Base Load Power Hub (BLPH)

OTP: BLACK START PROCEDURE

Document Number: 123A90-PML-COM-PRO-03036

Document Class: 2

01	30/06/2025	Accepted for Construction (AFC)	D. ZUCCONELLI	A.IVESON	M.BRUNELLI
00	19/05/2025	Issue for Review (IFR)	D. ZUCCONELLI	A.IVESON	M.BRUNELLI
Rev.	**Date**	**Description**	**Prepared**	**Reviewed**	**Approved**

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

Revision / Change Log

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

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

Table of Contents

1 INTRODUCTION 7
1.1 Project Overview 7
1.2 Project Location 7
1.3 Project Concept 8
2 DOCUMENT SCOPE 9
3 OTP SUMMARY 9
3.1 Test Objective 9
3.2 System Boundary Limits 10
3.3 Test and System Description 10
3.4 Safety Devices 12
3.5 HSE Management 12
3.6 Acceptance Criteria (Functional & Communication Tests) 13
4 DOCUMENTS REFERENCES AND ABBREVIATIONS 14
4.1 Reference Documents 14
4.1.1 Company Documents and Standards 14
4.1.2 Project Documents 14
4.2 Acronyms and Abbreviations 16
5 OTP AT ONSHORE WORKSITE 18
5.1 Planning and Manpower 18
5.1.1 Planned tasks with estimated manpower 18
5.1.2 Test duration estimate 18
5.1.3 Vendor Assistance 18
5.1.4 Items Postponed to C&E OTP 18
5.1.5 HOLDS 18
5.2 OTP Test Requirements – Onshore WORKSITE 18
5.2.1 Pre-Commissioning Achievement 18
5.2.2 Commissioning Achievement 18
5.2.3 Special Tools & Test Equipment 19
5.2.4 Consumable List 19
5.2.5 Temporary Facilities 19
5.3 OTP Description – Onshore WORKSITE 19
5.3.1 OTP Test Preparation 19
5.3.2 Electrical Preparation 20
5.3.3 Mechanical Preparation 20
5.3.4 Instrument Preparation 20

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

5.3.5 Piping Preparation 20
5.3.6 Additional Discipline Preparation 20
5.3.7 Test Preparation 20
5.4 BLACK START: BLPH Start-Up Procedure 21
5.4.1 Energization of Low Voltage SWBD SG-200N1 from Temporary Generator Supply 23
5.4.2 Energization UPS UP-200F3 24
5.4.3 Energization DP-200N1 and Lower & Upper Decks External Lights 27
5.4.4 Energization UPS UP-200F4 28
5.4.4.1 Energization ICSS (F&G, SIS, PCS, DATA NETWORKS & EMCS) 31
5.4.4.2 Energization HVAC B400-HSB-001 (only for technical room internal lighting circuits) 37
5.4.4.3 Energization HVAC B300-HSB-001 (only for technical room internal lighting circuit) 37
5.4.4.4 Energization HVAC B200-HSB-001 (only for technical room internal lighting circuits) 38
5.4.4.5 Energization HVAC B100-HSB-001 (only for technical room internal lighting circuits) 38
5.4.4.6 Energization UPS-200F1 39
5.4.4.7 Energization Auxiliary Supply SG-100D1(6.6kV) 40
5.4.4.8 Energization 6.6 kV Temporary Yard Supply, A4 and A6 UNIT 41
5.4.4.9 Switch from Temporary Generator Supply to 6.6kV Power Supply 44
5.4.4.10 Restore Normal Operation after BLPH Startup – Remove System Overrides 46
5.4.5 OTP SITE Tests Certifying Authority Table of Attendances 47
5.4.6 OTP SITE - Tests Final Signatures and Company Acceptance 47
5.5 Post-test Conditions 47
5.6 Reinstatement tasks 47
6 OTP AT OFFSHORE WORKSITE 48
6.1 Planning and Manpower 48
6.1.1 Offshore site test overview 48
6.1.2 Test duration estimate 49
6.1.3 Vendor Assistance 49
6.1.4 Items Postponed to C&E OTP 49
6.1.5 HOLDS 49
6.2 OTP Test Requirements – Offshore WORKSITE 49
6.2.1 Pre-Commissioning Achievement 49
6.2.2 Commissioning Achievement 49
6.2.3 Special Tools & Test Equipment 50
6.2.4 Consumable List 50
6.2.5 Temporary Facilities 50
***6.3* OTP DESCRIPTION – OFFSHORE** 50
6.3.1 Energization of Temporary Generator Supply 50

6.3.2 Energization of Low Voltage SWBD SG-200N1 from Temporary Generator Supply 51
6.3.3 Energization UPS UP-200F3 51
6.3.4 Energization DP-200N1 and Lightings 54
6.3.5 Energization UPS UP-200F4 55
6.3.6 Energization ICSS (F&G, SIS, PCS, DATA NETWORKS, EMC 58
6.3.6.1 Energization HVAC B400-HSB-001 (only lighting circuits) 64
6.3.6.2 Energization HVAC B300-HSB-001 (only lighting circuits) 64
6.3.6.3 Energization HVAC B200-HSB-001 (only lighting circuits) 65
6.3.6.4 Energization HVAC B100-HSB-001 (only lighting circuits) 65
6.3.6.5 Energization UPS – UP-200F1 66
6.3.6.6 Energization GIS AUXILIARY SUPPLY 6.6kV 67
6.3.6.7 Auxiliaries' energization Transformer TR-100AD1 70
6.3.6.8 Energization Auxiliary Supply SG-100D1 (6.6kV) 71
6.3.6.9 Energization A4, A6 UNIT and main busbar 71
6.3.6.10 Switch from Temporary Generator power supply to 6,6kV power supply 73
6.3.6.11 Restore Normal Operation after BLPH Startup – Remove System Overrides 75
6.3.7 OTP SITE Tests Certifying Authority Table of Attendances 76
6.3.8 OTP SITE - Tests Final Signatures and Company Acceptance 76
7 APPENDICES 77
7.1 Vendor SAT Procedure 77
7.2 Proverlis Summary System Reports 78
7.3 Equipment Related Technical Queries 79
7.4 As Built Documentation 80
7.5 Management of Change – Summary Table of Tasks and Details of Affected Related Documentation 81

List of Figures

Figure 1 - HOLLANDSE KUST NOORD WIND PARK Location Map 7
Figure 2 - Wind Park Details 8
Figure 3 – BLPH Concept 8
Figure 4 – OTP System Boundary Limits 10
Figure 5 – Black Start WORKSITE Single Line Block Diagram and Sequence 12
Figure 6 – Black Start SITE Single Line Block Diagram and Sequence 48

List of tables

Table 1: Black Start Execution Sequence 11
Table 2: Company Key Reference Documentation 14
Table 3: Reference Project Deliverables 15
Table 4: Acronyms and Abbreviations 17

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

1 INTRODUCTION

1.1 Project Overview

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.
Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.2 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

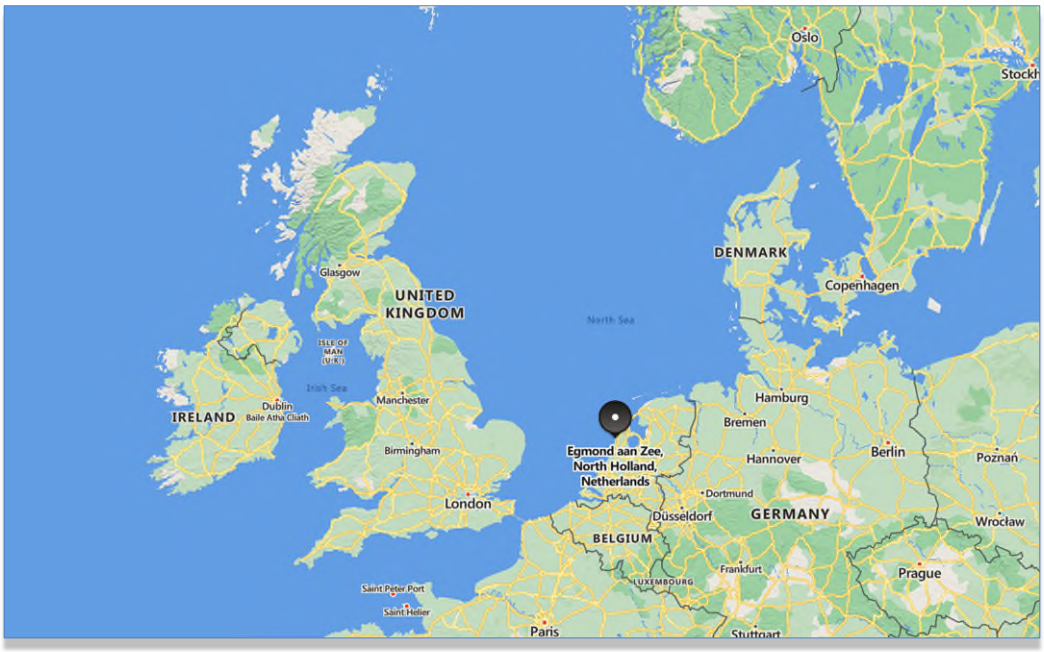


Figure 1 *- HOLLANDSE KUST NOORD WIND PARK Location Map*

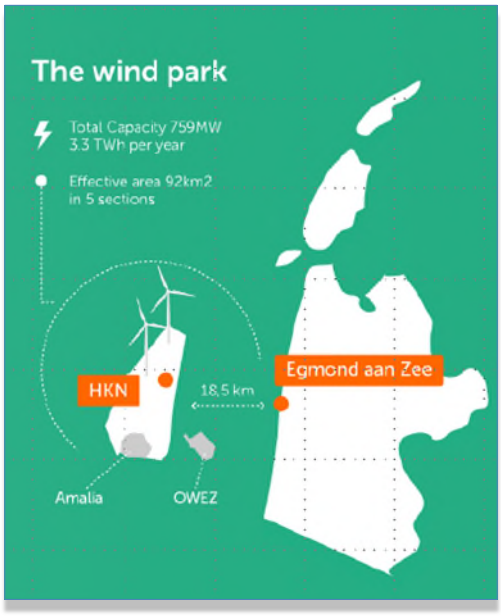


Figure 2 *- Wind Park Details*

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile is located on coordinates E 590719.1, N 5841602.3 and is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.3 Project Concept

All components included in the BLPH will be integrated onshore on a topside and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

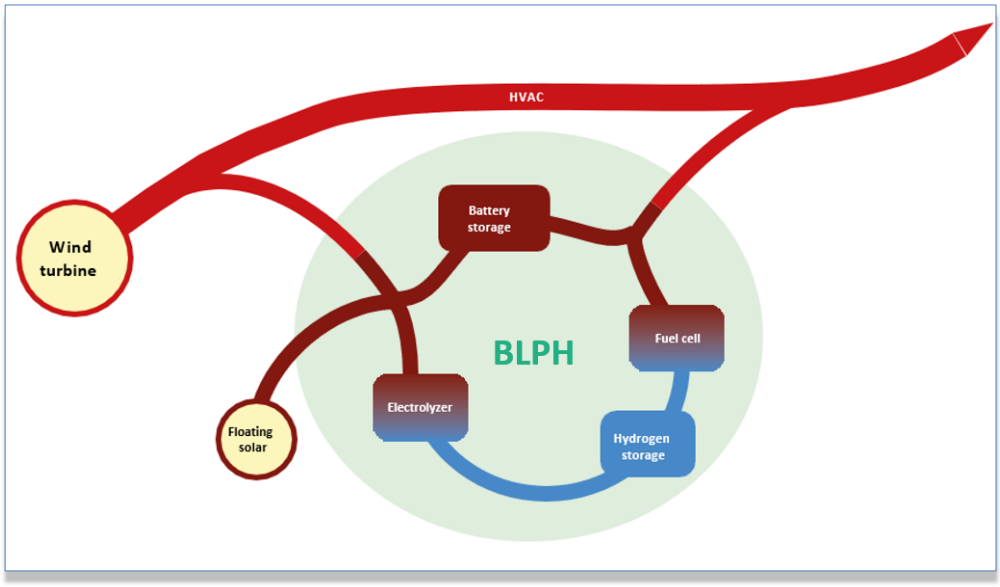


Figure 3 *– BLPH Concept*

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.
The purpose of the BLPH is to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

2 DOCUMENT SCOPE

The purpose of this document is to describe the methodology and the planned actions to be implemented for the preparation and execution of the Black Start Procedure at both the onshore and offshore locations.

At the onshore location, an incoming 66 kV high voltage main power supply will not be available, therefore energisation of GIS HNA6-AFA70 and Power Transformer TR-100AD1 66/6.6 kV 7 MVA will not be possible.
However, a temporary 6.6 kV yard power supply will be available, connected directly to the 6.6 kV Switchboard SG-100D1.

At the offshore location, the permanent configuration is foreseen with main incoming 66 kV high voltage power supply from HNA5.

3 OTP SUMMARY

3.1 Test Objective

The operating test procedure of Black Start is executed to ensure that the BLPH platform is started up in a safe and controlled manner and to verify the correct operation according to the project requirements.

Activities shall be developed as follows:

- Onshore commissioning activities at Contractor site (WORKSITE)
    - BLPH BLACK START utilising temporary 400V yard power supply and temporary 6.6 kV yard power supply
- Offshore commissioning activities (SITE)
    - BLPH BLACK START utilising 400V temporary generator and 66 kV incoming power supply from HNA5

It is assumed that BLPH will have been safely shutdown prior to performing the Black Start procedure, which will aim to achieve the following criteria:

- Restore main and emergency internal and external lighting,
- Energise AC and DC UPS systems to recharge respective battery banks required to power vital loads,
- Energise BLPH Safety and Control Systems
- Restore main incoming high voltage power supplies

3.2 System Boundary Limits

See below the affected systems and subsystems on the Overall Single Line Diagram

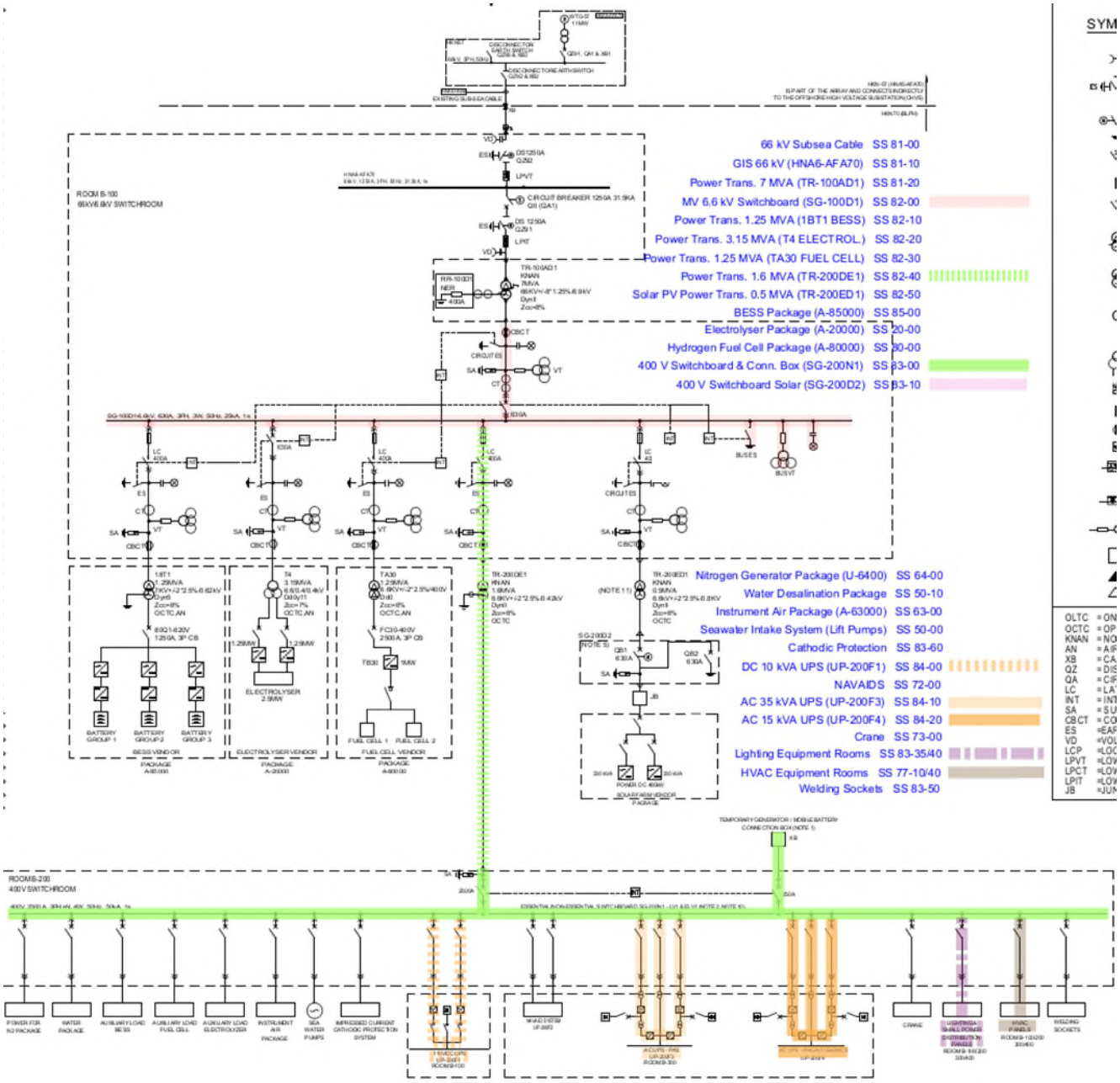


Figure 4 *– OTP System Boundary Limits*

3.3 Test and System Description

This document is related to the following systems/ subsystems:

- 70-00: F&G Control System
- 77-10: HVAC HV/MV Switchgear Room B-100 (Only Internal Lighting)
- 77-20: HVAC LV Switchgear Room B-200 (Only Internal Lighting)

- 77-30: HVAC UPS Equipment Room B-300 (Only Internal Lighting)
- 77-40: HVAC I&T Equipment Room B-400 (Only Internal Lighting)
- 79-00: Emergency Shutdown System (SIS)
- 82-00: MV 6.6 kV Switchboard (SG-100D1)
- 82-40: Power Transformer 1.6 MVA (TR-200DE1)
- 82-99: 6.6kV Temporary Yard Power Supply
- 83-00: 400/230V Switchboard SG-200N1
- 83-20: 400/230V Distribution Board DP-200N1
- 83-35: Emergency lighting Upper Deck
- 83-36: Emergency lighting Lower Deck
- 83-37: Emergency lighting Stairs/Transition Piece
- 83-40: Normal lighting Upper Deck
- 83-41: Normal lighting Lower Deck
- 83-42: Normal lighting Stairs/Transition Piece
- 83-99: 400V Temporary Yard Supply
- 84-00: 110V DC 10kVA UPS System (UP-200F1)
- 84-10: 230V AC UPS - 35KVA (UP-200F3)
- 84-20: 230V AC UPS – 15KVA (UP-200F3)
- 86-00: Data Networks
- 87-00: Power Distribution System (EMCS)
- 87-10: PROCESS CONTROL SYSTEM (PCS)
- 87-20: PROCESS CONTROL SYSTEM (PCS) - Instrumentation

All equipment is installed inside Technical Room B-100/B-200/B-300/B-400 and in all decks.

