

MAINS
3x400Vac 50Hz -50kA

L1;L2;L3;PE

-Q1
50A

-T1
110V/100A
019.6KVA

-PR2
-PR1

-R2
100mV
130A

-C1
3x6800µF
160V
Filtering 1%

-F1
NH00
125A

-V21
100A

-Q2
160A

-R3
100mV
130A

-Q3
160A

BATTERY
110Vdc
-X3
+/-
70 mm²

Battery
symmetry
-X31
+/-
4 mm²

-A10
BATTERY SIMMETRY
FAULT

-L+/-
2P 125A.
BUS BAR

+BP
BATTERY PROTECTION
NON SUPPLIED BY AEG PS

-F100
Plastic
box 80*80

+BAT
60 Cells
10x FLG12-150

-SD1
(+REC1-A1 /1.4) / SD1

-SD2
(+REC2-A1 /1.4) / SD2

CP-100F1
DC CONTROL 66kV G/S
LINE A-5.5KW
-Q10
-X2 1+/1-
16 mm²
50A-C

CP-100F1
DC CONTROL 66kV G/S
LINE B-2KW
-Q11
-X2 2+/2-
6 mm²
20A-C

SG-100D1
DC CONTROL 66kV
SWITCHGEAR LINE A-2KW
-Q12
-X2 3+/3-
6 mm²
16A-C

SG-100D1
DC CONTROL 66kV
SWITCHGEAR LINE B-2KW
-Q13
-X2 4+/4-
6 mm²
16A-C

SPARE 5,5KW
-Q14
-X2 5+/5-
16 mm²
50A-C

SPARE 2KW
-Q15
-X2 6+/6-
6 mm²
20A-C

SPARE 1KW
-Q16
-X2 7+/7-
6 mm²
16A-C

-F10/F11
DEHNguard

-A21
EARTH +/-

-Z2
400V

VBAT

VOUT

=20A

4100111

-A1
GCAU
CONTROL UNIT

-A5.1
Relays

-CR1-X5

-A71

-A300
DISPLAY

-A73
MODBUS-TCP/IP

-A8
Isolated

-A310
KEY PAD

-KF
PSR-SCP- 24DC / SIL3

SD1 / (+BAT-SD1 /1.8)

AUXILIARY SUPPLY
230Vac-50Hz

-Q6
02A-C

-H3

-X7
L/N
6 mm²

-Q7
02A-C

-THF4
0/60°C

-E50
100W

-X8
4 mm²
CHARGERS
INTERCONNECTION

2,5 mm²

INTERCONNECTION
-X6
50 mm²

PH4 35 mm²

-A8
(+REC1-CR1-J13:1 /1.4)

+REC2

2,5 mm²

-M1/2
220-240 Vca
50-60Hz
FAN

-PR2-TH1
THERMOSTAT 100°

-PR2-TH2
THERMOSTAT 90°

-PR1-TH1
THERMOSTAT 100°

-PR1-TH2
THERMOSTAT 90°

Charger
100A 12Pulses

-Z1
0/450V

-X1
L1
70 mm²

MAINS
3x400Vac 50Hz -50kA

L1;L2;L3;PE

-Q1
50A

-T1
110V/100A
019.6KVA

-PR2
-PR1

-R2
100mV
130A

-C1
3x6800µF
160V
Filtering 1%

-F1
NH00
125A

-V21
100A

-Q2
160A

SD2 / (+BAT-SD2 /1.8)

-A1
GCAU
CONTROL UNIT

-A5.1
Relays

-CR1-X5

-A71

-A300
DISPLAY

-A73
MODBUS-TCP/IP

-A8
Isolated

-A310
KEY PAD

A8 / (+REC2-X8 /1.4)

AUXILIARY SUPPLY
230Vac-50Hz

-Q6
02A-C

-H3

-X7
L/N
6 mm²

-Q7
02A-C

-THF4
0/60°C

-E50
100W

Battery
symmetry
-X31
+/-
4 mm²

-A10
BATTERY SIMMETRY
FAULT

ES521464

				Date	21/03/2024	3W POWER S.P.A.	AEG POWER SOLUTIONS	Single-line	= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm		System	+ 8 / 47
				Checked	JOP				& EFA A3 Sheet 1
Stat.	Alteration	Date	Name	Standard				ES521464 en	Sheets 1

