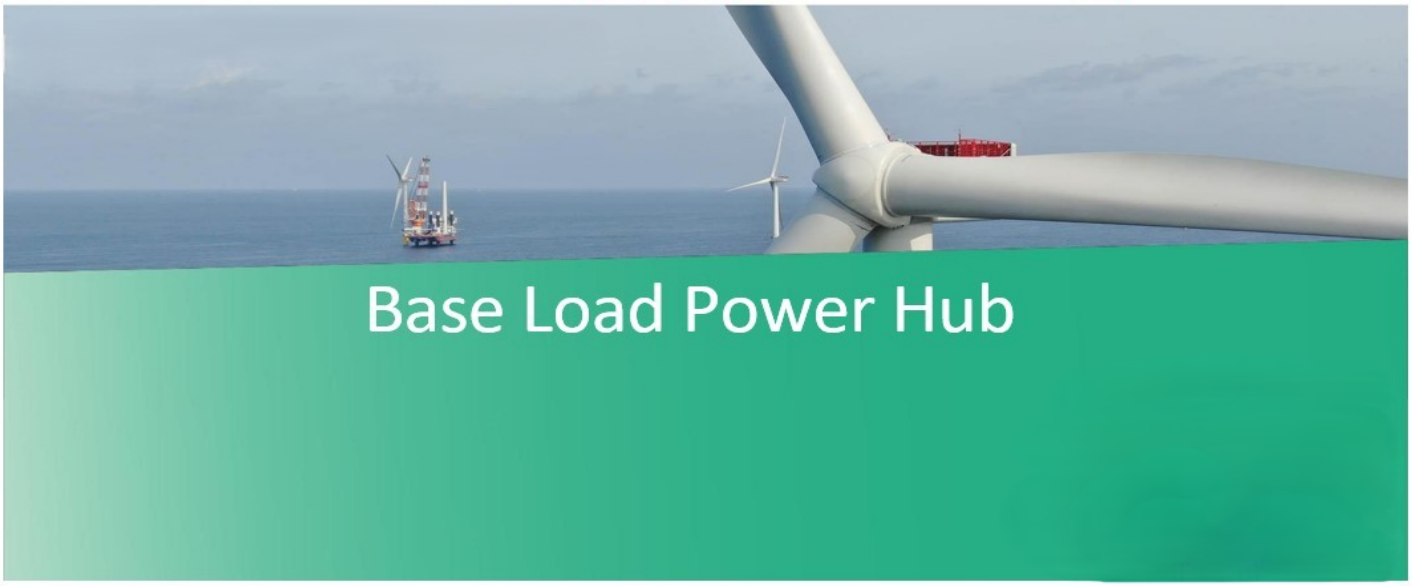
CROSSWIND

ROSETTI MARINO

PROVERLIS

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



MECHANICAL COMPLETION DOSSIER (ONSHORE)

SYSTEM	80 Hydrogen Fuel Cell Package
SUBSYSTEM	80-00 Hydrogen Fuel Cell Package (A-80000)

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

Sub System N°:	80-00	Tick as appropriate	ONSHORE	O
Description:	Hydrogen Fuel Cell Package (A-80000)		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*	O
8.	***MECHANICAL COMPLETION STATUS INDEX - TELECOMMUNICATION DISCIPLINE*** *Telecommunication Sub-System Status Index (Print out) and Check/Test Sheets*	O
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*	NA
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:	2		Issued on:	2024-12-03	
System:	80	/	Hydrogen Fuel Cell Package		
SubSystem:	80-00	/	Hydrogen Fuel Cell Package (A-80000)		

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 29

REMARKS:

	CONTRACTOR Construction Manager	**CONTRACTOR** Commissioning Manager	**COMPANY** Construction Lead (if required)	**COMPANY** Commissioning Lead (if required)
Name	Wolmer Borghi	Anthony Iveson	Jeroen van Loon	Jamie McAllister
Date	2024-12-03	2024-12-03	2024-12-03	2024-12-03
Signature	PROVERLIS Digitaly signed by Wolmer Borghi 2024-12-03T15:27:02.879Z	PROVERLIS Digitaly signed by Anthony Iveson 2024-12-03T16:02:49.209Z	PROVERLIS Digitaly signed by Jeroen van Loon 2024-12-03T16:30:45.573Z	PROVERLIS Digitaly signed by Jamie McAllister 2024-12-03T16:11:26.356Z

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on subsystem: 80-00 & process: MC

Electrical	80-00 Hydrogen Fuel Cell Package (A-80000)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
83012-CEL	LV Switchgear / Fuel Cell Auxiliary Load	ONSHORE	C10000523	CPX09	100	2024-11-21	RFC 2

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on subsystem: 80-00 & process: MC

Instrumental	80-00 Hydrogen Fuel Cell Package (A-80000)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
80-UCP-001/B400-FGS-003	CONFIRMED GAS ALARM / MARSHALLING PCS	ONSHORE	C10001466	CJX10	100	2024-11-20	RFC 2
C-80-XA-003/B400-SIS-001	UCP FAULT ALARM / MARSHALLING PCS	ONSHORE	C10001456	CJX10	100	2024-11-20	RFC 2
C-80-XS-001/B400-SIS-001	TRIP SIGNAL TO UCP / MARSHALLING PCS	ONSHORE	C10001449	CJX10	100	2024-11-20	RFC 2

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on subsystem: 80-00 & process: MC

Mechanical	80-00 Hydrogen Fuel Cell Package (A-80000)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
A-80000	Fuel Cell	ONSHORE	C10002358	CZX01M	100	2024-11-19	RFC 2

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on subsystem: 80-00 & process: MC

Telecom	80-00 Hydrogen Fuel Cell Package (A-80000)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
80-UCP-001/B400-NET-001.01	COMMUNICATION / NETWORK CABINET	ONSHORE	C10004351	CIX09	100	2024-11-27	RFC 2
80-UCP-001/B400-NET-001.02	COMMUNICATION / NETWORK CABINET	ONSHORE	C10004352	CIX09	100	2024-11-27	RFC 2

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM	80	Hydrogen Fuel Cell Package
SUBSYSTEM	80-00	Hydrogen Fuel Cell Package (A-80000)

Instrumental

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30000637	A	C-80-XA-003/B400-SIS-001 C10001456	Cable terminations are not as per typical installation drawing 123A90-DDL-EL-DD-20090	.		Gtangianu 2024-11-20	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000640	A	C-80-XS-001/B400-SIS-001 C10001449	Cable terminations are not as per typical installation drawing 123A90-DDL-EL-DD-20090, by package side	.		Gtangianu 2024-11-20	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000643	A	80-UCP-001/B400-FGS-003 C10001466	Cable terminations are not as per typical installation drawing 123A90-DDL-EL-DD-20090, by package side	.		Gtangianu 2024-11-20	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000636	B	C-80-XA-003/B400-SIS-001 C10001456	The terminal strip dont have any refer number inside the Package	.		Gtangianu 2024-11-20			
C30000638	B	C-80-XA-003/B400-SIS-001 C10001456	Missing cable tags on routing inside the Package	.		Gtangianu 2024-11-20			
C30000639	B	C-80-XS-001/B400-SIS-001 C10001449	Missing core identification tags on terminals inside the Package	.		Gtangianu 2024-11-20			
C30000641	B	C-80-XS-001/B400-SIS-001 C10001449	Missing cable tags on routing inside the Package	.		Gtangianu 2024-11-20			
C30000642	B	80-UCP-001/B400-FGS-003 C10001466	The terminal strip dont have any refer number inside (A-80000 FUEL CELL UCP).	.		Gtangianu 2024-11-20			

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM 80 Hydrogen Fuel Cell Package
SUBSYSTEM 80-00 Hydrogen Fuel Cell Package (A-80000)

Electrical

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30000689	A	83012-CEL C10000523	The cable termination is not complete. See attached photo.	.		Gtangianu 2024-11-21	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000686	B	83012-CEL C10000523	Bending radius on MCT is not correct. See attached photo.	.		Gtangianu 2024-11-21			
C30000687	B	83012-CEL C10000523	Missing plastic cable tag on internal/external side of package (Fuel Cell A-80000).	.		Gtangianu 2024-11-21			
C30000688	B	83012-CEL C10000523	Identification tag wire missing inside panel +UC50 (package Fuel Cell A-80000).	.		Gtangianu 2024-11-21			
C30001187	B	A-80000	HMI message does not specify that the external e-stop is activated. Must present a relevant alarm. 04-09-2024: Will be corrected with next sw			CPY 2024-12-03			
C30001188	B	A-80000	Current reading in pct vol. To be changed to pct LEL. 04-09-2024: Will be corrected with next sw release (17C - H2 sensor reading in HMI)			CPY 2024-12-03			
C30001189	B	A-80000	At FC module #3, there is coolant leakage (drops) at the connections to the heat exchanger, both connections. To be tightened and/or gaskets			CPY 2024-12-03			
C30001190	B	A-80000	Error messages not elaborate enough. Review error message readability (must be more explanatory) 04-09-2024: Will be corrected with			CPY 2024-12-03			
C30001191	B	A-80000	To be investigated and sealed 04-09-2024: Will be corrected when HT coolant is drained. (27C - H2 and smoke detector voting)			CPY 2024-12-03			

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM	80	Hydrogen Fuel Cell Package
SUBSYSTEM	80-00	Hydrogen Fuel Cell Package (A-80000)

Electrical

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30001192	B	A-80000	Operator screen built for HMI use not ready (Engineering interface not designed for HMI but for laptop use). Must be developed by Ballard			CPY 2024-12-03			
C30001193	B	A-80000	During shutdown of the FCwave, an intermittent timeout occurs (ca 5% of shutdowns) where the test stalls. Expected to be a software glitch to be			CPY 2024-12-03			

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM	80	Hydrogen Fuel Cell Package
SUBSYSTEM	80-00	Hydrogen Fuel Cell Package (A-80000)

Telecom

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30000973	A	80-UCP-001/B400-NET-001.01 C10004351	The cable termination is not installed in accordance with Electrical Typical Installation Details. see 123A90-DDL-EL-DD-20090 sh.8 / 29.	.		APolo 2024-11-27	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000977	A	80-UCP-001/B400-NET-001.02 C10004352	The cable termination is not installed in accordance with Electrical Typical Installation Details. see 123A90-DDL-EL-DD-20090 sh.8 / 29.	.		APolo 2024-11-27	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000970	B	80-UCP-001/B400-NET-001.01 C10004351	The copper conductor of the cable armor must be individually connected to the earthing bar. See 123A90-DDL-EL-DD-20090. (B400-NET-001.01)	.		APolo 2024-11-27			
C30000971	B	80-UCP-001/B400-NET-001.01 C10004351	Missing cables tag , cabinet inside Panel A-80000 80-UCP-001.	.		APolo 2024-11-27			
C30000972	B	80-UCP-001/B400-NET-001.01 C10004351	Missing cable tag SS project, outside MCT.	.		APolo 2024-11-27			
C30000974	B	80-UCP-001/B400-NET-001.02 C10004352	The copper conductor of the cable armor must be individually connected to the earthing bar. See 123A90-DDL-EL-DD-20090. (B400-NET-001)	.		APolo 2024-11-27			
C30000975	B	80-UCP-001/B400-NET-001.02 C10004352	Missing cable tag , cabinet input A-80000 80-UCP-001.	.		APolo 2024-11-27			
C30000976	B	80-UCP-001/B400-NET-001.02 C10004352	Missing cable tag SS project, outside MCT.	.		APolo 2024-11-27			

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM 80 Hydrogen Fuel Cell Package

SUBSYSTEM 80-00 Hydrogen Fuel Cell Package (A-80000)

Mechanical

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30000604	B	A-80000 C10002358	Container 459079-4. The item n.19 "Drain interface - TP 015" (General arrangement K559-2254-CWIWP4202202-B01-001 R.8 sheet	.		KAlbonetti 2024-11-19			
C30000605	B	A-80000 C10002358	10ft Container. Item n.21 Customer MV Connection (6,6kV AC 3P, 92A) (General arrangement	.		KAlbonetti 2024-11-19			
C30000606	B	A-80000 C10002358	30ft Container. Item n.10 Vents (General arrangement K559-2254-CWIWP4202202-B01-001 R.8 sheet	.		KAlbonetti 2024-11-19			
C30000607	B	A-80000 C10002358	30 ft container. No Ballard's nameplate. 10ft Container. Ballard's nameplate is in soft plastic and just glued to the structure.	.		KAlbonetti 2024-11-19			
C30000608	B	A-80000 C10002358	Containers' nameplates on both the 30 ft container and the 10 ft one have rust rising from underneath.	.		KAlbonetti 2024-11-19			
C30000609	B	A-80000 C10002358	Several painting touch-ups to be performed. See as example on SHS above anchor points A, B and H (images attached).	.		KAlbonetti 2024-11-19			
C30000610	B	A-80000 C10002358	There are discrepancies between the General arrangement document (K559-2254-CWIWP4202202-B01-001 R.8).	.		KAlbonetti 2024-11-19			
C30001186	B	A-80000	No door mounted to the cabinet Internal (cabinet door to be added) (15C - 10ft inspection hatch control panel)			CPY 2024-12-03			

Section 2 CONSOLIDATED PUNCH LISTS

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM	80	Hydrogen Fuel Cell Package
SUBSYSTEM	80-00	Hydrogen Fuel Cell Package (A-80000)

Instrumental

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30000637	A	C-80-XA-003/B400-SIS-001 C10001456	Cable terminations are not as per typical installation drawing 123A90-DDL-EL-DD-20090	.		Gtangianu 2024-11-20	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000640	A	C-80-XS-001/B400-SIS-001 C10001449	Cable terminations are not as per typical installation drawing 123A90-DDL-EL-DD-20090, by package side	.		Gtangianu 2024-11-20	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000643	A	80-UCP-001/B400-FGS-003 C10001466	Cable terminations are not as per typical installation drawing 123A90-DDL-EL-DD-20090, by package side	.		Gtangianu 2024-11-20	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000636	B	C-80-XA-003/B400-SIS-001 C10001456	The terminal strip dont have any refer number inside the Package	.		Gtangianu 2024-11-20	2025-02-13	Ecarotenuto 2025-02-13	2025-02-13
C30000638	B	C-80-XA-003/B400-SIS-001 C10001456	Missing cable tags on routing inside the Package	.		Gtangianu 2024-11-20			
C30000639	B	C-80-XS-001/B400-SIS-001 C10001449	Missing core identification tags on terminals inside the Package	.		Gtangianu 2024-11-20			
C30000641	B	C-80-XS-001/B400-SIS-001 C10001449	Missing cable tags on routing inside the Package	.		Gtangianu 2024-11-20			
C30000642	B	80-UCP-001/B400-FGS-003 C10001466	The terminal strip dont have any refer number inside (A-80000 FUEL CELL UCP).	.		Gtangianu 2024-11-20	2025-02-13	Ecarotenuto 2025-02-13	2025-02-13

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM 80 Hydrogen Fuel Cell Package

SUBSYSTEM 80-00 Hydrogen Fuel Cell Package (A-80000)

Electrical

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30000689	A	83012-CEL C10000523	The cable termination is not complete. See attached photo.	.		Gtangianu 2024-11-21	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000686	B	83012-CEL C10000523	Bending radius on MCT is not correct. See attached photo.	.		Gtangianu 2024-11-21			
C30000687	B	83012-CEL C10000523	Missing plastic cable tag on internal/external side of package (Fuel Cell A-80000).	.		Gtangianu 2024-11-21			
C30000688	B	83012-CEL C10000523	Identification tag wire missing inside panel +UC50 (package Fuel Cell A-80000).	.		Gtangianu 2024-11-21			
C30001187	B	A-80000	HMI message does not specify that the external e-stop is activated. Must present a relevant alarm. 04-09-2024: Will be corrected with next sw			CPY 2024-12-03			
C30001188	B	A-80000	Current reading in pct vol. To be changed to pct LEL. 04-09-2024: Will be corrected with next sw release (17C - H2 sensor reading in HMI)			CPY 2024-12-03			
C30001189	B	A-80000	At FC module #3, there is coolant leakage (drops) at the connections to the heat exchanger, both connections. To be tightened and/or gaskets			CPY 2024-12-03			
C30001190	B	A-80000	Error messages not elaborate enough. Review error message readability (must be more explanatory) 04-09-2024: Will be corrected with			CPY 2024-12-03			
C30001191	B	A-80000	To be investigated and sealed 04-09-2024: Will be corrected when HT coolant is drained. (27C - H2 and smoke detector voting)			CPY 2024-12-03			

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM	80	Hydrogen Fuel Cell Package
SUBSYSTEM	80-00	Hydrogen Fuel Cell Package (A-80000)

Electrical

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30001192	B	A-80000	Operator screen built for HMI use not ready (Engineering interface not designed for HMI but for laptop use). Must be developed by Ballard			CPY 2024-12-03			
C30001193	B	A-80000	During shutdown of the FCwave, an intermittent timeout occurs (ca 5% of shutdowns) where the test stalls. Expected to be a software glitch to be			CPY 2024-12-03			
C30001252	B	A-80000	Lack of signage on the JB to indicate IS circuits inside			CPY 2024-12-04			

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM 80 Hydrogen Fuel Cell Package

SUBSYSTEM 80-00 Hydrogen Fuel Cell Package (A-80000)

Telecom

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30000973	A	80-UCP-001/B400-NET-001.01 C10004351	The cable termination is not installed in accordance with Electrical Typical Installation Details. see 123A90-DDL-EL-DD-20090 sh.8 / 29.	.		APolo 2024-11-27	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000977	A	80-UCP-001/B400-NET-001.02 C10004352	The cable termination is not installed in accordance with Electrical Typical Installation Details. see 123A90-DDL-EL-DD-20090 sh.8 / 29.	.		APolo 2024-11-27	2024-12-03	Gtangianu 2024-12-03	2024-12-03
C30000970	B	80-UCP-001/B400-NET-001.01 C10004351	The copper conductor of the cable armor must be individually connected to the earthing bar. See 123A90-DDL-EL-DD-20090. (B400-NET-001.01)	.		APolo 2024-11-27	2025-01-22	APolo 2025-01-22	2025-01-22
C30000971	B	80-UCP-001/B400-NET-001.01 C10004351	Missing cables tag , cabinet inside Panel A-80000 80-UCP-001.	.		APolo 2024-11-27	2025-03-07	JKrizanic 2025-03-07	2025-03-07
C30000972	B	80-UCP-001/B400-NET-001.01 C10004351	Missing cable tag SS project, outside MCT.	.		APolo 2024-11-27	2025-02-26	Pschintu 2025-02-26	2025-02-26
C30000974	B	80-UCP-001/B400-NET-001.02 C10004352	The copper conductor of the cable armor must be individually connected to the earthing bar. See 123A90-DDL-EL-DD-20090. (B400-NET-001)	.		APolo 2024-11-27	2025-01-22	APolo 2025-01-22	2025-01-22
C30000975	B	80-UCP-001/B400-NET-001.02 C10004352	Missing cable tag , cabinet input A-80000 80-UCP-001.	.		APolo 2024-11-27	2025-03-07	JKrizanic 2025-03-07	2025-03-07
C30000976	B	80-UCP-001/B400-NET-001.02 C10004352	Missing cable tag SS project, outside MCT.	.		APolo 2024-11-27	2025-02-26	Pschintu 2025-02-26	2025-02-26

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

PUNCH LIST REPORT

SYSTEM 80 Hydrogen Fuel Cell Package

SUBSYSTEM 80-00 Hydrogen Fuel Cell Package (A-80000)

Mechanical

CODE	CAT	ITEM	DEFECT DESCRIPTION	CORRECTIVE ACTION	PERFORMED ACTION	ISSUED	CARRIED	CHECKED	APPROVED
C30000604	B	A-80000 C10002358	Container 459079-4. The item n.19 "Drain interface - TP 015" (General arrangement K559-2254-CWIWP4202202-B01-001 R.8 sheet	.		KAlbonetti 2024-11-19	2025-03-31	LNovaga 2025-03-31	2025-03-31
C30000605	B	A-80000 C10002358	10ft Container. Item n.21 Customer MV Connection (6,6kV AC 3P, 92A) (General arrangement	.		KAlbonetti 2024-11-19	2025-03-07	JKrizanic 2025-03-07	2025-03-07
C30000606	B	A-80000 C10002358	30ft Container. Item n.10 Vents (General arrangement K559-2254-CWIWP4202202-B01-001 R.8 sheet	.		KAlbonetti 2024-11-19			
C30000607	B	A-80000 C10002358	30 ft container. No Ballard's nameplate. 10ft Container. Ballard's nameplate is in soft plastic and just glued to the structure.	.		KAlbonetti 2024-11-19	2025-03-07	JKrizanic 2025-03-07	2025-03-07
C30000608	B	A-80000 C10002358	Containers' nameplates on both the 30 ft container and the 10 ft one have rust rising from underneath.	.		KAlbonetti 2024-11-19			
C30000609	B	A-80000 C10002358	Several painting touch-ups to be performed. See as example on SHS above anchor points A, B and H (images attached).	.		KAlbonetti 2024-11-19			
C30000610	B	A-80000 C10002358	There are discrepancies between the General arrangement document (K559-2254-CWIWP4202202-B01-001 R.8).	.		KAlbonetti 2024-11-19			
C30001186	B	A-80000	No door mounted to the cabinet Internal (cabinet door to be added) (15C - 10ft inspection hatch control panel)			CPY 2024-12-03			

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000606

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10002358	1.4 Discipline	Mechanical
1.2 Item	A-80000	Fuel Cell	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

30ft Container. Item n.10 Vents (General arrangement K559-2254-CWIWP4202202-B01-001 R.8 sheet 5/14). Two Vents have rust spots on the entire surface of the top side. One image attached as example.

Name: Kangi Albonetti

Date: 2024-11-19

Signature: Digitaly signed by Kangi Albonetti 2024-11-19T14:24:02.496Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Kangi Albonetti
3.4 Activity code	MC Mechanical Completion	Date	2024-11-19
3.5 Action by	VND Vendor	Signature	Digitaly signed by Kangi Albonetti 2024-11-19T14:24:25.852Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature



ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000608

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10002358	1.4 Discipline	Mechanical
1.2 Item	A-80000	Fuel Cell	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Containers' nameplates on both the 30 ft container and the 10 ft one have rust rising from underneath.

Name: Kangi Albonetti

Date: 2024-11-19

Signature: Digitaly signed by Kangi Albonetti 2024-11-19T14:30:49.219Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Kangi Albonetti
3.4 Activity code	MC Mechanical Completion	Date	2024-11-19
3.5 Action by	VND Vendor	Signature	Digitaly signed by Kangi Albonetti 2024-11-19T14:31:11.288Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature


Building year
NSN no
Customer serial no
DC-Supply project no 22– 1337
DC-SUPPLY A/S | Virkelyst 8 | 9400 Noerresundby | Denmar

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000609

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10002358	1.4 Discipline	Mechanical
1.2 Item	A-80000	Fuel Cell	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Several painting touch-ups to be performed. See as example on SHS above anchor points A, B and H (images attached).

Name: Kangi Albonetti

Date: 2024-11-19

Signature: Digitaly signed by Kangi Albonetti 2024-11-19T14:31:32.936Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Kangi Albonetti
3.4 Activity code	MC Mechanical Completion	Date	2024-11-19
3.5 Action by	VND Vendor	Signature	Digitaly signed by Kangi Albonetti 2024-11-19T14:31:53.227Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature






ICOU 1991
LLA

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000610

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10002358	1.4 Discipline	Mechanical
1.2 Item	A-80000	Fuel Cell	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

There are discrepancies between the General arrangement document (K559-2254-CWIWP4202202-B01-001 R.8). Sh.12/14. The interface point is different in field compared to the document. Two more in/out-lets exist. In addition there is one vent more originating from the point. See picture n.2 compared to sh.05/14. Finally there is one additional hose going to the Low temperature cooler compared to sh.05/14.

Name: Kangi Albonetti

Date: 2024-11-19

Signature: Digitaly signed by Kangi Albonetti 2024-11-19T14:32:09.942Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Kangi Albonetti
3.4 Activity code	MC Mechanical Completion	Date	2024-11-19
3.5 Action by	VND Vendor	Signature	Digitaly signed by Kangi Albonetti 2024-11-19T14:34:10.739Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature




BALDINI


DC

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000638

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10001456	1.4 Discipline	Instrumental
1.2 Item	C-80-XA-003/B400-SIS-001	UCP FAULT ALARM / MARSHALLING PCS	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Missing cable tags on routing inside the Package

Name: Giovanni Tangianu

Date: 2024-11-20

Signature: Digitaly signed by Giovanni Tangianu 2024-11-20T12:50:36.192Z

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	2024-11-20
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-20T13:04:22.236Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature



ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000639

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10001449	1.4 Discipline	Instrumental
1.2 Item	C-80-XS-001/B400-SIS-001	TRIP SIGNAL TO UCP / MARSHALLING PCS	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Missing core identification tags on terminals inside the Package

Name: Giovanni Tangianu

Date: 2024-11-20

Signature: Digitaly signed by Giovanni Tangianu 2024-11-20T13:08:13.665Z

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	2024-11-20
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-20T13:08:28.016Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

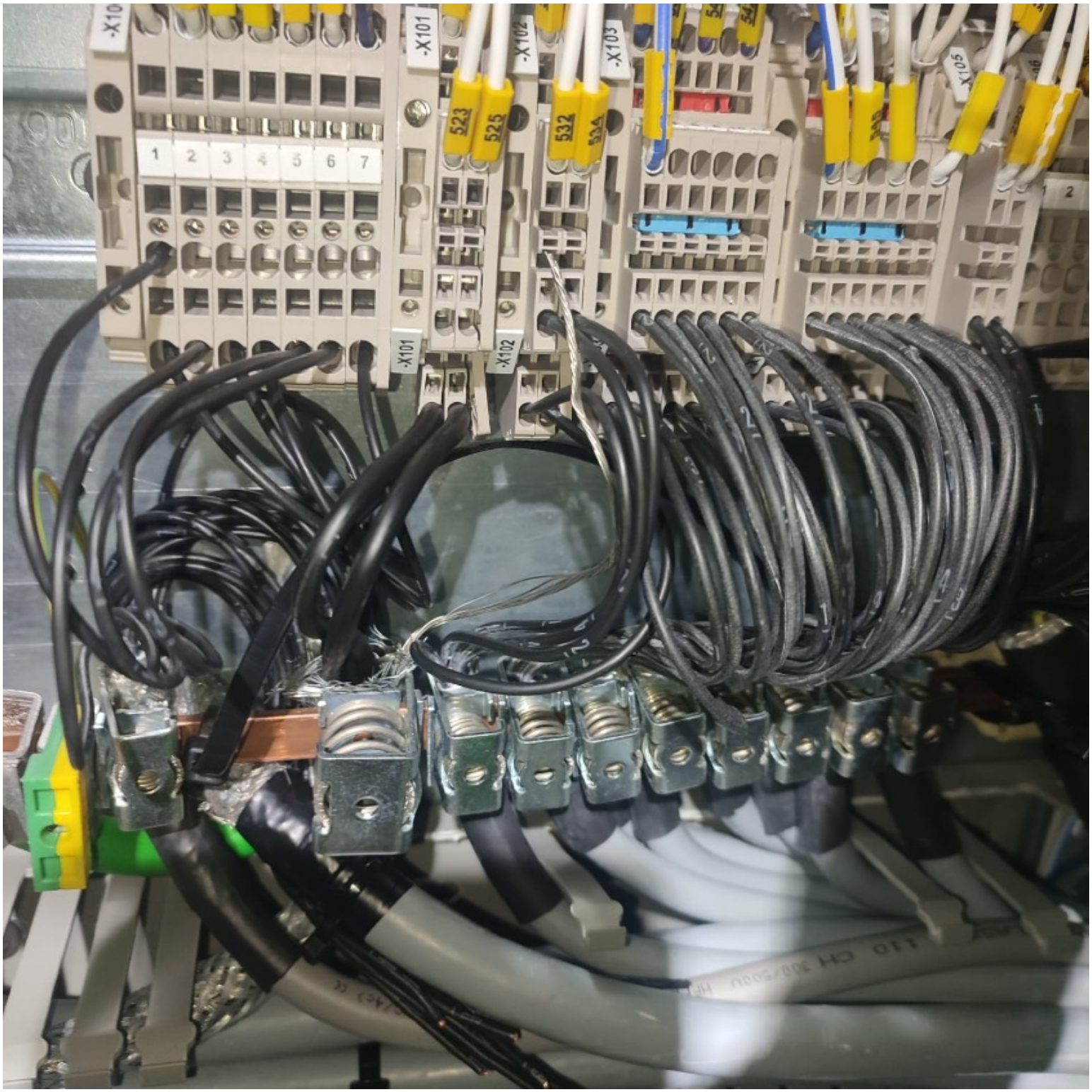
Signature

6- CLEARANCE APPROVAL

Name

Date

Signature


-X101
-X102
-X103
-X105
1 2 3 4 5 6 7
523
525
532
534

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000641

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10001449	1.4 Discipline	Instrumental
1.2 Item	C-80-XS-001/B400-SIS-001	TRIP SIGNAL TO UCP / MARSHALLING PCS	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Missing cable tags on routing inside the Package

Name: Giovanni Tangianu

Date: 2024-11-20

Signature: Digitaly signed by Giovanni Tangianu 2024-11-20T13:10:49.330Z

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	2024-11-20
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-20T13:11:00.289Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

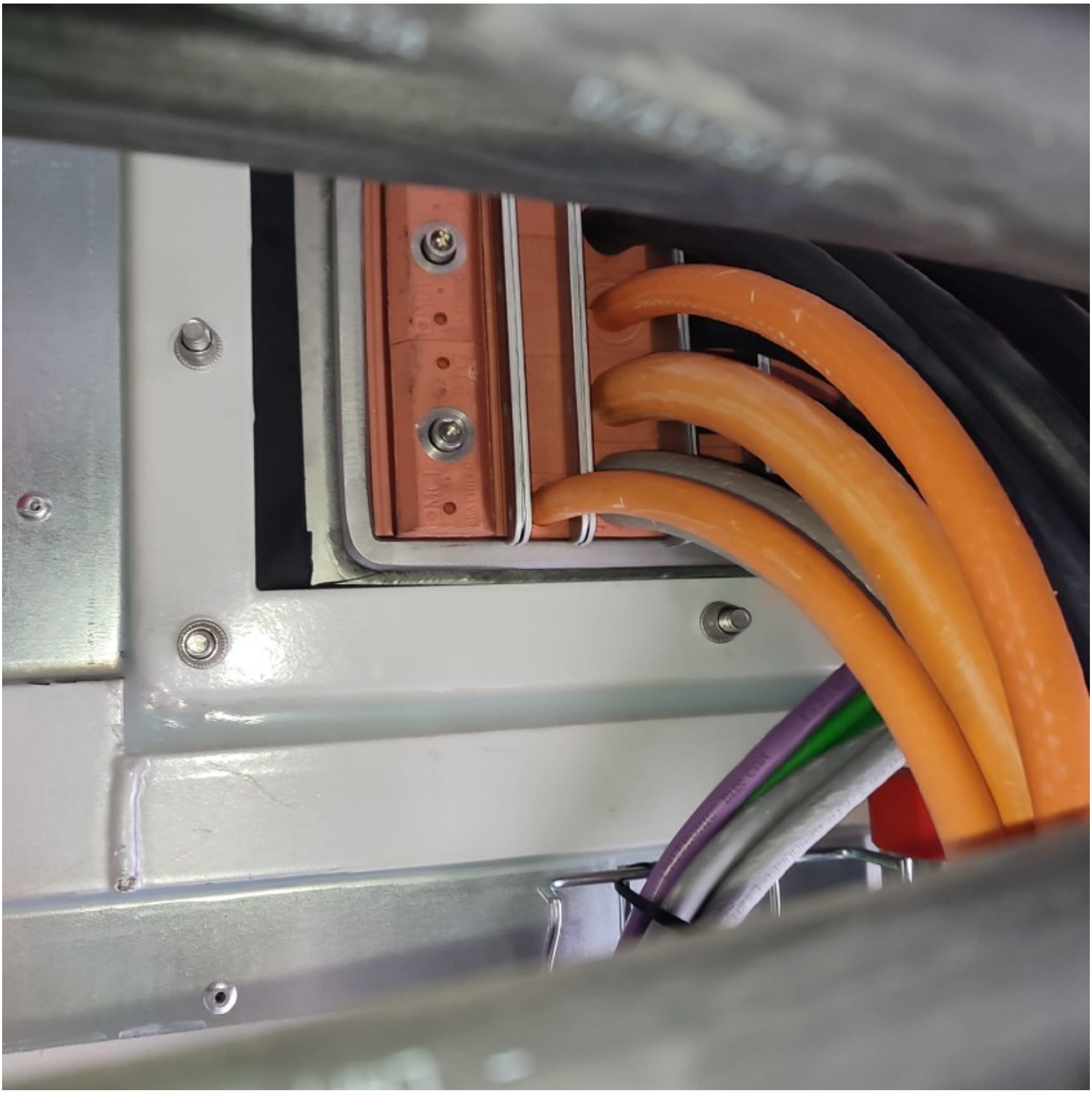
Signature

6- CLEARANCE APPROVAL

Name

Date

Signature



ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000686

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000523	1.4 Discipline	Electrical
1.2 Item	83012-CEL	LV Switchgear / Fuel Cell Auxiliary Load	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Bending radius on MCT is not correct. See attached photo.

Name: Giovanni Tangianu

Date: 2024-11-21

Signature: Digitaly signed by Giovanni Tangianu 2024-11-21T08:46:17.659Z

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	2024-11-21
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-21T08:47:25.380Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

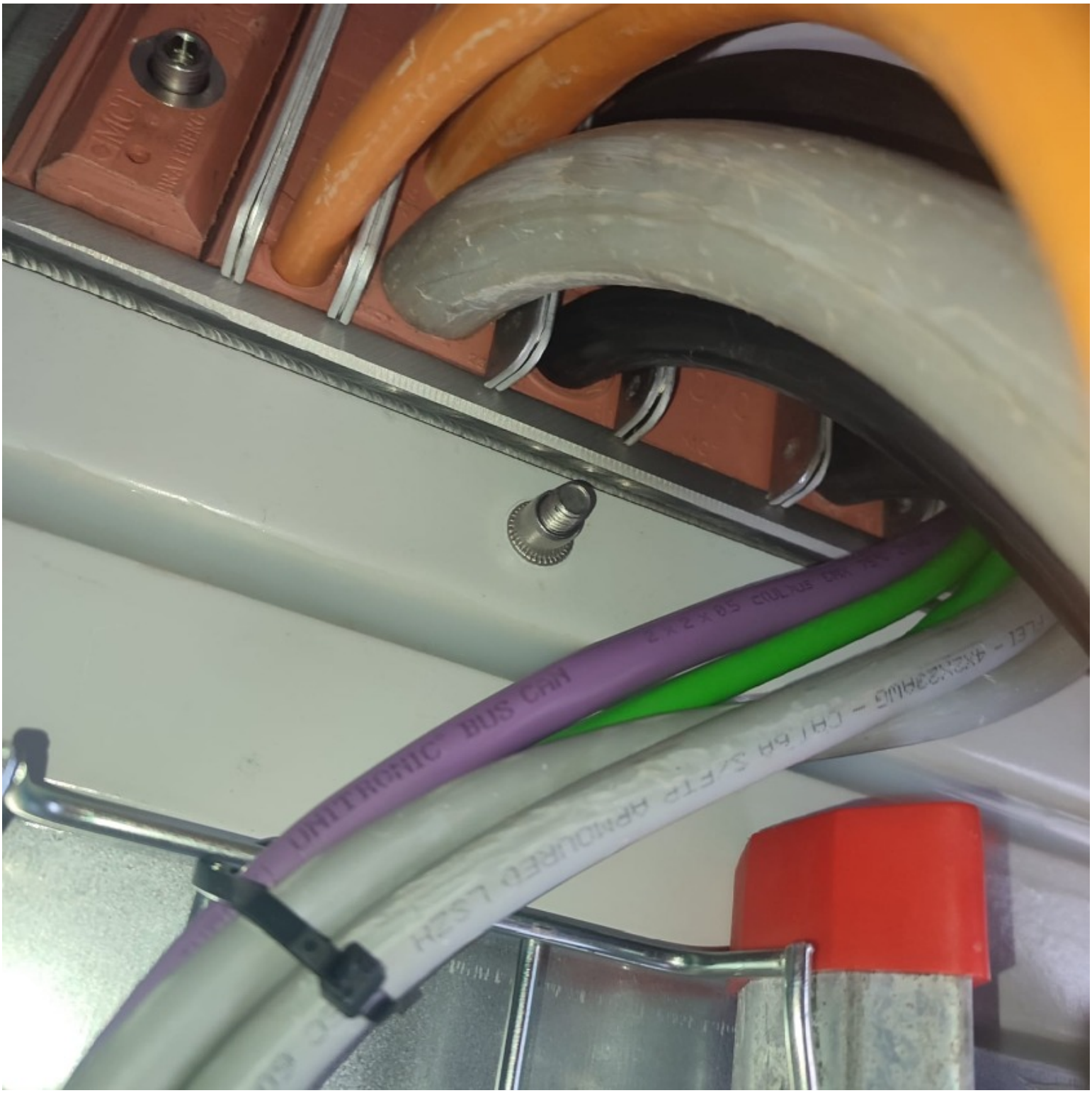
Signature

6- CLEARANCE APPROVAL

Name

Date

Signature


UNITRONIC BUS CAN

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000687

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000523	1.4 Discipline	Electrical
1.2 Item	83012-CEL	LV Switchgear / Fuel Cell Auxiliary Load	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Missing plastic cable tag on internal/external side of package (Fuel Cell A-80000).

Name: Giovanni Tangianu

Date: 2024-11-21

Signature: Digitaly signed by Giovanni Tangianu 2024-11-21T08:50:53.602Z

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	2024-11-21
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-21T08:51:14.367Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000688

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000523	1.4 Discipline	Electrical
1.2 Item	83012-CEL	LV Switchgear / Fuel Cell Auxiliary Load	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Identification tag wire missing inside panel +UC50 (package Fuel Cell A-80000).

Name: Giovanni Tangianu

Date: 2024-11-21

Signature: Digitaly signed by Giovanni Tangianu 2024-11-21T08:55:52.335Z

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	2024-11-21
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-21T08:56:05.606Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001186

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Mechanical
1.2 Item	A-80000		Fuel Cell
1.3 Subsystem	80-00		Hydrogen Fuel Cell Package (A-80000)

2 - OBSERVATION

No door mounted to the cabinet Internal (cabinet door to be added)
(15C - 10ft inspection hatch control panel)

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	-
3.4 Activity code	CPY Company	Date	2024-12-03
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001187

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Electrical
1.2 Item	A-80000		Fuel Cell
1.3 Subsystem	80-00		Hydrogen Fuel Cell Package (A-80000)

2 - OBSERVATION

HMI message does not specify that the external e-stop is activated. Must present a relevant alarm. 04-09-2024: Will be corrected with next sw release (16C - Customer/external E-stop)

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	-
3.4 Activity code	CPY Company	Date	2024-12-03
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001188

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Electrical
1.2 Item	A-80000		Fuel Cell
1.3 Subsystem	80-00		Hydrogen Fuel Cell Package (A-80000)

2 - OBSERVATION

Current reading in pct vol. To be changed to pct LEL. 04-09-2024: Will be corrected with next sw release (17C - H2 sensor reading in HMI)

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	-
3.4 Activity code	CPY Company	Date	2024-12-03
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001189

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Electrical
1.2 Item	A-80000		Fuel Cell
1.3 Subsystem	80-00		Hydrogen Fuel Cell Package (A-80000)

2 - OBSERVATION

At FC module #3, there is coolant leakage (drops) at the connections to the heat exchanger, both connections. To be tightened and/or gaskets replaced. 04-09-2024: Gasket will be changed when LT coolant is drained prior to shipment.
17-09-2024: To be corrected during installation (18C - FCwave #3 - Coolant leak)

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	-
3.4 Activity code	CPY Company	Date	2024-12-03
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001190

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Electrical
1.2 Item	A-80000		Fuel Cell
1.3 Subsystem	80-00		Hydrogen Fuel Cell Package (A-80000)

2 - OBSERVATION

Error messages not elaborate enough. Review error message readability (must be more explanatory) 04-09-2024: Will be corrected with next sw release (22C - Error Messages)

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	-
3.4 Activity code	CPY Company	Date	2024-12-03
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001191

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Electrical
1.2 Item	A-80000		Fuel Cell
1.3 Subsystem	80-00		Hydrogen Fuel Cell Package (A-80000)

2 - OBSERVATION

To be investigated and sealed 04-09-2024: Will be corrected when HT coolant is drained. (27C - H2 and smoke detector voting)

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	-
3.4 Activity code	CPY Company	Date	2024-12-03
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001192

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Electrical
1.2 Item	A-80000		Fuel Cell
1.3 Subsystem	80-00		Hydrogen Fuel Cell Package (A-80000)

2 - OBSERVATION

Operator screen built for HMI use not ready (Engineering interface not designed for HMI but for laptop use). Must be developed by Ballard 28-08-2024: Draft HMI ready for review @FAT2 (36B - HMI operator screen)

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	-
3.4 Activity code	CPY Company	Date	2024-12-03
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001193

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Electrical
1.2 Item	A-80000		Fuel Cell
1.3 Subsystem	80-00		Hydrogen Fuel Cell Package (A-80000)

2 - OBSERVATION

During shutdown of the FCwave, an intermittent timeout occurs (ca 5% of shutdowns) where the test stalls. Expected to be a software glitch to be corrected by FC wave dev team. (41B - Intermittent timeout of FCwave shutdown test)

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	-
3.4 Activity code	CPY Company	Date	2024-12-03
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30001252

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Electrical
1.2 Item	A-80000		Fuel Cell
1.3 Subsystem	80-00		Hydrogen Fuel Cell Package (A-80000)

2 - OBSERVATION

Lack of signage on the JB to indicate IS circuits inside

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	-
3.4 Activity code	CPY Company	Date	2024-12-04
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Name

Date

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000604

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10002358	1.4 Discipline	Mechanical
1.2 Item	A-80000	Fuel Cell	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Container 459079-4. The item n.19 "Drain interface - TP 015" (General arrangement K559-2254-CWIWP4202202-B01-001 R.8 sheet 6/14) shall measure 57 mm from structure but It does measure 67 mm.

Name: Kangi Albonetti

Date: 2024-11-19

Signature: Digitaly signed by Kangi Albonetti 2024-11-19T14:20:47.674Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Kangi Albonetti
3.4 Activity code	MC Mechanical Completion	Date	2024-11-19
3.5 Action by	VND Vendor	Signature	Digitaly signed by Kangi Albonetti 2024-11-19T14:22:06.037Z

4 - PERFORMED ACTION

Name

Date: 2025-03-31

Signature

5 - CLEARANCE CHECK

done.

Name: Lorenzo Novaga

Date: 2025-03-31

Signature: Digitaly signed by Lorenzo Novaga 2025-03-31T11:07:42.484Z

6- CLEARANCE APPROVAL

Name

Date: 2025-03-31

Signature


UNISTRUT
P1026SS
7
8
9
10
11
12
13

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000605

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10002358	1.4 Discipline	Mechanical
1.2 Item	A-80000	Fuel Cell	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

10ft Container. Item n.21 Customer MV Connection (6,6kV AC 3P, 92A) (General arrangement K559-2254-CWIWP4202202-B01-001 R.8 sheet 7/14) has missing screws.

Name: Kangi Albonetti

Date: 2024-11-19

Signature: Digitaly signed by Kangi Albonetti 2024-11-19T14:22:42.725Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Kangi Albonetti
3.4 Activity code	MC Mechanical Completion	Date	2024-11-19
3.5 Action by	VND Vendor	Signature	Digitaly signed by Kangi Albonetti 2024-11-19T14:23:39.661Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

DONE

Name: Josip Krizanic

Date: 2025-03-07

Signature: Digitaly signed by Josip Krizanic 2025-03-07T09:01:55.903Z

6- CLEARANCE APPROVAL

Name

Date

Signature



ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000607

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10002358	1.4 Discipline	Mechanical
1.2 Item	A-80000	Fuel Cell	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

30 ft container. No Ballard's nameplate.
10ft Container. Ballard's nameplate is in soft plastic and just glued to the structure.

Name: Kangi Albonetti

Date: 2024-11-19

Signature: Digitaly signed by Kangi Albonetti 2024-11-19T14:25:07.344Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Kangi Albonetti
3.4 Activity code	MC Mechanical Completion	Date	2024-11-19
3.5 Action by	VND Vendor	Signature	Digitaly signed by Kangi Albonetti 2024-11-19T14:26:07.540Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

DONE

Name: Josip Krizanic

Date: 2025-03-07

Signature: Digitaly signed by Josip Krizanic 2025-03-07T09:02:06.493Z

6- CLEARANCE APPROVAL

Name

Date

Signature


BALLARD™
Ballard Power Systems Europe A/S
Majsmarken 1, 9530 Hobro – DK
Phone: + 45 88435500
E-mail: service@ballardeurope.com
Product name: Power converter container
Part number: 6014568-7003716
Sub-assembly in: FC PowerGen 1000kW, part number 6014568-7002362
Range of ambient temperature (°C): MAX: 25 °C
MIN: -10 °C
Weight (kg): DRY: 7310 kg
WET: 7350 kg
Rated Power (kW): 1000 kW @ 100% duty
Electrical Output: 3P 6600V 50Hz, 93 A
Short circuit capacity (A): 93 A
Power Factor: 0.95

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000636

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10001456	1.4 Discipline	Instrumental
1.2 Item	C-80-XA-003/B400-SIS-001	UCP FAULT ALARM / MARSHALLING PCS	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

The terminal strip dont have any refer number inside the Package

Name: Giovanni Tangianu

Date: 2024-11-20

Signature: Digitaly signed by Giovanni Tangianu 2024-11-20T13:00:04.336Z

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	2024-11-20
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-20T13:03:35.999Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

DONE

Name: Eleonora Carotenuto

Date: 2025-02-13

Signature: Digitaly signed by Eleonora Carotenuto 2025-02-13T10:25:13.047Z

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000637

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10001456	1.4 Discipline	Instrumental
1.2 Item	C-80-XA-003/B400-SIS-001	UCP FAULT ALARM / MARSHALLING PCS	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Cable terminations are not as per typical installation drawing 123A90-DDL-EL-DD-20090, by package side

Name: Giovanni Tangianu

Date: 2024-11-20

Signature: Digitaly signed by Giovanni Tangianu 2024-11-20T12:55:23.426Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	A PL A	Name	Giovanni Tangianu
3.4 Activity code	MC Mechanical Completion	Date	2024-11-20
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-20T13:04:00.496Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Terminations completed.

Name: Giovanni Tangianu

Date: 2024-12-03

Signature: Digitaly signed by Giovanni Tangianu 2024-12-03T11:15:49.554Z

6- CLEARANCE APPROVAL

Name

Date

Signature


C-80-XA-003/B400-

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000640

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10001449	1.4 Discipline	Instrumental
1.2 Item	C-80-XS-001/B400-SIS-001	TRIP SIGNAL TO UCP / MARSHALLING PCS	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Cable terminations are not as per typical installation drawing 123A90-DDL-EL-DD-20090, by package side

Name: Giovanni Tangianu

Date: 2024-11-20

Signature: Digitaly signed by Giovanni Tangianu 2024-11-20T13:08:54.461Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	A PL A	Name	Giovanni Tangianu
3.4 Activity code	MC Mechanical Completion	Date	2024-11-20
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-20T13:10:29.459Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Terminations completed.

Name: Giovanni Tangianu

Date: 2024-12-03

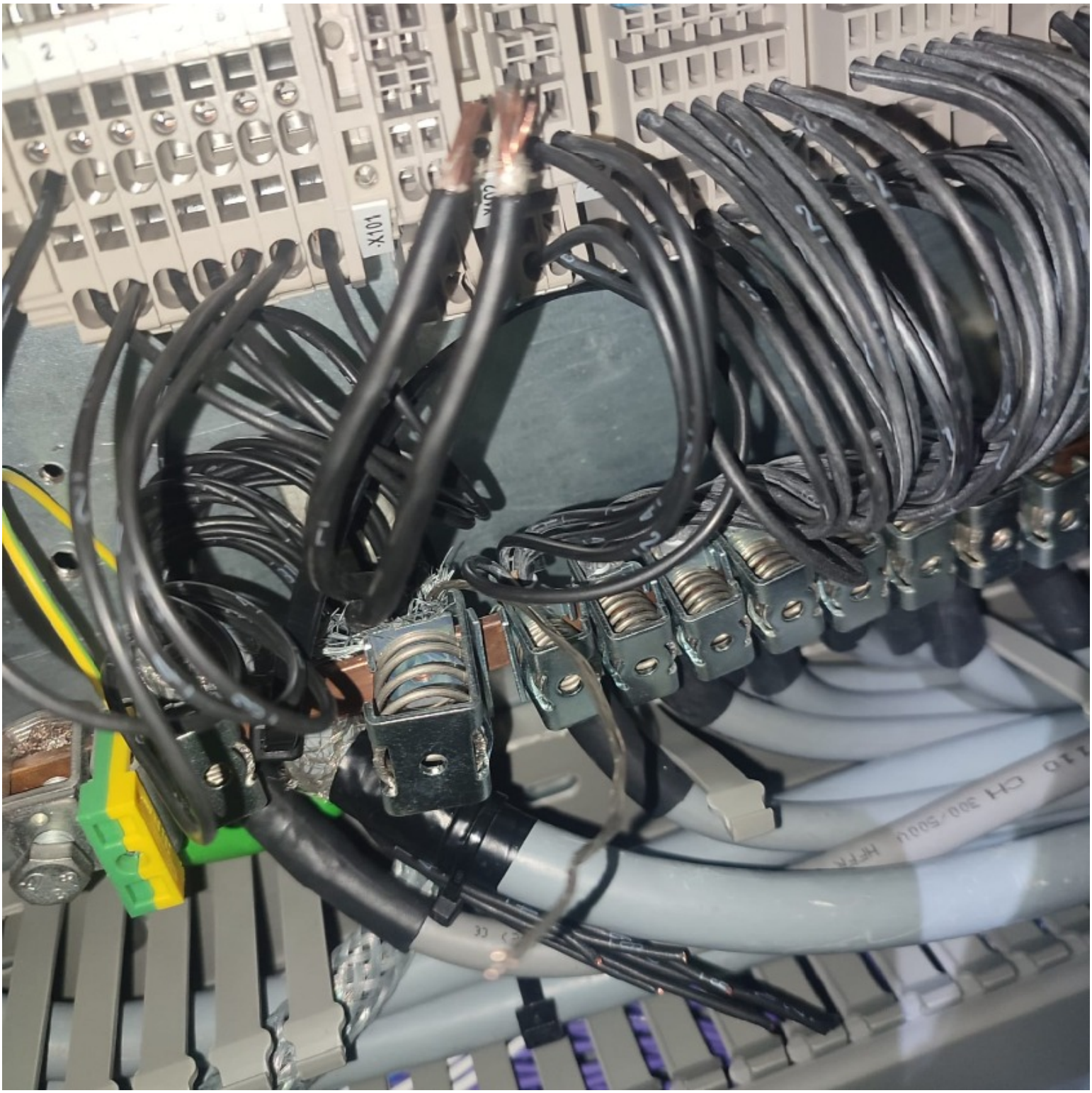
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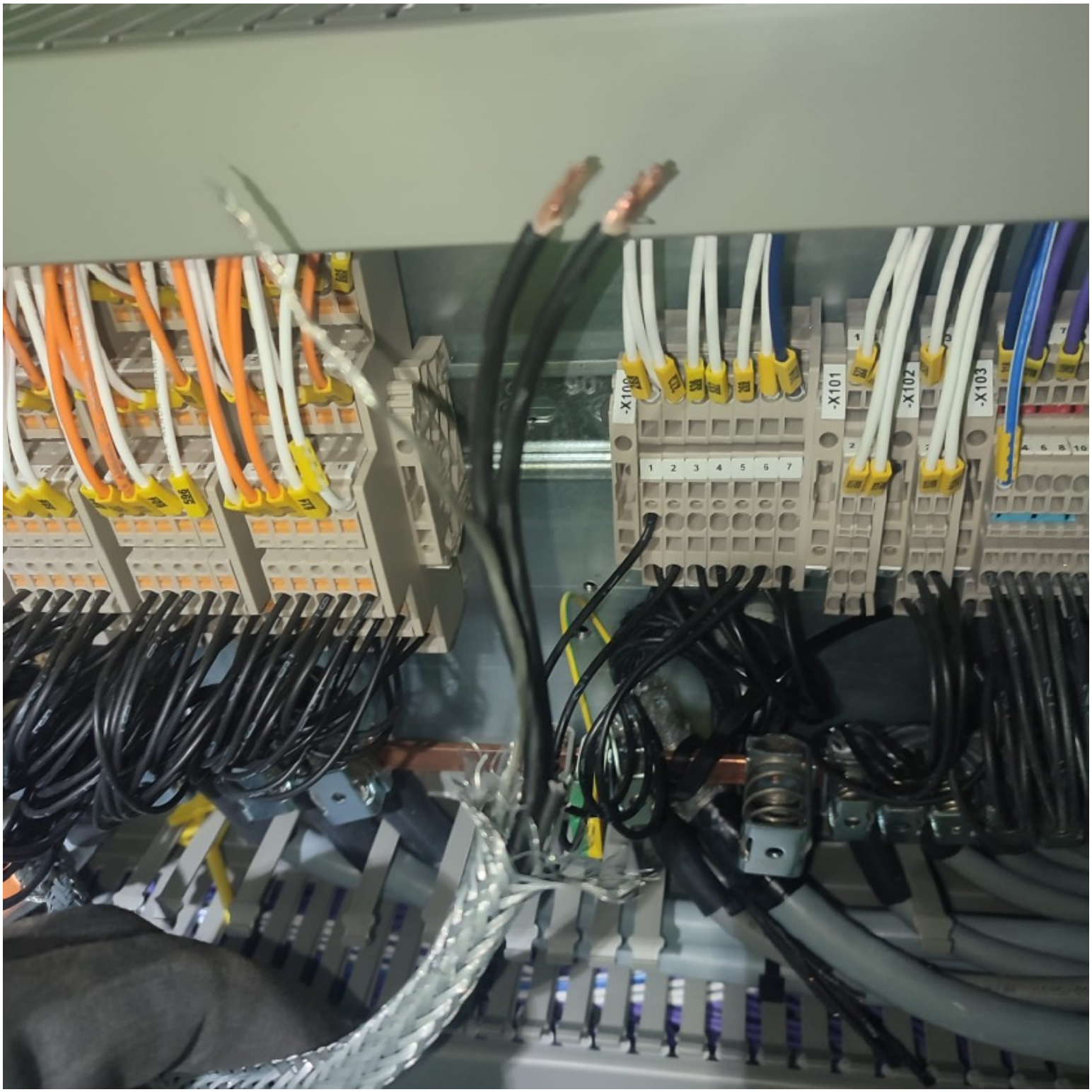
6- CLEARANCE APPROVAL

Name

Date

Signature


X101


-X101
-X102
-X103
1 2 3 4 5 6 7

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000642

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10001466	1.4 Discipline	Instrumental
1.2 Item	80-UCP-001/B400-FGS-003	CONFIRMED GAS ALARM / MARSHALLING PCS	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

The terminal strip dont have any refer number inside the Package

Name: Giovanni Tangianu

Date: 2024-11-20

Signature: Digitaly signed by Giovanni Tangianu 2024-11-20T13:14:57.878Z

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	2024-11-20
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-20T13:15:10.244Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

DONE

Name: Eleonora Carotenuto

Date: 2025-02-13

Signature: Digitaly signed by Eleonora Carotenuto 2025-02-13T10:31:30.814Z

6- CLEARANCE APPROVAL

Name

Date

Signature



ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000643

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10001466	1.4 Discipline	Instrumental
1.2 Item	80-UCP-001/B400-FGS-003	CONFIRMED GAS ALARM / MARSHALLING PCS	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Cable terminations are not as per typical installation drawing 123A90-DDL-EL-DD-20090, by package side

Name: Giovanni Tangianu

Date: 2024-11-20

Signature: Digitaly signed by Giovanni Tangianu 2024-11-20T13:18:04.731Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	A PL A	Name	Giovanni Tangianu
3.4 Activity code	MC Mechanical Completion	Date	2024-11-20
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-20T13:18:15.956Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Terminations completed.

Name: Giovanni Tangianu

Date: 2024-12-03

Signature: Digitaly signed by Giovanni Tangianu 2024-12-03T11:21:33.404Z

6- CLEARANCE APPROVAL

Name

Date

Signature



ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000689

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10000523	1.4 Discipline	Electrical
1.2 Item	83012-CEL	LV Switchgear / Fuel Cell Auxiliary Load	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

The cable termination is not complete (side FUEL CELL A-80000).
See attached photo.

Name: Giovanni Tangianu

Date: 2024-11-21

Signature: Digitaly signed by Giovanni Tangianu 2024-11-21T08:57:25.650Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	A PL A	Name	Giovanni Tangianu
3.4 Activity code	MC Mechanical Completion	Date	2024-11-21
3.5 Action by	VND Vendor	Signature	Digitaly signed by Giovanni Tangianu 2024-11-21T08:57:39.835Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Terminations completed.

Name: Giovanni Tangianu

Date: 2024-12-03

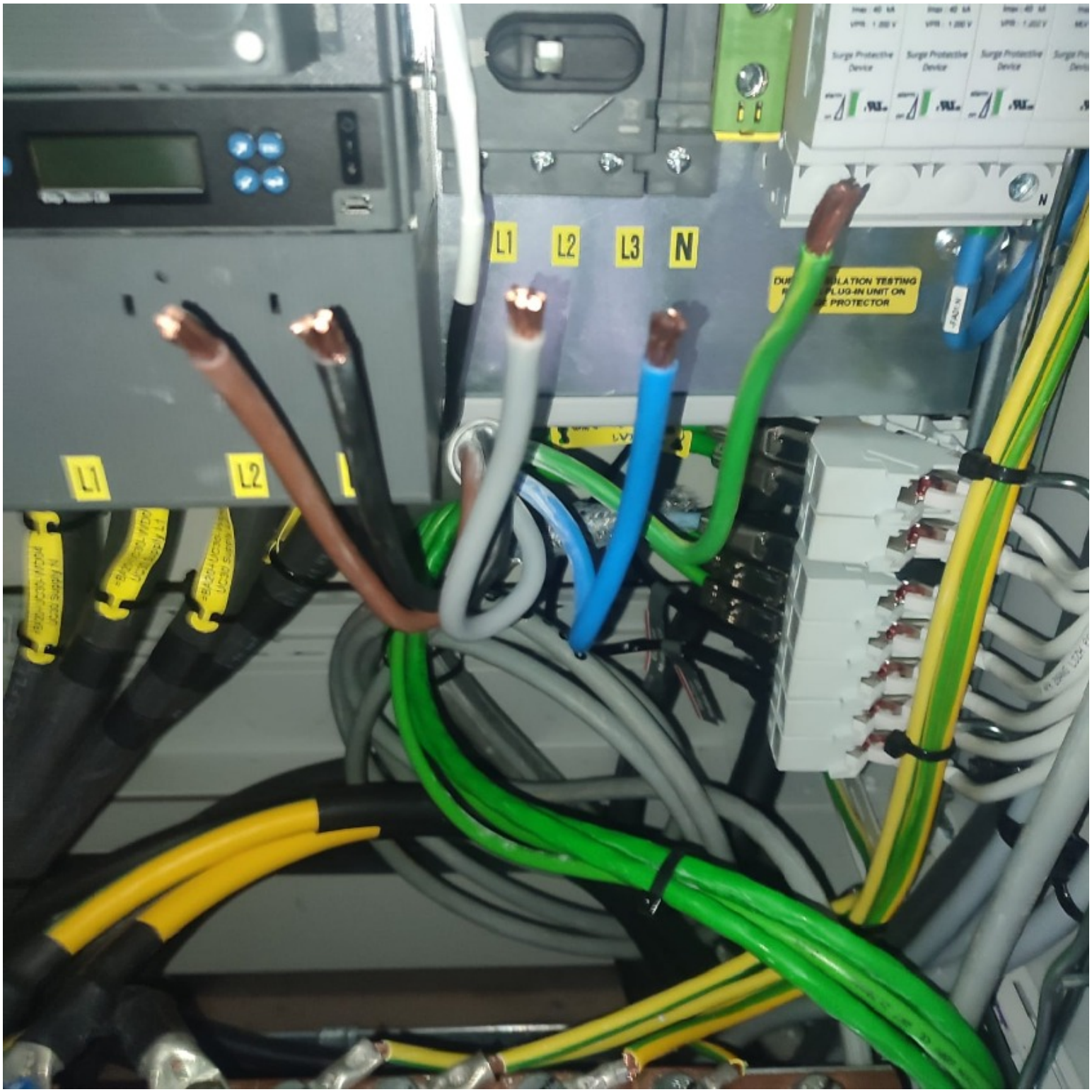
Signature: Digitaly signed by Giovanni Tangianu 2024-12-03T11:22:09.209Z

6- CLEARANCE APPROVAL

Name

Date

Signature


L1
L2
L3
N
Surge Protective Device
Surge Protective Device
Surge Protective Device
PLUG-IN UNIT ON
PROTECTOR

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000970

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10004351	1.4 Discipline	Telecom
1.2 Item	80-UCP-001/B400-NET-001.01	COMMUNICATION / NETWORK CABINET	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

The copper conductor of the cable armor must be individually connected to the earthing bar. See 123A90-DDL-EL-DD-20090. (B400-NET-001.01)

Name: Alessio Polo

Date: 2024-11-27

Signature: Digitaly signed by Alessio Polo 2024-11-27T11:02:54.362Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Alessio Polo
3.4 Activity code	MC Mechanical Completion	Date	2024-11-27
3.5 Action by	RM_CONSTR RM	Signature	Digitaly signed by Alessio Polo 2024-11-27T11:03:07.290Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

DONE

Name: Alessio Polo

Date: 2025-01-22

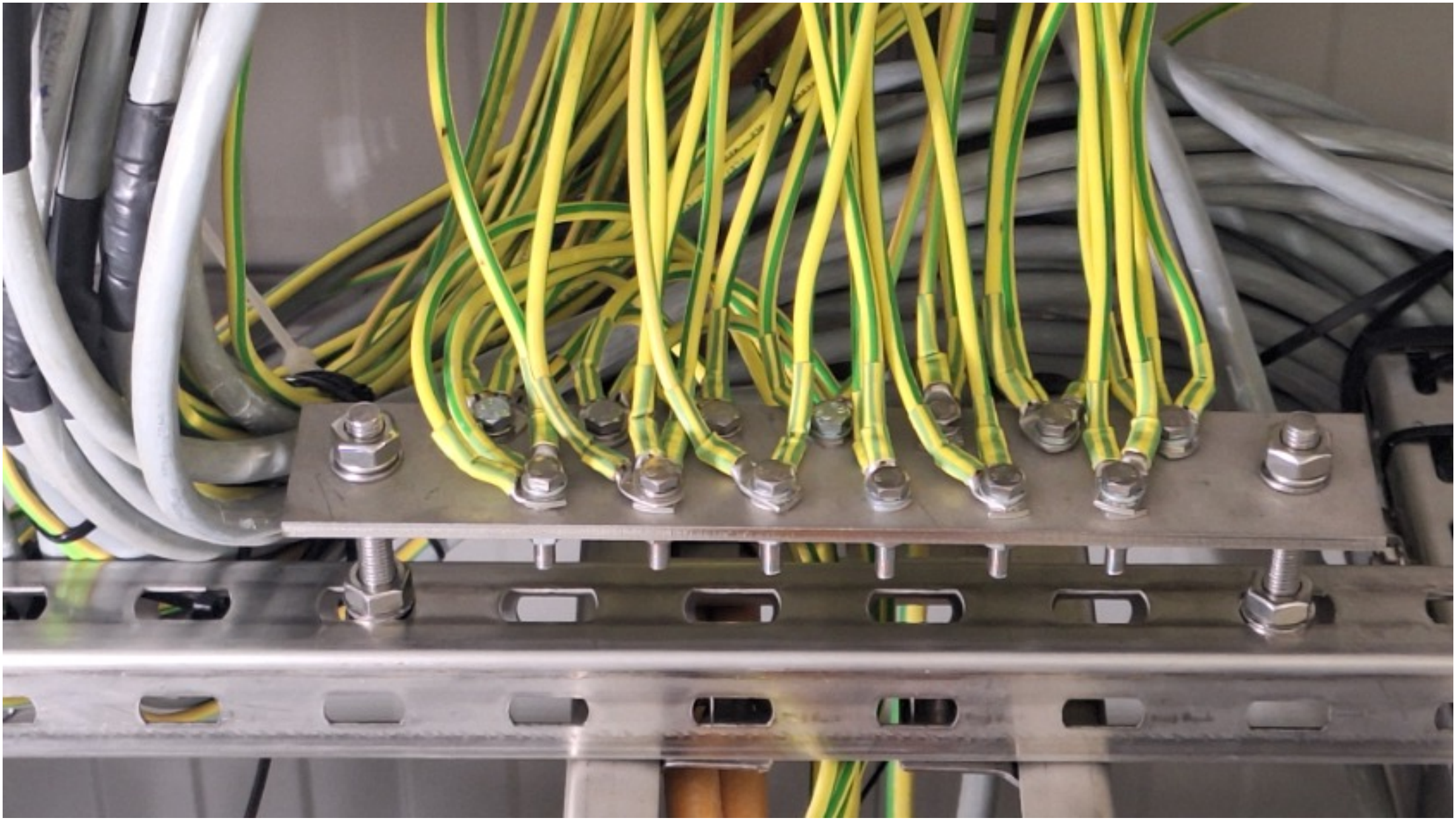
Signature: Digitaly signed by Alessio Polo 2025-01-22T16:07:20.739Z

6- CLEARANCE APPROVAL

Name

Date

Signature



ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000971

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10004351	1.4 Discipline	Telecom
1.2 Item	80-UCP-001/B400-NET-001.01	COMMUNICATION / NETWORK CABINET	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Missing cables tag , cabinet inside Panel A-80000 80-UCP-001.

