



PROCESS  
INDUSTRY  
PRACTICES

COMPLETE REVISION  
May 2018

***Electrical***

**PIP ELSMC13**  
**Low-Voltage Motor Control Centers**

---

## PURPOSE AND USE OF PROCESS INDUSTRY PRACTICES

In an effort to minimize the cost of process industry facilities, this Practice has been prepared from the technical requirements in the existing standards of major industrial users, contractors, or standards organizations. By harmonizing these technical requirements into a single set of Practices, administrative, application, and engineering costs to both the purchaser and the manufacturer should be reduced. While this Practice is expected to incorporate the majority of requirements of most users, individual applications may involve requirements that will be appended to and take precedence over this Practice. Determinations concerning fitness for purpose and particular matters or application of the Practice to particular project or engineering situations should not be made solely on information contained in these materials. The use of trade names from time to time should not be viewed as an expression of preference but rather recognized as normal usage in the trade. Other brands having the same specifications are equally correct and may be substituted for those named. All Practices or guidelines are intended to be consistent with applicable laws and regulations including OSHA requirements. To the extent these Practices or guidelines should conflict with OSHA or other applicable laws or regulations, such laws or regulations must be followed. Consult an appropriate professional before applying or acting on any material contained in or suggested by the Practice.

This Practice is subject to revision at any time.

© Process Industry Practices (PIP), Construction Industry Institute, The University of Texas at Austin, 3925 West Braker Lane (R4500), Austin, Texas 78759. PIP Member Companies and Subscribers may copy this Practice for their internal use. Changes or modifications of any kind are not permitted within any PIP Practice without the express written authorization of PIP. Authorized Users may attach addenda or overlays to clearly indicate modifications or exceptions to specific sections of PIP Practices. Authorized Users may provide their clients, suppliers and contractors with copies of the Practice solely for Authorized Users' purposes. These purposes include but are not limited to the procurement process (e.g., as attachments to requests for quotation/ purchase orders or requests for proposals/contracts) and preparation and issue of design engineering deliverables for use on a specific project by Authorized User's client. PIP's copyright notices must be clearly indicated and unequivocally incorporated in documents where an Authorized User desires to provide any third party with copies of the Practice.

### **PUBLISHING HISTORY**

<i>March 2000</i>	<i>Issued</i>	<i>April 2013</i>	<i>Complete Revision</i>
<i>October 2006</i>	<i>Complete Revision</i>	<i>May 2018</i>	<i>Complete Revision</i>
<i>October 2007</i>	<i>Editorial Revision</i>		

Not printed with State funds



## PIP ELSMC13 Low-Voltage Motor Control Centers

---

### Table of Contents

<b>1. Scope .....</b>	<b>2</b>
<b>2. References .....</b>	<b>2</b>
2.1 Process Industry Practices .....	2
2.2 Industry Codes and Standards .....	2
<b>3. Definitions .....</b>	<b>2</b>
<b>4. Requirements .....</b>	<b>3</b>
4.1 General .....	3
4.2 Enclosures .....	4
4.3 Wireways .....	5
4.4 Power Buses .....	6
4.5 Grounding .....	7
4.6 Incoming Line Section .....	7
4.7 Units .....	8
4.8 Combination Starters and Contactors .....	10
4.9 Feeder Units .....	13
4.10 Space Heaters .....	13
4.11 Painting .....	14
4.12 Nameplates .....	14
4.13 Inspection and Testing .....	15
4.14 Shipping .....	15
4.15 Documentation .....	15
4.16 Conflict Resolution .....	16

## 1. Scope

---

This Practice describes the requirements for the design, fabrication, inspection, testing, and shipping of factory-assembled 600 V motor control centers. It includes requirements for buses, enclosures, motor starters, fused switches, and circuit breakers. All equipment described in this Practice is suitable for use in dry, non-classified areas or in outdoor enclosures. Panelboards and adjustable speed drives are outside the scope of this Practice.

## 2. References

---

Applicable parts of the following Practices and industry codes and standards shall be considered an integral part of this Practice. The edition in effect on the date of contract award shall be used, except as otherwise noted. Short titles are used herein where appropriate.

### 2.1 Process Industry Practices (PIP)

- PIP ELSSG12 - *Design and Fabrication of Outdoor Enclosures for Motor Controllers and Switchgear*

### 2.2 Industry Codes and Standards

- American Society of Civil Engineers
  - ASCE/SEI 7 - *Minimum Design Loads for Building and Other Structures*
- Institute of Electrical and Electronics Engineers (IEEE)
  - IEEE C37.20.7 - *IEEE Guide for Testing Metal-Enclosed Switchgear Rated up to 38kV for Internal Arcing Faults*
- National Electrical Manufacturers Association (NEMA)
  - NEMA ICS 18 - *Motor Control Centers*
  - NEMA ICS 2 - *Industrial Control and System Controllers, Contactors and Overload Relays Rated 600 Volts*
- National Fire Protection Association (NFPA)
  - NFPA 70 - *National Electrical Code (NEC)*
- Underwriters Laboratories (UL)
  - UL 845 - *Motor Control Centers*

## 3. Definitions

---

*arc resistant*: Equipment designed to withstand the effects of an internal arcing fault, as indicated by meeting test requirements of *IEEE C37.20.7*

*spare*: Space occupied by a unused starter, feeder, or other device

*space*: A space specified and equipped to accept a future unit

*intelligent motor control center*: A motor control center (MCC) with digital communication and control capability