DESCRIPTION

This work shall consist of furnishing and installing Automatic Transfer Switch indicated on the Contract Drawings.

MATERIALS

Automatic Transfer switch

A. The automatic transfer switches shall consist of the following components:

1. Mechanically-held transfer switch
2. Control module

B. The ATS components shall be furnished in a single enclosure, completely factory assembled, interconnected and tested as one unit. A bypass isolation switch shall be provided to permit manual bypass and isolation of the automatic transfer switch for the purpose of maintenance and testing of the ATS.

C. Switch Ratings

1. Volts As shown on the Contract Drawings
2. Amperes As shown on the Contract Drawings.
3. Withstand Rating: Shall be rated to withstand the available RMS symmetrical short circuit at the ATS terminals with the type of overcurrent protection shown on the Contract Drawings.

D. Transfer Switch Construction

1. The transfer switch unit shall be electrically operated and mechanically held. The electrical operator shall be a single solenoid mechanism or motor, with 85 to 110 percent line voltage capability, momentarily energized to minimize power consumption and heat generation. The switch shall be positively locked and unaffected by voltage variations or momentary outages so that contact pressure is maintained at a constant value and temperature rise at the contacts is minimized for maximum reliability and operating life.

2. All main contacts shall be break-before-make type. All main and neutral contacts shall have a silver composition. ATS's utilizing components or parts which have not been intended for continuous duty, repetitive switching, or transfer between two active power sources are not acceptable.

E. Bypass-Isolation Switch Construction

1. A two-way bypass-isolation switch shall provide manual bypass of the load to either source and permit isolation of the automatic transfer switch from all source and load power conductors.
2. Power interconnections shall be made with suitably sized silver plated copper bus bars, braced to withstand magnetic and thermal forces created at the withstand rating specified for the associated ATS.

3. The operating speed of the bypass contacts shall be the same as that of the associated automatic transfer switch and shall be independent of the speed at which the manual bypass handle is operated. In the "Automatic" mode, bypass contacts shall be fully open so that they will not be subjected to fault currents.

4. The isolation handle shall provide, but not be limited to the following operating modes:
   a. Closed
   b. Open

5. The "Closed" position shall indicate that the ATS is closed in one of the two operating positions. The "Open" mode shall completely isolate the automatic transfer switch from all source and load power conductors. When in the "Open" mode, it shall be possible to completely withdraw the automatic transfer switch for inspection or maintenance without removal of power conductors or the use of any tools.

6. When the isolation switch is in the "Open" mode, the bypass switch shall function as a manual transfer switch allowing transfer and retransfer of the load between the two available sources without the feedback of load-regenerated voltage to the transfer switch. This transfer/retransfer operation shall comply with Paragraph 42.7 of UL 1008.

F. Control Module Construction

1. The control module shall direct the operation of the transfer switch. The module's sensing and logic shall be controlled by a built-in microprocessor or by hard wired control relays. The control module shall be connected to the transfer switch by an interconnecting wiring harness.

2. The control module shall be completely enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. Sensing and control logic shall be provided on printed circuit boards. Interfacing relays shall be industrial control grade plug-in type with dust covers. All relays shall be identical to minimize the number of unique parts.

3. The control panel shall meet or exceed the voltage surge withstand capability in accordance with IEEE 472 (ANSI C37.90a) and the impulse withstand voltage test in accordance with the proposed NEMA ICS 1-109.

G. Operation
1. Single-phase control modules shall be provided for single-phase power sources and three-phase control modules for three-phase power sources.

2. The voltage of each phase of the normal source shall be monitored, with pick-up adjustable from 85 to 100 percent and dropout adjustable from 75 to 98 percent of pick-up setting, both in increments of one percent. Repetitive accuracy of settings shall be plus or minus two percent or better over an operating temperature range of minus 20 degrees Centigrade to plus 70 degrees Centigrade, factory set to pick-up at 90 percent and dropout at 85 percent.