AEGPS_DOC_REV01
CAE EPLAN Electric P8

Type 2xTPRe 110V 100A Battery 10x FLG12-150 (60 Cells) (NON SUPPLIED) Mains AC 3x400Vac 50Hz

SETTINGS **20°C** TEMPERATURE COMPENSATION

FLOATING CHARGE	~~2,28~~ V/cel	X	2'25
HIGH RATE CHARGE	2,28 V/cel		2'30

WIRING

CABLE LABELLING : Standard AEG PS

CABLE TYPE : Standard AEG PS

SECTION SEE WIRING SCHEMATIC

This system includes some components which must be replaced periodically. The average life time of these components is provided in parts list section of this document. Please contact your nearest customer service location for more information

FITRAGE	1%
PROTECTION WITH DOOR OPEN	IP 20
PROTECTION WITH DOOR CLOSED	IP 43
ELECTRONIC BOARDS VARNISHED	
COMPONENTS LABEL	Engraved indivual labels

RELAY CHARACTERISTICS

Common alarm (GCAU card) : 250VAC/5A

24Vdc	48Vdc	110Vdc	220Vdc
6A	1,2A	0,3A	0,1A

Relay Alarm (Relay PCB) : 250VAC/5A

24Vdc	48Vdc	110Vdc	220Vdc
8A	2A	0,5A	0,4A

Legend

Power Control

0.5 mm²

Interconnections

Provided — Int — Int

Not Supplied — Int — Int

Power Control

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ES521464

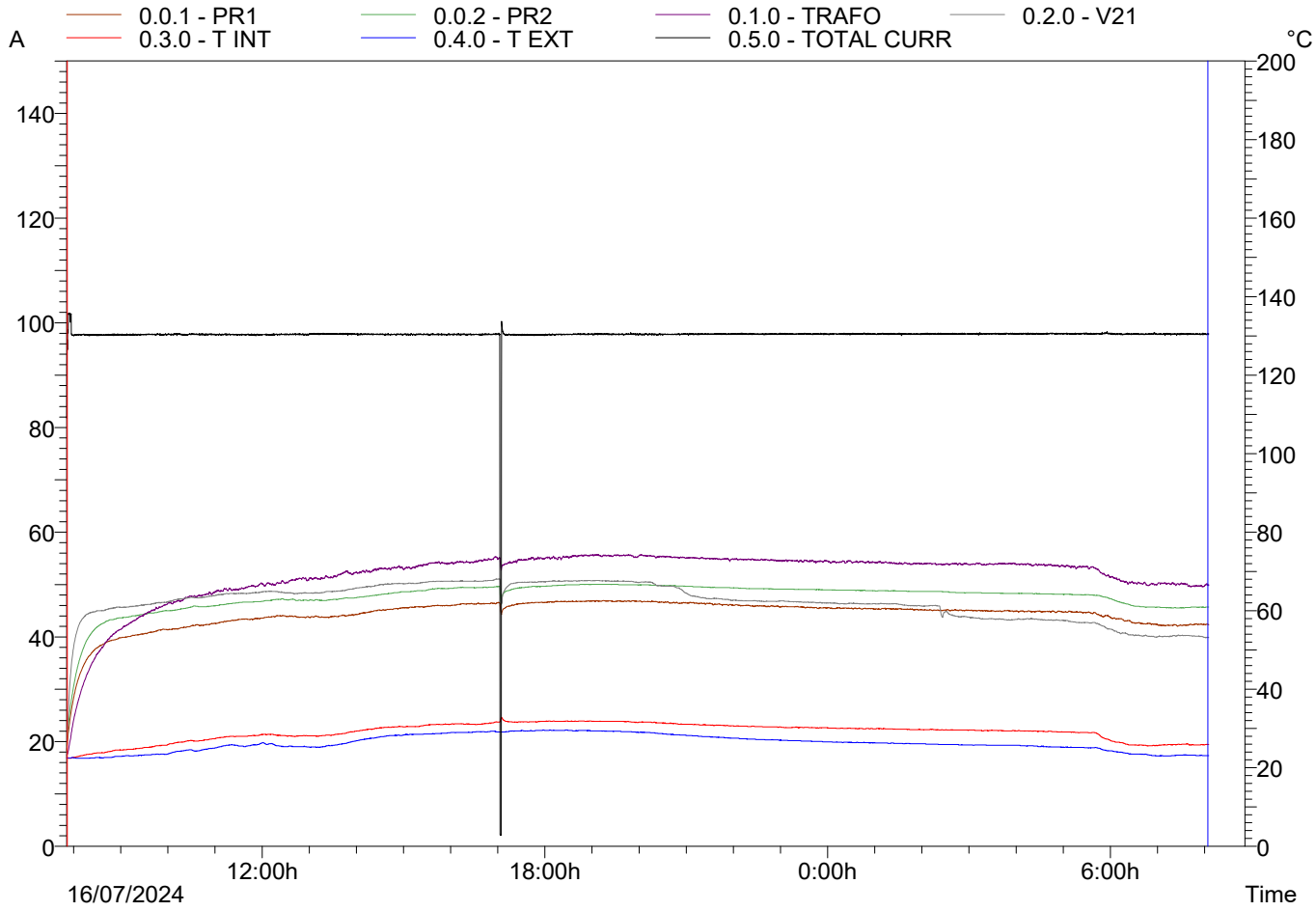
Date	21/03/2024	3W POWER S.P.A.	Electrical characteristic
Editor	EBM	Hollandse Kust Noord (HKN) wind farm	System
Checked	JOP		