Name: Alessio Polo

Date: 2024-11-27

Signature: Digitaly signed by Alessio Polo 2024-11-27T11:07:12.306Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Alessio Polo
3.4 Activity code	MC Mechanical Completion	Date	2024-11-27
3.5 Action by	VND Vendor	Signature	Digitaly signed by Alessio Polo 2024-11-27T11:07:25.611Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

DONE

Name: Josip Krizanic

Date: 2025-03-07

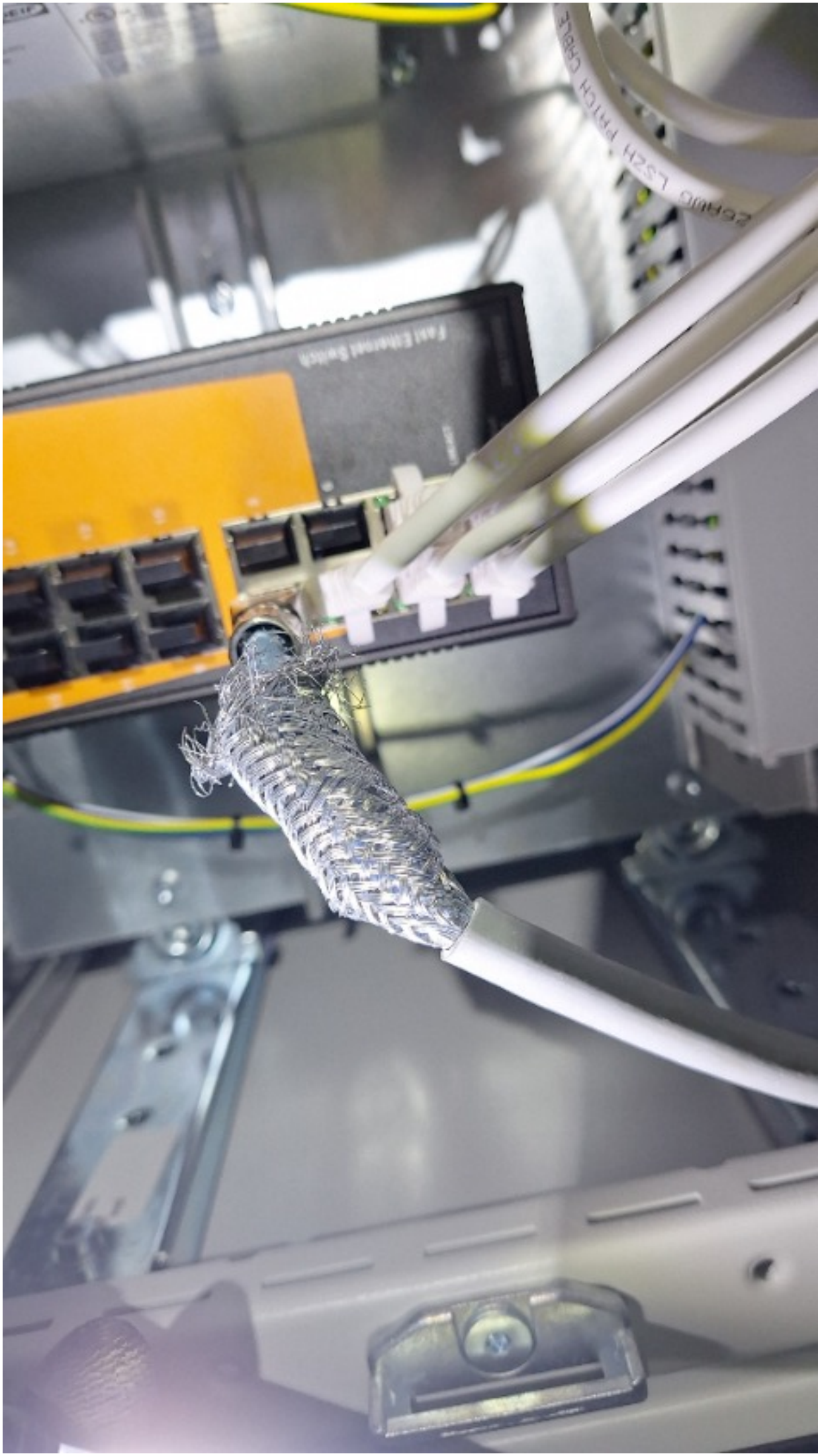
Signature: Digitaly signed by Josip Krizanic 2025-03-07T09:02:18.909Z

6- CLEARANCE APPROVAL

Name

Date

Signature



ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000972

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10004351	1.4 Discipline	Telecom
1.2 Item	80-UCP-001/B400-NET-001.01	COMMUNICATION / NETWORK CABINET	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Missing cable tag SS project, outside MCT.

Name: Alessio Polo

Date: 2024-11-27

Signature: Digitaly signed by Alessio Polo 2024-11-27T11:11:13.329Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Alessio Polo
3.4 Activity code	MC Mechanical Completion	Date	2024-11-27
3.5 Action by	RM_CONSTR RM	Signature	Digitaly signed by Alessio Polo 2024-11-27T11:11:28.713Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

DONE

Name: Paolo Schintu

Date: 2025-02-26

Signature: Digitaly signed by Paolo Schintu 2025-02-26T12:58:11.513Z

6- CLEARANCE APPROVAL

Name

Date

Signature



ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000973

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10004351	1.4 Discipline	Telecom
1.2 Item	80-UCP-001/B400-NET-001.01	COMMUNICATION / NETWORK CABINET	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

The cable termination is not installed in accordance with Electrical Typical Installation Details. see 123A90-DDL-EL-DD-20090 sh.8 / 29. (SIDE 80-UCP-001)

Name: Alessio Polo

Date: 2024-11-27

Signature: Digitaly signed by Alessio Polo 2024-11-27T11:15:42.276Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	A PL A	Name	Alessio Polo
3.4 Activity code	MC Mechanical Completion	Date	2024-11-27
3.5 Action by	VND Vendor	Signature	Digitaly signed by Alessio Polo 2024-11-27T11:16:52.793Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Terminations completed.

Name: Giovanni Tangianu

Date: 2024-12-03

Signature: Digitaly signed by Giovanni Tangianu 2024-12-03T11:22:32.607Z

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000974

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10004352	1.4 Discipline	Telecom
1.2 Item	80-UCP-001/B400-NET-001.02	COMMUNICATION / NETWORK CABINET	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

The copper conductor of the cable armor must be individually connected to the earthing bar. See 123A90-DDL-EL-DD-20090. (B400-NET-001)

Name: Alessio Polo

Date: 2024-11-27

Signature: Digitaly signed by Alessio Polo 2024-11-27T12:09:52.096Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Alessio Polo
3.4 Activity code	MC Mechanical Completion	Date	2024-11-27
3.5 Action by	RM_CONSTR RM	Signature	Digitaly signed by Alessio Polo 2024-11-27T12:10:03.688Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

DONE

Name: Alessio Polo

Date: 2025-01-22

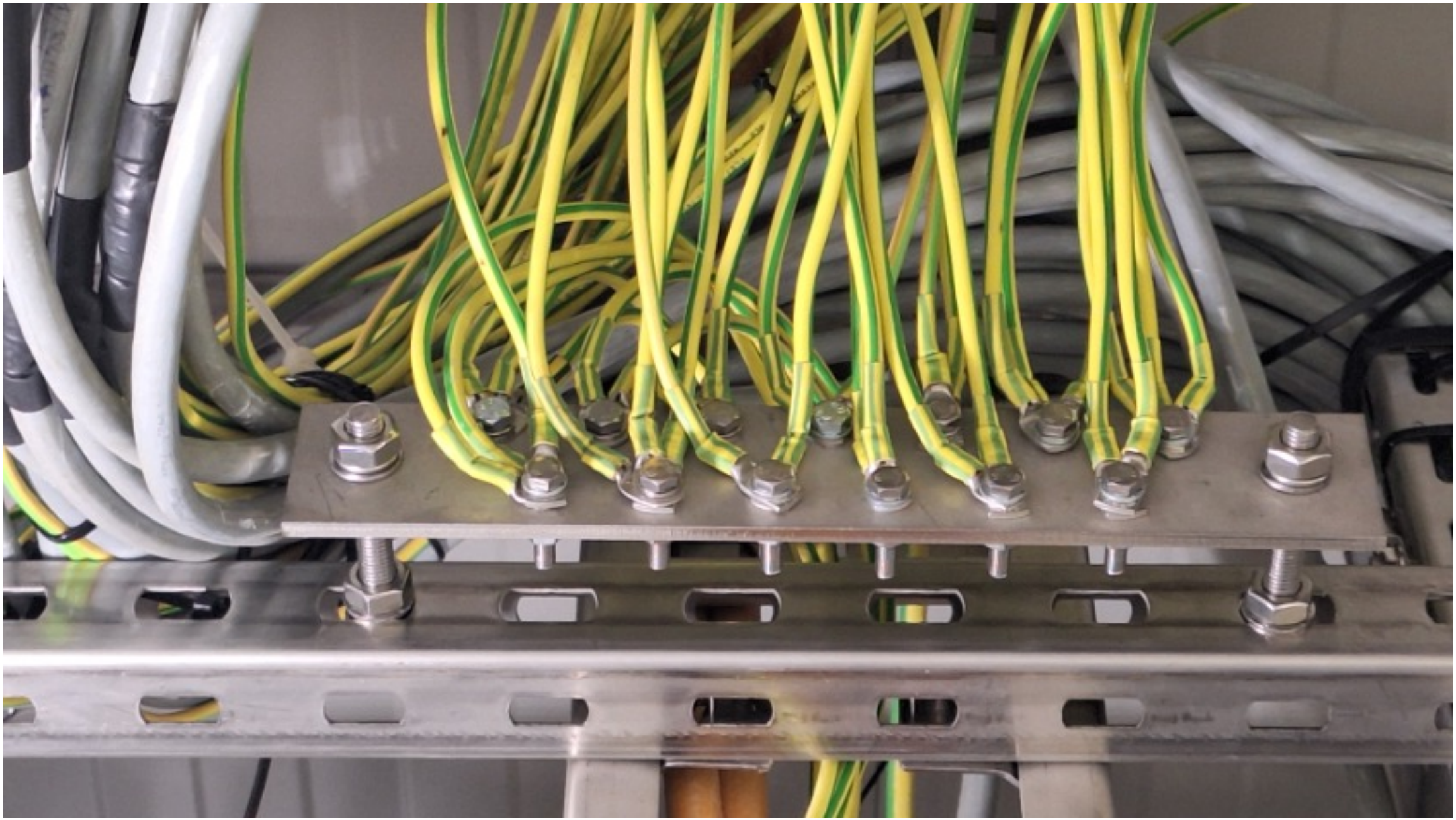
Signature: Digitaly signed by Alessio Polo 2025-01-22T16:07:33.201Z

6- CLEARANCE APPROVAL

Name

Date

Signature



ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000975

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10004352	1.4 Discipline	Telecom
1.2 Item	80-UCP-001/B400-NET-001.02	COMMUNICATION / NETWORK CABINET	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Missing cable tag , cabinet input A-80000 80-UCP-001.

Name: Alessio Polo

Date: 2024-11-27

Signature: Digitaly signed by Alessio Polo 2024-11-27T12:12:34.364Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Alessio Polo
3.4 Activity code	MC Mechanical Completion	Date	2024-11-27
3.5 Action by	VND Vendor	Signature	Digitaly signed by Alessio Polo 2024-11-27T12:12:50.921Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

DONE

Name: Josip Krizanic

Date: 2025-03-07

Signature: Digitaly signed by Josip Krizanic 2025-03-07T09:02:34.743Z

6- CLEARANCE APPROVAL

Name

Date

Signature


L2
L3
N
DURING INSULA
REMOVE PLUG-I
SURGE PROTE

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000976

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10004352	1.4 Discipline	Telecom
1.2 Item	80-UCP-001/B400-NET-001.02	COMMUNICATION / NETWORK CABINET	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

Missing cable tag SS project, outside MCT.

Name: Alessio Polo

Date: 2024-11-27

Signature: Digitaly signed by Alessio Polo 2024-11-27T12:13:58.165Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Alessio Polo
3.4 Activity code	MC Mechanical Completion	Date	2024-11-27
3.5 Action by	RM_CONSTR RM	Signature	Digitaly signed by Alessio Polo 2024-11-27T12:14:13.254Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

DONE

Name: Paolo Schintu

Date: 2025-02-26

Signature: Digitaly signed by Paolo Schintu 2025-02-26T12:58:19.090Z

6- CLEARANCE APPROVAL

Name

Date

Signature



ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000977

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task	C10004352	1.4 Discipline	Telecom
1.2 Item	80-UCP-001/B400-NET-001.02	COMMUNICATION / NETWORK CABINET	
1.3 Subsystem	80-00	Hydrogen Fuel Cell Package (A-80000)	

2 - OBSERVATION

The cable termination is not installed in accordance with Electrical Typical Installation Details. see 123A90-DDL-EL-DD-20090 sh.8 / 29. (A-80000 80-UCP-001)

Name: Alessio Polo

Date: 2024-11-27

Signature: Digitaly signed by Alessio Polo 2024-11-27T12:15:49.658Z

3 - DEFECT ASSESSMENT

.

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	A PL A	Name	Alessio Polo
3.4 Activity code	MC Mechanical Completion	Date	2024-11-27
3.5 Action by	VND Vendor	Signature	Digitaly signed by Alessio Polo 2024-11-27T12:16:22.901Z

4 - PERFORMED ACTION

Name

Date

Signature

5 - CLEARANCE CHECK

Terminations completed.

Name: Giovanni Tangianu

Date: 2024-12-03

Signature: Digitaly signed by Giovanni Tangianu 2024-12-03T11:22:50.543Z

6- CLEARANCE APPROVAL

Name

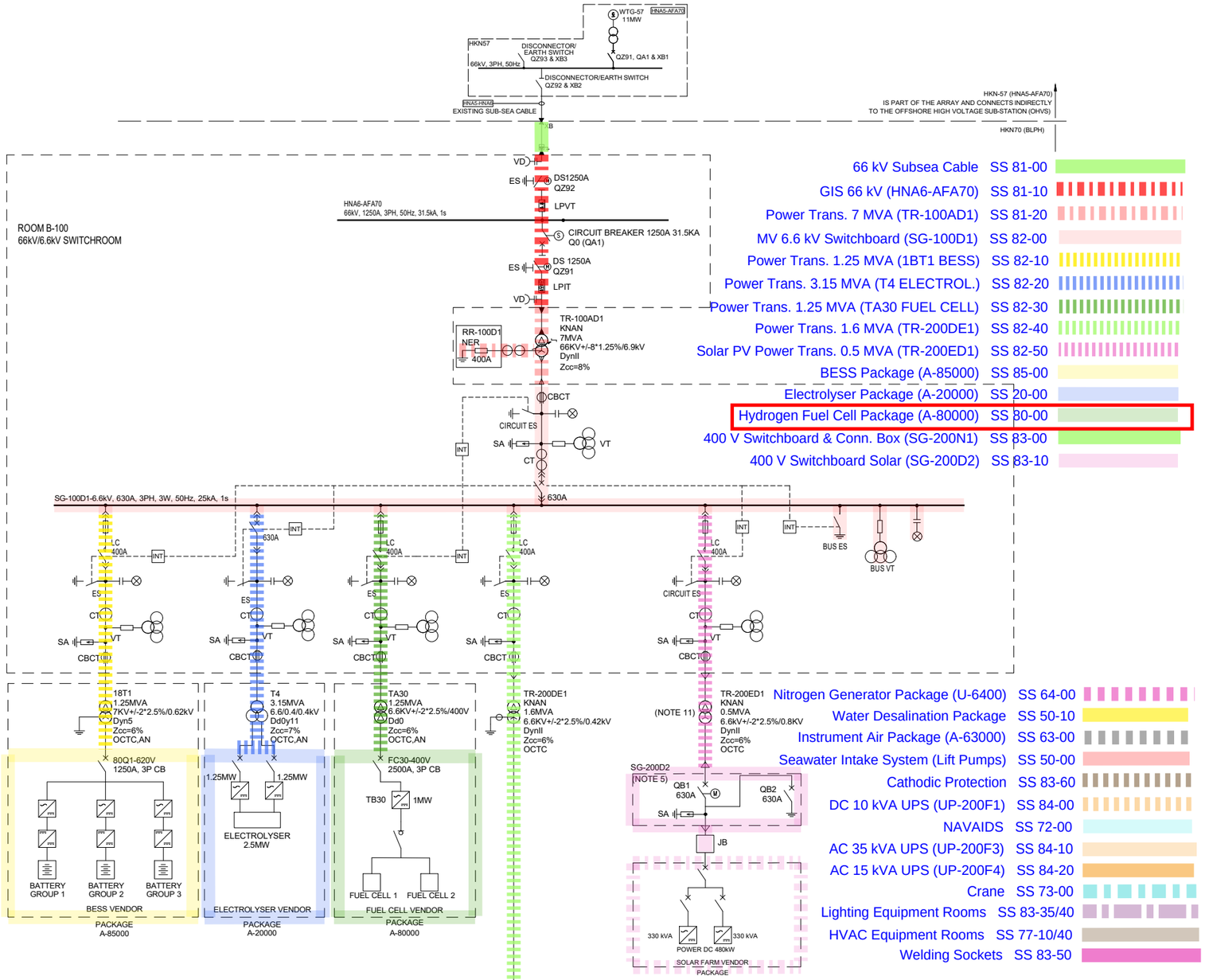
Date

Signature


L2
L3
N
DURING INSULA
REMOVE PLUG-I
SURGE PROTE

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 :

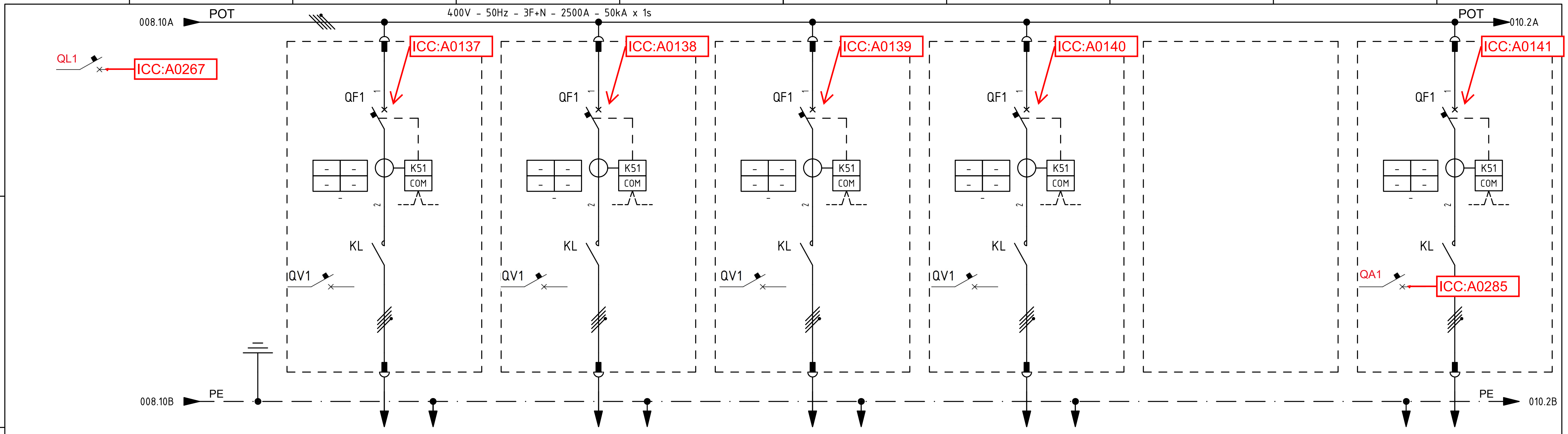
OVERALL/KEY SINGLE LINE DIAGRAM

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

1	2	3	4	5	6	7	8	9	10



ITEM	1	A-80000	CP-850F03	SPARE	SPARE		K-63001-A
UTILITY	2	FUEL CELL AUXILIARY LOAD	BESS PCS CABINET	SPARE	SPARE		INSTRUMENTS AIR PACKAGE 01A
COLUMN/CUBICLE	3	A4 / +03	A4 / +04	A4 / +05	A4 / +06		A4 / +08
RATED POWER | RATED CURRENT	4/5	20 kW | 32.84 A	11,09 kW | 17.42 A	- kW | - A	20.0 kW | 32.1 A		68.75 kW | 111.24 A
TYPICAL FUNCTIONAL	6	LK1-63	LK1-40	LK1-40	LK1-40		LK2-160
CIRCUIT BREAKER (ABB) — TYPE	7	XT2S - 160	XT2S - 160	XT2S - 160	XT2S - 160		XT4S - 250
CIRCUIT BREAKER (ABB) — VERSION	8	4P - FIXED	4P - FIXED	4P - FIXED	4P - FIXED		4P - FIXED
CIRCUIT BREAKER (ABB) — TRIP UNITS	9	EKIP HI TOUCH LSIG (In = 63A)	EKIP HI TOUCH LSIG (In = 40A)	EKIP HI TOUCH LSIG (In = 40A)	EKIP HI TOUCH LSIG (In = 40A)		EKIP HI TOUCH LSIG (In = 160A)
CIRCUIT BREAKER (ABB) — Icu KA	10	50 kA	50 kA	50 kA	50 kA		50 kA
OVERLOAD L — Range A	11	(0.4 - 1) x In	(0.4 - 1) x In	(0.4 - 1) x In	(0.4 - 1) x In		(0.4 - 1) x In
OVERLOAD L — Range t	12	k/I^2	k/I^2	k/I^2	k/I^2		k/I^2
SEL. SHORT-CIRCUIT S — Range A	13	(0.6 - 10) x In	(0.6 - 10) x In	(0.6 - 10) x In	(0.6 - 10) x In		(0.6 - 10) x In
SEL. SHORT-CIRCUIT S — Range t	14	0.05 - 0,4 sec / k/I^2	0.05 - 0,4 sec / k/I^2	0.05 - 0,4 sec / k/I^2	0.05 - 0,4 sec / k/I^2		0.05 - 0.4 sec / k/I^2
INST. SHORT-CIRCUIT I — Range A	15	(1.5 - 15) x In	(1.5 - 15) x In	(1.5 - 15) x In	(1.5 - 15) x In		(1.5 - 15) x In
INST. SHORT-CIRCUIT I — Range t	16	instantaneous	instantaneous	instantaneous	instantaneous		instantaneous
EARTH FAULT PROTECTION G — Range A	17	(0.1 - 1) x In	(0.1 - 1) x In	(0.1 - 1) x In	(0.1 - 1) x In		(0.1 - 1) x In
EARTH FAULT PROTECTION G — Range t	18	t=k / t=k/I^2	t=k / t=k/I^2	t=k / t=k/I^2	t=k / t=k/I^2		t=k / t=k/I^2
CONTACTOR (ABB)	19	AF52-40-00-13 (100A-AC1); 100-250VAC/DC	AF40-40-00-13 (70A-AC1); 100-250VAC/DC	AF40-40-00-13 (70A-AC1); 100-250VAC/DC	AF40-40-00-13 (70A-AC1); 100-250VAC/DC		AF190-40-11-13 (275A-AC1); 100-250 VAC/DC
THERMAL OVERLOAD RELAY (ABB)	20	-	-	-	-		-
SURGE ARRESTER (DEHN)	21	-	-	-	-		-
TOROIDAL CURRENT TRANSFORMER (FRER)	22	-	-	-	-		-
FUSE HOLDER (ITALWEBER)	23	SUBSISTEM 80.00	SUBSISTEM 85.00	SUBSISTEM 83.00	SUBSISTEM 83.00		SUBSISTEM 63.00
INDIRECT PROTECTION (ABB)	24						
VOLTMETER	25						
CURRENT TRANSFORMER FOR MEASURE (FRER) — TYPE	26	-	-	-	-		-
CURRENT TRANSFORMER FOR MEASURE (FRER) — PERFORMANCE/CLASS	27	-	-	-	-		-
VOLTAGE TRANSFORMER FOR MEASURE (FRER) — TYPE	28	-	-	-	-		-
VOLTAGE TRANSFORMER FOR MEASURE (FRER) — PERFORMANCE/CLASS	29	-	-	-	-		-
LOCK-OUT RELAY (-)	30	-	-	-	-		-
POWER CONDUCTOR mmq	31	83012-CEL 5G16	83011-CEL 4 x 10	-	-		5G70

=						
+						
DWG n° : 231298/SD/11	3	08/07/2024	Santinelli	Flamminio	Sigismondi	Accepted for Construction (AFC)
	2	03/05/2024	Santinelli	Flamminio	Sigismondi	Issued for review (IFR)
Item n° : PF1002983/26	1	28/03/2024	Santinelli	Flamminio	Sigismondi	Issued for review (IFR)
	0	15/02/2024	Santinelli	Flamminio	Sigismondi	Issued for review (IFR)
	REV.	DATE	DRN	CHKD	APPD	DESCRIPTION

IMESA ELECTRICAL ENGINEERING

CROSSWIND

ROSETTI MARINO

TITLE : "SG-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-00011 | SHEET 009 | REV. 03

F.to UNI A3: 420mmx297mm

File Name : 1723002197-EL-DG-00011 Rev. 03

DRAWING NO. DRAWING_NO.

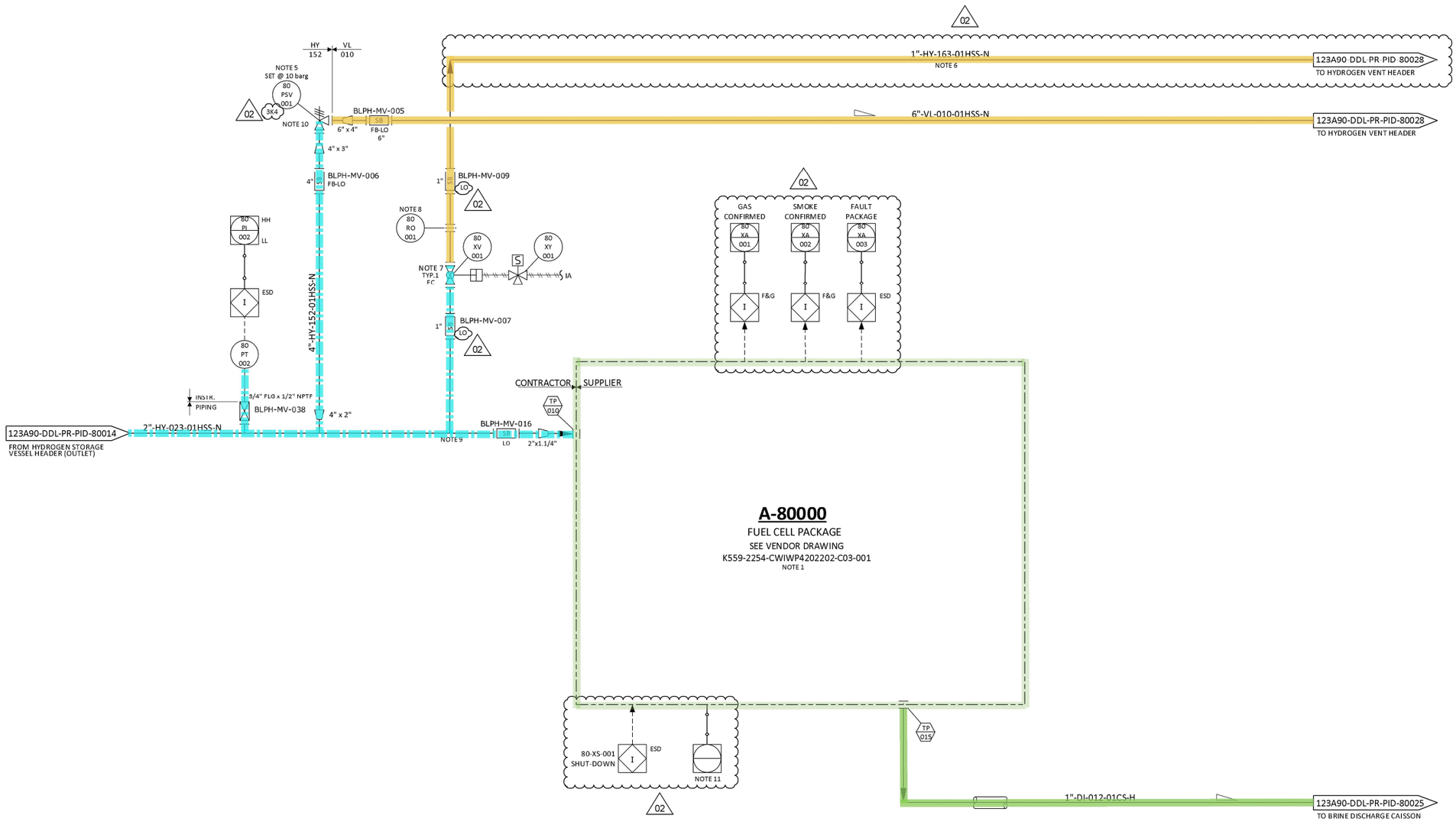
REV. REV

Hydrogen Vent Header & Drum System SS 43-00

Hydrogen Storage Vessels Header (Outlet) SS 25-08

Waste Water Brine Discharge System SS 55-01

Hydrogen Fuel Cell Package SS 80-00



NOTES

1. THE VENDOR PACKAGE WILL CONTAIN AIR INTAKE AND EXHAUST, SUITABLY SAFEGUARDED AND SEPARATED.
2. DELETED.
3. DELETED.
4. DELETED
5. ONE UNINSTALLED SPARE PSV SHALL BE AVAILABLE.
6. LINE REQUIRED FOR PURGING OF PIPING WORK.
7. TIGHT SHUT-OFF VALVE.
8. FOR ORIFICE DIAMETER REFERENCE SHALL BE MADE TO "RELIEF, VENT AND BLOWDOWN REPORT" DOC. N. "123A90-DDL-PR-RE-80030".
9. LINE 1"-HY-163-01HSS-N WILL BE LOCATED AS CLOSE TO THE PACKAGE AS POSSIBLE TO ENSURE COMPLETE PURGING OF THE LINE.
10. 80PSV001 SIZED FOR CV FAILURE OF UPSTREAM CONTROL VAVE 25PV055A/B.
11. SERIAL COMMUNICATION WITH CONTROL SYSTEM. 02

HOLDS

1. DELETED.
2. DELETED.

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
02	12/06/2024	CIM	RZI	DLO	ACCEPTED FOR CONSTRUCTION (AFC)
01	15/02/2024	CIM	RZI	DLO	ISSUE FOR ACCEPTANCE (IFA)
00	20/10/2023	CIM	RZI	DLO	ISSUE FOR ACCEPTANCE (IFA)

CROSSWIND

ROSETTI MARINO

TITLE :
BLPH PIPING AND INSTRUMENTATION DIAGRAM
FUEL CELL PACKAGE

CONTRACT NO./TITLE	CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK		SCALE NTS
DRAWN	CHECKED	APPROVED	DATE

A1	DRAWING NO. 123A90-DDL-PR-PID-80012	SHEET 001	REV. 02

File Name : FILE_NAME

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: 80-00 & process: MC & discipline : E

Electrical	80-00 Hydrogen Fuel Cell Package (A-80000)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
83012-CEL	LV Switchgear / Fuel Cell Auxiliary Load	ONSHORE	C10000523	CPX09	100	2024-11-21	RFC 2

ITEM	Tag	83012-CEL	: LV Switchgear / Fuel Cell Auxiliary Load		Dwg	123A90-DDL-EL-LIS-20148	
	S/Sys	80-00	: Hydrogen Fuel Cell Package (A-80000)		Module	LD_B-200/LD	
TASK	code	C10000523	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: 5G16 mm2 | Color: GREY

From: SG-200N1 | To: A-80000

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.	PL
6	Confirm cable glands suit for cable type, correctly mounted and tightened.	NA
7	Check gland plate for single core cables is non ferrous (non -magnetic).	OK
8	Confirm cable labelling is in accordance with specifications.	PL
9	Check cable is correctly loomed and segregated in accordance with specification.	OK
10	Check cable earthing against lastest drawings.	PL
11	Check cores marking are in accordance with termination diagram	PL
12	Check terminations are in accordance with latest termination diagram	PL
13	If required produce Red Line Mark Up for "AS BUILT"	

ITEM	Tag	83012-CEL	: LV Switchgear / Fuel Cell Auxiliary Load		Dwg	123A90-DDL-EL-LIS-20148	
	S/Sys	80-00	: Hydrogen Fuel Cell Package (A-80000)		Module	LD_B-200/LD	
TASK	code	C10000523	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	0,2	
6		PH 2	0,2	
7		PH 3	0,2	
8	ARMOUR CONTINUITY Ω		NA	
9	PROTECTIVE CONDUCTOR CONTINUITY Ω		0,2	
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	>999	
13	CABLE IS CORRECTLY RE-CONNECTED.		No	

TESTING INSTRUMENTS USED			
TYPE / SERIAL N° :	MEGGER : KEW3125A SERIAL: W8330207	TYPE / SERIAL N° :	MULTIMETER: FLUKE 175 SERIAL:AW1/018(17140769)
Calibration certificate N° and date:	N°7722/24 _ 10/07/2024	Calibration certificate N° and date:	N°7715/24 _ 10/07/2024

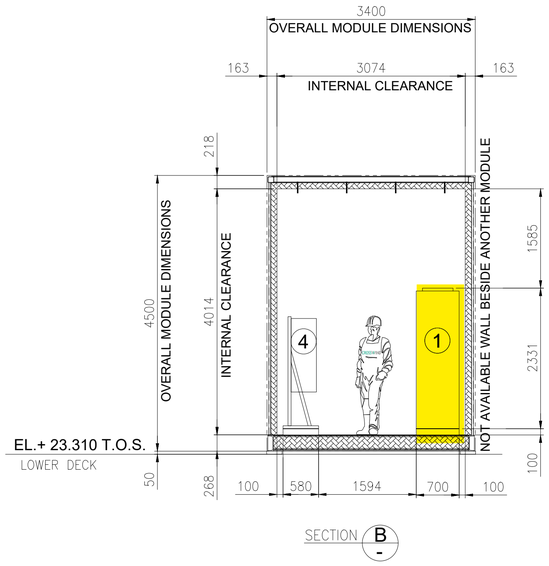
Comments:

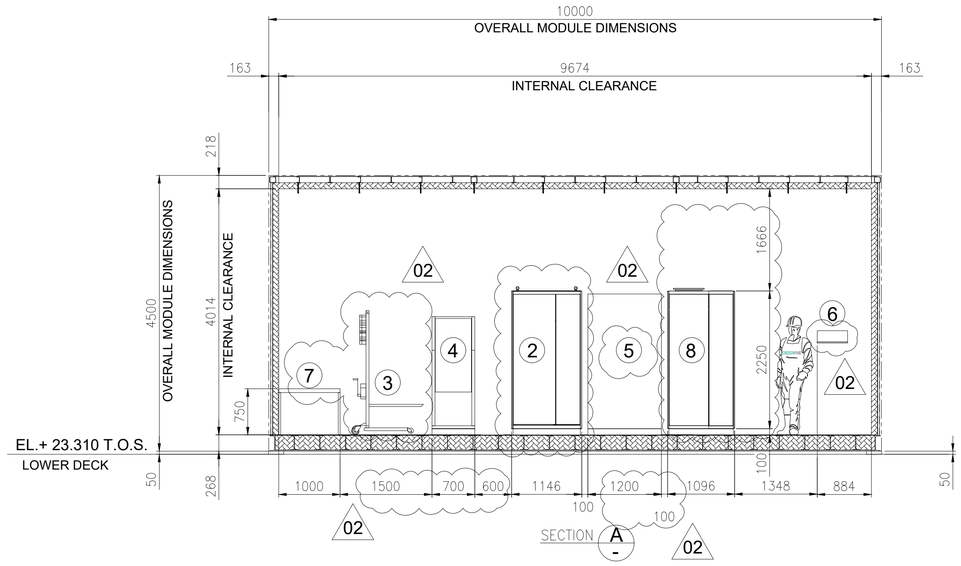
CORE CONTINUITY PH 4= 0.3
CORES / ARMOUR+EARTH INS. PH 4 = >999 M

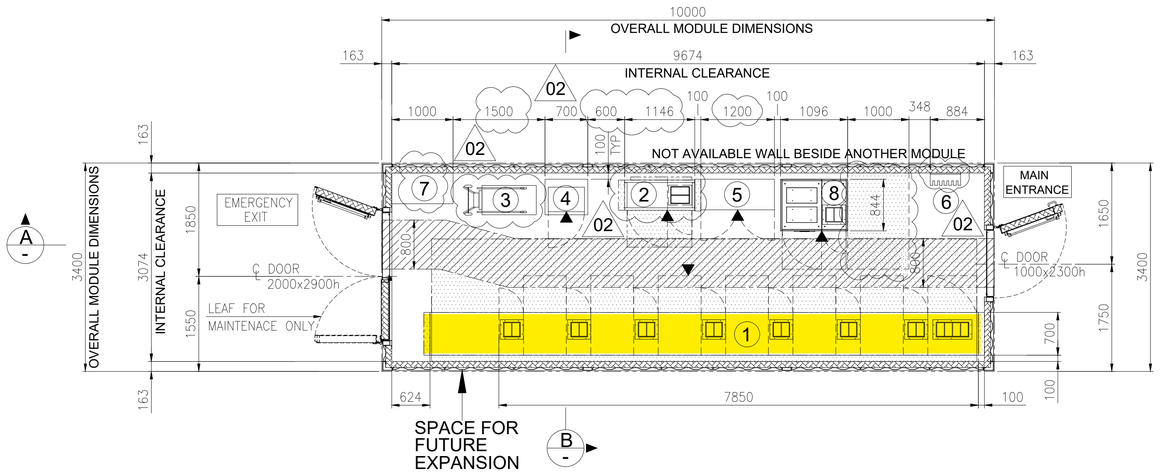
Note:
Refer to PL: C30000679 / C30000680 / C30000681 / C30000682

Page 2/2	Performed by	● WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	RM (ROSETTI MARINO)	
Name	Carmelo Bongiovanni	Giovanni Tangianu	
Date	2024-11-20	2024-11-21	
Signature	PROVERLIS Digitaly signed by Carmelo Bongiovanni 2024-11-20T17:16:35.511Z	PROVERLIS Digitaly signed by Giovanni Tangianu 2024-11-21T09:07:01.930Z	

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





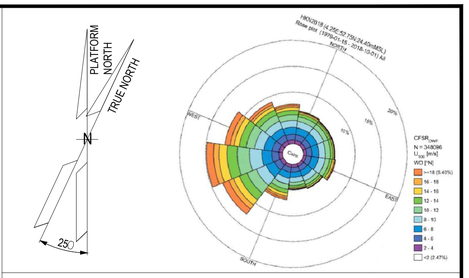


EQUIPMENT LAYOUT
"B-200" LV (400V) SWITCHGEAR ROOM
BOTTOM PLAN

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

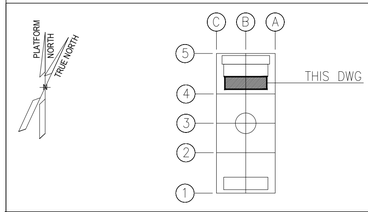
U.N.O. _____ UNLESS NOTED OTHERWISE
T.O.S. _____ TOP OF STEEL
_____ ESCAPE CORRIDOR - WIDTH 800mm.
_____ MAINTENANCE AREA - VENDOR REQUIREMENT
_____ SWITCHGEAR ROOM ENCLOUSURE
_____ FRONT OF EQUIPMENT

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



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

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

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

ROSETTI MARINO SpA

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

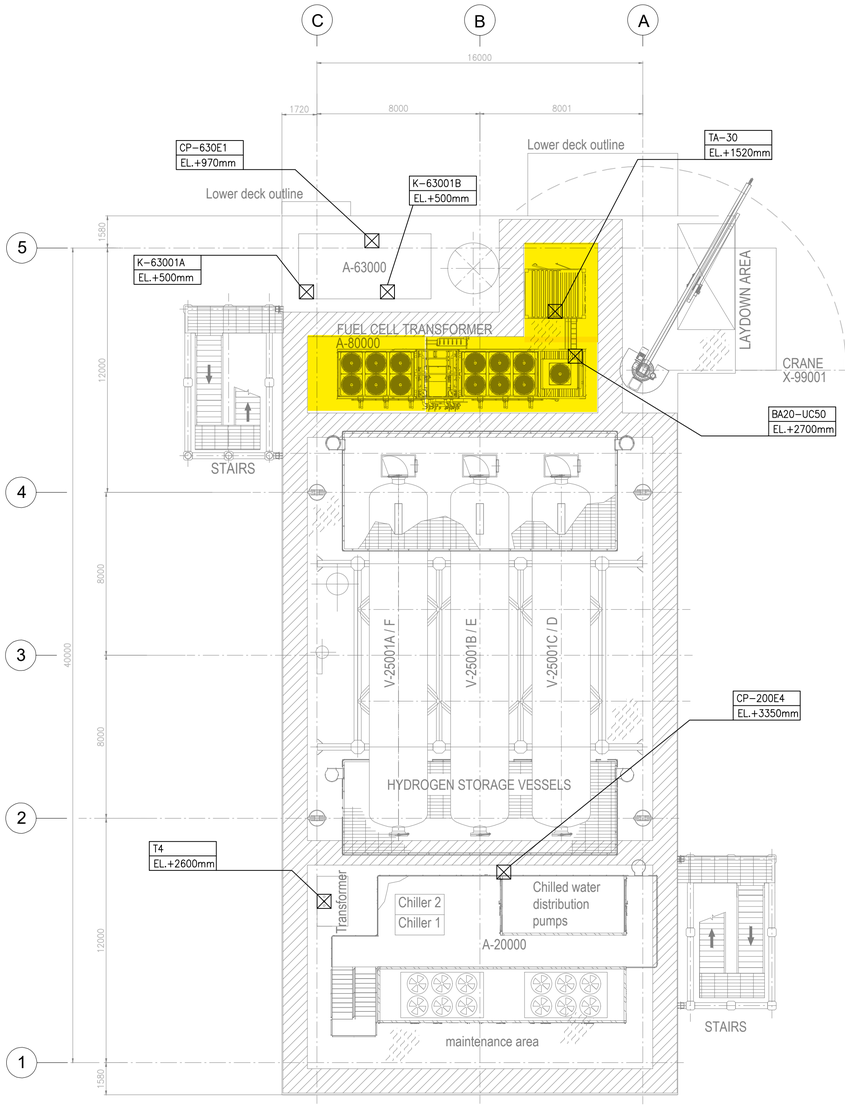
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:50
DRAWN FMO	CHECKED LMA/AMA	APPROVED LMA/MDO	DATE 27/05/2024

A1	DRAWING NO. 123A90-DDL-EL-DL-20105	SHEET 001	REV. 02

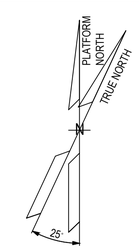
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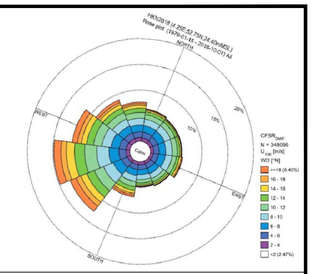
DRAWING NO. 123A90-DDL-EL-DL-20100

REV. 01



PLAN ON TOP DECK
EL+30.310 T.O.S.





NOTES

1. ALL DIMENSIONS IN MM UNLESS NOTED OTHERWISE.
2. ALL ELEVATIONS IN METERS. UNLESS NOTED OTHERWISE.
3. ELEVATIONS REFER TO T.O.S. UNLESS NOTED OTHERWISE.
4. AFTER INTERFACE PANEL/BATTERY LIMIT CABLES WILL BE ROUTED INSIDE VENDOR CABLETRAYS

LEGEND

⊠	INTERFACE PANEL/BATTERY LIMIT
JB-200E2	TAG ITEM
EL.+500mm	REFERED ELEVATION TO T.O.S. (TOP OF STEEL)

HOLDS

REFERENCE DOCUMENTS

123A90-DDL-PP-DL-70070	PLOT PLAN - LOWER & UPPER DECK
123A90-DDL-EL-DL-20140	ELECTRICAL HEAT TRACING JUNCTION BOX LAYOUT
123A90-DDL-EL-DL-20118	LIGHTING & SOCKET LAYOUT - TOP DECK

INSERT SUBCONTRACTOR / VENDOR LOGO HERE

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	22/07/24	SPS	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	29/05/24	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND

ROSETTI MARINO

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20100**

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

ROSETTI MARINO SpA

TITLE :
BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
TOP DECK

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:150
DRAWN SPS	CHECKED FMA/AMA	APPROVED FPA/DLO	DATE 22/07/24

	DRAWING NO.	SHEET	REV.
A1	123A90-DDL-EL-DL-20100	001	01

File Name : 123A90-DDL-EL-DL-20100-Electrical Equipment Layout - Top Deck

FROM	TO

DESCRIPTION: LV Switchgear
TAG NUMBER: SG-200N1

COLUMN/CUBIC.: A2/+08

L1	BK	83010-CEL-L1 1C X 95 mm²	BK → L1
L2	BK	83010-CEL-L2 1C X 95 mm²	BK → L2
L3	BK	83010-CEL-L3 1C X 95 mm²	BK → L3
N	BK	83010-CEL-N 1C X 95 mm²	BK → N
PE	Y/G	83010-CEL-E (01) 1C X 95 mm²	Y/G → PE

P.E. BUS BAR

COLUMN/CUBIC.: A1/+08

L1	BK	83013-CEL-L1 1C X 300 mm²	BK → L1
L2	BK	83013-CEL-L2 1C X 300 mm²	BK → L2
L3	BK	83013-CEL-L3 1C X 300 mm²	BK → L3
N	BK	83013-CEL-N 1C X 300 mm²	BK → N
PE	Y/G	83013-CEL-E 1C X 150 mm²	Y/G → PE

P.E. BUS BAR

COLUMN/CUBIC.: A4/+03

L1	BN	83012-CEL 5G16 mm²	→ -XB01 1 L1
L2	BK		→ -XB01 2 L2
L3	GY		→ -XB01 3 L3 (01)
N	BU		→ -XB01 4 N
	Y/G		→ -XB01 5 PE
PE			Y/G → PE

P.E. BUS BAR

DESCRIPTION: TEMPORARY GENERATOR / MOBILE BATTERY PACK
TAG NUMBER: JB-200E2

BK	L1	INCOMING FROM LV SWITCHGEAR SG-200N1
BK	L2	
BK	L3	
BK	N	
Y/G	PE	

P.E. BUS BAR

DESCRIPTION: ELECTROLYSER AUXILIARY LOAD
TAG NUMBER: A-20000

BK	L1
BK	L2
BK	L3
BK	N
Y/G	PE

P.E. BUS BAR

DESCRIPTION: FUEL CELL AUXILIARY LOAD
TAG NUMBER: A-80000

-XB01

BN	1	L1
BK	2	L2
GY	3	L3 (01)
BU	4	N
Y/G	5	PE

Y/G → PE

P.E. BUS BAR

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

REV.:	DATE:	SIGNATURE:
1_A	17/10/24	G.Randi

ROSETTI MARINO SpA

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
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)

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
ELECTRICAL INTERCONNECTING WIRING DIAGRAM
LV SWITCHGEAR SG-200N1

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

SCALE : 1:X

A3

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

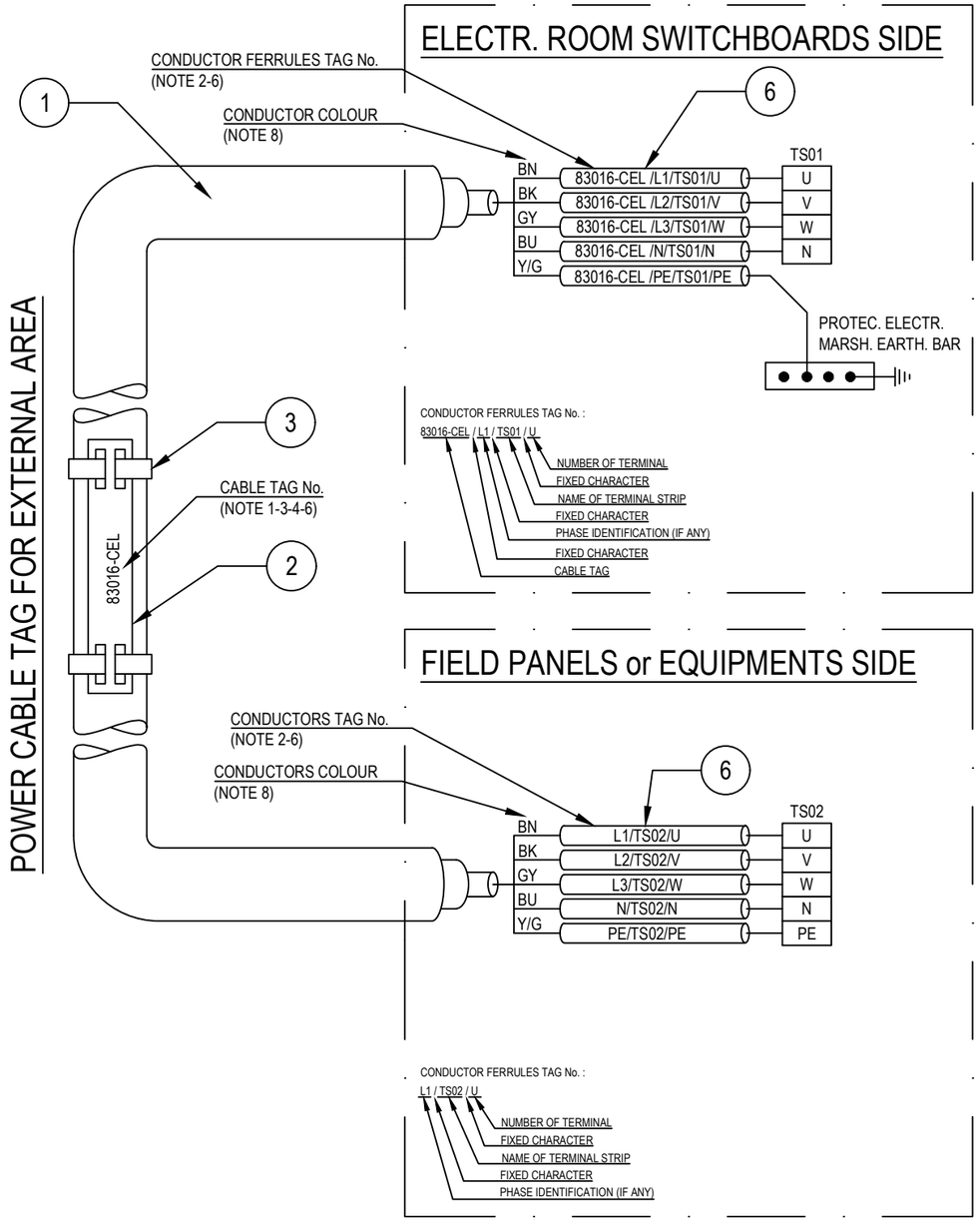
SHEET 021

REV. 01

F.to UNI A3: 420mmx297mm

File Name : 123A90-DDL-EL-DG-20162 Rev. 01

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.

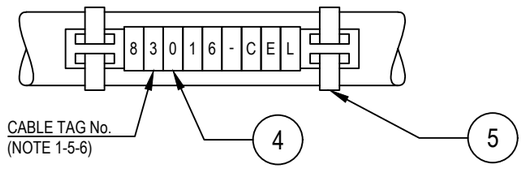
5) THE CABLE TAG FOR INTERNAL AREA SHALL BE DONE BY ENGRAVED PLASTIC SLIP ON CHARACTERS ONTO PLASTIC TIE, BLACK LETTER (H=5mm) ON WHITE.

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_A	28/08/24	G.Randi

ROSETTI MARINO SpA

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)

CROSSWIND

ROSETTI MARINO

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

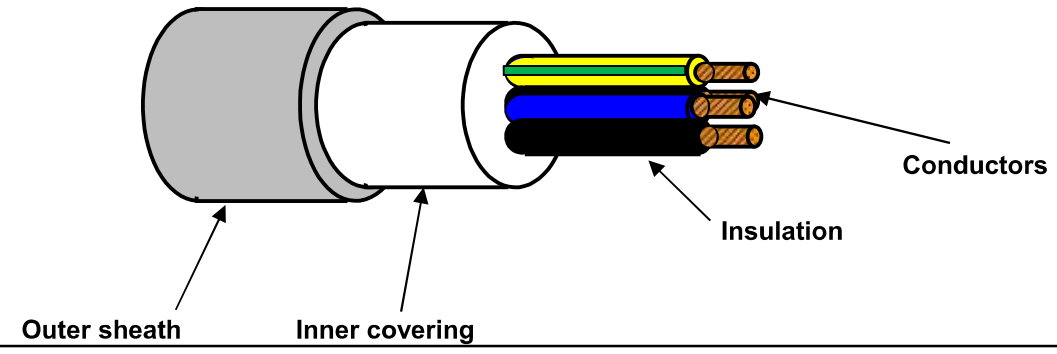
File Name : 123A90-DDL-EL-DD-20092 REV.02.DWG

Tag Number	Category	Discipline	Eng Status	NativeDoc	Layout	Parent Tag	Main Function	Secondary Function	Area	From Tag	From Main Function	From Area	To Tag	To Main Function	To Area	Material ID	Material Desc.	Gland Standard	From Gland	From Entry	From Fitting	To Gland	To Entry	To Fitting	Routing	Routing Manual
83012-CEL	Cable	EL	VFC	123A90-DDL-EL-LIS-20148						5G-200N1	LV 0,4 kV MCC Switchgear	Lower Deck (B-200)	A-80000	Fuel Cell	Upper Deck	ELECV15-5G16	Cable Cu Cl.2/EPR/LSZH 0,6/1kV 5G16mm² - Grey	M32	n.a.			Supplied_by_Vendor				L-450-101-LVT-025 / L-600-101-LVT-017 / E-MCT-202 / L-750-101-LVT-013 / L-750-101-LVT-015 / L-300-101-LVT-073 / E-MCT-U03 / L-300-102-LVT-002

FLEI s.r.l.

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

5G16 - 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 :	**Black - Brown - Grey - 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 1,4 mm	
Outer sheath color code:	**Grey**	
Outer printing (INKJET) :	**FLEI - ELECTRIC CABLE - 1000V - 5G16 SQMM - EPR/LSZH - 0,6/1 KV - IEC 60332.1.2 - IEC 60332.3.22 -**	
	Year of Manufacture - CE + Meter Marking	
Outer diameter :	(24,0 ± 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 :	≥ 530 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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Section 6 MECHANICAL COMPLETION STATUS INDEX - INSTRUMENTAL DISCIPLINE

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on subsystem: 80-00 & process: MC & discipline : I

Instrumental	80-00 Hydrogen Fuel Cell Package (A-80000)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
80-UCP-001/B400-FGS-003	CONFIRMED GAS ALARM / MARSHALLING PCS	ONSHORE	C10001466	CJX10	100	2024-11-20	RFC 2
C-80-XA-003/B400-SIS-001	UCP FAULT ALARM / MARSHALLING PCS	ONSHORE	C10001456	CJX10	100	2024-11-20	RFC 2
C-80-XS-001/B400-SIS-001	TRIP SIGNAL TO UCP / MARSHALLING PCS	ONSHORE	C10001449	CJX10	100	2024-11-20	RFC 2

ROSETTI MARINO | PROVERLIS | CROSSWIND

ITEM	Tag	C-80-XS-001/B400-SIS-001	: TRIP SIGNAL TO UCP / MARSHALLING PCS	Dwg	123A90-DDL-IN-LIS-40091		
	S/Sys	80-00	: Hydrogen Fuel Cell Package (A-80000)	Module	UD/LD_B-400		
TASK	code	C10001449	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	A-80000	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.	OK
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.	PL
10	Check that glands, shrouds and earthing are in accordance with specification.	PL
11	Check terminations are in accordance with termination diagram	PL
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	1,2	Ω
	SCREEN	1,2	Ω
	EARTH	NA	Ω
	ARMr	1,2	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

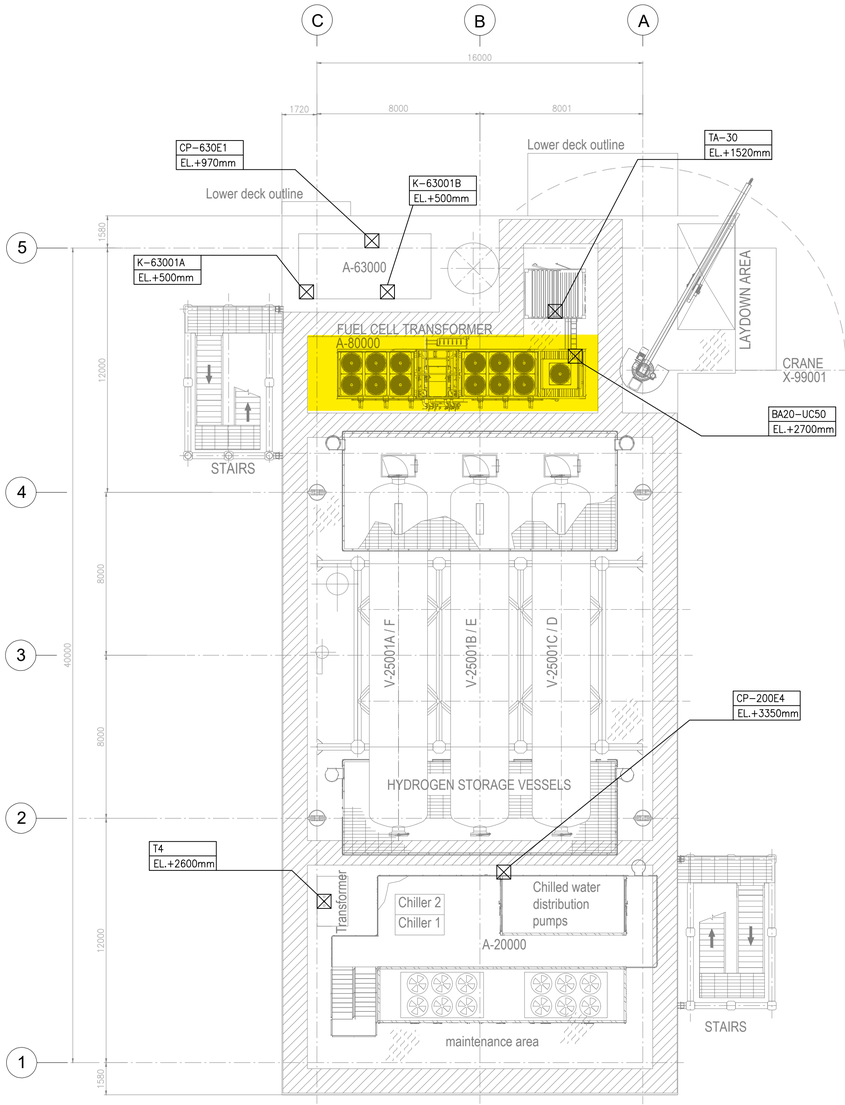
TYPE / SERIAL N°: MEGGER : KEW3125A SERIAL: W8330207 Calibration date: N°7722/24 10/07/2024

Comments

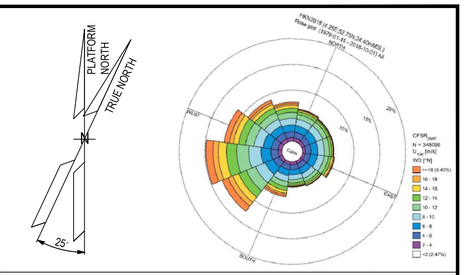
Page 1/1	Performed by	☑ WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	RM (ROSETTI MARINO)	
Name	Carmelo Bongiovanni	Giovanni Tangianu	
Date	2024-11-12	2024-11-20	
Signature	PROVERLIS Digitaly signed by Carmelo Bongiovanni 2024-11-12T17:48:17.753Z	PROVERLIS Digitaly signed by Giovanni Tangianu 2024-11-20T13:11:25.314Z	

DRAWING NO. 123A90-DDL-EL-DL-20100

REV. 01



PLAN ON TOP DECK
EL+30.310 T.O.S.



