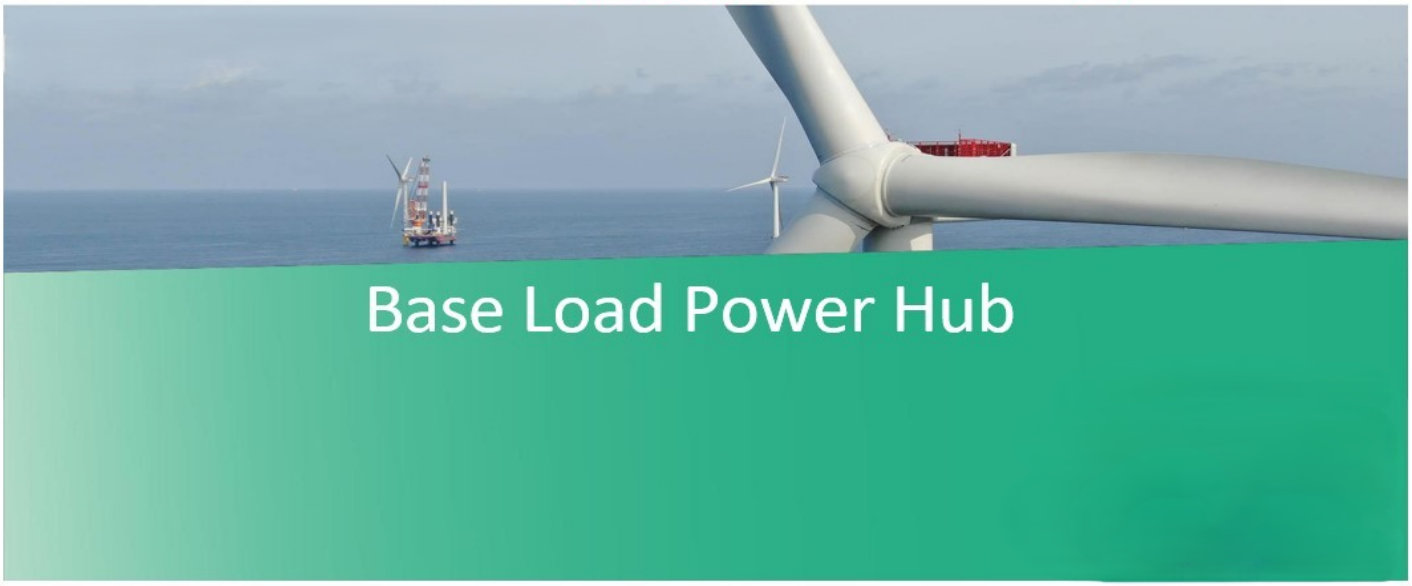
CROSSWIND

ROSETTI MARINO

PROVERLIS

PROJECT **123A90 - HOLLANDSE KUST NOORD WIND PARK**
BLPH Project



MECHANICAL COMPLETION DOSSIER (ONSHORE)

SYSTEM	81 Main Power Distribution High Voltage 66 kV
SUBSYSTEM	81-10 GIS 66 kV (HNA6-AFA70)

CROSSWIND	123A90 - HOLLANDSE KUST NOORD WIND PARK BLPH Project MECHANICAL COMPLETION DOSSIER INDEX	ROSETTI MARINO

Sub System N°:	81-10	Tick as appropriate	ONSHORE	O
Description:	GIS 66 kV (HNA6-AFA70)		OFFSHORE	NA

1.	***READY FOR COMMISSIONING CERTIFICATE*** *Ready For Commissioning Certificate (RFC)*	O
2.	***CONSOLIDATED PUNCH LISTS*** *Cleared and Residual Items*	O
3.	***SYSTEM/SUB-SYSTEM LIMIT DRAWINGS*** *Mark-up drawings showing the limits of the relevant System/Sub-System*	O
4.	***MECHANICAL COMPLETION STATUS INDEX – BUILDING DISCIPLINE*** *Building Sub-System Status Index (Print out) and Check/Test sheets*	NA
5.	***MECHANICAL COMPLETION STATUS INDEX – ELECTRICAL DISCIPLINE*** *Electrical Sub-System Status Index (Print out) and Check/Test Sheets* *Hazardous Area Equipment Detailed Inspection*	O
6.	***MECHANICAL COMPLETION STATUS INDEX - INSTRUMENTAL DISCIPLINE*** *Instrumental Sub-System Status Index (Print out) and Check/Test Sheets*	O
7.	***MECHANICAL COMPLETION STATUS INDEX - MECHANICAL DISCIPLINE*** *Mechanical SubSystem Status Index (Print out) and Check/Test Sheets*	NA
8.	***MECHANICAL COMPLETION STATUS INDEX - TELECOMMUNICATION DISCIPLINE*** *Telecommunication Sub-System Status Index (Print out) and Check/Test Sheets*	NA
9.	***MECHANICAL COMPLETION STATUS INDEX - HVAC DISCIPLINE*** *HVAC Sub-System Status Index (Print out) and Check/Test Sheets*	NA
10.	***MECHANICAL COMPLETION STATUS INDEX - PIPING DISCIPLINE*** *Piping Sub-System Status Index and Check/Test Sheets*	NA
11.	***MECHANICAL COMPLETION INDEX - SAFETY DISCIPLINE*** *Safety Sub-System Status Index (Print out) and Check/Test Sheets*	NA
12.	***FAT / VENDOR REPORTS*** *Fat reports issued by vendors and/or vendor reports*	OK
13.	***MECHANICAL COMPLETION CHANGES / MARK-UPS*** *A copy of the changes initiated during the Mechanical Completion process pertaining to the relevant Sub-System will be incorporated in this section*	NA

Note: Under the generic terminology “Building” are also covered the following disciplines: **Structural, Painting**

Under the generic terminology “Instrumental” is also covered the following discipline: **Fire & Gas**

ROSETTI MARINO

123A90 - HOLLANDSE KUST NOORD WIND PARK
BLPH Project

CROSSWIND

Ready For Commissioning (RFC) Certificate

COMPLETE	●	PARTIAL	

Revision:	1		Issued on:	2025-01-29	
System:	81	/	Main Power Distribution High Voltage 66 kV		
SubSystem:	81-10	/	GIS 66 kV (HNA6-AFA70)		

1	COMPANY has, at its option and if required, reviewed the mechanical completion associated with the above-named system/sub-system of the SCOPE and observed that such functional sub-system has been brought into readiness for commencement of the associated pre-commissioning and commissioning activities, but for the outstanding punch list items, if any, attached and referred in this Certificate.
2	Issuance of this Certificate shall not release CONTRACTOR from any of his obligations, responsibilities or liabilities under the CONTRACT.
3	Mechanical Completion Status Index attached (per Discipline) Punch List report attached (Outstanding and Cleared)

PUNCH LIST	PENDING POINTS	
Note: All Category "A" Items must be cleared prior to issue a Ready For Commissioning (RFC) Certificate	A '0	B 9

REMARKS:

	CONTRACTOR Construction Manager	**CONTRACTOR** Commissioning Manager	**COMPANY** Construction Lead (if required)	**COMPANY** Commissioning Lead (if required)
Name	Wolmer Borghi	Anthony Iveson	CPY NOT PRESENT	CPY NOT PRESENT
Date	2025-01-30	2025-01-30	2025-01-31	2025-01-31
Signature	PROVERLIS Digitaly signed by Wolmer Borghi 2025-01-30T16:21:36.723Z	PROVERLIS Digitaly signed by Anthony Iveson 2025-01-30T16:24:11.025Z	PROVERLIS Digitaly signed by CPY NOT PRESEN 2025-01-31T07:30:09.185Z	PROVERLIS Digitaly signed by CPY NOT PRESEN 2025-01-31T07:30:18.131Z

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on subsystem: 81-10 & process: MC

Electrical	81-10 GIS 66 kV (HNA6-AFA70)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
83118-CEL	Lighting & Small Power DB BoP / Auxiliary GIS	ONSHORE	C10000637	CPX09	100	2025-01-20	RFC 1
84101-CEL	DC UPS DB / DC Control for 66 kV GIS Line-1	ONSHORE	C10000565	CPX09	100	2025-01-20	RFC 1
84102-CEL	DC UPS DB / DC Control for 66 kV GIS Line-2	ONSHORE	C10000566	CPX09	100	2025-01-20	RFC 1
CP-100E1	66 kV Switchgear (GIS) Local Control Panel	ONSHORE	C10000859	CPX15	100	2025-01-28	RFC 1
HNA6-AFA70	66 kV Switchgear (GIS)	ONSHORE	C10000834	CPX04	100	2025-01-28	RFC 1

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on subsystem: 81-10 & process: MC

Instrumental	81-10 GIS 66 kV (HNA6-AFA70)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
C-CP-100E1/B400-SIS-001	TRIP SIGNAL / MARSHALLING PCS	ONSHORE	C10000188	CJX10	100	2025-01-21	RFC 1

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM	81	Main Power Distribution High Voltage 66 kV
SUBSYSTEM	81-10	GIS 66 kV (HNA6-AFA70)

Electrical

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30001984	B	HNA6-AFA70 C10000834	As per discussion, earth method between GIS and base frame (Metal to Metal) shall be mentioned on the related documents.			SLinari 2024-12-13			
C30001985	B	HNA6-AFA70 C10000834	Base frame fixing holes have not been drilled in a useable position. Once bolts are introduced it will not be possible to place washers and bolts			SLinari 2024-12-13			
C30001986	B	HNA6-AFA70 C10000834	During the protection relay settings validation tests, some discrepancies were noted between the requirements of engineering setting tables			SLinari 2024-12-13			
C30001987	B	HNA6-AFA70 C10000834	SIS (ESD) +24Vde signal function to be clarified. The current configuration does not provide the required functionality for SIS Trip Enable/Disable.			SLinari 2024-12-13			
C30001988	B	HNA6-AFA70 C10000834	The n.3 GIS dry air pressure switches provide clean contacts for low pressure alarm condition (4.7 barg) and low low pressure trip condition (4.5			SLinari 2024-12-13			
C30001989	B	HNA6-AFA70 C10000834	Wiring diagrams to be revised to align with internal wiring ferrule colors inside GIS control panel.			SLinari 2024-12-13			
C30003097	B	84101-CEL C10000565	Missing identification tag on terminal strip DP-200F1 side (terminal X2 / missing "1+")	.		Pschintu 2025-01-20			
C30003256	B	HNA6-AFA70 C10000834	All documentation listed in the SMIR, shall be re-issued in final revision and approved by RM and CW.	.		Gtangianu 2025-01-28			
C30003257	B	HNA6-AFA70 C10000834	The (HNA6-AFA70) the bolts are not tightened on the structure.	.		Gtangianu 2025-01-28			

Section 2 CONSOLIDATED PUNCH LISTS

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM	81	Main Power Distribution High Voltage 66 kV
SUBSYSTEM	81-10	GIS 66 kV (HNA6-AFA70)

Electrical

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30001984	B	HNA6-AFA70 C10000834	As per discussion, earth method between GIS and base frame (Metal to Metal) shall be mentioned on the related documents.		DONE – 1723001595-EL-DA-00006 has been re issued	SLinari 2024-12-13	Vendor 2025-05-13	SLinari 2025-05-13	2025-05-13
C30001985	B	HNA6-AFA70 C10000834	Base frame fixing holes have not been drilled in a useable position. Once bolts are introduced it will not be possible to place washers and bolts		Activity done with presence of CW represantative	SLinari 2024-12-13	Vendor 2025-05-13	SLinari 2025-05-13	2025-05-13
C30001986	B	HNA6-AFA70 C10000834	During the protection relay settings validation tests, some discrepancies were noted between the requirements of engineering setting tables		point closed - clarified between Engineering and Hyosung (see attached	SLinari 2024-12-13	SLinari 2025-06-06	SLinari 2025-06-06	2025-06-06
C30001987	B	HNA6-AFA70 C10000834	SIS (ESD) +24Vde signal function to be clarified. The current configuration does not provide the required functionality for SIS Trip Enable/Disable.		GIS panel modification and check perfromed during Hyosung field engineers visit	SLinari 2024-12-13	Alveson 2025-07-21	Alveson 2025-07-21	2025-07-21
C30001988	B	HNA6-AFA70 C10000834	The n.3 GIS dry air pressure switches provide clean contacts for low pressure alarm condition (4.7 barg) and low low pressure trip condition (4.5		Point can be considered closed- was not a request during engineering phase	SLinari 2024-12-13	SLinari 2025-06-06	SLinari 2025-06-06	2025-06-06
C30001989	B	HNA6-AFA70 C10000834	Wiring diagrams to be revised to align with internal wiring ferrule colors inside GIS control panel.		Done _ wiring re issued	SLinari 2024-12-13	Vendor 2025-05-13	SLinari 2025-05-13	2025-05-13
C30003097	B	84101-CEL C10000565	Missing identification tag on terminal strip DP-200F1 side (terminal X2 / missing "1+")	.		Pschintu 2025-01-20	2025-04-24	Gtangianu 2025-04-24	2025-04-24
C30003256	B	HNA6-AFA70 C10000834	All documentation listed in the SMIR, shall be re-issued in final revision and approved by RM and CW.	.		Gtangianu 2025-01-28	2025-02-15	Ecarotenuto 2025-02-15	2025-02-15
C30003257	B	HNA6-AFA70 C10000834	The (HNA6-AFA70) the bolts are not tightened on the structure.	.		Gtangianu 2025-01-28	2025-03-06	MBruschi 2025-03-06	2025-03-06

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001989

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000834	CPX04	1.4 Discipline	Electrical
1.2 Item	HNA6-AFA70		66 kV Switchgear (GIS)	
1.3 Subsystem	81-10		GIS 66 kV (HNA6-AFA70)	

2 - OBSERVATION

Wiring diagrams to be revised to align with internal wiring ferrule colors inside GIS control panel.

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Stefano Linari
3.4 Activity code	FAT factory acceptance test	Date	2024-12-13
3.5 Action by	VND Vendor	Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Done _ wiring re issued

Name Vendor Crosswind

Date 2025-05-13

Signature

5 - CLEARANCE CHECK

DONE

Name Stefano Linari

Date 2025-05-13

Signature

6- CLEARANCE APPROVAL

Name

Date 2025-05-13

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30003097

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000565	1.4 Discipline	Electrical
1.2 Item	84101-CEL	DC UPS DB / DC Control for 66 kV GIS Line-1	
1.3 Subsystem	81-10	GIS 66 kV (HNA6-AFA70)	

2 - OBSERVATION

Missing identification tag on terminal strip DP-200F1 side (terminal X2 / missing "1+")

Name: Paolo Schintu

Date: 2025-01-20

Signature:

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Paolo Schintu
3.4 Activity code	MC Mechanical Completion	Date	2025-01-20
3.5 Action by	PRE-COMM	Signature	

4 - PERFORMED ACTION

Point can be considered closed- was not a request during engineering phase

Name:

Date:

Signature:

5 - CLEARANCE CHECK

Installed.

Name: Giovanni Tangianu

Date: 2025-04-24

Signature:

6- CLEARANCE APPROVAL

Name:

Date:

Signature:

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30003256

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000834	1.4 Discipline	Electrical
1.2 Item	HNA6-AFA70	66 kV Switchgear (GIS)	
1.3 Subsystem	81-10	GIS 66 kV (HNA6-AFA70)	

2 - OBSERVATION

All documentation listed in the SMIR, shall be re-issued in final revision and approved by RM and CW.

Name: Giovanni Tangianu

Date: 2025-01-28

Signature:

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Giovanni Tangianu
3.4 Activity code	MC Mechanical Completion	Date	2025-01-28
3.5 Action by	VND Vendor	Signature	

4 - PERFORMED ACTION

Point can be considered closed- was not a request during engineering phase

Name:

Date:

Signature:

5 - CLEARANCE CHECK

Duplicate point. Refer to PL n°C30001989

Name: Eleonora Carotenuto

Date: 2025-02-15

Signature:

6- CLEARANCE APPROVAL

Name:

Date:

Signature:

ROSETTI MARINO CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30003257

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000834	1.4 Discipline	Electrical
1.2 Item	HNA6-AFA70	66 kV Switchgear (GIS)	
1.3 Subsystem	81-10	GIS 66 kV (HNA6-AFA70)	

2 - OBSERVATION

The (HNA6-AFA70) the bolts are not tightened on the structure.

Name: Giovanni Tangianu

Date: 2025-01-28

Signature:

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Giovanni Tangianu
3.4 Activity code	MC Mechanical Completion	Date	2025-01-28
3.5 Action by	RM_CONSTR RM	Signature	

4 - PERFORMED ACTION

Point can be considered closed- was not a request during engineering phase

Name:

Date:

Signature:

5 - CLEARANCE CHECK

Done.

Name: Massimo Bruschi

Date: 2025-03-06

Signature:

6- CLEARANCE APPROVAL

Name:

Date:

Signature:

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001984

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000834	CPX04	1.4 Discipline	Electrical
1.2 Item	HNA6-AFA70		66 kV Switchgear (GIS)	
1.3 Subsystem	81-10		GIS 66 kV (HNA6-AFA70)	

2 - OBSERVATION

As per discussion, earth method between GIS and base frame (Metal to Metal) shall be mentioned on the related documents.

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Stefano Linari
3.4 Activity code	FAT factory acceptance test	Date	2024-12-13
3.5 Action by	VND Vendor	Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

DONE – 1723001595-EL-DA-00006 has been re issued

Name Vendor Crosswind

Date 2025-05-13

Signature

5 - CLEARANCE CHECK

DONE

Name Stefano Linari

Date 2025-05-13

Signature

6- CLEARANCE APPROVAL

Name

Date 2025-05-13

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001985

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000834	CPX04	1.4 Discipline	Electrical
1.2 Item	HNA6-AFA70		66 kV Switchgear (GIS)	
1.3 Subsystem	81-10		GIS 66 kV (HNA6-AFA70)	

2 - OBSERVATION

Base frame fixing holes have not been drilled in a useable position. Once bolts are introduced it will not be possible to place washers and bolts (interference with vertical steel).Hyosung has confirmed that a solution will be implemented by their sub-supplier before shipping (a section of the vertical steel will be drilled out to allow room for washers and bolts tightening).

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Stefano Linari
3.4 Activity code	FAT factory acceptance test	Date	2024-12-13
3.5 Action by	VND Vendor	Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Activity done with presence of CW represantative

Name Vendor Crosswind

Date 2025-05-13

Signature

5 - CLEARANCE CHECK

DONE

Name Stefano Linari

Date 2025-05-13

Signature

6- CLEARANCE APPROVAL

Name

Date 2025-05-13

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001986

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000834	CPX04	1.4 Discipline	Electrical
1.2 Item	HNA6-AFA70		66 kV Switchgear (GIS)	
1.3 Subsystem	81-10		GIS 66 kV (HNA6-AFA70)	

2 - OBSERVATION

During the protection relay settings validation tests, some discrepancies were noted between the requirements of engineering setting tables and the corresponding characteristic curves available on the Siemens protection relays (e.g. 51N and 51G protections inverse curves not available?).

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Stefano Linari
3.4 Activity code	FAT factory acceptance test	Date	2024-12-13
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

point closed - clarified between Engineering and Hyosung (see attached email)

Name Stefano Linari

Date 2025-06-06

Signature

5 - CLEARANCE CHECK

point closed - clarified between Engineering and Hyosung (see attached email)

Name Stefano Linari

Date 2025-06-06

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

Linari Stefano (Rosetti)

Da: Maculan Luca (ERM)
Inviato: martedì 18 febbraio 2025 01:53
A: YEONG DONG LEE(이영동)
Cc: MIN SEONG KIM(김민성); Madaschi Andrea (Rosetti); Lo Sterzo Davide (Rosetti); MIN A PARK(박민아); CHEON HO LEE(이천호); Zwaan Vincent (ERM); Giunchi Claudia (Rosetti); Ramponi Vittorio (Rosetti); YEON CHUL YU(유연철); Linari Stefano (Rosetti); Iveson Anthony (ERM); Rico Bonifacio (Rosetti); Brunelli Massimiliano (Rosetti); WAN BYEONG LEE(이완병); KYEONGRAE BAEK(백경래)
Oggetto: R: 123A90 - CROSSWIND - HYOSUNG - PO 1723001595 (GIS) 66KV SWITCHGEARS - Electrical Protection Relay Selectivity

Dear Lee,

I'm terribly sorry, we misunderstood the comment.
You are right, the curve are direct time, so you have to select the protective functions with Direct-T1, instead of Inverse-T1.
Thanks a lot.

Luca

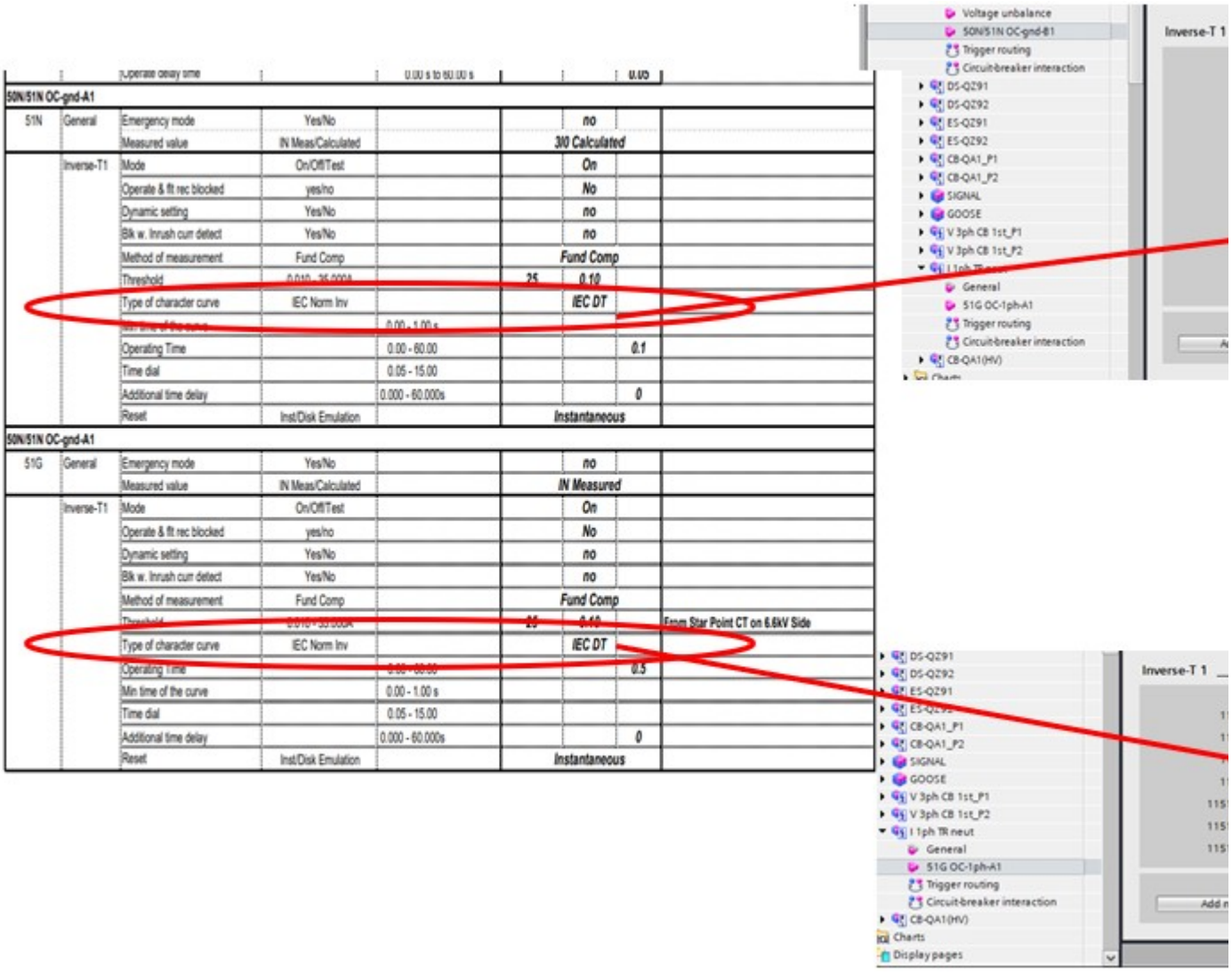
Da: YEONG DONG LEE(이영동) <ydlee09@hyosung.com>
Inviato: Friday, 14 February 2025 07:21
A: Maculan Luca (ERM) <Luca.Maculan@rosetti.it>
Cc: MIN SEONG KIM(김민성) <sloth98@hyosung.com>; Madaschi Andrea (Rosetti) <Andrea.Madaschi@rosetti.it>; Lo Sterzo Davide (Rosetti) <Davide.LoSterzo@rosetti.it>; MIN A PARK(박민아) <jessmpark@hyosung.com>; CHEON HO LEE(이천호) <cheonholee@hyosung.com>; Zwaan Vincent (ERM) <Vincent.Zwaan@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Ramponi Vittorio (Rosetti) <Vittorio.Ramponi@rosetti.it>; YEON CHUL YU(유연철) <yeonchul@hyosung.com>; Linari Stefano (Rosetti) <Stefano.Linari@rosetti.it>; Iveson Anthony (ERM) <Anthony.Iveson@rosetti.it>; Rico Bonifacio (Rosetti) <Bonifacio.Rico@rosetti.it>; Brunelli Massimiliano (Rosetti) <Massimiliano.Brunelli@rosetti.it>; WAN BYEONG LEE(이완병) <wblee@hyosung.com>; KYEONGRAE BAEK(백경래) <krback@hyosung.com>
Oggetto: RE: 123A90 - CROSSWIND - HYOSUNG - PO 1723001595 (GIS) 66KV SWITCHGEARS - Electrical Protection Relay Selectivity

Dear Luca

Thank you for your cooperation.
I already shared your mail (attached your mail) to our protection engineering sub vendor.

Our sub vendor also not able to do as per your recommendation.
So our protection guy reply as below.

The left image shows the **"123A90-DDL-EL-RE-20168"** relay calculation study, while the right image displays the **SIEMENS relay setting screen**.



		Operate delay time		0.00 s to 60.00 s		0.05	
50N/51N OC-gnd-A1							
51N	General	Emergency mode	Yes/No		no		
		Measured value	IN Meas/Calculated		3I0 Calculated		
	Inverse-T1	Mode	On/Off/Test		On		
		Operate & flt rec blocked	yes/no		No		
		Dynamic setting	Yes/No		no		
		Blk w. Inrush curr detect	Yes/No		no		
		Method of measurement	Fund Comp		Fund Comp		
		Threshold	0.010 - 35.000A		25 0.10		
		Type of character curve	IEC Norm Inv		IEC DT		
		Min time of the curve		0.00 - 1.00 s			
		Operating Time		0.00 - 60.00		0.1	
		Time dial		0.05 - 15.00			
		Additional time delay		0.000 - 60.000s		0	
		Reset	Inst/Disk Emulation		Instantaneous		
50N/51N OC-gnd-A1							
51G	General	Emergency mode	Yes/No		no		
		Measured value	IN Meas/Calculated		IN Measured		
	Inverse-T1	Mode	On/Off/Test		On		
		Operate & flt rec blocked	yes/no		No		
		Dynamic setting	Yes/No		no		
		Blk w. Inrush curr detect	Yes/No		no		
		Method of measurement	Fund Comp		Fund Comp		
		Threshold	0.010 - 35.000A		2.0 0.10		From Star Point CT on 6.6kV Side
		Type of character curve	IEC Norm Inv		IEC DT		
		Operating Time		0.00 - 60.00		0.5	
		Min time of the curve		0.00 - 1.00 s			
		Time dial		0.05 - 15.00			
		Additional time delay		0.000 - 60.000s		0	
		Reset	Inst/Disk Emulation		Instantaneous		

In the relay calculation study on the left, the item marked in red under "Type of character curve" instructs to select "IEC DT".

However, in the relay setting screen on the right, there is no option available to set IEC DT.

Since this setting cannot be configured in the relay, we kindly request a review of the relay calculation study to confirm whether IEC DT is indeed the correct setting.

We have received the setting table from the relay calculation study, but we have also requested a version that includes the relay calculation formulas.

The attached sample document is the initial relay calculation study prepared and submitted by Hyosung.

We are requesting a relay calculation study that includes the curve details as shown in the attached file.

If you have a relay calculation study that includes the curve details as in the attached file, please share it with us.

Best regards

LEE YEONG DONG

This e-mail is intended for the exclusive use of the recipients named above and may constitute information that is privileged or confidential or legally protected from disclosure as trade secret, know-how or otherwise under the Unfair Competition Prevention and Trade Secret Protection Act. Dissemination, distribution, forwarding or copying of any part of this e-mail by anyone other than the intended recipient is

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From: Maculan Luca (ERM) <Luca.Maculan@rosetti.it>
Sent: Thursday, February 13, 2025 6:58 PM
To: 이영동 차단기사양설계팀(YEONG DONG LEE) <ydlee09@hyosung.com>
Cc: 김민성 DX Solution Engineering팀(MIN SEONG KIM) <sloth98@hyosung.com>; Madaschi Andrea (Rosetti) <Andrea.Madaschi@rosetti.it>; Lo Sterzo Davide (Rosetti) <Davide.LoSterzo@rosetti.it>; 박민아 글로벌신시장팀(MIN A PARK) <jessmpark@hyosung.com>; 이천호 DX Solution Engineering팀_서울(CHEON HO LEE) <cheonholee@hyosung.com>; Zwaan Vincent (ERM) <Vincent.Zwaan@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Ramponi Vittorio (Rosetti) <Vittorio.Ramponi@rosetti.it>; 유연철 DX Solution Engineering팀(YEON CHUL YU) <yeonchul@hyosung.com>; Linari Stefano (Rosetti) <Stefano.Linari@rosetti.it>; Iveson Anthony (ERM) <Anthony.Iveson@rosetti.it>; Rico Bonifacio (Rosetti) <Bonifacio.Rico@rosetti.it>; Brunelli Massimiliano (Rosetti) <Massimiliano.Brunelli@rosetti.it>; 이완병 글로벌신시장팀(WAN BYEONG LEE) <wblee@hyosung.com>; 백경래 차단기품질관리팀(KYEONGRAE BAEK) <krback@hyosung.com>
Subject: R: 123A90 - CROSSWIND - HYOSUNG - PO 1723001595 (GIS) 66KV SWITCHGEARS - Electrical Protection Relay Selectivity

Dear Lee,

sorry but we are not understanding each other.
We started the discussion in December and I'm trying to explain to your specialist that it is not correct that you can not configure the inverse curve for the current grounding protection, please refer to my mail on 11 february with the screenshot from Digsi on how to implement the inverse time current.

If your guys are not able to do we can support you via teams or on site, let us know.

Thanks.
Luca

Da: YEONG DONG LEE(이영동) <ydlee09@hyosung.com>
Inviato: Wednesday, 12 February 2025 00:27
A: Maculan Luca (ERM) <Luca.Maculan@rosetti.it>
Cc: MIN SEONG KIM(김민성) <sloth98@hyosung.com>; Madaschi Andrea (Rosetti) <Andrea.Madaschi@rosetti.it>; Lo Sterzo Davide (Rosetti) <Davide.LoSterzo@rosetti.it>; MIN A PARK(박민아) <jessmpark@hyosung.com>; CHEON HO LEE(이천호) <cheonholee@hyosung.com>; Zwaan Vincent (ERM) <Vincent.Zwaan@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Ramponi Vittorio (Rosetti) <Vittorio.Ramponi@rosetti.it>; YEON CHUL YU(유연철) <yeonchul@hyosung.com>; Linari Stefano (Rosetti) <Stefano.Linari@rosetti.it>; Iveson Anthony (ERM) <Anthony.Iveson@rosetti.it>; Rico Bonifacio (Rosetti) <Bonifacio.Rico@rosetti.it>; Brunelli Massimiliano (Rosetti) <Massimiliano.Brunelli@rosetti.it>; WAN BYEONG LEE(이완병) <wblee@hyosung.com>; KYEONGRAE BAEK(백경래) <krback@hyosung.com>
Oggetto: RE: 123A90 - CROSSWIND - HYOSUNG - PO 1723001595 (GIS) 66KV SWITCHGEARS - Electrical Protection Relay Selectivity

Dear Luca

Thank you for your cooperation.

In addition, we have some mark up comment in the table.

Please check and inform us your feedback.

Best regards

LEE YEONG DONG

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From: 이영동 차단기사양설계팀(YEONG DONG LEE)
Sent: Wednesday, February 12, 2025 8:16 AM
To: 'Maculan Luca (ERM)' <Luca.Maculan@rosetti.it>
Cc: 김민성 DX Solution Engineering팀(MIN SEONG KIM) <sloth98@hyosung.com>; Madaschi Andrea (Rosetti) <Andrea.Madaschi@rosetti.it>; Lo Sterzo Davide (Rosetti) <Davide.LoSterzo@rosetti.it>; 박민아 글로벌신시장팀(MIN A PARK) <jessmpark@hyosung.com>; 이천호 DX Solution Engineering팀_서울(CHEON HO LEE) <cheonholee@hyosung.com>; Zwaan Vincent (ERM) <Vincent.Zwaan@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Ramponi Vittorio (Rosetti) <Vittorio.Ramponi@rosetti.it>; 유연철 DX Solution Engineering팀(YEON CHUL YU) <yeonchul@hyosung.com>; Linari Stefano (Rosetti) <Stefano.Linari@rosetti.it>; Iveson Anthony (ERM) <Anthony.Iveson@rosetti.it>; Rico Bonifacio (Rosetti) <Bonifacio.Rico@rosetti.it>; Brunelli Massimiliano (Rosetti) <Massimiliano.Brunelli@rosetti.it>; 이완병 글로벌신시장팀(WAN BYEONG LEE) <wblee@hyosung.com>; 백경래 차단기품질관리팀(KYEONGRAE BAEK) <krback@hyosung.com>
Subject: RE: 123A90 - CROSSWIND - HYOSUNG - PO 1723001595 (GIS) 66KV SWITCHGEARS - Electrical Protection Relay Selectivity

Dear Luca

Thank you for your cooperation.

I would like to check in below your mail.

"We shared with you prior to the FAT the most updated setting tables of your protections, replacing the ones attached to the coordination study, what are you looking for?"

In your reply as above, is the "most updated setting tables" means attached file?

Please check.

Best regards

LEE YEONG DONG

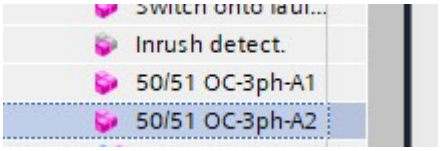
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From: Maculan Luca (ERM) <Luca.Maculan@rosetti.it>
Sent: Tuesday, February 11, 2025 9:28 PM

To: 이영동 차단기사양설계팀(YEONG DONG LEE) <ydlee09@hyosung.com>
Cc: 김민성 DX Solution Engineering팀(MIN SEONG KIM) <sloth98@hyosung.com>; Madaschi Andrea (Rosetti) <Andrea.Madaschi@rosetti.it>; Lo Sterzo Davide (Rosetti) <Davide.LoSterzo@rosetti.it>; 박민아 글로벌신시장팀(MIN A PARK) <jessmpark@hyosung.com>; 이천호 DX Solution Engineering팀_서울(CHEON HO LEE) <cheonholee@hyosung.com>; Zwaan Vincent (ERM) <Vincent.Zwaan@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Ramponi Vittorio (Rosetti) <Vittorio.Ramponi@rosetti.it>; 유연철 DX Solution Engineering팀(YEON CHUL YU) <yeonchul@hyosung.com>; Linari Stefano (Rosetti) <Stefano.Linari@rosetti.it>; Iveson Anthony (ERM) <Anthony.Iveson@rosetti.it>; Rico Bonifacio (Rosetti) <Bonifacio.Rico@rosetti.it>; Brunelli Massimiliano (Rosetti) <Massimiliano.Brunelli@rosetti.it>; 이완병 글로벌신시장팀(WAN BYEONG LEE) <wblee@hyosung.com>; 백경래 차단기품질관리팀(KYEONGRAE BAEK) <krback@hyosung.com>
Subject: R: 123A90 - CROSSWIND - HYOSUNG - PO 1723001595 (GIS) 66KV SWITCHGEARS - Electrical Protection Relay Selectivity

Dear Lee,

with respect to the setting of the current protective functions on the 7SJ85 relay, we have to functions according to the coordination study: 50/51 OC-3ph for the maximum phase currents and 50N/51N OC-gnd for the phase currents.
Attached you can find pictures taken from Digsi 5 with the screens you have when selecting these two protective functions.
As you can see in both cases you can choose either the definite time or the inverse time curves.
In addition, we would like to highlight you that for the second threshold of the maximum current protection you should select the function 50/51 OC-3ph-A2 if you use the 50/51 OC-3ph-A1 for the first threshold:



Please let me know if something is still not clear.

Regarding instead you last point I'm not sure I get your question.
We shared with you prior to the FAT the most updated setting tables of your protections, replacing the ones attached to the coordination study, what are you looking for?

Thanks a lot.
Luca

Da: YEONG DONG LEE(이영동) <ydlee09@hyosung.com>
Inviato: Tuesday, 11 February 2025 10:27
A: Maculan Luca (ERM) <Luca.Maculan@rosetti.it>
Cc: MIN SEONG KIM(김민성) <sloth98@hyosung.com>; Madaschi Andrea (Rosetti) <Andrea.Madaschi@rosetti.it>; Lo Sterzo Davide (Rosetti) <Davide.LoSterzo@rosetti.it>; MIN A PARK(박민아) <jessmpark@hyosung.com>; CHEON HO LEE(이천호) <cheonholee@hyosung.com>; Zwaan Vincent (ERM) <Vincent.Zwaan@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Ramponi Vittorio (Rosetti) <Vittorio.Ramponi@rosetti.it>; YEON CHUL YU(유연철) <yeonchul@hyosung.com>; Linari Stefano (Rosetti) <Stefano.Linari@rosetti.it>; Iveson Anthony (ERM) <Anthony.Iveson@rosetti.it>; Rico Bonifacio (Rosetti) <Bonifacio.Rico@rosetti.it>; Brunelli Massimiliano (Rosetti) <Massimiliano.Brunelli@rosetti.it>; WAN BYEONG LEE(이완병) <wblee@hyosung.com>; KYEONGRAE BAEK(백경래) <krback@hyosung.com>
Oggetto: RE: 123A90 - CROSSWIND - HYOSUNG - PO 1723001595 (GIS) 66KV SWITCHGEARS - Electrical Protection Relay Selectivity

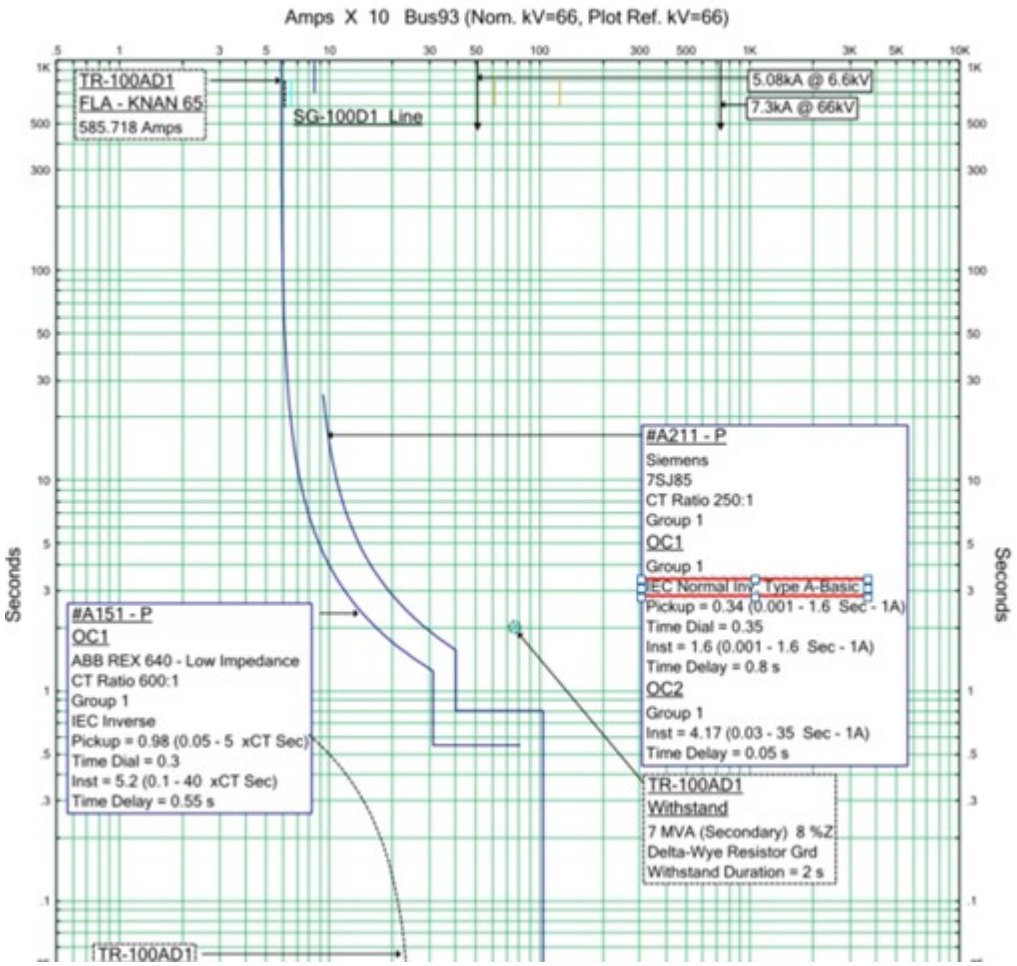
Dear Luca

Thank you for your cooperation.
We would like to reply as below.

We try to again according to your recommendation but there is no IEC DT in the Type of character. Curve when we select Invers-T-1.
Basically, select the Function first and then select the Inverse.
In the usual way, Definit/Iverse cannot be selected first.
If IEC DT Curve can be selected in Inverse, please send me a picture containing IEC DT and more detailed method within Curve Type and we will apply it.

In addition, we would like to ask as below.

The picture below is an excerpt from the first version of protection study as attachment.



As per above red marked, there are indicated as IEC Normal Invers, Type-A basic.
Therefore, among the previous inquiries, please check if it is okay to change the part called IEC DT to IEC Normal inverse.
Also, please share the data including the all protection study (including all characteristic curve).

Previously, there are only Siemens relay protection study table were shared.

Best regards
LEE YEONG DONG

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From: Maculan Luca (ERM) <Luca.Maculan@rosetti.it>
Sent: Friday, December 13, 2024 1:47 AM
To: 이영동 차단기사양설계팀(YEONG DONG LEE) <ydlee09@hyosung.com>
Cc: 김민성 DX Solution Engineering팀(MIN SEONG KIM) <sloth98@hyosung.com>; Madaschi Andrea (Rosetti) <Andrea.Madaschi@rosetti.it>; Lo Sterzo Davide (Rosetti) <Davide.LoSterzo@rosetti.it>; 박민아 글로벌신시장팀(MIN A PARK) <jessmpark@hyosung.com>; 이천호 DX Solution Engineering팀_서울(CHEON HO LEE) <cheonholee@hyosung.com>; Zwaan Vincent (ERM) <Vincent.Zwaan@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Ramponi Vittorio (Rosetti) <Vittorio.Ramponi@rosetti.it>; 유연철 DX Solution Engineering팀(YEON CHUL YU) <yeonchul@hyosung.com>; Linari Stefano (Rosetti) <Stefano.Linari@rosetti.it>; Iveson Anthony (ERM) <Anthony.Iveson@rosetti.it>; Rico Bonifacio (Rosetti) <Bonifacio.Rico@rosetti.it>; Brunelli Massimiliano (Rosetti) <Massimiliano.Brunelli@rosetti.it>; 이완병 글로벌신시장팀(WAN BYEONG LEE) <wblee@hyosung.com>; 백경래 차단기품질관리팀(KYEONGRAE BAEK) <krback@hyosung.com>
Subject: R: 123A90 - CROSSWIND - HYOSUNG - PO 1723001595 (GIS) 66KV SWITCHGEARS - Electrical Protection Relay Selectivity

Dear Lee,

with respect to the first point, I need to clarify that you have to choose the type of curve when selecting the function 50 or 51. In the siemens software, in fact, you have the function 50-definite and the function 50-inverse, the same for the 51. You can not choose the type of curve after the selection of the protective function, but you can choose the correct function.

Regarding instead the second point, if I correctly understood it, you simply have to revise the two tables with the protective functions in the LCC scheme page you copied in the mail according to the electrical protection relay selectivity.

Let me know if I solved your doubts.
Thanks.
Luca

Da: Maculan Luca (ERM)
Inviato: Thursday, 12 December 2024 09:09
A: YEONG DONG LEE(이영동) <ydlee09@hyosung.com>
Cc: MIN SEONG KIM(김민성) <sloth98@hyosung.com>; Madaschi Andrea (Rosetti) <Andrea.Madaschi@rosetti.it>; Lo Sterzo Davide (Rosetti) <Davide.LoSterzo@rosetti.it>; MIN A PARK(박민아) <jessmpark@hyosung.com>; CHEON HO LEE(이천호) <cheonholee@hyosung.com>; Zwaan Vincent (ERM) <Vincent.Zwaan@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Ramponi Vittorio (Rosetti) <Vittorio.Ramponi@rosetti.it>; YEON CHUL YU(유연철) <yeonchul@hyosung.com>; Linari Stefano (Rosetti) <Stefano.Linari@rosetti.it>; Iveson Anthony (ERM) <Anthony.Iveson@rosetti.it>; Rico Bonifacio (Rosetti) <Bonifacio.Rico@rosetti.it>; Brunelli Massimiliano (Rosetti)

<Massimiliano.Brunelli@rosetti.it>; WAN BYEONG LEE(이완병) <wblee@hyosung.com>; KYEONGRAE BAEK(백경래) <krback@hyosung.com>
Oggetto: R: 123A90 - CROSSWIND - HYOSUNG - PO 1723001595 (GIS) 66KV SWITCHGEARS - Electrical Protection Relay Selectivity

Dear Lee,

I got the first point and I'm checking the comment on the setting table you sent with our protection specialist and I'll return you as soon as possible.
In the meantime I would like asking you to clarify the second point, since I'm not sure I got it.
Can you please mark on our "Electrical Protection Relay Selectivity" the differences from the LCC schematic (protection single line diagram)?
Please help us to understand which are the differences you are referring to.

Thanks a lot.
Luca

Da: YEONG DONG LEE(이영동) <ydlee09@hyosung.com>
Inviato: Thursday, 12 December 2024 05:45
A: Maculan Luca (ERM) <Luca.Maculan@rosetti.it>
Cc: MIN SEONG KIM(김민성) <sloth98@hyosung.com>; Madaschi Andrea (Rosetti) <Andrea.Madaschi@rosetti.it>; Lo Sterzo Davide (Rosetti) <Davide.LoSterzo@rosetti.it>; MIN A PARK(박민아) <jessmpark@hyosung.com>; CHEON HO LEE(이천호) <cheonholee@hyosung.com>; Zwaan Vincent (ERM) <Vincent.Zwaan@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Ramponi Vittorio (Rosetti) <Vittorio.Ramponi@rosetti.it>; YEON CHUL YU(유연철) <yeonchul@hyosung.com>; Linari Stefano (Rosetti) <Stefano.Linari@rosetti.it>; Iveson Anthony (ERM) <Anthony.Iveson@rosetti.it>; Rico Bonifacio (Rosetti) <Bonifacio.Rico@rosetti.it>; Brunelli Massimiliano (Rosetti) <Massimiliano.Brunelli@rosetti.it>; WAN BYEONG LEE(이완병) <wblee@hyosung.com>; KYEONGRAE BAEK(백경래) <krback@hyosung.com>
Oggetto: 123A90 - CROSSWIND - HYOSUNG - PO 1723001595 (GIS) 66KV SWITCHGEARS - Electrical Protection Relay Selectivity

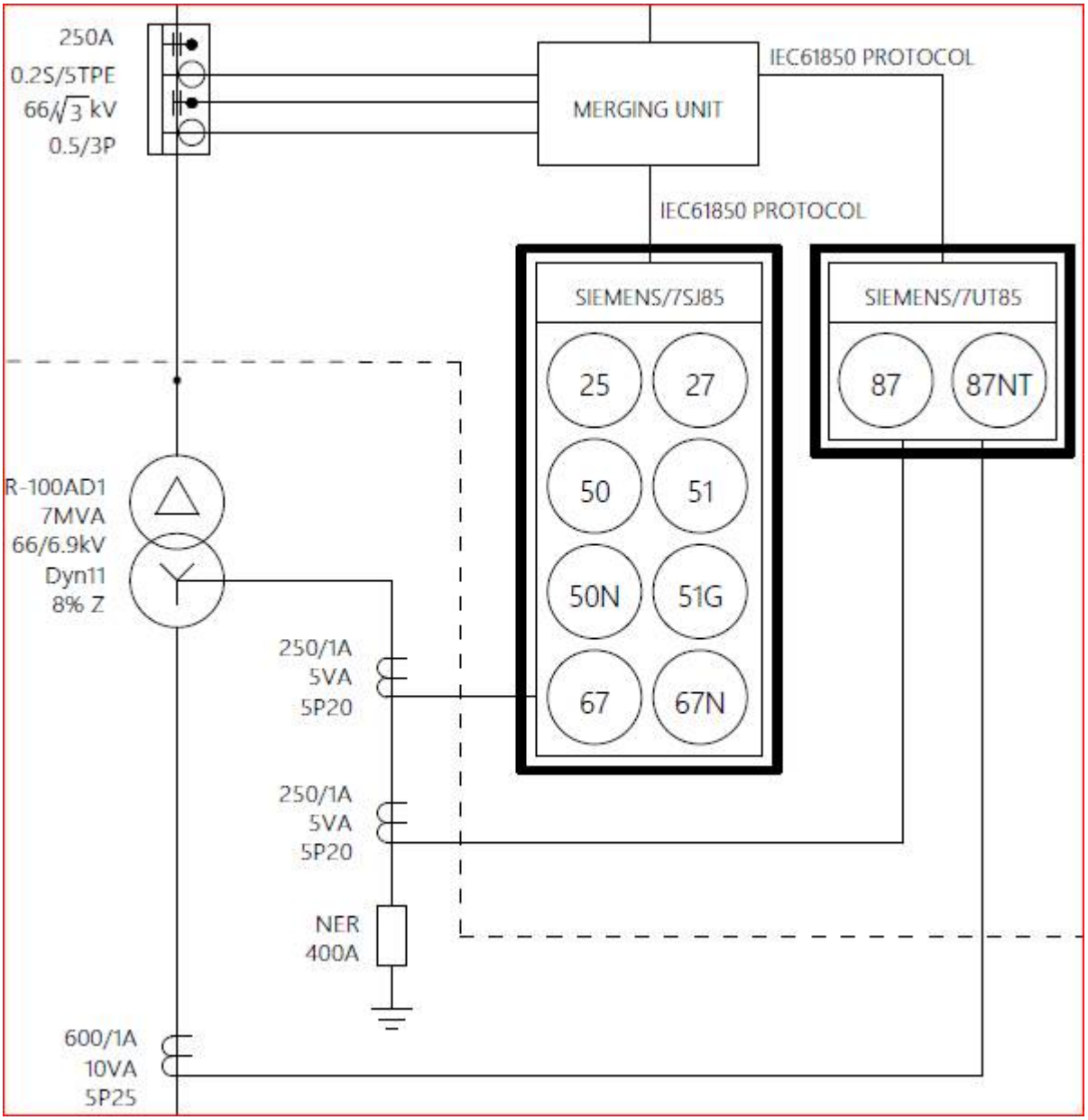
Dear Luca

Thank you for your cooperation.
We would like to clarify for "Electrical Protection Relay Selectivity" document from Rosetti as below.

1. We received this document last Nov-7-2024 as attached mail.
2. We proceed Relay setting as per this document during internal self test end of November.
3. After this internal self test, we have some comment for this document. Please refer to attached file (red mark up file).
4. I received this document before the FAT (4-Dec-2024) from our Protection Engineering company. But I missed this document to submit Rosetti
5. We explain our comment and proceed the FAT as per our comment.
6. But we have to share this issue with Rosetti engineering and design department in Milan.
7. So please refer to attached document with red mark up comment.

In addition, we proceed IED protection setting work as per this "Electrical Protection Relay Selectivity" document.

But “Electrical Protection Relay Selectivity” and LCC schematic (protection single line diagram) is different.



So if you need any update for “Electrical Protection Relay Selectivity” document, please inform us.

Best regards

LEE YEONG DONG

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*Save a tree! Don't print this e-mail unless you really need to.*

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001987

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000834	CPX04	1.4 Discipline	Electrical
1.2 Item	HNA6-AFA70		66 kV Switchgear (GIS)	
1.3 Subsystem	81-10		GIS 66 kV (HNA6-AFA70)	

2 - OBSERVATION

SIS (ESD) +24Vde signal function to be clarified. The current configuration does not provide the required functionality for SIS Trip Enable/Disable. Hyosung agreed to prepare a temporary modification to the respective circuit wiring inside the GIS control panel which was successively tested with positive result. (for all description refer to mom attached).

Name: Anthony Iveson
Date: 2025-07-21
Signature:

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Stefano Linari
3.4 Activity code	FAT factory acceptance test	Date	2024-12-13
3.5 Action by	VND Vendor	Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

GIS panel modification and check perfromed during Hyosung field engineers visit to yard during W07.

Name: Anthony Iveson
Date: 2025-07-21
Signature:

5 - CLEARANCE CHECK

Final test notified to CW on 15th July; final test performed on 16th July with positive result (local closing of GIS main breaker is possible without healthy signal from SIS only when control panel override switch is engaged).

Name: Anthony Iveson
Date: 2025-07-21
Signature:

6- CLEARANCE APPROVAL

Name:
Date: 2025-07-21
Signature:

Minutes of Meeting

Client	CROSSWIND / ROSETTI MARINO		
Manufacturer/Supplier	HYOSUNG HEAVY INDUSTRIES		
Date	06 Dec 2024 ~ 13 Dec 2024	Starting and ending time: 08:00 ~ 17:00	
Participant:	Name	Position	Signature
	Gerry McCann	COSSWIND	
	Anthony Iveson	ROSETTI MARINO	
	LEE, Sang-Hyup	COSSWIND TPI	
	PARK, Hyeon-Min	ROSETTI MARINO TPI	
	PARK, Mina	HYOSUNG	
	LEE, Yeong-Dong	HYOSUNG	
	BAEK, Kyeong-Rae	HYOSUNG	

Item No.:	Content & Conclusion
GIS 72.5kV 31.5kA	1. As per the issued inspection notification, FAT was carried out on 06, 09, 10, 11, 12, 13 Dec 2024 at HYOSUNG workshop located on Changwon-Korea. 2. As per 1723001595-QC-PRO-00027, 1723001595-EL-PRO-00023 FAT was carried out. 3. Outstanding items, to be registered on CMS database as Punch Category B: 1) As per discussion, earth method between GIS and base frame (Metal to Metal) shall be mentioned on the related documents. 2) Base frame fixing holes have not been drilled in a useable position. Once bolts are introduced it will not be possible to place washers and bolts (interference with vertical steel). Hyosung has confirmed that a solution will be implemented by their sub-supplier before shipping (a section of the vertical steel will be drilled out to allow room for washers and bolts tightening). 3) During the protection relay settings validation tests, some discrepancies were noted between the requirements of engineering setting tables and the corresponding characteristic curves available on the Siemens protection relays (e.g. 51N and 51G protections inverse curves not available?). 4) SIS (ESD) +24Vdc signal function to be clarified. The current configuration does not provide the required functionality for SIS Trip Enable/Disable. Hyosung agreed to prepare a temporary modification to the respective circuit wiring inside the GIS control panel which was successively tested with positive result. However, an additional modification will be required due to the fact that when the ESD signal will trip to 0V condition, the main circuit breaker will still close then reopen immediately. The additional modification must ensure that the main breaker will close only when SIS signal +24Vdc will be healthy. 5) The n.3 GIS dry air pressure switches provide clean contacts for low pressure alarm condition (4.7 barg) and low low pressure trip condition (4.5 barg). The clean contacts are normally open, therefore the system is not considered failsafe. Rosetti to confirm necessity to substitute the pressure switches type with normally closed contacts. 6) Wiring diagrams to be revised to align with internal wiring ferrule colors inside GIS control panel.

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001988

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000834	CPX04	1.4 Discipline	Electrical
1.2 Item	HNA6-AFA70		66 kV Switchgear (GIS)	
1.3 Subsystem	81-10		GIS 66 kV (HNA6-AFA70)	

2 - OBSERVATION

The n.3 GIS dry air pressure switches provide clean contacts for low pressure alarm condition (4.7 barg) and low low pressure trip condition (4.5 barg). The clean contacts are normally open, therefore the system is not considered failsafe. Rosetti to confirm necessity to substitute the pressure switches type with normally closed contacts.

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Stefano Linari
3.4 Activity code	FAT factory acceptance test	Date	2024-12-13
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Point can be considered closed- was not a request during engineering phase

Name Stefano Linari

Date 2025-06-06

Signature

5 - CLEARANCE CHECK

Point can be considered closed- was not a request during engineering phase

Name Stefano Linari

Date 2025-06-06

Signature

6- CLEARANCE APPROVAL

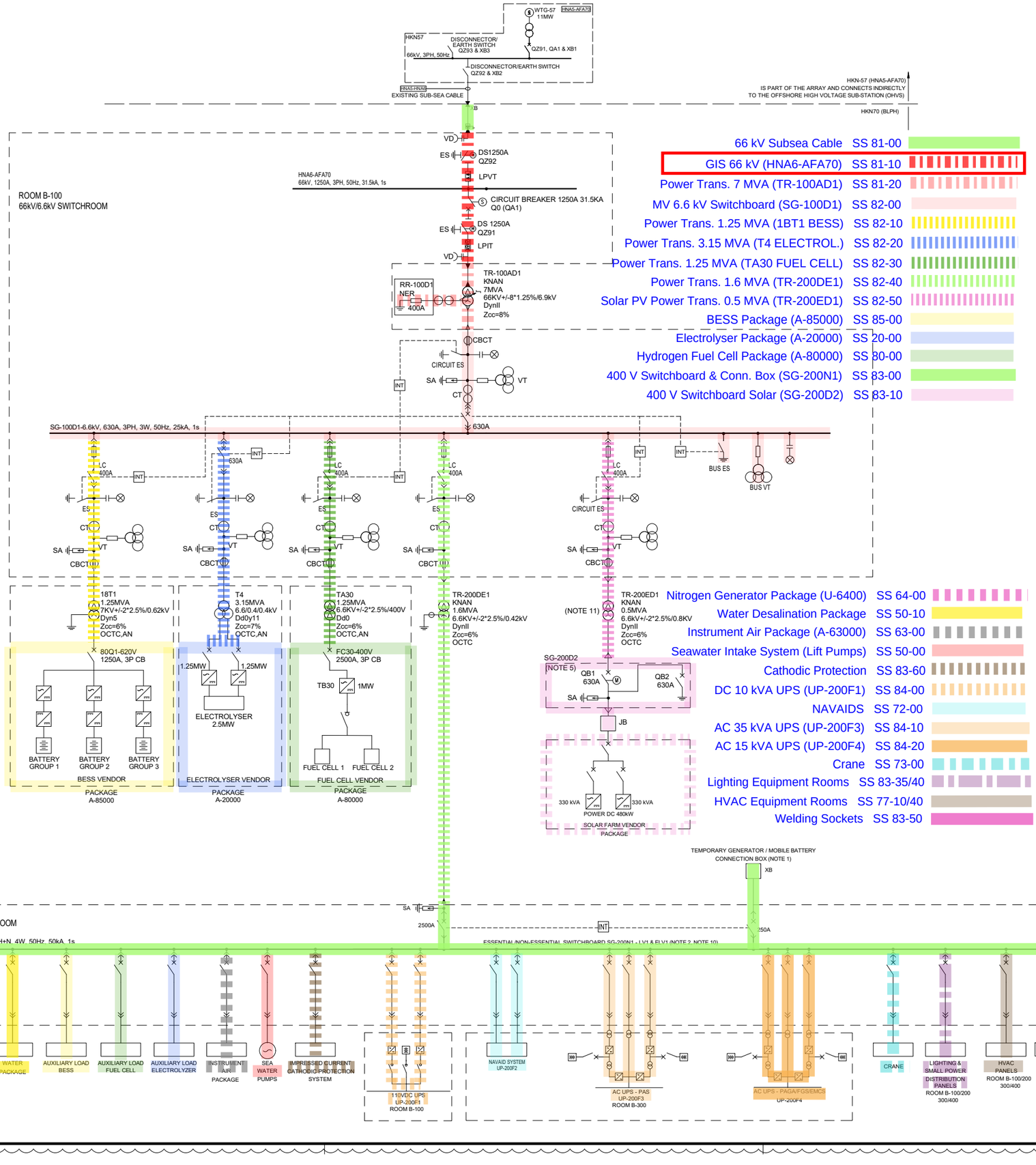
Name

Date

Signature

Section 3 SYSTEM,SUB-SYSTEM LIMIT DRAWINGS

DRAWING NO. 123A90-DDL-EL-DG-20158 REV. 01



SYMBOL LEGEND:

- VOLTAGE DETECTOR
- EARTHING SWITCH DISCONNECTOR
- MOTORIZED EARTHING SWITCH
- CIRCUIT BREAKER
- FUSE
- CONTACTOR
- THREE-PHASE TRANSFORMER WITH TAP CHANGER
- THREE-PHASE TRANSFORMER
- CURRENT TRANSFORMER
- THREE-PHASE TRANSFORMER, WITH THREE WINDINGS
- NEUTRAL EARTHING RESISTOR
- SURGE ARRESTER
- CORE BALANCE CURRENT TRANSFORMER
- SURGE ARRESTOR FOR T-CONNECTOR (N.1 FOR EACH PHASE)
- VOLTAGE & CURRENT TRANSFORMER (3Ø X 2) (LPIT TYPE)
- VOLTAGE TRANSFORMER (3Ø X 2) (LPVT TYPE)
- VOLTAGE TRANSFORMER
- CABLE BOX
- T-CONNECTOR CABLE TERMINATION
- CABLE AIR TERMINATION

OLTC	= ON LOAD TAP CHANGER
OCTC	= OPEN CIRCUIT TAP CHANGER
KNAN	= NON-MINERAL OIL NATURAL AIR COOLED
AN	= AIR NATURAL
XB	= CABLE BOX
QZ	= DISCONNECT SWITCH & EARTH SWITCH
QA	= CIRCUIT BREAKER
LC	= LATCHED FUSED CONTACTOR (400A)
INT	= INTERLOCK SYSTEM
SA	= SURGE ARRESTER
CBCT	= CORE BALANCE CURRENT TRANSFORMER
ES	=EARTHING SWITCH
VD	=VOLTAGE DETECTOR
LCP	=LOCAL CONTROL PANEL
LPVT	=LOW POWER VOLTAGE TRANSFORMER
LPCT	=LOW POWER CURRENT TRANSFORMER
LPIT	=LOW POWER INSTRUMENT TRANSFORMER
JB	=JUNCTION BOX

NOTES:

1. TEMPORARY POWER SUPPLY CONNECTION BOX LOCATED ON OUTSIDE WALL OF LV SWITCHROOM / CONTAINER.
2. LOAD DEFINITION 'ESSENTIAL' / 'NON-ESSENTIAL' IS SHOWN IN THE LOAD LIST. THE CCS, EMCS AND 'SMART' SWITCHGEAR WILL OPEN / CLOSE CIRCUIT BREAKERS AS REQUIRED.
3. A COMBINED CCS/EMCS SYSTEM COMPRISES A MICROPROCESSOR BASED SYSTEM, ASSOCIATED SOFTWARE AND REQUIRED PERIPHERALS FOR MONITORING AND CONTROLLING OF ELECTRICAL POWER NETWORK. ALL ELECTRICAL EQUIPMENT AND PACKAGE UNITS SHALL BE CONNECTED TO THE CENTRAL CONTROL SYSTEM .
4. IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM SUPPLIED BY COMPANY.
5. THE SOLAR FARM IN-FEED POWER CIRCUIT BREAKERS PANEL IS LOCATED INSIDE THE LV SWITCHGEAR ROOM B-200.
6. DELETED.
7. DELETED.
8. DELETED.
9. CROSSWIND SHALL BE ABLE TO CONTROL THE BLPH 66KV MOTORISED CIRCUIT BREAKER Q0 (QA1) & MOTORISED ELECTRICAL DISCONNECTOR / EARTH SWITCH (QZ92, TYPE B) USING THEIR 'HV-SCADA' SYSTEM. THIS BACK-UP / REDUNDANT CONTROL SHALL BE ADDITIONAL TO THAT PROVIDED BY THE CCS AND BE OF HIGHER PRIORITY OVER A SEPARATE FIBRE OPTIC CABLE (FOC). THE CCS OPERATOR AND 'HV-SCADA' SHALL BOTH BE KEPT FULLY AWARE OF EQUIPMENT STATUS AT ALL TIMES. INTERTRIPPING, INHIBITS & INTERLOCKING FOR BLPH 66KV EQUIPMENT SHALL BE AS PER THE WIND FARM.
10. THE LOADS IN THE LOW VOLTAGE SWITCHGEAR AND THE CURRENT VALUES OF THE CIRCUIT BREAKERS ARE ONLY INDICATIVE.
11. NEUTRAL POINT OF TR-200ED1 SHALL NOT BE GROUNDED AS REQUIRED BY SOLAR FARM SUPPLIER IN 123A90-PML-PM-TQ-00040.

REFERENCES:

1. 123A90-DDL-EL-DG-20014 ELECTRICAL CONTROL, PROTECTION AND METERING DIAGRAMS
2. 123A90-DDL-EL-DG-20015 ELECTRICAL SINGLE LINE DIAGRAM 6.6kV SYSTEMS
3. 123A90-DDL-EL-DG-20159 ELECTRICAL SINGLE LINE DIAGRAMS LV SYSTEM
4. 123A90-DDL-EL-DG-20160 ELECTRICAL SINGLE LINE DIAGRAMS AC UPS SYSTEMS
5. 123A90-DDL-EL-DG-20161 ELECTRICAL SINGLE LINE DIAGRAMS DC UPS SYSTEMS
6. 123A90-DDL-EL-DG-20185 ELECTRICAL SINGLE LINE DIAGRAM HV SYSTEMS
7. 123A90-DDL-EL-DL-20104 ELECTRICAL EQUIPMENT LAYOUT - HV SWITCHROOM
8. 123A90-DDL-EL-DL-20105 ELECTRICAL EQUIPMENT LAYOUT - LV SWITCHROOM
9. 123A90-DDL-EL-LIS-20016 ELECTRICAL LOAD LIST and BALANCE -CCS MODE CHARGING-
10. 123A90-DDL-EL-RE-20152 ELECTRICAL EQUIPMENT SIZING CCALCULATION REPORT
11. 123A90-DDL-EL-RE-20170 ELECTRICAL SYSTEM STUDY REPORT - LOAD FLOW
12. 123A90-DDL-EL-RE-20171 ELECTRICAL SYSTEM STUDY REPORT - SHORT CIRCUIT
13. 123A90-DDL-EL-RE-20172 ELECTRICAL SYSTEM STUDY REPORT - ARC FLASH ENERGY CALCULATION
14. 123A90-DDL-EL-RE-20173 ELECTRICAL SYSTEM STUDY REPORT - HARMONICS

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	26/03/2024	GPA	LMA/AMA	LMA/MDO	ISSUE FOR REVIEW (IFR)
00	02/11/2023	DSF	CB/AMA	OYFO/MDO	ISSUE FOR REVIEW (IFR)

CROSSWIND

ROSETTI MARINO

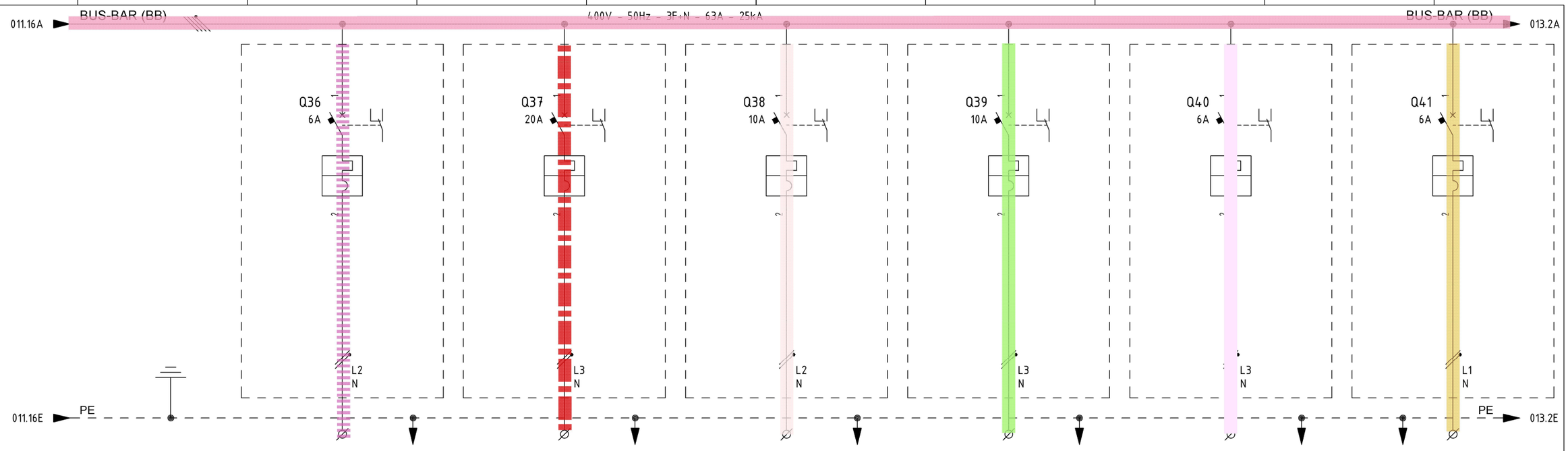
TITLE :

OVERALL/KEY SINGLE LINE DIAGRAM

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE N/A
DRAWN GPA	CHECKED LMA/AMA	APPROVED LMA/MDO	DATE 26/03/2023
A1	DRAWING NO. 123A90-DDL-EL-DG-20158	SHEET 001	REV. 01

01

File Name : 123A90-DDL-EL-DG-20158_REV01.dwg



ITEM			1	CP-200E2	CP-100E1	SG-100D1	SG-200N1	SG-200D2	UP-200F3
UTILITY			2	AUXILIARY TRAFO SOLARE 0.5MVA	AUXILIARY GIS	AUXILIARY 6.6KV SWITCHBOARD	AUXILIARY LV SWITCHBOARD	AUXILIARY LV SWITCHBOARD 800/460V	AC UPS PAS AUXILIARY
CUBICLE			3	+03	+03	+03	+03	+03	+03
RATED POWER | RATED CURRENT			4/5	0.5 KW | 2.72 A	3 KW | 16.3 A	1 KW | 5.43 A	1 KW | 5.43 A	0.5 KW | 2.72 A	0.2 KW | 0.82 A
TYPICAL FUNCTIONAL			6	-	-	-	-	-	-
CIRCUIT BREAKER (ABB)	TYPE		7	S302P-C6	S302P-C20	S302P-C10	S302P-C10	S302P-C6	S302P-C6
	VERSION		8	2P / MINIATURE	2P / MINIATURE	2P / MINIATURE	2P / MINIATURE	2P / MINIATURE	2P / MINIATURE
	TRIP UNITS		9	In=6A - Curve C	In=20A - Curve C	In=10A - Curve C	In=10A - Curve C	In=6A - Curve C	In=6A - Curve C
	Icu KA		10	25kA	25kA	25kA	25kA	25kA	25kA
OVERLOAD	L	Range A	11	-	-	-	-	-	-
		Range t	12	-	-	-	-	-	-
SEL. SHORT-CIRCUIT	S	Range A	13	-	-	-	-	-	-
		Range t	14	-	-	-	-	-	-
INST. SHORT-CIRCUIT	I	Range A	15	-	-	-	-	-	-
		Range t	16	-	-	-	-	-	-
EARTH FAULT PROTECTION	G	Range A	17	-	-	-	-	-	-
		Range t	18	-	-	-	-	-	-
CONTACTOR (ABB)			19	-	-	-	-	-	-
THERMAL OVERLOAD RELAY (ABB)			20	-	-	-	-	-	-
SURGE ARRESTERS (DHENN)			21	-	-	-	-	-	-
TOROIDAL CURRENT TRANSFORMER (FRER)			22	-	-	-	-	-	-
FUSE HOLDER (ABB)			23	-	-	-	-	-	-
TWILIGHT SWITCH (ABB)			24	-	-	-	-	-	-
VOLTMETER (FRER)			25	-	-	-	-	-	-
CURRENT TRANSFORMER FOR MEASURE (FRER)	TYPE		26	-	-	-	-	-	-
	PERFORMANCE/CLASS		27	-	-	-	-	-	-
VOLTAGE TRANSFORMER FOR MEASURE (FRER)	TYPE		28	-	-	-	-	-	-
	PERFORMANCE/CLASS		29	-	-	-	-	-	-
POWER TERM. BLOCK (CABUR) Type/mm²			30	SCREW / 4	SCREW / 6	SCREW / 4	SCREW / 4	SCREW / 4	SCREW / 4
POWER CONDUCTOR mm²			31	3G2.5	3G6	3G2.5	3G2.5	3G2.5	3G2.5

SUBSYSTEM 82-50 | SUBSYSTEM 81-10 | SUBSYSTEM 82-00 | SUBSYSTEM 83-00 | SUBSYSTEM 83-10 | SUBSYSTEM 84-10

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
3	05/07/2024	Santinelli	Flamminio	Sigismondi	Accepted for construction (AFC)
2	24/04/2024	Santinelli	Flamminio	Sigismondi	Issued for review (IFR)
1	15/03/2024	Santinelli	Flamminio	Sigismondi	Issued for review (IFR)
0	08/02/2024	Santinelli	Flamminio	Sigismondi	Issued for review (IFR)

=
+

DWG n° : 231298/SD/13
Item n° : PF1002888/101

IMESA ELECTRICAL ENGINEERING

CROSSWIND

ROSETTI MARINO

TITLE : "DP-200N1"

SINGLE LINE DIAGRAM
Single Line Drawing

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK

SCALE : NTS

A3

DRAWING NO. 1723002197-EL-DG-00013

SHEET 012

REV. 03

F.to UNI A3: 420mmx297mm

File Name : 1723002197-EL-DG-00013 Rev. 03

AEGPS_DOC_REV01
CAE EPLAN Electric P8
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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

SS:8400

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
TPC

-PR1
TPC

-A320
INTERFACE

-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
110 VDC

+BP
BATTERY PROTECTION

+BAT

2 (1x25) mm2
Int

-F100
Plastic
box 80*80

-SD1
-SD2

-Q10
50A-C
CP-100F1
DC CONTROL 66kV G/S
LINE A-5.2KW
-X2 1+/1-
16 mm²
3G16 mm2
amoured cable
SS 8110
(+REC1-A1 /1.4) / SD1

-Q11
20A-C
CP-100F1
DC CONTROL 66kV G/S
LINE B-2KW
-X2 2+/2-
16 mm²
3G16 mm2
amoured cable
SS 8110
(+REC2-A1 /1.4) / SD2

-Q12
16A-C
SG-100D1
DC CONTROL 6,6kV
SWITCHGEAR LINE A-1KW
-X2 3+/3-
16 mm²
3G16 mm2
amoured cable
SS 8200

-Q13
16A-C
SG-100D1
DC CONTROL 6,6kV
SWITCHGEAR LINE B-1KW
-X2 4+/4-
16 mm²
3G16 mm2
amoured cable
SS 8200

-Q14
50A-C
SPARE 5,5KW
-X2 5+/5-
16 mm²

-Q15
20A-C
SPARE 2KW
-X2 6+/6-
16 mm²

-Q16
16A-C
SPARE 1KW
-X2 7+/7-
16 mm²

-F10/F11
DEHNguard

-A21
EARTH +/-

-A1
GCAU
CONTROL UNIT

-A5.1
Relays
-CR1-X5

-A300
DISPLAY

-A310
KEY PAD

-A71

-A73
MODBUS-TCP/IP

-A8
Isolated

-KF
PSR-SCP- 24DC / SIL3

SD1 / (+BAT-SD1 /1.8)

-Z2
400V

-Q6
02A-C

-H3

-Q7
02A-C

-THF4
0/60ºC

-E50
100W

AUXILIARY SUPPLY
230Vac-50Hz

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

-X8
4 mm²
CHARGERS
INTERCONNECTION

2,5 mm²

INTERCONNECTION
50 mm²
-X6
PH4 35 mm²

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

+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

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
TPC

-PR1
TPC

-A320
INTERFACE

-R2
100mV
130A

-C1
3x6800µF
160V
Filtering 1%

-F1
NH00
125A

-V21
100A

-Q2
160A

-A1
GCAU
CONTROL UNIT

-A5.1
Relays
-CR1-X5

-A300
DISPLAY

-A310
KEY PAD

-A71

-A73
MODBUS-TCP/IP

-A8
Isolated

-KF
PSR-SCP- 24DC / SIL3

SD2 / (+BAT-SD2 /1.8)

-Q6
02A-C

-H3

-Q7
02A-C

-THF4
0/60ºC

-E50
100W

AUXILIARY SUPPLY
230Vac-50Hz

-X7
L/N
6 mm²

-X8
4 mm²
CHARGERS
INTERCONNECTION

2,5 mm²

INTERCONNECTION
-X6
50 mm²

-A8
(+REC2-CR1-J13:1 /1.4)

A8 / (+REC2-X8 /1.4)

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	= System
				Editor	EBM	Hollandse Kust Noord (HKN) wind farm				+ 8 / 47
				Checked	JOP			System		& EFA Sheet 1
Stat	Alteration	Date	Name	Standard					ES521464 en	A3 Sheets 1

Section 4 MECHANICAL COMPLETION STATUS INDEX - BUILDING DISCIPLINE

NOT APPLICABLE

Section 5 MECHANICAL COMPLETION STATUS INDEX - ELECTRICAL DISCIPLINE

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on subsystem: 81-10 & process: MC & discipline : E

Electrical	81-10 GIS 66 kV (HNA6-AFA70)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
83118-CEL	Lighting & Small Power DB BoP / Auxiliary GIS	ONSHORE	C10000637	CPX09	100	2025-01-20	RFC 1
84101-CEL	DC UPS DB / DC Control for 66 kV GIS Line-1	ONSHORE	C10000565	CPX09	100	2025-01-20	RFC 1
84102-CEL	DC UPS DB / DC Control for 66 kV GIS Line-2	ONSHORE	C10000566	CPX09	100	2025-01-20	RFC 1
CP-100E1	66 kV Switchgear (GIS) Local Control Panel	ONSHORE	C10000859	CPX15	100	2025-01-28	RFC 1
HNA6-AFA70	66 kV Switchgear (GIS)	ONSHORE	C10000834	CPX04	100	2025-01-28	RFC 1

ITEM	Tag	84101-CEL	: DC UPS DB / DC Control for 66 kV GIS Line-1		Dwg	123A90-DDL-EL-LIS-20148	
	S/Sys	81-10	: GIS 66 kV (HNA6-AFA70)		Module	LD_B-100	
TASK	code	C10000565	Location	Onshore Activities	User	Rosetti Marino Quality Control	
FORM	Process	MC	Activity CCK	Discipline Electrical	Form	CPX09	LV Power Cable

CABLE DATA

Type	Cu Cl.2/MGT/EPR/LSZH/GSWB/LSZH	Cores/Size mm²	3G16 mm2	Color	ORANGE
From	DP-200F1	To	CP-100E1		

1	Confirm cable is as specified in project cable schedule	OK
2	Visual Check cable physical integrity.	OK
3	Check is installed in accordance with layout drawing (segregation, distance…).	OK
4	Check cable is supported and fixed to rack according to project specification.	Note
5	Check bending radius is within the specified limits.	OK
6	Confirm cable glands suit for cable type, correctly mounted and tightened.	OK
7	Check gland plate for single core cables is non ferrous (non -magnetic).	NA
8	Confirm cable labelling is in accordance with specifications.	OK
9	Check cable is correctly loomed and segregated in accordance with specification.	OK
10	Check cable earthing against lastest drawings.	OK
11	Check cores marking are in accordance with termination diagram	OK
12	Check terminations are in accordance with latest termination diagram	PL
13	If required produce Red Line Mark Up for "AS BUILT"	

ITEM	Tag	84101-CEL	: DC UPS DB / DC Control for 66 kV GIS Line-1			Dwg	123A90-DDL-EL-LIS-20148
	S/Sys	81-10	: GIS 66 kV (HNA6-AFA70)			Module	LD_B-100
TASK	code	C10000565		Location	Onshore Activities	User	Rosetti Marino Quality Control
FORM	Process	MC	Activity CCK	Discipline	Electrical	Form	CPX09 LV Power Cable

CONTINUITY				
5	CORE CONTINUITY Ω	PH 1	0,7	
6		PH 2	0,7	
7		PH 3	NA	
8	ARMOUR CONTINUITY Ω		0,7	
9	PROTECTIVE CONDUCTOR CONTINUITY Ω		0,7	
INSULATION				
10	CORES / ARMOUR+EARTH MΩ	PH1 / PH2-PH3-A-E	> 1999	
11		PH2 / PH1-PH3-A-E	> 1999	
12		PH3 / PH1-PH2-A-E	NA	
13	CABLE IS CORRECTLY RE-CONNECTED.		Yes	

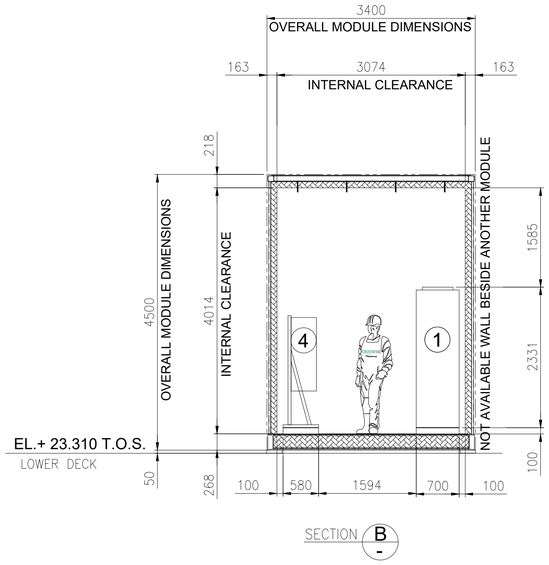
TESTING INSTRUMENTS USED

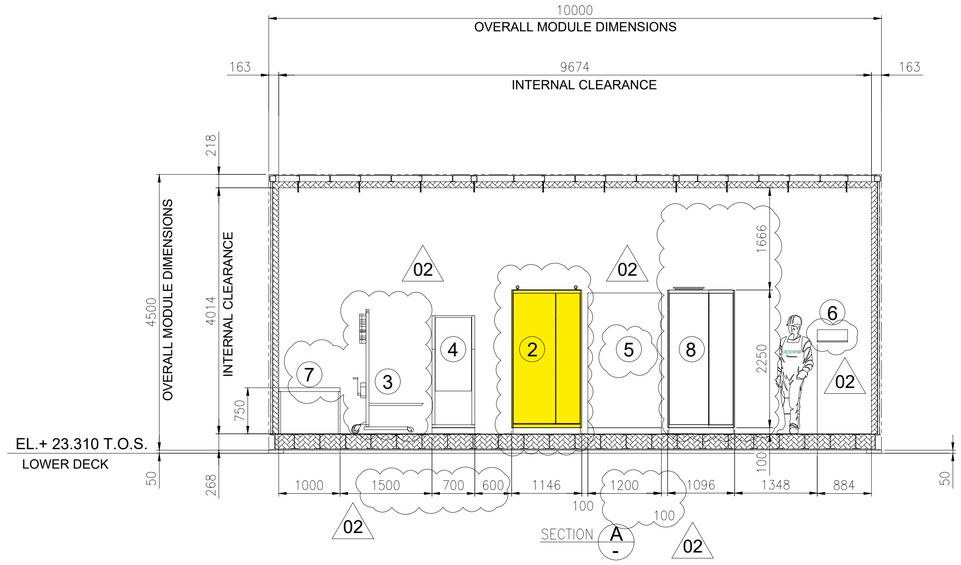
TYPE / SERIAL N° :	VOLCRAFT 1000V ET-200 S/N:H240103023	TYPE / SERIAL N° :	MEGGER : KEW3125A SERIAL: W8330207
Calibration certificate N° and date:	12/10/2024	Calibration certificate N° and date:	N°7722/24 _ 10/07/2024

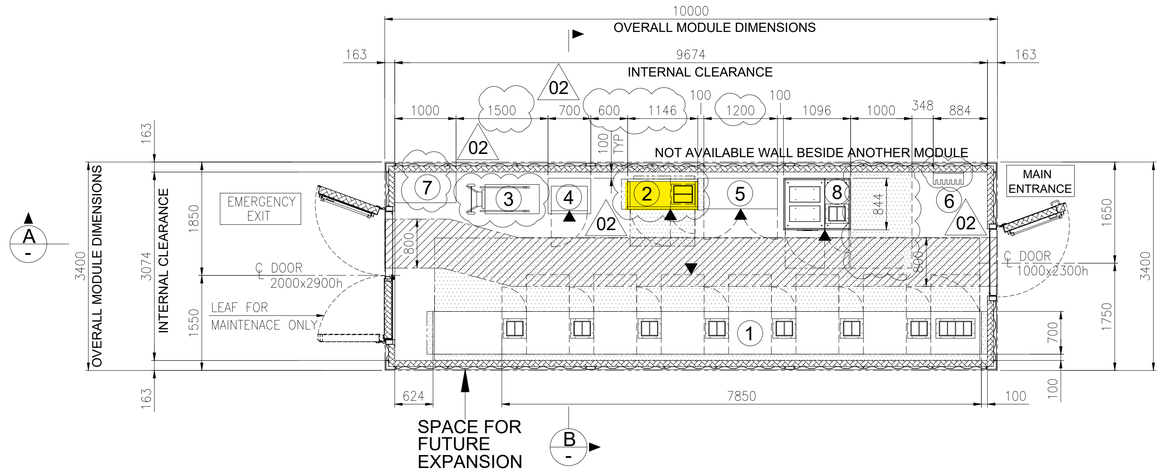
Comments: Nota 4: refer to PL C30000679

	Performed by	☉ WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	RM(ROSETTI MARINO)	
Name	Michele Tartaglia	Paolo Schintu	
Date	2025-01-15	2025-01-20	
Signature	PROVERLIS Digitaly signed by Michele Tartaglia 2025-01-15T10:31:44.540Z	PROVERLIS Digitaly signed by Paolo Schintu 2025-01-20T14:09:58.759Z	

DRAWING NO. 123A90-DDL-EL-DL-20105 REV. 02





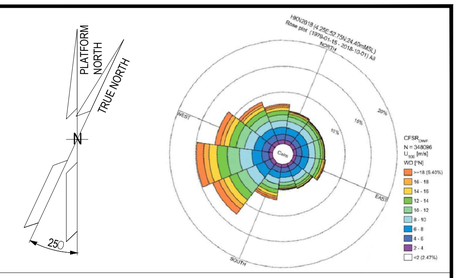


EQUIPMENT LAYOUT
"B-200" LV (400V) SWITCHGEAR ROOM
BOTTOM PLAN

1

EQUIPMENT LIST

REF.	TAG No.	DESCRIPTION	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	NOTE
1	SG-200N1	400V SWITCHGEAR	7850	700	2331	
2	DP-200N1	DISTRIBUTION BOARD FOR LIGHTING AND SMALL POWER B.O.P.	1146	520	2250	
3	-	SERVICE TROLLEY FOR 400V SWITCHGEAR	1034	490	2030	
4	CN-200N1	ICCP PANEL	700	580	1830	
5	B200-HSB-001	DISTRIBUTION & HVAC PANEL - LV ROOM	1200	600	1900	02
6	-	TOOL BOX	495	200	200	
7	-	TABLE	1000	500	750	
8	SG-200D2	ACB PANEL FOR SOLAR PACKAGE	1096	844	2294	



NOTES

1. U.N.O. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DELETED.
3. DOCUMENT VALID ONLY FOR ELECTRICAL COMPONENT, FOR OTHER SCOPE LOCATION AND INFORMATION, PLEASE REFER TO VENDORS AND PROJECT DOCUMENTS.
4. FOR OTHER ITEMS, CORRECT LOCATION AND INFORMATION, PLEASE REFER TO VENDORS AND DEDICATED PROJECT DOCUMENTATION.
5. HEIGHT OF ALL PANELS IN THE EQUIPMENT LIST TABLE IS WITHOUT THE BASE FRAME (100mm)

02

LEGEND

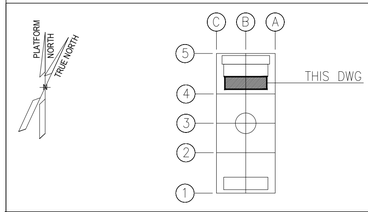
U.N.O. _____ UNLESS NOTED OTHERWISE
T.O.S. _____ TOP OF STEEL
_____ ESCAPE CORRIDOR - WIDTH 800mm.
_____ MAINTENANCE AREA - VENDOR REQUIREMENT
_____ SWITCHGEAR ROOM ENCLOUSURE
_____ FRONT OF EQUIPMENT

REFERENCES

DOCUMENT TITLE	DOCUMENT NUMBER
SG-200N1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00007
SG-200D2 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00008
DP-200N1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00009
AC UPS – GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS	1724000372-EL-DA-00004
AC UPS – BATTERY LAYOUT INTERCONNECTING DIAGRAM	1724000372-EL-DG-00011
B-200 -GENERAL ARRANGEMENT DRAWINGS - E&I SHELTER	1724000049-AR-DA-00015
ICCC PANEL GENERAL ARRANGEMENT DRAWING	144671-CORR-TF-FAB-DWG-0003

02

KEY PLAN



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20105**

REV.:	DATE:	SIGNATURE:
2_A	08/08/24	G.Randi

ROSETTI MARINO SpA

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	27/05/2024	FMO	LMA/AMA	LMA/MDO	ACCEPTED FOR CONSTRUCTION (AFC)
01	26/03/2024	GPA	LMA/AMA	LMA/MDO	ISSUE FOR REVIEW (IFR)
00	08/11/2023	DSF	CB/AMA	DYFO/MDO	ISSUE FOR REVIEW (IFR)

CROSSWIND

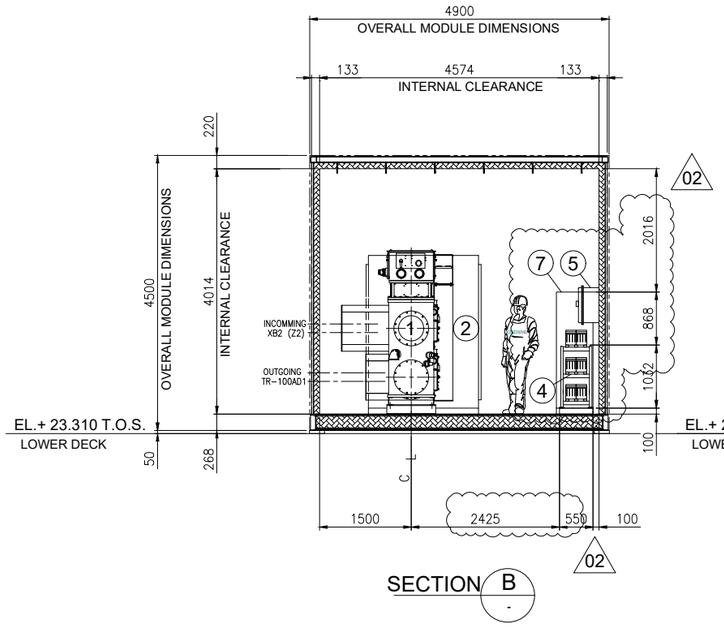
ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
LV SWITCHROOM

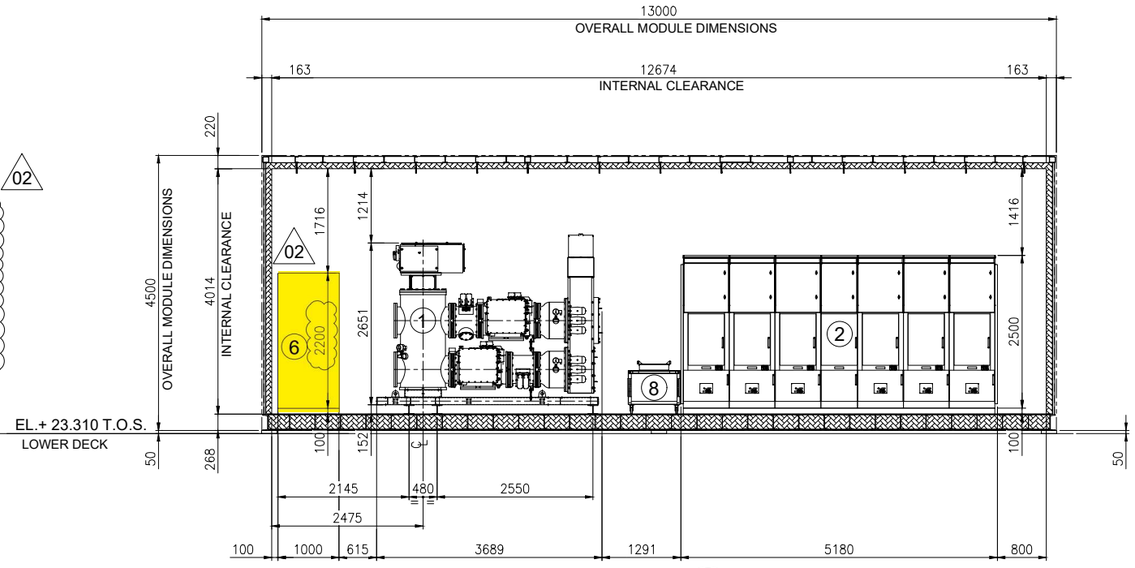
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:50
DRAWN FMO	CHECKED LMA/AMA	APPROVED LMA/MDO	DATE 27/05/2024
A1	DRAWING NO. 123A90-DDL-EL-DL-20105	SHEET 001	REV. 02

File Name : 123A90-DDL-EL-DL-20105_REV02.dwg

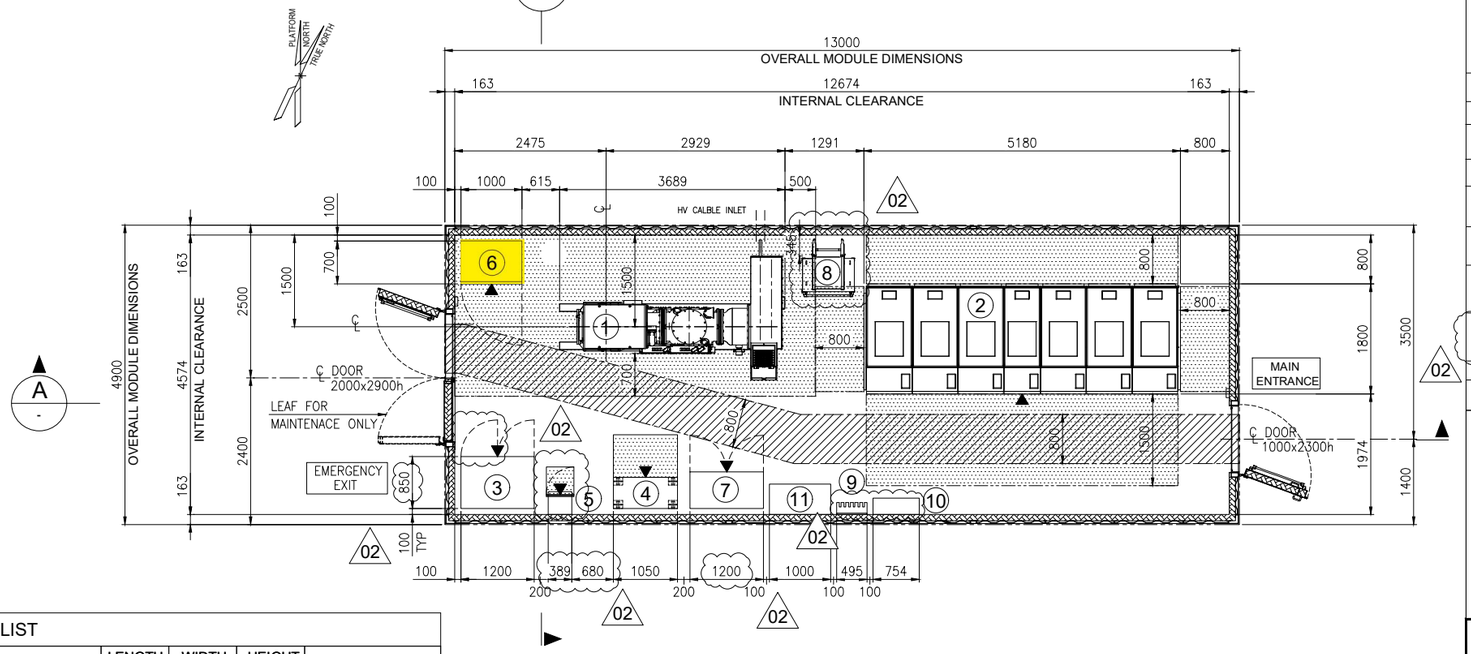
DRAWING NO. 123A90-DDL-EL-DL-20104 | REV. 02



SECTION B -



SECTION A -

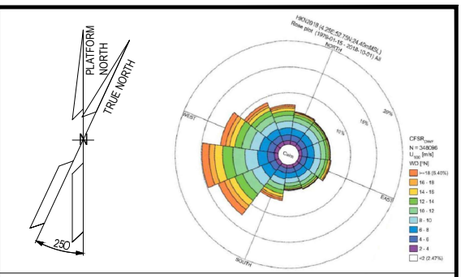


A -

B -

EQUIPMENT LIST

REF.	TAG No.	DESCRIPTION	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	NOTE
1	HNA6-AFA70	66kV SWITCHGEAR (GIS)	3689	2025	2651	
2	SG-100D1	6.6kV SWITCHGEAR	5180	1800	2500	
3	UP-200F1	DC UPS PANEL	1200	850	2105	
4	BA-200F1	DC UPS BATTERY RACK	1050	510	1272	
5	CB-200F1 02	ISOLATOR FOR DC UPS	452	377	634	
6	CP-100E1	66 kV SWITCHGEAR LOCAL CONTROL PANEL	1000	700	2200	02
7	B100-HSB-001	DISTRIBUTION & HVAC PANEL - HV MV ROOM	1200	600	1900	
8	-	SERVICE TROLLEY FOR 6.6kV SWITCHGEAR	943	862	874	
9	-	TOOL BOX	495	200	200	
10	-	SUBSTATION LIFE SAVING & INTERVENTION KIT	754	270	840	
11	-	TABLE	1000	500	750	



NOTES

1. U.N.O. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DELETED
3. DOCUMENT VALID ONLY FOR ELECTRICAL COMPONENT.
4. FOR OTHER ITEMS, CORRECT LOCATION AND INFROMATION, PLEASE REFER TO VENDORS AND DEDICATED PROJECT DOCUMENTATION.
5. HEIGHT OF ALL PANELS IN THE EQUIPMENT LIST TABLE IS WITHOUT THE BASE FRAME (100mm)

02

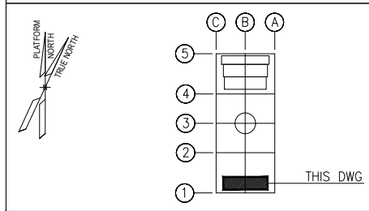
LEGEND

U.N.O. _____ UNLESS NOTED OTHERWISE
T.O.S. _____ TOP OF STEEL
_____ ESCAPE CORRIDOR - WIDTH 800mm.
_____ MAINTENANCE AREA - VENDOR REQUIREMENT
_____ SWITCHGEAR ROOM ENCLOSURE
_____ FRONT OF EQUIPMENT

REFERENCES

DOCUMENT TITLE	DOCUMENT NUMBER
66kV SWITCHGEAR (GIS) GENERAL ARRANGEMENT DRAWING	1723001595-EL-DA-00006
CIRCUIT AND WIRING DIAGRAM	1723001595-EL-DG-00015
SG-100D1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00006
DC UPS – GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS	1724000372-EL-DA-00003
DC UPS – BATTERY LAYOUT AND INTERCONNECTING DIAGRAM	1724000372-EL-DG-00010
B-100 - GENERAL ARRANGEMENT DRAWINGS - E&I SHELTER	1724000049-AR-DA-00014

KEY PLAN



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20104**

REV.:	DATE:	SIGNATURE:
2_A	08/08/24	G.Randi

ROSETTI MARINO SpA

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	27/05/2024	FMO	LMA/AMA	LMA/MDO	ACCEPTED FOR CONSTRUCTION (AFC)
01	26/03/2024	GPA	LMA/AMA	LMA/MDO	ISSUE FOR REVIEW (IFR)
00	10/11/2023	DSF	CB/AMA	DYFO/MDO	ISSUE FOR REVIEW (IFR)

CROSSWIND | ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
HV SWITCHROOM

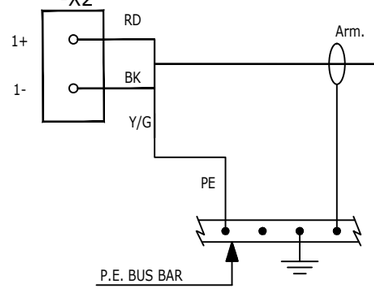
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:50
DRAWN GPA	CHECKED LMA/AMA	APPROVED LMA/MDO	DATE 27/05/2024
A1	DRAWING NO. 123A90-DDL-EL-DL-20104	SHEET 001	REV. 02

File Name : 123A90-DDL-EL-DL-20104_REV02.dwg

FROM	TO

DESCRIPTION: DC UPS DB
TAG NUMBER: DP-200F1

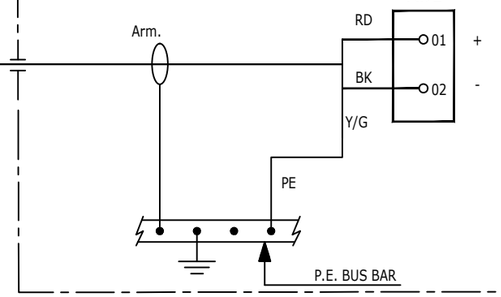
CB: -Q10



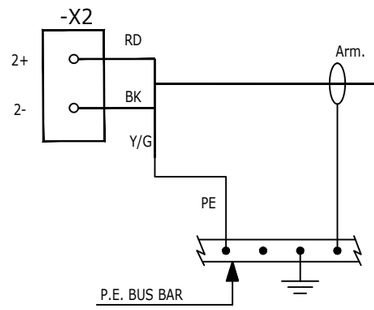
84101-CEL
3G16 mm²

DESCRIPTION: DC CONTROL FOR 66 KV GIS LINE-1
TAG NUMBER: CP-100E1

PANEL: LCP



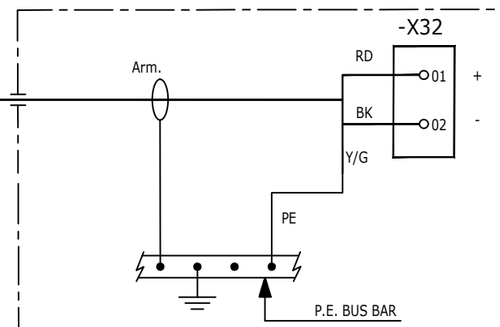
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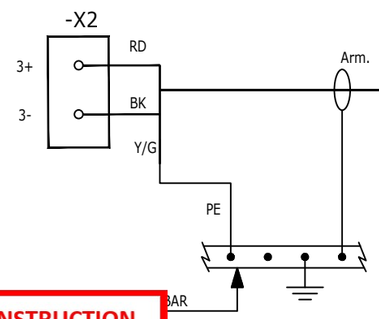
84102-CEL
3G16 mm²

DESCRIPTION: DC CONTROL FOR 66 KV GIS LINE-2
TAG NUMBER: CP-100E1

PANEL: LCP



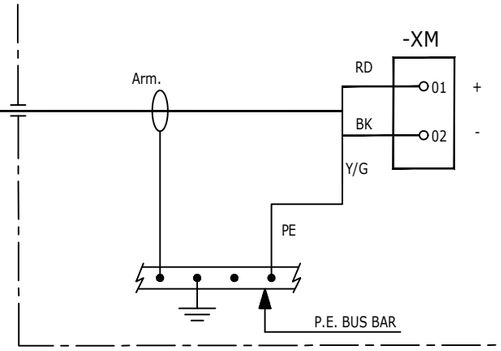
CB: -Q12



84103-CEL
3G16 mm²

DESCRIPTION: DC CONTROL FOR 6,6 KV SWITCHGEAR LINE-A
TAG NUMBER: SG-100D1

COLUMN/CUBIC.: A5



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DG-20149**

REV.:	DATE:	SIGNATURE:
2_H	16/01/25	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	19/11/24	SAI	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
01	16/10/24	SAI	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	08/07/24	SAI	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL INTERCONNECTING WIRING DIAGRAM
DC UPS DB DP-200F1

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK

SCALE : 1:X

A3

DRAWING NO. 123A90-DDL-EL-DG-20149

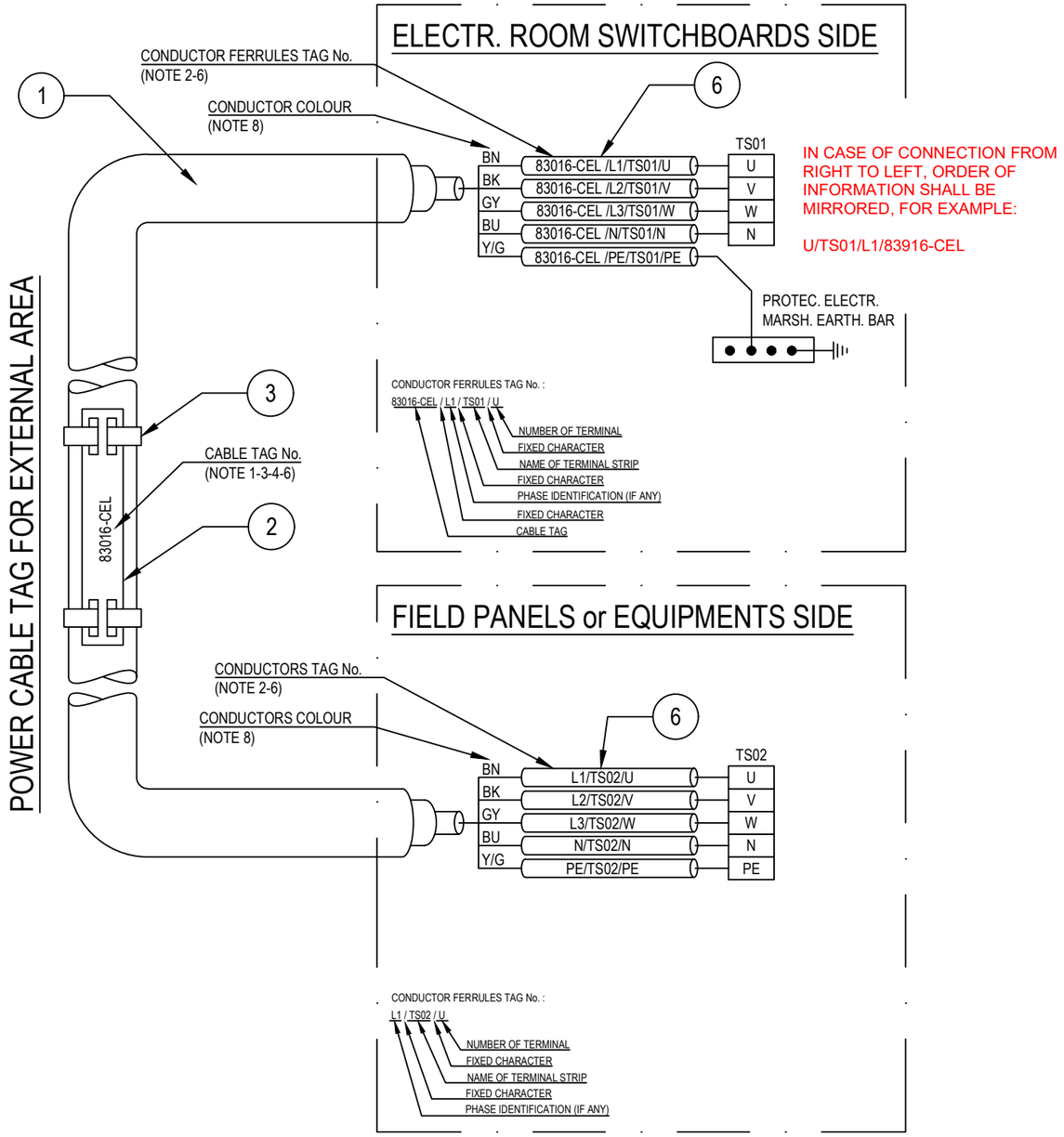
SHEET 033

REV. 02

F.to UNI A3: 420mmx297mm

File Name : 123A90-DDL-EL-DG-20149 Rev. 02

C02



POS.	DESCRIPTION	MATERIAL	SIZE	Q.TY	NOTE
1	UNARMOURED CABLE				
2	CABLE TAG FOR EXTERNAL AREA	HDG/SS			NOTE 1 NOTE 4
3	TIE FOR CABLE TAG IN EXTERNAL AREA	HDG/SS			
4	CABLE TAG FOR INTERNAL AREA	PVC			NOTE 1 NOTE 5
5	TIE FOR CABLE TAG IN INTERNAL AREA	NYLON 6.6			
6	CORE FERRULES	PVC			

NOTES:

1) ALL CABLES SHALL BE IDENTIFIED AT EACH TERMINATION AND EACH SIDE OF ANY OBSTACLE (E.G. CABLE TRANSIT ON WALLS INSIDE SHELTER AND FLOOR DECK CROSSING, BY THEIR RESPECTIVE TAGS/NUMBERS, AS INDICATED ON THE CABLE SCHEDULE.
CABLE IDENTIFICATION SHALL BE ALSO DONE BELOW AND IN THE SWITCHBOARD CABLE COMPARTMENT.