3. Single phase voltage sensing of the standby source shall be provided, with a pickup adjustable from 85 to 100 percent (and dropout fixed at 84 to 86 percent of pickup), and frequency sensing with pickup adjustable from 90 to 100 percent (and dropout fixed at 87 to 89 percent of pickup). Both pickup settings shall be fully-field adjustable in one percent increments. Repetitive accuracy of settings shall be plus or minus two percent or better over an operating temperature range of minus 20 degrees Centigrade to plus 70 degrees Centigrade, factory set to pick-up at 90 percent voltage and 95 percent frequency.

4. A momentary-type test switch shall be provided to simulate a normal source failure. Also terminals for a remote contact which opens to signal the ATS to transfer to standby and terminals for remote contacts which open to inhibit transfer to standby and/or retransfer to normal, wired to terminal strip, shall be provided. For automatic transfer - (Switch designations to be provided at future date), Provide two interposing relays to allow the SCADA system to energize/de-energize the automatic transfer switch exercise circuit via four (4) wire momentary signal (stop and start). Relays shall be 24VDC and of a construction for this application. Relay shall have 3 form ‘C’ contacts (3PDT) that have a minimum rating of 10 AMPS. Control points shall be wired out to a terminal strip.

5. A visual position indicator shall be provided to indicate bypass-isolation switch position.

H. Enclosure

1. ATS/BIS located outdoor shall be housed in a free standing, NEMA 4X type enclosure. Gauge of the enclosure metal shall be not less than No. 11. Enclosure shall be equipped with at least two specified size and type of grounding lugs as shown on the Contract Drawings.

2. Enclosure shall be constructed for convenient removal and replacement of contacts, coils, springs and control devices from the front without the disconnection of external power conductors or the removal or disassembly of major components.
3. Enclosure shall be equipped with specified size and type of lugs/terminals for incoming and outgoing power and control wiring with top or bottom feed as shown on the Contract Drawings. All wiring shall be accessible from the front.

I. Accessories

1. The automatic transfer and bypass-isolation switch (ATS/BIS) and automatic transfer switch (ATS) shall be furnished with the following accessories:

   a. In phase Monitor: An in phase monitor to protect against abnormal inrush currents which may result from out-of-phase transfer of motor loads shall be provided where motor loads are shown on the Contract Drawings. The in phase monitor shall operate without external control of electrical loads and without any external control of the power sources. The monitor shall compare the phase relationship and frequency difference between the normal and standby sources and permit transfer the first time.

   b. The sources are within 15 electrical degrees and only if transfer can be accomplished within 60 electrical degrees as determined by monitoring the frequency difference. In phase transfer shall be accomplished if both sources are within 2 Hertz of normal frequency and 70 percent or more of nominal voltage.

   c. As an alternate, an ATS with center off position may also be furnished.

J. Nameplates

1. Nameplates shall be furnished for each instrument and device. All devices, such as relays, fuses, and terminal blocks, shall be identified.

2. A nameplate shall be provided for each piece of equipment with appropriate data such as equipment number, rating, serial number, and manufacturer. All nameplates shall be fixed in a conspicuous position.

3. A nameplate shall be provided for each operating position, for all handles.

K. Painting

1. All metal surfaces shall be thoroughly cleaned and degreased before priming. Prime coat shall be covered with two air dried coats of finish paint to provide an average dry thickness of four mils.

2. Surface finish shall be applied free of runs, drops, ridges, waves, and laps, and paint in such a manner as to provide an even film covering corners and cervixes. Exterior finish of medium light gray shall be provided as indicated and white interior finish coating thickness of minimum two mils.
CONSTRUCTION DETAILS

1. Installation shall comply with ANSI C2, NFPA 70, the NEC, the manufacturer's instructions, and the requirements specified herein.

2. Conduits, raceways and ducts shall be installed as shown on the Contract Drawings.

3. Power cable and control wire connections shall be made as shown on the Contract Drawings.

4. Grounding connections shall be made as shown on the Contract Drawings.

5. Install conduits and raceways in accordance with manufacturer’s recommendations, and in accordance with the contract drawings and specifications.

METHOD OF MEASUREMENT

This work shall be measured on a lump sum basis.

BASIS OF PAYMENT

The lump sum price bid for this item shall include the cost of all labor, materials installation hardware and equipment necessary to satisfactorily complete the work in accordance with the Contract Plans and Specifications. The cost of testing, and associated appurtenances shall be included in the price.