NOTES

1. ALL DIMENSIONS IN MM UNLESS NOTED OTHERWISE.
2. ALL ELEVATIONS IN METERS. UNLESS NOTED OTHERWISE.
3. ELEVATIONS REFER TO T.O.S. UNLESS NOTED OTHERWISE.
4. AFTER INTERFACE PANEL/BATTERY LIMIT CABLES WILL BE ROUTED INSIDE VENDOR CABLETRAYS

LEGEND

⊠	INTERFACE PANEL/BATTERY LIMIT
JB-200E2 EL.+500mm	TAG ITEM REFERED ELEVATION TO T.O.S. (TOP OF STEEL)

HOLDS

REFERENCE DOCUMENTS

123A90-DDL-PP-DL-70070	PLOT PLAN - LOWER & UPPER DECK
123A90-DDL-EL-DL-20140	ELECTRICAL HEAT TRACING JUNCTION BOX LAYOUT
123A90-DDL-EL-DL-20118	LIGHTING & SOCKET LAYOUT - TOP DECK

INSERT SUBCONTRACTOR / VENDOR LOGO HERE

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	22/07/24	SPS	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	29/05/24	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND

ROSETTI MARINO

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20100**

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

ROSETTI MARINO SpA

TITLE :
BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
TOP DECK

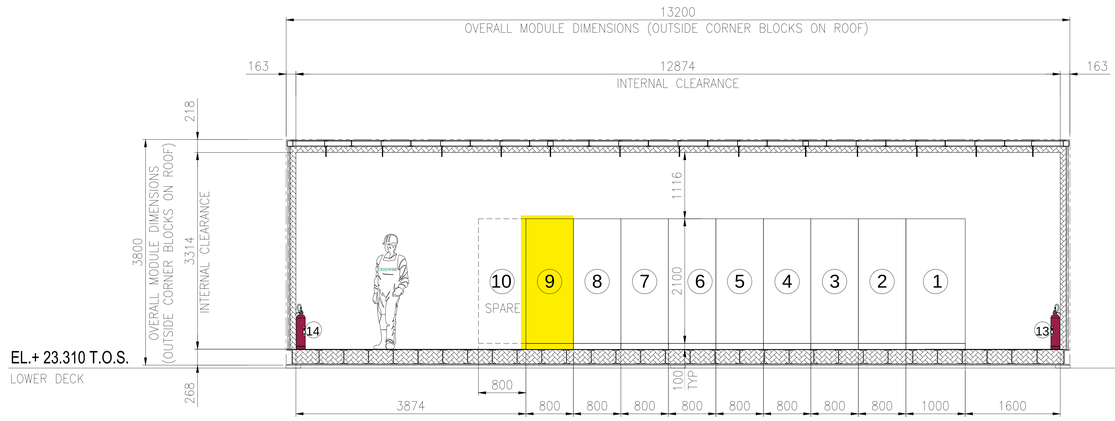
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:150
DRAWN SPS	CHECKED FMA/AMA	APPROVED FPA/DLO	DATE 22/07/24

	DRAWING NO.	SHEET	REV.
A1	123A90-DDL-EL-DL-20100	001	01

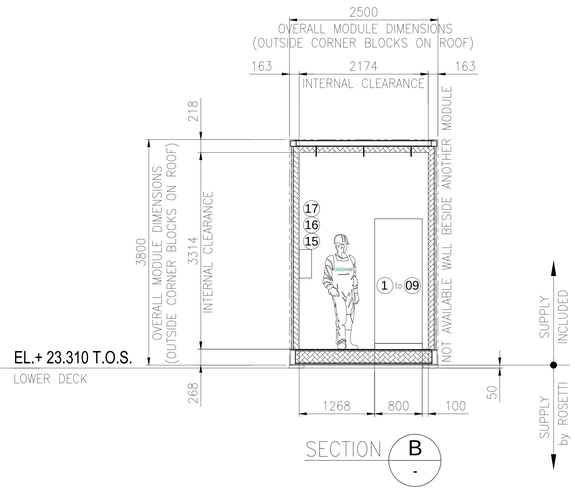
File Name : 123A90-DDL-EL-DL-20100-Electrical Equipment Layout - Top Deck

DRAWING NO. 123A90-DDL-IN-DL-40012

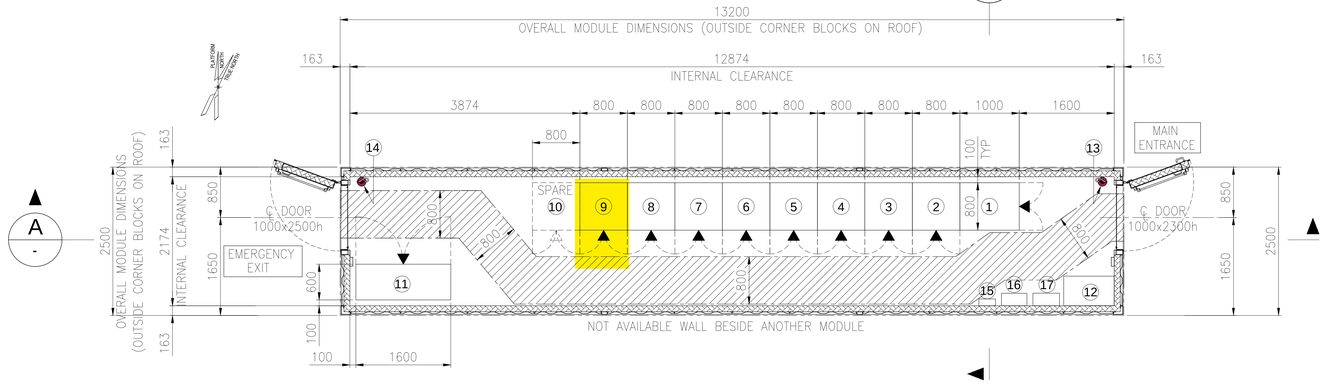
REV. 02



SECTION A -



SECTION B -

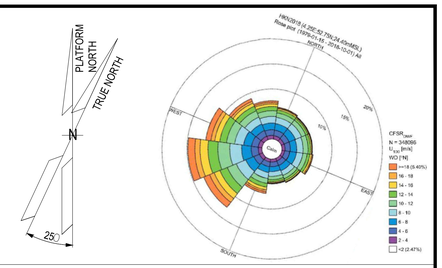


EQUIPMENT LAYOUT
"B-400" I&T EQUIPMENT ROOM
BOTTOM PLAN

02

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-001	PCS SYSTEM CABINET	800	800	2100	
5	B400-PCS-002	PCS MARSHALLING CABINET	800	800	2100	
6	B400-FGS-001	FGS SYSTEM CABINET	800	800	2100	
7	B400-FGS-002	FGS MARSHALLING CABINET 1	800	800	2100	
8	B400-FGS-003	FGS MARSHALLING CABINET 2	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	-	TABLE	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 ENCLOUSURE
_____ FRONT OF EQUIPMENT

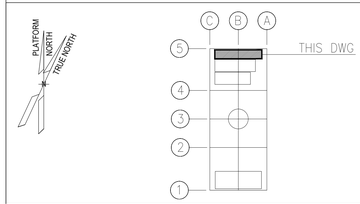
HOLDS

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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
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)

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. 02

VALID FOR CONSTRUCTION
FDL DWG: 123A90-FDL-IN-DL-40012
REV.: 2_A | DATE: 08/08/24 | SIGNATURE: G.Randi
ROSETTI MARINO SpA

File Name : 123A90-DDL-IN-DL-40012 Rev.02.dwg

DRAWING NO. 123-A90-DDL-IN-DG-40016

REV. 01

FIELD		I&T EQUIPMENT ROOM (ITER)
PACKAGE	CABLE NO	MARSHALLING CABINET B400-SIS-001

<01>

A-85000 BESS UCP — 85-XS-001 — (NOTE 5) / (NOTE 5) — 1BK / 2BK — NOTE-2

C-85-XS-001/B400-SIS-001
2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS

TB-XS-000 — 1BK 45 / 2BK 46 — 85-XS-001 — Shield Bar

A-20000 ELECTROLYSER UCP — 20-XS-001 — (NOTE 5) / (NOTE 5) — 1BK / 2BK — NOTE-2

C-20-XS-001/B400-SIS-001
2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS

TB-XS-000 — 1BK 07 / 2BK 08 — 20-XS-001 — Shield Bar

A-80000 FUEL CELL UCP — 80-XS-001 — (NOTE 5) / (NOTE 5) — 1BK / 2BK — NOTE-2

C-80-XS-001/B400-SIS-001
2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS

TB-XS-000 — 1BK 29 / 2BK 30 — 80-XS-001 — Shield Bar

A-50003 Water Treatment Unit UCP — 50-XS-001 — TB-EXT — 1 / 2 — 1BK / 2BK — NOTE-2

C-50-XS-001/B400-SIS-001
2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS

TB-XS-000 — 1BK 15 / 2BK 16 — 50-XS-001 — Shield Bar

A-63000 I. AIR PACKAGE UCP — 63-XS-001 — TB-XA — 1 / 2 — 1BK / 2BK — NOTE-2

C-63-XS-001/B400-SIS-001
2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS

TB-XS-000 — 1BK 17 / 2BK 18 — 63-XS-001 — Shield Bar

A-64000 NITROGEN PACKAGE UCP — 64-XS-001 — TB-XA — 1 / 2 — 1BK / 2BK — NOTE-2

C-64-XS-001/B400-SIS-001
2x2.5mm2,ShT+ARM,F.Res,ORANGE,NIS

TB-XS-000 — 1BK 19 / 2BK 20 — 64-XS-001 — I.E. — Shield Bar

<01>

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DG-40016**

REV.:	DATE:	SIGNATURE:
1_J	06/11/24	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
INSTRUMENT – SAFETY SYSTEM WIRING DIAGRAMS
PACKAGE UCP SHUTDOWN

CONTRACT NO./TITLE			SCALE N/A
DRAWN VBA	CHECKED LCA	APPROVED DLO	DATE 23/02/2024

	DRAWING NO.	SHEET	REV.
A3	123-A90-DDL-IN-DG-40016	020	01

File Name : 123A90-DDL-IN-DG-40015_00.DWG

DRAWING NO. 123A90-DDL-IN-DG-40016

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. CONNECTION TERMINAL BLOCK SHALL BE DEFINED DURING CONSTRUCTION PHASE.

<01>

LEGENDS & SYMBOLS:

LEGEND:

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 <01>
ESD	- EMERGENCY SHUTDOWN SYSTEM
SIS	- SAFETY INSTRUMENT SYSTEM
FGS	- FIRE & GAS SYSTEM <01>
MC	- MARSHALLING CABINET
AI	- ANALOGUE INPUT
AO	- ANALOGUE OUTPUT
DI	- DIGITAL INPUT
DO	- DIGITAL OUTPUT
JE	- JUNCTION BOX FOR ELECTRICAL SIGNALS <01>

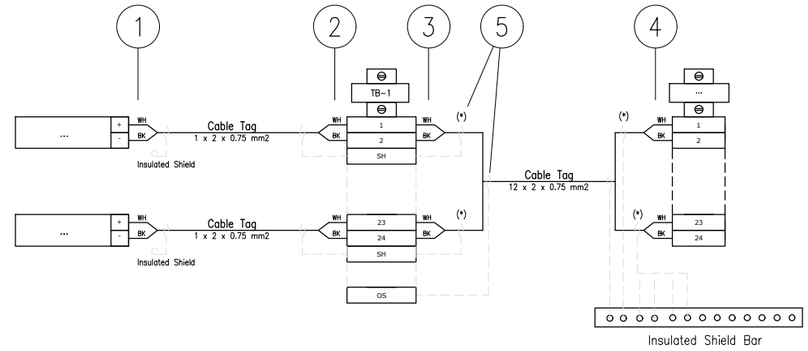
VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DG-40016**

REV.:	DATE:	SIGNATURE:
1_J	06/11/24	G.Randi

ROSETTI MARINO SpA

TYPICAL WIRE CROSS-FERRULING:

PHILOSOPHY OF CROSS-FERRULING: <01>



(*) Single shield is foreseen only for AI/AO signals.

1 - INSTRUMENT TERMINAL NO. OR POLARITY/JB NO./JB TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

2 - INSTRUMENT TERMINAL NO. OR POLARITY/INSTRUMENT TAG NO./JB TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

3 - PAIR OR CORE NO./MARSHALLING CABINET NO./TB NO./TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

4 - PAIR OR CORE NO./JB NO./JB TERMINAL NO./TB NO./TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

5 - HEAT SHRINKABLE BLACK FOR SHIELD OF NIS INSTRUMENT CABLE.
(HEAT SHRINKABLE BLUE FOR SHIELD OF NIS INSTRUMENT CABLE)

6 - IN CASE OF CONNECTION FROM RIGHT TO LEFT, ORDER OF INFORMATION SHALL BE MIRRORED

REFERENCE DRAWINGS

PIPING AND INSTRUMENT DIAGRAM	123A90-DDL-PR-PID-80009
INSTRUMENT INDEX	123A90-DDL-IN-LIS-40088 Rev.01
F&G DETECTORS LAYOUT	123A90-DDL-SAF-DL-30027

CROSSWIND

ROSETTI MARINO

TITLE :
BASE LOAD POWER HUB (BLPH)
INSTRUMENT – SAFETY SYSTEM WIRING DIAGRAMS
GENERAL NOTES/LEGENDS

CONTRACT NO./TITLE			SCALE N/A
DRAWN VBA	CHECKED LCA	APPROVED DLO	DATE 23/02/2024

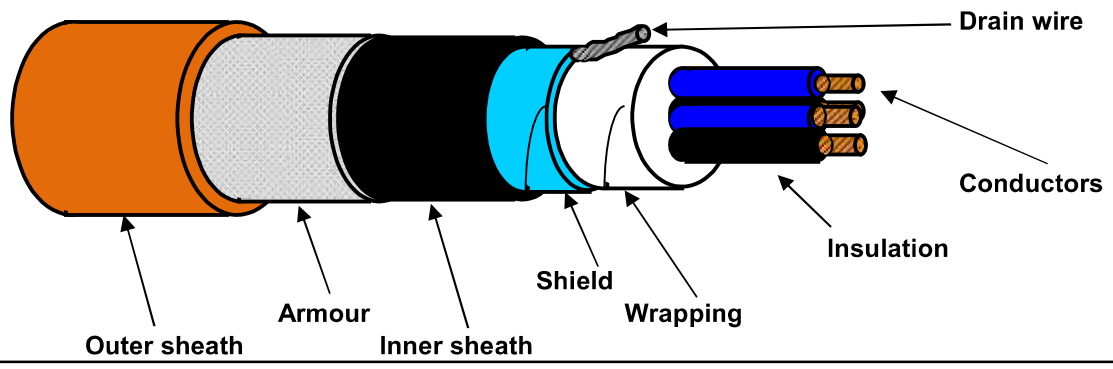
A3	DRAWING NO. 123A90-DDL-IN-DG-40016	SHEET 003	REV. 01

File Name : 123A90-DDL-IN-DG-40016_Rev.01

Tag Number	Category	Discipline	Eng Status	NativeDoc	Layout	Parent Tag	Main Function	Secondary Function	Area	From Tag	From Main Function	From Area	To Tag	To Main Function	To Area	Material ID	Material Desc.	Gland Standard	From Gland	From Entry	From Fitting	To Gland	To Entry	To Fitting	Routing	Routing Manual
C-80-XS-001/B400-SIS-001	Cable	IN	VFC	123A90-DDL-IN-LIS-40091						A-80000	Fuel Cell	Upper Deck	B400-SIS-001	Marshalling SIS	Lower Deck (B-400)	SMICV12-2X2,5	Cable Cu Cl.2/MGT/XLPE/OS/LSZH/SWB/LSZH 150/250V (300V) 2x2,5mm² - Orange	M20	T2_M20_Double			n.a.				I-MCT-UJ02 / L-SEC-19 / L-SEC-18A / B-400-SEC-2A / B-400-SEC-2B / B-400-SEC-2C / B-400-SEC-2E / B-400-SEC-2G / B-400-SEC-2H / I-MCT-403

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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ROSETTI MARINO

CROSSWIND

ITEM	Tag	C-80-XA-003/B400-SIS-001	: UCP FAULT ALARM / MARSHALLING PCS	Dwg	123A90-DDL-IN-LIS-40091		
	S/Sys	80-00	: Hydrogen Fuel Cell Package (A-80000)	Module	UD/LD_B-400		
TASK	code	C10001456	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	1X2X0,75 mm2	Color	ORANGE
From	A-80000	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.	OK
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.	PL
10	Check that glands, shrouds and earthing are in accordance with specification.	PL
11	Check terminations are in accordance with termination diagram	PL
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	0,4	Ω
	SCREEN	0,4	Ω
	EARTH	NA	Ω
	ARMr	0,4	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

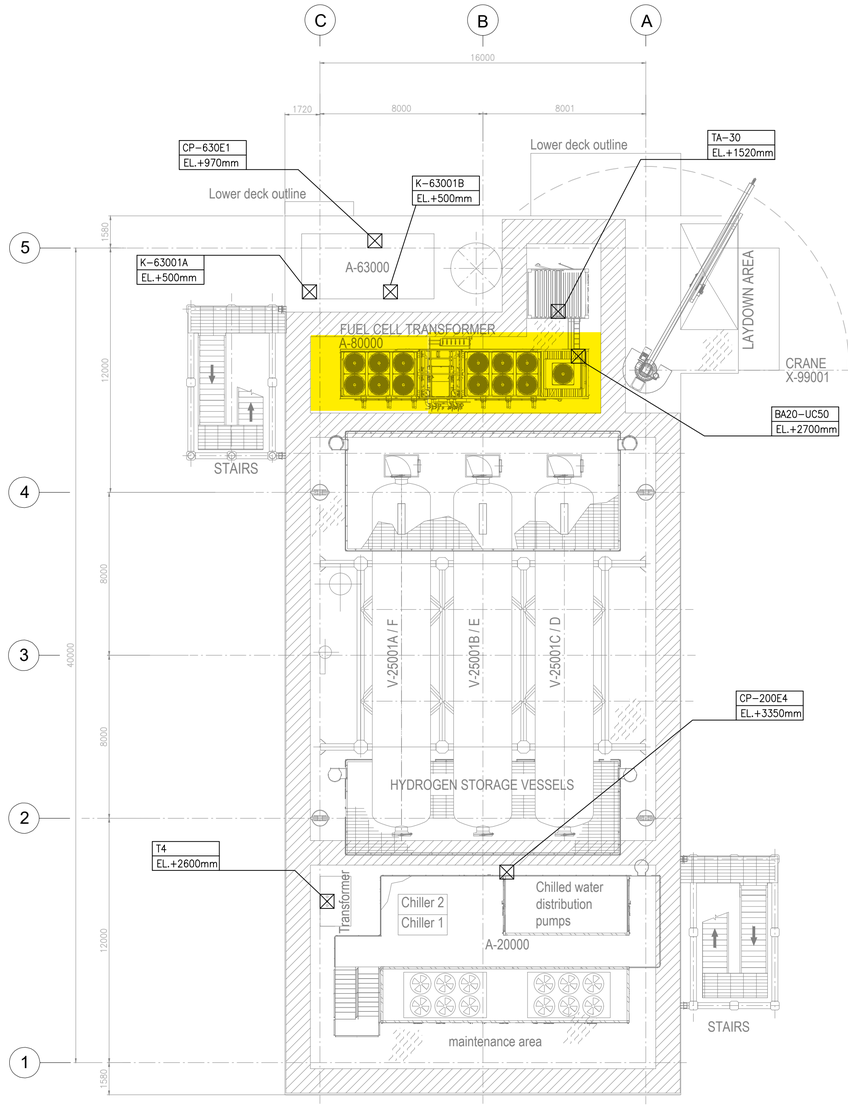
TYPE / SERIAL N°: MEGGER : KEW3125A SERIAL: W8330207 Calibration date: N°7722/24 10/07/2024

Comments

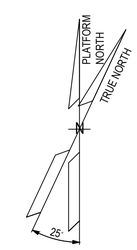
Page 1/1	Performed by	☑ WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	RM (ROSETTI MARINO)	
Name	Carmelo Bongiovanni	Giovanni Tangianu	
Date	2024-11-12	2024-11-20	
Signature	PROVERLIS Digitaly signed by Carmelo Bongiovanni 2024-11-12T17:48:28.174Z	PROVERLIS Digitaly signed by Giovanni Tangianu 2024-11-20T13:03:03.676Z	

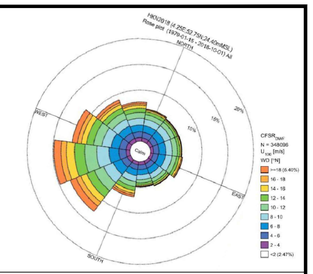
DRAWING NO. 123A90-DDL-EL-DL-20100

REV. 01



PLAN ON TOP DECK
EL+30.310 T.O.S.





NOTES

1. ALL DIMENSIONS IN MM UNLESS NOTED OTHERWISE.
2. ALL ELEVATIONS IN METERS. UNLESS NOTED OTHERWISE.
3. ELEVATIONS REFER TO T.O.S. UNLESS NOTED OTHERWISE.
4. AFTER INTERFACE PANEL/BATTERY LIMIT CABLES WILL BE ROUTED INSIDE VENDOR CABLETRAYS

LEGEND

⊠	INTERFACE PANEL/BATTERY LIMIT
JB-200E2	TAG ITEM
EL.+500mm	REFERED ELEVATION TO T.O.S. (TOP OF STEEL)

HOLDS

REFERENCE DOCUMENTS

123A90-DDL-PP-DL-70070	PLOT PLAN - LOWER & UPPER DECK
123A90-DDL-EL-DL-20140	ELECTRICAL HEAT TRACING JUNCTION BOX LAYOUT
123A90-DDL-EL-DL-20118	LIGHTING & SOCKET LAYOUT - TOP DECK

INSERT SUBCONTRACTOR / VENDOR LOGO HERE

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	22/07/24	SPS	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	29/05/24	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND

ROSETTI MARINO

TITLE :
BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
TOP DECK

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:150
DRAWN SPS	CHECKED FMA/AMA	APPROVED FPA/DLO	DATE 22/07/24

A1	DRAWING NO. 123A90-DDL-EL-DL-20100	SHEET 001	REV. 01

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20100**

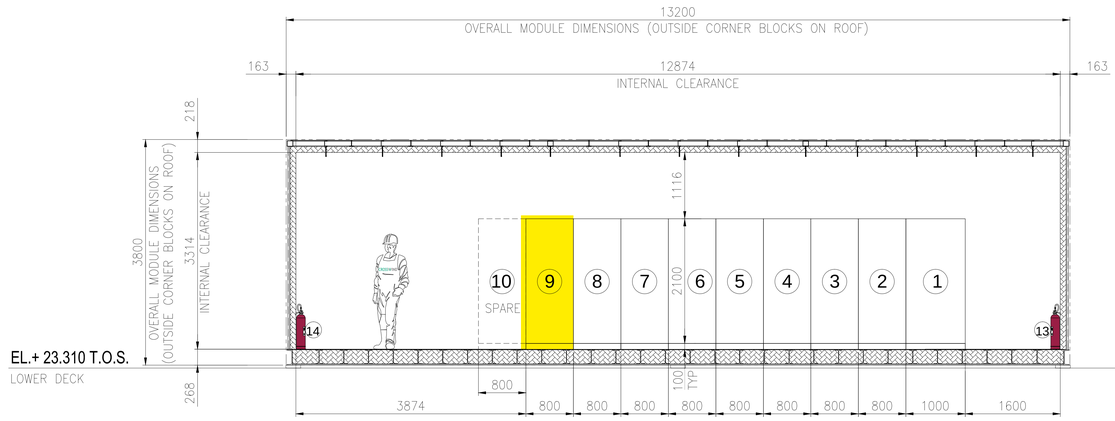
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1_A	08/08/24	G.Randi

ROSETTI MARINO SpA

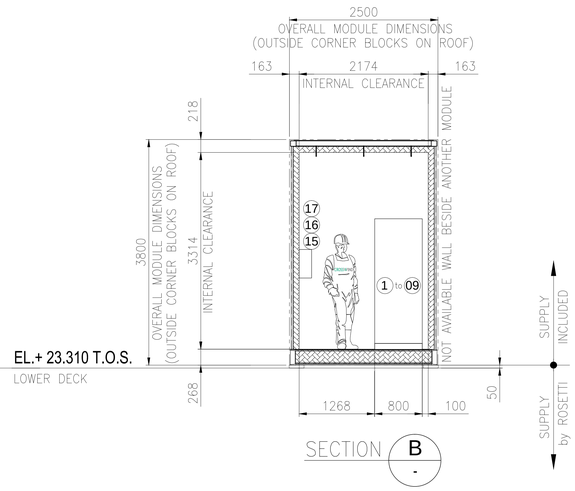
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DRAWING NO. 123A90-DDL-IN-DL-40012

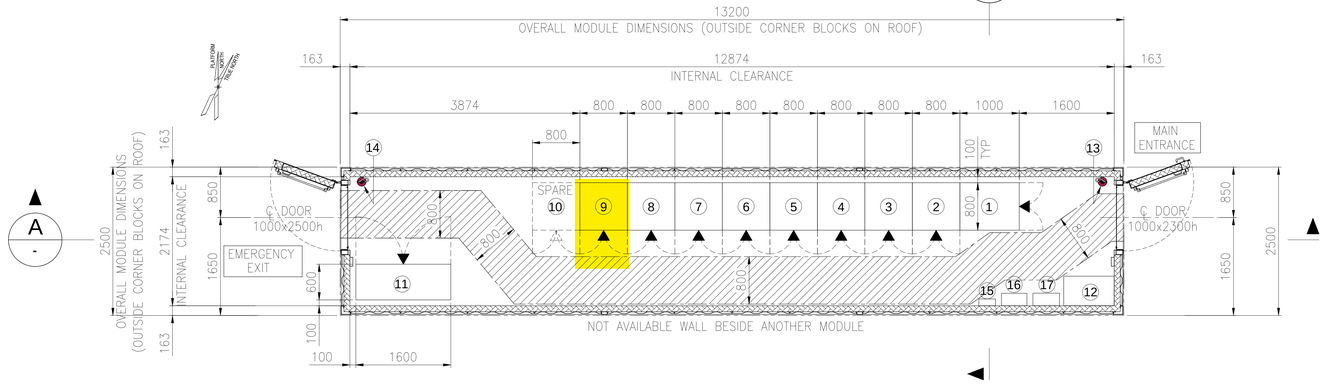
REV. 02



SECTION A -



SECTION B -

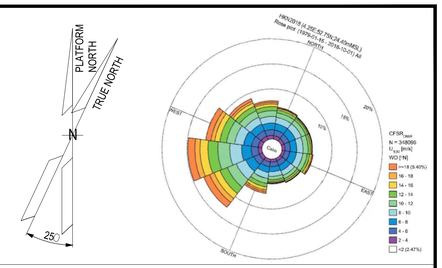


EQUIPMENT LAYOUT
"B-400" I&T EQUIPMENT ROOM
BOTTOM PLAN

02

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-001	PCS SYSTEM CABINET	800	800	2100	
5	B400-PCS-002	PCS MARSHALLING CABINET	800	800	2100	
6	B400-FGS-001	FGS SYSTEM CABINET	800	800	2100	
7	B400-FGS-002	FGS MARSHALLING CABINET 1	800	800	2100	
8	B400-FGS-003	FGS MARSHALLING CABINET 2	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	-	TABLE	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 ENCLOUSURE
_____ FRONT OF EQUIPMENT

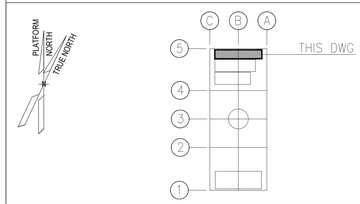
HOLDS

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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
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)

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. 02

VALID FOR CONSTRUCTION
FDL DWG: 123A90-FDL-IN-DL-40012
REV.: 2_A | DATE: 08/08/24 | SIGNATURE: G.Randi
ROSETTI MARINO SpA

File Name : 123A90-DDL-IN-DL-40012 Rev.02.dwg

DRAWING NO. 123-A90-DDL-IN-DG-40015

REV. 01

FIELD

PACKAGE		CABLE NO	I&T EQUIPMENT ROOM (ITER) MARSHALLING CABINET B400-SIS-001	
<01> A-85000 BESS UCP	85-XA-003 (NOTE 5) (NOTE 5) (NOTE 5) WH BK PR1 NOTE-2	P320PLC/B400-SIS-001 2x2x0.75mm2,Sh+ShT+ARM,F.Res,ORANGE,NIS	TB-P30PLC 01 WH PR1 BK 02 Shield Bar	85-XA-003
	85-XA-004 (NOTE 5) (NOTE 5) (NOTE 5) WH BK PR2 NOTE-2		03 WH PR2 BK 04 Shield Bar	85-XA-004
A-20000 ELECTROLYSER UCP	20-XA-003 (NOTE 5) (NOTE 5) (NOTE 5) WH BK NOTE-2	C-20-XA-003/B400-SIS-001 1x2x0.75mm2,ShT+ARM,F.Res,ORANGE,NIS	TB-XA-000 01 WH BK 02 Shield Bar	20-XA-003
A-80000 FUEL CELL UCP	80-XA-003 (NOTE 5) (NOTE 5) (NOTE 5) WH BK NOTE-2	C-80-XA-003/B400-SIS-001 1x2x0.75mm2,ShT+ARM,F.Res,ORANGE,NIS	TB-XA-000 03 WH BK 04 Shield Bar	80-XA-003
A-50003 Water Treatment Unit UCP	50-XA-003 TB-XDO 16 WH 17 BK NOTE-2	C-50-XA-003/B400-SIS-001 1x2x0.75mm2,ShT+ARM,F.Res,ORANGE,NIS	TB-XA-000 05 WH BK 06 Shield Bar	50-XA-003
A-63000 I. AIR PACKAGE UCP	63-XA-003 TB-XA 4 WH 5 BK NOTE-2	C-63-XA-003/B400-SIS-001 1x2x0.75mm2,ShT+ARM,F.Res,ORANGE,NIS	TB-XA-000 07 WH BK 08 Shield Bar	63-XA-003
A-64000 NITROGEN PACKAGE UCP	64-XA-003 TB-XA 4 WH 5 BK NOTE-2	C-64-XA-003/B400-SIS-001 1x2x0.75mm2,ShT+ARM,F.Res,ORANGE,NIS	TB-XA-000 09 WH BK 10 Shield Bar I.E.	64-XA-003

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DG-40016**

REV.:	DATE:	SIGNATURE:
1_J	06/11/24	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
INSTRUMENT – PCS WIRING DIAGRAMS
PACKAGE UCP FAULT ALARM

CONTRACT NO./TITLE			SCALE N/A
DRAWN VBA	CHECKED LCA	APPROVED DLO	DATE 23/02/2024

A3	DRAWING NO. 123-A90-DDL-IN-DG-40015	SHEET 014	REV. 01

File Name : 123A90-DDL-IN-DG-40016_Rev.01

DRAWING NO. 123A90-DDL-IN-DG-40016

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. CONNECTION TERMINAL BLOCK SHALL BE DEFINED DURING CONSTRUCTION PHASE.

<01>

LEGENDS & SYMBOLS:

LEGEND:

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 <01>
ESD	- EMERGENCY SHUTDOWN SYSTEM
SIS	- SAFETY INSTRUMENT SYSTEM
FGS	- FIRE & GAS SYSTEM <01>
MC	- MARSHALLING CABINET
AI	- ANALOGUE INPUT
AO	- ANALOGUE OUTPUT
DI	- DIGITAL INPUT
DO	- DIGITAL OUTPUT
JE	- JUNCTION BOX FOR ELECTRICAL SIGNALS <01>

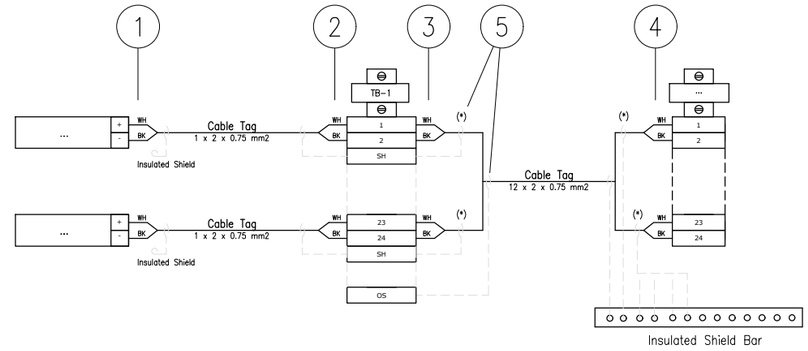
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REV.:	DATE:	SIGNATURE:
1_J	06/11/24	G.Randi

ROSETTI MARINO SpA

TYPICAL WIRE CROSS-FERRULING:

PHILOSOPHY OF CROSS-FERRULING: <01>



(*) Single shield is foreseen only for AI/AO signals.

1 - INSTRUMENT TERMINAL NO. OR POLARITY/JB NO./JB TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

2 - INSTRUMENT TERMINAL NO. OR POLARITY/INSTRUMENT TAG NO./JB TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

3 - PAIR OR CORE NO./MARSHALLING CABINET NO./TB NO./TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

4 - PAIR OR CORE NO./JB NO./JB TERMINAL NO./TB NO./TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

5 - HEAT SHRINKABLE BLACK FOR SHIELD OF NIS INSTRUMENT CABLE.
(HEAT SHRINKABLE BLUE FOR SHIELD OF NIS INSTRUMENT CABLE)

6 - IN CASE OF CONNECTION FROM RIGHT TO LEFT, ORDER OF INFORMATION SHALL BE MIRRORED

REFERENCE DRAWINGS

PIPING AND INSTRUMENT DIAGRAM	123A90-DDL-PR-PID-80009
INSTRUMENT INDEX	123A90-DDL-IN-LIS-40088 Rev.01
F&G DETECTORS LAYOUT	123A90-DDL-SAF-DL-30027

CROSSWIND

ROSETTI MARINO

TITLE :
BASE LOAD POWER HUB (BLPH)
INSTRUMENT – SAFETY SYSTEM WIRING DIAGRAMS
GENERAL NOTES/LEGENDS

CONTRACT NO./TITLE			SCALE N/A
DRAWN VBA	CHECKED LCA	APPROVED DLO	DATE 23/02/2024

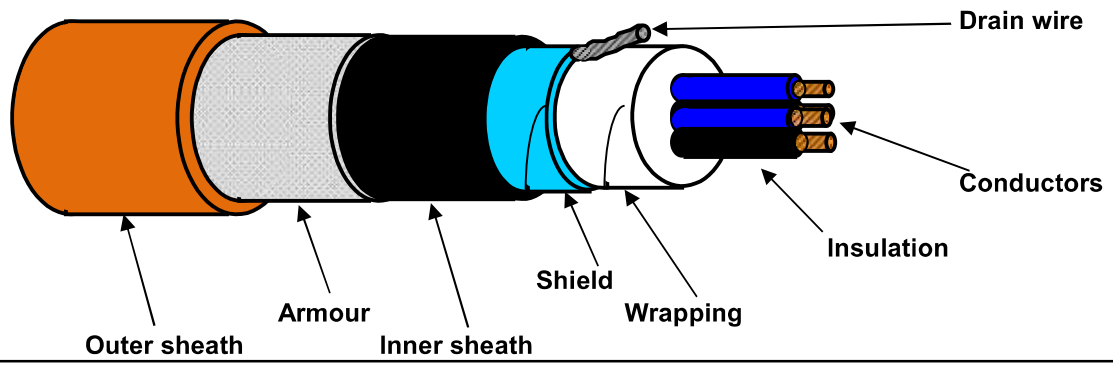
A3	DRAWING NO. 123A90-DDL-IN-DG-40016	SHEET 003	REV. 01

File Name : 123A90-DDL-IN-DG-40016_Rev.01

Tag Number	Category	Discipline	Eng Status	NativeDoc	Layout	Parent Tag	Main Function	Secondary Function	Area	From Tag	From Main Function	From Area	To Tag	To Main Function	To Area	Material ID	Material Desc.	Gland Standard	From Gland	From Entry	From Fitting	To Gland	To Entry	To Fitting	Routing	Routing Manual
C-80-XA-003/B400-SIS-001	Cable	IN	VFC	123A90-DDL-IN-LIS-40091						A-80000	Fuel Cell	Upper Deck	B400-SIS-001	Marshalling SIS	Lower Deck (B-400)	SMICV08-1X2X0,75	Cable Cu Cl.2/MGT/XLPE/OS/LSZH/SWB/LSZH 150/250V (300V) 1x2x0,75mm² - Orange	M20S	T2_M20S_Double			n.a.				I-MCT-UO2 / L-SEC-19 / L-SEC-18A / B-400-SEC-2A / I-MCT-403

Cu Cl.2/MGT/XLPE/OS/LSZH/SWB/LSZH 150/250 V (300 V)

1X2X0,75 - 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 0,5 mm	
Cores colour code :	**White - Black**	
Pair Assembling :	Not required	
Pair Wrapping:	Not required	
Drain wire :	Not required	
Pair Shield :	Not required	
Shield Insulation :	Not required	
Total Assembling :	10/1mt	
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 0,5 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 1,2 mm	
Outer sheath color code:	**Orange**	
Outer printing (INKJET) :	**FLEI - 1X2X0,75 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 :	(8,5 ± 10%) mm	
Over armour diameter :	(9,3 ± 10%) mm	
Outer diameter :	(11,7 ± 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 :	≤ 26 Ω/km (@ 20°C)	
Insulation Resistance :	≥ 1000 MΩ x Km (@ 20°C)	
Mutual Capacitance :	≤ 150 nF/km	
L/R ratio :	≤ 25 µH/Ω	
Inductance :	≤ 0,9 mH/km	
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 herein are meant for the transaction will be used in the sense of the article 19 of the Regulation (UE) 2016/679 also by such 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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ROSETTI MARINO — CROSSWIND

ITEM	Tag	80-UCP-001/B400-FGS-003	: CONFIRMED GAS ALARM / MARSHALLING PCS	Dwg	123A90-DDL-IN-LIS-40091		
	S/Sys	80-00	: Hydrogen Fuel Cell Package (A-80000)	Module	UD/LD_B-400		
TASK	code	C10001466	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-IS-OS-LSZH-SWB-LSZH	Cores/Size mm²	2X2X0,75 mm2	Color	ORANGE
From	80-UCP-001		To	B400-FGS-003	

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.	OK
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.	PL
10	Check that glands, shrouds and earthing are in accordance with specification.	PL
11	Check terminations are in accordance with termination diagram	PL
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	1,6	Ω
	SCREEN	1,6	Ω
	EARTH	NA	Ω
	ARMr	1,6	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

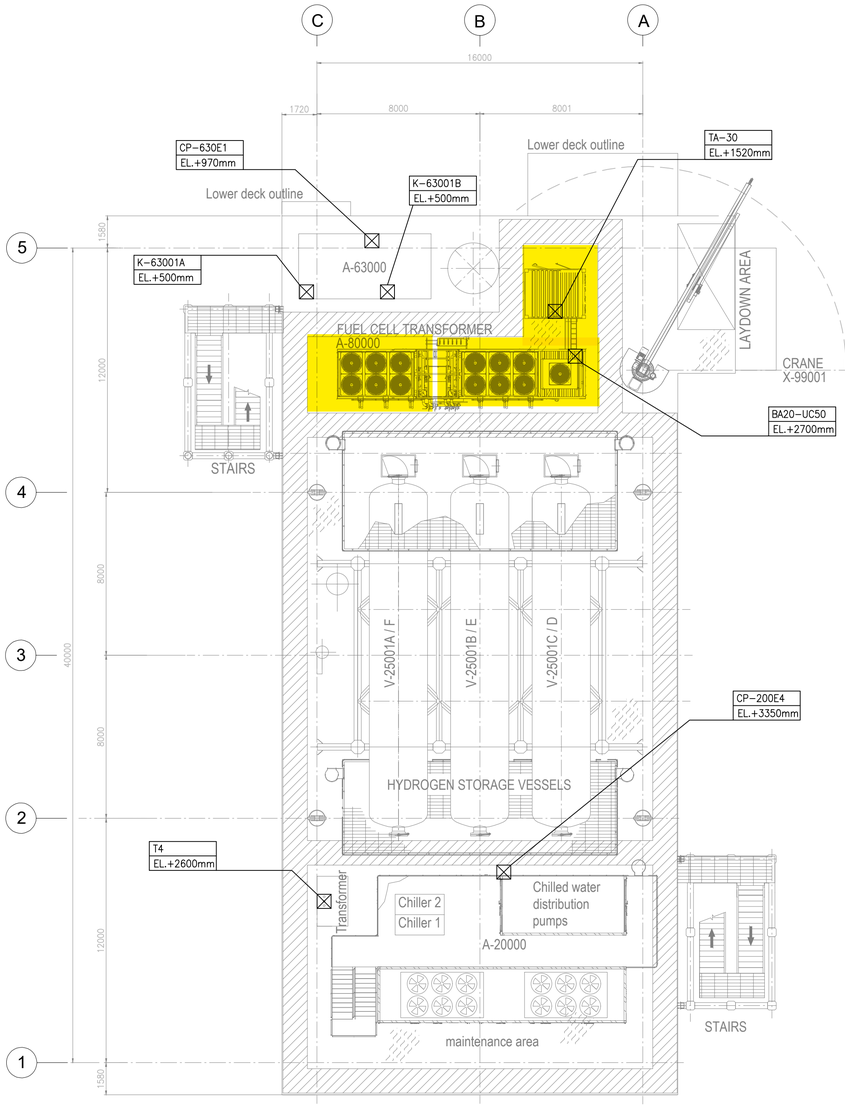
TYPE / SERIAL N°: MEGGER : KEW3125A SERIAL: W8330207 Calibration date: N°7722/24 10/07/2024

Comments

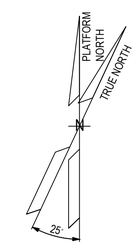
Page 1/1	Performed by	☑ WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	RM(ROSETTI MARINO)	
Name	Carmelo Bongiovanni	Giovanni Tangianu	
Date	2024-11-12	2024-11-20	
Signature	PROVERLIS Digitaly signed by Carmelo Bongiovanni 2024-11-12T17:48:39.400Z	PROVERLIS Digitaly signed by Giovanni Tangianu 2024-11-20T13:23:35.112Z	

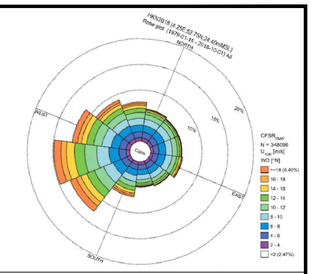
DRAWING NO. 123A90-DDL-EL-DL-20100

REV. 01



PLAN ON TOP DECK
EL+30.310 T.O.S.





NOTES

1. ALL DIMENSIONS IN MM UNLESS NOTED OTHERWISE.
2. ALL ELEVATIONS IN METERS. UNLESS NOTED OTHERWISE.
3. ELEVATIONS REFER TO T.O.S. UNLESS NOTED OTHERWISE.
4. AFTER INTERFACE PANEL/BATTERY LIMIT CABLES WILL BE ROUTED INSIDE VENDOR CABLETRAYS

LEGEND

⊠	INTERFACE PANEL/BATTERY LIMIT
JB-200E2 EL.+500mm	TAG ITEM REFERED ELEVATION TO T.O.S. (TOP OF STEEL)

HOLDS

REFERENCE DOCUMENTS

123A90-DDL-PP-DL-70070	PLOT PLAN - LOWER & UPPER DECK
123A90-DDL-EL-DL-20140	ELECTRICAL HEAT TRACING JUNCTION BOX LAYOUT
123A90-DDL-EL-DL-20118	LIGHTING & SOCKET LAYOUT - TOP DECK

INSERT SUBCONTRACTOR / VENDOR LOGO HERE

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	22/07/24	SPS	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	29/05/24	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND

ROSETTI MARINO

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20100**

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

ROSETTI MARINO SpA

TITLE :
BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
TOP DECK

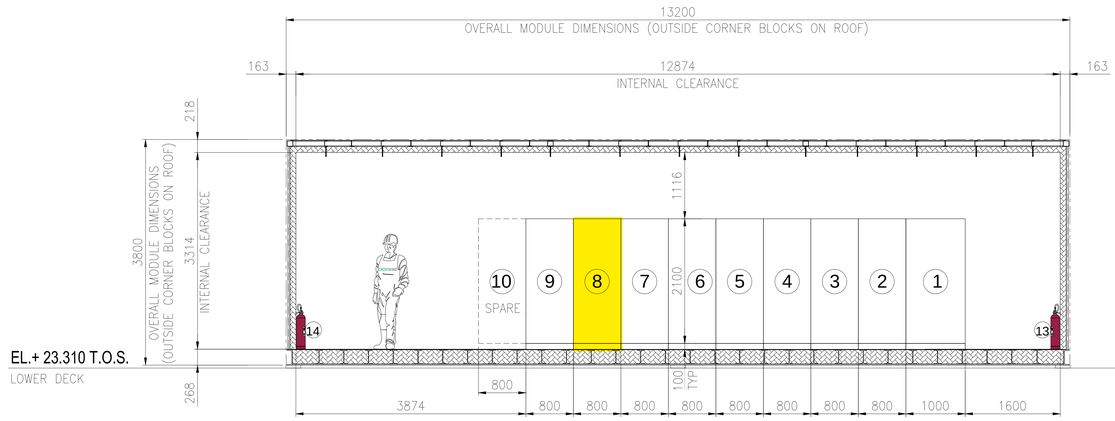
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:150
DRAWN SPS	CHECKED FMA/AMA	APPROVED FPA/DLO	DATE 22/07/24

	DRAWING NO.	SHEET	REV.
A1	123A90-DDL-EL-DL-20100	001	01

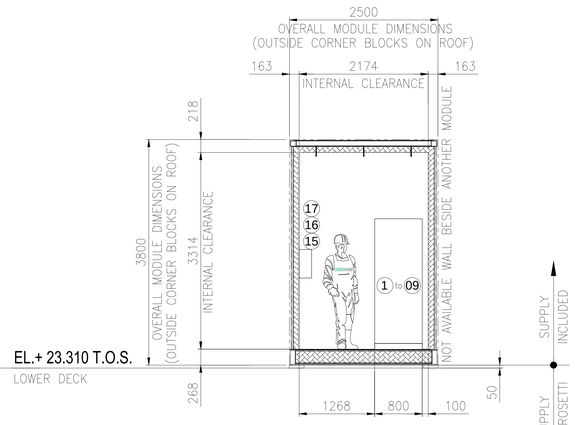
File Name : 123A90-DDL-EL-DL-20100-Electrical Equipment Layout - Top Deck

DRAWING NO. 123A90-DDL-IN-DL-40012

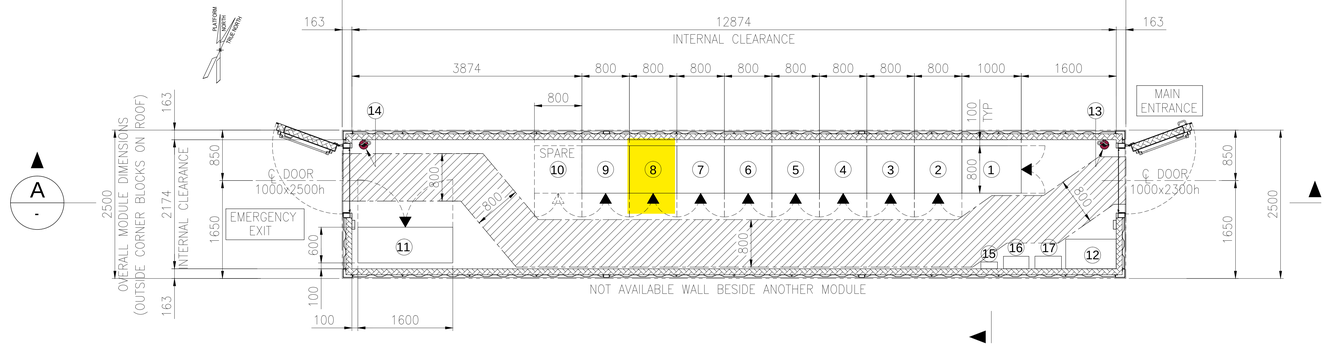
REV. 02



SECTION A -



SECTION B -

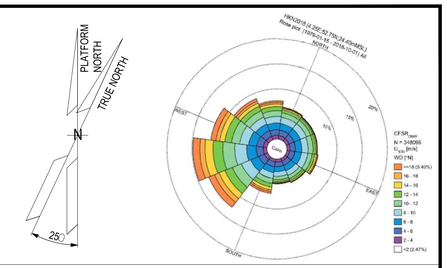


EQUIPMENT LAYOUT
"B-400" I&T EQUIPMENT ROOM
BOTTOM PLAN

02

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-001	PCS SYSTEM CABINET	800	800	2100	
5	B400-PCS-002	PCS MARSHALLING CABINET	800	800	2100	
6	B400-FGS-001	FGS SYSTEM CABINET	800	800	2100	
7	B400-FGS-002	FGS MARSHALLING CABINET 1	800	800	2100	
8	B400-FGS-003	FGS MARSHALLING CABINET 2	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	-	TABLE	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 ENCLOUSURE
_____ FRONT OF EQUIPMENT

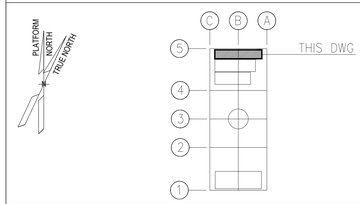
HOLDS

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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
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)

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. 02

VALID FOR CONSTRUCTION
FDL DWG: 123A90-FDL-IN-DL-40012
REV.: 2_A | DATE: 08/08/24 | SIGNATURE: G.Randi
ROSETTI MARINO SpA

File Name : 123A90-DDL-IN-DL-40012 Rev.02.dwg

DRAWING NO. 123A90-DDL-IN-DG-40016

REV. 01

FIELD		I&T EQUIPMENT ROOM (ITER)
PACKAGE	CABLE NO	MARSHALLING CABINET
		~~B400-FGS-002~~ B400-FGS-003

<01>

A-85000 BESS UCP
- 85-XA-001
- 85-XA-002

NOTE 5 → NOTE 5 → NOTE 5 → NOTE 5 → NOTE 5
WH/BK → PR1 → NOTE-2
WH/BK → PR2 → NOTE-2

P320PLC/B400-FGS-003
~~P320PLC/B400-FGS-002~~
2x2x0.75mm2,Sh+ShT+ARM,F.Res,ORANGE,NIS

TB-P320PLC
PR1 (WH/BK) → 01 → 85-XA-001
Shield Bar
PR2 (WH/BK) → 03 → 85-XA-002
Shield Bar
02
04

A-20000 ELECTROLYSER UCP
- 20-XA-001
- 20-XA-002

NOTE 5 → NOTE 5 → NOTE 5 → NOTE 5 → NOTE 5
WH/BK → PR1 → NOTE-2
WH/BK → PR2 → NOTE-2

20-UCP-001/B400-FGS-003
~~20-UCP-001/B400-FGS-002~~
2x2x0.75mm2,Sh+ShT+ARM,F.Res,ORANGE,NIS

TB-20-UPC-001
PR1 (WH/BK) → 01 → 20-XA-001
Shield Bar
PR2 (WH/BK) → 03 → 20-XA-002
Shield Bar
02
04

A-80000 FUEL CELL UCP
- 80-XA-001
- 80-XA-002

NOTE 5 → NOTE 5 → NOTE 5 → NOTE 5 → NOTE 5
WH/BK → PR1 → NOTE-2
WH/BK → PR2 → NOTE-2

80-UCP-001/B400-FGS-003
~~80-UCP-001/B400-FGS-002~~
2x2x0.75mm2,Sh+ShT+ARM,F.Res,ORANGE,NIS

TB-80-UCP-001
~~TB-80-UPC-001~~
PR1 (WH/BK) → 01 → 80-XA-001
Shield Bar
PR2 (WH/BK) → 03 → 80-XA-002
Shield Bar
02
04

F&G PANEL 50-LP-002

A-50003 Water Treatment Unit UCP
- 50-XA-001
- 50-XA-002

TB-RLY
5 → PR1 (WH/BK) → NOTE-2
6
1 → PR2 (WH/BK) → NOTE-2
2

50-LP-002/B400-FGS-003
~~50-LP-002/B400-FGS-002~~
2x2x0.75mm2,Sh+ShT+ARM,F.Res,ORANGE,NIS

TB-50-LP-002
PR1 (WH/BK) → 01 → 50-XA-001
Shield Bar
PR2 (WH/BK) → 03 → 50-XA-002
02
04
I.E.
Shield Bar

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DG-40016**

REV.:	DATE:	SIGNATURE:
1_K	18/11/24	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

TITLE :

BASE LOAD POWER HUB (BLPH)
INSTRUMENT– FGS WIRING DIAGRAMS
FIRE & GAS ALARM FROM PACKAGE

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	060	01

File Name : 123A90-DDL-IN-DG-40016_Rev.01

DRAWING NO. 123A90-DDL-IN-DG-40016

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. CONNECTION TERMINAL BLOCK SHALL BE DEFINED DURING CONSTRUCTION PHASE.

<01>

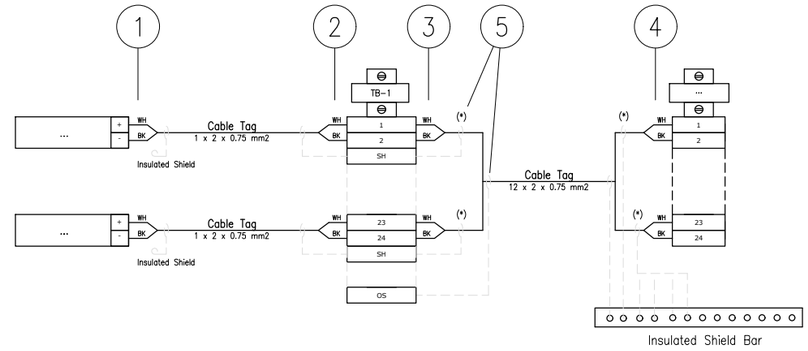
LEGENDS & SYMBOLS:

LEGEND:

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 <01>
ESD	- EMERGENCY SHUTDOWN SYSTEM
SIS	- SAFETY INSTRUMENT SYSTEM
FGS	- FIRE & GAS SYSTEM <01>
MC	- MARSHALLING CABINET
AI	- ANALOGUE INPUT
AO	- ANALOGUE OUTPUT
DI	- DIGITAL INPUT
DO	- DIGITAL OUTPUT
JE	- JUNCTION BOX FOR ELECTRICAL SIGNALS <01>

TYPICAL WIRE CROSS-FERRULING:

PHILOSOPHY OF CROSS-FERRULING: <01>



(*) Single shield is foreseen only for AI/AO signals.

1 - INSTRUMENT TERMINAL NO. OR POLARITY/JB NO./JB TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

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(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

5 - HEAT SHRINKABLE BLACK FOR SHIELD OF NIS INSTRUMENT CABLE.
(HEAT SHRINKABLE BLUE FOR SHIELD OF NIS INSTRUMENT CABLE)

6 - IN CASE OF CONNECTION FROM RIGHT TO LEFT, ORDER OF INFORMATION SHALL BE MIRRORED

REFERENCE DRAWINGS

PIPING AND INSTRUMENT DIAGRAM	123A90-DDL-PR-PID-80009
INSTRUMENT INDEX	123A90-DDL-IN-LIS-40088 Rev.01
F&G DETECTORS LAYOUT	123A90-DDL-SAF-DL-30027

CROSSWIND

ROSETTI MARINO

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DG-40016**

REV.:	DATE:	SIGNATURE:
1_K	18/11/24	G.Randi

ROSETTI MARINO SpA

TITLE :
BASE LOAD POWER HUB (BLPH)
INSTRUMENT – SAFETY SYSTEM WIRING DIAGRAMS
GENERAL NOTES/LEGENDS

CONTRACT NO./TITLE			SCALE N/A
DRAWN VBA	CHECKED LCA	APPROVED DLO	DATE 23/02/2024

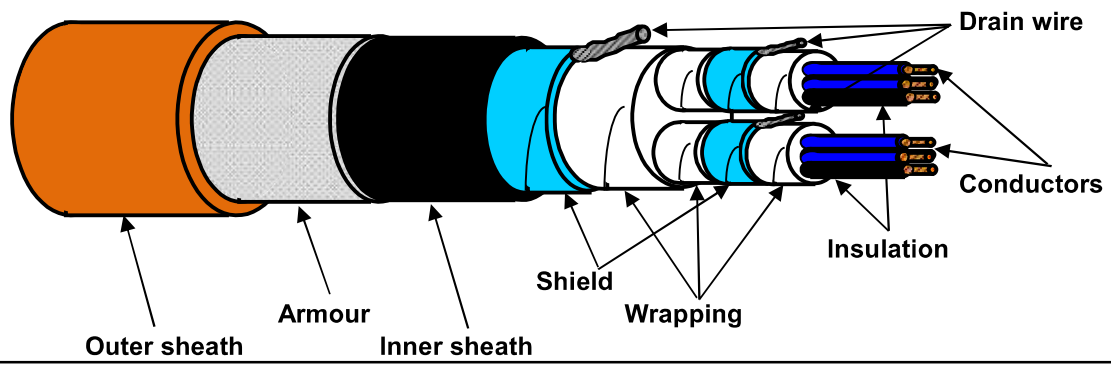
	DRAWING NO.	SHEET	REV.
A3	123A90-DDL-IN-DG-40016	003	01

File Name : 123A90-DDL-IN-DG-40016_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
80-UCP-001/B400-FGS-003	Cable	IN	VFC	123A90-DDL-IN-LIS-40091						80-UCP-001	Communication	Upper Deck	80-XA-001/002	B400-FGS-003	Marshalling FGS	Lower Deck (B-400)		SMICV09-2X2X0,75	Cable Cu Cl.2/MGT/XLPE/IS/OS/LSZH/SWB/LSZH 150/250V (300V) 2x2x0,75mm² - Orange	M25	n.a.			n.a.				I-MCT-U02 / L-SEC-19 / L-SEC-18A / B-400-SEC-2A / B-400-SEC-2B / B-400-SEC-2C / B-400-SEC-2E / B-400-SEC-2F / I-MCT-403

Cu Cl.2/MGT/XLPE/IS/OS/LSZH/SWB/LSZH 150/250 V (300 V)

2X2X0,75 - 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 0,5 mm	
Cores colour code :	**White - Black (each core NUMBERED for PAIR identification)**	
Pair Assembling :	10/1mt	
Pair Wrapping:	by polyester-PET Minimum Thickness 0,010 mm tape helically wound (overlap ≥ 25%)	
Drain wire :	7-Stranded **TINNED** annealed copper drain wire, **size 0,5 sqmm**, in continuous contact with the shield	
Pair Shield :	by Aluminium-**Al** Minimum Thickness 0,008 mm / polyester-**PET** Minimum Thickness 0,010 mm tape helically wound (overlap ≥ 25%)	
Shield Insulation :	by polyester-PET Minimum Thickness 0,010 mm tape helically wound (overlap ≥ 25%)	
Total Assembling :	5/1mt	
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 0,5 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 1,3 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 1,5 mm	
Outer sheath color code:	**Orange**	
Outer printing (INKJET) : (every 1000 mm)	**FLEI - 2X2X0,75 SQMM - MGT/XLPE/IS/OS/LSZH/SWB/LSZH - 150/250 V - IEC 60331.21 - IEC 60332.1.2 - IEC 60332.3.22 - Year of Manufacture - CE + Meter Marking**	
Under armour diameter :	(15,1 ± 10%) mm	
Over armour diameter :	(16,3 ± 10%) mm	
Outer diameter :	(19,3 ± 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 :	≤ 26 Ω/km (@ 20°C)	
Insulation Resistance :	≥ 1000 MΩ x Km (@ 20°C)	
Mutual Capacitance :	≤ 150 nF/km	
L/R ratio :	≤ 25 µH/Ω	
Inductance :	≤ 0,9 mH/km	
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 herein are meant for the transmission will be used in the sense of the article 19 of the Regulation (UE) 2016/679 also to such subjects outside it 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

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on subsystem: 80-00 & process: MC & discipline : M

Mechanical	80-00 Hydrogen Fuel Cell Package (A-80000)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
A-80000	Fuel Cell	ONSHORE	C10002358	CZX01M	100	2024-11-19	RFC 2

ITEM	Tag	A-80000	: Fuel Cell			Dwg	123A90-DDL-PR-PID-80012
	S/Sys	80-00	: Hydrogen Fuel Cell Package (A-80000)			Module	UD
TASK	code	C10002358		Location	Onshore Activities	User	Rosetti Marino Quality Control
FORM	Process	MC	Activity CCK	Discipline	Mechanical	Form	CZX01M Package - M

1	Check that the nameplate details and tag number are complete and correct.	Note
2	Check that the holding down arrangements are correct.	Note
3	Check for all interface piping/mechanical reinstated on site by contractor.	PL
4	Check that the package Mechanical equipment is complete and not damaged.	Note
5	Check all the equipment for correct lubrication, for oil leaks and cleanliness.	Note
6	Check for the free rotation of rotating equipment.	NA
7	Check the insulation, painting and for correct tagging and identification.	PL
8	Check that the earthing system of the equipment is as per specification.	OK
9	Check that the Package is fixed and tightened to the structures.	OK
10	Check the release note, FAT report and outstanding Punch list for the Package	Note
11	If required produce Red Line Mark Up for "AS BUILT".	

Comments:

01. Company provided item. Point impossible to be verified due documentation not provided. Nameplates of containers are present on the main doors of both containers. Ballard's nameplates: see PL C30000607.

02. Point not checked because the package is a Company provided item. Documentation not provided.

04. Company provided item. Only external side of the package has been checked. See PL n.C30000610.

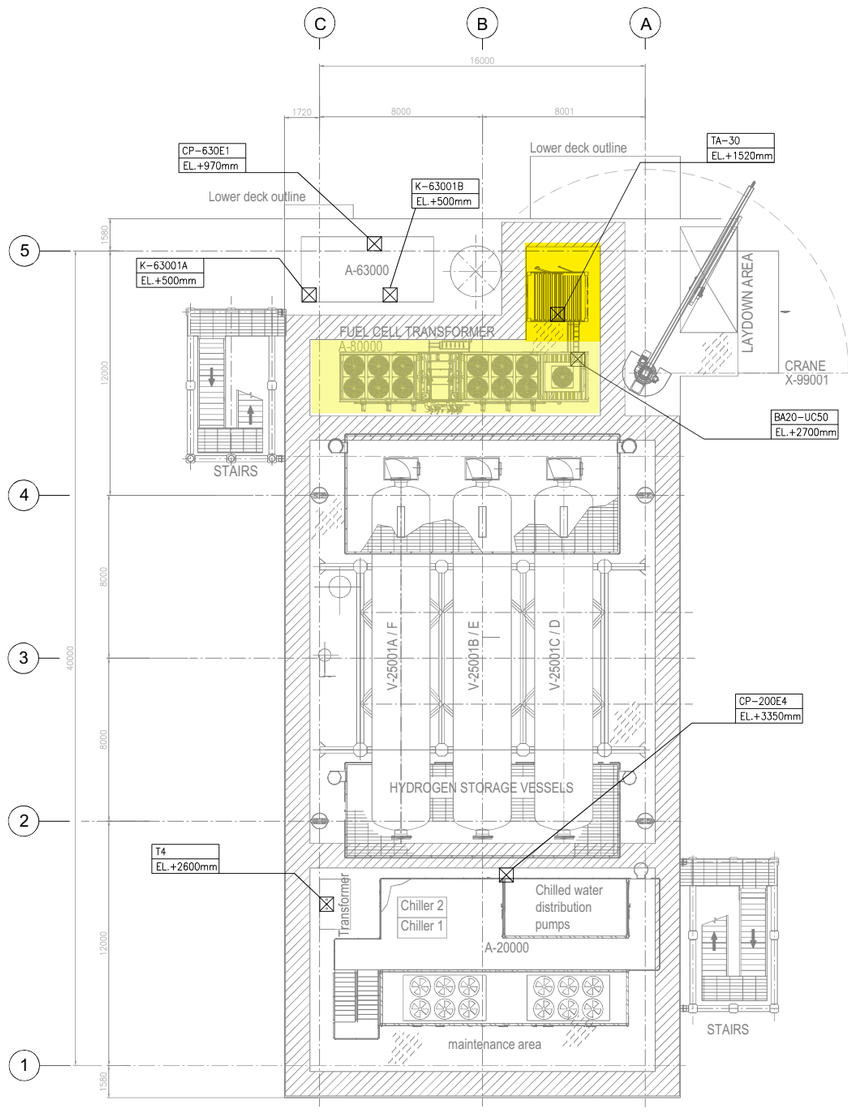
05. Company provided item. Only external side of the package has been checked. No oil leaks visible and cleanliness acceptable.

10. Point not checked because the package is a Company provided item. Documentation not provided.

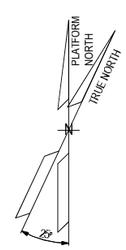
	Performed by	● WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	RM (ROSETTI MARINO)	
Name	Carmelo Bongiovanni	Kangi Albonetti	
Date	2024-11-12	2024-11-19	
Signature	Digitaly signed by Carmelo Bongiovanni 2024-11-12T17:48:56.697Z	Digitaly signed by Kangi Albonetti 2024-11-19T14:45:09.848Z	

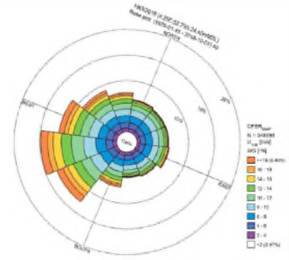
DRAWING NO. 123A90-DDL-EL-DL-20100

REV. 01



PLAN ON TOP DECK
EL+30.310 T.O.S.





