SECTION 26 36 00

~~~ PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
ARCHITECT OF RECORD/ENGINEER OF RECORD IS RESPONSIBLE FOR REVIEWING THIS SPECIFICATION SECTION IN DETAIL FOR COORDINATION WITH THE PROJECT SCOPE OF WORK.

ALL "PROJECT NOTE" TEXT IS TO BE REMOVED FOLLOWING REVIEW OF THE CONTENT OF EACH NOTE BY THE ARCHITECT OF RECORD/ENGINEER OF RECORD.

EDIT THE DOCUMENT FOOTER TO INCLUDE THE PROJECT NAME AND NUMBER.

EDIT THE DOCUMENT HEADER TO INDICATE THE ARCHITECT OF RECORD PROJECT ISSUE" DATE. THE "CPS CONTROL" DATE SHOULD NOT BE EDITED.

ANY MODIFICATIONS TO THE TECHNICAL STANDARDS IN THIS SECTION - INCLUDING THE REMOVAL OR ADDITION OF MANUFACTURERS - MUST BE APPROVED BY CPS.

REQUESTS FOR MODIFICATION ARE TO BE SUBMITTED TO THE DESIGN MANAGER DURING THE DESIGN PHASE FOR REVIEW AND APPROVAL.

~~~ END OF PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~

TRANSFER SWITCHES

PART 1 - GENERAL

PART 2 -
~~~ PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
TRANSFER SWITCH TYPES AND SPECIALTY CONDITIONS TO BE SELECTED FOR SCOPE OF PROJECT. NON-AUTOMATIC AND MANUAL TRANSFER SWITCHES ARE NOT TYPICAL. THESE MAY BE UTILIZED IF REQUIRED DUE TO SCOPE OF PROJECT.

~~~ END OF PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~

2.01 SECTION INCLUDES

A. Transfer switches for low-voltage (600 V and less) applications and associated accessories:
   1. Automatic transfer switches.
   2. Includes service entrance rated transfer switches.
   3. Includes bypass/isolation transfer switches.
   4. Remote annunciators.

2.02 REFERENCE STANDARDS

A. Chicago Electrical Code - Municipal Code of the City of Chicago, Building/Electrical Code Requirements; 2018.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

D. NEMA ICS 1 - Industrial Control and Systems General Requirements; 2000 (Reaffirmed 2015).

E. NEMA ICS 10 Part 1 - Industrial Control and Systems Part 1: Electromechanical AC Transfer Switch Equipment; 2005, with Errata (2006).

F. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.

G. NFPA 110 - Standard for Emergency and Standby Power Systems; 2016.

H. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

I. UL 1008 - Transfer Switch Equipment; Current Edition, Including All Revisions.

2.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate compatibility of transfer switches to be installed with work provided under other sections or by others.
   a. Engine Generators: See Section 26 32 13 - Switchboards.
2. Comply with the Chicago Electrical Code.
3. Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.
4. Coordinate the work with placement of supports, anchors, etc. required for mounting.
5. Closed Transition Transfer Switches:
   a. Coordinate source interconnection requirements with Utility Company.
   b. Where applicable, coordinate the work to provide engine generators with isochronous governors suitable for closed transition transfer.
   c. Coordinate the work to provide shunt trip breakers necessary for protection from source interconnection for longer than specified maximum interconnection time.
   d. Pre-installation Meeting: Convene one week prior to commencing work of this section to review interconnection requirements and details with Utility Company representative.
   e. Arrange for inspections necessary to obtain Utility Company approval of installation.
6. Notify Architect/Engineer of Record of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Pre-installation Meeting: Convene one week before starting work of this section; require attendance of all affected installers.
1. Ensure required submittals have been provided with sufficient time for review prior to scheduling the Preinstallation Meeting.
2. Review the detailed requirements for the work of this section and to review the drawings and specifications for this work
3. Require attendance by all affected installers including but not limited to
   a. Contractor's Superintendent
   b. Installer
   c. Manufacturer/Fabricator Representative
   d. Other affected Subcontractors
   e. Architect/Engineer of Record
   f. Board’s Representative
4. Record minutes and distribute copies within 5 days after meeting to participants as well as Architect/Engineer of Record, Board and those affected by decisions made.