2) CABLE CORE FERRULES SHALL BE FITTED AT EVERY TERMINATION. THESE FERRULES SHALL BE OF ENGRAVED PLASTIC SLIP ON, INTERLOCKED AND SELF GRIP TYPE.

3) ON CABLE TRAYS OR LADDERS, CABLES SHALL BE IDENTIFIED AT EACH END, AND EVERY 25 METERS.

4) THE CABLE TAG FOR EXTERNAL AREA SHALL DONE BY 316L STAINLESS STEEL LABELS, TAG (H=5mm) SHALL BE LASER PRINTED PREFERABLY OR EMBOSSED, LABEL HELD BY TWO 316L STAINLESS STEEL TIES.

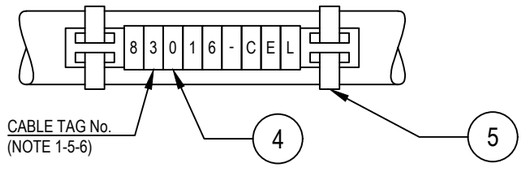
5) THE CABLE TAG FOR INTERNAL AREA SHALL BE DONE BY ENGRAVED PLASTIC SLIP ON CHARACTERS ONTO PLASTIC TIE, BLACK LETTER (H=5mm) ON WHITE.

6) CABLE AND CONDUCTOR TAG ARE INDICATIVE ONLY.

7) WITHIN TECHNICAL BUILDING, PROTECTIVE CONDUCTOR SHALL BE TAGGED BETWEEN FOLLOWING ITEMS:
- PANEL (SWITCHBOARD, SWITCHGEAR, DISTRIBUTION BOARD, ETC) AND EARTH BAR
- EARTH BAR AND EARTH BOSS

8) ONLY IF NECESSARY, SHRINK TUBES OF THE APPROPRIATE COLOR WILL BE INSTALLED TO COVER THE WRONG CONDUCTOR COLOR, THIS WILL BE PERFORMED IN EACH SIDE OF THE CABLES WHERE NECESSARY.

POWER CABLE TAG FOR INTERNAL AREA



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DD-20092**

REV.:	DATE:	SIGNATURE:
2_D	20/12/24	V.Ramponi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	28/08/24	GRA	AMA	DLO	ACCEPTED FOR CONSTRUCTION (AFC)
01	04/07/24	NLK	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	21/11/23	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL TYPICAL INSTALLATION DETAILS-POWER SYSTEM & CABLE INSTALLATION
CABLES INSTALLATION SYSTEM IDENTIFICATION FOR POWER CABLES

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK | SCALE : NTS

A3 | DRAWING NO. 123A90-DDL-EL-DD-20092 | SHEET 007 | REV. 02

F.to UNI A3: 420mmx297mm

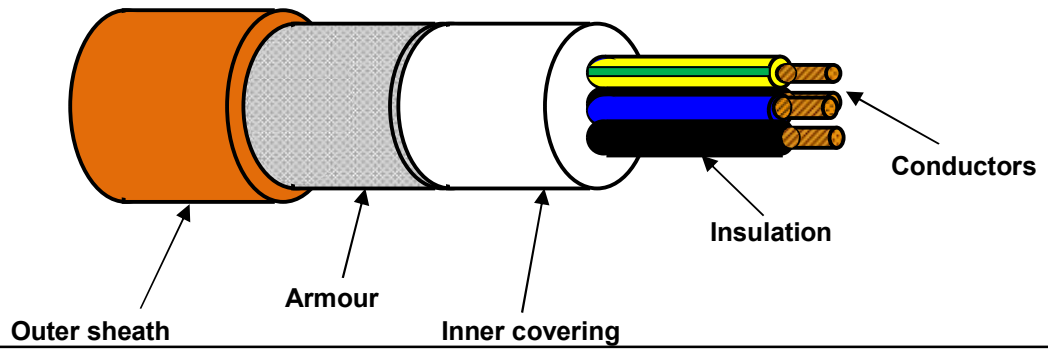
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84101-CEL	Cable	EL	VFC	123A90-DDL-EL-LIS-20148						DP-200F1	DC UPS 10 kVA Distribution Board	Lower Deck (B-100)	DB CABINET	CP-100E1	66 kV GIS Local Control Panel	Lower Deck (B-100)	DC Control LCP	ELECV18-3G16	Cable Cu Cl.2/MGT/EPR/LSZH/GSWB/LSZH 0,6/1kV 3G16mm² - Orange-DC	M25	T2_M25_Double			T2_M25_Double				L-300-101-LVT-060 / L-600-101-LVT-058 / L-300-101-LVT-059 / L-300-101-LVT-063

FLEI s.r.l.

Cu Cl.2/MGT/EPR/LSZH/GSWB/LSZH 0,6/1 KV

3G16 - DC POWER CABLE - Fire Resistant & Flame Retardant - ARMOURED



TECHNICAL FEATURES

Conductors :	**STRANDED** plain/bare annealed copper wires	IEC 60228 Class 2
Insulation :	Mica/Glass Tape/s (MGT) plus EPR compound, quality to IEC 60092.360, Nominal Thickness 1,0 mm	
Cores colour code :	**Red - Black - Yellow/Green**	
Pair Assembling :	Not required	
Pair Wrapping:	Not required	
Drain wire :	Not required	
Pair Shield :	Not required	
Shield Insulation :	Not Required	
Total Assembling :	Cores layed up with optimal lay length	
Overall Wrapping:	Not required	
Drain wire :	Not required	
Overall Shield:	Not required	
Inner covering :	Extruded LSZH compound, Average Thickness 1,0 mm	
Inner covering color code:	**Black or Natural**	
Armour :	**Galvanized Steel Wire Braid Armour (coverage ≥ 90%)**	
Outer sheath :	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type **SHF1** to IEC 60093.360, Average Thickness 1,6 mm	
Outer sheath color code:	**Orange**	
Outer printing (INKJET) :	**FLEI - ELECTRIC CABLE - 1000V - 3G16 SQMM - MGT/EPR/LSZH/GSWB/LSZH - 0,6/1 KV - IEC 60331.21 - IEC 60332.1.2 - IEC 60332.3.22 - Year of Manufacture - CE + Meter Marking**	
Under Armour diameter :	(19,2 ± 10%) mm	
Over Armour diameter :	(20,4 ± 10%) mm	
Outer diameter :	(23,6 ± 10%) mm	
Bending radius :	cable outer diameter x 10	(in fixed installation)
Voltage test :	3,5 kV a.c. for 5' (Between Cores - Armour)	
Conductors DC Resistance :		IEC 60228 Class 2
Insulation Resistance :	≥ 460 MΩ x Km (@ 20°C)	
Applicable Standards		
Design Guidelines :	**IEC 60092.353**	
ON COMPLETE CABLE		
Fire Resistant test :	**IEC 60331.21**	
Flame Retardant test :	IEC 60332.1.2 - IEC 60332.3.22	
Acid Gas generation :	IEC 60754.1/2	
Smoke density/Light Transmittance :	IEC 61034.2 (LT ≥ 60%)	
Temperature Range :		
ON INSULATION	(max +90°C)	(max continuous operation temperature of conductors)
	(max +250°C)	(max conductors temperature during short-circuit for 5 seconds)
ON COMPLETE CABLE		
During Operation :	(-20°C up to +90°C)	(in fixed installation)
During installation :	(- 5°C up to +50°C)	
Note :	**To meet the requirements of installation and use in Zone 1 & Zone 2 (IEC 60079-14) and "Gas & Vapour Tight" the cable must be provided with Penetrating Inner covering together with correct ATEX approved equipment or accessories.**	

Office	Date	Sign	Rev.	Date	Sign
Drawn by :	29/03/2024	Messa			
Checked :	29/03/2024	Spaccasassi			
Approved :	29/03/2024	Cucinotta			

The data provided, lending assent for the treatment, will be used to the sense of the article 13 of of the Regulation (UE) 2016/679, also through outsiders, in order to allow the realization of the fulfilments informatives, administrative, commercial and accounting related to the contractual relationship. Integral copy of the informative could be requested at our offices.

All proprietary rights reserved according to law. This document shall be not reproduced without written permission. FLEI reserves the right to change characteristics and technical data of product shown at any time.

ITEM	Tag	84102-CEL	: DC UPS DB / DC Control for 66 kV GIS Line-2		Dwg	123A90-DDL-EL-LIS-20148	
	S/Sys	81-10	: GIS 66 kV (HNA6-AFA70)		Module	LD_B-100	
TASK	code	C10000566	Location	Onshore Activities	User	Rosetti Marino Quality Control	
FORM	Process	MC	Activity CCK	Discipline Electrical	Form	CPX09	LV Power Cable

CABLE DATA

Type	Cu Cl.2/MGT/EPR/LSZH/GSWB/LSZH	Cores/Size mm²	3G16 mm2	Color	ORANGE
From	DP-200F1	To	CP-100E1		

1	Confirm cable is as specified in project cable schedule	OK
2	Visual Check cable physical integrity.	OK
3	Check is installed in accordance with layout drawing (segregation, distance…).	OK
4	Check cable is supported and fixed to rack according to project specification.	Note
5	Check bending radius is within the specified limits.	OK
6	Confirm cable glands suit for cable type, correctly mounted and tightened.	OK
7	Check gland plate for single core cables is non ferrous (non -magnetic).	NA
8	Confirm cable labelling is in accordance with specifications.	OK
9	Check cable is correctly loomed and segregated in accordance with specification.	OK
10	Check cable earthing against lastest drawings.	OK
11	Check cores marking are in accordance with termination diagram	OK
12	Check terminations are in accordance with latest termination diagram	OK
13	If required produce Red Line Mark Up for "AS BUILT"	

ROSETTI MARINO PROVERLIS CROSSWIND

ITEM	Tag	84102-CEL	: DC UPS DB / DC Control for 66 kV GIS Line-2			Dwg	123A90-DDL-EL-LIS-20148
	S/Sys	81-10	: GIS 66 kV (HNA6-AFA70)			Module	LD_B-100
TASK	code	C10000566		Location	Onshore Activities	User	Rosetti Marino Quality Control
FORM	Process	MC	Activity CCK	Discipline	Electrical	Form	CPX09 LV Power Cable

	CONTINUITY			
5	CORE CONTINUITY Ω	PH 1	0,7	
6		PH 2	0,7	
7		PH 3	NA	
8	ARMOUR CONTINUITY Ω		0,7	
9	PROTECTIVE CONDUCTOR CONTINUITY Ω		0,7	
	INSULATION			
10	CORES / ARMOUR+EARTH MΩ	PH1 / PH2-PH3-A-E	> 1999	
11		PH2 / PH1-PH3-A-E	> 1999	
12		PH3 / PH1-PH2-A-E	NA	
13	CABLE IS CORRECTLY RE-CONNECTED.		Yes	

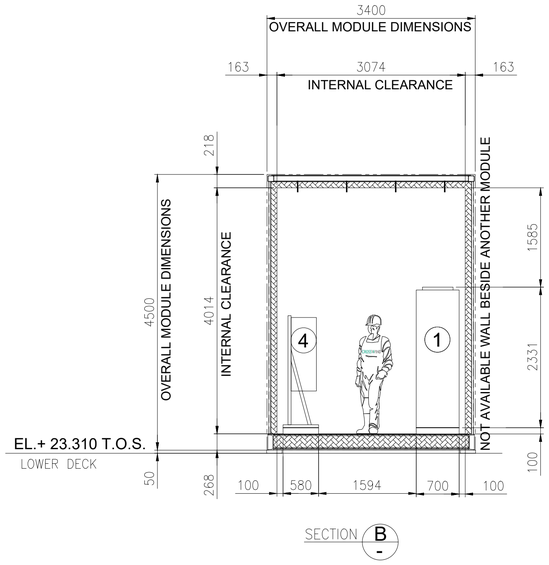
TESTING INSTRUMENTS USED

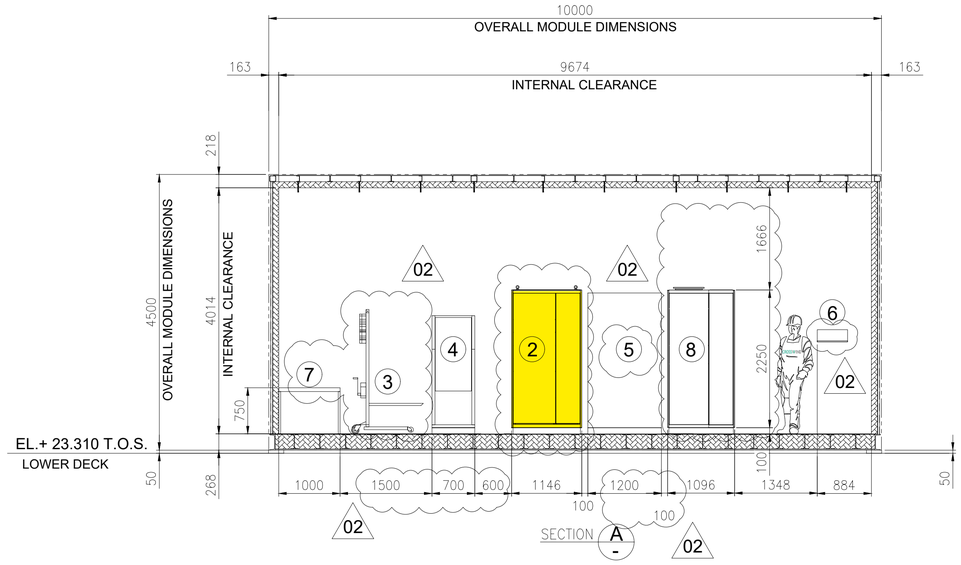
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Calibration certificate N° and date:	12/10/2024	Calibration certificate N° and date:	N°7722/24 _ 10/07/2024

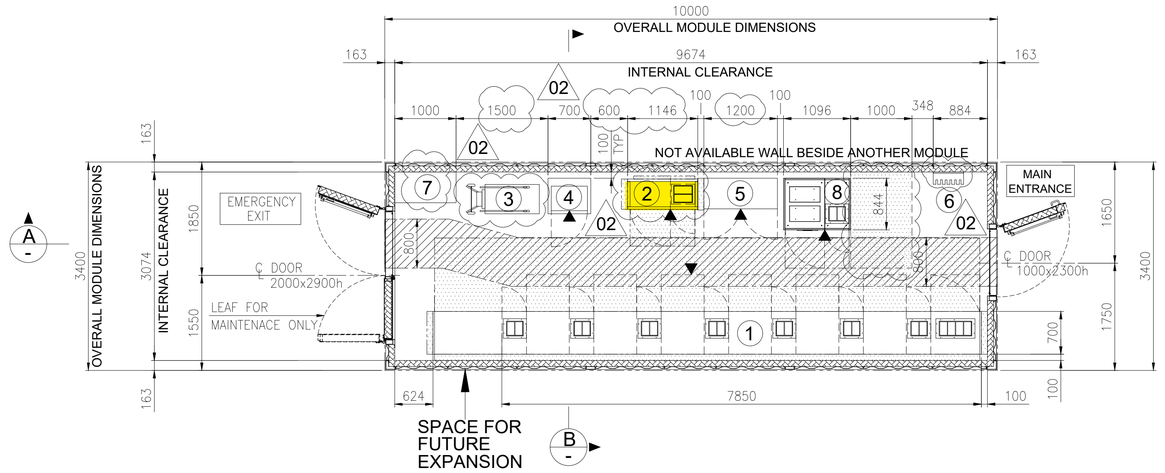
Comments:

	Performed by	☉ WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	RM(ROSETTI MARINO)	
Name	Michele Tartaglia	Paolo Schintu	
Date	2025-01-15	2025-01-20	
Signature	PROVERLIS Digitaly signed by Michele Tartaglia 2025-01-15T10:32:04.222Z	PROVERLIS Digitaly signed by Paolo Schintu 2025-01-20T14:10:51.094Z	

DRAWING NO. 123A90-DDL-EL-DL-20105 REV. 02





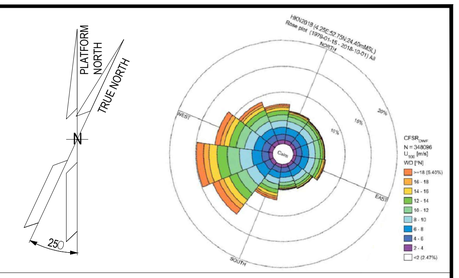


EQUIPMENT LAYOUT
"B-200" LV (400V) SWITCHGEAR ROOM
BOTTOM PLAN

1

EQUIPMENT LIST

REF.	TAG No.	DESCRIPTION	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	NOTE
1	SG-200N1	400V SWITCHGEAR	7850	700	2331	
2	DP-200N1	DISTRIBUTION BOARD FOR LIGHTING AND SMALL POWER B.O.P.	1146	520	2250	
3	-	SERVICE TROLLEY FOR 400V SWITCHGEAR	1034	490	2030	
4	CN-200N1	ICCP PANEL	700	580	1830	
5	B200-HSB-001	DISTRIBUTION & HVAC PANEL - LV ROOM	1200	600	1900	02
6	-	TOOL BOX	495	200	200	
7	-	TABLE	1000	500	750	
8	SG-200D2	ACB PANEL FOR SOLAR PACKAGE	1096	844	2294	



NOTES

1. U.N.O. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DELETED.
3. DOCUMENT VALID ONLY FOR ELECTRICAL COMPONENT, FOR OTHER SCOPE LOCATION AND INFORMATION, PLEASE REFER TO VENDORS AND PROJECT DOCUMENTS.
4. FOR OTHER ITEMS, CORRECT LOCATION AND INFORMATION, PLEASE REFER TO VENDORS AND DEDICATED PROJECT DOCUMENTATION.
5. HEIGHT OF ALL PANELS IN THE EQUIPMENT LIST TABLE IS WITHOUT THE BASE FRAME (100mm)

02

LEGEND

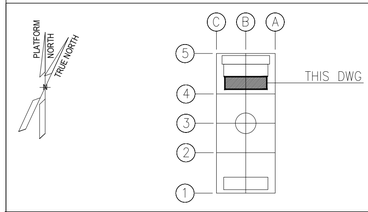
U.N.O. _____ UNLESS NOTED OTHERWISE
T.O.S. _____ TOP OF STEEL
_____ ESCAPE CORRIDOR - WIDTH 800mm.
_____ MAINTENANCE AREA - VENDOR REQUIREMENT
_____ SWITCHGEAR ROOM ENCLOUSURE
_____ FRONT OF EQUIPMENT

REFERENCES

DOCUMENT TITLE	DOCUMENT NUMBER
SG-200N1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00007
SG-200D2 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00008
DP-200N1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00009
AC UPS – GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS	1724000372-EL-DA-00004
AC UPS – BATTERY LAYOUT INTERCONNECTING DIAGRAM	1724000372-EL-DG-00011
B-200 -GENERAL ARRANGEMENT DRAWINGS - E&I SHELTER	1724000049-AR-DA-00015
ICCC PANEL GENERAL ARRANGEMENT DRAWING	144671-CORR-TF-FAB-DWG-0003

02

KEY PLAN



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20105**

REV.:	DATE:	SIGNATURE:
2_A	08/08/24	G.Randi

ROSETTI MARINO SpA

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	27/05/2024	FMO	LMA/AMA	LMA/MDO	ACCEPTED FOR CONSTRUCTION (AFC)
01	26/03/2024	GPA	LMA/AMA	LMA/MDO	ISSUE FOR REVIEW (IFR)
00	08/11/2023	DSF	CB/AMA	DYFO/MDO	ISSUE FOR REVIEW (IFR)

CROSSWIND

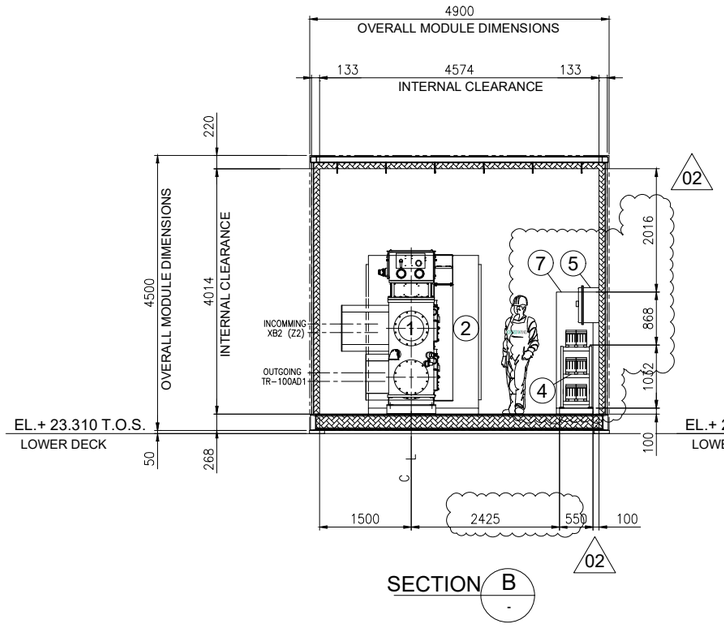
ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
LV SWITCHROOM

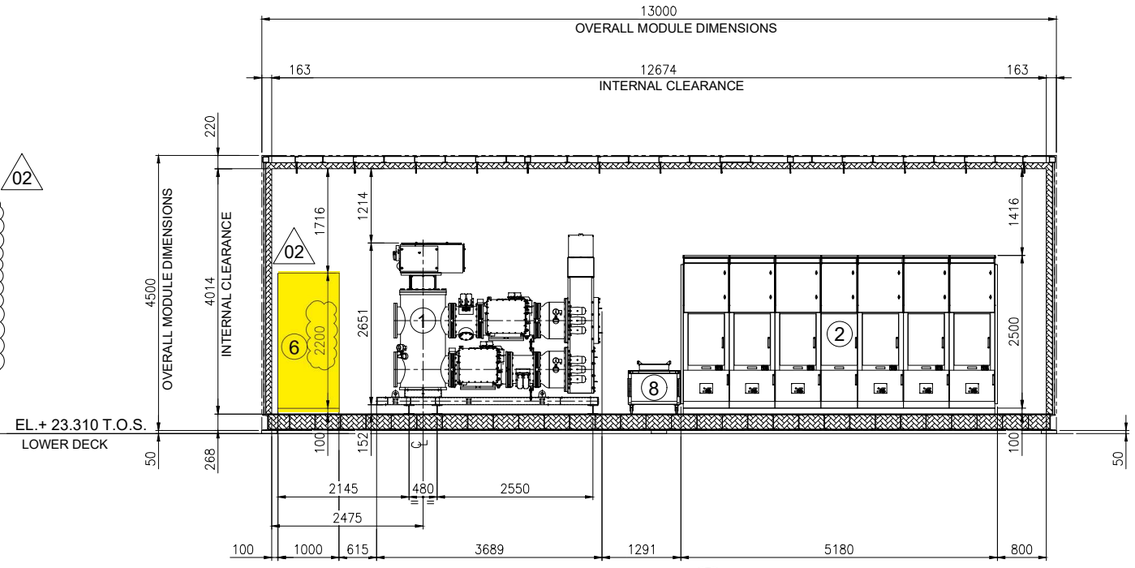
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:50
DRAWN FMO	CHECKED LMA/AMA	APPROVED LMA/MDO	DATE 27/05/2024
A1	DRAWING NO. 123A90-DDL-EL-DL-20105	SHEET 001	REV. 02

File Name : 123A90-DDL-EL-DL-20105_REV02.dwg

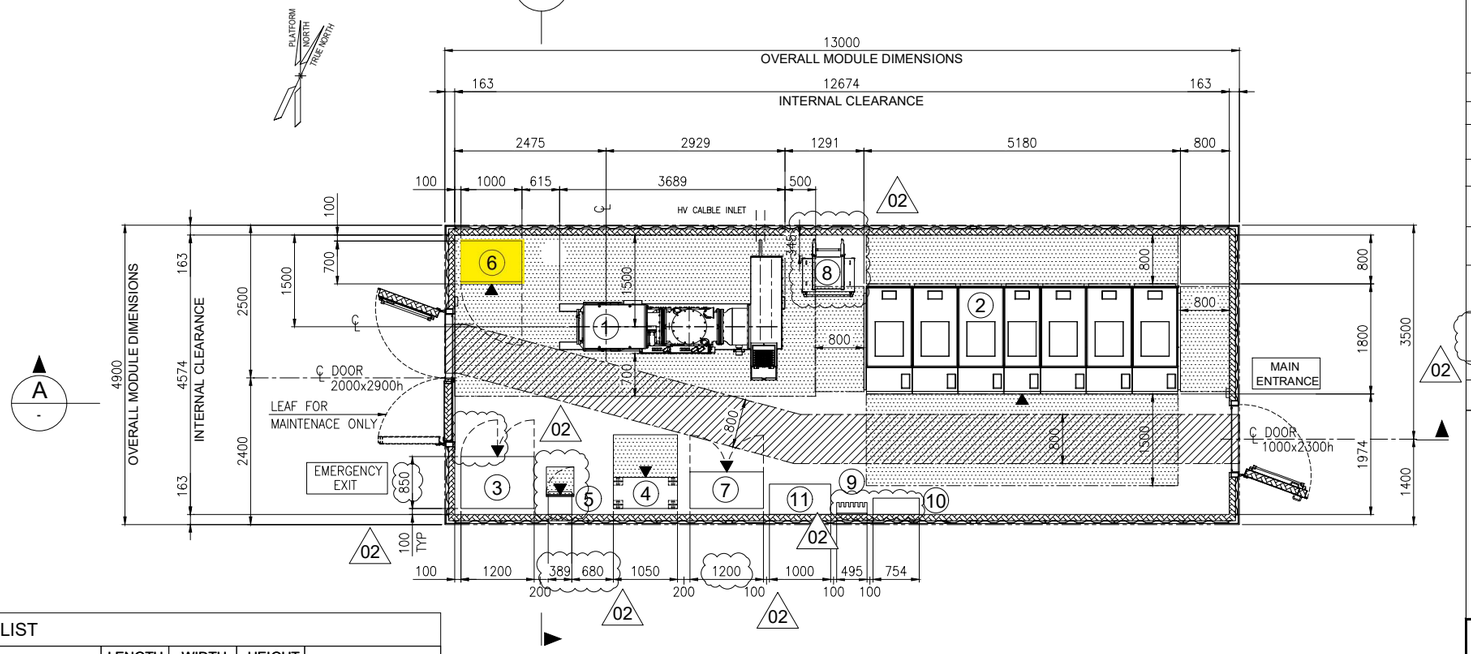
DRAWING NO. 123A90-DDL-EL-DL-20104 | REV. 02



SECTION B -



SECTION A -

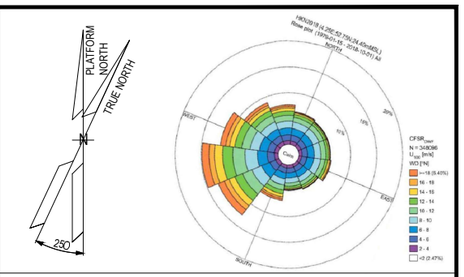


A -

B -

EQUIPMENT LIST

REF.	TAG No.	DESCRIPTION	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	NOTE
1	HNA6-AFA70	66kV SWITCHGEAR (GIS)	3689	2025	2651	
2	SG-100D1	6.6kV SWITCHGEAR	5180	1800	2500	
3	UP-200F1	DC UPS PANEL	1200	850	2105	
4	BA-200F1	DC UPS BATTERY RACK	1050	510	1272	
5	CB-200F1 02	ISOLATOR FOR DC UPS	452	377	634	
6	CP-100E1	66 kV SWITCHGEAR LOCAL CONTROL PANEL	1000	700	2200	02
7	B100-HSB-001	DISTRIBUTION & HVAC PANEL - HV MV ROOM	1200	600	1900	
8	-	SERVICE TROLLEY FOR 6.6kV SWITCHGEAR	943	862	874	
9	-	TOOL BOX	495	200	200	
10	-	SUBSTATION LIFE SAVING & INTERVENTION KIT	754	270	840	
11	-	TABLE	1000	500	750	



NOTES

1. U.N.O. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DELETED
3. DOCUMENT VALID ONLY FOR ELECTRICAL COMPONENT.
4. FOR OTHER ITEMS, CORRECT LOCATION AND INFROMATION, PLEASE REFER TO VENDORS AND DEDICATED PROJECT DOCUMENTATION.
5. HEIGHT OF ALL PANELS IN THE EQUIPMENT LIST TABLE IS WITHOUT THE BASE FRAME (100mm)

02

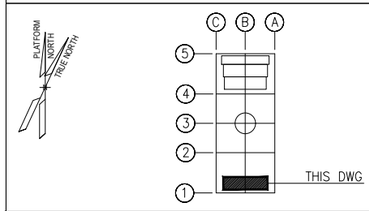
LEGEND

U.N.O. _____ UNLESS NOTED OTHERWISE
T.O.S. _____ TOP OF STEEL
_____ ESCAPE CORRIDOR - WIDTH 800mm.
_____ MAINTENANCE AREA - VENDOR REQUIREMENT
_____ SWITCHGEAR ROOM ENCLOSURE
_____ FRONT OF EQUIPMENT

REFERENCES

DOCUMENT TITLE	DOCUMENT NUMBER
66kV SWITCHGEAR (GIS) GENERAL ARRANGEMENT DRAWING	1723001595-EL-DA-00006
CIRCUIT AND WIRING DIAGRAM	1723001595-EL-DG-00015
SG-100D1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00006
DC UPS – GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS	1724000372-EL-DA-00003
DC UPS – BATTERY LAYOUT AND INTERCONNECTING DIAGRAM	1724000372-EL-DG-00010
B-100 - GENERAL ARRANGEMENT DRAWINGS - E&I SHELTER	1724000049-AR-DA-00014

KEY PLAN



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20104**

REV.:	DATE:	SIGNATURE:
2_A	08/08/24	G.Randi

ROSETTI MARINO SpA

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	27/05/2024	FMO	LMA/AMA	LMA/MDO	ACCEPTED FOR CONSTRUCTION (AFC)
01	26/03/2024	GPA	LMA/AMA	LMA/MDO	ISSUE FOR REVIEW (IFR)
00	10/11/2023	DSF	CB/AMA	DYFO/MDO	ISSUE FOR REVIEW (IFR)

CROSSWIND | ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
HV SWITCHROOM

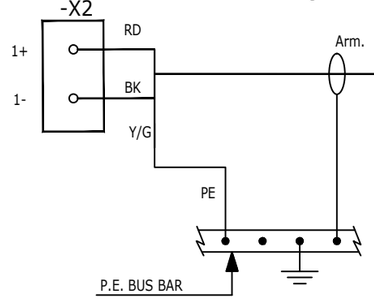
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:50
DRAWN GPA	CHECKED LMA/AMA	APPROVED LMA/MDO	DATE 27/05/2024
A1	DRAWING NO. 123A90-DDL-EL-DL-20104	SHEET 001	REV. 02

File Name : 123A90-DDL-EL-DL-20104_REV02.dwg

FROM	TO

DESCRIPTION: DC UPS DB
TAG NUMBER: DP-200F1

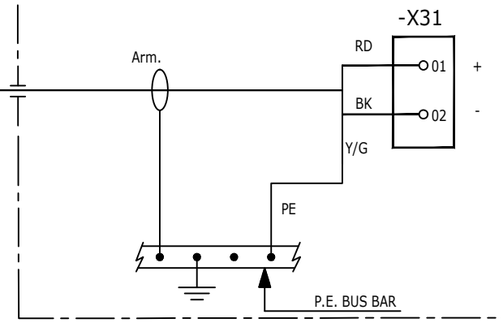
CB: -Q10



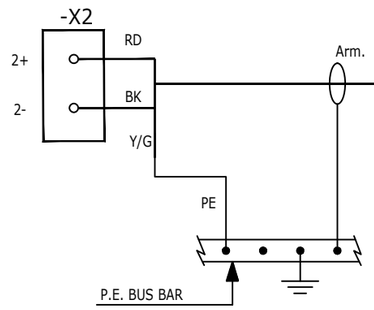
84101-CEL
3G16 mm²

DESCRIPTION: DC CONTROL FOR 66 KV GIS LINE-1
TAG NUMBER: CP-100E1

PANEL: LCP



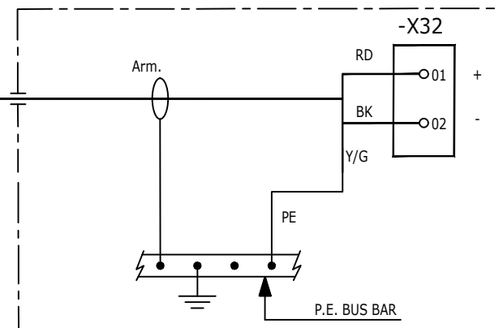
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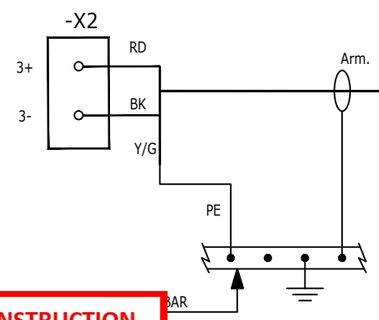
84102-CEL
3G16 mm²

DESCRIPTION: DC CONTROL FOR 66 KV GIS LINE-2
TAG NUMBER: CP-100E1

PANEL: LCP



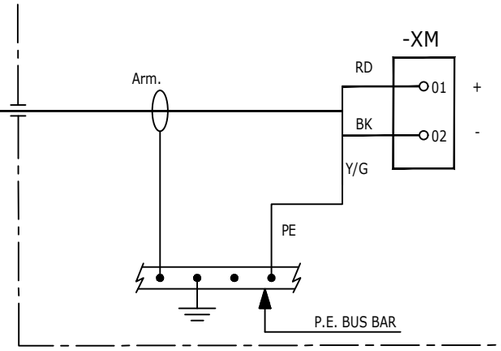
CB: -Q12



84103-CEL
3G16 mm²

DESCRIPTION: DC CONTROL FOR 6,6 KV SWITCHGEAR LINE-A
TAG NUMBER: SG-100D1

COLUMN/CUBIC.: A5



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DG-20149**

REV.:	DATE:	SIGNATURE:
2_H	16/01/25	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	19/11/24	SAI	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
01	16/10/24	SAI	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	08/07/24	SAI	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL INTERCONNECTING WIRING DIAGRAM
DC UPS DB DP-200F1

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK

SCALE : 1:X

A3

DRAWING NO. 123A90-DDL-EL-DG-20149

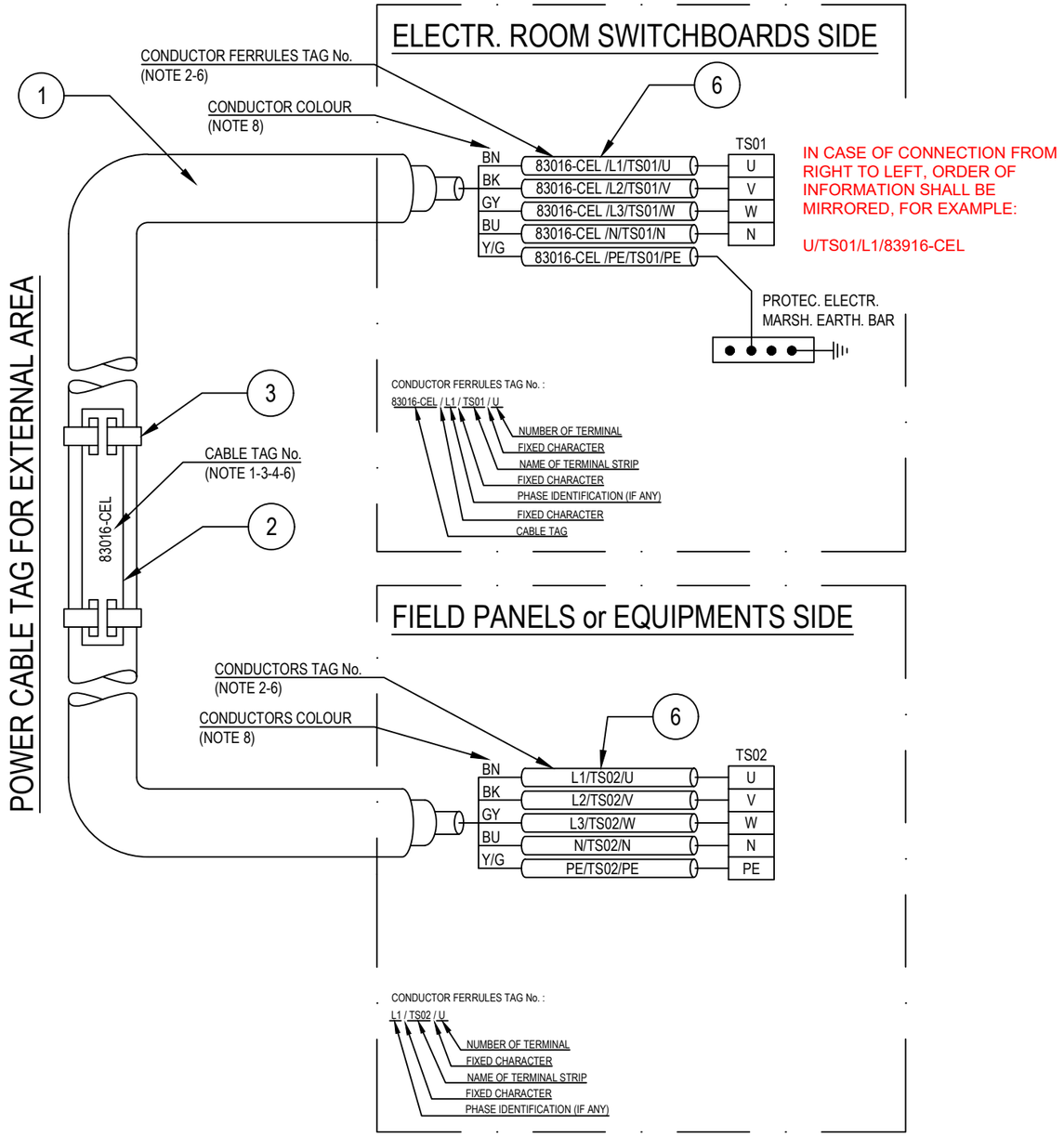
SHEET 033

REV. 02

F.to UNI A3: 420mmx297mm

File Name : 123A90-DDL-EL-DG-20149 Rev. 02

C02



POS.	DESCRIPTION	MATERIAL	SIZE	Q.TY	NOTE
1	UNARMOURED CABLE				
2	CABLE TAG FOR EXTERNAL AREA	HDG/SS			NOTE 1 NOTE 4
3	TIE FOR CABLE TAG IN EXTERNAL AREA	HDG/SS			
4	CABLE TAG FOR INTERNAL AREA	PVC			NOTE 1 NOTE 5
5	TIE FOR CABLE TAG IN INTERNAL AREA	NYLON 6.6			
6	CORE FERRULES	PVC			

NOTES:

1) ALL CABLES SHALL BE IDENTIFIED AT EACH TERMINATION AND EACH SIDE OF ANY OBSTACLE (E.G. CABLE TRANSIT ON WALLS INSIDE SHELTER AND FLOOR DECK CROSSING, BY THEIR RESPECTIVE TAGS/NUMBERS, AS INDICATED ON THE CABLE SCHEDULE.
CABLE IDENTIFICATION SHALL BE ALSO DONE BELOW AND IN THE SWITCHBOARD CABLE COMPARTMENT.

2) CABLE CORE FERRULES SHALL BE FITTED AT EVERY TERMINATION. THESE FERRULES SHALL BE OF ENGRAVED PLASTIC SLIP ON, INTERLOCKED AND SELF GRIP TYPE.

3) ON CABLE TRAYS OR LADDERS, CABLES SHALL BE IDENTIFIED AT EACH END, AND EVERY 25 METERS.

4) THE CABLE TAG FOR EXTERNAL AREA SHALL DONE BY 316L STAINLESS STEEL LABELS, TAG (H=5mm) SHALL BE LASER PRINTED PREFERABLY OR EMBOSSED, LABEL HELD BY TWO 316L STAINLESS STEEL TIES.

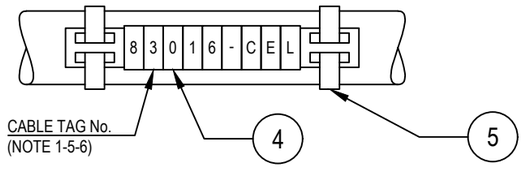
5) THE CABLE TAG FOR INTERNAL AREA SHALL BE DONE BY ENGRAVED PLASTIC SLIP ON CHARACTERS ONTO PLASTIC TIE, BLACK LETTER (H=5mm) ON WHITE.

6) CABLE AND CONDUCTOR TAG ARE INDICATIVE ONLY.

7) WITHIN TECHNICAL BUILDING, PROTECTIVE CONDUCTOR SHALL BE TAGGED BETWEEN FOLLOWING ITEMS:
- PANEL (SWITCHBOARD, SWITCHGEAR, DISTRIBUTION BOARD, ETC) AND EARTH BAR
- EARTH BAR AND EARTH BOSS

8) ONLY IF NECESSARY, SHRINK TUBES OF THE APPROPRIATE COLOR WILL BE INSTALLED TO COVER THE WRONG CONDUCTOR COLOR, THIS WILL BE PERFORMED IN EACH SIDE OF THE CABLES WHERE NECESSARY.

POWER CABLE TAG FOR INTERNAL AREA



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DD-20092**

REV.:	DATE:	SIGNATURE:
2_D	20/12/24	V.Ramponi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	28/08/24	GRA	AMA	DLO	ACCEPTED FOR CONSTRUCTION (AFC)
01	04/07/24	NLK	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	21/11/23	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL TYPICAL INSTALLATION DETAILS-POWER SYSTEM & CABLE INSTALLATION
CABLES INSTALLATION SYSTEM IDENTIFICATION FOR POWER CABLES

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK | SCALE : NTS

A3 | DRAWING NO. 123A90-DDL-EL-DD-20092 | SHEET 007 | REV. 02

F.to UNI A3: 420mmx297mm

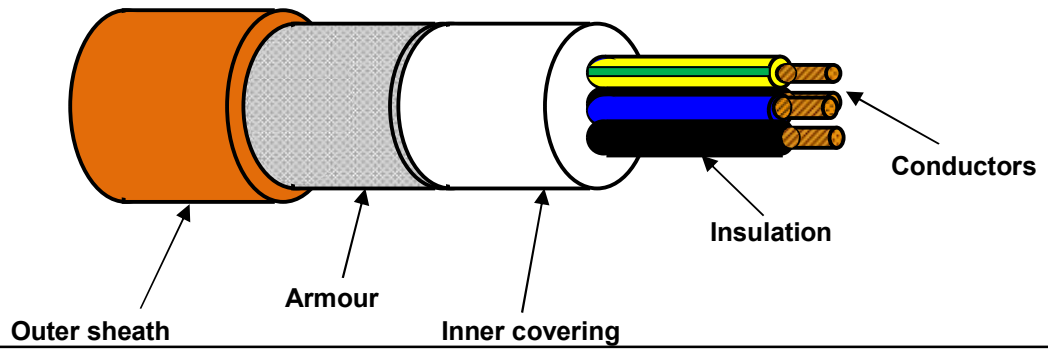
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Tag Number	Category	Discipline	Eng Status	NativeDoc	Layout	Parent Tag	Main Function	Secondary Function	Area	From Tag	From Main Function	From Area	From Tag Sect	To Tag	To Main Function	To Area	To Tag Secti	Material ID	Material Desc.	Gland Standard	From Gland	From Entry	From Fitting	To Gland	To Entry	To Fitting	Routing	Routing Manual
84102-CEL	Cable	EL	VFC	123A90-DDL-EL-LIS-20148						DP-200F1	DC UPS 10 kVA Distribution Board	Lower Deck (B-100)	DB CABINET	CP-100E1	66 kV GIS Local Control Panel	Lower Deck (B-100)	DC Control LCP	ELECV18-3G16	Cable Cu Cl.2/MGT/EPR/LSZH/GSWB/LSZH 0,6/1kV 3G16mm² - Orange-DC	M25	T2_M25_Double			T2_M25_Double				L-300-101-LVT-060 / L-600-101-LVT-058 / L-300-101-LVT-059 / L-300-101-LVT-063

FLEI s.r.l.

Cu Cl.2/MGT/EPR/LSZH/GSWB/LSZH 0,6/1 KV

3G16 - DC POWER CABLE - Fire Resistant & Flame Retardant - ARMOURED



TECHNICAL FEATURES

Conductors :	**STRANDED** plain/bare annealed copper wires	IEC 60228 Class 2
Insulation :	Mica/Glass Tape/s (MGT) plus EPR compound, quality to IEC 60092.360, Nominal Thickness 1,0 mm	
Cores colour code :	**Red - Black - Yellow/Green**	
Pair Assembling :	Not required	
Pair Wrapping:	Not required	
Drain wire :	Not required	
Pair Shield :	Not required	
Shield Insulation :	Not Required	
Total Assembling :	Cores layed up with optimal lay length	
Overall Wrapping:	Not required	
Drain wire :	Not required	
Overall Shield:	Not required	
Inner covering :	Extruded LSZH compound, Average Thickness 1,0 mm	
Inner covering color code:	**Black or Natural**	
Armour :	**Galvanized Steel Wire Braid Armour (coverage ≥ 90%)**	
Outer sheath :	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type **SHF1** to IEC 60093.360, Average Thickness 1,6 mm	
Outer sheath color code:	**Orange**	
Outer printing (INKJET) :	**FLEI - ELECTRIC CABLE - 1000V - 3G16 SQMM - MGT/EPR/LSZH/GSWB/LSZH - 0,6/1 KV - IEC 60331.21 - IEC 60332.1.2 - IEC 60332.3.22 - Year of Manufacture - CE + Meter Marking**	
Under Armour diameter :	(19,2 ± 10%) mm	
Over Armour diameter :	(20,4 ± 10%) mm	
Outer diameter :	(23,6 ± 10%) mm	
Bending radius :	cable outer diameter x 10	(in fixed installation)
Voltage test :	3,5 kV a.c. for 5' (Between Cores - Armour)	
Conductors DC Resistance :		IEC 60228 Class 2
Insulation Resistance :	≥ 460 MΩ x Km (@ 20°C)	
Applicable Standards		
Design Guidelines :	**IEC 60092.353**	
ON COMPLETE CABLE		
Fire Resistant test :	**IEC 60331.21**	
Flame Retardant test :	IEC 60332.1.2 - IEC 60332.3.22	
Acid Gas generation :	IEC 60754.1/2	
Smoke density/Light Transmittance :	IEC 61034.2 (LT ≥ 60%)	
Temperature Range :		
ON INSULATION	(max +90°C)	(max continuous operation temperature of conductors)
	(max +250°C)	(max conductors temperature during short-circuit for 5 seconds)
ON COMPLETE CABLE		
During Operation :	(-20°C up to +90°C)	(in fixed installation)
During installation :	(- 5°C up to +50°C)	
Note :	**To meet the requirements of installation and use in Zone 1 & Zone 2 (IEC 60079-14) and "Gas & Vapour Tight" the cable must be provided with Penetrating Inner covering together with correct ATEX approved equipment or accessories.**	

Office	Date	Sign	Rev.	Date	Sign
Drawn by :	29/03/2024	Messa			
Checked :	29/03/2024	Spaccasassi			
Approved :	29/03/2024	Cucinotta			

The data provided, lending assent for the treatment, will be used to the sense of the article 13 of of the Regulation (UE) 2016/679, also through outsiders, in order to allow the realization of the fulfilments informatives, administrative, commercial and accounting related to the contractual relationship. Integral copy of the informative could be requested at our offices.

All proprietary rights reserved according to law. This document shall be not reproduced without written permission. FLEI reserves the right to change characteristics and technical data of product shown at any time.

ITEM	Tag	83118-CEL	: Lighting & Small Power DB BoP / Auxiliary GIS			Dwg	123A90-DDL-EL-LIS-20148
	S/Sys	81-10	: GIS 66 kV (HNA6-AFA70)			Module	LD_B-200/LD_B-100
TASK	code	C10000637	Location	Onshore Activities		User	Rosetti Marino Quality Control
FORM	Process	MC	Activity CCK	Discipline	Electrical	Form	CPX09 LV Power Cable

CABLE DATA

Type: Cu Cl.2/EPR/LSZH | Cores/Size mm²: 3G6 mm2 | Color: GREY

From: DP-200N1 | To: CP-100E1

1	Confirm cable is as specified in project cable schedule	OK
2	Visual Check cable physical integrity.	OK
3	Check is installed in accordance with layout drawing (segregation, distance…).	OK
4	Check cable is supported and fixed to rack according to project specification.	Note
5	Check bending radius is within the specified limits.	OK
6	Confirm cable glands suit for cable type, correctly mounted and tightened.	OK
7	Check gland plate for single core cables is non ferrous (non -magnetic).	NA
8	Confirm cable labelling is in accordance with specifications.	OK
9	Check cable is correctly loomed and segregated in accordance with specification.	OK
10	Check cable earthing against lastest drawings.	OK
11	Check cores marking are in accordance with termination diagram	OK
12	Check terminations are in accordance with latest termination diagram	OK
13	If required produce Red Line Mark Up for "AS BUILT"	

REFER TO FINAL SHEET FOR ACCEPTANCE

ROSETTI MARINO PROVERLIS CROSSWIND

ITEM	Tag	83118-CEL	: Lighting & Small Power DB BoP / Auxiliary GIS			Dwg	123A90-DDL-EL-LIS-20148
	S/Sys	81-10	: GIS 66 kV (HNA6-AFA70)			Module	LD_B-200/LD_B-100
TASK	code	C10000637		Location	Onshore Activities	User	Rosetti Marino Quality Control
FORM	Process	MC	Activity CCK	Discipline	Electrical	Form	CPX09 LV Power Cable

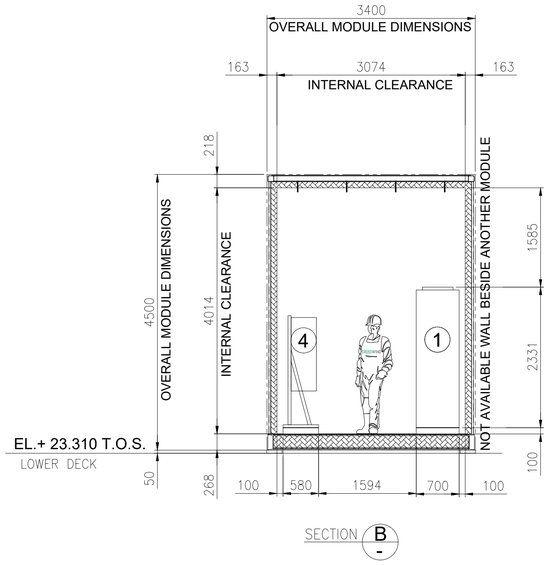
CONTINUITY				
5	CORE CONTINUITY Ω	PH 1	0,6	
6		PH 2	0,6	
7		PH 3	NA	
8	ARMOUR CONTINUITY Ω		NA	
9	PROTECTIVE CONDUCTOR CONTINUITY Ω		0,6	
INSULATION				
10	CORES / ARMOUR+EARTH MΩ	PH1 / PH2-PH3-A-E	>999	
11		PH2 / PH1-PH3-A-E	>999	
12		PH3 / PH1-PH2-A-E	NA	
13	CABLE IS CORRECTLY RE-CONNECTED.		Yes	

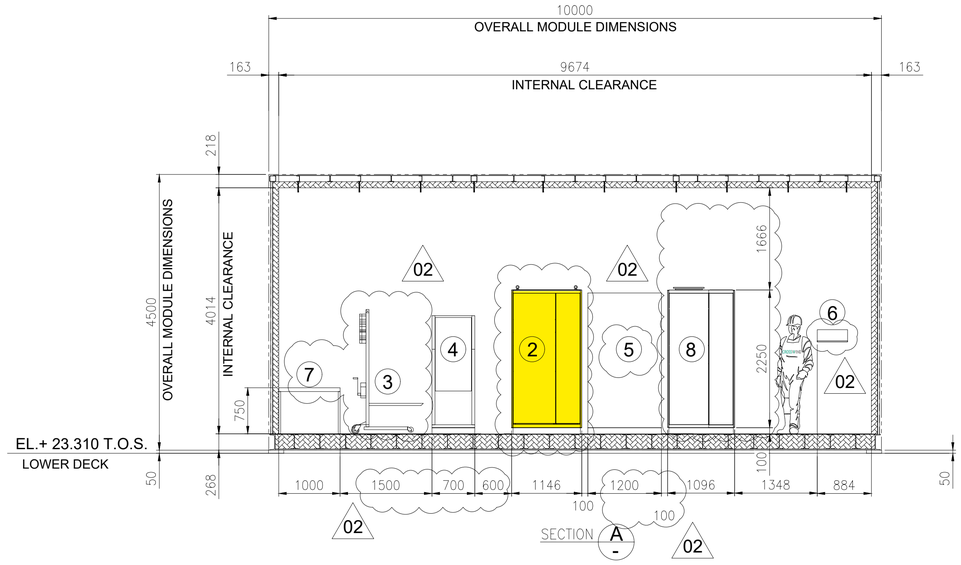
TESTING INSTRUMENTS USED			
TYPE / SERIAL N° :	VOLCRAFT 1000V ET-200 S/N:H240103023	TYPE / SERIAL N° :	MEGGER : KEW3125A SERIAL: W8330207
Calibration certificate N° and date:	12/10/2024	Calibration certificate N° and date:	N°7722/24 _ 10/07/2024

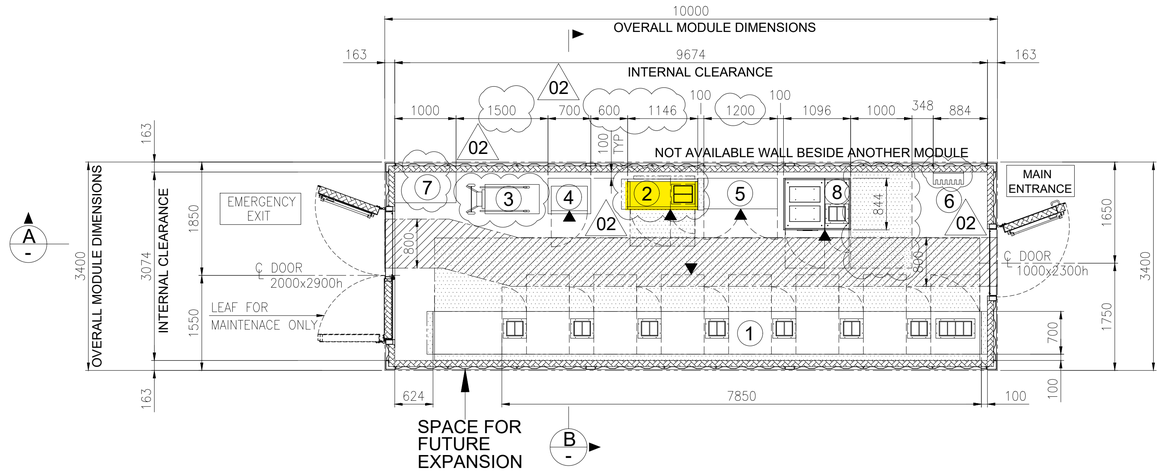
Comments: Nota 4: refer to PL C30000679

	Performed by	● WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	RM(ROSETTI MARINO)	
Name	Michele Tartaglia	Paolo Schintu	
Date	2025-01-15	2025-01-20	
Signature	PROVERLIS Digitaly signed by Michele Tartaglia 2025-01-15T10:32:20.512Z	PROVERLIS Digitaly signed by Paolo Schintu 2025-01-20T13:54:22.791Z	

DRAWING NO. 123A90-DDL-EL-DL-20105 REV. 02





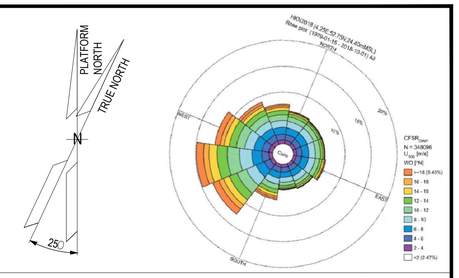


EQUIPMENT LAYOUT
"B-200" LV (400V) SWITCHGEAR ROOM
BOTTOM PLAN

1

EQUIPMENT LIST

REF.	TAG No.	DESCRIPTION	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	NOTE
1	SG-200N1	400V SWITCHGEAR	7850	700	2331	
2	DP-200N1	DISTRIBUTION BOARD FOR LIGHTING AND SMALL POWER B.O.P.	1146	520	2250	
3	-	SERVICE TROLLEY FOR 400V SWITCHGEAR	1034	490	2030	
4	CN-200N1	ICCP PANEL	700	580	1830	
5	B200-HSB-001	DISTRIBUTION & HVAC PANEL - LV ROOM	1200	600	1900	02
6	-	TOOL BOX	495	200	200	
7	-	TABLE	1000	500	750	
8	SG-200D2	ACB PANEL FOR SOLAR PACKAGE	1096	844	2294	



NOTES

1. U.N.O. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DELETED.
3. DOCUMENT VALID ONLY FOR ELECTRICAL COMPONENT, FOR OTHER SCOPE LOCATION AND INFORMATION, PLEASE REFER TO VENDORS AND PROJECT DOCUMENTS.
4. FOR OTHER ITEMS, CORRECT LOCATION AND INFORMATION, PLEASE REFER TO VENDORS AND DEDICATED PROJECT DOCUMENTATION.
5. HEIGHT OF ALL PANELS IN THE EQUIPMENT LIST TABLE IS WITHOUT THE BASE FRAME (100mm)

02

LEGEND

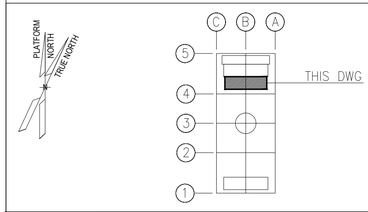
U.N.O. _____ UNLESS NOTED OTHERWISE
T.O.S. _____ TOP OF STEEL
_____ ESCAPE CORRIDOR - WIDTH 800mm.
_____ MAINTENANCE AREA - VENDOR REQUIREMENT
_____ SWITCHGEAR ROOM ENCLOUSURE
_____ FRONT OF EQUIPMENT

REFERENCES

DOCUMENT TITLE	DOCUMENT NUMBER
SG-200N1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00007
SG-200D2 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00008
DP-200N1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00009
AC UPS – GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS	1724000372-EL-DA-00004
AC UPS – BATTERY LAYOUT INTERCONNECTING DIAGRAM	1724000372-EL-DG-00011
B-200 -GENERAL ARRANGEMENT DRAWINGS - E&I SHELTER	1724000049-AR-DA-00015
ICCC PANEL GENERAL ARRANGEMENT DRAWING	144671-CORR-TF-FAB-DWG-0003

02

KEY PLAN



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20105**

REV.:	DATE:	SIGNATURE:
2_A	08/08/24	G.Randi

ROSETTI MARINO SpA

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	27/05/2024	FMO	LMA/AMA	LMA/MDO	ACCEPTED FOR CONSTRUCTION (AFC)
01	26/03/2024	GPA	LMA/AMA	LMA/MDO	ISSUE FOR REVIEW (IFR)
00	08/11/2023	DSF	CB/AMA	DYFO/MDO	ISSUE FOR REVIEW (IFR)

CROSSWIND

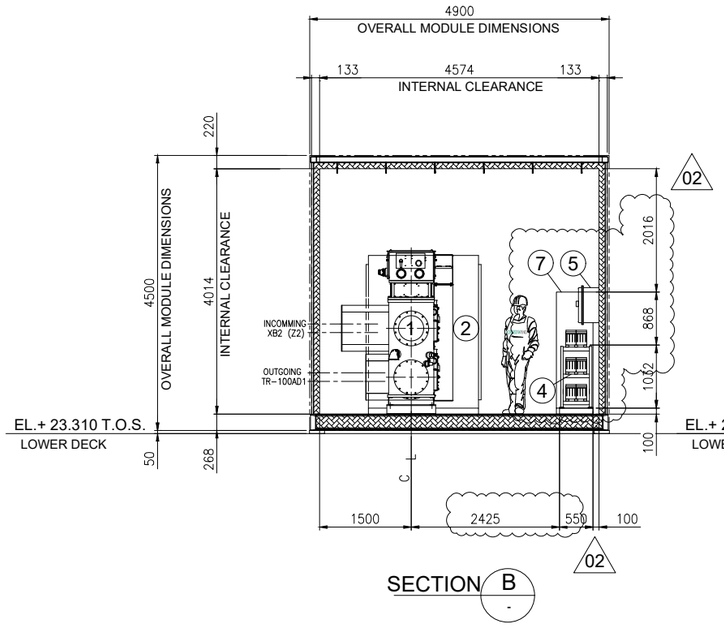
ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
LV SWITCHROOM

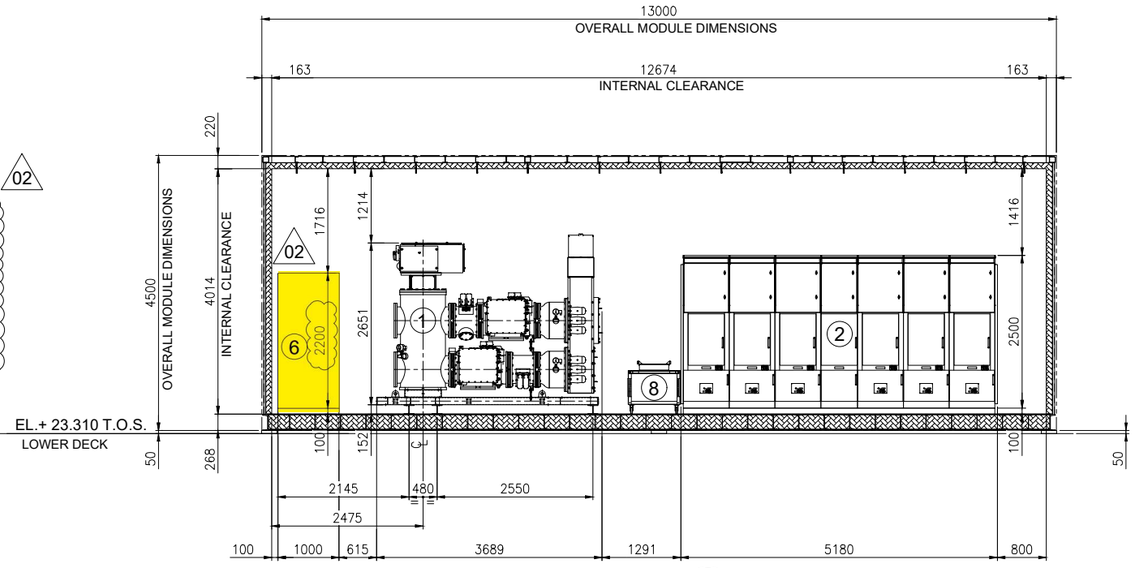
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:50
DRAWN FMO	CHECKED LMA/AMA	APPROVED LMA/MDO	DATE 27/05/2024
A1	DRAWING NO. 123A90-DDL-EL-DL-20105	SHEET 001	REV. 02

File Name : 123A90-DDL-EL-DL-20105_REV02.dwg

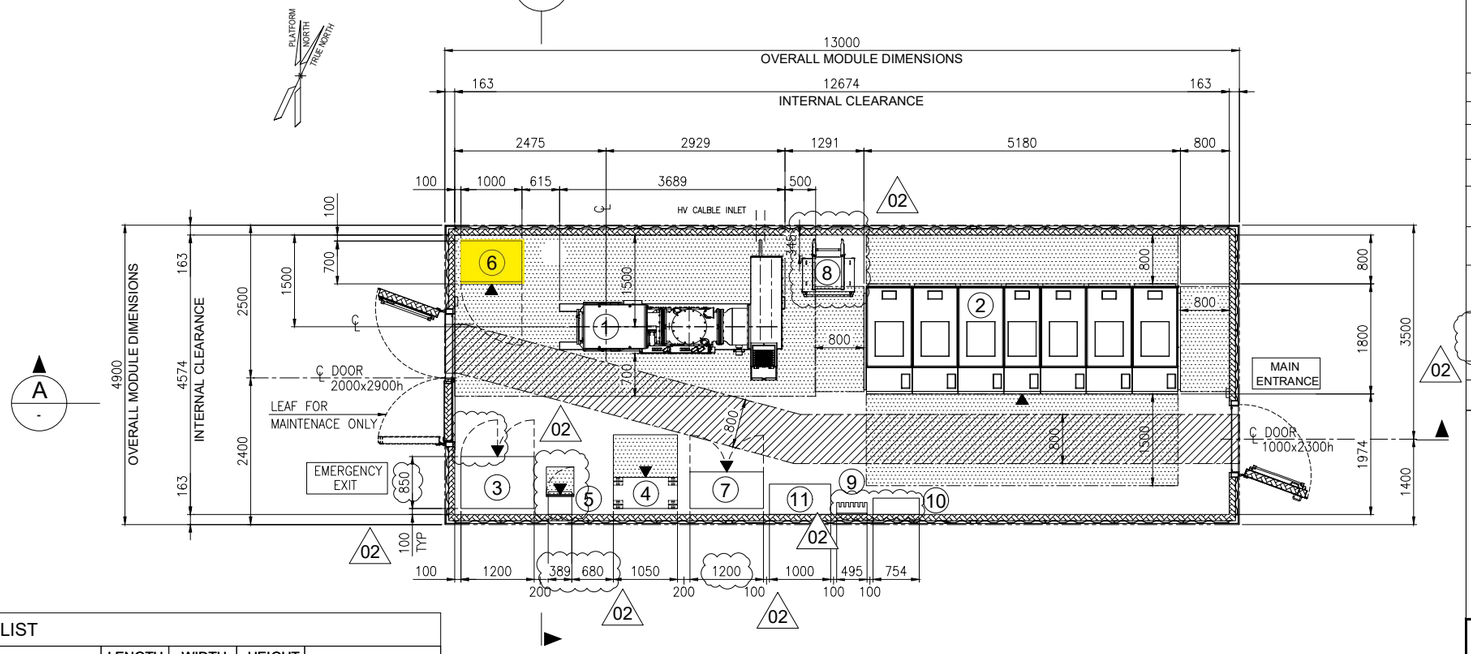
DRAWING NO. 123A90-DDL-EL-DL-20104 | REV. 02



SECTION B -



SECTION A -

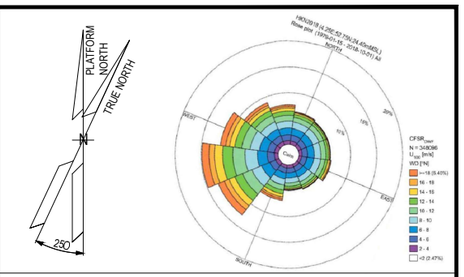


A -

B -

EQUIPMENT LIST

REF.	TAG No.	DESCRIPTION	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	NOTE
1	HNA6-AFA70	66kV SWITCHGEAR (GIS)	3689	2025	2651	
2	SG-100D1	6.6kV SWITCHGEAR	5180	1800	2500	
3	UP-200F1	DC UPS PANEL	1200	850	2105	
4	BA-200F1	DC UPS BATTERY RACK	1050	510	1272	
5	CB-200F1 02	ISOLATOR FOR DC UPS	452	377	634	
6	CP-100E1	66 kV SWITCHGEAR LOCAL CONTROL PANEL	1000	700	2200	02
7	B100-HSB-001	DISTRIBUTION & HVAC PANEL - HV MV ROOM	1200	600	1900	
8	-	SERVICE TROLLEY FOR 6.6kV SWITCHGEAR	943	862	874	
9	-	TOOL BOX	495	200	200	
10	-	SUBSTATION LIFE SAVING & INTERVENTION KIT	754	270	840	
11	-	TABLE	1000	500	750	



NOTES

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4. FOR OTHER ITEMS, CORRECT LOCATION AND INFROMATION, PLEASE REFER TO VENDORS AND DEDICATED PROJECT DOCUMENTATION.
5. HEIGHT OF ALL PANELS IN THE EQUIPMENT LIST TABLE IS WITHOUT THE BASE FRAME (100mm)

02

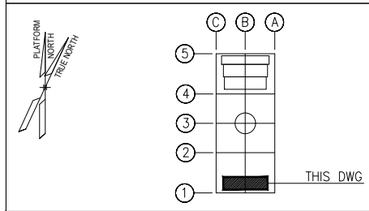
LEGEND

U.N.O. _____ UNLESS NOTED OTHERWISE
T.O.S. _____ TOP OF STEEL
_____ ESCAPE CORRIDOR - WIDTH 800mm.
_____ MAINTENANCE AREA - VENDOR REQUIREMENT
_____ SWITCHGEAR ROOM ENCLOSURE
_____ FRONT OF EQUIPMENT

REFERENCES

DOCUMENT TITLE	DOCUMENT NUMBER
66kV SWITCHGEAR (GIS) GENERAL ARRANGEMENT DRAWING	1723001595-EL-DA-00006
CIRCUIT AND WIRING DIAGRAM	1723001595-EL-DG-00015
SG-100D1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00006
DC UPS – GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS	1724000372-EL-DA-00003
DC UPS – BATTERY LAYOUT AND INTERCONNECTING DIAGRAM	1724000372-EL-DG-00010
B-100 - GENERAL ARRANGEMENT DRAWINGS - E&I SHELTER	1724000049-AR-DA-00014

KEY PLAN



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20104**

REV.:	DATE:	SIGNATURE:
2_A	08/08/24	G.Randi

ROSETTI MARINO SpA

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	27/05/2024	FMO	LMA/AMA	LMA/MDO	ACCEPTED FOR CONSTRUCTION (AFC)
01	26/03/2024	GPA	LMA/AMA	LMA/MDO	ISSUE FOR REVIEW (IFR)
00	10/11/2023	DSF	CB/AMA	DYFO/MDO	ISSUE FOR REVIEW (IFR)

CROSSWIND | ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
HV SWITCHROOM

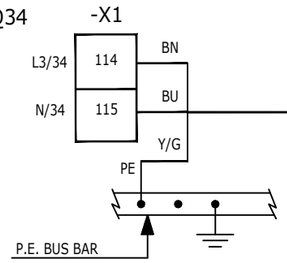
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:50
DRAWN GPA	CHECKED LMA/AMA	APPROVED LMA/MDO	DATE 27/05/2024
A1	DRAWING NO. 123A90-DDL-EL-DL-20104	SHEET 001	REV. 02

File Name : 123A90-DDL-EL-DL-20104_REV02.dwg

FROM	TO

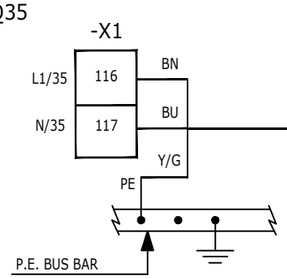
DESCRIPTION: LIGHTING & SMALL POWER DB BOP
TAG NUMBER: DP-200N1

CUBICLE/CB: +03/Q34



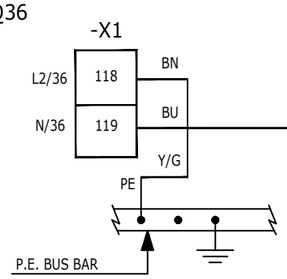
83115-CEL
3G2.5 mm²

CUBICLE/CB: +03/Q35



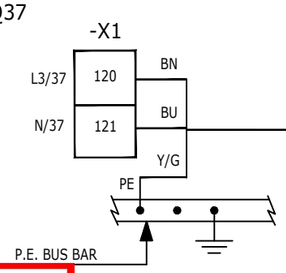
83116-CEL
3G2.5 mm²

CUBICLE/CB: +03/Q36



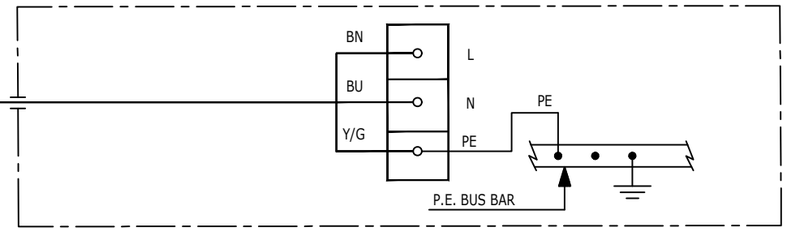
83117-CEL
3G2.5 mm²

CUBICLE/CB: +03/Q37

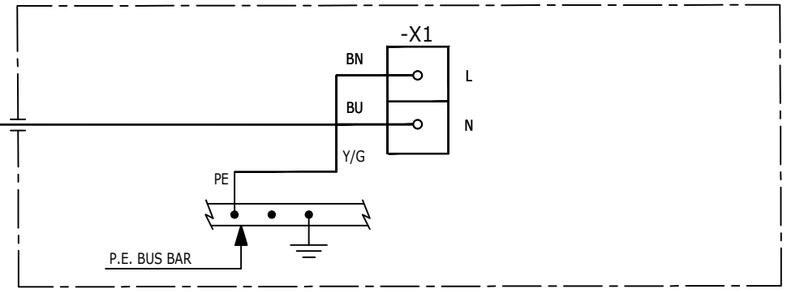


83118-CEL
3G6 mm²

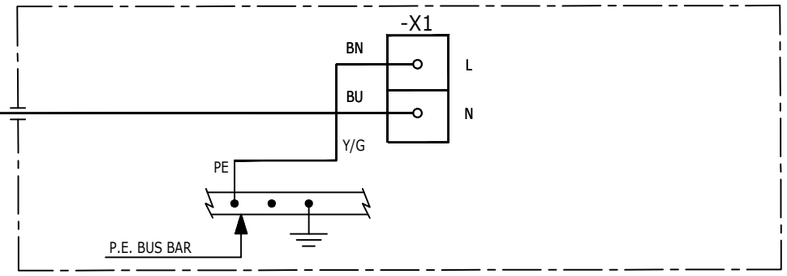
DESCRIPTION: AUXILIARY NER
TAG NUMBER: RR-100D1



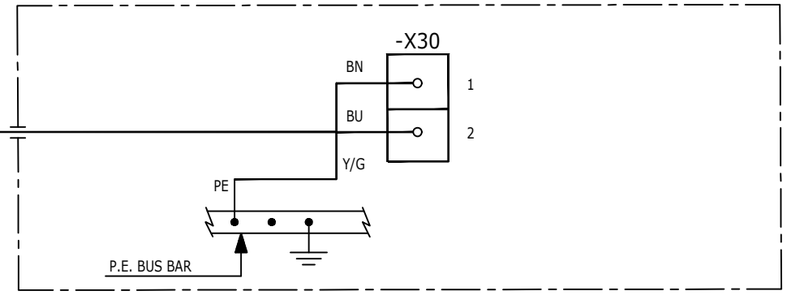
DESCRIPTION: AUXILIARY TRAFO 1,6MVA
TAG NUMBER: CP-200E1



DESCRIPTION: AUXILIARY TRAFO SOLAR 0,5MVA
TAG NUMBER: CP-200E2



DESCRIPTION: AUXILIARY GIS
TAG NUMBER: CP-100E1



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DG-20149**

REV.:	DATE:	SIGNATURE:
2_H	16/01/25	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	19/11/24	SAI	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
01	16/10/24	SAI	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	08/07/24	SAI	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL INTERCONNECTING WIRING DIAGRAM
LIGHTING & SMALL POWER DB BOP

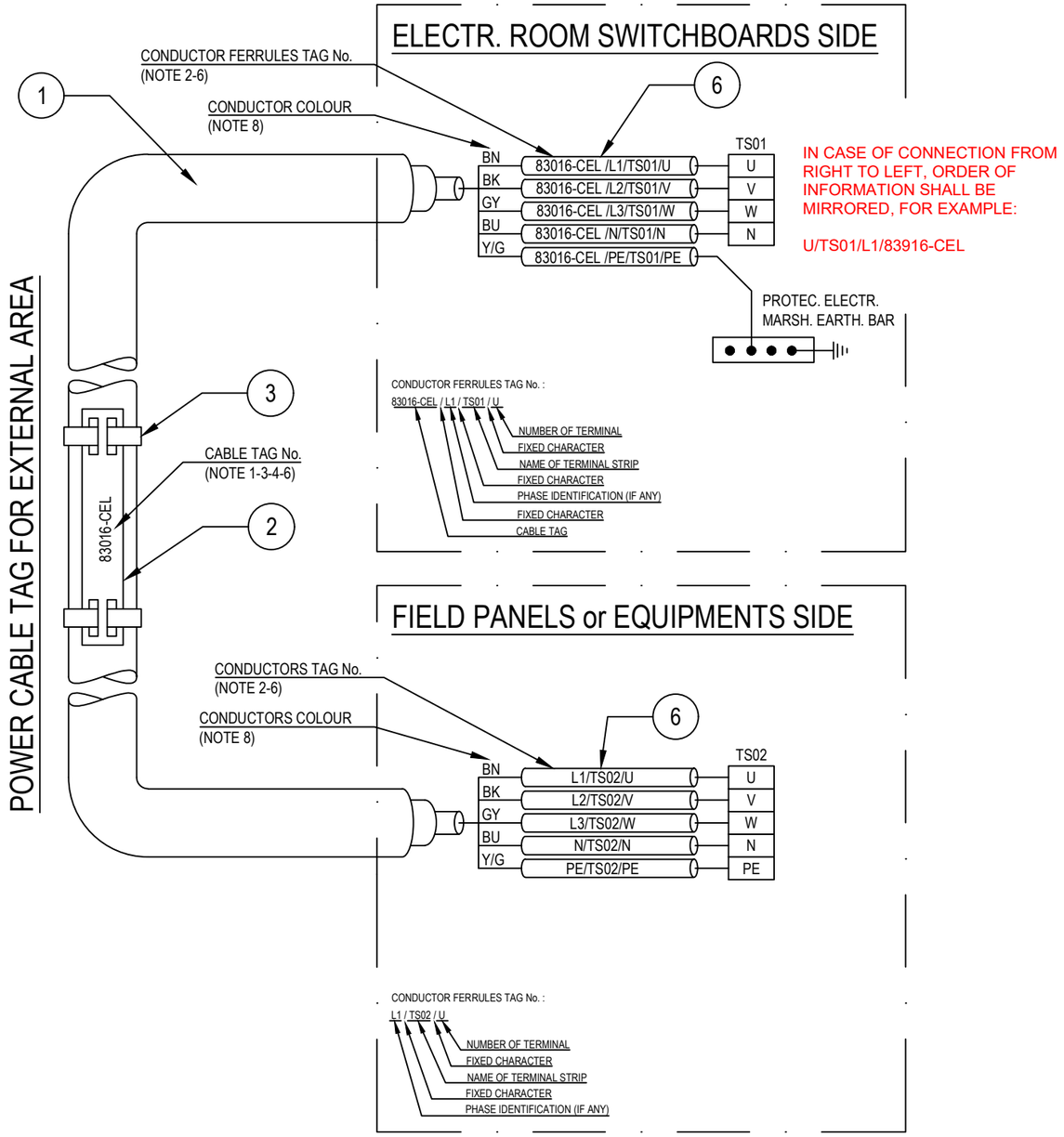
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK | SCALE : 1:X

A3 | DRAWING NO. 123A90-DDL-EL-DG-20149 | SHEET 055 | REV. 02

F.to UNI A3: 420mmx297mm

File Name : 123A90-DDL-EL-DG-20149 Rev. 02

C02



POS.	DESCRIPTION	MATERIAL	SIZE	Q.TY	NOTE
1	UNARMOURED CABLE				
2	CABLE TAG FOR EXTERNAL AREA	HDG/SS			NOTE 1 NOTE 4
3	TIE FOR CABLE TAG IN EXTERNAL AREA	HDG/SS			
4	CABLE TAG FOR INTERNAL AREA	PVC			NOTE 1 NOTE 5
5	TIE FOR CABLE TAG IN INTERNAL AREA	NYLON 6.6			
6	CORE FERRULES	PVC			

NOTES:

1) ALL CABLES SHALL BE IDENTIFIED AT EACH TERMINATION AND EACH SIDE OF ANY OBSTACLE (E.G. CABLE TRANSIT ON WALLS INSIDE SHELTER AND FLOOR DECK CROSSING, BY THEIR RESPECTIVE TAGS/NUMBERS, AS INDICATED ON THE CABLE SCHEDULE.
CABLE IDENTIFICATION SHALL BE ALSO DONE BELOW AND IN THE SWITCHBOARD CABLE COMPARTMENT.

2) CABLE CORE FERRULES SHALL BE FITTED AT EVERY TERMINATION. THESE FERRULES SHALL BE OF ENGRAVED PLASTIC SLIP ON, INTERLOCKED AND SELF GRIP TYPE.

3) ON CABLE TRAYS OR LADDERS, CABLES SHALL BE IDENTIFIED AT EACH END, AND EVERY 25 METERS.

4) THE CABLE TAG FOR EXTERNAL AREA SHALL DONE BY 316L STAINLESS STEEL LABELS, TAG (H=5mm) SHALL BE LASER PRINTED PREFERABLY OR EMBOSSED, LABEL HELD BY TWO 316L STAINLESS STEEL TIES.

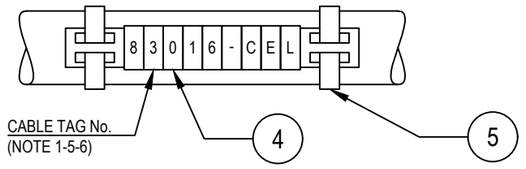
5) THE CABLE TAG FOR INTERNAL AREA SHALL BE DONE BY ENGRAVED PLASTIC SLIP ON CHARACTERS ONTO PLASTIC TIE, BLACK LETTER (H=5mm) ON WHITE.

6) CABLE AND CONDUCTOR TAG ARE INDICATIVE ONLY.

7) WITHIN TECHNICAL BUILDING, PROTECTIVE CONDUCTOR SHALL BE TAGGED BETWEEN FOLLOWING ITEMS:
- PANEL (SWITCHBOARD, SWITCHGEAR, DISTRIBUTION BOARD, ETC) AND EARTH BAR
- EARTH BAR AND EARTH BOSS

8) ONLY IF NECESSARY, SHRINK TUBES OF THE APPROPRIATE COLOR WILL BE INSTALLED TO COVER THE WRONG CONDUCTOR COLOR, THIS WILL BE PERFORMED IN EACH SIDE OF THE CABLES WHERE NECESSARY.

POWER CABLE TAG FOR INTERNAL AREA



VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DD-20092**

REV.:	DATE:	SIGNATURE:
2_D	20/12/24	V.Ramponi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	28/08/24	GRA	AMA	DLO	ACCEPTED FOR CONSTRUCTION (AFC)
01	04/07/24	NLK	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	21/11/23	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL TYPICAL INSTALLATION DETAILS-POWER SYSTEM & CABLE INSTALLATION
CABLES INSTALLATION SYSTEM IDENTIFICATION FOR POWER CABLES

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK | SCALE : NTS

A3 | DRAWING NO. 123A90-DDL-EL-DD-20092 | SHEET 007 | REV. 02

F.to UNI A3: 420mmx297mm

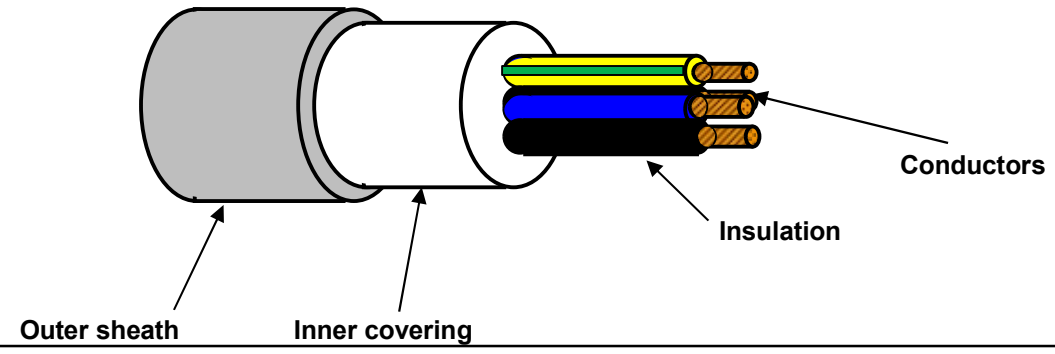
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Tag Number	Category	Discipline	Eng Status	NativeDoc	Layout	Parent Tag	Main Function	Secondary Function	Area	From Tag	From Main Function	From Area	From Tag Sect	To Tag	To Main Function	To Area	To Tag Secti	Material ID	Material Desc.	Gland Standard	From Gland	From Entry	From Fitting	To Gland	To Entry	To Fitting	Routing	Routing Manual
83118-CEL	Cable	EL	VFC	123A90-DDL-EL-LIS-20148						DP-200N1	LV 0,4 / 0,23 kV Distribution Switchgear	Lower Deck (B-200)	03/Q37	CP-100E1	66 kV GIS Local Control Panel	Lower Deck (B-100)	Local Control Panel	ELECV05-3G6	Cable Cu Cl.2/EPR/LSZH 0,6/1kV 3G6mm² - Grey	M25	n.a.			n.a.				L-450-101-LVT-030 / L-600-101-LVT-020 / L-600-101-LVT-018 / L-600-101-LVT-017 / E-MCT-201 / L-750-101-LVT-011 / L-600-101-LVT-012 / L-300-101-LVT-074 / E-MCT-105 / L-600-101-LVT-058 / L-300-101-LVT-059

FLEI s.r.l.

Cu Cl.2/EPR/LSZH 0,6/1 KV

3G6 - L.V. POWER CABLE - Flame Retardant



TECHNICAL FEATURES

Conductors :	**STRANDED** plain/bare annealed copper wires	IEC 60228 Class 2
Insulation :	EPR compound, quality to IEC 60092.360, Nominal Thickness 1,0 mm	
Cores colour code :	**Brown - Blue - Yellow/Green**	
Pair Assembling :	Not required	
Pair Wrapping:	Not required	
Drain wire :	Not required	
Pair Shield :	Not required	
Shield Insulation :	Not Required	
Total Assembling :	Cores layed up with optimal lay length	
Overall Wrapping:	Not required	
Drain wire :	Not required	
Overall Shield:	Not required	
Inner covering :	Extruded LSZH compound, Average Thickness 1,0 mm	
Inner covering color code:	**Black or Natural**	
Armour :	Not required	
Outer sheath :	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type **SHF1** to IEC 60093.360, Average Thickness 1,2 mm	
Outer sheath color code:	**Grey**	
Outer printing (INKJET) :	**FLEI - ELECTRIC CABLE - 1000V - 3G6 SQMM - EPR/LSZH - 0,6/1 KV - IEC 60332.1.2 - IEC 60332.3.22 -**	
	Year of Manufacture - CE + Meter Marking	
Outer diameter :	(15,6 ± 10%) mm	
Bending radius :	cable outer diameter x 10	(in fixed installation)
Voltage test :	3,5 kV a.c. for 5' (Between Cores)	
Conductors DC Resistance :		IEC 60228 Class 2
Insulation Resistance :	≥ 770 MΩ x Km (@ 20°C)	
Applicable Standards		
Design Guidelines :	**IEC 60092.353**	
ON COMPLETE CABLE		
Flame Retardant test :	IEC 60332.1.2 - IEC 60332.3.22	
Acid Gas generation :	IEC 60754.1/2	
Smoke density/Light Transmittance :	IEC 61034.2 (LT ≥ 60%)	
Temperature Range :		
ON INSULATION	(max +90°C)	(max continuous operation temperature of conductors)
	(max +250°C)	(max conductors temperature during short-circuit for 5 seconds)
ON COMPLETE CABLE		
During Operation :	(-20°C up to +90°C)	(in fixed installation)
During installation :	(- 5°C up to +50°C)	
Note :	**To meet the requirements of installation and use in Zone 1 & Zone 2 (IEC 60079-14) and "Gas & Vapour Tight" the cable must be provided with Penetrating Inner covering together with correct ATEX approved equipment or accessories.**	

Office	Date	Sign	Rev.	Date	Sign
Drawn by :	29/03/2024	Messa			
Checked :	29/03/2024	Spaccasassi			
Approved :	29/03/2024	Cucinotta			

The data provided, lending assent for the treatment, will be used to the sense of the article 13 of of the Regulation (UE) 2016/679, also through outsiders, in order to allow the realization of the fulfilments informatives, administrative, commercial and accounting related to the contractual relationship. Integral copy of the informative could be requested at our offices.