NOTES

1. ALL DIMENSIONS IN MM UNLESS NOTED OTHERWISE.
2. ALL ELEVATIONS IN METERS. UNLESS NOTED OTHERWISE.
3. ELEVATIONS REFER TO T.O.S. UNLESS NOTED OTHERWISE.
4. AFTER INTERFACE PANEL/BATTERY LIMIT CABLES WILL BE ROUTED INSIDE VENDOR CABLETRAYS

LEGEND

⊠	INTERFACE PANEL/BATTERY LIMIT
JB-200E2 EL.+500mm	TAG ITEM REFERED ELEVATION TO T.O.S. (TOP OF STEEL)

HOLDS

REFERENCE DOCUMENTS

123A90-DDL-PP-DL-70070	PLOT PLAN - LOWER & UPPER DECK
123A90-DDL-EL-DL-20140	ELECTRICAL HEAT TRACING JUNCTION BOX LAYOUT
123A90-DDL-EL-DL-20118	LIGHTING & SOCKET LAYOUT - TOP DECK

INSERT SUBCONTRACTOR / VENDOR LOGO HERE

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	22/07/24	SPS	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	29/05/24	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND | ROSETTI MARINO

TITLE :
BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
TOP DECK

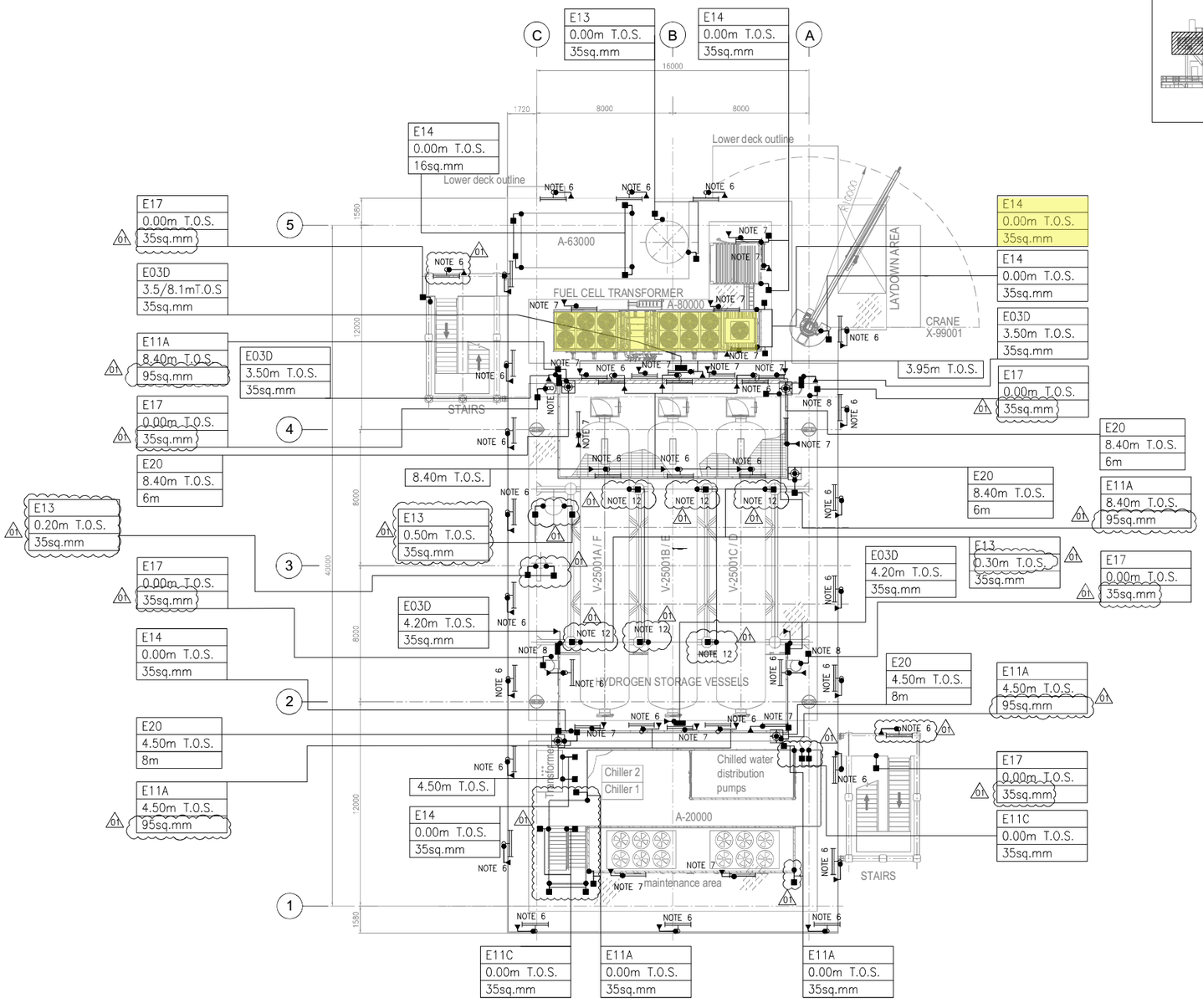
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DRAWN SPS	CHECKED FMA/AMA	APPROVED FPA/DLO	DATE 22/07/24
A1	DRAWING NO. 123A90-DDL-EL-DL-20100	SHEET 001	REV. 01

VALID FOR CONSTRUCTION
FDL DWG: 123A90-FDL-EL-DL-20100
REV.: 1_A | DATE: 08/08/24 | SIGNATURE: G.Randi
ROSETTI MARINO SpA

File Name : 123A90-DDL-EL-DL-20100-Electrical Equipment Layout - Top Deck

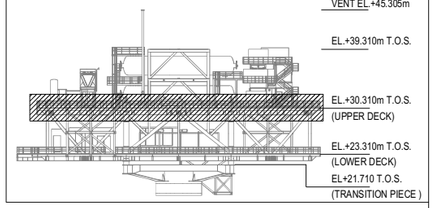
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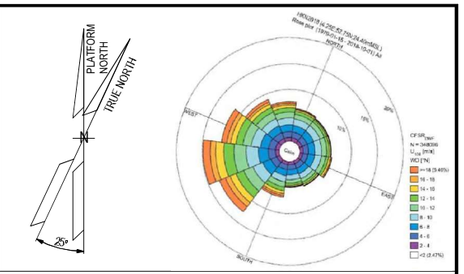
REV. 01



PLAN ON TOP DECK
EL+30.310 T.O.S.

KEY PLAN





NOTES

1. ALL DIMENSIONS AND ELEVATIONS ARE GIVEN IN mm UNLESS OTHERWISE NOTED.
2. ELEVATIONS REFER TO T.O.S.
3. THIS DOCUMENT IS ONLY VALID FOR EARTHING LAYOUT.
4. ALL ELECTRICAL EQUIPMENT NOT DIRECTLY WELDED TO SKID FRAME SHALL BE BONDED TO STEEL TO THE STRUCTURE OF SKID BASEFRAME.
5. FOR LIGHTNING PROTECTION SYSTEM SURGE PROTECTIVE DEVICES (SPD), REFER TO THE DOCUMENT 123A90-DDL-EL-RE-20154. 01
6. ALL NON-WELDED POLES WILL BE EARTHED AS PER TYPICAL E05 AND E24. 01
7. ALL LINEAR LIGHTING FIXTURE WILL BE EARTHED AS PER TYPICAL E32.
8. LADDER MUST BE EARTHED IF NOT WELDED TO THE STRUCTURE. LADDER MUST BE EARTHED TO THE UPPER BEAM OF THE STRUCTURE, COMPLETE EARTHING INCLUDING WITH 2 THREADED STUDS AS PER TYPICAL E17D.
9. ALL EARTH BAR WILL BE EARTHED AS PER TYPICAL E03D.
10. ALL POLE MOUNTED EQUIPMENTS WILL BE EARTHED AS PER TYPICAL E05.
11. EQUIPOTENTIAL BONDING GROUPING FOR BOLTED HANDRAILS ARE PROVIDED EVERY 3M FOR THE ENTIRE PERIMETER AS TYPICAL E16 AND WILL BE DEFINED DURING ASSEMBLY PHASE
12. EARTHED VESSELS V-25001D/E/F. FOR EARTHING V-25001A/B/C SEE SHEET 2 01

LEGEND

- LIGHTING FIXTURE POLE MOUNTED
- LINEAR LIGHTING FIXTURE
- EARTHING BOSS AISI316L
- COMPRESSION TYPE LUG TINNED COPPER
- THREADED STUD FOR EARTHING CONNECTION
- AIR TERMINATION ROD FOR LIGHTNING PROTECTION
- Exx EARTHING TYPICAL CODE
- EARTHING BAR

TYP.	TYPICAL
ELE	ELEVATION
SIZE	

E20	AIR TERMINATION ROD NO.
ELE	ELEVATION
HEIGHT	

REFERENCE DOCUMENTS

123A90-DDL-PP-DL-70070	PLOT PLAN - LOWER & UPPER DECK
123A90-DDL-EL-DL-20100	ELECTRICAL EQUIPMENT LAYOUT - TOP DECK
123A90-DDL-EL-DD-20090	ELECTRICAL TYPICAL INSTALLATION DETAILS - EARTHING SYSTEM
123A90-DDL-EL-RE-20154	LIGHTNING PROTECTION SYSTEM CALCULATION REPORT
123A90-DDL-EL-DL-20118	LIGHTING & SOCKET LAYOUT - TOP DECK

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	31/07/24	SAM	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	27/05/24	NLK	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND — ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
EARTHING & LIGHTNING LAYOUT
TOP DECK

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:150
DRAWN NLK	CHECKED FMA/AMA	APPROVED FPA/DLO	DATE 31/07/24
A1	DRAWING NO. 123A90-DDL-EL-DL-20132	SHEET 001	REV. 01

SHEET 001 OF 002

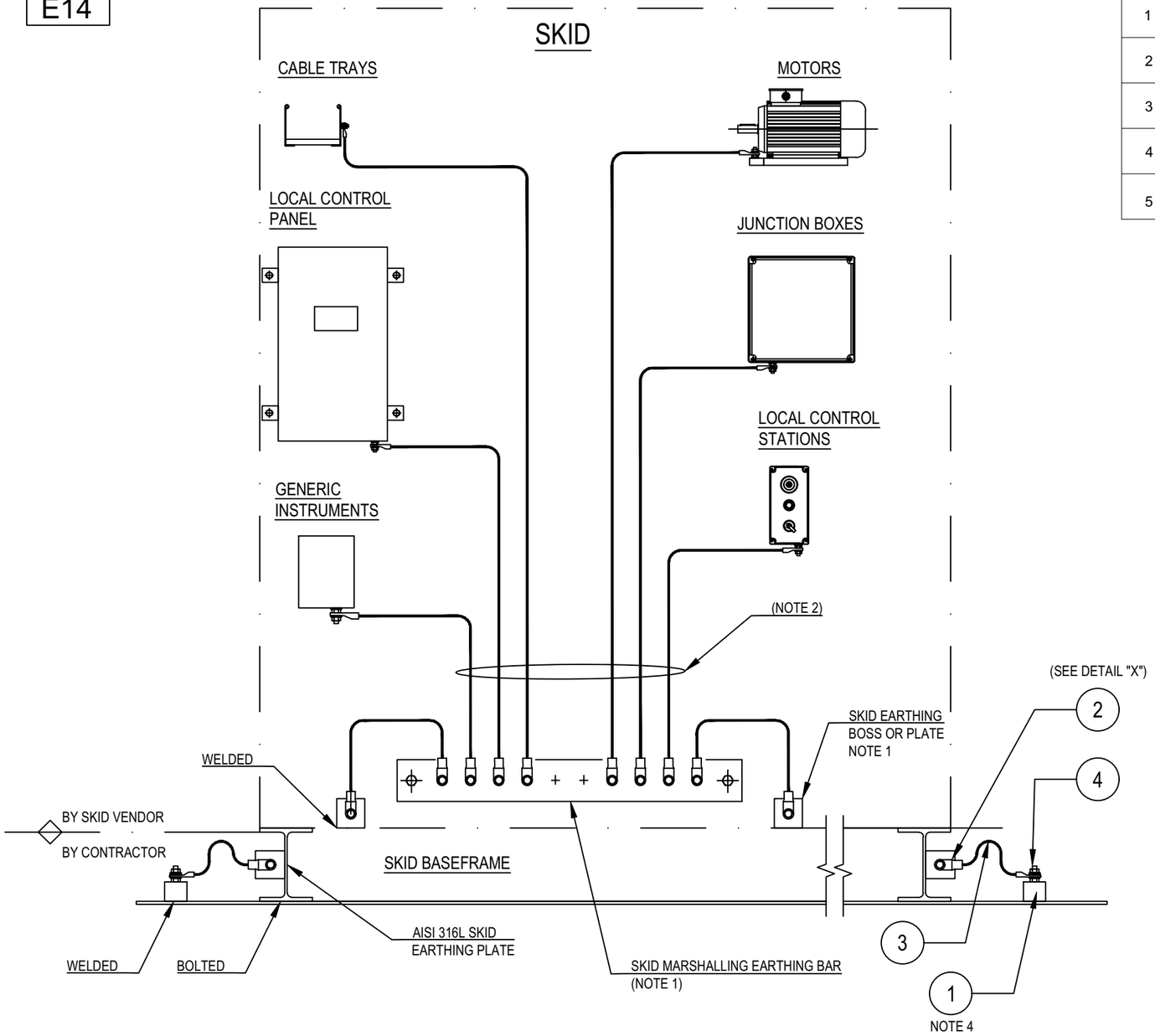
VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20132**

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

ROSETTI MARINO SpA

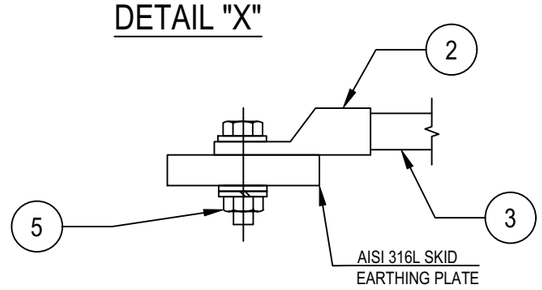
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E14



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_G	25/10/24	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)

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

CROSSWIND

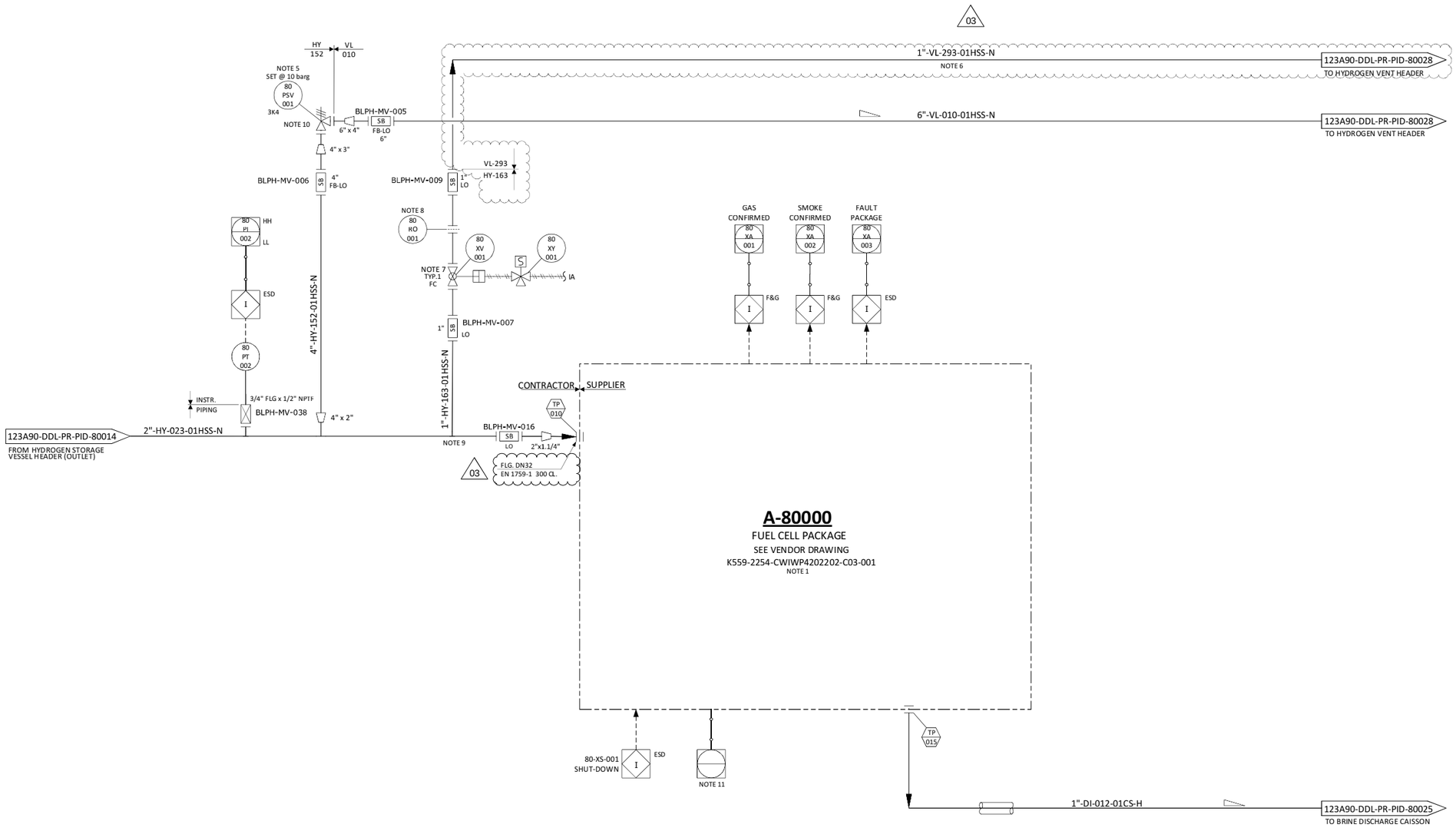
ROSETTI MARINO

F.to UNI A3: 420mmx297mm

File Name : 123A90-DDL-EL-DD-20090 REV.02.DWG

DRAWING NO. DRAWING_NO.

REV. REV



NOTES

1. THE VENDOR PACKAGE WILL CONTAIN AIR INTAKE AND EXHAUST, SUITABLY SAFEGUARDED AND SEPARATED.
2. DELETED.
3. DELETED.
4. DELETED
5. ONE UNINSTALLED SPARE PSV SHALL BE AVAILABLE.
6. LINE REQUIRED FOR PURGING OF PIPING WORK.
7. TIGHT SHUT-OFF VALVE.
8. FOR ORIFICE DIAMETER REFERENCE SHALL BE MADE TO "RELIEF, VENT AND BLOWDOWN REPORT" DOC. N. "123A90-DDL-PR-RE-80030".
9. LINE 1"-HY-163-01HSS-N WILL BE LOCATED AS CLOSE TO THE PACKAGE AS POSSIBLE TO ENSURE COMPLETE PURGING OF THE LINE.
10. 80-PSV-001 SIZED FOR CV FAILURE OF UPSTREAM CONTROL VALVE 25-PV-055A/B.
11. SERIAL COMMUNICATION WITH CONTROL SYSTEM.

HOLDS

1. DELETED.
2. DELETED.

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
03	09/09/2024	CIM	RZI	DLO	ACCEPTED FOR CONSTRUCTION (AFC)
02	12/06/2024	CIM	RZI	DLO	ACCEPTED FOR CONSTRUCTION (AFC)
01	15/02/2024	CIM	RZI	DLO	ISSUE FOR ACCEPTANCE (IFA)
00	20/10/2023	CIM	RZI	DLO	ISSUE FOR ACCEPTANCE (IFA)

CROSSWIND

ROSETTI MARINO

TITLE :
BLPH PIPING AND INSTRUMENTATION DIAGRAM
FUEL CELL PACKAGE

CONTRACT NO./TITLE	CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK		SCALE NTS
DRAWN	CHECKED	APPROVED	DATE
A1	DRAWING NO. 123A90-DDL-PR-PID-80012		SHEET 001 / REV. 03

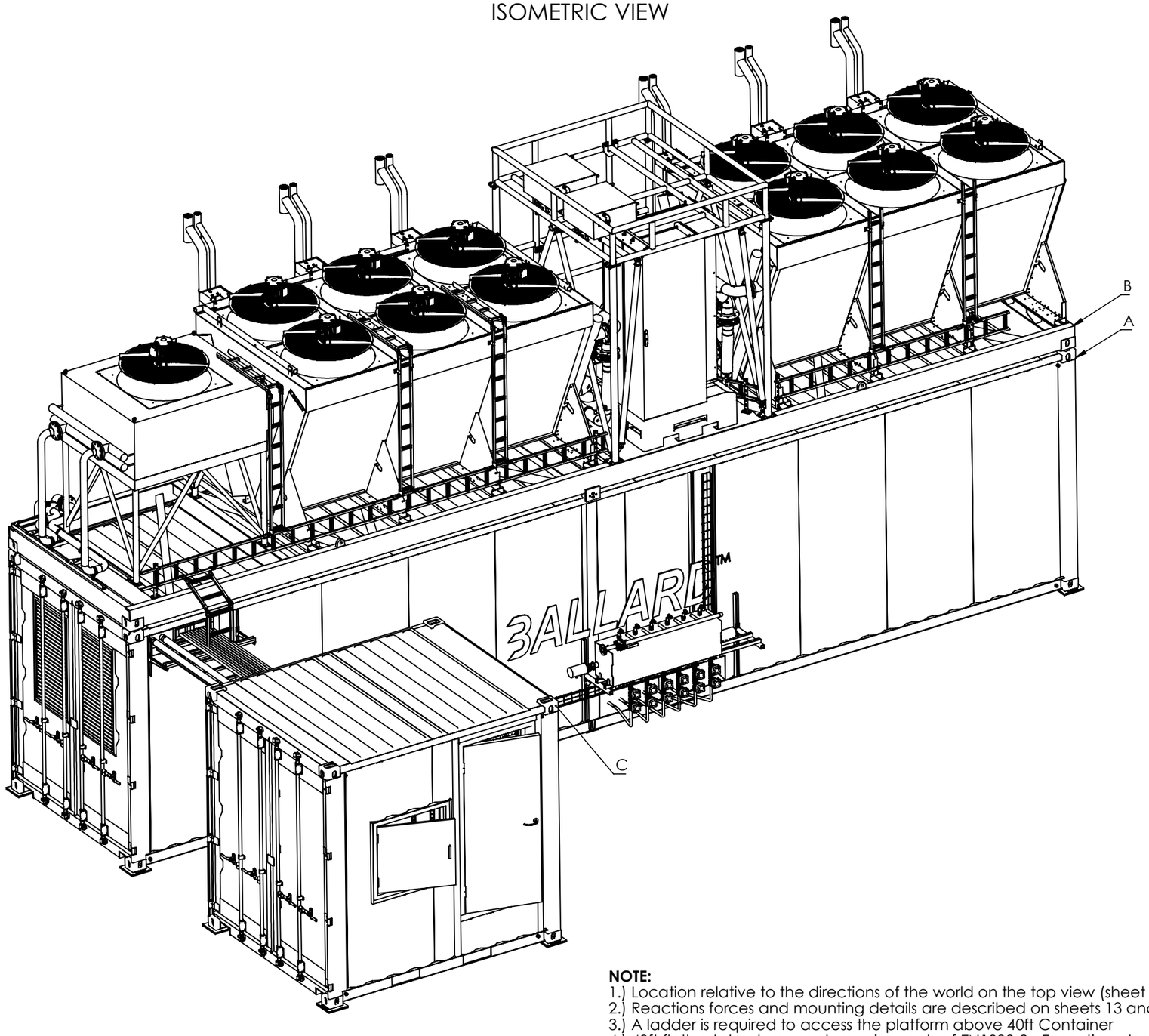
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Ballard Power Systems Europe A/S
Majsmarken 1
9500 Hobro
Denmark

Revision history		
Rev.	**Date.**	**Description**
001	10/02/2023	First Issue
002	24/03/2023	Re-issue according to comments
003	30/05/2023	Re-issue according to comments
004	10/11/2023	Re-issue according to comments
005	24/11/2023	Re-issue according to comments
006	02/04/2024	Re-issue according to comments
007	17/07/2024	Re-issue according to comments
008	05/09/2024	Re-issue (as built)

Document Title:	**BLPH Project - General Arrangements**
Document Number:	K559-2254-CWIWP4202202-B01-001
Revision:	Rev008
Sequence Number:	001
File Name:	K559-2254-CWIWP4202202-B01-001Rev008
Purchaser Job:	K559-2254
Purchase Order:	CWIWP4202202
Code:	B01
Requsition Number:	n/a
Customer:	CrossWind C.V., Rotterdam, The Netherlands

ISOMETRIC VIEW



No	Name	Operating Masses	Dry Masses
A	40ft container	21680kg	21320kg
B	40ft fladbed	10060kg	9060kg
C	10ft container	7350kg	7310kg

NOTE:
1.) Location relative to the directions of the world on the top view (sheet 3/14)
2.) Reactions forces and mounting details are described on sheets 13 and 14
3.) A ladder is required to access the platform above 40ft Container
4.) 40ft flatbed structure meets requirements of EN1090-2 - Execution class: EXC2.

MATERIAL

Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)

BALLARD™

Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

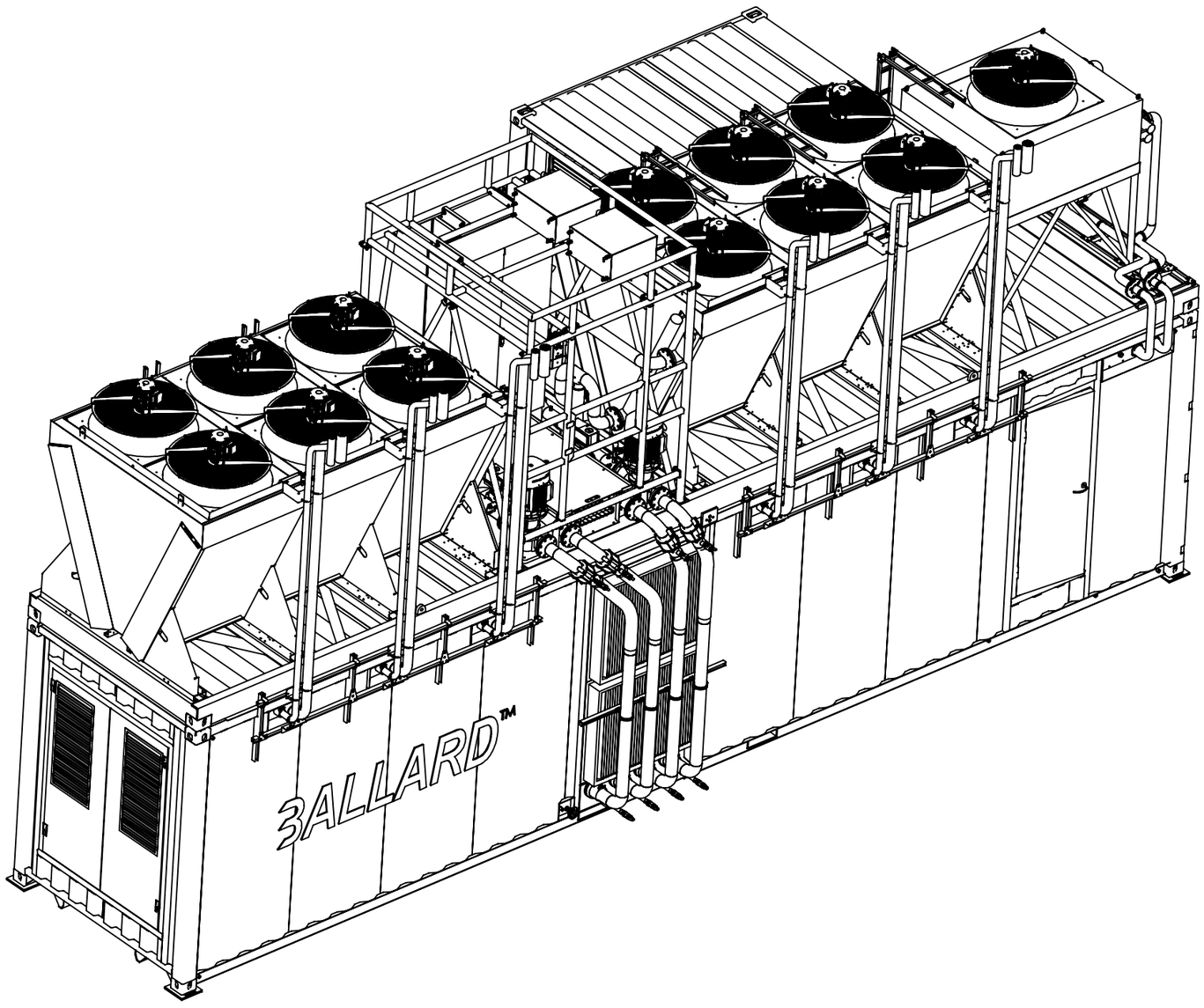
	By	Date
Drawn	ASM	20-02-2024
Revision		
Released		

General arrangement

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WEIGHT		SIZE	SHEET	SCALE	PART NUMBER:	REVISION
24943288 g	1st angle projection	A3	1/14	1:50	601456B	8

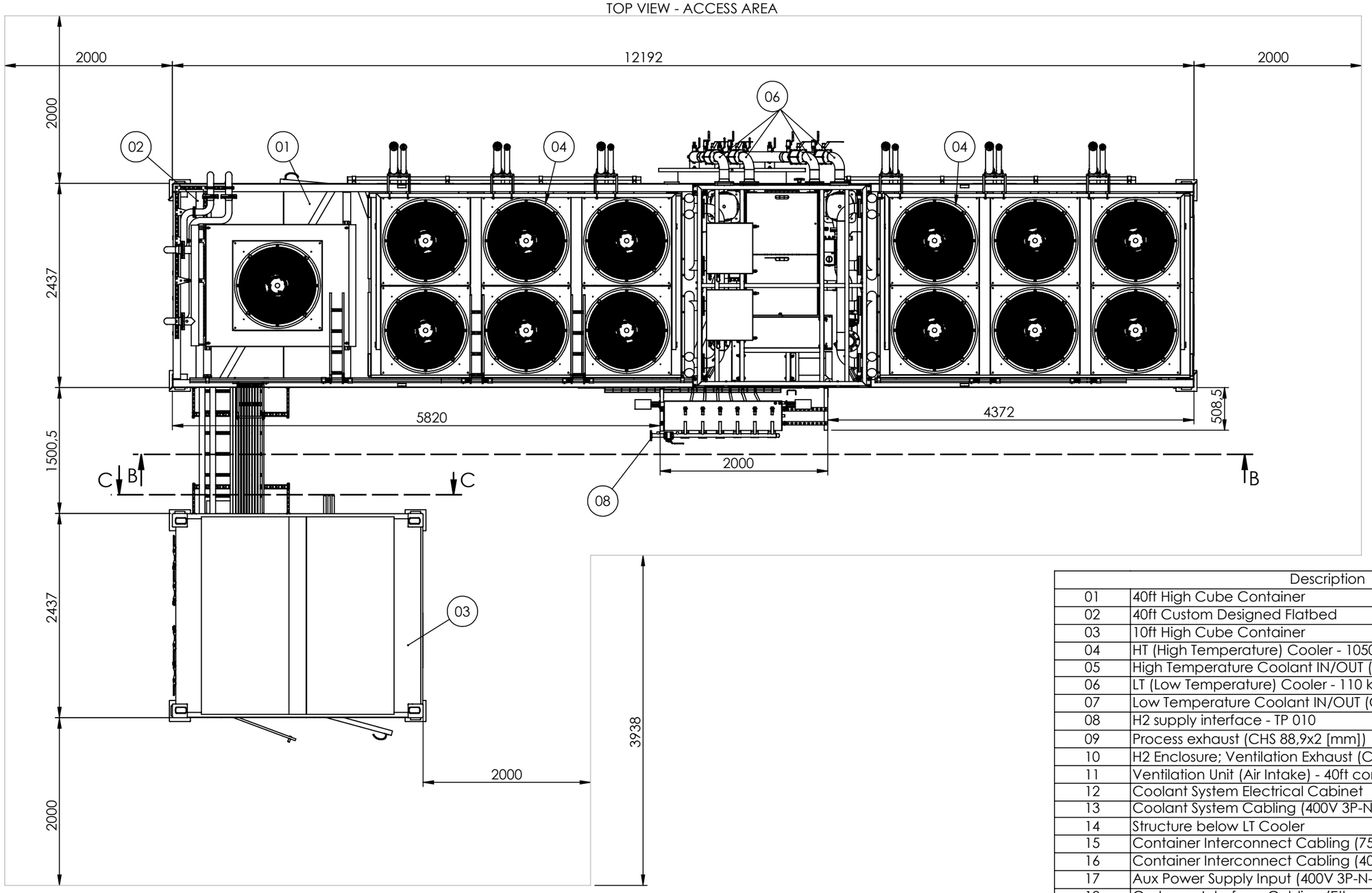
ISOMETRIC VIEW



NOTE:
1.) Location relative to the directions of the world on the top view (sheet 3/14)
2.) Reactions forces and mounting details are described on sheets 13 and 14
3.) A ladder is required to access the platform above 40ft Container
4.) 40ft flatbed structure meets requirements of EN1090-2 - Execution class: EXC2.

MATERIAL Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)				BALLARD™			
Tolerances for linear and angular dimensions without individual tolerance according to ISO668		By	Date	General arrangement			
	Drawn	ASM	20-02-2024				
Surface appearance, if not specified, according to reference table LZT 142 0001, category 6	Revision						
	Released						
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TOP VIEW - ACCESS AREA



	Description	Note
01	40ft High Cube Container	
02	40ft Custom Designed Flatbed	
03	10ft High Cube Container	
04	HT (High Temperature) Cooler - 1050kW (Evapco)	
05	High Temperature Coolant IN/OUT (CHS 114,3x3 [mm])	
06	LT (Low Temperature) Cooler - 110 kW (Evapco)	
07	Low Temperature Coolant IN/OUT (CHS 88,9x3 [mm])	
08	H2 supply interface - TP 010	CIP
09	Process exhaust (CHS 88,9x2 [mm])	
10	H2 Enclosure; Ventilation Exhaust (CHS 60,3x2 [mm])	
11	Ventilation Unit (Air Intake) - 40ft container	
12	Coolant System Electrical Cabinet	
13	Coolant System Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
14	Structure below LT Cooler	
15	Container Interconnect Cabling (750V DC)	
16	Container Interconnect Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
17	Aux Power Supply Input (400V 3P-N-PE, 32A)	CIP
18	Customer Interface Cabling (Ethernet, Hardwired)	CIP
19	Drain interface - TP 015	CIP
21	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
22	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
23	Ventilation Unit (Air Intake) - 10ft container	
CHS = Circular Hollow Section		
CIP - Customer Interface Point		

NOTE:
1.) Location relative to the directions of the world on the top view (sheet 3/14)
2.) Reactions forces and mounting details are described on sheets 13 and 14
3.) A ladder is required to access the platform above 40ft Container
4.) 40ft flatbed structure meets requirements of EN1090-2 - Execution class: EXC2.

MATERIAL

Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)

Tolerances for linear and angular dimensions without individual tolerance according to ISO668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

	By	Date
Drawn	ASM	20-02-2024
Revision		
Released		

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WEIGHT 24943288 g

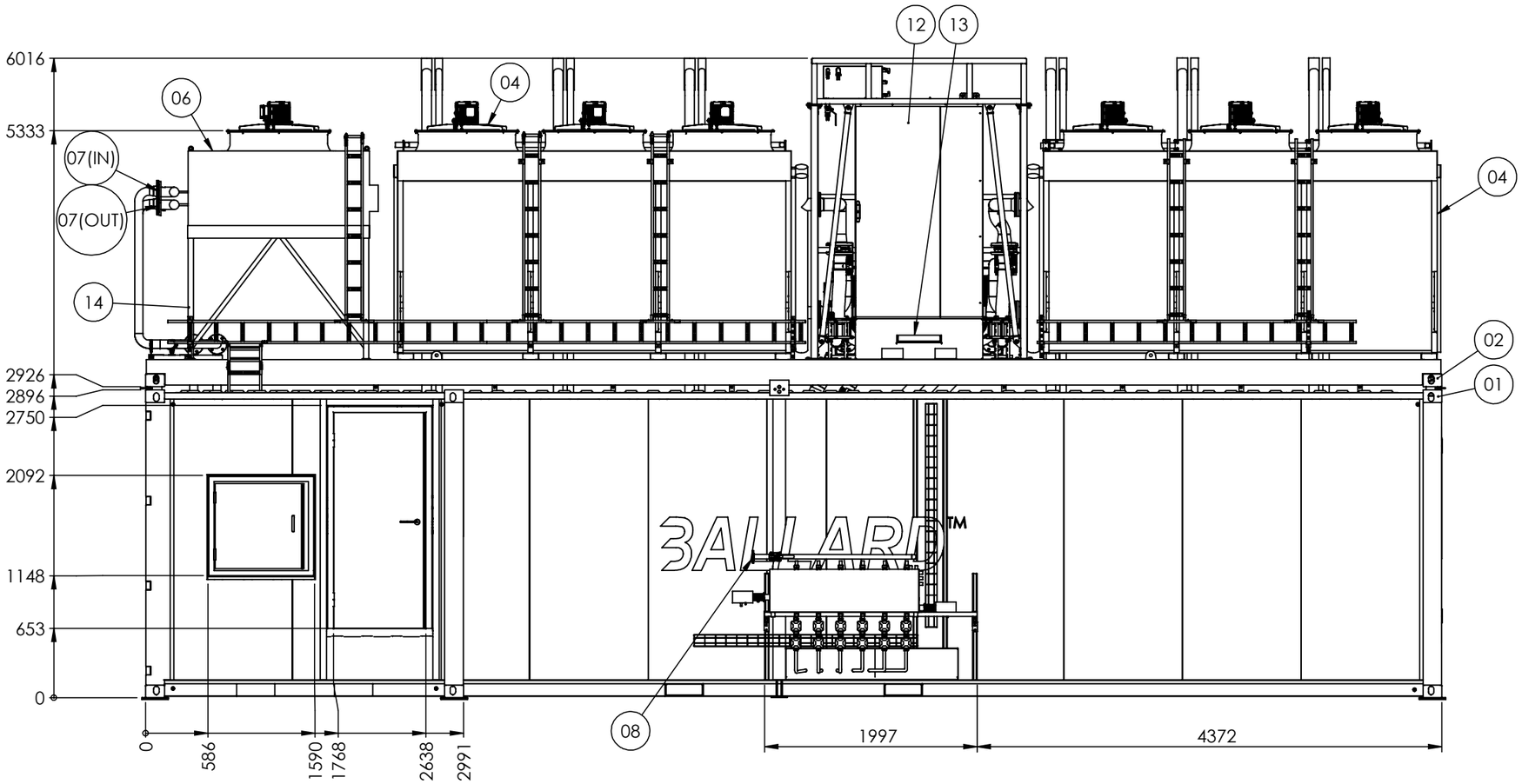
1st angle projection

BALLARD

General arrangement

SIZE	SHEET	SCALE	PART NUMBER:	REVISION
A3	3/14	1:50	601456B	8

FRONT VIEW
(LOOKING SOUTH)



	Description	Note
01	40ft High Cube Container	
02	40ft Custom Designed Flatbed	
03	10ft High Cube Container	
04	HT (High Temperature) Cooler - 1050kW (Evapco)	
05	High Temperature Coolant IN/OUT (CHS 114,3x3 [mm])	
06	LT (Low Temperature) Cooler - 110 kW (Evapco)	
07	Low Temperature Coolant IN/OUT (CHS 88,9x3 [mm])	
08	H2 supply interface - TP 010	CIP
09	Process exhaust (CHS 88,9x2 [mm])	
10	H2 Enclosure; Ventilation Exhaust (CHS 60,3x2 [mm])	
11	Ventilation Unit (Air Intake) - 40ft container	
12	Coolant System Electrical Cabinet	
13	Coolant System Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
14	Structure below LT Cooler	
15	Container Interconnect Cabling (750V DC)	
16	Container Interconnect Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
17	Aux Power Supply Input (400V 3P-N-PE, 32A)	CIP
18	Customer Interface Cabling (Ethernet, Hardwired)	CIP
19	Drain interface - TP 015	CIP
20	~~Cover of hydrogen manifold~~	Optional
21	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
22	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
23	Ventilation Unit (Air Intake) - 10ft container	
CHS = Circular Hollow Section		
CIP - Customer Interface Point		

NOTE:
1.) Location relative to the directions of the world on the top view (sheet 3/14)
2.) Reactions forces and mounting details are described on sheets 13 and 14
3.) A ladder is required to access the platform above 40ft Container
4.) 40ft flatbed structure meets requirements of EN1090-2 - Execution class: EXC2.

MATERIAL

Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)

Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

	By	Date
Drawn	ASM	20-02-2024
Revision		
Released		

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WEIGHT 24943288 g

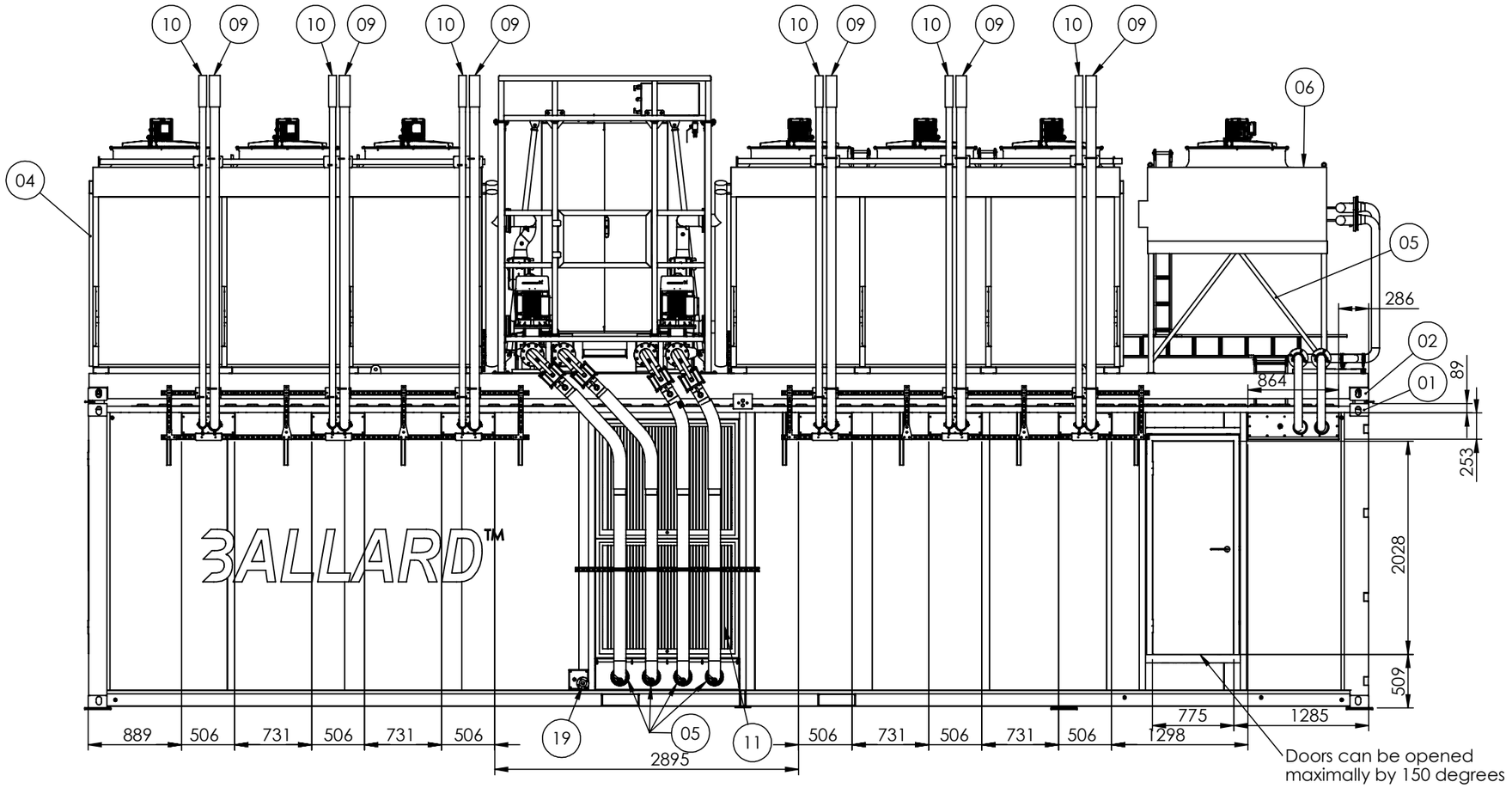
1st angle projection

BALLARD™

General arrangement

SIZE	SHEET	SCALE	PART NUMBER:	REVISION
A3	4/14	1:50	601456B	8

BACK VIEW
(LOOKING NORTH)



	Description	Note
01	40ft High Cube Container	
02	40ft Custom Designed Flatbed	
03	10ft High Cube Container	
04	HT (High Temperature) Cooler - 1050kW (Evapco)	
05	High Temperature Coolant IN/OUT (CHS 114,3x3 [mm])	
06	LT (Low Temperature) Cooler - 110 kW (Evapco)	
07	Low Temperature Coolant IN/OUT (CHS 88,9x3 [mm])	
08	H2 supply interface - TP 010	CIP
09	Process exhaust (CHS 88,9x2 [mm])	
10	H2 Enclosure; Ventilation Exhaust (CHS 60,3x2 [mm])	
11	Ventilation Unit (Air Intake) - 40ft container	
12	Coolant System Electrical Cabinet	
13	Coolant System Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
14	Structure below LT Cooler	
15	Container Interconnect Cabling (750V DC)	
16	Container Interconnect Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
17	Aux Power Supply Input (400V 3P-N-PE, 32A)	CIP
18	Customer Interface Cabling (Ethernet, Hardwired)	CIP
19	Drain interface - TP 015	CIP
20	~~Cover of hydrogen manifold~~	Optional
21	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
22	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
23	Ventilation Unit (Air Intake) - 10ft container	
CHS = Circular Hollow Section		
CIP - Customer Interface Point		

NOTE:
1.) Location relative to the directions of the world on the top view (sheet 3/14)
2.) Reactions forces and mounting details are described on sheets 13 and 14
3.) A ladder is required to access the platform above 40ft Container
4.) 40ft flatbed structure meets requirements of EN1090-2 - Execution class: EXC2.

MATERIAL

Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)

Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

	By	Date
Drawn	ASM	20-02-2024
Revision		
Released		

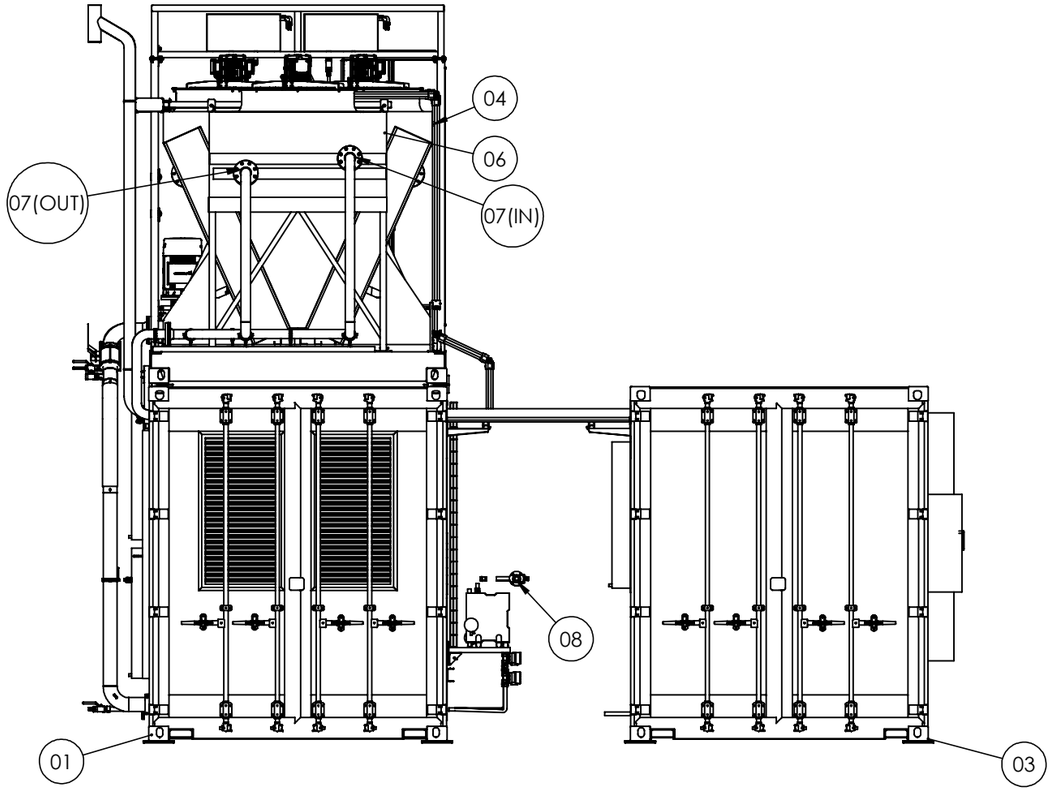
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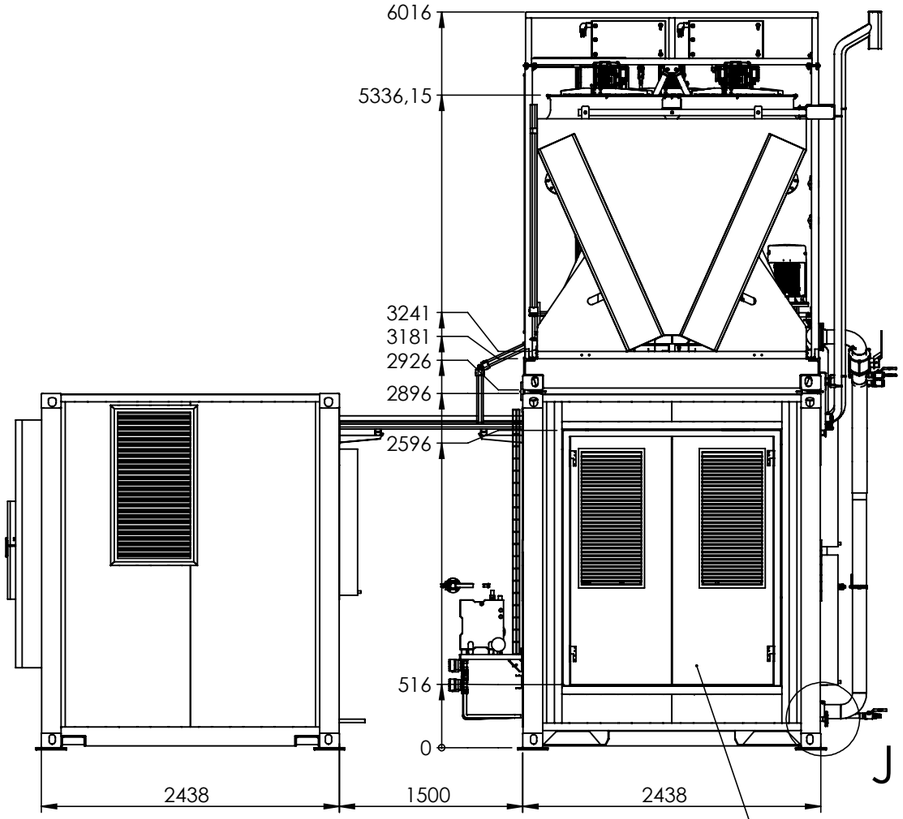
General arrangement

WEIGHT		SIZE	SHEET	SCALE	PART NUMBER:	REVISION
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RIGHT VIEW
(LOOKING WEST)

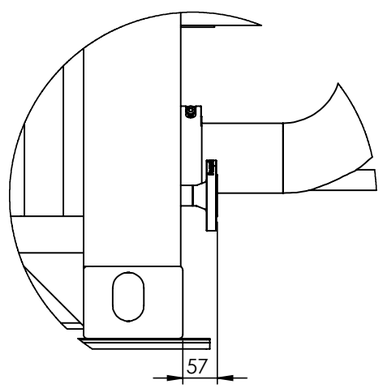


LEFT VIEW
(LOOKING EAST)



Doors can be opened
maximally by 150 degrees

	Description	Note
01	40ft High Cube Container	
02	40ft Custom Designed Flatbed	
03	10ft High Cube Container	
04	HT (High Temperature) Cooler - 1050kW (Evapco)	
05	High Temperature Coolant IN/OUT (CHS 114,3x3 [mm])	
06	LT (Low Temperature) Cooler - 110 kW (Evapco)	
07	Low Temperature Coolant IN/OUT (CHS 88,9x3 [mm])	
08	H2 supply interface - TP 010	CIP
09	Process exhaust (CHS 88,9x2 [mm])	
10	H2 Enclosure; Ventilation Exhaust (CHS 60,3x2 [mm])	
11	Ventilation Unit (Air Intake) - 40ft container	
12	Coolant System Electrical Cabinet	
13	Coolant System Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
14	Structure below LT Cooler	
15	Container Interconnect Cabling (750V DC)	
16	Container Interconnect Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
17	Aux Power Supply Input (400V 3P-N-PE, 32A)	CIP
18	Customer Interface Cabling (Ethernet, Hardwired)	CIP
19	Drain interface - TP 015	CIP
20	~~Cover of hydrogen manifold~~	Optional
21	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
22	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
23	Ventilation Unit (Air Intake) - 10ft container	
CHS = Circular Hollow Section		
CIP - Customer Interface Point		



DETAIL J
SCALE 1 : 10

NOTE:
1.) Location relative to the directions of the world on the top view (sheet 3/14)
2.) Reactions forces and mounting details are described on sheets 13 and 14
3.) A ladder is required to access the platform above 40ft Container
4.) 40ft flatbed structure meets requirements of EN1090-2 - Execution class: EXC2.

MATERIAL

Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)

BALLARD™

Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

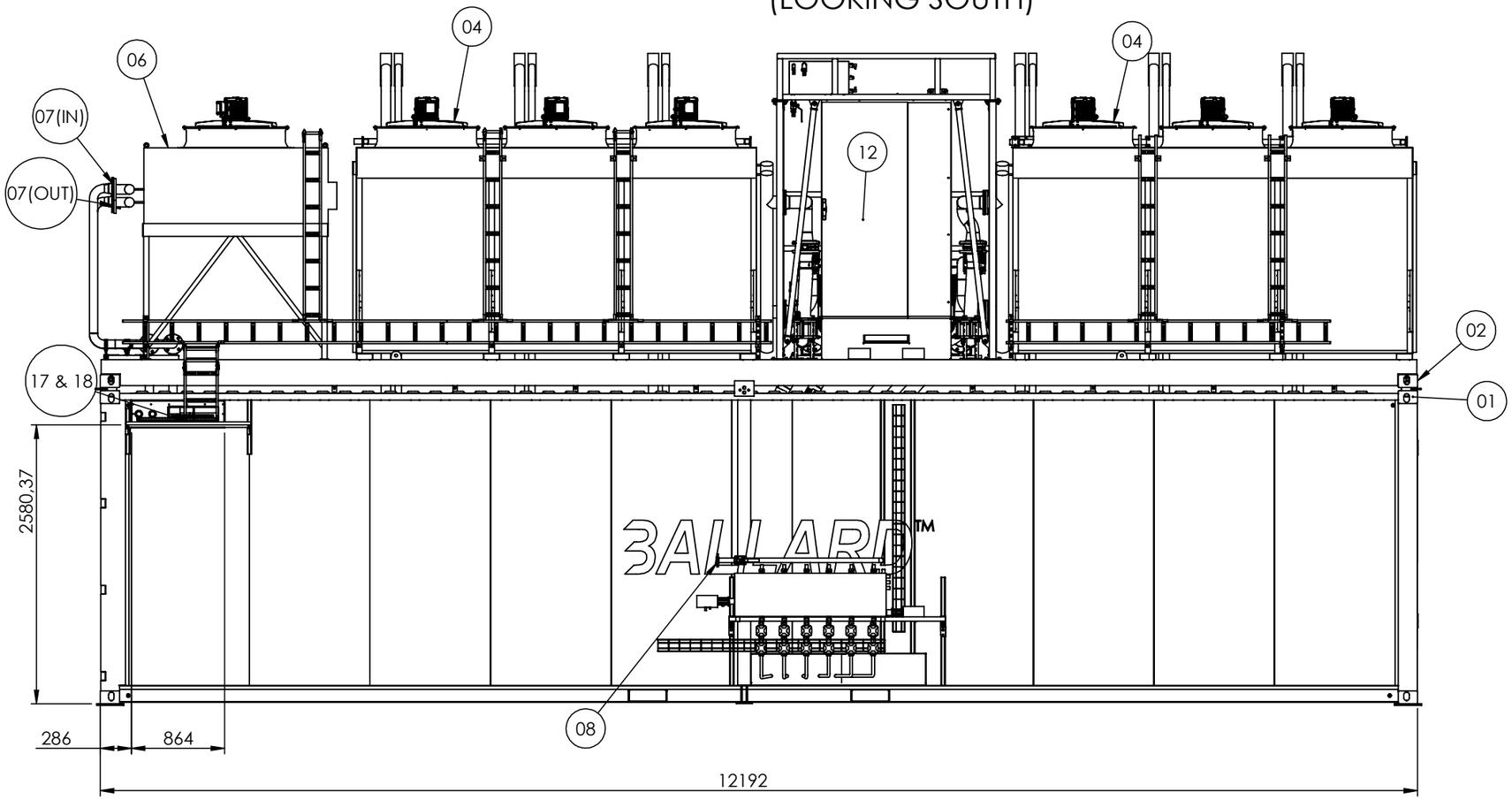
	By	Date
Drawn	ASM	20-02-2024
Revision		
Released		

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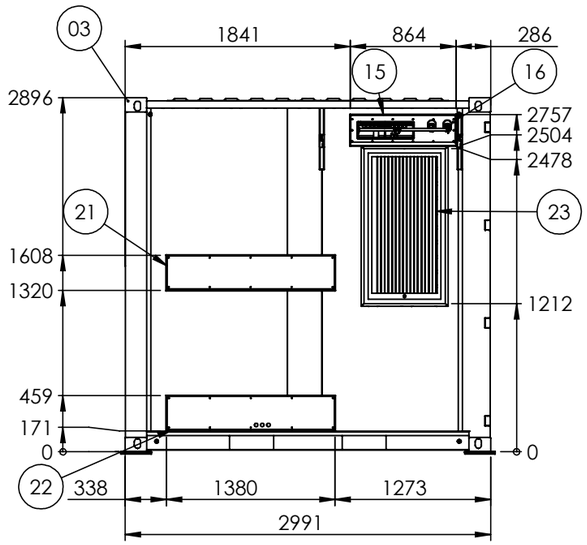
General arrangement

WEIGHT		SIZE	SHEET	SCALE	PART NUMBER:	REVISION
24943288 g	1st angle projection	A3	6/14	1:50	601456B	8

FRONT VIEW
(LOOKING SOUTH)



SECTION B-B



SECTION C-C

	Description	Note
01	40ft High Cube Container	
02	40ft Custom Designed Flatbed	
03	10ft High Cube Container	
04	HT (High Temperature) Cooler - 1050kW (Evapco)	
05	High Temperature Coolant IN/OUT (CHS 114,3x3 [mm])	
06	LT (Low Temperature) Cooler - 110 kW (Evapco)	
07	Low Temperature Coolant IN/OUT (CHS 88,9x3 [mm])	
08	H2 supply interface - TP 010	CIP
09	Process exhaust (CHS 88,9x2 [mm])	
10	H2 Enclosure; Ventilation Exhaust (CHS 60,3x2 [mm])	
11	Ventilation Unit (Air Intake) - 40ft container	
12	Coolant System Electrical Cabinet	
13	Coolant System Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
14	Structure below LT Cooler	
15	Container Interconnect Cabling (750V DC)	
16	Container Interconnect Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
17	Aux Power Supply Input (400V 3P-N-PE, 32A)	CIP
18	Customer Interface Cabling (Ethernet, Hardwired)	CIP
19	Drain interface - TP 015	CIP
20	~~Cover of hydrogen manifold~~	Optional
21	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
22	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
23	Ventilation Unit (Air Intake) - 10ft container	
CHS = Circular Hollow Section		
CIP - Customer Interface Point		

NOTE:
1.) Location relative to the directions of the world on the top view (sheet 3/14)
2.) Reactions forces and mounting details are described on sheets 13 and 14
3.) A ladder is required to access the platform above 40ft Container
4.) 40ft flatbed structure meets requirements of EN1090-2 - Execution class: EXC2.

MATERIAL

Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)

Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

	By	Date
Drawn	ASM	20-02-2024
Revision		
Released		

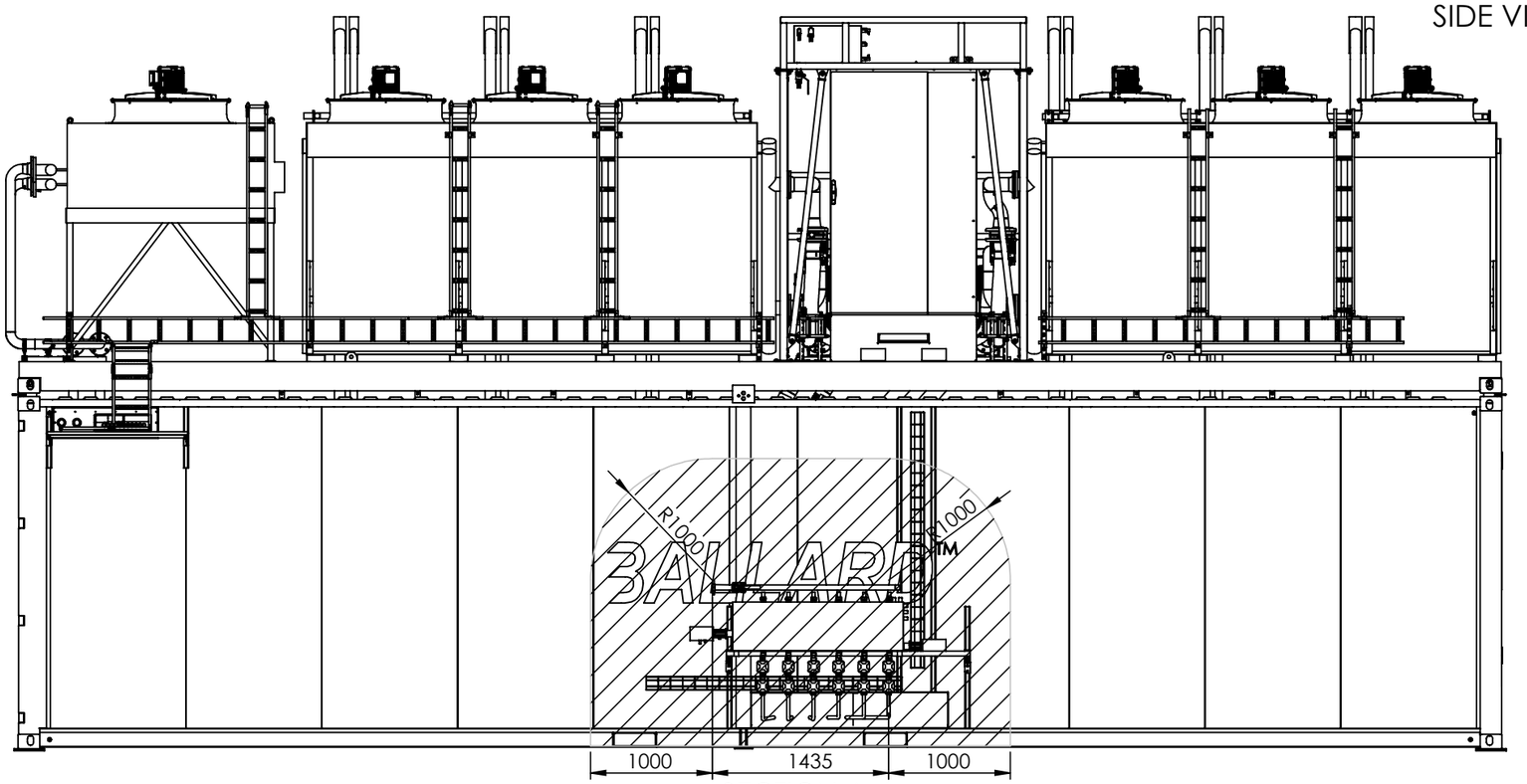
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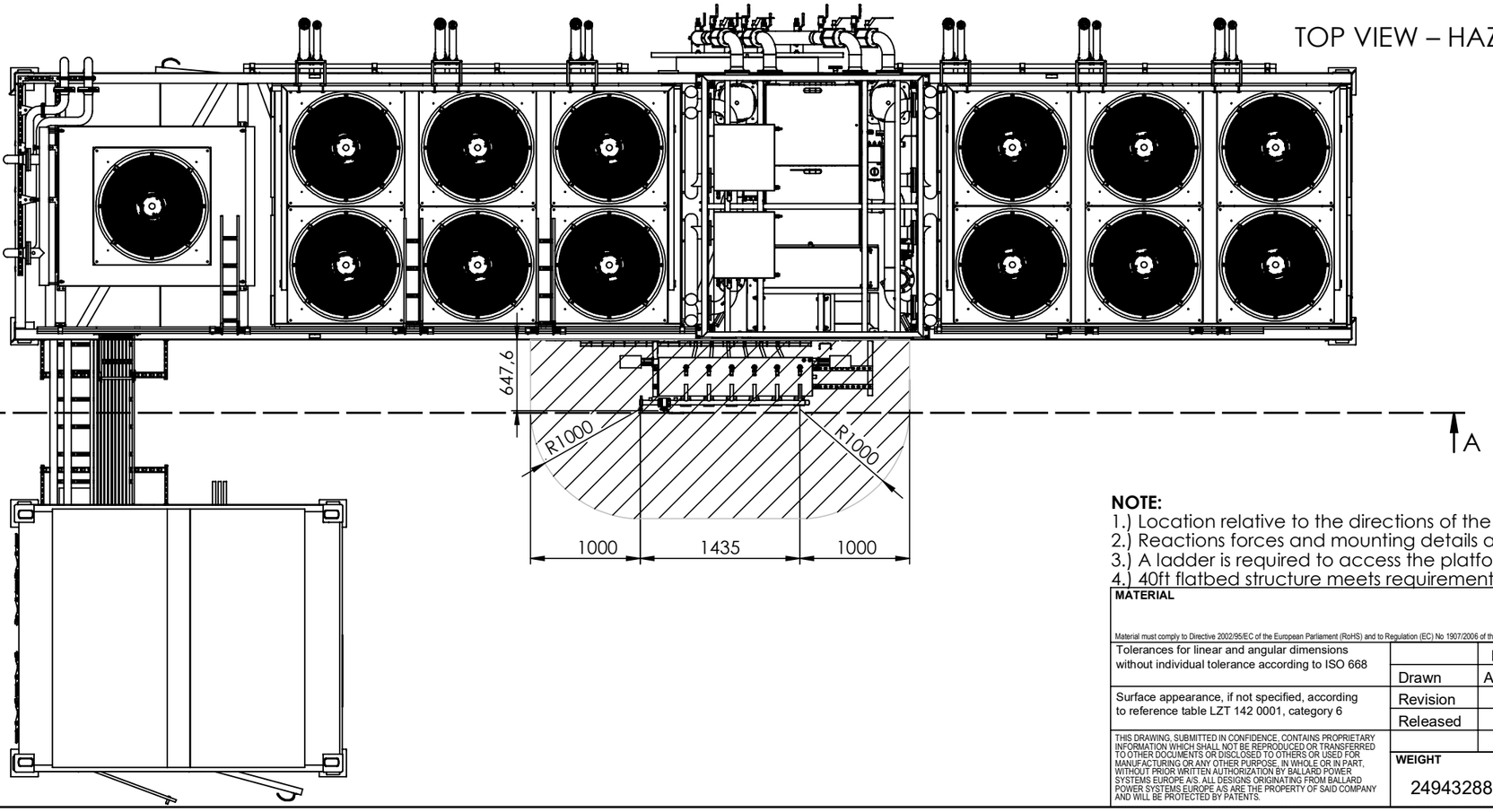
General arrangement

WEIGHT		SIZE	SHEET	SCALE	PART NUMBER:	REVISION
24943288 g	1st angle projection	A3	7/14	1:50	601456B	8

SIDE VIEW - HAZARD AREA



SECTION A-A



TOP VIEW – HAZARD AREA

Zone 2 IIC T1

NOTE:
1.) Location relative to the directions of the world on the top view (sheet 3/14)
2.) Reactions forces and mounting details are described on sheets 13 and 14
3.) A ladder is required to access the platform above 40ft Container
4.) 40ft flatbed structure meets requirements of EN1090-2 - Execution class: EXC2.

MATERIAL

Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)

BALLARD™

General arrangement

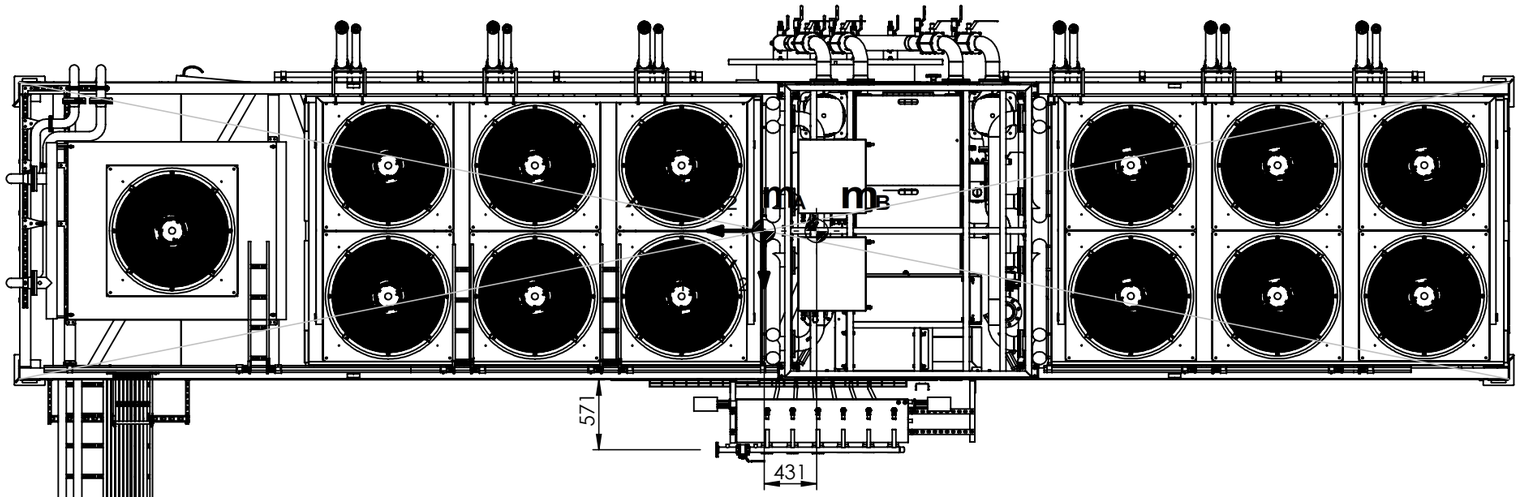
Tolerances for linear and angular dimensions without individual tolerance according to ISO 668		By	Date
	Drawn	ASM	20-02-2024
Surface appearance, if not specified, according to reference table LZT 142 0001, category 6	Revision		
	Released		

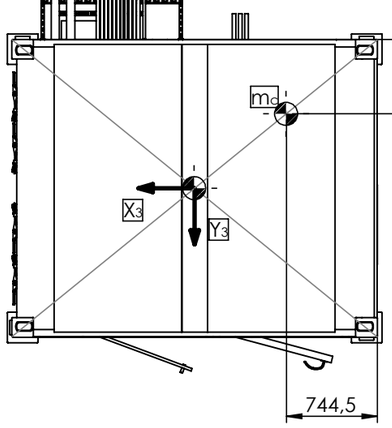
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WEIGHT		SIZE	SHEET	SCALE	PART NUMBER:	REVISION
24943288 g	1st angle projection	A3	8/14	1:50	601456B	8

TOP VIEW - Center of Gravity

Access area





Access area

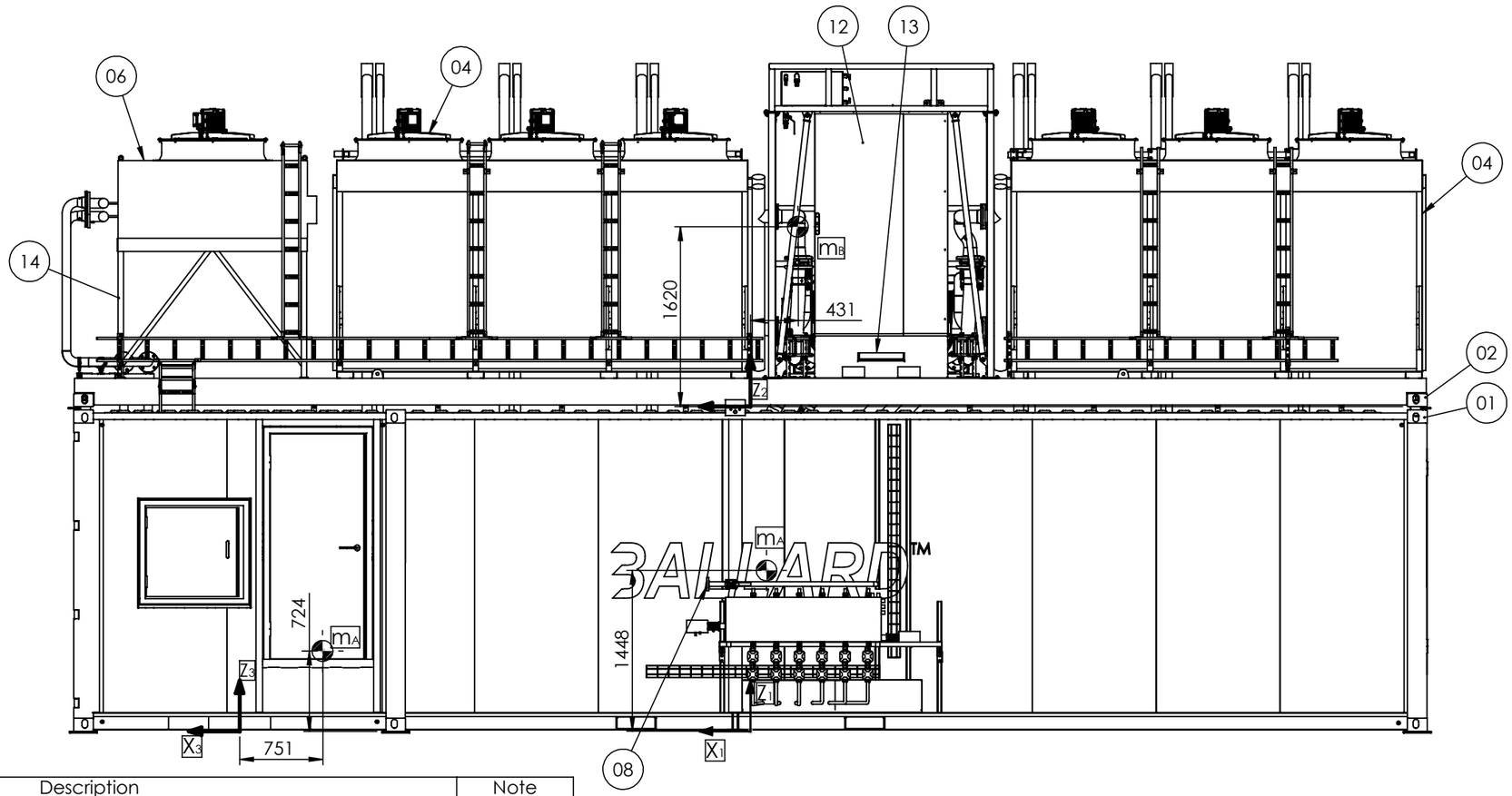


NOTE:
1.) Location relative to the directions of the world on the top view (sheet 3/14)
2.) Reactions forces and mounting details are described on sheets 13 and 14
3.) A ladder is required to access the platform above 40ft Container
4.) 40ft flatbed structure meets requirements of EN1090-2 - Execution class: EXC2.

MATERIAL Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)				BALLARD TI-1
Tolerances for linear and angular dimensions without individual tolerance according to ISO 668		By	Date	General arrangement
	Drawn	ASM	20-02-2024	
Surface appearance, if not specified, according to reference table LZT 142 0001, category 6	Revision			
	Released			
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WEIGHT		SIZE	SHEET	SCALE	PART NUMBER:	REVISION
24943288 g	1st angle projection	A3	9/14	1:50	601456B	8

FRONT VIEW - Center of Gravity
(LOOKING SOUTH)



	Description	Note
01	40ft High Cube Container	
02	40ft Custom Designed Flatbed	
03	10ft High Cube Container	
04	HT (High Temperature) Cooler - 1050kW (Evapco)	
05	High Temperature Coolant IN/OUT (CHS 114,3x3 [mm])	
06	LT (Low Temperature) Cooler - 110 kW (Evapco)	
07	Low Temperature Coolant IN/OUT (CHS 88,9x3 [mm])	
08	H2 supply interface - TP 010	CIP
09	Process exhaust (CHS 88,9x2 [mm])	
10	H2 Enclosure; Ventilation Exhaust (CHS 60,3x2 [mm])	
11	Ventilation Unit (Air Intake) - 40ft container	
12	Coolant System Electrical Cabinet	
13	Coolant System Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
14	Structure below LT Cooler	
15	Container Interconnect Cabling (750V DC)	
16	Container Interconnect Cabling (400V 3P-N-PE, Ethernet, Hardwired)	
17	Aux Power Supply Input (400V 3P-N-PE, 32A)	CIP
18	Customer Interface Cabling (Ethernet, Hardwired)	CIP
19	Drain interface - TP 015	CIP
20	~~Cover of hydrogen manifold~~	Optional
21	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
22	Customer MV Connection (6,6kV AC 3P, 92A)	CIP
23	Ventilation Unit (Air Intake) - 10ft container	
CHS = Circular Hollow Section		
CIP - Customer Interface Point		

NOTE:
1.) Location relative to the directions of the world on the top view (sheet 3/14)
2.) Reactions forces and mounting details are described on sheets 13 and 14
3.) A ladder is required to access the platform above 40ft Container
4.) 40ft flatbed structure meets requirements of EN1090-2 - Execution class: EXC2.

MATERIAL

Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)

BALLARD™

Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

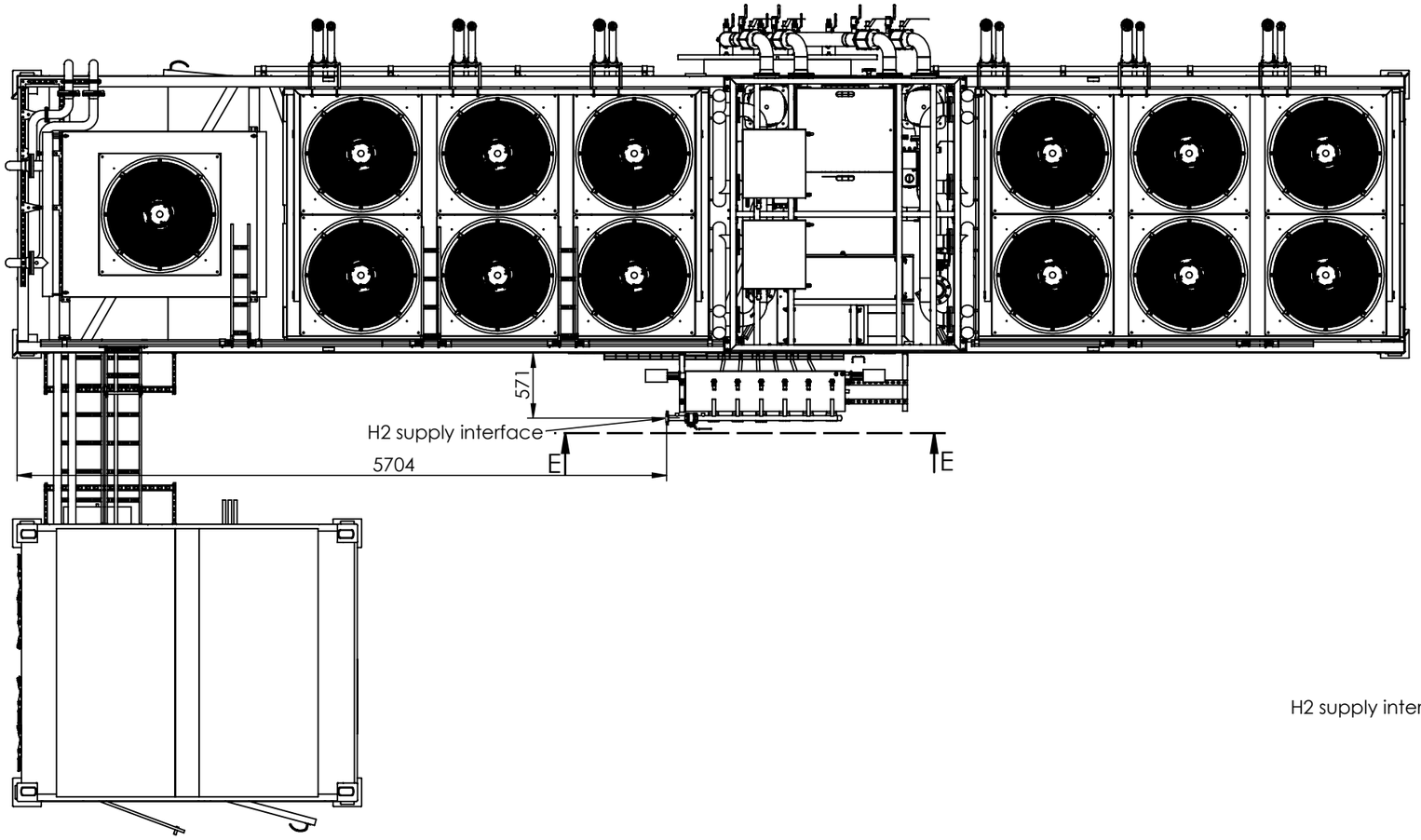
	By	Date
Drawn	ASM	20-02-2024
Revision		
Released		

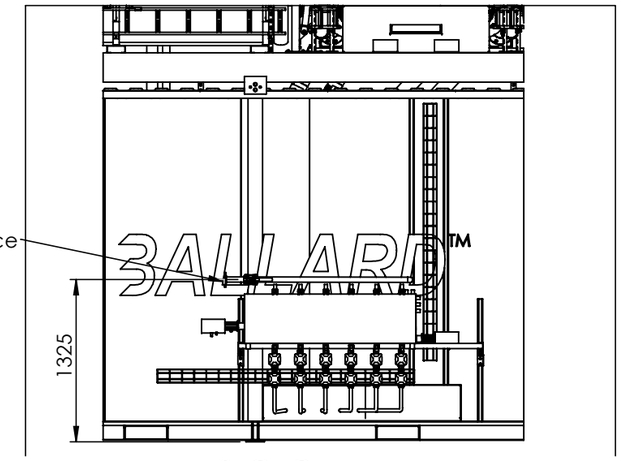
General arrangement

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WEIGHT		SIZE	SHEET	SCALE	PART NUMBER:	REVISION
24943288 g	1st angle projection	A3	10/14	1:50	601456B	8

TOP VIEW - H2 SUPPLY INTERFACE





SECTION E-E

Reference	Interface	Dimension	Flange Standard	Pressure class	Flange face	Material	Allowable nozzle loads
08	H2 supply interface - TP 010	DN32	EN1759-1	300	RF	ANSI 316	50N*
* All interfacing flanges/connections must be fully supported and compensated for loads and moments.							

MATERIAL

Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)

Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

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WEIGHT 24943288 g

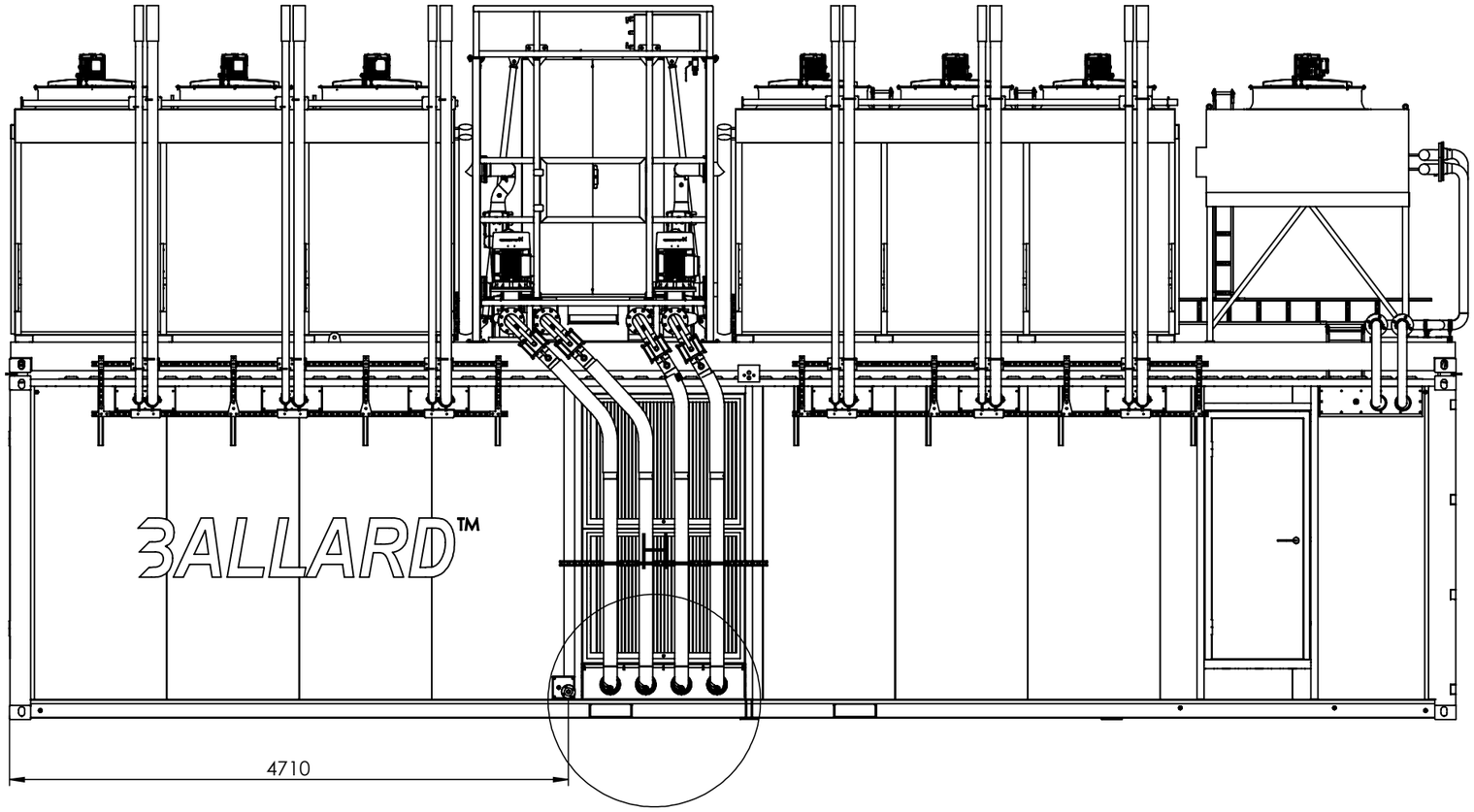
1st angle projection

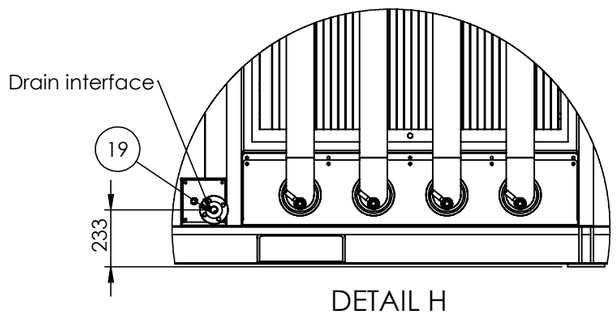
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General arrangement

SIZE	SHEET	SCALE	PART NUMBER:	REVISION
A3	11/14	1:50	601456B	8

FRONT VIEW LOOKING NORTH- DRAIN INTERFACE





DETAIL H
SCALE 1 : 25

Reference	Interface	Dimension	Flange Standard	Pressure class	Flange face	Material	Allowable nozzle loads
19	Drain interface - TP 015	1"	ASME B 16.5	150	RF	ANSI 316	50N*
* All interfacing flanges/connections must be fully supported and compensated for loads and moments.							

MATERIAL

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WEIGHT 24943288 g

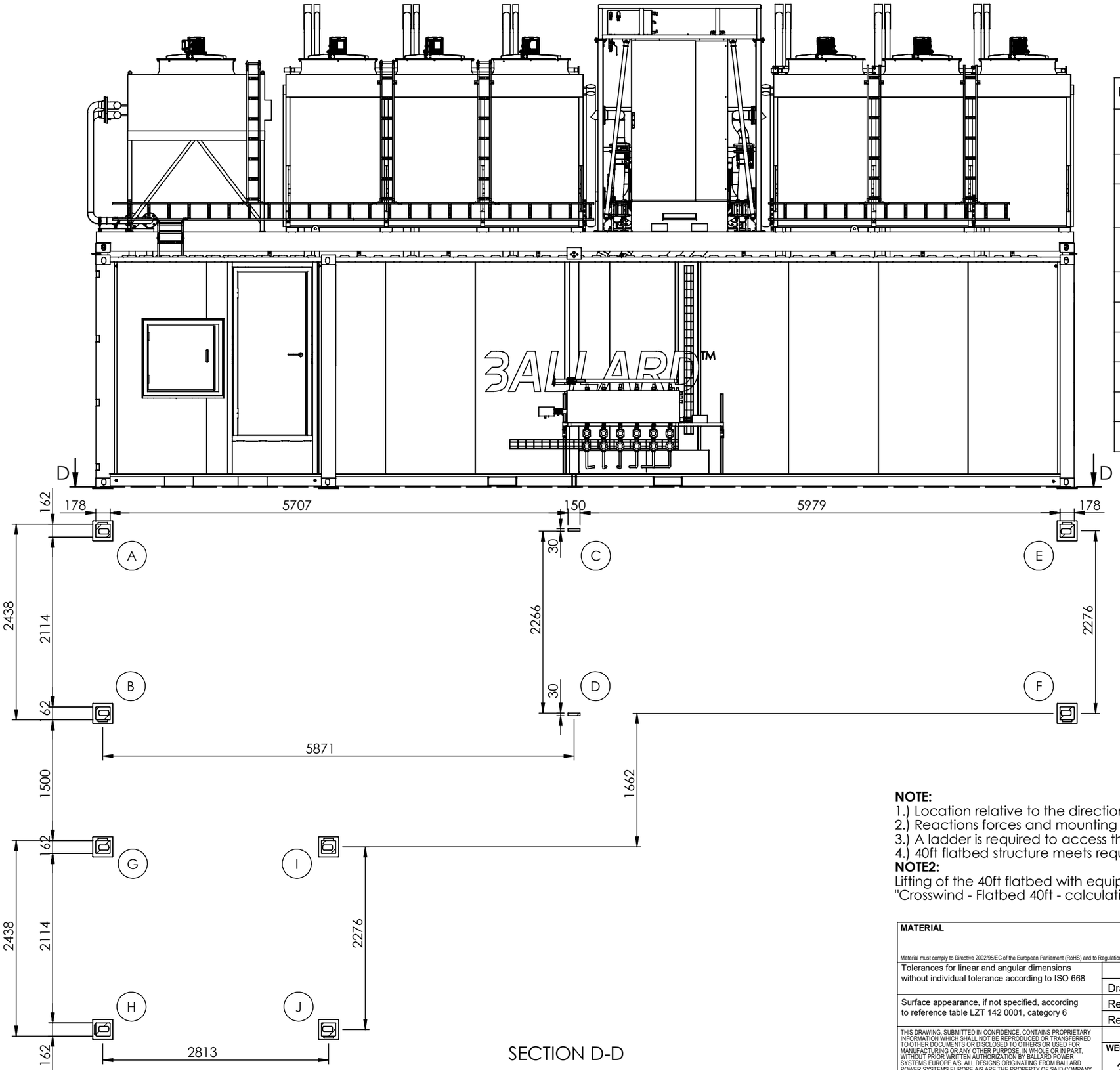
1st angle projection

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General arrangement

SIZE	SHEET	SCALE	PART NUMBER:	REVISION
A3	12/14	1:50	601456B	8

REACTIONS BOTTOM



SECTION D-D

Pointer	Element description	Required support description
A	Bottom left corner - ISO1161	Standard Container Twist-Lock (blocked movement in directions X, Y, Z)
B	Bottom right corner - ISO1161	Standard Container Twist-Lock (blocked movement in directions X, Y, Z)
C	Support plate 12x30x150	Supporting plate 30x150 (blocked movement in direction Z) (no bolts, only compression reaction force)
D	Support plate 12x30x150	Supporting plate 30x150 (blocked movement in direction Z) (no bolts, only compression reaction force)
E	Bottom right corner - ISO1161	Standard Container Twist-Lock (blocked movement in directions X, Y, Z)
F	Bottom left corner - ISO1161	Standard Container Twist-Lock (blocked movement in directions X, Y, Z)
G	Bottom left corner - ISO1161	Standard Container Twist-Lock (blocked movement in directions X, Y, Z)
H	Bottom right corner - ISO1161	Standard Container Twist-Lock (blocked movement in directions X, Y, Z)
I	Bottom right corner - ISO1161	Standard Container Twist-Lock (blocked movement in directions X, Y, Z)
J	Bottom left corner - ISO1161	Standard Container Twist-Lock (blocked movement in directions X, Y, Z)

NOTE:
1.) Location relative to the directions of the world on the top view (sheet 3/14)
2.) Reactions forces and mounting details are described on sheets 13 and 14
3.) A ladder is required to access the platform above 40ft Container
4.) 40ft flatbed structure meets requirements of EN1090-2 - Execution class: EXC2.

NOTE2:
Lifting of the 40ft flatbed with equipment in accordance to guidelines specified in structural calculation report: "Crosswind - Flatbed 40ft - calculation report rev_1.pdf"

MATERIAL

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Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

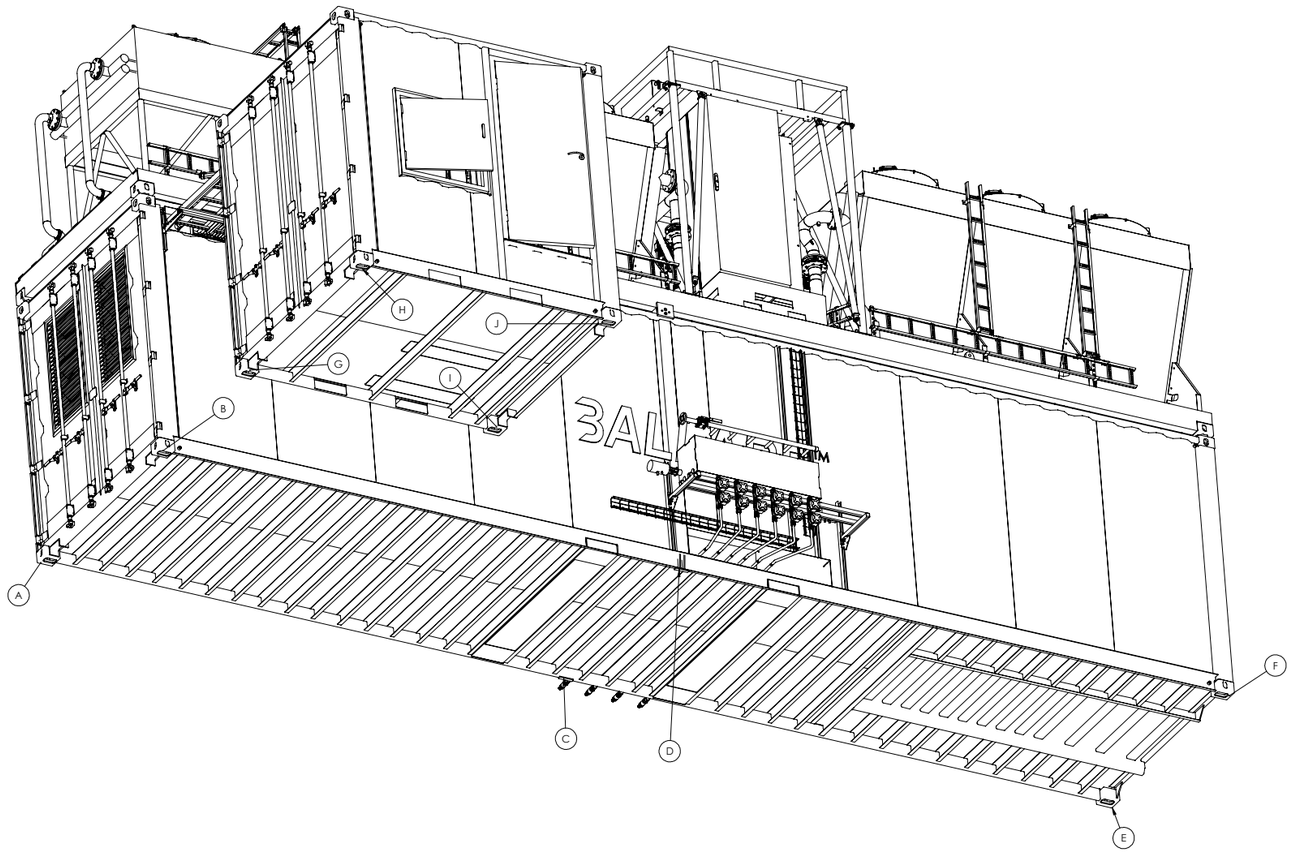
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General arrangement

WEIGHT		SIZE	SHEET	SCALE	PART NUMBER:	REVISION
24943288 g	1st angle projection	A3	13/14	1:50	601456B	8



40ft container							
Ultimate Limit State: LC5 - Lifting of 40ft container with full equipment							
LC5 - Lifting offshore vertical by 4 bottom ISO 1161 Corners (only 40ft container), [SF=2,34]				LC5 - Lifting offshore vertical by 4 bottom ISO 1161 Corners (only 40ft container), [SF=2,34]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	-	-	126	A	-	-	125
B	-	-	133	B	-	-	134
C	-	-	-	C	-	-	-
D	-	-	-	D	-	-	-
E	-	-	133	E	-	-	134
F	-	-	128	F	-	-	128

40ft container							
Ultimate Limit State: LC5 - Lifting of 10ft container with full equipment							
LC5 - Lifting offshore vertical by 4 bottom ISO 1161 Corners (only 40ft container), [SF=2,34]				LC5 - Lifting offshore vertical by 4 bottom ISO 1161 Corners (only 40ft container), [SF=2,34]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	-	-	25	G	-	-	25
H	-	-	17	H	-	-	16
I	-	-	100	I	-	-	99
J	-	-	22	J	-	-	23

40ft container + 40ft flatbed (CROSSWIND)							
Ultimate Limit State: LC7-LC14 - Sea transport on barge							
40ft container + 40ft flatbed (max self-weight) LC7 MAX-Sea transport on the barge Head sea, bow down, Y+ [Pitch case 1]				40ft container + 40ft flatbed (min self-weight) LC7 MIN-Sea transport on the barge Head sea, bow down, Y+ [Pitch case 1]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	39	-75	-158	A	65	-72	-217
B	-103	-63	300	B	-76	-63	234
C	-	-	113	C	-	-	53
D	-	-	130	D	-	-	24
E	11	-42	27	E	-24	-60	-70
F	53	-83	138	F	35	-67	93
40ft container + 40ft flatbed (max self-weight) LC8 MAX-Sea transport on the barge Quatering sea, bow down, X+ Y+ [Quatering 1]				40ft container + 40ft flatbed (min self-weight) LC8 MIN-Sea transport on the barge Quatering sea, bow down, X+ Y+ [Quatering 1]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	-64	-39	-60	A	-42	-37	-98
B	-153	-49	263	B	-131	-50	207
C	-	-	101	C	-	-	34
D	-	-	127	D	-	-	41
E	-45	-33	30	E	-74	-48	-42
F	-37	-44	85	F	-52	-30	21
40ft container + 40ft flatbed (max self-weight) LC9 MAX-Sea transport on the barge Beam sea, bow down, X+ [Roll case 1]				40ft container + 40ft flatbed (min self-weight) LC9 MIN-Sea transport on the barge Beam sea, bow down, X+ [Roll case 1]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	-130	9	80	A	-111	10	48
B	-131	-12	141	B	-111	-13	90
C	-	-	99	C	-	-	31
D	-	-	124	D	-	-	47
E	-44	2	70	E	-70	-11	-10
F	-78	2	-4	F	-92	13	-41
40ft container + 40ft flatbed (max self-weight) LC10 MAX-Sea transport on the barge Quatering sea, stern down, X+ Y+ [Quatering 2]				40ft container + 40ft flatbed (min self-weight) LC10 MIN-Sea transport on the barge Quatering sea, stern down, X+ Y+ [Quatering 2]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	-154	51	206	A	-132	53	172
B	-67	31	-6	B	-44	31	-65
C	-	-	105	C	-	-	30
D	-	-	126	D	-	-	49
E	-4	46	127	E	-32	32	61
F	-74	37	-39	F	-90	49	-82
40ft container + 40ft flatbed (max self-weight) LC11 MAX-Sea transport on the barge Head sea, stern down, Y- [Pitch case 2]				40ft container + 40ft flatbed (min self-weight) LC11 MIN-Sea transport on the barge Head sea, stern down, Y- [Pitch case 2]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	-104	68	265	A	-79	71	225
B	33	65	-126	B	61	64	-164
C	-	-	118	C	-	-	23
D	-	-	130	D	-	-	59
E	77	85	178	E	43	67	101
F	-6	43	-13	F	-26	59	-79
40ft container + 40ft flatbed (max self-weight) LC12 MAX-Sea transport on the barge Quatering sea, stern down, X-Y- [Quatering 3]				40ft container + 40ft flatbed (min self-weight) LC12 MIN-Sea transport on the barge Quatering sea, stern down, X- Y- [Quatering 3]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	0	33	161	A	22	35	129
B	88	51	-101	B	111	51	-166
C	-	-	118	C	-	-	41
D	-	-	120	D	-	-	51
E	129	75	164	E	101	61	99
F	81	6	60	F	66	19	10
40ft container + 40ft flatbed (max self-weight) LC13 MAX-Sea transport on the barge Beam sea, bow down, X- [Roll case 2]				40ft container + 40ft flatbed (min self-weight) LC13 MIN-Sea transport on the barge Beam sea, bow down, X- [Roll case 2]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	69	-14	19	A	88	-13	-13
B	66	14	9	B	87	13	-31
C	-	-	115	C	-	-	47
D	-	-	117	D	-	-	40
E	126	39	120	E	100	25	60
F	122	-38	120	F	107	-27	83
40ft container + 40ft flatbed (max self-weight) LC14 MAX-Sea transport on the barge Quatering sea, stern down, X-Y+ [Quatering 4]				40ft container + 40ft flatbed (min self-weight) LC14 MIN-Sea transport on the barge Quatering sea, stern down, X- Y+ [Quatering 4]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	92	-57	-108	A	113	-55	-150
B	1	-29	170	B	24	-30	116
C	-	-	113	C	-	-	53
D	-	-	120	D	-	-	35
E	88	-5	70	E	59	-20	-5
F	119	-74	154	F	104	-61	116

10ft container (CROSSWIND)							
Ultimate Limit State: LC7-LC14 - Sea transport on barge							
10ft container (max self-weight) LC7 MAX-Sea transport on barge Head sea, bow down, Y+ [Pitch case 1]				10ft container (min self-weight) LC7 MIN-Sea transport on barge Head sea, bow down, Y+ [Pitch case 1]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	3	-3	14	G	5	-7	1
H	-17	-19	15	H	-8	-11	5
I	11	-18	63	I	4	-16	7
J	2	-7	24	J	-1	-14	12
10ft container (max self-weight) LC8 MAX-Sea transport on barge Quatering sea, bow down, X+ Y+ [Quatering 1]				10ft container (min self-weight) LC8 MIN-Sea transport on barge Quatering sea, bow down, X+ Y+ [Quatering 1]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	-23	3	24	G	-21	0	13
H	-27	-26	14	H	-20	-19	6
I	-7	-12	52	I	-13	-10	6
J	-7	5	19	J	-10	-1	10
10ft container (max self-weight) LC9 MAX-Sea transport on barge Beam sea, X+ [Roll case 1]				10ft container (min self-weight) LC9 MIN-Sea transport on barge Beam sea, X+ [Roll case 1]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	-33	10	29	G	-32	6	19
H	-27	-23	13	H	-21	-17	5
I	-13	-3	54	I	-19	-1	11
J	-9	16	13	J	-12	11	4
10ft container (max self-weight) LC10 MAX-Sea transport on barge Quatering sea, stern down, X+ Y+ [Quatering 2]				10ft container (min self-weight) LC10 MIN-Sea transport on barge Quatering sea, stern down, X+ Y+ [Quatering 2]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	-29	14	28	G	-28	11	17
H	-21	-15	11	H	-13	-8	3
I	-9	7	63	I	-15	9	17
J	-5	25	8	J	-8	20	-2
10ft container (max self-weight) LC11 MAX-Sea transport on barge Head sea, stern down, Y- [Pitch case 2]				10ft container (min self-weight) LC11 MIN-Sea transport on barge Head sea, stern down, Y- [Pitch case 2]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	-8	14	19	G	-6	10	7
H	-6	-2	10	H	3	6	0
I	8	12	80	I	0	14	24
J	5	24	6	J	2	18	-6
10ft container (max self-weight) LC12 MAX-Sea transport on barge Quatering sea, stern down, X-Y- [Quatering 3]				10ft container (min self-weight) LC12 MIN-Sea transport on barge Quatering sea, stern down, X-Y- [Quatering 3]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	18	7	7	G	20	3	-3
H	6	5	10	H	13	12	1
I	25	7	84	I	19	8	37
J	15	12	9	J	12	6	0
10ft container (max self-weight) LC13 MAX-Sea transport on barge Beam sea, X- [Roll case 2]				10ft container (min self-weight) LC13 MIN-Sea transport on barge Beam sea, X- [Roll case 2]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	29	0	3	G	30	-3	8
H	6	3	11	H	13	9	3
I	31	-3	80	I	26	-1	37
J	17	0	15	J	14	-6	6
10ft container (max self-weight) LC14 MAX-Sea transport on barge Quatering sea, stern down, X-Y+ [Quatering 4]				10ft container (min self-weight) LC14 MIN-Sea transport on barge Quatering sea, stern down, X-Y+ [Quatering 4]			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	25	-4	4	G	26	-7	7
H	-1	-6	13	H	6	2	5
I	27	-12	73	I	21	-10	26
J	13	-8	21	J	10	14	11

40ft container + 40ft flatbed (CROSSWIND)							
Ultimate Limit State: LC15-LC13 - destination place (Offshore)							
40ft container + 40ft flatbed (max self-weight) LC15 MAX-Destination place - Offshore Wind X+				40ft container + 40ft flatbed (min self-weight) LC15 MIN-Destination place - Offshore Wind X+			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	-67	2	58	A	-61	3	48
B	-69	-4	99	B	-63	-4	83
C	-	-	84	C	-	-	63
D	-	-	102	D	-	-	78
E	1	10	71	E	-7	6	51
F	-23	-8	20	F	-27	-4	9
40ft container + 40ft flatbed (max self-weight) LC16 MAX-Destination place - Offshore Wind Y+				40ft container + 40ft flatbed (min self-weight) LC16 MIN-Destination place - Offshore Wind Y+			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	65	-95	-260	A	71	-95	-275
B	-115	-82	362	B	-108	-81	347
C	-	-	103	C	-	-	92
D	-	-	105	D	-	-	80
E	-4	-65	-38	E	-12	-69	-61
F	53	-95	158	F	50	-92	149
40ft container + 40ft flatbed (max self-weight) LC17 MAX-Destination place - Offshore Wind X+				40ft container + 40ft flatbed (min self-weight) LC17 MIN-Destination place - Offshore Wind X+			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	16	-7	26	A	21	-6	17
B	13	6	39	B	19	6	21
C	-	-	97	C	-	-	76
D	-	-	102	D	-	-	78
E	69	24	91	E	61	20	72
F	60	-24	78	F	56	-20	66
40ft container + 40ft flatbed (max self-weight) LC18 MAX-Destination place - Offshore Wind Y+				40ft container + 40ft flatbed (min self-weight) LC18 MIN-Destination place - Offshore Wind Y+			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
A	-117	90	332	A	-111	91	323
B	60	83	-237	B	67	83	-257
C	-	-	98	C	-	-	76
D	-	-	119	D	-	-	106
E	73	98	189	E	65	94	172
F	-17	66	-72	F	-21	69	-88

10ft container (CROSSWIND)							
Ultimate Limit State: LC15-LC18 - destination place (Offshore)							
10ft container (max self-weight) LC15 MAX-Destination place - Offshore Wind X+				10ft container (min self-weight) LC15 MIN-Destination place - Offshore Wind X+			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	-28	16	32	G	-24	13	28
H	-8	-14	-1	H	-7	-11	-1
I	6	-25	38	I	2	-21	26
J	-7	23	22	J	-8	19	17
10ft container (max self-weight) LC16 MAX-Destination place - Offshore Wind Y+				10ft container (min self-weight) LC16 MIN-Destination place - Offshore Wind Y+			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	-19	0	4	G	-15	-4	0
H	-7	-26	13	H	-6	-23	13
I	21	-30	39	I	16	-26	27
J	6	7	36	J	4	3	31
10ft container (max self-weight) LC17 MAX-Destination place - Offshore Wind X+				10ft container (min self-weight) LC17 MIN-Destination place - Offshore Wind X+			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	-4	6	2	G	1	3	-2
H	6	-10	0	H	7	-7	1
I	27	-16	38	I	22	-12	56
J	8	19	21	J	7	15	16
10ft container (max self-weight) LC18 MAX-Destination place - Offshore Wind Y+				10ft container (min self-weight) LC18 MIN-Destination place - Offshore Wind Y+			
Reactions	X [kN]	Y [kN]	Z [kN]	Reactions	X [kN]	Y [kN]	Z [kN]
G	-23	28	35	G	-18	25	30
H	-2	2	-17	H	-1	5	-17
I	21	-10	60	I	17	-6	48
J	3	29	13	J	2	25	8

MATERIAL

Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)

Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

	By	Date
Drawn	ASM	20-02-2024
Revision		
Released		

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BALLARD™

General arrangement

WEIGHT	SIZE	SHEET	SCALE	PART NUMBER:	REVISION
24943288 g	A1	14/14	1:30	601456B	8

1st angle projection

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Revision history		
Rev.	**Date.**	**Description**
001	03/02/2023	First Issue
002	17/02/2023	Mod. acc. to comments, new values
003	21/09/2023	Mod. acc. to comments, new values
004	30/11/2023	Modified according to comments

Document Title:	**BLPH Project - Utilities Schedule**	
Document Number:	TBD	
Legacy Number:	K559-2254-CWIWP4202202-D01-001	
Revision:	Rev004	
Sequence Number:	001	
File Name:	K559-2254-CWIWP4202202-D01-001Rev004	
Purchaser Job:	K559-2254	
Purchase Order:	CWIWP4202202	
Code:	D01	
Requsition Number:	n/a	
Customer:	CrossWind C.V., Rotterdam, The Netherlands	

Title:	**Utilities Schedule**	Version:	Rev004
Description:	1 MW Power Container	Date:	November 30, 2023

Inputs

Hydrogen Supply [08]⁺ (Tag-Nr.: =HA01+DA02-XM01)						
Pressure			**Temperature**		**Mass Flow**	
Min.	Max.	Nominal	Min.	Max.	Min.*	Max.
barg	barg	barg	°C	°C	kg/h	kg/h
3.5	6.5	4.5	-8.4	80	3.24	105.84

Note: Hydrogen purity as per SAE J2719 or ISO 14687:2019 Type I, Type II – Grade D.

AUX Power Supply [17]⁺ (Tag-Nr.: =BA20+UC20-XB01)			
Control Voltage	**AUX Voltage**	**Connection**	**Current**
			Max.
Vac	Vac	-	A
230	400	3P+N+PE	32

Note: AUX power supplies all necessary auxiliaries and controls within Ballard's scope while fuel cells are not running.

MV Link - Input [21, 22]⁺ (Tag-Nr.: =BA30+DA03-TA30)				
Voltage	**Connection**	**Frequency**	**Power**	
			Min.	Max.
kVac	3-wire / 3-phase	Hz	kW	kW
6.6		50	10	150

Note: This is a bi-directional interface (power supplied during "Startup", "Rampdown" and "Aftercooling" modes).

Max. power depends on # of FCwave™ modules starting at the same time.

Total Air Intake [11, 23]⁺ (for Process and Ventilation) (Tag-Nr.: =JA01+DA02)					
Temperature		**Humidity**		**Mass Flow**	
Min.	Max.	Min.	Max.	Min.	Max.
°C	°C	%RH	%RH	g/s	g/s
-8.4	25	5	95	135 ("Standby" mode) 0 ("Sleep" mode)	~10,000 (@ 40 °C) ~6,000 (@ 25 °C)

Note: Air is sucked into the container from the surrounding environment, no need for a physical connection.

Cooling Air [04, 06]⁺ (for HT and LT coolers)					
Temperature		**Humidity**		**Mass Flow**	
Min.	Max.	Min.	Max.	Min.	Max.
°C	°C	%RH	%RH	g/s	g/s
-8.4	25	5	95	0	~123,500

Note: Air is sucked into the coolers from the surrounding environment, no need for a physical connection.

	Physical connection required.
	No physical connection required.

⁺ Number references from General Arrangements.

* During operation, otherwise 0.

Outputs

MV Link - Output [21, 22]+ (Tag-Nr.: =BA30+DA03-TA30)				
Voltage	**Connection**	**Frequency**	**Power**	
			Min.*	Max.
kVac	3-wire / 3-phase	Hz	kW	MW
6.6		50	50	1.05

Note: This is a bi-directional interface.

Water Drain [19]+ (Tag-Nr.: =JB01+DA02-XM01)			
Temperature		**Volume Flow**	
Min.	Max.	Min.	Max.
°C	°C	L/min	L/min
20	70	0	18

Note: Volume flow varies depending on environmental and operating conditions.
Max. value assumes all process water exits through the water drain.

Process Air Exhaust [09]+ (Tag-Nr.: =JA02+DA02-WM01..06)								
Temperature		**Humidity**	**H_2 Concentration**		**Mass Flow (per FCwave™)**		**Mass Flow (Total)**	
Min.	Max.		Startup	Operation	Min.*	Max.	Min.*	Max.
°C	°C	%RH	% vol H_2	% vol H_2	g/s	g/s	g/s	g/s
50	80	~100	< 2	< 2	100	260	100	1,560

Note: Exhaust air is blown out into the surrounding environment, no need for a physical connection.
During package-internal purge and pressure relief scenarios, the hydrogen is vented out through this process exhaust.

H_2 Enclosure Ventilation Air Exhaust [10]+ (Tag-Nr.: =JA02+DA02-WM07..12)					
Temperature		**Mass Flow (per FCwave™)**		**Mass Flow (Total)**	
Min.	Max.	Min.	Max.	Min.*	Max.
°C	°C	g/s	g/s	g/s	g/s
0	45	0	15	15	90

Note: Ventilation air is blown out into the surrounding environment, no need for a physical connection.
Detection of H_2 above 40% LFL or failure of a H_2 sensor leads to immediate shutdown of the module.

Container Ventilation Air Exhaust [24]+ (Tag-Nr.: =JA01+DA02-XT09..10)			
Temperature		**Mass Flow**	
Min.	Max.	Min.	Max.
°C	°C	g/s	g/s
0	53	135 ("Standby" mode) 0 ("Sleep" mode)	~8,350 (@ 40 °C) ~4,350 (@ 25 °C)

Note: Ventilation air is blown out into the surrounding environment, no need for a physical connection.

	Physical connection required.
	No physical connection required.

+ Number references from General Arrangements.
* During operation, otherwise 0.

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Revision history		
Rev.	**Date.**	**Description**
001	20/01/2023	First Issue
002	15/12/2023	Modified acc. to comments, expanded

Document Title:	**BLPH Project - Data Sheet**
Document Number:	K559-2254-CWIWP4202202-D03-001
Revision:	Rev002
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File Name:	K559-2254-CWIWP4202202-D03-001Rev002
Purchaser Job:	K559-2254
Purchase Order:	CWIWP4202202
Code:	D03
Requsition Number:	n/a
Customer:	CrossWind C.V., Rotterdam, The Netherlands

Datasheet

1 MW AC Power Container for CrossWind

Revision Record			
Rev	**CO**	**Description**	Date
001	EZE	Initial release	2023-11-20
002	EZE	Format changed, content expanded, modified according to customer comments.	2023-12-15

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Contents

1.0 General Description 3
2.0 Technical Datasheet 3
3.0 System Layout 7
4.0 Container Overview 9
5.0 Water Drainage System 10
6.0 Requirements for Upstream H_2 Delivery System 10
7.0 Hydrogen Safety 10
8.0 Control and Monitoring System 11
9.0 Emergency Shutdown 11
10.0 Block Diagram 12

List of Figures

Figure 1. Isometric views of the 1 MW AC containerized solution. 7
Figure 2. Top view of the 1 MW AC containerized solution. 8
Figure 3. Visualization of the inside of the 40’ container (indicative). 9
Figure 4. FCwave™ module, hydrogen enclosure, and stack assembly. 10
Figure 5. Block diagram of the 1 MW AC containerized solution. 12

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1.0 General Description

The stationary fuel cell system is based on 6 FCwave™ hydrogen fuel cells, built into a 40’ HC container, capable of delivering 1 MW AC power. A transformer matching the local grid voltage is included in a separate 10’ HC container and hence a complete microgrid can be established.

The containerized solution includes all the equipment necessary to operate the fuel cells and converts the DC power generated by the fuel cells into AC power. The container is delivered with a complete cooling system that dissipates the heat generated by the fuel cells and power conversion.

2.0 Technical Datasheet

FCwave™ 1 MW AC Power Container

Specification:	Value (Metric)	Value (Imperial)
Generator Specification:		
Max. Continuous Power @20 °C Ambient	1 MW AC	
Min. Continuous Power	0 kW	
Output Voltage @DC/AC Output @Transformer Output	 400 V @50 Hz – 3p+n (see transformer specs)	
Noise Level	75 dBA @10 m	75 dBA @32.97’
Fuel Cell Module Performance:		
Fuel Cell Model (Product Name)	FCwave™ 200 kW DC	
Container Configuration	6 x FCwave™	
Module Load Power Generation	55 to 200 kW DC	
Module Peak Fuel Efficiency	53 %	
Physical[1]:		
Fuel Cell Container (40’) Dimensions (l x w x h)[2]	12.2 x 2.5 x 2.9 m	40 x 8.2 x 9.5’
Fuel Cell Container Weight	≤ 23,262 kg	≤ 51,284 lb
Painted Surface Treatment	C5M - RAL 7035 textured	
Container Doors, Intrusion Protection	System locking	
Cooling Skid Dimensions (l x w x h)	12.2 x 2.5 x 3.1 m	40 x 8.2 x 10.2’
Cooling Skid Weight	≤ 10,757 kg	≤ 23,715 kg lb

[1] *Figures are subject to modification during final design work and site adaptation.*
[2] *Based on standard 40’ high-cube container*

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Transformer Container (10') Dimensions (l x w x h)[3]	3 x 2.44 x 2.9 m	10 x 8 x 9.5'
Transformer Container Weight	≤ 7,138 kg	≤ 15,737 lb
Transformer Specification:		
Type	TES-R2 EU548 Tier2	
Insulation Type	Cast Resin	
Cooling	Air Natural	
Loading Conditions	Converter THDi<10%	
Nominal Power	1,250 kVA	
Number of Phases	3	
Frequency	50 Hz	
Voltage Rating V_1/V_2	400 V / 6,600 V	
Tappings	±2 x 2.5%	
LV Current	1,804.27 A	
Vector Group	Dd0	
No-Load Losses	1,620 W +0% tol.	
Load Losses @75 °C (167 °F)	9,700 W +0% tol.	
Load Losses @120 °C (248 °F)	11,000 W +0% tol.	
No-Load Current	0.3%	
Impedance Voltage	5.0%	
Efficiency @120 °C (248 °F)		
4/4 cosfi 1	99.00%	
4/4 cosfi 0.8	98.75%	
Voltage Drop		
4/4 cosfi 1	1.001%	
4/4 cosfi 0.8	3.715%	
Thermal Insulation Class	F/F	
Primary Insulation Levels	7.2 – 20 – 60 kV	
Secondary Insulation Levels	1.1 – 3 kV	
Core Temperature Rise	100 °C	212 °F

[3] *Based on standard 10' high-cube container*

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Reactants & Cooling:		
Fuel Type	Gaseous hydrogen	
Hydrogen Grade	As per SAE spec. J2719 or ISO 14687:2019 Type I, Type II – Grade D	
Hydrogen Supply Pressure	3.5 – 6.5 bar(g)	
Hydrogen Consumption Rate, BOL	3 to 75.6 kg/h	6.61 to 166.67 lb/h
Cooling Media	Ethylene-glycol / DI-Water	
Cooling Mix	50% / 50%	
Total Cooling Media Volume	2,000 l	528.34 gal
AUX standby connection:		
AUX Voltage (3P+N+PE)	400 V AC	
AUX Current	32 A	
Safety Compliance:		
Certifications	CE, non-hazardous area	
Fire Alarm	Smoke detectors Warning by sound/light	
Monitoring:		
HMI, Basic Operation	In container, basic operation only	
SCADA/Control Interface	Modbus TCP/IP	
Safety Interface	Hardwire	
Remote Monitoring Interface	VPN Ethernet	

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Operating Conditions:		
Altitude	< 100 m	< 328’
Minimum Ambient Temperature, Operating	-8.4 °C	16.9 °F
Maximum Ambient Temperature, Operating	+25 °C	77 °F
Humidity	5% to 95% RH	
Wind Velocity[4]	31 m/s	69.35 mph
Weather	Designed for all year operation in temperate offshore areas, including wind driven rain and snow	
Salt Mist and Sea Salt Protection	Yes	
Flooding	Approximately 10 cm above ground level	Approximately 3.94” above ground level
Earthquake	Not earthquake safe, but designed to withstand customer-defined accelerations	

Note: If there are discrepancies between metric and imperial, it will be metric that applies.

[4] *10-minute mean wind velocity at 10 m elevation with 50 years return period*

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3.0 System Layout

The isometric views of the layout shown below are taken from the General Arrangements drawing. The cooling platform, incl. HT coolers, HT cooling pump sub-assemblies and LT cooler, is mounted on top of the 40’ HC container. The 10’ transformer container is installed next to the 40’ container in an L-type arrangement. For more information, incl. details on the interface connections, please refer to the General Arrangements drawing (K559-2254-CWIWP4202202-B01-001).

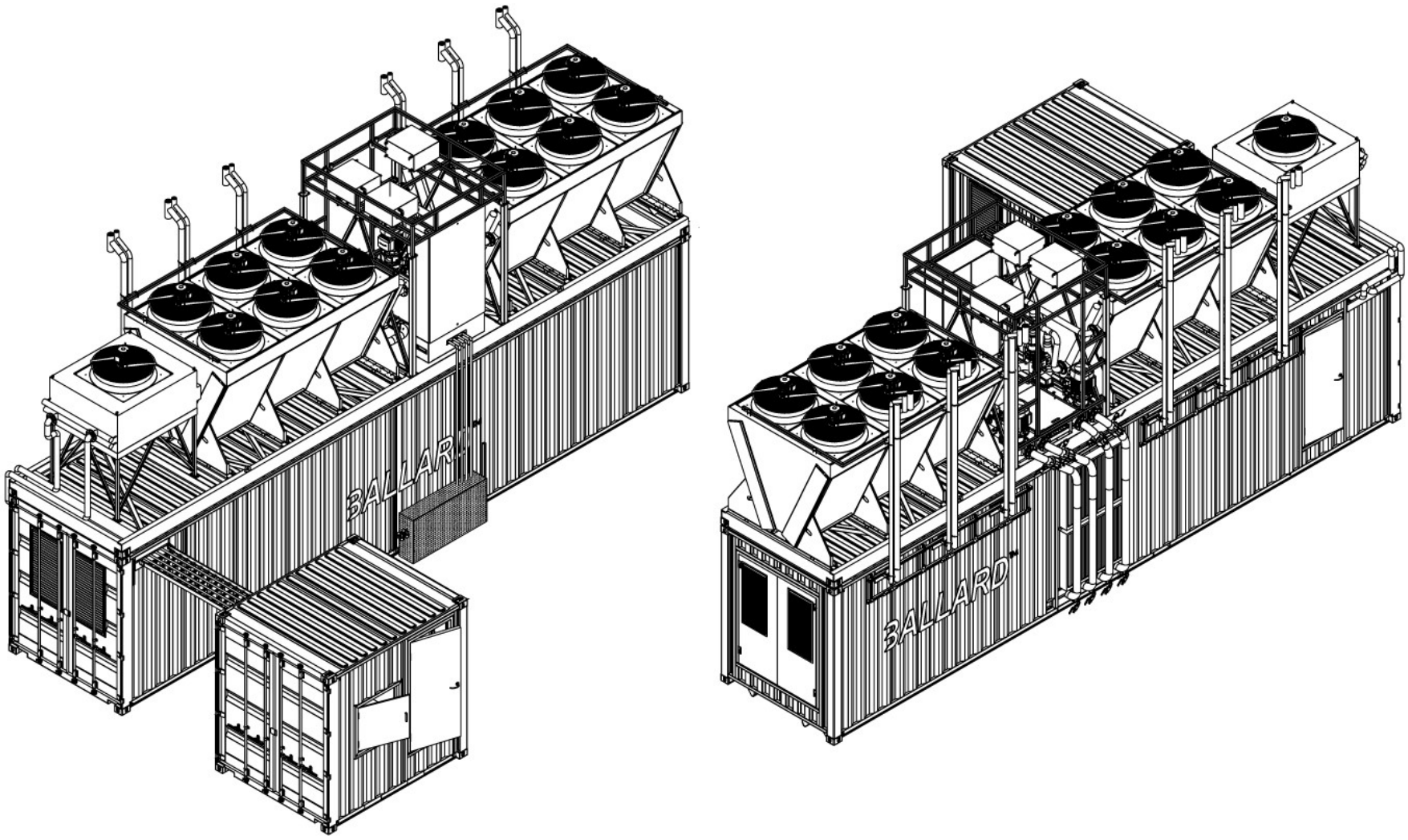


Figure 1. Isometric views of the 1 MW AC containerized solution.

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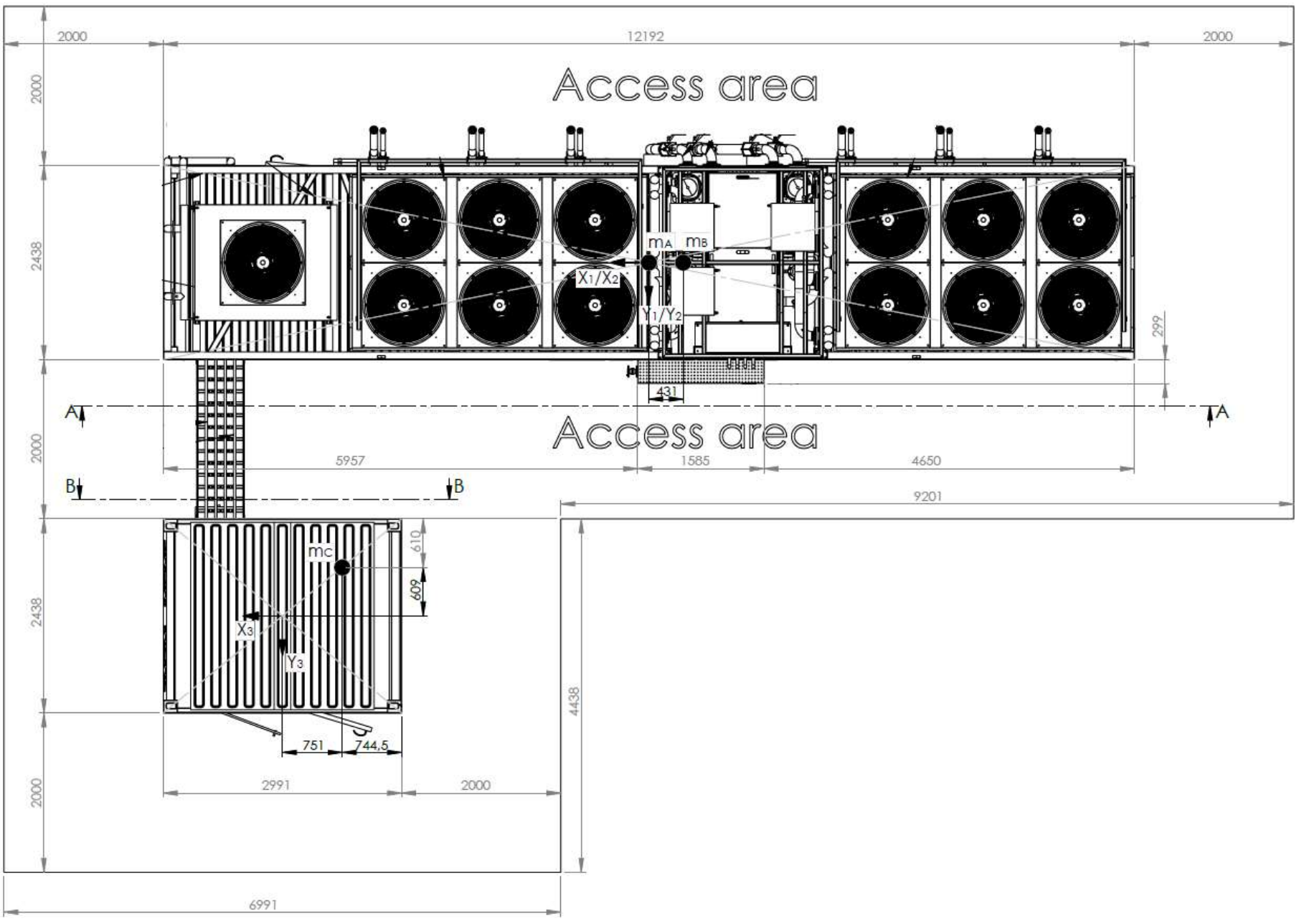


Figure 2. Top view of the 1 MW AC containerized solution.

The installation requires at least 2 meters (6.56’) service clearance to other installations.

To ensure proper function of the coolers, any buildings taller than 6.6 meters (21.65’) should be located at least 5 meters (16.4’) away.

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4.0 Container Overview

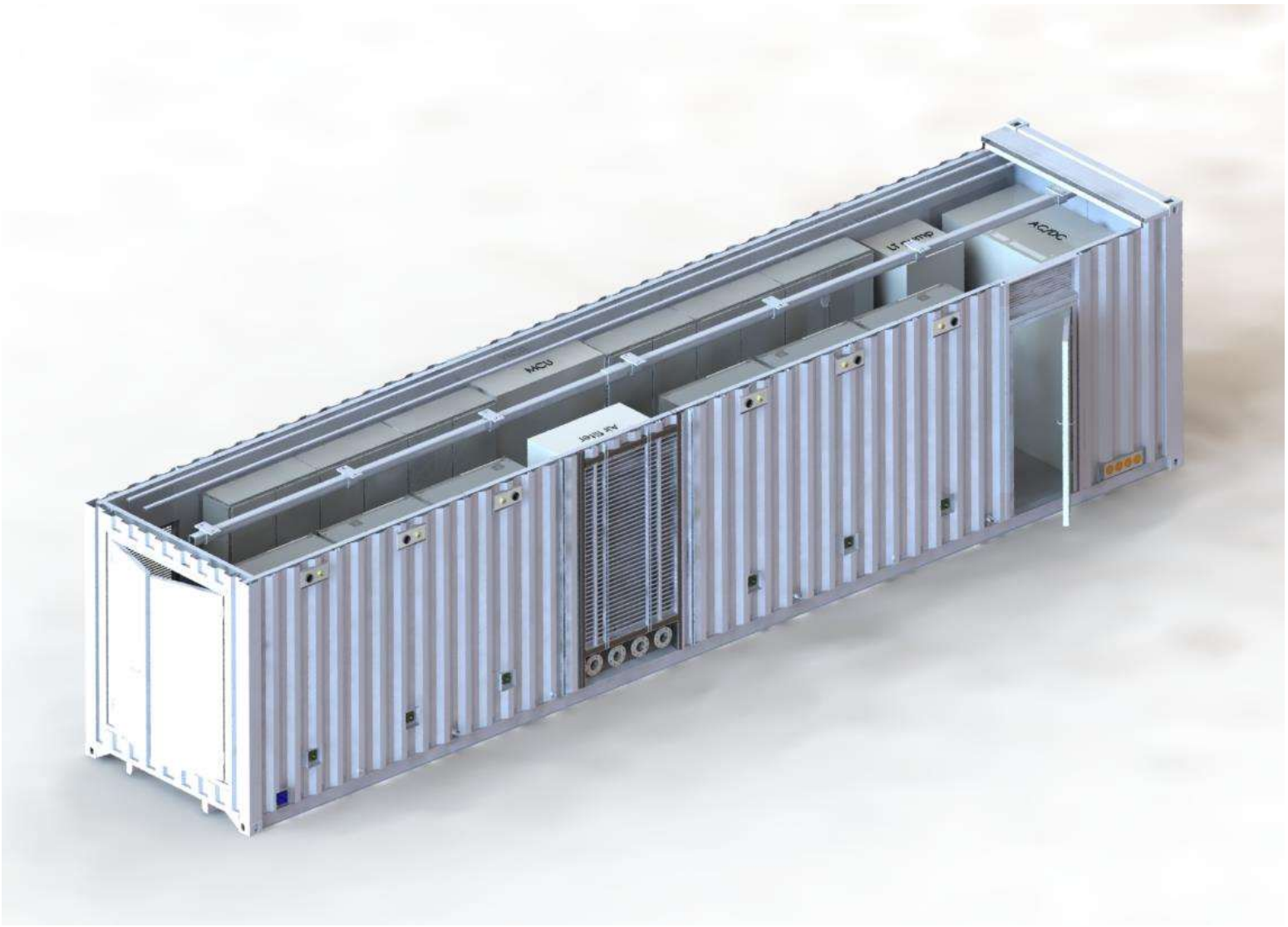


Figure 3. Visualization of the inside of the 40’ container (indicative).

The container contains the following main components:

1. Air filter with dampers and rain protection.
2. Container ventilation fans.
3. FCwave™ fuel cell modules.
4. H_2 intake manifold, incl. safety shut-off valves (opposite side).
5. Raised floor. Cooling, electrical, and interfacing is installed below the floor.
6. Container control unit (CCU) cabinet, which contains the computers and controls required to manage the container and all peripherals (e.g., coolers, transformer, power conditioning), manage load distribution and start/stop sequences as well as safety of the container. The CCU is the interface to the customer’s control system.
7. DC/DC cabinets for connecting each FCwave™ to a shared DC power bus, including necessary filters.
8. DC/AC cabinet for converting the full power capacity to the AC required, inclusive filters and connecting points for transformer.
9. Transformer to boost the AC output voltage to the customer-required voltage level (not shown).
10. Low temperature pump arrangements for cooling of power electronics, compressors, etc.
11. High temperature cooling for fuel cell stacks (not shown).
12. 2 access doors.
    The interior of the container is not to be considered a working area, and access should be prohibited during operation, unless by a trained service engineer.
13. Ventilation and process exhaust piping above FCwave™ (not shown).

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5.0 Water Drainage System

The fuel cell process will produce a max. of 18 L/min of deionized (DI) water at full load. For sizing purposes, it is assumed that all of this DI water condenses and exits through the process water drain. The DI water exiting from the system may be disposed of similar to tap water or reutilized for other purposes if needed by the customer.

The drainage system is internally designed so that it shall not freeze nor block the water flow. The drainage system outlet pipe is guided to the outside of the container, where care must be taken to ensure proper functionality, also during freezing.

6.0 Requirements for Upstream H_2 Delivery System

The integrator must provide sufficient hydrogen of quality, pressure, and temperature as specified in section 2.

The integrator must provide a block and bleed capability upstream of the module.

The hydrogen supply must be designed to prevent the inlet pressure to exceed 6.5 bar(g).

7.0 Hydrogen Safety

Every FCwave™ is equipped with a comprehensive safety system, preventing any leakages of Hydrogen inside the FCwave™ to develop into an explosive or flammable mixture. The safety system is verified and tested according to maritime safety codes and has been certified by the DNV for installation on ships.



Figure 4. FCwave™ module, hydrogen enclosure, and stack assembly.

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The FCwave™ module has been designed with a hydrogen enclosure. The hydrogen enclosure is a unique design concept, which allows to separate the hydrogen related components such as fuel cell stacks from the auxiliary electrical components and control units.

The internal hydrogen supply installation is made as double wall piping, with a ventilated outer tube. Any leaked hydrogen will escape outside and will not build up to an explosive atmosphere inside the container.

With the hydrogen enclosure and the double wall barrier, the container is not regarded as an Atex zone, and is furthermore ventilated during operation.

The immediate outlet of the exhaust is typically to be considered an Atex zone.

The safety system for each FCwave™ is integrated with the CCU safety controller, such that any error will lead to a warning or safe shutdown, depending on the severity. The container is equipped with hydrogen sensors, which are integrated into the safety system.

For more information, please refer to the Hydrogen Safety Concept document (K559-2254-CWIWP4202202-C99-001).

8.0 Control and Monitoring System

Included in the delivery from Ballard is a Container Control Unit (CCU) for the complete embedded control of the container and auxiliary equipment required for the container to operate safely. The CCU will monitor and manage the power production according to the power requested by the customer.

The CCU is the interface to the customer's control system. The customer must supply a control system for communication with the CCU via Modbus Ethernet. Communication is bidirectional, sending operating instructions to the CCU and receiving status and alarms from the CCU, preferably to be visualized for the operator (must be included in the SCADA supply).

The CCU includes the option for connecting a PC-based engineering interface typically used during commissioning and service.

9.0 Emergency Shutdown

Emergency shutdown for the Stationary fuel cell system is an event, in which the hydrogen flow is stopped immediately, and the currents and voltages of the fuel cell modules are brought down to zero. Hydrogen flow will be handled in the gas handling unit.

The emergency shutdown procedure for the container system can be triggered by any of the FCwave™ fuel cell controllers or the CCU (e.g., due to an unsafe operating state):

- a safety system trip.
- a hydrogen alarm.
- a fire/smoke alarm.
- fuel cell control system.
- the container safety system.

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10.0 Block Diagram

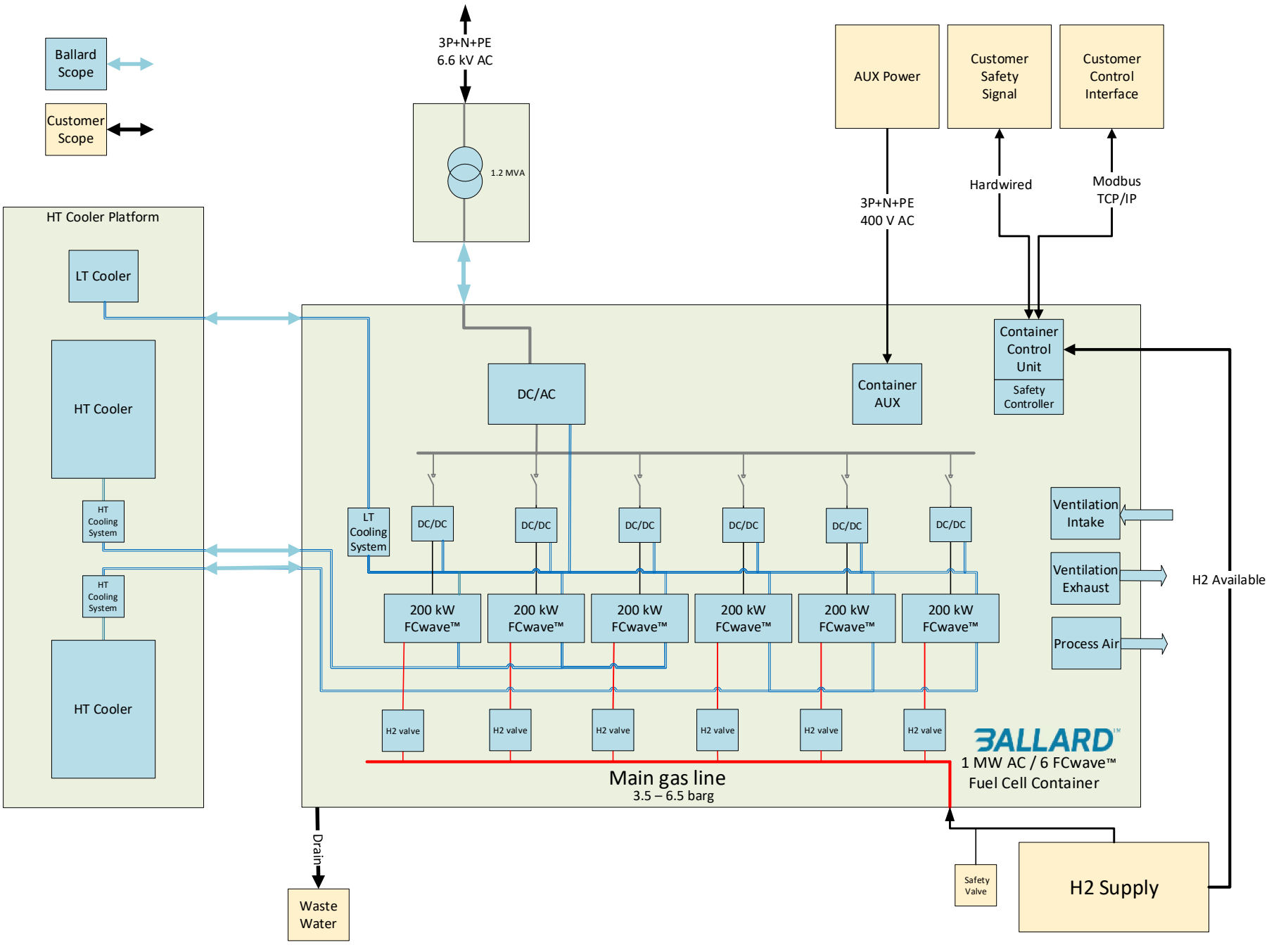
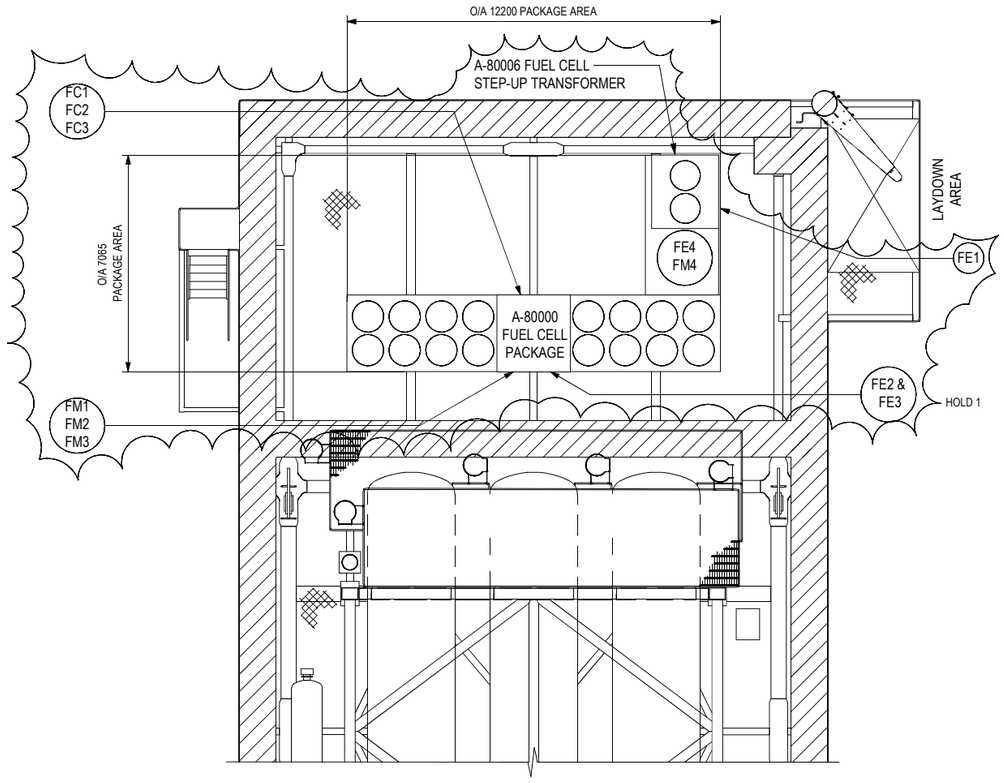


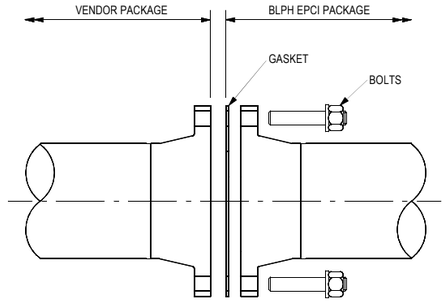
Figure 5. Block diagram of the 1 MW AC containerized solution.

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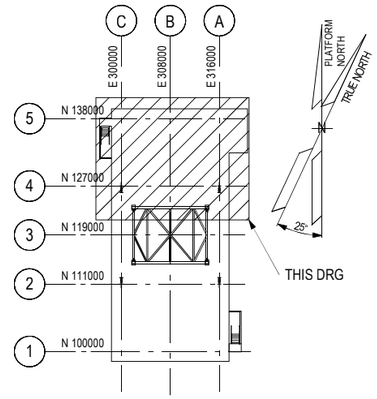
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PLAN ON UPPER DECK
EL+30.310 T.O.S.



STANDARD PIPING
INTERFACE DETAIL



KEYPLAN

NOTES

1. FOR GENERAL NOTES REFER TO DRG No. K559-2254-ST-GAS-001-001
2. FOR FUEL CELL VENDOR INTERFACE DOCUMENTS REFER TO : K559-2254-CWIWP4202202-D01-001 & B01-001.

LEGEND

- DENOTES PLATED DECK
- DENOTES OPEN GRATING
- ESCAPE/MATERIAL HANDLING ROUTE
- FE1 & FE2 — FUEL CELL RESPONSIBILITY MATRIX REFERENCE (SEE DRG K559-2254-EM-GAS-004-002)

HOLDS

1. FUEL CELL INTERFACES TO BE DETERMINED BY VENDOR.

K559-2254-PI-PPL-001-002	BASE LOAD POWER HUB PLOT PLAN
K559-2254-PI-PPL-001-001	BASE LOAD POWER HUB PLOT PLAN

REFERENCE DRAWINGS

2023-07-06 | 17:51 BST

REV	DATE	DESCRIPTIONS	ORG'D	CHK'D	APPR'D
1	06.07.23	ISSUED FOR INFORMATION	NC	MD/KR	JR
0	26.04.23	ISSUED FOR REVIEW	NC	MD/SA	JS

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SHELL BLPH FEED
FUEL CELL PACKAGE INTERFACE WITH BLPH TOPSIDES
GENERAL ARRANGEMENT

SCALE	1:100	DWG NO.:	SHEET	REV
FORMAT	A1	K559-2254-EM-GAS-004	001	1

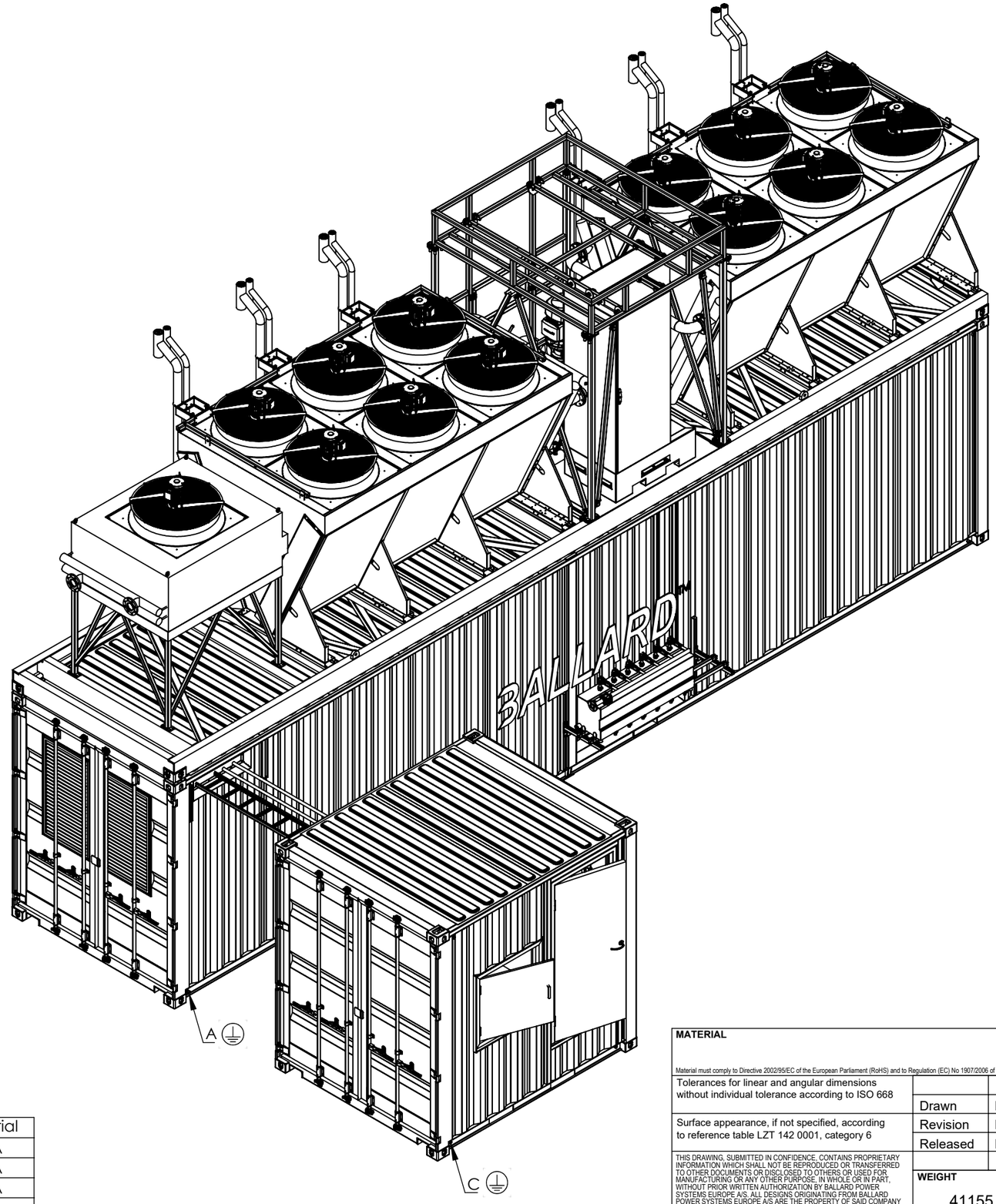
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Revision history		
Rev.	**Date.**	**Description**
001	03/03/2023	First Issue
002	11/04/2024	Updated/modified acc. to comments

Document Title:	**BLPH Project - Specials: Earthing Layout**
Document Number:	K559-2254-CWIWP4202202-E99-004
Revision:	Rev002
Sequence Number:	004
File Name:	K559-2254-CWIWP4202202-E99-004Rev002
Purchaser Job:	K559-2254
Purchase Order:	CWIWP4202202
Code:	E99
Requsition Number:	n/a
Customer:	CrossWind C.V., Rotterdam, The Netherlands

ISOMETRIC VIEW

Revision Table				
ZONE	REV.	DESCRIPTION	DATE	REV. BY
0	0	RELEASE	09/04/2024	PSZ



Point	Bolt size	Bolt length	Torque	Material
A	M12x1.5	25 mm	65 Nm	V2A
B	M12x1.5	25 mm	65 Nm	V2A
C	M12x1.5	25 mm	65 Nm	V2A
D	M12x1.5	25 mm	65 Nm	V2A

MATERIAL

Material must comply to Directive 2002/95/EC of the European Parliament (RoHS) and to Regulation (EC) No 1907/2006 of the European Parliament (Reach)

Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

	By	Date
Drawn	PSZ	09-04-2024
Revision	PSZ	09-04-2024
Released	PSZ	09-04-2024

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WEIGHT 41155 kg

1st angle projection

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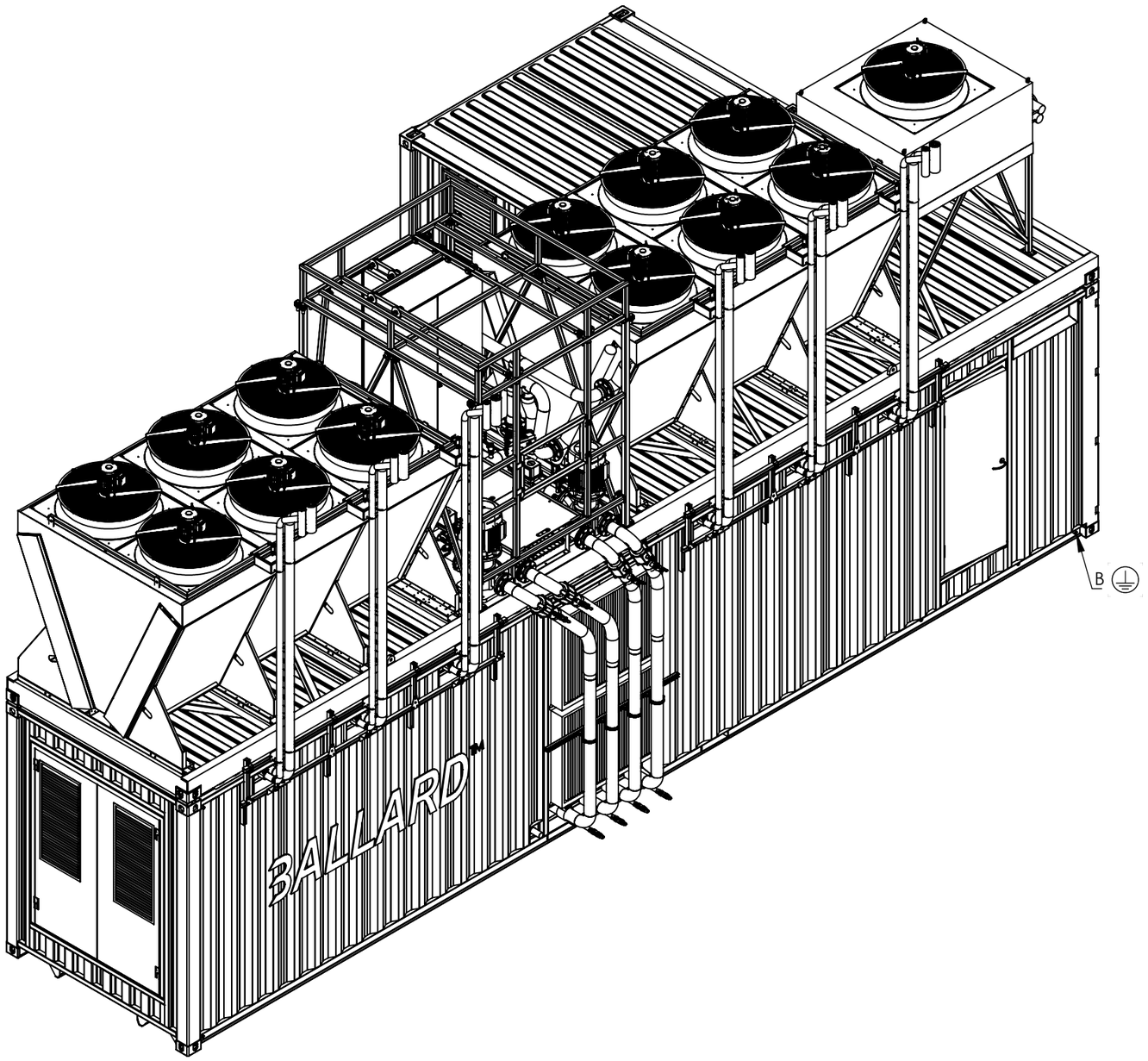
Ballard hydrogen system

ISOMETRIC VIEW

SIZE	SHEET	SCALE	PART NUMBER:	REVISION
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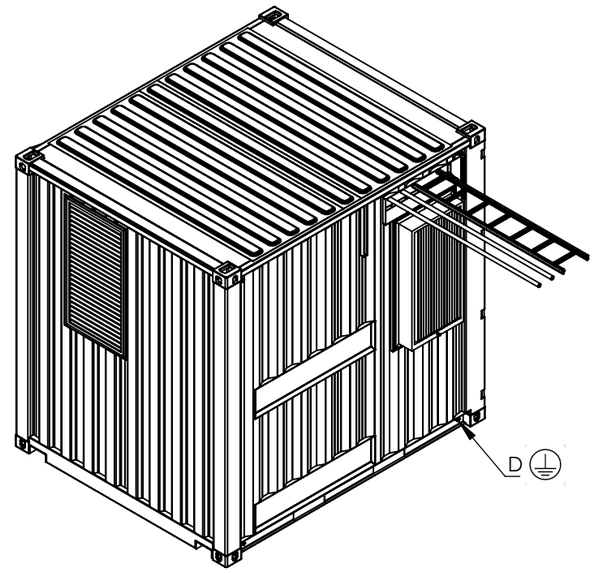
Revision Table				
ZONE	REV.	DESCRIPTION	DATE	REV. BY
0	0	RELEASE	09/04/2024	PSZ

ISOMETRIC VIEW - 40FT CONTAINER



ISOMETRIC VIEW - 10FT CONTAINER

(40ft container hidden)



Point	Bolt size	Bolt length	Torque	Material
A	M12x1.5	25 mm	65 Nm	V2A
B	M12x1.5	25 mm	65 Nm	V2A
C	M12x1.5	25 mm	65 Nm	V2A
D	M12x1.5	25 mm	65 Nm	V2A

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WEIGHT 41155 kg

1st angle projection

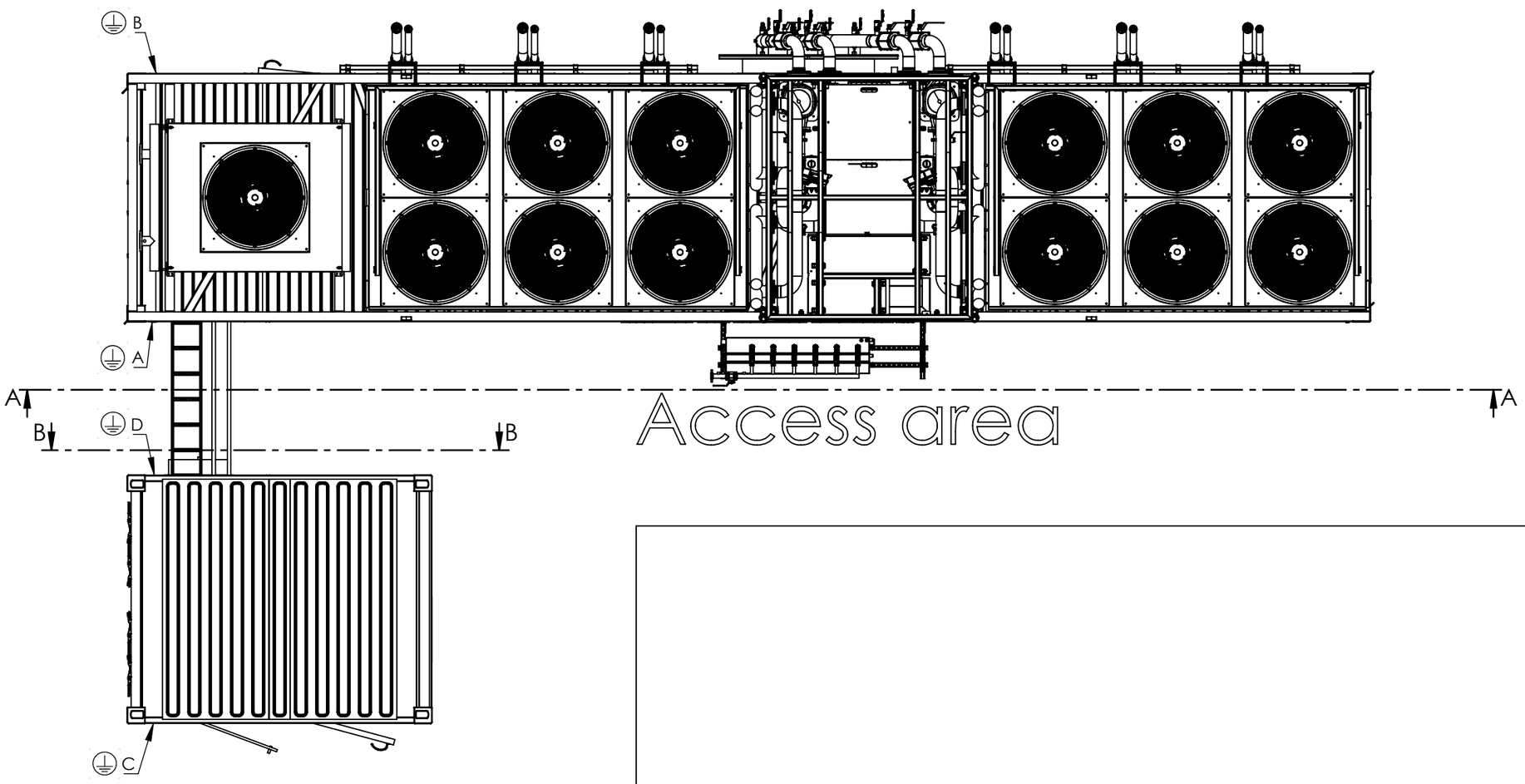
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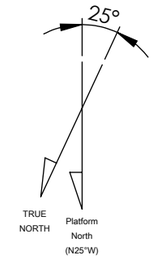
Ballard hydrogen system

ISOMETRIC VIEW - Back

SIZE	SHEET	SCALE	PART NUMBER:	REVISION
A3	2/6	1:50	E99-004	0

TOP VIEW - ACCESS AREA





Point	Bolt size	Bolt length	Torque	Material
A	M12x1.5	25 mm	65 Nm	V2A
B	M12x1.5	25 mm	65 Nm	V2A
C	M12x1.5	25 mm	65 Nm	V2A
D	M12x1.5	25 mm	65 Nm	V2A

MATERIAL

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	By	Date
Drawn	PSZ	09-04-2024
Revision	PSZ	09-04-2024
Released	PSZ	09-04-2024

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WEIGHT 41155 kg

1st angle projection

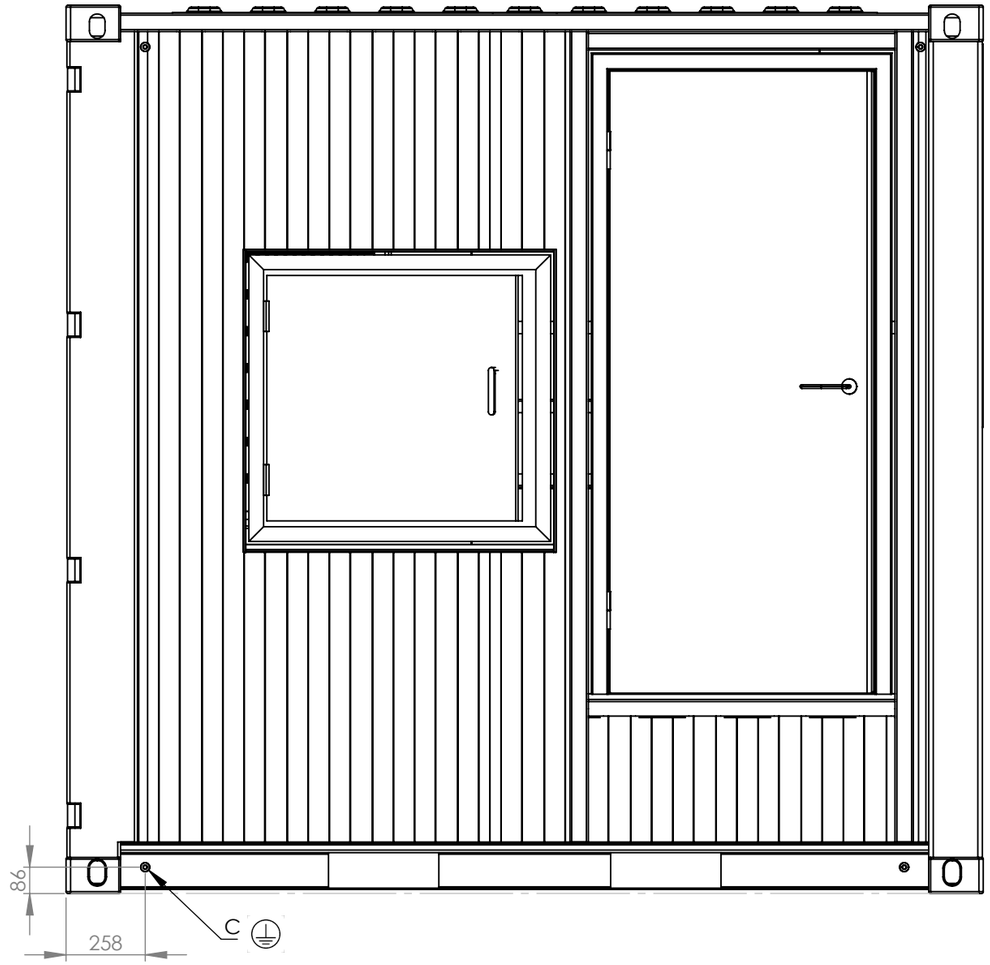
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Top - Access area

SIZE	SHEET	SCALE	PART NUMBER:	REVISION
A3	3/6	1:50	E99-004	0

FRONT VIEW - 10FT CONTAINER
(LOOKING SOUTH)



Point	Bolt size	Bolt length	Torque	Material
A	M12x1.5	25 mm	65 Nm	V2A
B	M12x1.5	25 mm	65 Nm	V2A
C	M12x1.5	25 mm	65 Nm	V2A
D	M12x1.5	25 mm	65 Nm	V2A

MATERIAL

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Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

	By	Date
Drawn	PSZ	09-04-2024
Revision	PSZ	09-04-2024
Released	PSZ	09-04-2024

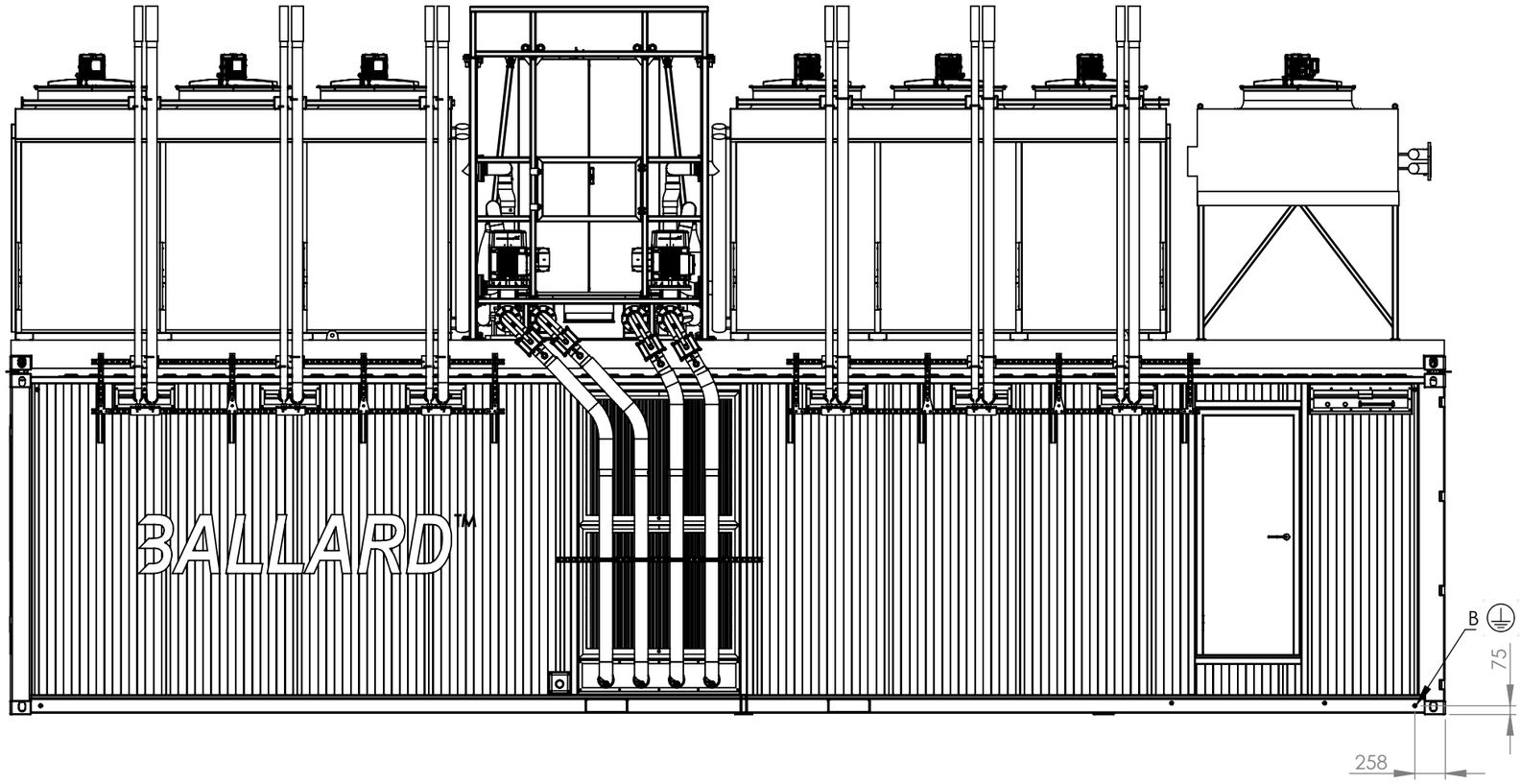
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FRONT

WEIGHT		SIZE	SHEET	SCALE	PART NUMBER:	REVISION
41155 kg	1st angle projection	A3	4/6	1:20	E99-004	0

BACK VIEW - 40FT CONTAINER
(LOOKING NORTH)



Point	Bolt size	Bolt length	Torque	Material
A	M12x1.5	25 mm	65 Nm	V2A
B	M12x1.5	25 mm	65 Nm	V2A
C	M12x1.5	25 mm	65 Nm	V2A
D	M12x1.5	25 mm	65 Nm	V2A

MATERIAL

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Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

Surface appearance, if not specified, according to reference table LZT 142 0001, category 6

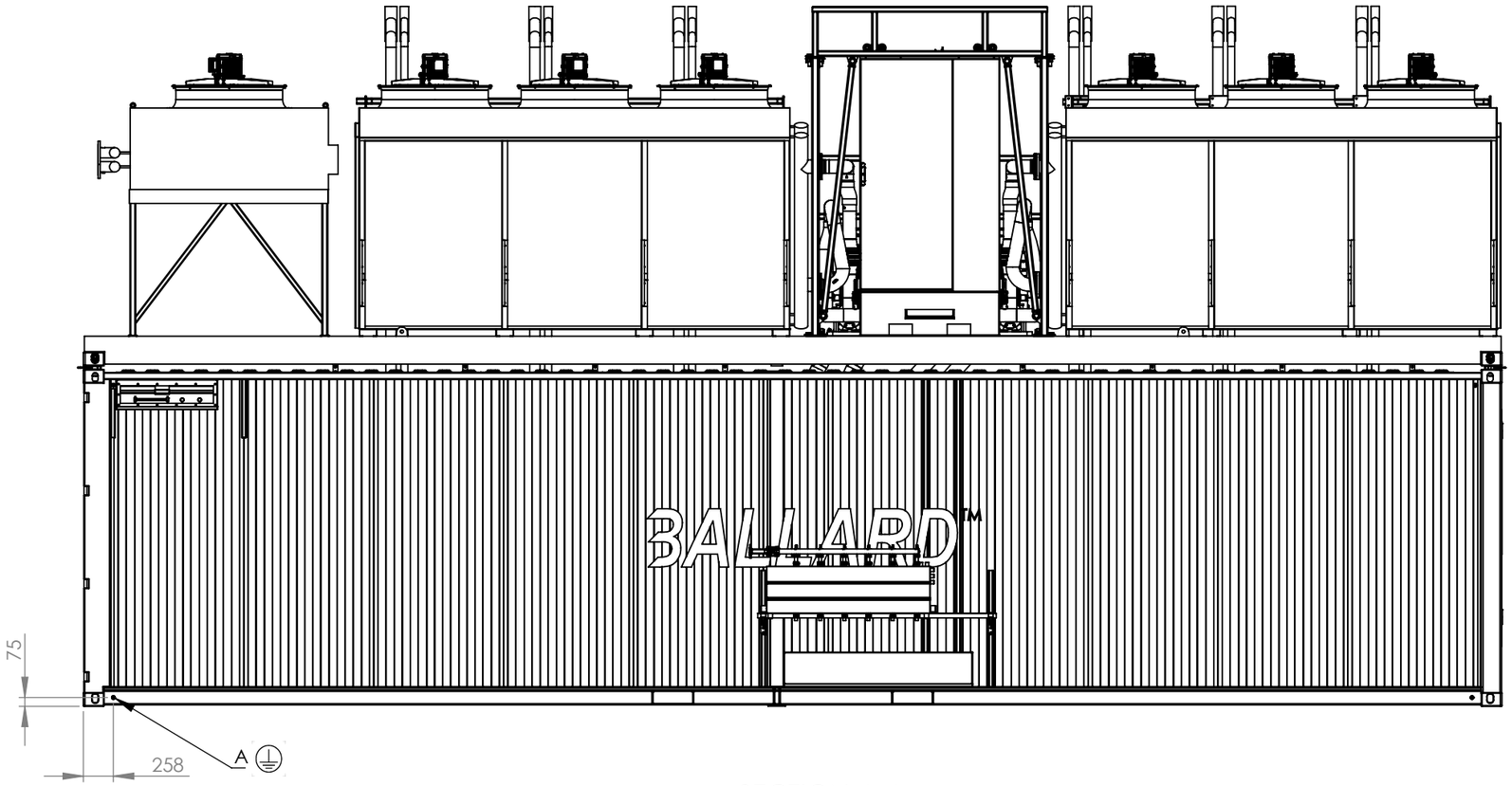
	By	Date
Drawn	PSZ	09-04-2024
Revision	PSZ	09-04-2024
Released	PSZ	09-04-2024

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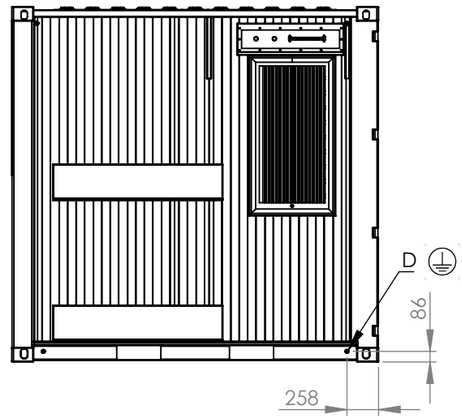
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BACK

WEIGHT		SIZE	SHEET	SCALE	PART NUMBER:	REVISION
41155 kg	1st angle projection	A3	5/6	1:50	E99-004	0



SECTION A-A



SECTION B-B

MATERIAL

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Tolerances for linear and angular dimensions without individual tolerance according to ISO 668

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Revision	PSZ	09-04-2024
Released	PSZ	09-04-2024

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Ballard hydrogen system

Cross sections

WEIGHT		SIZE	SHEET	SCALE	PART NUMBER:	REVISION
41155 kg	1st angle projection	A3	6/6	1:50	E99-004	0

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Revision history		
Rev.	**Date.**	**Description**
001	27/01/2023	First Issue
002	03/03/2023	Modified according to comments
003	17/05/2023	Updated according to comments
004	08/03/2024	Updated according to comments
005	16/10/2024	Updated according to comments and with changed water separator

Document Title:	**BLPH Project - P&IDs**
Document Number:	K559-2254-CWIWP4202202-C03-001
Revision:	Rev005
Sequence Number:	001
File Name:	K559-2254-CWIWP4202202-C03-001Rev005
Purchaser Job:	K559-2254
Purchase Order:	CWIWP4202202
Code:	C03
Requsition Number:	n/a
Customer:	CrossWind C.V., Rotterdam, The Netherlands

Process And Instrumentation Diagrams

Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS

Table of Contents

Higher-Level Function	Mounting Location	Page	Page Description	Last Modified Date
		1	P&ID Introduction	16-Oct-24
		2	Structure Identifier Overview	16-Oct-24
		3	Symbol List	15-Oct-24
		4	Hydrogen Supply System	15-Oct-24
		5	Hydrogen Supply System - BOM	16-Oct-24
		6	Process Exhaust and Drain	16-Oct-24
		7	HT1 Coolant System - Fuel Cells	16-Oct-24
		8	HT2 Coolant System - Fuel Cells	16-Oct-24
		9	LT Coolant System - Overview	16-Oct-24
		10	LT Coolant System - Fuel Cells	16-Oct-24
		11	LT Coolant System - Power Converters 1/2	16-Oct-24
		12	LT Coolant System - Power Converters 2/2	16-Oct-24
		13	LT Coolant System - BOM	16-Oct-24
		13.a	LT Coolant System - BOM	16-Oct-24
		14	Ventilation Air System - 40ft Container	16-Oct-24
		15	Ventilation Air System - 10ft Container	16-Oct-24

Reference Item Number	Ballard Part # TBD		
EPLAN Project Name	601456B - Shell Baseload Power Hub		
EPLAN Revision	03.P18		
EPLAN Project Pages	623		
=	++	+	& B02

REVISION INFORMATION
DESCRIPTION
DATE
16-Oct-24

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DRAWING	601456B C03 Process and Instrumentation Diagram	REVISION	03.P18	
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS			
SHEET TYPE/DESC	P&ID Introduction			
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A3	LANGUAGE EN	SHEET/TOTAL	1 / 12

Structure Identifier Overview

Functional Designation

Which function is associated with the components?

Structure identifier overview

Full designation	Labeling	Structure description
=AA01	Function designation	Container Interconnection
=BA01	Function designation	Power Conversion Block 1
=BA02	Function designation	Power Conversion Block 2
=BA20	Function designation	Power Conversion BOP
=BA30	Function designation	Power Conversion Output
=HA01	Function designation	Hydrogen Supply System
=HE01	Function designation	High Temperature Cooling Circuit #1
=HE02	Function designation	High Temperature Cooling System #2
=HE03	Function designation	Low Temperature Cooling Circuit
=JA01	Function designation	Container Ventilation System
=JA02	Function designation	Process Exhaust System
=JA03	Function designation	H2 Enclosure Ventilation
=JB01	Function designation	Condensate Drainage System
=LA01	Function designation	Container Control System
=LB02	Function designation	Container Safety System
=RE01	Function designation	Fuel Cell System 1
=RE02	Function designation	Fuel Cell System 2
=HKN70	Function designation	Baseload Power Hub
=EXT	Function designation	External Connection
=JB02	Function designation	Condensate Drainage System

Location Designation

Where is the component located?

Structure identifier overview

Full designation	Labeling	Structure description
+DA01	Location designation	Container #1 Inside
+DA02	Location designation	Container #1 Outside
+DA03	Location designation	Container #2 Inside
+DA04	Location designation	Container #2 Outside
+GB01	Location designation	FCwave Module #1
+GB02	Location designation	FCwave Module #2
+GB03	Location designation	FCwave Module #3
+GB04	Location designation	FCwave Module #4
+GB05	Location designation	FCwave Module #5
+GB06	Location designation	FCwave Module #6
+UC01	Location designation	DCDC Cabinet #1
+UC02	Location designation	DCDC Cabinet #2
+UC03	Location designation	DCDC Cabinet #3
+UC04	Location designation	DCDC Cabinet #4
+UC05	Location designation	DCDC Cabinet #5
+UC06	Location designation	DCDC Cabinet #6
+UC07	Location designation	Ventilation Cabinet
+UC10	Location designation	DCAC Cabinet Output
+UC20	Location designation	Control Cabinet (40ft)
+UC30	Location designation	Coolant Skid Control Cabinet
+UC31	Location designation	Control Cabinet (10ft)
+UC40	Location designation	Coolant Power Distribution
+UC41	Location designation	HT+LT VFD Cabinet
+UC50	Location designation	AC Power Distribution
+WZ10	Location designation	Container Interconnect Frame
+H2SS	Location designation	Hydrogen Supply (Ext)

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Symbol List

Process Engineering

Threaded Connection
Dissimilar male and female part
=+-XM00

Valve, Hand-actuated
Typically quarter-turn, lockable in both positions
=+-QM00

Wall-passthough
Penetration through enclosure or container
-XT01

Valve, solenoid-actuated
Electromagnetic shutoff valve, normally closed type
-QM00

Pipe fixed point
Eg pipe end or welding connection
-XM00

Valve, check
One-way flow control valve for gas for fluid
-RM00

Liquid cooling element
Cooling path of liquid cooled power electronics
-TA00

Cooling Tower, with fans
Suction type
=+-EG00

Pump, centrifugal, with motor
Suction type
-GP00

Hose, Flexible
-WP00

Exhaust, to free air
With weather shield
-WM00

Valve, Shut-off, Motorized, Modulating
Motorized Control Valve, gradual between 0-100%
-QN00

Vessel or tank
With volume indicated
=+-CL00
Volume XL

Flow restrictor or orifice
For limiting gas or fluid flow rate
-QN00

Reducer, concentric
With indication of size
-XM00

Ventilation and Heating

Heater, with fans
Space heating element, electric
-EB00

Damper, lamellar
For ventilation purposes
-QM00

Actuator, motor, modulating
For dampers or valves
=+-QM00.MA00

Fan, axial flow
With motor
-GQ00

Fan, radial flow
With motor
-GQ00

Sensor, Room
Sensor for sensing conditions in open space
-BT00

Sensor, Process
Sensor with process connection
-BT00

Filter, for air
Cooling path of liquid cooled power electronics
-FS00

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	601456B - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
= | ++	+ | & B02

REVISION INFORMATION	
DESCRIPTION	
DATE	
15-Oct-24	

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DRAWING	601456B C03 Process and Instrumentation Diagram	REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS		
SHEET TYPE/DESC	Symbol List		
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A1	LANGUAGE EN	SHEET/TOTAL 3 / 16

FRMS103653/08

Hydrogen Supply System - Fuel Cells 1-6

=RE01
Fuel Cell System 1

+GB01
FCwave 1

-XM01
20mm
H2 Supply Inlet

-WP_H2927
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

+GB02
FCwave 2

-XM01
20mm
H2 Supply Inlet

-WP_H2926
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

+GB03
FCwave 3

-XM01
20mm
H2 Supply Inlet

-WP_H2925
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

=RE02
Fuel Cell System 2

+GB04
FCwave 4

-XM01
20mm
H2 Supply Inlet

-WP_H2924
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

+GB05
FCwave 5

-XM01
20mm
H2 Supply Inlet

-WP_H2923
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

+GB06
FCwave 6

-XM01
20mm
H2 Supply Inlet

-WP_H2922
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

=HA01+DA02
Hydorgen Supply System, Container #1 Outside

-XT01
Wall pass-through

-WP_H2917
Hydrogen
3,5-6,5 barg
12 - 80°C
<4,9 g/s

Y V
QM21

=HA01+DA02-QM21
DN20
Shut-off Valve

-WP_H2907
Hydrogen
3,5-6,5 barg
12 - 80°C
<4,9 g/s

Y V
QM11

=HA01+DA02-QM11
DN20
Shut-off Valve

-XT02
Wall pass-through

-WP_H2916
Hydrogen
3,5-6,5 barg
12 - 80°C
<4,9 g/s

Y V
QM22

=HA01+DA02-QM22
DN20
Shut-off Valve

-WP_H2906
Hydrogen
3,5-6,5 barg
12 - 80°C
<4,9 g/s

Y V
QM12

=HA01+DA02-QM12
DN20
Shut-off Valve

-XT03
Wall pass-through

-WP_H2915
Hydrogen
3,5-6,5 barg
12 - 80°C
<4,9 g/s

Y V
QM23

=HA01+DA02-QM23
DN20
Shut-off Valve

-WP_H2905
Hydrogen
3,5-6,5 barg
12 - 80°C
<4,9 g/s

Y V
QM13

=HA01+DA02-QM13
DN20
Shut-off Valve

-XT04
Wall pass-through

-WP_H2914
Hydrogen
3,5-6,5 barg
12 - 80°C
<4,9 g/s

Y V
QM24

=HA01+DA02-QM24
DN20
Shut-off Valve

-WP_H2904
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

Y V
QM14

=HA01+DA02-QM14
DN20
Shut-off Valve

-XT05
Wall pass-through

-WP_H2913
Hydrogen
3,5-6,5 barg
12 - 80°C
<4,9 g/s

Y V
QM25

=HA01+DA02-QM25
DN20
Shut-off Valve

-WP_H2903
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

Y V
QM15

=HA01+DA02-QM15
DN20
Shut-off Valve

-XT06
Wall pass-through

-WP_H2912
Hydrogen
3,5-6,5 barg
12 - 80°C
<4,9 g/s

Y V
QM26

=HA01+DA02-QM26
DN20
Shut-off Valve

-WP_H2902
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

Y V
QM16

=HA01+DA02-QM16
DN20
Shut-off Valve

-BL01
SI = 11 mm
Ex Point Liquid Detection

BT01
PT1000 -40...150 °C
Liquid Temperature Sensor

-CM01
SS316, Volume 146L
Hydrogen Heater Vessel

-EA01
3x400V, 9kW, Ex
Heating Element 1

-EA02
3x400V, 9kW, Ex
Heating Element 2

-WP01
DN25, 3000m
Tube Coil

-WP02
DN25, 3000m
Tube Coil

-WP03
DN25, 3000m
Tube Coil

-WP04
DN25, 3000m
Tube Coil

-WP05
DN25, 3000m
Tube Coil

-WP06
DN25, 3000m
Tube Coil

-WP_H2947
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

H
=HA01+DA02-QM01
DN25
Isolation Valve, Lockable

-WP_H2946
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

H
=HA01+DA02-QM02
DN25
Isolation Valve, Lockable

-WP_H2945
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

H
=HA01+DA02-QM03
DN25
Isolation Valve, Lockable

-WP_H2944
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

H
=HA01+DA02-QM04
DN25
Isolation Valve, Lockable

-WP_H2943
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

H
=HA01+DA02-QM05
DN25
Isolation Valve, Lockable

-WP_H2942
Hydrogen
3,5-6,5 barg
-6,4 - 80°C
<4,9 g/s

H
=HA01+DA02-QM06
DN25
Isolation Valve, Lockable

=HKN70
Baseload Power Hub, Hydrogen Supply

0,9 - 29,4 g/s
-6,4 - 25°C
4,5 - 6,5 barg
Hydrogen

-XM01
DN32, EN1759-1, RF face
H2 Supply Connection
Flange Fitting

P T
BT01

=HA01+DA02-BP01
0...10 barg
Hydrogen Inlet
Pressure Transmitter

-WP_H2900
Hydrogen
3,5 - 6,5 barg
-6,4 - 80°C
0,9 - 29,4 g/s

H
=HA01+DA02-QM00
DN32
Manual shutoff valve
Lockable

-WP_H2901
Hydrogen
3,5 - 6,5 barg
-6,4 - 80°C
0,9 - 29,4 g/s

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	6014568 - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
= | ++	+ | & B02

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DRAWING	6014568 C03 Process and Instrumentation Diagram	REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS		
SHEET TYPE/DESC	Hydrogen Supply System		
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A1	LANGUAGE EN	SHEET/TOTAL 4 / 16

FRMS103653/08

Hydrogen Supply System - Fuel Cells 1-6

Bill of Materials / Parts List

Device tag	Qty	Unit	Description	Manufacturer		
				Name	Type Number	Order Number
-AC01-WG01	2	meter	ÖLFLEX CLASSIC 110 CH 18G0,75	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035051
-BL01	1	Piece	Electronic level sensor; Operating voltage 18...30 DC V; ATEX; M12 Connector; Gold-plated contacts	IFM Electronic AS	LMACE-A12E-QSKG-I/US/3D/3G	LMT01A
-BL01-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540
-BL01-XG01	0					
-BP01	1		Pressure Transducer, 0-10 barg, 4-20mA, ATEX, -25 to 85°C Ta, M12 Connector, 10..30 VDC, 2-wire, G1/2 Process Connection, FPM Seal	HUBA Controls AG	Pressure Transducer 520 Series	520930S04M801
-BP01-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540
-BP01-XG01	0					
-BT01	1	Piece	PT1000 Sensor Element, Ø10mm x 160mm, 4 wire connection, EN60751 Class A	IFM Electronic AS	TT-100KBBD10-...../US/	TT1050
-BT01-XG01	0					
-BT02-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540
-CM01	1		Hydrogen Heater System, Water bath heat exchanger, SS316L, Volume 146L	Ballard Power Systems Europe		
-CM01-EA01	1		Immersion Heater, 3x400V, 9kW, ATEX, IP66, Screw plug 2", ASTM A182 F316, Element Length 600m	JEVI Heating Elements AS		TBD
-CM01-EA02	1		Immersion Heater, 3x400V, 9kW, ATEX, IP66, Screw plug 2", ASTM A182 F316, Element Length 600m	JEVI Heating Elements AS		TBD
-CM01-WP01	1		Pipe coil, for H2 heater system. DN25 seamless pipe, 2mm wall, Stainless Steel 316L	Ballard Power Systems Europe		
-CM01-WP02	1		Pipe coil, for H2 heater system. DN25 seamless pipe, 2mm wall, Stainless Steel 316L	Ballard Power Systems Europe		
-CM01-WP03	1		Pipe coil, for H2 heater system. DN25 seamless pipe, 2mm wall, Stainless Steel 316L	Ballard Power Systems Europe		
-CM01-WP04	1		Pipe coil, for H2 heater system. DN25 seamless pipe, 2mm wall, Stainless Steel 316L	Ballard Power Systems Europe		
-CM01-WP05	1		Pipe coil, for H2 heater system. DN25 seamless pipe, 2mm wall, Stainless Steel 316L	Ballard Power Systems Europe		
-CM01-WP06	1		Pipe coil, for H2 heater system. DN25 seamless pipe, 2mm wall, Stainless Steel 316L	Ballard Power Systems Europe		
-EA01-WD01	1	meter	Screened control cable, 4G2.5mm2, LSZH	Lapp Group	ÖLFLEX® CLASSIC 135 CH	1123342
-EA02-WD01	1	meter	Screened control cable, 4G2.5mm2, LSZH	Lapp Group	ÖLFLEX® CLASSIC 135 CH	1123342
-QM00	1		Quarter-turn ball valve, lockabe, Size 1 1/2", Female NPT thread, Material: Body 316SS, Seals PTFE, Pressure <70 barg, Temp <200°C	Hy-Lok Corporation	110 Series Ball Valve	BVF-24N
-QM01	1		Quarter-turn ball valve, lockabe, Size 1", Female NPT thread, Material: Body 316SS, Seals PTFE, Pressure <70 barg, Temp <200°C	Hy-Lok Corporation	110 Series Ball Valves	BVF-16N
-QM02	1		Quarter-turn ball valve, lockabe, Size 1", Female NPT thread, Material: Body 316SS, Seals PTFE, Pressure <70 barg, Temp <200°C	Hy-Lok Corporation	110 Series Ball Valves	BVF-16N
-QM03	1		Quarter-turn ball valve, lockabe, Size 1", Female NPT thread, Material: Body 316SS, Seals PTFE, Pressure <70 barg, Temp <200°C	Hy-Lok Corporation	110 Series Ball Valves	BVF-16N
-QM04	1		Quarter-turn ball valve, lockabe, Size 1", Female NPT thread, Material: Body 316SS, Seals PTFE, Pressure <70 barg, Temp <200°C	Hy-Lok Corporation	110 Series Ball Valves	BVF-16N
-QM05	1		Quarter-turn ball valve, lockabe, Size 1", Female NPT thread, Material: Body 316SS, Seals PTFE, Pressure <70 barg, Temp <200°C	Hy-Lok Corporation	110 Series Ball Valves	BVF-16N
-QM06	1		Quarter-turn ball valve, lockabe, Size 1", Female NPT thread, Material: Body 316SS, Seals PTFE, Pressure <70 barg, Temp <200°C	Hy-Lok Corporation	110 Series Ball Valves	BVF-16N
-QM11	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM11-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-QM12	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM12-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-QM13	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM13-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-QM14	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM14-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-QM15	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM15-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-QM16	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM16-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-QM21	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM21-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-QM22	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM22-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-QM23	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM23-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-QM24	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM24-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-QM25	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM25-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-QM26	1		Solenoid Valve, Normally Closed, 3/4" Bore, ATEX for Hydrogen, Material: Body SS316, Seal, Diaphragm NBR, Pressure 0 to 16 barg	Emerson ASCO	NF X E210D488E 24/DC	NF X E210D488E 24/DC
-QM26-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056
-XD01	0					
-XM01	1		ASME B16.5 Flange	Neo Impex Stainless Pvt Ltd.	ASME-B16.5-DN32-SS316	
-XT01	1		Cable Gland, Ex, Stainless Steel, M40 for cables 22..32mm, IP66, IP68, UL Type 4X	Pepperl+Fuchs Group	CG Series Cable Glands, Metric	CG.NA.M40.SS.C.18.K01
-XT02	1		Cable Gland, Ex, Stainless Steel, M40 for cables 22..32mm, IP66, IP68, UL Type 4X	Pepperl+Fuchs Group	CG Series Cable Glands, Metric	CG.NA.M40.SS.C.18.K01

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	601456B - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
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FRM5103653/08

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DESCRIPTION	
DATE	16-Oct-24

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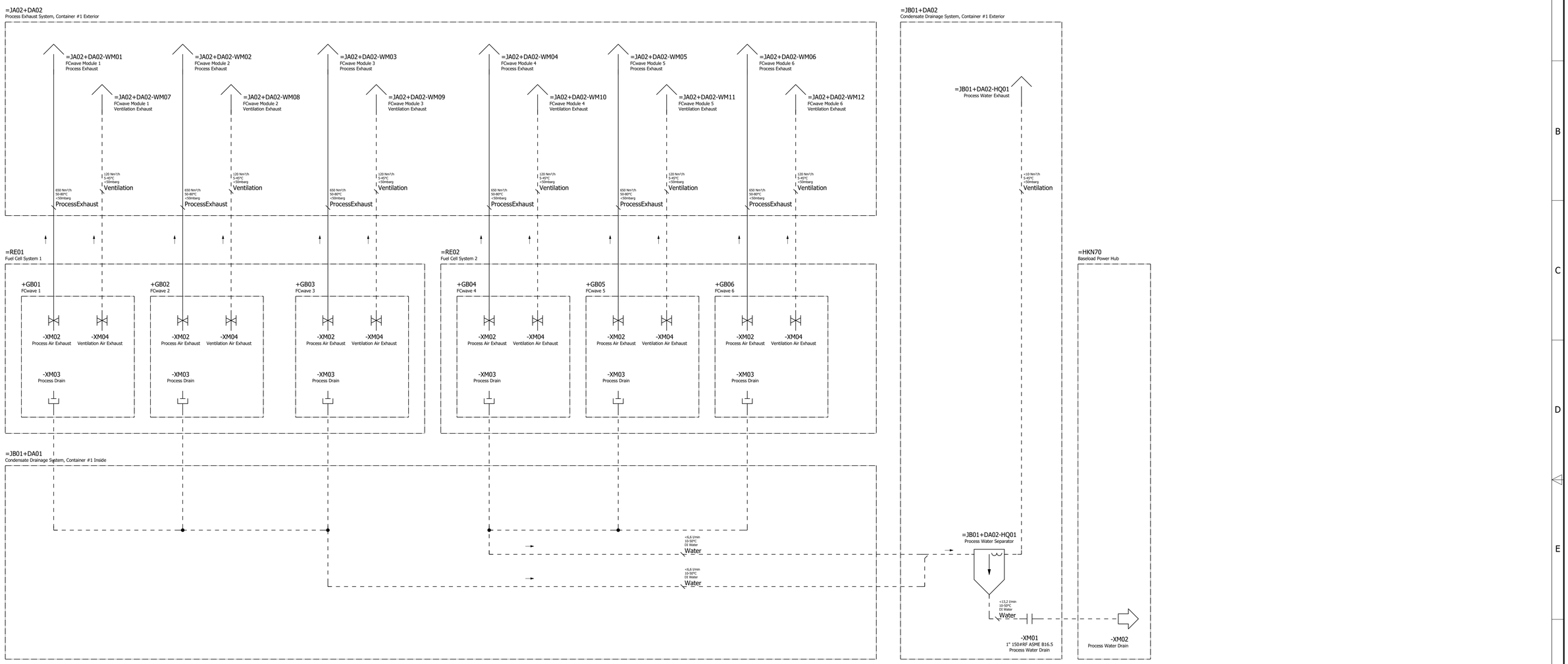
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DRAWING	601456B C03 Process and Instrumentation Diagram	REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS		
SHEET TYPE/DESC	Hydrogen Supply System - BOM		
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A1	LANGUAGE EN	SHEET/TOTAL 5 / 16

Process Exhaust, Ventilation Exhaust, Process Water Drain - Fuel Cells 1-6



Parts List

Device tag	Qty	Unit	Description	Manufacturer		
				Name	Type Number	Order Number
=JB01+DA02-HQ01	0					
=JB01+DA02-HQ01	1		Ventilation Exhaust, Megablock, 2", Stainless 316	Ballard Power Systems Europe		7001554
=JA02+DA02-WM01	1		Process Exhaust for FCwave, Megablock, 3" Stainless 316	Ballard Power Systems Europe		7001553
=JA02+DA02-WM02	1		Process Exhaust for FCwave, Megablock, 3" Stainless 316	Ballard Power Systems Europe		7001553
=JA02+DA02-WM03	1		Process Exhaust for FCwave, Megablock, 3" Stainless 316	Ballard Power Systems Europe		7001553
=JA02+DA02-WM04	1		Process Exhaust for FCwave, Megablock, 3" Stainless 316	Ballard Power Systems Europe		7001553
=JA02+DA02-WM05	1		Process Exhaust for FCwave, Megablock, 3" Stainless 316	Ballard Power Systems Europe		7001553
=JA02+DA02-WM06	1		Process Exhaust for FCwave, Megablock, 3" Stainless 316	Ballard Power Systems Europe		7001553
=JA02+DA02-WM07	1		Ventilation Exhaust, Megablock, 2", Stainless 316	Ballard Power Systems Europe		7001554
=JA02+DA02-WM08	1		Ventilation Exhaust, Megablock, 2", Stainless 316	Ballard Power Systems Europe		7001554
=JA02+DA02-WM09	1		Ventilation Exhaust, Megablock, 2", Stainless 316	Ballard Power Systems Europe		7001554
=JA02+DA02-WM10	1		Ventilation Exhaust, Megablock, 2", Stainless 316	Ballard Power Systems Europe		7001554
=JA02+DA02-WM11	1		Ventilation Exhaust, Megablock, 2", Stainless 316	Ballard Power Systems Europe		7001554
=JA02+DA02-WM12	1		Ventilation Exhaust, Megablock, 2", Stainless 316	Ballard Power Systems Europe		7001554
=JB01+DA02-XM01	1		Pipe End, Ø60.3mm, Material 1.4301	Ballard Power Systems Europe		5500231B-2891

Reference Item Number	Ballard Part # TBD		
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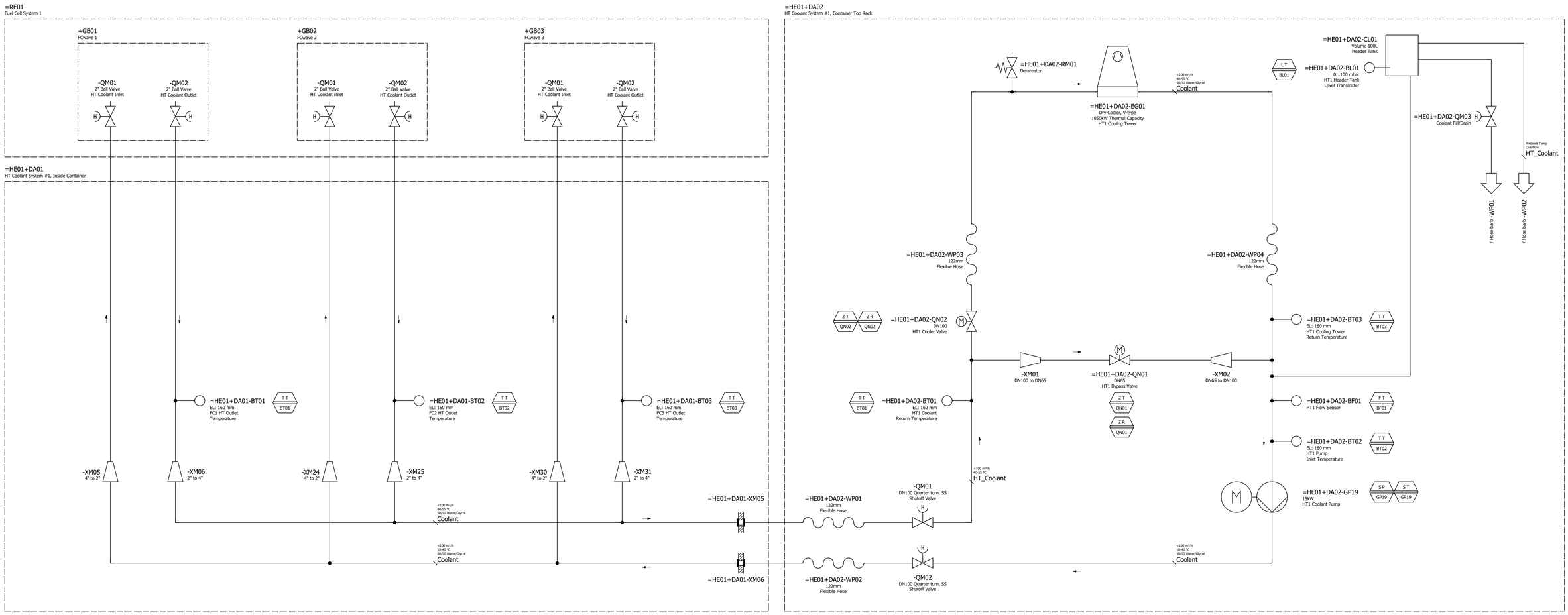
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REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS
SHEET TYPE/DESC	Process Exhaust and Drain
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A1 / LANGUAGE EN / SHEET/TOTAL 6 / 16

FRMS10365J/08

High Temperature Cooling System - Fuel Cells 1-3



Parts List

Device tag	Qty	Unit	Description	Manufacturer		
				Name	Type Number	Order Number
=HE01+DA02-BF01	1	Piece	Flow sensor	IFM Electronic AS	SAEXXXXB50KG/US-100	SA4104
=HE01+DA02-BL01	1	Piece	Pressure transmitter with ceramic measuring cell, DC, analogue signal	IFM Electronic AS	PA-,10BRBG14-A-ZVG/US/ /V	PA3589
=HE01+DA01-BT01	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE01+DA01-BT02	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE01+DA01-BT03	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE01+DA02-BT01	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE01+DA02-BT02	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE01+DA02-BT03	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE01+DA02-CL01	1		Header Tank, Volume 100L, AISI 304	Ballard Power Systems Europe	5500231B-3002	5500231B-3002
=HE01+DA02-EG01	1		Dry Cooler, 1050kW, With Ventilators (Offshore)	EVAPCO Europe A/S	VA091 Series Drycooler	VA091EWHHD-682-IHD-120-2,3-Sp
=HE01+DA02-GP19	1		Centrifugal pump, with electric motor, single-stage close coupled in line.	Grundfos AS	TP 100-310/2 X-F-A-BQQE-OW1	92886729
=HE01+DA02-QM01	1		Ball Valve, Stainless Steel, DN100, Weld Flange	Armatec DVCAS	DVC Type 1311	1311510100
=HE01+DA02-QM02	1		Ball Valve, Stainless Steel, DN100, Weld Flange	Armatec DVCAS	DVC Type 1311	1311510100
=HE01+DA02-QM03	0					
=HE01+DA02-QN01	1	piece	Valve act. 24...230V, 160 Nm, bus, IP66	Belimo Holding AG	PRCA-BAC-S2-T	PRCA-BAC-S2-T
=HE01+DA02-QN02	1	piece	Valve act. 24...230V, 160 Nm, bus, IP66	Belimo Holding AG	PRCA-BAC-S2-T	PRCA-BAC-S2-T
=HE01+DA02-RM01	1		De-aerator, For coolant containing 50% glycol, 21.3mm BSPT thread external	Sanistål	Flexvent 1/2"	
=HE01+DA02-WP01	1		Coolant Hose, 110x122mm, EPDM, 4barg	Radiacord	5.002.000.01604	NW110-122
=HE01+DA02-WP02	1		Coolant Hose, 110x122mm, EPDM, 4barg	Radiacord	5.002.000.01604	NW110-122
=HE01+DA02-WP03	1		Coolant Hose, 110x122mm, EPDM, 4barg	Radiacord	5.002.000.01604	NW110-122
=HE01+DA02-WP04	1		Coolant Hose, 110x122mm, EPDM, 4barg	Radiacord	5.002.000.01604	NW110-122

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	601456B - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
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REVISION INFORMATION	
DESCRIPTION	
DATE	16-Oct-24

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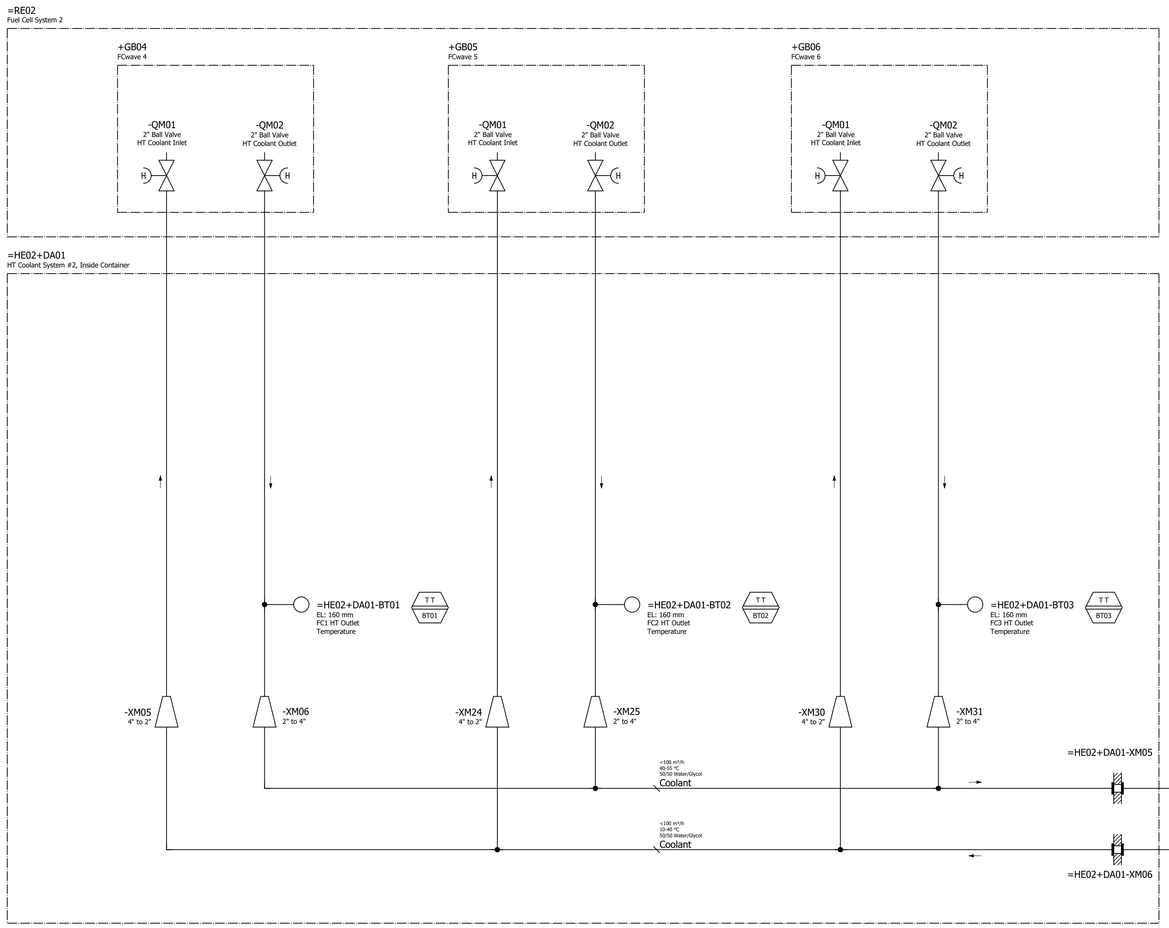
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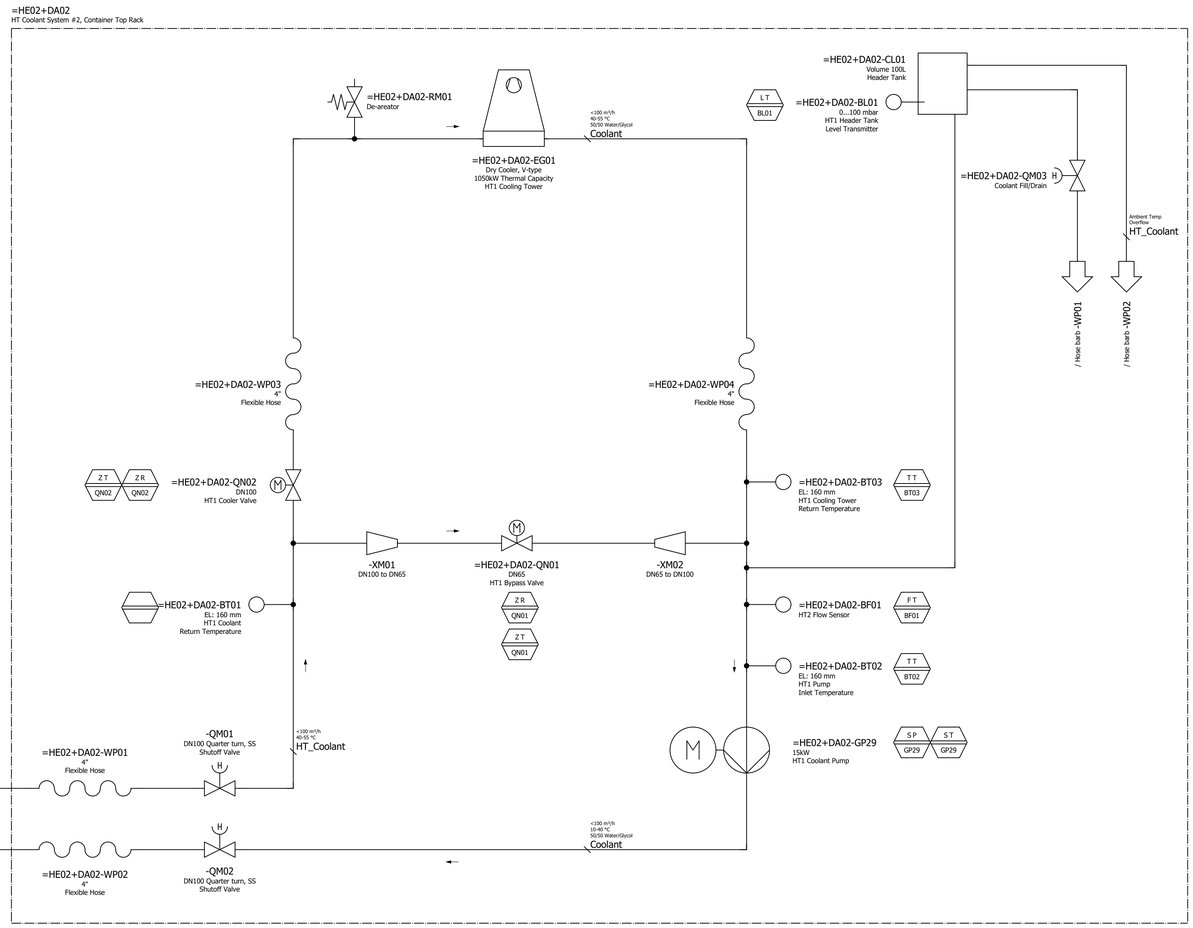
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DRAWING	601456B C03 Process and Instrumentation Diagram
REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS
SHEET TYPE/DESC	HT1 Coolant System - Fuel Cells
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A1 / LANGUAGE EN / SHEET/TOTAL 7 / 16

FRMS103653/0B

High Temperature Cooling System - Fuel Cells 4-6





Parts List

Device tag	Qty	Unit	Description	Manufacturer		
				Name	Type Number	Order Number
=HE02+DA02-BF01	1	Piece	Flow sensor	IFM Electronic AS	SAEXXXXB50KG/US-100	SA4104
=HE02+DA02-BL01	1	Piece	Pressure transmitter with ceramic measuring cell, DC, analogue signal	IFM Electronic AS	PA-,10BRBG14-A-ZVG/US/ /V	PA3589
=HE02+DA01-BT01	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE02+DA01-BT02	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE02+DA01-BT03	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE02+DA02-BT01	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE02+DA02-BT02	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE02+DA02-BT03	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE02+DA02-CL01	1		Header Tank, Volume 100L, AISI 304	Ballard Power Systems Europe	5500231B-3002	5500231B-3002
=HE02+DA02-EG01	1		Dry Cooler, 1050kW, With Ventilators (Offshore)	EVAPCO Europe A/S	VA091 Series Drycooler	VA091EWHHD-682-IHD-120-2,3-Sp
=HE02+DA02-GP29	1		Centrifugal pump, with electric motor, single-stage close coupled in line.	Grundfos AS	TP 100-310/2 X-F-A-BQQE-OW1	92886729
=HE02+DA02-QM01	1		Ball Valve, Stainless Steel, DN100, Weld Flange	Armatec DVCAS	DVC Type 1311	1311510100
=HE02+DA02-QM02	1		Ball Valve, Stainless Steel, DN100, Weld Flange	Armatec DVCAS	DVC Type 1311	1311510100
=HE02+DA02-QM03	0					
=HE02+DA02-QN01	1	piece	Valve act. 24...230V, 160 Nm, bus, IP66	Belimo Holding AG	PRCA-BAC-S2-T	PRCA-BAC-S2-T
=HE02+DA02-QN02	1	piece	Valve act. 24...230V, 160 Nm, bus, IP66	Belimo Holding AG	PRCA-BAC-S2-T	PRCA-BAC-S2-T
=HE02+DA02-RM01	1		De-aerator, For coolant containing 50% glycol, 21.3mm BSPT thread external	Sanistål	Flexvent 1/2"	
=HE02+DA02-WP01	1		Coolant Hose, 110x122mm, EPDM, 4barg	Radiacord	5.002.000.01604	NW110-122
=HE02+DA02-WP02	1		Coolant Hose, 110x122mm, EPDM, 4barg	Radiacord	5.002.000.01604	NW110-122
=HE02+DA02-WP03	1		Coolant Hose, 110x122mm, EPDM, 4barg	Radiacord	5.002.000.01604	NW110-122
=HE02+DA02-WP04	1		Coolant Hose, 110x122mm, EPDM, 4barg	Radiacord	5.002.000.01604	NW110-122

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	601456B - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
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DATE	16-Oct-24

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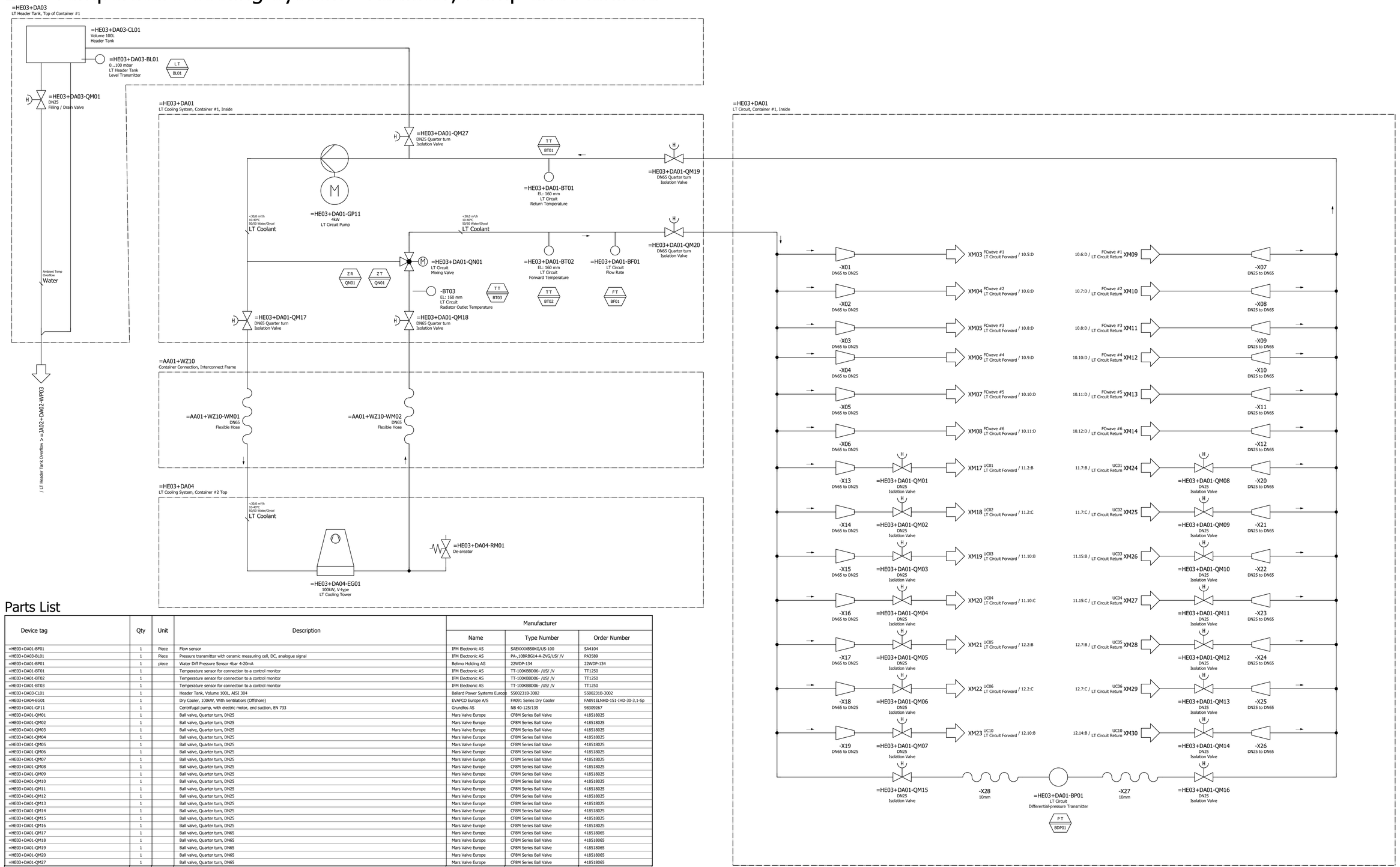
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DRAWING	601456B C03 Process and Instrumentation Diagram
REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS
SHEET TYPE/DESC	HT2 Coolant System - Fuel Cells
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A1 | LANGUAGE EN | SHEET/TOTAL 8 / 16

FRMS103653/0B

Low Temperature Cooling System - Radiator, Pump and Manifold



Parts List

Device tag	Qty	Unit	Description	Manufacturer		
				Name	Type Number	Order Number
=HE03+DA01-BF01	1	Piece	Flow sensor	IFM Electronic AS	SAEXXXXB50KG/US-100	SA4104
=HE03+DA03-BL01	1	Piece	Pressure transmitter with ceramic measuring cell, DC, analogue signal	IFM Electronic AS	PA-,108RBG14-A-ZVG/US/ /V	PA3589
=HE03+DA01-BP01	1	piece	Water Diff Pressure Sensor 4bar 4-20mA	Belimo Holding AG	22WDP-134	22WDP-134
=HE03+DA01-BT01	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE03+DA01-BT02	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE03+DA01-BT03	1		Temperature sensor for connection to a control monitor	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250
=HE03+DA03-CL01	1		Header Tank, Volume 100L, AISI 304	Ballard Power Systems Europe	S500231B-3002	S500231B-3002
=HE03+DA04-EG01	1		Dry Cooler, 100kW, With Ventilators (Offshore)	EVAPCO Europe A/S	FA091 Series Dry Cooler	FA091ELNHD-151-IHD-30-3,1-Sp
=HE03+DA01-GP11	1		Centrifugal pump, with electric motor, end suction, EN 733	Grundfos AS	NB 40-125/139	98309267
=HE03+DA01-QM01	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM02	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM03	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM04	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM05	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM06	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM07	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM08	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM09	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM10	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM11	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM12	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM13	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM14	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM15	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM16	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QM17	1		Ball valve, Quarter turn, DN65	Mars Valve Europe	CF8M Series Ball Valve	418S18065
=HE03+DA01-QM18	1		Ball valve, Quarter turn, DN65	Mars Valve Europe	CF8M Series Ball Valve	418S18065
=HE03+DA01-QM19	1		Ball valve, Quarter turn, DN65	Mars Valve Europe	CF8M Series Ball Valve	418S18065
=HE03+DA01-QM20	1		Ball valve, Quarter turn, DN65	Mars Valve Europe	CF8M Series Ball Valve	418S18065
=HE03+DA01-QM27	1		Ball valve, Quarter turn, DN65	Mars Valve Europe	CF8M Series Ball Valve	418S18065
=HE03+DA03-QM01	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S18025
=HE03+DA01-QN01	1		3-way flow control valve, Stainless steel, Internal thread, DN50, PN25	Belimo Holding AG	H3S Series Globe Valve	H350S-P
=HE03+DA01-QN01.MA01	1		Actuator, for globe valves, modulating, 1500N force	Belimo Holding AG	SVC Series Modulaing Actuators	SVC24A-SR-TPC
=HE03+DA04-RM01	1		De-aerator, Stainless, For coolant containing 50% glycol, 3/8"	Brdr AO Johansen	Aeromat Series	
=HE03+DA01-X27	1		Polyamide Flexible Tubing, Ø10x8,0	Parker Hannifin		100P1000
=HE03+DA01-X28	1		Polyamide Flexible Tubing, Ø10x8,0	Parker Hannifin		100P1000

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	6014568 - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
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REVISION INFORMATION
DESCRIPTION
DATE
16-Oct-24

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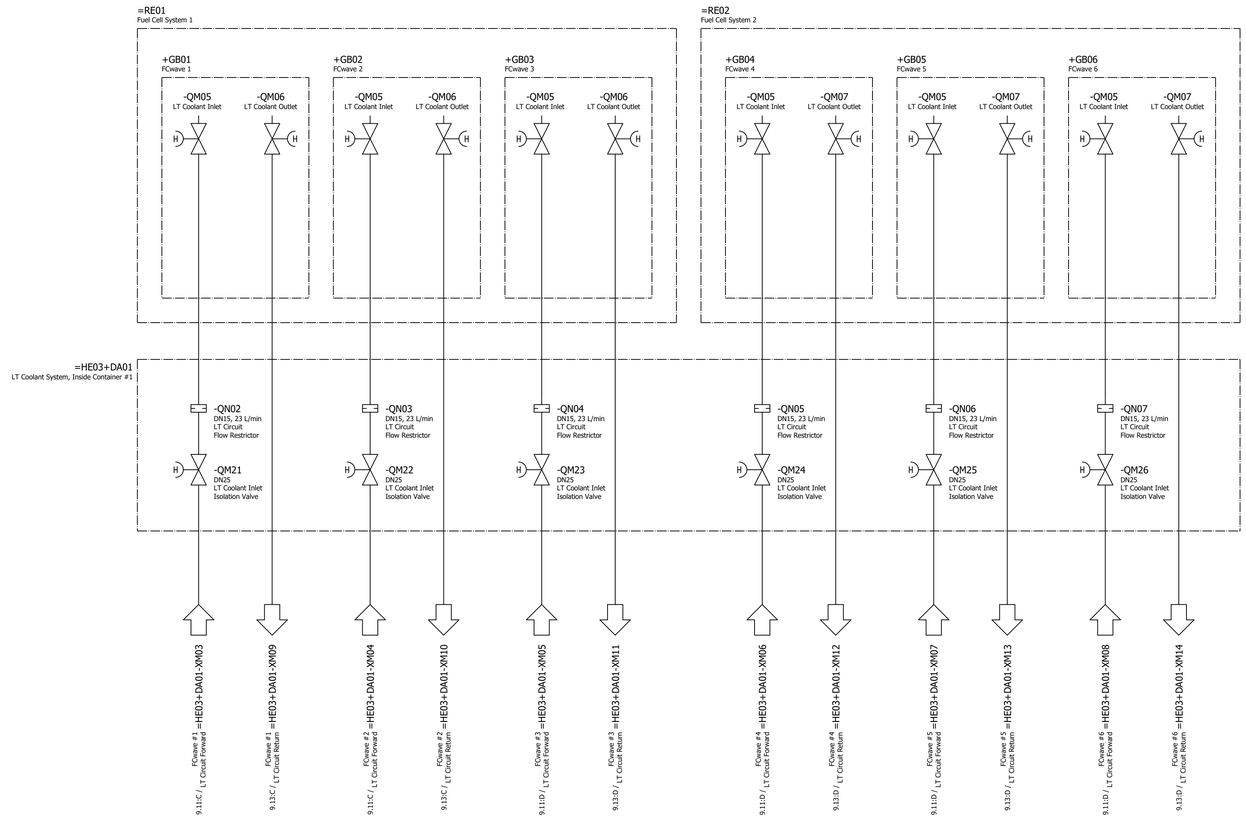
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DRAWING	6014568 C03 Process and Instrumentation Diagram
REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS
SHEET TYPE/DESC	LT Coolant System - Overview
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A1 | LANGUAGE EN | SHEET/TOTAL 9 / 16

FRMS103653/08

Low Temperature Cooling System - Fuel Cell Connections



Parts List

Device tag	Qty	Unit	Description	Manufacturer		
				Name	Type Number	Order Number
=HE03+DA01-QM21	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S1802S
=HE03+DA01-QM22	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S1802S
=HE03+DA01-QM23	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S1802S
=HE03+DA01-QM24	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S1802S
=HE03+DA01-QM25	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S1802S
=HE03+DA01-QM26	1		Ball valve, Quarter turn, DN25	Mars Valve Europe	CF8M Series Ball Valve	418S1802S
=HE03+DA01-QN02	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP
=HE03+DA01-QN03	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP
=HE03+DA01-QN04	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP
=HE03+DA01-QN05	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP
=HE03+DA01-QN06	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP
=HE03+DA01-QN07	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	601456B - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
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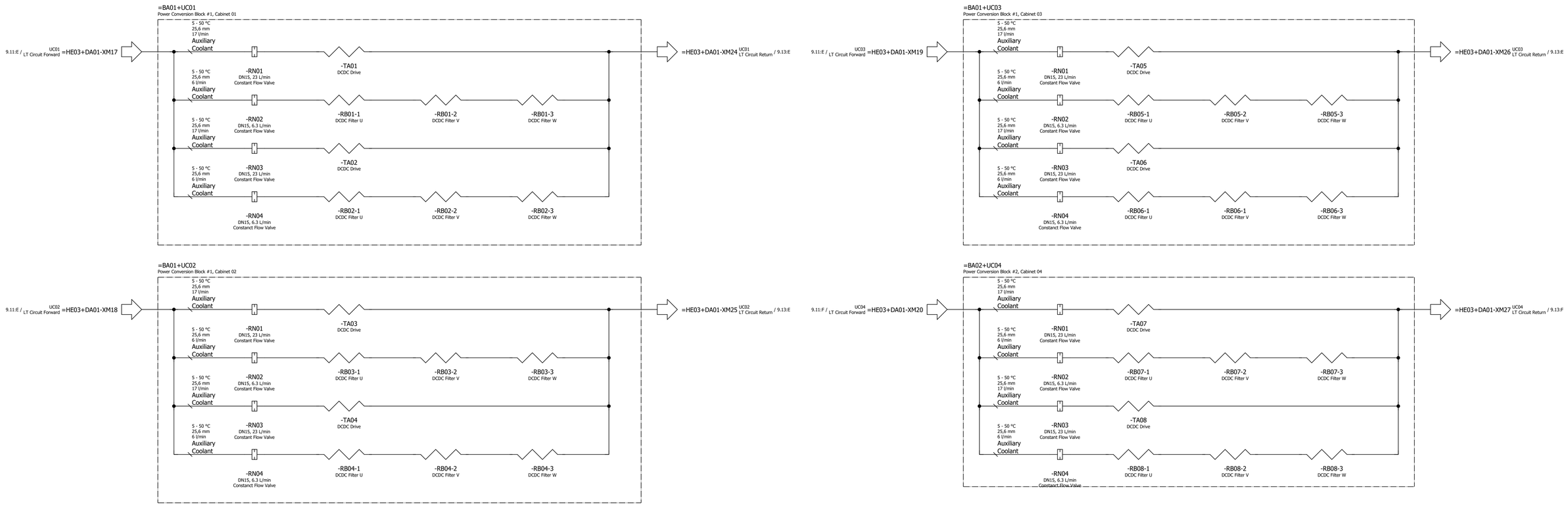
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DRAWING	601456B C03 Process and Instrumentation Diagram
REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS
SHEET TYPE/DESC	LT Coolant System - Fuel Cells
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A1 / LANGUAGE EN / SHEET/TOTAL 10 / 16

FRM510365 3/08

Low Temperature Cooling System - Power Converter Connections 1/2



Parts List

Device tag	Qty	Unit	Description	Manufacturer		
				Name	Type Number	Order Number
=BA01+UC01-RB01-1	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC01-RB01-2	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC01-RB01-3	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC01-RB02-1	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC01-RB02-2	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC01-RB02-3	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC02-RB03-1	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC02-RB03-2	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC02-RB03-3	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC02-RB04-1	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC02-RB04-2	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC02-RB04-3	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC03-RB05-1	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC03-RB05-2	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC03-RB05-3	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC03-RB06-1	2		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC03-RB06-3	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	18IB5969	
=BA01+UC01-RN01	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP
=BA01+UC01-RN02	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		117115P63LP
=BA01+UC01-RN03	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP
=BA01+UC01-RN04	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		117115P63LP
=BA01+UC02-RN01	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP
=BA01+UC02-RN02	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		117115P63LP
=BA01+UC02-RN03	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP
=BA01+UC02-RN04	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		117115P63LP
=BA01+UC03-RN01	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP
=BA01+UC03-RN02	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		117115P63LP
=BA01+UC03-RN03	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP
=BA01+UC03-RN04	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		117115P63LP
=BA01+UC01-TA01	1		Heat exchanger, Frame FR8 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FR08901
=BA01+UC01-TA02	1		Heat exchanger, Frame FR8 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FR08901
=BA01+UC02-TA03	1		Heat exchanger, Frame FR8 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FR08901
=BA01+UC02-TA04	1		Heat exchanger, Frame FR8 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FR08901
=BA01+UC03-TA05	1		Heat exchanger, Frame FR8 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FR08901

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	6014568 - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
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REVISION INFORMATION	
DESCRIPTION	
DATE	16-Oct-24

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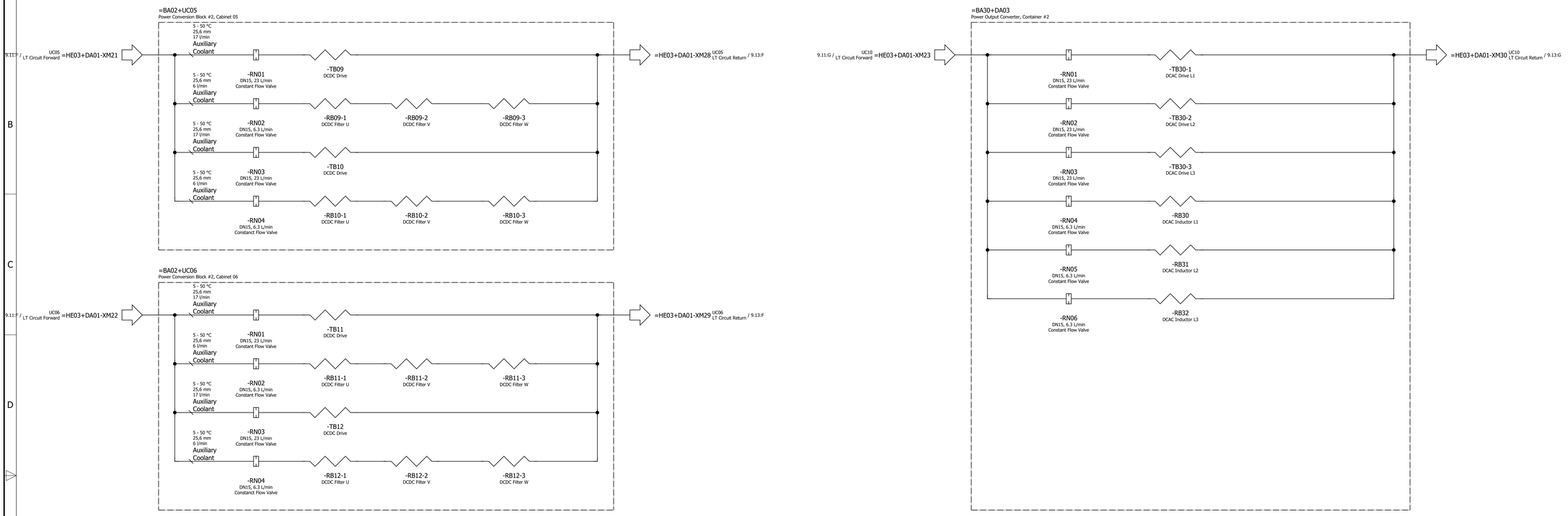
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DRAWING	6014568 C03 Process and Instrumentation Diagram
REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS
SHEET TYPE/DESC	LT Coolant System - Power Converters 1/2
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A1 | LANGUAGE EN | SHEET/TOTAL 11 / 16

FRMS103653/08

Low Temperature Cooling System - Power Converter Connections 2/2



Parts List

Device tag	Qty	Unit	Description	Manufacturer		
				Name	Type Number	Order Number
=BA02+UC05-RB09-1	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA02+UC05-RB09-2	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA02+UC05-RB09-3	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA02+UC05-RB10-1	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA02+UC05-RB10-2	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA02+UC05-RB10-3	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA02+UC06-RB11-1	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA02+UC06-RB11-2	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA02+UC06-RB11-3	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA02+UC06-RB12-1	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA02+UC06-RB12-2	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA02+UC06-RB12-3	1		Heat Exchanger, for liquid cooled DC inductors, 168A, 1050V	QA Trafotek Oy	181B5969	
=BA30+DA03-RB30	1		Heat exchanger, Frame CH64 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FW64905
=BA30+DA03-RB31	1		Heat exchanger, Frame CH64 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FW64905
=BA30+DA03-RB32	1		Heat exchanger, Frame CH64 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FW64905
=BA02+UC05-RN01	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		11711SP230LP
=BA02+UC05-RN02	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		11711SP63LP
=BA02+UC05-RN03	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		11711SP230LP
=BA02+UC05-RN04	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		11711SP63LP
=BA02+UC06-RN01	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		11711SP230LP
=BA02+UC06-RN02	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		11711SP63LP
=BA02+UC06-RN03	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		11711SP230LP
=BA02+UC06-RN04	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		11711SP63LP
=BA30+DA03-RN01	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		11711SP230LP
=BA30+DA03-RN02	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		11711SP63LP
=BA30+DA03-RN03	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		11711SP63LP
=BA30+DA03-RN04	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		11711SP63LP
=BA30+DA03-RN05	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		11711SP63LP
=BA30+DA03-RN06	1		Valve, Constant Flow, DN15, 6.3 L/min	Bertfeld Teknik AB		11711SP63LP
=BA02+UC05-TB09	1		Heat exchanger, Frame FR8 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FR08901
=BA02+UC05-TB10	1		Heat exchanger, Frame FR8 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FR08901
=BA02+UC06-TB11	1		Heat exchanger, Frame FR8 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FR08901
=BA02+UC06-TB12	1		Heat exchanger, Frame FR8 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FR08901
=BA30+DA03-TB30-1	1		Heat exchanger, Frame CH64 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FW64905
=BA30+DA03-TB30-2	1		Heat exchanger, Frame CH64 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FW64905
=BA30+DA03-TB30-3	1		Heat exchanger, Frame CH64 for NXP series	Danfoss	FR8 Chassis Heat Exhanger	FW64905

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	6014568 - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
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FRM5103653/0B

REVISION INFORMATION	
DESCRIPTION	
DATE	
16-Oct-24	

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DRAWING	6014568 C03 Process and Instrumentation Diagram	REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS		
SHEET TYPE/DESC	LT Coolant System - Power Converters 2/2		
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A1	LANGUAGE EN	SHEET/TOTAL 12 / 16

0	1	2	3	4	5	6	7	8

Bill of Materials / Parts List

Device tag	Qty	Unit	Description	Manufacturer			
				Name	Type Number	Order Number	
-BF01	1	Piece	Flow sensor, Connector: 1 x M12; coding: A; Contacts: gold-plated	IFM Electronic AS	SAEXXXXB50KG/US-100	SA4104	
-BF01-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540	
-BF01-XD01	0						
-BF01-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540	
-BF01-XG01	0						
-BL01-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540	
-BL01-XG01	0						
-BL01	1	Piece	Pressure transmitter with ceramic measuring cell, DC, analogue signal	IFM Electronic AS	PA-,10BRBG14-A-ZVG/US/ /V	PA3589	
-BP01	1	piece	Differential Pressure Sensor Water 0...4 bar AC/DC 24 V, Output signal 0...10 V	Belimo Holding AG	22WDP-134	22WDP-134	
-BP01-WG01	1	meter	ÖLFLEX CLASSIC 110 CH 3G1	Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035056	
-BP01-XD01	0						
-BP02	0						
-BP02-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540	
-BP02-XG01	0						
-BP03-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540	
-BP03-XG01	0						
-BP04	0						
-BP04-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540	
-BP04-XG01	0						
-BP05	0						
-BP05-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540	
-BP05-XG01	0						
-BP06	0						
-BP06-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540	
-BP06-XG01	0						
-BP07	0						
-BP07-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540	
-BP07-XG01	0						
-BT01	1		PT1000 Sensor Element, Length 160mm to M12, A code connector. 3/4 wire measurement	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250	
-BT02	1		PT1000 Sensor Element, Length 160mm to M12, A code connector. 3/4 wire measurement	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250	
-BT03	1		PT1000 Sensor Element, Length 160mm to M12, A code connector. 3/4 wire measurement	IFM Electronic AS	TT-100KBBD06- /US/ /V	TT1250	
-BT04-XG01	0						
-BT05-XG01	0						
-BT05-WG01	1	Piece	Connecting cable with socket; 4x0.34mm2, AC/DC < 50 V; 10 m M12 to open end; LSZH	IFM Electronic AS	ADOGH040MSS0010K04	EVC540	
-BT05-XG01	0						
-CL01	1		Header Tank, Volume 100L, AISI 304	Ballard Power Systems Europe	5500231B-3002	5500231B-3002	
-EG01	1		Dry Cooler, 100kW, With Ventilatiors (Offshore), Tube 316, Fins AlMg/316, Frame 316	EVAPCO Europe A/S	FA091 Series Dry Cooler	FA091ELNHD-151-IHD-30-3,1-Sp	
-GP11	1		Centrifugal pump, with electric motor, end suction, EN 733, Motor: 4kW, 3x380-415D, 50Hz, 7.9A	Grundfos AS	NB 40-125/139	98309267	
-GP11-WG01	1	m	ÖLFLEX CLASSIC 110 Control Line, 3G1.0 Min Bending Radius 90mm, Numbered Conductors	Lapp Group	ÖLFLEX CLASSIC 110	1119 203	
-GP11-WG01	0						
-GP11.WD01	1	meter	Screened control cable, 4G2.5mm2, LSZH	Lapp Group	ÖLFLEX® CLASSIC 135 CH	1123342	
-GP11.WD02	1	meter	Screened control cable, 4G2.5mm2, LSZH	Lapp Group	ÖLFLEX® CLASSIC 135 CH	1123342	
-GP11.WG02	1	meter		Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035059	
-GQ31	1		Three-phase asynchronous motor, 4 pole pairs, 4,0kW	Fabrika A/S	Fabrika CX B14 TEAO	CXB14-4	
-GQ31-WD01	1	meter	ÖLFLEX CLASSIC 135 CH BK 0,6/1 kV 4G2,5	Lapp Group	ÖLFLEX® CLASSIC 135 CH BK 0,6/1 kV	1123478	
-QM01	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM02	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM03	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM04	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM05	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM06	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM07	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM08	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM09	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM10	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM11	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	601456B - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
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REVISION INFORMATION
DESCRIPTION
DATE
16-Oct-24

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DRAWING		REVISION	03.P18
DRAWING TITLE			
SHEET TYPE/DESC	LT Coolant System - BOM		
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A3	LANGUAGE EN	SHEET/TOTAL 13 /

0	1	2	3	4	5	6	7	8

Bill of Materials / Parts List

Device tag	Qty	Unit	Description	Manufacturer			
				Name	Type Number	Order Number	
-QM12	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM13	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM14	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM15	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM16	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM17	1		Ball valve, Quarter turn, DN65, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518065	
-QM18	1		Ball valve, Quarter turn, DN65, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518065	
-QM19	1		Ball valve, Quarter turn, DN65, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518065	
-QM20	1		Ball valve, Quarter turn, DN65, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518065	
-QM21	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM22	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM23	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM24	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM25	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM26	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QM27	1		Ball valve, Quarter turn, DN65, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518065	
-QM01	1		Ball valve, Quarter turn, DN25, Material body, valve AISI304, gasket and sealing ring PTFE	Mars Valve Europe	CF8M Series Ball Valve	418518025	
-QN01	1		3-way flow control valve, Stainless steel, Internal thread, DN50, PN25	Belimo Holding AG	H3S Series Globe Valve	H350S-P	
-QN01.MA01	1		Actuator, for globe valves, modulating, 1500N force	Belimo Holding AG	SVC Series Modulaing Actuators	SVC24A-SR-TPC	
-QN01.WG01	1	meter		Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035059	
-QN01.WG02	1	meter		Lapp Group	ÖLFLEX® CLASSIC 110 CH	10035059	
-QN02	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP	
-QN03	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP	
-QN04	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP	
-QN05	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP	
-QN06	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP	
-QN07	1		Valve, Constant Flow, DN15, 23 L/min	Bertfeld Teknik AB		117115P230LP	
-RM01	1		De-aerator, Stainless, For coolant containing 50% glycol, 3/8"	Brdr AO Johansen	Aeromat Series		
-TA11	2	PIECES	Safe Torque off & ATEX board for VACON® NXP 2DI,1RO(NO/NC), 1RO(NO), 1TI Slot B	Danfoss	OPT-AF	OPT-AF-V	
-TA11	2	pieces	VFD , Input voltage: 3x 380-500 VAC, Output Power: 4 kW	Danfoss	NXP00095-A5H1SSV	NXP00095-A5H1SSV	
-TA11	0						
-TA11	2	pieces	Vacon NX, Ethernet option board with two RJ-45 connectors SLOT: D, E	Danfoss	OPT-E9	OPT-E9-V	
-TF01	1		Signal Converter Voltage/Current, Input 0-10V or (0)4-20mA, Output (0)4-20mA	Belimo Holding AG	Z-UIC	Z-UIC	
-X27	1		Polyamide Flexible Tubing, Ø10x8,0 - OD 10mm, ID 8mm, 50bar, -40 to 100°C	Parker Hannifin		100P1000	
-X28	1		Polyamide Flexible Tubing, Ø10x8,0 - OD 10mm, ID 8mm, 50bar, -40 to 100°C	Parker Hannifin		100P1000	

Reference Item Number	Ballard Part # TBD		
EPLAN Project Name	601456B - Shell Baseload Power Hub		
EPLAN Revision	03.P18		
EPLAN Project Pages	623		
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REVISION INFORMATION
DESCRIPTION
DATE
16-Oct-24

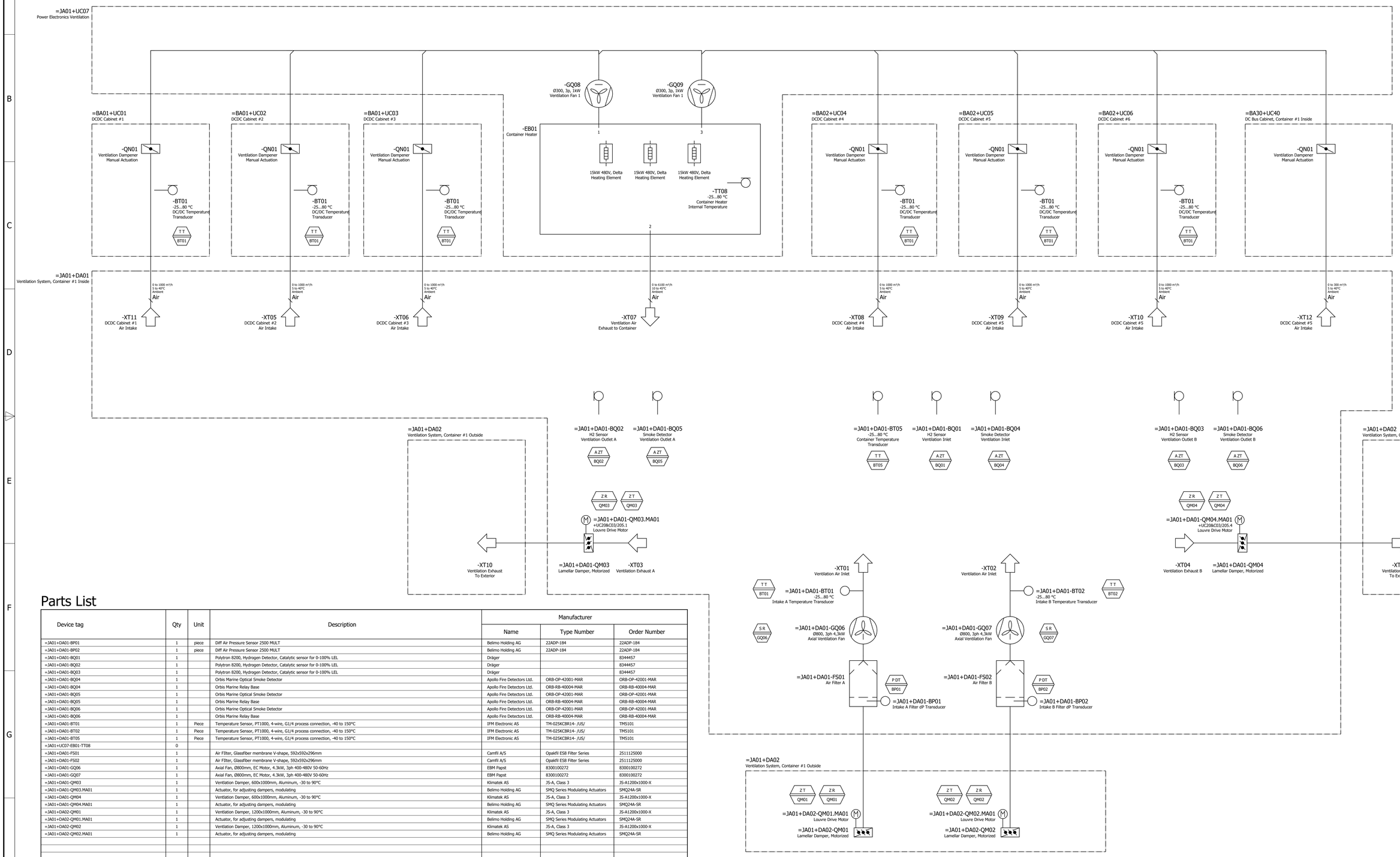
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DRAWING		REVISION	03.P18
DRAWING TITLE			
SHEET TYPE/DESC	LT Coolant System - BOM		
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A3	LANGUAGE EN	SHEET/TOTAL 13.a /

Ventilation Air System - 40ft Container



Parts List

Device tag	Qty	Unit	Description	Manufacturer		
				Name	Type Number	Order Number
=JA01+DA01-BP01	1	piece	Diff Air Pressure Sensor 2500 MULT	Belimo Holding AG	22ADP-184	22ADP-184
=JA01+DA01-BP02	1	piece	Diff Air Pressure Sensor 2500 MULT	Belimo Holding AG	22ADP-184	22ADP-184
=JA01+DA01-BQ01	1		Polytron 8200, Hydrogen Detector, Catalytic sensor for 0-100% LEL	Dräger		8344457
=JA01+DA01-BQ02	1		Polytron 8200, Hydrogen Detector, Catalytic sensor for 0-100% LEL	Dräger		8344457
=JA01+DA01-BQ03	1		Polytron 8200, Hydrogen Detector, Catalytic sensor for 0-100% LEL	Dräger		8344457
=JA01+DA01-BQ04	1		Orbis Marine Optical Smoke Detector	Apollo Fire Detectors Ltd.	ORB-OP-42001-MAR	ORB-OP-42001-MAR
=JA01+DA01-BQ04	1		Orbis Marine Relay Base	Apollo Fire Detectors Ltd.	ORB-RB-40004-MAR	ORB-RB-40004-MAR
=JA01+DA01-BQ05	1		Orbis Marine Optical Smoke Detector	Apollo Fire Detectors Ltd.	ORB-OP-42001-MAR	ORB-OP-42001-MAR
=JA01+DA01-BQ05	1		Orbis Marine Relay Base	Apollo Fire Detectors Ltd.	ORB-RB-40004-MAR	ORB-RB-40004-MAR
=JA01+DA01-BQ06	1		Orbis Marine Optical Smoke Detector	Apollo Fire Detectors Ltd.	ORB-OP-42001-MAR	ORB-OP-42001-MAR
=JA01+DA01-BQ06	1		Orbis Marine Relay Base	Apollo Fire Detectors Ltd.	ORB-RB-40004-MAR	ORB-RB-40004-MAR
=JA01+DA01-BT01	1	Piece	Temperature Sensor, PT1000, 4-wire, G1/4 process connection, -40 to 150°C	IFM Electronic AS	TM-025KCBR14- /US/	TM5101
=JA01+DA01-BT02	1	Piece	Temperature Sensor, PT1000, 4-wire, G1/4 process connection, -40 to 150°C	IFM Electronic AS	TM-025KCBR14- /US/	TM5101
=JA01+DA01-BT05	1	Piece	Temperature Sensor, PT1000, 4-wire, G1/4 process connection, -40 to 150°C	IFM Electronic AS	TM-025KCBR14- /US/	TM5101
=JA01+UC07-EB01-TT08	0					
=JA01+DA01-FS01	1		Air Filter, Glassfiber membrane V-shape, 592x592x296mm	Camfil A/S	Opakfil ES8 Filter Series	2511125000
=JA01+DA01-FS02	1		Air Filter, Glassfiber membrane V-shape, 592x592x296mm	Camfil A/S	Opakfil ES8 Filter Series	2511125000
=JA01+DA01-GQ06	1		Axial Fan, Ø800mm, EC Motor, 4.3kW, 3ph 400-480V 50-60Hz	EBM Papst	8300100272	8300100272
=JA01+DA01-GQ07	1		Axial Fan, Ø800mm, EC Motor, 4.3kW, 3ph 400-480V 50-60Hz	EBM Papst	8300100272	8300100272
=JA01+DA01-QM03	1		Ventilation Damper, 600x1000mm, Aluminum, -30 to 90°C	Klimatek AS	JS-A, Class 3	JS-A1200x1000-X
=JA01+DA01-QM03.MA01	1		Actuator, for adjusting dampers, modulating	Belimo Holding AG	SMQ Series Modulating Actuators	SMQ24A-SR
=JA01+DA01-QM04	1		Ventilation Damper, 600x1000mm, Aluminum, -30 to 90°C	Klimatek AS	JS-A, Class 3	JS-A1200x1000-X
=JA01+DA01-QM04.MA01	1		Actuator, for adjusting dampers, modulating	Belimo Holding AG	SMQ Series Modulating Actuators	SMQ24A-SR
=JA01+DA02-QM01	1		Ventilation Damper, 1200x1000mm, Aluminum, -30 to 90°C	Klimatek AS	JS-A, Class 3	JS-A1200x1000-X
=JA01+DA02-QM01.MA01	1		Actuator, for adjusting dampers, modulating	Belimo Holding AG	SMQ Series Modulating Actuators	SMQ24A-SR
=JA01+DA02-QM02	1		Ventilation Damper, 1200x1000mm, Aluminum, -30 to 90°C	Klimatek AS	JS-A, Class 3	JS-A1200x1000-X
=JA01+DA02-QM02.MA01	1		Actuator, for adjusting dampers, modulating	Belimo Holding AG	SMQ Series Modulating Actuators	SMQ24A-SR

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	6014568 - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
=	++ + & B02

REVISION INFORMATION	
DESCRIPTION	
DATE	16-Oct-24

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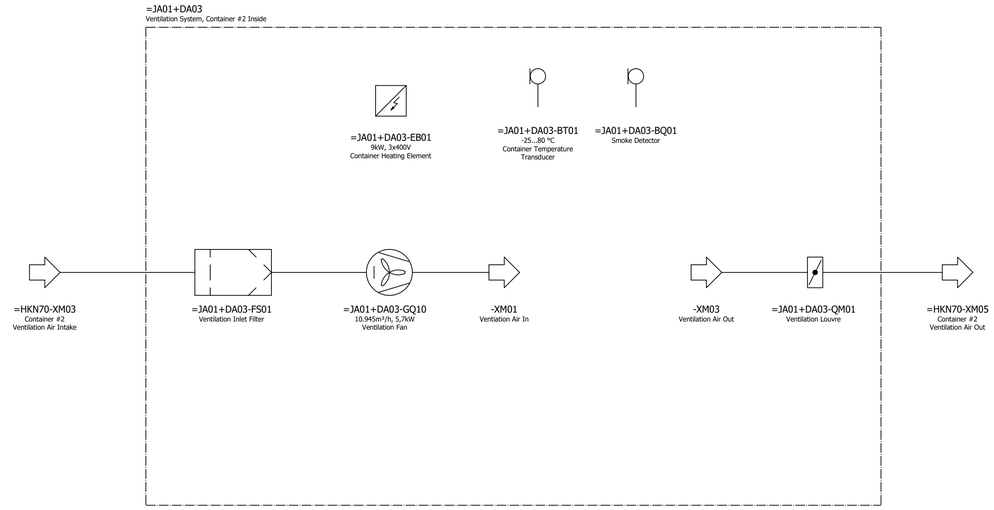
BALLARD™ CONFIDENTIAL

THIS DOCUMENT'S APPROVAL IS MANAGED BY E-SIGNATURE ON FILE IN BALLARD POWER SYSTEMS PLM SYSTEM

DRAWING	6014568 C03 Process and Instrumentation Diagram		REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS			
SHEET TYPE/DESC	Ventilation Air System - 40ft Container			
ALL SHEETS ARE THE SAME REVISION STATUS		SIZE A1	LANGUAGE EN	SHEET/TOTAL 14 / 16

FRMS103653/08

Ventilation Air System - 10ft Container



Parts List

Device tag	Qty	Unit	Description	Manufacturer		
				Name	Type Number	Order Number
=JA01+DA03-BQ01	1		Orbis Marine Optical Smoke Detector	Apollo Fire Detectors Ltd.	ORB-OP-42001-MAR	ORB-OP-42001-MAR
=JA01+DA03-BQ01	1		Orbis Marine Relay Base	Apollo Fire Detectors Ltd.	ORB-RB-40004-MAR	ORB-RB-40004-MAR
=JA01+DA03-BT01	1	Piece	Temperature Sensor, PT1000, 4-wire, G1/4 process connection, -40 to 150°C	IFM Electronic AS	TM-025KCBR14- /US/	TM5101
=JA01+DA03-EB01	1		Placeholder			
=JA01+DA03-FS01	0					
=JA01+DA03-GQ10	1		Ventilation Fan, Radial, EC Motor, 3ph, 400-480V, 5.7kW			
=JA01+DA03-QM01	0					

Reference Item Number	Ballard Part # TBD
EPLAN Project Name	6014568 - Shell Baseload Power Hub
EPLAN Revision	03.P18
EPLAN Project Pages	623
=	++ + & B02