C. Where work of this section involves interruption of existing electrical service, arrange service interruption with Board no fewer than two (2) days in advance of proposed interruption of electrical service. Do not proceed with interruption without Architect's/Engineer of Record written permission.

2.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product, including ratings, configurations, dimensions, finishes, weights, service condition requirements, and installed features.
   1. Where applicable, include characteristic trip curves for overcurrent protective devices.

C. Shop Drawings: Include dimensioned plan views and sections indicating locations of system components, required clearances, and field connection locations. Include system interconnection schematic diagrams showing all factory and field connections.
   1. Clearly indicate whether proposed short circuit current ratings are based on testing with specific overcurrent protective devices or time durations; indicate short-time ratings where applicable.

D. Specimen Warranty: Submit sample of manufacturer's warranty.

E. Evidence of qualifications for installer.

F. Evidence of qualifications for maintenance contractor (if different entity from installer).

G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.

H. Manufacturer's certification that products meet or exceed specified requirements.

I. Source quality control test reports.

J. Manufacturer’s detailed field testing procedures.

K. Field quality control test reports.

L. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
   1. Include contact information for entity that will be providing contract maintenance and trouble call-back service.

M. Executed Warranty: Submit documentation of final executed warranty completed in School's name and registered with manufacturer.

N. Maintenance contracts.

O. Project Record Documents: Record actual locations of system components, installed circuiting arrangements and routing, and final equipment settings.

P. Maintenance Materials: Furnish the following for Board's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Bypass/Isolation Transfer Switches: Provide accessories (ramps, dollies, etc.) necessary for removal of draw-out components.

2.05 QUALITY ASSURANCE

A. Comply with the following:
   1. NFPA 110 (Standard for Emergency and Standby Power Systems); meet requirements for system Level specified in Section 26 32 13 - Engine Generators.
   2. Chicago Electrical Code.
   3. NEMA ICS 1.
   4. UL 1008 unless the requirements of these Specifications are stricter.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
   1. Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a response period of less than eight (8) hours from time of notification.

D. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with power transfer systems of similar size, type, and complexity; manufacturer's authorized installer.

E. Maintenance Contractor Qualifications: Same entity as installer or different entity with specified qualifications.
   1. Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a response period of less than eight (8) hours from time of notification.

F. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the Chicago Electrical Code, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

2.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store transfer switches in accordance with manufacturer's instructions.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's instructions to avoid damage to transfer switch components, enclosure, and finish.

2.07 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

B. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Board or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:

1. Notify Architect no fewer than two (2) days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Architect's/Engineer of Record written permission.

2.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide minimum one (1) year manufacturer warranty covering repair or replacement due to defective materials or workmanship, including parts and labor.

PART 3 - PRODUCTS

3.01 MANUFACTURERS

A. Transfer Switches:
1. ABB/GE: www.geindustrial.com/#sle.
2. ASCO Power Technologies, a brand of Emerson Network Power: www.emersonnetworkpower.com.
3. Russelectric, Inc: www.russelectric.com.

B. Source Limitations: Furnish transfer switches and accessories produced by a single manufacturer and obtained from a single supplier.

3.02 TRANSFER SWITCHES

A. Provide complete power transfer system consisting of all required equipment, conduit, boxes, wiring, supports, accessories, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

D. 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 degrees C.

E. 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.

F. Electrical Operation: Accomplish by a non-fused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.

G. Applications:
1. Utilize open transition transfer unless otherwise indicated or required.
2. For transfer of highly inductive loads (e.g. large motors and transformers), utilize open transition transfer with in-phase monitor or delayed transition transfer.
3. Neutral Switching (Single Phase, Three Wire and Three Phase, Four Wire Systems):
   a. Unless otherwise indicated or required, provide solid (unswitched) neutral.
   b. Unless otherwise indicated or required, provide neutral switching:
      1) For systems with ground fault protection.

2) Where the alternate/emergency source is a separately derived system.

4. Provide signal before transfer contacts for transfer switches serving elevators.

H. Construction Type: Only "contactor type" (open contact) transfer switches are acceptable. Do not use "breaker type" (enclosed contact) transfer switches.

I. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable.
2. Switch Action: Double Throw; mechanically held in both directions.
3. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units rated 225 A and greater have separate arcing contacts.
   a. Unassigned Auxiliary Contacts: Two (2) normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
   b. Engine Starting Contacts: One (1) isolated and normally closed, and one (1) isolated and normally open; rated 10 A at 32-V dc minimum.
4. 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.

J. Neutral Terminal: Solid and fully rated.

K. Automatic Transfer Switch:

L.

~~~ PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
MODIFY BASIS OF DESIGN FOR SCOPE OF PROJECT.

~~~ END OF PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~

1. Comply with Level 1 equipment according to NFPA 110.
2. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.
3. Manual Switch Operation: Unloaded. Control circuit automatically disconnects from electrical operator during manual operation.
4. Transfer Switch Type: Automatic transfer switch.
5. Transition Configuration: Open-transition (no neutral position).
6. Voltage: As indicated on the drawings.
7. Ampere Rating: As indicated on the drawings.
8. Neutral Configuration: Solid neutral (unswitched), except as indicated.
9. Load Served: As indicated on the drawings.
10. Primary Source: As indicated on the drawings.
11. Alternate Source: As indicated on the drawings.

M. Comply with NEMA ICS 10 Part 1, and list and label as complying with UL 1008 for the classification of the intended application (e.g. emergency, optional standby).

N. Do not use double throw safety switches or other equipment not specifically designed for power transfer applications and listed as transfer switch equipment.

O. Load Classification: Classified for total system load (any combination of motor, electric discharge lamp, resistive, and tungsten lamp loads with tungsten lamp loads not exceeding 30 percent of the continuous current rating) unless otherwise indicated or required.

P. Switching Methods:

1. Open Transition:
   a. Provide break-before-make transfer without a neutral position that is not connected to either source, and with interlocks to prevent simultaneous connection of the load to both sources.
   b. Where in-phase transfer is indicated, utilize in-phase monitor to initiate transfer when phase angle difference between sources is near zero to limit in-rush currents.
2. Delayed Transition:
   a. Provide break-before-make transfer with programmable time delay in a neutral position not connected to either source, and with interlocks to prevent simultaneous connection of the load to both sources.
3. Closed Transition:
   a. When both sources are available and synchronized, provide make-before-break transfer without interruption of power to the load and with momentary interconnection of both sources for not more than 100 ms, unless otherwise approved by Utility Company.
   b. Provide synchronization/in-phase monitor to initiate transfer when voltage and phase angle difference between sources are within predetermined requirements for synchronization.
   c. Source Synchronization Requirements: Phase angle differential within five degrees; voltage differential within five volts.
   d. When sources fail to synchronize within a predetermined time period, remain connected to current source and initiate an alarm.
   e. When sources remain interconnected for longer than specified maximum interconnection time, provide contact closure signal to shunt trip designated circuit breaker and initiate an alarm.
   f. Provide additional protective relaying where required by Utility Company.
   g. When only one source is available, automatically utilizes open transition (break-before-make) transfer.
4. Neutral Switching: Either simultaneously switched neutral (break-before-make) or overlapping neutral (make-before-break) methods are acceptable.
5. Obtain control power for transfer operation from line side of source to which the load is to be transferred.

Q. Service Conditions: Provide transfer switches suitable for continuous operation at indicated ratings under the service conditions at the installed location.

R. Enclosures:
1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
   a. Indoor Clean, Dry Locations: Type 1.
   b. Outdoor Locations: Type 3R.
2. Provide lockable door(s) for outdoor locations.
3. Finish: Manufacturer's standard unless otherwise indicated.

S. Short Circuit Current Rating:
1. Withstand and Closing Rating: Provide transfer switches, when protected by the supply side overcurrent protective devices to be installed, with listed withstand and closing rating not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 26 05 73 - Power System Studies.
2. Short Time Rating: Where the requirement for selectivity is indicated, provide transfer switches with short time ratings suitable for the maximum short time delay setting of the supply side overcurrent protective device.

