PROCESS INDUSTRY PRACTICES

COMPLETE REVISION
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Electrical

PIP ELSAP01
Design and Fabrication of Utility Type Battery Chargers

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.

PUBLISHING HISTORY

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Table of Contents

1. Scope

This Practice describes the minimum requirements for design, fabrication, inspection, testing, shipment, and documentation for an electronically-controlled battery charger used for charging float-type batteries and simultaneously powering the connected utility system loads in indoor unclassified areas.

2. References

Applicable parts of the following Practices, industry codes and standards, and references 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 ELSAP01-D - *Data Sheet for Battery Chargers*
- PIP STC01015 - *Structural Design Criteria*

2.2 Industry Codes and Standards

- National Electrical Manufacturers Association (NEMA)
  - NEMA PE 5 - *Utility Type Battery Chargers*
- National Fire Protection Association (NFPA)
  - NFPA 70 - *National Electrical Code (NEC)*
- Underwriters Laboratory, Inc. (UL)
  - UL 489 - *Molded-Case Circuit Breakers, Molded Case Switches, and Circuit-Breaker Enclosures*

3. Definitions

equalizing charge: An extended charge, at an elevated voltage, to a measured end point that is given to a storage battery to ensure the complete restoration of the active materials in all the plates of all the cells

floating charge: A method of operation for storage batteries in which a constant voltage is applied to the battery terminals sufficient to maintain an approximately constant state of charge

ripple voltage: The alternating-voltage component of the unidirectional voltage from a direct current power supply arising from sources within the power supply

battery eliminator: A device that provides direct-current energy from an alternating-current source in place of a battery

4. Requirements

4.1 General

4.1.1 The battery charger shall be designed and fabricated in accordance with *NEMA PE 5*.

4.1.2 The charger shall provide constant voltage float and equalize charging of the battery bank and, at the same time, deliver 0%–100%-rated current output to a varying on-line load.

4.1.3 The charger shall maintain the preset output DC voltage regulation to the connected load with the battery connected to the charger.

4.1.4 Unless otherwise specified on the purchaser's *PIP ELSAP01-D* Data Sheet, the charger shall be capable of recharging to 90% capacity a completely discharged battery within 8 hours while also supplying the normal load requirements.

4.1.5 Consideration must be given to the type of battery being utilized when selecting and specifying a battery charger.

4.2 Operating Environment

4.2.1 Unless otherwise specified on the purchaser's *PIP ELSAP01-D* Data Sheet, equipment shall be designed to perform satisfactorily under the following ambient conditions:

a. Ambient condition within the limits of 0°C (32°F) and 50°C (122°F)

b. Altitude of installation does not exceed 3300 feet (1000 m)

c. Humidity within the limits of 0 - 95% non-condensing

4.2.2 The battery charger shall be located in an indoor unclassified area.

4.2.3 When specified on purchaser's *PIP ELSAP01-D* Data Sheet, seismic requirements shall be as specified in *PIP STC01015*, Structural Design Criteria.

4.3 Input and Output Requirements

4.3.1 Input Overcurrent Protection

4.3.1.1 An input circuit breaker shall be provided for overcurrent and short-circuit protection, and to provide a means of isolating the input power to the charger.

4.3.1.2 The input circuit breaker shall have an interrupting capacity equal to or greater than the available short-circuit current listed on the purchaser's *PIP ELSAP01-D* Data Sheet.

4.3.1.3 Molded-case circuit breakers shall be designed and tested in accordance with *UL 489*.

4.3.2 Input Power Supply

The input power supply shall be as specified on the purchaser's *PIP ELSAP01-D* Data Sheet.