PROCESS INDUSTRY PRACTICES

November 2021

Electrical

PIP ELEGL07
Electric Motor Voltage Dip Impact Mitigation

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.

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1. Scope

Electrical systems will experience electrical events in the form of voltage dips and outages. Depending on the magnitude and duration of these electrical events, electric motors can drop offline. The unexpected loss of an electric motor in a production unit can cause personnel safety issues, environmental issues, and loss profit opportunities (LPO). This Practice provides information which can be used to develop the basic premises on which to implement a voltage dip impact mitigation program to help overcome the adverse effects of production units dropping offline. The voltage dip impact mitigation program addresses the application of both under-voltage ride-through and under-voltage restart capabilities which should be added to the controls of electrical motors.

2. References

Applicable parts of the following 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.

Industry Codes, Standards, and Technical Information

- Institute of Electrical and Electronic Engineers (IEEE)

  PCIC-92-15 - *Minimizing Refinery Upset During Power Interruptions Using PLC Control*

  PCIC-89-07 - *Bus Transfer of AC Induction Motors, A Perspective*

  PCIC-2011-14 - *Motor Reacceleration to Improve Process Uptime*

  IEEE Transactions, Vol. 35, No. 4, July/August 1999 - *Transient Motor Reacceleration Study in an Integrated Petrochemical Facility*

- International Council on Large Electric Systems (CIGRE)

  CIGRE 412 - *Voltage Dip Immunity of Equipment and Installations*

- National Electrical Manufacturers Association (NEMA)

  MG 1 - *Motors and Generators*

  C50.41 - *Polyphase Induction Motors for Power Generating Stations*

- National Fire Prevention Association (NFPA)

  NFPA 70 - National Electrical Code (NEC)

- General Electric (GE)

  Industrial Power Systems Data Book - Unusual Design Problems: Load Reclosing and Transfer

- Allis Chalmers Engineering Review

  Timing Motor Reclosure or Bus Transfer

- ABB Baldor

  A-C Motor Typical Data