AEG POWER SOLUTIONS

ES521464 en

= System 9 / 47
+
& EDA A3 Sheet 1
Sheets 1

ES521464-TPRE3855ch1.amr



Channel	Left Cursor		Right Cursor		Difference		Minimum		Maximum		Max - Min	
Time	16/07/2024, 07:51:58		17/07/2024, 08:04:02		1.00:12:04							
0.0.1 - PR1	26,3	°C	56,5	°C	30,2	°C	26,3	°C	62,6	°C	36,3	°C
0.0.2 - PR2	28,3	°C	60,9	°C	32,6	°C	28,3	°C	66,7	°C	38,4	°C
0.1.0 - TRAFO	23,5	°C	66,5	°C	43	°C	23,5	°C	74,3	°C	50,8	°C
0.2.0 - V21	28,1	°C	53,2	°C	25,1	°C	28,1	°C	68,1	°C	40	°C
0.3.0 - T INT	22,5	°C	25,9	°C	3,4	°C	22,4	°C	32,9	°C	10,5	°C
0.4.0 - T EXT	22,5	°C	23,1	°C	0,6	°C	22,4	°C	29,6	°C	7,2	°C
0.5.0 - TOTAL CURR	95,37	A	97,75	A	2,38	A	2,1	A	101,83	A	99,73	A

17/07/2024, 09:20

\\Nas-spsi\Company\Plataforma\Calentamientos\ES521464-TPRE3855ch1.amr

AEG POWER SOLUTIONS

SPRe/TPRe TEST REPORT

CUSTOMER: 3W POWER

CUSTOMER ORDER: OV59153

EQUIPMENT: TPRe

Serial number: 3855

CHARGER 1

SPRe/TPRe series rectifiers	**ID/batch number**:
Language	English
Nominal voltages	400 Vac, 50 Hz and 110 Vdc
Floating voltage	2.28 Vdc x 60 cells = 136.8 Vdc
Rectifier current and shunt	100 A with Shunt of 130 A
Battery Current and Shunt	15 A with Shunt of 130 A
AC Voltmeter active	OK
Load voltmeter active	OK
Manual current adjustment	N/A
Voltage adjustment min/max.	N/A
Automatic high rate	N/A
Manual High rate function	OK
High rate relay output	N/A
Battery fan delay function	N/A
High rate charge voltage	2.28 Vdc x 60 cells = 136.8 Vdc
High rate timer and mode	8 hours & timer mode POST
Commissioning voltage	N/A
Commissioning relay output	N/A
Comm. Current, timer value	N/A
dtmax and dtmin for VO batteries	N/A
Ib_min and timer VO batt.	N/A
Mains failure shutdown	N/A
Rectifier failure shutdown	N/A
High DC voltage shutdown	OK
Temperature compensation and value	0.13 % per ºC
Battery AH meter	N/A
Battery test	N/A
Battery capacity	150 Ah
Discharge percentage	N/A
Discharge End voltage	N/A
Discharge Alarm Voltage	N/A
Periodic battery test	N/A
Communication	OK