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ITEM	Tag	HNA6-AFA70	: 66 kV Switchgear (GIS)			Dwg	123A90-DDL-EL-DL-20104
	S/Sys	81-10	: GIS 66 kV (HNA6-AFA70)			Module	LD_B-100
TASK	code	C10000834		Location	Onshore Activities	User	Rosetti Marino Quality Control
FORM	Process	MC	Activity CCK	Discipline	Electrical Form CPX04		HV Switchboard

1	Check switchboard is de-energized and safe.	OK
2	Check conformity against latest data sheet and project specification.	OK
3	Check that anti-condensation heaters are ready to be energized.	OK
4	Check equipment is correclty aligned, leveled, rigid and secured with correct bolting.	PL
5	Check all panel mounted devices are undamaged and tagged in accordance with data.	OK
6	Check if construction rating plate data is correct.	OK
7	Check bus bars and supports are clean and clear of debris, torque all bolts to specification.	OK
8	Check earthing and bonding of all equipment against latest drawings.	OK
9	Check all switching devices are mechanically operational and undamaged.	OK
10	Check switchgear mechanical interlocks against interlock diagram.	Note
11	Check all shutters are identified, operational and lockable.	OK
12	Check C.T's &VT's are properly installed and match drawing and protection diagram.	Note
13	Check interconnection wiring against latest drawings.	Note
14	Check suppliers document	OK
15	If required produce Red Line Mark Up for "AS BUILT"	

ROSETTI MARINO PROVERLIS CROSSWIND

ITEM	Tag	HNA6-AFA70	: 66 kV Switchgear (GIS)			Dwg	123A90-DDL-EL-DL-20104
	S/Sys	81-10	: GIS 66 kV (HNA6-AFA70)			Module	LD_B-100
TASK	code	C10000834		Location	Onshore Activities	User	Rosetti Marino Quality Control
FORM	Process	MC	Activity CCK	Discipline	Electrical	Form	CPX04 HV Switchboard

SWITCHBOARD DATA

Manufacturer :	HYOSUNG	Serial N° :	10248704_002	Voltage	72,5 kV
Current	1250	IP Rating	NA	Datasheet	1723001595-EL-SP-00005
RATED SC CURRENT (RMS):	31,5	**kA:1s**		Specification	723001595-EL-DA-00006

Testing & measurement instruments used

Type	Serial n°	Calibration certificate	Validity
NA	NA	NA	NA

TEST RESULTS

CONTINUITY	Bus bars R	Bus bars S	Bus bars T	Polarity distribution Control	Polarity distribution Signalling	Space heater circuit	Motor rearming wiring
Continuity A	NOTE						
Continuity B	NOTE						

				Control Wiring	Signaling wiring	Space heater circuit	Motor rearming wiring
Utility Insulation Resistance	Test V	NOTE	Min Req. MΩ				
					R-STE	**S-RTE**	**T-RSE**
1st Insulation Resistance	Test Voltage	NOTE	Min Required MΩ				
HV test 1 min	Test Voltage	NOTE	Min Required MΩ				
2nd Insulation Resistance	Test Voltage	NOTE	Min Required MΩ				

VT IDENTITY	CONTINUITY Primary U1	U2	U3	Secondary V1a	V2a	V3a	V1b	V2b	V3b	INSULATION Prim/secondary-Earth U1/E	U2/E	U3/E	Secondary/primary- Earth V1a-E	V2a-E	V3a-E	V1b-E	V2b-E	V3b-E

Note: for VT tests neutral to be disconnected from Secondary

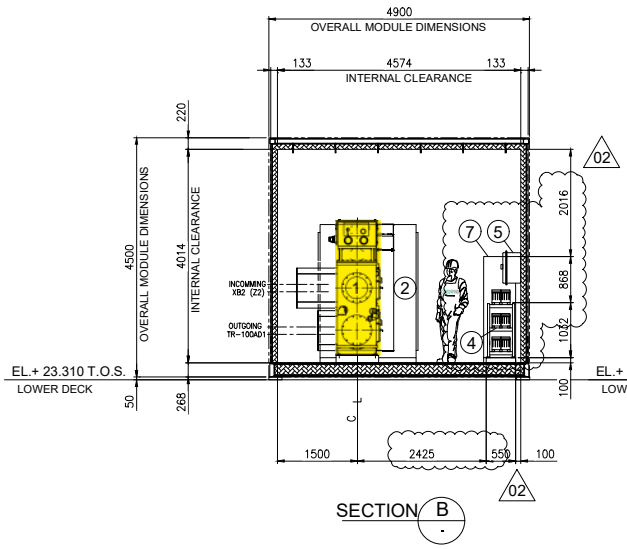
Comments: Note: refer to punch list raised during FAT

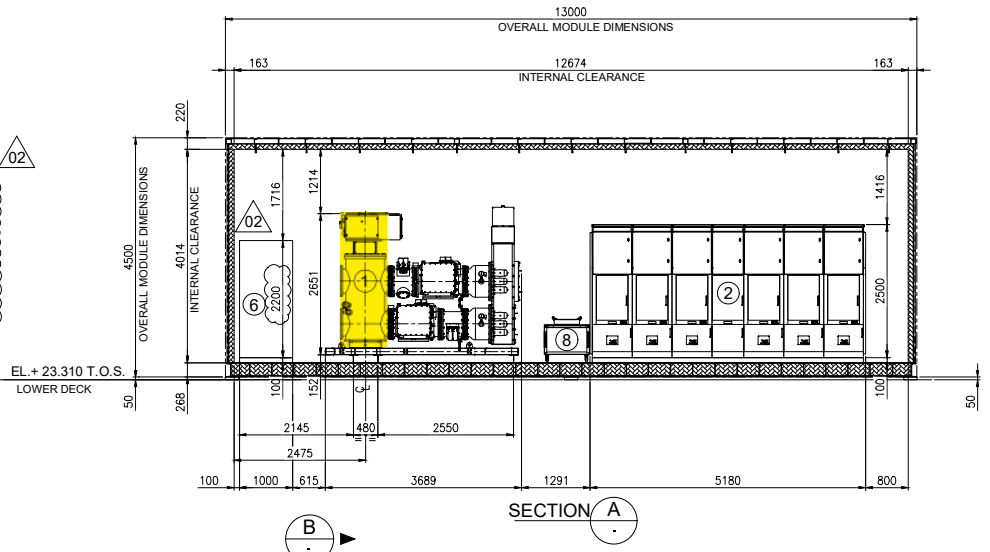
Note: 10/12/13 : PL: C300001984/C300001985/C300001986/C300001987/C300001988/C300001989

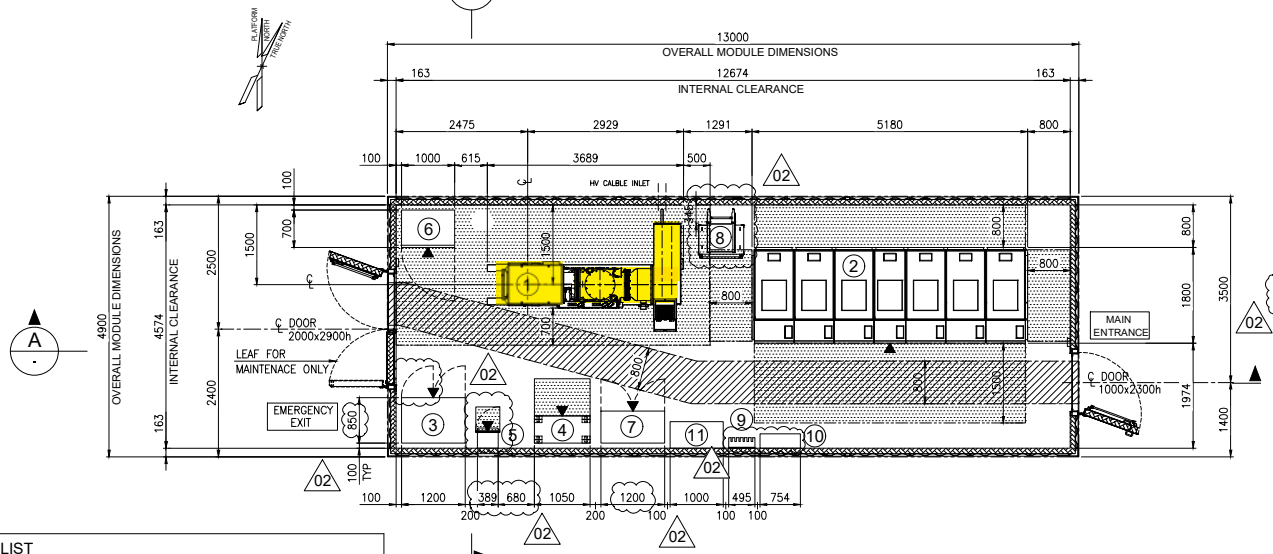
Note: See attached FAT Report

Page 2/2	Performed by	☉ WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	RM(ROSETTI MARINO)	
Name	Michele Tartaglia	Giovanni Tangianu	
Date	2025-01-28	2025-01-28	
Signature	PROVERLIS Digitaly signed by Michele Tartaglia 2025-01-28T07:46:51.193Z	PROVERLIS Digitaly signed by Giovanni Tangianu 2025-01-28T16:53:05.117Z	

DRAWING NO. 123A90-DDL-EL-DL-20104 REV. 02

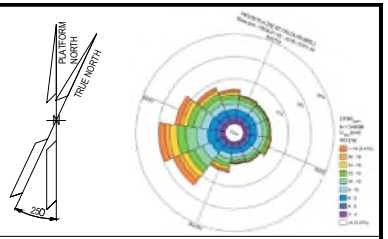






EQUIPMENT LIST

REF.	TAG No.	DESCRIPTION	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	NOTE
1	HNA6-AFA70	66kV SWITCHGEAR (GIS)	3689	2025	2651	
2	SG-100D1	6.6kV SWITCHGEAR	5180	1800	2500	
3	UP-200F1	DC UPS PANEL	1200	850	2105	
4	BA-200F1	DC UPS BATTERY RACK	1050	510	1272	
5	CB-200F1 (02)	ISOLATOR FOR DC UPS	452	377	634	
6	CP-100E1	66 kV SWITCHGEAR LOCAL CONTROL PANEL	1000	700	2200	(02)
7	B100-HSB-001	DISTRIBUTION & HVAC PANEL - HV MV ROOM	1200	600	1900	
8	-	SERVICE TROLLEY FOR 6.6kV SWITCHGEAR	943	862	874	
9	-	TOOL BOX	495	200	200	
10	-	SUBSTATION LIFE SAVING & INTERVENTION KIT	754	270	840	
11	-	TABLE	1000	500	750	



NOTES

1. U.N.O. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DELETED
3. DOCUMENT VALID ONLY FOR ELECTRICAL COMPONENT.
4. FOR OTHER ITEMS, CORRECT LOCATION AND INFROMATION, PLEASE REFER TO VENDORS AND DEDICATED PROJECT DOCUMENTATION.
5. HEIGHT OF ALL PANELS IN THE EQUIPMENT LIST TABLE IS WITHOUT THE BASE FRAME (100mm)

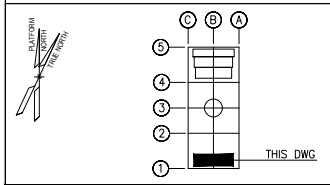
LEGEND

U.N.O. _____ UNLESS NOTED OTHERWISE
T.O.S. _____ TOP OF STEEL
_____ ESCAPE CORRIDOR - WIDTH 800mm.
_____ MAINTENANCE AREA - VENDOR REQUIREMENT
_____ SWITCHGEAR ROOM ENCLOUSURE
_____ FRONT OF EQUIPMENT

REFERENCES

DOCUMENT TITLE	DOCUMENT NUMBER
66kV SWITCHGEAR (GIS) GENERAL ARRANGEMENT DRAWING	1723001595-EL-DA-00006
CIRCUIT AND WIRING DIAGRAM	1723001595-EL-DG-00015
SG-100D1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00006
DC UPS – GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS	1724000372-EL-DA-00003
DC UPS – BATTERY LAYOUT AND INTERCONNECTING DIAGRAM	1724000372-EL-DG-00010
B-100 - GENERAL ARRANGEMENT DRAWINGS - E&I SHELTER	1724000049-AR-DA-00014

KEY PLAN



REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	27/05/2024	FMO	LMA/AMA	LMA/MDO	ACCEPTED FOR CONSTRUCTION (AFC)
01	26/03/2024	GPA	LMA/AMA	LMA/MDO	ISSUE FOR REVIEW (IFR)
00	10/11/2023	DSF	CB/AMA	OYFO/MDO	ISSUE FOR REVIEW (IFR)

VALID FOR CONSTRUCTION
FDL DWG: 123A90-FDL-EL-DL-20104
REV.: 2_A | DATE: 08/08/24 | SIGNATURE: G.Randi
ROSETTI MARINO SpA

CROSSWIND | ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
HV SWITCHROOM

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK | SCALE 1:50
DRAWN GPA | CHECKED LMA/AMA | APPROVED LMA/MDO | DATE 27/05/2024
A1 | DRAWING NO. 123A90-DDL-EL-DL-20104 | SHEET 001 | REV. 02

File Name : 123A90-DDL-EL-DL-20104_REV02.dwg

PLATFORM NORTH
TRUE NORTH

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20136**

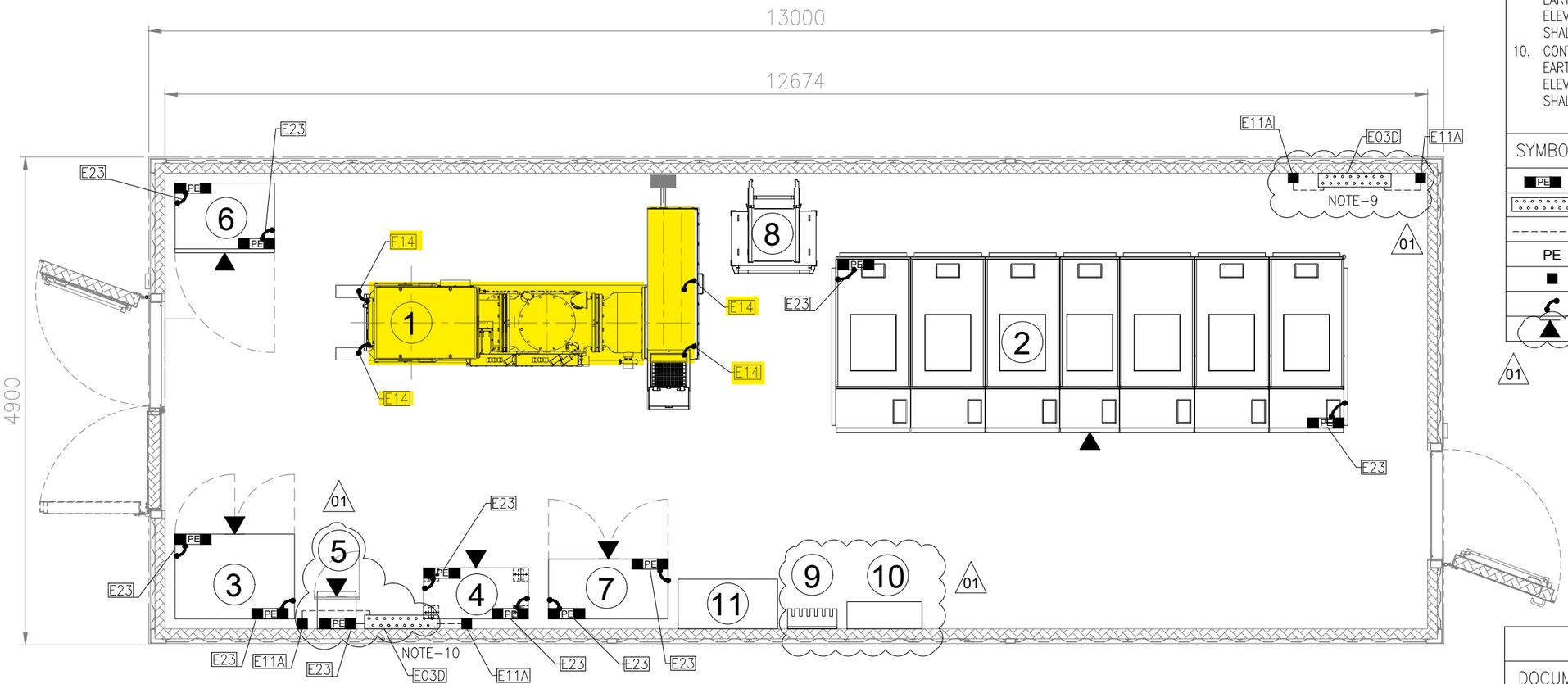
REV.:	DATE:	SIGNATURE:
1_A	08/08/24	G.Randi

ROSETTI MARINO SpA

EQUIPMENT LIST		
REF.	TAG No.	DESCRIPTION
1	HNA6-AFA70	66kV SWITCHGEAR (GIS)
2	SG-100D1	6.6kV SWITCHGEAR
3	UP-200F1	DC UPS PANEL
4	BA-200F1	DC UPS BATTERY RACK
5	CB-200F1	ISOLATOR FOR DC UPS (01)
6	CP-100E1	66 kV SWITCHGEAR LOCAL CONTROL PANEL
7	B100-HSB-001	DISTRIBUTION & HVAC PANEL – HV SWITCH ROOM
8	–	SERVICE TROLLEY FOR 6.6kV SWITCHGEAR
9	–	TOOL BOX
10	–	ELECTRIC SAFETY KIT
11	–	TABLE

NOTES

1. THIS DOUCMENT IS VALID ONLY FOR EARTHING LAYOUT.
2. THE CABLE SIZE SHALL BE CONFIRMED.
3. THE EXACT POSITION OF EARTHING/MARSHALLING BUS BAR SHALL BE DEFINED BY VENDOR.
4. THE EARTHING BUS BAR INSTALLATION SHALL BE PREFERABLY IN VERTICAL MODE.
5. FOR TYPICAL DETAILS PLEASE REFER DOCUMENT "123A90-DDL-EL-DD-20090-ELECTRICAL TYPICAL INSTALLATION DETAILS- EARTHING SYSTEM".
6. DUE TO THE TOP CABLE ENTRIES THE EARTHING BUS BAR INSIDE THE CABINETS SHALL BE INSTALLED AT THE TOP OF THE CABINETS THEMSELVES.
7. FOR LIGHTNING PROTECTION SYSTEM SURGE PROTECTIVE DEVICES (SPD), REFER DOCUMENT 123A90-DDL-EL-RE-20154.
8. ALL NON WELDED OBJECTS SHALL BE EARTHED.
9. CONTAINER WILL HAVE A BTH (EARTHING BAR TINNED COPPER) WITH 2 EARTHING BOSS, INSTALLED IN THE NORTH-EAST CORNER AT AN ELEVATION OF 2.8M FROM THE CONTAINER FLOOR. EARTHING BOSS SHALL BE INSTALLED AT SAME ELEVATION 2.8M.
10. CONTAINER WILL HAVE A BTH (EARTHING BAR TINNED COPPER) WITH 2 EARTHING BOSS, INSTALLED IN THE SOUTH-WEST CORNER AT AN ELEVATION OF 2.5M FROM THE CONTAINER FLOOR. EARTHING BOSS SHALL BE INSTALLED AT SAME ELEVATION 2.5M.



EARTHING LAYOUT
B-100-HV(66kV/6.6kV) SWITCHROOM
PLAN
EL.+ 23.310 T.O.S.

SYMBOL	DESCRIPTION
PE	EARTHING BUS
	EARTHING BAR TINNED COPPER WITH no.18 HOLES
--------	35sq.mm Y/G INSULATED COPPER CONDUCTOR FOR PE
PE	PROTECTIVE EARTH
	EARTHING BOSS AISI316L
	JUMPER CONNECTION
	FRONT OF EQUIPMENT

01

REFERENCE	
DOCUMENT NUMBER	DOCUMENT TITLE
123A90-DDL-EL-DD-20090	ELECTRICAL TYPICAL INSTALLATION DETAILS -EARTHING SYSTEM
123A90-DDL-EL-DL-20104	ELECTRICAL EQUIPMENT LAYOUT- HV SWITCHROOM
01 1724000049-AR-DD-00018	B-100 DETAILED DRAWINGS-E&I SHELTERS

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	25/07/24	ASR	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	21/05/24	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND
ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
EARTHING & LIGHTNING LAYOUT-HV SWITCHROOM "B-100"HV SWITCHROOM

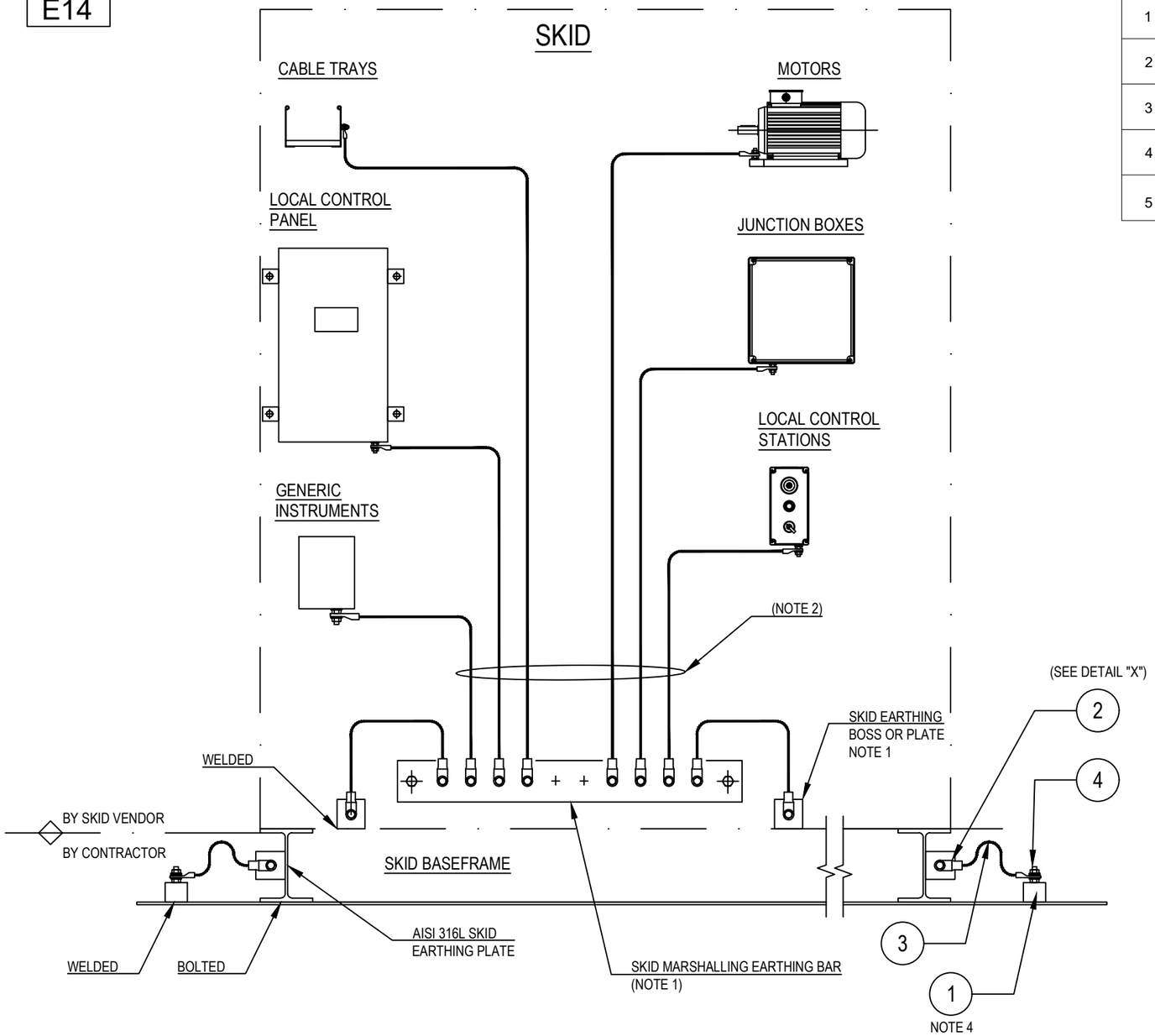
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK | SCALE : 1:50

A3	DRAWING NO.	SHEET	REV.
	123A90-DDL-EL-DL-20136	003	01

F.to UNI A3: 420mmx297mm

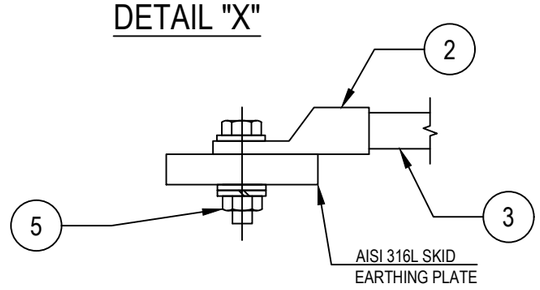
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E14



POS.	DESCRIPTION	MATERIAL	SIZE	Q.TY	NOTE
1	EARTHING BOSS WITH THREADED HOLE M10	AISI 316L	50X50		NOTE 5
2	COMPRESSION TYPE LUG FOR INSULATION COPPER CONDUCTOR	TINNED COPPER	35mm^2		NOTE 3
3	Y/G INSULATING COPPER CONDUCTOR	COPPER	35mm^2		NOTE 3
4	STUD BOLT WITH PLANE WASHER, SPRING WASHER AND NUT	AISI 316L	M10X50		
5	HEXAG. BOLT COMPLETE WITH PLANE WASHERS, SPRING WASHER AND NUT	AISI 316L	M10X30		

DETAIL "X"



NOTES:
1) EARTHING BAR/BOSS/PLATE SUPPLIED BY SKID MANUFACTURER
2) ALL EQUIPMENTS AND CABLE TRAYS WILL BE EARTHING ON SKID EARTHING BAR BY SKID MANUFACTURER
3) ~~CABLE LUG CRIMPING METHOD SHALL BE HEXAGONAL COMPRESSION DIES ONLY~~
4) FOR EARTHING BOSS TYPICAL DETAIL E11A
5) EXTERNAL EARTHING CONNECTION ONLY SHALL BE PROTECTED AGAINST CORROSION USING OXIDE RESISTANT COMPOUND (E.G. COPPER GREASE)

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DD-20090**

REV.:	DATE:	SIGNATURE:
2_I	07/11/24	G.Randi

ROSETTI MARINO SpA

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	26/08/24	GRA	AMA	DLO	ACCEPTED FOR CONSTRUCTION (AFC)
01	10/06/24	SPS	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	21/11/23	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL TYPICAL INSTALLATION DETAILS–EARTHING SYSTEM
EARTHING FOR SKID BASEFRAME

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK | SCALE : NTS

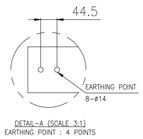
A3 | DRAWING NO. 123A90-DDL-EL-DD-20090 | SHEET 014 | REV. 02

F.to UNI A3: 420mmx297mm

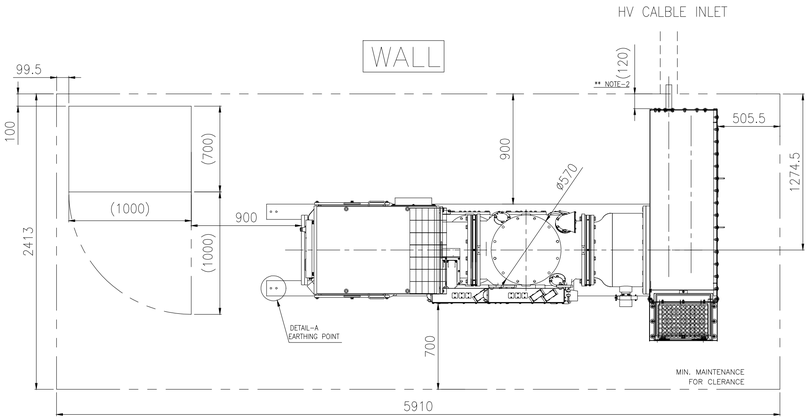
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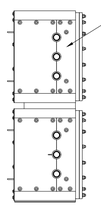
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REV. 00

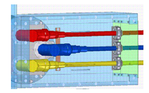


DETAIL-A (SCALE 3:1)
EARTHING POINT : 4 POINTS

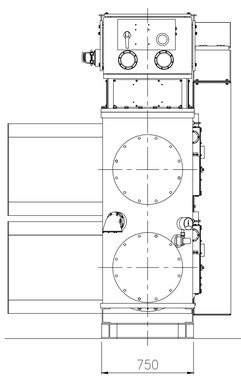


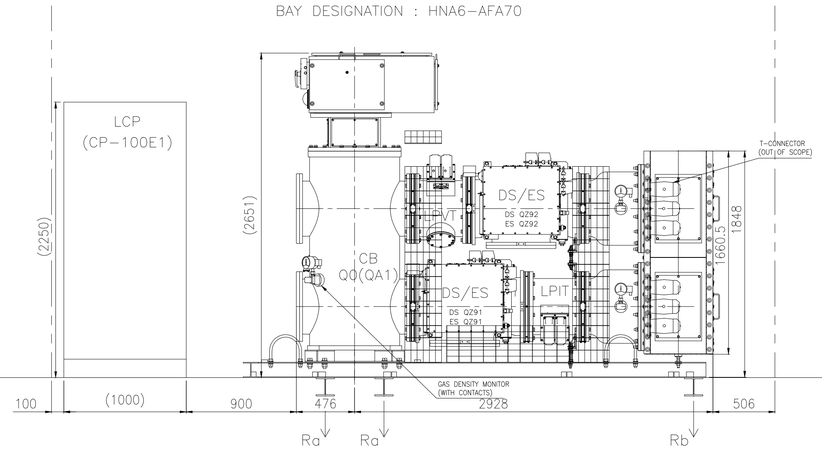


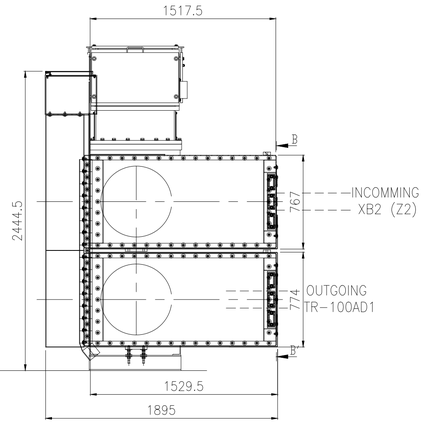
SECTION B-B'

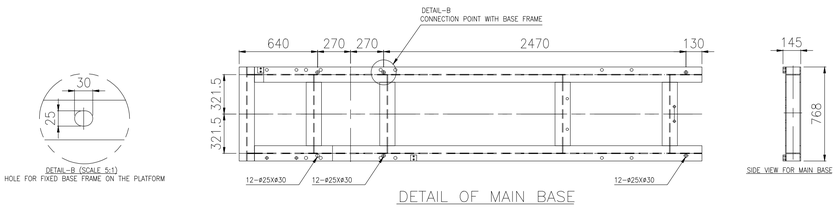


DETAIL OF INTERNAL PART OF CABLE BOX







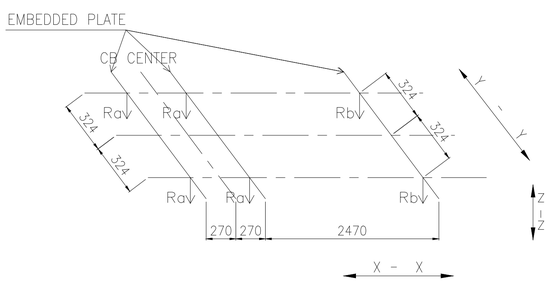


DETAIL-B (SCALE 5:1)
HOLE FOR FIXED BASE FRAME ON THE PLATFORM

SIDE VIEW FOR MAIN BASE

DETAIL OF MAIN BASE

[SKETCH FOR LOADING POINT]

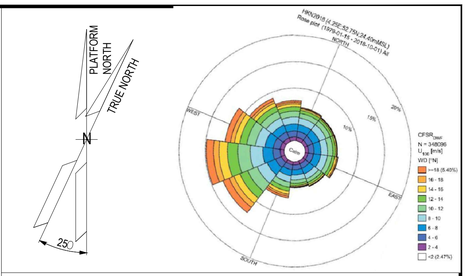


[LOADING DATA]

DIRECTION / LOADING	X(kg)		Y(kg)		Z(kg)	
	Ra	Rb	Ra	Rb	Ra	Rb
STATIC	-	-	-	-	428	447
DYNAMIC	255	134	128	134	573	683
	- 128	- 134	- 128	- 134	- 573	- 683
Max. Compression Load	255	134	128	134	1,001	1,130
Max. Tensile Load	- 128	- 134	- 128	- 134	- 145	- 236

THE WEIGH OF GIS (APPROXIMATELY)

1) GIS : 2600 [kg]
2) LCP : 850 [kg]
3) T-CONNECTOR + SURGE ARRESTER + HV CABLE : 300 [kg]



NOTES

1. DESCRIPTION of ABBREVIATIONS.
   - CB : CIRCUIT BREAKER
   - DS : DISCONNECTING SWITCH
   - ES : EARTHING SWITCH
   - VD : VOLTAGE DETECTOR
   - LPIT : LOW POWER INSTRUMENT TRANSFORMER
   - LPVT : LOW POWER VOLTAGE TRANSFORMER
   - LPCT : LOW POWER CURRENT TRANSFORMER
2. THE MINIMUM DISTANCE IS 120 [MM] BUT IT HAS TO BE CONSIDERED CABLE CONNECTION METHOD INCLUDING T-CONNECTOR AND HV CABLE.

LEGEND

HOLDS

REFERENCE DRAWING

DRAWING TITLE	DRAWING NUMBER
SINGLE LINE DIAGRAM	1723001595-EL-DG-00013
GAS SINGLE LINE DIAGRAM	1723001595-EL-DG-00014

HYOSUNG HEAVY INDUSTRIES

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
4	05/11/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ACCEPTED FOR CONSTRUCTION (AFC)
3	17/04/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ISSUE FOR CLIENT REVIEW (ICR)
2	13/02/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ISSUE FOR CLIENT REVIEW (ICR)
1	08/02/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ISSUE FOR CLIENT REVIEW (ICR)
0	10/11/23	Y.D.LEE	Y.W.LEE	S.J.CHO	ISSUE FOR CLIENT REVIEW (ICR)

CROSSWIND

ROSETTI MARINO

TITLE :
BASE LOAD POWER HUB (BLPH)
66kV SWITCHGEAR (GIS)
GENERAL ARRANGEMENT DRAWING INCLUDING FOUNDATION LOAD CALCULATION

CONTRACT NO./TITLE	CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK		SCALE 1_:_25
DRAWN Y.D.LEE	CHECKED Y.W.LEE	APPROVED S.J.CHO	DATE 10/11/23
A1	DRAWING NO. 1723001595-EL-DA-00006	SHEET 001	REV. 04

File Name : DRAWING_NO.

WITNESS TEST REPORT FOR GIS

Customer / Country	:	ROSETTI / ITALY
Project	:	BASE LOAD POWER HUB (BLPH) 66kV SWITCH GEAR (GIS)
Substation Name	:	BLPH 66kV

Technical Data

Gas Insulated Switchgear Type	:	HSGE-074B
Rated voltage	:	72 kV
Rated current	:	1250 A
Rated short-circuit breaking current	:	31.5 kA
Rated frequency	:	50 Hz
PJT No.	:	10248704_0002
Bay(CB) Name	:	Q0(QA1) CB
Date of Tests	:	06.DEC.2024 ~ 11.DEC.2024

OBO RMG
PARK.H.M
2024,DEC,13
REVIEW WITNESS

On Behalf of Rosetti
☐WITNESS
☐REVIEW
Date: 13 Dec 2024
Sign:

Factory Information

Place of Test	:	HYOSUNG Changwon Factory
Address	:	171, Yeonduk-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, South-Korea

General

We certify that the above items have been inspected in compliance with the requirements of the customer.

Prepared by :	Checked by :	Approved by :
Y. I. JEONG	K. R. BAEK	J. G. KANG

CONTENTS

No.	Test Item	Page
1	Design and Visual Check	3
2	Power Frequency Withstand Voltage Test on the Main circuit	3
3	Partial Discharge Measurement	3
4	Mechanical Operation Test - Continuous Operating Test	4
5	Mechanical Operation Test - Timing Test	5
6	Measurement of the Resistance of the Main Circuit	6
7	Tightness test	7
8	Gas Density Switch Test	7
9	Test on auxiliary & control circuit(Including LCP test)	7
10	Low Power Voltage Transformer test	8
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1. Design and Visual Check

The below contents are checked whether the test objects are suitable according to approved specification and relevant standards.

Test Item	Result
Dimension and Nameplate are checked in according to the approved drawings.	Pass
Construction, indicator, painting & welding condition are inspected visually.	Pass
Other specified items are checked in approved specification.	Pass

2. Power Frequency Withstand Voltage Test on the Main circuit

The specified power frequency withstand voltage test has been performed successfully.

2.1 Test condition

Dryair Gas pressure [bar.G] CB : 4.5 Others : 4.5

Test Item	Test Voltage [kV]	Test Duration [s]	Result
Phase to Earth	90	60	withstood
Across Open Pole (CB, DS)	90	60	withstood

2.2 Measurement of insulation resistance

Test sequence	Test Voltage [V]	Acceptance criteria [MΩ]	Measured Value [MΩ]	Result
Before H.V test	10,000	≥1,000	≥1,000	Pass
After H.V test	10,000	≥1,000	≥1,000	Pass

3. Partial Discharge Measurement

After line to earth condition of the power frequency withstand voltage test, the quantity of partial discharges has been measured successfully.

3.1 Test condition

Test Item	Test Voltage [kV]	Acceptance criteria [pC]	Measured Value [pC]	Result
Phase to Earth	54	≤5	<3	Pass

3.2 Test condition without F-Bushing

Test Item	Test Voltage [kV]	Acceptance criteria [pC]	Measured Value [pC]	Result
Phase to Earth	87	≤5	<2	Pass

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4. Mechanical Operation Test - Continuous Operating Test

All operating test required by the standards have been carried out successfully.

4.1 Continuous Operating Test (CB)

Sequence	Control Voltage [Vdc]		Control Pressure [bar.G]		Operating Times	Result
Close	Max	121	Max	N/A	5	Pass
	Rated	110	Rated	N/A	5	Pass
	Min	93	Min	N/A	5	Pass
Open	Max	121	Max	N/A	5	Pass
	Rated	110	Rated	N/A	5	Pass
	Min	77	Min	N/A	5	Pass
C-O	Rated	110	Rated	N/A	5	Pass
O-C	Rated	110	Rated	N/A	5	Pass
O-CO	Rated	110	Rated	N/A	1	Pass

4.2 Continuous Operating Test(DS, ES)

Sequence	Control Voltage [Vdc]		Operating Times	Result
Close / Open	Max	121	5	Pass
	Rated	110	5	Pass
	Min	93	5	Pass

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5. Mechanical Operation Test - Timing Test

All operating test required by the standards have been carried out successfully.

5.1 Timing Test (CB)

Sequence		Control Voltage [Vdc]	Control Pressure [bar.G]	Phase L1 [ms]	Phase L2 [ms]	Phase L3 [ms]	Pole discrepancy [ms]	Page No. (Annex. A)	Result
Close	C1	110	-	57.675	57.150	58.175	1.025	CB 1	Pass
	C2	110	-	-	-	-	-	-	-
Open	T1	110	-	22.425	22.575	22.500	0.150	CB 2	Pass
	T2	110	-	22.625	22.775	22.700	0.150	CB 3	Pass
C-O	C1,T1	110	-	115.275	115.975	114.900	-	CB 4	Pass
	C1,T2	110	-	113.875	114.775	113.625	-	CB 5	Pass
O-C	C1,T1	110	-	184.975	184.000	185.300	-	CB 6	Pass
	C1,T2	110	-	184.975	183.950	185.325	-	CB 7	Pass
O-C-O	C1,T1	110	-	184.950	184.475	184.775	-	CB 8	Pass

* Acceptance criteria : Close time (less than 70ms), Pole discrepancy (less than 5ms)

(At rated condition) Open time (less than 32ms), Pole discrepancy (less than 3.3ms2

CO (must be possible), O-C time (Less than 300ms)

* Refer to the attached <Annex A>

5.2 Timing Test (DS, ES)

Test Item	Sequence	Control Voltage [Vdc]	Phase L1 [ms]	Phase L2 [ms]	Phase L3 [ms]	Page No. (Annex. A)	Result
QZ92DS	CLOSE	110	495.250	480.150	502.400	EDS1	Pass
	OPEN		444.950	443.700	456.300	EDS2	Pass
QZ91DS	CLOSE	110	512.000	498.500	518.600	EDS3	Pass
	OPEN		456.650	453.750	466.900	EDS4	Pass
QZ91ES	CLOSE	110	425.500	444.550	450.050	EDS5	Pass
	OPEN		409.450	399.850	415.750	EDS6	Pass
QZ92ES	CLOSE	110	520.250	515.550	530.100	EDS7	Pass
	OPEN		403.200	393.500	412.750	EDS8	Pass

* Acceptance criteria : Close Time (Less than 10000ms), Open Time (Less than 10000ms)

* Refer to the attached <Annex A>

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6. Measurement of the Resistance of the Main Circuit

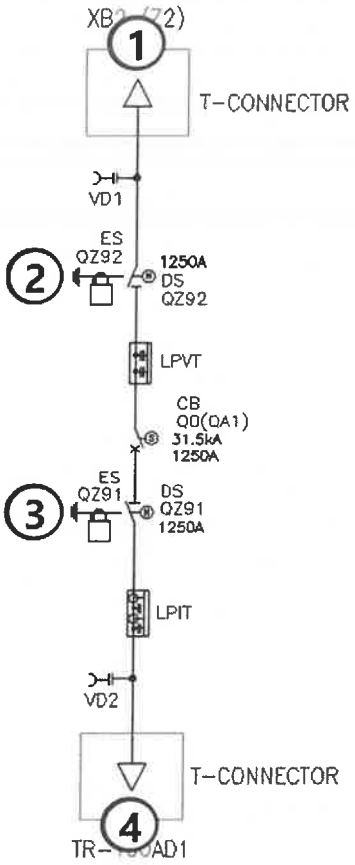
Applying DC current of 100A to the main circuit, the resistance of GIS has been measured by voltage drop method.

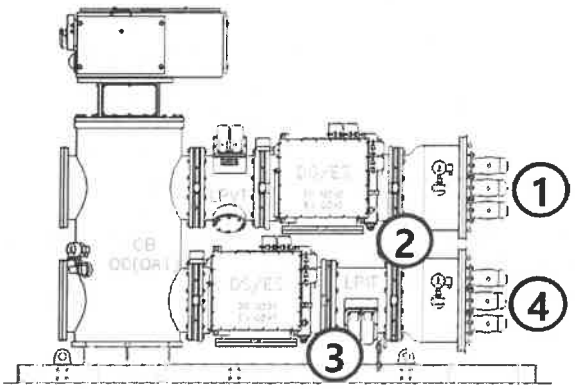
Ambient Temp. [℃] : 11.0

Measuring Parts	Measured Value / Acceptance criteria [μΩ]									Result
	Phase L1			Phase L2			Phase L3			
1 ~ 4	125.5	/	< 172.3	124.4	/	< 172.3	129.2	/	< 167.5	Pass
1 ~ 2	35.6	/	< 45.0	35.6	/	< 45.0	35.7	/	< 45.0	Pass
3 ~ 4	44.9	/	< 57.4	46.8	/	< 57.4	46.3	/	< 57.4	Pass

* Acceptance criteria : Measuring Value is less than 120% of the Design Value.

< Reference Drawing >





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7. Tightness test

After filling the test object to rated gas pressure with SF6 gas and wrapping all connection part with vinyl.

At least 6 hour later, it has been checked with gas detector.

SF6 Gas pressure [bar.G] CB : 5 Others : 5

Test Duration [hr]	Acceptance Criteria	Measured	Result
6	Less than 0.5% per year	Less than 12ppm (Less than 0.15% per year)	Pass

8. Gas Density Switch Test

Alarm contacts of gas density switch have been checked successfully.

Test Item	Standard Gas Pressure [bar.G]				Result
	1'st Alarm	2'nd Alarm	-	-	
GD-1	4.7±0.2	4.5±0.2	-	-	Pass
GD-2	4.7±0.2	4.5±0.2	-	-	Pass
GD-3	4.7±0.2	4.5±0.2	-	-	Pass

9. Test on auxiliary & control circuit(Including LCP test)

The below contents are checked whether the test objects are suitable according to approved specification and relevant Standards.

Test Item	Result
Dimension and nameplate check	Pass
Painting and wiring color check	Pass
Interlock test	Pass
Functional Test	Pass

9.1 Aux. Device Resistance Measurement

9.1.1 Coil & Resistor

Ambient Temp. [℃] : 9.1

Test Item	Acceptance Criteria [Ω]	Measured Value [Ω]			Result
		Phase L1	Phase L2	Phase L3	
Open Coil (T1)	29.9±15%	29.6			Pass
Open Coil (T2)	29.9±15%	29.5			Pass
Close Coil (C1)	36.5±15%	34.8			Pass

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9.1.2 Heater

Test Item	Acceptance Criteria [Ω]	Measured Value [Ω]			Result
		Phase L1	Phase L2	Phase L3	
LCP	220±10%	210			Pass
Q0(QA1)	484±10%	485			Pass
QZ92 DS	530±10%	501			Pass
QZ92 ES	530±10%				Pass
QZ91 DS	530±10%	512			Pass
QZ91 ES	530±10%				Pass

9.2 Dielectric Test and Insulation Resistance Measurement on Auxiliary and Control Circuits

Test Item	Test Voltage [V]	Test Duration [s]	Measured Value [MΩ]	Result
Auxiliary and Control Circuits to Earth	1000 Vac	1	-	withstood
	500 Vdc (Megger)	-	>2	Pass

* Acceptance criteria of Insulation Resistance : ≥2 MΩ

10. Low Power Voltage Transformer test

- Refer to the attached <Appendix A>

11. Low Power Instrument Transformer test

- Refer to the attached <Appendix A>

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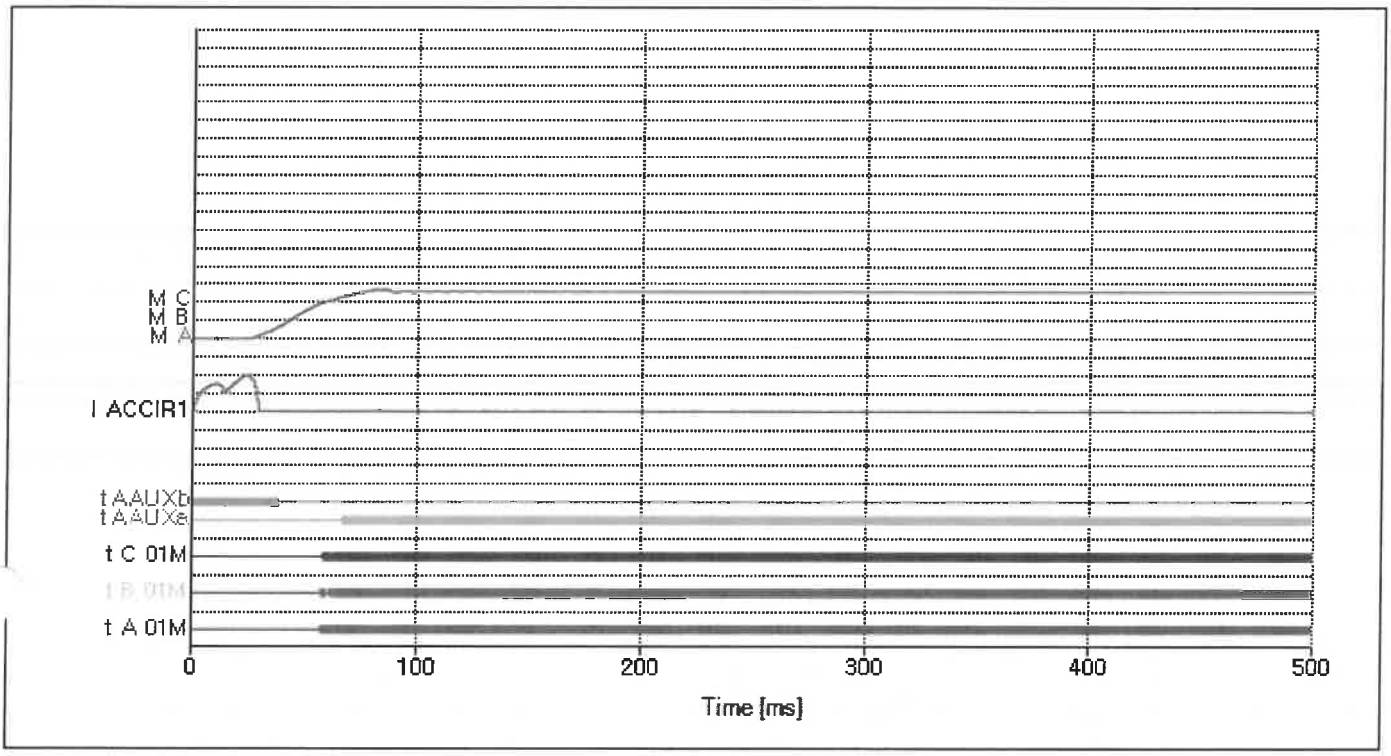
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	CB 1

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	Q0 CB

1. CLOSE



2. Test Condition

CLOSE COIL	1	DC 110V
OPEN COIL	--	--

Press.(MPa)	N/A

3. Test Results

Phs	Main Contact Time (ms)	PIR (ms)		Auxiliary				Motion		Current (A)
				Aux-a		Aux-b		Stroke (mm)	Speed (m/s)	
		Time	M-PIR	time	M-a	time	M-b			
A	57.675	--	--	66.850	8.675	38.800	-19.375	52.000	1.300	2.900
	--	--	--	-	-	-	-			
B	57.150	--	--	--	--	--	--	--	--	--
	--	--	--	-	-	-	-			
C	58.175	--	--	--	--	--	--	--	--	--
	--	--	--	-	-	-	-			
Df.	1.025									
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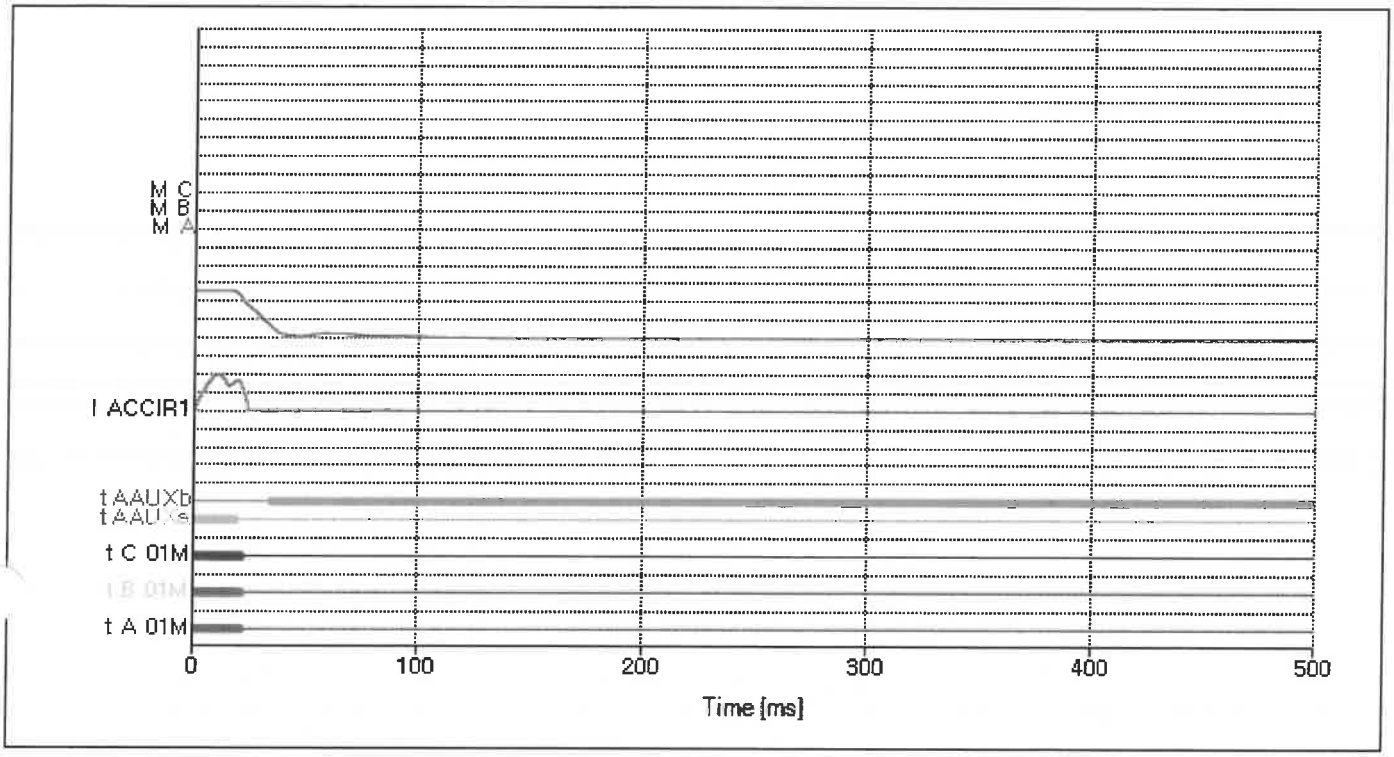
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	CB 2

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	Q0 CB

1. OPEN



2. Test Condition

CLOSE COIL	--	DC 110V
OPEN COIL	1	--

Press.(MPa)	N/A

3. Test Results

Phs	Main Contact Time (ms)	PIR (ms)		Auxiliary				Motion		Current (A)
				Aux-a		Aux-b		Stroke (mm)	Speed (m/s)	
		Time	M-PIR	time	M-a	time	M-b			
A	22.425	--	--	19.375	-3.200	33.900	10.825	51.800	2.260	1.300
	--	--	--	--	--	--	--			
B	22.575	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
C	22.500	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
Df.	0.150									
	--									

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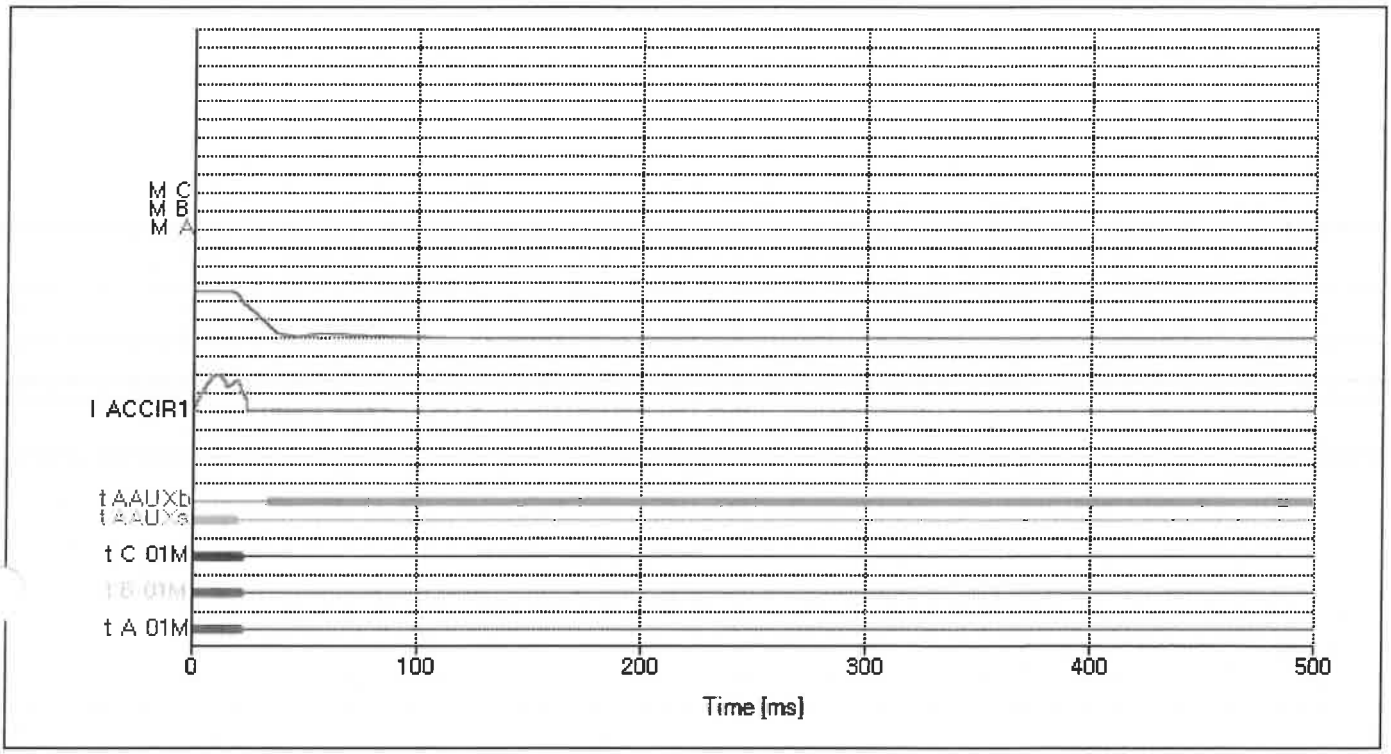
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	CB 3

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	Q0 CB

1. OPEN



2. Test Condition

CLOSE COIL	--	DC 110V
OPEN COIL	2	--

Press.(MPa)	N/A

3. Test Results

Phs	Main Contact Time (ms)	PIR (ms)		Auxiliary				Motion		Current (A)
				Aux-a		Aux-b		Stroke (mm)	Speed (m/s)	
		Time	M-PIR	time	M-a	time	M-b			
A	22.625	--	--	19.575	-3.000	34.050	10.800	52.000	2.270	1.200
	--	--	--	--	--	--	--			
B	22.775	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
C	22.700	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
Df.	0.150									
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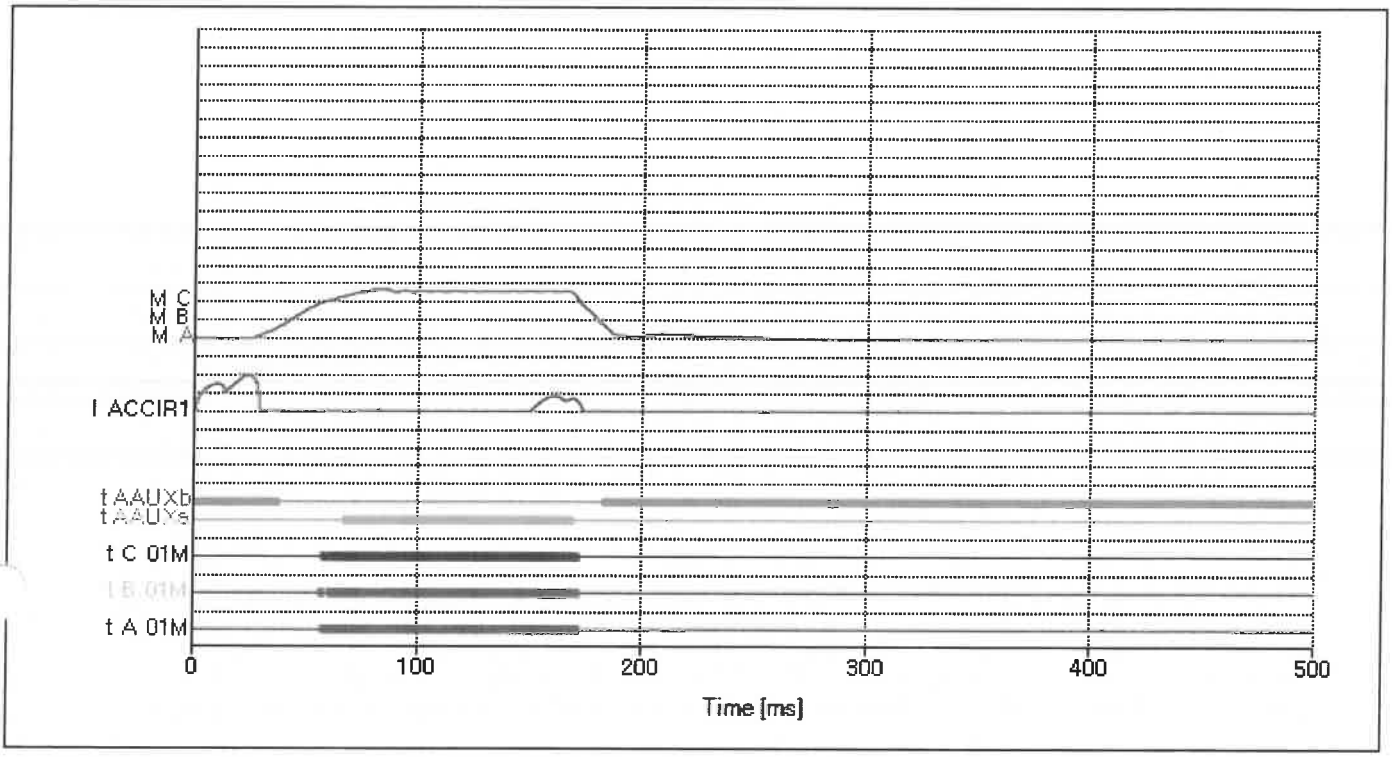
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	CB 4

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	Q0 CB

1. CLS-OPN



2. Test Condition

CLOSE COIL	1	DC 110V
OPEN COIL	1	--

Press.(MPa)	N/A

3. Test Results

Phs	O-C Time (ms)	C-O Time (ms)
A	-- --	115.275 --
B	-- --	115.975 --
C	-- --	114.9 --
Df.	-- --	-- --

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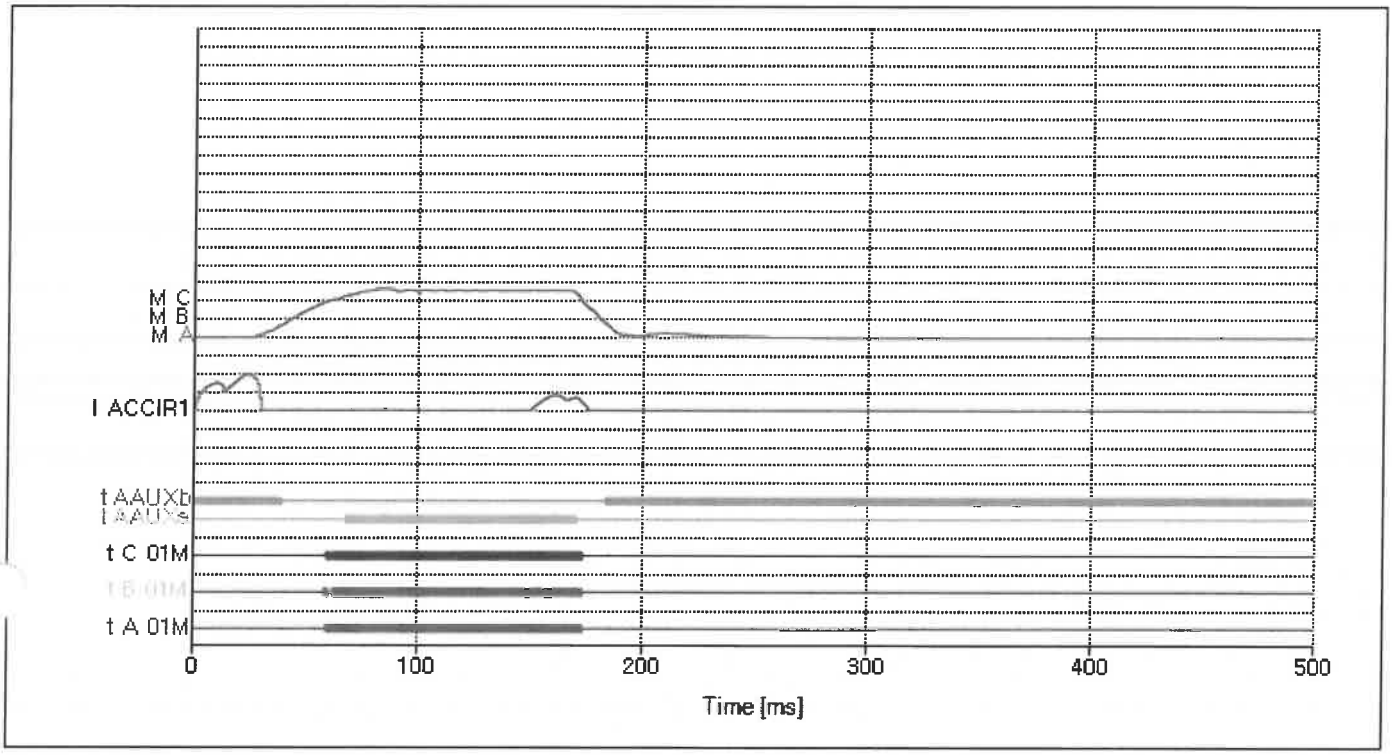
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	CB 5

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	Q0 CB

1. CLS-OPN



2. Test Condition

CLOSE COIL	1	DC 110V
OPEN COIL	2	--

Press.(MPa)	N/A

3. Test Results

Phs	O-C Time (ms)	C-O Time (ms)
A	-- --	113.875 --
B	-- --	114.775 --
C	-- --	113.625 --
Df.	-- --	-- --

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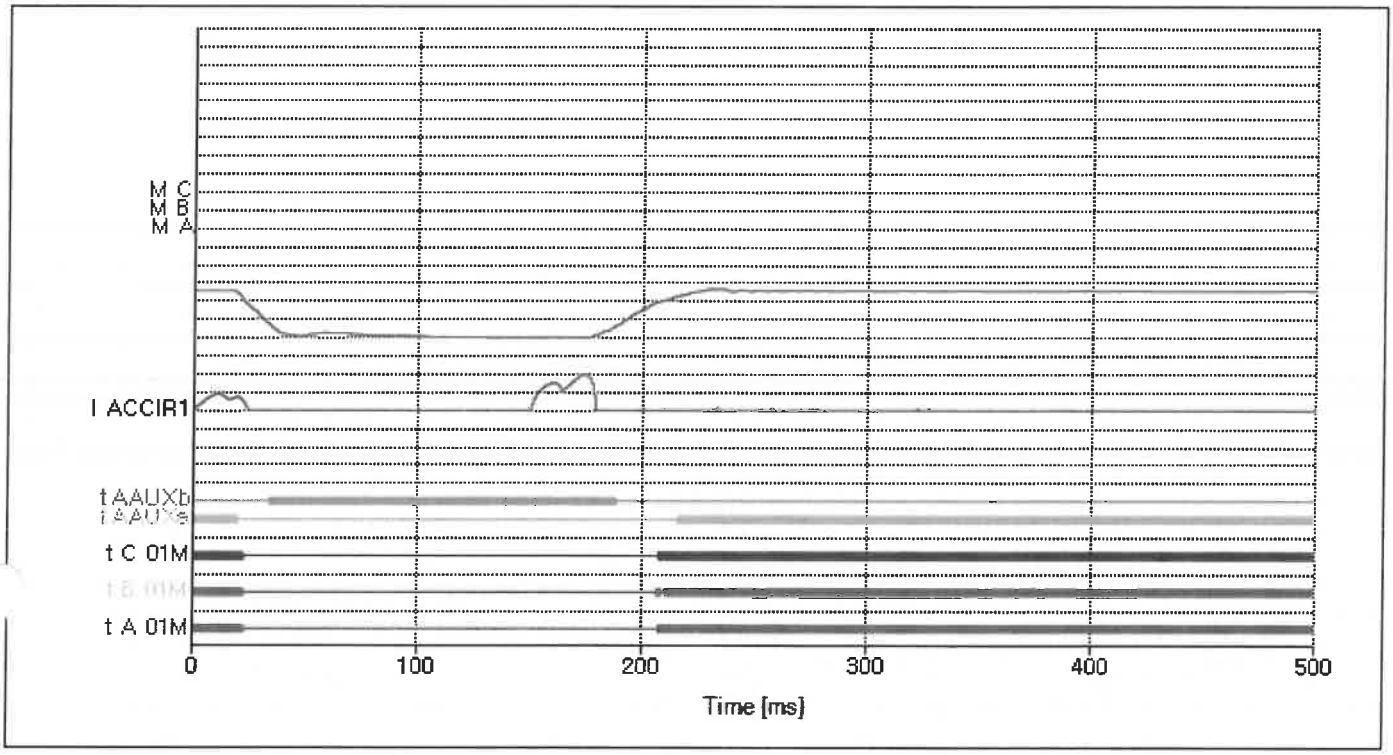
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	CB 6

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	Q0 CB

1. OPN-CLS



2. Test Condition

CLOSE COIL	1	DC 110V
OPEN COIL	1	--

Press.(MPa)	N/A

3. Test Results

Phs	O-C Time (ms)	C-O Time (ms)
A	184.975 --	-- --
B	184 --	-- --
C	185.3 --	-- --
Df.	-- --	-- --

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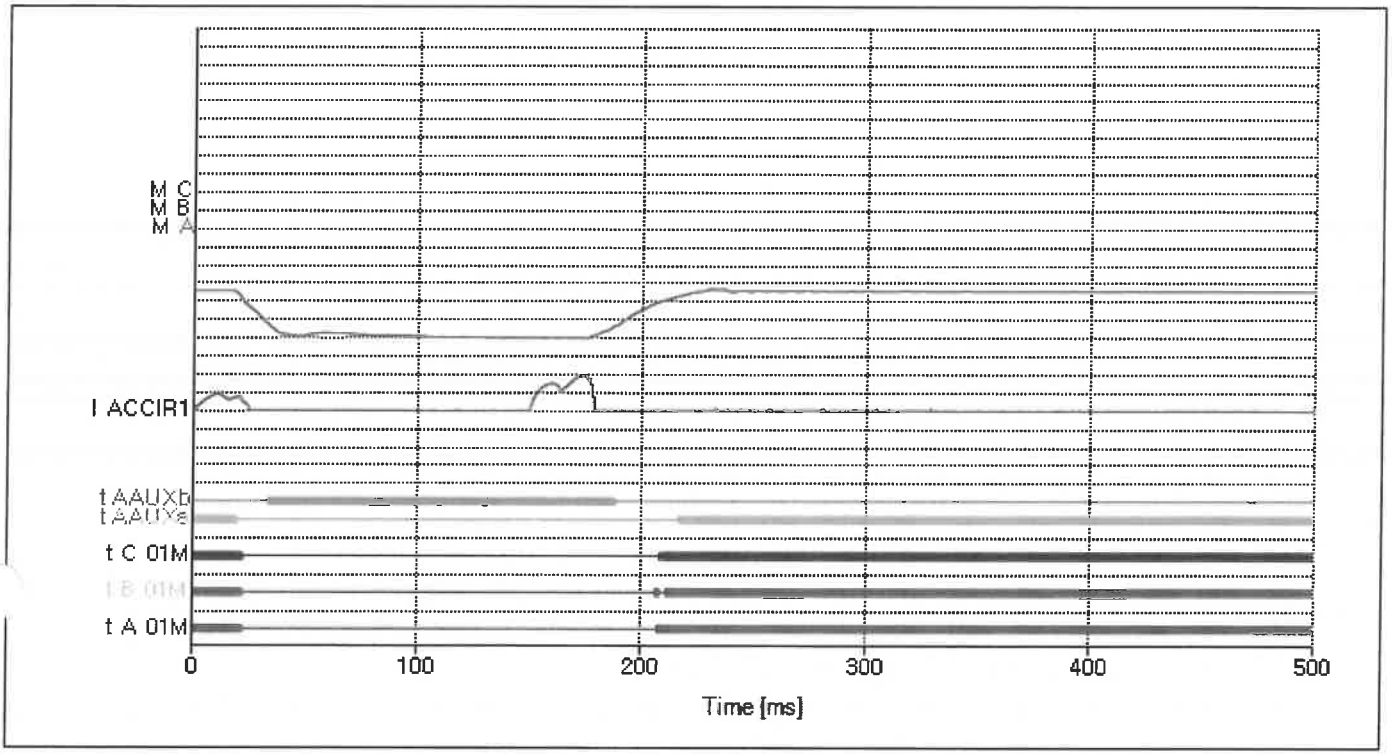
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	CB 7

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	Q0 CB

1. OPN-CLS



2. Test Condition

CLOSE COIL	1	DC 110V
OPEN COIL	2	--

Press.(MPa)	N/A

3. Test Results

Phs	O-C Time (ms)	C-O Time (ms)
A	184.975 --	-- --
B	183.95 --	-- --
C	185.325 --	-- --
Df.	-- --	-- --

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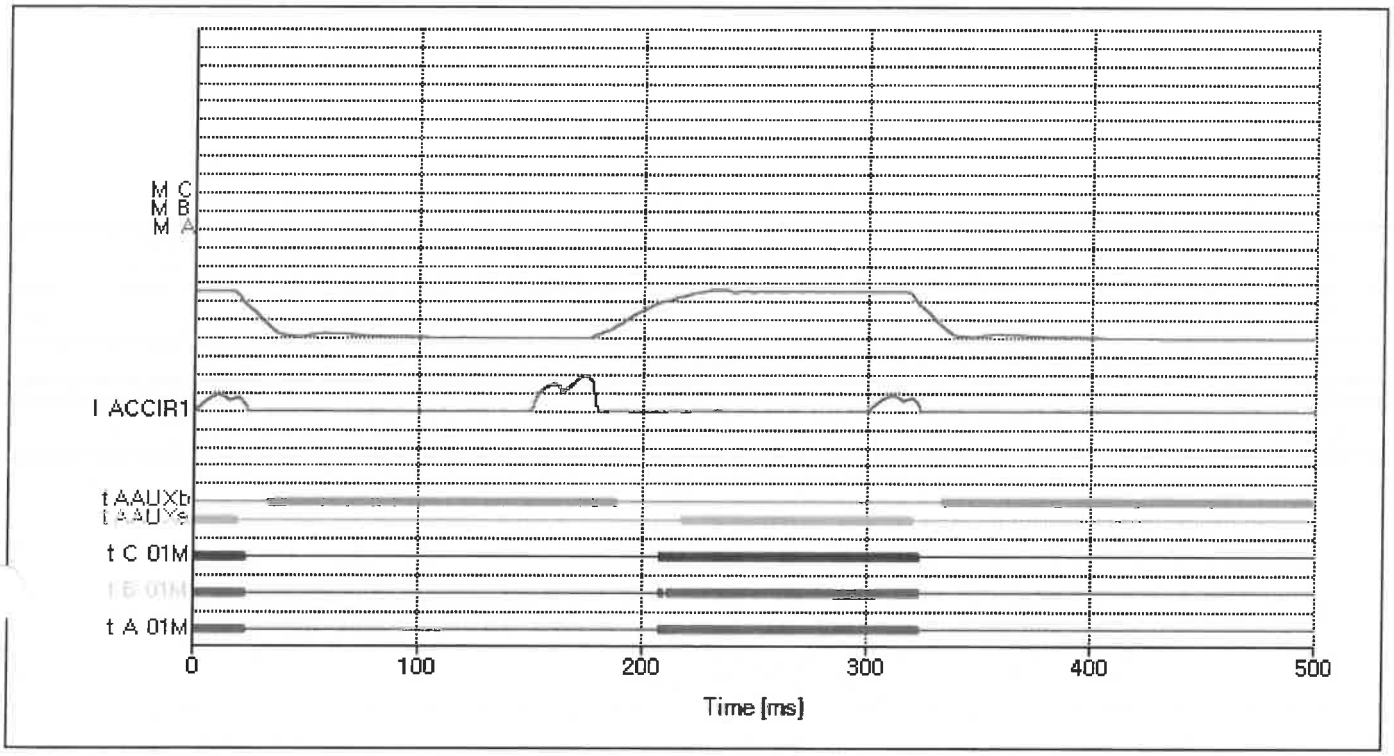
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	CB 8

< BREAKER DATA >

BASE LOAD POWER HUB	**72kV 31.5kA**	**Q0 CB**

1. OPN-CLS-OPN



2. Test Condition

CLOSE COIL	1	DC 110V
OPEN COIL	1	--

Press.(MPa)	N/A

3. Test Results

Phs	O-C Time (ms)	C-O Time (ms)
A	184.95 --	115.200 --
B	184.475 --	115.675 --
C	184.775 --	115.35 --
Df.	-- --	-- --

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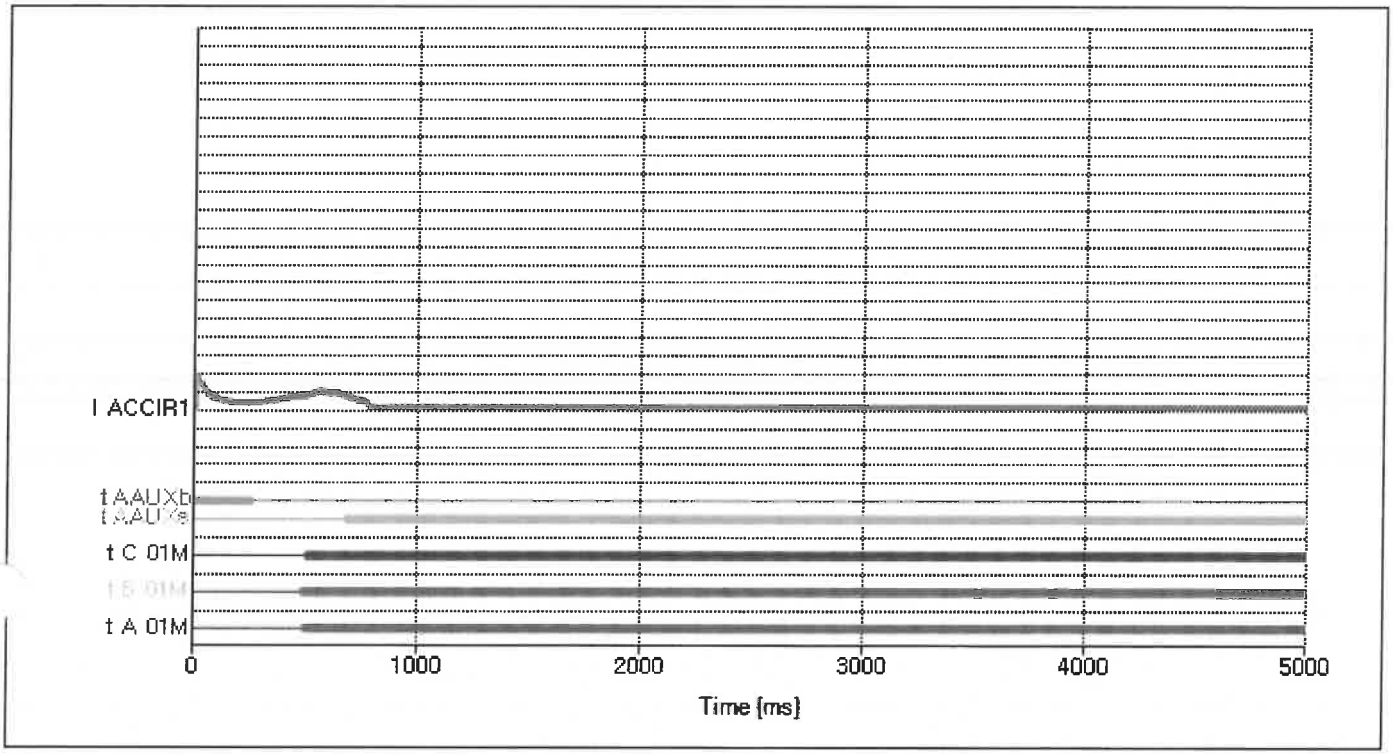
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	EDS1

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	QZ92DS

1. CLOSE



2. Test Condition

CLOSE COIL	1	DC 110V
OPEN COIL	--	--

Press.(MPa)	N/A

3. Test Results

Phs	Main Contact Time (ms)	PIR (ms)		Auxiliary				Motion		Current (A)
				Aux-a		Aux-b		Stroke (mm)	Speed (m/s)	
		Time	M-PIR	time	M-a	time	M-b			
A	495.250	--	--	--	--	--	--	--	--	8.600
	--	--	--	--	--	--	--			
B	480.150	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
C	502.400	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
Df.	22.250									
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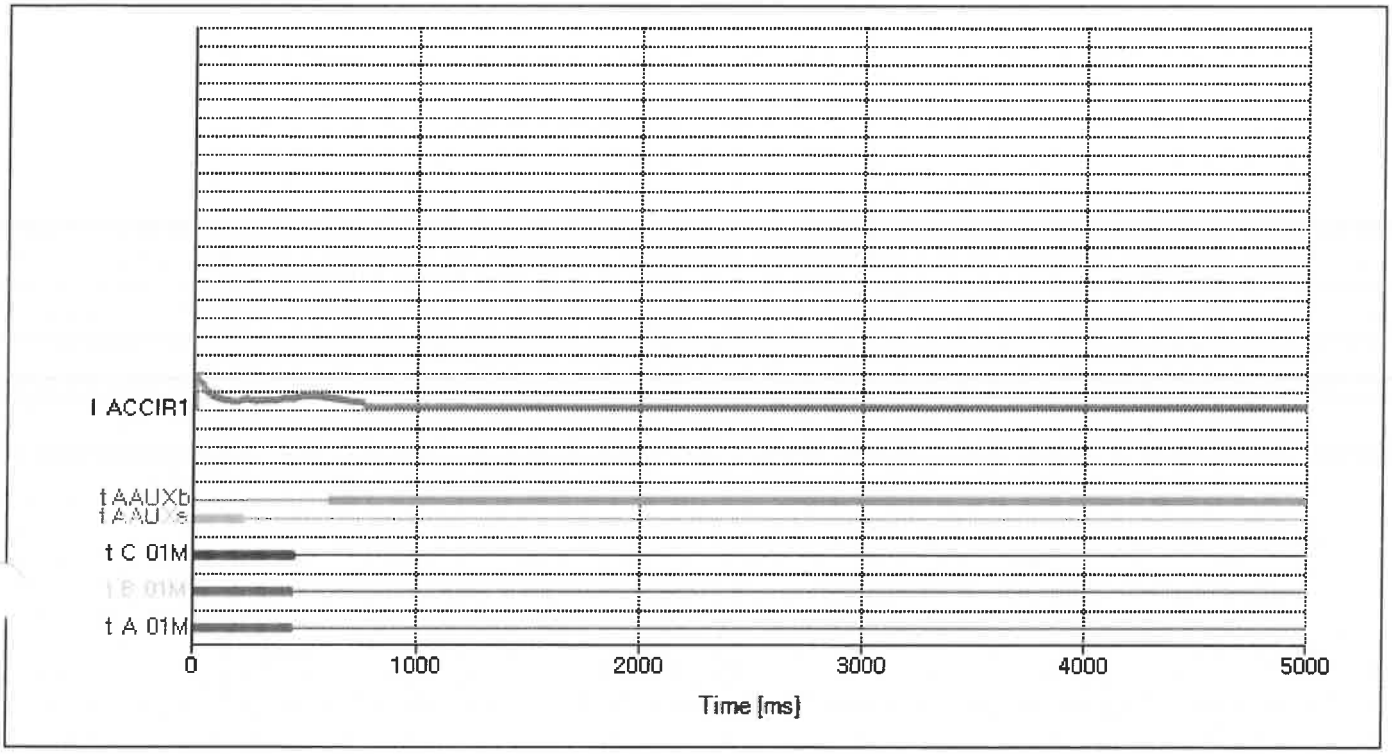
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	EDS2

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	QZ92DS

1. OPEN



2. Test Condition

CLOSE COIL	--	DC 110V
OPEN COIL	1	--

Press.(MPa)	N/A

3. Test Results

Phs	Main Contact Time (ms)	PIR (ms)		Auxiliary				Motion		Current (A)
				Aux-a		Aux-b		Stroke	Speed	
		Time	M-PIR	time	M-a	time	M-b	(mm)	(m/s)	
A	444.950	--	--	--	--	--	--	--	--	8.600
	--	--	--	--	--	--	--			
B	443.700	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
C	456.300	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
Df.	12.600									
	--									

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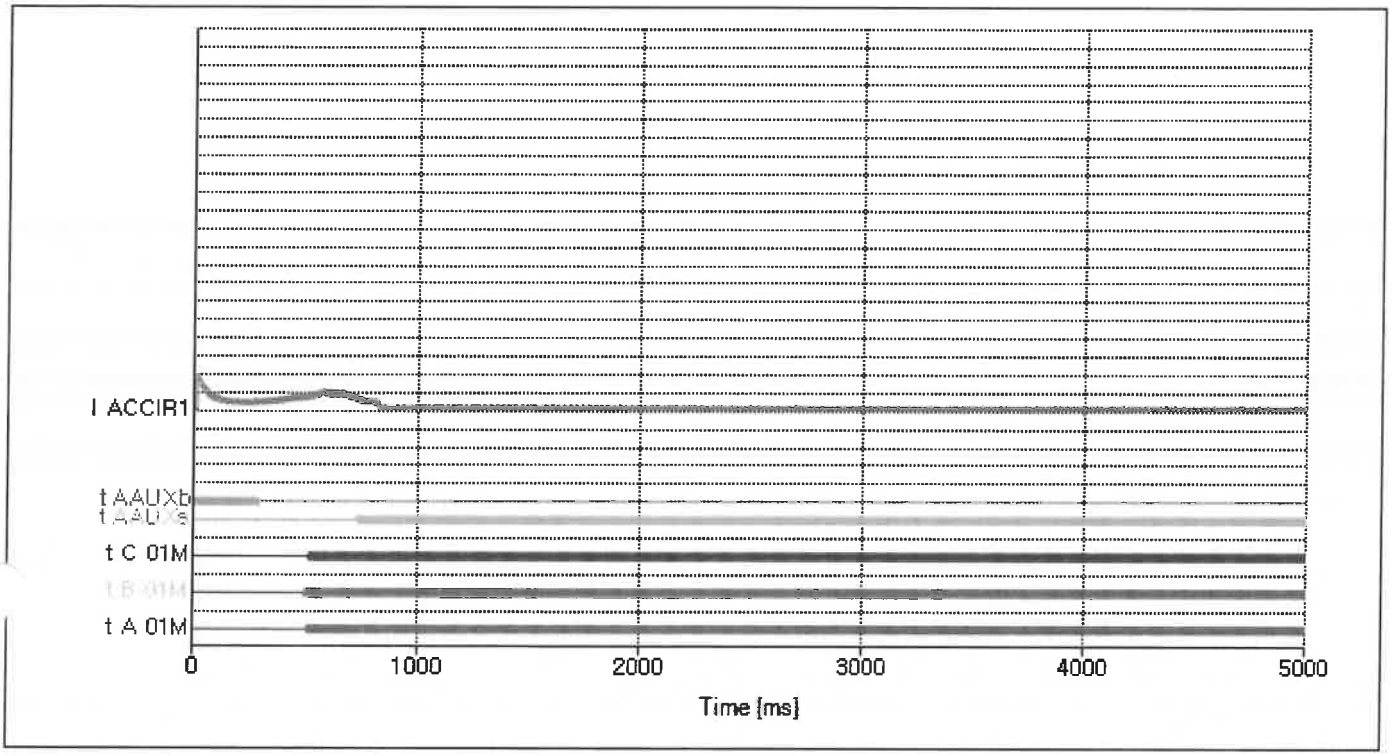
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	EDS3

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	QZ91DS

1. CLOSE



2. Test Condition

CLOSE COIL	1	DC 110V
OPEN COIL	--	--

Press.(MPa)	N/A

3. Test Results

Phs	Main Contact Time (ms)	PIR (ms)		Auxiliary				Motion		Current (A)
				Aux-a		Aux-b		Stroke (mm)	Speed (m/s)	
		Time	M-PIR	time	M-a	time	M-b			
A	512.000	--	--	--	--	--	--	--	--	8.700
	--	--	--	-	-	-	-			
B	498.500	--	--	--	--	--	--	--	--	--
	--	--	--	-	-	-	-			
C	518.600	--	--	--	--	--	--	--	--	--
	--	--	--	-	-	-	-			
Df.	20.100									
	--									

Remark

On Behalf of Class witness
☐ WITNESS
☐ REVIEW
Date: 2024.12.13
Sign:

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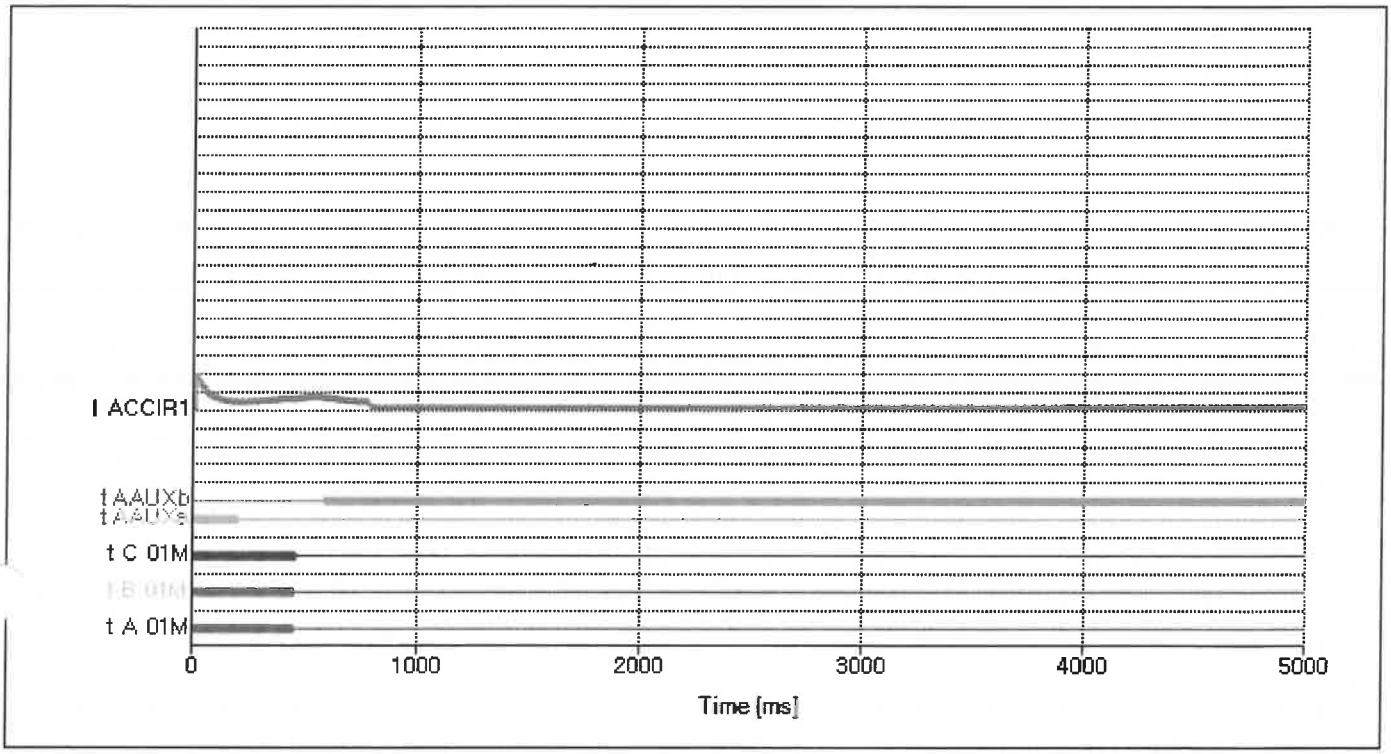
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	EDS4

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	QZ91DS

1. OPEN



2. Test Condition

CLOSE COIL	--	DC 110V
OPEN COIL	1	--

Press.(MPa)	N/A

3. Test Results

Phs	Main Contact Time (ms)	PIR (ms)		Auxiliary				Motion		Current (A)
				Aux-a		Aux-b		Stroke (mm)	Speed (m/s)	
		Time	M-PIR	time	M-a	time	M-b			
A	456.650	--	--	--	--	--	--	--	--	8.600
	--	--	--	--	--	--	--			
B	453.750	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
C	466.900	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
Df.	13.150									
	--									

Remark

On Behalf of Crosslink
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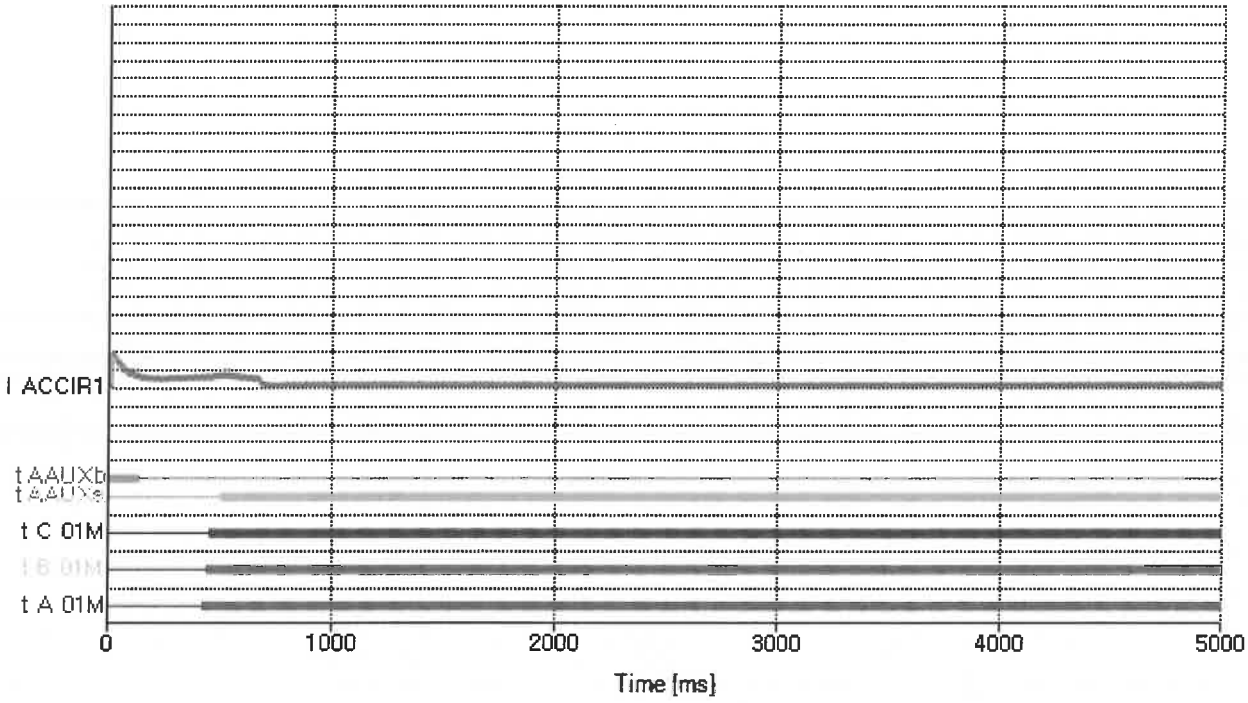
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	EDS5

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	QZ91ES

1. CLOSE



2. Test Condition

CLOSE COIL	1	DC 110V
OPEN COIL	--	--

Press.(MPa)	N/A

3. Test Results

Phs	Main Contact Time (ms)	PIR (ms)		Auxiliary				Motion		Current (A)
				Aux-a		Aux-b		Stroke (mm)	Speed (m/s)	
		Time	M-PIR	time	M-a	time	M-b			
A	425.500	--	--	--	--	--	--	--	--	8.400
	--	--	--	-	-	-	-			
B	444.550	--	--	--	--	--	--	--	--	--
	--	--	--	-	-	-	-			
C	450.050	--	--	--	--	--	--	--	--	--
	--	--	--	-	-	-	-			
Df.	24.550									
	--									

Remark

On Behalf of cross unit
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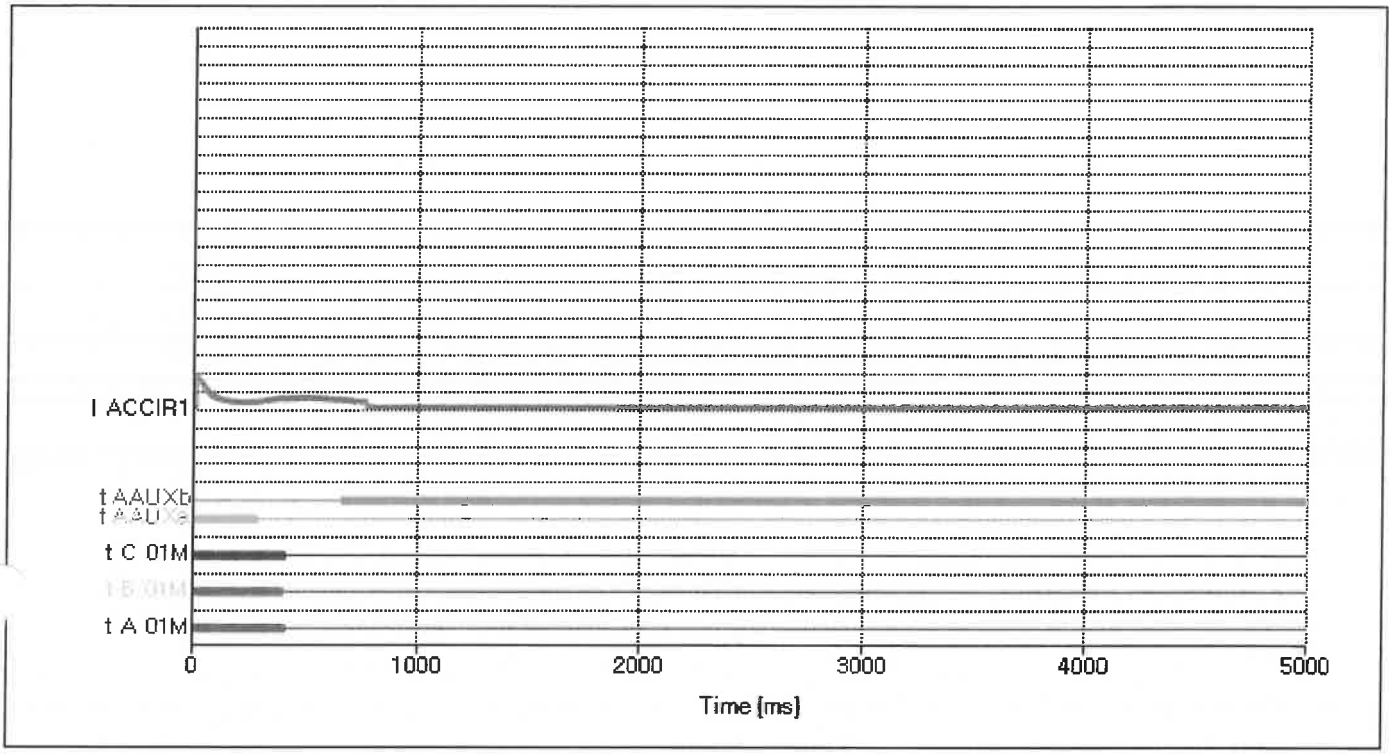
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	EDS6

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	QZ91ES

1. OPEN



2. Test Condition

CLOSE COIL	--	DC 110V
OPEN COIL	1	--

Press.(MPa)	N/A

3. Test Results

Phs	Main Contact Time (ms)	PIR (ms)		Auxiliary				Motion		Current (A)
				Aux-a		Aux-b		Stroke (mm)	Speed (m/s)	
		Time	M-PIR	time	M-a	time	M-b			
A	409.450	--	--	--	--	--	--	--	--	8.800
	--	--	--	--	--	--	--			
B	399.850	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
C	415.750	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
Df.	15.900									
	--									

Remark

On Behalf of Choi Gwang
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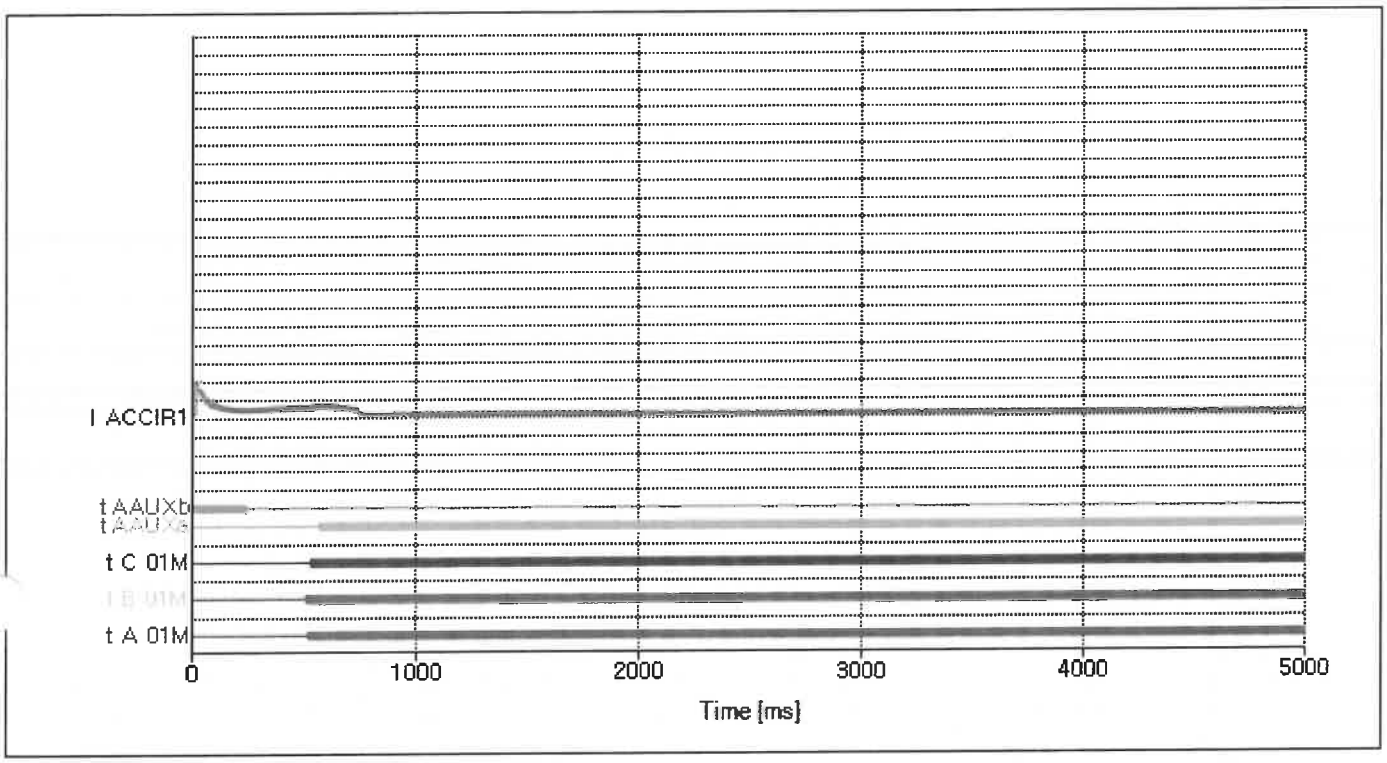
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	EDS7

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	QZ92ES

1. CLOSE



2. Test Condition

CLOSE COIL	1	DC 110V
OPEN COIL	--	--

Press.(MPa)	N/A

3. Test Results

Phs	Main Contact Time (ms)	PIR (ms)		Auxiliary				Motion		Current (A)
				Aux-a		Aux-b		Stroke	Speed	
		Time	M-PIR	time	M-a	time	M-b	(mm)	(m/s)	
A	520.250	--	--	--	--	--	--	--	--	8.600
	--	--	--	--	--	--	--			
B	515.550	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
C	530.100	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--			
Df.	14.550									
	--									

Remark

On Behalf of Customer
WITNESS
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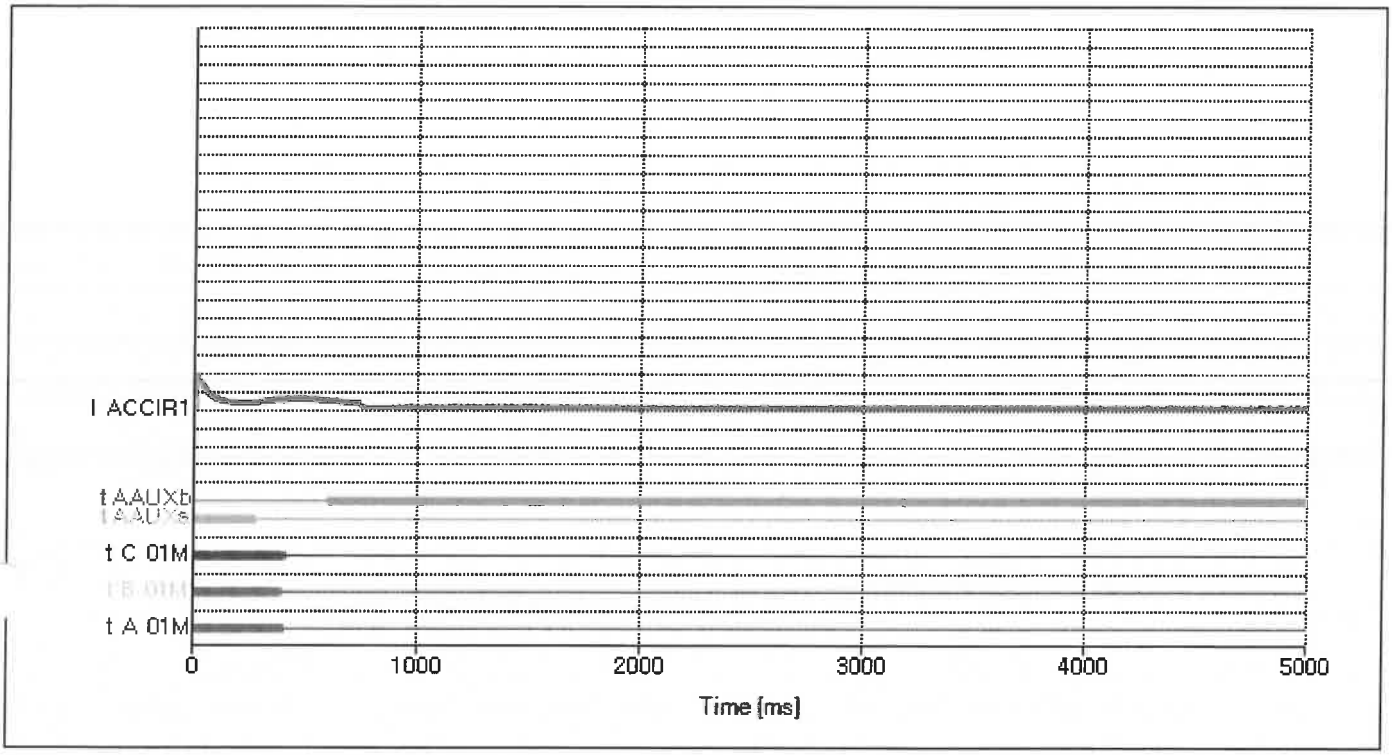
TEST REPORT

Test Article	Organisation	Page :
Operation Characteristic Test	Qulity Control Team Switchgear	EDS8

< BREAKER DATA >

BASE LOAD POWER HUB	72kV 31.5kA	QZ92ES

1. OPEN



2. Test Condition

CLOSE COIL	--	DC 110V
OPEN COIL	1	--

Press.(MPa)	N/A

3. Test Results

Phs	Main Contact Time (ms)	PIR (ms)		Auxiliary				Motion		Current (A)
				Aux-a		Aux-b		Stroke (mm)	Speed (m/s)	
		Time	M-PIR	time	M-a	time	M-b			
A	403.200	--	--	--	--	--	--	--	--	8.700
	--	--	--	-	-	-	-			
B	393.500	--	--	--	--	--	--	--	--	--
	--	--	--	-	-	-	-			
C	412.750	--	--	--	--	--	--	--	--	--
	--	--	--	-	-	-	-			
Df.	19.250									
	--									

Remark

On Behalf of Crosswind
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< Appendix A >

- Low Power Voltage Transformer test

- Low Power Instrument Transformer test



ROUTINE TEST REPORT FOR LPIT

Customer / Country	:	ROSETTI / ITALY
Project	:	BASE LOAD POWER HUB (BLPH) 66kV SWITCH GEAR (GIS)
Substation Name	:	BLPH 66kV
PJT No.		10248704
Date of Tests		2024.12.11

Technical Data

LPIT Type	XM1
Rated voltage	66/√3kV
Rated current	250A
Rated short-circuit breaking current	31.5kA
Rated frequency	50 Hz
Accuracy class for LPVT	0.5/3P
Accuracy class for LPCT	0.2S/5TPE

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Factory Information

Place of Test	:	HYOSUNG Changwon Factory
Address	:	171, Yeonduk-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, South-Korea

General

We certify that the above items have been inspected in compliance with the requirements of the customer.