These parts of the system have been tested on worksite and at site.

The Black Start procedure is a carefully planned sequence of steps, starting with the most critical equipment and gradually bringing the entire platform back to operational status.

TASK SEQUENCE	DESCRIPTION	REMARKS
1	Start Temporary Generator Supply (400V yard supply)	Power supply connected to LV SWBD SG-200N1 ref. Cubicle A2/+08
2	Energise LV SWBD SG-200N1	Preapre to energise n.3 UPS UP-200F3, UP-200F4 & UP-200F1
3	Energise UPS UP-200F3	n.3 feeders from SG-200N1 ref. Cubicles A3/+01, A4/+01, A7/+02
4	Energise DP-200N1	Energise external illumination upper & lower decks
5	Energise UPS UP-200F4	n.3 feeders from SG-200N1 ref. Cubicles A3/+01, A4/+01, A2/+04
6	Energise F&G / Network Cabinets	n.4 feeders from UPS UP-200F4
7	Energise SIS Cabinets	n.2 feeders from UPS UP-200F3
8	Energise EMCS Cabinets	n.2 feeders from UPS UP-200F3
9	Energise PCS / Server Cabinets	n.4 feeders from UPS UP-200F3
10	From EWS start up ICSS Systems	Engineering Workstation Installed inside cabinet B-400-NET-001
11	Energise HVAC UCP Tecnical Room B-400 (only internal lighting)	n.1 feeder from SG-200N1 ref. Cubicel A5/+04 & n.1 feeder from UP-200F3
12	Energise HVAC UCP Tecnical Room B-300 (only internal lighting)	n.1 feeder from SG-200N1 ref. Cubicle A5/+03 & n.1 feeder from UP-200F3
13	Energise HVAC UCP Tecnical Room B-200 (only internal lighting)	n.1 feeder from SG-200N1 ref. Cubicle A5/+02 & n.1 feeder from UP-200F3
14	Energise HVAC UCP Tecnical Room B-100 (only internal lighting)	n.1 feeder from SG-200N1 ref. Cubicle A4/+02 & n.1 feeder from UP-200F3
15	Energise UPS UP-200F1	n.2 feeders from SG-200N1 ref. Cubicles A7/+05, A7/+06
16	Start Temporary 6.6 kV Yard Power Supply	Close incomer temporary power supply 6.6kV

Table 1: Black Start Execution Sequence

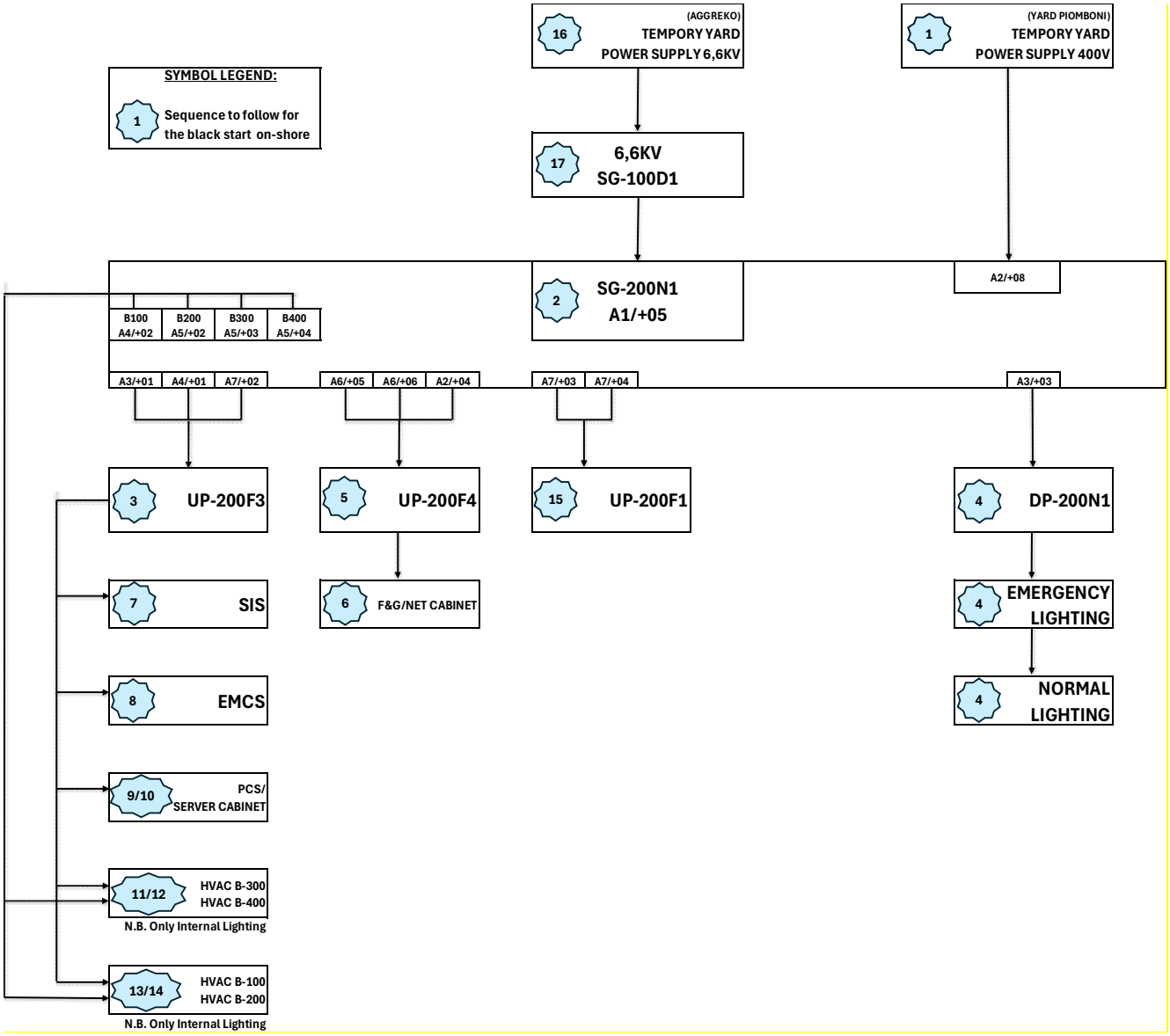


Figure 5 – Black Start Block Diagram and Execution Sequence

3.4 Safety Devices

- Appropriate Personnel Protective Equipment (PPE) and safety equipment e.g., safety shoes, hand gloves, helmet, earplugs etc. are available and must be used in line with the site requirements.
- Warning safety signs are to be posted with restricted access to essential personnel only.
- Adequate firefighting equipment.

3.5 HSE Management

All necessary safety precautions must be taken to avoid any risk for personnel injury.

- All personnel involved in this operational test shall be competent for the tasks they will be required to undertake
- Place safety / warning signs and segregate the entire area with barrier tapes (safety barriers) of a colour distinguished (blue and white) from those used for construction activities
- Restrict access into area only to authorized personnel
- Conduct "Toolbox Talk" with all personnel prior to starting test work

- Appropriate Personnel Protective Equipment (PPE) and safety equipment e.g. safety shoes, hand gloves, helmet, earplugs etc. are available and must be used in line with the site requirements
- All activities carried out on the project shall be performed in accordance with the "Permit to Work" system Doc. PRO-HSE-23
- Electrical and mechanical isolations are to be assured as per Doc. PRO-HSE-08 and "Commissioning and start-up operation" procedure.
- Observe and enforce all international codes and regulations to safeguard personnel, plant and environment.
- Ensure that the working area is clean, tidy, well illuminated and that access and escape routes are free from obstructions.

Before starting work on any of the activities in this OTP it is the responsibility of the persons performing the work to:

- Familiarize themselves with the plant/equipment to be worked on
- Ensure they are aware of all other work activities that are taking place, or due to take place
- If necessary, re-plan any situation/activity
- Ensure proper communications between parties involved in the execution of the OTP
- Read the relevant Vendor documentation for the equipment covered by this OTP and observe any special requirements and limitations recommended or imposed by Vendor
- Verify that all personnel involved in the implementation of this procedure are familiar with its content as well as the associated safety requirements (Toolbox Talk)

3.6 Acceptance Criteria (Functional & Communication Tests)

Before Power ON:
Visual inspection and verification are a crucial step to identify any obvious issues with the installation, such as loose connections, missing components, or damage to the equipment.

Crosschecking the installation with engineering documentation ensures that the installation is done correctly and according to the manufacturer's guidelines. These steps can help identify any missing or incorrect components, and wrong connections.

After Power ON:
Execution of individual test steps will demonstrate the safe startup of the BLPH platform and consequently ensure that the temporary overrides required for the black start will not cause successive trips once they will be restored to normal working operations,

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

4 DOCUMENTS REFERENCES AND ABBREVIATIONS

4.1 Reference Documents

4.1.1 Company Documents and Standards

Document ID	Document Title
[1] K559-2254-CG-PHI-001	Commissioning Philosophy
[2] K559-2254-EL-ELL-002	BLPH Electrical Load List (CCS MODE 2(A) 'HOT STANDBY')
[3] K559-2254-EL-ELL-003	BLPH Electrical Load List (CCS MODE 3(C) 'DISCHARGING')
[4] K559-2254-EL-ELL-004	BLPH Electrical Load List (CCS MODE 4(A) 'COLD STANDBY')
[5] K559-2254-EL-ELL-005	BLPH Electrical Load List (CCS MODE 4A(D) 'EMERGENCY MODE (Island))
[6] K559-2254-EL-ELL-006	BLPH Electrical Load List (CCS MODE 5(D) 'POWER OUT (Blackout))
[7] K559-2254-PR-PHI-001	Main process control philosophy

Table 2: Company Key Reference Documentation

These documents were produced in FEED and made available to RM for info. They have subsequently been superseded by Detailed Design, similar or same deliverables.

4.1.2 Project Documents

Document ID	Document Title
[1] 123A90-PML-PM-LIS-01001	Master Document Register
[2] 123A90-PML-PM-PL-00001	Project Execution Plan
[3] 123A90-PML-QHSE-PL-00001	Project HSE Plan
[4] 123A90-PRO-HSE-23	RM Yard Permit To Work Procedure
[5] 123A90-PML-COM-PL-03002	Mechanical Completion & Comm. Execution Plan
[6] 123A90-PML-COM-LIS-03011	System/Sub-Systems List
[7] 123A90-PML-COM-LIS-03012	System/Sub-System Boundary Limit Diagrams
[8] 123A90-PML-COM-PRO-03038	Leak Test Procedure
[9] 123A90-PML-COM-SP-03032	Pre-Commissioning Functional Test Sheet Template Collection (ITR-B)
[10] 123A90-PML-COM-SP-03014	Commissioning TDS - Temporary Equipment & Facilities
[11] 123A90-PML-COM-PRO-03019	OTP – Onshore Performance & Integrated Test Procedure
[12] 123A90-PML-COM-LIS-03034	Inhibit-Override Register
[13] 123A90-PML-COM-LIS-03035	PSV Calibration Register
[14] 123A90-PML-COM-PRO-03036	OTP - Black Start Procedure

Document ID	Document Title
[15] 123A90-PML-COM-LIS-03024	Commissioning Spare Parts and Consumables List
[16] 123A90-PML-COM-PRO-03022	Initial offshore START-UP procedures
[17] 123A90-PML-COM-SP-03057	Worksite WEF (Work Execution Flow Scheme)
[18] 123A90-PML-COM-SP-03058	Site WEF (Work Execution Flow Scheme)
[19] 123A90-PML-COM-RE-03001	Commissioning Final Dossier (ITR-B)
[20] 123A90-PML-QHSE-PRO-00116	Flushing and Cleaning Procedures
[21] 123A90-PML-QHSE-SP-00118	Mechanical Completion Check Sheet Template Collection (ITR-A)
[22] 123A90-PML-QHSE-RE-00115	Mechanical Completion Final Dossier (ITR-A)
[23] 123A90-PML-QHSE-PRO-00117	Punch list Management Procedure
[24] 123A90-PML-COM-PRO-03041	OTP - Hydrogen Storage & Venting Systems
[25] 123A90-PML-COM-PRO-03042	OTP - Sea Water Intake & Fresh Water Treatment Syst.
[26] 123A90-PML-COM-PRO-03043	OTP - Instrument Air System
[27] 123A90-PML-COM-PRO-03055	OTP - Nitrogen Generation System
[28] 123A90-PML-COM-PRO-03045	OTP - HV Switchgear & 66 kV Transformer Systems
[29] 123A90-PML-COM-PRO-03046	OTP - 6.6 kV Switchgear & Transformer Systems
[30] 123A90-PML-COM-PRO-03047	OTP - LV Switch Boards & LV Distribution Board Syst.
[31] 123A90-PML-COM-PRO-03048	OTP - Lighting & Small Power Systems
[32] 123A90-PML-COM-PRO-03049	OTP - Electrical Heat Tracing Systems
[33] 123A90-PML-COM-PRO-03050	OTP - DC UPS System 10kVA UP-200F1
[34] 123A90-PML-COM-PRO-03051	OTP - Data Network Systems
[35] 123A90-PML-COM-PRO-03053	OTP - Navaid System
[36] 123A90-PML-COM-PRO-03054	OTP - F&G and ESD C&E Logics
[37] 123A90-PML-QHSE-PRO-00120	Proverlis Management Procedure
[38] 123A90-PML-COM-PRO-03056	OTP – Document Template
[39] 123A90-PML-COM-PRO-03059	OTP - AC UPS System 35kVA UP-200F3
[40] 123A90-PML-COM-PRO-03060	OTP - AC UPS System 15kVA UP-200F4
[41] 123A90-PML-COM-PRO-03007	Commissioning Strategy

Table 3: Reference Project Deliverables

4.2 Acronyms and Abbreviations

Acronyms / Abbreviations	Description
AIS	Automatic Identification System
AHU	Air Handling Unit
AOC	Achievement of Commissioning
C&E	Cause & Effects
CCS	Central Control System
CCTV	Closed Circuit Television
CMS	Completions Management System
CPI	Company Provided Item
CRS	Comments Response Sheet
CSU	Commissioning & Start-Up
E&I	Electrical & Instrumentation
EMCS	Electrical Monitoring & Control System
ESD	Emergency Shut Down
FAT	Factory Acceptance Test
FT	Functional Test
F&G	Fire & Gas
GALT	Gross Air Leak Test
HAZID	Hazard Identification Studies
HAZOP	Hazard and Operability Studies
HKN	Hollandse Kust Noord
HV	High Voltage
HVAC	Heating, Ventilation and Air Conditioning
HSE	Health, Safety, & Environment
ICSS	Integrated Control and Safety System
ITR	Inspection & Test Record
LC	Locked Closed
LO	Locked Open
LoSH	Limits of System Handover
LOTO	Lock-Out / Tag-Out
LV	Low Voltage
MC	Mechanical Completion
MDR	Master Document Register
MOC	Management of Change
NUI	Normally Unmanned Installation

Acronyms / Abbreviations	Description
OEM	Original Equipment Manufacturer
OMAR	Operating Modes Assurance Review
OTP	Operational Test Procedure (Commissioning)
OR	Operations Readiness
ORR	Operations Readiness Review
PACO	Process Automation, Control and Optimisation
PCS	Process Control System
PID (P&ID)	Piping and Instrumentation Diagram
PSV	Pressure Safety Valve
PTW	Permit to Work
PVP	Piping and Vessels Preparation
PC&C	Pre-Commissioning & Commissioning
PSUA	Pre Start-Up Audit
PSSR	Pre Start-up Safety Review
RFC	Ready for Commissioning
RFO	Ready for Operation
RFSA	Ready For Sail Away
RFSU	Ready For Start-Up
SAT	Site Acceptance test
SECE	Safety Environmental Critical Element
SIF	Safety Instrumentation Function
SIL	Safety Integrity Level
SIMOPS	Simultaneous Operations & Maintenance
SIS	Safety Instrumented System
SLD	Single Line Diagram
SoF	Statement of Fitness
TA	Technical Authority
TQ	Technical Query
TIV	Technical Integrity verification
UPS	Uninterruptible Power Supply
VHF	Very High Frequency
VSAT	Very Small Aperture Terminal

Table 4: Acronyms and Abbreviations

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

5 OTP AT ONSHORE WORKSITE

This chapter refers to the activities on the Contractor worksite (construction yard).

5.1 Planning and Manpower

5.1.1 Planned tasks with estimated manpower

Estimated manpower for the entire duration of the Test:

- 1 E&I commissioning superintendent
- 1 E&I commissioning supervisor from Contractor
- 1 E&I commissioning technicians from Contractor
- 1 PCS/ESD Workstation Operator

5.1.2 Test duration estimate

The test duration should be as follows:

- 0.5 day approx.

If necessary, the estimated time can be extended in order to complete all required steps.

5.1.3 Vendor Assistance

Not applicable

5.1.4 Items Postponed to C&E OTP

Not applicable

5.1.5 HOLDS

Not applicable

5.2 OTP Test Requirements – Onshore WORKSITE

5.2.1 Pre-Commissioning Achievement

Prior the commissioning operation starts, the relevant pre-commissioning ITR's should be fully signed.