Tested by: OSCAR SIEIRO Controlled: Date: 15/07/2024

AEG POWER SOLUTIONS

SPRe/TPRe TEST REPORT

CUSTOMER: 3W POWER

CUSTOMER ORDER: OV59153

EQUIPMENT: TPRe

Serial number: 3855

CHARGER 1

Isolation test: >10MΩ, 500Vdc (6.2.2. PQC-628)		Dielectric strength: 2000V (6.2.2. PQC-628)	
Continuity: N/A (6.2.3. PQC-628)		THDi: N/A (6.12. PQC-628)	
FRONTAL PANEL	Check	CALIBRATION	Check
Breakers	OK	Rectifier voltmeter	OK
Frontal panel key 1	OK	Load voltmeter	OK
Frontal panel key 2	OK	Rectifier ammeter	OK
Frontal panel key 3	OK	Battery ammeter	OK
Display Unit	OK	AC voltmeter	OK
LEDs of functions	OK	Temperature	26ºC

CHARGE TEST	CONFIGURATION	VALUES OF TESTS	
Floating Charge	136.8 V	BATTERY	LOAD
Load 3%.		136.2 V	136.1 V
Load 50%.		135.8 V	135.5 V
Load 100%.		135.7 V	134.9 V
Ripple voltage	6250 mV Max.	200 mV	
Current limitation	100 A	15 A	102 A
High-rate charge	136.8 V		
Load 3%.		136.2 V	136.1 V
Load 50%.		135.8 V	135.5 V
Load 100%.		135.7 V	134.9 V
Commissioning charge	-----		
Load 3%.		-----	-----
		-----	-----
		-----	-----

Duration of test	Start 06:00	Final 10:00	Total time 4 Hours

INSTRUMENTATION	
MODEL	REFERENCE
FLUKE 117	081010460
FLUKE 115	08109160
FLUKE 374	08123860

Tested by: OSCAR SIEIRO Controlled: Date: 15/07/2024

AEG POWER SOLUTIONS

SPRe/TPRe TEST REPORT

CUSTOMER: 3W POWER

CUSTOMER ORDER: OV59153

EQUIPMENT: TPRe

Serial number: 3855

CHARGER 2

SPRe/TPRe series rectifiers	**ID/batch number**:
Language	English
Nominal voltages	400 Vac, 50 Hz and 110 Vdc
Floating voltage	2.28 Vdc x 60 cells = 136.8 Vdc
Rectifier current and shunt	100 A with Shunt of 130 A
Battery Current and Shunt	15 A with Shunt of 130 A
AC Voltmeter active	OK
Load voltmeter active	OK
Manual current adjustment	N/A
Voltage adjustment min/max.	N/A
Automatic high rate	N/A
Manual High rate function	OK
High rate relay output	N/A
Battery fan delay function	N/A
High rate charge voltage	2.28 Vdc x 60 cells = 136.8 Vdc
High rate timer and mode	8 hours & timer mode POST
Commissioning voltage	N/A
Commissioning relay output	N/A
Comm. Current, timer value	N/A
dtmax and dtmin for VO batteries	N/A
Ib_min and timer VO batt.	N/A
Mains failure shutdown	N/A
Rectifier failure shutdown	N/A
High DC voltage shutdown	OK
Temperature compensation and value	0.13 % per ºC
Battery AH meter	N/A
Battery test	N/A
Battery capacity	150 Ah
Discharge percentage	N/A
Discharge End voltage	N/A
Discharge Alarm Voltage	N/A
Periodic battery test	N/A
Communication	OK

Tested by: OSCAR SIEIRO Controlled: Date: 15/07/2024

AEG POWER SOLUTIONS

SPRe/TPRe TEST REPORT

CUSTOMER: 3W POWER

CUSTOMER ORDER: OV59153

EQUIPMENT: TPRe

Serial number: 3855

CHARGER 2

Isolation test: >10MΩ, 500Vdc (6.2.2. PQC-628)		Dielectric strength: 2000V (6.2.2. PQC-628)	
Continuity: N/A (6.2.3. PQC-628)		THDi: N/A (6.12. PQC-628)	
FRONTAL PANEL	Check	CALIBRATION	Check
Breakers	OK	Rectifier voltmeter	OK
Frontal panel key 1	OK	Load voltmeter	OK
Frontal panel key 2	OK	Rectifier ammeter	OK
Frontal panel key 3	OK	Battery ammeter	OK
Display Unit	OK	AC voltmeter	OK
LEDs of functions	OK	Temperature	23ºC