Prepared by : M.S.KIM	Checked by : Y.C.YU	Approved by : Y.M.KIM
김민성.	유연규	

Applied Product

Bay Name	Serial Number			Test Date
	LPIT(convertor)		Merging Unit	
HNA6-AFA70	main	SCFA-3-2024-1006	SN-IM2-2024-011	
	back up	SCFA-3-2024-1007		
	main	SCFA-3-2024-1008	SN-IM2-2024-011	
	back up	SCFA-3-2024-1009		
	main			
	back up			
	main			
	back up			
	main			
	back up			
	main			
	back up			
	main			
	back up			
	main			
	back up			

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1. Design and Visual Check

The below contents are checked whether the test objects are suitable according to approved specification and relevant standards.

Test Item	Result
Dimension is checked according to the approved drawings.	PASS
Construction, indicator, painting & welding condition are inspected visually.	PASS

2. Verification of markings

The below test items satisfied with approved specification and relevant standards.

Test Item	Result
Nameplate is checked according to the approved drawings.	PASS
Terminal markings are checked according to the approved drawings.	PASS

3. Power-frequency voltage withstand tests on primary terminals (With GIS)

The specified power frequency withstand voltage test has been performed successfully.

Test Item	Test Voltage [kV]	Test Duration [s]	Result
Primary terminals to Earth	140	60	PASS

4. Partial Discharge Measurement (With GIS)

After the power frequency withstand voltage test, the quantity of partial discharges has been measured successfully.

4.1 Test condition

Test Item	Test Voltage [kV]	Acceptance criteria [pC]	Measured Value [pC]	Result
Phase to Earth	54	≤5	<3	PASS

4.2 Test condition without F-Bushing

Test Item	Test Voltage [kV]	Acceptance criteria [pC]	Measured Value [pC]	Result
Phase to Earth	87	≤5	<2	PASS

5. Enclosure tightness test at ambient temperature (With GIS)

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The LPIT is fully assembled with the GIS and tested simultaneously.

At least 6 hour later, it has been checked with gas detector.

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SF6 Gas pressure [Bar.G] LPIT : 5

Test Duration [hr]	Acceptance Criteria	Measured	Result
6	Less than 0.5% per year	Less than 12ppm (Less than 0.15% per year)	PASS

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6. MU test

- The below contents are checked whether the test objects are suitable according to approved specification and relevant standards.
- Refer to the attached <Appendix A>

6.1 Sampled value check

Test Item	Result
The Sampled Value checked that there were no errors in the data sets.	PASS

6.2 Alarm check

Test Item	Result
Alarm, LED statue etc. condition are inspected visually.	PASS

7. Power-frequency voltage withstand tests on secondary terminals & low-voltage components

- Refer to the attached <Appendix A>

8. Pressure Test for Enclosure

- Refer to the GIS test report.

9. Test for accuracy with MU

- Refer to the attached <Appendix B>

(END)

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HYOSUNG HEAVY INDUSTRIES **TEST CERTIFICATE** Merging Unit (IM2)

Serial No. : SN-IM2-2024-011
Order No. :
Firmware : Ver 1.20

test date : 2024-07-16
tested by :

This report is only valid with the original hardware configuration!

Upload Firmware to the device

Test step Passed.

Upload configuration files to the device

Test step Passed.

Check HW

Type of device: IM2
communication modules: Normal
Power Supply (Voltage variant): DC 110V (100 ~ 250V)
LEDs: 32
LCD Screen: 1
Front/Rear Ethernet Port : Wired-X via Ethernet, RJ45
Process Bus (PB) Channel A Port: Fiber-optic Connection (Redundancy communication)
PB Channel B Port: Fiber-optic Connection (Redundancy communication)
Station Bus (STB) Channel A Port: Fiber-optic Connection (Redundancy communication)
STB Channel B Port: Fiber-optic Connection (Redundancy communication)

Description	MAC
PB MAC Address	00:1B:4B:00:57:90
STB MAC Address	00:1B:4B:00:57:91
Service Port MAC eth1	00:1B:4B:00:57:92
DGA Port MAC	00:1B:4B:00:57:93

Test step Passed.

Ordering Code Validation Check

Ordering code : B1-0000-0B-L040

Category	Description	State
Language	English	Pass
Supply Voltage	110V	Pass
Slot 1	-	-
Slot 2	-	-
Slot 3	-	-
Slot 4	-	-
Slot 5	DI 26 + Power Supply	Pass
Slot 6 - Comm Speed	-	-
Slot 6 - Comm Speed	1Gbps (1310nm)	Pass
Slot 7	SCIU	Pass
Slot 8	-	-

Test step Passed.

Human Machine Interface Check

Test step Passed.

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HYOSUNG HEAVY INDUSTRIES **TEST CERTIFICATE** Merging Unit (IM2)

Serial No. : SN-IM2-2024-011
Order No. :
Firmware : Ver 1.20
test date : 2024-07-16
tested by :

This report is only valid with the original hardware configuration!

Slot 1

N/A

Slot 2

N/A

Slot 3

N/A

Slot 4

N/A

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Power Consumption and Digital Input at Slot 5

Voltage [V]	Current [A]	Power [W]	Max. [W]	State
110dc				Pass

Test step Passed.

DI Number	DI Threshold	Input [V]	DI State	State
1	Pickup 88Vdc Dropout 40Vdc	0Vdc	Low	Pass
		110Vdc	High	Pass
2		0Vdc	Low	Pass
		110Vdc	High	Pass
3		0Vdc	Low	Pass
		110Vdc	High	Pass
4		0Vdc	Low	Pass
		110Vdc	High	Pass
5		0Vdc	Low	Pass
		110Vdc	High	Pass
6		0Vdc	Low	Pass
		110Vdc	High	Pass
7		0Vdc	Low	Pass
		110Vdc	High	Pass
8		0Vdc	Low	Pass
		110Vdc	High	Pass
9		0Vdc	Low	Pass
		110Vdc	High	Pass
10		0Vdc	Low	Pass
		110Vdc	High	Pass
11		0Vdc	Low	Pass
		110Vdc	High	Pass
12		0Vdc	Low	Pass
		110Vdc	High	Pass
13		0Vdc	Low	Pass
		110Vdc	High	Pass
14		0Vdc	Low	Pass
		110Vdc	High	Pass
15		0Vdc	Low	Pass
		110Vdc	High	Pass

IM2 2 / 4

On Behalf of Chris Wind
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HYOSUNG HEAVY INDUSTRIES **TEST CERTIFICATE** Merging Unit (IM2)

Serial No. : SN-IM2-2024-011
Order No. :
Firmware : Ver 1.20

test date 2024-07-16
tested by

This report is only valid with the original hardware configuration!

16		0Vdc	Low	Pass
		110Vdc	High	Pass
17		0Vdc	Low	Pass
		110Vdc	High	Pass
18		0Vdc	Low	Pass
		110Vdc	High	Pass
19		0Vdc	Low	Pass
		110Vdc	High	Pass
20		0Vdc	Low	Pass
		110Vdc	High	Pass
21		0Vdc	Low	Pass
		110Vdc	High	Pass
22		0Vdc	Low	Pass
		110Vdc	High	Pass
23		0Vdc	Low	Pass
		110Vdc	High	Pass
24		0Vdc	Low	Pass
		110Vdc	High	Pass
25		0Vdc	Low	Pass
		110Vdc	High	Pass
26		0Vdc	Low	Pass
		110Vdc	High	Pass

Test step Passed.

PTP Time Synchronization Check at Slot 6

Category	Description	State
Time Difference	<1us	Pass

Channel Redundancy Check at Slot 6

Category	State
HSR/PRP Channel A	Empty
HSR/PRP Channel B	Pass

SCIU Check at Slot 7

Category	State
Slot 1	Pass
Slot 2	Pass
Slot 3	Pass
Slot 4	Pass

Slot 8

N/A

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HYOSUNG HEAVY INDUSTRIES

TEST CERTIFICATE

Merging Unit (IM2)

Serial No. : SN-IM2-2024-011
Order No. :
Firmware : Ver 1.20

test date : 2024-07-16
tested by :

This report is only valid with the original hardware configuration!

Power-frequency voltage withstand test

Test voltage applied between	Test voltage (V)	Breakdown / flashover (Yes/No)
Electric circuit - Enclosure	2200	No breakdown
Other circuit - Enclosure	500	No breakdown
Electric circuit - Electric circuit	2200	No breakdown
Other circuit - Other circuit	500	No breakdown
Electric circuit - Other circuit	2200	No breakdown
Contact point – Contact point	1000	No breakdown

Test step Passed.

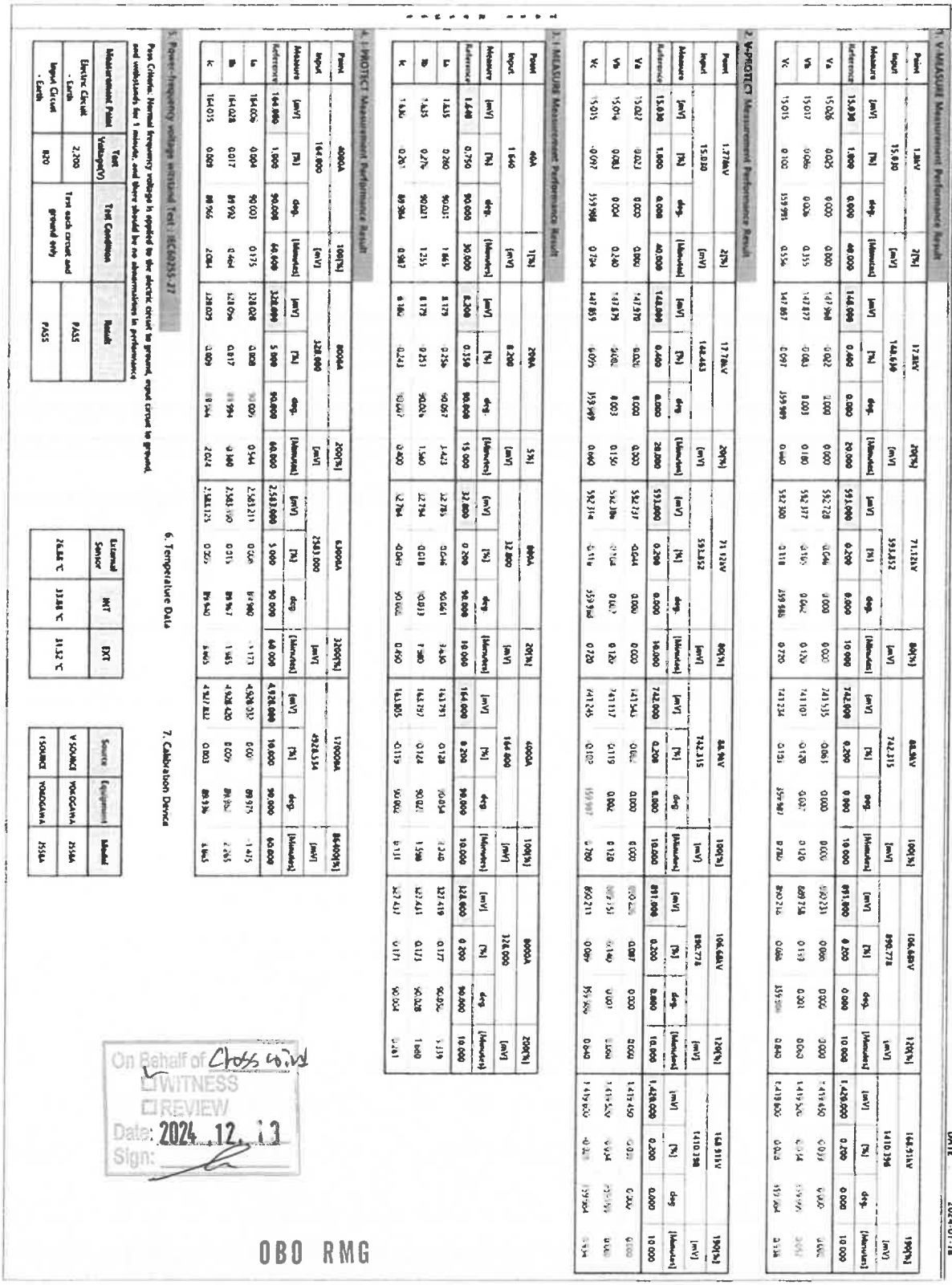
Impulse-voltage withstand test

Test voltage applied between	Voltage shape (AC, DC, impulse, surge)	Breakdown / flashover (Yes/No)
Electric circuit - Enclosure	5000	No breakdown
Other circuit - Enclosure	1000	No breakdown
Electric circuit - Electric circuit	5000	No breakdown
Electric circuit - Other circuit	5000	No breakdown
Other circuit – Other circuit	1000	No breakdown

Test step Passed

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SC-UNIT Test Report
DATE 2024-07-18
S/N SCDA3-1024-1006 TYPE : LP-ACTIVE
1. V-MEASURE Measurement Performance Result
2. V-PROTECT Measurement Performance Result
3. I-MEASURE Measurement Performance Result
4. I-PROTECT Measurement Performance Result
5. Power-frequency voltage withstand Test : IEC60255-27
Pass Criteria: Normal frequency voltage is applied to the electric circuit to ground, equal circuit to ground, and withstands for 1 minute, and there should be no abnormalities in performance
Measurement Point
Test Voltage(V)
Test Condition
Result
Electric Circuit - Earth
2,200
Test each circuit and ground only
PASS
Input Circuit - Earth
820
PASS
6. Temperature Data
External Sensor
INT
EXT
7. Calibration Device
Source
Equipment
Model
SOURCE
YOKOGAWA
2558A
MEASURE
YOKOGAWA
2558A
On Behalf of Cross Wind
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Date: 2024. 12. 13
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SC-UNIT Test Report

S/N : SCFA-J-2024-1007 TYPE : 3Φ ACTIVE DATE : 2024-07-18

1. V-MEASURE Measurement Performance Result

Point	1.8kV	2[%]	17.9kV	20[%]	71.12kV	80[%]	88.9kV	100[%]	120[%]	149.91kV	190[%]
Input	15.030	[mV]	148.638	[mV]	591.852	[mV]	742.315	[mV]	890.778	[mV]	[Measure]
Measure	[mV]	[%]	[deg.]	[Measure]	[mV]	[%]	[deg.]	[Measure]	[mV]	[%]	[deg.]	[Measure]	[mV]	[%]	[deg.]	[Measure]	[mV]
Reference	15.030	1.000	0.000	40.000	148.638	0.000	0.000	20.000	591.852	0.000	0.000	10.000	742.315	0.000	0.000	10.000	890.778	0.000	0.000	10.000	1410.358	0.000	0.000	10.000	1410.358
Va	15.061	0.204	0.000	0.800	148.319	0.214	0.000	0.000	593.953	0.178	0.000	0.000	743.761	0.178	0.000	0.000	892.219	0.147	0.000	0.000	1420.129	0.010	0.000	0.000	1420.129
Vb	15.059	0.193	359.927	1.480	148.304	0.205	359.915	1.480	594.048	0.177	359.915	1.500	743.760	0.156	359.915	1.500	892.219	0.127	359.924	1.500	1420.329	0.010	0.000	0.000	1420.329
Vc	15.057	0.180	0.010	0.570	148.313	0.211	0.000	0.480	593.969	0.167	0.007	0.420	743.150	0.155	0.007	0.420	892.274	0.154	0.007	0.420	1420.734	0.006	0.000	0.360	1420.734

2. V-PROTECT Measurement Performance Result

Point	1.778kV	2[%]	17.78kV	20[%]	71.12kV	80[%]	88.9kV	100[%]	120[%]	149.91kV	190[%]
Input	15.030	[mV]	148.463	[mV]	591.852	[mV]	742.315	[mV]	890.778	[mV]	[Measure]
Measure	[mV]	[%]	[deg.]	[Measure]	[mV]	[%]	[deg.]	[Measure]	[mV]	[%]	[deg.]	[Measure]	[mV]	[%]	[deg.]	[Measure]	[mV]
Reference	15.030	1.000	0.000	40.000	148.463	0.000	0.000	20.000	591.852	0.000	0.000	10.000	742.315	0.000	0.000	10.000	890.778	0.000	0.000	10.000	1410.358	0.000	0.000	10.000	1410.358
Va	15.061	0.204	0.000	0.800	148.321	0.217	0.000	0.000	593.961	0.179	0.000	0.000	743.780	0.179	0.000	0.000	892.353	0.150	0.000	0.000	1420.170	0.012	0.000	0.000	1420.170
Vb	15.059	0.194	359.926	1.480	148.307	0.207	359.915	1.500	594.057	0.178	359.915	1.500	743.782	0.159	359.924	1.500	892.231	0.128	359.924	1.500	1420.418	0.009	0.000	0.360	1420.418
Vc	15.057	0.181	0.008	0.562	148.315	0.213	0.008	0.480	594.000	0.169	0.007	0.420	743.174	0.158	0.007	0.420	892.287	0.136	0.007	0.420	1420.422	0.010	0.000	0.360	1420.422

3. I-MEASURE Measurement Performance Result

Point	40A	1[%]	200A	5[%]	800A	20[%]	4000A	100[%]	8000A	200[%]
Input	1.640	[mV]	8.240	[mV]	32.960	[mV]	164.800	[mV]	328.000	[mV]
Measure	[mV]	[%]	[deg.]	[Measure]	[mV]	[%]	[deg.]	[Measure]	[mV]	[%]	[deg.]	[Measure]	[mV]
Reference	1.640	0.750	90.000	30.000	8.200	0.250	90.000	15.000	32.800	0.200	90.000	10.000	164.000	0.200	90.000	10.000	328.000
Ia	1.639	-0.061	90.044	2.634	8.198	-0.024	90.057	1.435	32.791	-0.027	90.063	1.763	164.196	0.101	90.056	1.380	328.262
Ib	1.640	0.016	90.640	2.404	8.200	0.005	90.096	1.335	32.802	0.007	90.642	1.767	164.230	0.134	90.055	1.350	328.260
Ic	1.640	-0.003	89.993	0.450	8.201	0.015	90.015	0.185	32.805	0.016	90.019	1.140	164.234	0.141	90.015	0.760	328.300

4. I-PROTECT Measurement Performance Result

Point	4000A	100[%]	8000A	200[%]	32000A	400[%]	176000A	880[%]
Input	164.000	[mV]	328.000	[mV]	2563.000	[mV]	4926.534	[mV]
Measure	[mV]	[%]	deg.	[Measure]	[mV]	[%]	deg.	[Measure]	[mV]	[%]	deg.	[Measure]
Reference	164.000	1.000	90.000	60.000	328.000	5.000	90.000	60.000	2563.000	5.000	90.000	60.000	4926.534	10.000	90.000	60.000
Ia	164.033	0.020	90.070	4.170	328.065	0.020	90.012	4.294	2563.796	0.015	90.045	2.985	4928.404	0.008	90.041	2.414
Ib	164.050	0.030	90.059	3.944	328.096	0.029	90.041	3.918	2563.950	0.021	90.035	2.100	4928.880	0.018	90.051	2.866
Ic	164.044	0.028	90.011	1.974	328.091	0.028	90.035	2.100	2563.901	0.021	90.007	0.447	4928.767	0.016	90.003	0.780

5. Power frequency voltage withstand Test : IEC60255-27

Pass Criteria: Normal frequency voltage is applied to the electric circuit to ground, each circuit to ground, and withstand for 1 minute, and there should be no abnormalities in performance.

Measurement Point	Test Voltage(V)	Test Condition	Result
Electric Circuit - Earth	2,200	Test each circuit and ground only	PASS
Input Circuit - Earth	820		PASS

6. Temperature Data

External Sensor	INT	EXT
27.1 ℃	34.1 ℃	31.00 ℃

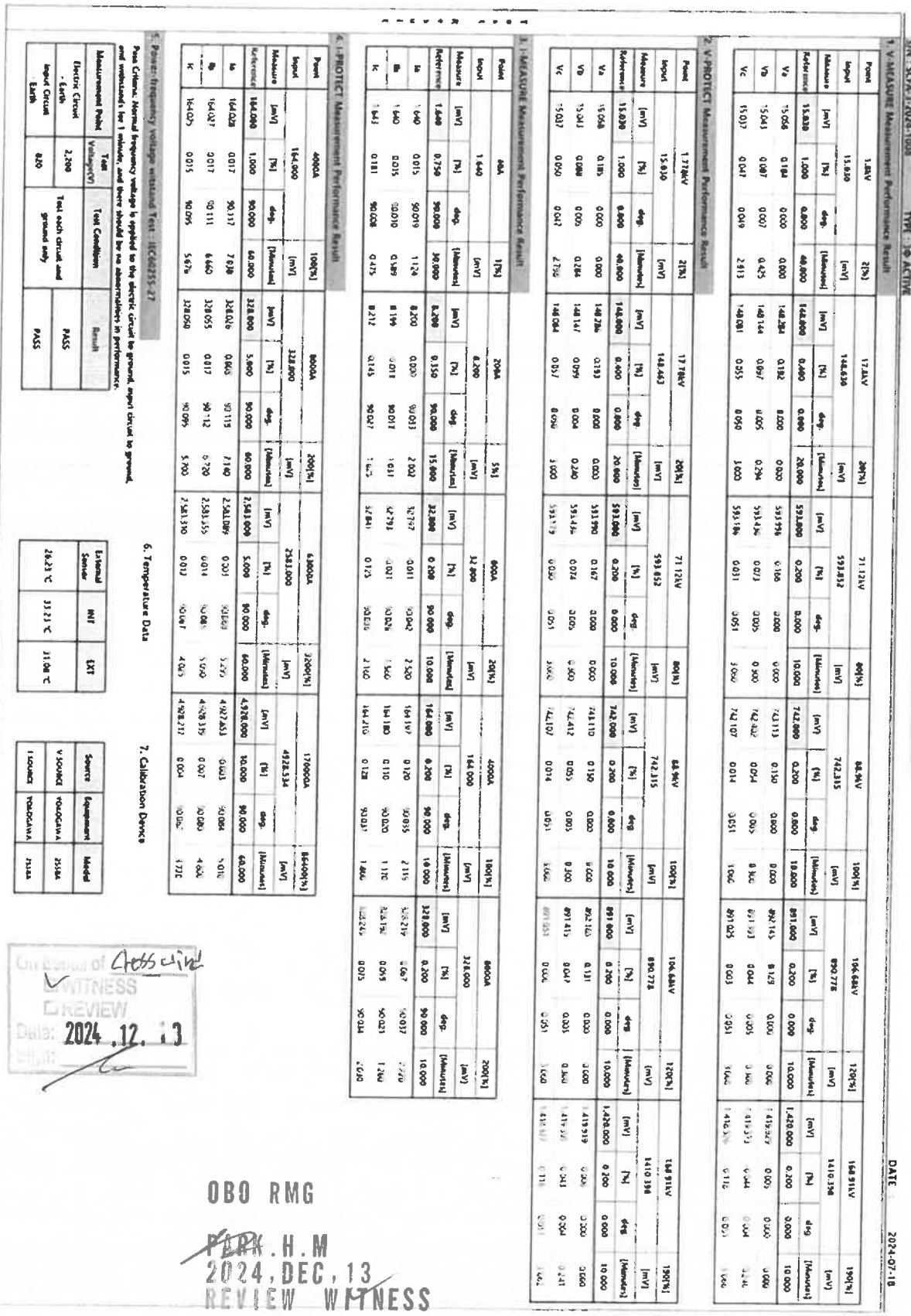
7. Calibration Device

Source	Equipment	Model
V SOURCE	YOKOGAWA	2533A
I SOURCE	YOKOGAWA	2533A

On behalf of Hyosung
WITNESS
REVIEW
Date: 2024. 12. 13
Sign:

OBO RMG

PARK. H.M
2024. DEC. 13
REVIEW WITNESS



SC-UNIT Test Report

DATE 2024-07-18

SCN : SCFA-3-2024-1008 TYPE : 3Φ ACTIVE

1. V-MEASURE Measurement Performance Result

Point	1.8kV	2[%]	12.6kV	20[%]	71.12kV	40[%]	88.9kV	100[%]	106.68kV	120[%]	150.91kV	190[%]
Input	15.830		148.630		593.852		742.315		890.778		1419.356	
Measure	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]
Reference	15.839 1.000 0.000	40.000	148.000 0.000 0.000	20.000	593.000 0.200 0.000	10.000	742.000 0.200 0.000	10.000	891.000 0.200 0.000	10.000	1419.000 0.200 0.000	10.000
Va	15.056 0.184 0.000	0.000	140.364 0.182 0.000	0.000	591.996 0.168 0.000	0.000	742.113 0.150 0.000	0.000	892.145 0.128 0.000	0.000	1419.267 0.005 0.000	0.000
Vb	15.043 0.087 0.007	0.425	140.144 0.097 0.005	0.294	593.436 0.073 0.005	0.300	742.432 0.054 0.005	0.300	891.593 0.044 0.005	0.300	1419.573 0.044 0.005	0.300
Vc	15.017 0.047 0.049	2.813	148.081 0.055 0.050	1.000	593.196 0.031 0.051	0.600	742.107 0.014 0.051	1.000	891.025 0.003 0.051	1.000	1419.356 0.013 0.051	1.000

2. V-PROTECT Measurement Performance Result

Point	1.776kV	2[%]	17.76kV	20[%]	71.12kV	40[%]	88.9kV	100[%]	106.68kV	120[%]	150.91kV	190[%]
Input	15.830		148.463		593.852		742.315		890.778		1419.356	
Measure	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]
Reference	15.839 1.000 0.000	40.000	148.000 0.400 0.000	20.000	593.000 0.200 0.000	10.000	742.000 0.200 0.000	10.000	891.000 0.200 0.000	10.000	1419.000 0.200 0.000	10.000
Va	15.058 0.185 0.000	0.000	140.786 0.193 0.000	0.003	593.990 0.167 0.000	0.000	742.110 0.150 0.000	0.000	892.165 0.131 0.000	0.000	1419.919 0.000 0.000	0.000
Vb	15.043 0.088 0.005	0.284	140.147 0.099 0.004	0.240	593.436 0.074 0.005	0.300	742.412 0.055 0.005	0.300	891.415 0.047 0.005	0.300	1419.576 0.041 0.004	0.240
Vc	15.017 0.050 0.047	2.750	148.084 0.057 0.050	1.000	593.179 0.030 0.051	0.600	742.107 0.014 0.051	1.000	891.025 0.004 0.051	1.000	1419.356 0.013 0.051	1.000

3. I-MEASURE Measurement Performance Result

Point	40A	1[%]	20kA	5[%]	80kA	20[%]	160kA	40[%]	200kA	50[%]	240kA	60[%]
Input	1.640		8.200		32.000		164.000		328.000		492.000	
Measure	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]
Reference	1.640 0.750 90.000	30.000	8.200 0.550 90.000	15.000	32.000 0.200 90.000	10.000	164.000 0.200 90.000	10.000	328.000 0.200 90.000	10.000	492.000 0.200 90.000	10.000
Ia	1.640 0.015 90.019	1.124	8.200 0.000 90.003	2.002	32.027 0.011 90.042	2.520	164.197 0.120 90.055	2.115	328.219 0.067 90.037	2.760	492.329 0.046 90.021	1.260
Ib	1.640 0.015 90.010	0.589	8.199 0.018 90.013	1.011	32.026 0.021 90.024	1.560	164.180 0.110 90.020	1.170	328.196 0.055 90.023	1.260	492.294 0.035 90.034	1.260
Ic	1.641 0.181 90.008	0.475	8.212 0.145 90.007	1.465	32.041 0.125 90.016	2.160	164.210 0.128 90.021	1.404	328.249 0.015 90.034	2.760	492.371 0.011 90.051	1.404

4. I-PROTECT Measurement Performance Result

Point	40kA	10[%]	80kA	20[%]	160kA	40[%]	200kA	50[%]	240kA	60[%]	320kA	80[%]
Input	164.000		328.000		656kA		820[%]		1700kA		984kA[%]	
Measure	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]	[mV] [%] deg.	[Minutes]
Reference	164.000 1.000 90.000	60.000	328.000 0.800 90.000	60.000	2581.000 5.000 90.000	60.000	[mV] [%] deg.	[Minutes]	4928.334 90.000 90.000	60.000	[mV] [%] deg.	[Minutes]
Ia	164.028 0.017 90.117	7.838	328.026 0.065 90.115	7.140	2581.089 0.031 90.060	5.220						
Ib	164.027 0.017 90.111	6.460	328.055 0.017 90.112	6.720	2581.355 0.014 90.048	5.040						
Ic	164.025 0.015 90.095	5.676	328.050 0.015 90.095	5.700	2581.370 0.013 90.047	4.920	4928.217 0.004 90.047	4.920				

5. Power-frequency voltage withstand Test : IEC60255-27

Pass Criteria: Normal frequency voltage is applied to the electric circuit to ground, input circuit to ground, and withstand for 1 minute, and there should be no abnormalities in performance.

Measurement Point	Test Voltage(V)	Test Condition	Result
Electric Circuit - Earth	2,200	Test each circuit and ground only	PASS
Input Circuit - Earth	820		PASS

6. Temperature Data

External Sensor	INT	EXT
26.23 ℃	33.21 ℃	31.04 ℃

7. Calibration Device

Source	Equipment	Model
I SOURCE	YOKOGAWA	7552A
V SOURCE	YOKOGAWA	2558A

On behalf of Hyosung
WITNESS
REVIEW
Date: 2024.12.13
Sign:

OBO RMG

PARK.H.M
2024,DEC,13
REVIEW WITNESS

ROUTINE TEST REPORT FOR LPIT

Appendix A

Project Name : BASE LOAD POWER HUB (BLPH)

SC-UNIT Test Report

DATE : 2024-07-18

S/N : SCA-2-2024-1009 TYPE : 3P ACTIVE

1. V-MEASURE Measurement Performance Result

Point	1.8kV	2[%]	17.8kV	20[%]	71.12kV	80[%]	88.9kV	100[%]	106.68kV	120[%]	169.51kV	190[%]
Input	15.030		148.639		593.852		742.315		890.778		1410.398	
Measure	[mV]	[%]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]
Reference	15.030	1.000	148.639	0.400	0.000	20.000	593.852	0.200	0.000	10.000	742.315	0.200	0.000	10.000	890.778	0.200	0.000	10.000	1410.398	0.200	0.000	10.000
Va	15.045	0.098	148.963	0.110	0.000	0.000	593.988	0.000	0.000	0.000	742.515	0.070	0.000	0.000	891.424	0.048	0.000	0.000	1418.743	0.070	0.000	0.000
Vb	15.016	0.036	148.071	0.064	0.003	0.180	593.137	0.043	0.003	0.175	742.060	0.008	0.003	0.180	891.071	0.008	0.004	0.120	1.419.044	0.006	0.004	0.144
Vc	15.046	0.103	148.984	0.114	0.011	0.060	593.562	0.055	0.010	0.060	742.540	0.021	0.010	0.060	891.451	0.004	0.010	0.060	1419.003	0.010	0.010	0.060

2. V-PROTECT Measurement Performance Result

Point	1.77kV	2[%]	17.78kV	20[%]	71.12kV	80[%]	88.9kV	100[%]	106.68kV	120[%]	169.51kV	190[%]
Input	15.016		148.463		593.852		742.315		890.778		1410.398	
Measure	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]
Reference	15.030	1.000	40.000	148.639	0.400	0.000	20.000	593.852	0.200	0.000	10.000	742.315	0.200	0.000	10.000	890.778	0.200	0.000	10.000	1410.398	0.200	0.000	10.000
Va	15.044	0.094	0.000	148.555	0.105	0.000	0.000	593.547	0.052	0.000	0.000	742.477	0.064	0.000	0.000	891.416	0.047	0.000	0.000	1418.582	0.072	0.000	0.000
Vb	15.015	0.034	0.000	148.065	0.044	0.003	0.174	593.181	0.031	0.003	0.180	742.028	0.004	0.003	0.186	890.971	0.008	0.002	0.120	1419.479	0.005	0.001	0.084
Vc	15.045	0.097	0.000	148.957	0.104	0.010	0.060	593.562	0.059	0.010	0.060	742.490	0.066	0.010	0.060	891.446	0.012	0.010	0.060	1419.276	0.033	0.010	0.060

3. I-MEASURE Measurement Performance Result

Point	40A	1[%]	20kA	5[%]	80kA	20[%]	400kA	100[%]	800kA	200[%]
Input	1.640		8.200		32.800		164.000		328.000	
Measure	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]
Reference	1.640	0.750	90.000	30.000	8.200	0.350	90.000	15.000	32.800	0.200	90.000	10.000	164.000	0.200	90.000	10.000	328.000	0.200	90.000	10.000
Ia	1.637	0.193	90.057	1.432	8.187	-0.101	90.056	1.360	32.747	-0.142	90.056	1.360	163.947	-0.032	90.056	1.360	327.729	-0.081	90.056	1.360
Ib	1.637	0.194	90.041	2.586	8.187	-0.114	90.037	2.220	32.749	-0.140	90.040	2.095	163.934	-0.027	90.043	2.220	327.716	-0.076	90.046	2.161
Ic	1.637	0.192	90.010	0.600	8.186	-0.131	90.019	1.140	32.753	-0.116	90.024	1.546	163.985	-0.009	90.018	1.560	327.795	-0.026	90.020	1.200

4. I-PROTECT Measurement Performance Result

Point	400A	100[%]	800kA	200[%]	6300kA	1600[%]	17000kA	6400[%]
Input	164.000		328.000		2562.500		4328.534	
Measure	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]	[mV]	[%]	deg.	[Minutes]
Reference	164.000	1.000	90.000	60.000	328.000	5.000	90.000	60.000	2.562.000	5.000	90.000	60.000	4.328.000	10.000	90.000	60.000
Ia	164.023	0.615	90.043	2.585	328.049	0.616	90.044	2.631	2.563.437	0.611	90.015	0.555	4.328.552	0.610	90.011	0.624
Ib	164.045	0.627	90.057	3.404	328.099	0.627	90.059	3.512	2.563.636	0.624	90.034	1.560	4.328.840	0.617	90.026	1.560
Ic	164.019	0.624	90.047	2.420	328.080	0.624	90.049	2.406	2.563.562	0.622	90.022	1.295	4.328.720	0.615	90.016	1.075

5. Power-frequency voltage withstand Test : IEC60255-27

Pass Criteria: Normal frequency voltage is applied to the electric circuit to ground, input circuit to ground, and withstands for 1 minute, and there should be no abnormalities in performance.

Measurement Point	Test Voltage[V]	Test Condition	Result
Electric Circuit - Earth	2,200	Test each circuit and ground only	PASS
Input Circuit - Earth	820		PASS

6. Temperature Data

External Sensor	INT	EXT
26.25 ℃	31.25 ℃	31.02 ℃

7. Calibration Device

Name	Equipment	Model
I SOURCE	YOKOGAWA	2558A
V SOURCE	YOKOGAWA	2558A

On Behalf of
WITNESS
REVIEW
Date: 2024.12.13
Sign:

OBO RMG

~~PARK~~ H.M
2024,DEC,13
REVIEW WITNESS

LPIT

Bay Name : HNA6-AFA70

TEST DATE : 2024.12.11

Result	PASS	Reviewed by	M.S.KIM

1. MAIN

App.	Test current(A)	± ε Limit in %	Ratio error (ε) in %			± φe Limit in °	Phase error (φe) in °			Result	Remark
			L1	L2	L3		L1	L2	L3		
Metering	2.5(1%)	0.75	0.301	0.009	-0.043	0.9	-0.226	0.102	-0.143	PASS	
	12.5(5%)	0.35	0.037	0.011	-0.018	0.45	-0.071	-0.029	-0.029	PASS	
	50(20%)	0.2	0.056	0.036	0.042	0.3	-0.087	-0.030	0.015	PASS	
	250(100%)	0.2	0.049	0.01	0.032	0.3	-0.080	-0.020	0.031	PASS	
	300(120%)	0.2	0.046	0.004	0.017	0.3	-0.071	-0.031	0.026	PASS	
Protection	250(100%)	1	-0.046	-0.016	0.002	1.8	-0.061	-0.015	-0.019	PASS	

App.	Test volatge(kV)	± ε Limit in %	Ratio error (ε) in %			± φe Limit in °	Phase error (φe) in °			Result	Remark
			L1	L2	L3		L1	L2	L3		
Metering	0.84(2%)	0.5	0.071	0.05	0.042	2.4	0.014	0.018	0.011	PASS	
	8.4(20%)	0.5	0.035	-0.004	-0.003	1.2	-0.006	0.004	-0.005	PASS	
Protection	0.84(2%)	0.5	0.071	0.05	0.042	2.4	0.014	0.018	0.011	PASS	
	8.4(20%)	0.5	0.035	-0.004	-0.003	1.2	-0.006	0.004	-0.005	PASS	

2. BACK UP

App.	Test current(A)	± ε Limit in %	Ratio error (ε) in %			± φe Limit in °	Phase error (φe) in °			Result	Remark
			L1	L2	L3		L1	L2	L3		
Metering	2.5(1%)	0.75	0.125	-0.431	-0.191	0.9	-0.096	0.233	0.006	PASS	
	12.5(5%)	0.35	0.052	0.048	-0.002	0.45	-0.065	-0.049	-0.011	PASS	
	50(20%)	0.2	0.071	0.04	0.022	0.3	-0.071	-0.012	0.014	PASS	
	250(100%)	0.2	0.045	0.027	0.02	0.3	-0.068	-0.019	0.024	PASS	
	300(120%)	0.2	0.043	0.02	0.014	0.3	-0.059	-0.031	0.021	PASS	
Protection	250(100%)	0.2	0.06	-0.017	0.014	1.8	-0.026	-0.092	0.03	PASS	

App.	Test volatge(kV)	± ε Limit in %	Ratio error (ε) in %			± φe Limit in °	Phase error (φe) in °			Result	Remark
			L1	L2	L3		L1	L2	L3		
Metering	0.84(2%)	0.5	0.063	0.025	0.049	2.4	0.006	-0.009	0.047	PASS	
	8.4(20%)	0.5	0.034	-0.008	0.076	1.2	0.003	0.001	-0.017	PASS	
Protection	0.84(2%)	0.5	0.063	0.025	0.049	2.4	0.006	-0.009	0.047	PASS	
	8.4(20%)	0.5	0.034	-0.008	0.076	1.2	0.003	0.001	-0.017	PASS	

Remark

On Behalf of Cross Wind
WITNESS
REVIEW
Date: 2024. 12. 13
Sign:

OBO RMG

PARK.H.M
2024,DEC,13
REVIEW WITNESS

Appendix B

LPVT

Bay Name : HNA6-AFA70

TEST DATE : 2024.12.11

Result	PASS	Reviewed by	M.S.KIM

1. MAIN

App.	Test volatge(kV)	± ε Limit in %	Ratio error (ε) in %			± φe Limit in °	Phase error (φe) in °			Result	Remark
			L1	L2	L3		L1	L2	L3		
Metering	0.84(2%)	0.5	0.016	0.023	0.022	2.4	-0.009	0.016	0.014	PASS	
	8.4(20%)	0.5	-0.014	-0.024	-0.015	1.2	-0.005	0.002	0.007	PASS	
Protection	0.84(2%)	0.5	0.016	0.023	0.022	2.4	-0.009	0.016	0.014	PASS	
	8.4(20%)	0.5	-0.014	-0.024	-0.015	1.2	-0.005	0.002	0.007	PASS	

2. BACK UP

App.	Test volatge(kV)	± ε Limit in %	Ratio error (ε) in %			± φe Limit in °	Phase error (φe) in °			Result	Remark
			L1	L2	L3		L1	L2	L3		
Metering	0.84(2%)	0.5	0.029	0.025	-0.002	2.4	0.006	-0.002	-0.006	PASS	
	8.4(20%)	0.5	-0.015	-0.026	-0.016	1.2	-0.019	0.001	0	PASS	
Protection	0.84(2%)	0.5	0.029	0.025	-0.002	2.4	0.006	-0.002	-0.006	PASS	
	8.4(20%)	0.5	-0.015	-0.026	-0.016	1.2	-0.019	0.001	0	PASS	

Remark

Witness of Cheolwoong
WITNESS
REVIEW
Date: 2024.12.13
Sign:

OBO RMG

~~PARK~~ H.M
2024.DEC.13
REVIEW WITNESS

ITEM	Tag	CP-100E1	: 66 kV Switchgear (GIS) Local Control Panel		Dwg	123A90-DDL-EL-DL-20104	
	S/Sys	81-10	: GIS 66 kV (HNA6-AFA70)		Module	LD_B-100	
TASK	code	C10000859	Location	Onshore Activities	User	Rosetti Marino Quality Control	
FORM	Process	MC	Activity CCK	Discipline Electrical	Form	CPX15	Distribution Board

1	Check equipment is de-energized and safe.	OK
2	Check anti-condensation heaters are ready to be energized.	OK
3	Check equipment earthing and bonding against latest drawings.	OK
4	Check equipment is undammaged, correctly mounted, tagged and installed in accordance with latest layout drawings.	OK
5	Check all doors, gland plates are correctly mounted.	OK
6	Check panel-front components, indicators, lamps, meters are securely mounted and undamaged.	OK
7	Check all switching devices rating and tagging against latest drawings.	OK
8	Check all switching devices for proper mechanical operation.	OK
9	Check (visual) of cables connections.	OK
10	If required produce Red Line Mark Up for "AS BUILT"	

NAME PLATE DATA

Manufacturer :	HYOSUNG	Serial N° :	10248704_0002	Type:	HSGE-074B
Voltage :	66KV **V**	Frequency :	50 **Hz**	Rating :	NA **kW**
IP Rating	NA	N° of outgoers:	16	Specification:	1723001595-EL-SP-00005
SWBD & CUB ref:	NA			Data Sheet :	723001595-EL-DA-00006

TESTING AND MEASUREMENT INSTRUMENT USED

Type	Serial n°	Calibration certificate	Validity
NOTE	NOTE		
.			
.			
.			

TEST RESULTS

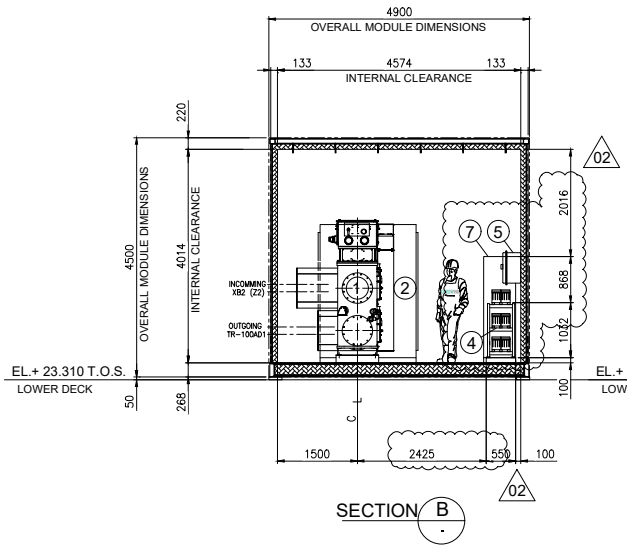
INSULATION RESISTANCE

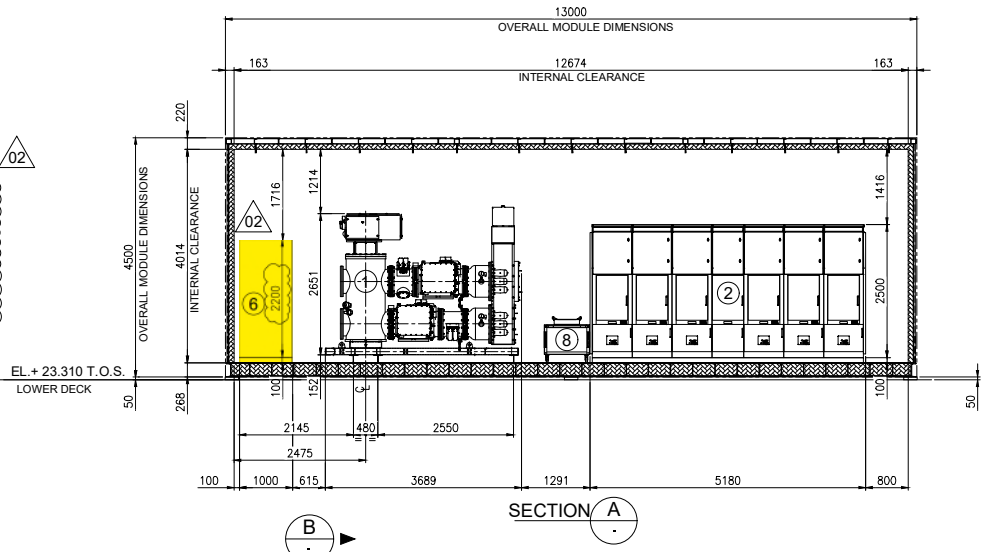
TEST VOLTAGE	NOTE	V	R/ S-T-EARTH	NOTE	Mohm
			S/ R-T-EARTH	NOTE	Mohm
			T/S-R-EARTH	NOTE	Mohm

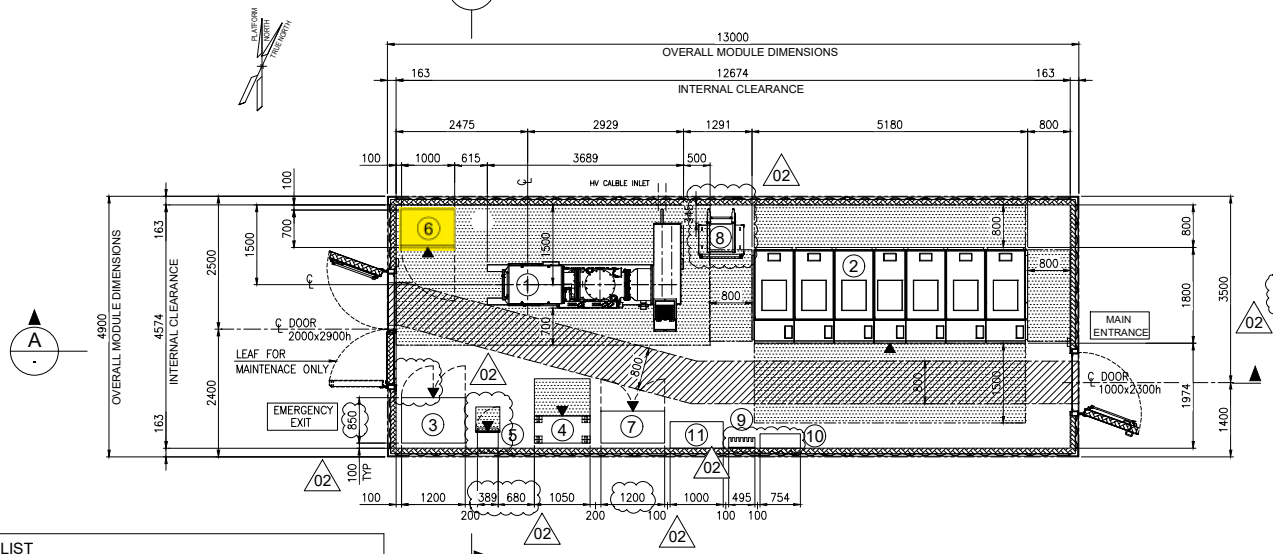
Comments: Note: refer to punch list raised during FAT (GIS-66KV-HNA6-AFA70).

	Performed by	☐ WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	RM (ROSETTI MARINO)	
Name	Michele Tartaglia	Giovanni Tangianu	
Date	2025-01-28	2025-01-28	
Signature	PROVERLIS Digitaly signed by Michele Tartaglia 2025-01-28T07:47:12.131Z	PROVERLIS Digitaly signed by Giovanni Tangianu 2025-01-28T17:30:04.334Z	

DRAWING NO. 123A90-DDL-EL-DL-20104 REV. 02

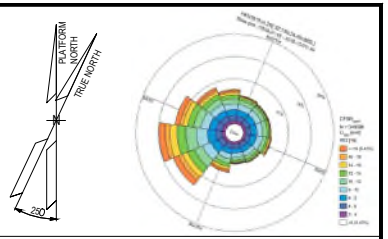






EQUIPMENT LIST

REF.	TAG No.	DESCRIPTION	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	NOTE
1	HNA6-AFA70	66kV SWITCHGEAR (GIS)	3689	2025	2651	
2	SG-100D1	6.6kV SWITCHGEAR	5180	1800	2500	
3	UP-200F1	DC UPS PANEL	1200	850	2105	
4	BA-200F1	DC UPS BATTERY RACK	1050	510	1272	
5	CB-200F1	ISOLATOR FOR DC UPS	452	377	634	
6	CP-100E1	66 kV SWITCHGEAR LOCAL CONTROL PANEL	1000	700	2200	02
7	B100-HSB-001	DISTRIBUTION & HVAC PANEL - HV MV ROOM	1200	600	1900	
8	-	SERVICE TROLLEY FOR 6.6kV SWITCHGEAR	943	862	874	
9	-	TOOL BOX	495	200	200	
10	-	SUBSTATION LIFE SAVING & INTERVENTION KIT	754	270	840	
11	-	TABLE	1000	500	750	



NOTES

1. U.N.O. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DELETED
3. DOCUMENT VALID ONLY FOR ELECTRICAL COMPONENT.
4. FOR OTHER ITEMS, CORRECT LOCATION AND INFROMATION, PLEASE REFER TO VENDORS AND DEDICATED PROJECT DOCUMENTATION.
5. HEIGHT OF ALL PANELS IN THE EQUIPMENT LIST TABLE IS WITHOUT THE BASE FRAME (100mm)

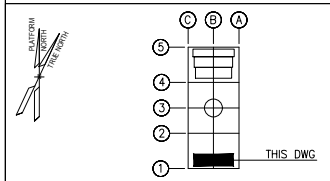
LEGEND

U.N.O. _____ UNLESS NOTED OTHERWISE
T.O.S. _____ TOP OF STEEL
_____ ESCAPE CORRIDOR - WIDTH 800mm.
_____ MAINTENANCE AREA - VENDOR REQUIREMENT
_____ SWITCHGEAR ROOM ENCLOUSURE
_____ FRONT OF EQUIPMENT

REFERENCES

DOCUMENT TITLE	DOCUMENT NUMBER
66kV SWITCHGEAR (GIS) GENERAL ARRANGEMENT DRAWING	1723001595-EL-DA-00006
CIRCUIT AND WIRING DIAGRAM	1723001595-EL-DG-00015
SG-100D1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00006
DC UPS – GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS	1724000372-EL-DA-00003
DC UPS – BATTERY LAYOUT AND INTERCONNECTING DIAGRAM	1724000372-EL-DG-00010
B-100 - GENERAL ARRANGEMENT DRAWINGS - E&I SHELTER	1724000049-AR-DA-00014

KEY PLAN



REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	27/05/2024	FMO	LMA/AMA	LMA/MDO	ACCEPTED FOR CONSTRUCTION (AFC)
01	26/03/2024	GPA	LMA/AMA	LMA/MDO	ISSUE FOR REVIEW (IFR)
00	10/11/2023	DSF	CB/AMA	OYFO/MDO	ISSUE FOR REVIEW (IFR)

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20104**

REV.:	DATE:	SIGNATURE:
2_A	08/08/24	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
HV SWITCHROOM

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:50
DRAWN GPA	CHECKED LMA/AMA	APPROVED LMA/MDO	DATE 27/05/2024
A1	DRAWING NO. 123A90-DDL-EL-DL-20104	SHEET 001	REV. 02

File Name : 123A90-DDL-EL-DL-20104_REV02.dwg

PLATFORM NORTH
TRUE NORTH

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20136**

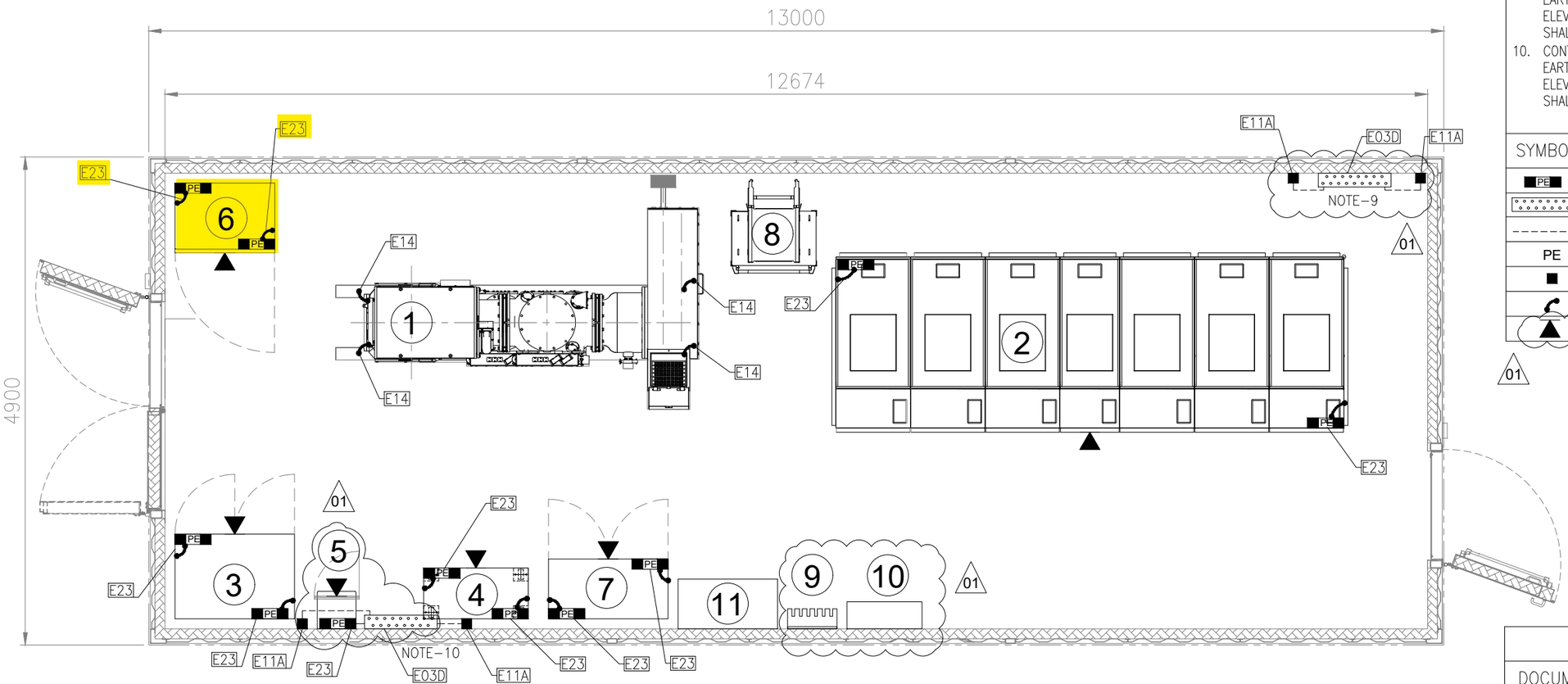
REV.:	DATE:	SIGNATURE:
1_A	08/08/24	G.Randi

ROSETTI MARINO SpA

EQUIPMENT LIST		
REF.	TAG No.	DESCRIPTION
1	HNA6-AFA70	66kV SWITCHGEAR (GIS)
2	SG-100D1	6.6kV SWITCHGEAR
3	UP-200F1	DC UPS PANEL
4	BA-200F1	DC UPS BATTERY RACK
5	CB-200F1	ISOLATOR FOR DC UPS (01)
6	CP-100E1	66 kV SWITCHGEAR LOCAL CONTROL PANEL
7	B100-HSB-001	DISTRIBUTION & HVAC PANEL – HV SWITCH ROOM
8	–	SERVICE TROLLEY FOR 6.6kV SWITCHGEAR
9	–	TOOL BOX
10	–	ELECTRIC SAFETY KIT
11	–	TABLE

NOTES

1. THIS DOUCMENT IS VALID ONLY FOR EARTHING LAYOUT.
2. THE CABLE SIZE SHALL BE CONFIRMED.
3. THE EXACT POSITION OF EARTHING/MARSHALLING BUS BAR SHALL BE DEFINED BY VENDOR.
4. THE EARTHING BUS BAR INSTALLATION SHALL BE PREFERABLY IN VERTICAL MODE.
5. FOR TYPICAL DETAILS PLEASE REFER DOCUMENT "123A90-DDL-EL-DD-20090-ELECTRICAL TYPICAL INSTALLATION DETAILS- EARTHING SYSTEM".
6. DUE TO THE TOP CABLE ENTRIES THE EARTHING BUS BAR INSIDE THE CABINETS SHALL BE INSTALLED AT THE TOP OF THE CABINETS THEMSELVES.
7. FOR LIGHTNING PROTECTION SYSTEM SURGE PROTECTIVE DEVICES (SPD), REFER DOCUMENT 123A90-DDL-EL-RE-20154.
8. ALL NON WELDED OBJECTS SHALL BE EARTHED.
9. CONTAINER WILL HAVE A BTH (EARTHING BAR TINNED COPPER) WITH 2 EARTHING BOSS, INSTALLED IN THE NORTH-EAST CORNER AT AN ELEVATION OF 2.8M FROM THE CONTAINER FLOOR. EARTHING BOSS SHALL BE INSTALLED AT SAME ELEVATION 2.8M.
10. CONTAINER WILL HAVE A BTH (EARTHING BAR TINNED COPPER) WITH 2 EARTHING BOSS, INSTALLED IN THE SOUTH-WEST CORNER AT AN ELEVATION OF 2.5M FROM THE CONTAINER FLOOR. EARTHING BOSS SHALL BE INSTALLED AT SAME ELEVATION 2.5M.



EARTHING LAYOUT
B-100-HV(66kV/6.6kV) SWITCHROOM
PLAN
EL.+ 23.310 T.O.S.

SYMBOL	DESCRIPTION
PE	EARTHING BUS
	EARTHING BAR TINNED COPPER WITH no.18 HOLES
- - - - - - -	35sq.mm Y/G INSULATED COPPER CONDUCTOR FOR PE
PE	PROTECTIVE EARTH
	EARTHING BOSS AISI316L
	JUMPER CONNECTION
	FRONT OF EQUIPMENT

01

REFERENCE	
DOCUMENT NUMBER	DOCUMENT TITLE
123A90-DDL-EL-DD-20090	ELECTRICAL TYPICAL INSTALLATION DETAILS -EARTHING SYSTEM
123A90-DDL-EL-DL-20104	ELECTRICAL EQUIPMENT LAYOUT- HV SWITCHROOM
01 1724000049-AR-DD-00018	B-100 DETAILED DRAWINGS-E&I SHELTERS

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	25/07/24	ASR	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	21/05/24	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND
ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
EARTHING & LIGHTNING LAYOUT-HV SWITCHROOM "B-100"HV SWITCHROOM

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK | SCALE : 1:50

A3	DRAWING NO.	SHEET	REV.
	123A90-DDL-EL-DL-20136	003	01

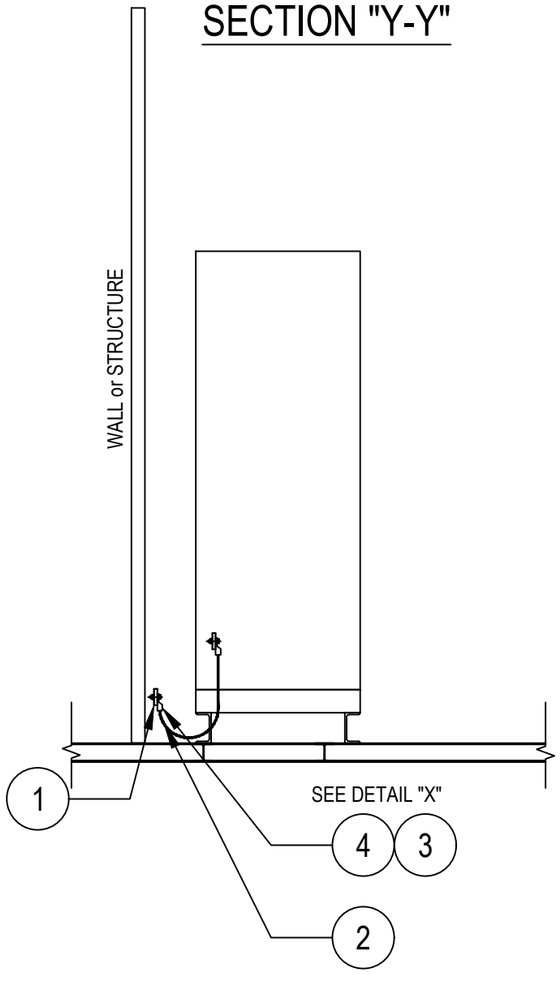
F.to UNI A3: 420mmx297mm

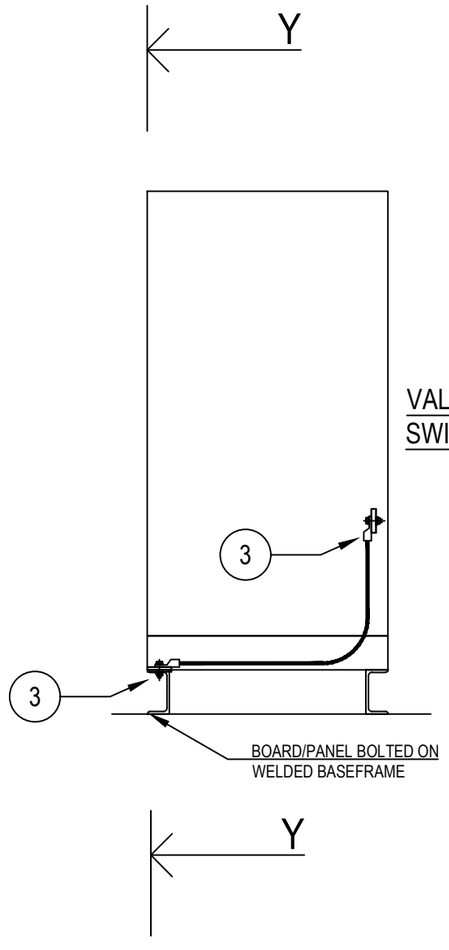
File Name : 123A90-DDL-EL-DL-20136 Rev. 01

E23

POS.	DESCRIPTION	MATERIAL	SIZE	Q.TY	NOTE
1	MARSHALLING EARTHING BAR	TINNED COPPER	50X5		NOTE 1
2	Y/G INSULATING COPPER CONDUCTOR	COPPER	35mm² SEE NOTE 1		NOTE 1
3	COMPRESSION TYPE LUG FOR INSULATION COPPER CONDUCTOR	TINNED COPPER	35mm² SEE NOTE 1	4	NOTE 1
4	BOLT, PLANE WASHER, GROWER SPRING WASHER AND NUT	AISI 316L	M10X30	4	

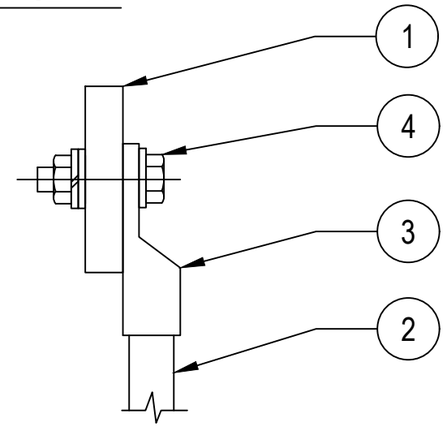
SECTION "Y-Y"





VALID FOR HV/LV SWITCHGEAR

DETAIL "X"



NOTES:

1) FOR SIZE OF THE EARTHING CABLE SEE ALSO EARTHING LAYOUT DRAWINGS OF RESPECTIVE AREAS

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DD-20090**

REV.:	DATE:	SIGNATURE:
2_I	07/11/24	G.Randi

ROSETTI MARINO SpA

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	26/08/24	GRA	AMA	DLO	ACCEPTED FOR CONSTRUCTION (AFC)
01	10/06/24	SPS	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	21/11/23	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL TYPICAL INSTALLATION DETAILS–EARTHING SYSTEM
EARTHING FOR PANELS/BOARDS IN TECHNICAL ROOM

CONTRACT NO./TITLE CW–I–WP4–2023–05/HOLLANDSE KUST NOORD WIND PARK | SCALE : NTS

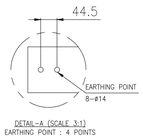
A3	DRAWING NO.	SHEET	REV.
	123A90–DDL–EL–DD–20090	011	02

F.to UNI A3: 420mmx297mm

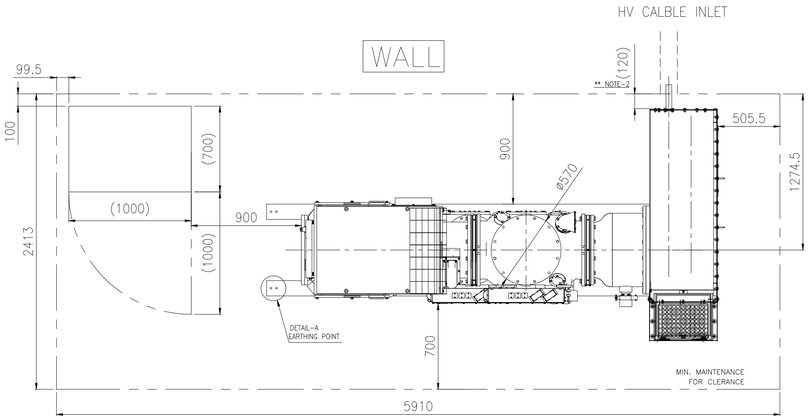
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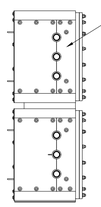
DRAWING NO. 1723001595-EL-DA-00006

REV. 00

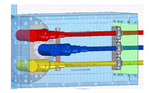


DETAIL-A (SCALE 3:1)
EARTHING POINT : 4 POINTS

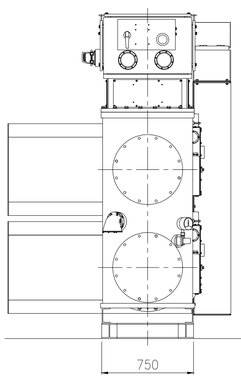


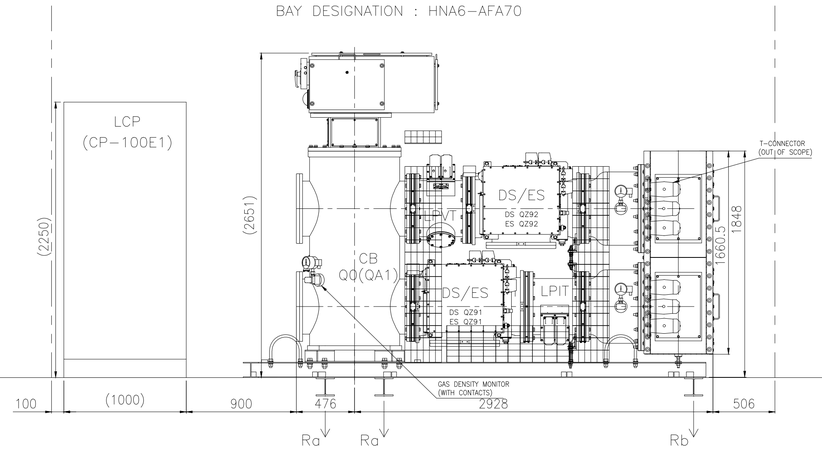


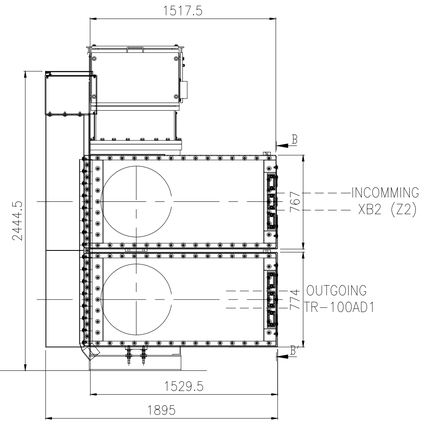
SECTION B-B'

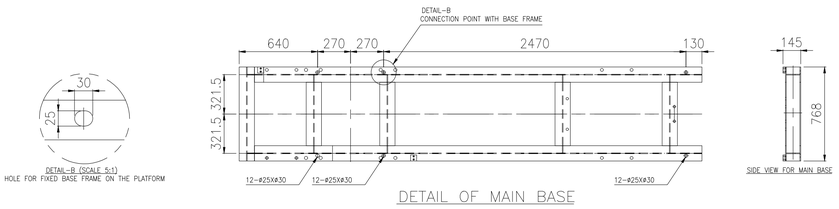


DETAIL OF INTERNAL PART OF CABLE BOX







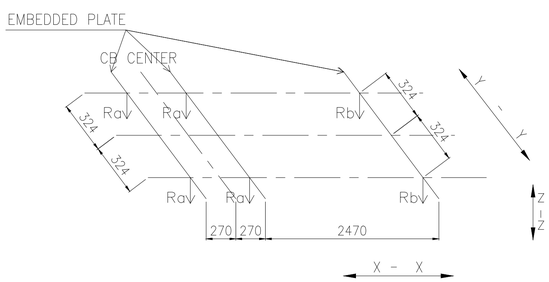


DETAIL-B (SCALE 5:1)
HOLE FOR FIXED BASE FRAME ON THE PLATFORM

SIDE VIEW FOR MAIN BASE

DETAIL OF MAIN BASE

[SKETCH FOR LOADING POINT]

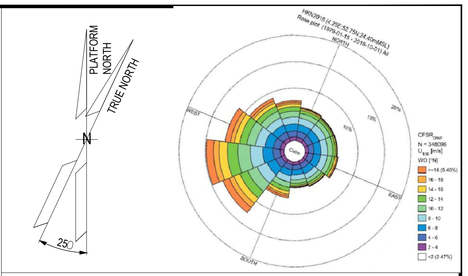


[LOADING DATA]

DIRECTION / LOADING	X(kg)		Y(kg)		Z(kg)	
	Ra	Rb	Ra	Rb	Ra	Rb
STATIC	-	-	-	-	428	447
DYNAMIC	255	134	128	134	573	683
	- 128	- 134	- 128	- 134	- 573	- 683
Max. Compression Load	255	134	128	134	1,001	1,130
Max. Tensile Load	- 128	- 134	- 128	- 134	- 145	- 236

THE WEIGH OF GIS (APPROXIMATELY)

1) GIS : 2600 [kg]
2) LCP : 850 [kg]
3) T-CONNECTOR + SURGE ARRESTER + HV CABLE : 300 [kg]



NOTES

1. DESCRIPTION of ABBREVIATIONS.
   - CB : CIRCUIT BREAKER
   - DS : DISCONNECTING SWITCH
   - ES : EARTHING SWITCH
   - VD : VOLTAGE DETECTOR
   - LPIT : LOW POWER INSTRUMENT TRANSFORMER
   - LPVT : LOW POWER VOLTAGE TRANSFORMER
   - LPCT : LOW POWER CURRENT TRANSFORMER
2. THE MINIMUM DISTANCE IS 120 [MM] BUT IT HAS TO BE CONSIDERED CABLE CONNECTION METHOD INCLUDING T-CONNECTOR AND HV CABLE.

LEGEND

HOLDS

REFERENCE DRAWING

DRAWING TITLE	DRAWING NUMBER
SINGLE LINE DIAGRAM	1723001595-EL-DG-00013
GAS SINGLE LINE DIAGRAM	1723001595-EL-DG-00014

HYOSUNG HEAVY INDUSTRIES

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
4	05/11/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ACCEPTED FOR CONSTRUCTION (AFC)
3	17/04/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ISSUE FOR CLIENT REVIEW (ICR)
2	13/02/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ISSUE FOR CLIENT REVIEW (ICR)
1	08/02/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ISSUE FOR CLIENT REVIEW (ICR)
0	10/11/23	Y.D.LEE	Y.W.LEE	S.J.CHO	ISSUE FOR CLIENT REVIEW (ICR)

CROSSWIND

ROSETTI MARINO

TITLE :
BASE LOAD POWER HUB (BLPH)
66kV SWITCHGEAR (GIS)
GENERAL ARRANGEMENT DRAWING INCLUDING FOUNDATION LOAD CALCULATION

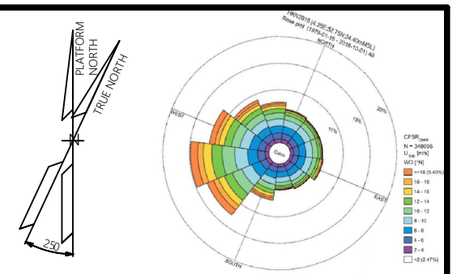
CONTRACT NO./TITLE	CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK		SCALE 1_:_25
DRAWN Y.D.LEE	CHECKED Y.W.LEE	APPROVED S.J.CHO	DATE 10/11/23
A1	DRAWING NO. 1723001595-EL-DA-00006	SHEET 001	REV. 04

File Name : DRAWING_NO.

DRAWING NO. 1723001595-EL-DG-00013

REV. 00

CONTRACTOR	ROSETTI
CUSTOMER	ROSETTI
PROJECT TITLE	BASE LOAD POWER HUB (BLPH)
CONTRACT NO.	CW-I-WP4-2023-05
DRAWING/DOCUMENT NUMBER	1723001595-EL-DG-00015
EQUIPMENT	66kV 40kA GIS LOCAL CONTROL PANEL CP-100E1
DRAWING TITLE	CIRCUIT AND WIRING DIAGRAM
REVISION NO.	03



Reference documents

No.	Reference	Title
1	1723001595-EL-DA-00006	BASE LOAD POWER HUB (BLPH) - 66kV Switchgear(GIS) - General arrangement drawing including foundation load calculation
2	1723001595-EL-DG-00010	Connection diagram
3	1723001595-EL-DG-00012	Functional logic diagram
4	1723001595-EL-DG-00013	BASE LOAD POWER HUB (BLPH) - 66kV Switchgear (GIS) - Single line diagram
5	1723001595-EL-DG-00014	BASE LOAD POWER HUB (BLPH)- 66 kv SWITCHGEAR (GIS) - GAS SINGLE LINE DIAGRAM
6	1723001595-EL-DG-00015	Circuit and wiring diagram
7	1723001595-EL-DG-00016	Inter-panel wiring diagram
8	1723001595-EL-DG-00017	Inter-panel logic diagram
9	1723001595-EL-LIS-00008	Utility load schedule
10	1723001595-EL-LIS-00011	Switchgear IO list
11	1723001595-EL-SO-00019	IED interrogation and programming software
12	1723001595-EL-SO-00020	Relay IED configuration files
13	1723001595-EL-SO-00021	IEC 61850 configuration files

HYOSUNG HEAVY INDUSTRIES

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
03	18/10/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ACCEPTED FOR CONSTRUCTION (AFC)
02	06/08/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ISSUE FOR CLIENT REVIEW (ICR)
01	05/06/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ISSUE FOR CLIENT REVIEW (ICR)
00	01/02/24	Y.D.LEE	Y.W.LEE	S.J.CHO	ISSUE FOR CLIENT REVIEW (ICR)

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
66kV SWITCHGEAR (GIS)
CIRCUIT AND WIRING DIAGRAM

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1_:_NS
DRAWN Y.D.LEE	CHECKED Y.W.LEE	APPROVED S.J.CHO	DATE 10/11/23
A1	DRAWING NO. 1723001595-EL-DG-00015	SHEET 1	REV. 03

File Name : DRAWING_NO.

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2	2	LIST OF CONTENTS	01/02/24	05/06/24	06/08/24	18/10/24	
3	3	LIST OF CONTENTS	01/02/24	05/06/24	06/08/24	18/10/24	
4	4	LIST OF CONTENTS	01/02/24	05/06/24	06/08/24	18/10/24	
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7	7	WIRING SPECIFICATION	01/02/24	05/06/24	06/08/24	18/10/24	
8	8	LCC EXTERNAL VIEW	01/02/24	05/06/24	06/08/24	18/10/24	
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14	14	DC POWER DISTRIBUTION-1	01/02/24	05/06/24	06/08/24	18/10/24	
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16	16	DC POWER DISTRIBUTION-3	01/02/24	05/06/24	06/08/24	18/10/24	
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18	18	CB CLOSE & TRIP-1 CONTROL CIRCUIT	01/02/24	05/06/24	06/08/24	18/10/24	
19	19	CB CLOSE-1 CONTROL CIRCUIT	01/02/24	05/06/24	06/08/24	18/10/24	
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22	22	CB GAS PRESSURE LOW STAGE-1/2 CIRCUIT	01/02/24	05/06/24	06/08/24	18/10/24	
23	23	QZ91/QZ92(DS & ES) MOTOR CIRCUIT	01/02/24	05/06/24	06/08/24	18/10/24	
24	24	DS QZ92_ES QZ92(DS & ES) CONTROL CIRCUIT	01/02/24	05/06/24	06/08/24	18/10/24	
25	25	DS QZ91_ES QZ91(DS & ES) CONTROL CIRCUIT	01/02/24	05/06/24	06/08/24	18/10/24	
26	26	LAMP & INDICATOR CIRCUIT-1	01/02/24	05/06/24	06/08/24	18/10/24	
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29	29	VOLTAGE DUPLICATOR	01/02/24	05/06/24	06/08/24	18/10/24	
30	30	7SJ85(PROTECTION RELAY) METERING CIRCUIT	01/02/24	05/06/24	06/08/24	18/10/24	
31	31	7SJ85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-1	01/02/24	05/06/24	06/08/24	18/10/24	
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35	35	7SJ85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-5	01/02/24	05/06/24	06/08/24	18/10/24	
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40	40	7SJ85(PROTECTION RELAY) OUTPUT SIGNAL CIRCUIT-1	01/02/24	05/06/24	06/08/24	18/10/24	
41	41	7SJ85(PROTECTION RELAY) OUTPUT SIGNAL CIRCUIT-2	01/02/24	05/06/24	06/08/24	18/10/24	
42	42	7UT85(PROTECTION RELAY) METERING CIRCUIT	01/02/24	05/06/24	06/08/24	18/10/24	
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48	48	SPARE SIGNAL CIRCUIT	01/02/24	05/06/24	06/08/24	18/10/24	
49	49	IM2(MERGING UNIT) CIRCUIT-1	01/02/24	05/06/24	06/08/24	18/10/24	
50	50	IM2(MERGING UNIT) CIRCUIT-2	01/02/24	05/06/24	06/08/24	18/10/24	
51	51	IED & FDF CIRCUIT-1	01/02/24	05/06/24	06/08/24	18/10/24	
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53	53	IED & FDF CIRCUIT-3	01/02/24	05/06/24	06/08/24	18/10/24	
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57	57	ARRANGEMENT FOR LCC SWITCH-4	01/02/24	05/06/24	06/08/24	18/10/24	
58	58	ARRANGEMENT FOR LCC SWITCH-5	01/02/24	05/06/24	06/08/24	18/10/24	
59	59	ARRANGEMENT FOR CB Q0(QA1)(CB) OPTD MECH. BOX	01/02/24	05/06/24	06/08/24	18/10/24	
60	60	CB Q0(QA1)(CB) AUXILIARY CONTACTS	01/02/24	05/06/24	06/08/24	18/10/24	
61	61	ARRANGEMENT FOR DS QZ92_ES QZ92(DS & ES) OPTD MECH. BOX	01/02/24	05/06/24	06/08/24	18/10/24	
62	62	DS QZ92_ES QZ92(DS & ES) AUXILIARY SWITCH	01/02/24	05/06/24	06/08/24	18/10/24	
63	63	ARRANGEMENT FOR DS QZ91_ES QZ91(DS & ES) OPTD MECH. BOX	01/02/24	05/06/24	06/08/24	18/10/24	
64	64	DS QZ91_ES QZ91(DS & ES) AUXILIARY SWITCH	01/02/24	05/06/24	06/08/24	18/10/24	
65	65	DEVICE LIST	01/02/24	05/06/24	06/08/24	18/10/24	
66	66	DEVICE LIST	01/02/24	05/06/24	06/08/24	18/10/24	
67	67	DEVICE LIST	01/02/24	05/06/24	06/08/24	18/10/24	
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03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
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HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: LIST OF CONTENTS

DWG. NO.: 1723001595-EL-DG-00015

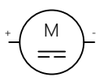
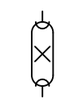
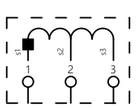
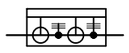
CONTRACT NO: CW-I-WP4-2023-05

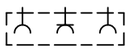
REV. 03

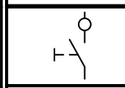
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SYMBOL LIST

SYMBOL	DESG.	DESCRIPTION
	-K	RELAY
	-K	TIMER RELAY
	-K	POLE DISCRIPANCY RELAY
	-B	ELECTRICAL COUNTER
	-Y	SOLENOID AND COIL
	-K	THERMAL PROTECTION RELAY
	-K	MAKE CONTACT
	-K	BREAK CONTACT
	-K	CHANGE-OVER CONTACT
	-K	CONTACTOR, MAIN MAKE CONTACT
	-K	TIME DELAY CHANGE-OVER CONTACT
	-M	DC MOTOR
	-H	FLUORESCENT LAMP
	-T	CURRENT TRANSFORMER
	-LPIT	VOLTAGE & CURRENT TRANSFORMER (3Ø X 2) (LPIT TYPE)

SYMBOL	DESG.	DESCRIPTION
	-S	KEY ROTARY SWITCH MAKE CONTACT (MAINTAINED TYPE)
	-S	KEY ROTARY SWITCH BREAK CONTACT (MAINTAINED TYPE)
	-S	PUSH BUTTON SWITCH MAKE CONTACT (AUTOMATIC RETURN TYPE)
	-S	PUSH BUTTON SWITCH BREAK CONTACT (AUTOMATIC RETURN TYPE)
	-S	3-POSITION KEY ROTARY SWITCH MAKE CONTACT (MAINTAINED TYPE)
	-S	4-POSITION KEY ROTARY SWITCH MAKE CONTACT (MAINTAINED TYPE)
	-S	POSITION SWITCH, NORMAL MAKE CONTACT OF AUXILIARY SWITCH
	-S	POSITION SWITCH, NORMAL BREAK CONTACT OF AUXILIARY SWITCH
	-S	POSITION SWITCH, EARLY MAKE CONTACT OF AUXILIARY SWITCH
	-S	POSITION SWITCH, LATELY BREAK CONTACT OF AUXILIARY SWITCH
	-S	POSITION SWITCH, WIPING CONTACT OF AUXILIARY SWITCH
	-TH, -HD	THERMOSTAT AND HUMIDISTAT SELF-OPERATING, MAKE CONTACT
	-REC	RECEPTACLE
	-U	EARTH
	-VT	VOLTAGE TRANSFOMER
	-LPVT	VOLTAGE TRANSFORMER (3Ø X 2) (LPVT TYPE)

SYMBOL	DESG.	DESCRIPTION
	-PS	PRESSURE SWITCH, MAKE CONTACT AT GIS NORMAL PRESSURE
	-PS	PRESSURE SWITCH, BREAK CONTACT AT GIS NORMAL PRESSURE
	-L	LIMIT SWITCH, MAKE CONTACT
	-L	LIMIT SWITCH, BREAK CONTACT
	-L	LIMIT SWITCH, CHANGE-OVER CONTACT
	-X	SOLID TYPE TERMINAL
	-X	CONNECTING LINK TYPE TERMINAL
	-X	KNIFE TYPE TERMINAL
	-MX	PLUG AND SOCKET, TERMINAL FOR CABLE CONNECTION
	-E	HEATING ELEMENT
	-R	RESISTOR
	-H	LAMP
	-H	LIGHT EMITTING DIODE (LED)
	-F	MCB MINIATURE CIRCUIT BREAKER
	-SA -LA	SURGE ARRESTER, LIGHTING ARRETER

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HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: SYMBOL LIST	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

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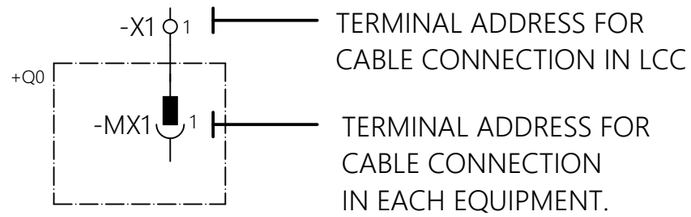
CONT. 6

DRAWING PRINCIPLES

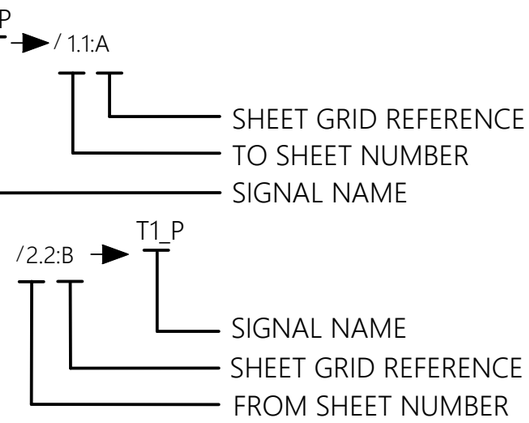
PRESENTATION OF TERMINALS



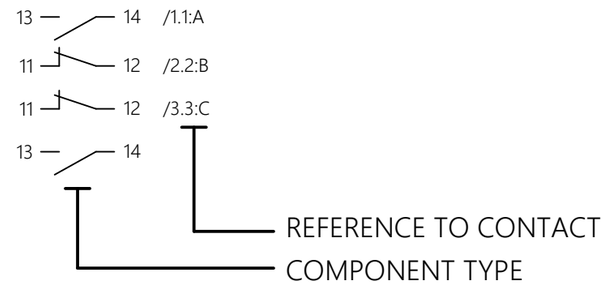
PRESENTATION OF CABLE CONNECTION SCHEDULE



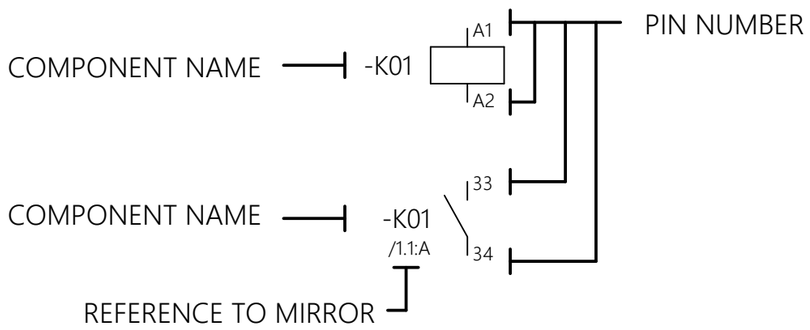
PRESENTATION OF SHEET TO SHEET REFERENCE



PRESENTATION OF THE MIRROR



PRESENTATION OF COMPONENTS



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
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HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: DRAWING PRINCIPLE	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

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CONT. 7

DESCRIPTION OF WIRE SYSTEM

1.1 EMPLOYED WIRE

450/750V HALOGEN FREE INSULATED FLEXIBLE WIRE (IEC 60332-2-2)

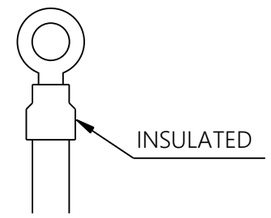
1.2 WIRE COLORING & SIZE

KIND OF CIRCUIT			WIRE COLOR	SIZE[mm²]	AUX CAP		REMARK
					LETTER	COLOR	
AC CIRCUIT	1-PHASE AC CIRCUIT (HEATER)	PHASE	GRAY	2.5	L	WHITE	
		NEUTRAL	GRAY	2.5	N	WHITE	
DC CIRCUIT	DC SUPPLY CIRCUIT	POSITIVE(+ve)	GRAY	1.5	+	WHITE	
		NEGATIVE(-ve)	GRAY	1.5	-	WHITE	
	DC CONTROL CIRCUIT		GRAY	1.5	+ or -	WHITE	
	TRIP CIRCUIT		GRAY	1.5	TRIP	RED	
	ALARM CIRCUIT		GRAY	1.5			
CT CIRCUIT	R/Y/B/N		GRAY	2.5			
VT CIRCUIT	R/Y/B/N		GRAY	2.5			
EARTH (FOR GROUNDING)			GREEN WITH YELLOW STRIPS	2.5			

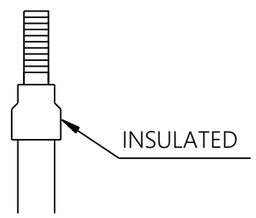
1) PLEASE REFER TO DETAIL FERRULE(AUX CAP) ON '4.3) AUX CAP'.