5.2.2 Commissioning Achievement

The commissioning achievement will be the successful operation, functionality and safeguarding test of all the equipment, installed and put in operation during the WORKSITE phase:

- 70-00: F&G Control System
- 77-10: HVAC HV/MV Switchgear Room B-100
- 77-20: HVAC LV Switchgear Room B-200 (only internal lighting)
- 77-30: HVAC UPS Equipment Room B-300 (only internal lighting)
- 77-40: HVAC I&T Equipment Room B-400 (only internal lighting)
- 79-00: Emergency Shutdown System (SIS) (only internal lighting)
- 82-00: MV 6.6 kV Switchboard (SG-100D1)
- 82-40: Power Transformer 1.6 MVA (TR-200DE1)
- 82-99: MV 6.6kV Temporary Yard Supply Integrated test
- 83-00: 400/230V Switchboard SG-200N1
- 83-20: 400/230V Distribution Board DP-200N1
- 83-99: 400 V Temporary Yard Power Supply
- 84-00: 110V DC 10kVA UPS System (UP-200F1)

- 84-10: 230V AC UPS - 35KVA (UP-200F3)
- 84-20: 230V AC UPS – 15KVA (UP-200F4)
- 86-00: Data Networks
- 87-00: Power Distribution System (EMCS)
- 87-10: PROCESS CONTROL SYSTEM (PCS)
- 87-20: PROCESS CONTROL SYSTEM (PCS) - Instrumentation

5.2.3 Special Tools & Test Equipment

The following special tool and Test Equipment are required (see vendor document 1723002197-EL-LIS-00053):

- Voltage, frequency, continuity tester (Multimeter)
- Phases sequence tester
- Portable radios
- Amperometric clampmeter

TESTING & MEASUREMENT INSTRUMENT USED			
Type	Serial N.	Calibration certificate	Validity

5.2.4 Consumable List

Not applicable

5.2.5 Temporary Facilities

Temporary YARD Power Supply 400V and Temporary YARD Power Station AGGREKO 6.6kV.

5.3 OTP Description – Onshore WORKSITE

5.3.1 OTP Test Preparation

Step	**Description**	**Result**	**Verified by**	**Date**
1	All systems Ready for Commissioning Certificate (RFC) are issued and approved.			
2	No Mechanical Completion or Pre-commissioning punch list 'A' items are outstanding against the systems to be commissioned.			
3	All personnel involved in the implementation of this procedure are familiar with its content as well as with associated safety requirements (Toolbox Talk to be conducted before initiation of activities).			
4	A final walkdown of the system has been completed, to ensure that the system and the area are ready for the Black Start.			
5	Check that areas are free for work and escape routes are clear of any obstructions.			
6	All safety barriers and warning signs have been installed.			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

Step	Description	Result	Verified by	Date
7	Ensure that proper communications have been established between parties involved in the implementation of the procedure.			
8	Verify availability of test equipment and consumables as per section 5.2.3 and 5.2.4.			
9	System(s) isolations as per LOTO procedure defined within HSSE Permits to Work and Commissioning procedures duly prepared and approved. Particular attention will be given to LOTO isolation of ALL outgoing MCB feeders.			

5.3.2 Electrical Preparation

Step	Description	Result	Verified by	Date
10	Check that grounding and bonding are in accordance with applicable documents.			
11	All drawers in SG-200N1 are open and disconnected.			

5.3.3 Mechanical Preparation

Not applicable.

5.3.4 Instrument Preparation

Step	Description	Result	Verified by	Date
12	Verify that all relevant associated systems / subsystems are ready.			
13	Check Inhibit and Override register has been prepared and validated.			
14	Verify that relevant equipment/ components are available and in operation for start of Black Start activities.			

5.3.5 Piping Preparation

Not applicable

5.3.6 Additional Discipline Preparation

Not applicable.

5.3.7 Test Preparation

In the context of BLPH, "Black Start" refers to the process of restoring power and initiating production after a complete shutdown or power failure.

This is is a critical procedure to ensure safety, reliability, and continuity of operations.

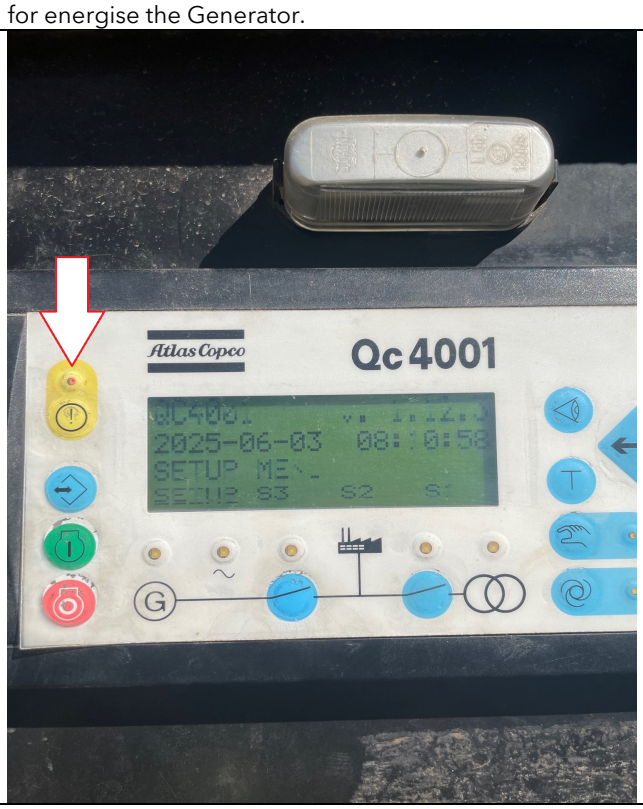
The process consequently involves restarting emergency and essential power systems first, which are crucial for initiating the larger power generation and distribution systems on the platform.

Need to Verify:

- All circuit breakers are open, ready to be closed according to the test steps in this procedure,
- All systems and subsystems involved in this procedure must be available and ready for Black Start.

5.4 BLACK START: BLPH Start-Up Procedure

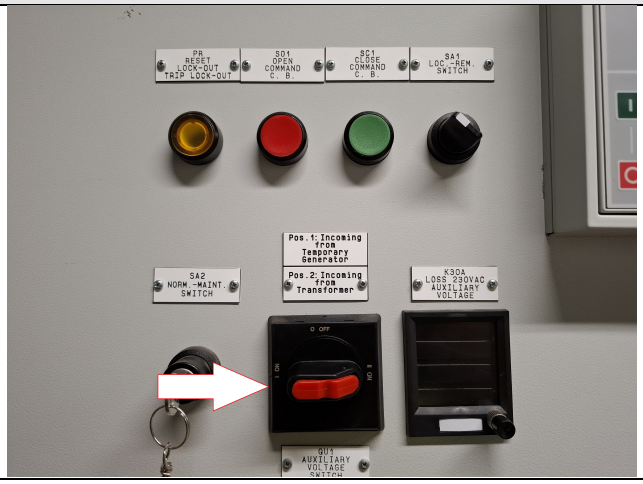
Step	Description	Result	Verified by	Date
BLPH START-UP: BLACK START				
	Energization from 400V YARD PIOMBONI (Temporary Generator Supply): **Temporary Generator Supply circuit JB-200E2 on LV Switchboard SG-200N1**			
1	Verify and confirm on LV Switchboard SG-200N1 that the INCOMING TRANSFORMER BREAKER QF1 is open and the drawer A1/+05 (SG-200N1, column 1) is in extract position.			
2	Verify and confirm on SG-200N1 that the INCOMING BREAKER QF1 of JB-200E2 is open and the drawer A2/+08 (Switchboard SG-200N1, column 2) is in extract position.			
3	On the Temporary Generator open the back and connect the batteries by turning the crank (see figure below)			
4				
5	Now, on the control panel switch the selector 0/1 in pos. 1. (see below photo).			

Step	Description	Result	Verified by	Date
6				
7	Wait 30/40 seconds for stabilisation. When the red led (see below photo) is off the user can press GREEN button for energise the Generator.			
8				

Step	Description	Result	Verified by	Date
9	When the 2 LEDs (see in photo below) are green the user can press the BLUE button for energise the drawer A2/+08			
10				
11	Verify the voltage and the phase sequence L1, L2, L3, on the input power of the drawer A2/+08 in the Switchboard SG-200N1 (if necessary).			
12	Now the system LV SG-200N1 is ready to energize via temporary generator connection.			

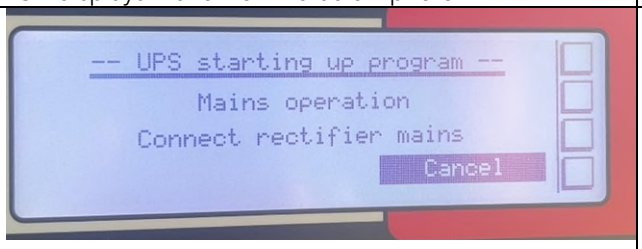
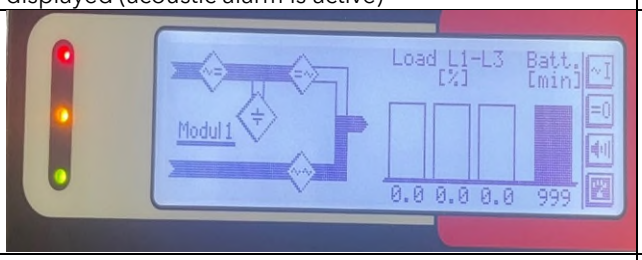
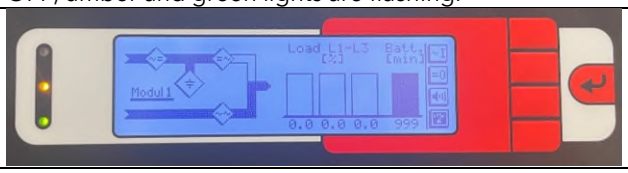
5.4.1 Energization of Low Voltage SWBD SG-200N1 from Temporary Generator Supply

Step	Description	Result	Verified by	Date
Energization of Low Voltage SWBD SG-200N1 from Temporary Generator Supply				
1	The selector QU1 Auxiliary Voltage Switch located on CUBICLE A2/+02 must be closed on POS.1 (see below photo) Ref. drawing: 1723002197-EL-DG-00030 Sht. 016.			

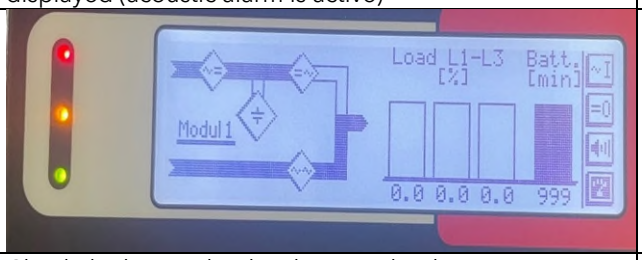
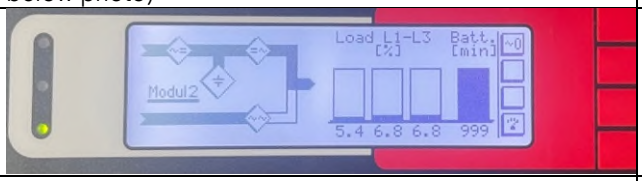
Step	Description	Result	Verified by	Date
2				
3	Close protection FUSE QU3 located inside the cubicle A2/+02 for the auxiliary voltage from temporary generator.			
4	Check MCB QA1 (auxiliary) of Drawer A2/+08 is closed (inside the drawer).			
5	VERIFICATION DRAWER A2/+08 in SERVICE POSITION (test is already done in the OTP Ref. Document 123A90-PML-COM-PRO-03047 for LV SWITCHBOARD)			
6	Proceed to close the main breaker QF1 on A2/+08 and receive power supply via temporary generator connection.			
7	SWBD SG-200N1 is now available to energise the UPS – UP-200F3 and successive Vital loads.			

5.4.2 Energization UPS UP-200F3

Step	Description	Result	Verified by	Date
Energization of UPS UP-200F3				
1	On the UPS Battery Banks Cut-off breakers (CB-200F3A, CB-200F3B) put the selector switch S2 in OVERRIDE position			
2	On Switchboard SG-200N1, close the breakers QA1 for the aux power supply in the drawers A3/+01 (AC UPS PAS - 30 MIN UP-200F3 - LINE A), A4/+01 (AC UPS PAS - 30 MIN UP-200F3 - LINE B) and A7/+02 (AC UPS PAS - 30 MIN UP-200F3 - BY PASS)			
3	Put the drawers in service position			
4	Manually close the circuit breakers QF1 for each drawer and consequently energize the power supplies to UP-200F3			
5	In UPS1 (BY PASS COLUMN) close Q10 QF1 (Ref. drawing 1724000372-EL-DG-00009) to energize the system from bypass.			

Step	Description	Result	Verified by	Date
6	In UPS1 and UPS2 check status: The bypass is starting up; the green and amber LEDs are flashing. LCD displays the text on the below photo.			
7				
8	In UPS1 and UPS2 press return key twice to see Single Line Diagram. The bypass is ready; the green and amber lights are both flashing.			
9	Check the manual bypass switch Q29 to position "1 - Inverter operation". The green and amber LEDs flash.			
10	In UPS1 set the load interrupter switch Q1 QF1 (Ref. drawing 1724000372-EL-DG-00009) to the "ON" position			
11	Wait for status: The REC is ready; the green, red and amber LEDs are flashing. LCD: Details Power supply up to the inverter is displayed (acoustic alarm is active)			
12				
13	Check the battery bank voltage and polarity: _____ V (BANK A)			
14	Reset Cut Off breaker (if necessary), close the battery cut off breaker Q0 on CB-200F3A. LCD: Details power from batteries is OK; red light is OFF, amber and green lights are flashing.			
15				
16	Press return key on the HMI, now the user can see in Single Line Diagram that batteries are connect.			
17	In UPS2 set the load interrupter switch Q1 QF1 (Ref. drawing 1724000372-EL-DG-00009) to the "ON" position			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

Step	Description	Result	Verified by	Date
18	Wait for status: The REC is ready; the green, red and amber LEDs are flashing. LCD: Details Power supply up to the inverter is displayed (acoustic alarm is active)			
19				
20	Check the battery bank voltage and polarity: _____ V (BANK B)			
21	Reset Cut Off breaker (if necessary), close the battery cut off breaker Q0 on CB-200F3B. LCD: Details power from batteries is OK; red and the amber light is OFF, green light is flashing.			
22				
23	Press return key on the HMI, now the user can see in Single Line Diagram that batteries are connect.			
24	In UPS2 press the "~I" key on the HMI for connect the inverter.			
25	Wait for status: Bypass switches to normal operation, green LED lights up (fixed not flashing). LCD: "Energy flow display via INV" is displayed (See below photo)			
26				
27	Verify the battery bank is in charge mode on HMI display			
28	Now the user can switch on the vital loads circuit breakers in the BYPASS column			
29	The vital loads circuit breakers to switch on are as follows: - QF37: SERVER CABINET ITER - LINE A - QF38: SERVER CABINET ITER - LINE B - QF43: SIS CONTROLLER AND I/O CABINET - LINE A - QF44: SIS CONTROLLER AND I/O CABINET - LINE B - QF45: PCS – CONTR. AND I/O CABINET - LINE A - QF46: PCS – CONTR. AND I/O CABINET - LINE B			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

Step	Description	Result	Verified by	Date
	- QF47: EMCS – CONTR. AND I/O CABINET - LINE A - QF48: EMCS – CONTR. AND I/O CABINET - LINE B - QF49: LV SWITCHBOARD AUXILIARY - QF51: LV SWITCHBOARD 800/460V AUXILIARY			

5.4.3 Energization DP-200N1 and Lower & Upper Decks External Lights

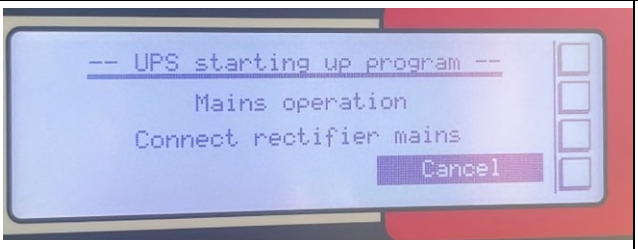
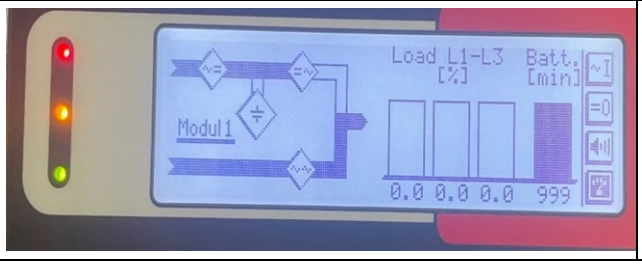
Step	Description	Result	Verified by	Date
	Energization of Distribution Panel DP-200N1			
1	On Switchboard SG-200N1 column A2/+02 proceed to close the following: - QA1 (Supply motor spring charger) - QV1 (Measurement) - QV2 (Measurement) - QA5 (command circuit feeders) - QA2 (protection device INCOMING) - QA3 (command circuit INCOMING) - QA4 (Supply 230/24 Vdc Converter) - QD1 and QD2 (Supply I/O Protection and Module)			
2	Close the circuit breaker QA1 for the aux power supply in the drawer A3/+03 (ref. DP-200N1) on SG-200N1			
3	Put the drawer in service position and the selector SA1 in Local position			
4	All the functionality of this Drawer has been tested on the document: "OTP - LV Switch Boards & LV Distribution Board System"			
5	Manually close the circuit breaker QF1 and press the button PM1 to close the contactor K1 and consequently energize the power supply to DP-200N1			
6	Close the general incoming circuit breaker Q1 (General Incomer) of DP-200N1 manually (see below photo)			

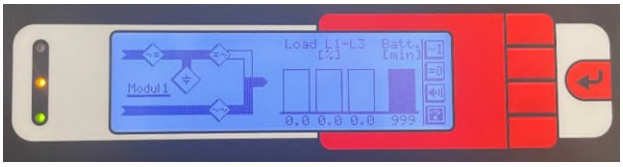
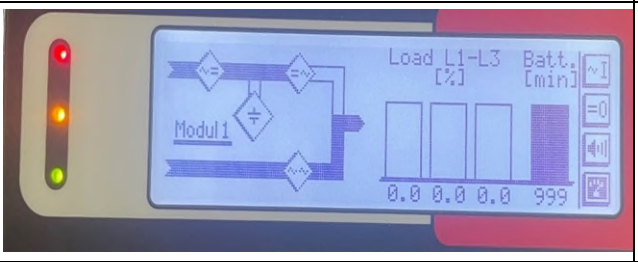
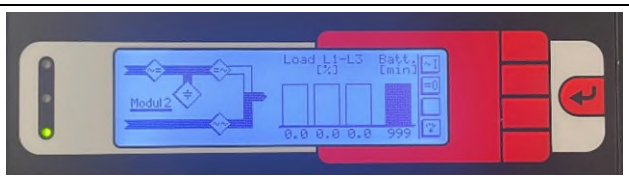
This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

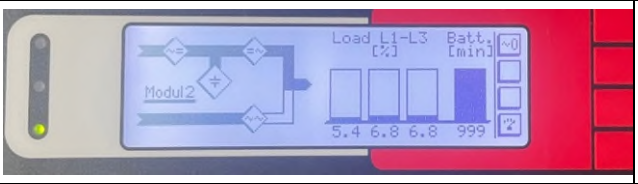
Step	Description	Result	Verified by	Date
7				
8	The Cumulative Trip Signal has been tested on the document: "OTP - LV Switch Boards & LV Distribution Board System"			
9	The Distribution Board DP-200N1 is now available to energise the respective platform BOP loads.			
10	To energise all the external lights, now, proceed to close the following MCB's: - QT1: TWILIGHT SWITCH AND AUXILIARY - SA1: MANUAL POSITION (IF NECESSARY) - Q2: NORMAL LIGHTING UPPER DECK - Q3: NORMAL LIGHTING LOWER DECK - Q4: NORMAL LIGHTING STARS - Q8: EMERGENCY LIGHTING UPPER DECK - Q9: EMERGENCY LIGHTING LOWER DECK - Q10: EMERGENCY LIGHTING STAIRS			
11	Verify all the external lights are switched on.			

5.4.4 Energization UPS UP-200F4

Step	Description	Result	Verified by	Date
Energization of UPS UP-200F4				
1	On the UPS Battery Cut-offs CB-200F4A and CB-200F4B put the selector switches S2 in OVERRIDE position			
2	In SG-200N1, close the circuit breakers QA1 for the aux power supply in the drawers A6/+05 (AC UPS F&G - 8H UP-200F4 - LINE A), A6/+06 (AC UPS F&G - 8H UP-200F4 - LINE B) and A2/+04 (AC UPS F&G - 8H UP-			

Step	Description	Result	Verified by	Date
	200F4 - BY PASS)			
3	Push the MCC drawers in service position			
4	Manually close the circuit breakers QF1 for each drawer and consequently energize the power supply to UPS UP-200F4			
5	In UPS-200F4 (BY PASS COLUMN) close Q10 QF1 (Ref. drawing 1724000372-EL-DG-00009) to energize the system from bypass			
6	In UP-200F4 - UPS1 and UP-200F4 - UPS2 check status: The bypass is starting up; the green and amber LEDs are flashing. LCD displayed the text on the below photo.			
7				
8	In UPS1 and UPS2 press HMI return key twice to display Single Line Diagram. The bypass is ready; the green and amber lights are both flashing.			
9	Check the manual bypass switch Q29 to position "1 - Inverter operation". The green and amber LEDs flash.			
10	In UPS1 set the load interrupter switch Q1 QF1 (Ref. drawing 1724000372-EL-DG-00009) to the "ON" position			
11	Wait for status: The REC is ready; the green, red and amber LEDs are flashing. LCD: Details Power supply up to the inverter is displayed (acoustic alarm is active)			
12				

Step	Description	Result	Verified by	Date
13	Check the battery bank voltage and polarity: _____ V (BANK A)			
14	Reset Battery Cut Off breaker (if necessary), then proceed to close the battery cut off breaker Q0 on CB-200F4A. LCD: Details power from batteries is OK; red light is OFF, amber and green lights are flashing.			
15				
16	Press return key on the HMI, now the user can see in Single Line Diagram that batteries are connected.			
17	In UPS2 set the load interrupter switch Q1 QF1 (Ref. drawing 1724000372-EL-DG-00009) to the "ON" position			
18	Wait for status: The REC is ready; the green, red and amber LEDs are flashing. LCD: Details Power supply up to the inverter is displayed (acoustic alarm is active)			
19				
20	Check the battery bank voltage and polarity: _____ V (BANK B)			
21	Reset Battery Cut Off Breaker (if necessary), close the battery cut off breaker Q0 on CB-200F4B. LCD: Details power from batteries is OK; red and the amber light is OFF, green light is flashing.			
22				

Step	Description	Result	Verified by	Date
23	Press return key on the HMI, now the user can see in Single Line Diagram that batteries are connect.			
24	In UPS2 press the "~I" key on the HMI for connect the inverter.			
25	Wait for status: Bypass switches to normal operation, green LED lights up (fixed not flashing). LCD: "Energy flow display via INV" is displayed (See below photo)			
26				
27	Verify the battery bank is in charge mode on HMI			
28	Now the user can switch on the vital loads circuit breakers in the BYPASS column			
29	The vital loads circuit breakers to switch on are as follows: - QF31: FGS PANEL LINE A - QF32: FGS PANEL LINE B - QF36: NETWORK CABINET LINE A - QF37: NETWORK CABINET LINE B			

5.4.4.1 Energization ICSS (F&G, SIS, PCS, DATA NETWORKS & EMCS)

Step	Description	Result	Verified by	Date
Energization ICSS (F&G, SIS, PCS, DATA NETWORKS & EMCS)				
1	In UPS UP-200F4 proceed to switch on the following MCBs: - QF31: FGS PANEL LINE A - QF32: FGS PANEL LINE B - QF36: NETWORK CABINET LINE A - QF37: NETWORK CABINET LINE B			
2	In UPS UP-200F3 proceed to switch on the following MCBs: - QF37: SERVER CABINET ITER - LINE A - QF38: SERVER CABINET ITER - LINE B - QF43: SIS-CONTROLLER AND I/O CABINET - LINE A - QF44: SIS-CONTROLLER AND I/O CABINET - LINE B - QF45: PCS – CONTR. AND I/O CABINET - LINE A - QF46: PCS – CONTR. AND I/O CABINET - LINE B - QF47: EMCS – CONTR. AND I/O CABINET - LINE A - QF48: EMCS – CONTR. AND I/O CABINET - LINE B			

Step	Description	Result	Verified by	Date
	- QF49: LV SWITCHBOARD AUXILIARY - QF50: LV SWITCHBOARD 800/460V AUXILIARY			
3	Verify in the respective system cabinets that the incoming UPS supply voltage is present			
4	In OER HKN-WP01_BLP_NET_01 switch on the following MCBs: - MS1: UPS-1 - MS2: UPS-2 - QF1: UTILITY - QF2: SOCKET - QF3: LIGHT - QF5: G1 - QF6: SK2, SK3, SK6 - QF8: G2 - QF9: SK4, SK5, SK7 - QF11: 24V LINE A DISTRIBUTION - QF12: 24V LINE B DISTRIBUTION			
5	In SERVER ITER & NETWORK B400-SRV-001 B400-NET-001 switch on the following MCBs: B400-SRV-001 - MS1_S: UPS 1 - MS2_S: UPS 2 - QF1: UTILITY - QF2: SOCKET - QF3: LIGHT - QF5: SK2, SK3 - QF7: SK4, SK5 B400-NET-001 - MS1_N: UPS 1 - MS2_N: UPS 2 - QF50: UTILITY - QF51: SOCKET - QF52: LIGHT - QF54: FAN - QF55: G1_N - QF56: SK7, SK8 - QF58: G2_N - QF59: Sk9, Sk10 - QF57: FIREWALL 3 - QF60: FIREWALL 4 - QF61: 24V LINE A DISTRIBUTION - QF62: 24V LINE B DISTRIBUTION			

Step	Description	Result	Verified by	Date
6	In FGS B400-FGS-001 switch on the following MCBs: - MS1: UPS 1 - MS2: UPS 2 - QF6: G1 - LINE A - QF7: PW RACK1 - LINE A - QF8: PW RACK2 - LINE A - QF9: PW RACK3 - LINE A - QF10: PW RACK4 - LINE A - QF11: PW RACK5 - LINE A - QF12: PW RACK6 - LINE A - QF24: FAN PROSAFE - LINE A - QF14: G2 - LINE B - QF15: PW RACK1 - LINE B - QF16: PW RACK2 - LINE B - QF17: PW RACK3 - LINE B - QF18: PW RACK4 - LINE B - QF19: PW RACK5 - LINE B - QF20: PW RACK6 - LINE B - QF25: FAN PROSAFE - LINE B - QF1: UTILITY - QF2: SOCKET - QF3: LIGHT - QF5: FAN - QF22: 24V LINE A DISTRIBUTION - QF23: 24V LINE B DISTRIBUTION			
7	In SIS B400-SIS-001 switch on the following MCBs: - MS1: UPS 1 - MS2: UPS 2 - QF55: G1 - LINE A - QF56: PW RACK1 - LINE A - QF57: PW RACK2 - LINE A - QF58: PW RACK3 - LINE A - QF67: FAN PROSAFE - LINE A - QF60: G2 - LINE B - QF61: PW RACK1 - LINE B - QF62: PW RACK2 - LINE B - QF63: PW RACK3 - LINE B - QF68: FAN PROSAFE - LINE B - QF50: UTILITY - QF51: SOCKET - QF52: LIGHT - QF54: FAN - QF65: 24V LINE A DISTRIBUTION - QF66: 24V LINE B DISTRIBUTION			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

Step	Description	Result	Verified by	Date
8	In PCS B400-PCS-001 switch on the following MCBs: - MS1: UPS 1 - MS2: UPS 2 - QF6: G1 - LINE A - QF7: PW RACK1 - LINE A - QF8: PW RACK2 - LINE A - QF9: PW RACK3 - LINE A - QF10: PW RACK4 - LINE A - QF20: G3 - LINE A - QF12: G2 - LINE B - QF13: PW RACK1 - LINE B - QF14: PW RACK2 - LINE B - QF15: PW RACK3 - LINE B - QF16: PW RACK4 - LINE B - QF21: G4 - LINE B - QF1 UTILITY - QF2: SOCKET - QF3: LIGHT - QF5: FAN - QF18: 24V LINE A DISTRIBUTION - QF19: 24V LINE B DISTRIBUTION			
9	In EMCS B400-EMCS-001 switch on the following MCBs: - MS1: UPS 1 - MS2: UPS 2 - QF6: G1 - LINE A - QF8: G2 - LINE B - QF1: UTILITY - QF2: SOCKET - QF3: LIGHT - QF5: FAN - QF10: 24V DISTRIBUTION - QF11: 24V DISTRIBUTION			
10	After closing the breakers inside the ICSS cabinets, the following should be performed: 1. (optional step but highly recommended) disconnect power to the relays of the R101...111 F&G sounders so as to prevent their activation during system boot up (until trips are cleared all			

Step	Description	Result	Verified by	Date
	sounders will activate) 2. from KVM, open EWS0164 and start the Prosafe Workbench application by loading the PrjLibrary file for SCS0110 (SIS) 3. in Tools > Maintenance > SCS Security Level and set new level = 1 4. in Tools > Maintenance > SCS Status Overview (password field is empty), double-click in SCS0110, then select Tools > I/O Channel Status and click on Output Enable. Repeat the step for SCS0120 (FGS). 5. at this point, SIS and FGS will be tripping, with beacon and sounder activation (which were, however, de-energized in step 1) 6. from HMI, proceed to do Interlock Reset starting with FGS and continuing with SIS: ASD, ESD1-D, ESD1, PSD, MOB 7. to reset the packages, in Prosafe Workbench select Tools > Maintenance > IO Lock Window and force the relevant responses to TRUE and do the reset from local panel 8. once all packages have been reset, it will be possible to reset the PSD at HMI 9. after the PSD has been reset, it will be possible to remove the forcings that were set in step 7 10. reconnect the relays (see point 1) to re-enable the F&G sounders.			
11	Force the following signals: **SIS_TAG** **85XA-003** A-85000 BESS PKG UCP fault **20XA-003** A-20000 Electrolyser PKG UCP fault **80XA-003** A-80000 Fuel cell PKG UCP fault **50XA-003** A-500003 Sea water treatment PKG F&G LCP fault **63XA-003** A-63000 Instrument air PKG fault **64XA-003** A-64000 Nitrogen PKG fault **77XA-001** B-100 HV/MV SWGR room HVAC fault **77XA-002** B-200 LV SWGR room HVAC fault **77XA-003** B-300 UPS room HVAC fault **77XA-004** B-400 I&T equip. Room HVAC fault			

Step	Description	Result	Verified by	Date
	72XA-001 Wave-off light system fault **85XA-004** A-85000 BESS PKG UCP thermal run away **80PI-002** Hydrogen storage to A-80000 Package **FGS_TAG** **85XA-001** A-85000 BESS PKG confirmed gas alarm **85XA-002** A-85000 BESS PKG confirmed fire alarm **20XA-001** A-20000 Electrolyser PKG confirmed gas alarm **20XA-002** A-20000 Electrolyser PKG confirmed fire alarm **80XA-001** A-80000 Fuel cell PKG confirmed gas alarm **80XA-002** A-80000 Fuel cell PKG confirmed fire alarm **50XA-001** A-500003 Sea water treatment PKG confirmed gas alarm **50XA-002** A-500003 Sea water treatment PKG confirmed fire alarm			

5.4.4.2 Energization HVAC B400-HSB-001 (only for technical room internal lighting circuits)

Step	Description	Result	Verified by	Date
Energization HVAC B400-HSB-001				
1	On Switchboard SG-200N1, close the breaker QA1 for the aux power supply in the drawers A5/+04 (HVAC PANEL ITER ROOM)			
2	Put the drawer in service position and the selector SA1 in Local position			
3	Manually close the circuit breaker QF1 and press the button PM1 to close the contactor K1 and consequently energize the power supply to B400-HSB-001			
4	In UPS UP-200F3 proceed to close the breaker QF42 to energize the auxiliary control circuit			
5	The HVAC Panel Board B400-HSB-001 is now available to energise the respective circuits.			
6	Inside the panel B400-HSB-001, proceed to switch on the following circuit breakers required for internal technical room illumination: - QS1 Main Incomer - QF400: MVA-1with Panel Multimeter - QF1: MODULE LIGHT AND EMERGENCY LIGHT - QF3: INTERNAL AUX 230V			
7	Locate the pushbuttons, CELS-B400H-F1-L1-01 and CELS-B400H-F1-L1-01, near the doors to switch on the internal lighting circuits.			

5.4.4.3 Energization HVAC B300-HSB-001 (only for technical room internal lighting circuit)

Step	Description	Result	Verified by	Date
Energization HVAC B300-HSB-001				
1	In SG-200N1, closing the breaker QA1 for the aux power supply in the drawers A5/+03 (HVAC PANEL UPS TECHNICAL ROOM)			
2	Put the drawer in service position and the selector SA1 in Local position			
3	Manually close the circuit breaker QF1 and press the button PM1 to close the contactor K1 and consequently energize the power supply to B300-HSB-001			
4	In UP-200F3 closing the breaker QF41 to energize the auxiliary control circuit			
5	The HVAC Board B300-HSB-001 is now available to energise the respective circuits.			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

6	Inside the panel B300-HSB-001, proceed to switch on the following circuit breakers required for internal technical room illumination: - QS1 Main Incomer - QF400: MVA-1with Panel Multimeter - QF1: MODULE LIGHT AND EMERGENCY LIGHT - QF3: INTERNAL AUX 230V			
7	Locate the pushbuttons, CELS-B400H-F1-L1-01 and CELS-B400H-F1-L1-01, near the doors to switch on the internal lighting circuits.			

5.4.4.4 Energization HVAC B200-HSB-001 (only for technical room internal lighting circuits)

Step	Description	Result	Verified by	Date
Energization HVAC B200-HSB-001				
1	In SG-200N1, close the breakers QA1 for the aux power supply in the drawers A5/+02 (HVAC PANEL - LV TECHNICAL ROOM)			
2	Put the drawer in service position and the selector SA1 in Local position			
3	Manually close the circuit breaker QF1 and press the button PM1 to close the contactor K1 and consequently energize the power supply to B200-HSB-001			
4	In UP-200F3 closing the breaker QF40 to energize the auxiliary control circuit			
5	The HVAC Board B200-HSB-001 is now available to energise the respective circuits			
6	Inside the panel B200-HSB-001, the user must switch on these circuit breakers: - QS1 Main Incomer - QF400: MVA-1with Panel Multimeter - QF1: MODULE LIGHT AND EMERGENCY LIGHT - QF3: INTERNAL AUX 230V			
7	Locate the pushbuttons, CELS-B400H-F1-L1-01 and CELS-B400H-F1-L1-01, near the doors to switch on the internal lighting circuits.			

5.4.4.5 Energization HVAC B100-HSB-001 (only for technical room internal lighting circuits)

Step	Description	Result	Verified by	Date
Energization HVAC B100-HSB-001				
1	In SG-200N1, close the breakers QA1 for the aux power supply in the drawers A4/+02(HVAC PANEL HV TECHNICAL ROOM)			

2	Put the drawer in service position and the selector SA1 in Local position			
3	Manually close the circuit breaker QF1 and press the button PM1 to close the contactor K1 and consequently energize the power supply to B100-HSB-001			
4	In UP-200F3 closing the breaker QF39 to energize the auxiliary control circuits			
5	The HVAC Board B100-HSB-001 is now available to energise the respective circuits.			
6	Inside the panel B100-HSB-001, the user must switch on these circuit breakers: - QS1 Main Incomer - QF400: MVA-1with Panel Multimeter - QF1: MODULE LIGHT AND EMERGENCY LIGHT - QF3: INTERNAL AUX 230V			
7	Locate the pushbuttons, CELS-B400H-F1-L1-01 and CELS-B400H-F1-L1-01, near the doors to switch on the internal lighting circuits.			

5.4.4.6 Energization UPS-200F1

Step	Description	Result	Verified by	Date
Energization of UPS UP-200F1A				
1	On the Battery Cut-Off Breaker CB-200F1 put the selector S2 in OVERRIDE position			
2	In SG-200N1 closing the breakers QA1 for the aux power supply in the drawers A7/+03 (DC BATTERY SYSTEM SWGR CONTROL - FEEDER A) and A7/+04 (DC BATTERY SYSTEM SWGR CONTROL - FEEDER B)			
3	Push the MCC drawers in service position			
4	Manually close the circuit breakers QF1 for the drawers and consequently energize the power supply to UP-200F1A and B			
5	In DP-200N1 closing the breaker Q43 to energize the auxiliary circuit			
6	Set the load interrupter switch Q1 to the "ON" position			
7	Check the functionality of rectifier on the controller display A300			
8	Set the output interrupter switch Q2 to "ON" position			
9	Check the battery bank voltage and polarity: _____ V			

Step	Description	Result	Verified by	Date
10	Set the battery interrupter switch Q3 to "ON" position			
11	Set the external battery cut off (CB-200F1) interrupter switch Q0 to "ON" position			
12	Verify the battery bank is in charge by display with the Charging Current			
13				
14	The first UPS 'A' unit is now in operation			
15	In UPS 'B' set the load interrupter switch Q1 to the "ON" position			
16	Check the functionality of rectifier on the controller display A300			
17	Set the output interrupter switch Q2 to "ON" position			
18	The second UPS unit is now in operation			
19	The essential circuit breaker to switch on are: - Q12 (110Vdc Supply A) - Q13 (110Vdc Supply B)			

5.4.4.7 Energization Auxiliary Supply SG-100D1(6.6kV)

Step	Description	Result	Verified by	Date
Energization Auxiliary Supply SG-100D1 (6.6kV)				
1	In UP-200F1 switch on Q12 (110Vdc Supply A) and Q13 (110Vdc Supply B)			
2	In column A5 (SG-100D1) close MCB QD01 and QD02 (110Vdc distribution)			
3	In column A4 (SG-100D1) close MCB QD1 (protection device) and QD2 (command circuits). Now the HMI panel is online			
4	In column A6 (SG-100D1) close MCB QD1 (protection device), QD2 (command circuits) and QD3 (spring			

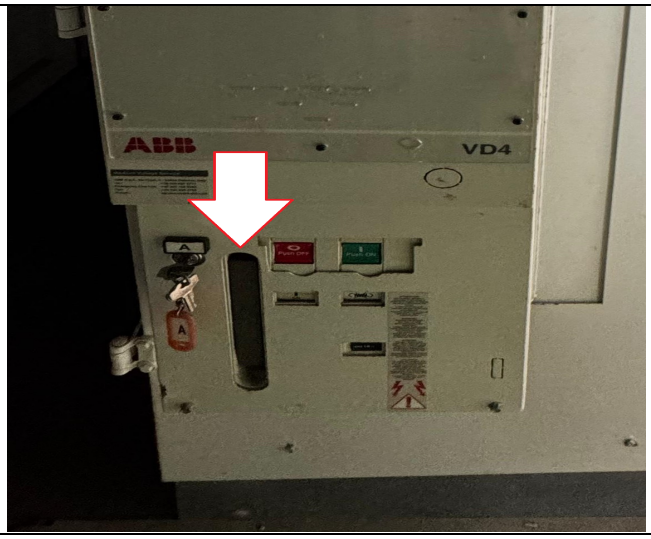
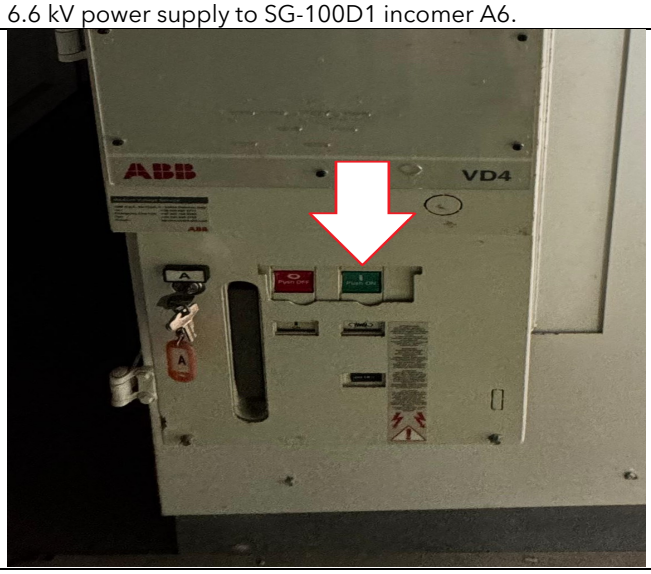
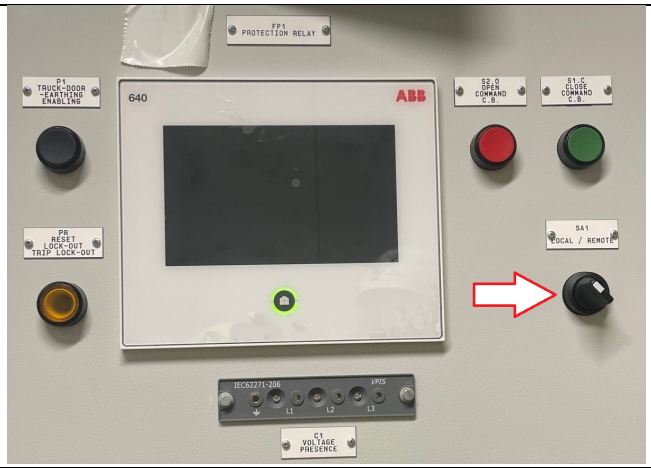
This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

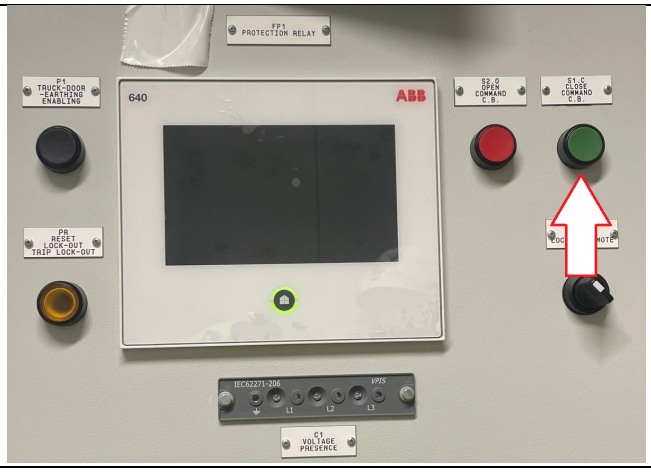
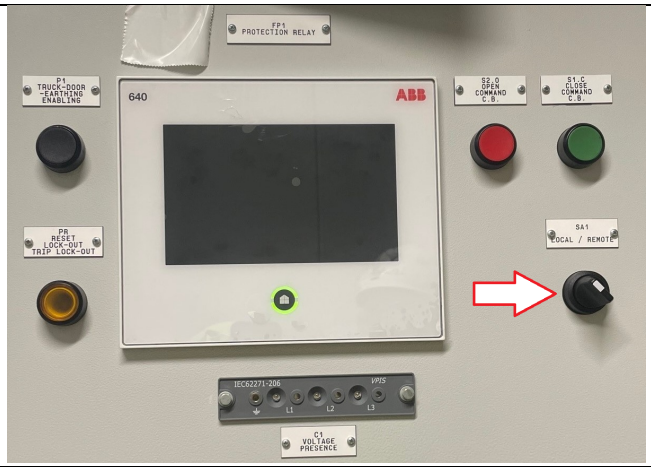
Step	Description	Result	Verified by	Date
	charging motor). Now the HMI panel is online			
5	In column A5 switch on QD1 and QD2 for energize DC/DC converter GS1 and the commands			
6	Verify and confirm the power supply 24V on column A5: - measure 24Vdc on QD4 - close MCB QD4 (main breaker for 24Vdc) - close MCB QD5 (exetherm device) - close MCB QD6 (partial discharged monitoring) - close MCB QD21 (ethernet switch A) - close MCB QD22 (ethernet switch B + C)			
7	Close QV1, QV2, QV3, QV4, QV5 (Voltmetric measure for protection relay FP1) in column A5			
8	Verify the led on ethernet switches and on the Exetherm are ON			
9	In column A6 switch on: - QV1, QV2, QV3, QV4, QV5 (measurement) - QD4 (exeterm 24Vdc)			
10	In column A4 switch on: - QD4 (termally monitor) - QV4, QV5 (measurement FP1)			
11	Now the column 4 and 6 is ready to energise. N.B. The Breaker must be inserted and the earth switch must be open.			

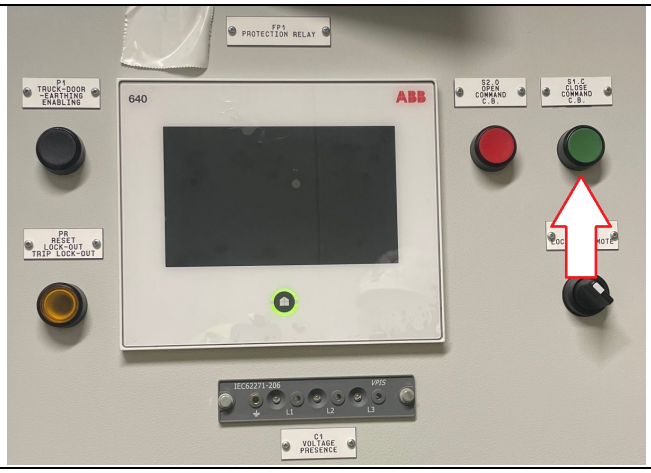
5.4.4.8 Energization 6.6 kV Temporary Yard Supply, A4 and A6 UNIT

Step	Description	Result	Verified by	Date
Energization 6.6 kV Temporary Yard Supply, A4 and A6 UNIT				
1	Inside 6.6 kV main protection container "DG", the user must be Charge the springs manually with the black lever (see photo below)			

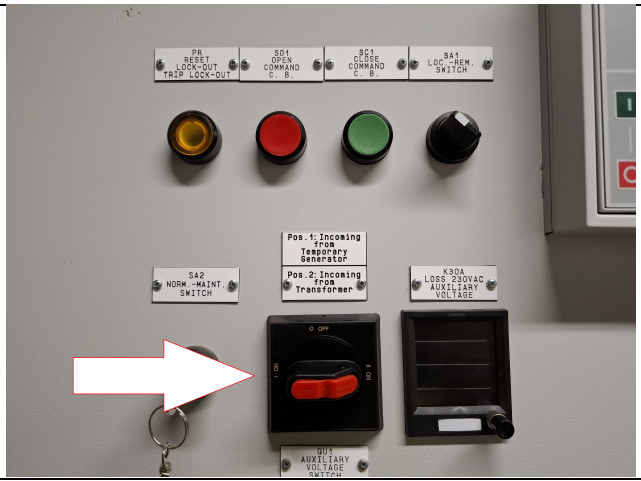
This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

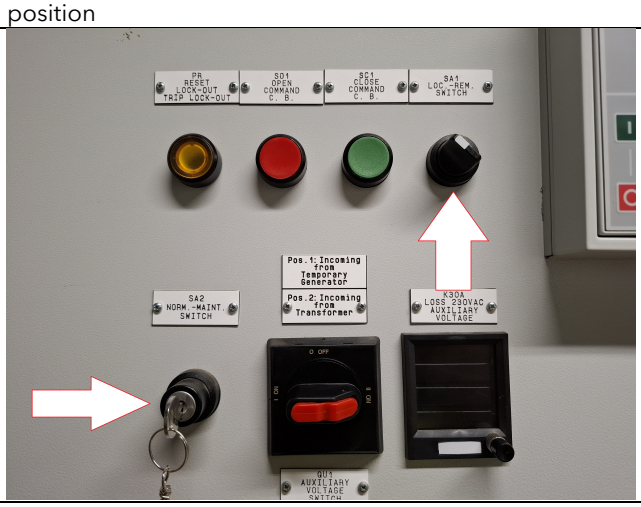
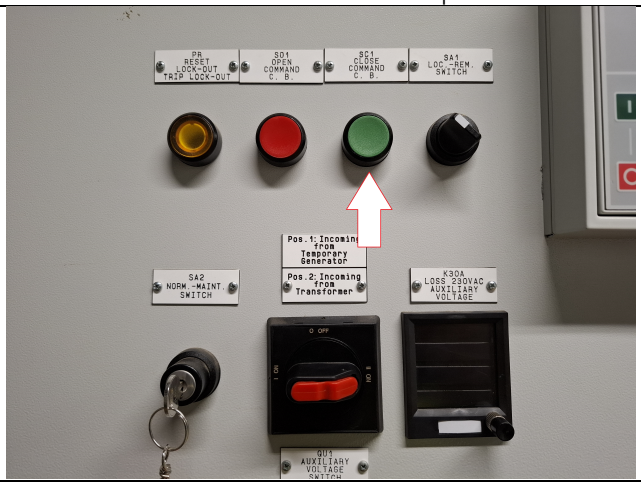
2				
3	Now the user can close the circuit breaker with the green button (see below photo) and consequently energize the 6.6 kV power supply to SG-100D1 incomer A6.			
4				
5	In column A6 (SG-100D1) place the selector SA1, in local position (see below photo)			
6				

7	Close QM Breaker by pressing the green button S1C (see below photo)			
8				
9	See on FP1 Protection Relay Display if Breaker Closed is confirmed on REX640 HMI			
10	On Unit A5 the busbar voltage presence lamps C1 are ON			
11	The busbar is now energized			
12	Now, in column A4 the user put the selector SA1 in local position (see below photo)			
13				
14	Close QM Breaker by pressing the green button S1C (see below photo)			

15				
16	See on FP1 Protection Relay Display if Contactor Closed is confirmed on REX640 HMI			
17	On Unit A4 the downstream voltage presence lamps C1 are ON and the Transformer is energised.			
IMPORTANT NOTE: Verify that the batteries of UPS F1/F3/F4 are fully charged before switching over incoming power supplies on LV Switchboard SG-200N1				

5.4.4.9 Switch from Temporary Generator Supply to 6.6kV Power Supply

Step	Description	Result	Verified by	Date
Switch from Temporary Generator Supply to 6.6 kV Power Supply				
1	Open the circuit breaker A2/+08 (SG-200N1) (circuit breaker for 400V Temporary Generator)			
N.B.: THE OPENING OF CIRCUIT BREAKER A2/+08 WILL CREATE A BLACK OUT AND THE NORMAL LIGHTING WILL AUTOMATICALLY SWITCH OFF, WHILE EMERGENCY LIGHTING WILL ACTIVATE				
2	The selector QU1 Auxiliary Voltage Switch located on cubicle A2/+02 (SG-200N1) must be closed on POS.2			
3				
4	Close protection fuse QU2, located inside the cubicle A2/+02, for the auxiliary voltage from main bus bar in			

Step	Description	Result	Verified by	Date
	upstream.			
5	Rack in the Main incoming breaker QF1 (SG-200N1) in SERVICE position on column A1/+05			
6	The test of the incomer QF1 (SG-200N1) in TEST POSITION and the hardwired I/O signals has been done during the OTP (Ref. Document: 123A90-PML-COM-PRO-03047)			
7	In column A2/+02: - Place the selector SA1 in local position - Verify and confirm the SA2 Selector is in normal position			
8				
9	Now: - Push SC1 to close main breaker - Led-3 on the REF615 must be ON - On the REF615 display the circuit breaker symbol will change to closed - Rotate selector switch SA1 to remote position			
10				

5.4.4.10 Restore Normal Operation after BLPH Startup – Remove System Overrides

Step	Description	Result	Verified by	Date
Restore Normal Operation after BLPH Startup				
1	Verify and confirm that the Fire & Gas and SIS protection systems are in normal operation without any trip signals impacting the restoration of BLPH normal operation an subsequent startup			
2	Verify and confirm on 6.6 kV Switchboard SG-100D1 that no overrides are in place and equipment is in normal operation			
3	Verify and confirm on 400 V Switchboard SG-200N1 that no overrides are in place and equipment is in normal operation			
4	Verify and confirm on UPS system UP-200F3 that battery cut-off breakers overrides have been restored to normal operation with no alarms present			
5	Verify and confirm on UPS system UP-200F4 that battery cut-off breakers overrides have been restored to normal operation with no alarms present			
6	Verify and confirm on UPS system UP-200F1 that battery cut-off breaker override has been restored to normal operation with no alarms present			
7	Confirm maximum power requirement for Black Start operation from Temporary Generator Supply: P = _____ kW			

5.4.5 OTP SITE Tests Certifying Authority Table of Attendances

Name and Surname	Certifying Authority	Position	Signature

5.4.6 OTP SITE - Tests Final Signatures and Company Acceptance

Name and Surname	Company Representative	Position	Signature

5.5 Post-test Conditions

All the electrical contacts which were disconnected for the testing purposes must be reconnected.
After functional tests have been completed, system / sub-systems are left in healthy and safety condition and that they are operational.

5.6 Reinstatement tasks

Generally, the system/ sub-system shall be reinstated at its initial condition; and the following activities must be carried out as minimum:

- all inhibition done for the test shall be removed (as per Inhibit / Override List)
- all equipment/devices shall be returned in healthy functional conditions.

6 OTP AT OFFSHORE WORKSITE

This chapter refer to the activities on the Contractor worksite (construction yard).

6.1 Planning and Manpower

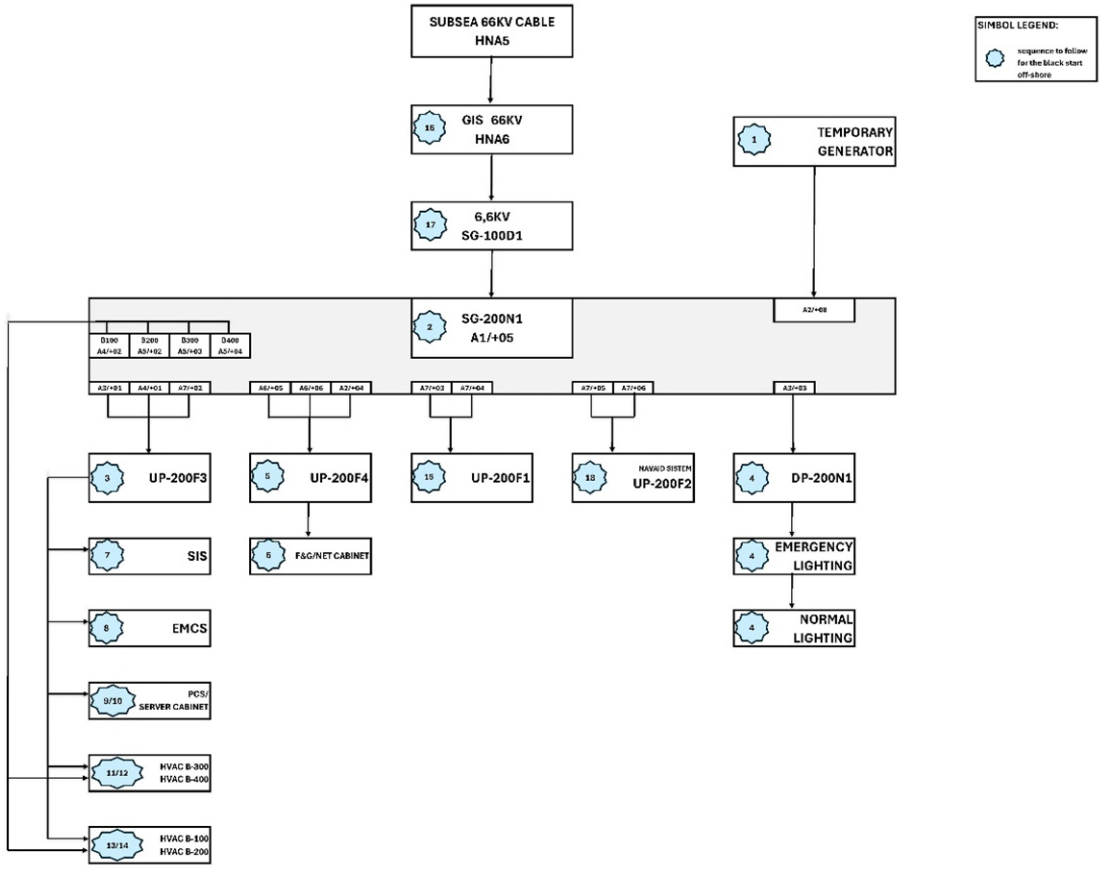


Figure 6 – Black Start SITE Single Line Block Diagram and Sequence

6.1.1 Offshore site test overview

It is expected that all precommissioning tests, systems energization and commissioning steps will have been successfully performed during the Onshore Phases.
Consequently, during the offshore SITE phase, the respective systems will be inspected prior to re-energization.

No additional test steps will be required on these items of equipment, correct operation and functioning will be verified.

Estimated manpower for the entire duration of the Test:

- 1 E&I commissioning superintendent
- 1 E&I commissioning supervisor from Contractor
- 2 E&I commissioning technicians from Contractor
- 1 PCS/ESD Workstation Operators

6.1.2 Test duration estimate

The test duration should be as follows:

- 2 hours approx.

If necessary, the estimated time can be extended in order to complete all required steps.

6.1.3 Vendor Assistance

Not applicable

6.1.4 Items Postponed to C&E OTP

Not applicable

6.1.5 HOLDS

Not applicable

6.2 OTP Test Requirements – Offshore WORKSITE

Not applicable

6.2.1 Pre-Commissioning Achievement

Not applicable

6.2.2 Commissioning Achievement

The commissioning achievement will be the successful operation, functionality and safeguarding test of all the equipment, installed and put in operation during the WORKSITE phase:

- 70-00: F&G Control System
- 77-10: HVAC HV/MV Switchgear Room B-100
- 77-20: HVAC LV Switchgear Room B-200
- 77-30: HVAC UPS Equipment Room B-300
- 77-40: HVAC I&T Equipment Room B-400
- 79-00: Emergency Shutdown System (SIS)
- 82-00: MV 6.6 kV Switchboard (SG-100D1)
- 82-40: Power Transformer 1.6 MVA (TR-200DE1)
- 83-00: 400/230V Switchboard SG-200N1
- 83-20: 400/230V Distribution Board DP-200N1
- 84-00: 110V DC 10kVA UPS System (UP-200F1)
- 84-10: 230V AC UPS - 35KVA (UP-200F3)
- 84-20: 230V AC UPS – 15KVA (UP-200F3)
- 86-00: Data Networks
- 87-00: Power Distribution System (EMCS)
- 87-10: PROCESS CONTROL SYSTEM (PCS)
- 87-20: PROCESS CONTROL SYSTEM (PCS) – Instrumentation

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

6.2.3 Special Tools & Test Equipment

The following special tool and Test Equipment are required (see vendor document 1723002197-EL-LIS-00053):

- Voltage, frequency, continuity tester (Multimeter)
- Phases sequence tester
- Portable radios
- Amperometric clamp
- Portable radios

TESTING & MEASUREMENT INSTRUMENT USED			
Type	Serial N.	Calibration certificate	Validity

6.2.4 Consumable List

Not applicable

6.2.5 Temporary Facilities

Not applicable

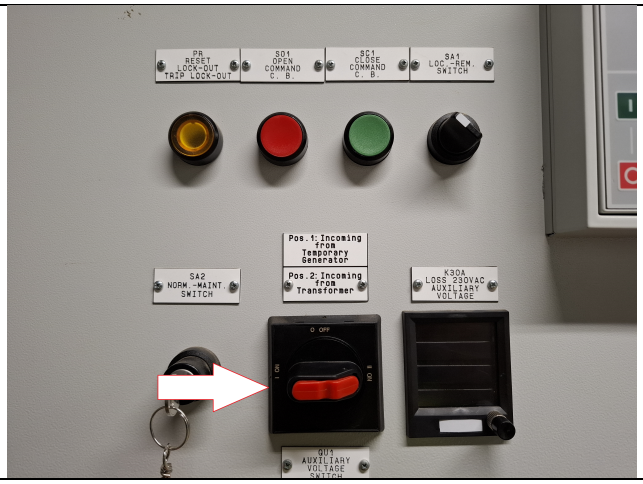
6.3 OTP DESCRIPTION – OFFSHORE

6.3.1 Energization of Temporary Generator Supply

Step	Description	Result	Verified by	Date
Energization Temporary Generator, 400V Power Supply by "Temporary Generator Supply" circuit JB-200E2				
1	Verify and confirm on LV Switchboard SG-200N1 that the INCOMING TRANSFORMER BREAKER QF1 is open and the drawer A1/+05 (SG-200N1, column 1) is in extract position.			
2	Verify and confirm on SG-200N1 that the INCOMING BREAKER QF1 of JB-200E2 is open and the drawer A2/+08 (Switchboard SG-200N1, column 2) is in extract position.			
3	Verify that the temporary generator key is in the closed position.			
4	Energise the Temporary Generator with the START button.			
5	Verify the correct phase sequence L1, L2, L3, on the input power of the drawer A2/+08.			
6	Now the system LV is ready to energize			

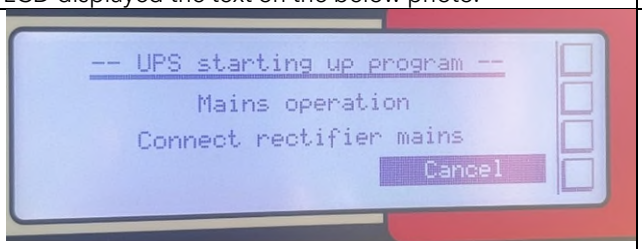
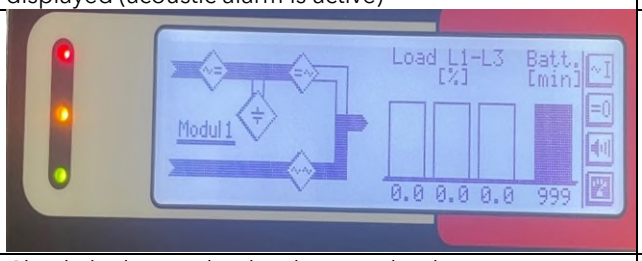
This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

6.3.2 Energization of Low Voltage SWBD SG-200N1 from Temporary Generator Supply

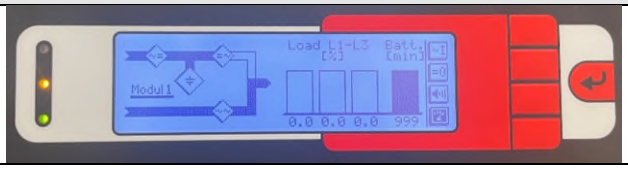
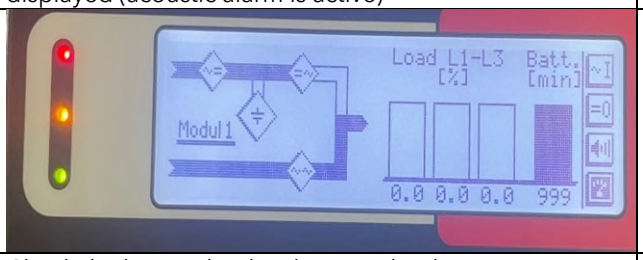
Step	Description	Result	Verified by	Date
Energization of Low Voltage SWBD SG-200N1				
1	The selector QU1 Auxiliary Voltage Switch located on CUBICLE A2/+02 must be closed on POS.1 (see below photo) Ref. drawing: 1723002197-EL-DG-00030 SHT 016.			
2				
3	Close protection FUSE QU3 located inside the cubicle A2/+02 for the auxiliary voltage from temporary generator.			
4	Check MCB QA1 (auxiliary) of Drawer A2/+08 is closed (inside the drawer). If not closed, closed this one.			
5	VERIFICATION DRAWER A2/+08 IN TEST POSITION (test is already done in the OTP Ref. Document 123A90-PML-COM-PRO-03047)			
6	Close the main breaker QF1 on A2/+08			
7	The SWBD SG-200N1 is now available to energise the UPS – UP-200F3 and the other Vital loads.			

6.3.3 Energization UPS UP-200F3

Step	Description	Result	Verified by	Date
Energization of UPS UP-200F3				
1	On the Battery Banks Cut-off breakers (CB-200F3A, CB-200F3B) put the selector switch S2 in OVERRIDE position			
2	In SG-200N1, close the breakers QA1 for the aux power supply in the drawers A3/+01 (AC UPS PAS - 30 MIN UP-200F3 - LINE A), A4/+01 (AC UPS PAS - 30 MIN UP-200F3 - LINE B) and A7/+02 (AC UPS PAS - 30 MIN UP-200F3 - BY PASS)			

Step	Description	Result	Verified by	Date
3	Put the drawers in service position			
4	Manually close the circuit breakers QF1 for each drawer and consequently energize the power supplies to UP-200F3			
5	In UPS1 (BY PASS COLUMN) close Q10 QF1 (Ref. drawing 1724000372-EL-DG-00009) for energize the system from bypass.			
6	In UPS1 and UPS2 check status: The bypass is starting up; the green and amber LEDs are flashing. LCD displayed the text on the below photo.			
7				
8	In UPS1 and UPS2 press return key twice to see Single Line Diagram. The bypass is ready; the green and amber lights are both flashing.			
9	Check the manual bypass switch Q29 to position "1 - Inverter operation". The green and amber LEDs flash.			
10	In UPS1 set the load interrupter switch Q1 QF1 (Ref. drawing 1724000372-EL-DG-00009) to the "ON" position			
11	Wait for status: The REC is ready; the green, red and amber LEDs are flashing. LCD: Details Power supply up to the inverter is displayed (acoustic alarm is active)			
12				
13	Check the battery bank voltage and polarity: _____ V (BANK A)			
14	Reset CutOff (if necessary) , close the battery cut off breaker Q0 on CB-200F3A. LCD: Details power from batteries is OK; red light is OFF, amber and green lights are flashing.			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

Step	Description	Result	Verified by	Date
15				
16	Press return key on the LCD, now the user can see in Single Line Diagram that batteries are connect.			
17	In UPS2 set the load interrupter switch Q1 QF1 (Ref. drawing 1724000372-EL-DG-00009) to the "ON" position			
18	Wait for status: The REC is ready; the green, red and amber LEDs are flashing. LCD: Details Power supply up to the inverter is displayed (acoustic alarm is active)			
19				
20	Check the battery bank voltage and polarity: _____ V (BANK B)			
21	Reset CutOff (if necessary) , close the battery cut off breaker Q0 on CB-200F3B. LCD: Details power from batteries is OK; red and the amber light is OFF, green light is flashing.			
22				
23	Press return key on the LCD, now the user can see in Single Line Diagram that batteries are connect.			
24	In UPS2 press the "~I" key on the HMI for connect the inverter.			
25	Wait for status: Bypass switches to normal operation, green LED lights up (fixed not flashing). LCD: "Energy flow display via INV" is displayed (See below photo)			
26				
27	Verify the battery bank is in charge by display			
28	Now the user can switch on the essential circuit breakers in the BYPASS column			

Step	Description	Result	Verified by	Date
29	The essential circuit breakers to switch on are the following: - QF37: SERVER CABINET ITER - LINE A - QF38: SERVER CABINET ITER - LINE B - QF43: SIS - CONTROLLER AND I/O CABINET - LINE A - QF44: SIS - CONTROLLER AND I/O CABINET - LINE B - QF45: PCS – CONTR. AND I/O CABINET - LINE A - QF46: PCS – CONTR. AND I/O CABINET - LINE B - QF47: EMCS – CONTR. AND I/O CABINET - LINE A - QF48: EMCS – CONTR. AND I/O CABINET - LINE B - QF49: LV SWITCHBOARD AUXILIARY - QF51: LV SWITCHBOARD 800/460V AUXILIARY			

6.3.4 Energization DP-200N1 and Lightings

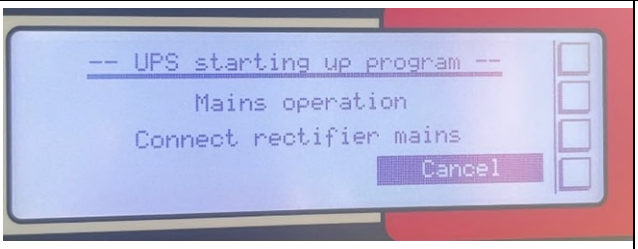
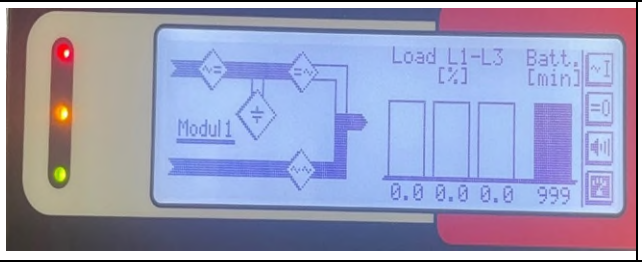
Step	Description	Result	Verified by	Date
	Energization of Distribution Panel DP-200N1			
1	In SG-200N1 column A2/+02 switch on: - QA1 (Supply motor spring charger) - QV1 (Measurement) - QV2 (Measurement) - QA5 (command circuit feeders) - QA2 (protection device INCOMING) - QA3 (command circuit INCOMING) - QA4 (Supply 230/24 Vdc Converter) - QD1 and QD2 (Supply I/O Protection and Module)			
2	Close the circuit breaker QA1 for the aux power supply in the drawer A3/+03 (DP-200N1) on SG-200N1			
3	Put the drawer in service position and the selector SA1(Local/Remote) in Local position			
4	All the functionality of this Drawer has been tested on the document: "OTP - LV Switch Boards & LV Distribution Board System"			
5	Manually close the circuit breaker QF1 and press the button PM1 to close the contactor K1 and consequently energize the power supply to DP-200N1			
6	Close the general incoming circuit breaker Q1 (General Incomer) of DP-200N1 manually (see below photo)			

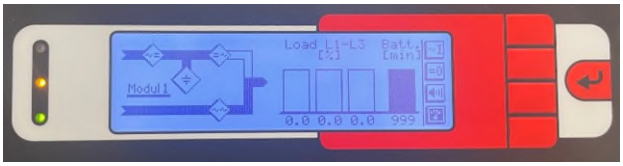
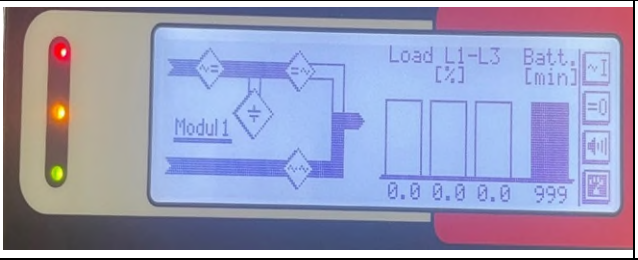
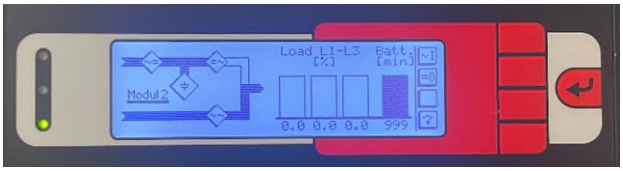
This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

Step	Description	Result	Verified by	Date
7				
8	The Cumulative Trip Signal has been tested on the document: "OTP - LV Switch Boards & LV Distribution Board System"			
9	The Distribution Board DP-200N1 is now available to energise the respective platform BOP loads.			
10	To energise all the external lights, now, switch on: - QT1: TWILIGHT SWITCH AND AUXILIARY - SA1: MANUAL POSITION (IF NECESSARY) - Q2: NORMAL LIGHTING UPPER DECK - Q3: NORMAL LIGHTING LOWER DECK - Q4: NORMAL LIGHTING STARS - Q8: EMERGENCY LIGHTING UPPER DECK - Q9: EMERGENCY LIGHTING LOWER DECK - Q10: EMERGENCY LIGHTING STAIRS			
11	Verify all the lights are switched on.			