CHARGE TEST	CONFIGURATION	VALUES OF TESTS	
Floating Charge	136.8 V	BATTERY	LOAD
Load 3%.		137.0 V	136.9 V
Load 50%.		136.4 V	136.0 V
Load 100%.		135.9 V	135.2 V
Ripple voltage	6250 mV Max.	200 mV	
Current limitation	100 A	15 A	102 A
High-rate charge	136.8 V		
Load 3%.		137.0 V	136.9 V
Load 50%.		136.4 V	136.0 V
Load 100%.		135.9 V	135.2 V
Commissioning charge	-----		
Load 3%.		-----	-----
		-----	-----
		-----	-----

Duration of test	Start	Final	Total time
	06:00	10:00	4 Hours

INSTRUMENTATION	
MODEL	REFERENCE
FLUKE 117	081010460
FLUKE 115	08109160
FLUKE 374	08123860

Tested by: OSCAR SIEIRO Controlled: Date: 15/07/2024

AEG POWER SOLUTIONS

Customer: 3W POWER
Int. Ref.: OV59193
Rectifier Type: 110TPR100

Cust. ref:
File: ES521464_CH
Serial Nbr: TPRe3855ch1

Label Lang. 1	Function	Value	Delay	Rel #	Rel. Qty	R. Latch	Led #	D. Latch	ShtDwn	Common	Label Lang. 2	ModBus Reg
HIGH MAINS VOLTS	Alarm	460,0 VAC	4s	1	1	---	0	---	---	Yes	V RED AC ALTA	40002
LOW MAINS VOLTS	Alarm	340,0 VAC	4s	1	1	---	0	---	---	Yes	V RED AC BAJA	40003
CHARGER FAULT	Alarm	NA	30s	2	1	---	0	---	---	Yes	FALLO CARGADOR	40004
HIGH BATT.VOLTS	Alarm	139,8 VDC	30s	0	1	---	0	---	---	Yes	V MAX BATERIA	40005
LOW BATT.VOLTS	Alarm	117,0 VDC	30s	5	1	---	0	---	---	Yes	V MIN BATERIA	40006
HIGH DC VOLTAGE	Alarm	147,0 VDC	10s	3	1	Yes	0	Yes	Yes	Yes	V MAX DC	40007
LOW DC VOLTAGE	Alarm	111,0 VDC	10s	4	1	---	0	---	---	Yes	V MIN DC	40008
Q1 OPEN	Alarm	0	4s	0	1	---	0	---	---	Yes	Q1 ABIERTO	40011
BATT MCCB TRIP	Alarm	0	4s	0	1	---	0	---	---	Yes	DISPARO PROT BAT	40012
GROUND FAULT -	Alarm	0	4s	7	1	---	0	---	---	Yes	FALLO TIERRA -	40014
GROUND FAULT +	Alarm	0	4s	6	1	---	0	---	---	Yes	FALLO TIERRA +	40015
DISTRIB FAILURE	Alarm	0	4s	0	1	---	0	---	---	Yes	FALLO DISTRIB	40016
BATT SYMM FAULT	Alarm	0	4s	0	1	---	0	---	---	Yes	FALLO SIM. BAT.	40017
VENTILATION FAIL	Alarm	0	4s	0	1	---	0	---	---	Yes	FALLO VENTIL.	40018
HIGH CHARGR CURR	Alarm	110,0 A	10s	0	1	Yes	0	Yes	Yes	Yes	I RECTIFIC ALTA	40021
HIGH BATT. CURR	Alarm	16,5 A	10s	0	1	---	0	---	---	Yes	I BATERIA ALTA	40022
HIGH TEMPERATURE	Alarm	NA	0s	0	1	---	0	---	---	Yes	TEMPERATURA ALTA	40023
TEMP SENSE ERROR	Alarm	NA	0s	0	1	---	0	---	---	Yes	FALLO SONDA TEMP	40024
INTERNAL CHECK	Alarm	NA	0s	0	1	---	0	---	---	Yes	VERIF. INTERNA	40025
HIGH BATT. TEMP.	Alarm	45 °C	30s	0	1	---	0	---	---	Yes	TEMP. BAT. ALTA	40028
LONG CHARGE TIME	Alarm	NA	0s	0	1	---	0	---	---	Yes	TEMP CARGA LARGO	40030
NO PS VOLTAGE	Alarm	NA	0s	0	1	---	0	---	---	Yes	SIN ALIMENTACION	40031
CTRL FLOATING	Forced Float	0	0s	0	1	---	0	---	---	---	CTRL FLOATING	40034

