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NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY
NATIONAL IRANIAN OIL ENGINEERING
& CONSTRUCTION COMPANY

NIOEC SP

NIOEC SPECIFICATION FOR PROGRAMMABLE LOGIC CONTROLLERS (PLC)

THIRD EDITION
DECEMBER 2017

THIS STANDARD IS THE PROPERTY OF NATIONAL IRANIAN OIL ENGINEERING & CONSTRUCTION COMPANY. IT IS CONFIDENTIAL AND ALL RIGHTS RESERVED TO THE OWNER. NEITHER WHOLE NOR ANY PART OF THIS DOCUMENT MAY BE DISCLOSED TO ANY THIRD PARTY, REPRODUCED, STORED IN ANY RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE PRIOR WRITTEN CONSENT OF THE NATIONAL IRANIAN OIL ENGINEERING & CONSTRUCTION COMPANY.

IN THE NAME OF GOD**FOREWORD**

By their very nature, technical Specifications are continuously subject to modifications and revisions. To strengthen their merit and usefulness, continuous improvements, addendum, deletion of disparate information and consequently provision of updated revisions are to be made in order to ascertain that such Specifications meet the current requirements, inclusive of Iranian Petroleum Standards (IPS) and the recognized and acceptable national and international Standards, as well as the optimal codes and practices based on the accumulated in-house know-how and plant knowledge and experiences.

However, in reality, due to several reasons, not to mention the complexity of the matter, the ultimate goal of continuous direct embedment of the required changes on the relevant Specifications may be far reaching. Therefore, in the interim periods between the officially issued revisions, the required changes will appear in other documents related to the engineering and design work of the ongoing projects.

In response to the initiative of the Design and Engineering Directorate, and considering that the task of the execution of several important and mega projects for the realization of the new oil refineries, pipelines and oil terminals as well as improvements of the existing facilities, has been assigned to NIOEC, it was decided to update the NIOEC Specifications and to issue new official revisions.

The Design and Engineering Directorate was itself entrusted to carry out this important task, and as such by forming several special technical committees, working in close co-operation and cohesion and sharing their expertise and knowledge, the updated and revised NIOEC Specifications were successfully prepared and complied.

These Specifications are intended to be used for Oil Refineries, Distribution Depots, Oil Terminals, Pipelines and Pump Stations within NIOEC's projects, and have been proven to be of high value for such purposes. It must however be appreciated that these Specifications represent the minimum requirements and should in no way be interpreted as a restriction on the use of better procedures, engineering and design practices or materials.

We encourage and highly appreciate the users and other clear sighted and experts to send their comments on the Specifications to the Design and Engineering Director of NIOEC for evaluation and approval.

REVISION INDEX

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NOTES:

- 1) THIS SHEET IS A RECORD OF ALL REVISIONS TO THIS SPECIFICATION.
- 2) WHEN APPROVED EACH REVISION SHALL BE CONSIDERED AS A PART OF THE ORIGINAL DOCUMENT.
- 3) NUMBER OF PAGES EXCLUDES THIS SHEET AND THE COVER SHEET.

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2	DECEMBER 2017	A.H.BEHRADFAR	G.R.MOHSENI	M.R.FARZAM	M.KARGARNAJAFI
1	DECEMBER 2009	INST. DISC.	KHATIB	FARZAM	SAJEDI
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1. SCOPE

This specification defines NIOEC's minimum requirements for the design and installation of Logic Systems, which will be based on Programmable Logic Controller.

Logic Systems addresses in this document are classified as follows:

1.1. Interlock System

Systems, which will be used to perform interlocks and will be referred to as "Interlock System". In plants, where Process Control System is employed, this function is normally incorporated within the PCS.

1.2. Logic Control System

Systems which will be used to perform repetitive, batch type sequencing of valves and controllers and provide process control and automation in plants where other process control systems are not employed due to small size of plant and the economies involved, and will be referred to as "Logic Control System".

Deviations from this specification will only be permitted on obtaining written approval from NIOEC.

Resolution on cases not explicitly stipulated in this Specification, or on cases where conflicts may arise among the requirements of the referenced IOPTC (Iranian Oil Pipeline and Telecommunications Company) Specifications and the international standards, shall be made through written consent and approval of NIOEC.

2. REFERENCES

The following standards, codes, and specifications, to the extent specified hereinafter, shall constitute a part of this NIOEC Specification. Latest edition of the undated referenced documents and the cited edition of the dated references shall apply. The applicability of changes made to the dated references, after the cited date shall be mutually agreed upon between NIOEC and the Vendor /Contractor.

BSI (BRITISH STANDARDS INSTITUTION)

BS 381C, shade 217	"Colors for identifications, coding and special purposes"
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EU (EUROPEAN UNION)

Directive 2014/30/EU	"European Union EMC Directive"
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IEC (INTERNATIONAL ELECTRO-TECHNICAL COMMISSION)

IEC 60068	"Basic Environmental Testing Procedures"
IEC 60332	"Test On Electric Cables under Fire Conditions"
IEC 60529	"Classification of Degree of Protection Provided By Enclosures"
IEC-60605	"Equipment Reliability Testing"
IEC 60751	"Industrial Platinum Resistance Thermometer Sensors"

IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4	“Electromagnetic Compatibility (EMC)”
IEC 61131-2	“Programmable Controllers-Part 2: Equipment Requirements and Tests”
IEC 61131-3	"Programmable Controllers – Part 3: Programming Languages"
IEC 61131-5	“Programmable controllers - Part 5: Communications”
IEC 61158-2	“Foundation Field Bus Standard for Use in Industrial Control Systems – Part 2 Physical Layer Specification and Service Definition”
IEC 61499-1, IEC 61499-2	“Function Blocks For Industrial Process Measurement and Control Systems”
IEC 61511	"Functional safety - Safety instrumented systems for the process industry sector"
IEC TR 62380	“Reliability Data Handbook– Universal Model for Reliability Prediction of Electronics Components, PCBs and Equipment”
IEEE (INSTITUTE OF ELECTRICAL & ELECTRONICS ENGINEERS)	
IEEE 802.3	"Local Area Network Specific Requirements - Part 3: Carrier Sense Multiple access with Collision Detecting (CSMA/CD) Access Method and Physical Layer Specification"
IEEE C37.90.1	“Surge Withstand Capability (SWC) Tests for Relay Systems Associated with Electric Power Apparatus”
ISA (INTERNATIONAL SOCIETY OF AUTOMATION)	
ISA RP 55-1	“Hardware Testing Of Digital Process Computers”
ISA - S 5.1	“Instrument Symbols and Identifications”
ISA - S 5.2	“Binary Logic Diagrams For Process Operations”
ISA - S 5.3	“Graphic Symbols For Distributed Control/Shared Display Instrumentation, Logic and Computer Systems”
ISA - S 5.4	“Instrument Loop Diagrams”
ISA- S 18.1	“Annunciator Sequences and Specification”
ISA- S 50.1	“Compatibility of Analogue Signals for Electronic Industrial Process Instruments”
ISA- S 84	"Application of Safety Instrumented Systems (SIS) for the Process Industry"
ISO (INTERNATIONAL STANDARD ORGANISATION)	
ISO 9000	“Quality Management Systems - Fundamentals and Vocabulary”