2. CRIMP TERMINAL

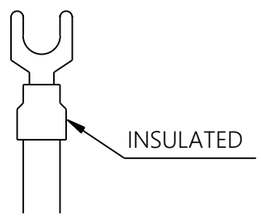
1) RING TYPE



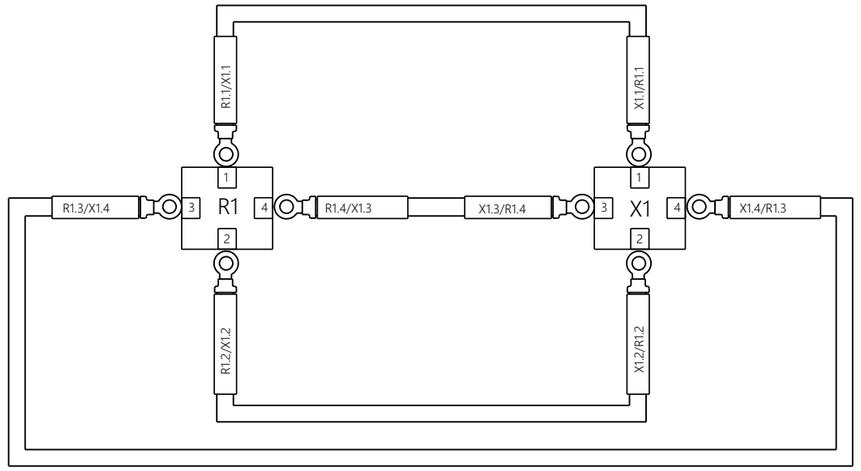
2) BLADE TYPE



3) SPADE TYPE

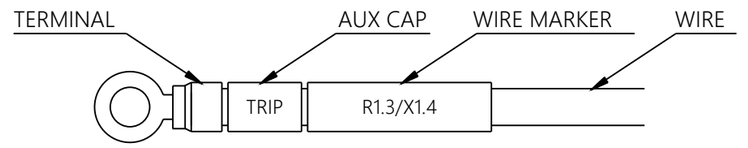


3. INSERTION OF WIRE MARK



4. WIRING MARKER(FERRULES)

1) DETAIL OF WIRING



2) LETTERS OF WIRE MARKER

a. THE LETTERS STARTS FROM LEFT TO RIGHT

b. BLACK LETTER ON WHITE BACK GROUND

3) AUX CAP

a. WHITE LETTER ON RED BACK GROUND (LETTER : TRIP)

b. BLACK LETTER ON WHITE BACK GROUND (DC CIRCUIT, LETTER : +)

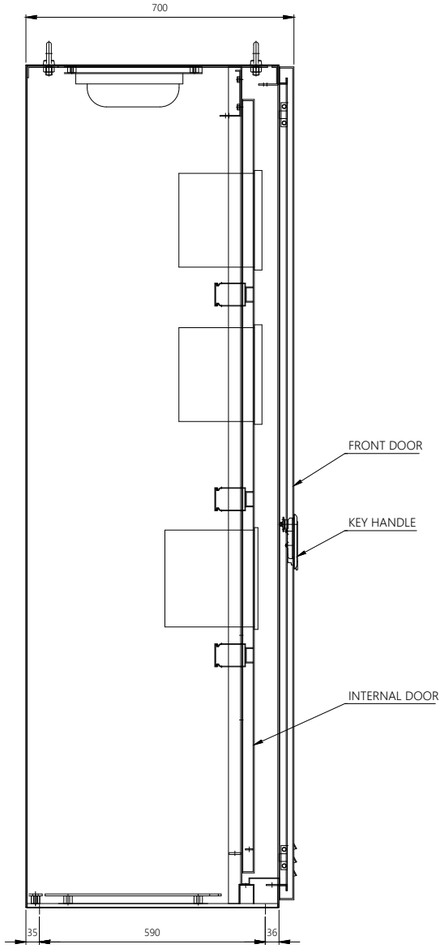
b. BLACK LETTER ON WHITE BACK GROUND (DC CIRCUIT, LETTER : -)

d. BLACK LETTER ON WHITE BACK GROUND (AC CIRCUIT, LETTER : L/L1/L2/L3)

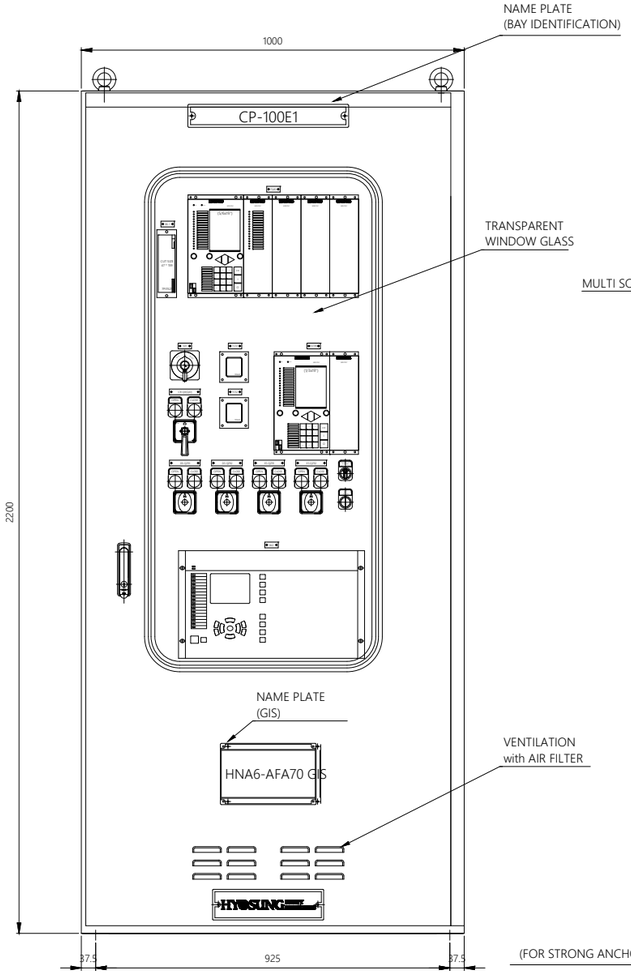
e. BLACK LETTER ON WHITE BACK GROUND (AC CIRCUIT, LETTER : N)

5. CRIMP TERMINAL PVC INSULATION COLOR

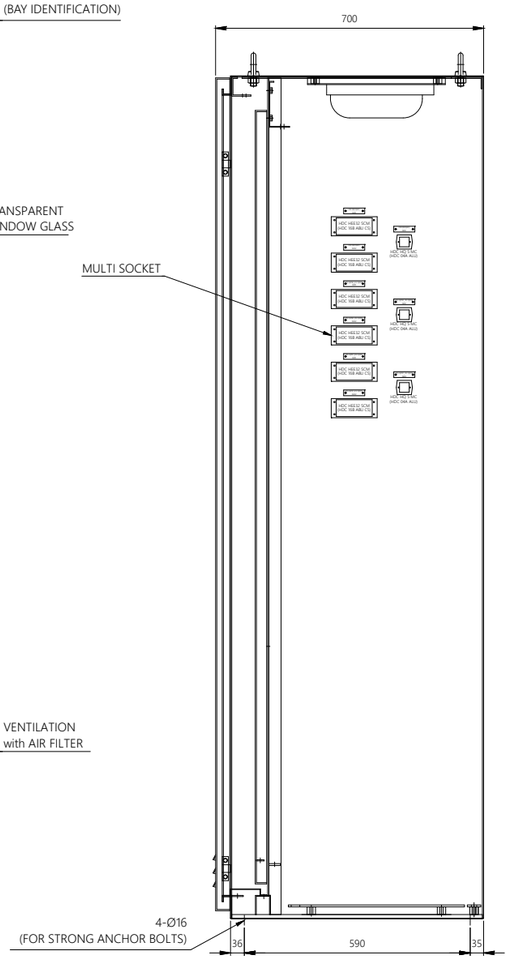
WIRE SIZE	COLORING
1.5mm ^{2}	RED
2.5mm ^{2}	BLUE
4.0mm ^{2}	YELLOW



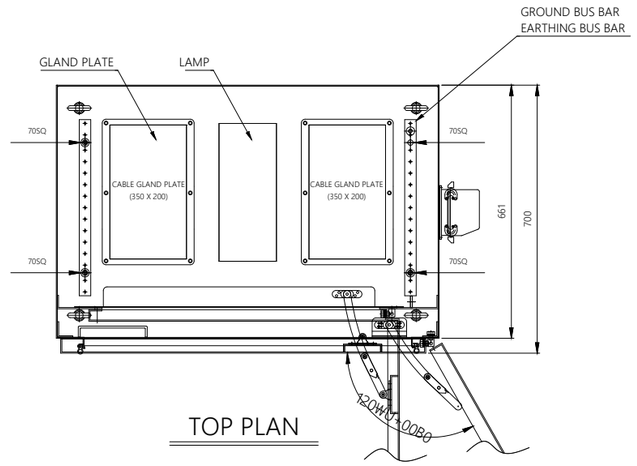
LEFT SIDE VIEW



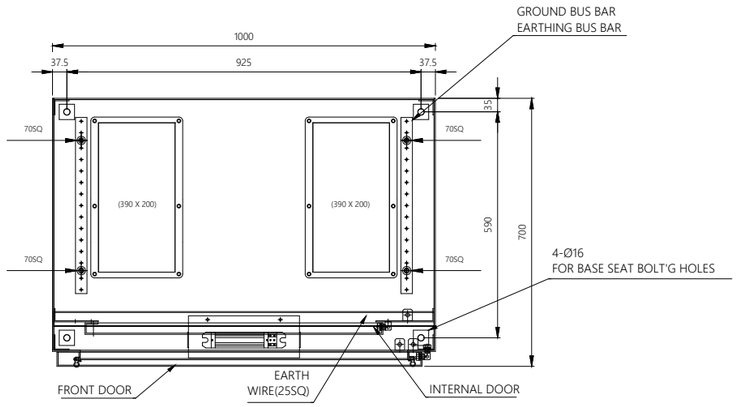
FRONT VIEW



RIGHT SIDE VIEW



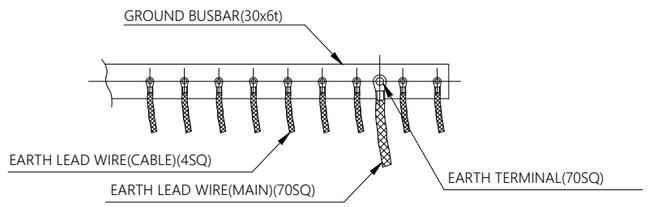
TOP PLAN



BASE PLAN

NOTE

1. COLOR OF PAINT : EXTERNAL: RAL 7032, INTERNAL: RAL 7032
2. INSTALATION : INDOOR
3. IP : 55
4. METAL THICKNESS OF PANEL : SPHC 2.3mm
5. THICKNESS OF PANEL PAINT : EXTERNAL: 120 MICRONS(MINIMUM)
   : INTERNAL: 120 MICRONS(MINIMUM)
6. GROUND BUS BAR : 6T X 30
7. GRAND PLATE : 3T AL PLATE
8. FRONT DOOR OPENING ANGLE : 120°
9. PANEL WEIGHT : 850[kg] (APPROXIMATE)

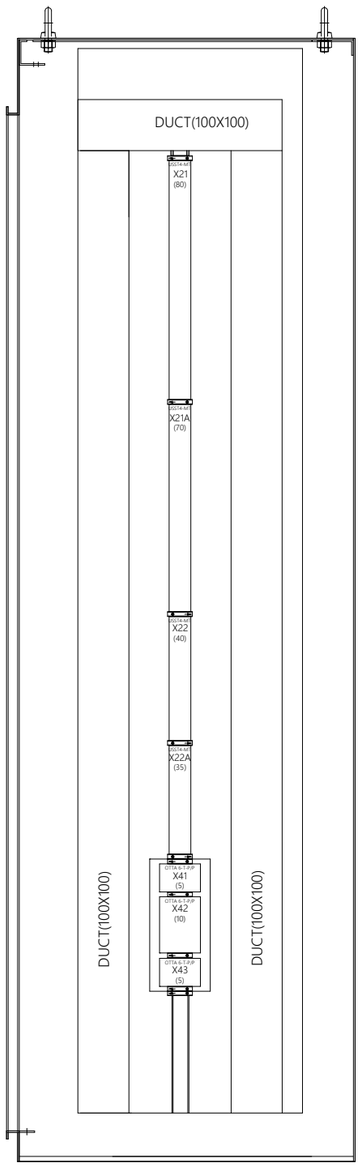


DETAIL "B"

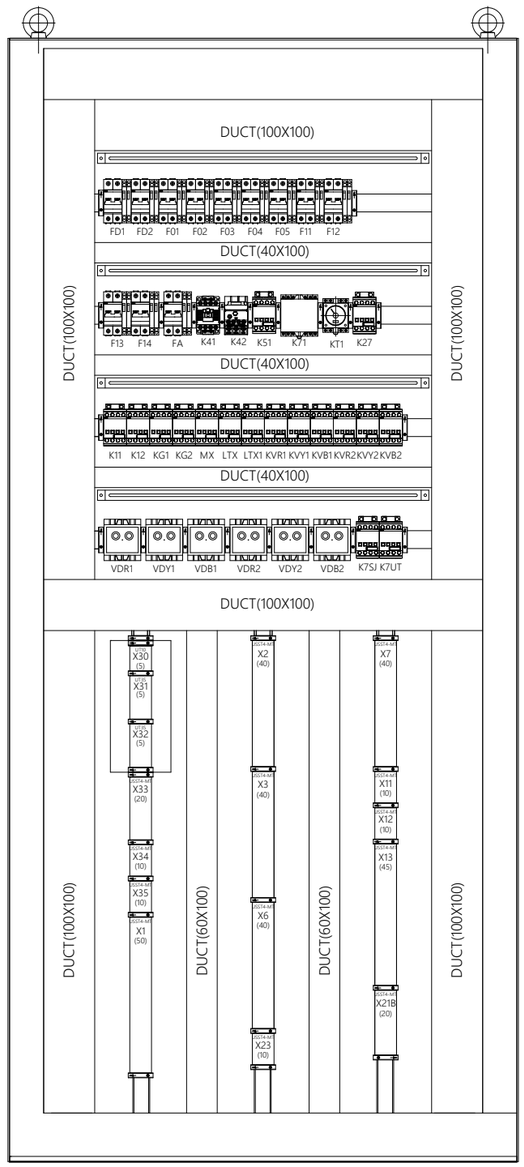
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

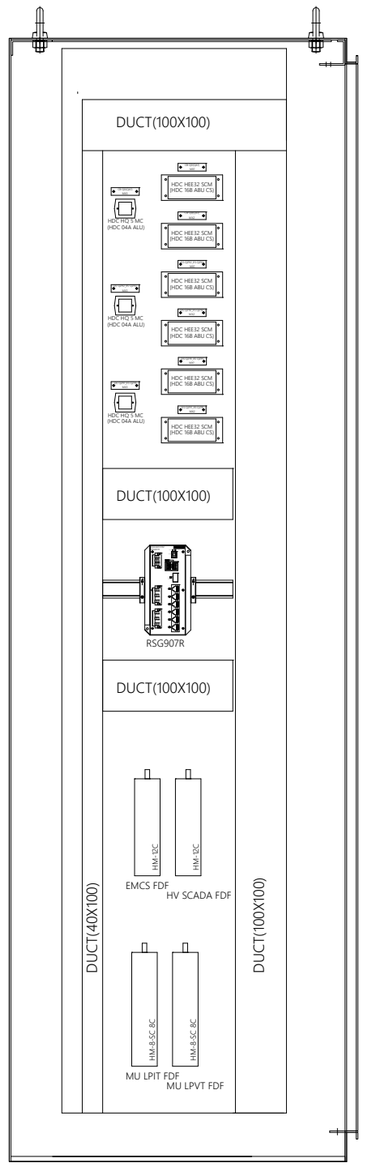
SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: LCC EXTERNAL VIEW	REV. 03	SH. 8 / 72
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05		CONT. 9



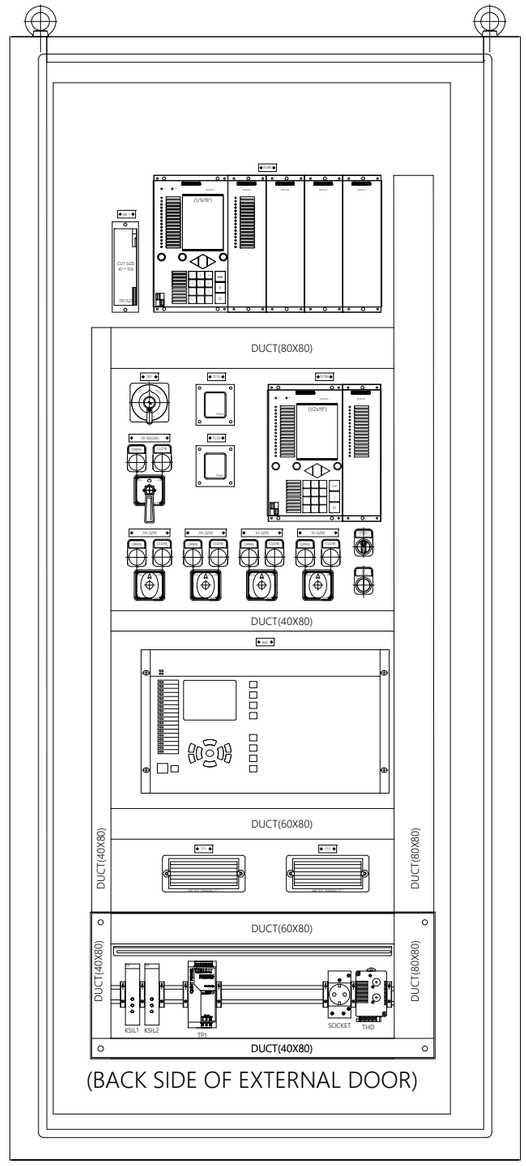
LEFT MOUNTING PLATE



FRONT MOUNTING PLATE



RIGHT MOUNTING PLATE



(BACK SIDE OF EXTERNAL DOOR)

INTERNAL DOOR

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

TITLE: LCC INTERNAL VIEW

REV. 03

SH. 9 / 72

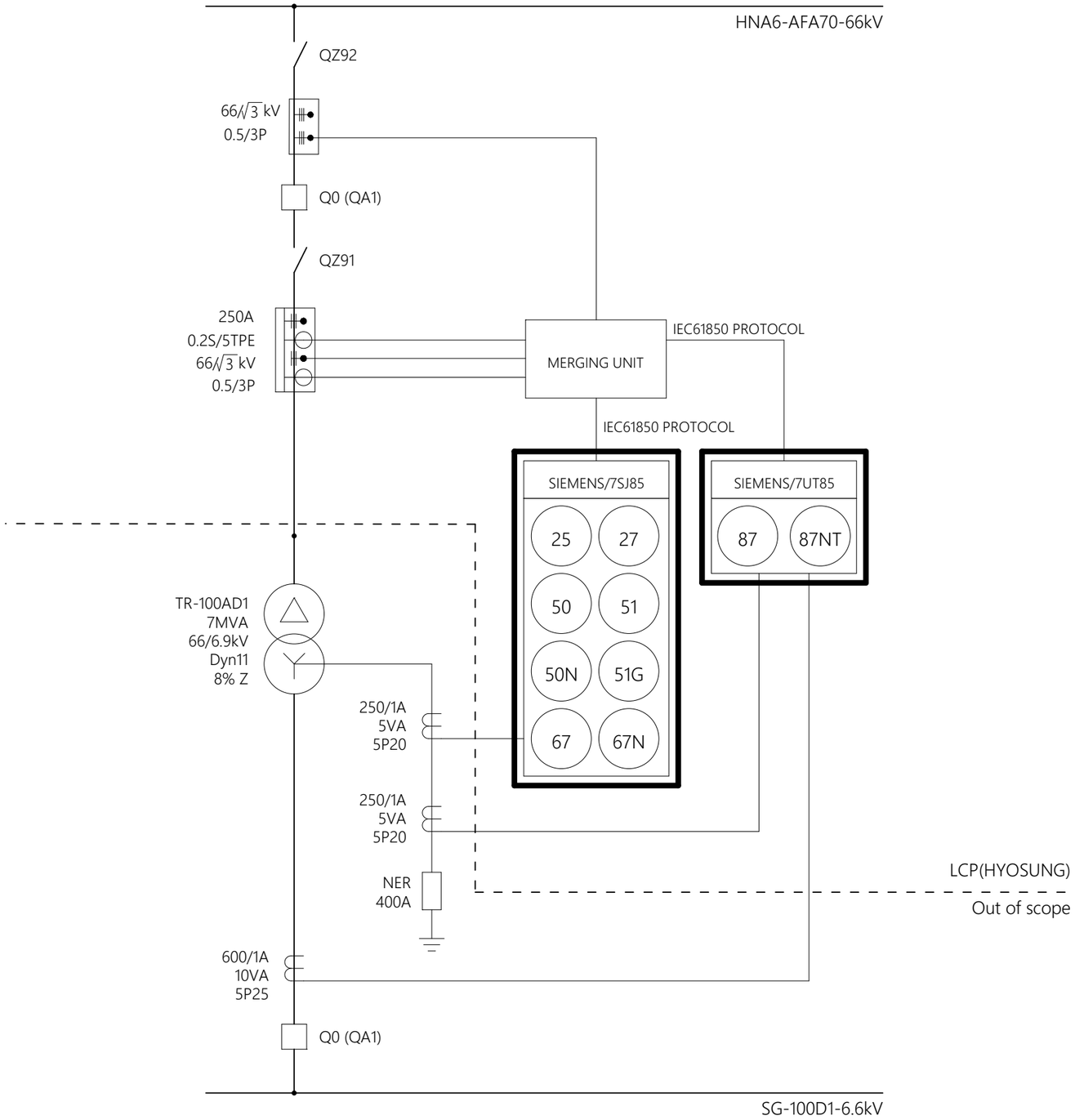
EQUIPMENT: 66kV, 40kA GIS

LOCATION: HOLLANDSE KUST NOORD WIND PARK

DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

CONT. 10



❏ SYMBOL

SYMBOL	DESCRIPTION
	VOLTAGE & CURRENT TRANSFORMER (3Ø X 2) (LPIT TYPE)
	VOLTAGE TRANSFORMER (3Ø X 2) (LPVT TYPE)

❏ LPVT SPECIFICATION

PRIMARY VOLTAGE [kV], Upr	66/ √3	
ACCURACY CLASS	0.5	3P
	METERING	PROTECTION

❏ LPIT SPECIFICATION

LPCT	RATED PRIMARY CURRENT [A], Ipr	In 250, Imax 1250	
	ACCURACY CLASS	0.2S	5TPE
		METERING	PROTECTION
LPVT	PRIMARY VOLTAGE [kV], Upr	66/ √3	
	ACCURACY CLASS	0.5	3P
		METERING	PROTECTION

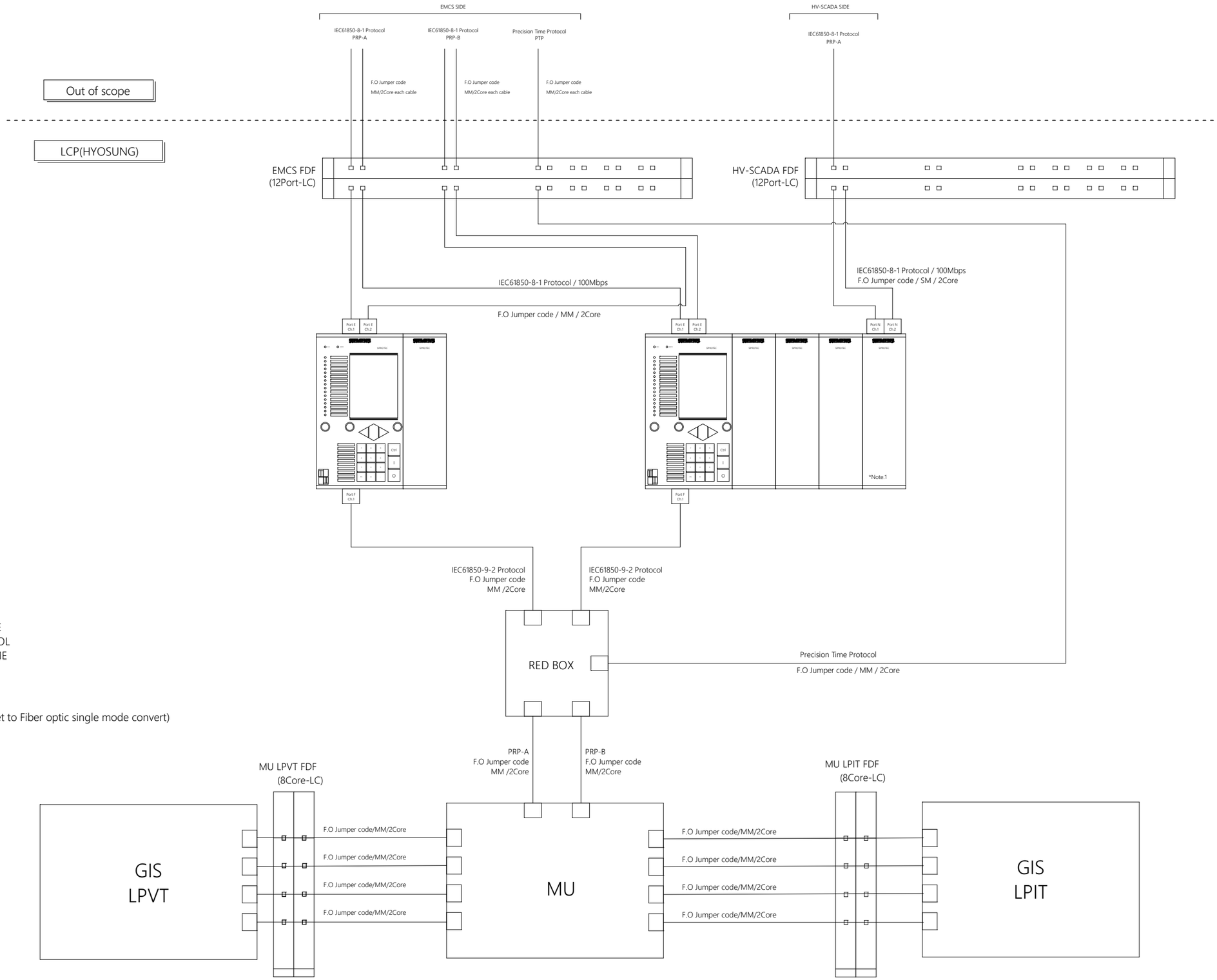
❏ ABBREVIATIONS

- LPVT : LOW POWER VOLTAGE TRANSFORMER
- LPCT : LOW POWER CURRENT TRANSFORMER
- EVT : ELECTRONIC VOLTAGE TRANSFORMER
- ECT : ELECTRONIC CURRENT TRANSFORMER
- VDR/Y/B : VOLTAGE DETECTOR R/Y/B PHASE
- VD1 : VOLTAGE DETECTOR 1

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
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02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: PROTECTION SINGLE LINE DIAGRAM	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 17230015595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	SH. 10 / 72 CONT. 11



❏ ABBREVIATIONS

- LCC : LOCAL CONTROL CUBICLE
- PRP : PRECISION TIME PROTOCOL
- FDF : FIBER DISTRIBUTION FRAME

Note.1
- Communication module(Ethernet to Fiber optic single mode convert)

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: MU SYSTEM CONFIGURATION	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	SH. 11 / 72 CONT. 12

AC MAIN SUPPLY

LCP LIGHTING CIRCUIT

SOCKET OUTLET

LCP HEATING CIRCUIT

+DP-200N1
-Q37

AC POWER DISTRIBUTION 230V AC BOARD

-TB NO (L)

Cable 83118-CEL

-X30 1

-FA (32A) 1 2

-X33 2

L / 13:1A

-X33 3

NO NC

-DLS
CLOSE WHEN DOOR OPEN

COM

-SOCKET a PE b

GND -E

3 4

-THD /12:7C
TH : -10~50℃
HD : 30~90%

1 2

-THD /12:6C
THERMO & HUMIDISTAT

x1 x2

-FL1

1 2

-HEATER1
AC 230V / 100W

-FA /12:2B 4 3

-X33 12

-X33 13

-TB NO (N)

Cable 83118-CEL

-X30 2

N / 13:1E

-FA
S202-C-2P-32A
S2C-H6R_1/14, 1/11, 1/12
S2C-H6R_2/14, 2/11, 2/12

1 2 /12:2B
3 4 /12:2E
1/14 1/12 1/11 /33:6B
2/14 2/12 2/11

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: AC POWER DISTRIBUTION-1	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 12 / 72

CONT. 13

CB Q0(QA1) OPERATING
MECHANISM
HEATING CIRCUIT

DS QZ92_ES QZ92 OPERATING
MECHANISM
HEATING CIRCUIT

DS QZ91_ES QZ91 OPERATING
MECHANISM
HEATING CIRCUIT

12:7A / L

-X33 4 -X33 5 -X33 6 -X33 7

-CB Q0(QA1)
-MX3 3 -MX3 1

+CB Q0(QA1)
-MX3 3 -MX3 1

-THD
TH:-10~50℃
HD:30~80%
3 4

-HEATER1
AC 240V
100W
a b

-THD
THERMO &
HUMIDISTAT
~ 1 2

-MX3 2

-CB Q0(QA1)
-MX3 2

-X33 14

-DS QZ92_ES QZ92
-MX3 1

+DS QZ92_ES QZ92
-MX3 1

-THD
TH : 5℃
HD : 80%
3 4

-HEATER
58W
a b

-THD
THERMO &
HUMIDISTAT
~ 1 2

-MX3 2

-DS QZ92_ES QZ92
-MX3 2

-X33 15

-DS QZ91_ES QZ91
-MX3 1

+DS QZ91_ES QZ91
-MX3 1

-THD
TH : 5℃
HD : 80%
3 4

-HEATER
58W
a b

-THD
THERMO &
HUMIDISTAT
~ 1 2

-MX3 2

-DS QZ91_ES QZ91
-MX3 2

-X33 16

-K27
AC
SUPPLY
SUPERVISION
A1 A2

12:7E / N

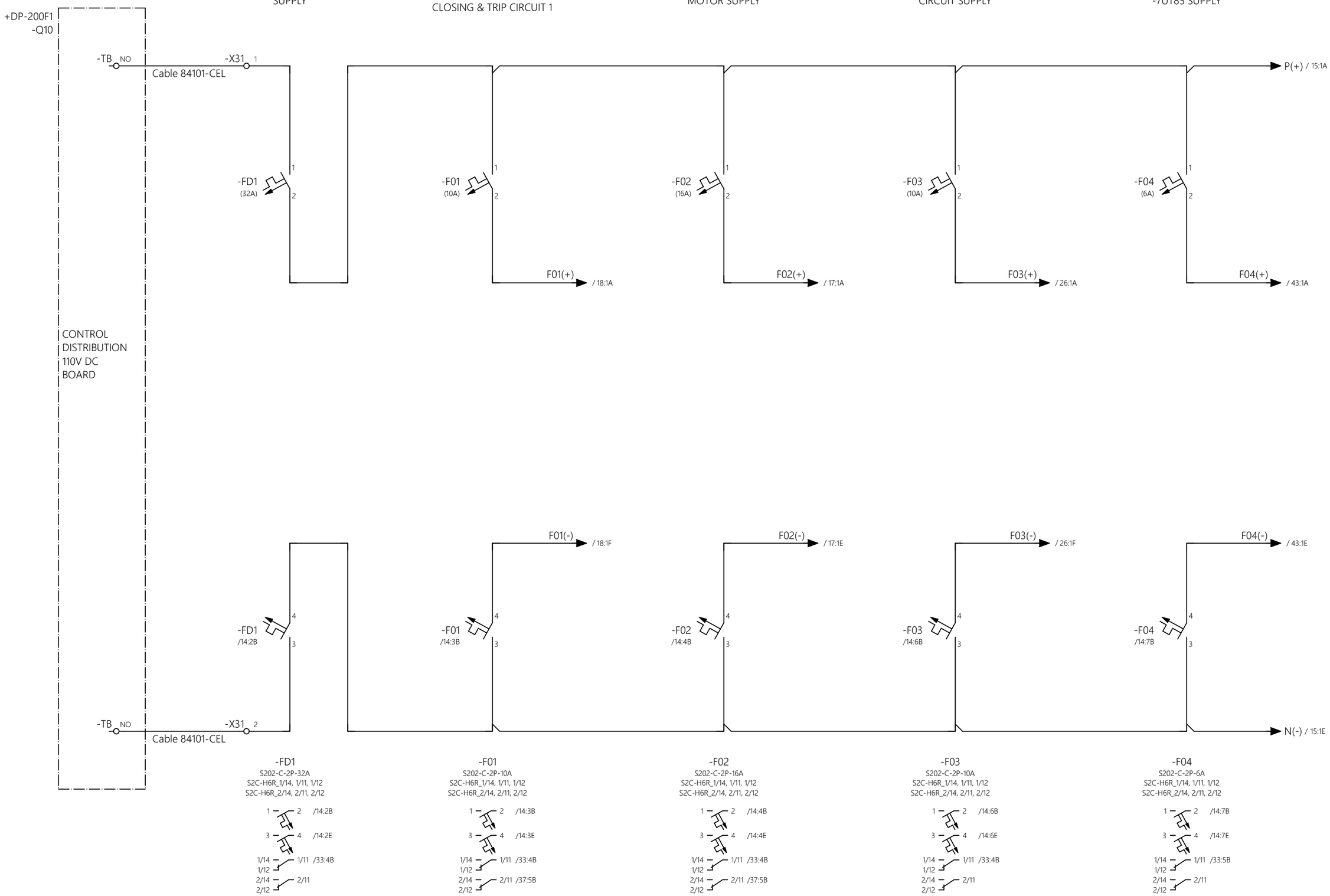
NF22E-13

13 — 14
21 — 22 /33:7B
31 — 32
43 — 44

03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: AC POWER DISTRIBUTION-2	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05
		SH. 13 / 72	CONT. 14



HYOSUNG HEAVY INDUSTRIES

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

SUBSTATION: BLPH

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

TITLE: DC POWER DISTRIBUTION-1

EQUIPMENT: 66kV, 40kA GIS

LOCATION: HOLLANDSE KUST NOORD WIND PARK

DWG. NO.: 1723001595-EL-DG-00015

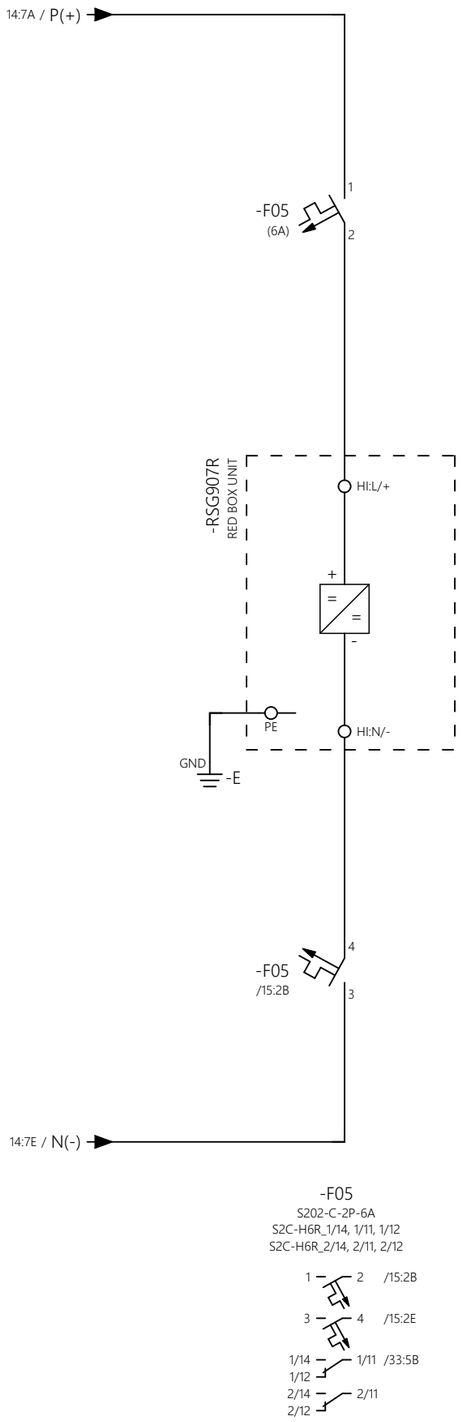
CONTRACT NO: CW-I-WP4-2023-05

REV. 03

SH. 14 / 72

CONT. 15

RED BOX UNIT:
RSG907R SUPPLY



-F05
S202-C-2P-6A
S2C-H6R_1/14, 1/11, 1/12
S2C-H6R_2/14, 2/11, 2/12

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
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02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

TITLE: DC POWER DISTRIBUTION-2

REV. 03

SH. 15 / 72

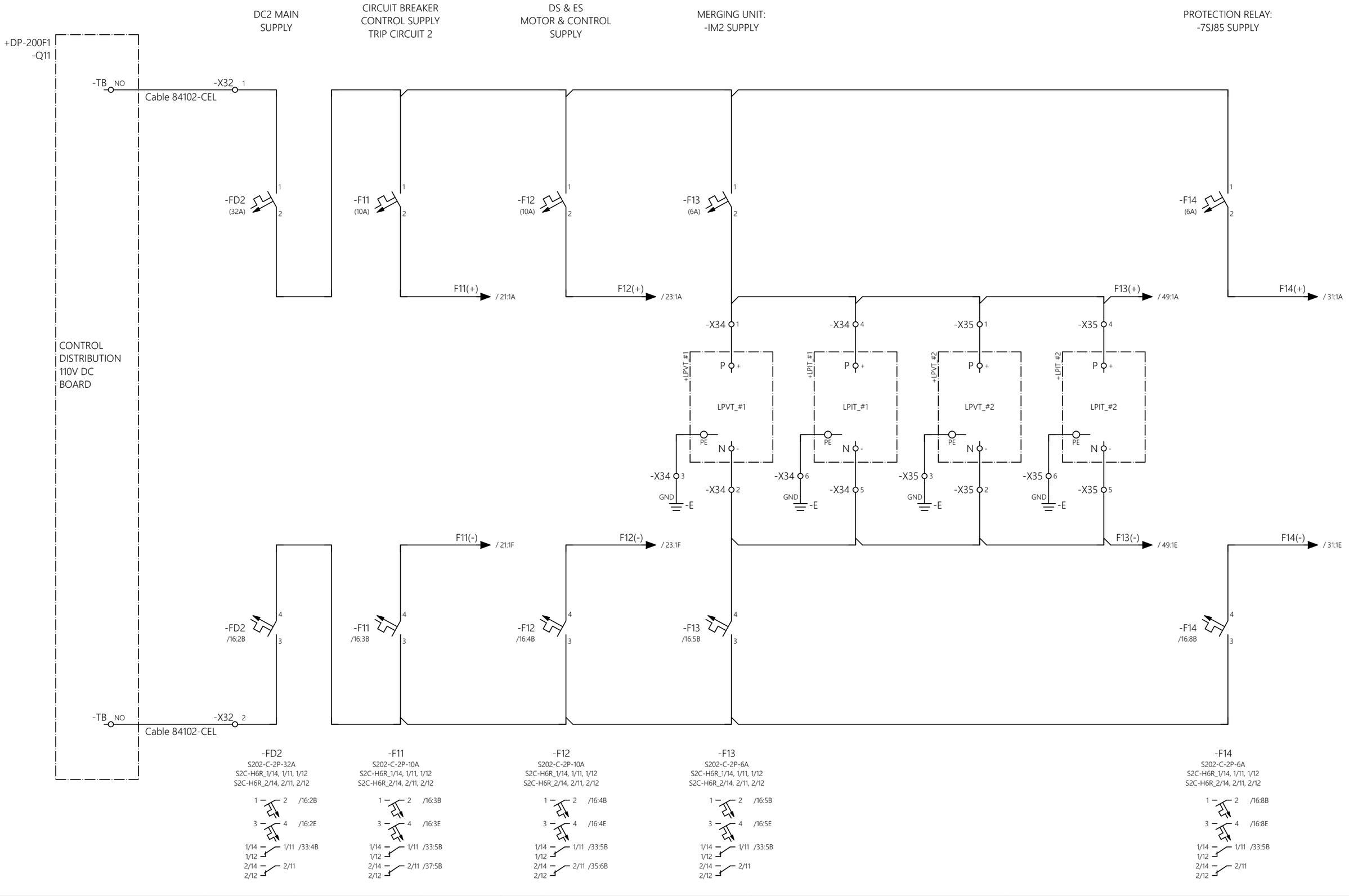
EQUIPMENT: 66kV, 40kA GIS

LOCATION: HOLLANDSE KUST NOORD WIND PARK

DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

CONT. 16



HYOSUNG HEAVY INDUSTRIES

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: DC POWER DISTRIBUTION-3	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 16 / 72

CONT. 17

CB MOTOR
OPERATING CIRCUIT

CB SPRING EXCESSIVE
RUN TIME

14:5C / F02(+)

-K51
/17:5E
CB SPRING
CHARGE EXCESSIVE
RUN TIME ALARM

-K42
/17:3B
CB MOTOR
CONTROL

-K41
/17:2E
CB MOTOR
CONTACTOR

-K42
CB MOTOR
CONTROL
(5~8A)

-X1

-CB Q0(QA1)

+CB Q0(QA1)

-MX1

-L5

-L1

-L4

-M

COM
NO
NC
R
BK

-K42
/17:3B
(5~8A)
CB MOTOR
CONTROL

-K41
/17:2E
CB MOTOR
CONTACTOR

-KT1
CB MOTOR
RUNTIME
CHECK
'A' Mode, 18 sec

-KT1
/17:4E
CB MOTOR
RUNTIME
CHECK

-K51
CB SPRING
CHARGE EXCESSIVE
RUN TIME ALARM

-K41
CB MOTOR
CONTACTOR

A1
A2

14:5D / F02(-)

MC-22b(DC110V)

1 2 /17:3A
3 4
5 6 /17:3E
31 32
43 44

MT-32/2H6.5

1 2 /17:3B
3 4
6 5 /17:3E
95 96 /17:2B
97 98 /35:3B

AT8N

3 1 /17:5E
4
6 8
5

NF22E-13

13 14 /35:4B
21 22 /17:2A
31 32 /35:5B
43 44

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

TITLE: CB MOTOR OPERATING CIRCUIT

REV. 03

SH. 17 / 72

EQUIPMENT: 66kV, 40kA GIS

LOCATION: HOLLANDSE KUST NOORD WIND PARK

DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

CONT. 18

CB Q0(QA1) CLOSE

CB Q0(QA1) TRIP

LOR RESET COMMAND

LOR SET COMMAND 7SJ85 RELAY

LOR SET COMMAND 7UT85 RELAY

LOR SET COMMAND TR-100AD1 PROTECTION TRIP

14:4C / F01(+)

F01(+) / 19:1A

-S01 LOCAL /54:3B

-CS1

-X13 15

Cable 82010-CEC

+6.6kV SWG.

-TB NO

CB OPEN

-TB NO

Cable 82010-CEC

-X13 16

-X13 17

-X13 18

+DS QZ92_ES QZ92

-DS QZ92_ES QZ92

-X2 29

-MX2 15

-MX2 15

67

-S1

68

-MX2 16

-MX2 16

-X2 30

-X6 29

+DS QZ91_ES QZ91

-DS QZ91_ES QZ91

-MX2 15

-MX2 15

67

-S1

68

-MX2 16

-MX2 16

-X6 30

-X2 17

-MX2 7

-MX2 7

27

-S1

28

-MX2 8

-MX2 8

-X2 18

-X6 17

-MX2 7

-MX2 7

27

-S1

28

-MX2 8

-MX2 8

-X6 18

-K11 CB Q0(QA1) CLOSE

A1

A2

-K12 CB Q0(QA1) TRIP

A1

A2

-CS1

-86-1 HIGH SPEED TRIP RELAY

25 +Ve

27 +Ve

-Ve 26

-Ve 28

-7SJ85 PROTECTION IED

-X21A 27

IO207:3.C6

RESET COMMAND

IO207:3.C5

-X21A 28

-7SJ85 PROTECTION IED

-X21A 29

IO207:3.C8

TRIP COMMAND

IO207:3.C7

-X21A 30

-7UT85 PROTECTION IED

-X22A 1

IO203:1.D1

TRIP COMMAND

IO203:1.D2

-X22A 2

-TT1

5

6

-TT2

5

6

-X13 19

Cable 82012-CEC

+6.6kV SWG.

-TB NO

-TB NO

Cable 82012-CEC

-X13 20

-K7SJ /28:2E 7SJ85 FAILURE

21

22

-K7UT /28:4E 7UT85 FAILURE

21

22

+R

-X13 21

-TB NO

-TB NO

-X13 22

14:4D / F01(-)

F01(-) / 19:1F

NF22E-13

13 14 /19:3B

21 22

31 32

43 44

NF22E-13

13 14 /20:6B

21 22

31 32

43 44 /21:5B

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: CB CLOSE & TRIP-1 CONTROL CIRCUIT

DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

REV. 03

SH. 18 / 72

CONT. 19

CB Q0(QA1) CLOSE COMMAND

CB Q0(QA1) CLOSE COMMAND

CB Q0(QA1) CLOSE COIL

CB Q0(QA1) ANTI PUMPING CIRCUIT

18:8A / F01(+)

F01(+) / 20:1A

-X21A 19

-7SJ85 PROTECTION IED

IO207:3.B12

CLOSE COMMAND

IO207:3.B11

-X21A 20

-K11 /18:3E CB Q0(QA1) CLOSE

13 14

-K71 /19:5E ANTI-PUMPING OF CB

3 4

2

8 7

9

-X1 5

-X1 11

-CB Q0(QA1)

-MX1 5

-MX1 9

+CB Q0(QA1)

-MX1 5

-MX1 9

51

-S1

52

1 COM

-L6

NO 3 NC 2

1 COM

-L2

NO 3 NC 2

W

-52C CLOSE COIL

BK

21

-S1

22

-MX1 6

-MX1 10

-CB Q0(QA1)

-MX1 6

-MX1 10

-X1 6

-X1 12

-KG2 /22:7E CB Q0(QA1) GAS PRESSURE LOW STAGE-2

61

62

-K71 ANTI-PUMPING OF CB

12 5

11

1

10

18:8F / F01(-)

F01(-) / 20:1F

MM4XP(DC110V)

3 4 — 2 /19:4B

8 7 — 9 /19:4B

12 5 — 11 /19:5C

14 6 — 15

03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

TITLE: CB CLOSE-1 CONTROL CIRCUIT

REV. 03

SH. 19 / 72

EQUIPMENT: 66kV, 40kA GIS

LOCATION: HOLLANDSE KUST NOORD WIND PARK

DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

CONT. 20

REMOTE TRIP-1 COMMAND

REMOTE TRIP-1 COMMAND

CB Q0(QA1) TRIP COIL-1 50/50N, 51/51G, 67, 67N

CB Q0(QA1) TRIP COIL-1 87

CB Q0(QA1) TRIP COIL-1 86

CB TRIP-1 COMMAND

CB TRIP-1 COMMAND

PROTECTION TRIP SIGNAL

19:7A / F01(+)

F01(+) / 22:1A

-X21B 1

-X21B 3

-X21A 31

-X22A 3

-86-1 HIGH SPEED TRIP RELAY

9

11

MAKE CONTACT

+R

-TB NO

-TB NO

-X21B 2

-X21B 4

-X21A 32

-X22A 4

-7SJ85 PROTECTION IED

IO207:3.C12

TRIP COMMAND

IO207:3.C11

-7UT85 PROTECTION IED

IO203:1.D3

TRIP COMMAND

IO203:1.D4

-TT1

1

2

3

4

-KSIL1 /20:2E TRIP SAFETY SYSTEM

41

42

-K12 /18:3E CB Q0(QA1) TRIP

13

14

-RS1 DISABLED

3

4

-TCS1 Circuit Supervision Relay

X11 5

1

-K1

-K2

-K3

12

4

8

2

X11 6

X11 7

X11 8

X11 9

SIS SAFETY SYSTEM DC 24V INPUT

+SIS

/ (-)

/ (+)

SIS SAFETY SYSTEM

-TB NO

-TB NO

-X13 13

-X13 14

-KSIL1 DC 24V TRIP SAFETY SYSTEM

R1

X4

R2

-X1 13

-X1 19

+CB Q0(QA1)

-MX1 13

-MX1 17

25

53

-S1

-S1

26

54

W

-52T1 TRIP COIL-1

BK

-MX1 14

-CB Q0(QA1)

-MX1 14

-X1 14

-KG2 /22:7E CB Q0(QA1) GAS PRESSURE LOW STAGE-2

21

22

19:7F / F01(-)

F01(-) / 22:1F

BSR10

13 — 14 /22:4B

23 — 24

33 — 34

41 — 42 /20:5B

03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

TITLE: CB TRIP-1 CONTROL CIRCUIT

REV. 03

SH. 20 / 72

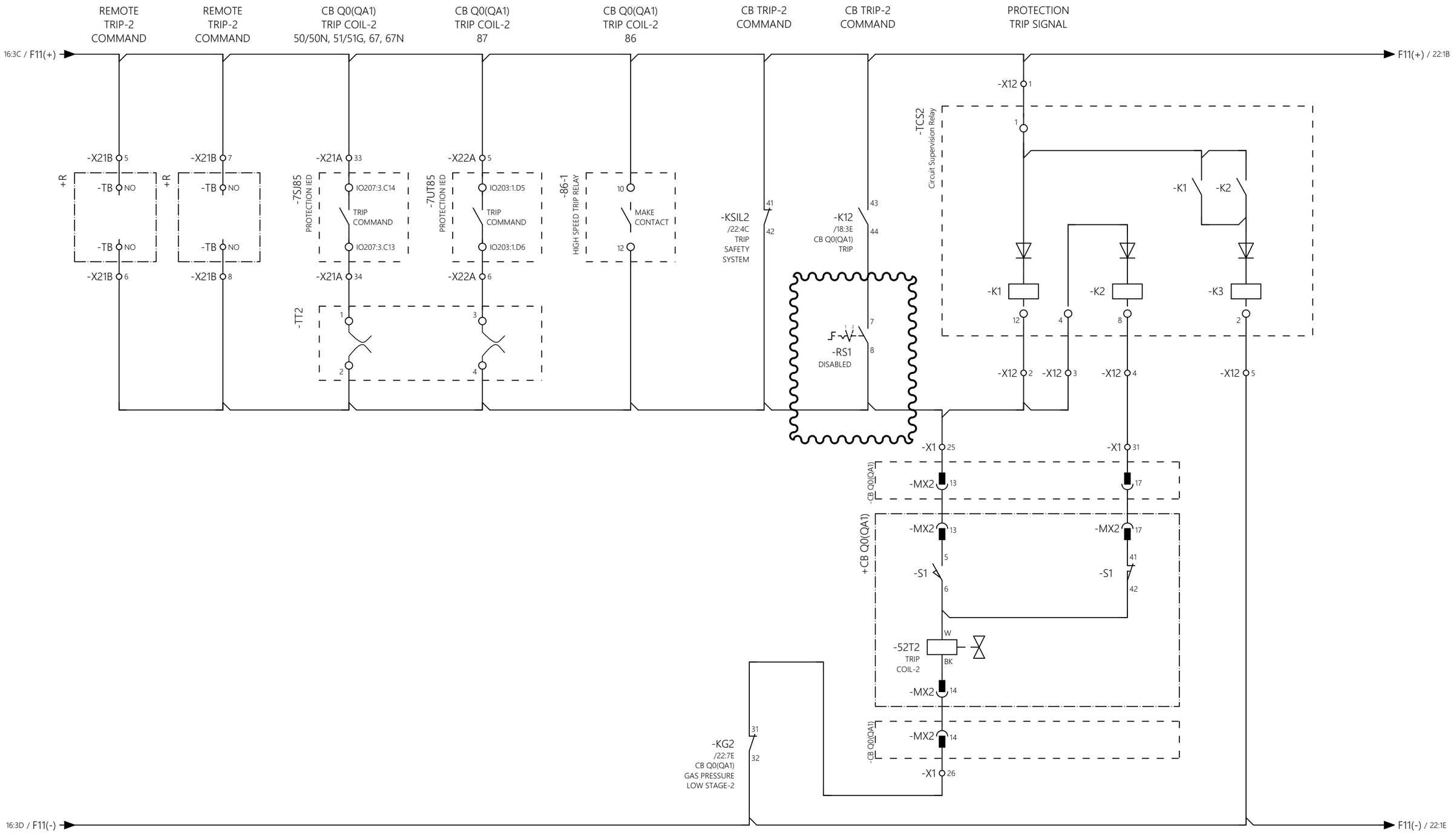
EQUIPMENT: 66kV, 40kA GIS

LOCATION: HOLLANDSE KUST NOORD WIND PARK

DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

CONT. 21



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: CB TRIP-2 CONTROL CIRCUIT-1	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 21 / 72

CONT. 22

SAFETY SYSTEM POWER

SIS SAFETY SYSTEM DC 24V INPUT

CB Q0(QA1) GIS PRESSURE LOW STAGE-1

CB Q0(QA1) GIS PRESSURE LOW STAGE-2

20:8A / F01(+)

21:8A / F11(+)

-TP1

L(+)

+V

N(-)

GND

-V

GND

-U

-SRPW1 / 37:3A

-SRPW2 / 37:3B

-KSIL1
/20:2E
TRIP
SAFETY
SYSTEM

-KSIL2
DC 24V
TRIP
SAFETY
SYSTEM

R1

X4

R2

+GD_1

X11 1

-TB 1

-PS1

P

≤4.7 bar.G
1ST ALARM

-TB 2

X11 3

X11 2

-TB 3

-PS2

≤4.5 bar.G
2ST ALARM

-TB 4

X11 4

21:8F / F11(-)

-KG1
CB Q0(QA1)
GAS PRESSURE
LOW STAGE-1

-KG2
CB Q0(QA1)
GAS PRESSURE
LOW STAGE-2

A1

A2

20:8F / F01(-)

BSR10

13 — 14
23 — 24
33 — 34
41 — 42 /21:5B

NF22E-13

13 — 14 /35:2B
21 — 22
31 — 32
43 — 44

NF22E-13
CA4-22N

13 — 14 /35:2B
21 — 22 /20:5E
31 — 32 /21:5E
43 — 44
53 — 54
61 — 62 /19:3E
71 — 72
83 — 84

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

TITLE: CB GAS PRESSURE LOW STAGE-1/2 CIRCUIT

REV. 03

SH. 22 / 72

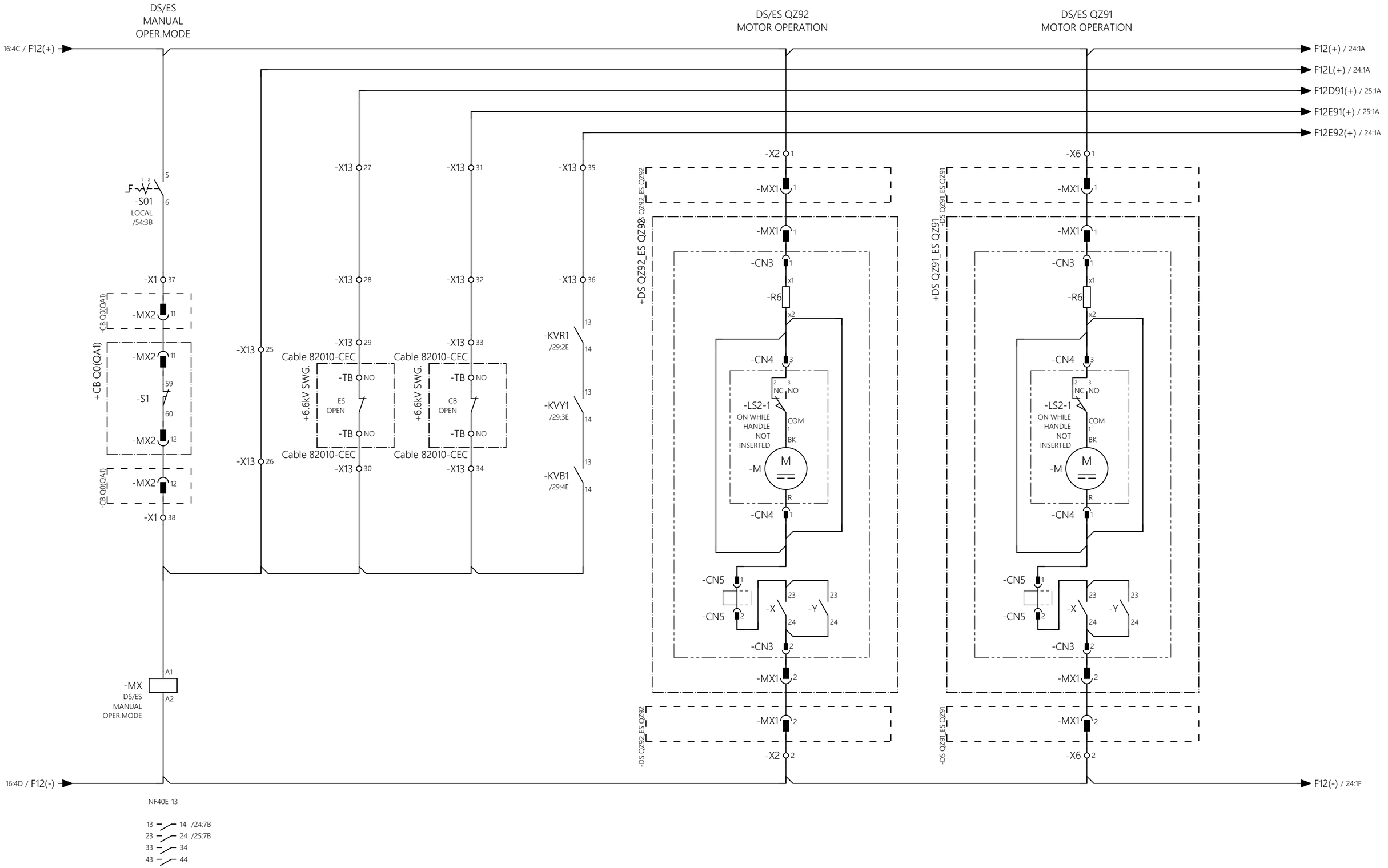
EQUIPMENT: 66kV, 40kA GIS

LOCATION: HOLLANDSE KUST NOORD WIND PARK

DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

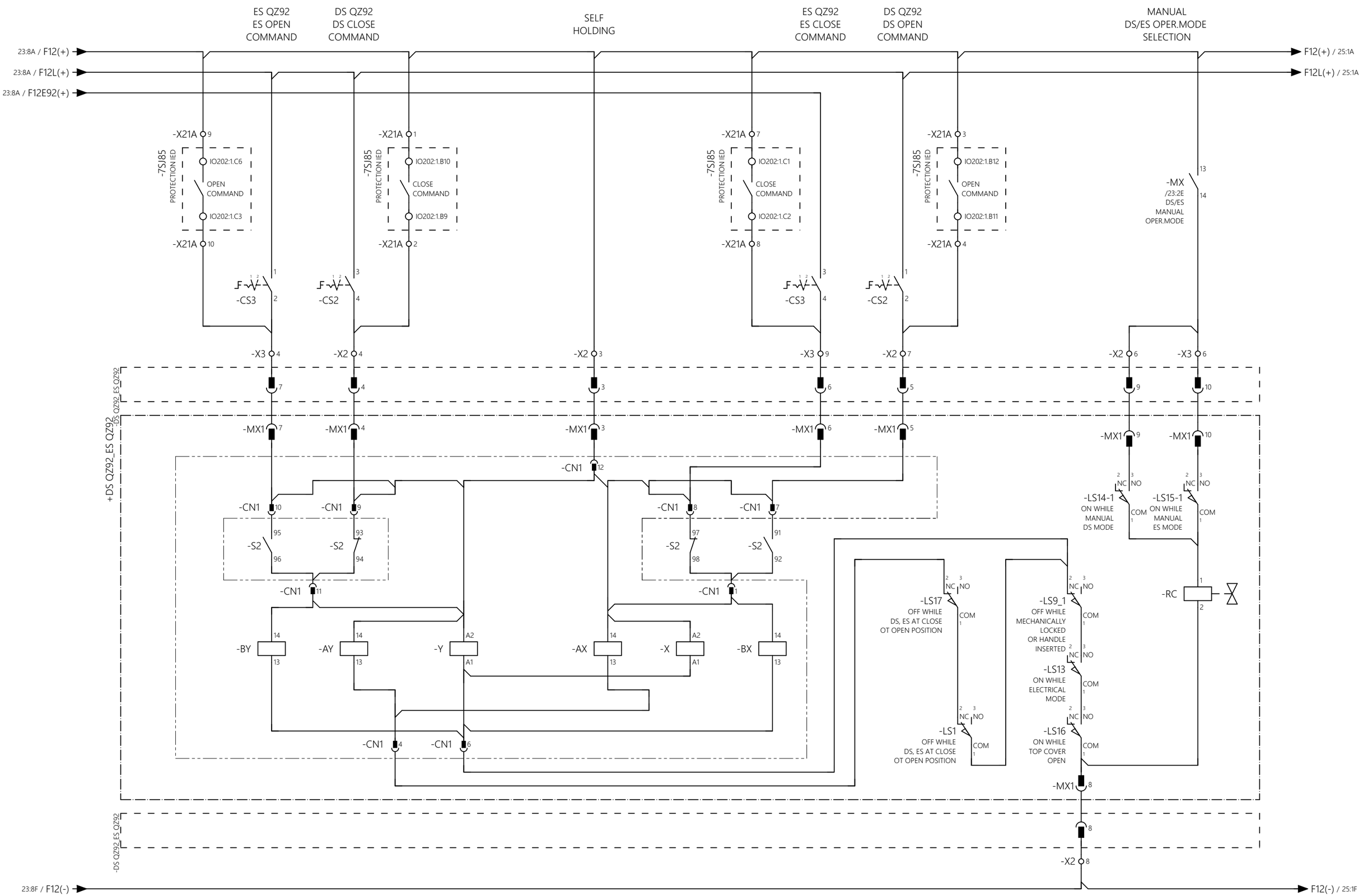
CONT. 23



03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: QZ91/QZ92(DS & ES) MOTOR CIRCUIT	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05
		SH. 23 / 72	CONT. 24



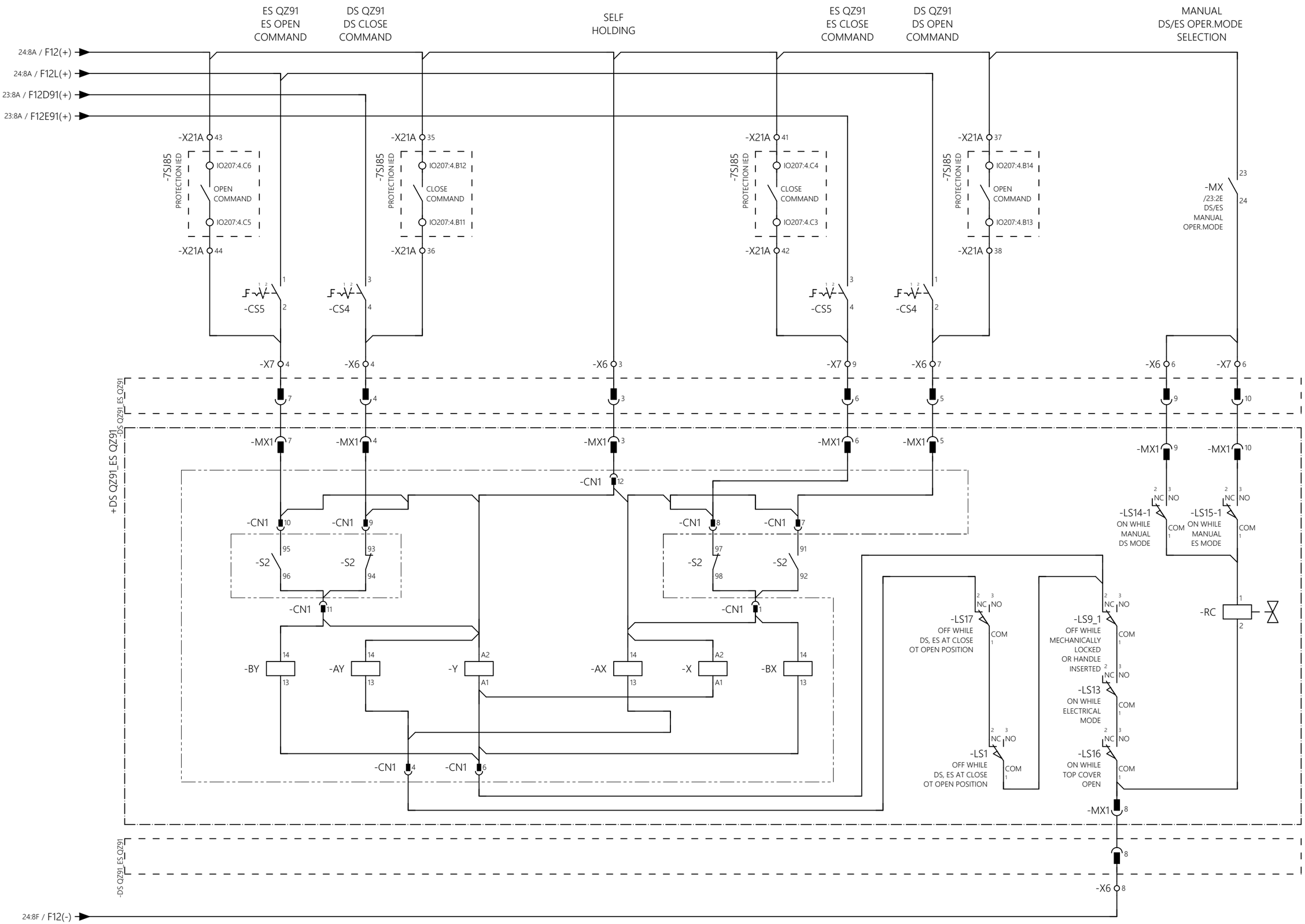
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: DS QZ92_ES QZ92(DS & ES) CONTROL CIRCUIT	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 24 / 72

CONT. 25



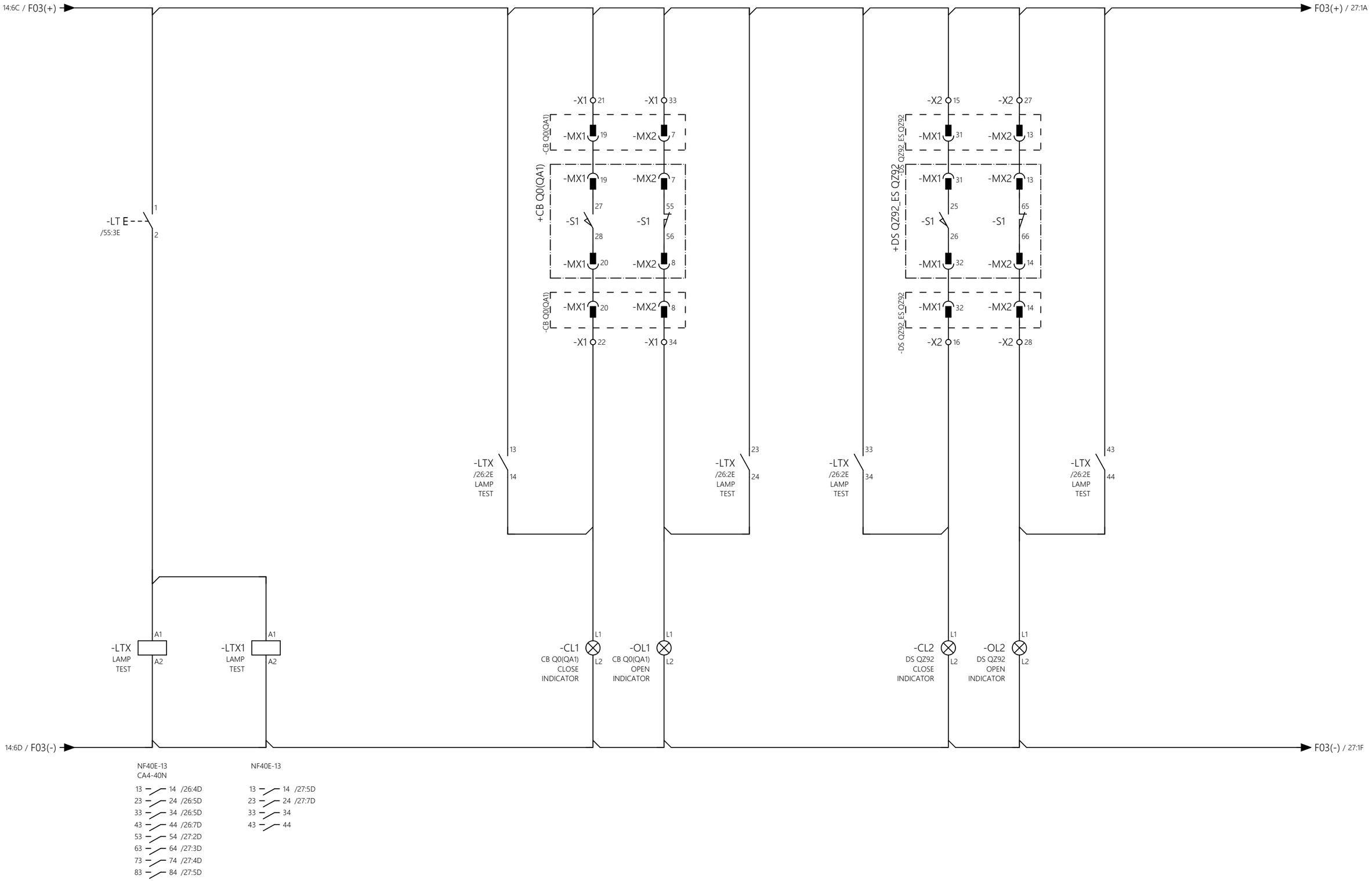
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: DS QZ91_ES QZ91(DS & ES) CONTROL CIRCUIT	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 25 / 72

CONT. 26



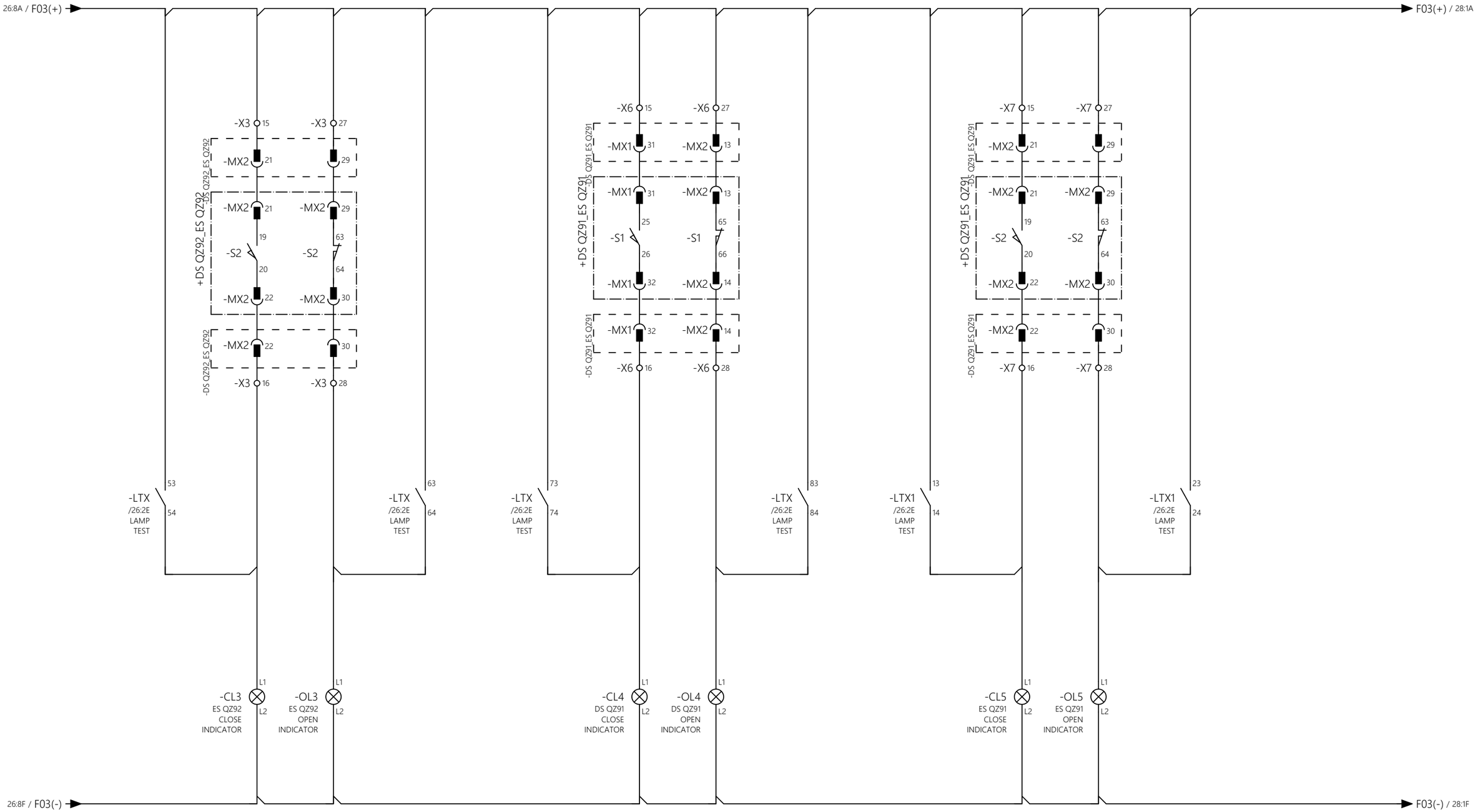
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: LAMP & INDICATOR CIRCUIT-1	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 26 / 72

CONT. 27



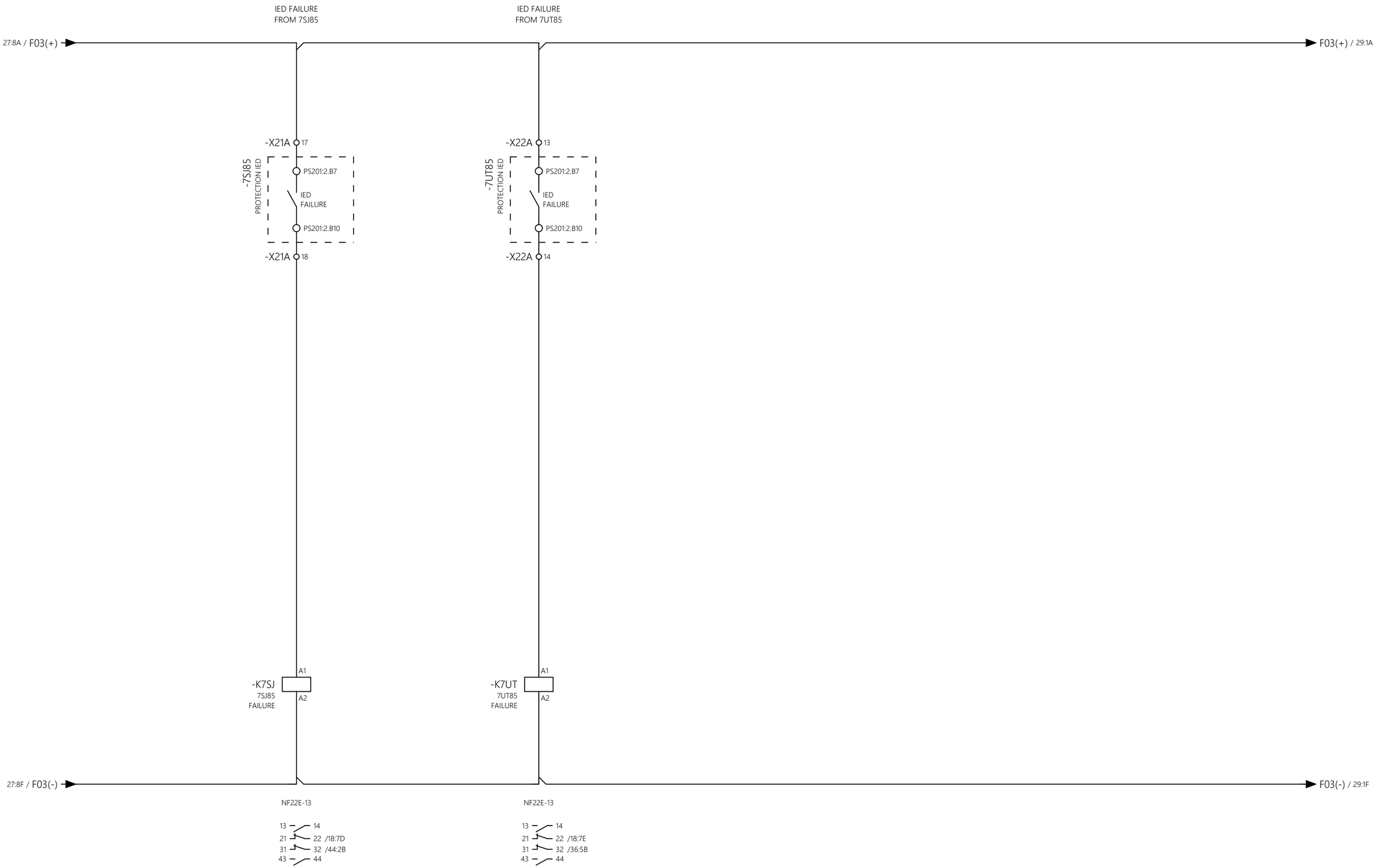
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: LAMP & INDICATOR CIRCUIT-2	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 27 / 72

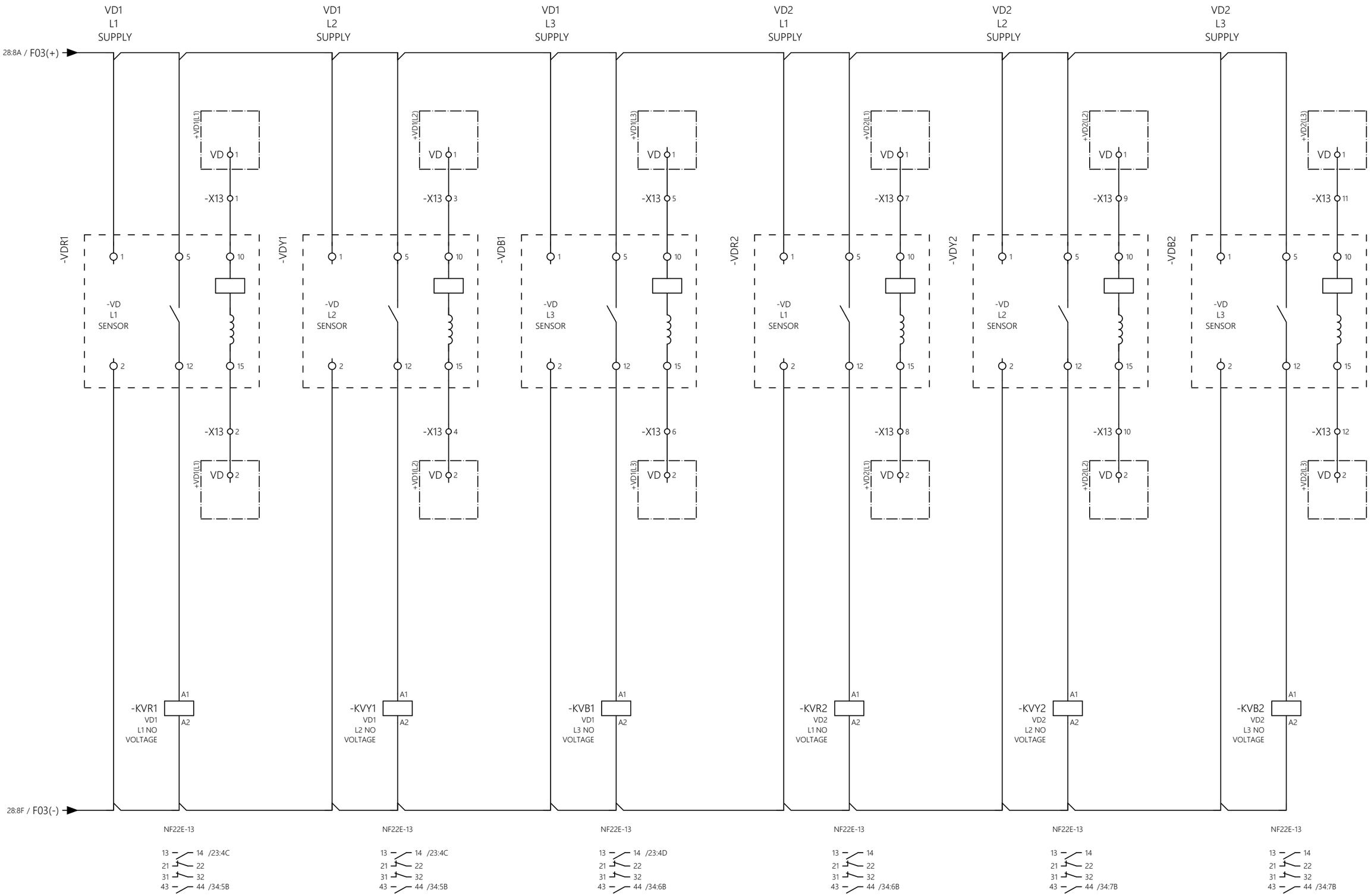
CONT. 28



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: IED FAILURE CIRCUIT	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05
		SH. 28 / 72	CONT. 29



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

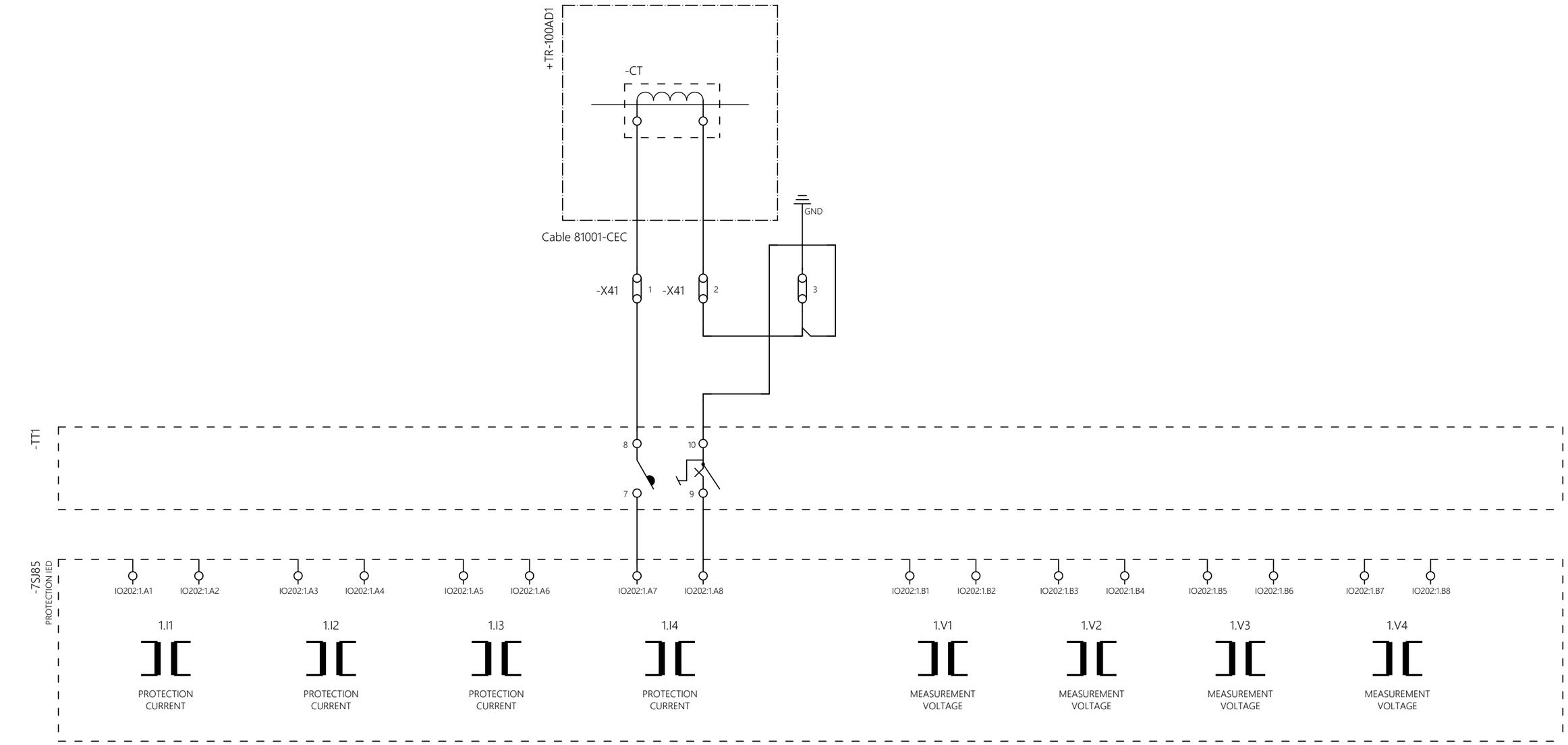
HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: VOLTAGE DUPLICATOR	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 29 / 72

CONT. 30

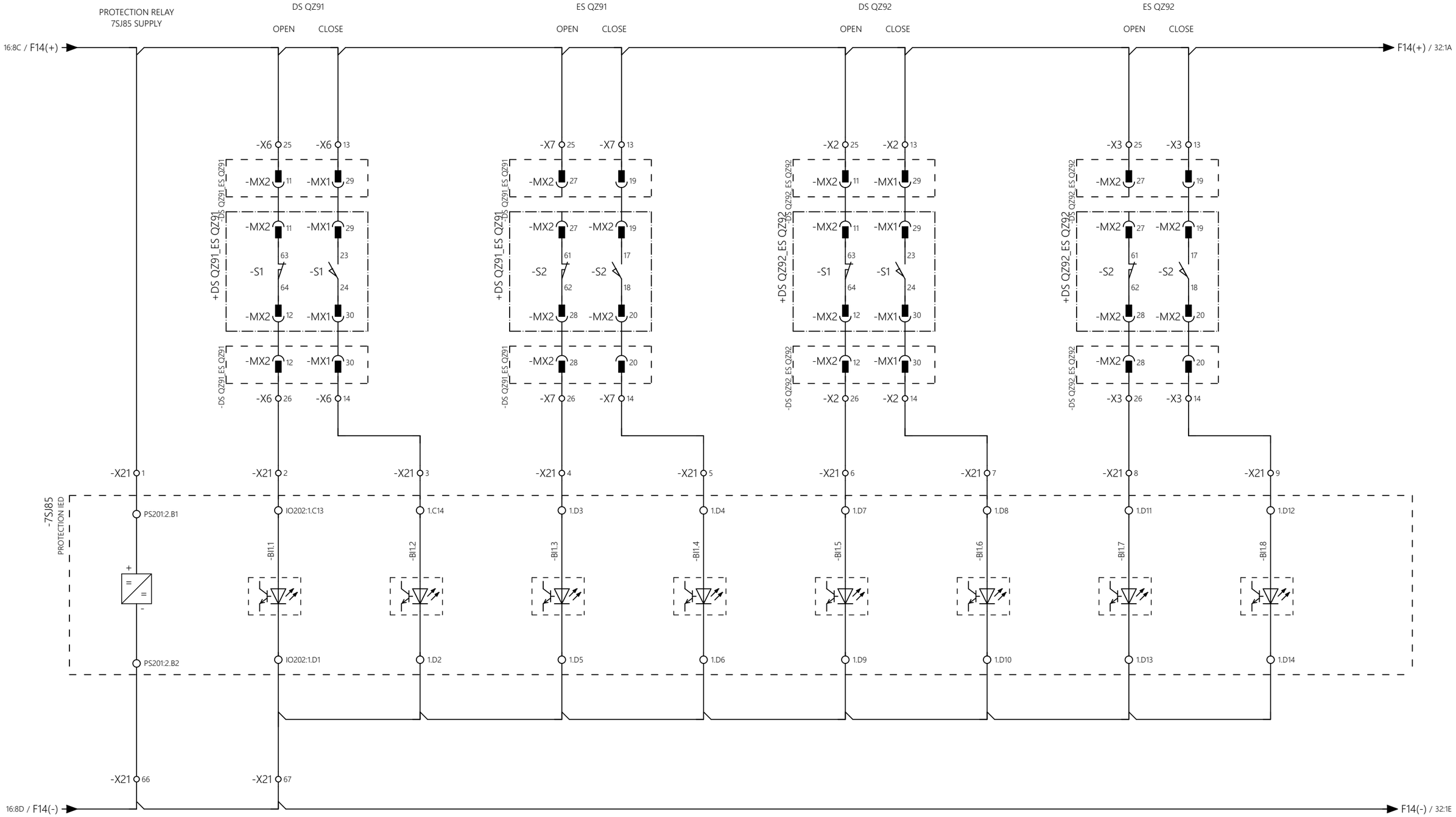
1	2	3	4	5	6	7	8
SPARE	SPARE	SPARE	TR-100AD1 STAR POINT CT	SPARE	SPARE	SPARE	SPARE



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7SJ85(PROTECTION RELAY) METERING CIRCUIT	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	SH. 30 / 72 / CONT. 31



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7SJ85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-1	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 31 / 72

CONT. 32

SPARE SPARE SPARE

31:8A / F14(+) → F14(+) / 33:1A

-X21 10 -X21 11 -X21 12

-7SJ85 PROTECTION IED

PS201:2.B12 2.B14 2.B13

-BI2.1 -BI2.2 -BI2.3

PS201:2.B11

-X21 68

31:8E / F14(-) → F14(-) / 33:1E

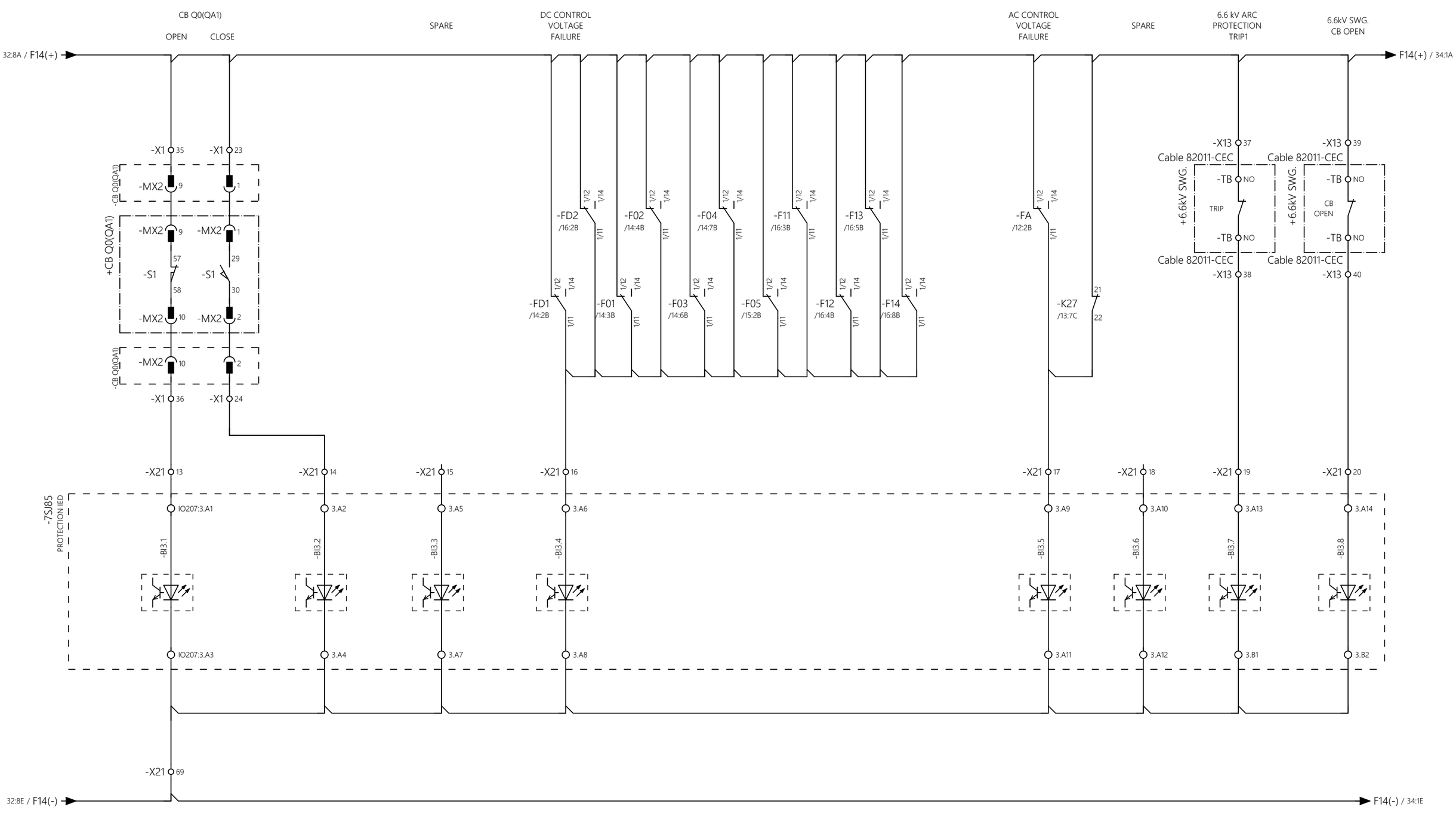
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7SJ85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-2	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 32 / 72

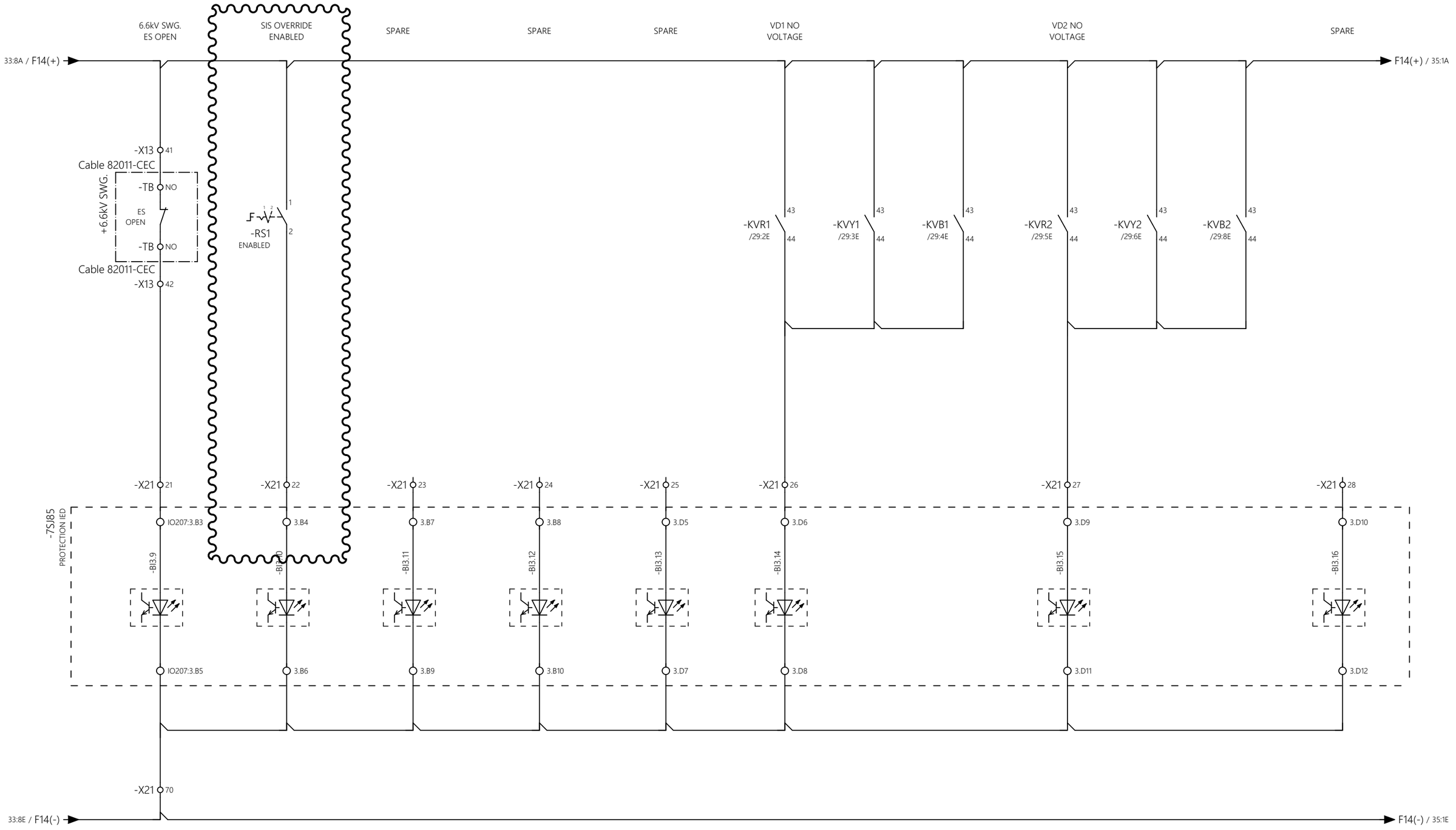
CONT. 33



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

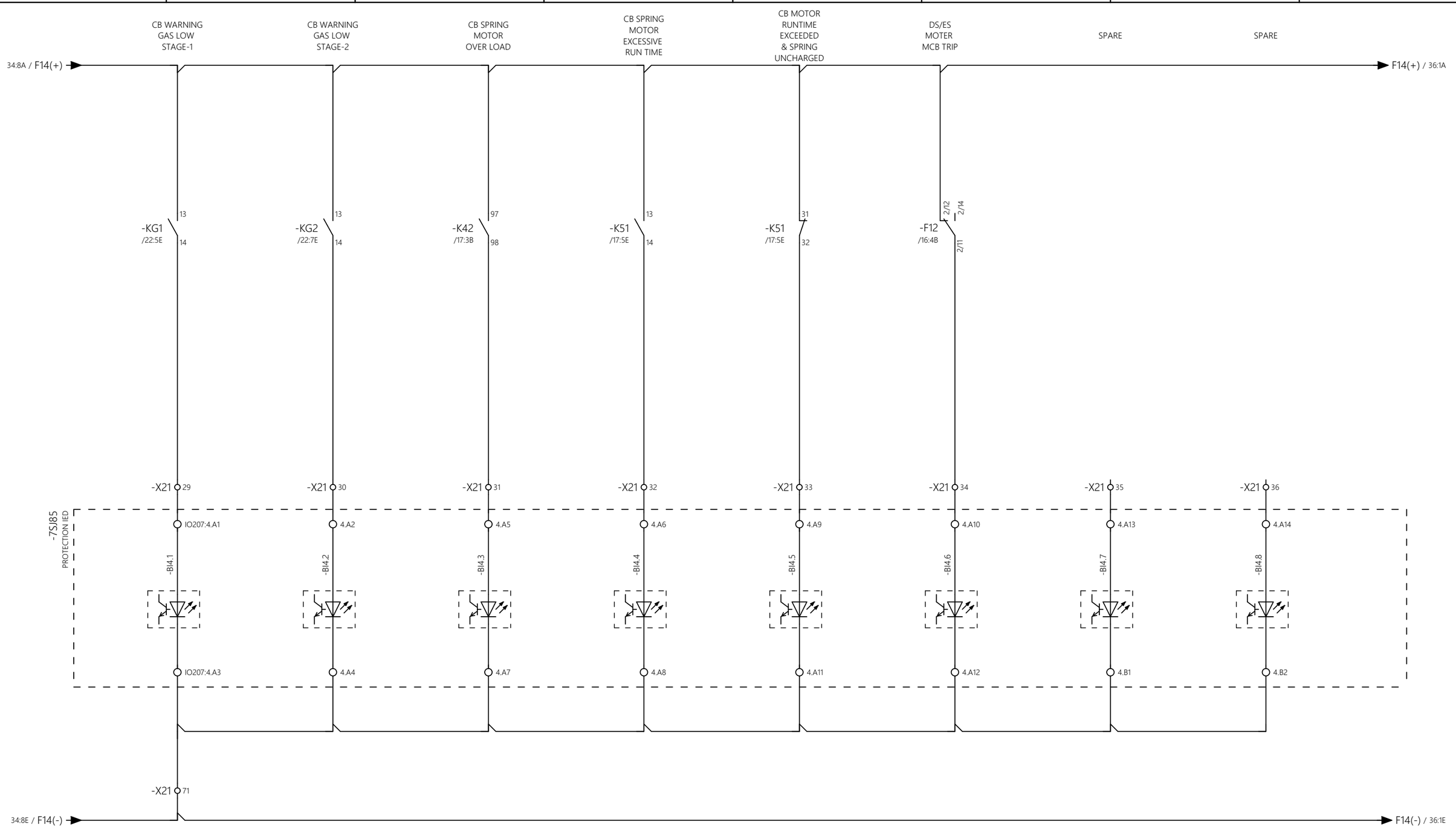
SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7SJ85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-3	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	SH. 33 / 72
			CONT. 34



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7SJ85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-4	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05
		SH. 34 / 72	CONT. 35



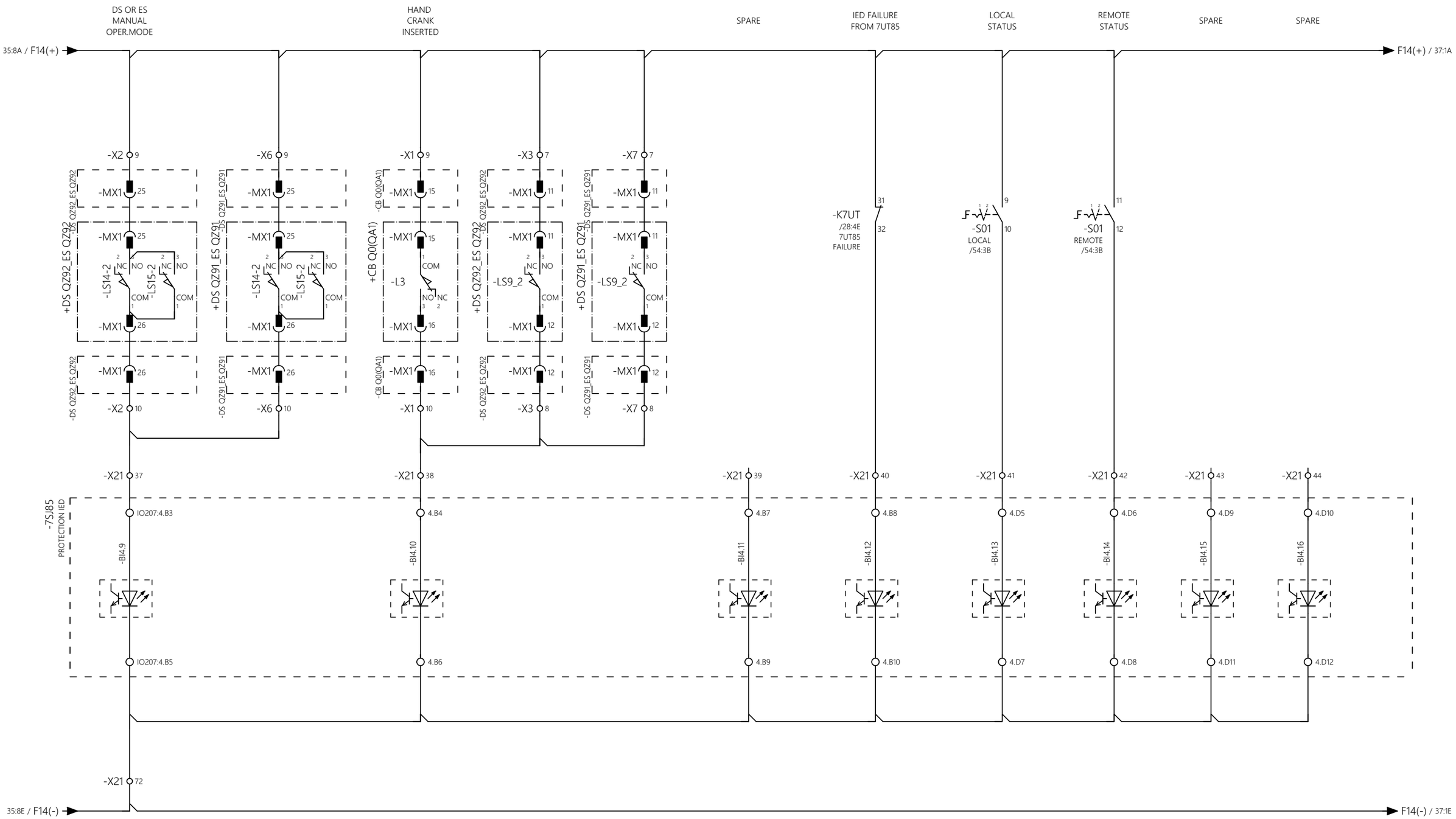
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7SJ85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-5	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 35 / 72

CONT. 36



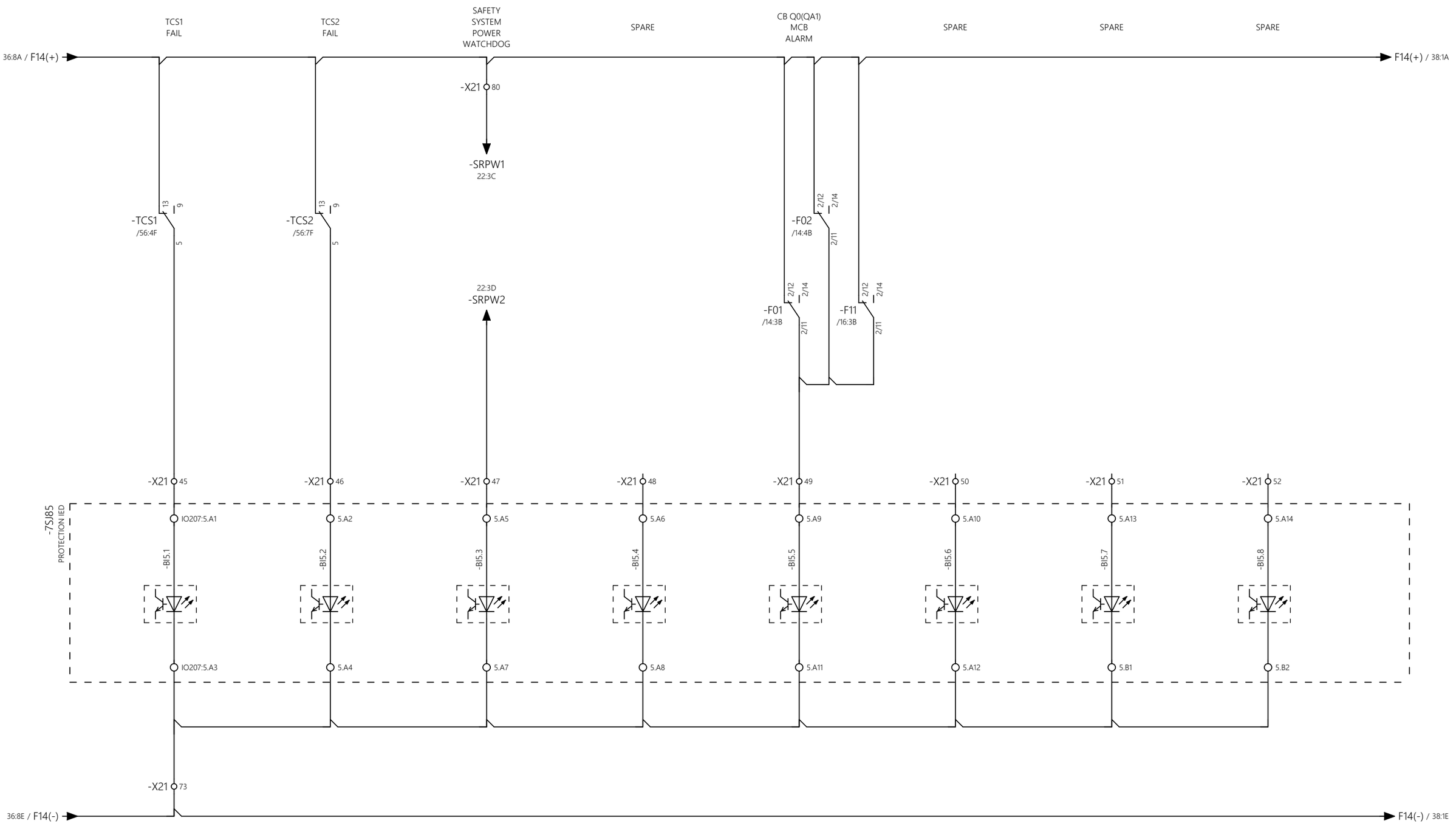
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7SJ85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-6	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 36 / 72

CONT. 37



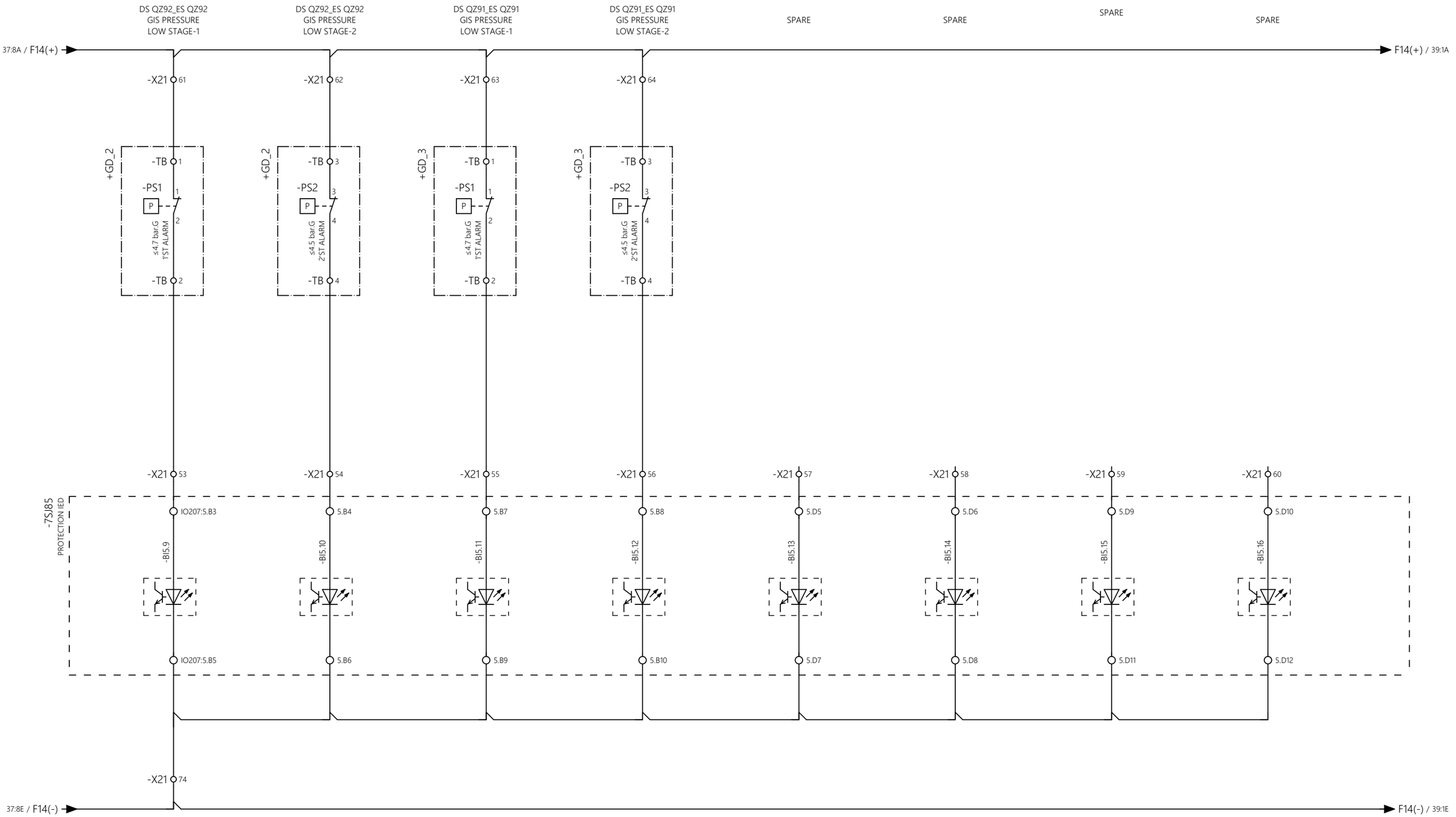
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7SJ85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-7	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 37 / 72

CONT. 38



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7SJ85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-8	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 38 / 72

CONT. 39

PROTECTION RELAY
7SJ85(CB202)
SUPPLY

38:8A / F14(+)

-X21 75

-7SJ85
PROTECTION IED

CB202:6.A1

+
=
=
-

CB202:6.A2

-X21 76

38:8E / F14(-)

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

TITLE: 7SJ85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-9

EQUIPMENT: 66kV, 40kA GIS

LOCATION: HOLLANDSE KUST NOORD WIND PARK

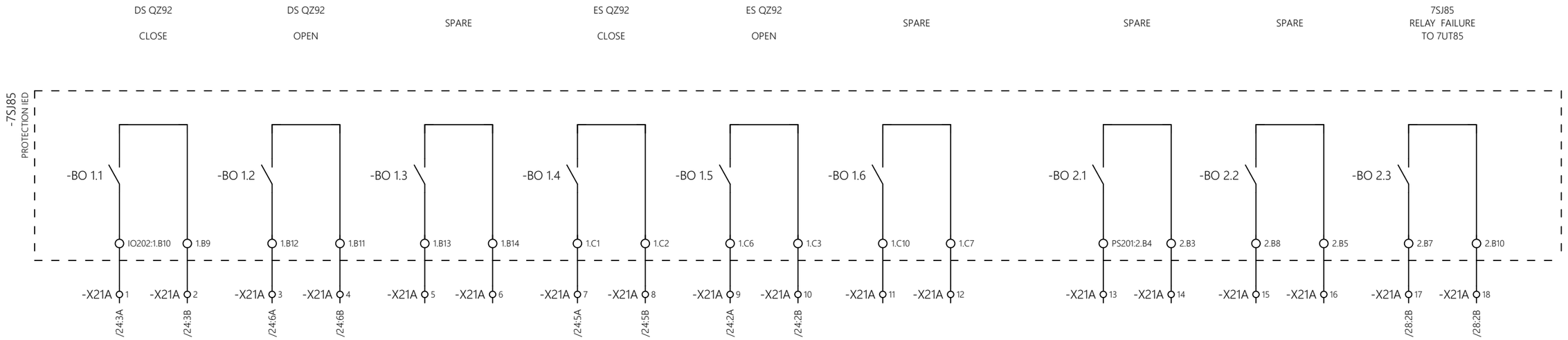
DWG. NO.: 1723001595-EL-DG-00015

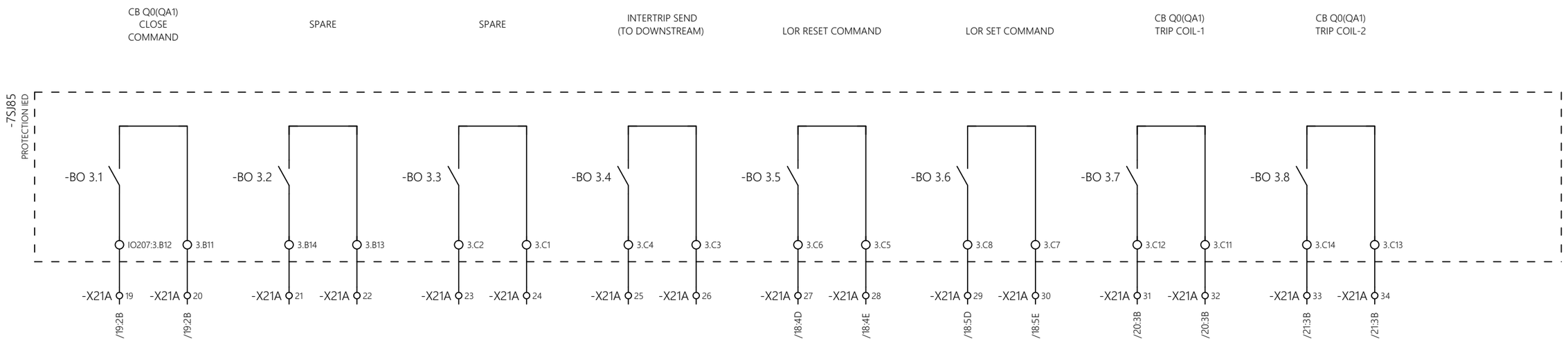
CONTRACT NO: CW-I-WP4-2023-05

REV. 03

SH. 39 / 72

CONT. 40

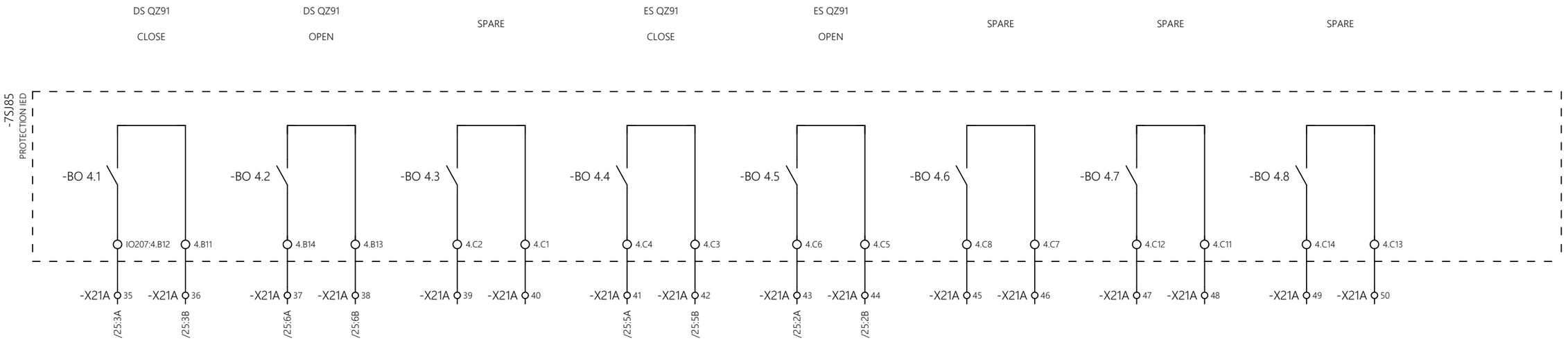


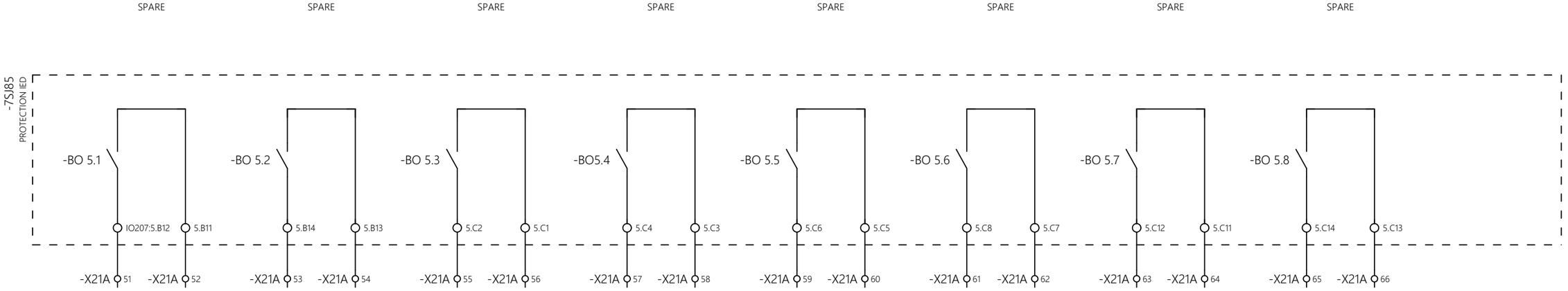


03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7SJ85(PROTECTION RELAY) OUTPUT SIGNAL CIRCUIT-1	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	SH. 40 / 72
			CONT. 41





REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: 7SJ85(PROTECTION RELAY) OUTPUT SIGNAL CIRCUIT-2

DWG. NO.: 1723001595-EL-DG-00015

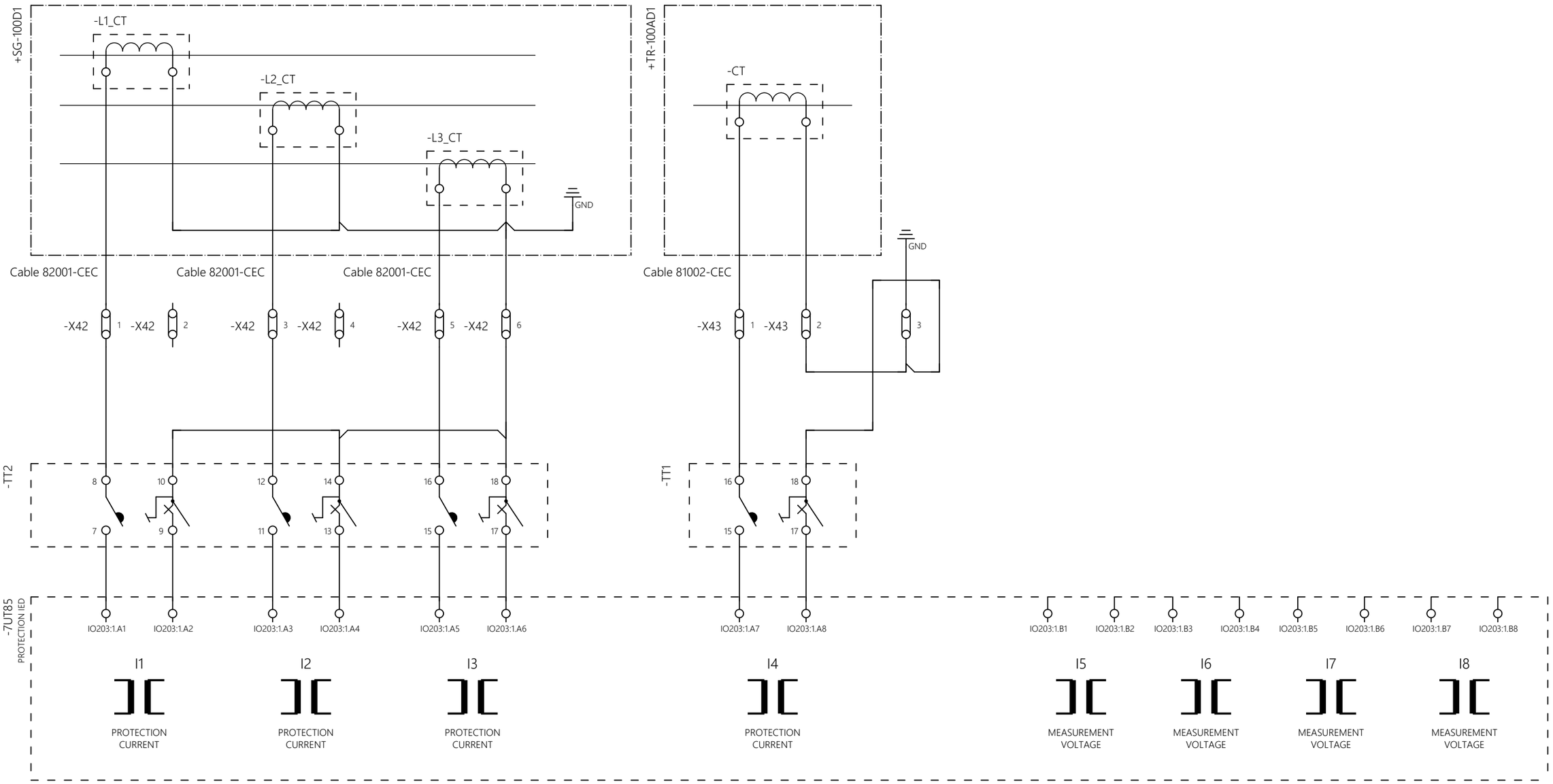
CONTRACT NO: CW-I-WP4-2023-05

REV. 03

SH. 41 / 72

CONT. 42

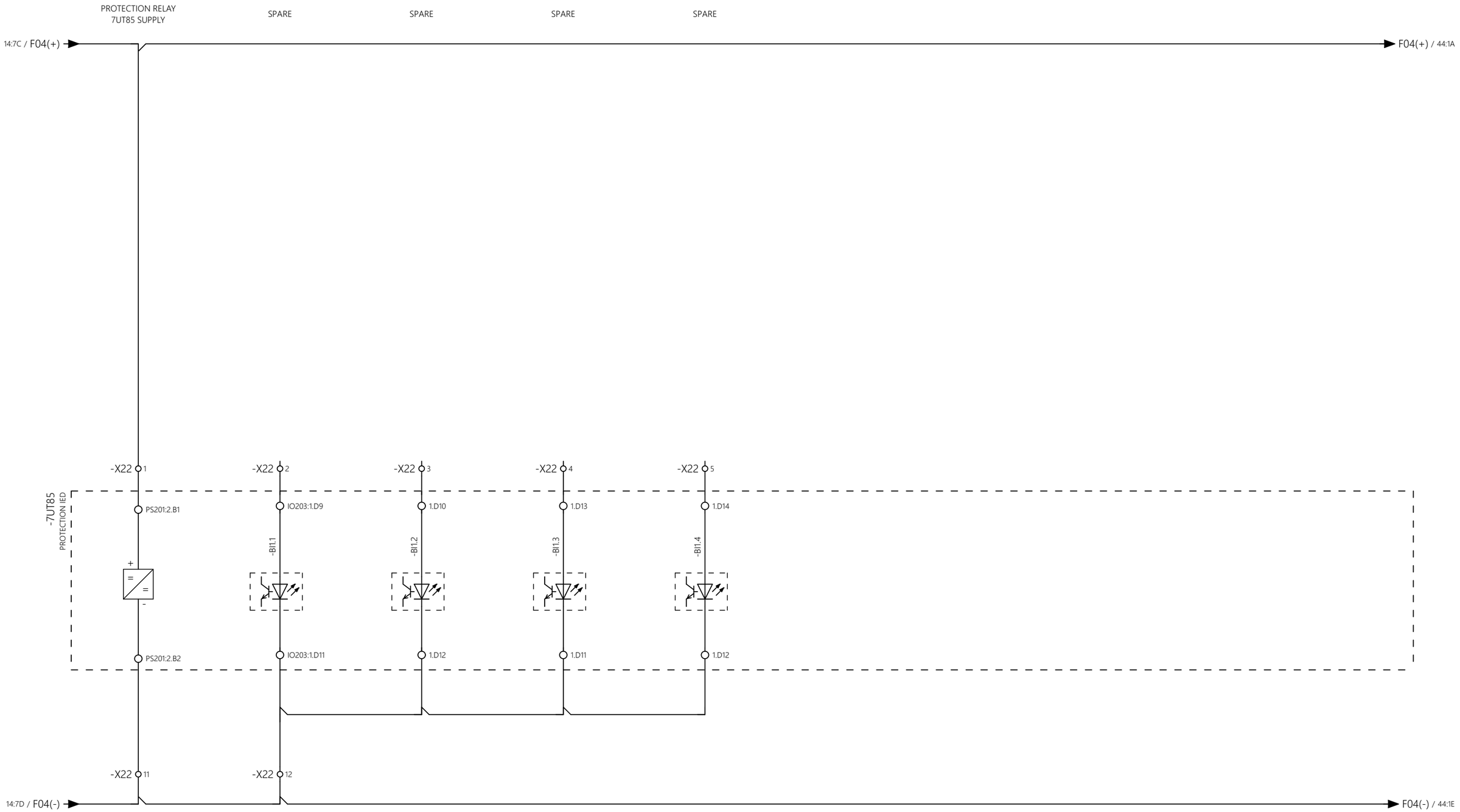
1	2	3	4	5	6	7	8
SG-100D1 L1 CT	SG-100D1 L2 CT	SG-100D1 L3 CT	TR-100AD1 STAR POINT CT		SPARE	SPARE	SPARE	SPARE



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7UT85(PROTECTION RELAY) METERING CIRCUIT	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05
		SH. 42 / 72	CONT. 43



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: 7UT85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-1	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	SH. 43 / 72
			CONT. 44

IED FAILURE
FROM 7SJ85

SPARE

SPARE

43:8A / F04(+)

-K7SJ
/28:2E
7SJ85
FAILURE

31

32

-X22 6

-X22 7

-X22 8

-7UT85
PROTECTION IED

PS201:2.B12

2.B14

2.B13

-BI2.1

-BI2.2

-BI2.3

PS201:2.B11

-X22 13

43:8E / F04(-)

F04(-) / 45:1E

03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

TITLE: 7UT85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-2

REV. 03

SH. 44 / 72

EQUIPMENT: 66kV, 40kA GIS

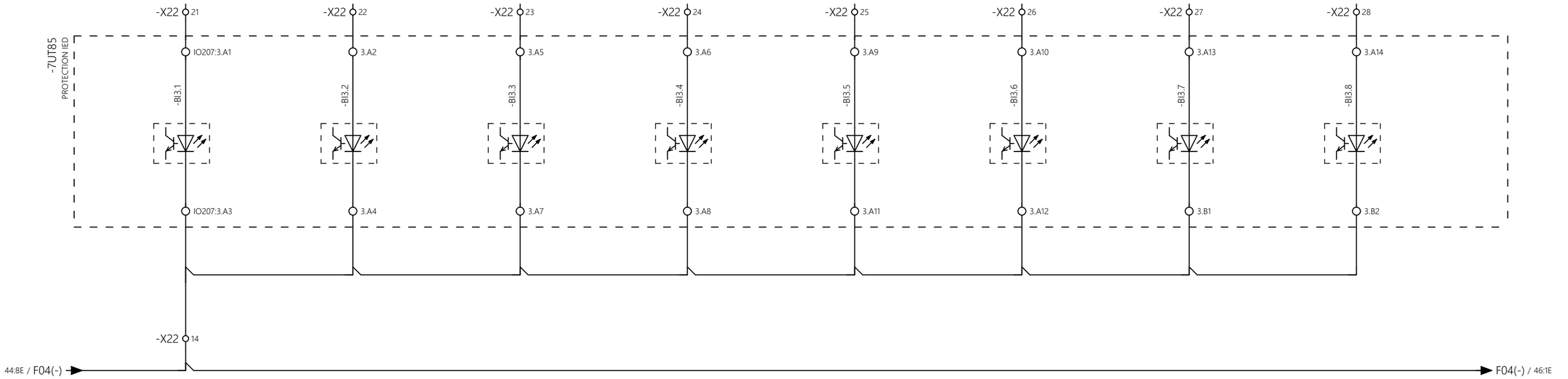
LOCATION: HOLLANDSE KUST NOORD WIND PARK

DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

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SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: 7UT85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-3

DWG. NO.: 1723001595-EL-DG-00015

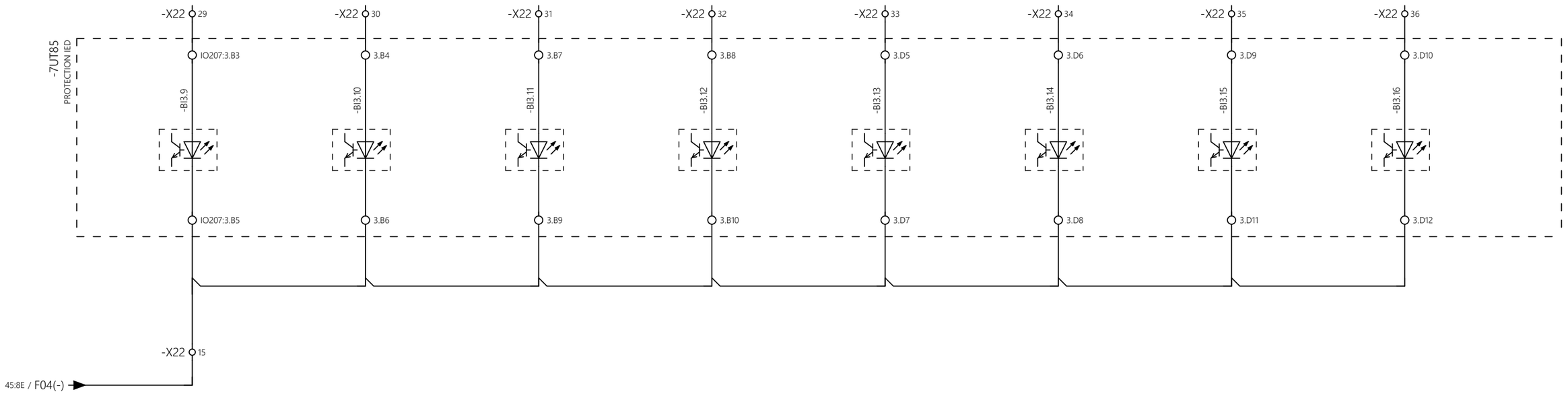
CONTRACT NO: CW-I-WP4-2023-05

REV. 03

SH. 45 / 72

CONT. 46

SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: 7UT85(PROTECTION RELAY) INPUT SIGNAL CIRCUIT-4

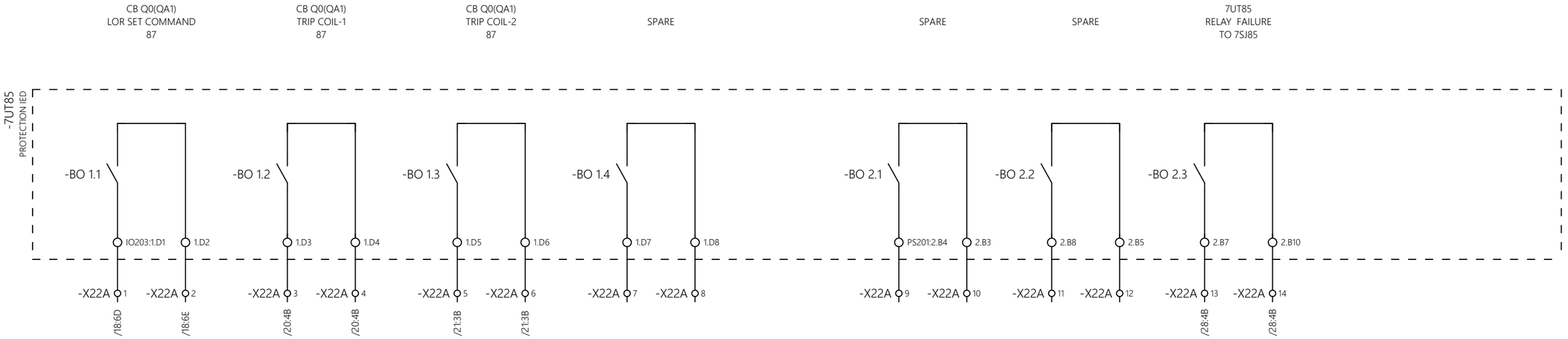
DWG. NO.: 1723001595-EL-DG-00015

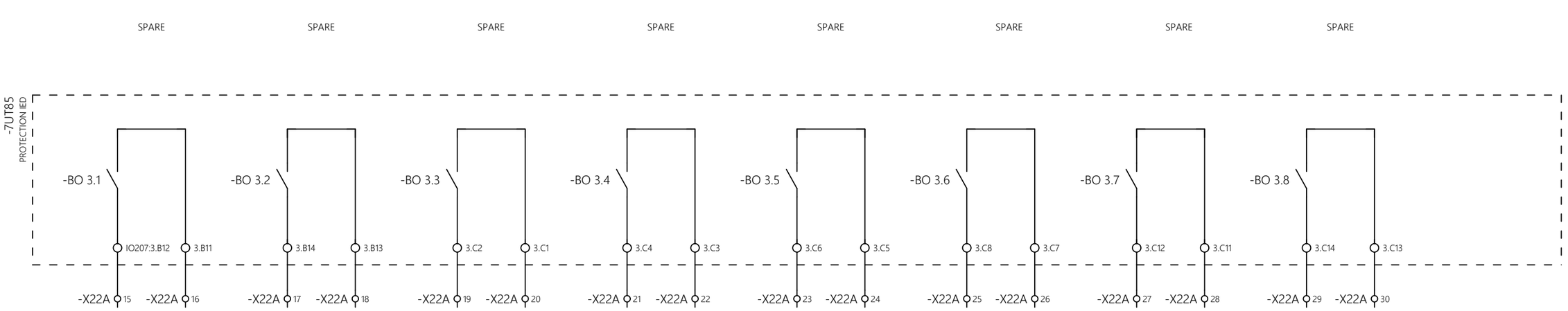
CONTRACT NO: CW-I-WP4-2023-05

REV. 03

SH. 46 / 72

CONT. 47





REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: 7UT85(PROTECTION RELAY) OUTPUT SIGNAL CIRCUIT-1

DWG. NO.: 1723001595-EL-DG-00015

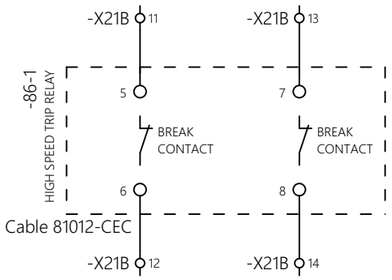
CONTRACT NO: CW-I-WP4-2023-05

REV. 03

SH. 47 / 72

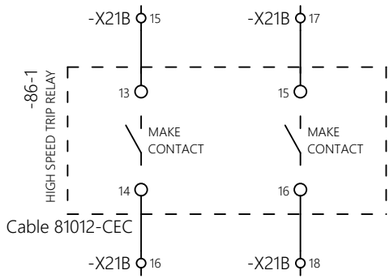
CONT. 48

-86-1
HIGH SPEED TRIP RELAY
SPARE CONTACT



To 6.6 kV incomer

-86-1
HIGH SPEED TRIP RELAY
SPARE CONTACT



To 6.6 kV incomer

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: SPARE SIGNAL CIRCUIT

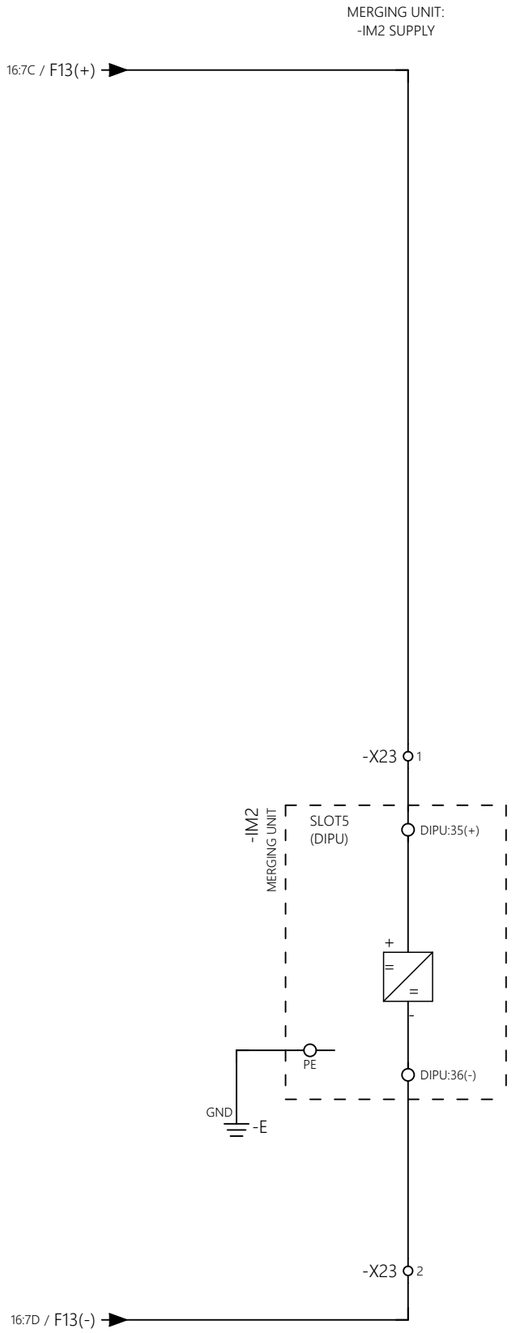
DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

REV. 03

SH. 48 / 72

CONT. 49



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

TITLE: IM2(MERGING UNIT) CIRCUIT-1

REV. 03

SH. 49 / 72

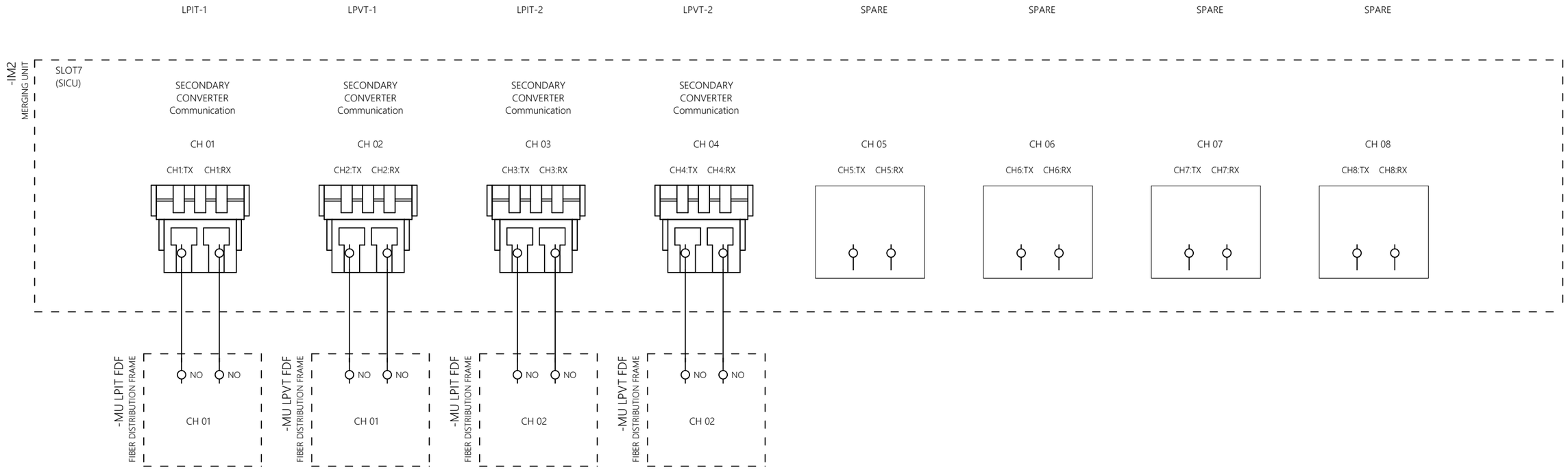
EQUIPMENT: 66kV, 40kA GIS

LOCATION: HOLLANDSE KUST NOORD WIND PARK

DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

CONT. 50



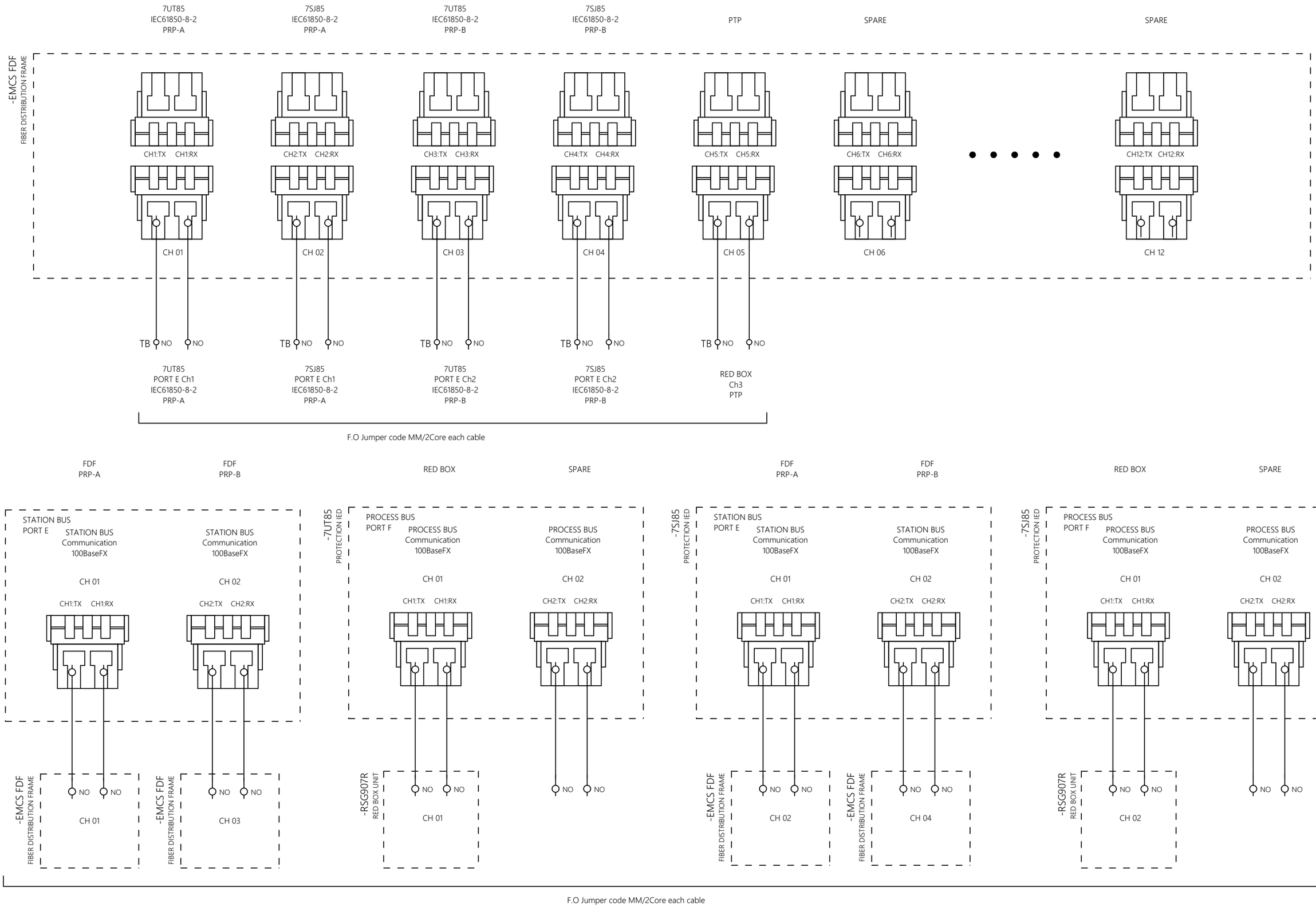
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: IM2(MERGING UNIT) CIRCUIT-2	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 50 / 72

CONT. 51



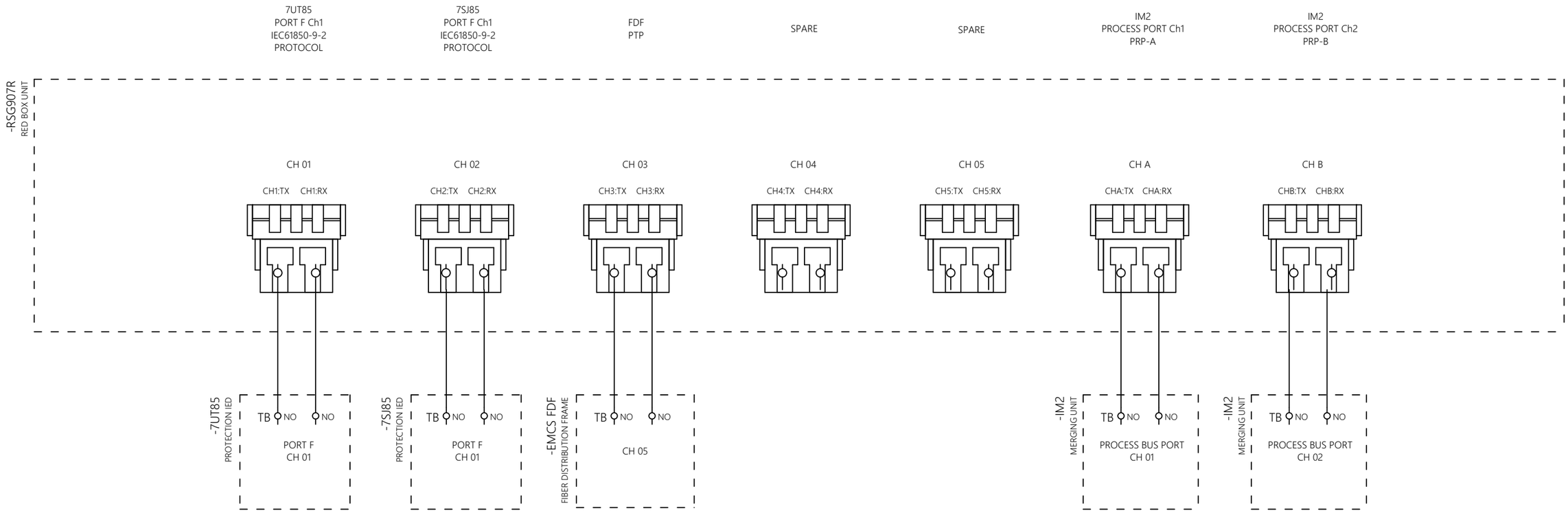
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: IED & FDF CIRCUIT-1	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 51 / 72

CONT. 52



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: IED & FDF CIRCUIT-2

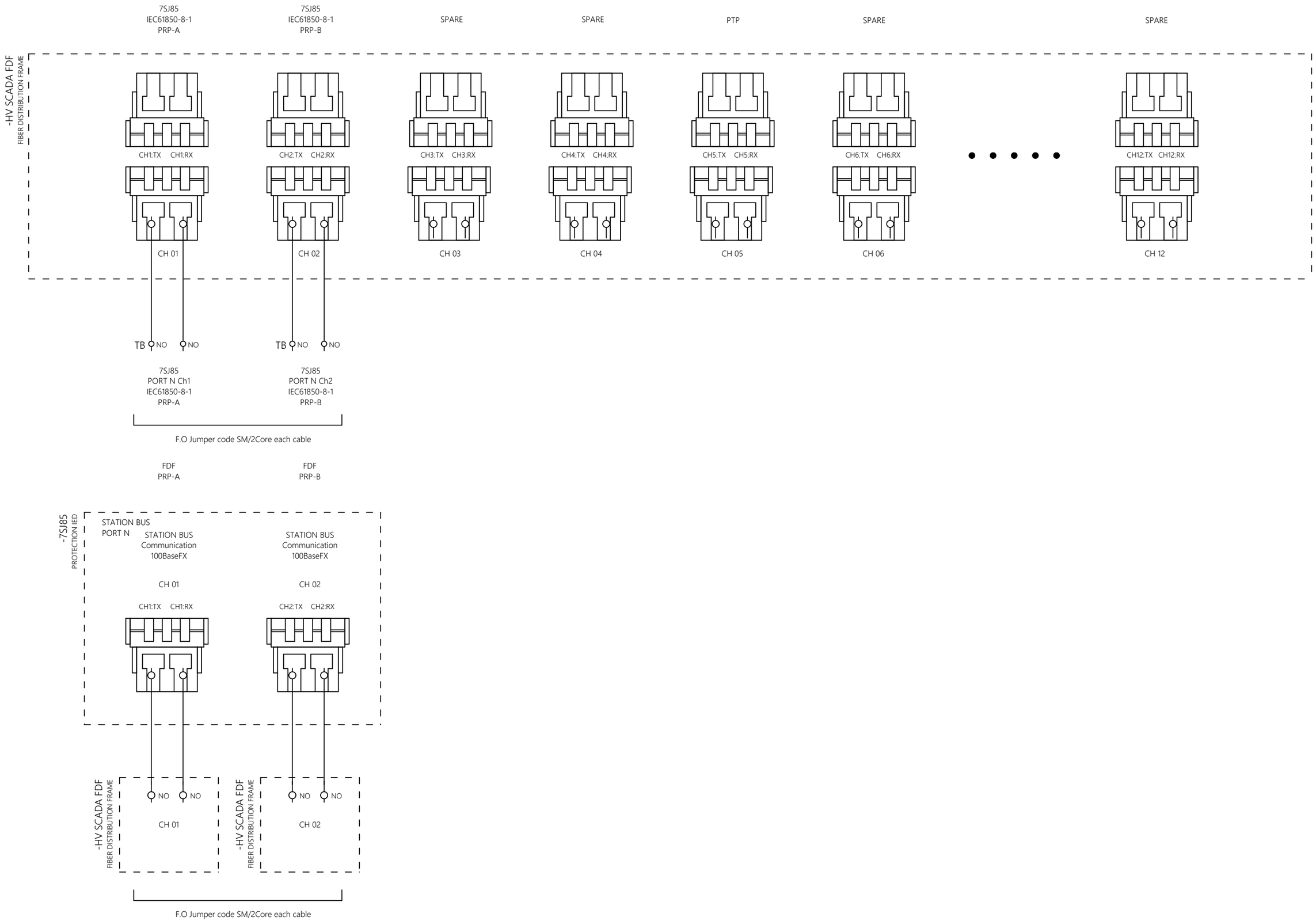
DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

REV. 03

SH. 52 / 72

CONT. 53



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

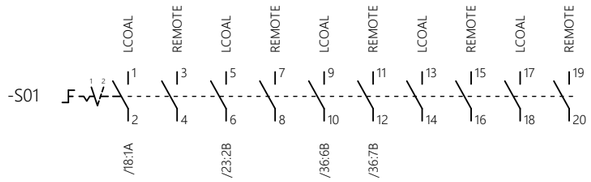
HYOSUNG HEAVY INDUSTRIES

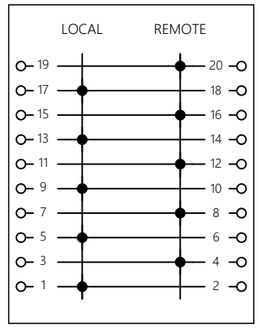
SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: IED & FDF CIRCUIT-3	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

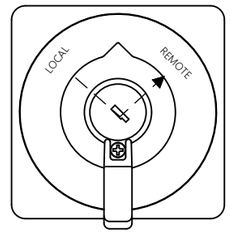
SH. 53 / 72

CONT. 54

-S01
LOCAL/REMOTE
2-POSITION KEY SWITCH

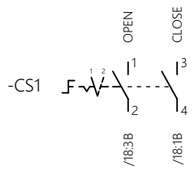


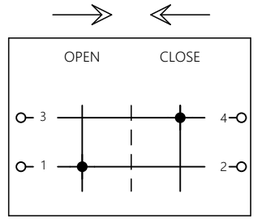


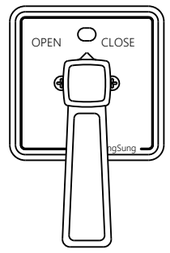


KEY LOCKABLE SWITCH (-S01)
▶ KEY REMOVABLE POSITION

-CS1
CB Q0(QA1)
CAM SWITCH

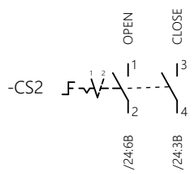


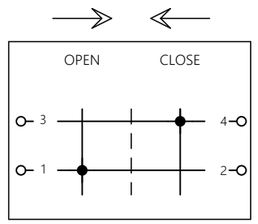


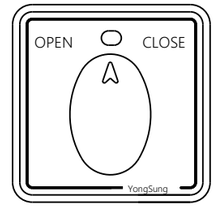


CONTROL CAM SWITCH (CS1)
HANDLE COLOR : RED

-CS2
DS QZ92
CAM SWITCH

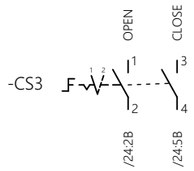


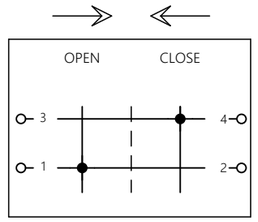




CONTROL CAM SWITCH (CS2)
HANDLE COLOR : BLACK

-CS3
ES QZ92
CAM SWITCH





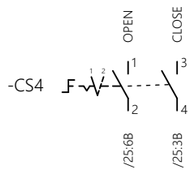
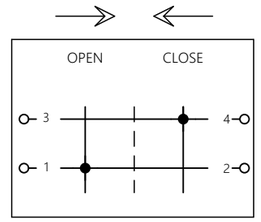
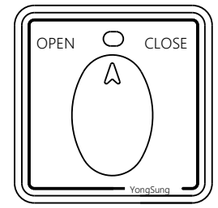
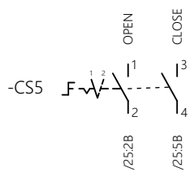
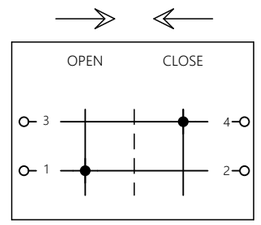
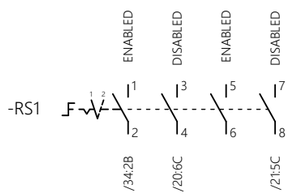
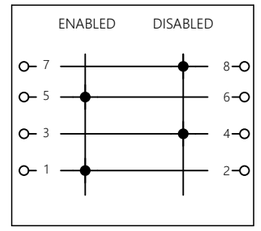
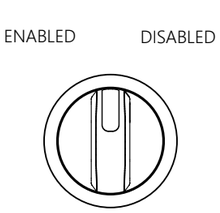
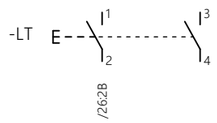


CONTROL CAM SWITCH (CS3)
HANDLE COLOR : BLACK

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: ARRANGEMENT FOR LCC SWITCH-1	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	SH. 54 / 72 · CONT. 55

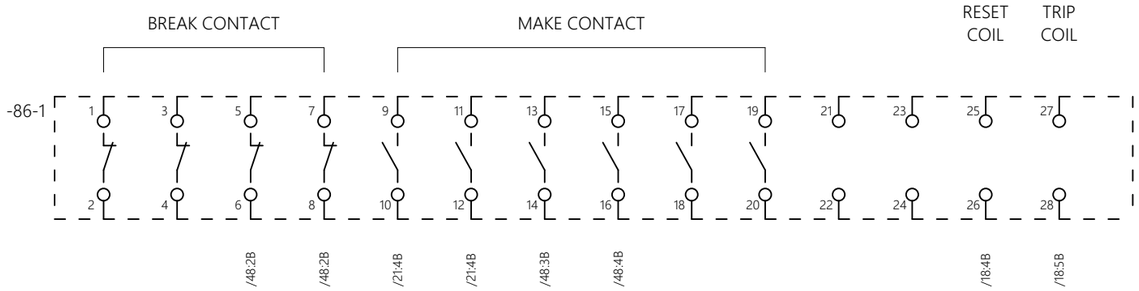
-CS4 DS QZ91 CAM SWITCH	   ***CONTROL CAM SWITCH (CS4)*** HANDLE COLOR : BLACK
-CS5 ES QZ91 CAM SWITCH	   ***CONTROL CAM SWITCH (CS5)*** HANDLE COLOR : BLACK
-RS1 OVERRIDE FOR SIS SIGNAL ROTARY SWITCH	   ***ROTARY SWITCH (RS1)***
-LT LAMP TEST PUSH BUTTON SWITCH	

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

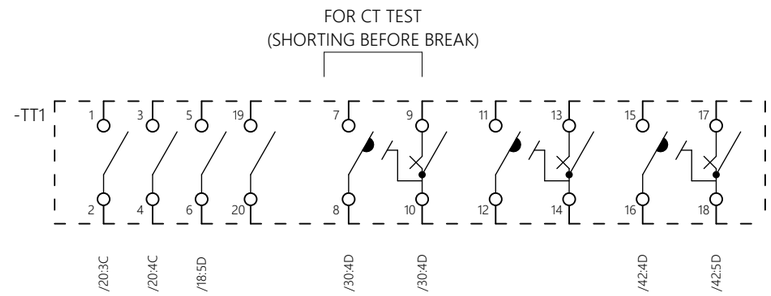
HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: ARRANGEMENT FOR LCC SWITCH-2	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	SH. 55 / 72 / CONT. 56

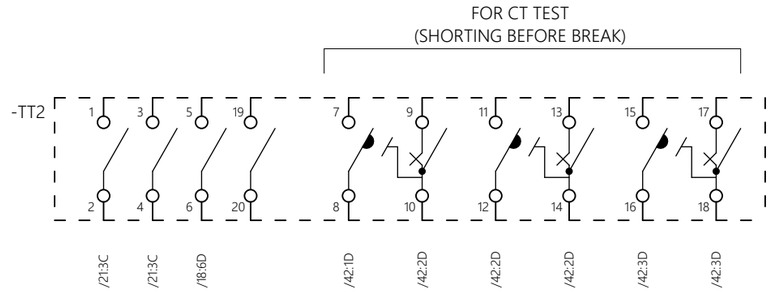
-86-1
HIGH SPEED TRIP RELAY
FOR
86



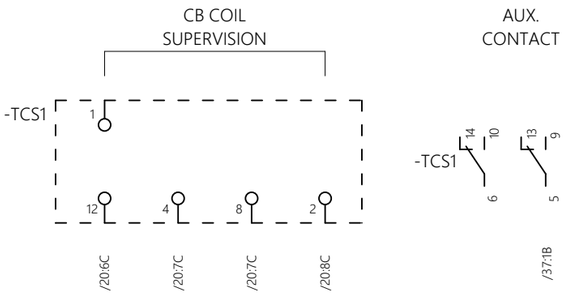
-TT1
FLEXITEST SWITCH
FOR
7SJ85



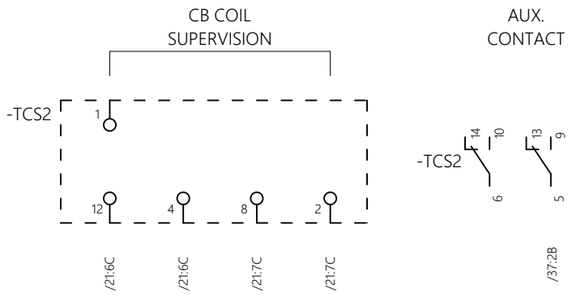
-TT2
FLEXITEST SWITCH
FOR
7UT85



-TCS1
CIRCUIT SUPERVISION RELAY
FOR
TCS



-TCS2
CIRCUIT SUPERVISION RELAY
FOR
TCS



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: ARRANGEMENT FOR LCC SWITCH-3

DWG. NO.: 1723001595-EL-DG-00015

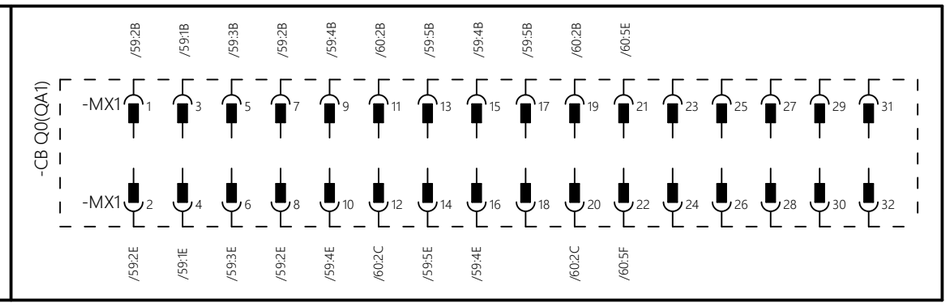
CONTRACT NO: CW-I-WP4-2023-05

REV. 03

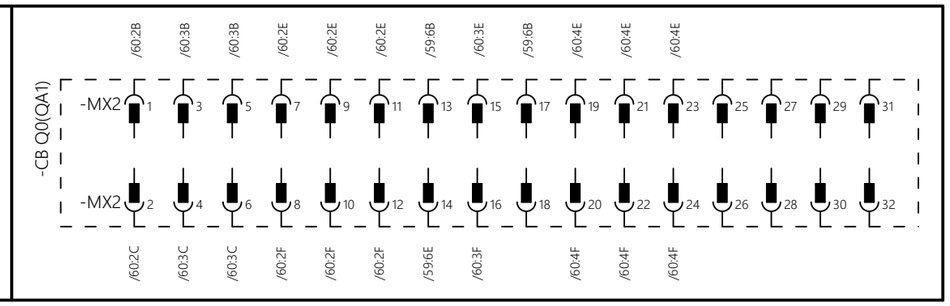
SH. 56 / 72

CONT. 57

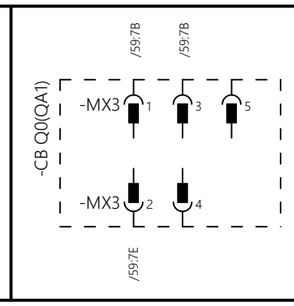
CB
MULTY SOCKET
FOR CB Q0(QA1) (MX1)



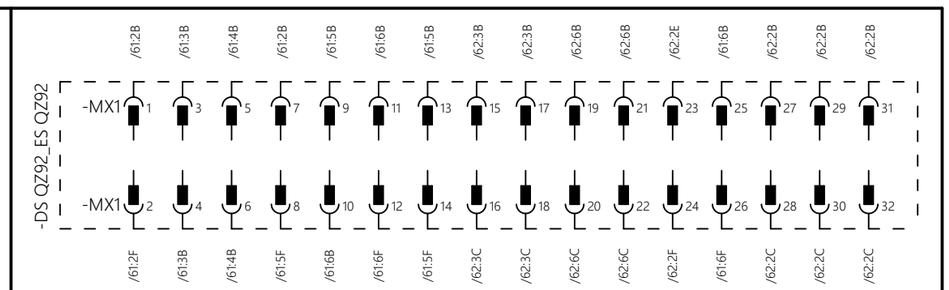
CB
MULTY SOCKET
FOR CB Q0(QA1) (MX2)



CB
MULTY SOCKET
FOR CB Q0(QA1) (MX3)



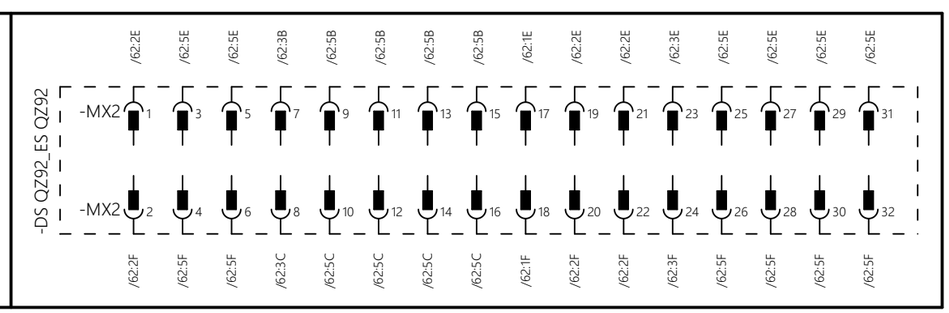
DS
MULTY SOCKET
FOR DS QZ92 (MX1)



DS/ES
MULTY SOCKET
FOR DS QZ92_ES QZ92(MX3)



ES
MULTY SOCKET
FOR ES QZ92(MX2)



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: ARRANGEMENT FOR LCC SWITCH-4

DWG. NO.: 1723001595-EL-DG-00015

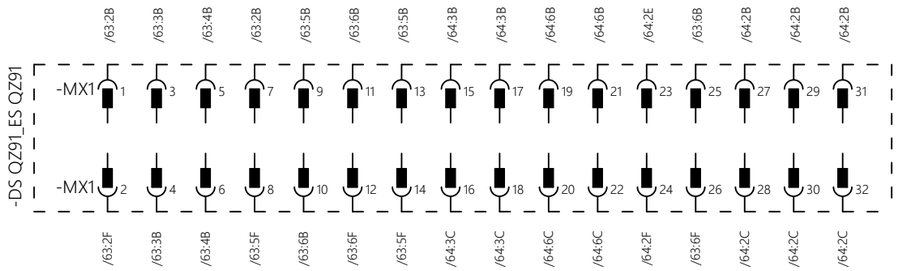
CONTRACT NO: CW-I-WP4-2023-05

REV. 03

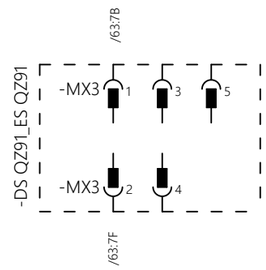
SH. 57 / 72

CONT. 58

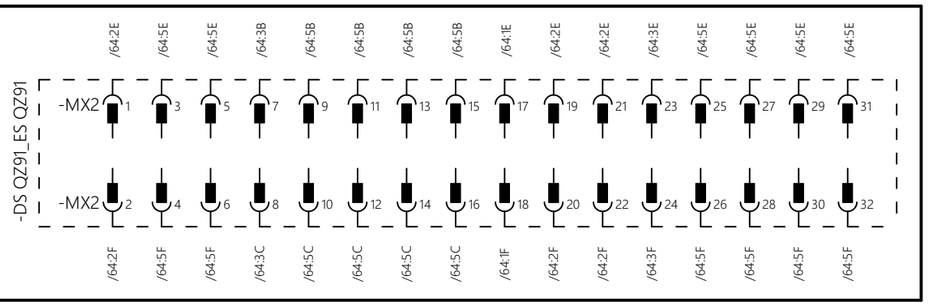
DS
MULTY SOCKET
FOR DS QZ91 (MX1)



DS/ES
MULTY SOCKET
FOR DS QZ91_ES QZ91(MX3)



ES
MULTY SOCKET
FOR ES QZ91(MX2)



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: ARRANGEMENT FOR LCC SWITCH-5

DWG. NO.: 1723001595-EL-DG-00015

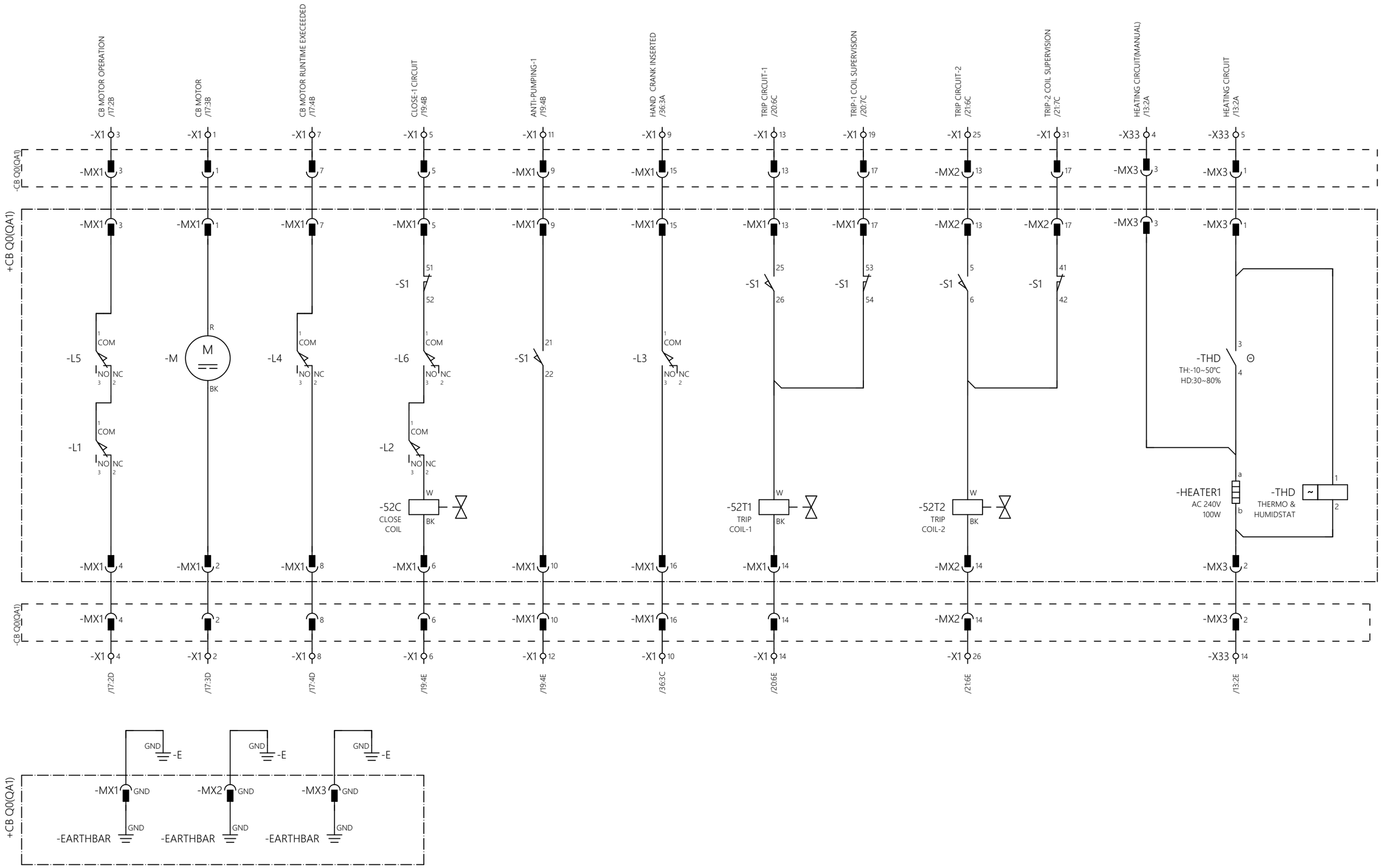
CONTRACT NO: CW-I-WP4-2023-05

REV. 03

SH. 58 / 72

CONT. 59

CB Q0(QA1)(CB) OPERATING MECHANISM REFERENCE DRAWING

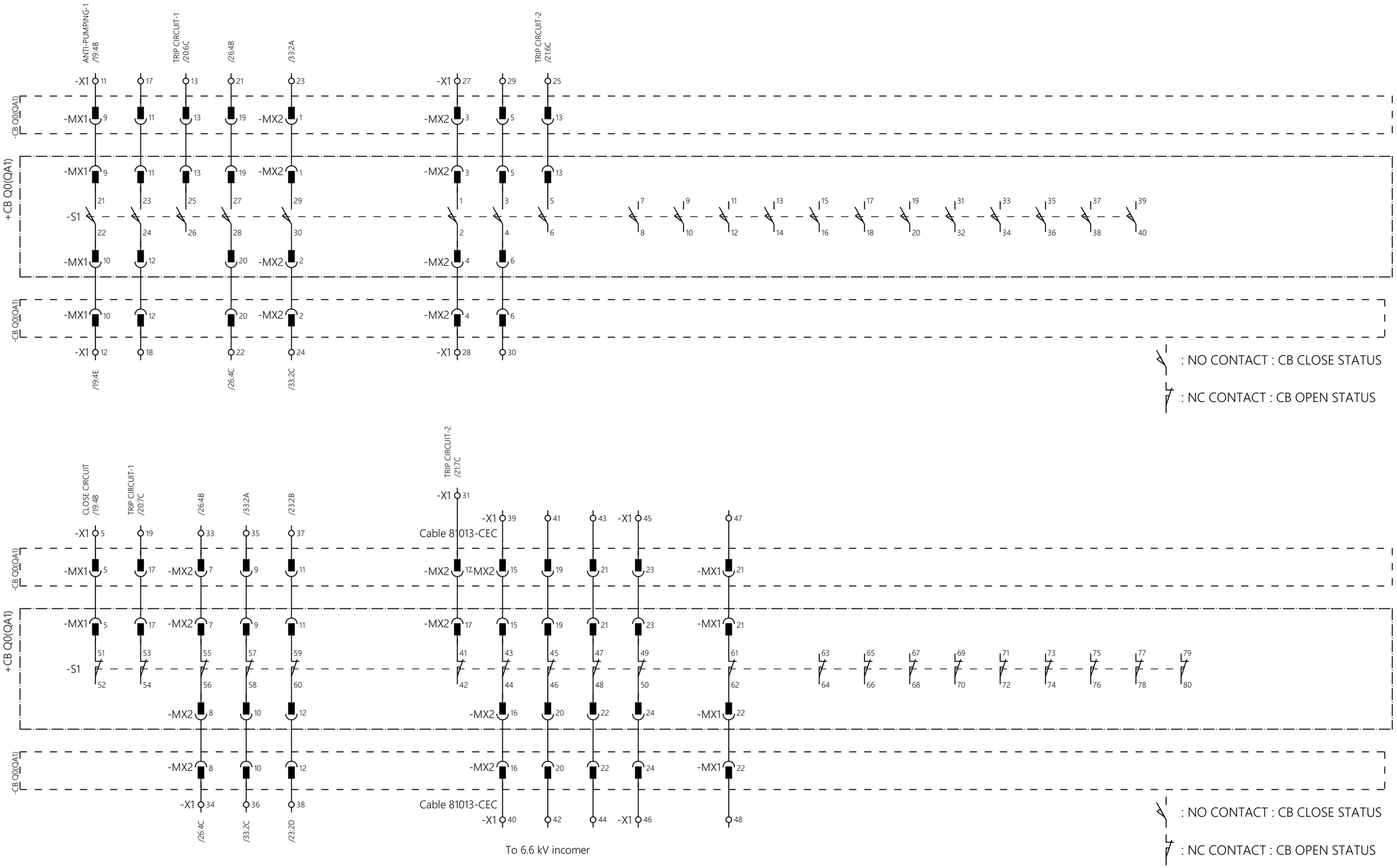


03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: ARRANGEMENT FOR CB Q0(QA1)(CB) OPTD MECH. BOX	REV. 03 / SH. 59 / 72
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	CONT. 60

CB Q0(QA1)(CB) AUXILIARY CONTACTS REFERENCE DRAWING



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

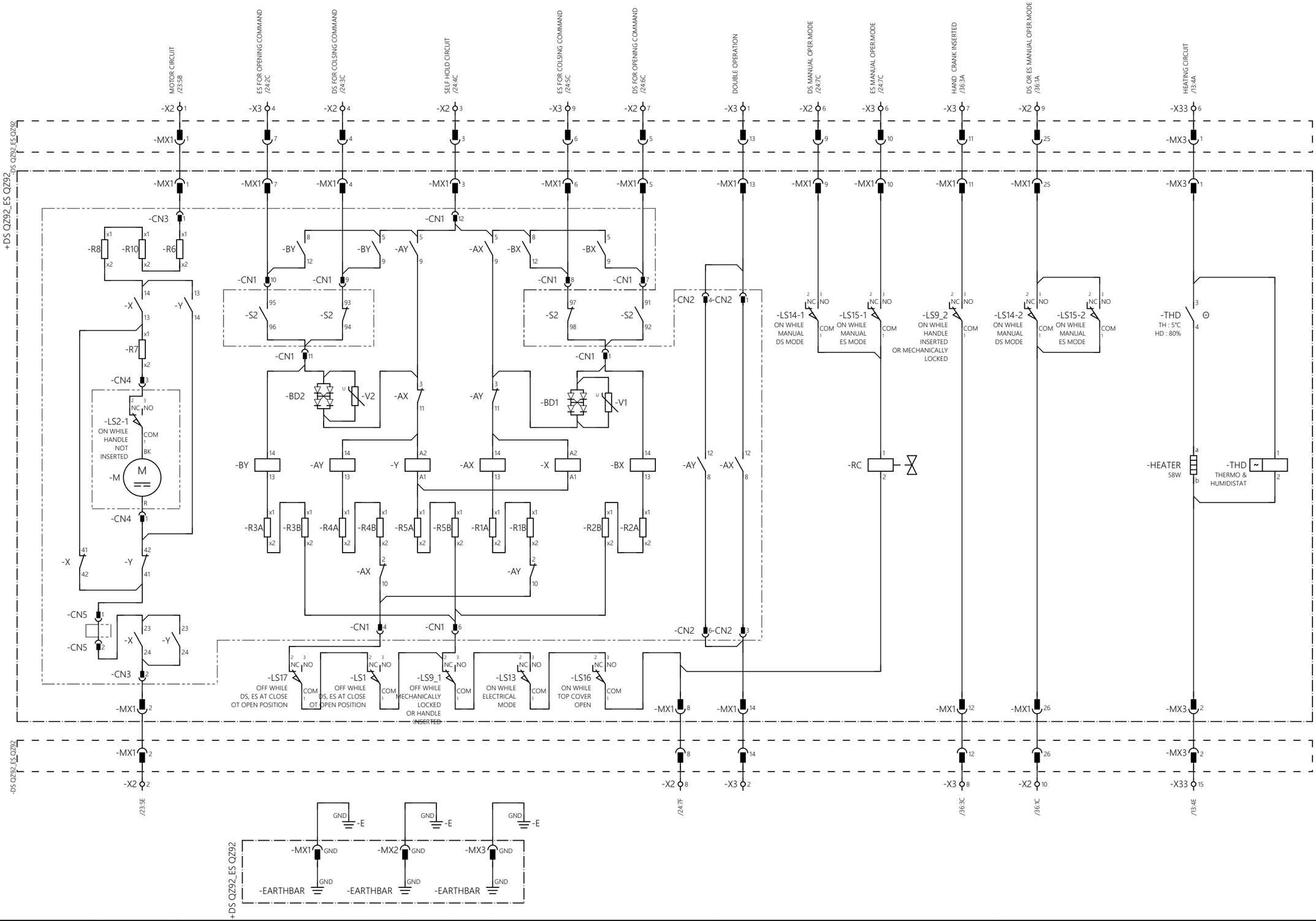
HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: CB Q0(QA1)(CB) AUXILIARY CONTACTS	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 60 / 72

CONT. 61

DS QZ92_ES QZ92(DS & ES) OPERATING MECHANISM REFERENCE DRAWING

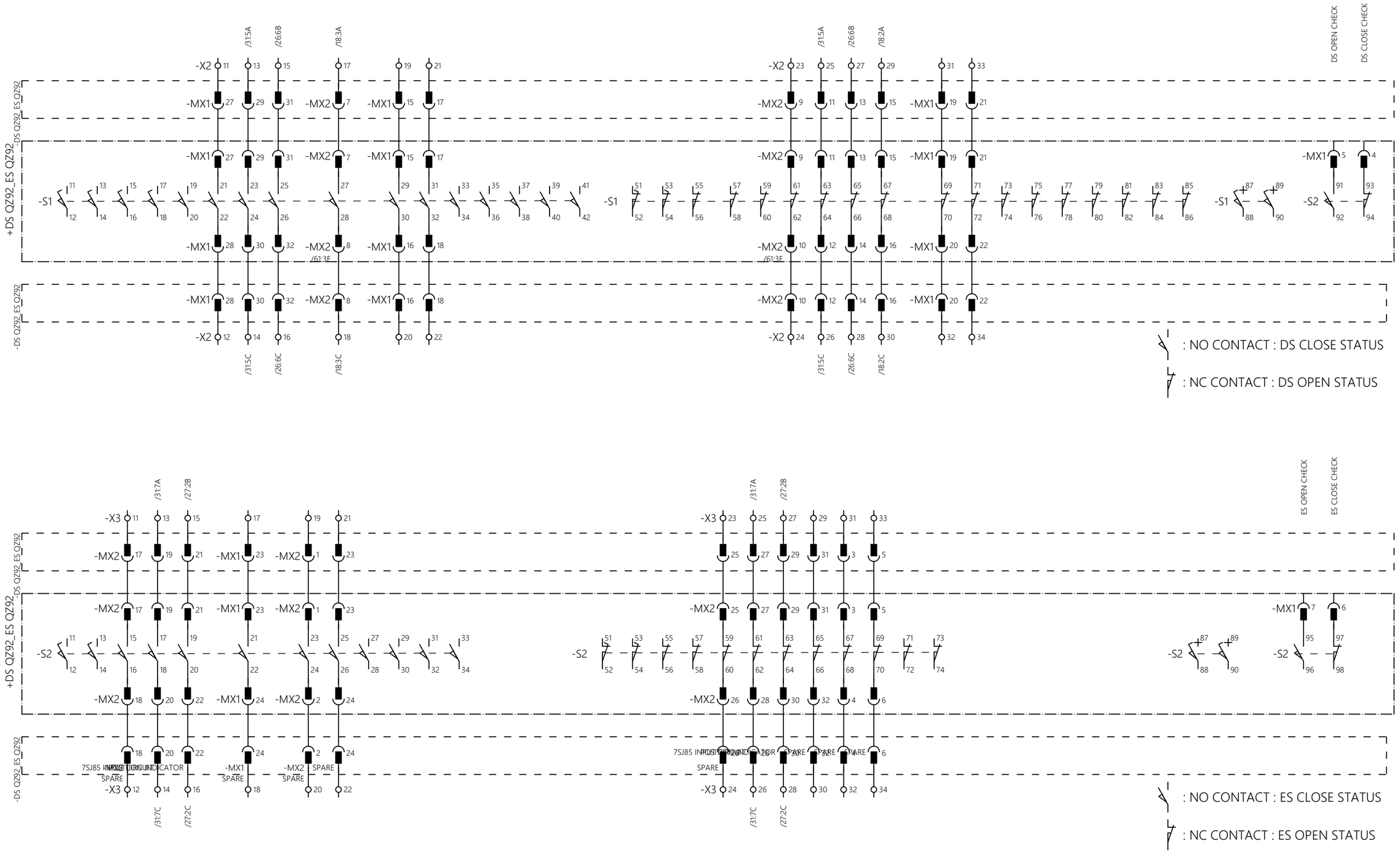


REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: ARRANGEMENT FOR DS QZ92_ES QZ92(DS & ES) OPTD MECH. BOX	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	SH. 61 / 72 / CONT. 62

DS QZ92_ES QZ92(DS & ES) AUXILIARY CONTACTS REFERENCE DRAWING



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

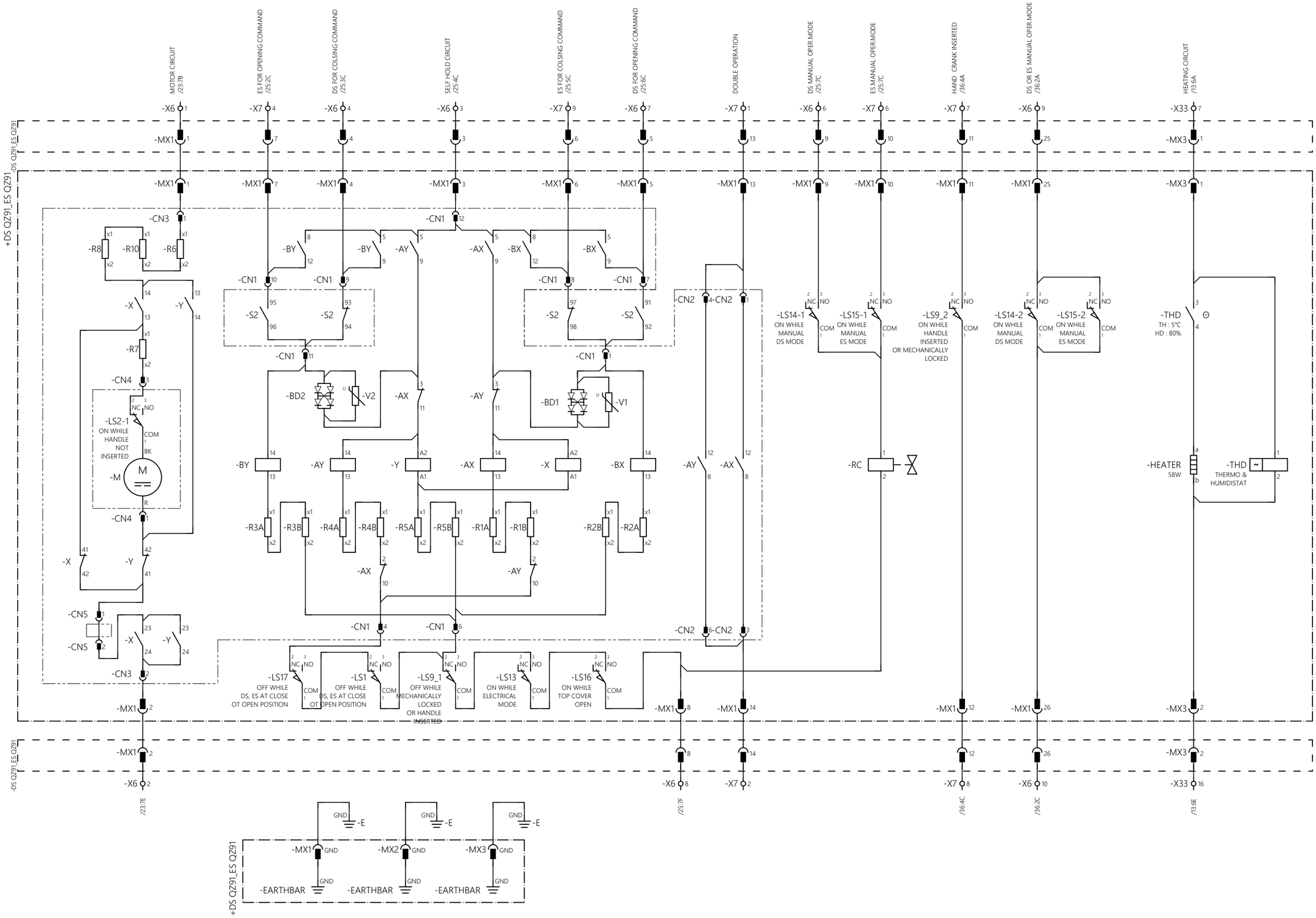
HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: DS QZ92_ES QZ92(DS & ES) AUXILIARY SWITCH	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015	CONTRACT NO: CW-I-WP4-2023-05

SH. 62 / 72

CONT. 63

DS QZ91_ES QZ91(DS & ES) OPERATING MECHANISM REFERENCE DRAWING

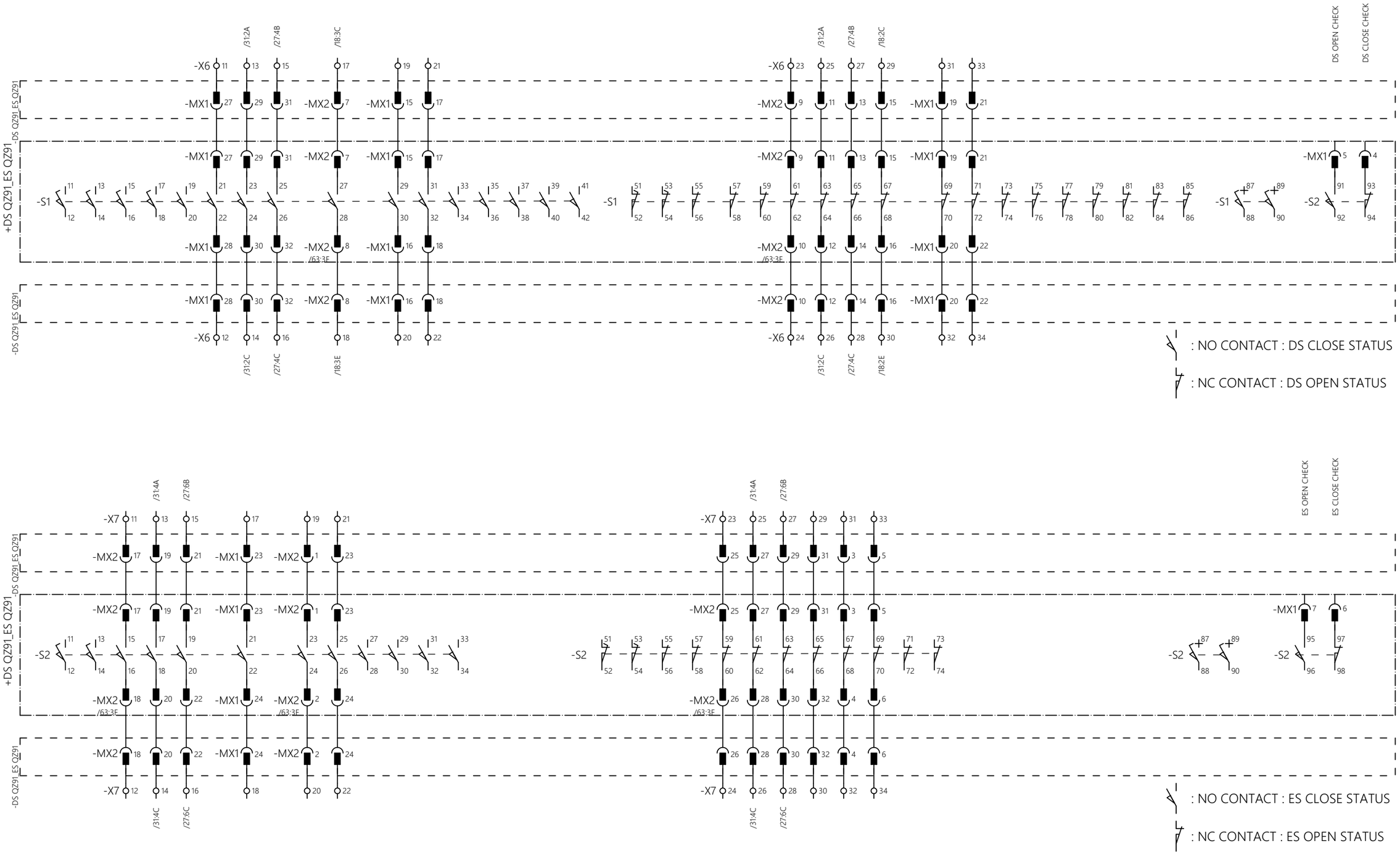


03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: ARRANGEMENT FOR DS QZ91_ES QZ91(DS & ES) OPTD MECH. BOX	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	SH. 63 / 72
			CONT. 64

DS QZ91_ES QZ91(DS & ES) AUXILIARY CONTACTS REFERENCE DRAWING



REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

HYOSUNG HEAVY INDUSTRIES

SUBSTATION: BLPH	DOC. TYPE: CIRCUIT AND WIRING DIAGRAM	TITLE: DS QZ91_ES QZ91(DS & ES) AUXILIARY SWITCH	REV. 03
EQUIPMENT: 66kV, 40kA GIS	LOCATION: HOLLANDSE KUST NOORD WIND PARK	DWG. NO.: 1723001595-EL-DG-00015 / CONTRACT NO: CW-I-WP4-2023-05	SH. 64 / 72
			CONT. 65

DEVICE TAG	DEVICE DESCRIPTION / FUNCTION	PART NUMBER	MANUFACTURER	/Page.Path
-86-1	PROTECTION RELAY FOR HIGH SPEED TRIP RELAY FOR 86 High speed trip, high burden with contact type (hand reset and electrical reset) and hand reset flag	7PJ1524	SIEMENS	/56.A2
-CB Q0(QA1)	MULTI SOCKET FOR CB MULTY SOCKET FOR CB Q0(QA1) (MX1) MULTI SOCKET CRIMP TERMINAL / 32 pin / AC 500 V / 16 A	HEE32 +HQ-5 +HEE32	WEIDMULLER	/57.A2
-CL1	PILOT LAMP FOR CB Q0(QA1) CLOSE INDICATOR DC 110V , RED COLOR, LED	YSBPL2-DL11R	YONGSUNG	/26.E4
-CL2	PILOT LAMP FOR DS QZ92 CLOSE INDICATOR DC 110V , RED COLOR, LED	YSBPL2-DL11R	YONGSUNG	/26.E6
-CL3	PILOT LAMP FOR ES QZ92 CLOSE INDICATOR DC 110V , RED COLOR, LED	YSBPL2-DL11R	YONGSUNG	/27.E2
-CL4	PILOT LAMP FOR DS QZ91 CLOSE INDICATOR DC 110V , RED COLOR, LED	YSBPL2-DL11R	YONGSUNG	/27.E4
-CL5	PILOT LAMP FOR ES QZ91 CLOSE INDICATOR DC 110V , RED COLOR, LED	YSBPL2-DL11R	YONGSUNG	/27.E6
-CS1	SELECTOR SWITCH FOR CB Q0(QA1) CAM SWITCH SELECT SWITCH / PISTOL TYPE HANDLE / PULL AND TURN TYPE	YSDNC3102-64RP20B	YONG SUNG	/54.C3
-CS2	SELECTOR SWITCH FOR DS QZ92 CAM SWITCH SELECT SWITCH / EGG TYPE HANDLE / PULL AND TURN TYPE	YSDNC3102-64RE20B	YONG SUNG	/54.D3
-CS3	SELECTOR SWITCH FOR ES QZ92 CAM SWITCH SELECT SWITCH / EGG TYPE HANDLE / PULL AND TURN TYPE	YSDNC3102-64RE20B	YONG SUNG	/54.F3
-CS4	SELECTOR SWITCH FOR DS QZ91 CAM SWITCH SELECT SWITCH / EGG TYPE HANDLE / PULL AND TURN TYPE	YSDNC3102-64RE20B	YONG SUNG	/55.B3
-CS5	SELECTOR SWITCH FOR ES QZ91 CAM SWITCH SELECT SWITCH / EGG TYPE HANDLE / PULL AND TURN TYPE	YSDNC3102-64RE20B	YONG SUNG	/55.C3

DEVICE TAG	DEVICE DESCRIPTION / FUNCTION	PART NUMBER	MANUFACTURER	/Page.Path
-DLS	LIMIT SWITCH FOR LCP LIMIT SWITCH / DC125 V, 10 A / AC250V, 3A / HINGE ROLLER LEVER / SCREW TERMINAL(WITH TOOTHED WASHER)	X-10GW2-B	OMRON	/12.C3
-DS QZ91_ES QZ91	MULTI SOCKET FOR DS MULTY SOCKET FOR DS QZ91 (MX1) MULTI SOCKET CRIMP TERMINAL / 32 pin / AC 500 V / 16 A	HEE32 +HEE32 +HQ-5	WEIDMULLER	/58.A2
-DS QZ92_ES QZ92	MULTI SOCKET FOR DS MULTY SOCKET FOR DS QZ92 (MX1) MULTI SOCKET CRIMP TERMINAL / 32 pin / AC 500 V / 16 A	HEE32 +HEE32 +HQ-5	WEIDMULLER	/57.D2
-EMCS FDF	FDF FOR FIBER DISTRIBUTION FRAME 12PORT, LC TYPE	HM-12-LC 12C	HARRY RND	/51.A1
-F01	MINIATURE CIRCUIT BREAKER FOR CIRCUIT BREAKER CONTROL SUPPLY CLOSING & TRIP CIRCUIT 1 DOUBLE POLE, 10A	S202-C-2P-10A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/14.B3
-F02	MINIATURE CIRCUIT BREAKER FOR CIRCUIT BREAKER MOTOR SUPPLY DOUBLE POLE, 16A	S202-C-2P-16A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/14.B4
-F03	MINIATURE CIRCUIT BREAKER FOR INDICATION CIRCUIT SUPPLY DOUBLE POLE, 10A	S202-C-2P-10A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/14.B6
-F04	MINIATURE CIRCUIT BREAKER FOR PROTECTION RELAY -7UT85 SUPPLY DOUBLE POLE, 6A	S202-C-2P-6A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/14.B7
-F05	MINIATURE CIRCUIT BREAKER FOR RED BOX UNIT RSG907R SUPPLY DOUBLE POLE, 6A	S202-C-2P-6A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/15.B2
-F11	MINIATURE CIRCUIT BREAKER FOR CIRCUIT BREAKER CONTROL SUPPLY TRIP CIRCUIT 2 DOUBLE POLE, 10A	S202-C-2P-10A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/16.B3
-F12	MINIATURE CIRCUIT BREAKER FOR DS & ES MOTOR & CONTROL SUPPLY DOUBLE POLE, 10A	S202-C-2P-10A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/16.B4
-F13	MINIATURE CIRCUIT BREAKER FOR MERGING UNIT -IM2 SUPPLY DOUBLE POLE, 6A	S202-C-2P-6A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/16.B5

DEVICE TAG	DEVICE DESCRIPTION / FUNCTION	PART NUMBER	MANUFACTURER	/Page.Path
-F14	MINIATURE CIRCUIT BREAKER FOR PROTECTION RELAY -7SJ85 SUPPLY DOUBLE POLE, 6A	S202-C-2P-6A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/16.B8
-FA	MINIATURE CIRCUIT BREAKER FOR AC MAIN SUPPLY DOUBLE POLE, 32A	S202-C-2P-32A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/12.B2
-FD1	MINIATURE CIRCUIT BREAKER FOR DC1 MAIN SUPPLY DOUBLE POLE, 32A	S202-C-2P-32A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/14.B2
-FD2	MINIATURE CIRCUIT BREAKER FOR DC2 MAIN SUPPLY DOUBLE POLE, 32A	S202-C-2P-32A +S2C-H6R_1/14, 1/11, 1/12 +S2C-H6R_2/14, 2/11, 2/12	ABB	/16.B2
-FL1	FLUORESCENT LAMP INPUT : AC 110~240V, 50/60Hz	DH6W-340/RC	DONG HEE	/12.D3
-HEATER1	SPACE HEATER Space Heater / AC 230 V / 100W	RHTS-100W(230V)	RUN ELEC.	/12.D6
-HV SCADA FDF	FDF FOR RED BOX UNIT 12PORT, LC TYPE	HM-12-LC 12C	HARRY RND	/53.A1
-IM2	MERGING UNIT FOR MERGING UNIT MERGING UNIT. AC/DC 100~250V	IM2	HYOSUNG	/49.D2
-K7SJ	CONTROL RELAY FOR 7SJ85 FAILURE 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/28.E2
-K7UT	CONTROL RELAY FOR 7UT85 FAILURE 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/28.E4
-K11	CONTROL RELAY FOR CB Q0(QA1) CLOSE 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/18.E3
-K12	CONTROL RELAY FOR CB Q0(QA1) TRIP 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/18.E3

DEVICE TAG	DEVICE DESCRIPTION / FUNCTION	PART NUMBER	MANUFACTURER	/Page.Path
-K27	CONTROL RELAY FOR AC SUPPLY SUPERVISION 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/13.C7
-K41	MAGNETIC CONTACTOR FOR CB MOTOR CONTACTOR DC 110V / 3 MC + 1 NO 1 NC	MC-22b(DC110V)	LS ELECTRIC	/17.E2
-K42	THERMAL OVERLOAD RELAY FOR CB MOTOR CONTROL 1NO 1NC (5~8A)	MT-32/2H6.5	LS ELECTRIC	/17.B3
-K51	CONTROL RELAY FOR CB SPRING CHARGE EXCESSIVE RUN TIME ALARM 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/17.E5
-K71	CONTROL RELAY FOR ANTI-PUMPING OF CB DC 110 V / 4NO/NC / Operate time : 50ms max / Release time : 30ms max / DC-Switching type	MM4XP(DC110V)	OMRON	/19.E5
-KG1	CONTROL RELAY FOR CB Q0(QA1) GAS PRESSURE LOW STAGE-1 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/22.E5
-KG2	CONTROL RELAY FOR CB Q0(QA1) GAS PRESSURE LOW STAGE-2 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13 +CA4-22N	ABB	/22.E7
-KSIL1	SAFETY RELAY FOR TRIP SAFETY SYSTEM DC 24V / 3NO+1NC	BSR10	ABB	/20.E2
-KSIL2	SAFETY RELAY FOR TRIP SAFETY SYSTEM DC 24V / 3NO+1NC	BSR10	ABB	/22.C4
-KT1	TIMER FOR CB MOTOR RUNTIME CHECK DC 24-240 V / AC 100-240 V (50/60HZ) / 2NO/NC	AT8N	AUTONICS	/17.E4
-KVB1	CONTROL RELAY FOR VD1 L3 NO VOLTAGE 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/29.E4
-KVB2	CONTROL RELAY FOR VD2 L3 NO VOLTAGE 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/29.E8

DEVICE TAG	DEVICE DESCRIPTION / FUNCTION	PART NUMBER	MANUFACTURER	/Page.Path
-KVR1	CONTROL RELAY FOR VD1 L1 NO VOLTAGE 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/29.E2
-KVR2	CONTROL RELAY FOR VD2 L1 NO VOLTAGE 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/29.E5
-KVY1	CONTROL RELAY FOR VD1 L2 NO VOLTAGE 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/29.E3
-KVY2	CONTROL RELAY FOR VD2 L2 NO VOLTAGE 100-250V50/60HZ-DC / 2NO+2NC Screw clamp connections	NF22E-13	ABB	/29.E6
-LT	PUSH BUTTON FOR LAMP TEST PUSH BUTTON SWITCH Ø25, 2a, BLACK, AUTO RETURN	YSB12-20B	YONG SUNG	/55.E3
-LTX	CONTROL RELAY FOR LAMP TEST 100-250V50/60HZ-DC / 4NO+0NC Screw clamp connections	NF40E-13 +CA4-40N	ABB	/26.E2
-LTX1	CONTROL RELAY FOR LAMP TEST 100-250V50/60HZ-DC / 4NO+0NC Screw clamp connections	NF40E-13	ABB	/26.E2
-MU LPIT FDF	FDF FOR FIBER DISTRIBUTION FRAME 8PORT, LC TYPE	HM-8-LC 8C	HARRY RND	/50.C1
-MU LPVT FDF	FDF FOR FIBER DISTRIBUTION FRAME 8PORT, LC TYPE	HM-8-LC 8C	HARRY RND	/50.C2
-MX	CONTROL RELAY FOR DS/ES MANUAL OPER.MODE 100-250V50/60HZ-DC / 4NO+0NC Screw clamp connections	NF40E-13	ABB	/23.E2
-OL1	PILOT LAMP FOR CB Q0(QA1) OPEN INDICATOR DC 110V , GREEN COLOR, LED	YSBPL2-DL11G	YONGSUNG	/26.E4
-OL2	PILOT LAMP FOR DS QZ92 OPEN INDICATOR DC 110V , GREEN COLOR, LED	YSBPL2-DL11G	YONGSUNG	/26.E6

DEVICE TAG	DEVICE DESCRIPTION / FUNCTION	PART NUMBER	MANUFACTURER	/Page.Path
-OL3	PILOT LAMP FOR ES QZ92 OPEN INDICATOR DC 110V , GREEN COLOR, LED	YSBPL2-DL11G	YONGSUNG	/27.E2
-OL4	PILOT LAMP FOR DS QZ91 OPEN INDICATOR DC 110V , GREEN COLOR, LED	YSBPL2-DL11G	YONGSUNG	/27.E4
-OL5	PILOT LAMP FOR ES QZ91 OPEN INDICATOR DC 110V , GREEN COLOR, LED	YSBPL2-DL11G	YONGSUNG	/27.E6
-RS1	ROTARY SWITCH FOR ES QZ91 CAM SWITCH ROTARY SWITCH FOR 2 POSITION	YSBR2-222B	YONG SUNG	/55.D3
-RSG907R	RED BOX FOR RED BOX UNIT 4 x 100BASE-FX + 3 x 1000 BASE-X (SFP), 3 x 1 Gbit/s SFP ports, LO 24/48 VDC (12 – 60 VDC), HI (85 – 264 VAC / 88 – 300 VDC)	RSG907R	SIEMENS	/15.C2
-S01	KEY CAM SWITCH 76X76mm / 20A / MANUAL RETURN TYPE	YSKDNC2504-79M20	YONG SUNG	/54.B3
-7SJ85	PROTECTION RELAY FOR PROTECTION IED Firmware:Current version, Binary inputs:59, Binary outputs:33 Relays, Power Supply:DC 60 V-250 V, AC 100 V-230 V	7SJ85 +7SJ85	SIEMENS	/31.D1
-SOCKET	SOCKET FOR AC 220V RECEPTACLE SOCKET OUTLET / AC 250 V / 16 A / 2P	M1173	ABB	/12.C4
-TCS1	TCS FOR Circuit Supervision Relay DC 110/125 V, Rated Voltage : 82.5 to 137.5, 1-phase, With base	7PA30	SIEMENS	/56.E2
-TCS2	TCS FOR Circuit Supervision Relay DC 110/125 V, Rated Voltage : 82.5 to 137.5, 1-phase, With base	7PA30	SIEMENS	/56.E6
-THD	THERMO-HUMIDSTAT FOR HEATER CIRCUIT Temperature Range : -10 ~ 50°C Humidity range : 30 ~ 90 %	RHC-90-HS	RUN ELEC.	/12.C7
-TP1	POWER SUPPLY FOR SAFETY RELAY Input data : AC input voltage : 85 VAC ~ 264 VAC, DC input voltage : 90 VDC ~ 350 VDC, AC frequency range : 45 Hz ~ 65 Hz Output data : setting range of the output voltage : 22.5 VDC ~ 28.5 VDC, Output current : 3.5 A	QUINT-PS-100-240AC/24DC/3.5	PHOENIX CONTACT	/22.C1

DEVICE TAG	DEVICE DESCRIPTION / FUNCTION	PART NUMBER	MANUFACTURER	/Page.Path
-TT1	TEST SWITCH FOR FLEXITEST SWITCH FOR 7SJ85 4 Potential 6 Current Flexitest Switch.	FT-1-129A514G01	ABB	/56.C2
-TT2	TEST SWITCH FOR FLEXITEST SWITCH FOR 7UT85 4 Potential 6 Current Flexitest Switch.	FT-1-129A514G01	ABB	/56.D2
-7UT85	PROTECTION RELAY FOR PROTECTION IED Firmware:Current version, Binary inputs:7, Binary outputs:7 Relays, Power Supply:DC 60 V-250 V, AC 100 V-230 V	7UT85	SIEMENS	/43.D1
-VDB1	VOLTAGE SENSOR FOR VD RELAY VOLTAGE SENSOR, 0.2~12V(AC/DC), DC100/110V	SDV-DM4, 0.2~12V, DC100/110V	OMRON	/29.B4
-VDB2	VOLTAGE SENSOR FOR VD RELAY VOLTAGE SENSOR, 0.2~12V(AC/DC), DC100/110V	SDV-DM4, 0.2~12V, DC100/110V	OMRON	/29.B7
-VDR1	VOLTAGE SENSOR FOR VD RELAY VOLTAGE SENSOR, 0.2~12V(AC/DC), DC100/110V	SDV-DM4, 0.2~12V, DC100/110V	OMRON	/29.B1
-VDR2	VOLTAGE SENSOR FOR VD RELAY VOLTAGE SENSOR, 0.2~12V(AC/DC), DC100/110V	SDV-DM4, 0.2~12V, DC100/110V	OMRON	/29.B5
-VDY1	VOLTAGE SENSOR FOR VD RELAY VOLTAGE SENSOR, 0.2~12V(AC/DC), DC100/110V	SDV-DM4, 0.2~12V, DC100/110V	OMRON	/29.B2
-VDY2	VOLTAGE SENSOR FOR VD RELAY VOLTAGE SENSOR, 0.2~12V(AC/DC), DC100/110V	SDV-DM4, 0.2~12V, DC100/110V	OMRON	/29.B6

TERMINAL SUMMARY

HS_HIS_F14_TIBAT

TERMINAL DESIGNATION	FUNCTION	MANUFACTURER	TYPE	QUANTITY	TERMINAL DIARAM REFERENCE PAGE
-X1	TERMINAL BLOCK FOR CB Q0(QA1)(CB) FOR CIRCUIT	PHOENIX CONTACT	USST 4-MT	50	
-X2	TERMINAL BLOCK FOR DS QZ92 DS OPERATING MECHANISM CIRCUIT	PHOENIX CONTACT	USST 4-MT	40	
-X3	TERMINAL BLOCK FOR ES QZ92 ES OPERATING MECHANISM CIRCUIT	PHOENIX CONTACT	USST 4-MT	40	
-X6	TERMINAL BLOCK FOR DS QZ91 DS OPERATING MECHANISM CIRCUIT	PHOENIX CONTACT	USST 4-MT	40	
-X7	TERMINAL BLOCK FOR ES QZ91 ES OPERATING MECHANISM CIRCUIT	PHOENIX CONTACT	USST 4-MT	40	
-X11	TERMINAL BLOCK FOR CB CLOSE & TRIP-1 CIRCUIT	PHOENIX CONTACT	USST 4-MT	10	
-X12	TERMINAL BLOCK FOR CB TRIP-2 CIRCUIT	PHOENIX CONTACT	USST 4-MT	10	
-X13	TERMINAL BLOCK FOR EXTERNAL CIRCUIT	PHOENIX CONTACT	USST 4-MT	45	
-X21	TERMINAL BLOCK FOR 7SJ85 INPUT CIRCUIT	PHOENIX CONTACT	USST 4-MT	80	
-X21A	TERMINAL BLOCK FOR 7SJ85 OUTPUT CIRCUIT	PHOENIX CONTACT	USST 4-MT	70	
-X21B	TERMINAL BLOCK FOR EXTERNAL CIRCUIT	PHOENIX CONTACT	USST 4-MT	20	
-X22	TERMINAL BLOCK FOR 7UT85 INPUT CIRCUIT	PHOENIX CONTACT	USST 4-MT	40	
-X22A	TERMINAL BLOCK FOR 7UT85 OUTPUT CIRCUIT	PHOENIX CONTACT	USST 4-MT	35	
-X23	TERMINAL BLOCK FOR IM2 INPUT CIRCUIT	PHOENIX CONTACT	USST 4-MT	10	
-X30	TERMINAL BLOCK FOR DP-200N1 CIRCUIT	PHOENIX CONTACT	UT10	5	
-X31	TERMINAL BLOCK FOR DP-200F1 CIRCUIT	PHOENIX CONTACT	UT35	5	
-X32	TERMINAL BLOCK FOR DP-200F1 CIRCUIT	PHOENIX CONTACT	UT35	5	
-X33	TERMINAL BLOCK FOR HEATER CIRCUIT	PHOENIX CONTACT	USST 4-MT	20	
-X34	TERMINAL BLOCK FOR LPVT/LPIT-1 CIRCUIT	PHOENIX CONTACT	USST 4-MT	10	
-X35	TERMINAL BLOCK FOR LPVT/LPIT-2 CIRCUIT	PHOENIX CONTACT	USST 4-MT	10	
-X41	TERMINAL BLOCK FOR TR-100AD1 CT CIRCUIT	PHOENIX CONTACT	OTTA 6-T-P/P	5	
-X42	TERMINAL BLOCK FOR SG-100D1 CT CIRCUIT	PHOENIX CONTACT	OTTA 6-T-P/P	10	
-X43	TERMINAL BLOCK FOR TR-100AD1 CT CIRCUIT	PHOENIX CONTACT	OTTA 6-T-P/P	5	

HYOSUNG HEAVY INDUSTRIES

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
03	18/10/24	Y.D.LEE	ACCEPTED FOR CONSTRUCTION (AFC)	Y.D.LEE	Y.W.LEE	S.J.CHO
02	06/08/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
01	05/06/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO
00	01/02/24	Y.D.LEE	ISSUE FOR CLIENT REVIEW (ICR)	Y.D.LEE	Y.W.LEE	S.J.CHO

SUBSTATION: BLPH

EQUIPMENT: 66kV, 40kA GIS

DOC. TYPE: CIRCUIT AND WIRING DIAGRAM

LOCATION: HOLLANDSE KUST NOORD WIND PARK

TITLE: TERMINAL SUMMARY

DWG. NO.: 1723001595-EL-DG-00015

CONTRACT NO: CW-I-WP4-2023-05

REV. 03

SH. 72 / 72

CONT. =INT/1

Section 6 MECHANICAL COMPLETION STATUS INDEX - INSTRUMENTAL DISCIPLINE

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on subsystem: 81-10 & process: MC & discipline : I

Instrumental	81-10 GIS 66 kV (HNA6-AFA70)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
C-CP-100E1/B400-SIS-001	TRIP SIGNAL / MARSHALLING PCS	ONSHORE	C10000188	CJX10	100	2025-01-21	RFC 1

ROSETTI MARINO — CROSSWIND

ITEM	Tag	C-CP-100E1/B400-SIS-001 : TRIP SIGNAL / MARSHALLING PCS				Dwg	123A90-DDL-IN-LIS-40091
	S/Sys	81-10 : GIS 66 kV (HNA6-AFA70)				Module	LD_B-100/LD_B-400
TASK	code	C10000188		Location	Onshore Activities	User	Rosetti Marino Quality Control
FORM	Process	MC	Activity CCK	Discipline	Instrumental Form CJX10		Multi/Single-Core Instrument Control Cable

CABLE DATA

Type: Cu-MICA-XLPE-OS-LSZH-SWB-LSZH — Cores/Size mm²: 2X2,5 mm2 — Color: ORANGE

From: CP-100E1 — To: B400-SIS-001

1	Check cable is as specified in project cable schedule.	OK
2	Check relevant documents are at the latest revision.	OK
3	Check cable is routed in accordance with cable layout drawings.	OK
4	Check cable for any physical damage.	OK
5	Check cable is adequately supported and correctly fixed to rack according to Project specification.	Note
6	Check bending radius is within the specified limits.	OK
7	Check cable is correctly loomed and segregated in accordance with specification.	OK
8	Check cable and core marking are in accordance with specification.	OK
9	Check cable labelling is in accordance with specification.	OK
10	Check that glands, shrouds and earthing are in accordance with specification.	OK
11	Check terminations are in accordance with termination diagram	OK
12	Check gland plate for single core cables is non-ferrous.	NA
13	If required produce Red Line Mark Up for "AS BUILT"	

INSULATION	CORE to EARTH		>999	MΩ
	CORE to CORE		>999	MΩ
	CORE to SCREEN		>999	MΩ
	CORE to ARMr		>999	MΩ
	SCREEN to EARTH		>999	MΩ
	SCREEN to ARMr		>999	MΩ
CONTINUITY	CORES		0,5	Ω
	SCREEN		0,5	Ω
	EARTH		0.6	Ω
	ARMr		0,6	Ω
	TEST VOLTS		500	V

TEST ALL CORES AND RECORD LOWEST VALUE

Notes: The lowest value is recorded and must be within project specifications

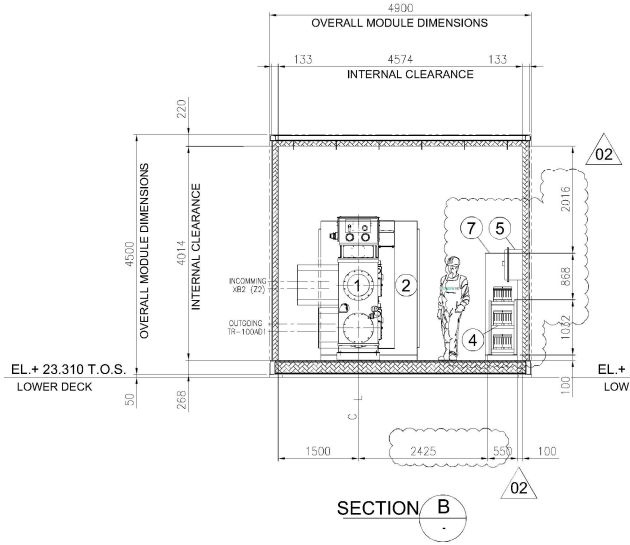
TESTING INSTRUMENTS USED

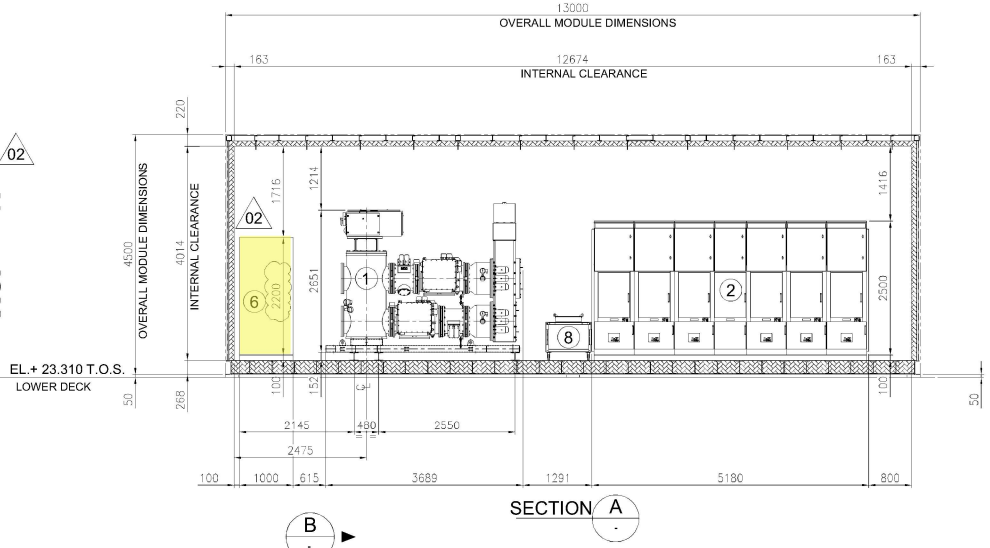
TYPE / SERIAL N°: VOLCRAFT 1000V ET-200 S/N:H240103023 — Calibration date: 12/10/2024

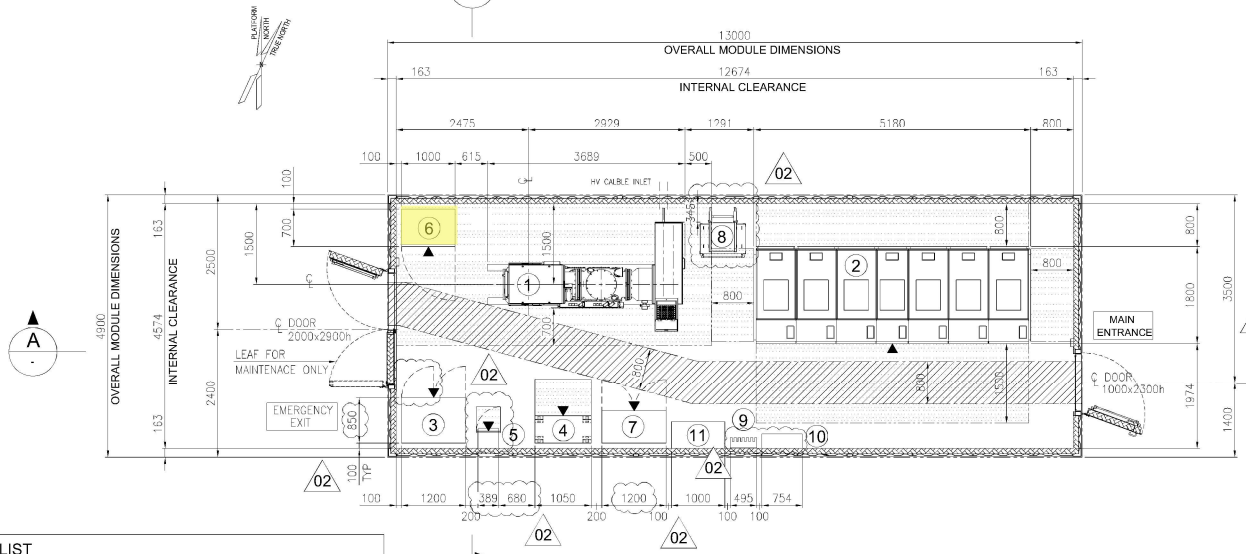
Comments: Nota 5: refer to PL C30000680

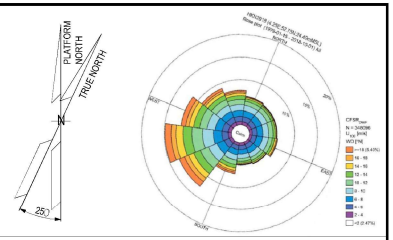
Page 1/1	Performed by	☑ WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	RM(ROSETTI MARINO)	
Name	Michele Tartaglia	Paolo Schintu	
Date	2025-01-17	2025-01-21	
Signature	PROVERLIS Digitaly signed by Michele Tartaglia 2025-01-17T07:46:03.175Z	PROVERLIS Digitaly signed by Paolo Schintu 2025-01-21T16:34:38.007Z	

DRAWING No. 123A90-DDL-EL-DL-20104 REV. 02









NOTES

1. U.N.O. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DELETED
3. DOCUMENT VALID ONLY FOR ELECTRICAL COMPONENT.
4. FOR OTHER ITEMS, CORRECT LOCATION AND INFROMATION, PLEASE REFER TO VENDORS AND DEDICATED PROJECT DOCUMENTATION.
5. HEIGHT OF ALL PANELS IN THE EQUIPMENT LIST TABLE IS WITHOUT THE BASE FRAME (100mm)

02

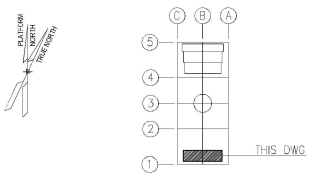
LEGEND

U.N.O.	UNLESS NOTED OTHERWISE
T.O.S.	TOP OF STEEL
	ESCAPE CORRIDOR - WIDTH 800mm.
	MAINTENANCE AREA - VENDOR REQUIREMENT
	SWITCHGEAR ROOM ENCLOUSURE
▼	FRONT OF EQUIPMENT

REFERENCES

DOCUMENT TITLE	DOCUMENT NUMBER
66kV SWITCHGEAR (GIS) GENERAL ARRANGEMENT DRAWING	1723001595-EL-DA-00006
CIRCUIT AND WIRING DIAGRAM	1723001595-EL-DG-00015
SG-100D1 GENERAL ARRANGEMENT DRAWING	1723002197-EL-DA-00006
DC UPS – GENERAL ARRANGEMENT AND DIMENSIONAL DRAWINGS	1724000372-EL-DA-00003
DC UPS – BATTERY LAYOUT AND INTERCONNECTING DIAGRAM	1724000372-EL-DG-00010
B-100 - GENERAL ARRANGEMENT DRAWINGS - E&I SHELTER	1724000049-AR-DA-00014

KEY PLAN



EQUIPMENT LIST

REF.	TAG No.	DESCRIPTION	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	NOTE
1	HNA6-AFA70	66kV SWITCHGEAR (GIS)	3689	2025	2651	
2	SG-100D1	6.6kV SWITCHGEAR	5180	1800	2500	
3	UP-200F1	DC UPS PANEL	1200	850	2105	
4	BA-200F1	DC UPS BATTERY RACK	1050	510	1272	
5	CB-200F1 02	ISOLATOR FOR DC UPS	452	377	634	
6	CP-100E1	66 kV SWITCHGEAR LOCAL CONTROL PANEL	1000	700	2200	02
7	B100-HSB-001	DISTRIBUTION & HVAC PANEL - HV MV ROOM	1200	600	1900	
8	-	SERVICE TROLLEY FOR 6.6kV SWITCHGEAR	943	862	874	
9	-	TOOL BOX	495	200	200	
10	-	SUBSTATION LIFE SAVING & INTERVENTION KIT	754	270	840	
11	-	TABLE	1000	500	750	

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20104**

REV.:	DATE:	SIGNATURE:
2_A	08/08/24	G.Randi

ROSETTI MARINO SpA

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	27/05/2024	FMO	LMA/AMA	LMA/MDO	ACCEPTED FOR CONSTRUCTION (AFC)
01	26/03/2024	GPA	LMA/AMA	LMA/MDO	ISSUE FOR REVIEW (IFR)
00	10/11/2023	DSF	CB/AMA	DMO/MDO	ISSUE FOR REVIEW (IFR)

CROSSWIND

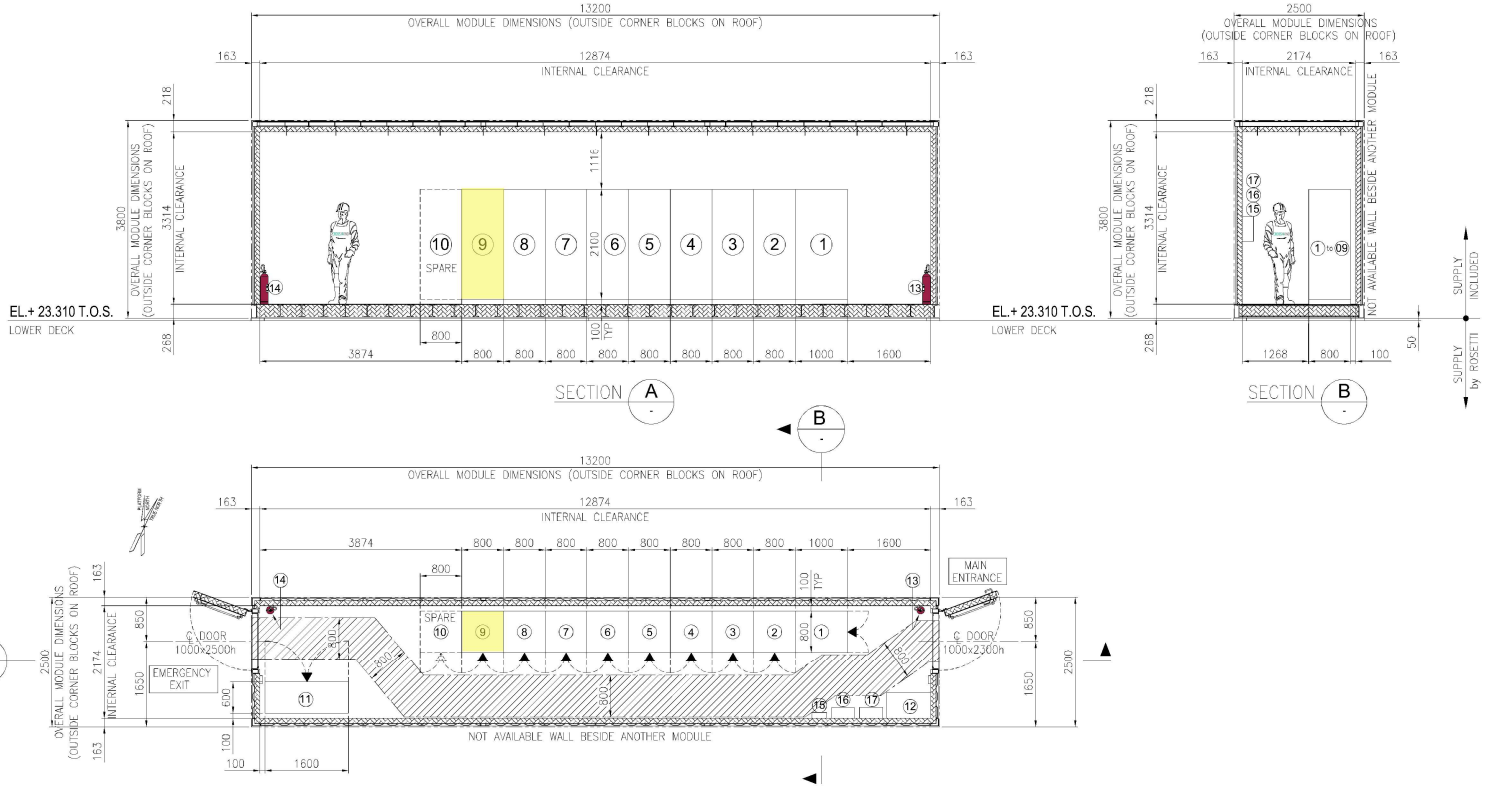
ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
HV SWITCHROOM

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:50
DRAWN GPA	CHECKED LMA/AMA	APPROVED LMA/MDO	DATE 27/05/2024
A1	DRAWING NO. 123A90-DDL-EL-DL-20104	SHEET 001	REV. 02

File Name : 123A90-DDL-EL-DL-20104_REV02.dwg

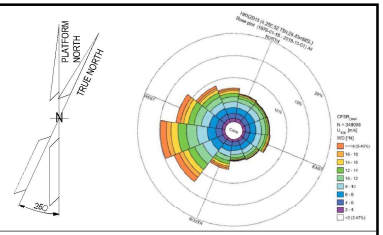
DRAWING NO. 123A90-DDL-IN-DL-40012 REV. 03



EQUIPMENT LAYOUT
"B-400" I&T EQUIPMENT ROOM
BOTTOM PLAN

EQUIPMENT LIST

REF.	TAG No.	DESCRIPTION	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	NOTE
1	B400-SRV-001	SERVER CABINET	1000	800	2100	
2	B400-NET-001	NETWORK CABINET	800	800	2100	
3	B400-EMCS-001	EMCS SYSTEM CABINET	800	800	2100	
4	B400-PCS-002	PCS MARSHALLING CABINET	800	800	2100	
5	B400-PCS-001	PCS SYSTEM CABINET 03	800	800	2100	
6	B400-FGS-003	FGS MARSHALLING CABINET 2	800	800	2100	
7	B400-FGS-002	FGS MARSHALLING CABINET 1	800	800	2100	
8	B400-FGS-001	FGS SYSTEM CABINET	800	800	2100	
9	B400-SIS-001	SIS SYSTEM/MARSHALLING CABINET	800	800	2100	
10	-	SPARE				
11	B400-HSB-001	DISTRIBUTION & HVAC PANEL - I&T ROOM	1600	600	2300	
12	-	TARI F	850	500	750	
13	-	PORTABLE EXTINGUISHER (CO2) 5 Kg.	150	150	750	
14	-	PORTABLE EXTINGUISHER (CO2) 5 Kg.	150	150	750	
15	-	FIRST AID KIT	280	115	200	
16	-	RESUSCITATION UNIT	430	210	480	
17	-	CABINET INCLUDED N.10 ESCAPE MASK	448	213	422	



NOTES

1. U.N.O. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DOCUMENT VALID ONLY FOR INSTRUMENT COMPONENT, FOR OTHER SCOPE LOCATION AND INFORMATION, PLEASE REFER TO VENDORS AND PROJECT DOCUMENTS.