Customer: 3W POWER

Cust. ref:

AEG POWER SOLUTIONS

Customer: 3W POWER
Int. Ref.: OV59193
Rectifier Type: 110TPR100

Cust. ref:
File: ES521464_CH
Serial Nbr: TPRe3855ch2

Label Lang. 1	Function	Value	Delay	Rel #	Rel. Qty	R. Latch	Led #	D. Latch	ShtDwn	Common	Label Lang. 2	ModBus Reg
HIGH MAINS VOLTS	Alarm	460,0 VAC	4s	1	1	---	0	---	---	Yes	V RED AC ALTA	40002
LOW MAINS VOLTS	Alarm	340,0 VAC	4s	1	1	---	0	---	---	Yes	V RED AC BAJA	40003
CHARGER FAULT	Alarm	NA	30s	2	1	---	0	---	---	Yes	FALLO CARGADOR	40004
HIGH BATT.VOLTS	Alarm	139,8 VDC	30s	0	1	---	0	---	---	Yes	V MAX BATERIA	40005
LOW BATT.VOLTS	Alarm	117,0 VDC	30s	5	1	---	0	---	---	Yes	V MIN BATERIA	40006
HIGH DC VOLTAGE	Alarm	147,0 VDC	10s	3	1	Yes	0	Yes	Yes	Yes	V MAX DC	40007
LOW DC VOLTAGE	Alarm	111,0 VDC	10s	4	1	---	0	---	---	Yes	V MIN DC	40008
Q1 OPEN	Alarm	0	4s	0	1	---	0	---	---	Yes	Q1 ABIERTO	40011
BATT MCCB TRIP	Alarm	0	4s	0	1	---	0	---	---	Yes	DISPARO PROT BAT	40012
GROUND FAULT -	Alarm	0	4s	7	1	---	0	---	---	Yes	FALLO TIERRA -	40014
GROUND FAULT +	Alarm	0	4s	6	1	---	0	---	---	Yes	FALLO TIERRA +	40015
DISTRIB FAILURE	Alarm	0	4s	0	1	---	0	---	---	Yes	FALLO DISTRIB	40016
BATT SYMM FAULT	Alarm	0	4s	0	1	---	0	---	---	Yes	FALLO SIM. BAT.	40017
VENTILATION FAIL	Alarm	0	4s	0	1	---	0	---	---	Yes	FALLO VENTIL.	40018
HIGH CHARGR CURR	Alarm	110,0 A	10s	0	1	Yes	0	Yes	Yes	Yes	I RECTIFIC ALTA	40021
HIGH BATT. CURR	Alarm	16,5 A	10s	0	1	---	0	---	---	Yes	I BATERIA ALTA	40022
HIGH TEMPERATURE	Alarm	NA	0s	0	1	---	0	---	---	Yes	TEMPERATURA ALTA	40023
TEMP SENSE ERROR	Alarm	NA	0s	0	1	---	0	---	---	Yes	FALLO SONDA TEMP	40024
INTERNAL CHECK	Alarm	NA	0s	0	1	---	0	---	---	Yes	VERIF. INTERNA	40025
HIGH BATT. TEMP.	Alarm	45 °C	30s	0	1	---	0	---	---	Yes	TEMP. BAT. ALTA	40028
LONG CHARGE TIME	Alarm	NA	0s	0	1	---	0	---	---	Yes	TEMP CARGA LARGO	40030
NO PS VOLTAGE	Alarm	NA	0s	0	1	---	0	---	---	Yes	SIN ALIMENTACION	40031
CTRL FLOATING	Forced Float	0	0s	0	1	---	0	---	---	---	CTRL FLOATING	40034

Customer: 3W POWER

Cust. ref: