PETROBRAS	TECHNICAL SPECIFICATION	N°: I-ET-3010.2Q-1200-800-P4X-014	
	CLIENT: MARLIM LESTE E SUL		SHEET: 1 of 17
	JOB: PROJETO BÁSICO – REVIT I		
	AREA: MARLIM LESTE E SUL		
	TITLE: **AUTOMATION INTERFACE OF PACKAGED UNITS**		ESUP
			INTERNAL

INDEX OF REVISION

REV.	DESCRIPTION AND/OR REVISED SHEETS
0	ORIGINAL
A	REVISED WHERE INDICATED
B	REVISED WHERE INDICATED DUE TO CONSISTENCY ANALYSIS

	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E
DATE	APR/02/2024	JUN/06/2024	JUL/16/2024			
EXECUTION	U44D	U44D	DVOP			
CHECK	U5D6	C27N	U44D			
APPROVAL	U361	U361	U361			

SUMMARY

1. INTRODUCTION

1.1. Objective

1.1.1. This specification describes the minimum requirements for the adequate interfacing of the Main Packages' Automation and Instrumentation System with the FPU.

1.1.2. This technical specification deals exclusively with the interfaces related to Automation and Instrumentation. For interface with the other systems, see respective discipline's design documentation.

1.1.3. Interface signals with electrical system are not scope of this technical specification. See I-LI-3010.00-5140-797-P4X-001 - ELECTRICAL SYSTEM AUTOMATION INTERFACE SIGNALS LIST, I-ET-3010.00-5140-700-P4X-003 - ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS, I-ET-3010.00-5140-700-P4X-001 - SPECIFICATION FOR ELECTRICAL DESIGN FOR OFFSHORE UNITS and I-DE-3010.00-5140-797-P4X-002 - ELECTRICAL SYSTEM AUTOMATION TYPICAL ACTUATION DIAGRAMS for additional information on these signals and the logic associated to them.

1.2. Definitions

1.2.1. Refer to I-ET-3010.00-1200-940-P4X-002 - GENERAL TECHNICAL TERMS.

1.3. Abbreviations, acronyms and initialisms

AEPR	Automation & Electrical Panels Rooms
CCR-OA	Central Control Room – Operation Ambiance
CCR-EA	Central Control Room – Equipment Ambiance
CSS	Control and Safety System
DIO	Optical Internal Distributor
ESD	Emergency Shutdown
FAT	Factory Acceptance Test
FPU	Floating Production Unit
I/O	Input / Output
IP	Internet Protocol
LAN	Local Area Network
MMS	Machinery Monitoring System
MPA	Automatized Procedures Module (Portuguese*: Módulo de Procedimentos Automatizados*)
MPS	Machinery Protection System
OPC	Open Platform Communications
PCS	Process Control System
RESD	Emergency Shutdown Relay
RIO	Remote I/O
SOS	Supervision and Operation System
TCP	Transmission Control Protocol
UCP	Unit Control Panel

2. REFERENCE DOCUMENTS, CODES AND STANDARDS

2.1. External references

2.1.1. International codes, recommended practices and standards

IEC – INTERNATIONAL ELECTROTECHNICAL COMMISSION

IEC	60079	EXPLOSIVE ATMOSPHERE – ALL PARTS
IEC	60092-350	ELECTRICAL INSTALLATIONS IN SHIPS – PART 350 - GENERAL CONSTRUCTION AND TEST METHODS OF POWER, CONTROL AND INSTRUMENTATION CABLES FOR SHIPBOARD AND OFFSHORE APPLICATIONS
IEC	60092-376	ELECTRICAL INSTALLATIONS IN SHIPS – PART 376 - CABLES FOR CONTROL AND INSTRUMENTATION CIRCUITS 150/250 V (300 V)
IEC	60092-504	ELECTRICAL INSTALLATIONS IN SHIPS - PART 504: - AUTOMATION, CONTROL AND INSTRUMENTATION
IEC	60529	DEGREES OF PROTECTION PROVIDED BY ENCLOSURES (IP CODE)
IEC	60533	ELECTRICAL AND ELECTRONIC INSTALLATIONS IN SHIPS - ELECTROMAGNETIC COMPATIBILITY (EMC) – SHIPS WITH METALLIC HULL
IEC	61000	ELECTROMAGNETIC COMPATIBILITY (EMC) SERIES - ALL PARTS
IEC	61280	FIBRE OPTIC COMMUNICATION SUBSYSTEM BASIC TEST PROCEDURES – ALL PARTS
IEC	62337	COMMISSIONING OF ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEMS IN THE PROCESS INDUSTRY – SPECIFIC PHASES AND MILESTONES
IEC	62381	AUTOMATION SYSTEMS IN THE PROCESS INDUSTRY - FACTORY ACCEPTANCE TEST (FAT), SITE ACCEPTANCE TEST (SAT) AND SITE INTEGRATION TEST (SIT)

2.1.2. Classification Society

2.1.2.1. The detailed design shall be submitted to approval by the Classification Society. The design and installation shall take into account their requirements and comments.

2.1.2.2. The design, installation and operation shall strictly follow the classification society requirements, along with the specific requirements identified in this document, including, also, all referenced documents' requirements.

2.1.3. Brazilian Codes and Standards

INMETRO – INSTITUTO NACIONAL DE METROLOGIA, QUALIDADE E TECNOLOGIA

PORTARIA Nº 115 (21/MARÇO/2022)	*REQUISITOS DE AVALIAÇÃO DA CONFORMIDADE PARA EQUIPAMENTOS ELÉTRICOS PARA ATMOSFERAS EXPLOSIVAS - CONSOLIDADO*

