

AUTOMATIC LOAD TRANSFER EQUIPMENT

1. GENERAL

1.1 References

- .1 CAN3-C13, Instrument Transformers
- .2 CAN3-C17, Alternating-Current Electricity Metering
- .3 ANSI/NEMA ICS 2, Industrial Control Devices, Controllers, and Assemblies
- .4 UL 1008 - Standard for Automatic Transfer Switches
- .5 IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
- .6 NEMA Standard ICS10-1993 (formerly ICS2-447) - AC Automatic Transfer Switches

1.2 System Description

- .1 Automatic load transfer equipment which is electrically operated, mechanically held to:
 - .1 Monitor voltage on all phases of normal power supply.
 - .2 Transfer load from normal supply to alternate supply on normal power failure or abnormal voltage on any one phase below preset adjustable limits for adjustable period of time.
 - .3 Transfer load from alternate supply to normal power supply when normal power restored, confirmed by sensing of voltage on all phases above adjustable pre-set limit for adjustable time period.

1.3 Shop Drawings

- .1 Submit shop drawings in accordance with Section 13000 – Submittals.
- .2 Include:
 - .1 Make, model and type
 - .2 Single line diagram showing controls and relays
 - .3 Description of equipment operation including:
 - .1 Automatic transfer to alternate supply and back to normal power
 - .2 Test control

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.3 Manual control

1.4 Operation and Maintenance Data

- .1 Provide O&M data for automatic load transfer equipment for incorporation into manual specified in Section 01730 – Operation and Maintenance Manuals.
- .2 Detailed instructions to permit effective operation, maintenance and repair.
- .3 Technical data:
 - .1 Schematic diagram of components, controls and relays
 - .2 Illustrated parts lists with parts catalogue numbers
 - .3 Certified copy of factory test results

1.5 Source Quality Control

- .1 Complete equipment, including transfer mechanism, controls, relays and accessories factory assembled and tested.
- .2 Tests:
 - .1 Operate equipment both mechanically and electrically to ensure proper performance.
 - .2 Check selector switch, in all modes of operation Test, Auto, Manual and record results.
 - .3 Check voltage sensing and time delay relay settings.
 - .4 Check:
 - .1 Automatic transfer of load on failure of normal power
 - .2 Retransfer of load when normal power supply resumed

2. PRODUCTS

2.1 Mechanically Held Transfer Switch

- .1 The transfer switch shall be electrically operated and mechanically held. The electrical operator shall be a momentarily energized, single-solenoid mechanism. Main operators which include overcurrent disconnect devices, linear motors or gears shall not be acceptable.
- .2 The switch shall provide closed transition switching when both sources are available.

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- .3 The switch shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.
- .4 All main contacts shall be silver composition.
- .5 Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.
- .6 Neutral conductors are to be solidly connected as shown on the plans, a copper neutral conductor plate with fully rated pressure connectors shall be provided.
- .7 Provide a bypass isolation switch to permit inspection and servicing while maintaining power to the load.

2.2 Microprocessor Controller

- .1 The controller's sensing and logic shall be provided by a single built-in microprocessor for maximum reliability, minimum maintenance, and the ability to communicate serially through an optional serial communication module.
- .2 A single controller shall provide twelve selectable nominal voltages for maximum application flexibility and minimal spare part requirements. Voltage sensing shall be true RMS type and shall be accurate to 1% of nominal voltage. Frequency sensing shall be accurate to 0.2%. The panel shall be capable of operating over a temperature range of -20 to +60°C and storage from -55 to +85°C.
- .3 The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Sensing and control logic shall be provided on multi-layer printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers. The panel shall be enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. The protective cover shall include a built-in pocket for storage of the operator's manuals.
- .4 All customer connections shall be wired to a common terminal block to simplify field-wiring connections.
- .5 Source status screens shall be provided for both normal & emergency to provide digital readout of voltage on all three phases, frequency, and phase rotation.

2.3 Enclosure

- .1 The ATS shall be furnished in a Type 1 enclosure unless otherwise shown on the plans.

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- .2 All standard and optional door-mounted switches and pilot lights shall be 16 mm industrial grade type or equivalent for easy viewing and replacement. Door controls shall be provided on a separate removable plate, which can be supplied loose for open type units.

2.4 Accessories

- .1 Pilot lights to indicate switch position.
- .2 Solid neutral bar, rated: 200 A.
- .3 Auxiliary relays to provide 2 N.O. contacts for switch position monitoring.
- .4 Auxiliary relay to provide 1 N.O. and 1 N.C. contacts for monitoring of phase loss, undervoltage and power fail on load side of transfer switch.
- .5 Test pushbutton (momentary contact) to simulate failure of normal power.

2.5 Equipment Identification

- .1 Provide equipment identification in accordance with Section 16010 – Electrical General Requirements.

2.6 Acceptable Manufacturers

- .1 ASCO 7000 series, or approved equals.

3. EXECUTION

3.1 Installation

- .1 Locate, install and connect transfer equipment in Clearwell Inlet Building.
- .2 Check solid state monitors and adjust as required.
- .3 Connect two (2) transfer switch position contacts and one (1) power fail contact to PLC located in control panel, LCP-T11.

3.2 Field Quality Control

- .1 Perform tests in accordance with Section 16980 – Testing, Adjusting and Balancing of Electrical Equipment and Systems.
- .2 Energize transfer equipment from normal power supply.
- .3 Set selector switch in "Test" position to ensure proper transfer to alternate supply and retransfer.

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- .4 Set selector switch in "Manual" position and check to ensure proper performance.
- .5 Set selector switch in "Auto" position and open normal power supply disconnect. Load should transfer to alternate supply. Allow to operate for 5 minutes, then close main power supply disconnect. Load should transfer back to normal power supply.

END OF SECTION