

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 CSA International
 - .1 CSA C22.2 No.5-09, Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, NMX-J-266-ANCE-2010).
 - .2 CSA C22.2 No.178.1-2007, Automatic Transfer Switches.
 - .3 CAN/CSA C60044-1-07, Instrument Transformers.
- .2 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA ICS 2-1996(R2009), Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC, Part 8: Disconnect Devices for Use in Industrial Control Equipment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for transfer switches and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit shop drawings.
 - .1 Indicate on drawings:
 - .1 Make, model and type.
 - .2 Load classification:
 - .1 Tungsten lamp load: kW.
 - .2 Ballast lamp load: kW.
 - .3 Motor load: kW.
 - .4 Restricted use: resistance and general loads, 0.8 pf or higher kW.
 - .3 Single line diagram showing controls and relays.
 - .4 Description of equipment operation including:
 - .1 Automatic starting and transfer to standby unit and back to normal power.
 - .2 Test control.
 - .3 Manual control.
 - .4 Automatic shutdown.
- .4 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for transfer switches for incorporation into manual.
- .3 Detailed instructions to permit effective operation, maintenance and repair.
- .4 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.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 60 00 - Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect transfer switches from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 00 - Cleaning and Waste Management.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- .1 Automatic load transfer equipment to:
 - .1 Monitor voltage on phases of normal power supply.
 - .2 Initiate cranking of standby generator unit on normal power failure or abnormal voltage on any one phase below preset adjustable limits for adjustable period of time.
 - .3 Transfer load from normal supply to standby unit when standby unit reaches rated frequency and voltage pre-set adjustable limits.
 - .4 Transfer load from standby unit to normal power supply when normal

power restored, confirmed by sensing of voltage on phases above adjustable pre-set limit for adjustable time period.

.5 Shut down standby unit after running unloaded to cool down using adjustable time delay relay.

2.2 MATERIALS

- .1 Instrument transformers: to CAN/CSA C60044-1.
- .2 Contactors: to NEMA ICS2.
- .3 Nema 1 enclosure for sprinkler proof.
- .4 Automatic Transfer Switch shall be ASCO part number J07ATSA30600R5XC or equivalent.

2.3 CONTACTOR TYPE TRANSFER EQUIPMENT

- .1 Contact Type Transfer Equipment: to CSA C22.2 No.178.1.
- .2 Two-3 pole contactors mounted on common frame, in double throw arrangement, mechanically and electrically interlocked, solenoid operated, with CSA type 3R enclosure.
- .3 Rated:
 - .1 ATS-1, 208V, 60Hz, 600A. 3 pole, 3 wire, solid neutral.
- .4 Main contacts: silver surfaced, protected by arc disruption means.
- .5 Switch and relay contacts, coils, spring and control elements accessible for inspection and maintenance from front of panel without removal of switch panel or disconnection of drive linkages and power conductors.
- .6 Auxiliary contact: gold silver plated, to initiate emergency generator start-up on failure of normal power.
- .7 Fault withstand rating: 35 kA symmetrical for 3 cycles with maximum peak value of 35 kA.
- .8 Lever to operate switch manually when switch is isolated.
- .9 Neutral bar, solid rated: 600 A for ATS-1.
- .10 Overlapping neutral contacts on contactor type transfer equipment.

2.4 CONTROLS

- .1 Selector switch No. 1 - 3 position "System Test", "Auto", "Time delay override".