2.1.3.1. All *Secretaria de Inspeção do Trabalho* Regulatory Standards (NRs) shall be followed.

2.2. Internal references

2.2.1. Project Documents

DR-ENGP-M-I-1.3	SAFETY ENGINEERING GUIDELINE
I-DE-3010.00-5140-797-P4X-002	ELECTRICAL SYSTEM AUTOMATION TYPICAL ACTUATION DIAGRAMS
I-ET-3010.00-1200-321-P4X-001	TECHNICAL SPECIFICATION FOR CENTRIFUGAL COMPRESSOR DRIVEN BY ELECTRIC MOTOR
I-ET-3010.00-1200-800-P4X-002	AUTOMATION, CONTROL AND INSTRUMENTATION ON PACKAGE UNITS
I-ET-3010.00-1200-800-P4X-010	CRITERIA FOR ESTABLISHING CABLE CODES AND CABLE GLAND CODES
I-ET-3010.00-1200-800-P4X-013	GENERAL CRITERIA FOR INSTRUMENTATION PROJECTS
I-ET-3010.00-1200-850-P4X-002	ASSET MANAGEMENT SYSTEM (AMS)
I-ET-3010.00-1200-940-P4X-002	GENERAL TECHNICAL TERMS
I-ET-3010.00-1225-323-P4X-001	TECHNICAL SPECIFICATION FOR VAPOR RECOVERY UNIT
I-ET-3010.00-5139-390-P4X-001	HYDRAULIC POWER UNIT (HPU) FOR TOPSIDES VALVES
I-ET-3010.00-5140-700-P4X-001	SPECIFICATION FOR ELECTRICAL DESIGN FOR OFFSHORE UNITS
I-ET-3010.00-5140-700-P4X-003	ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS
I-ET-3010.00-5147-332-P4X-001	TECHNICAL SPECIFICATION - GAS TURBINE DRIVER FOR GAS TURBOGENERATOR SET
I-ET-3010.00-5500-854-P4X-001	MACHINERY MONITORING SYSTEM (MMS)
I-ET-3010.00-5520-800-P4X-001	SUPERVISION AND OPERATION SYSTEM (SOS) SCREENS
I-ET-3010.00-5520-800-P4X-004	AUTOMATION NETWORK REQUIREMENTS
I-ET-3010.00-5520-861-P4X-003	VIRTUALIZATION OF AUTOMATION SYSTEM COMPUTERS
I-ET-3010.00-5520-888-P4X-001	AUTOMATION PANELS
I-LI-3010.00-5140-797-P4X-001	ELECTRICAL SYSTEM AUTOMATION INTERFACE SIGNALS LIST
I-DE-3010.2Q-1200-942-P4X-002	GENERAL ARRANGEMENT
I-DE-3010.2Q-1200-94A-P4X-001	AREA CLASSIFICATION - GENERAL
I-DE-3010.2Q-5520-800-P4X-002	AUTOMATION AND CONTROL ARCHITECTURE
I-DE-3010.2Q-5520-800-P4X-004	NETWORK INTERCONNECTION DIAGRAM
I-ET-3010.2Q-1200-800-P4X-001	INSTRUMENTATION ADDITIONAL TECHNICAL REQUIREMENTS
I-ET-3010.2Q-1200-800-P4X-005	FIELD INSTRUMENTATION
I-ET-3010.2Q-1235-560-P4X-001	AMINE REGENERATION PACKAGE (Z-1235001)
I-LI-3010.2Q-1200-940-P4X-002	EQUIPMENT LIST
I-MD-3010.2Q-5520-800-P4X-003	AUTOMATION NETWORK DESCRIPTION
I-RL-3010.2Q-1200-940-P4X-001	GENERAL SPECIFICATION FOR AVAILABLE UTILITIES

2.2.1.1. When more restrictive, Brazilian regulation and INMETRO regulation superpose all codes and regulations listed in section 2.2, since they are enforced by Brazilian law.

3. GENERAL REQUIREMENTS TO ALL PACKAGES

3.1. Requirements

3.1.1. For each package type requirements and definitions, refer to I-ET-3010.00-1200-800-P4X-002 – AUTOMATION, CONTROL AND INSTRUMENTATION ON PACKAGE UNITS.

3.1.2. During detailed engineering design, four additional documents regarding cables shall be issued: cable list, cable code list, cable gland code list and cable tray occupation calculation memory. Document I-ET-3010.00-1200-800-P4X-010 – CRITERIA FOR ESTABLISHING CABLE CODES AND CABLE GLAND CODES, contains the criteria for emitting such documents.

3.1.3. Redundant network cables shall have segregated routing in such a way that a cause of damage to one of the cables will not affect the other.

3.1.4. UCP shall be installed at the Automation and Electrical Panels Room (AEPR), Central Control Room – Equipment Ambiance (CCR-EA) or at field (where designated) while RIO Panels (where applicable, as in section 3.1.10) shall be installed at field.

3.1.5. For UCPs and RIOs locations, see I-LI-3010.2Q-1200-940-P4X-002 – EQUIPMENT LIST.

3.1.6. All PACKAGE UNIT's Fire and Gas signals shall be routed straight to UCP.

3.1.6.1. All PACKAGE UNIT's Fire and Gas signals shall not be routed through RIO panels, should they exist.

3.1.7. For operational and environmental conditions additional to this section, see I-ET-3010.2Q-1200-800-P4X-001 - INSTRUMENTATION ADDITIONAL TECHNICAL REQUIREMENTS.

3.1.8. The available power supply for UCP and RIO panels shall be in accordance with I-ET-3010.00-5140-700-P4X-003 - ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS. The voltage to be supplied by UCP to field instruments shall be 24 Vdc unless otherwise specified on I-ET-3010.2Q-1200-800-P4X-005 - FIELD INSTRUMENTATION.

3.1.9. All panels, materials, instruments and equipment installed in hazardous areas according to I-DE-3010.2Q-1200-94A-P4X-001 – AREA CLASSIFICATION – GENERAL shall be certified for appropriate zone classification. In addition, the ones that are installed in a non-hazardous open area and that are kept energized during ESD-3P or ESD-3T condition, shall be certified for Zone 2 EPL Gc IIA T3 hazardous area, as per IEC 61892-1. Hazardous area certificates shall be in accordance with *PORTARIA INMETRO Nº 115 DE 21/MARÇO/2022* and its annexes and shall be provided for Buyer approval before FAT.

3.1.10. Main and Exportation Compressors, as well as Vapor Recovery Unit, Turbogenerators, Combined Cycle / Cogeneration Plant and Sulphate Removal Unit shall have a package RIO Panel each. For more information on UCP and RIO Panel specifications and required functionalities, see its respective PACKAGE TECHNICAL SPECIFICATION.

