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امور تدوین استانداردها

IGS

مشخصات فنی خرید

تابلوهای برق فشار ضعیف

Low Voltage Switch Gears



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باسلام،

به استحضار می‌رساند در جلسه ۲۰۵۹ مورخ ۱۴۰۳/۰۳/۰۶ هیأت مدیره،
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Foreword

This standard specification is intended to be mainly used by N.I.G.C. and contractors, and has been prepared base on interpretation of recognized standards and technical documents, as well as knowledge, backgrounds and experiences in gas industries at national and international levels.

Iranian Gas Specification (IGS) are prepared, reviewed and amended by technical standard committees within NIGC standardization division of research and technology management and submitted to "the standards council of NIGC" for approval.

IGSs are subjected to revision, amendment or withdrawal, if required, and thus the latest edition of IGS shall be checked / inquired by NIGC'S users.

This standard must not be modified or altered by NIGC employees or its contractors. Any deviation or conflicts between this specification and other applicable standards, codes, procedure or well-known manufacturer's specifications must be resolved in writing by the user or its representative through Manager, Engineering Department or standardization division of NIGC.

The technical standard committee welcomes comments and feedbacks from concerned or interested corporate and individuals about this standard, and may revise this document accordingly based on the received feedbacks.

General Definitions

Throughout this standard the following definitions, where applicable, should be followed:

- 1- "STANDARDIZATION DIV." is organized to deal with all aspects of industry standards in NIGC. Therefore, all enquiries for clarification or amendments are requested to be directed to mentioned division.
- 2- "COMPANY": refers to National Iranian Gas Company (NIGC).
- 3- "SUPPLIER": refers to a firm who will supply the service, equipment or material to IGS specification whether as the prime producer or manufacturer or a trading firm.
- 4- "SHALL ": is used where a provision is mandatory.
- 5- "SHOULD": is used where a provision is advised only.
- 6- "MAY": is used where a provision is completely discretionary.

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Guidance for Use of This Specification:

The amendments/ supplements IPS-M-EL-143(3)¹ low voltage switchgear and control gear given in this specification are directly equivalent sections or clauses in IPS-M-EL-143(3) all other Paragraphs which are not amended by this supplementary shall remain valid as Written. The following annotations, as specified hereunder, have been used at the Beginning of each paragraph to indicate the type of change made to that paragraph of IPS-M-EL-143(3).

Sub. (Substitution) "The paragraph in IPS-M-EL-143(3) low voltage switchgear and controlgear shall be deleted and replaced by the new paragraph in this supplementary"

Del. (Deletion) "The paragraph in IPS-M-EL-143(3) low voltage switchgear and controlgear shall be deleted without any replacement"

Add. (Addition) "The new paragraph with the new number shall be added to the relevant section of IPS-M-EL-143(3) low voltage switchgear and controlgear"

Mod. (Modification) "Part of the clause or paragraph in IPS-M-EL-143(3) low voltage switchgear and controlgear shall be modified and/or the new description and/or statement shall be added to that clause or paragraph as given in this supplementary".

¹ Third edition April 2019

1. Scope (Sub.)

This document applies to all projects in NIGC and covers the minimum requirements of low voltage AC switchgear and controlgear assemblies herein after referred to this specification as “low voltage switchgear” or “switchgear.”

3.10 Cubicle-Type Assembly (add)

enclosed assembly of the floor-standing type, which may comprise several sections, subsections or compartments.

3.11 Multi-Cubicle-Type Assembly (add)

combination of a number of mechanically joined cubicle-type assemblies

3.12 Desk-Type Assembly (add)

enclosed assembly with a horizontal or inclined control panel, or a combination of both, that incorporates control, measuring, and signaling apparatus, etc.

3.13 Box-Type Assembly (add)

enclosed assembly intended to be mounted on a vertical plane.

3.14 Multi-Box-Type Assembly (add)

combination of box-type assemblies mechanically joined together, with or without a common supporting frame, the electrical connections passing between two adjacent boxes through openings in the adjoining faces.

