PROCESS INDUSTRY PRACTICES

COMPLETE REVISION
May 2024

Electrical

PIP ELSSG04
Automatic Transfer Systems for Secondary Selective Substations

PURPOSE AND USE OF PROCESS INDUSTRY PRACTICES

This Practice has been prepared by harmonizing technical requirements from existing standards of major industrial operators, contractors, and standards development organizations. While this Practice is intended to incorporate the majority of requirements, individual applications may have requirements which take precedence over this Practice. Determinations concerning fitness for purpose or application of this Practice to specific project or engineering situations should not be made solely on information contained in this Practice. All Practices are intended to be consistent with applicable laws and regulations. Should this Practice conflict with 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 this Practice.

Use of trade names should not be viewed as an expression of preference. Other brands having the same specifications are equally correct and may be substituted for those named.

This Practice is subject to revision at any time. For more information refer to PIP ADG001, *Specification for Developing Practices*.

Process Industry Practices
3925 West Braker Lane (R4500)
Austin, Texas 78759

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Data Form

ELSSG04-D – Automatic Transfer Systems for Secondary Selective Substations

1. Scope

This Practice describes minimum requirements for design, performance, inspection, testing, and documentation of automatic delayed transfer systems (ATS) for two-source secondary selective substations, typically known as Main-Tie-Main transfer scheme. ATS provides automatic restoration of bus voltage upon loss of one of the sources. This Practice also covers remote monitoring and control requirements. This Practice does not cover fast bus transfer or delayed in-phase transfer systems.

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 ELSSG01 - *Design and Fabrication of Low Voltage Metal-Enclosed AC Power Circuit Breaker Switchgear*
- PIP ELSSG02 - *Design and Fabrication of Medium Voltage Metal-Clad Switchgear above 1000 V to 38 kV*
- PIP ELSSG13 - *Design and Fabrication of Medium Voltage Gas Insulated Switchgear up to 52 kV*

2.2 Industry Codes and Standards

Institute of Electrical and Electronics Engineers (IEEE)

- IEEE Std C37.2 - IEEE Standard for Electrical Power System Device Function Numbers, Acronyms, and Contact Designations

3. Definitions

closed transition transfer: A transfer system designed such that both sources of the secondary selective system are connected at the same time during power transfer. This results in the temporary paralleling of sources, and prevents a bus from being de-energized while switching sources. Also known as “make-before-break” operation.

delayed in-phase transfer: Type of open transition transfer system typically used when a fast transfer attempt fails (i.e., after approximately 10 cycles). The system waits for next in-phase event to transfer (i.e., typically within 20 cycles).

delayed transfer: Type of open transition transfer system designed to wait for a predetermined time (i.e., typically greater than 20 cycles) or decay of bus voltage to a predetermined level after a bus power source is removed before connecting the bus to another source. This type of transfer is not intended to maintain process continuity; certain motor-driven loads may necessitate restart of the motors on the bus. Also known as “slow transfer,” “residual voltage transfer,” or “long time transfer.”

fast bus transfer: Type of open transition transfer system designed to minimize the time to reclose and restore power (i.e., typically less than 10 cycles)