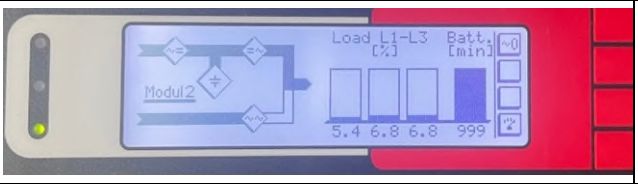
6.3.5 Energization UPS UP-200F4

Step	Description	Result	Verified by	Date
Energization of UPS UP-200F4				
1	On the Cut-offs CB-200F4A and CB-200F4B put the selector S2 in OVERRIDE position			
2	In SG-200N1, close the circuit breakers QA1 for the aux power supply in the drawers A6/+05 (AC UPS F&G - 8H			

Step	Description	Result	Verified by	Date
	UP-200F4 - LINE A), A6/+06 (AC UPS F&G - 8H UP-200F4 - LINE B) and A2/+04 (AC UPS F&G - 8H UP-200F4 - BY PASS)			
3	Push the drawers in service position			
4	Manually close the circuit breakers QF1 for each drawer and consequently energize the power supply to UP-200F4			
5	In UPS-200F4 (BY PASS COLUMN) close Q10 QF1 (Ref. drawing 1724000372-EL-DG-00009) for energize the system from bypass			
6	In UP-200F4 - UPS1 and UP-200F4 - UPS2 check status: The bypass is starting up; the green and amber LEDs are flashing. LCD displayed the text on the below photo.			
7				
8	In UPS1 and UPS2 press return key twice to see Single Line Diagram. The bypass is ready; the green and amber lights are both flashing.			
9	Check the manual bypass switch Q29 to position "1 - Inverter operation". The green and amber LEDs flash.			
10	In UPS1 set the load interrupter switch Q1 QF1 (Ref. drawing 1724000372-EL-DG-00009) to the "ON" position			
11	Wait for status: The REC is ready; the green, red and amber LEDs are flashing. LCD: Details Power supply up to the inverter is displayed (acoustic alarm is active)			
12				

Step	Description	Result	Verified by	Date
13	Check the battery bank voltage and polarity: _____ V (BANK A)			
14	Reset CutOff (if necessary) , close the battery cut off breaker Q0 on CB-200F4A. LCD: Details power from batteries is OK; red light is OFF, amber and green lights are flashing.			
15				
16	Press return key on the LCD, now the user can see in Single Line Diagram that batteries are connect.			
17	In UPS2 set the load interrupter switch Q1 QF1 (Ref. drawing 1724000372-EL-DG-00009) to the "ON" position			
18	Wait for status: The REC is ready; the green, red and amber LEDs are flashing. LCD: Details Power supply up to the inverter is displayed (acoustic alarm is active)			
19				
20	Check the battery bank voltage and polarity: _____ V (BANK B)			
21	Reset CutOff (if necessary) , close the battery cut off breaker Q0 on CB-200F4B. LCD: Details power from batteries is OK; red and the amber light is OFF, green light is flashing.			
22				
23	Press return key on the LCD, now the user can see in Single Line Diagram that batteries are connect.			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

Step	Description	Result	Verified by	Date
24	In UPS2 press the "~I" key on the HMI for connect the inverter.			
25	Wait for status: Bypass switches to normal operation, green LED lights up (fixed not flashing). LCD: "Energy flow display via INV" is displayed (See below photo)			
26				
27	Verify the battery bank is in charge by display			
28	Now the user can switch on the essential circuit breakers in the BYPASS column			
29	The essential circuit breaker to switch on are: - QF31: FGS PANEL LINE A - QF32: FGS PANEL LINE B - QF36: NETWORK CABINET LINE A - QF37: NETWORK CABINET LINE B			

6.3.6 Energization ICSS (F&G, SIS, PCS, DATA NETWORKS, EMC

Step	Description	Result	Verified by	Date
Energization ICSS (F&G, SIS, PCS, DATA NETWORKS & EMCS)				
1	In UPS UP-200F4 switch on: - QF31: FGS PANEL LINE A - QF32: FGS PANEL LINE B - QF36: NETWORK CABINET LINE A - QF37: NETWORK CABINET LINE B			
2	In UPS UP-200F3 switch on: - QF37: SERVER CABINET ITER - LINE A - QF38: SERVER CABINET ITER - LINE B - QF43: SIS-CONTROLLER AND I/O CABINET - LINE A - QF44: SIS-CONTROLLER AND I/O CABINET - LINE B - QF45: PCS – CONTR. AND I/O CABINET - LINE A - QF46: PCS – CONTR. AND I/O CABINET - LINE B - QF47: EMCS – CONTR. AND I/O CABINET - LINE A - QF48: EMCS – CONTR. AND I/O CABINET - LINE B - QF49: LV SWITCHBOARD AUXILIARY - QF50: LV SWITCHBOARD 800/460V AUXILIARY			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

Step	Description	Result	Verified by	Date
3	Verify in the respective system cabinets if the incoming supply voltage is present			
4	In OER HKN-WP01_BLP_NET_01 - MS1:UPS-1 - MS2:UPS-2 - QF1: UTILITY - QF2: SOCKET - QF3: LIGHT - QF5: G1 - QF6: SK2, SK3, SK6 - QF8: G2 - QF9: SK4, SK5, SK7 - QF11: 24V LINE A DISTRIBUTION - QF12: 24V LINE B DISTRIBUTION			
5	In SERVER ITER & NETWORK B400-SRV-001 B400-NET-001 switch on the following MCBs: B400-SRV-001 - MS1_S: UPS 1 - MS2_S:UPS 2 - QF1: UTILITY - QF2: SOCKET - QF3: LIGHT - QF5: SK2, SK3 - QF7: SK4, SK5 B400-NET-001 - MS1_N: UPS 1 - MS2_N: UPS 2 - QF50: UTILITY - QF51: SOCKET - QF52: LIGHT - QF54: FAN - QF55: G1_N - QF56: SK7, SK8 - QF58: G2_N - QF59: Sk9, Sk10 - QF57: FIREWALL 3 - QF60: FIREWALL 4 - QF61: 24V LINE A DISTRIBUTION - QF62: 24V LINE B DISTRIBUTION			
6	In FGS B400-FGS-001 switch on: - MS1: UPS 1 - MS2: UPS 2 - QF6: G1 - LINE A			

Step	Description	Result	Verified by	Date
	- QF7: PW RACK1 - LINE A - QF8: PW RACK2 - LINE A - QF9: PW RACK3 - LINE A - QF10: PW RACK4 - LINE A - QF11: PW RACK5 - LINE A - QF12: PW RACK6 - LINE A - QF24: FAN PROSAFE - LINE A - QF14: G2 - LINE B - QF15: PW RACK1 - LINE B - QF16: PW RACK2 - LINE B - QF17: PW RACK3 - LINE B - QF18: PW RACK4 - LINE B - QF19: PW RACK5 - LINE B - QF20: PW RACK6 - LINE B - QF25: FAN PROSAFE - LINE B - QF1: UTILITY - QF2: SOCKET - QF3: LIGHT - QF5: FAN - QF22: 24V LINE A DISTRIBUTION - QF23: 24V LINE B DISTRIBUTION			
7	In SIS B400-SIS-001 switch on: - MS1: UPS 1 - MS2: UPS 2 - QF55: G1 - LINE A - QF56: PW RACK1 - LINE A - QF57: PW RACK2 - LINE A - QF58: PW RACK3 - LINE A - QF67: FAN PROSAFE - LINE A - QF60: G2 - LINE B - QF61: PW RACK1 - LINE B - QF62: PW RACK2 - LINE B - QF63: PW RACK3 - LINE B - QF68: FAN PROSAFE - LINE B - QF50: UTILITY - QF51: SOCKET - QF52: LIGHT - QF54: FAN - QF65: 24V LINE A DISTRIBUTION - QF66: 24V LINE B DISTRIBUTION			
8	In PCS B400-PCS-001 switch on: - MS1: UPS 1 - MS2: UPS 2			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

Step	Description	Result	Verified by	Date
	- QF6: G1 - LINE A - QF7: PW RACK1 - LINE A - QF8: PW RACK2 - LINE A - QF9: PW RACK3 - LINE A - QF10: PW RACK4 - LINE A - QF20: G3 - LINE A - QF12: G2 - LINE B - QF13: PW RACK1 - LINE B - QF14: PW RACK2 - LINE B - QF15: PW RACK3 - LINE B - QF16: PW RACK4 - LINE B - QF21: G4 - LINE B - QF1 UTILITY - QF2: SOCKET - QF3: LIGHT - QF5: FAN - QF18: 24V LINE A DISTRIBUTION - QF19: 24V LINE B DISTRIBUTION			
9	In EMCS B400-EMCS-001 switch on: - MS1: UPS 1 - MS2: UPS 2 - QF6: G1 - LINE A - QF8: G2 - LINE B - QF1: UTILITY - QF2: SOCKET - QF3: LIGHT - QF5: FAN - QF10: 24V DISTRIBUTION - QF11: 24V DISTRIBUTION			
10	After closing the breakers inside the ICSS cabinets, the following should be done: (optional but recommended) disconnect power to the relays of the R101...111 sounders so as to prevent their activation during trip from KVM, open EWS0164 and start the Prosafe Workbench application by loading the PrjLibrary file for SCS0110 (SIS) in Tools > Maintenance > SCS Security Level and set new level = 1 in Tools > Maintenance > SCS Status Overview (password field is empty), double-click in			

Step	Description	Result	Verified by	Date
	SCS0110, then select Tools > I/O Channel Status and click on Output Enable. Repeat the step for SCS0120 (FGS). at this point, SIS and FGS will be tripping, with beacon and sounder activation (which were, however, de-energized in step 1) from HMI, proceed to do Interlock Reset starting with FGS and continuing with SIS: ASD, ESD1-D, ESD1, PSD, MOB to reset the packages, in Prosafe Workbench select Tools > Maintenance > IO Lock Window and force the relevant responses to TRUE and do the reset from local panel once all packages have been reset, it will be possible to reset the PSD at HMI after the PSD has been reset, it will be possible to remove the forcings that were set in step 7			
11	Force the following signals: **SIS_TAG** **85XA-003** A-85000 BESS PKG UCP fault **20XA-003** A-20000 Electrolyser PKG UCP fault **80XA-003** A-80000 Fuel cell PKG UCP fault **50XA-003** A-500003 Sea water treatment PKG F&G LCP fault **63XA-003** A-63000 Instrument air PKG fault **64XA-003** A-64000 Nitrogen PKG fault **77XA-001** B-100 HV/MV SWGR room HVAC fault **77XA-002** B-200 LV SWGR room HVAC fault **77XA-003** B-300 UPS room HVAC fault **77XA-004** B-400 I&T equip. Room HVAC fault **72XA-001** Wave-off light system fault **85XA-004** A-85000 BESS PKG UCP thermal run away			

Step	Description	Result	Verified by	Date
	80PI-002 Hyrogen storage to A-80000 Package **FGS_TAG** **85XA-001** A-85000 BESS PKG confirmed gas alarm **85XA-002** A-85000 BESS PKG confirmed fire alarm **20XA-001** A-20000 Electrolyser PKG confirmed gas alarm **20XA-002** A-20000 Electrolyser PKG confirmed fire alarm **80XA-001** A-80000 Fuel cell PKG confirmed gas alarm **80XA-002** A-80000 Fuel cell PKG confirmed fire alarm **50XA-001** A-500003 Sea water treatment PKG confirmed gas alarm **50XA-002** A-500003 Sea water treatment PKG confirmed fire alarm			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

6.3.6.1 Energization HVAC B400-HSB-001 (only lighting circuits)

Step	Description	Result	Verified by	Date
Energization HVAC B400-HSB-001				
1	On Switchboard SG-200N1, close the breaker QA1 for the aux power supply in the drawers A5/+04 (HVAC PANEL ITER ROOM)			
2	Put the drawer in service position and the selector SA1 in Local position			
3	Manually close the circuit breaker QF1 and press the button PM1 to close the contactor K1 and consequently energize the power supply to B400-HSB-001			
4	In UPS UP-200F3 proceed to close the breaker QF42 to energize the auxiliary control circuit			
5	The HVAC Panel Board B400-HSB-001 is now available to energise the respective circuits.			
6	Inside the panel B400-HSB-001, proceed to switch on the following circuit breakers required for internal technical room illumination: - QS1 Main Incomer - QF400: MVA-1with Panel Multimeter - QF1: MODULE LIGHT AND EMERGENCY LIGHT - QF3: INTERNAL AUX 230V			
7	Locate the pushbuttons, CELS-B400H-F1-L1-01 and CELS-B400H-F1-L1-01, near the doors to switch on the internal lighting circuits.			

6.3.6.2 Energization HVAC B300-HSB-001 (only lighting circuits)

Step	Description	Result	Verified by	Date
Energization HVAC B300-HSB-001				
1	In SG-200N1, closing the breaker QA1 for the aux power supply in the drawers A5/+03 (HVAC PANEL UPS TECHNICAL ROOM)			
2	Put the drawer in service position and the selector SA1 in Local position			
3	Manually close the circuit breaker QF1 and press the button PM1 to close the contactor K1 and consequently energize the power supply to B300-HSB-001			
4	In UP-200F3 closing the breaker QF41 to energize the auxiliary control circuit			
5	The HVAC Board B300-HSB-001 is now available to energise the respective circuits.			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

6	Inside the panel B300-HSB-001, proceed to switch on the following circuit breakers required for internal technical room illumination: - QS1 Main Incomer - QF400: MVA-1with Panel Multimeter - QF1: MODULE LIGHT AND EMERGENCY LIGHT - QF3: INTERNAL AUX 230V			
7	Locate the pushbuttons, CELS-B400H-F1-L1-01 and CELS-B400H-F1-L1-01, near the doors to switch on the internal lighting circuits.			

6.3.6.3 Energization HVAC B200-HSB-001 (only lighting circuits)

Step	Description	Result	Verified by	Date
Energization HVAC B200-HSB-001				
1	In SG-200N1, close the breakers QA1 for the aux power supply in the drawers A5/+02 (HVAC PANEL - LV TECHNICAL ROOM)			
2	Put the drawer in service position and the selector SA1 in Local position			
3	Manually close the circuit breaker QF1 and press the button PM1 to close the contactor K1 and consequently energize the power supply to B200-HSB-001			
4	In UP-200F3 closing the breaker QF40 to energize the auxiliary control circuit			
5	The HVAC Board B200-HSB-001 is now available to energise the respective circuits			
6	Inside the panel B200-HSB-001, the user must switch on these circuit breakers: - QS1 Main Incomer - QF400: MVA-1with Panel Multimeter - QF1: MODULE LIGHT AND EMERGENCY LIGHT - QF3: INTERNAL AUX 230V			
7	Locate the pushbuttons, CELS-B400H-F1-L1-01 and CELS-B400H-F1-L1-01, near the doors to switch on the internal lighting circuits.			

6.3.6.4 Energization HVAC B100-HSB-001 (only lighting circuits)

Step	Description	Result	Verified by	Date
Energization HVAC B100-HSB-001				
1	In SG-200N1, close the breakers QA1 for the aux power supply in the drawers A4/+02(HVAC PANEL HV TECHNICAL ROOM)			

2	Put the drawer in service position and the selector SA1 in Local position			
3	Manually close the circuit breaker QF1 and press the button PM1 to close the contactor K1 and consequently energize the power supply to B100-HSB-001			
4	In UP-200F3 closing the breaker QF39 to energize the auxiliary control circuits			
5	The HVAC Board B100-HSB-001 is now available to energise the respective circuits.			
6	Inside the panel B100-HSB-001, the user must switch on these circuit breakers: - QS1 Main Incomer - QF400: MVA-1with Panel Multimeter - QF1: MODULE LIGHT AND EMERGENCY LIGHT - QF3: INTERNAL AUX 230V			
7	Locate the pushbuttons, CELS-B400H-F1-L1-01 and CELS-B400H-F1-L1-01, near the doors to switch on the internal lighting circuits.			

6.3.6.5 Energization UPS – UP-200F1

Step	Description	Result	Verified by	Date
Energization of UPS UP-200F1A				
1	On the Cut-off CB-200F1 put the selector S2 in OVERRIDE position			
2	In SG-200N1 closing the breakers QA1 for the aux power supply in the drawers A7/+03 (DC BATTERY SYSTEM SWGR CONTROL - FEEDER A) and A7/+04 (DC BATTERY SYSTEM SWGR CONTROL - FEEDER B)			
3	Push the drawers in service position			
4	Manually close the circuit breakers QF1 for the drawers and consequently energize the power supply to UP-200F1A and B			
5	In DP-200N1 closing the breaker Q43 for energize the auxiliary circuit			
6	Set the load interrupter switch Q1 to the "ON" position			
7	Check the functionality of rectifier on the controller display A300			
8	Set the output interrupter switch Q2 to "ON" position			
9	Check the battery bank voltage and polarity: _____ V			

Step	Description	Result	Verified by	Date
10	Set the battery interrupter switch Q3 to "ON" position			
11	Set the external battery cut off (CB-200F1) interrupter switch Q0 to "ON" position			
12	Verify the battery bank is in charge by display with the Charging Current			
13				
14	The first UPS 'A' unit is now in operation			
15	In UPS 'B' set the load interrupter switch Q1 to the "ON" position			
16	Check the functionality of rectifier on the controller display A300			
17	Set the output interrupter switch Q2 to "ON" position			
18	The second UPS unit is now in operation			
19	The essential circuit breaker to switch on are: - Q12 (110Vdc Supply A SG-100D1) - Q13 (110Vdc Supply B SG-100D1) - Q10 (110Vdc Supply A GIS) - Q11 (110Vdc Supply B GIS)			

6.3.6.6 Energization GIS AUXILIARY SUPPLY 6.6kV

Step	Description	Result	Verified by	Date
Energization GIS AUXILIARY SUPPLY				
1	In DP-200N1 closing the breaker Q37 for energize the auxiliary circuit of CP-100E1			

Step	Description	Result	Verified by	Date
2	In CP-100E1 closing the breaker FA-AC MAIN SUPPLY for energize: - LCP LIGHTING CIRCUIT - LCP HEATING CIRCUIT - SOCKET OUTLET - CB Q0 (QA1) OPERATING MECHANISM - CB Q0 (QA1) HEATING CIRCUIT - DS QZ92_ES QZ92 OPERATING MECHANISM HEATING CIRCUIT - DS QZ91_ES QZ91 OPERATING MECHANISM HEATING CIRCUIT			
3	In CP-100E1 closing the breaker FD1 - DC1 110Vdc MAIN SUPPLY and F01 - CIRCUIT BREAKER CONTROL SUPPLY CLOSING & TRIP CIRCUITS 1. Now check: - CLOSE COMMAND CIRCUIT - K86-1 of 7SJ85 PROTECTION LOCK OUT RELAY CIRCUITS - LOCK OUT RELAY SET COMMAND TR-100AD1 PROTECTION TRIP - CB Q0 (QA1) ANTI PUMPING CIRCUIT - CB Q0 (QA1) PROTECTION & TRIP COIL CIRCUITS - SAFETY SYSTEM POWER - CB Q0 (QA1) GIS PRESSURE LOW STAGES 1&2			
4	In CP-100E1 closing the breaker F02 - CIRCUIT BREAKER MOTOR SUPPLY Now check: - CB Q0 (QA1) MOTOR OPERATING CIRCUIT - CB Q0 (QA1) SPRING EXCESSIVE RUN TIME			
5	In CP-100E1 closing the breaker F03 - INDICATION CIRCUIT SUPPLY Now check: - LAMP TEST - CB Q0 (QA1) POSITION INDICATOR CLOSE & OPEN - DS QZ92 POSITION INDICATOR CLOSE & OPEN - ES QZ92 POSITION INDICATOR CLOSE & OPEN - DS QZ91 POSITION INDICATOR CLOSE & OPEN - ES QZ91 POSITION INDICATOR CLOSE & OPEN - IED FAILURE FROM 7SJ85 - IED FAILURE FROM 7UT85 - VD1 L1, L2, L3 SUPPLY - VD2 L1, L2, L3 SUPPLY			
6	In CP-100E1 closing the breaker F04 - PROTECTION RELAY: 7UT85 SUPPLY Now check: - PROTECTION RELAY 7UT85 SUPPLY - IED FAILURE FROM 7SJ85			
7	In CP-100E1 closing the breaker F05 - RED BOX UNIT: RSG907R SUPPLY			