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- .1 Test position - Selecting System test will start the generator and transfer load to generator, test timer is to be programmable and when done will automatically return to normal and shut generator down.
 - .2 Auto position - normal operation of transfer switch on failure of normal power; retransfers on return of normal voltage and shuts down engine.
 - .3 Engine start position - engine starts but unit will not transfer unless normal power supply fails. Switch must be returned to "Auto" to stop engine.
 - .2 Selector switch No. 2 for engine control with off/auto/engine start positions.
 - .1 Engine Start will start generator but not transfer the load, AUTO switch to function normally, in OFF position generator start signal will not be sent to generator.
 - .3 Control transformers: dry type with 120 V secondary to isolate control circuits from:
 - .1 Normal power supply.
 - .2 Emergency power supply.
 - .4 Relays: continuous duty, industrial control type, with wiping action contacts rated 10 A minimum:
 - .1 Voltage sensing: 3 phase for normal power and on one phase only for emergency, solid state type, adjustable drop out and pick up, close differential, 2 V minimum undervoltage and over voltage protection.
 - .2 Time delay: normal power to standby, adjustable solid state, 0 - 60 minutes in 1 second increments.
 - .3 Time delay on engine starting to override momentary power outages or dips, adjustable solid state, 0 to 6 s delay.
 - .4 Time delay on retransfer from standby to normal power, adjustable 0 to 60 min in 1 second increments.
 - .5 Time delay for engine cool-off to permit standby set to run unloaded after retransfer to normal power, adjustable solid state, 0 to 60 minutes in 1 second increments.
 - .6 Frequency sensing, to prevent transfer from normal power supply until frequency of standby unit reaches preset adjustable values.
 - .5 Solid state electronic in-phase monitor.

2.5 ACCESSORIES

- .1 Ensure pilot lights indicate power availability normal and standby, switch position, green for normal, red for standby, mounted in panel remote.
- .2 Plant exerciser: 168 hours timer to start standby unit once each week for selected interval but does not transfer load from normal supply transfers load to emergency supply and retransfers to normal supply on standby unit shutdown. Timer adjustable 0-168 hours in 15 minute intervals.
- .3 Auxiliary relay to provide 2 N.O. and 2 N.C. contacts for remote alarms.

2.6 EQUIPMENT IDENTIFICATION

- .1 Identify equipment in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Control panel:
 - .1 For selector switch and manual switch: size 4 nameplates.
 - .2 For meters, indicating lights, minor controls: use size 2 nameplates.
 - .3 Nameplates to include: Identifier Tag, Amperage and Load Fed.

2.7 SOURCE QUALITY CONTROL

- .1 Complete equipment, including transfer mechanism, controls, relays and accessories factory assembled and tested in presence of Owner's Representative.
- .2 Notify Owner's Representative 5 days minimum in advance of date of factory test.
- .3 Tests:
 - .1 Operate equipment both mechanically and electrically to ensure proper performance.
 - .2 Check selector switch, in modes of operation Test, Auto, Manual, Engine Start and record results.
 - .3 Check voltage sensing and time delay relay settings.
 - .4 Check:
 - .1 Automatic starting and transfer of load on failure of normal power.
 - .2 Retransfer of load when normal power supply resumed.
 - .3 Automatic shutdown.
 - .4 In-phase monitor operation.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for transfer switches installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Owner's Representative.
 - .2 Inform Owner's Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Owner's Representative.

3.2 INSTALLATION

- .1 Locate, install and connect transfer equipment as indicated.
- .2 Check relays and solid state monitors and adjust as required to ensure correct operation.
- .3 Install and connect battery and remote alarms.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Energize transfer equipment from normal power supply.
- .3 Set selector switch in "Test" position to ensure proper standby start, running, transfer, retransfer. Return selector switch to "Auto" position to ensure standby shuts down.
- .4 Set selector switch in "Manual" position and check to ensure proper performance.
- .5 Set selector switch in "Engine start" position and check to ensure proper performance. Return switch to "Auto" to stop engine.
- .6 Set selector switch in "Auto" position and open normal power supply disconnect. Standby should start, come up to rated voltage and frequency, and then load should transfer to standby. Allow to operate for 10 minutes, then close main power supply disconnect. Load should transfer back to normal power supply and standby should shutdown.
- .7 Repeat, at 1 hour intervals, four times, complete test with selector switch in each position, for each test.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning and Waste Management.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning and Waste Management.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 00 - Cleaning and Waste Management.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION