	<b>TECHNICAL SPECIFICATION</b>		Nº: I-ET-3010.00-1200-859-P4X-001
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	JOB:		
	AREA:		
SRGE	TITLE: <b>AUTOMATION REQUIREMENTS FOR CORROSION MONITORING SYSTEM (CMS)</b>		NP-1 ESUP

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## 1 INTRODUCTION

### 1.1 Objective

1.1.1 This specification describes the minimum requirements for the supply of the Corrosion Monitoring System, to be installed at the UNIT, covering: all equipment, materials, software, interconnection, documentation, configuration, tests, installation and training.

### 1.2 Definitions

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

### 1.3 Abbreviations

AEPR	Automation & Electrical Panel Room
CMS	Corrosion Monitoring System
CSS	Control and Safety System
ER	Electrical Resistance
FAT	Factory Acceptance Test
FSM	Field Signature Method
IACS	International Association of Classification Societies
IP	Ingress Protection Ratings
LPR	Linear Polarization Resistance
OLE	Object Linking and Embedding
OPC	Open Platform Communications
SAT	Site Acceptance Test
SIT	Site Integration Test
SOS	Supervision and Operation System
UI	Unified Interpretation

## 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 ATMOSPHERES
IEC	60529	DEGREES OF PROTECTION PROVIDED BY ENCLOSURES (IP CODE)
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. UIs issued by IACS must be implemented since these are to be required by classification society.

#### 2.1.3 Brazilian Codes and Standard

#### INMETRO – INSTITUTO NACIONAL DE METROLOGIA, NORMALIZAÇÃO E QUALIDADE INDUSTRIAL

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

#### 2.2.1 Project Documents

I-ET-3010.00-5140-700-P4X-003	ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS
I-ET-3010.00-5520-861-P4X-002	SUPERVISION AND OPERATION SYSTEM - SOS
I-ET-3010.00-5520-888-P4X-001	AUTOMATION PANELS
I-ET-3010.00-1200-940-P4X-002	GENERAL TECHNICAL TERMS
I-ET-3010.00-1200-940-P4X-006	CORROSION MONITORING SYSTEM

### 3 ENVIRONMENTAL AND OPERATION CONDITIONS

#### 3.1 General

- 3.1.1 CMS equipment shall be installed at different classification areas and at different environment conditions, and shall be subject to electromagnetic and radio-frequency interferences, vibration and/or mechanical shocks.
- 3.1.2 All materials and equipment proper to be used in hazardous areas, shall have conformity certificates complying with **PORTARIA INMETRO Nº 115 DE 21/MARÇO/2022 and its annexes**, and shall be approved by Classification Society.
- 3.1.3 For operating and environmental conditions, refer to INSTRUMENTATION ADDITIONAL TECHNICAL REQUIREMENTS project documentation.

### 4 DESIGN REQUIREMENTS

#### 4.1 General

- 4.1.1 The system consists of corrosion probes, sensor pins or transducers with their electronics and systems of communication and CORROSION MONITORING SYSTEM PANEL.
- 4.1.2 The monitoring station shall exhibit all values measures in the graphic format.
- 4.1.3 All components of the CMS shall be supplied by one single manufacturer for probes and for non-intrusive devices.
- 4.1.4 CMS shall be powered according to I-ET-3010.00-5140-700-P4X-003– ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS. Conversion and distribution of the different power supplies inside the panel shall be foreseen, including where necessary an AC/DC stabilized power supply unit for the cabinet internal distribution of 24 Vdc.
- 4.1.5 The corrosion transmitters shall always be connected through communication network from the field to the CORROSION MONITORING SYSTEM PANEL for on-line and continuous monitoring corrosion. The field connection shall allow up to 32 (thirty two) transmitters in the same network through a proprietary network standard through TIA/EIA-485 (RS-485).
- 4.1.6 The communication network shall allow connecting ER (Electrical Resistance) transmitters, LPR (Linear Polarization Resistance), Galvanic, non-intrusive transmitters (data-logger) at the signal cables to reduce quantity of cables at field in accordance with the architecture indicated in the item 4.2.1 of this specification. Other type of transmitters shall not be directly connected into this network to the CORROSION MONITORING SYSTEM PANEL. These

transmitters shall be installed in non-classified areas. A wi-fi communication network could be acceptable under previous PETROBRAS approval.

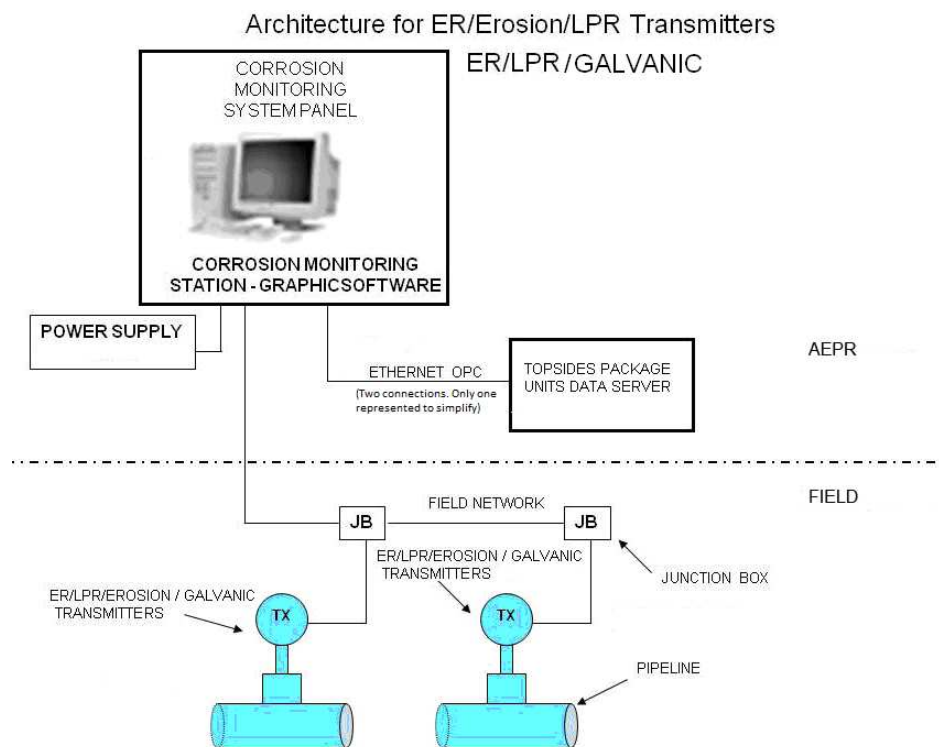
4.1.7 The system shall supply energy to the transmitters and communicate with them. Batteries shall have 4 years lifespan in normal operation of the equipment in case of power failure or if external power supply is not available shall be supplied for non-intrusive devices.

4.1.8 The remote communication between the CORROSION MONITORING SYSTEM PANEL and the station for corrosion monitoring shall be implemented by proprietary network.

4.1.9 The communication between the CORROSION MONITORING SYSTEM PANEL and the Topsides SOS Servers Panel shall be done via Gigabit Ethernet (IEEE 802.3ab) through "Package Unit LAN". Two communication drivers (one per server) OPC TCP/IP (certified as OPC compliant by OPC Foundation) shall be supplied. For more details refer to I-ET-3010.00-5520-861-P4X-002 SUPERVISION AND OPERATION SYSTEM - SOS

**4.2 System Architecture**

4.2.1 The basic architecture of the CMS is described in the following figure. The technical proposal for the CMS shall include the following structure to satisfy the requirements of this specification.





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4.2.2 For non-intrusive devices, the junction box shall be interconnected to the transmitter (data-logger), which shall connect to the sensors. The number of transmitters shall be reduced to a minimum.

4.2.3 CMS shall be a system with field-proven technologies on offshore units.

4.2.4 Another type of architecture shall be presented and is subjected to PETROBRAS approval.

### 4.3 Corrosion Sensors and Transmitters

4.3.1 The platform shall be equipped with corrosion probes according to I-ET-3010.00-1200-940-P4X-006 - CORROSION MONITORING SYSTEM mechanical discipline documentation.

4.3.2 The LPR probes shall be mounted with 2 (two) electrodes.

4.3.3 The ER and Erosion sensors shall be high resolution type.

4.3.4 The model (ER, Galvanic, LPR or non-intrusive) shall be defined in CORROSION MONITORING SYSTEM mechanical discipline documentation.

### 4.4 Corrosion Monitoring System Panel

4.4.1 The CORROSION MONITORING SYSTEM PANEL shall be designed as a cabinet with front and rear access door and adequate to for installation in AEPR.

4.4.2 The CORROSION MONITORING SYSTEM PANEL shall be based on digital electronic and supply interface with the corrosion transmitters and with the Station of Corrosion Monitoring.

4.4.3 The CORROSION MONITORING SYSTEM PANEL shall be IP-22 as a minimum, according to IEC 60529.

### 4.5 Station for Corrosion Monitoring

4.5.1 The Station for Corrosion Monitoring shall be supplied to permit a good interface with the CMS. It shall be installed inside the CORROSION MONITORING SYSTEM PANEL.

4.5.2 With the objective to guarantee compatibility, the station shall have the software basic configuration of the operation stations of SOS HMIs according to described in I-ET-3010.00-5520-861-P4X-002 SUPERVISION AND OPERATION SYSTEM – SOS.

4.5.3 The Main software functions of the transmitters connected through the field network shall be as below. The CORROSION MONITORING SYSTEM PANEL shall have this functions configured in its interface.

- Graphic representation of instruments and probes;



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- Graphics of the corrosion rate and the accumulated corrosion;
- For non-intrusive devices of section measurement, graphics and corrosion analysis showing localized, generalized and erosion.
- Supports ER, Galvanic and LPR probes data; supports sensor pins/transducers data;
- Register each corrosion data set by an alpha-numeric code which can be a tag number, production numbers, types etc.;
- Calculate the mean of corrosion rate from any selected set of corrosion data in the time range selected by the operator;
- Filter corrosion data eliminating spurious entries selecting an specific interval from the data stored (those considered as by the operator);
- Plot corrosion data at the time range selected by the operator.

**4.6 Accessories and Tools**

4.6.1 Enclosures and Junction Boxes shall have at least protection level IP-56.

4.6.2 Junction Boxes shall be constructed in AISI 316 stainless steel.

4.6.3 Any special connectors between the corrosion transmitters and probes shall be supplied. Transmitters and probes shall be connected by a cable as short as possible to minimize noises.

4.6.4 Spare parts shall be supplied in suitable quantities for system maintenance up to 5 years.

**4.7 Cabinet Project**

4.7.1 The cabinets shall be in accordance with I-ET-3010.00-5520-888-P4X-001  
AUTOMATION PANELS

**4.8 Services**

4.8.1 Along with CMS, it shall be supplied, in minimum, the following services:

- Validation Test of project
- Pre commissioning;
- Commissioning;
- FAT
- SAT;
- SIT;



## 5 DOCUMENTATION

### 5.1 General

5.1.1 Complete information of the CMS, covering all devices and services, shall be supplied with the proposal, for approval, and for final acceptance.

5.1.2 There shall be supplied with the proposal at least the following technical documents:

- Technical specifications, comprising: system, equipment, accessories, cables, materials and software;
- Data-sheets and brochures for each equipment;
- All equipment and installation data including: material list, equipment list, spare part list, power consumption, weight, software manual, panel lay-out, system lay-out, etc;
- Complete description of services, training courses, tests etc.

5.1.3 There shall be supplied for approval at least the following technical documents:

- Technical specifications, comprising: system, equipment, accessories, cables, materials and software;
- Data-sheets and drawings for each equipment;
- Installation drawings including general arrangement, electrical diagrams, wiring diagrams, cable list, material list, equipment list;
- Test procedures, training course program, services schedule;
- Programming tools, system reports, system diagnosis etc.

5.1.4 Complete CMS certified documentation, including operation manual, installation manual and maintenance manual shall be provided, in the number of CD copies requested at BID documents, including all programming and configurations software.