Step	Description	Result	Verified by	Date
	Now check: - RSG907R RED BOX UNIT			
8	In CP-100E1 closing the breakers: - FD2: DC2 110Vdc MAIN SUPPLY - F11: CIRCUIT BREAKER CONTROL SUPPLY CLOSING & TRIP CIRCUITS 2 Now check: - REMOTE TRIP-2 COMMAND - CB Q0(QA1) TRIP COIL-2 50/50N/51/51G/67/67N - CB QO(QA1) TRIP COIL-2 87 - CB QO(QA1) TRIP COIL-2 86 - CB TRIP-2 COMMAND - PROTECTION TRIP SIGNAL - CB Q0(QA1) GIS PRESSURE LOW STAGE-1 - CB Q0(QA1) GIS PRESSURE LOW STAGE-2 - SIS SAFETY SYSTEM DC 24V INPUT			
9	In CP-100E1 closing the breakers: - F12: DS & ES MOTOR & CONTROL SUPPLY Now check: - DS/ES MANUAL OPER. MODE - DS/EZ QZ92 MOTOR OPERATION - DS/EZ QZ91 MOTOR OPERATION - ES QZ92 ES OPEN COMMAND - DS QZ92 DS CLOSE COMMAND - DS/ES QZ92 SELF HOLDING - ES QZ92 ES CLOSE COMMAND - DS QZ92 DS OPEN COMMAND - MANUAL DS/ES QZ92 OPER. MODE SELECTION - ES QZ91 ES OPEN COMMAND - DS QZ91 DS CLOSE COMMAND - DS/ES QZ91 SELF HOLDING - ES QZ91 ES CLOSE COMMAND - DS QZ91 DS OPEN COMMAND - MANUAL DS/ES QZ91 OPE. MODE SELECTION			
10	In CP-100E1 closing the breaker F13 - MERGING UNIT: IM2 SUPPLY Now check: - MERGING UNIT: IM2 SUPPLY			
11	In CP-100E1 closing the breakers F14: PROTECTION RELAY: 7SJ85 Now check: - PROTECTION RELAY 7SJ85 SUPPLY - DS QZ91 OPEN/CLOSE - ES QZ91 OPEN/CLOSE - DS QZ92 OPEN/CLOSE - ES QZ92 OPEN/CLOSE - CB Q0(QA1) OPEN/CLOSE - DC CONTROL VOLTAGE FAILURE - AC CONTROL VOLTAGE FAILURE - 6.6 kV ARC PROTECTION TRIP1 - 6.6 kV SWG. CB OPEN			

This document undergoes an issuance cycle within EDMS “FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as “NOT CONTROLLED” copy.
File: 123A90-PML-COM-PRO-03036

Step	Description	Result	Verified by	Date
	- 6.6 kV SWG. ES OPEN - SIS OVERRIDE ENABLE - VD1 NO VOLTAGE - VD2 NO VOLTAGE - CB WARNING GAS LOW VOLTAGE STAGE-1 - CB WARNING GAS LOW VOLTAGE STAGE-2 - CB SPRING MOTOR OVERLOAD - CB SPRING MOTOR EXCESSIVE RUN TIME - CB MOTOR RUNTIME EXCEEDED & SPRING UNCHARGED - DS/ES MOTOR MCB TRIP - DS OR ES MANUAL OPER. MODE - HAND CRANK INSERTED - IED FAILURE FROM 7UT85 - LOCAL STATUS - REMOTE STATUS - TCS1 FAIL - TCS2 FAIL - SAFETY SYSTEM POWER WATCHDOG - CB Q0(QA1) MCB ALARM - DS QZ92_ES QZ92 GIS PRESSURE LOW STAGE-1 - DS QZ92_ES QZ92 GIS PRESSURE LOW STAGE-2 - DS QZ91_ES QZ91 GIS PRESSURE LOW STAGE-1 - DS QZ91_ES QZ91 GIS PRESSURE LOW STAGE-2 - PROTECTION RELAY 7SJ85 (CB202) SUPPLY			
12	Verify and confirm ESD signal 81-XS-001 from SIS on CP-100E1 is working			
13	KSIL is ON in healthy condition the NO contact is closed. Check: - KSIL2 DC 24V TRIP SAFETY SYSTEM must be on and GIS will be in healthy condition - ESD (SIS) Override selector SR1 must be disable to permit any signal of Emergency Shut Down.			

6.3.6.7 Auxiliaries' energization Transformer TR-100AD1

Step	Description	Result	Verified by	Date
Energization Auxiliary TR-100AD1				
1	In DP-200N1 switch on: - Q33 (Auxiliary CP-100E4) - Q32 (Auxiliary CP-100E3) - Q31 (Auxiliary CP-100E2) Now the Control Panels of TR-100AD1 are energise			
2	Verify in CP-100E4 that no alarms are present and the power supply is ok			
4	Verify in CP-100E3 that no alarms are present and the power supply is ok			

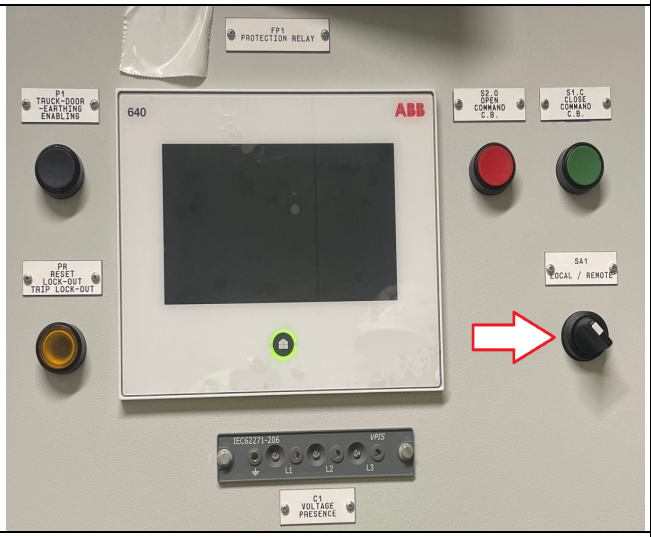
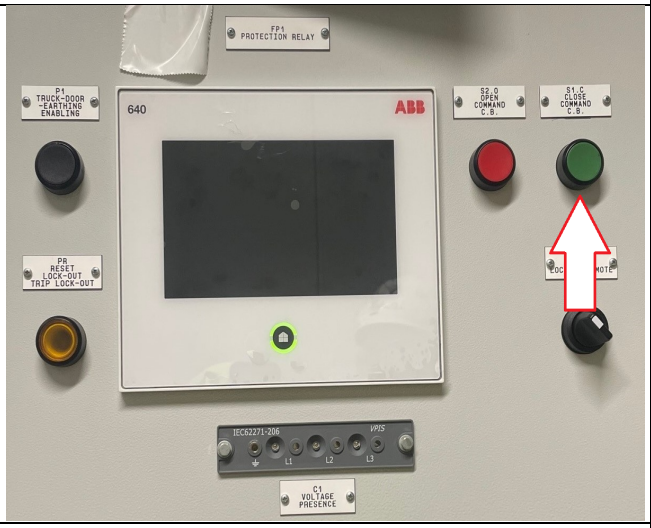
6	Verify in CP-100E2 that no alarms are present and the power supply is ok			

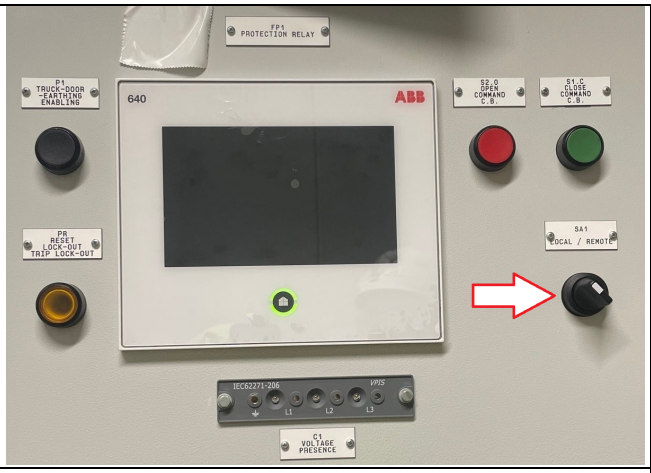
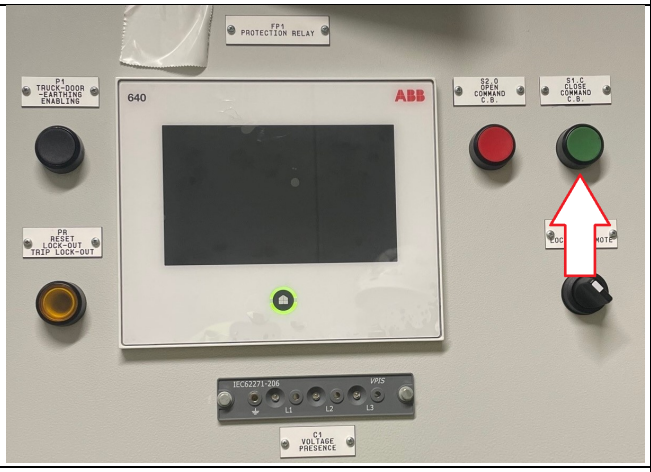
6.3.6.8 Energization Auxiliary Supply SG-100D1 (6.6kV)

Step	Description	Result	Verified by	Date
Energization Auxiliary Supply SG-100D1 (6.6kV)				
1	In UP-200F1 switch on Q12 (110Vdc Supply A) and Q13 (110Vdc Supply B)			
2	In column A5 (SG-100D1) close MCB QD01 and QD02 (110Vdc distribution)			
3	In column A4 (SG-100D1) close MCB QD1 (protection device) and QD2 (command circuits). Now the HMI panel is online			
4	In column A6 (SG-100D1) close MCB QD1 (protection device), QD2 (command circuits) and QD3 (spring charging motor). Now the HMI panel is online			
5	In column A5 switch on QD1 and QD2 for energize DC/DC converter GS1 and the commands			
6	Verify and confirm the power supply 24V on column A5: - measure 24Vdc on QD4 - close MCB QD4 (main breaker for 24Vdc) - close MCB QD5 (exetherm device) - close MCB QD6 (partial discharged monitoring) - close MCB QD21 (ethernet switch A) - close MCB QD22 (ethernet switch B + C)			
7	Close QV1, QV2, QV3, QV4, QV5 (Voltmetric measure for protection relay FP1) in column A5			
8	Verify the led on ethernet switches and on the exetherm are ON			
9	In column A6 switch on: - QV1, QV2, QV3, QV4, QV5 (measurement) - QD4 (exeterm 24Vdc)			
10	In column A4 switch on: - QD4 (termally monitor) - QV4, QV5 (measurement FP1)			
11	Now the column 4 and 6 is ready to energise. P.s.: The Breaker must be insert and the earth open.			

6.3.6.9Energization A4, A6 UNIT and main busbar

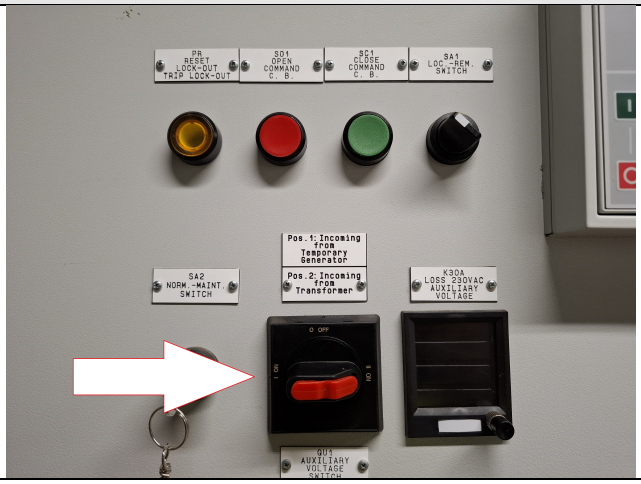
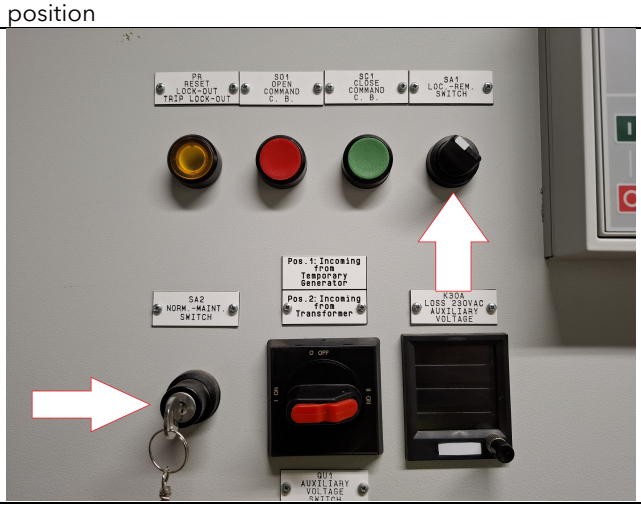
Step	Description	Result	Verified by	Date
Energization A5, A6 UNIT and main busbar				
1	Confirm availability of the 66kV (GIS) and prepare to energize.			

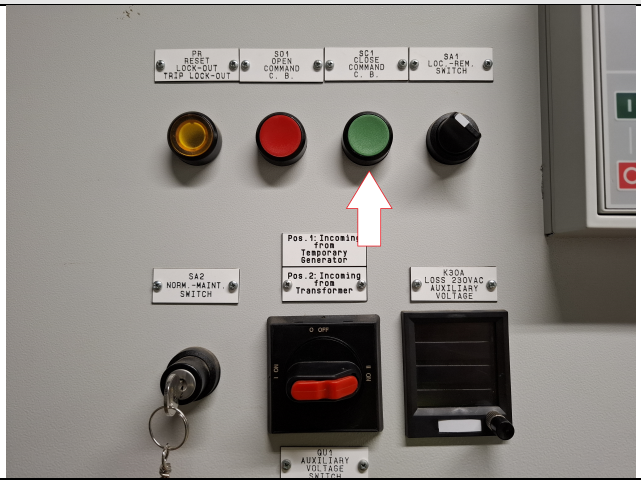
2	Close the main breaker Q0(QA1) on CP-100E1			
3	Verify the voltage presence in the Switchgear SG-100D1 on the warning lights C1 in column A6			
4	In column A6 (SG-100D1) place the selector SA1(Local/Remote), in local position (see below photo)			
5				
6	Close QM Breaker by pressing the green button S1C (see below photo)			
7				
8	See on FP1 Protection Relay Display if Breaker Closed is confirmed on REX640 HMI			
9	On Unit A5 the busbar voltage presence lamps C1 are ON			
10	The busbar is now energized			
11	Now, in column A4 the user put the selector SA1(Local/Remote), in local position (see below photo)			

12				
13	Close QM Breaker by pressing the green button S1C (see below photo)			
14				
15	See on FP1 Protection Relay Display if Contactor Closed is confirmed on REX640 HMI			
16	On Unit A4 the downstream voltage presence lamps C1 are ON and the Transformer is energise.			
IMPORTANT NOTE: Before making the switch from YARD to MV verify that the batteries of UPS F1/F3/F4 are fully charged				

6.3.6.10 Switch from Temporary Generator power supply to 6,6kV power supply

Step	Description	Result	Verified by	Date
Switch from Temporary GENERATOR to 6,6kV power supply				
1	Open the circuit breaker A2/+08 (SG-200N1) (circuit breaker for 400V Temporary Generator)			
N.B.: THE OPENING OF CIRCUIT BREAKER A2/+08 WILL CREATE A BLACK OUT AND THE NORMAL LIGHTINGS WILL AUTOMATICALLY SWITCH OFF, WHILE THE EMERGENCY LIGHTINGS ARE AVAILABLE IN EMERGENCY MODE				
2	The selector QU1 Auxiliary Voltage Switch located on cubicle A2/+02 (SG-200N1) must be closed on POS.2			

Step	Description	Result	Verified by	Date
3				
4	Close protection fuse QU2, located inside the cubicle A2/+02, for the auxiliary voltage from main bus bar in upstream.			
5	Rack in the Main incoming breaker QF1 (SG-200N1) in SERVICE position on column A1/+05 (if necessary)			
6	The test of the incomer QF1 in TEST POSITION and the hardwired I/O signals has been done during the OTP (Ref. Document: 123A90-PML-COM-PRO-03047)			
7	In column A2/+02: - Place the selector SA1 in local position - Verify and confirm the SA2 Selector is in normal position			
8				
9	Now: - Push SC1 to close main breaker - Led-3 on the REF615 must be ON - On the REF615 display the circuit breaker symbol will change to closed - Rotate selector switch SA1 to remote position			

Step	Description	Result	Verified by	Date
10				
11	Now the user can put all in remote and remove all the remaining override (if necessary) by YOKOGAWA			

6.3.6.11 Restore Normal Operation after BLPH Startup – Remove System Overrides

Step	Description	Result	Verified by	Date
Restore Normal Operation after BLPH Startup				
1	Verify and confirm that the Fire & Gas and SIS protection systems are in normal operation without any trip signals impacting the restoration of BLPH normal operation an subsequent startup			
2	Verify and confirm on 6.6 kV Switchboard SG-100D1 that no overrides are in place and equipment is in normal operation			
3	Verify and confirm on 400 V Switchboard SG-200N1 that no overrides are in place and equipment is in normal operation			
4	Verify and confirm on UPS system UP-200F3 that battery cut-off breakers overrides have been restored to normal operation with no alarms present			
5	Verify and confirm on UPS system UP-200F4 that battery cut-off breakers overrides have been restored to normal operation with no alarms present			
6	Verify and confirm on UPS system UP-200F1 that battery cut-off breaker override has been restored to normal operation with no alarms present			

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

6.3.7 OTP SITE Tests Certifying Authority Table of Attendances

Name and Surname	Certifying Authority	Position	Signature

6.3.8 OTP SITE - Tests Final Signatures and Company Acceptance

Name and Surname	Company Representative	Position	Signature

7 APPENDICES

7.1 Vendor SAT Procedure

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

7.2 Proverlis Summary System Reports

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

7.3 Equipment Related Technical Queries

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

7.4 As Built Documentation

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036

7.5 Management of Change – Summary Table of Tasks and Details of Affected Related Documentation

This document undergoes an issuance cycle within EDMS "FusionLive". Its distribution is electronically controlled.
Once printed shall be considered as "NOT CONTROLLED" copy.
File: 123A90-PML-COM-PRO-03036