4. HARDWIRED INTERFACE SIGNALS

4.1. Interface Signals to CSS

4.1.1. The minimal interface signals between PACKAGE UNITs and CSS are in accordance with annex spreadsheet below, other signals may be required. PACKAGE's Technical Specification and related P&IDs shall be consulted in order to identify complementary interface signals between PACKAGE UNITs and CSS. Other signals may be necessary during Detail Engineering Design as well.

4.1.2. Whenever a signal is mentioned for a package that has multiplicity, such as a compression unit composed of 3 compression trains, UC-1231001A/C for example, the signal is applicable to each one of the identical packages. For example, the signal for the aforementioned case should be XSL-1231001A, XSL-1231001B and XSL-1231001C – one per identical PACKAGE.

4.2. Additional interface signals

4.2.1. All UCPs shall also foresee I/O points for interface signals between two different PACKAGES or between different panels from the same PACKAGE. PACKAGE's Technical Specification and related P&IDs shall be consulted in order to verify what hardwired signals are expected by each UCP.

4.2.2. For the GG-5241501A/B - INERT GAS GENERATOR PACKAGE, the following signals shall also be foreseen in addition to the ones mentioned on section 4.2.1:

I. From PN-GG-5241501A-02 to PN-GG-5241501B-02: Deck Pressure Monitoring (Main) reading – Analog Signal;

II. From PN-GG-5241501B-02 to PN-GG-5241501A-02: Deck Pressure Monitoring (Auxiliary) reading – Analog Signal;

III. From PN-GG-5241501A-02 to PN-GG-5241501B-02 and from PN-GG-5241501B-02 to PN-GG-5241501A-02: two signals for selected operation mode – These signals shall be used to ensure that both panels will consider the same operation mode (Direct alignment or Crossover alignment).

5. INTERFACE SIGNALS SENT VIA NETWORK TO CSS

5.1. Signals

5.1.1. All P2, P2S, P2C and P2SC PACKAGE UNIT shall make available through network interface (i.e., make available in the PACKAGE UNIT's communication map), at least, the following signals:

I. All process variables (including totalizers);

II. All Fire and Gas transmitters analog readings;

III. All valve statuses (limit switch, position indicator, commands to valves);

IV. All alarm set points;

V. All alarm statuses;

VI. All controllers set points (including PID internal variables like Kp, Ki, Kd and internal accumulators);

VII. All equipment (pumps, compressors etc.) statuses (Running/Stopped);

VIII. All equipment (pumps, compressors etc.) VSD set point (for those with VSD);

IX. All equipment (pumps, compressors etc.) stepped capacity set point (for those with stepped capacity set point);

X. Timers for batch processes cycles (ex.: adsorption cycles, membrane cycle etc.).

5.1.2. In order to standardize variables and alarms presentation for automation integration services and historical recording in SOS, the following variables to be presented in communication map of Package unit's controller, to be read by SOS Package Units Data Servers, shall have the values below:

I. Variable in Normal Condition = 0;

II. Variable in Abnormal Condition = 1;

III. Logical outputs: Engine ON (Running), Valve Opened (all valves) = 1;

IV. Non-active alarm: 0; Active alarm: 1;

V. Not acknowledged Alarm: 0, Acknowledged alarm: 1;

VI. Levels: normalized to 0 – 100 %.

NOTE: Since 1 means "valve opened", the output of the BDV and fail open XV blocks shall be connected to a logical inverter ("0" to "1" and "1" to "0").

6. FIELD INSTRUMENTS INTERFACE

6.1. Interface

6.1.1. All skid instruments shall be connected to the specific junction box on the skid according to I-ET-3010.00-1200-800-P4X-013 - GENERAL CRITERIA FOR INSTRUMENTATION PROJECTS and PACKAGE TECHNICAL SPECIFICATION.

6.1.2. At least one interface junction box shall be provided on the module for each skid. These junction boxes shall be specified and segregated according to I-ET-3010.00-1200-800-P4X-013 - GENERAL CRITERIA FOR INSTRUMENTATION PROJECTS.

6.1.3. All signals provided by instruments on process plant related to anti-surge and capacity control will be connected by multicables to the corresponding module's interface junction boxes and from these junction boxes to the respective UCPs.

6.1.4. Never, in any case, BDVs shall be used to other purpose than emergency depressurization (such as process or commissioning depressurization, in which case a XV shall be used).

6.1.5. All cables connecting to SDV limit switch shall be fire-resistant, see I-ET-3010.00-1200-800-P4X-013 - GENERAL CRITERIA FOR INSTRUMENTATION PROJECTS.

7. NETWORK INTERFACE

7.1. General

7.1.1. Buyer will inform, during project's detailing design phase, a list of available IP addresses to be used for the connection between the PACKAGE UNIT and PACKAGE UNITS LAN, according to I-MD-3010.2Q-5520-800-P4X-003 - AUTOMATION NETWORK DESCRIPTION and I-ET-3010.00-1200-800-P4X-002 - AUTOMATION, CONTROL AND INSTRUMENTATION ON PACKAGE UNITS.

7.1.2. Each UCP of the PACKAGE UNIT shall be integrated to PACKAGE UNITS LAN via interconnection either to panel PN-5523011 (TOPSIDES SOS CLUSTERS PANEL, in case of a Topsides PACKAGE) or to panel PN-5523508 (HULL SOS CLUSTERS PANEL, in case of a Hull PACKAGE), through a redundant Gigabit Ethernet link, according to I-DE-3010.2Q-5520-800-P4X-004 – NETWORK INTERCONNECTION DIAGRAM and I-ET-3010.00-5520-800-P4X-004 – AUTOMATION NETWORK REQUIREMENTS.

7.1.3. Ethernet connections between PACKAGE UNIT and SOS shall be according to I-ET-3010.00-5520-800-P4X-004 – AUTOMATION NETWORK REQUIREMENTS.

7.1.4. UCP controllers shall be provided with 2 OPC UA server drivers. These OPC drivers shall be installed in PACKAGE UNIT DATA SERVERS, in order to standardize the communication between UCP and PACKAGE UNIT DATA SERVERS. The OPC driver shall be OPC Foundation™ compliant. Only in case the UCP doesn't support OPC Server driver, Buyer accepts Modbus/TCP

driver or a dedicated communication driver for communication between UCP and PACKAGE UNIT DATA SERVERS. This link shall be used to send all variables described in section 5.1.1 to SOS. A simplified version of the PACKAGE UNIT operation screen shall be made available in SOS HMIs using these variables.

7.1.5. Both Hull and Topsides Packages Entry Switches shall be from the same Manufacturer as the ones from the PACKAGE UNITS LAN Main Ring. The usage of Firewall for the connection between the Package and FPU's Package Lan is not acceptable. For additional information see I-DE-3010.2Q-5520-800-P4X-004 - NETWORK INTERCONNECTION DIAGRAM.

7.2. AMS Interface

7.2.1. AMS System shall acquire data from PACKAGE UNIT through the PACKAGE UNITS LAN, for P2/P2S/P2C/P2SC packages. For more information on AMS System, see I-ET-3010.00-1200-850-P4X-002 – ASSET MANAGEMENT SYSTEM (AMS).

7.2.1.1. Instruments from FMS system shall not be monitored by AMS System.

7.3. MMS Interface

7.3.1. For P0 PACKAGE UNITS (see Appendix I for PACKAGE UNIT classification), the machinery monitoring signals will be connected to PN-5500506 - HULL MMS PROTECTION AND ACQUISITION PANEL (HULL PAP), in case of a Hull Machine, or PN-5500009 - TOPSIDES MMS PROTECTION AND ACQUISITION PANEL (TOPSIDES PAP), in case of a Topsides Machine.

7.3.2. For P2/P2S/P2C/P2SC PACKAGE UNITS (see Appendix I for PACKAGE UNIT classification), the UCP for PACKAGE UNITS (or RIO Panel, should it exist – see section 3.1.10) shall provide connection from MPS inside UCP Panel (or RIO Panel) to MMS Server Panel (PN-5500007/PN-5500014). If necessary, conversion between fiber optic and twisted pair shall be performed in a converter mounted inside DIOs panel.

7.3.3. For more information on MMS System, see I-ET-3010.00-5500-854-P4X-001 – MACHINERY MONITORING SYSTEM (MMS).

7.4. HIM Interface

7.4.1. All P2S and P2SC (according to classification on Appendix I) UCPs will be connected to a network switch in the AEPR or CCR-EA (depending on whether it's a topsides or hull package) that will be connected to its HMI at the CCR-OA, such as defined in I-DE-3010.2Q-5520-800-P4X-002 - AUTOMATION AND CONTROL ARCHITECTURE.

7.4.2. For Main and Exportation compressors, the aforementioned switch will be connected to PN-5500010A/B workstations (COMPRESSOR GOVERNOR SYSTEM WORKSTATION) at CCR-OA, such as defined in I-DE-3010.2Q-5520-800-P4X-002 - AUTOMATION AND CONTROL ARCHITECTURE.

7.4.3. All P2 PACKAGE UNITS, that do not have a dedicated HMI in CCR-OA, shall be able to have

its UCP internal HMI accessed via PN-5523006A/B – REMOTE ACCESS WORKSTATION. These workstations will be located in CCR-OA and shall be able to access the UCPs internal HMI via Windows Remote Desktop. If additional licenses or passwords are necessary to perform this access, they shall be supplied along with the PACKAGE UNIT. These workstations shall be thin clients accessing virtual images in the respective automation cluster. For further details, refer to I-ET-3010.00-5520-861-P4X-003 – VIRTUALIZATION OF AUTOMATION SYSTEM COMPUTERS.

7.5. UCP and RIO Panel Interface

7.5.1. Where applicable (see section 3.1.10) Control RIO, Safety RIO and Overspeed Protection shall be connected to a DIOs PANEL by a redundant optical fiber network connection and from the aforementioned DIOs Panel to UCP by twisted pair network cables. These communication protocols may be proprietary.

7.5.2. Panels installed on the field shall be certified as Ex-“pz”, certified for Zone 2, according to IEC-60079. An air vessel shall be supplied to keep the panel protected in case of loss of air from the FPU. Vessel sizing shall be submitted to Buyer. For further details, see I-ET-3010.00-5520-888-P4X-001 - AUTOMATION PANELS.

7.5.3. For compression services mentioned in section 3.1.10, the internal components of the UCP and RIO are depicted in Figure 7.5-I. Blue signals represent network signals and red signals represent hardwired signals.

