

NORTHWESTERN UNIVERSITY
PROJECT NAME _____
JOB # _____

FOR: _____
ISSUED: 03/29/2017

SECTION 26 3600

2. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a response period of less than eight hours from time of notification.
- B. Source Limitations: Obtain automatic transfer switches and bypass/isolation switches through one source from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with NEMA ICS 1.
- E. Comply with NFPA 70.
- F. Comply with NFPA 110.
- G. Comply with UL 1008 unless requirements of these Specifications are stricter.
- H. Comply with most current edition of the Northwestern University Design Standards.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store enclosed transfer switches indoors in clean, dry space with uniform temperature to prevent condensation. Protect from exposure to dirt, fumes, water, corrosive substances, and physical damage.
- B. If stored in areas subject to weather, cover enclosed controllers 6(t)-13.2(9Ta8)-2Tc 0.086]TJ 0 T .6(w)9.1se

- B. Installation Pathway: Remove and replace building components and structures to provide pathway for moving transfer switches into place.
- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for transfer switches, including clearances between transfer switches and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- D. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:
 - 1. Ambient Temperature: Not exceeding 40 deg C.
 - 2. Altitude: Not exceeding 6600 feet (2010 m).

1.7 COORDINATION

- A. Coordinate sensor-communication module package with the University's SCADA system for successful transmission and remote readout of remote monitoring data specified in this Section.
- B. Floor mounted switches: Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3 Sections.

1.8 WARRANTY

- A. Comply with Division 1 requirements.
- B. The automatic transfer switch shall be provided with a ten year warranty, covering all parts, labor, travel and expenses during the first two years, followed by seven years of replacement parts coverage. Warranty shall commence on startup. Warranty shall not be dependent upon customer purchase of additional equipment or preventive maintenance contracts.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by:
 - 1.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

- A. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.
- B. Transfer switches shall be seismic certified, capable of operating successfully after being subjected to a minimum IBC 200% g Earthquake Test. Testing shall be performed and verified by an independent, A2LA accredited, testing laboratory, in accordance with IBC 2006.
- C. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
1. A color, ¼ VGA minimum, graphical display shall be provided for viewing data and setting operational parameters. Parameters shall also be available for viewing remotely and limited control through a front accessible USB communications port with keypad.
 2. All control components and wiring shall be front accessible. All control wires shall be multi-conductor minimum 18 gauge 600-volt SIS switchboard type point to point harness. All control wire terminations shall be identified with tubular sleeve-type markers.
 3. The Controller shall provide high intensity LED's for the following:
 - a. Source Availability - Indicates the source voltage and frequency are within pre-set parameters.
 - b. Source Connected - Indicates the source main contacts closed and the load being served from the source.
 - c. XFER Inhibit - Indicates that the ATS is being inhibited from automatic operation to the unconnected source.
 - d. Alarm: Indicates an alarm condition is active.
 - e. TD Active: Indicates that a transfer switch time delay is actively timing.
 4. For ease of navigation, the display shall include the following:
 - a. Soft Keys – Change function based on user location in the menu structure.
 - b. Dedicated Navigational Keys – Home, Scroll Up, End, Escape and Enter.
 - c. Dedicated Pushbuttons for Alarm Reset, Test, Control and Information.
- D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- E. Electrical Operation: Accomplish by a non-fused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.
- F. The automatic transfer switch shall be capable of transferring successfully in either direction with 70% of rated voltage applied to the switch terminals.

(Select Paragraph 'G' or 'H' Per Job Requirements, review with University's Chief Electrician)

- G. **[Switches shall be four-pole as indicated on the drawings. A true four pole switch shall be supplied, with all four poles mounted on a common shaft. The entire fourth pole assembly, including contacts, arc chutes, etc. shall be identical to the other power poles. The fourth pole shall be switched simultaneously with, and by the same mechanism as, the main power poles. The short circuit rating of the fourth pole shall be identical to the**

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ratings of the main power poles. The complete assembly shall be factory tested to ensure proper operation and compliance with the specifications requirements.]

H. [Switches shall be three-pole as indicated on the drawings with Neutral Terminal solid and fully rated, unless otherwise indicated.]

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2. Automatic transfer switch components shall be removable without disconnecting external source or load power conductors.
3. Finish: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal.
4. The switch shall be operable from a dead-front location.
5. Provide copies of wiring diagrams and maintenance instructions located on the inside of enclosure door in a permanent mounting s(n)32432(m)-243U9(Tc 6(t)-24-24.5(ai)3.1)]TJ 0.00l0on [(e13

type, operable through the door of the enclosure. Safe manual transfer shall be possible under all load conditions, either energized or non-energized. The external manual operator is not required on transfer switches equipped with a bypass switch.

E. Automatic Transfer-Switch Features:

1. Programmable Undervoltage and Frequency Sensing for Each Phase of Normal and Emergency Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 70 to 98 percent of nominal, and dropout voltage is adjustable from 72 to 100 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent. Over voltage to pick up at 102 to 110% and drop out at 100 to 108%. Over frequency sensing to pick up at 50.1 to 69.8 Hz and drop out at 50.0 to 69.7 Hz. Under – frequency sensing to pick up at 45.0 to 59.9 Hz and drop out at 45.1 to 60 .0 Hz (VFS1,2)
2. Contact to close on normal source failure to initiate engine start (CES).
3. Normal status relay (CS1A).
4. Emergency status relay (CS2A).
5. Bypass and transfer switch auxiliary contact in parallel with engine start to maintain start signal whenever load is connected to emergency source (CMES).
6. The controller shall monitor phase rotation of both sources and inhibit transfer if both sources are not the same phase rotation. Source rotation shall be field selectable as either ABC or CBA

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18. Unassigned Auxiliary Contacts: Two normally closed, single-pole, double-throw contacts for emergency switch position, rated 10 A at 240-V ac (CS2P).
19. Unassigned Auxiliary Contacts: Two closed, single-pole, double-throw contacts when switch is bypassed to normal and emergency switch positions, rated 10 A at 240-VAC (CB1, CB2).
20. Provide additional elevator signals on switches connected to emergency equipment branch:

a. Additional Form "C" contacts (two) to indicate ATS in Emergency position.

b. ~~Form "C" contacts (two) to indicate ATS in Emergency position. (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)~~

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- C. Report results of tests and inspections in writing. Record adjustable relay settings and