LEGEND

U.N.O. _____ UNLESS NOTED OTHERWISE
T.O.S. _____ TOP OF STEEL
_____ ESCAPE CORRIDOR – WIDTH 800mm.
_____ EQUIPMENT ROOM ENCLOSURE
_____ FRONT OF EQUIPMENT

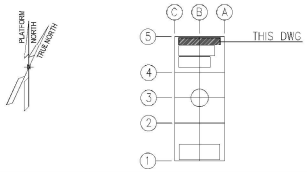
HOLDS

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REFERENCE

DOCUMENT TITLE	DOCUMENT NUMBER
Control System Architecture Detailed Drawings	123A90-DDL-IN-DD-40096
Data Network Architecture Drawings	123A90-DDL-IN-DD-40019
Earthing layouts drawings (CCR, ITER)	123A90-DDL-IN-DL-40013
Instrument and Telecom MCT Layout – Lower Deck	123A90-DDL-IN-DL-40086
"B-400" I&T Equipment Room – Architectural Layout	123A90-DDL-AR-DL-10015
"B-400" ARCHITECTURAL GENERAL LAYOUT PLAN, WIEW, SECTIONS & TYP. DETAILS	123A90-DDL-AR-DL-10015
"B-400" GENERAL ARRANGEMENT DRAWING	1724000049-AR-DA-00017
"B-400" GENERAL ARRANGEMENT DRAWING	1724000049-AR-DD-00021
"B-400" HVAC SYSTEM G.A. and DETAILS	1724000049-HV-DA-00067

KEY PLAN



REV.	DATE	DRN.	CHKD	APPD	DESCRIPTION
03	04/10/24	VBA	LCA	DLO	ACCEPTED FOR CONSTRUCTION (AFC)
02	27/05/24	MGA	LCA	DLO	ACCEPTED FOR CONSTRUCTION (AFC)
01	22/01/24	VBA	LCA	DLO	ISSUE FOR REVIEW (IFR)
00	07/11/23	VBA	LCA	DLO	ISSUE FOR REVIEW (IFR)

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DL-40012**

REV.:	DATE:	SIGNATURE:
3_A	07/10/24	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
OFF-SHORE ITER
EQUIPMENT LAYOUT

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:33.3
DRAWN MGA	CHECKED LCA	APPROVED DLO	DATE 27/05/24
A1	DRAWING NO. 123A90-DDL-IN-DL-40012	SHEET 001	REV. 03

File Name : 123A90-DDL-IN-DL-40012 Rev.03.dwg

DRAWING NO. 123-A90-DDL-IN-DG-40016

REV. 01

FIELD		I&T EQUIPMENT ROOM (ITER)
B-100 - HV SWITCHGEAR ROOM	CABLE NO	MARSHALLING CABINET B400-SIS-001

<01>

OPEN WIND FARM INCOMING CIRCUIT BREAKERS (CP-100E1)	81-XS-001	TB-X13 13 (1BK) 14 (2BK) NOTE-2	C-CP-100E1/B400-SIS-001 2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS	TB-XS-000 31 (1BK) 32 (2BK) Shield Bar	81-XS-001
OPEN SOLAR INCOMING CIRCUIT BREAKERS (SG-100D1)	82-XS-001	TB-XM 51 (1BK) 52 (2BK) NOTE-2	C-SG-100D1-001/B400-SIS-001 ~~SG-100D1-001/B400-SIS-001~~ 2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS	TB-XS-000 33 (1BK) 34 (2BK) Shield Bar	82-XS-001
OPEN BESS A-85000 INCOMING CIRCUIT BREAKERS (SG-100D1)	82-XS-002	TB-XM 43 (1BK) 44 (2BK) NOTE-2	C-SG-100D1-002/B400-SIS-001 ~~SG-100D1-002/B400-SIS-001~~ 2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS	TB-XS-000 35 (1BK) 36 (2BK) Shield Bar	82-XS-002
OPEN FUEL CELL A-80000 INCOMING C. BREAKERS (SG-100D1)	82-XS-003	TB-XM 37 (1BK) 38 (2BK) NOTE-2	C-SG-100D1-003/B400-SIS-001 ~~SG-100D1-003/B400-SIS-001~~ 2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS	TB-XS-000 37 (1BK) 38 (2BK) Shield Bar	82-XS-003
DISCONNECT DC UPS BATTERY DC UPS (CB-200F1)	84-XS-006	TB-X3 7 (1BK) 8 (2BK) NOTE-2	C-CB-200F1/B400-SIS-001 ~~CB-200F1/B400-SIS-001~~ 2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS	TB-XS-000 39 (1BK) 40 (2BK) Shield Bar	84-XS-006
INHIBIT. BATTERY CHARGING DA UPS (UP-200F1)	84-XS-009	TB-X10 1 (1BK) 2 (2BK) NOTE-2	C-UP-200F1/B400-SIS-001 ~~UP-200F1/B400-SIS-001~~ 2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS	TB-XS-000 41 (1BK) 42 (2BK) Shield Bar	84-XS-009

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DG-40016**

REV.:	DATE:	SIGNATURE:
1_O	08/01/25	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

TITLE :

BASE LOAD POWER HUB (BLPH)
INSTRUMENT–SAFETY SYSTEM WIRING DIAGRAMS
ELECTRICAL EQUIPMENT – SHUTDOWN

CONTRACT NO./TITLE			SCALE N/A
DRAWN VBA	CHECKED LCA	APPROVED DLO	DATE 23/02/2024

	DRAWING NO.	SHEET	REV.
A3	123A90–DDL–IN–DG–40016	022	01

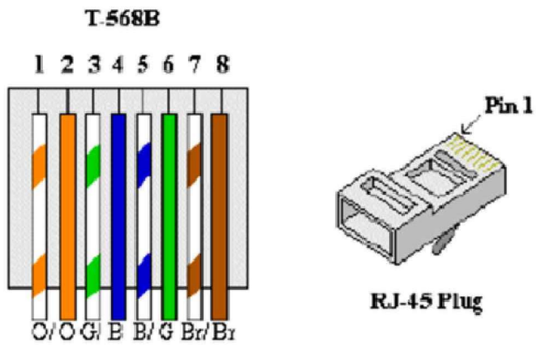
File Name : 123A90-DDL-IN-DG-40016_Rev.01

DRAWING NO. 123A90-DDL-IN-DG-40015

REV. 01

NOTES:

1. ALL SPARE ENTRIES SHALL BE PROVIDED WITH CERTIFIED EX PROOF PLUGS.
2. CABLE SCREENS / DRAIN WIRE SHALL BE SECURELY INSULATED AND TIED BACK IN THE INSTRUMENT SIDE AND SHAL BE TERMINATED IN THE MARSHALLING SIDE OF THE PANEL.
3. SPARE PAIRS / TRIADS SHALL BE CONNECTED TO TERMINALS IN JUNCTION BOX AND PANEL / MARSHALLING CABINETS.
4. ALL CABLE SCREENS TO BE TERMINATED AT THE INSTRUMENT EARTH BAR IN THE RESPECTIVE EARTH BARS (IS OR NIS) AS APPLICABLE IN THE MARSHALLING CABINET.
5. SWITCH TAG NAME AND PORT WILL BE DEFINED DURING THE CONSTRUCTION PHASE
6. FOR OPTICAL FIBERS, USE THE FOLLOWING COLOR CODING:
   - 01- RED
   - 02- GREEN
   - 03- BLUE
   - 04- YELLOW
   - 05- GREY
   - 06- PURPLE
   - 07- BROWN
   - 08- ORANGE
   - 09- WHITE
   - 10- PINK
   - 11- BLACK
   - 12- TURQUOISE
7. CAT.6A CABLE SHALL BE TERMINATED MEETING REQUIREMENTS OF STANDARD EIA/TIA 568B:



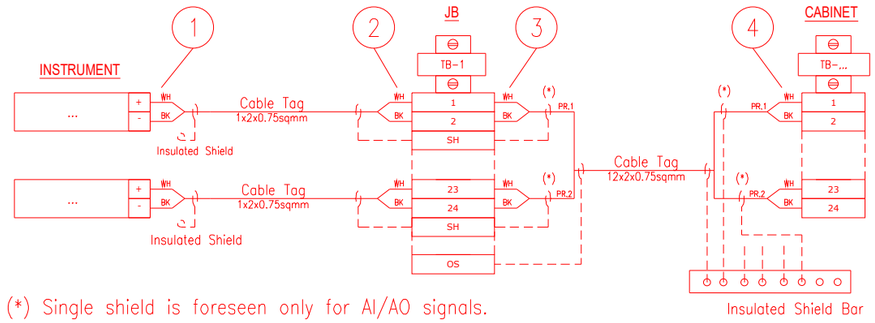
8. FOR INTRISICALLY SAFE CIRCUIT USE LIGHT BLUE CABLE OR ALTERNATIVELY ORANGE CABLE WITH HEAT SHRINKABLE SLEEVE BLUE AT BOTH END (SEE DOC. 123A90-FDL-IN-DD-40017).

LEGENDS & SYMBOLS:

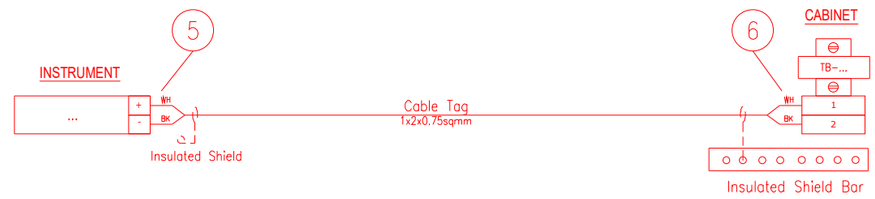
I.E.	- GREEN ⟶ INSTRUMENT SIGNAL EARTH
P.E.	- GREEN / YELLOW ⟶ P.E. EARTH / BONDING
	- TERMINAL BLOCK (TB)
WH	- WHITE
BK	- BLACK
RD	- RED
S	- SHIELD TERMINAL
OS	- OVERALL SHIELD TERMINAL
O/A Shld	- OVERALL SHIELD
I&O/A Shld	- INDIVIDUAL & OVERALL SHIELD
NIS	- NON INTRINSICALLY SAFE
IS	- INTRINSICALLY SAFE
P.E.	- PLANT EARTH
PCS	- PROCESS CONTROL SYSTEM
ESD	- EMERGENCY SHUTDOWN SYSTEM
SIS	- SAFETY INSTRUMENT SYSTEM
FGS	- FIRE & GAS SYSTEM
MC	- MARSHALLING CABINET
AI	- ANALOGUE INPUT
AO	- ANALOGUE OUTPUT
DI	- DIGITAL INPUT
DO	- DIGITAL OUTPUT
JE	- JUNCTION BOX FOR ELECTRICAL SIGNALS

PHILOSOPHY OF CROSS-FERRULING:

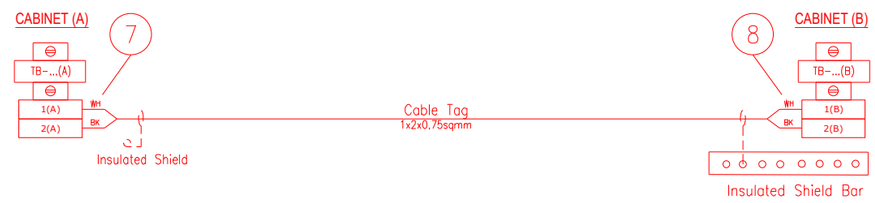
INSTRUMENT CONNECTION THROUGH MARSHALLING JB TO CABINET



INSTRUMENT CONNECTION STRAIGHT TO CABINET



CABINET CONNECTION TO CABINET



1 - INSTR. TERMINAL NO. OR POLARITY / JB TAG / JB TERMINAL NO.
2 - INSTR. TERMINAL NO. OR POLARITY / INSTR. TAG / JB TERMINAL NO.
3 - JB TERMINAL NO. / JB TERMINAL STRIP / CABINET TERMINAL STRIP / PAIR OR CORE NO.
4 - PAIR OR CORE NO. / JB TAG / JB TERMINAL NO. / CABINET TERMINAL STRIP / CABINET TERMINAL NO.
5 - INSTR. TERMINAL NO. OR POLARITY / CABINET TAG / CABINET TERMINAL STRIP / CABINET TERMINAL NO.
6 - INSTR. TERMINAL NO. OR POLARITY / INSTR. TAG / CABINET TERMINAL STRIP/ CABINET TERMINAL NO.
7 - TERMINAL NO. (A) / TERMINAL STRIP (A) / CABINET TAG (B) / CABINET TERMINAL NO. (B) / PAIR OR CORE NO.
8 - PAIR OR CORE NO. / CABINET TERMINAL NO. (A) / CABINET TAG (A) / TERMINAL STRIP (B) / TERMINAL NO. (B)

NOTES: A - HEAT SHRINKABLE BLACK FOR SHIELD OF NIS INSTRUMENT CABLE.
HEAT SHRINKABLE BLUE FOR SHIELD OF IS INSTRUMENT CABLE.
B - ABOVE DESCRIBED PHILOSOPHY IS INTENDED FOR CONNECTION AS REPRESENTED:
IN CASE OF CONNECTION FROM THE OPPOSITE SIDE, ORDER OF FERULE TAG SHALL BE MIRRORED.
C - SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO SHIELDS TERMINATED ON TERMINAL STRIP.

REFERENCE DRAWINGS:

PIPING AND INSTRUMENT DIAGRAM 123A90-DDL-PR-PID-80009
INSTRUMENT INDEX 123A90-DDL-IN-LIS-40088
F&G DETECTORS LAYOUT 123A90-DDL-SAF-DL-30027

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DG-40016**

REV.:	DATE:	SIGNATURE:
1_O	08/01/25	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

TITLE :
BASE LOAD POWER HUB (BLPH)
INSTRUMENT – PCS WIRING DIAGRAMS
GENERAL NOTES/LEGENDS

CONTRACT NO./TITLE			SCALE N/A
DRAWN VBA	CHECKED LCA	APPROVED DLO	DATE 23/02/2024

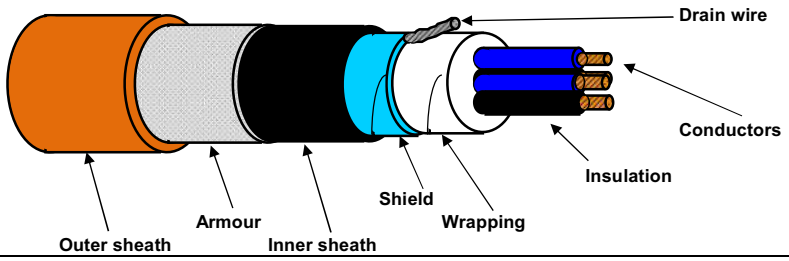
	DRAWING NO.	SHEET	REV.
A3	123A90-DDL-IN-DG-40015	003	01

File Name : 123A90-DDL-IN-DG-40015_Rev.01

Tag Number	Category	Discipline	Eng Status	NativeDoc	Layout	Parent Tag	Main Function	Secondary Function	Area	From Tag	From Main Function	From Area	From Tag Section	To Tag	To Main Function	To Area	To Tag Section	Material ID	Material Desc.	Gland Standard	From Gland	From Entry	From Fitting	To Gland	To Entry	To Fitting	Routing	Routing Manual
C-CP-100E1/B400-SIS-001	Cable	IN	VFC	123A90-DDL-IN-LIS-40091						CP-100E1	66 kV GIS Local Control Panel	Lower Deck (B-100)	81-XS-001	B400-SIS-001	Marshalling SIS	Lower Deck (B-400)		SMICVI2-2X2,5	Cable Cu CL2/MGT/XLPE/OS/ILSZH/SWB/LSZH 150/250V (300V) 2x2,5mm² - Orange	M20	T2_M20_Double			n.a.				I-MCT-101 / B-100-SEC-1D / B-100-SEC-1C / B-100-SEC-1A / L-SEC-17 / L-SEC-1N / L-SEC-1M / L-SEC-1L / L-SEC-1J / L-SEC-1I / L-SEC-1H / L-SEC-1G / L-SEC-1F / L-SEC-1E / L-SEC-1D / L-SEC-1C / L-SEC-1B / L-SEC-1A / B-400-SEC-1A / I-MCT-401

Cu Cl.2/MGT/XLPE/OS/LSZH/SWB/LSZH 150/250 V (300 V)

2X2,5 - INSTRUMENT CABLE - Fire Resistant - Not I.S.



TECHNICAL FEATURES

Conductors :	**7-STRANDED** plain/bare soft annealed copper wires	**IEC 60228 Class 2**
Insulation :	Mica/Glass Tape (MGT) plus XLPE, Nominal Thickness 0,6 mm	
Cores colour code :	**Black NUMBERED (from 1 to 2)**	
Pair Assembling :	Not required	
Pair Wrapping:	Not required	
Drain wire :	Not required	
Pair Shield :	Not required	
Shield Insulation :	Not required	
Total Assembling :	8/1mt	
Overall Wrapping:	by polyester-PET Minimum Thickness 0,010 mm tape helically wound (overlap ≥ 25%)	
Drain wire :	7-Stranded **TINNED** annealed copper drain wire, **size 1,0 sqmm**, in continuous contact with the shield	
Overall Shield :	by Aluminium-**Al** Minimum Thickness 0,008 mm / polyester-**PET** Minimum Thickness 0,010 mm tape helically wound (overlap ≥ 25%)	
Inner sheath :	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type **SHF1** to IEC 60093.360, Average Thickness 1,1 mm	
Inner sheath color code:	**Black**	
Armour :	Galvanized Steel Wire Braid Armour (coverage ≥ 90%)	
Outer sheath :	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type **SHF1** to IEC 60093.360, moisture/abrasion/UV Resistant,	
	Average Thickness 1,3 mm	
Outer sheath color code:	**Orange**	
Outer printing (INKJET) :	**FLEI - 2X2,5 SQMM - MGT/XLPE/OS/LSZH/SWB/LSZH - 150/250 V - IEC 60331.21 -**	
(every 1000 mm)	**IEC 60332.1.2 - IEC 60332.3.22 - Year of Manufacture - CE + Meter Marking**	
Under armour diameter :	(10,3 ± 10%) mm	
Over armour diameter :	(11,5 ± 10%) mm	
Outer diameter :	(14,1 ± 10%) mm	
Bending radius :	cable outer diameter x 10 (in fixed installation)	
Voltage Test :	1,5 kV a.c. for 5' (Between Cores) / 1,5 kV a.c. for 5' (Between Cores - Shield)	
Conductors DC Resistance :	≤ 7,86 Ω/km (@ 20°C)	
Insulation Resistance :	≥ 1000 MΩ x Km (@ 20°C)	
Applicable Standards		
Design Guidelines :	**IEC 60092.376**	
ON COMPLETE CABLE		
Fire Resistant test :	**IEC 60331.21**	
Flame Retardant test :	IEC 60332.1.2 - IEC 60332.3.22	
Acid Gas generation :	IEC 60754.1/2	
Smoke density/Light Transmittance :	IEC 61034.2 (LT ≥ 60%)	
Hazardous Areas :	IEC 60079.14 par.9.3.2a	
Temperature Range :		
ON INSULATION	(max +90°C) (max continuous operation temperature of conductors)	
	(max +250°C) (max conductors temperature during short-circuit for 5 seconds)	
ON COMPLETE CABLE		
During Operation :	(-20°C up to +90°C) (in fixed installation)	
During installation :	(- 5°C up to +50°C)	
Note :	**To meet the requirements of installation and use in Zone 1 & Zone 2 (IEC 60079-14) and "Gas & Vapour Tight" the cable must be provided with Penetrating Inner sheath together with correct ATEX approved equipment or accessories.**	

Office	Date	Sign	Rev.	Date	Sign
Drawn by :	04/04/2024	Messa			
Checked :	04/04/2024	Spaccasassi			
Approved :	04/04/2024	Cucinotta			

The data provided, lending assent for the treatment, will be used to the sense of the article 13 of of the Regulation (UE) 2016/679, also through outsiders, in order to allow the realization of the fulfilments informatives, administrative, commercial and accounting related to the contractual relationship. Integral copy of the informative could be requested at our offices.

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Section 7 MECHANICAL COMPLETION STATUS INDEX - MECHANICAL DISCIPLINE

NOT APPLICABLE

Section 8 MECHANICAL COMPLETION STATUS INDEX - TELECOMMUNICATION DISCIPLINE

NOT APPLICABLE

Section 9 MECHANICAL COMPLETION STATUS INDEX - HVAC DISCIPLINE

NOT APPLICABLE

Section 10 MECHANICAL COMPLETION STATUS INDEX - PIPING DISCIPLINE

NOT APPLICABLE

Section 11 MECHANICAL COMPLETION INDEX - SAFETY DISCIPLINE

NOT APPLICABLE

Section 12 FAT / VENDOR REPORTS

ROSETTI MARINO	**INSPECTION REPORT**	**Report No.** IR-1595-HYO-02	SHEET 1 di 92
		Data *Date* **06 to 13.12.2024**	Rev. *Rev.* ***00***

PROGETTO	**CLIENTE**	**COMMESSA /** *Job*	**COMMESSA FORNITORE** / *Job Vendor*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	**123A90**	
FORNITORE/*Supplier* HYOSUNG	**No. Ordine/***P.O. No.* 1723001595	**OGGETTO/** *Object:* **66KV SWITCHGEARS**	

DESCRIZIONE DEL MATERIALE / *Material Description*					
POS. *Item*	**QUANTITA'** *Quantity*	**DESCRIZIONE** *Description*	**Nr. TAG S/N** *TAG No. S/N*	**TIPO DI ISPEZIONE /** *Kind of Inspection*	**ESITO /** *Result*
20	**1**	**GIS 72,5 kV**	**1EQP001**	**FAT**	**Accepted**

DOCUMENTI APPLICABILI / *Applicable Documents*			
TITOLO DOCUMENTO / *Document Title*	**NUMERO DOCUMENTO /** *Document Number*	**REVISIONE /** *Revision*	**STATO DOCUMENTO /** *Document Status*
ITP	1723001595-QC-ITP-00002	02	Approved
FAT procedure	1723001595-MAT-PRO-00026	03	Approved
Circuit and wiring diagram	1723001595-EL-DG-00015	03	Approved

DISTRIBUZIONE A: / *Distribution to:*	
☐**GESTIONE FORNITURE** / *Supply Management Department*	☐**CAPO COMMESSA** / *Project Manager*
☐**PRODUZIONE** / *Production*	☒**FORNITORE** / *Supplier*
☐**PPLM** / *Project Procurement & Logistic Manager*	☐**P.Q.M.**
☐**MAGAZZINO** / *Warehouse*	☐**P.E.M.**

ATTIVITA' ESEGUITE / *Activities Carried Out*

A – INTRODUZIONE / *Preliminary Introduction*

1. As per ITP para 1.0, design and visual check was carried out on 06 Dec 2024 and inspection result was satisfactory.
2. As per ITP para 2.0, mechanical operation test was carried out on 10 Dec 2024 and inspection result was satisfactory.
3. As per ITP para 3.0, mechanical operation test was carried out on 10 Dec 2024 and inspection result was satisfactory.
4. As per ITP para 4.0, power frequency withstand voltage test on the main circuit was carried out on 09 Dec 2024 and inspection result was satisfactory.
5. As per ITP para 5.0, partial discharge measurement was carried out on 09 Dec 2024 and inspection result was satisfactory.
6. As per ITP para 6.0, measurement of insulation resistance was carried out on 09 Dec 2024 and inspection result was satisfactory.
7. As per ITP para 8.0, tightness test was carried out on 06 Dec 2024 and inspection result was satisfactory.
8. As per ITP para 9.0, gas density switch test was carried out on 06 Dec 2024 and inspection result was satisfactory.
9. As per ITP para 10.0, test on auxiliary & control circuit was carried out on 06 Dec 2024 and inspection result was satisfactory.

L' INCARICATO / *The person in charge*	**IL RAPP. DEL CLIENTE** / *Client's Representative*	**IL FORNITORE** / *Supplier*
P. Hyeon Enginex Inspector on Behalf of Rosetti Marino		

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO /
This document does not relieve the Supplier of the responsibility of any possible defects and/or misfunctioning arising during the utilisation.

PROGETTO	CLIENTE	COMMESSA / *Job*	COMMESSA FORNITORE / *Job Vendor*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	123A90	
FORNITORE/*Supplier* HYOSUNG	**No. Ordine**/*P.O. No.* 1723001595	**OGGETTO**/ *Object:* 66KV SWITCHGEARS	

10. As per ITP para 10.0, function test for switching device and indicator was carried out on 10 Dec 2024 and inspection result was satisfactory.
11. As per ITP para 10.0, interlock test was carried out on 10 Dec 2024 and inspection result was satisfactory.
12. As per ITP para 10.0, the resistance values of the closing / tripping coils and heaters checking was carried out on 10 Dec 2024 and inspection result was satisfactory.
13. As per ITP para 13.0, low power voltage transformer was carried out on 11 Dec 2024 and inspection result was satisfactory.
14. As per ITP para 14.0, low power instrument transformer was carried out on 11 Dec 2024 and inspection result was satisfactory.
15. As per ITP, remote and control simulation test was carried out 12, 13 Dec 2024 and inspection result was satisfactory.

B –SCOPO DELL'ISPEZIONE / *Scope of Inspection*

DESCRIZIONE DEI TEST PRESENZIATI / *Description of witnessed tests*	**ESITO** / *Result*
1. Design and visual check 1) Before starting inspection, item quantity inspection and item identification was checked. 2) Before starting inspection, applicable drawing approval status was checked. 3) Before starting inspection, used qc tools calibration condition was checked. 4) As per drawing, base frame width, length and height was checked. 5) As per drawing, anchor bolt hole size, quantity and BCD was checked. 6) As per drawing, control panel width, height and length was checked. 7) As per paint specification, paint DFT and final color was checked. a. Applicable paint specification was 1723001595-MAT-PRO-00026 b. As per paint specification, final color for local control panel was RAL 7032. c. As per paint specification, hot dip galvanize was applied to base frame. d. As per paint specification, final DFT was measured. e. As per paint specification, galvanizing thickness was checked. **8) <u>As per the Hyosung design team confirmation, earthing between base frame and GIS was metal to metal method so this information will be mentioned on the related GA drawing.</u>** 9) Inspection result was satisfactory	Accepted

L' INCARICATO / *The person in charge*	**IL RAPP. DEL CLIENTE** / *Client's Representative*	**IL FORNITORE** / *Supplier*
P. Hyeon Enginex Inspector on Behalf of Rosetti Marino		

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO /
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2. **As per ITP para 2.0, mechanical operation test** – continuous operating test was carried out on 10 Dec 2024 and inspection result was satisfactory. 1) As per procedure, closing, opening, CO, OC, O-CO for CB was checked. (5times were carried out.) 2) As per procedure, closing, opening for DS, ES was checked. (5times were carried out.) 3) As per procedure, supplied voltage for operation condition for CB was checked. 4) As per procedure, supplied voltage for operation condition for DS, ES was checked. 5) During and after mechanical operation test, there was no hardpoint and mechanical damage. 6) Inspection result was satisfactory	Accepted
3. **As per ITP para 3.0, mechanical operation test** – timing test was carried out on 10 Dec 2024 and inspection result was satisfactory. 1) As per procedure, closing, opening, CO, OC, O-CO for CB was checked. (Opening time and closing time was checked and it was within acceptance criteria) 2) As per procedure, closing, opening for DS, ES was checked. (Opening time and closing time was checked and it was within acceptance criteria) 3) As per procedure, supplied voltage was 110V (Rated voltage) 4) During and after mechanical operation test, there was no hardpoint and mechanical damage. 5) Inspection result was satisfactory	Accepted
4. **As per ITP para 4.0, power frequency withstand voltage test** on the main circuit was carried out on 09 Dec 2024 and inspection result was satisfactory. 1) As per procedure, test content was phase to earth & phase to phase. 2) As per procedure, test was caried out after completion of all assembly. 3) As per procedure, applied voltage was 90kV and holding time was 1mins. 4) Inspection result was satisfactory	Accepted
5. **As per ITP para 5.0, partial discharge measurement** was carried out on 09 Dec 2024 and inspection result was satisfactory. 1) As per procedure, test content was phase to earth & phase to phase. 2) As per procedure, partial discharge level was no exceed 5pC. 3) As per procedure, applied PD test voltage was 54kV 4) As per procedure, at the same condition as line to earth of power frequency withstand voltage test on main circuit, the quantity of partial discharges was measured. 5) Inspection result was satisfactory	Accepted

L' INCARICATO / *The person in charge*	IL RAPP. DEL CLIENTE / *Client's Representative*	IL FORNITORE / *Supplier*
P. Hyeon Enginex Inspector on Behalf of Rosetti Marino		

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO /
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6. **As per ITP para 6.0, measurement of insulation resistance** was carried out on 09 Dec 2024 and inspection result was satisfactory. 1) As per procedure, test content was main circuit. 2) As per procedure, measurement of insulation resistance was carried before / after high voltage test. 3) As per procedure, insulation resistance between main circuit and earth was measured by using 1000V megger. 4) Inspection result was satisfactory	Accepted
7. ITP para 8.0: Tightness test 1) Tightness test was carried out to ensure whether there is any leakage of gas in test object. 2) Applied rated pressure was 5bar.G at CV 3) Applied rated pressure was 5bar.G at others 4) The above rated pressure was supplied with SF6gas and wrapping all connection part by using vinyl. 5) And then it was checked for leakage from the test object 6) Inspection result was satisfactory.	Accepted
8. ITP para 9.0: Gas density switch test 1) Gas density switch test was carried out to ensure whether switches are set to alarm and lock-out pressure correctly according to approved specification. 2) As per procedure, pressure was set as 5bar.G at 20degreee for CB (Low 1st stage, Low 2nd stage) and others (Low 1st stage, Low 2nd stage) 3) Alarm was operated at correct pressure. 4) Inspection result was satisfactory.	Accepted
9. ITP para 10.0: Test on auxiliary & control circuit (Including LCP test) 1) Dielectric test and insulation resistance measurement on control and auxiliary circuits was checked on 06 Dec 2024. a. As per procedure, test check point was checked. b. As per procedure, applied voltage 1was 1kV and holding time was 1sec. c. Required insulation resistance measurement was more than 20Mohm and actual result was within acceptance criteria. d. The resistance values of the closing / tripping coils and heaters checking was carried out on 10 Dec 2024. 2) Function test for switching device and indicator was checked on 10 Dec 2024. 3) Interlock test was carried out on 10 Dec 2024. 4) Inspection result was satisfactory	Accepted

L' INCARICATO / *The person in charge*	**IL RAPP. DEL CLIENTE** / *Client's Representative*	**IL FORNITORE** / *Supplier*
P. Hyeon Enginex Inspector on Behalf of Rosetti Marino		

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO /
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10. ITP para 13.0: Low power voltage transformer 1) Voltage accuracy test was checked on 11 Dec 2024. a. As per procedure, accuracy test voltage was applied up to 20% of rated voltage 2) Inspection result was satisfactory	Accepted
11. ITP para 12.0: Low power instrument transformer 1) Low power instrument transformer was checked on 11 Dec 2024. a. Voltage accuracy test was checked on 11 Dec 2024. b. As per procedure, accuracy test voltage was applied up to 20% of rated voltage c. As per procedure, accuracy test current was applied up to 120% of rated current 2) Inspection result was satisfactory	Accepted
12. Remote and control simulation test 1) Diagnostic test was carried out on 12 Dec 2024 a. Internal relate signal of the IED was checked. b. The LED lamp on the IED was checked. c. The status via menu button of the IED was checked. d. The event log file on the IED was checked. 2) Relay setting check was carried out on 12 Dec 2024 a. Tester notebook and protection relay connection condition was checked. b. After connection between tester notebook and protection relay, relay setting value was checked. c. DIGSI software's relay setting file was checked. d. DIGSI setting file and relay setting was checked. 3) IO Operation test was carried out on 12 Dec 2024 a. Based on BI number, BI input test and BI output test was caried out. b. BI number and activated signal was checked. 4) Measurement test was carried out on 12, 13 Dec 2024 a. Injection value and actual detected value was checked. b. Applied tolerance was checked.	Accepted

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5) Protection test was carried out on 12 Dec 2024
   a. It was checked the relay setting calculation report and setting table in advance and confirm that the protection relay settings have been completed as per the report.
   b. It was used the test terminal block, separate the secondary side of the CT and the protection relay.
   c. Connect relays and equipment to the Process Bus network to use Sample Values.
   d. Transformer differential protection was checked.
   e. Overcurrent protection phase / ground was checked.

6) Remote test was carried out on 12 Dec 2024
   a. Check by comparing the submitted IO LIST (including IEC61850 address) with the setting file
   b. Run the program that can check the IEC61850 address on engineering notebook and check that the protection relay is properly connected to the Station bus network.
   c. Refer to the IO list and change the value of the test tag to check whether the communication signal changes at the same time.
   d. The test program checks whether the value of the tag being tested is changed normally

C –DETTAGLIO DEGLI STRUMENTI UTILIZZATI PER TEST E ISPEZIONE / *Details of Inspection and Test Instruments used*

NOME DELLO STRUMENTO *Equipment name*	PRODUTTORE *Manufacturer*	MODELLO *Model*	PROSSIMA TARATURA *Next calibration*
Hygrometer	Deayoon	DHT-1-11	2025-01-09
Coating thickness tester	Elcometer	SL17130	2025-08-20
AC High voltage test system	High volt	918897 / 928398	2028-08-03
PD calibrator	Power diagnostix	2320	2025-11-01
Circuit breaker motion analyzer	Megger	1200046	2025-04-08
Micro-Ohm meter	Megger	1592060	2025-04-17
Digital insulation tester	Fluke	34990424WS	2025-04-06
Gas leak detector	Bacharach	15073980	2025-10-16
Puncture tester	Schleich	22801	2025-08-19
Digital multi meter	Yokogawa	H590664	2025-06-15
Signal analyzer	Omicron	HG281H	2025-01-0
Current transformer	Vosta	FH0001	2026-09-27
Potential transformer	Vosta	SPT-132	2025-11-30
Relay test system	Omicron	DF910F	2025-02-20

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ROSETTI MARINO	**INSPECTION REPORT**	**Report No.** IR-1595-HYO-02	SHEET 7 di 92
		Data *Date* **06 to 13.12.2024**	Rev. *Rev.* ***00***

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HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	**123A90**	
FORNITORE/*Supplier* HYOSUNG	**No. Ordine/***P.O. No.* 1723001595	**OGGETTO/** *Object:* **66KV SWITCHGEARS**	

D –ALLEGATI / *Attachments (***CERTIFICATI E TEST REPORT** */ Certificates and Test Reports)*

NUMERO DOCUMENTO / *Document Number*	**DESCRIZIONE** / *Description*	**TIPO** / *Type*	**NR. PAGINE** / *No. Pages*
1. [Witness test report] ITALY ROSETTI BLPH 72.5kV 10248704_0002	Test report		39 Page
2. FAT Minutes of meeting for BLPH GIS	MOM		1 Page
3. [Witness test report] ITALY ROSETTI BLPH 72.5kV 10248704_Certificate of test equipment	Calibration report		45 Page

E – DETTAGLI ED ESITO DELL'ISPEZIONE */ Details and Results of Inspection*

POS. *Item*	**BREVE DESCRIZIONE MATERIALE** *Material brief description*	**Q.TA' ODA** *Order Q.ty*	**Q.TA' TESTATA** *Tested Q.ty*	**ACCETTATO** *Accepted*	**DATA ACCETTAZIONE** *Acceptance date*
20	GIS 72,5 kV	1	1	1	13 Dec 2024

F – CONCLUSIONI */ Conclusions*

1. As per ITP para 1.0, design and visual check was carried out on 06 Dec 2024 and inspection result was satisfactory.
2. As per ITP para 4.0, power frequency withstand voltage test on the main circuit was carried out on 09 Dec 2024 and inspection result was satisfactory.
3. As per ITP para 5.0, partial discharge measurement was carried out on 09 Dec 2024 and inspection result was satisfactory.
4. As per ITP para 6.0, measurement of insulation resistance was carried out on 09 Dec 2024 and inspection result was satisfactory.
5. As per ITP para 8.0, tightness test was carried out on 06 Dec 2024 and inspection result was satisfactory.
6. As per ITP para 9.0, gas density switch test was carried out on 06 Dec 2024 and inspection result was satisfactory.
7. As per ITP para 10.0, test on auxiliary & control circuit was carried out on 06 Dec 2024 and inspection result was satisfactory.
8. As per ITP para 9.0, gas density switch test was carried out on 06 Dec 2024 and inspection result was satisfactory.
9. As per ITP para 10.0, test on auxiliary & control circuit was carried out on 06 Dec 2024 and inspection result was satisfactory.
10. As per ITP para 10.0, function test for switching device and indicator was carried out on 10 Dec 2024 and inspection result was satisfactory.
11. As per ITP para 10.0, interlock test was carried out on 10 Dec 2024 and inspection result was satisfactory.

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12. As per ITP para 10.0, the resistance values of the closing / tripping coils and heaters checking was carried out on 10 Dec 2024 and inspection result was satisfactory.
13. As per ITP para 13.0, low power voltage transformer was carried out on 11 Dec 2024 and inspection result was satisfactory.
14. As per ITP para 14.0, low power instrument transformer was carried out on 11 Dec 2024 and inspection result was satisfactory.
15. As per ITP, remote and control simulation test was carried out 12, 13 Dec 2024 and inspection result was satisfactory.

G – PUNTI IRRISOLTI / *Outstanding points*

1. There was no quantity issue,
2. There was no quality issue.
3. There was no HSE issue.

H – STATO PACKING LIST / *Packing List Status*	☐ **EMESSO** / *Issued*	☐ **NON EMESSO** / *Not Issued*	DD/MM/YYYY **ULTIMA DATA UTILE** / *Last Date*

PUNCH LIST REPORT: VEDI ALLEGATO N° / *Refer to Attachment n° N/A*

REPORT FOTOGRAFICO (SE PRESENTE) / *Digital Pictures (if any)*



Witness final visual and dimensional inspection on 06 Dec 2024



Witness final visual and dimensional inspection on 06 Dec 2024

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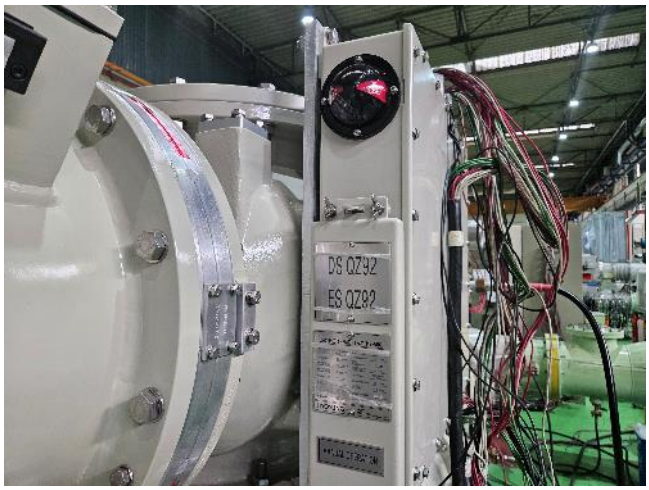
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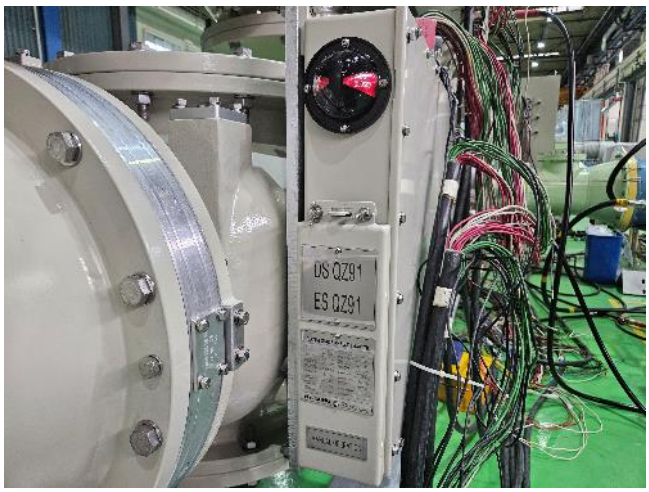
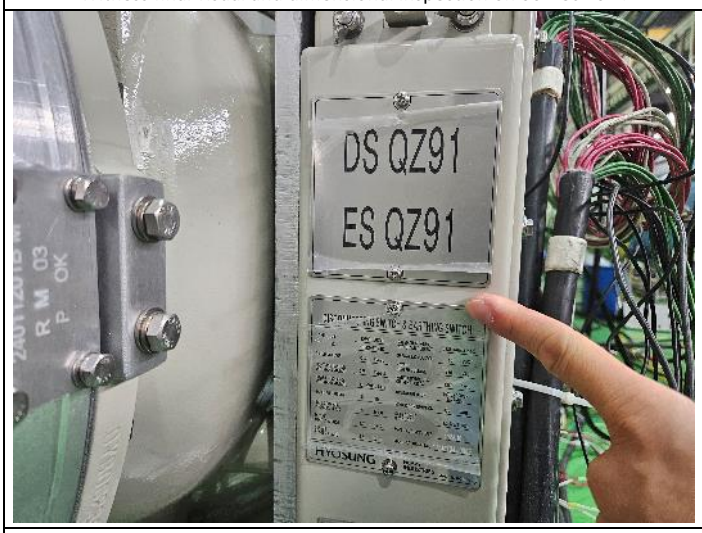
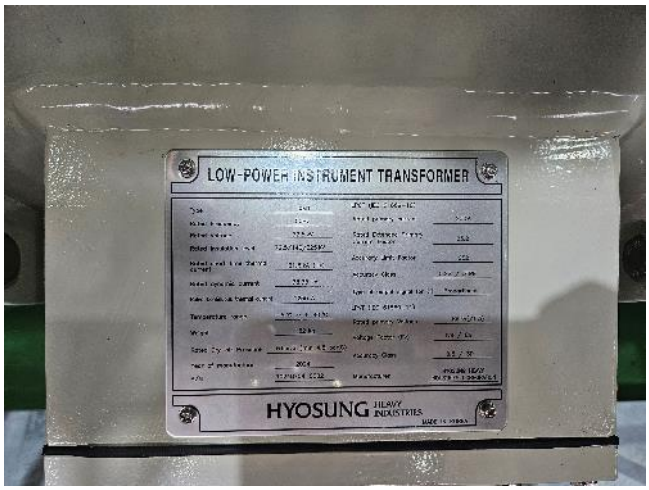


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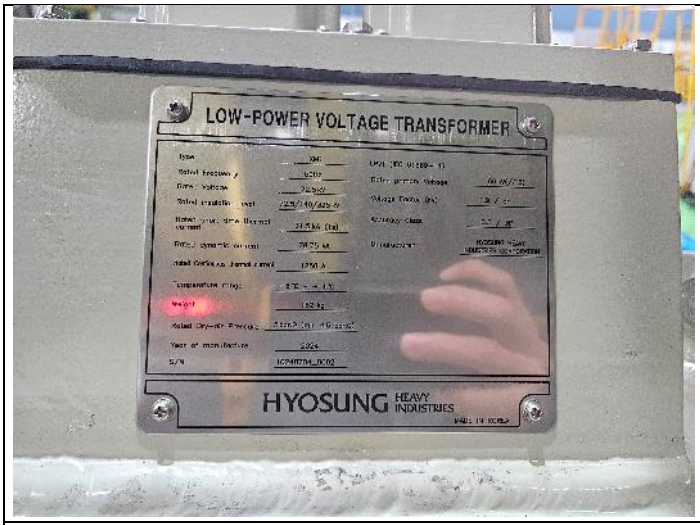
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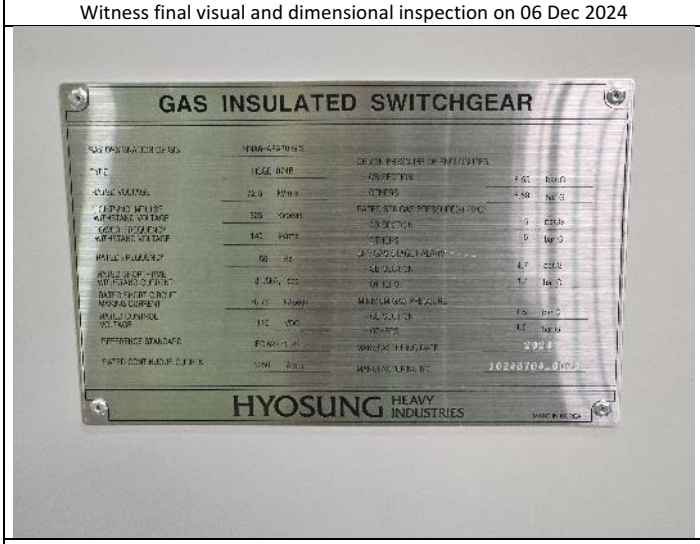
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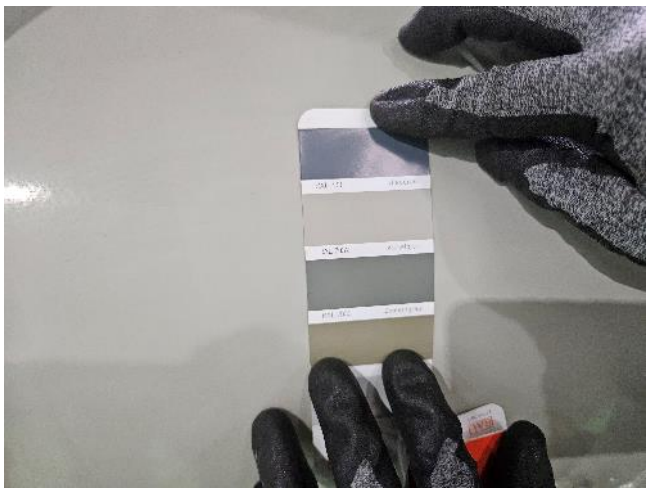
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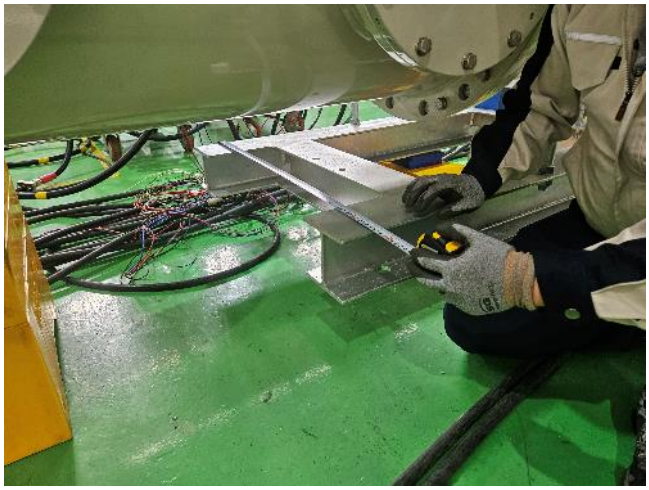
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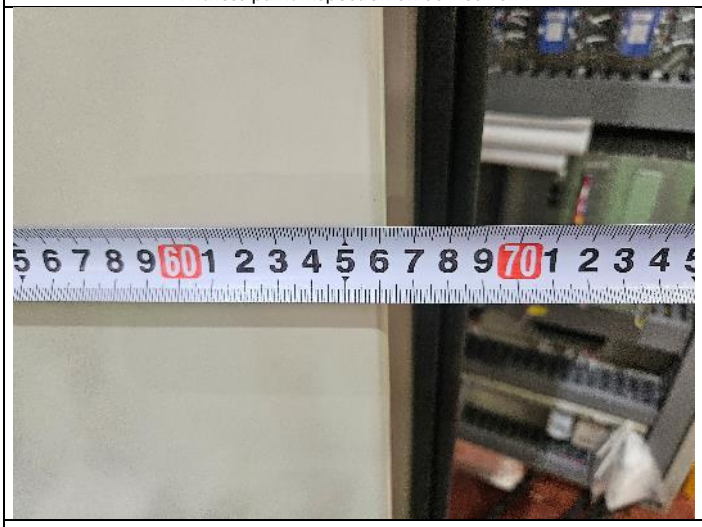
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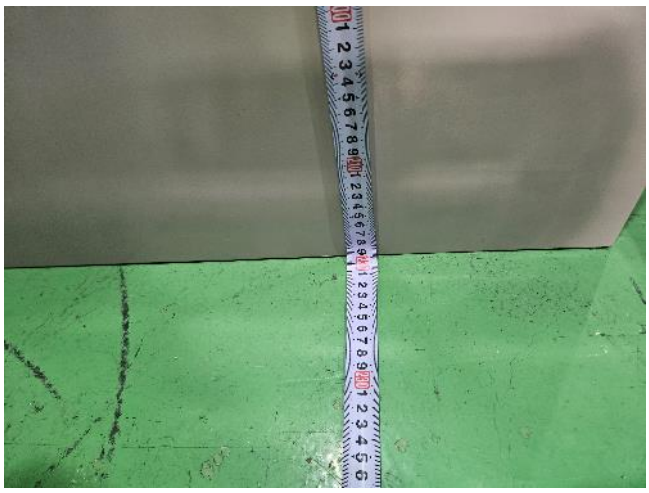
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Witness paint inspection on 06 Dec 2024



Witness paint inspection on 06 Dec 2024



Witness gas tightness test on 06 Dec 2024



Witness gas tightness test on 06 Dec 2024

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FORNITORE/*Supplier* *HYOSUNG*	**No. Ordine/***P.O. No.* *1723001595*	**OGGETTO/** *Object:* **66KV SWITCHGEARS**	



Witness gas tightness test on 06 Dec 2024



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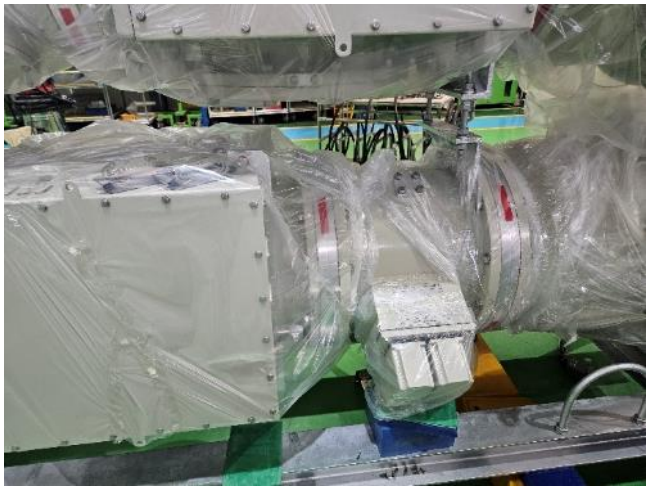
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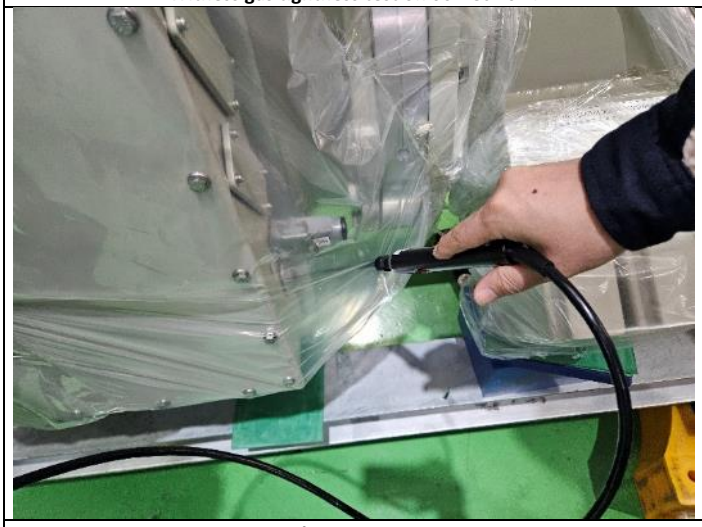
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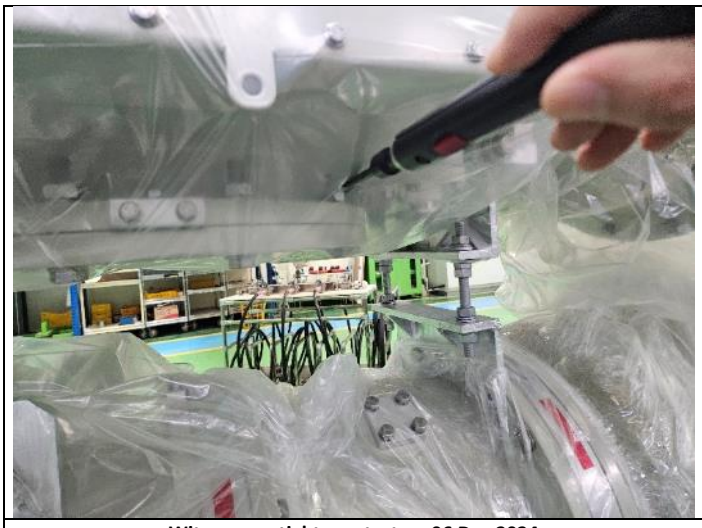


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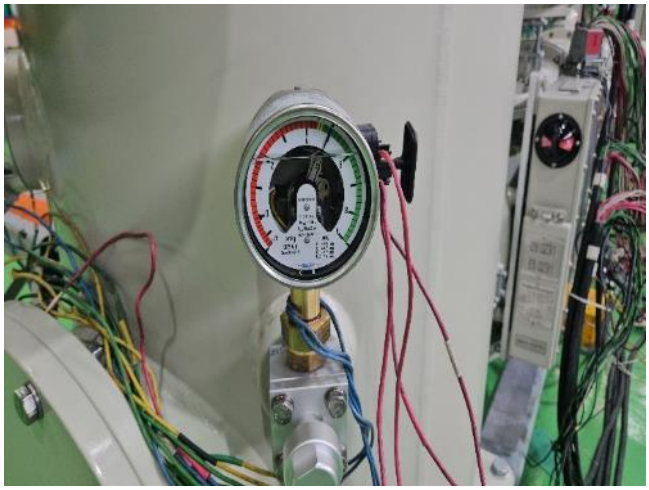
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Witness gas density switch test on 06 Dec 2024



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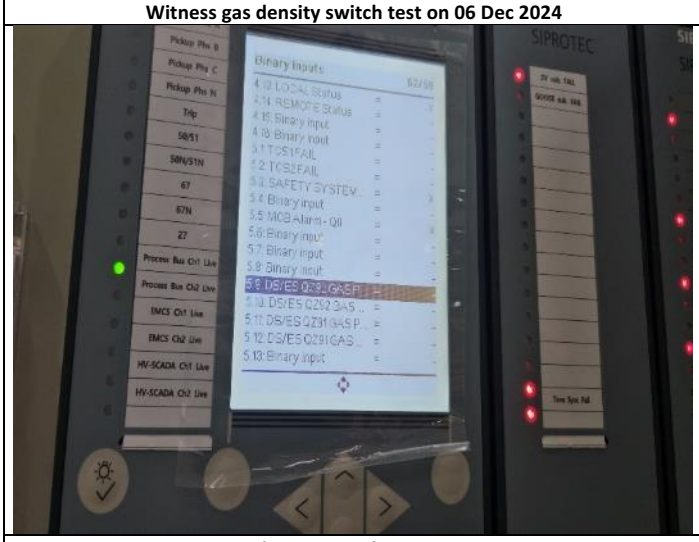
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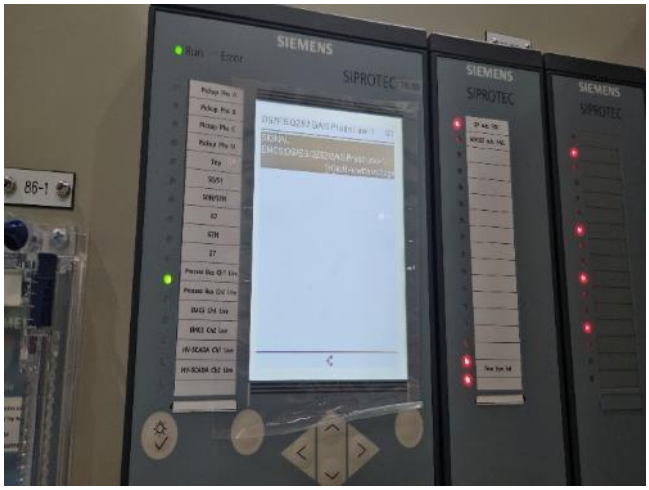
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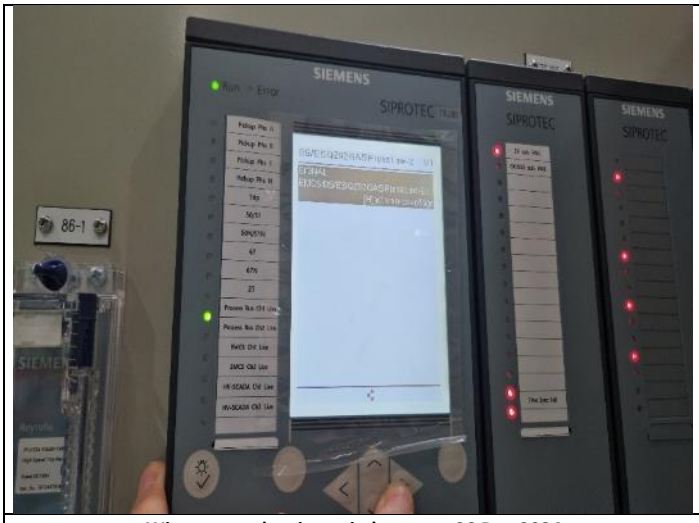


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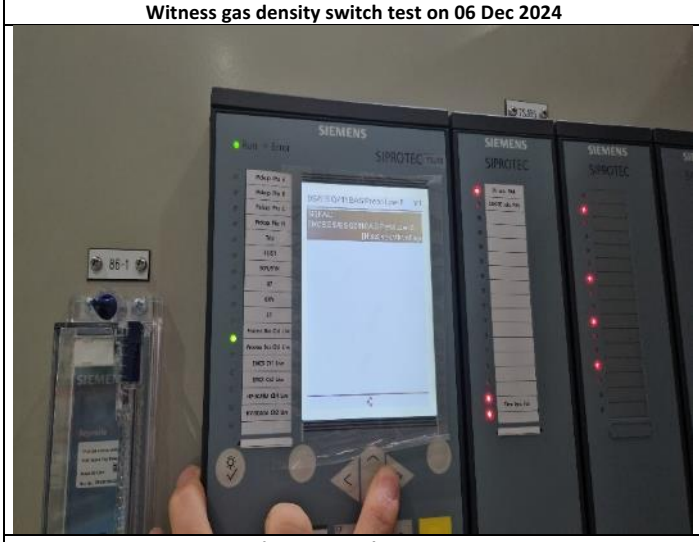
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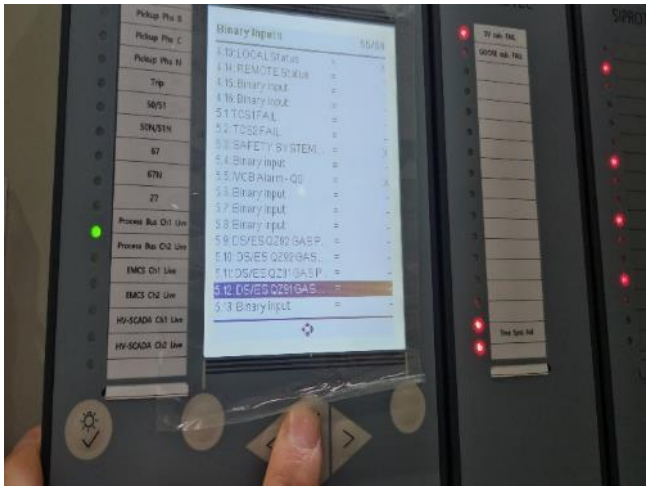
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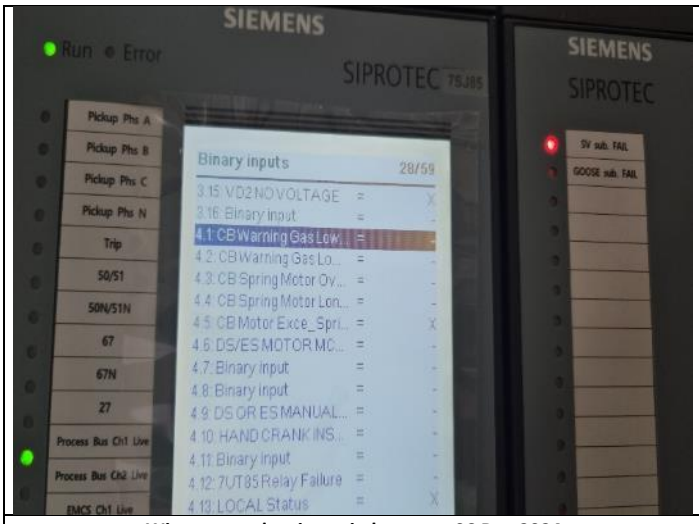


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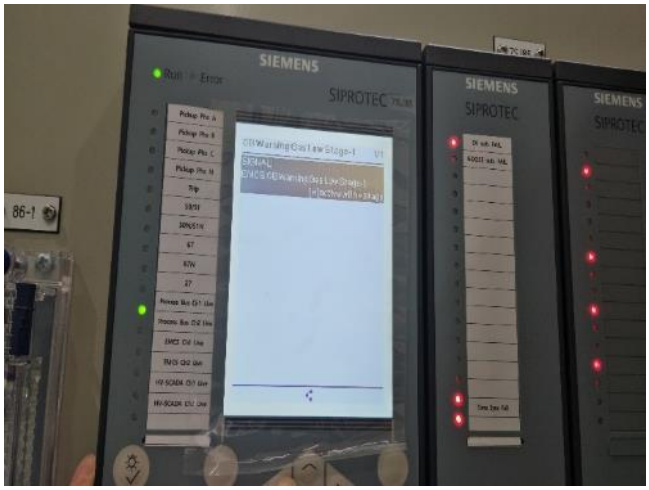
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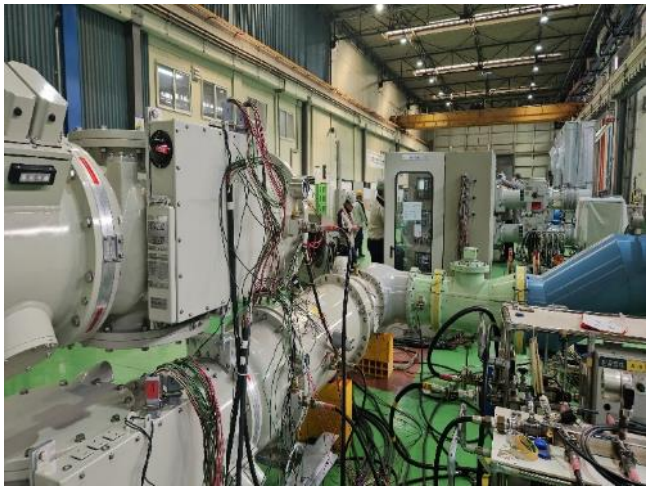
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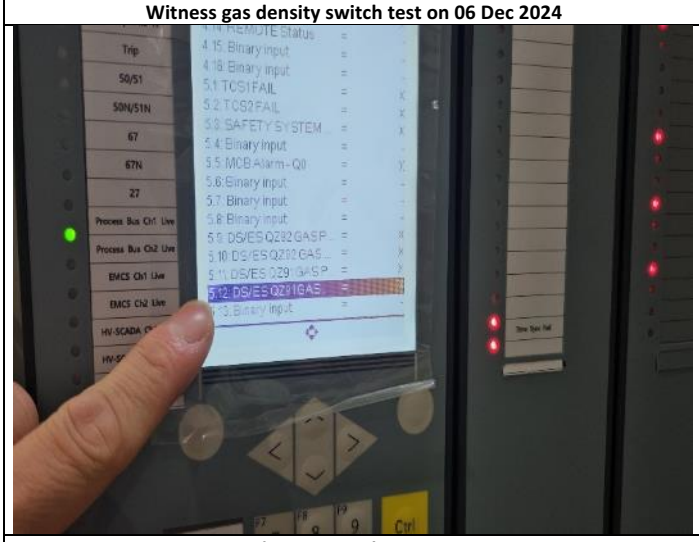
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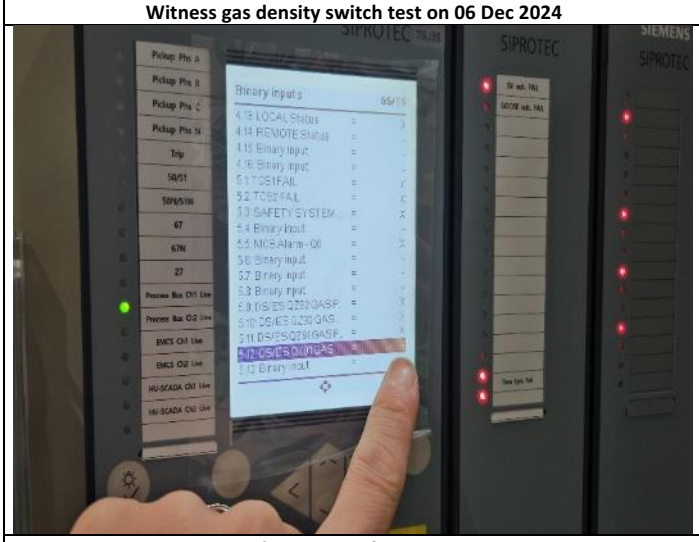
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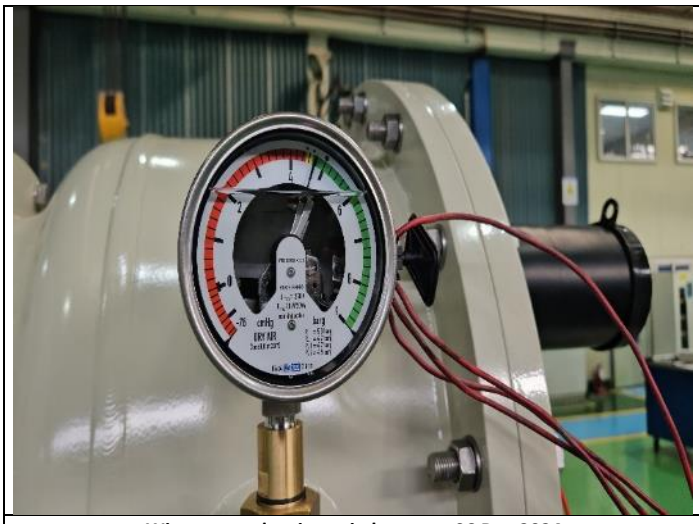


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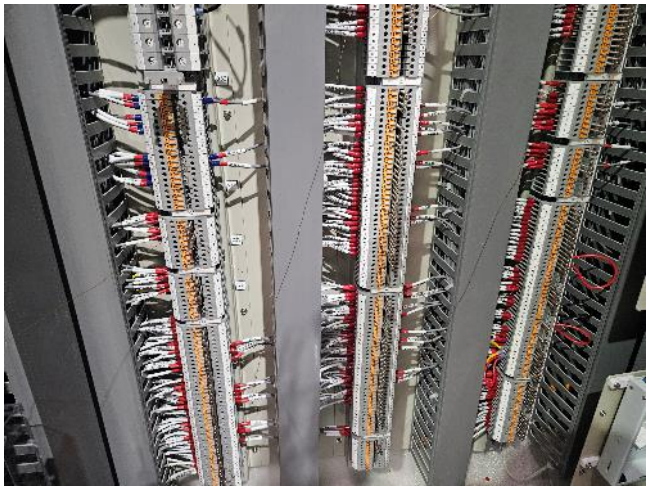
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Test on auxiliary & control circuit (Dielectric test) on 06 Dec 2024

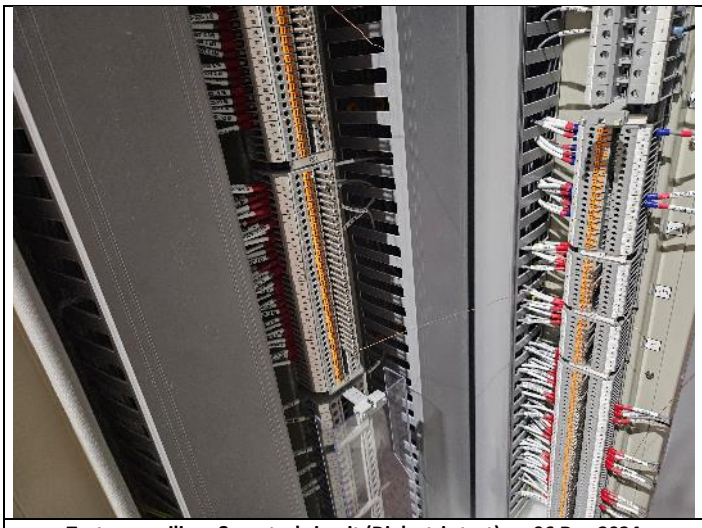


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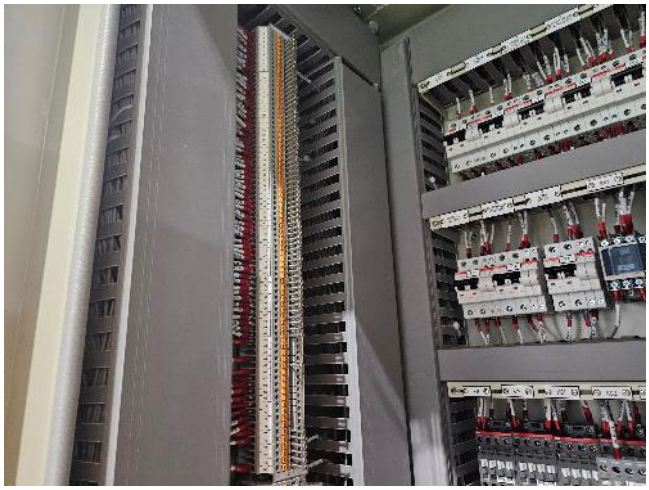
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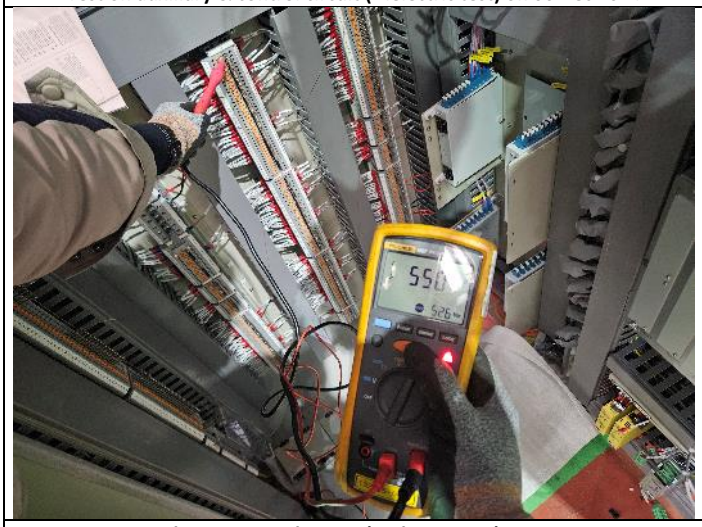
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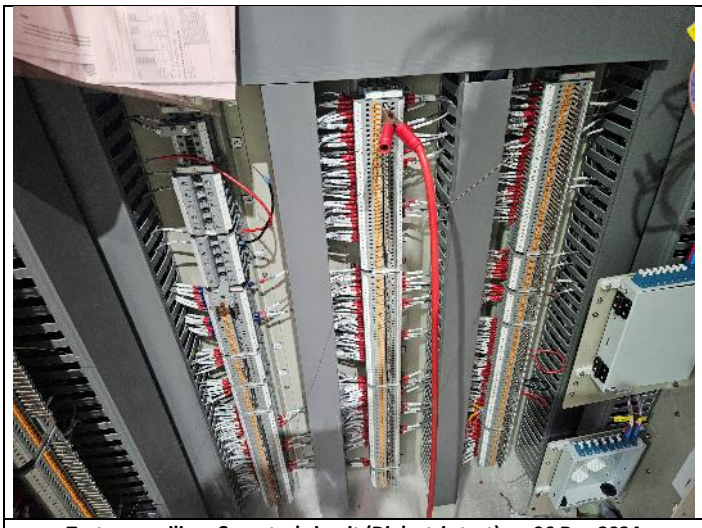


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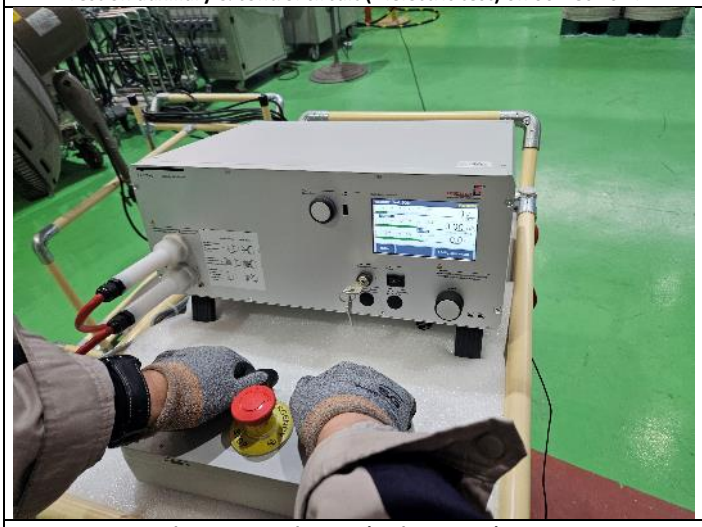
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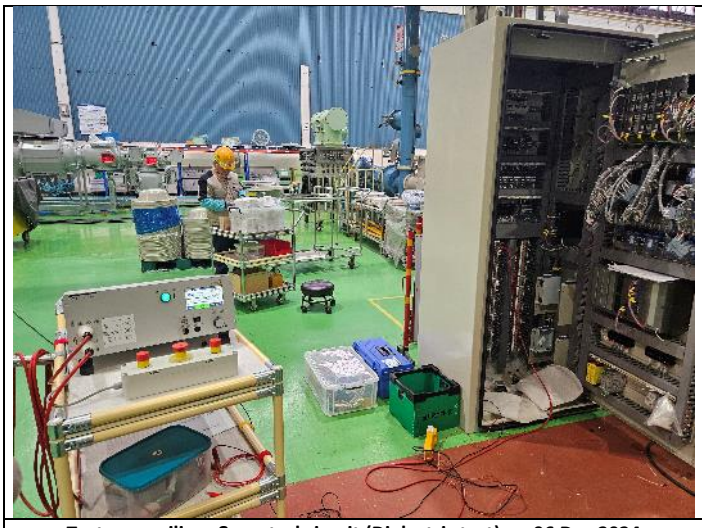


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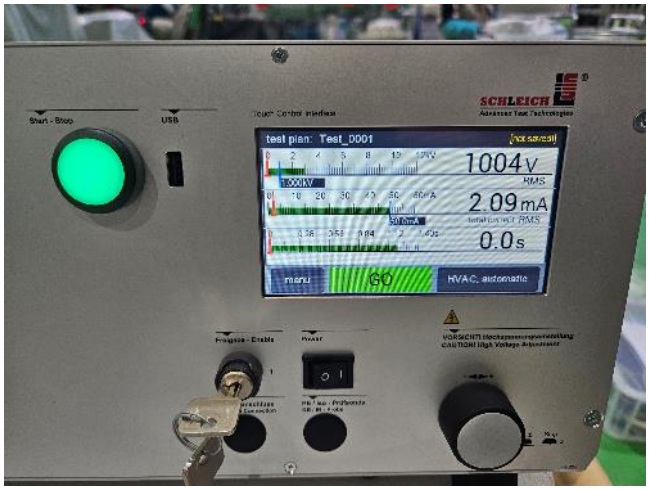
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Power frequency withstand voltage test on 09 Dec 2024



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FORNITORE/*Supplier* HYOSUNG	**No. Ordine**/*P.O. No.* 1723001595	**OGGETTO**/ *Object:* 66KV SWITCHGEARS	



Power frequency withstand voltage test on 09 Dec 2024



Power frequency withstand voltage test on 09 Dec 2024



Power frequency withstand voltage test on 09 Dec 2024



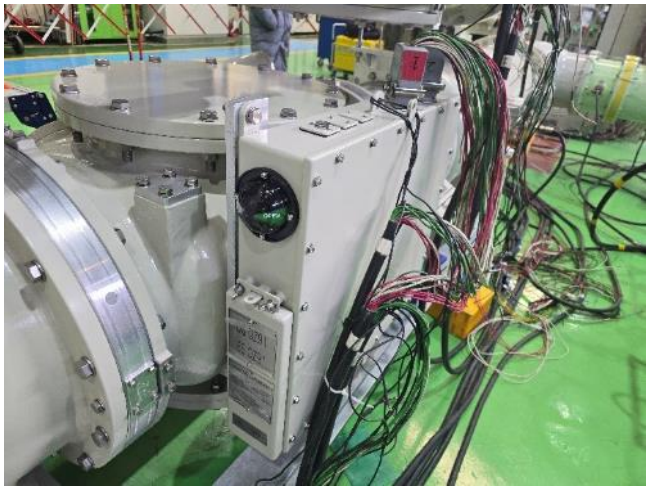
Power frequency withstand voltage test on 09 Dec 2024

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P. Hyeon Enginex Inspector on Behalf of Rosetti Marino		

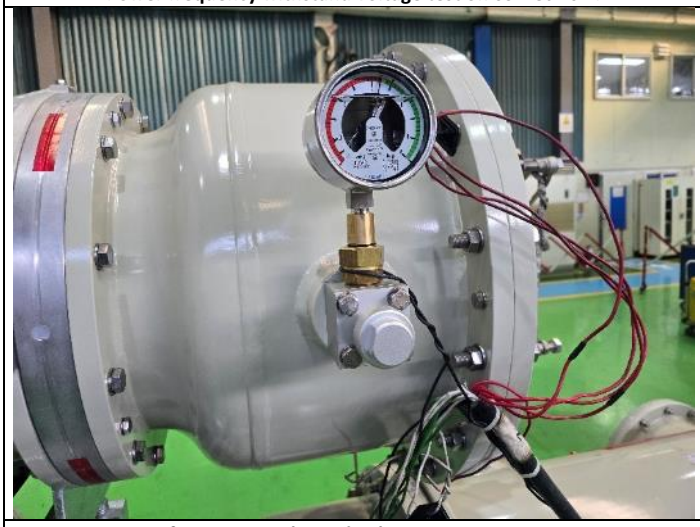
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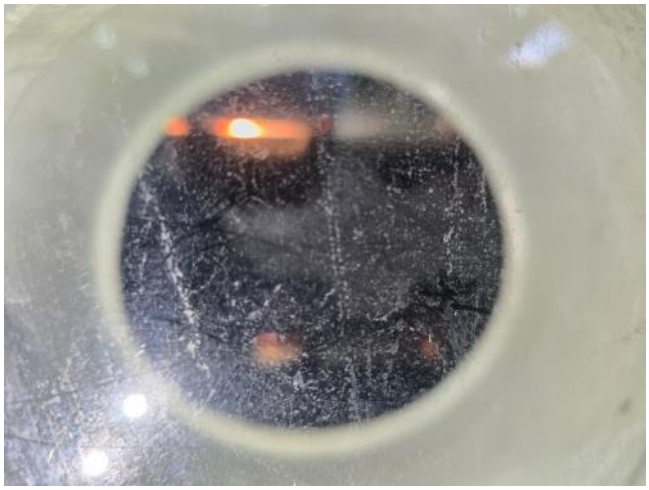
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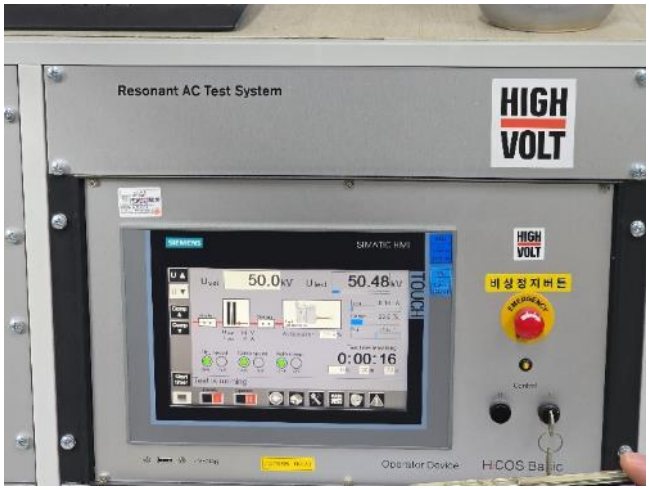
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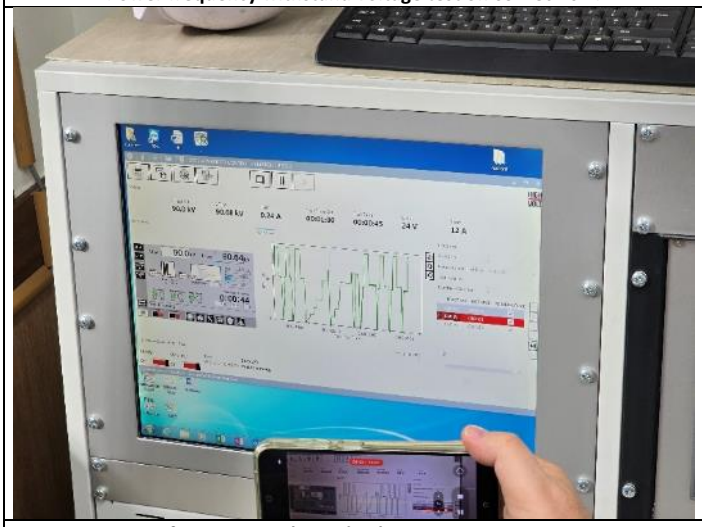
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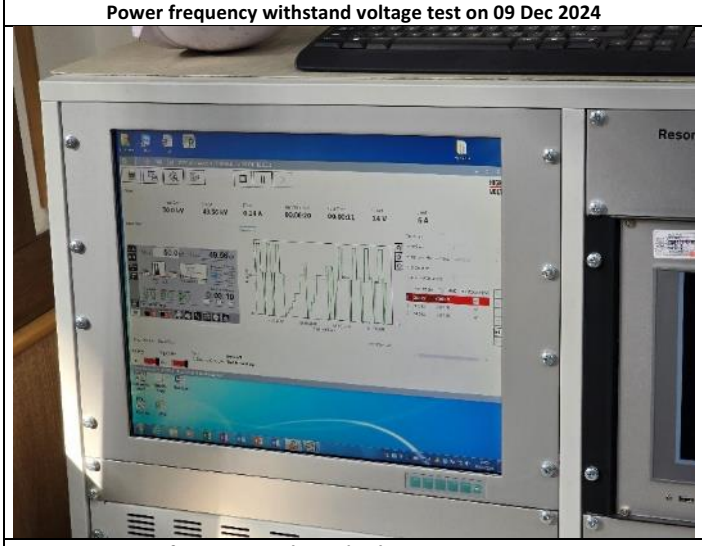
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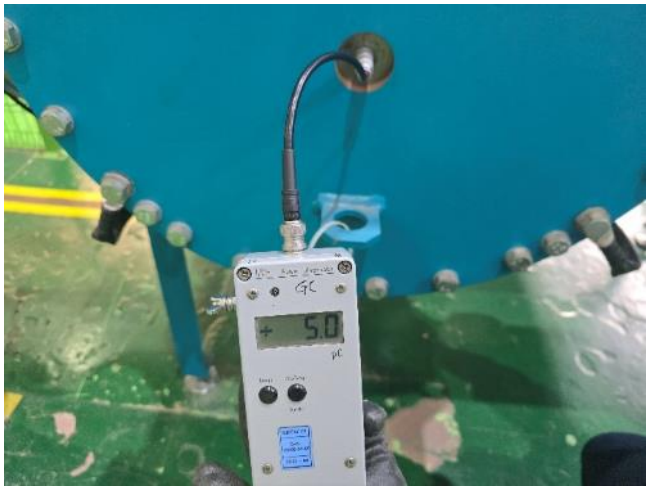
Power frequency withstand voltage test on 09 Dec 2024



Power frequency withstand voltage test on 09 Dec 2024



Power frequency withstand voltage test on 09 Dec 2024



Partial discharge measurement on 09 Dec 2024

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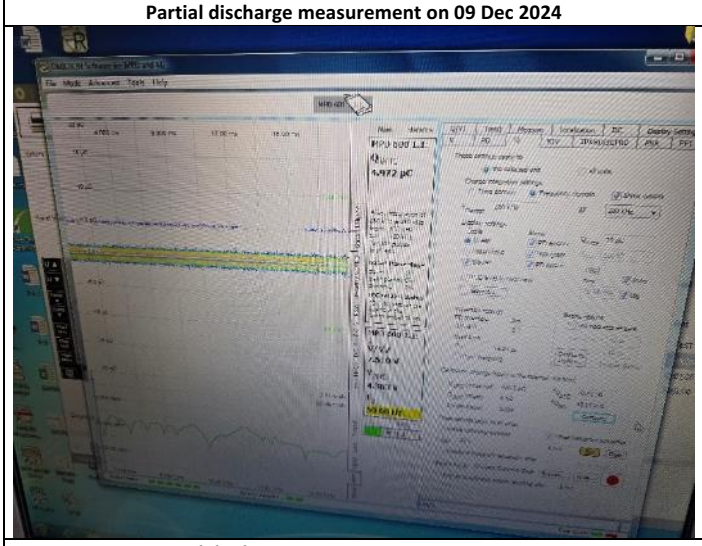
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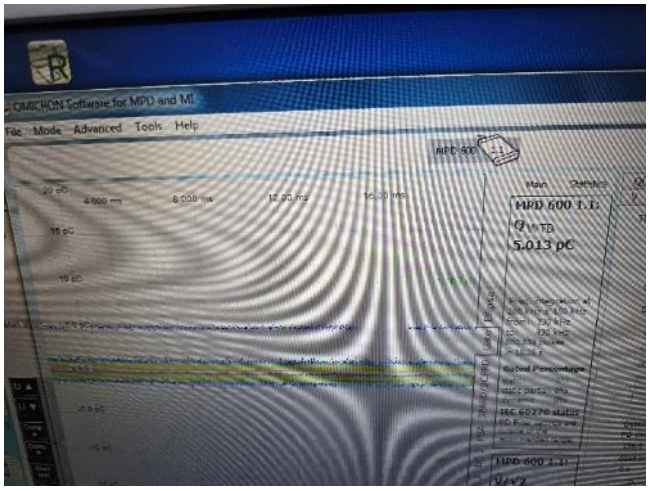
Partial discharge measurement on 09 Dec 2024



Partial discharge measurement on 09 Dec 2024



Partial discharge measurement on 09 Dec 2024



Partial discharge measurement on 09 Dec 2024

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Measurement of insulation resistance on 09 Dec 2024 (Before HV)



Measurement of insulation resistance on 09 Dec 2024 (Before HV)



Measurement of insulation resistance on 09 Dec 2024 (Before HV)



Measurement of insulation resistance on 09 Dec 2024 (Before HV)

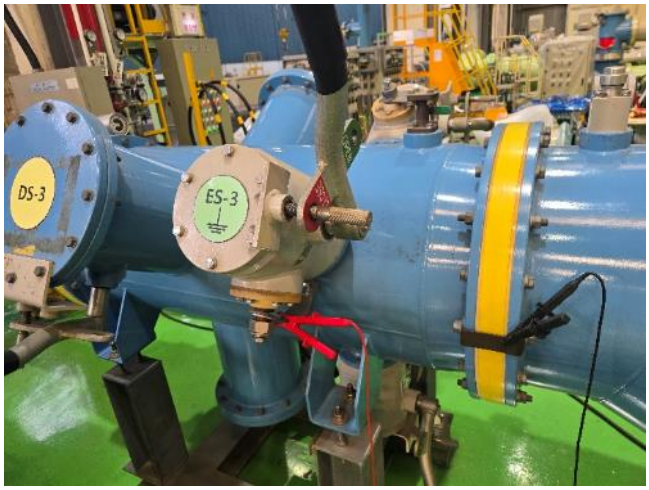
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Measurement of insulation resistance on 09 Dec 2024 (After HV)

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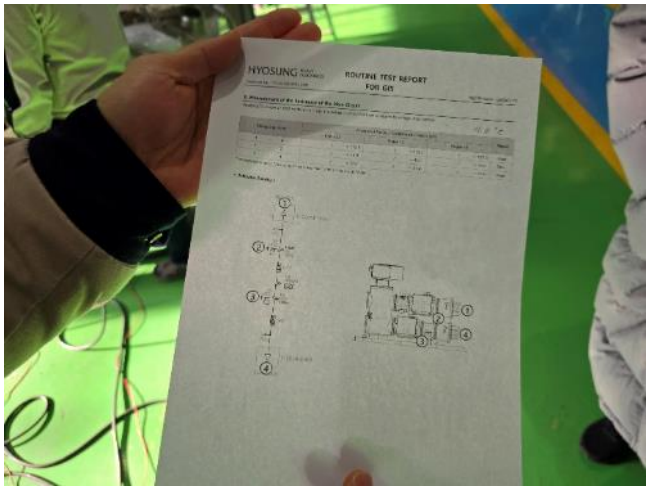
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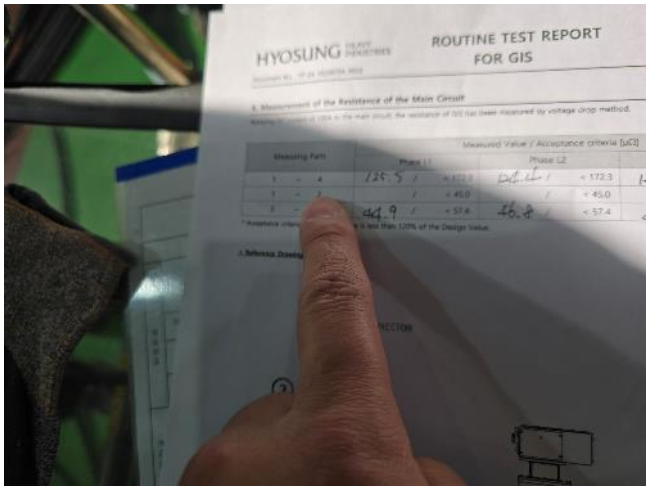
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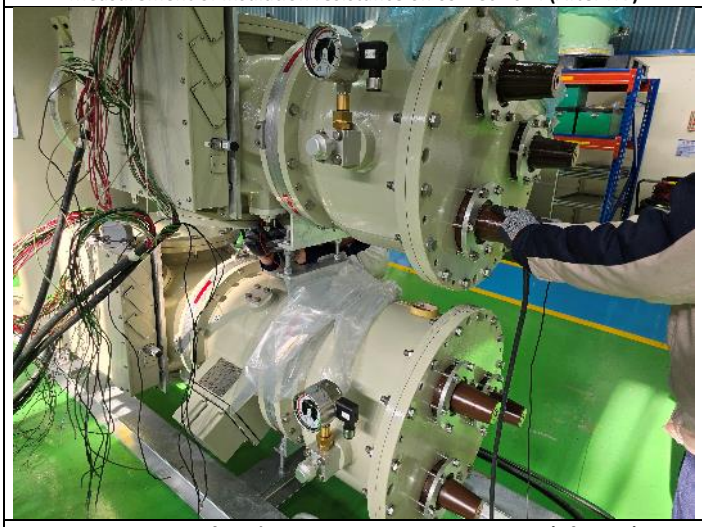
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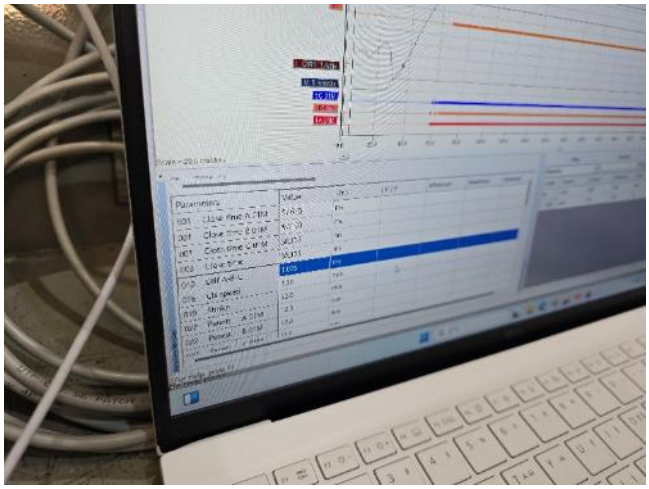
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Mechanical operation test – Timing test on 10 Dec 2024

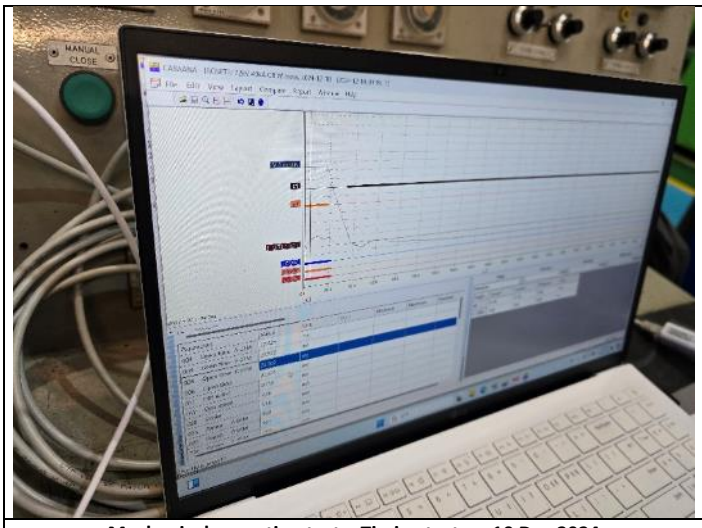


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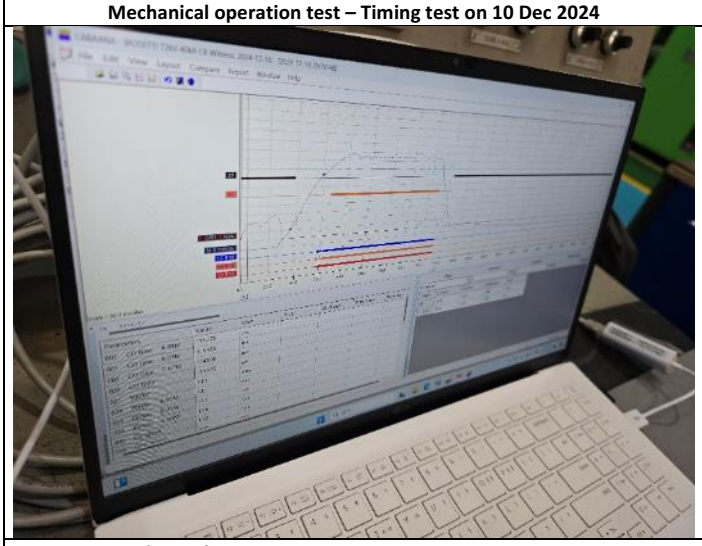
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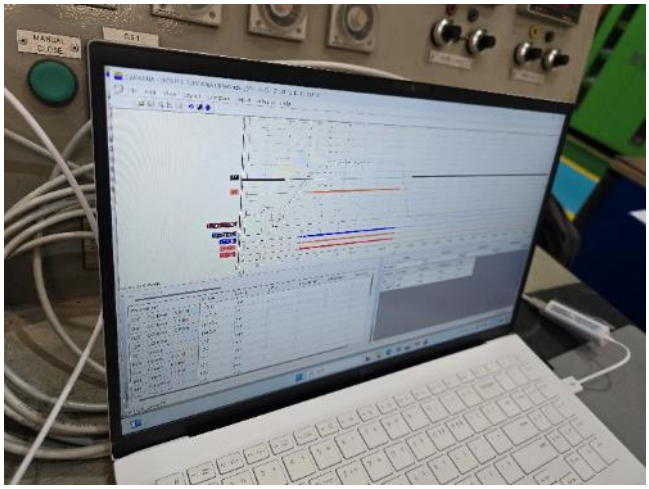
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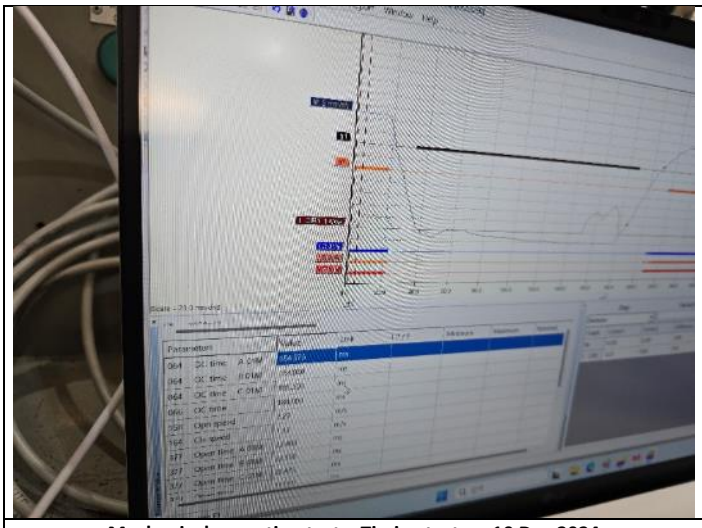


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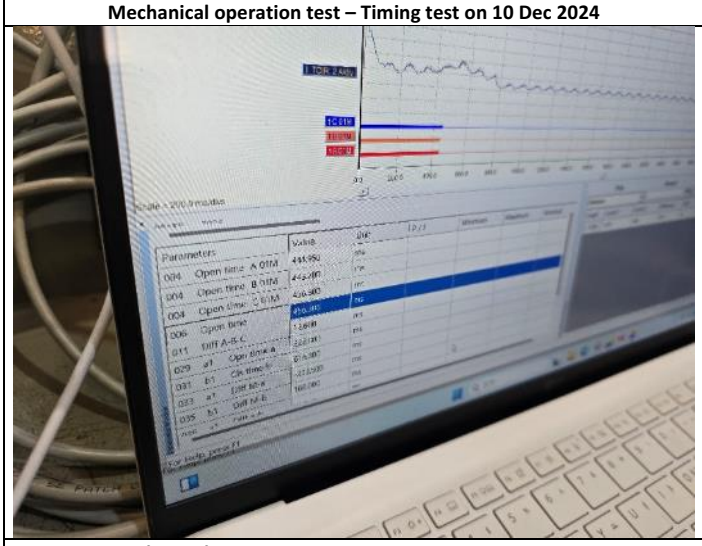
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FORNITORE/*Supplier* *HYOSUNG*	**No. Ordine/***P.O. No.* *1723001595*	**OGGETTO/** *Object:* **66KV SWITCHGEARS**	



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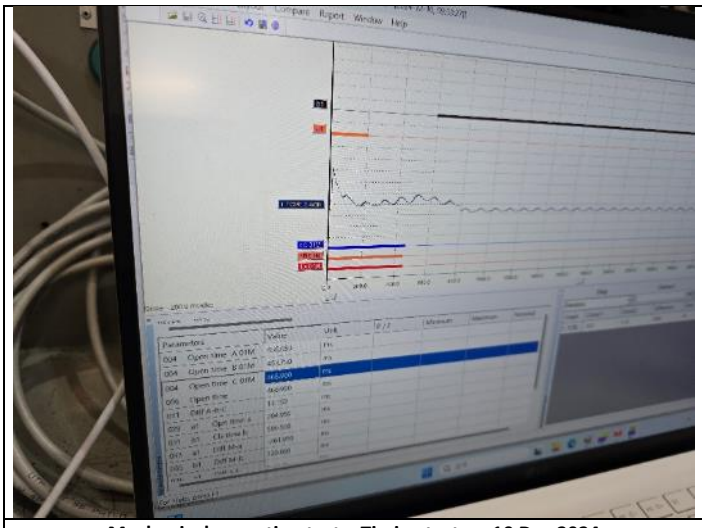


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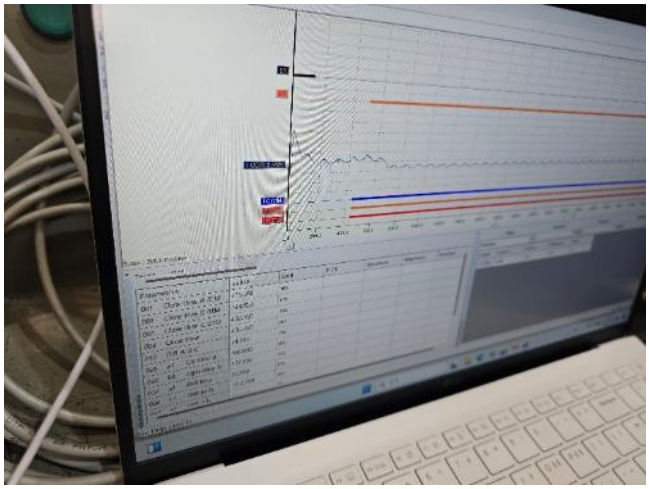
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Mechanical operation test – Timing test on 10 Dec 2024



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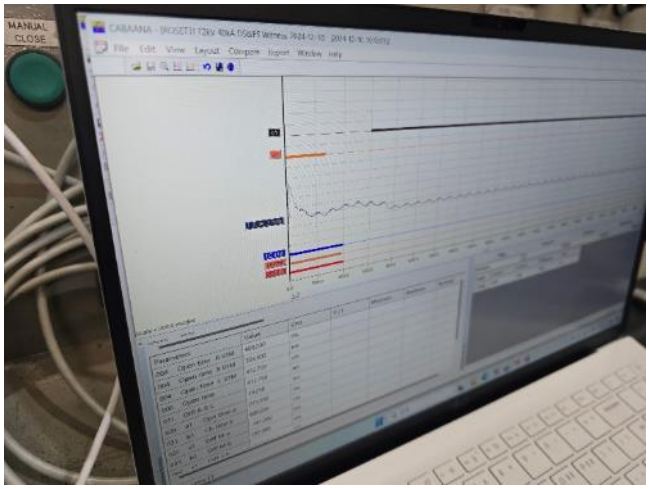
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P. Hyeon Enginex Inspector on Behalf of Rosetti Marino		

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HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	123A90	
FORNITORE/*Supplier* HYOSUNG	**No. Ordine**/*P.O. No.* 1723001595	**OGGETTO**/ *Object:* 66KV SWITCHGEARS	



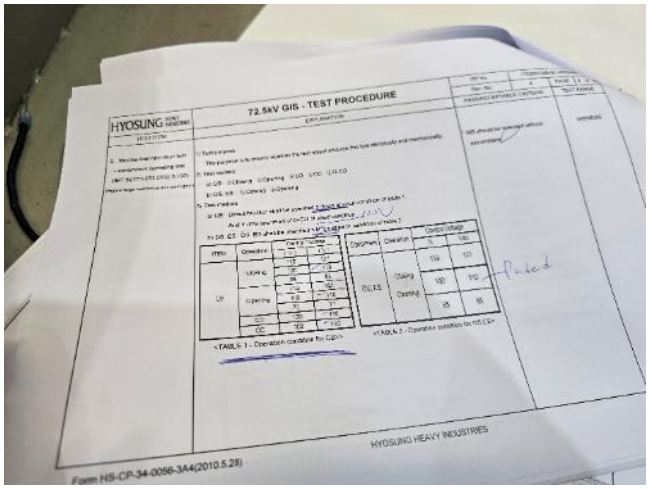
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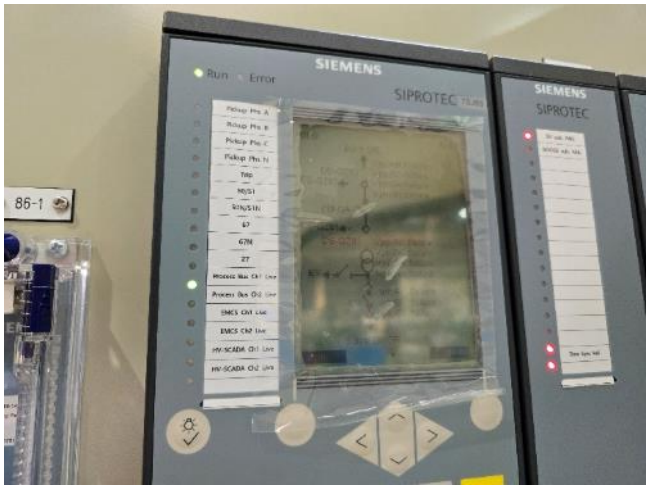
Mechanical operation test – continuous operation test on 10 Dec 2024

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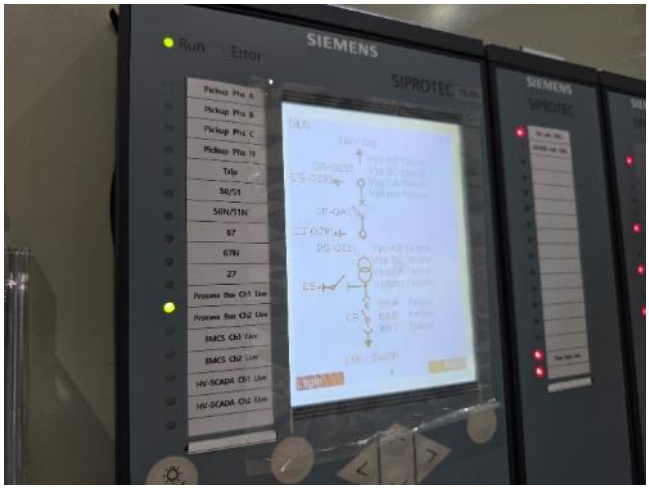
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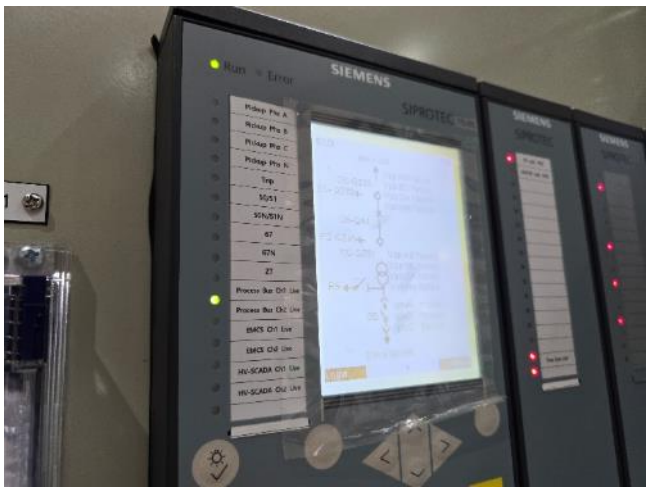
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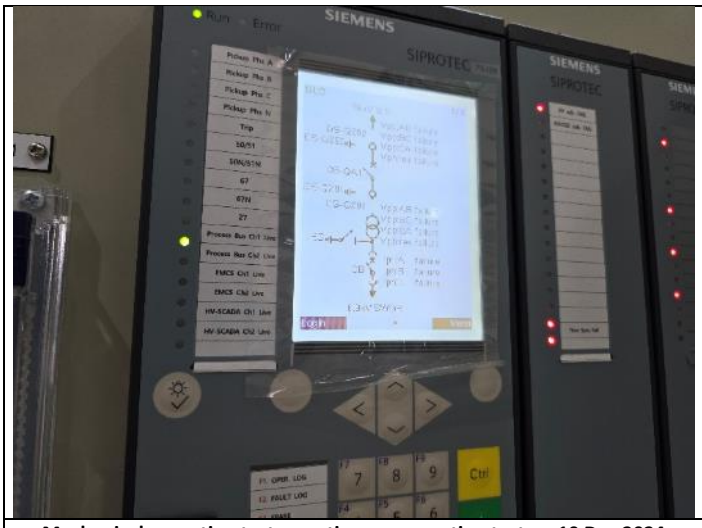


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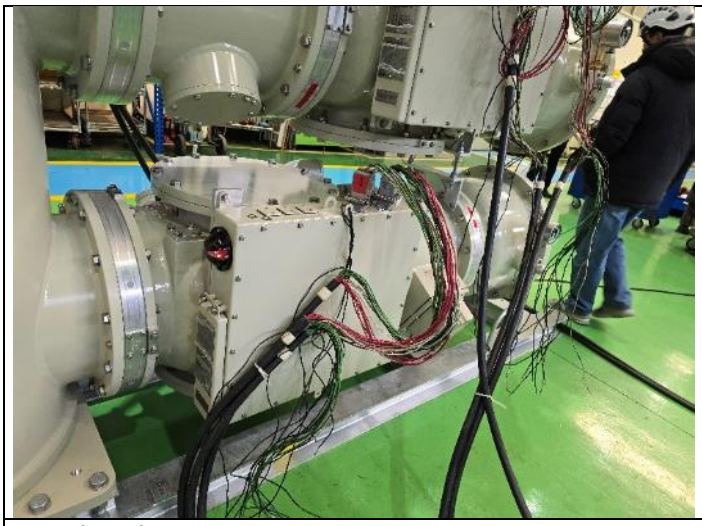
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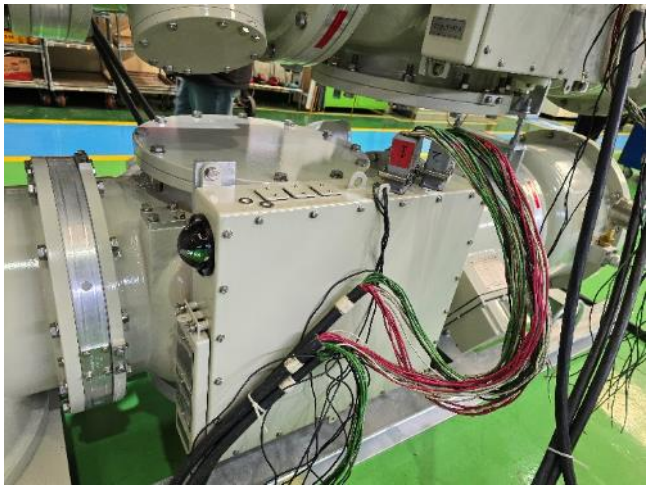
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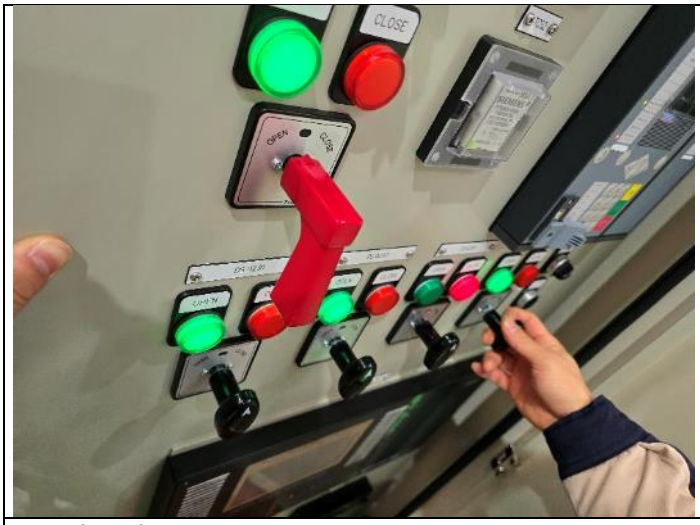


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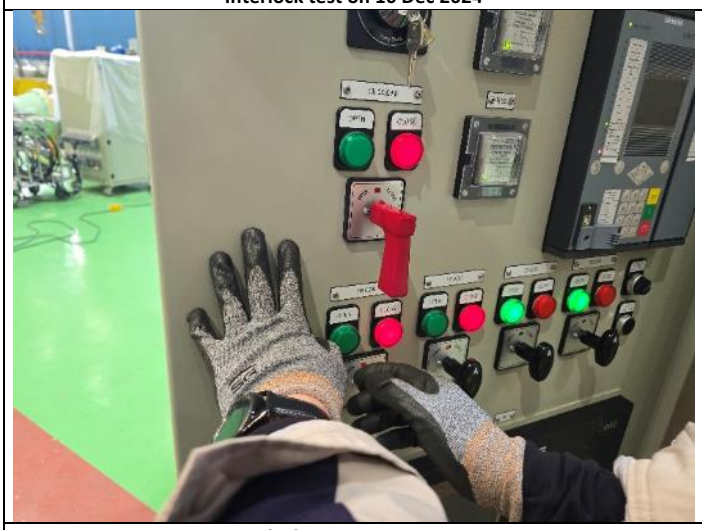
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HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	123A90	
FORNITORE/*Supplier* HYOSUNG	**No. Ordine/***P.O. No.* 1723001595	**OGGETTO/** *Object:* **66KV SWITCHGEARS**	



Interlock test on 10 Dec 2024



Interlock test on 10 Dec 2024



Interlock test on 10 Dec 2024



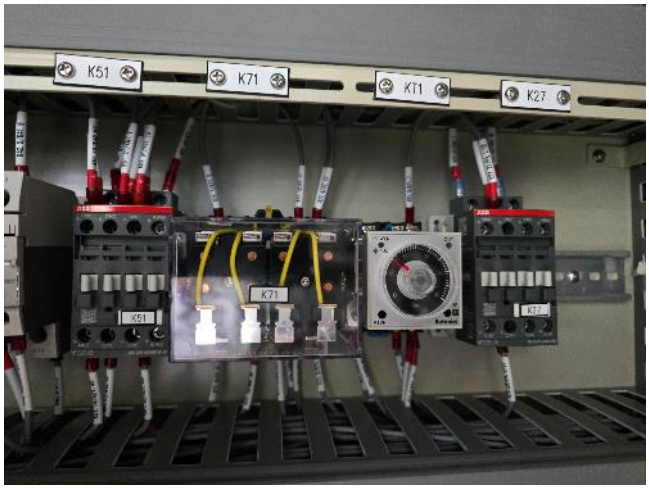
Interlock test on 10 Dec 2024

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The resistance values of the closing / tripping coils and heaters check



The resistance values of the closing / tripping coils and heaters check



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The resistance values of the closing / tripping coils and heaters check

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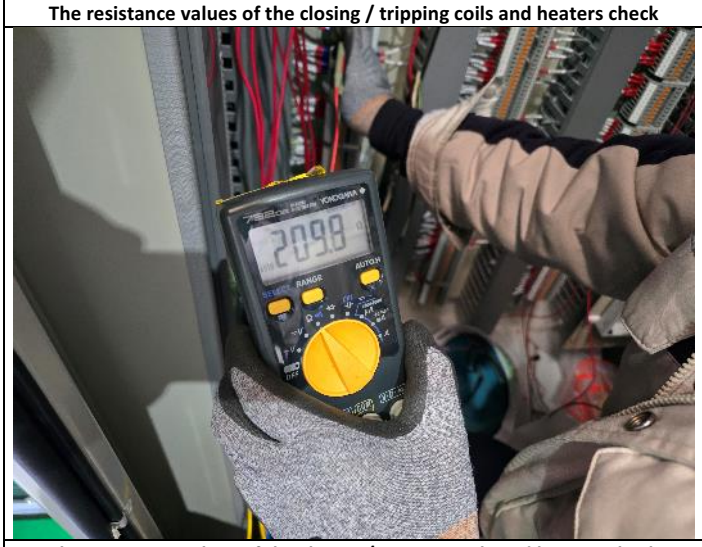
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HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	123A90	
FORNITORE/*Supplier* HYOSUNG	**No. Ordine**/*P.O. No.* 1723001595	**OGGETTO**/ *Object:* 66KV SWITCHGEARS	



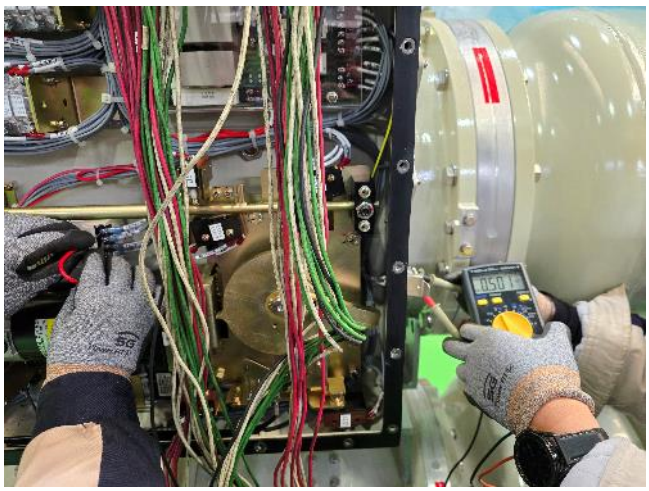
The resistance values of the closing / tripping coils and heaters check



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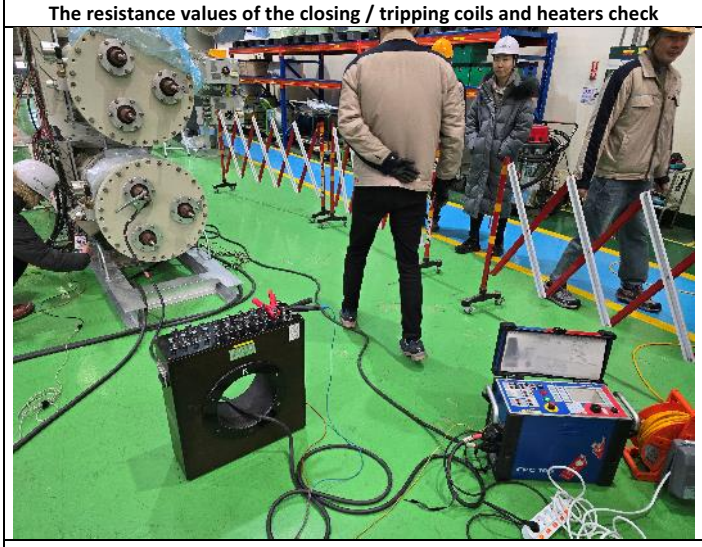
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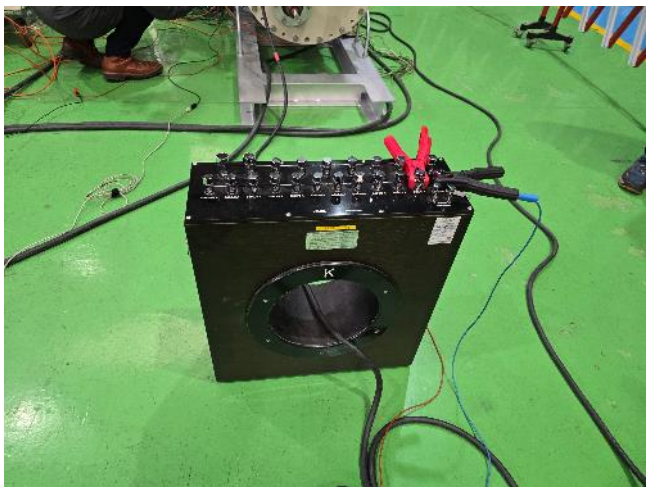
The resistance values of the closing / tripping coils and heaters check



The resistance values of the closing / tripping coils and heaters check



Current accuracy test on 11 Dec 2024



Current accuracy test on 11 Dec 2024

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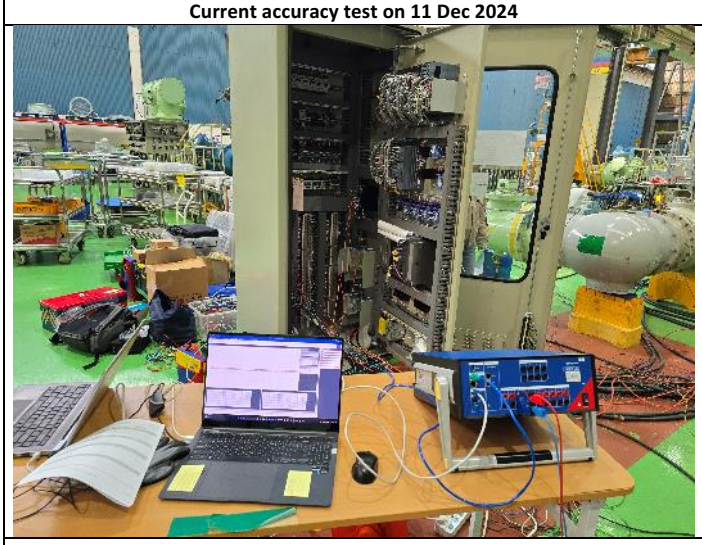
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HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	123A90	
FORNITORE/*Supplier* HYOSUNG	**No. Ordine**/*P.O. No.* 1723001595	**OGGETTO**/ *Object:* 66KV SWITCHGEARS	



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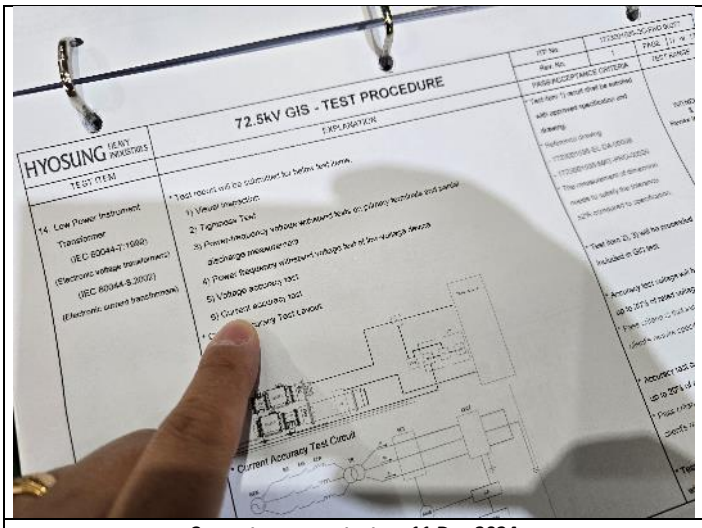


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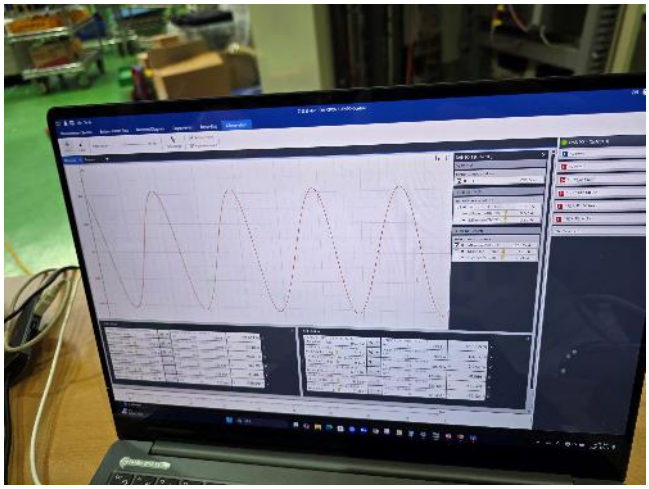
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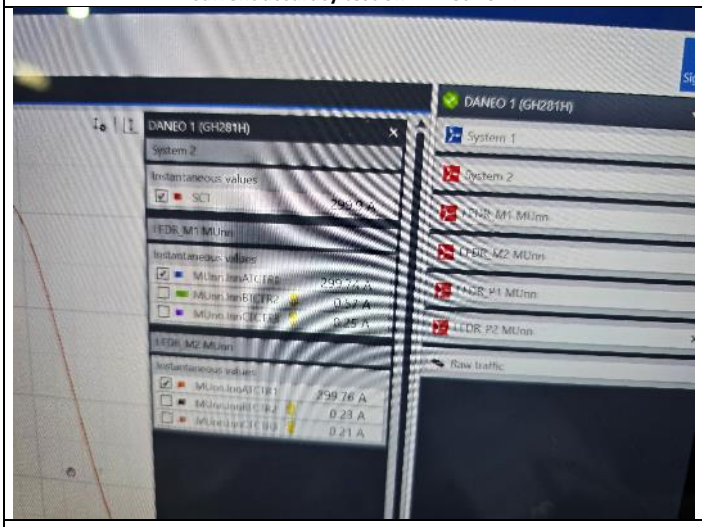
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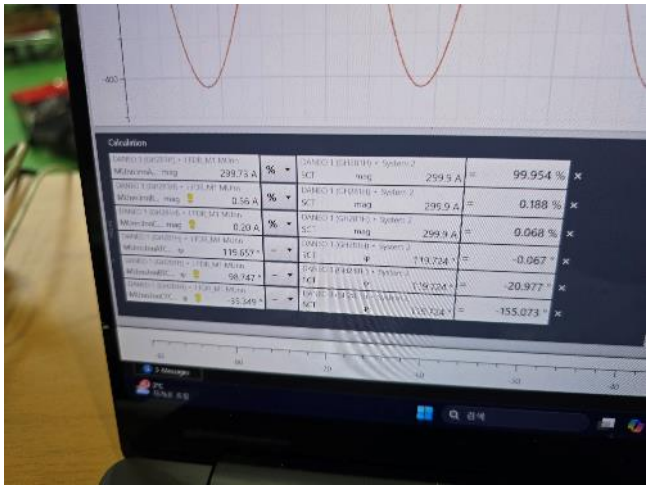
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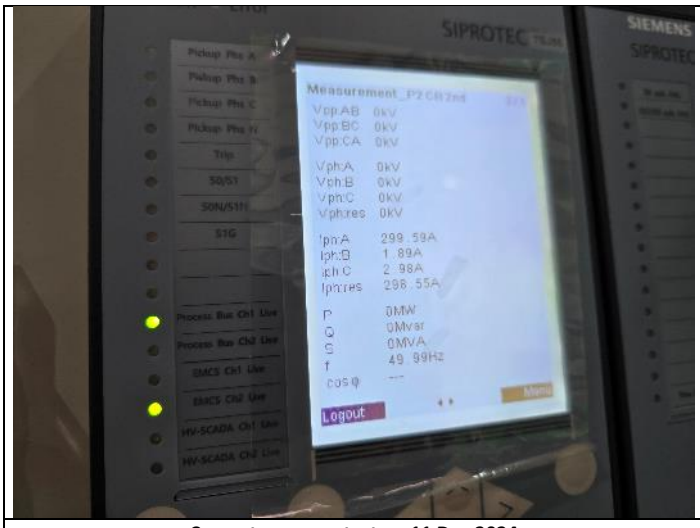


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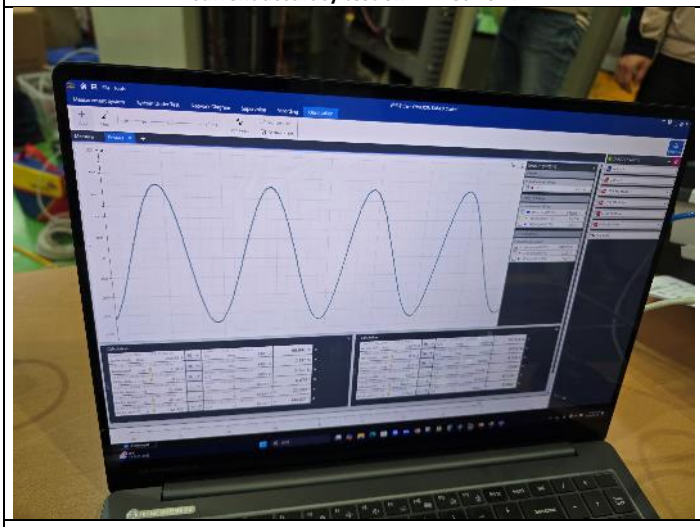
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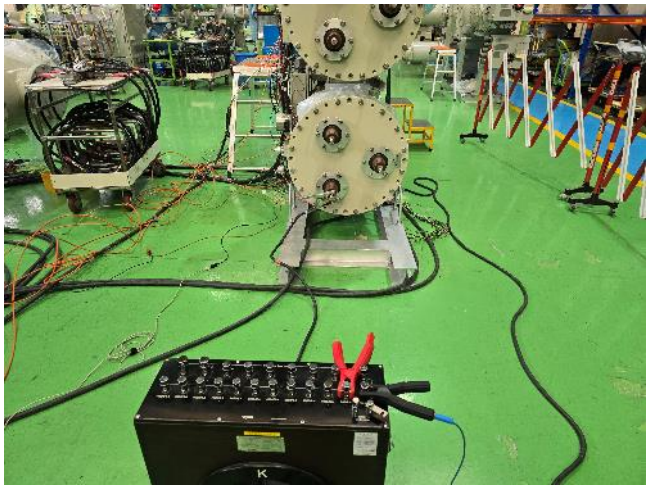
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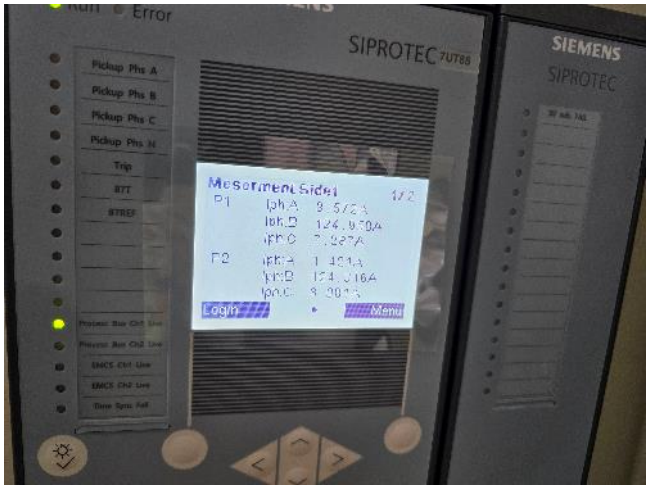
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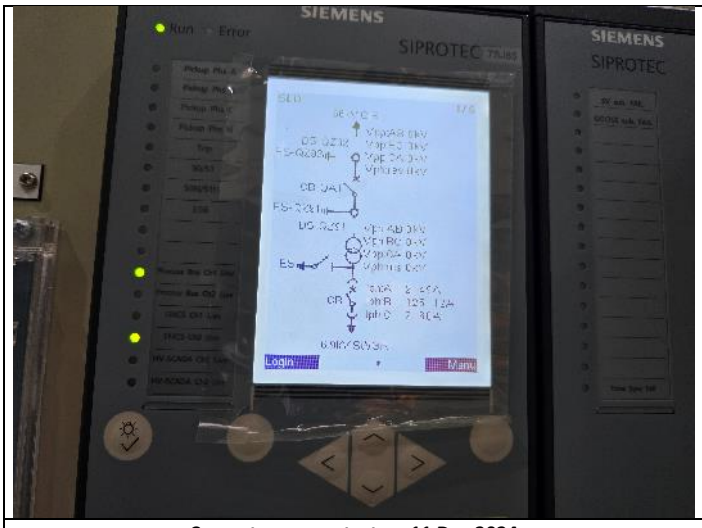


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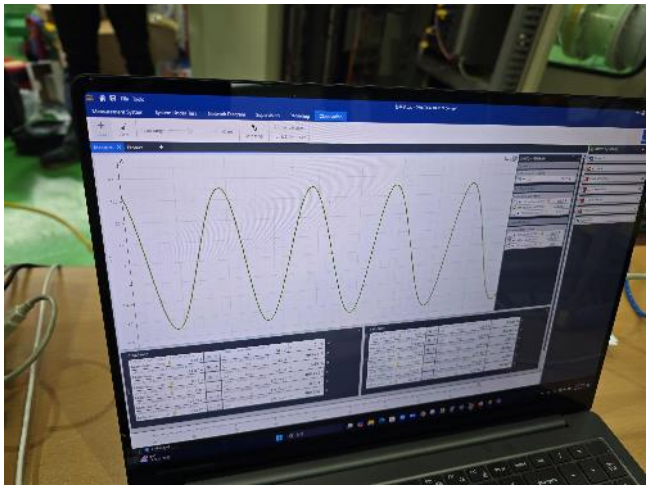
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PROGETTO	CLIENTE	COMMESSA / *Job*	COMMESSA FORNITORE / *Job Vendor*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	123A90	
FORNITORE/*Supplier* HYOSUNG	**No. Ordine/***P.O. No.* 1723001595	**OGGETTO/** *Object:* **66KV SWITCHGEARS**	



Current accuracy test on 11 Dec 2024



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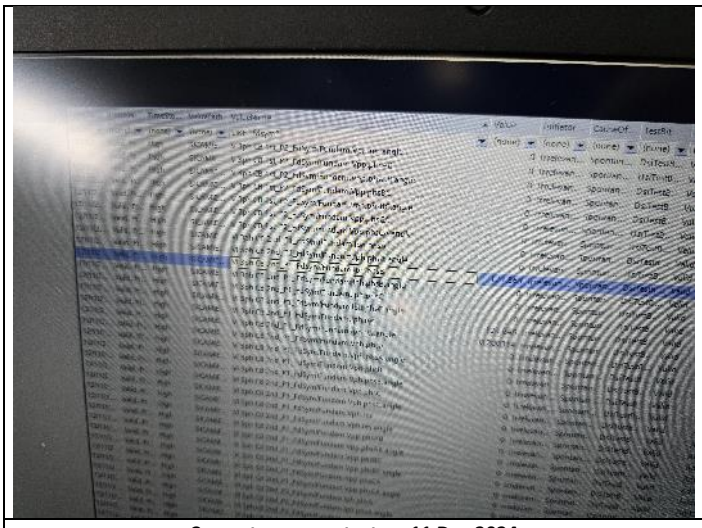


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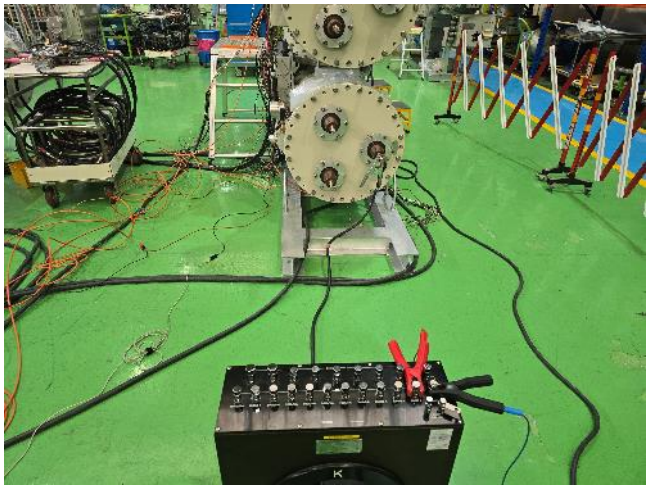
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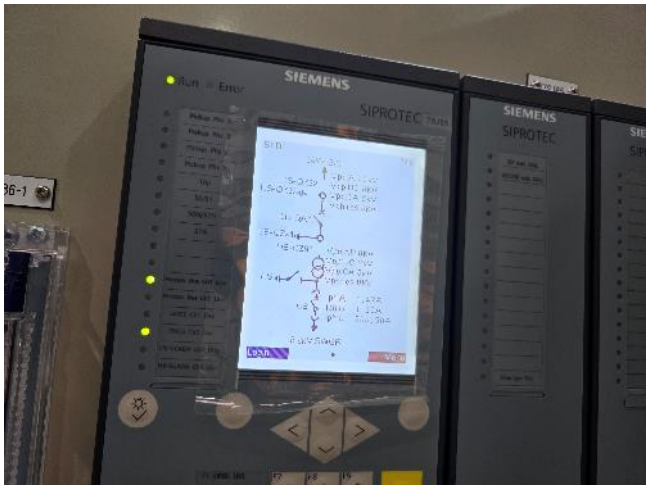
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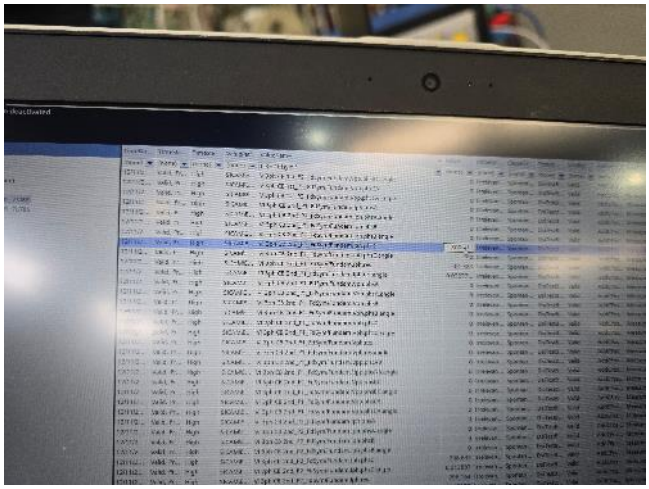
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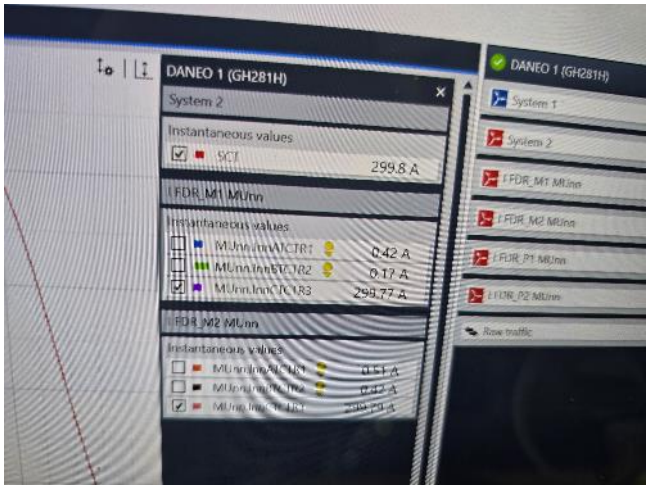
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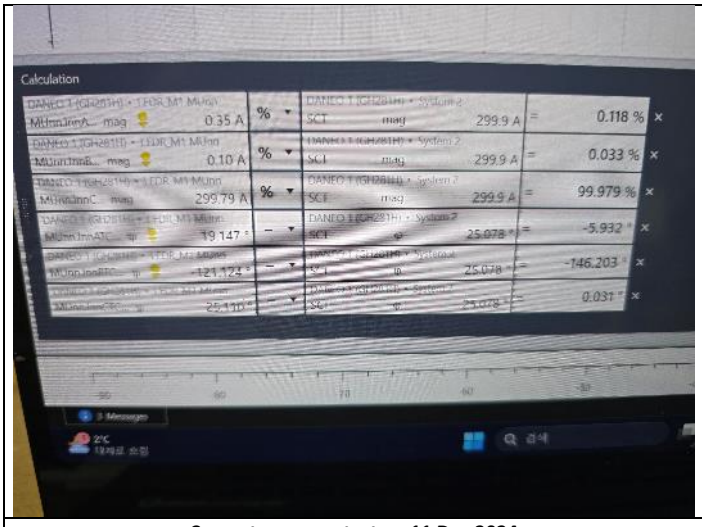


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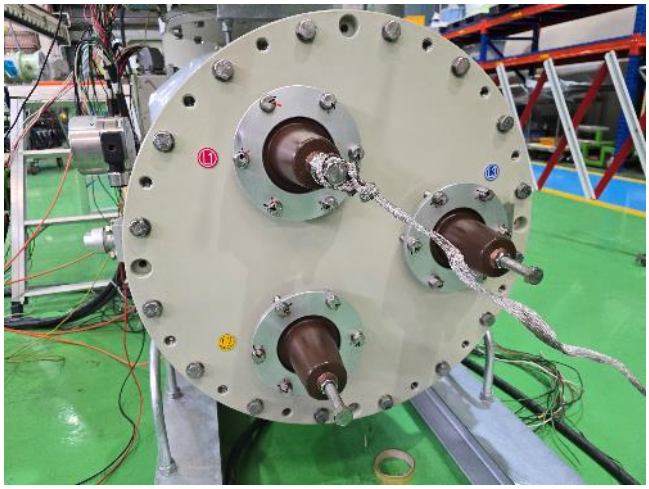
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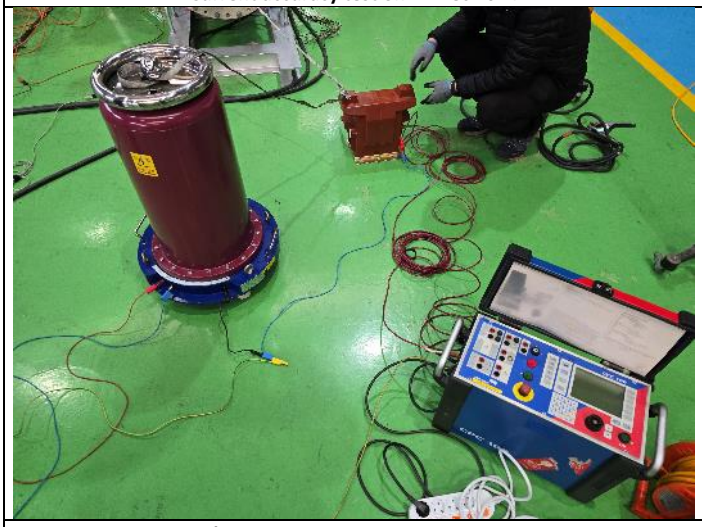
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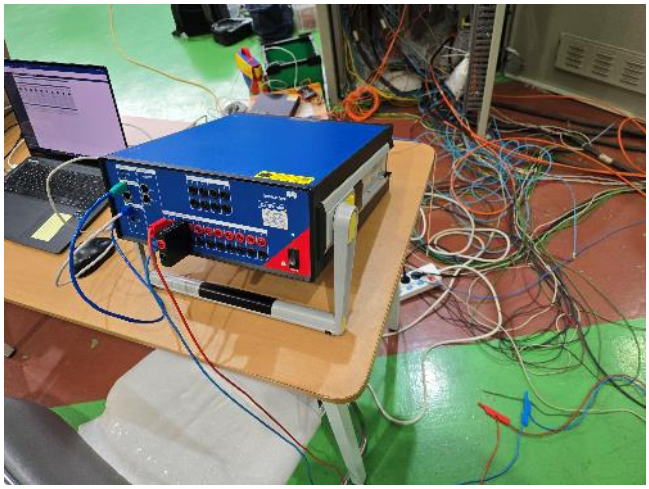
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Current accuracy test on 11 Dec 2024



Voltage accuracy test on 11 Dec 2024

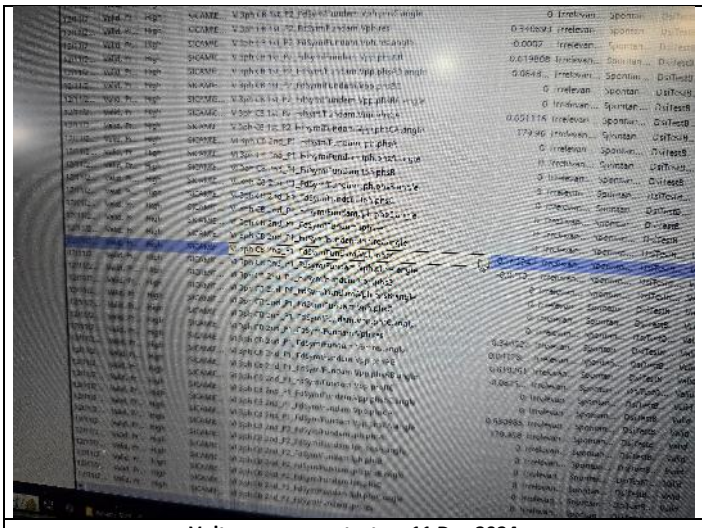


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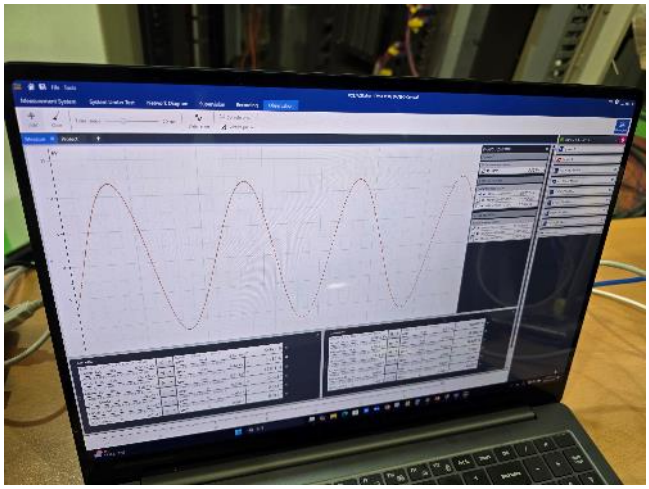
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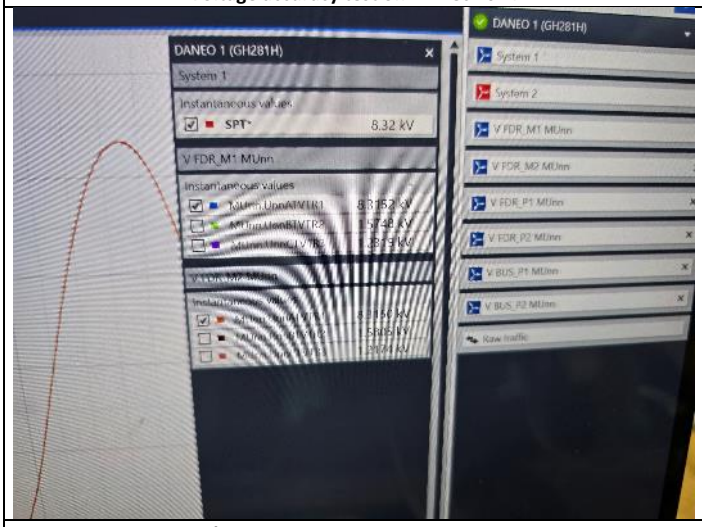
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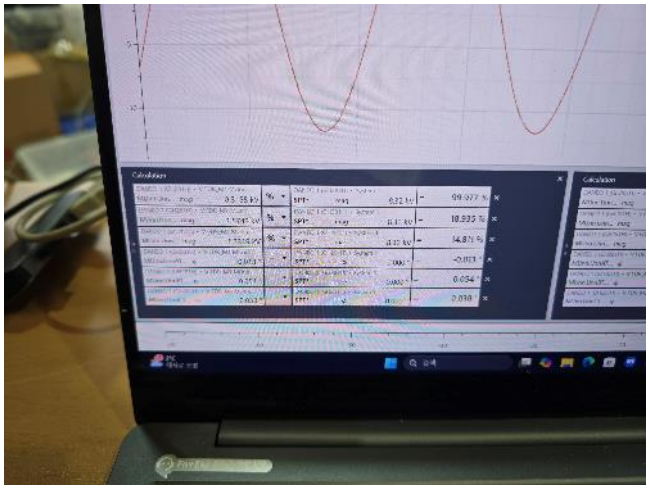
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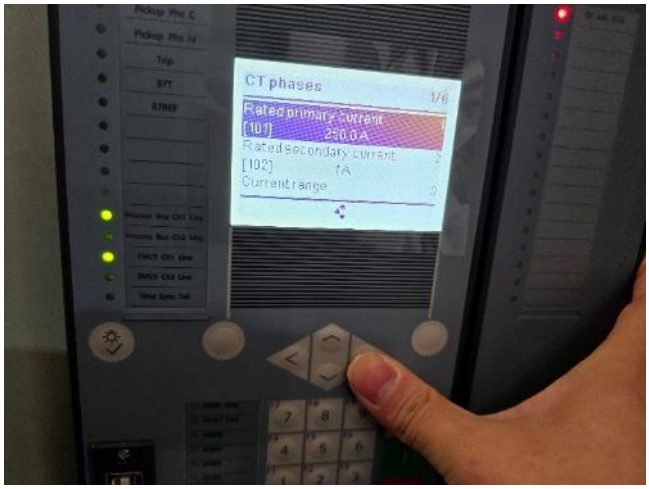
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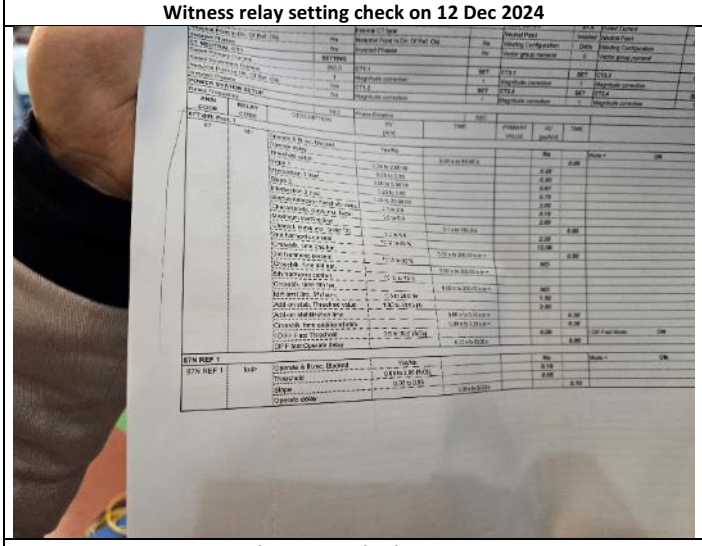
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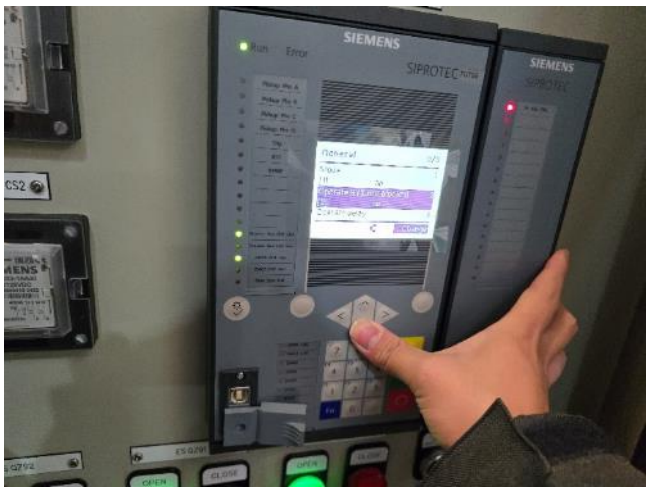
Witness relay setting check on 12 Dec 2024



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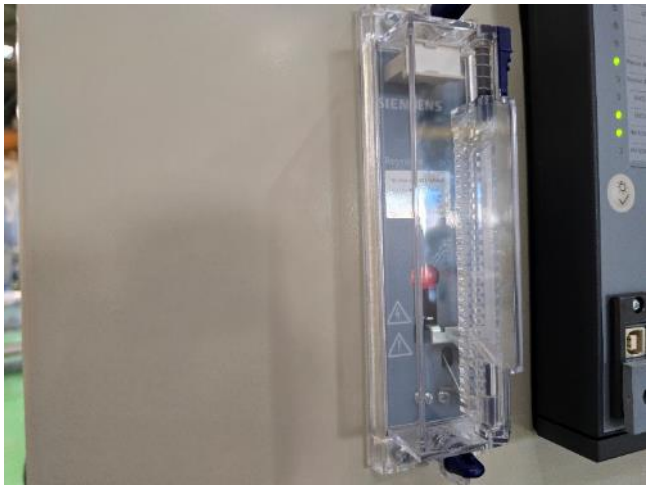
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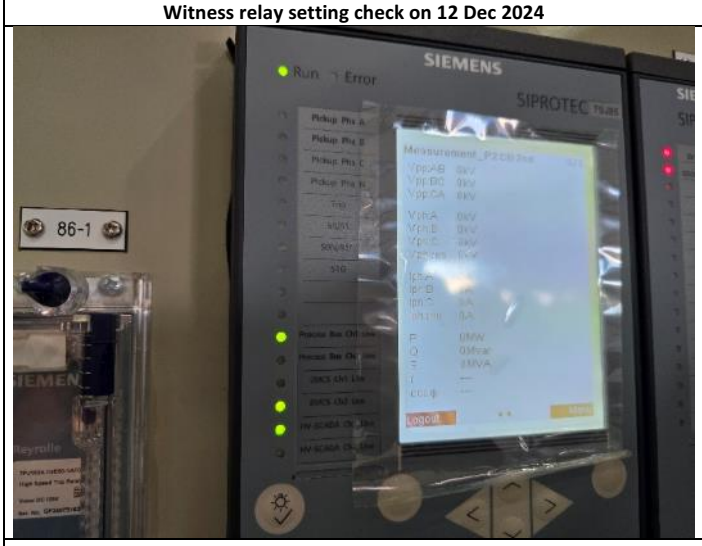
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HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	**123A90**	
FORNITORE/*Supplier* *HYOSUNG*	**No. Ordine/***P.O. No.* *1723001595*	**OGGETTO/** *Object:* **66KV SWITCHGEARS**	



Witness relay setting check on 12 Dec 2024



Witness protection test on 12 Dec 2024



Witness protection test on 12 Dec 2024

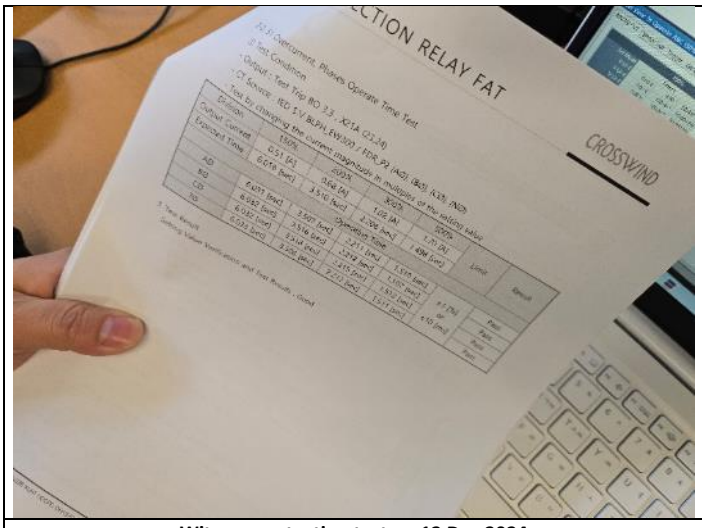


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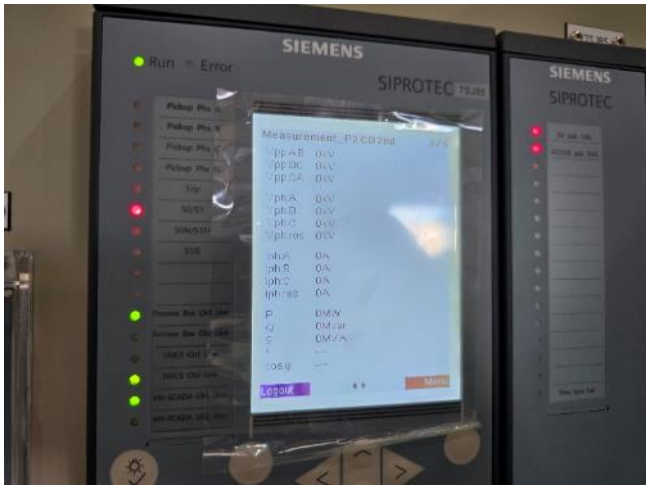
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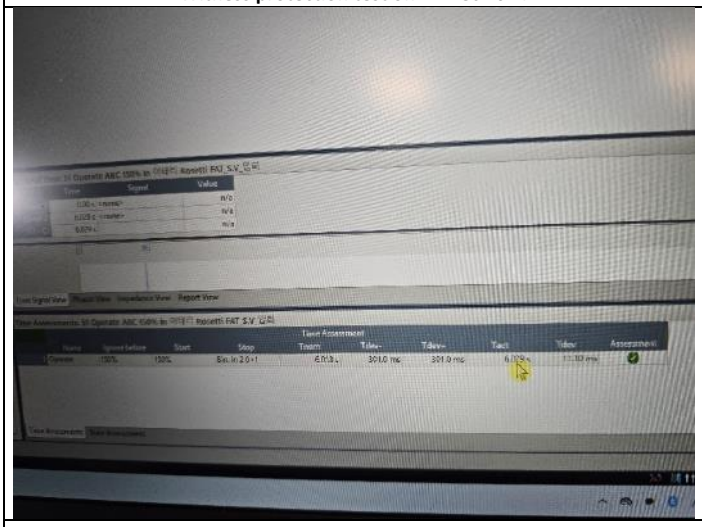
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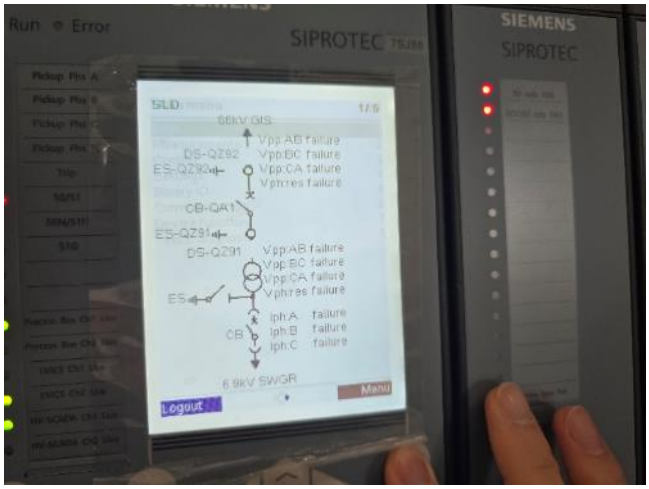
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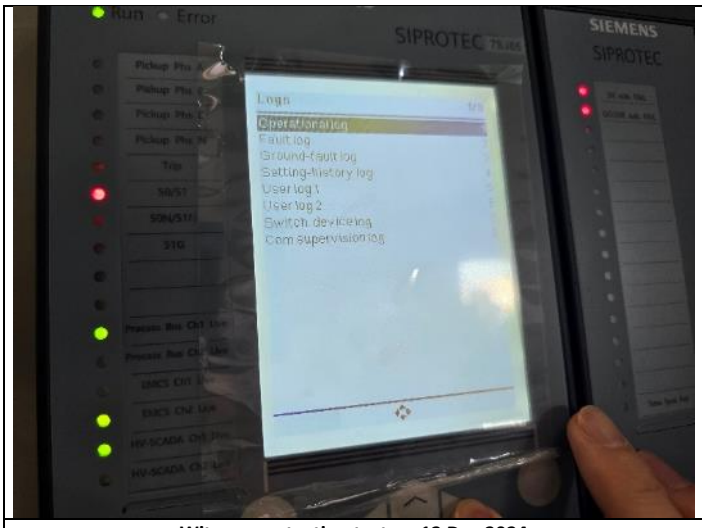


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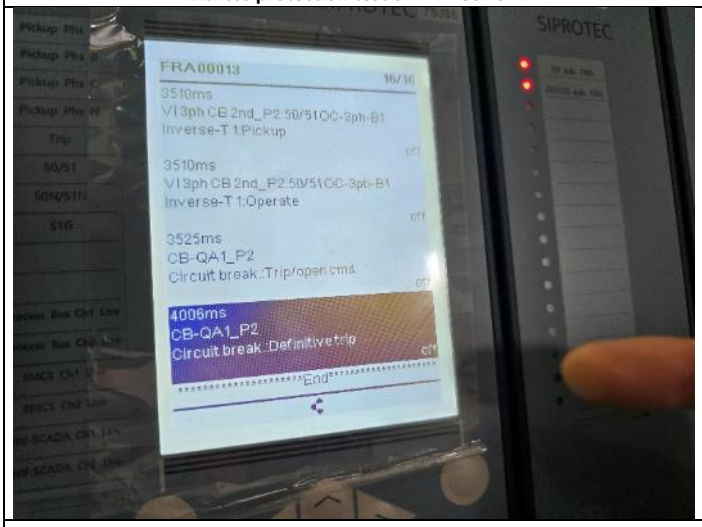
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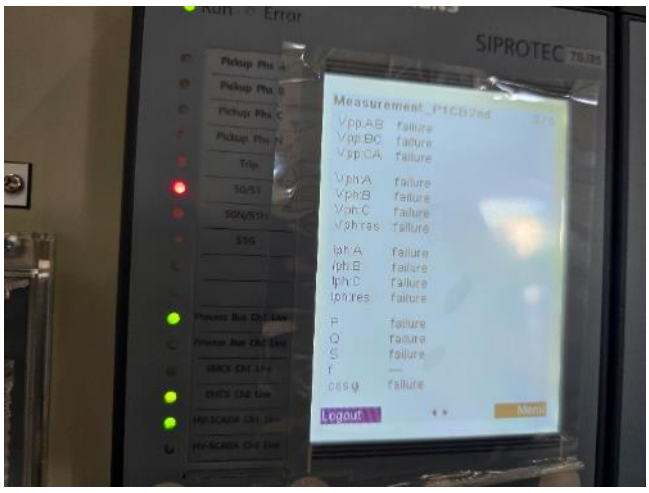
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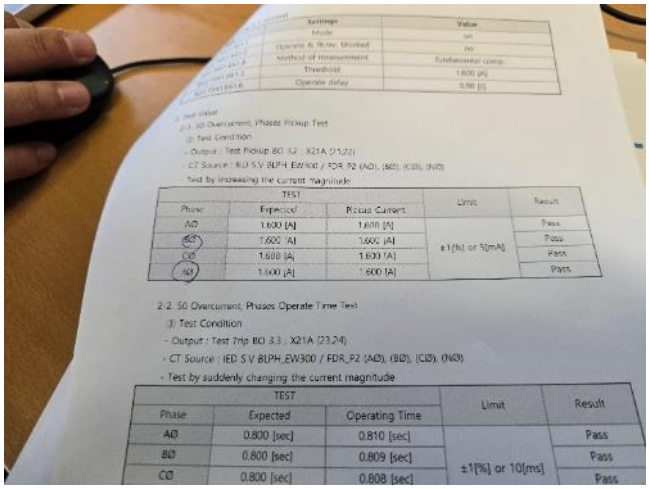
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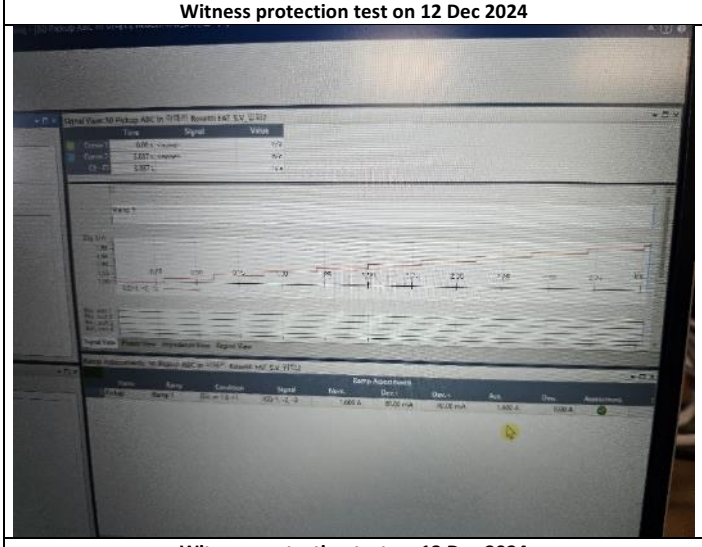
2-2. 50 Overcurrent, Phases Operate Time Test

① Test Condition

- Output : Test 7Hp BO 3,3 , X21A (23,24)
- CT Source : IED S.V BLPH_EW300 / FDR_P2 (AØ), (BØ), (CØ), (NØ)
- Test by suddenly changing the current magnitude

TEST				
Phase	Expected	Operating Time	Limit	Result
AØ	0.800 [sec]	0.810 [sec]	±1[%] or 10[ms]	Pass
BØ	0.800 [sec]	0.809 [sec]		Pass
CØ	0.800 [sec]	0.808 [sec]		Pass

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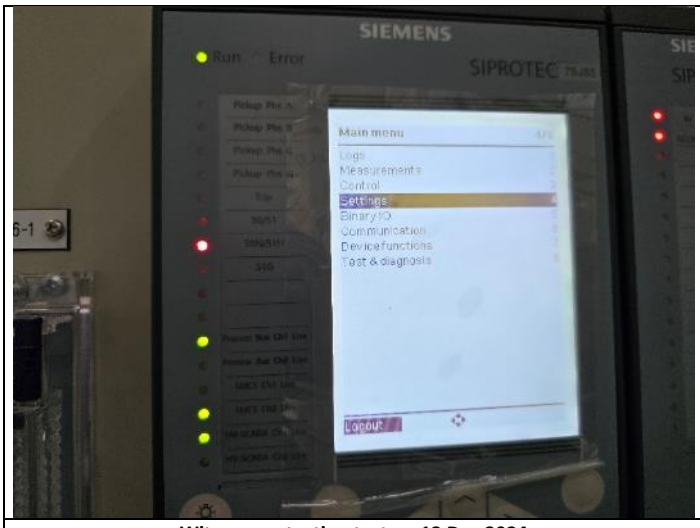


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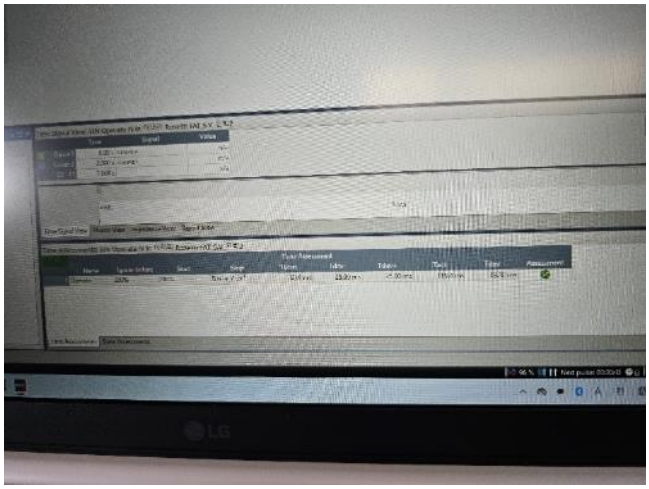
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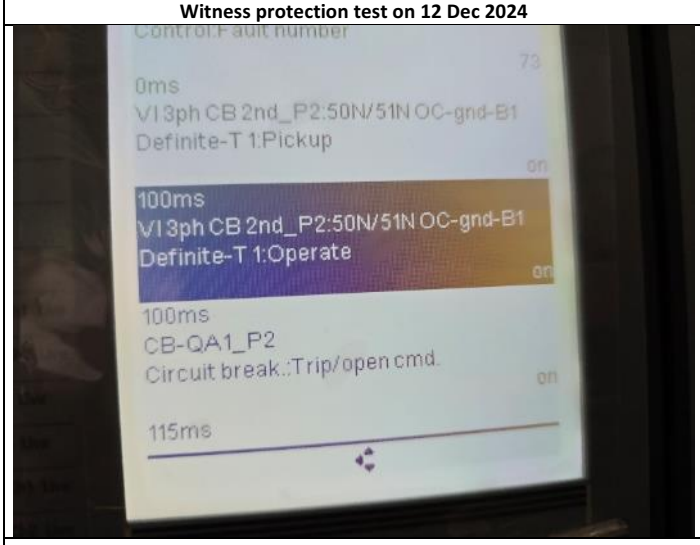
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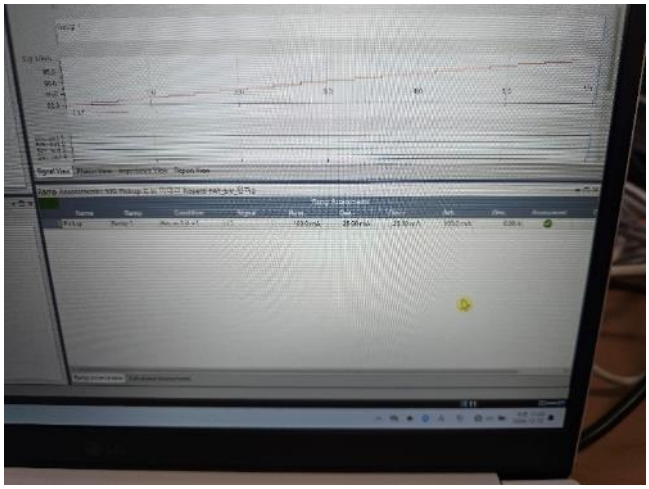
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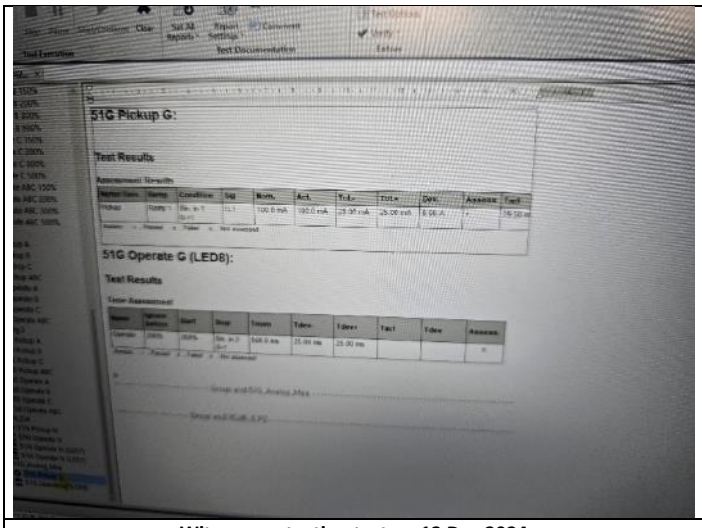


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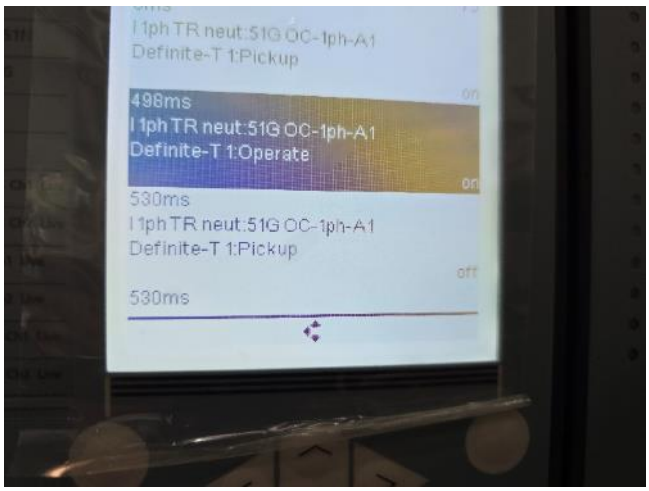
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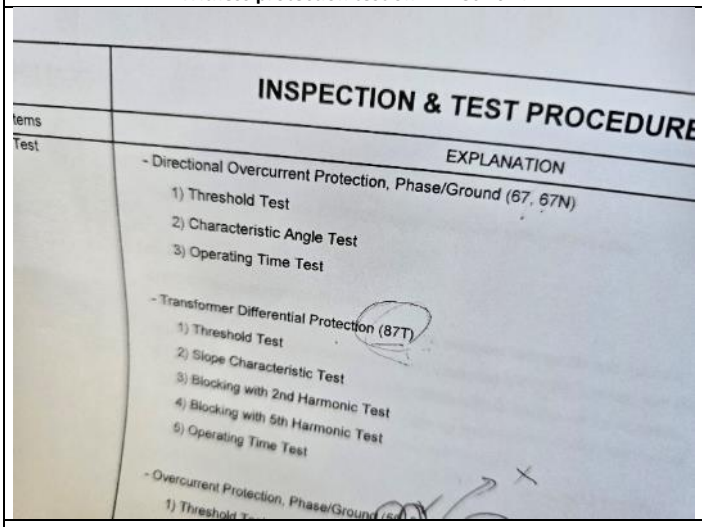
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Witness protection test on 12 Dec 2024



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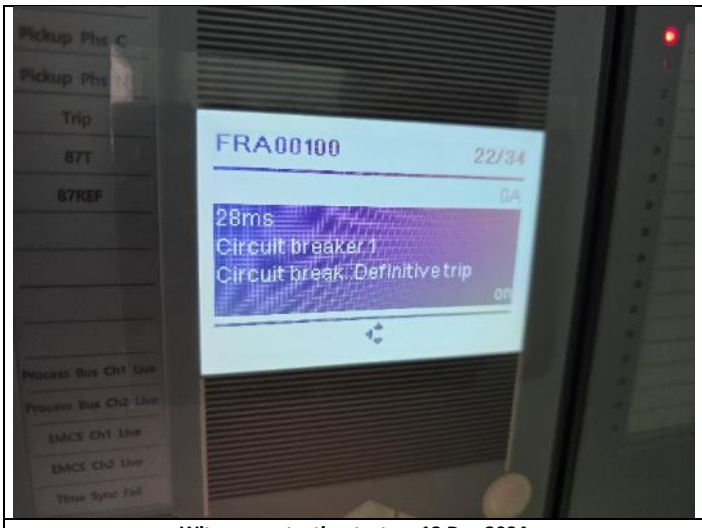


Witness protection test on 12 Dec 2024

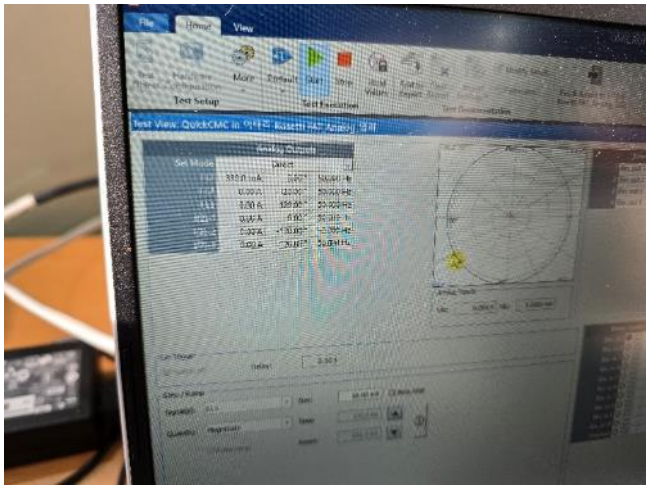
L' INCARICATO / *The person in charge*	IL RAPP. DEL CLIENTE / *Client's Representative*	IL FORNITORE / *Supplier*
P. Hyeon Enginex Inspector on Behalf of Rosetti Marino		

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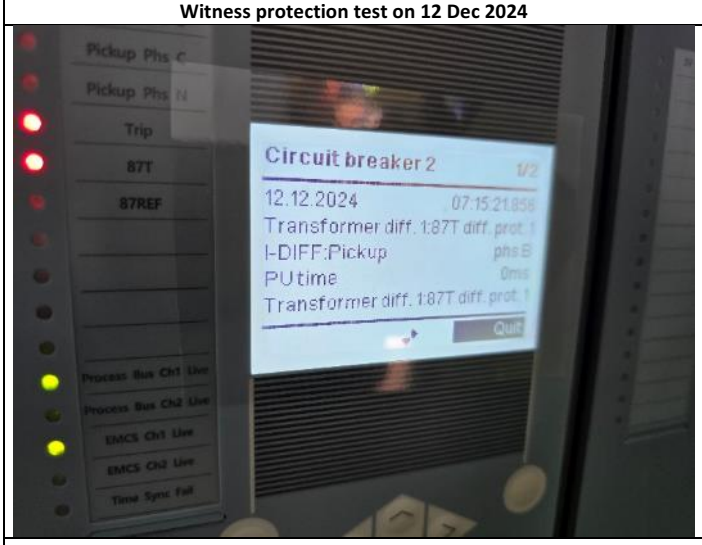
PROGETTO	CLIENTE	COMMESSA / *Job*	COMMESSA FORNITORE / *Job Vendor*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	123A90	
FORNITORE/*Supplier* HYOSUNG	**No. Ordine/***P.O. No.* 1723001595	**OGGETTO/** *Object:* **66KV SWITCHGEARS**	



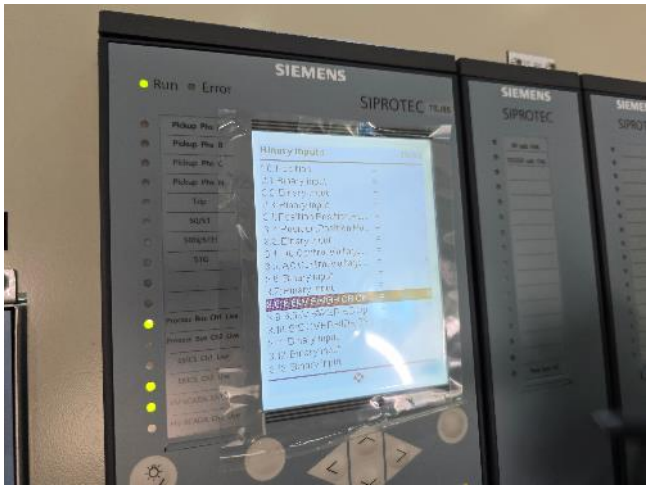
Witness protection test on 12 Dec 2024



Witness protection test on 12 Dec 2024



Witness protection test on 12 Dec 2024



Witness IO operation test on 12 Dec 2024

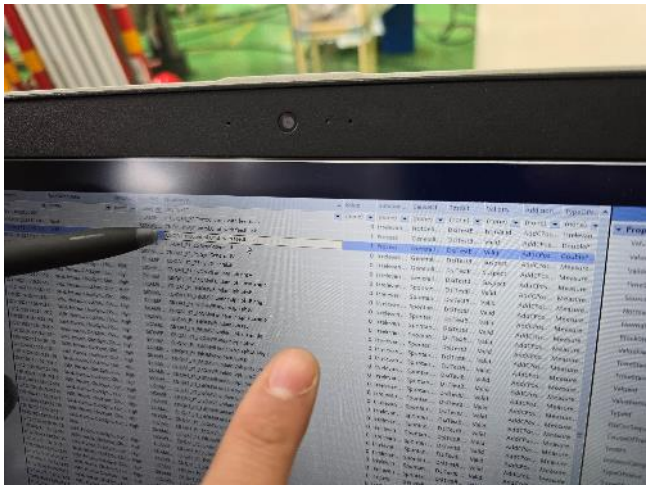
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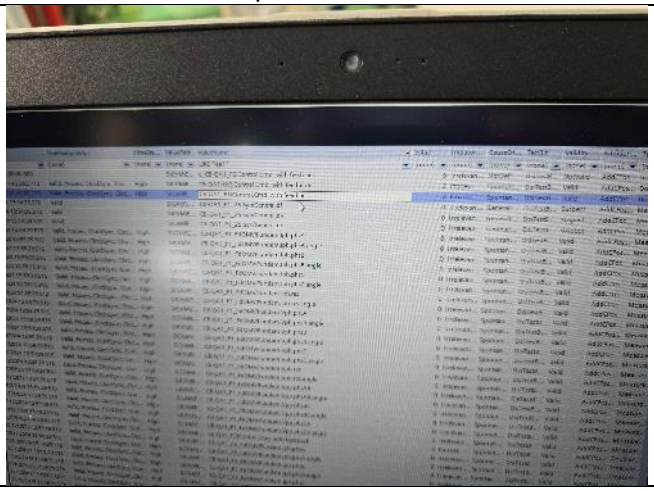
PROGETTO	CLIENTE	COMMESSA / *Job*	COMMESSA FORNITORE / *Job Vendor*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	123A90	
FORNITORE/*Supplier* HYOSUNG	**No. Ordine**/*P.O. No.* 1723001595	**OGGETTO**/ *Object:* 66KV SWITCHGEARS	



Witness IO operation test on 12 Dec 2024



Witness IO operation test on 12 Dec 2024



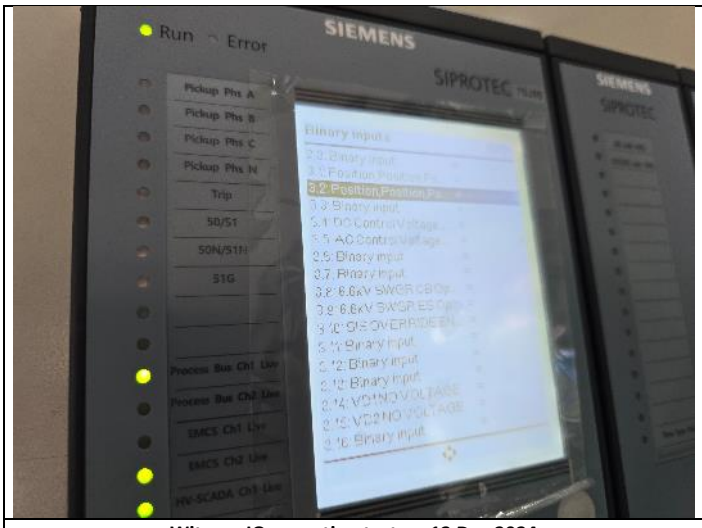
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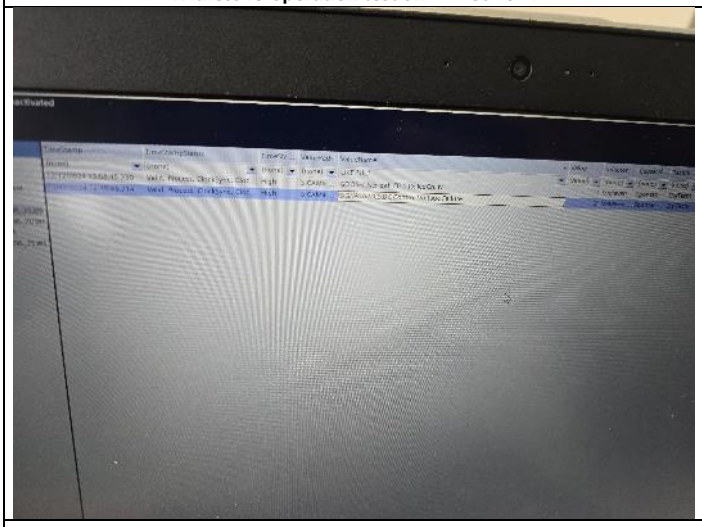
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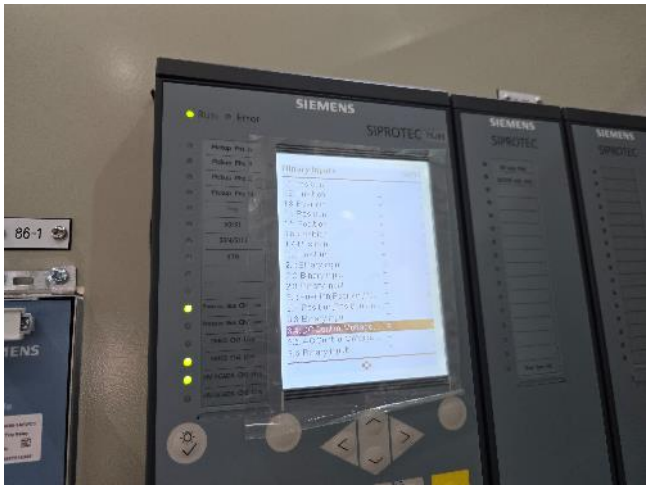
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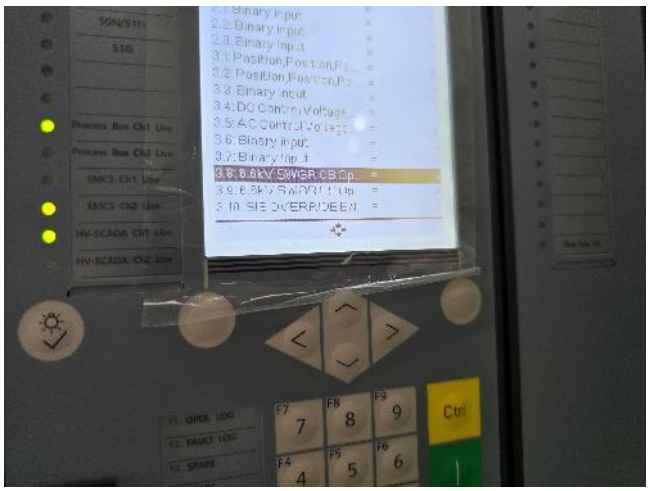
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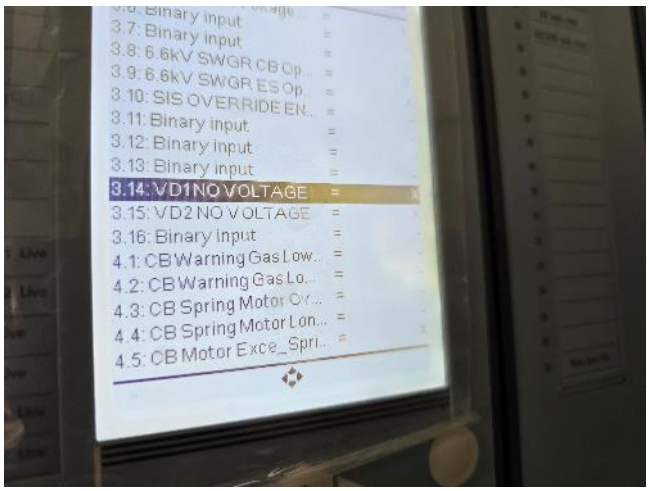
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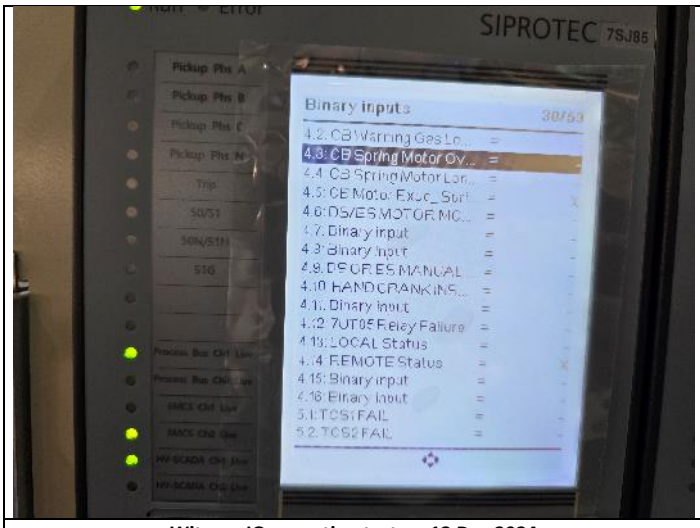
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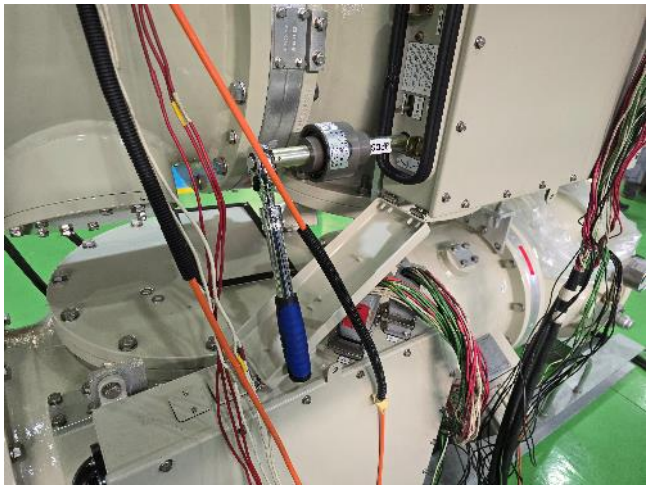
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ROSETTI MARINO	**INSPECTION REPORT**	**Report No.** IR-1595-HYO-02	SHEET 90 di 92
		Data *Date* **06 to 13.12.2024**	Rev. *Rev.* ***00***

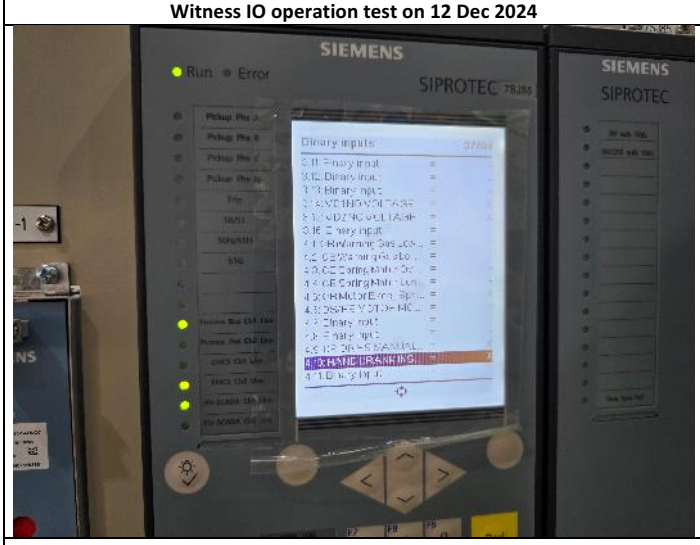
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FORNITORE/*Supplier* *HYOSUNG*	**No. Ordine**/*P.O. No.* *1723001595*	**OGGETTO**/ *Object:* **66KV SWITCHGEARS**	



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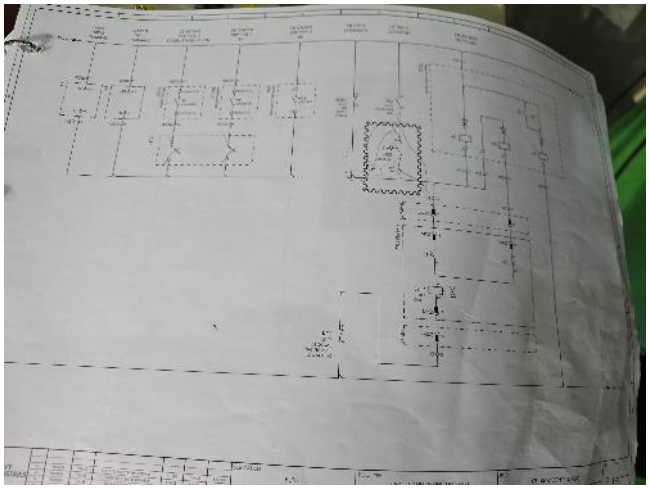
Witness IO operation test on 12 Dec 2024



Witness IO operation test on 12 Dec 2024



Witness additional check points on 13 Dec 2024



Witness additional check points on 13 Dec 2024

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Witness additional check points on 13 Dec 2024



Witness additional check points on 13 Dec 2024

NON VALIDO PER IL RILASCIO DELLA FORNITURA / *It is not valid for the supply's release*

L' INCARICATO / *The person in charge*	IL RAPP. DEL CLIENTE / *Client's Representative*	IL FORNITORE / *Supplier*
P. Hyeon Enginex Inspector on Behalf of Rosetti Marino		

Section 13 MECHANICAL COMPLETION CHANGES / MARK-UPS

NOT APPLICABLE