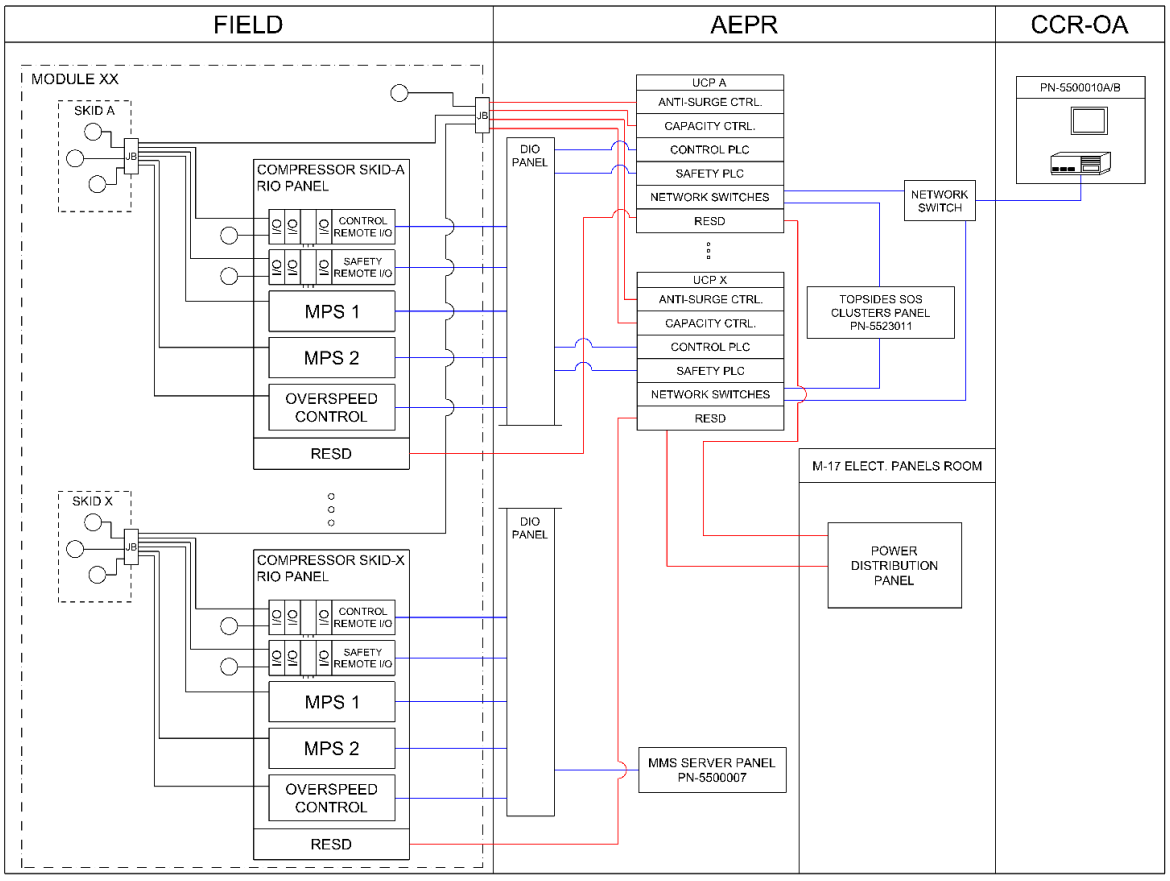

Figure 7.5-I – Internal Components

7.6. Compressor Control MPA Interface

7.6.1. Main and Exportation compressors as well as Vapor Recovery Unit will have an interface with MPA software to perform advanced control. This MPA software will be installed at BR Optimization Server.

7.6.2. All signals necessary to MPA software will be sent through network interface from PACKAGE UNIT UCP and PACKAGE UNIT RTDS. These signals shall be available in the PACKAGE UNIT communication map. For more information on these signals, see section 5.1.1.

7.6.3. The MPA software will read these data from PACKAGE UNIT RTDS through SOS LAN. The result of the MPA control will then be sent to PCS via network (CSS LAN), and then to the PACKAGE UNIT UCP via hardwired analog signals. For more information on these signals, see section 4.1.1.

7.6.4. Since these signals will command loops from the PACKAGE UNIT UCP, there shall be a selection logic between the signal from the PACKAGE UNIT itself and the signal from MPA software. This selection logic shall be done in PACKAGE UNIT UCP. For more details, see I-ET-3010.00-1225-323-P4X-001 TECHNICAL SPECIFICATION FOR VAPOR RECOVERY UNIT, I-ET-3010.00-1200-321-P4X-001 TECHNICAL SPECIFICATION FOR CENTRIFUGAL COMPRESSOR DRIVEN BY ELECTRIC MOTOR.

7.6.5. The aforementioned communications are depicted in Figure 2.

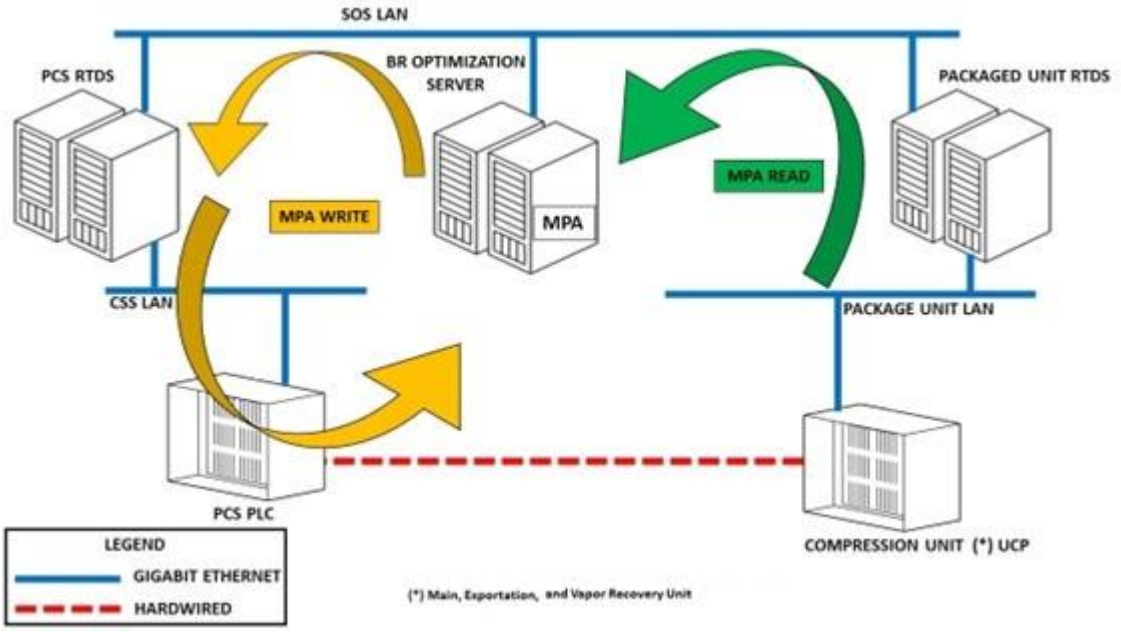

Figure 7.6-I – MPA Communications

8. PACKAGE RIO PANEL AND UCP HARDWIRED INTERFACE

8.1. Interface

8.1.1. For PACKAGE UNITS where such panel exists (see section 3.1.10), there shall be a hardwired connection between the Emergency Shutdown Relay (RESD) installed in RIO Panel and the one installed in UCP. For more information regarding the RESD and its functionality, see PACKAGE TECHNICAL SPECIFICATION.

9. PNEUMATIC / HYDRAULIC INTERFACE

9.1. Interface

9.1.1. Essential air supply shall be made available by the FPU to the PACKAGE UNITS in which it is necessary and to the RIO Panels (where such panel exists, see section 3.1.10). For details about specifications for service air, see I-ET-3010.2Q-1200-800-P4X-001 - INSTRUMENTATION ADDITIONAL TECHNICAL REQUIREMENTS and I-RL-3010.2Q-1200-940-P4X-001 - GENERAL SPECIFICATION FOR AVAILABLE UTILITIES.

9.1.2. In case a Topsides PACKAGE UNIT needs hydraulic fluid to power an internal component, Buyer shall be consulted beforehand. For details about specifications for hydraulic fluid, see I-ET-3010.00-5139-390-P4X-001 - HYDRAULIC POWER UNIT (HPU) FOR TOPSIDES VALVES.

9.1.3. Service air tubing diameters and hydraulic fluid tubing diameters shall be defined during Detailing Engineering Design.

10. APPENDIX I – PACKAGE CLASSIFICATION

10.1. Packages classification

10.1.1. The classification of each package according to the definition from I-ET-3010.00-1200-800-P4X-002 – AUTOMATION, CONTROL AND INSTRUMENTATION ON PACKAGE UNITS. Electrical system packages are not listed in this appendix. See section 1.1.3 for more details. Other packages not specifically defined in this appendix are considered as P0.

TAG	NAME	TYPE	UCP TAG	LOCATION
AC-5252001A/C	AIR HANDLING UNIT - AUTOMATION AND ELECTRICAL PANELS ROOM	P1	PN-AC-5252001A/C	TOPSIDES
AC-5252002A/C	AIR HANDLING UNIT - TOPSIDE NORMAL PANELS ROOM 4	P1	PN-AC-5252002A/C	TOPSIDES
AC-5252003A/B	AIR HANDLING UNIT - LABORATORY	P1	PN-AC-5252003A/B	TOPSIDES
AC-5252004A/B	AIR HANDLING UNIT - GENERATORS CONTROL PANELS ROOM	P1	PN-AC-5252004A/B	TOPSIDES
AC-5252005A/B	AIR HANDLING UNIT - GENERATORS POWER PANELS ROOM	P1	PN-AC-5252005A/B	TOPSIDES
AC-5252006A/B	AIR HANDLING UNIT - TOPSIDE NORMAL PANELS ROOM 1	P1	PN-AC-5252006A/B	TOPSIDES

TAG	NAME	TYPE	UCP TAG	LOCATION
AC-5252008A/D	AIR HANDLING UNIT - TOPSIDE NORMAL PANELS ROOM 3	P1	PN-AC-5252008A/D	TOPSIDES
AC-5252011A/B	AIR HANDLING UNIT - FRESH AIR LABORATORY OFFICES	P1	PN-AC-5252011A/B	TOPSIDES
AC-5252501A/B	AIR HANDLING UNIT - HULL NORMAL PANELS ROOMS	P1	PN-AC-5252501A/B	HULL
AC-5252502A/B	AIR HANDLING UNIT - ESSENTIAL PANEL ROOM	P1	PN-AC-5252502A/B	HULL
AC-5252503A/B	SELF- CONTAINED UNIT - FWD PANELS ROOM	P1	PN-AC-5252503A/B	HULL
AC-5252528A/B	AIR HANDLING UNIT - MESSROOM	P1	PN-AC-5252528A/B	HULL
AC-5252529A/B	AIR HANDLING UNIT - GALLEY	P1	PN-AC-5252529A/B	HULL
AC-5252530	AIR HANDLING UNIT - CCR AUTOM. & TBM ROOM / SUPROD / CCR OPER. AMB / EMERG. RESP. CENTER	P1	PN-AC-5252530	HULL
AC-5252531	AIR HANDLING UNIT - TELECOM CCR / CCR EQUIP. AMBIENCE	P1	PN-AC-5252531	HULL
AC-5252612	AIR HANDLING UNIT - TELECOM CONTROL ROOM/ TELECOM PANEL ROOM	P1	PN-AC-5252612	HULL
AC-5252613A/C	AIR HANDLING UNIT - MAIN DECK, A, B, C, D, E, F DECKS	P1	PN-AC-5252613A/C	HULL
AC-5252614A/B	AIR HANDLING UNIT - TREATMENT ROOM, INFIRMARY F DECK	P1	PN-AC-5252614A/B	HULL
AC-5252615A/B	AIR HANDLING UNIT - LAUNDRY AREAS	P1	PN-AC-5252615A/B	HULL
AC-5252619	SELF-CONTAINED UNIT - CCR AUTOM. & TBM ROOM / SUPROD / CCR OPER. AMB / EMERG. RESP. CENTER	P1	PN-AC-5252619	HULL
AC-5252620	SELF-CONTAINED UNIT - TELECOM CCR / CCR EQUIP. AMBIENCE	P1	PN-AC-5252620	HULL
AC-5252623	SELF-CONTAINED UNIT - TELECOM CONTROL ROOM/ TELECOM PANEL ROOM	P1	PN-AC-5252623	HULL
AC-5252012A/D	AIR HANDLING UNIT - ELECTRICAL PANELS ROOM 1	P1	PN-AC-5252012A/D	TOPSIDES
AC-5252013A/F	AIR HANDLING UNIT - ELECTRICAL PANELS ROOM 2 CONTROL PANEL	P1	PN-AC-5252013A/F	TOPSIDES
AC-5252014A/B	AIR HANDLING UNIT - AUTOMATION PANELS ROOM CONTROL PANEL	P1	PN-AC-5252014A/B	TOPSIDES
B-1240001 B-1240002 B-1240003 B-1240004	SBMS	P2SC	PN-B-1240001-01 PN-B-1240002-01 PN-B-1240003-01 PN-B-1240004-01	TOPSIDES
B-1243001 B-1243002	BCSS	P2SC	PN-1243001	TOPSIDES
B-1251002A/C	INJECTION WATER MAIN PUMP	P2	PN-B-1251002A/C	TOPSIDES
B-5133001A/C	WELL SERVICE PUMP	P1	PN-B-5133001A/C	TOPSIDES
B-5252501A/D B-5252502A/B B-5252503A/B PN-UR-5252501A/D	CHILLED WATER SYSTEM	P2	PN-UR-5252501A/D-01	HULL
B-Z-5424501-A/B	FOAM CONCENTRATE PUMP	P1	PN-B-Z-5424501-A/B	HULL
B-Z-5424505-A/B	FOAM CONCENTRATE PUMP	P1	PN-B-Z-5424505-A/B	HULL
GD-5266501	FIXED BOOM CRANE	P1	PN-GD-5266501	HULL
GD-5266502	FIXED BOOM CRANE	P1	PN-GD-5266502	HULL
GG-5241501A/B	INERT GAS GENERATOR	P2S	PN-GG-5241501A/B-02	HULL

TAG	NAME	TYPE	UCP TAG	LOCATION
GN-Z-1359502-01	OFFLOADING HOSE REEL (AFT)	P1	PN-GN-Z-1359502-01	HULL
GN-Z-1359502-02	HAWSER REEL (AFT)	P1	PN-GN-Z-1359502-02	HULL
GN-Z-1359506-01	OFFLOADING HOSE REEL (FWD)	P1	PN-GN-Z-1359506-01	HULL
GN-Z-1359506-02	HAWSER REEL (FWD)	P1	PN-GN-Z-1359506-02	HULL
PN-1210001A/B	SUBSEA MASTER CONTROL STATION	P2SC	PN-1210001A/B	TOPSIDES
PN-1210002A/B	SUBSEA MASTER CONTROL STATION	P2SC	PN-1210002A/B	TOPSIDES
PN-1210003A/B	SUBSEA MASTER CONTROL STATION	P2SC	PN-1210003A/B	TOPSIDES
PN-1210004A/B	SUBSEA MASTER CONTROL STATION	P2SC	PN-1210004A/B	TOPSIDES
PN-1210005A/B	SUBSEA MASTER CONTROL STATION	P2SC	PN-1210005A/B	TOPSIDES
PN-1210006A/B	SUBSEA MASTER CONTROL STATION	P2SC	PN-1210006A/B	TOPSIDES
PN-1210007A/B	SUBSEA MASTER CONTROL STATION	P2SC	PN-1210007A/B	TOPSIDES
PN-1210008A/B	SUBSEA MASTER CONTROL STATION	P2SC	PN-1210008A/B	TOPSIDES
PN-1210009A/B	SUBSEA MASTER CONTROL STATION	P2SC	PN-1210009A/B	TOPSIDES
PN-1210011A/F	DHSV-E PANEL	P2C	PN-1210011A/F	TOPSIDES
PN-1223001	FLOW METERING SYSTEM PANEL	P2S	PN-1223001	TOPSIDES
PN-1223005	MULTIPHASE FLOW METERING SYSTEM PANEL	P2	PN-1223005	TOPSIDES
PN-1358501	REMOTE ULLAGE, PRESSURE AND TEMPERATURE MONITORING PANEL	P2S	PN-1358501	HULL
PN-1358504	HIGH LEVEL OVERFILL SYSTEM PANEL	P2S	PN-1358504	HULL
PN-5412001	FLARE AND SLOP VESSEL GAS RECOVERY SYSTEM RELIEF PANEL	P2	PN-5412001	TOPSIDES
PN-5524001A/B	SUBSEA INTERFACE PANEL	P2	PN-5524001A/B	TOPSIDES
PN-5525501	HC SAMPLING SYSTEM PANEL	P2	PN-5525501	HULL
PN-5537501	PRS - POSITIONING SYSTEM	P2S	PN-5537501	HULL
SAO-5330501	OILY WATER SEPARATOR	P1	PN-SAO-5330501	HULL
SC-5133501A/C	DIESEL OIL PURIFIER	P1	PN-SC-5133501A/C	HULL
SC-Z-5336501-A/B	SLOP TREATMENT CENTRIFUGE	P1	PN-SC-Z-5336501-A/B	HULL
TA-5412001	FLARE IGNITION AND MONITORING PANEL	P2	PN-TA-5412001-01	TOPSIDES
TA-5412001	FLARE TURNDOWN CONTROL SYSTEM	P2	PN-TA-5412001-02	TOPSIDES
TG-5262001	SEA WATER DUMP LINE TURBOGENERATOR	P2	PN-TG-5262001	TOPSIDES
UA-5134501A/C	AIR DRYING UNIT	P2	PN-UA-5134501A/C	HULL
UB-5420501A/D	DIESEL HYDRAULIC FIRE WATER PUMPING UNIT	P2	PN-UB-5420501A/D	HULL
UC-1223001	SETTLING TANKS GAS RECOVERY COMPRESSION UNIT	P2	PN-UC-1223001	TOPSIDES
UC-1225001A/B	VAPOR RECOVERY UNIT	P2S	PN-UC-1225001A/B-01	TOPSIDES
UC-1231001A/C	MAIN COMPRESSION UNIT	P2S	PN-UC-1231001A/C-01	TOPSIDES
UC-1231002A/C	EXPORTATION GAS COMPRESSION UNIT	P2S	PN-UC-1231002A/C-01	TOPSIDES
UC-5134501A/B	INSTRUMENT / SERVICE AIR COMPRESSION UNIT	P2	PN-UC-5134501A/B-01	HULL
UC-5134502A/B	INSTRUMENT / SERVICE AIR COMPRESSION UNIT	P2	PN-UC-5134502A/B-01	HULL
UC-5138501A/B	AUXILIARY GENERATOR START UP AIR COMPRESSOR UNIT	P1	PN-UC-5138501A/B	HULL