REVISION INFORMATION	
DESCRIPTION	
DATE	
16-Oct-24	

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BALLARD™
CONFIDENTIAL

THIS DOCUMENT'S APPROVAL IS MANAGED BY E-SIGNATURE ON FILE IN BALLARD POWER SYSTEMS PLM SYSTEM

DRAWING	6014568 C03 Process and Instrumentation Diagram
REVISION	03.P18
DRAWING TITLE	Crosswind/Shell Baseload Power Hub, Fuel Cell Container 1MW, no BESS
SHEET TYPE/DESC	Ventilation Air System - 10ft Container
ALL SHEETS ARE THE SAME REVISION STATUS	SIZE A1 · LANGUAGE EN · SHEET/TOTAL 15 / 16

FRMS103653/08

Section 8 MECHANICAL COMPLETION STATUS INDEX - TELECOMMUNICATION DISCIPLINE

CROSSWIND

ROSETTI MARINO

Project CROSSWIND

STATUS INDEX DETAIL

Filtered on subsystem: 80-00 & process: MC & discipline : T

Telecom	80-00 Hydrogen Fuel Cell Package (A-80000)						
ITEM		TASK					
Code	Description	Location	Code	Form	Progress	Date	Certificate
80-UCP-001/B400-NET-001.01	COMMUNICATION / NETWORK CABINET	ONSHORE	C10004351	CIX09	100	2024-11-27	RFC 2
80-UCP-001/B400-NET-001.02	COMMUNICATION / NETWORK CABINET	ONSHORE	C10004352	CIX09	100	2024-11-27	RFC 2

ITEM	Tag	80-UCP-001/B400-NET-001.01	: COMMUNICATION / NETWORK CABINET			Dwg	123A90-DDL-IN-LIS-40091
	S/Sys	80-00	: Hydrogen Fuel Cell Package (A-80000)			Module	UD/LD_B-400
TASK	code	C10004351		Location	Onshore Activities	User	Rosetti Marino Quality Control
FORM	Process	MC	Activity CCK	Discipline	Telecom	Form	CIX09 Telecom Cable RJ45

CABLE DATA

Type	FTP-LSZH-IS-OS-SWB-LSZH	Cores/Size mm²	4X2X23AWG mm2	Color	GREY
From	80-UCP-001		To	B400-NET-001	

1	Confirm cable is as specified in project cable schedule	OK
2	Check cable physical integrity.	OK
3	Check is installed in accordance with layout drawing (segregation, distance…).	PL
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	Confirm cable labelling is in accordance with specifications.	PL
8	Check cable is correctly loomed and segregated in accordance with specification.	OK
9	Check proper fitting of heat shrink sleeves and cable glands (if applicable).	OK
10	Check cores marking are in accordance with termination diagram.	OK
11	Check terminations are in accordance with latest termination diagram.	PL
12	To roll up that measured lenght complies with pulled lenght.	OK
13	To roll up the cable complies with Cat. 5E performance requirements (250 Mhz).	OK
14	Attach LAN tester print out to this test sheet.	OK
15	if required produce Red Line Mark Up for "AS BUILT"	

Comments: Nota 4: refer to PL C30000680

	Performed by	● WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	Rosetti Marino	
Name	Francesco Zucca	Alessio Polo	
Date	2024-11-25	2024-11-27	
Signature	Digitaly signed by Francesco Zucca 2024-11-25T11:04:43.795Z	Digitaly signed by Alessio Polo 2024-11-27T12:20:59.345Z	

ROSETTI MARINO

Cable ID: 80-UPC-001/B400-NET-001.01

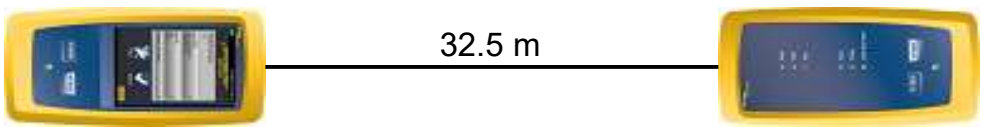
Test Limit: ISO11801 Channel Class Ea
Limits Version: V7.6
Date / Time: 22-11-2024 16:36:15
Headroom 8.8 dB (NEXT 1,2-3,6)
Cable Type: Cat 6A S/FTP
NVP: 77.0%

Main: Versiv
S/N: 2226344
Software Version: V6.7 Build 1
Calibration Date: 12-12-2022
Adapter: DSX-8000 (DSX-CHA804)
S/N: 22201706

Test Summary: PASS

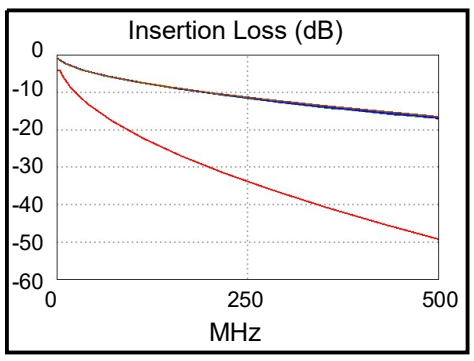
Remote: Versiv
S/N: 2226336
Software Version: V6.7 Build 1
Calibration Date: 12-12-2022
Adapter: DSX-8000R (DSX-CHA804)
S/N: 22201720

Length (m), Limit 100.0	[Pair 4,5]	32.5
Prop. Delay (ns), Limit 555	[Pair 1,2]	143
Delay Skew (ns), Limit 50	[Pair 1,2]	2
Resistance (ohms), Limit 25.00	[Pair 7,8]	7.72
Insertion Loss Margin (dB)	[Pair 4,5]	32.2
Frequency (MHz)	[Pair 4,5]	498.0
Limit (dB)	[Pair 4,5]	49.2

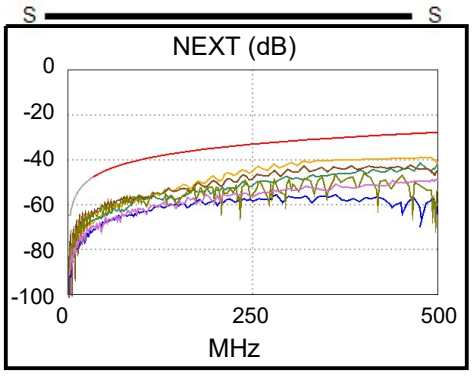


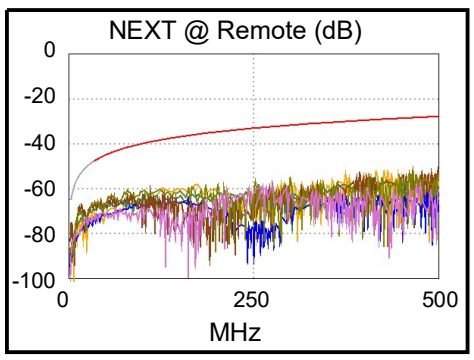
Wire Map (T568B)
PASS



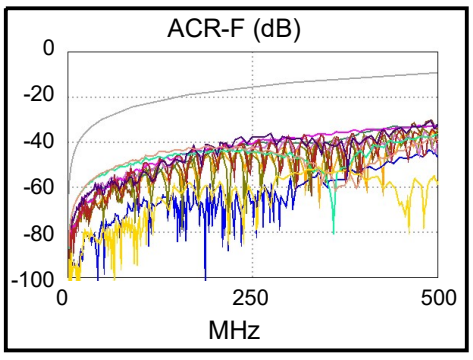


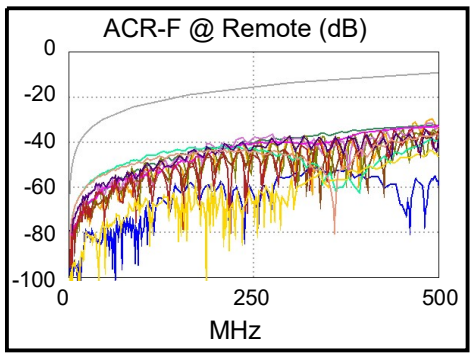
	Worst Case Margin		Worst Case Value	
PASS	MAIN	SR	MAIN	SR
Worst Pair	1,2-3,6	3,6-7,8	1,2-3,6	3,6-4,5
NEXT (dB)	8.8	18.2	10.9	23.8
Freq. (MHz)	321.0	34.8	489.0	499.0
Limit (dB)	31.2	47.6	28.1	27.9
Worst Pair	3,6	3,6	3,6	3,6
PS NEXT (dB)	9.6	17.4	10.7	24.1
Freq. (MHz)	321.0	35.0	405.0	499.0
Limit (dB)	28.2	44.9	26.5	24.9



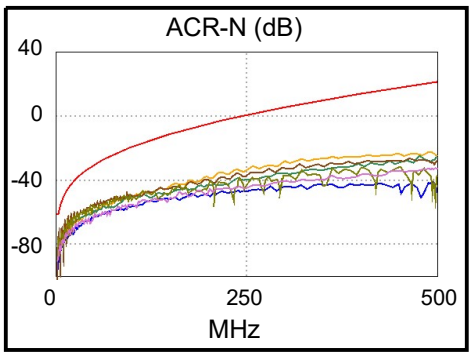


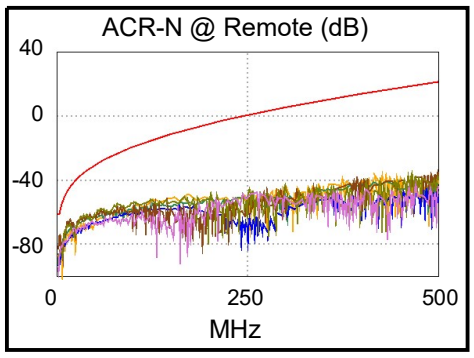
PASS	MAIN	SR	MAIN	SR
Worst Pair	3,6-1,2	1,2-3,6	3,6-1,2	1,2-3,6
ACR-F (dB)	20.5	19.9	20.5	19.9
Freq. (MHz)	489.0	489.0	489.0	489.0
Limit (dB)	9.5	9.5	9.5	9.5
Worst Pair	1,2	3,6	1,2	3,6
PS ACR-F (dB)	21.8	21.2	21.9	21.2
Freq. (MHz)	490.0	486.0	491.0	486.0
Limit (dB)	6.5	6.5	6.4	6.5



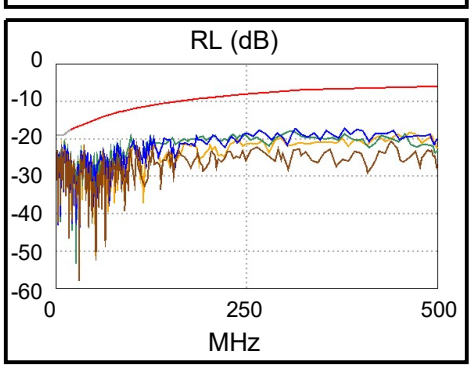


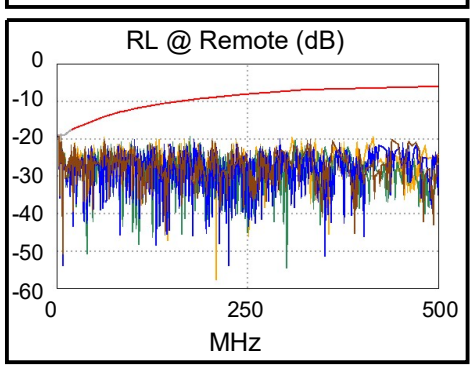
PASS	MAIN	SR	MAIN	SR
Worst Pair	3,6-4,5	3,6-4,5	1,2-3,6	3,6-4,5
ACR-N (dB)	13.2	13.5	42.9	56.2
Freq. (MHz)	3.5	3.1	489.0	499.0
Limit (dB)	60.0	60.8	-20.7	-21.4
Worst Pair	3,6	3,6	3,6	3,6
PS ACR-N (dB)	13.8	15.5	44.5	56.5
Freq. (MHz)	3.5	3.4	489.0	499.0
Limit (dB)	57.5	57.7	-23.7	-24.4





PASS	MAIN	SR	MAIN	SR
Worst Pair	1,2	7,8	4,5	1,2
RL (dB)	6.9	4.4	10.3	13.8
Freq. (MHz)	36.5	23.0	357.0	414.0
Limit (dB)	16.2	17.2	6.5	6.0





Compliant Network Standards:

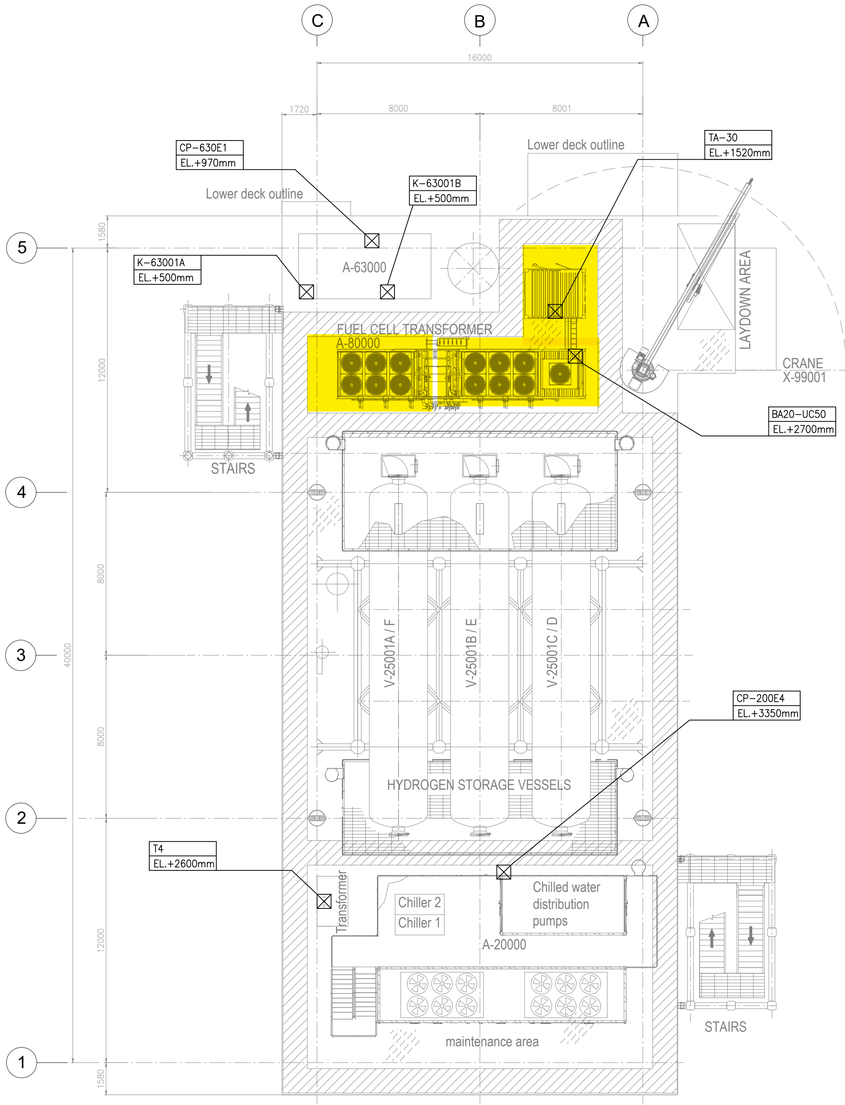
10BASE-T	100BASE-TX	100BASE-T4
1000BASE-T	2.5GBASE-T	5GBASE-T
10GBASE-T	ATM-25	ATM-51
ATM-155	100VG-AnyLan	TR-4
TR-16 Active	TR-16 Passive	

LinkWare™ PC Version 11.4

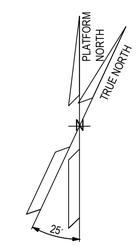
FLUKE networks

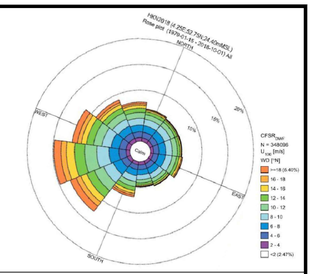
DRAWING NO. 123A90-DDL-EL-DL-20100

REV. 01



PLAN ON TOP DECK
EL+30.310 T.O.S.





NOTES

1. ALL DIMENSIONS IN MM UNLESS NOTED OTHERWISE.
2. ALL ELEVATIONS IN METERS. UNLESS NOTED OTHERWISE.
3. ELEVATIONS REFER TO T.O.S. UNLESS NOTED OTHERWISE.
4. AFTER INTERFACE PANEL/BATTERY LIMIT CABLES WILL BE ROUTED INSIDE VENDOR CABLETRAYS

LEGEND

⊠	INTERFACE PANEL/BATTERY LIMIT
JB-200E2 EL.+500mm	TAG ITEM REFERED ELEVATION TO T.O.S. (TOP OF STEEL)

HOLDS

REFERENCE DOCUMENTS

123A90-DDL-PP-DL-70070	PLOT PLAN - LOWER & UPPER DECK
123A90-DDL-EL-DL-20140	ELECTRICAL HEAT TRACING JUNCTION BOX LAYOUT
123A90-DDL-EL-DL-20118	LIGHTING & SOCKET LAYOUT - TOP DECK

INSERT SUBCONTRACTOR / VENDOR LOGO HERE

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	22/07/24	SPS	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	29/05/24	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND

ROSETTI MARINO

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20100**

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

ROSETTI MARINO SpA

TITLE :
BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
TOP DECK

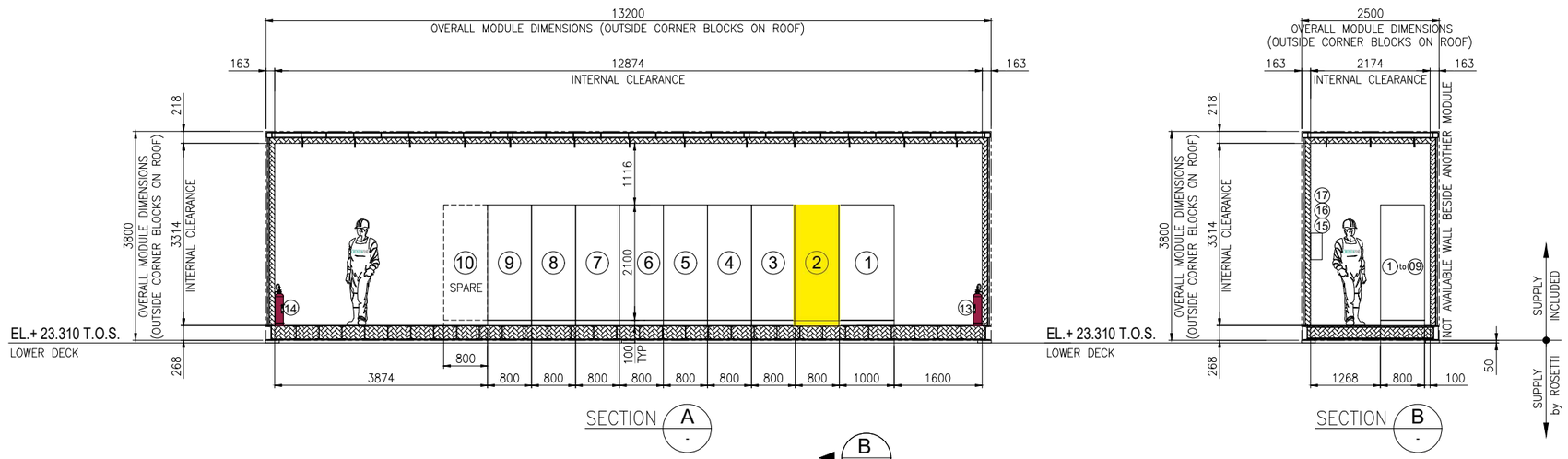
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:150
DRAWN SPS	CHECKED FMA/AMA	APPROVED FPA/DLO	DATE 22/07/24

	DRAWING NO.	SHEET	REV.
A1	123A90-DDL-EL-DL-20100	001	01

File Name : 123A90-DDL-EL-DL-20100-Electrical Equipment Layout - Top Deck

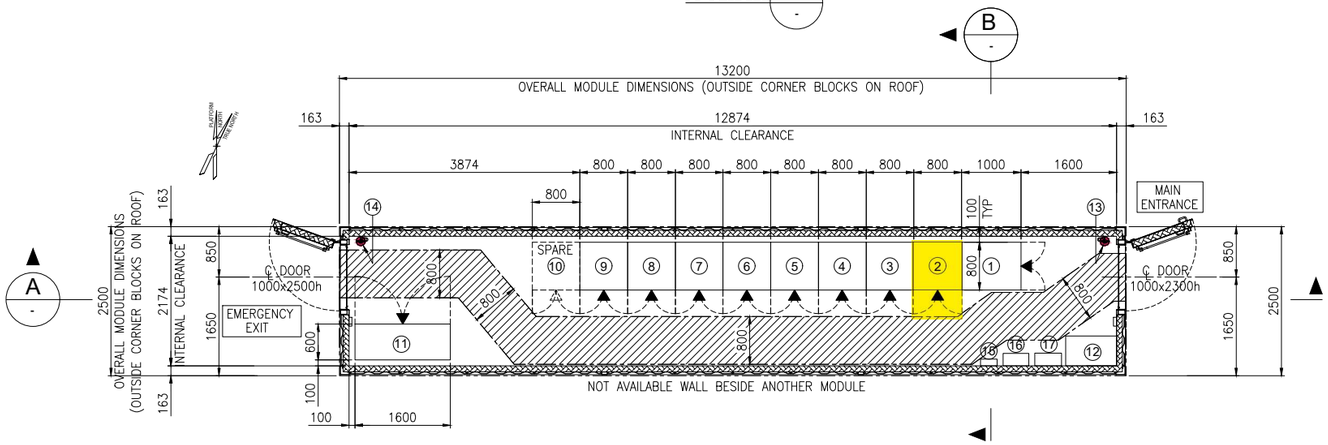
DRAWING NO. 123A90-DDL-IN-DL-40012

REV. 03



SECTION A -

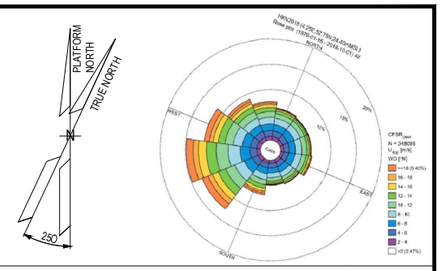
SECTION B -



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	-	TABLE	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 ENCLOUSURE
_____ FRONT OF EQUIPMENT

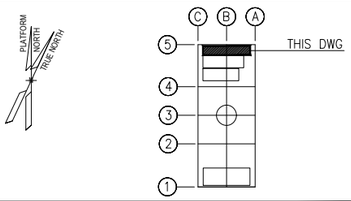
HOLDS

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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)

CROSSWIND

ROSETTI MARINO

VALID FOR CONSTRUCTION
FDL DWG: 123A90-FDL-IN-DL-40012
REV.: 3_A | DATE: 07/10/24 | SIGNATURE: G.Randi
ROSETTI MARINO SpA

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. 123A90-DDL-IN-DG-40015

REV. 01

FIELD				I&T EQUIPMENT ROOM (ITER B400)		
				NETWORK CABINET - B400-NET-001		
						<01>
BESS (A-85000) P320 PLC	ITEM: NOTE 5 PORT: NOTE 5	RJ45	P320PLC/B400-NET-001.01 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P01	
BESS (A-85000) P320 PLC	ITEM: NOTE 5 PORT: NOTE 5	RJ45	P320PLC/B400-NET-001.02 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P11	
ELECTROLYSER (A-20000) 20-UCP-001	ITEM: NOTE 5 PORT: NOTE 5	RJ45	20-UCP-001/B400-NET-001.01 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P02	
ELECTROLYSER (A-20000) 20-UCP-001	ITEM: NOTE 5 PORT: NOTE 5	RJ45	20-UCP-001/B400-NET-001.02 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P09	
FUEL CELL (A-80000) 80-UCP-001	ITEM: NOTE 5 PORT: NOTE 5	RJ45	80-UCP-001/B400-NET-001.01 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P10	
FUEL CELL (A-80000) 80-UCP-001	ITEM: NOTE 5 PORT: NOTE 5	RJ45	80-UCP-001/B400-NET-001.02 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P03	

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DG-40015**

REV.:	DATE:	SIGNATURE:
1_E	19/11/24	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

TITLE :

BASE LOAD POWER HUB (BLPH)
INSTRUMENT – PCS WIRING DIAGRAMS
COMMUNICATION – CAT-6

CONTRACT NO./TITLE			SCALE 1:1
DRAWN VBA	CHECKED LCA	APPROVED DLO	DATE 23/02/2024

A3	DRAWING NO.	SHEET	REV.
	123A90-DDL-IN-DG-40015	037	01

File Name : 123A90-DDL-IN-DG-40015_Rev.01

DRAWING NO. 123A90-DDL-IN-DG-40015

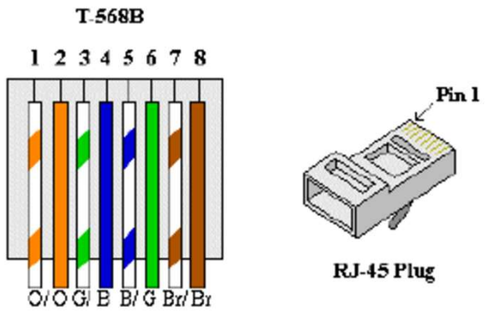
REV. 01

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. FIBER OPTIC TAG NAME WILL BE DEFINED DURING THE CONSTRUCTION PHASE.

<01>

7. CAT. 6A CABLE SHALL BE TERMINATED MEETING REQUIREMENTS OF STANDARD EIA/TIA 568B:



RJ-45 Plug

8. 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

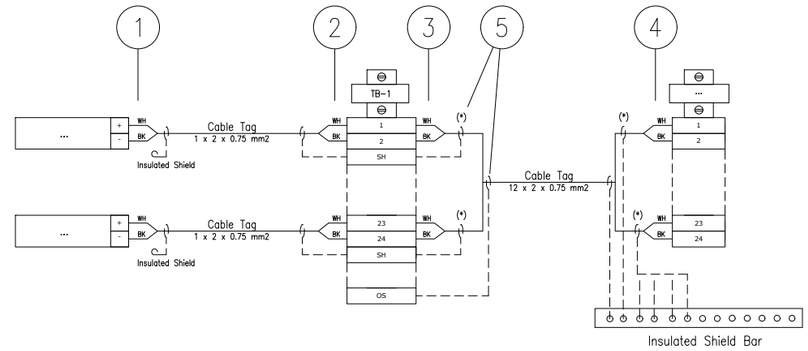
LEGENDS & SYMBOLS:

LEGEND:

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
MC	- MARSHALLING CABINET
AI	- ANALOGUE INPUT
AO	- ANALOGUE OUTPUT
DI	- DIGITAL INPUT
DO	- DIGITAL OUTPUT

TYPICAL WIRE CROSS-FERRULING:

PHILOSOPHY OF CROSS-FERRULING: <01>



(*) Single shield is foreseen only for AI/AO signals.

1 - INSTRUMENT TERMINAL NO. OR POLARITY/JB NO./JB TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

2 - INSTRUMENT TERMINAL NO. OR POLARITY/INSTRUMENT TAG NO./JB TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

3 - PAIR OR CORE NO./MARSHALLING CABINET NO./TB NO./TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

4 - PAIR OR CORE NO./JB NO./JB TERMINAL NO./TB NO./TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

5 - HEAT SHRINKABLE BLACK FOR SHIELD OF NIS INSTRUMENT CABLE.
(HEAT SHRINKABLE BLUE FOR SHIELD OF NIS INSTRUMENT CABLE)

6 - IN CASE OF CONNECTION FROM RIGHT TO LEFT, ORDER OF INFORMATION SHALL BE MIRRORED

REFERENCE DRAWINGS

PIPING AND INSTRUMENT DIAGRAM	123A90-DDL-PR-PID-80009
INSTRUMENT INDEX	123A90-DDL-IN-LIS-40088 Rev.01

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DG-40015**

REV.:	DATE:	SIGNATURE:
1_E	19/11/24	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 1:1
DRAWN VBA	CHECKED LCA	APPROVED DLO	DATE 23/02/2024

A3	DRAWING NO. 123A90-DDL-IN-DG-40015	SHEET 003	REV. 01

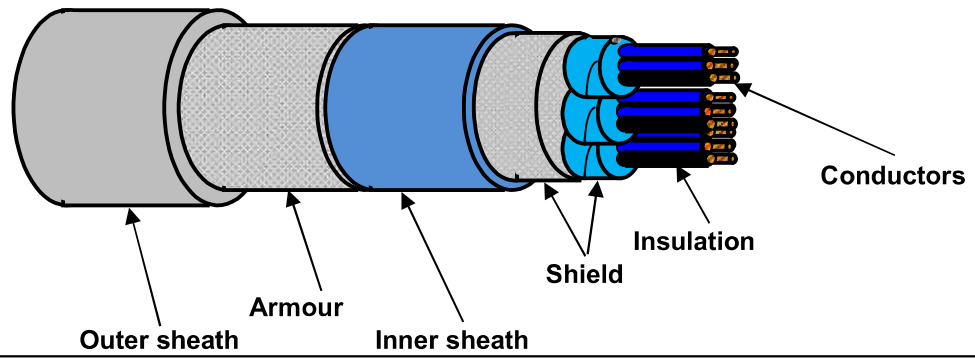
File Name : 123A90-DDL-IN-DG-40015_Rev.01

Tag Number	Category	Discipline	Eng Status	NativeDoc	Layout	Parent Tag	Main Function	Secondary Functio	Area	From Tag	From Main Function	From Area	To Tag	To Main Function	To Area	Material ID	Material Desc.	Gland Standa	From Glan	From Entry	From Fittir	To Gland	To Entry	To Fitting	Routing	Routing Manual
80-UCP-001/B400-NET-001.01	Cable	IN	VFC	123A90-DDL-IN-LIS-40091						80-UCP-001	Communication	Upper Deck	B400-NET-001	Network Cabinet / EMCS System	Lower Deck (B-400)	TELCV03-4X2X23AWG	Cable CAT 6A S/FTP 4x2x23AWG Armoured LSZH - Grey	M20S	n.a.			n.a.				I-MCT-U02 / L-SEC-19 / L-SEC-18A / B-400-SEC-2A / B-400-SEC-2B / B-400-SEC-3B / I-MCT-403

FLEI s.r.l.

CAT. 6A S/FTP ARMOURED LSZH

4X2X23AWG - Based on Draka UC500 HS23



TECHNICAL FEATURES

Conductors :	**SOLID** plain annealed copper wires (AWG23) **ø 0,56 mm**
Insulation :	Foamskin PE - **ø 1,38 mm**
Cores colour code :	**blue/white; orange/white; green/white; brown/white**
Pair Assembling :	Cores twisted in pairs
Pair Shield :	Al-laminated plastic foil
Overall Shield:	Tinned copper braid
Inner sheath :	Extruded LSZH Thermoplastic Compound
Inner sheath color code:	**Blue**
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 1,2 mm
Outer sheath color code:	**Grey**
Outer printing (INKJET) :	**FLEI - 4X2X23AWG - CAT.6A S/FTP ARMOURED LSZH - IEC 60332.1.2 - IEC 60332.3.22 -**
(every 1000 mm)	**Year of Manufacture - CE + Meter Marking**
Under armour diameter :	(7,5 ± 10%) mm
Over armour diameter :	(8,3 ± 10%) mm
Outer diameter :	(10,7 ± 10%) mm
Bending radius :	cable outer diameter x 8 (in fixed installation)
Test Voltage :	1000 V DC for 1' (Between Cores) / 1000 V DC for 1' (Between Cores - Shield)
Loop Resistance :	≤ 154 Ω/Km (@ 20°C)
Insulation Resistance :	≥ 2000 MΩ x km (@ 20°C)
Mutual Capacitance :	Nom. 43 nF/km
Characteristic Impedance :	(100 ± 5) Ω
Applicable Standards	
Design Guidelines :	**Generally to ISO/IEC 11801 / IEC 61156-5 / EN 50173-1 / EN 50288-10 / IEEE 802.3at / af / bt**
ON COMPLETE CABLE	
Flame Retardant test :	IEC 60332.1.2 - IEC 60332.3.22
Acid Gas generation :	IEC 60754.1/2
Smoke density/Light Transm	IEC 61034.2 (LT ≥ 60%)
Hazardous Areas :	IEC 60079.14 par.9.3.2a
Temperature Range :	
ON COMPLETE CABLE	
During Operation :	(-20°C up to +60°C) (in fixed installation)
During installation :	(0°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 :	29/05/2024	Messa			
Checked :	29/05/2024	Spaccasassi			
Approved :	29/05/2024	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	80-UCP-001/B400-NET-001.02 : COMMUNICATION / NETWORK CABINET			Dwg	123A90-DDL-IN-LIS-40091	
	S/Sys	80-00 : Hydrogen Fuel Cell Package (A-80000)			Module	UD/LD_B-400	
TASK	code	C10004352	Location	Onshore Activities	User	Rosetti Marino Quality Control	
FORM	Process	MC	Activity	CCK	Discipline	Telecom	Form	CIX09	Telecom Cable RJ45

CABLE DATA

Type	FTP-LSZH-IS-OS-SWB-LSZH	Cores/Size mm²	4X2X23AWG mm2	Color	GREY
From	80-UCP-001	To	B400-NET-001		

1	Confirm cable is as specified in project cable schedule	OK
2	Check cable physical integrity.	OK
3	Check is installed in accordance with layout drawing (segregation, distance…).	PL
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	Confirm cable labelling is in accordance with specifications.	PL
8	Check cable is correctly loomed and segregated in accordance with specification.	OK
9	Check proper fitting of heat shrink sleeves and cable glands (if applicable).	OK
10	Check cores marking are in accordance with termination diagram.	OK
11	Check terminations are in accordance with latest termination diagram.	PL
12	To roll up that measured lenght complies with pulled lenght.	OK
13	To roll up the cable complies with Cat. 5E performance requirements (250 Mhz).	OK
14	Attach LAN tester print out to this test sheet.	OK
15	if required produce Red Line Mark Up for "AS BUILT"	

Comments: Nota 4: refer to PL C30000680

	Performed by	● WITNESS ☐ REVIEW	☐ WITNESS ☐ REVIEW
Company	ICS IMPIANTI	Rosetti Marino	
Name	Francesco Zucca	Alessio Polo	
Date	2024-11-25	2024-11-27	
Signature	Digitaly signed by Francesco Zucca 2024-11-25T11:04:57.605Z	Digitaly signed by Alessio Polo 2024-11-27T12:20:40.920Z	

ROSETTI MARINO

Cable ID: 80-UPC-001/B400-NET-001.02

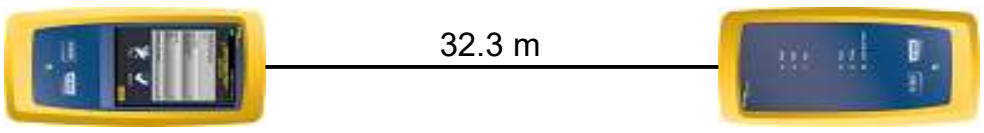
Test Limit: ISO11801 Channel Class Ea
Limits Version: V7.6
Date / Time: 22-11-2024 16:34:44
Headroom 11.7 dB (NEXT 3,6-4,5)
Cable Type: Cat 6A S/FTP
NVP: 77.0%

Main: Versiv
S/N: 2226344
Software Version: V6.7 Build 1
Calibration Date: 12-12-2022
Adapter: DSX-8000 (DSX-CHA804)
S/N: 22201706

Test Summary: PASS

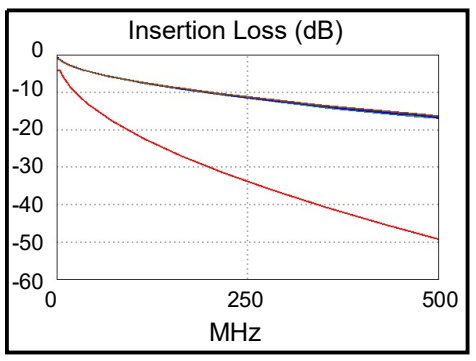
Remote: Versiv
S/N: 2226336
Software Version: V6.7 Build 1
Calibration Date: 12-12-2022
Adapter: DSX-8000R (DSX-CHA804)
S/N: 22201720

Length (m), Limit 100.0	[Pair 4,5]	32.3
Prop. Delay (ns), Limit 555	[Pair 1,2]	142
Delay Skew (ns), Limit 50	[Pair 1,2]	2
Resistance (ohms), Limit 25.00	[Pair 7,8]	7.28
Insertion Loss Margin (dB)	[Pair 3,6]	32.4
Frequency (MHz)	[Pair 3,6]	500.0
Limit (dB)	[Pair 3,6]	49.3

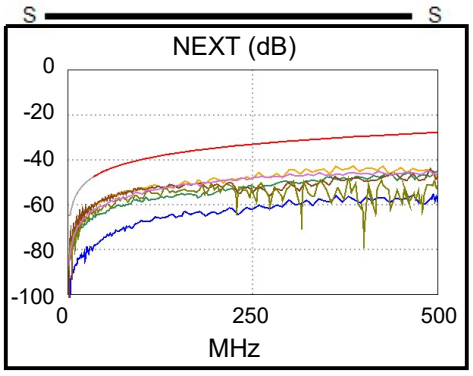


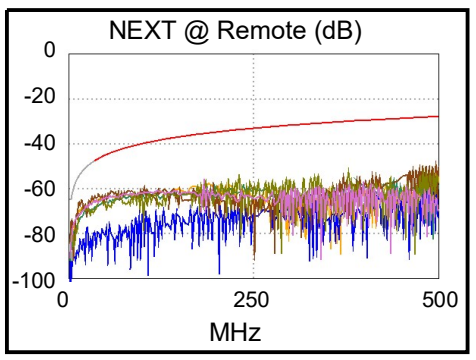
Wire Map (T568B)
PASS



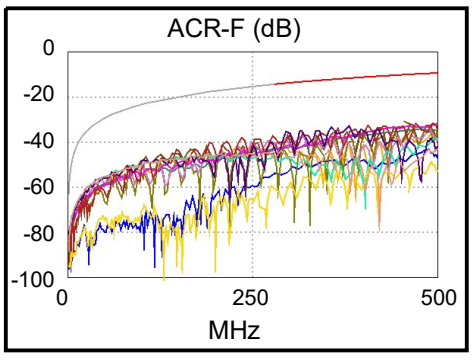


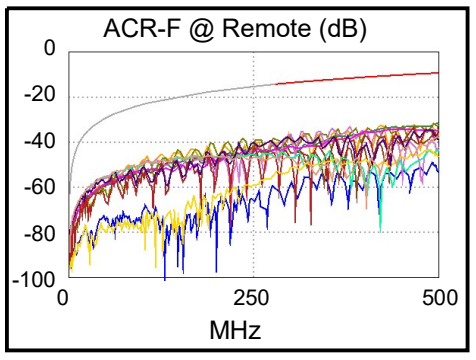
	Worst Case Margin		Worst Case Value	
PASS	MAIN	SR	MAIN	SR
Worst Pair	3,6-4,5	3,6-4,5	1,2-3,6	3,6-4,5
NEXT (dB)	11.7	15.4	12.4	21.7
Freq. (MHz)	46.3	35.5	384.0	496.0
Limit (dB)	45.6	47.5	29.9	27.9
Worst Pair	3,6	3,6	4,5	3,6
PS NEXT (dB)	11.1	15.3	15.5	22.6
Freq. (MHz)	47.3	40.0	490.0	500.0
Limit (dB)	42.7	43.9	25.0	24.8



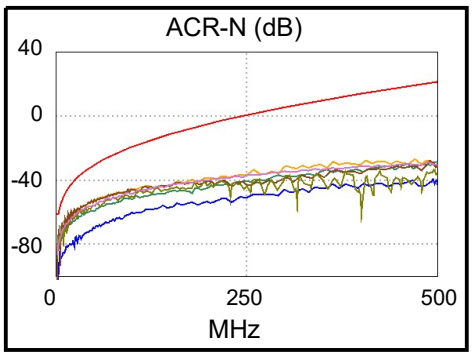


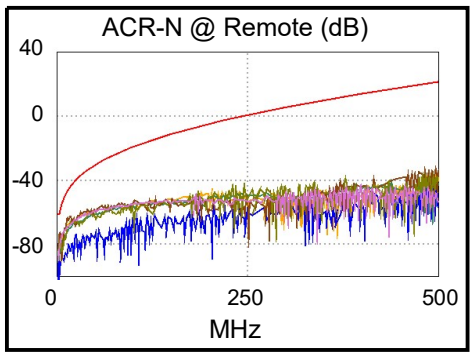
PASS	MAIN	SR	MAIN	SR
Worst Pair	7,8-3,6	3,6-7,8	4,5-3,6	1,2-3,6
ACR-F (dB)	20.3	20.9	21.6	22.2
Freq. (MHz)	379.0	379.0	471.0	485.0
Limit (dB)	11.7	11.7	9.8	9.5
Worst Pair	3,6	3,6	1,2	3,6
PS ACR-F (dB)	21.6	21.5	22.4	21.5
Freq. (MHz)	296.0	486.0	463.0	486.0
Limit (dB)	10.8	6.5	6.9	6.5



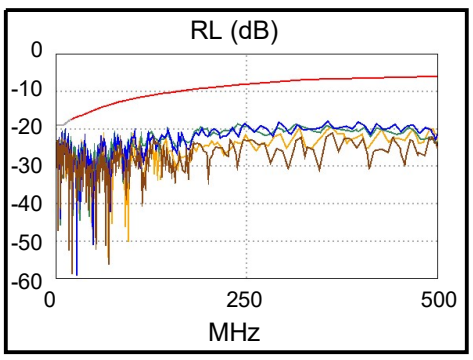


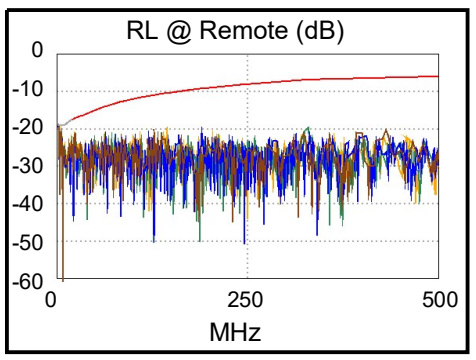
PASS	MAIN	SR	MAIN	SR
Worst Pair	3,6-4,5	3,6-4,5	1,2-3,6	3,6-4,5
ACR-N (dB)	11.5	12.5	45.8	54.0
Freq. (MHz)	3.6	3.1	469.0	496.0
Limit (dB)	59.7	60.8	-19.2	-21.1
Worst Pair	3,6	3,6	3,6	3,6
PS ACR-N (dB)	11.4	13.5	47.8	55.0
Freq. (MHz)	3.6	3.6	490.0	500.0
Limit (dB)	57.2	57.2	-23.8	-24.5





PASS	MAIN	SR	MAIN	SR
Worst Pair	3,6	7,8	4,5	3,6
RL (dB)	6.1	4.0	11.2	12.9
Freq. (MHz)	19.3	23.4	360.0	329.0
Limit (dB)	17.6	17.2	6.4	6.8





Compliant Network Standards:

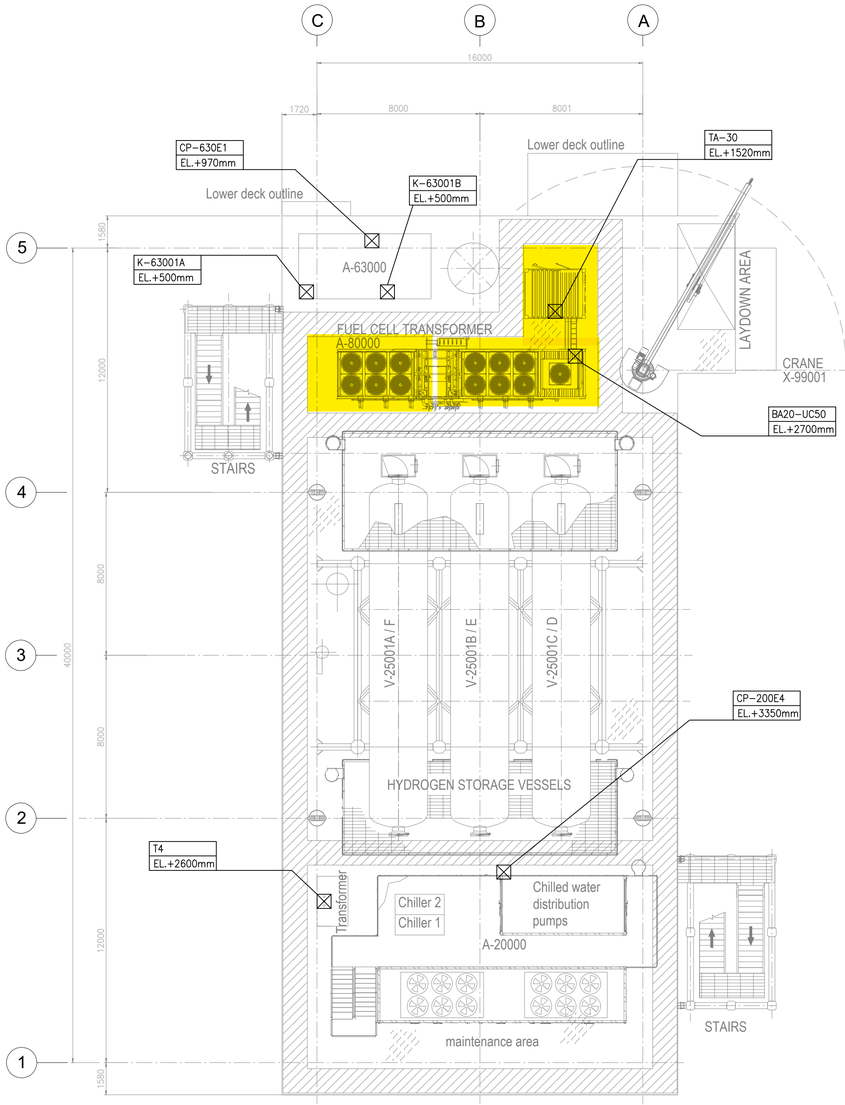
10BASE-T	100BASE-TX	100BASE-T4
1000BASE-T	2.5GBASE-T	5GBASE-T
10GBASE-T	ATM-25	ATM-51
ATM-155	100VG-AnyLan	TR-4
TR-16 Active	TR-16 Passive	

LinkWare™ PC Version 11.4

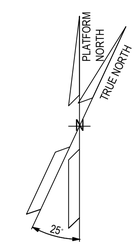
FLUKE networks

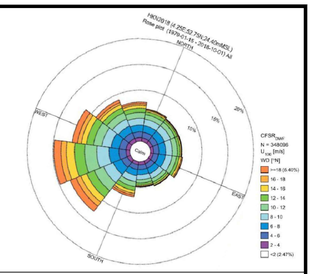
DRAWING NO. 123A90-DDL-EL-DL-20100

REV. 01



PLAN ON TOP DECK
EL+30.310 T.O.S.





NOTES

1. ALL DIMENSIONS IN MM UNLESS NOTED OTHERWISE.
2. ALL ELEVATIONS IN METERS. UNLESS NOTED OTHERWISE.
3. ELEVATIONS REFER TO T.O.S. UNLESS NOTED OTHERWISE.
4. AFTER INTERFACE PANEL/BATTERY LIMIT CABLES WILL BE ROUTED INSIDE VENDOR CABLETRAYS

LEGEND

⊠	INTERFACE PANEL/BATTERY LIMIT
JB-200E2 EL.+500mm	TAG ITEM REFERED ELEVATION TO T.O.S. (TOP OF STEEL)

HOLDS

REFERENCE DOCUMENTS

123A90-DDL-PP-DL-70070	PLOT PLAN - LOWER & UPPER DECK
123A90-DDL-EL-DL-20140	ELECTRICAL HEAT TRACING JUNCTION BOX LAYOUT
123A90-DDL-EL-DL-20118	LIGHTING & SOCKET LAYOUT - TOP DECK

INSERT SUBCONTRACTOR / VENDOR LOGO HERE

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	22/07/24	SPS	FMA/AMA	FPA/DLO	ACCEPTED FOR CONSTRUCTION (AFC)
00	29/05/24	SPS	FMA/AMA	FPA/DLO	ISSUE FOR REVIEW (IFR)

CROSSWIND

ROSETTI MARINO

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-EL-DL-20100**

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

ROSETTI MARINO SpA

TITLE :
BASE LOAD POWER HUB (BLPH)
ELECTRICAL EQUIPMENT LAYOUT
TOP DECK

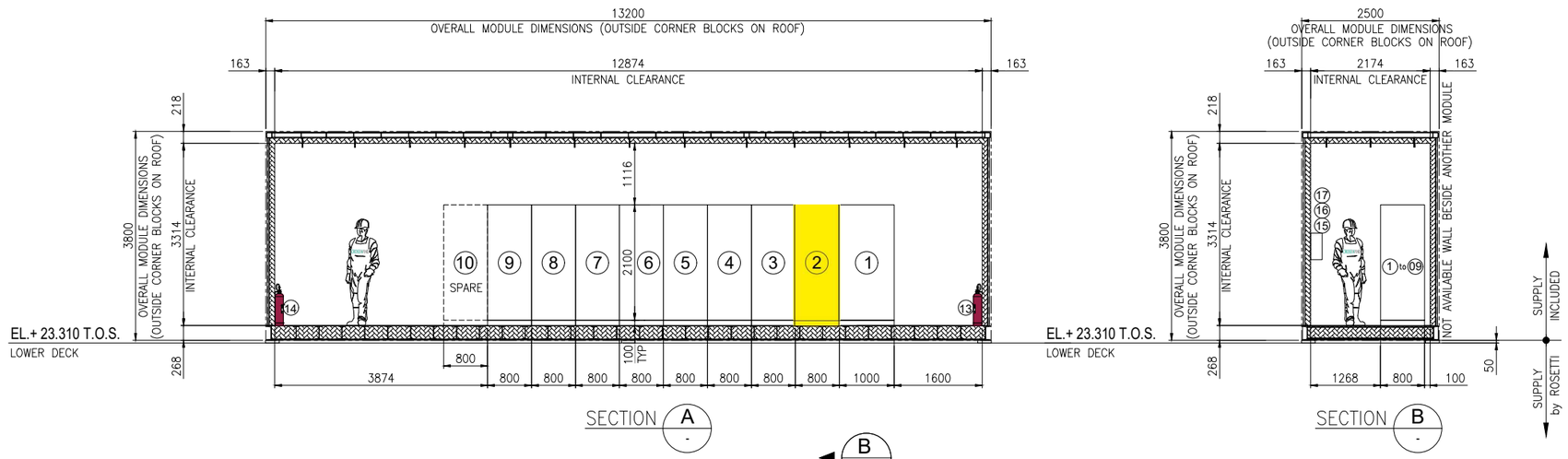
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:150
DRAWN SPS	CHECKED FMA/AMA	APPROVED FPA/DLO	DATE 22/07/24

	DRAWING NO.	SHEET	REV.
A1	123A90-DDL-EL-DL-20100	001	01

File Name : 123A90-DDL-EL-DL-20100-Electrical Equipment Layout - Top Deck

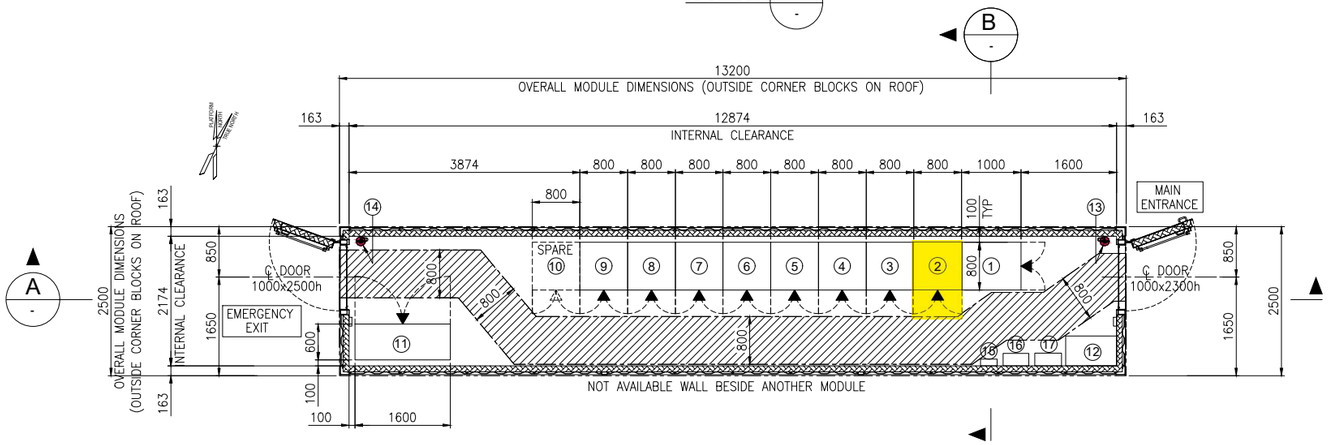
DRAWING NO. 123A90-DDL-IN-DL-40012

REV. 03



SECTION A -

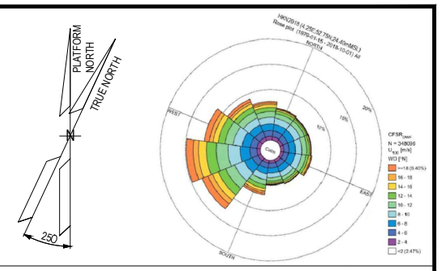
SECTION B -



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	-	TABLE	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 ENCLOUSURE
_____ FRONT OF EQUIPMENT

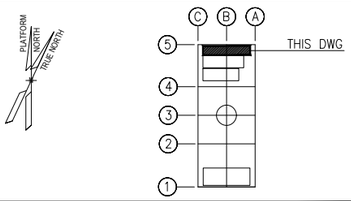
HOLDS

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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)

CROSSWIND

ROSETTI MARINO

VALID FOR CONSTRUCTION
FDL DWG: 123A90-FDL-IN-DL-40012
REV.: 3_A | DATE: 07/10/24 | SIGNATURE: G.Randi
ROSETTI MARINO SpA

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. 123A90-DDL-IN-DG-40015

REV. 01

FIELD				I&T EQUIPMENT ROOM (ITER B400)		
				NETWORK CABINET - B400-NET-001		
						<01>
BESS (A-85000) P320 PLC	ITEM: NOTE 5 PORT: NOTE 5	RJ45	P320PLC/B400-NET-001.01 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P01	
BESS (A-85000) P320 PLC	ITEM: NOTE 5 PORT: NOTE 5	RJ45	P320PLC/B400-NET-001.02 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P11	
ELECTROLYSER (A-20000) 20-UCP-001	ITEM: NOTE 5 PORT: NOTE 5	RJ45	20-UCP-001/B400-NET-001.01 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P02	
ELECTROLYSER (A-20000) 20-UCP-001	ITEM: NOTE 5 PORT: NOTE 5	RJ45	20-UCP-001/B400-NET-001.02 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P09	
FUEL CELL (A-80000) 80-UCP-001	ITEM: NOTE 5 PORT: NOTE 5	RJ45	80-UCP-001/B400-NET-001.01 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P10	
FUEL CELL (A-80000) 80-UCP-001	ITEM: NOTE 5 PORT: NOTE 5	RJ45	80-UCP-001/B400-NET-001.02 CAT.6A4x2xAWG23,Sh+ShT+ARM,F.Ret,GREEN,NIS	RJ45	SWITCH: COOP-02 PORT: P03	

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DG-40015**

REV.:	DATE:	SIGNATURE:
1_E	19/11/24	G.Randi

ROSETTI MARINO SpA

CROSSWIND

ROSETTI MARINO

TITLE :

BASE LOAD POWER HUB (BLPH)
INSTRUMENT – PCS WIRING DIAGRAMS
COMMUNICATION – CAT-6

CONTRACT NO./TITLE			SCALE 1:1
DRAWN VBA	CHECKED LCA	APPROVED DLO	DATE 23/02/2024

A3	DRAWING NO.	SHEET	REV.
	123A90-DDL-IN-DG-40015	037	01

File Name : 123A90-DDL-IN-DG-40015_Rev.01

DRAWING NO. 123A90-DDL-IN-DG-40015

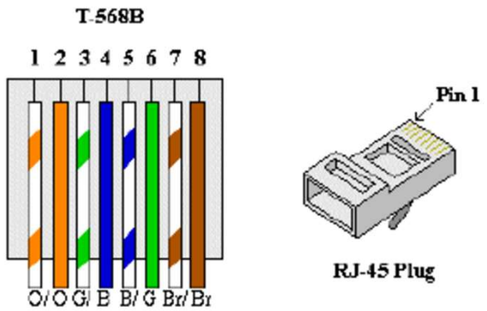
REV. 01

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. FIBER OPTIC TAG NAME WILL BE DEFINED DURING THE CONSTRUCTION PHASE.

<01>

7. CAT. 6A CABLE SHALL BE TERMINATED MEETING REQUIREMENTS OF STANDARD EIA/TIA 568B:



RJ-45 Plug

8. 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

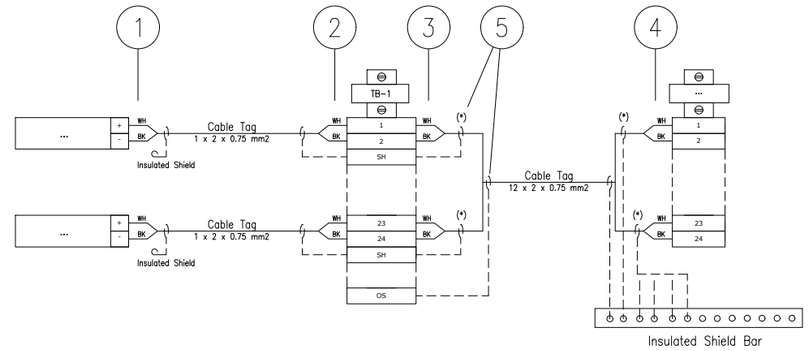
LEGENDS & SYMBOLS:

LEGEND:

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
MC	- MARSHALLING CABINET
AI	- ANALOGUE INPUT
AO	- ANALOGUE OUTPUT
DI	- DIGITAL INPUT
DO	- DIGITAL OUTPUT

TYPICAL WIRE CROSS-FERRULING:

PHILOSOPHY OF CROSS-FERRULING: <01>



(*) Single shield is foreseen only for AI/AO signals.

1 - INSTRUMENT TERMINAL NO. OR POLARITY/JB NO./JB TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

2 - INSTRUMENT TERMINAL NO. OR POLARITY/INSTRUMENT TAG NO./JB TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

3 - PAIR OR CORE NO./MARSHALLING CABINET NO./TB NO./TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

4 - PAIR OR CORE NO./JB NO./JB TERMINAL NO./TB NO./TERMINAL NO.
(SAME TAGGING PHILOSOPHY SHALL APPLIED ALSO TO THE SHIELD)

5 - HEAT SHRINKABLE BLACK FOR SHIELD OF NIS INSTRUMENT CABLE.
(HEAT SHRINKABLE BLUE FOR SHIELD OF NIS INSTRUMENT CABLE)

6 - IN CASE OF CONNECTION FROM RIGHT TO LEFT, ORDER OF INFORMATION SHALL BE MIRRORED

REFERENCE DRAWINGS

PIPING AND INSTRUMENT DIAGRAM	123A90-DDL-PR-PID-80009
INSTRUMENT INDEX	123A90-DDL-IN-LIS-40088 Rev.01

VALID FOR CONSTRUCTION
FDL DWG: **123A90-FDL-IN-DG-40015**

REV.:	DATE:	SIGNATURE:
1_E	19/11/24	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 1:1
DRAWN VBA	CHECKED LCA	APPROVED DLO	DATE 23/02/2024

A3	DRAWING NO. 123A90-DDL-IN-DG-40015	SHEET 003	REV. 01

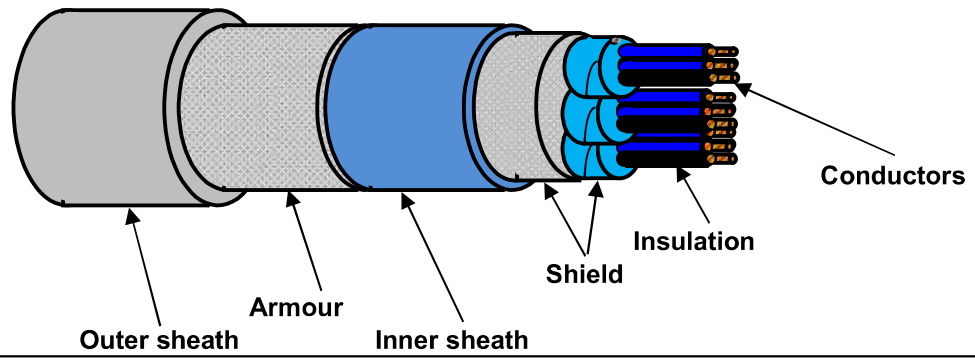
File Name : 123A90-DDL-IN-DG-40015_Rev.01

Tag Number	Category	Discipline	Eng Status	NativeDoc	Layout	Parent Tag	Main Function	Secondary Functio	Area	From Tag	From Main Function	From Area	To Tag	To Main Function	To Area	Material ID	Material Desc.	Gland Standa	From Glan	From Entry	From Fittir	To Gland	To Entry	To Fitting	Routing	Routing Manual
80-UCP-001/B400-NET-001.02	Cable	IN	VFC	123A90-DDL-IN-LIS-40091						80-UCP-001	Communication	Upper Deck	B400-NET-001	Network Cabinet / EMCS System	Lower Deck (B-400)	TELCV03-4X2X23AWG	Cable CAT 6A S/FTP 4x2x23AWG Armoured LSZH - Grey	M20S	n.a.			n.a.				I-MCT-U02 / L-SEC-19 / L-SEC-18A / B-400-SEC-2A / B-400-SEC-2B / B-400-SEC-3B / I-MCT-403

FLEI s.r.l.

CAT. 6A S/FTP ARMOURED LSZH

4X2X23AWG - Based on Draka UC500 HS23



TECHNICAL FEATURES

Conductors :	**SOLID** plain annealed copper wires (AWG23) **ø 0,56 mm**
Insulation :	Foamskin PE - **ø 1,38 mm**
Cores colour code :	**blue/white; orange/white; green/white; brown/white**
Pair Assembling :	Cores twisted in pairs
Pair Shield :	Al-laminated plastic foil
Overall Shield:	Tinned copper braid
Inner sheath :	Extruded LSZH Thermoplastic Compound
Inner sheath color code:	**Blue**
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 1,2 mm
Outer sheath color code:	**Grey**
Outer printing (INKJET) :	**FLEI - 4X2X23AWG - CAT.6A S/FTP ARMOURED LSZH - IEC 60332.1.2 - IEC 60332.3.22 -**
(every 1000 mm)	**Year of Manufacture - CE + Meter Marking**
Under armour diameter :	(7,5 ± 10%) mm
Over armour diameter :	(8,3 ± 10%) mm
Outer diameter :	(10,7 ± 10%) mm
Bending radius :	cable outer diameter x 8 (in fixed installation)
Test Voltage :	1000 V DC for 1' (Between Cores) / 1000 V DC for 1' (Between Cores - Shield)
Loop Resistance :	≤ 154 Ω/Km (@ 20°C)
Insulation Resistance :	≥ 2000 MΩ x km (@ 20°C)
Mutual Capacitance :	Nom. 43 nF/km
Characteristic Impedance :	(100 ± 5) Ω
Applicable Standards	
Design Guidelines :	**Generally to ISO/IEC 11801 / IEC 61156-5 / EN 50173-1 / EN 50288-10 / IEEE 802.3at / af / bt**
ON COMPLETE CABLE	
Flame Retardant test :	IEC 60332.1.2 - IEC 60332.3.22
Acid Gas generation :	IEC 60754.1/2
Smoke density/Light Transm	IEC 61034.2 (LT ≥ 60%)
Hazardous Areas :	IEC 60079.14 par.9.3.2a
Temperature Range :	
ON COMPLETE CABLE	
During Operation :	(-20°C up to +60°C) (in fixed installation)
During installation :	(0°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 :	29/05/2024	Messa			
Checked :	29/05/2024	Spaccasassi			
Approved :	29/05/2024	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 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

NOT APPLICABLE

Section 13 MECHANICAL COMPLETION CHANGES / MARK-UPS

NOT APPLICABLE