3.15 Wall-Mounted Surface Type Assembly (add)

assembly for installation on the surface of a wall

3.16 Wall-Mounted Recessed Type Assembly (add)

assembly for installation into a wall recess, where the enclosure does not support the portion of wall above

3.17 Floor-Standing Type Assembly (add)

assembly for installation on the floor

7.2.11 (mod)

A separate earth busbar made of hard drawn copper, rated for the maximum available earth fault current for one second (minimum acceptable cross section is 35 mm^2), shall run the entire length of the switchgear. Sufficient connection points with adequate terminating facilities shall be provided for terminating the cables screen and/or armors. The earth busbar shall be equipped with suitable connectors or bolts to be connected to earth copper conductors at each end.

The size of earth copper conductors shall be considered according to IPS-E-EL-100 and switchgear earthing system shall be according to IGS-E-EL- 030.

7.2.12 Main Circuits(add)

The phase, neutral and earth busbars shall be of hard or medium hard drawn, high conductivity copper.

The phase and neutral busbars shall be located in the top compartments of the switchboard or alternatively in the rear of the switchgear. In the latter case the design shall be such that access is provided to the busbar joints via a firmly secured cover that is at least IP 4X and has captive bolts/nuts.

The busbar system shall be accessible for construction and maintenance duties.

The neutral bar shall be insulated from earth and shall be extended to all compartments reached by the phase busbars.

The earth bar shall be located in the top or bottom compartments over the whole length of the switchboard and in all cable riser compartments (top to bottom) and shall be easily accessible. Sufficient connection points with adequate terminating facilities shall be provided for terminating the cable earth leads and the external earth connections. For the termination of external earth connections, the earth bar shall be provided with an M10 bolt near the bottom of each outgoing cable compartment and at the incoming panels.

In the busbar compartment the phase busbars shall be fully insulated. The insulation shall be type tested for withstanding at least an AC test voltage of 2 kV for a period of 60 s applied between the bar and an aluminium foil wrapped closely around the insulation over a length of at least one metre.

The distribution busbars (droppers, phase and neutral) shall have full segregation by insulated material. The insulation of the busbar joints and busbar to dropper joints shall be of equal quality to that of the main bars and shall be removable and easily replaceable for inspection. The comparative tracking index (CTI as defined in IEC 60112) of the insulating material used for the supports and insulation of the busbar and dropper systems shall be at least 300. The CTI for the insulation materials used for the components protected by the short-circuit protective devices in the outgoing functional units shall be at least 175.

The neutral busbar may be un-insulated in the busbar compartment but shall be insulated in all other compartments with the same insulation level as the phase conductors.

7.5 Arc protection (add)

Arc detection and mitigation devices shall be considered in cubicle type assembly Switchgear with short circuit level of 50KA and higher in accordance to IEC 60947-9-2.

7.6 Labels (add)

7.6.1 Cubicles, compartments, withdrawable units, circuit breakers and components shall be identified by labels with circuit numbers. Cubicle label designations (at front and rear of panel, on the fixed and removable parts, at the main and auxiliaries' cables terminations) shall be in accordance with the switchgear assembly single line diagram and associated data sheets.

7.6.2 Mimic one-line diagram shall be provided on request, indicating the busbars, incomers, bus-ties and main feeders.

Nameplates shall bear all identification in accordance with the reference standards. Language used for labelling shall be stated in the data sheet.

7.7 Circuit Breaker Padlock(add)

7.7.1 Incoming circuit for distribution boards Unless otherwise specified, a padlockable switching device shall be used.

7.7.2 Outgoing circuit breakers of distribution boards shall be fitted with padlocking device. Unless otherwise specified, circuit-breakers for distribution feeders shall be operated manually. If a tripping coil is required, it shall be of energized to trip type unless otherwise stated. Socket outlets circuits shall be fitted with a 30-mA earth leakage device

8.1.2 (mod)

In cubicle type assembly switchgear Circuit-breakers used as incomers and bus tie breaker shall be four poles with drawable air circuit breakers. Molded case circuit breakers (MCCB) should be used for such purpose with maximum rating/setting of 400 A.

8.1.8 (mod)

The short circuit capacity of circuit-breakers shall be appropriate to the specified system short circuit and power factor. The breaking and making short circuit capacities of circuit breakers as defined in IEC 60947-2 shall not be less than 50 kA and 105 kA rms symmetrical respectively.

For box type assembly and wall mounted assembly switchgear The minimum Ics shall be 10 kA unless otherwise agreed by the Principal.

Circuit breakers in a change-over supply duty should be withdrawable but shall at least have isolating facilities for maintenance and testing purposes.

If the circuit breakers require a separate DC supply for tripping and/or closing, then the Principal shall be consulted as to supplies available, if this information is not stated on the requisition sheet.

8. 4 Fuses (add)

8.4.1 High breaking capacity (HBC) type general purpose fuse links, utilisation category gG in accordance with IEC 60269-1 shall be used. The breaking capacity shall be equal to the short circuit rating of the busbar system with a minimum of 80 kA. The requisition shall indicate what type of fuse system in accordance with IEC 60269-2-1.

Material and equipment standard for low voltage switchgear and controlgear – Technical Specifications

**Third edition
April 2019**

Foreword

The Iranian Petroleum Standards (IPS) reflect the views of the Iranian Ministry of Petroleum and are intended for use in the oil and gas production facilities, oil refineries, chemical and petrochemical plants, gas handling and processing installations and other such facilities.

IPS is based on internationally acceptable standards and includes selections from the items stipulated in the referenced standards. They are also supplemented by additional requirements and/or modifications based on the experience acquired by the Iranian Petroleum Industry and the local market availability. The options which are not specified in the text of the standards are itemized in data sheet/s, so that, the user can select his appropriate preferences therein

The IPS standards are therefore expected to be sufficiently flexible so that the users can adapt these standards to their requirements. However, they may not cover every requirement of each project. For such cases, an addendum to IPS Standard shall be prepared by the user which elaborates the particular requirements of the user. This addendum together with the relevant IPS shall form the job specification for the specific project or work.

The IPS is reviewed and up-dated approximately every five years. Each standards are subject to amendment or withdrawal, if required, thus the latest edition of IPS shall be applicable

The users of IPS are therefore requested to send their views and comments, including any addendum prepared for particular cases to the following address. These comments and recommendations will be reviewed by the relevant technical committee and in case of approval will be incorporated in the next revision of the standard.

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Introduction

This standard has been developed in “specialized reference committees”¹ and with the consensus of a wide range of professionals, representatives of organizations, companies, management, institutions and research-laboratory centers, manufacturers, associations, etc.

Petroleum Standards developed by the Ministry of Petroleum are reviewed systematically by specialized reference committees every five years and, are performed with regard to their applicability and effectiveness, approve, revoke or revise them in accordance with current Ministry of Petroleum regulations. Obviously, in accordance with clause 4 of the Procedure, the periodical review can be done early, if necessary. In case of conflict between Farsi (Persian) and English languages, English language shall govern.

Note 1 - The standard specification for switchgear, IPS-M-EL-140(0) is withdrawn in June 2004 , and replaced by the following two standard specifications which are issued as revision(1).

IPS-M-EL-143(1) Low voltage switchgear and control gear

IPS-M-EL-144(1) Medium and high voltage switchgear and control gear

By the way, standard specification low voltage motor starters IPS-M-EL-142(0) and standard specification low voltage motor control center IPS-M-EL-165(0) are withdrawn.

Note 2 - This bilingual standard is a revised version of the IPS-M-EL-143(2) standard specification by the relevant technical committee on 2019, which is issued as revision (3). Revision (2) of the mentioned standard specification is withdrawn.

Iranian Petroleum Standards (IPS)

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1 - Standardized specialized reference committees are qualified committees responsible for determination and reviewing standards for the petroleum industry (governmental, private and cooperative sectors).