TAG	NAME	TYPE	UCP TAG	LOCATION
UC-5412001	FLARE/SLOP VESSEL GAS RECOVERY COMPRESSION UNIT	P2	PN-UC-5412001-01	TOPSIDES
UC-UG-5261501	EMERGENCY GENERATOR START UP AIR COMPRESSOR UNIT	P1	PN-UC-UG-5261501	HULL
UD-5122001A/C	FRESH WATER MAKER	P1	PN-UD-5122001A/C	TOPSIDES
UD-5122002A/B	FRESH WATER MAKER FOR OIL DILUTION	P1	PN-UD-5122002A/B-01	TOPSIDES
UE-5121501	SEA WATER ELECTROCHLORINATION UNIT	P1	PN-UE-5121501	HULL
UG-5132001	COMBINED CYCLE/ COGENERATION PLANT	P2S	PN-UG-5132001-01 PN-TG-5147001A/D-01 PN-TG-5147002-01	TOPSIDES
UH-1210001	HYDRAULIC POWER UNIT FOR SUBSEA SYSTEMS	P2	PN-UH-1210001	TOPSIDES
UH-1359506A/B	OFFLOADING HYDRAULIC POWER UNIT	P2	PN-UH-1359506A/B	HULL
UH-5139001	HPU FOR TOPSIDES VALVES	P2	PN-UH-5139001	TOPSIDES
UH-5139501	HYDRAULIC VALVES REMOCON UNIT (HULL SYSTEMS)	P2	PN-UH-5139501	HULL
UH-5139502A/B	HYDRAULIC POWER UNIT FOR SUBMERGED PUMPS	P2S	PN-UH-5139502A/B-01	HULL
UH-5139505A/B	HYDRAULIC POWER UNIT FOR MOORING SYSTEM	P1	PN-UH-5139505A/B	HULL
UH-5268501	HYDRAULIC POWER UNIT FOR MAIN AND AUXILIARY PULL-IN/PULL-OUT WINCHES	P1	PN-UH-5268501	HULL
UH-5268502	HYDRAULIC POWER UNIT FOR PULL-IN/PULL-OUT TROLLEY	P1	PN-UH-5268502	HULL
UM-5121501A/B	POTABLE WATER MAKER	P1	PN-UM-5121501A/B	HULL
UR-5252501A/D	WATER CHILLER	P2	PN-UR-5252501A/D	HULL
UT-1251001	ULTRAFILTRATION UNIT	P2	PN-UT-1251001	TOPSIDES
UT-1251002	SULPHATE REMOVAL UNIT	P2	PN-UT-1251002-01	TOPSIDES
Z-1227001	TEG REGENERATION UNIT	P2C	PN-Z-1227001	TOPSIDES
Z-1235001	AMINE REGENERATION UNIT	P2	PN-Z-1235001	TOPSIDES
Z-1251001A/C	UV STERILIZER UNIT	P1	PN-Z-1251001A/C	TOPSIDES
Z-1350001	STRUCTURAL TANKS GAS RECOVERY UNIT	P2	PN-Z-1350001 PN-5525511	TOPSIDES
Z-5100501A/B	DIESEL OIL AND FRESH WATER HOSE REELS	P1	PN-Z-5100501A/B	HULL
Z-5115501	FRESH WATER HYDROPHORE UNIT	P1	PN-Z-5115501	HULL
Z-5121501A/B	ULTRAVIOLET STERILIZER UNIT	P1	PN-Z-5121501A/B	HULL
Z-5122001	FRESH WATER CHLORINATION UNIT	P1	PN-Z-5122001	TOPSIDES
Z-5125501	CALORIFIER UNIT	P1	PN-Z-5125501-A/B	HULL
Z-5139502A/G	CHAIN STOPPER AFT PORTSIDE	P2	PN-Z-5139502A/G	HULL
Z-5139503A/G	CHAIN STOPPER AFT STARBOARD	P2	PN-Z-5139503A/G	HULL
Z-5139504A/G	CHAIN STOPPER FWD STARBOARD	P2	PN-Z-5139504A/G	HULL
Z-5139505A/G	CHAIN STOPPER FWD PORTSIDE	P2	PN-Z-5139505A/G	HULL
Z-5241001A/B	NITROGEN GENERATION UNIT	P2	PN-Z-5241001A/B	TOPSIDES
Z-5241002A/B	NITROGEN GENERATION UNIT FOR FLARE	P2	PN-Z-5241002A/B	TOPSIDES
Z-5241003A/B	HIGH PURITY NITROGEN GENERATION UNIT	P2	PN-Z-5241003A/B	TOPSIDES
Z-5260501A/B	MARINE GROWTH PREVENTION SYSTEM	P2	PN-Z-5260501A/B	HULL

TAG	NAME	TYPE	UCP TAG	LOCATION
Z-5312502A/B	SEWAGE TREATMENT UNIT	P1	PN-Z-5312502A/B	HULL
Z-UT-1251003	VACUUM SYSTEM	P2	PN-Z-UT-1251003	TOPSIDES

10.1.2. PN-UR-5252501A/D-01 - CHILLED WATER SYSTEM CONTROL PANEL is the "independent" panel mentioned in section "7.7.9 Chilled water pumps" of I-ET-3010.2Q-5250-300-P4X-001 – HVAC SYSTEM - HVAC TECHNICAL SPECIFICATIONS and controls:

I. Pumps B-5252501A/D – CHILLED WATER CIRCULATION PUMP (PRIMARY SYSTEM);

II. Pumps B-5252502A/B – CHILLED WATER SECONDARY SYSTEM CIRCULATION PUMP FOR TOPSIDE;

III. Pumps B-5252503A/B – CHILLED WATER SECONDARY SYSTEM CIRCULATION PUMP FOR ACCOMMODATION;

IV. PN-UR-5252501A/D – WATER CHILLER CONTROL PANEL. The individual panel of each UR is, at least, started/stopped by PN-UR-5252501A/D-01. Other signals may also be exchanged by them, at UR-5252501A/D – CHILLED WATER UNIT Supplier discretion;

V. Associated instrumentation with each UR and each pump (i.e. most of the instrumentation of drawing I-DE-3010.2Q-5252-944-P4X-001 – HVAC SYSTEM - CHILLED WATER GENERATION – P&ID.

10.1.2.1. It consists of a single panel (dimensions to be defined during Detail Engineering Design) to control all aforementioned equipment. In other words, this additional panel is not per pump, but instead a single panel to "orchestrate" all pumps and the refrigeration units.

10.1.2.2. PN-UR-5252501A/D-01 shall communicate with PN-UR-5252501A/D - WATER CHILLER CONTROL PANEL via network and/or hardwired signals, so that UR-5252501A/D, B-5252501A/D, B-5252502A/B, and B-5252503A/B are each operating in conjunction with each other.

10.1.2.3. This panel shall be placed at the same room as the HVAC equipment it communicates with / controls (same room as UR-5252501A/D, pumps B-5252501A/D, pumps B-5252502A/B and B-5252503A/B). It shall be adequate to the operation conditions of the room.