T. Automatic Transfer Switches:

1. Description: Transfer switches with automatically initiated transfer between sources; electrically operated and mechanically held.
2. Control Functions:
   a. Automatic mode.
   b. Test Mode: Simulates failure of primary/normal source.
   c. Voltage and Frequency Sensing:
      1) Undervoltage sensing for each phase of primary/normal source; adjustable dropout/pickup settings.
      2) Undervoltage sensing for alternate/emergency source; adjustable dropout/pickup settings.
      3) Underfrequency sensing for alternate/emergency source; adjustable dropout/pickup settings.
      4) Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
   d. Outputs:
      1) Contacts for engine start/shutdown (except where direct generator communication interface is provided).
      2) Auxiliary contacts; one set(s) for each switch position.
      3) Signal before transfer (load disconnect) contacts; for selective load disconnection prior to transfer.
   e. Adjustable Time Delays:
      1) Engine generator start time delay; delays engine start signal to override momentary primary/normal source failure. Adjustable from zero to six seconds and factory set for one second.
      2) Transfer to alternate/emergency source time delay.
      3) Retransfer to primary/normal source time delay.
      4) Signal before transfer (load disconnect) contact time delay.
      5) Engine generator cooldown time delay; delays engine shutdown following retransfer to primary/normal source to permit generator to run unloaded for cooldown period.
      6) Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
   f. In-Phase Monitor (Open Transition Transfer Switches): Monitors phase angle difference between sources for initiating in-phase transfer.
   g. Synchronization/In-Phase Monitor (Closed Transition Transfer Switches): Monitors voltage and phase angle difference between sources for initiating synchronized transfer.
   h. Engine Exerciser: Provides programmable scheduled exercising of engine generator selectable with or without transfer to load; provides memory retention during power outage. Factory settings are for seven (7) day exercise cycle, twenty (20) minute running period, and five (5) minute cool-down period. Exerciser features include the following:
      1) Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
      2) Push-button programming control with digital display of settings.
      3) Integral battery operation of time switch when normal control power is not available.
   i. Retransfer to Normal Switch: Bypasses time delays for retransfer to primary/normal source.
   j. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of

condition of normal source. Flashing pilot light indicates override status. This condition shall also be indicated on the remove annunciator.

3. Status Indications:
   a. Connected to alternate/emergency source.
   b. Connected to primary/normal source.
   c. Alternate/emergency source available.
   d. Primary/normal source available.
   e. Audible Alarms: Transfer switch shall be equipped with audible alarms that indicate the transfer switch is in other than normal position. A silencing switch is permitted to be installed in the alarm circuit provided an “ALARM SILENCED” indicating light is installed.
4. Alarm Indications for Closed Transition Transfer Switches:
   a. Failure to synchronize.
   b. Extended source interconnection/transfer switch locked out.
5. Other Features:
   a. Event log.
   b. Communications Capability: Compatible with system indicated. Provide all accessories necessary for proper interface. Transfer switch digital communication interface to match capability of remote annunciator.
   c. Remote monitoring capability via PC.
6. Automatic Sequence of Operations:
   a. Upon failure of primary/normal source for a programmable time period (engine generator start time delay), initiate starting of engine generator where applicable.
   b. Where applicable, initiate signal before transfer (load disconnect) contacts at programmable time before transfer.
   c. When alternate/emergency source is available, transfer load to alternate/emergency source after programmable time delay.
   d. When primary/normal source has been restored, retransfer to primary/normal source after a programmable time delay. Bypass time delay if alternate/emergency source fails and primary/normal source is available.
   e. Where applicable, initiate shutdown of engine generator after programmable engine cooldown time delay.

U. Service Entrance Rated Transfer Switches:
   1. Furnished with integral disconnecting and overcurrent protective device on the primary/normal source and with ground-fault protection where indicated.
   2. Listed and labeled as suitable for use as service equipment according to UL 869A.

V. Bypass/Isolation Transfer Switches:
   1. Description: Factory-assembled units consisting of interconnected transfer switch and bypass/isolation switch that permits manual bypass and isolation of the transfer switch with connection of the load to either source.
   2. Bypass/Isolation Switch Type: Provide overlapping (make-before-break) switches with no interruption of power to load. Load break (break-before-make) switches that interrupt power to load are not acceptable.
   3. Bypass/Isolation Operation:
      a. Operable from exterior of enclosure.
      b. Normal Mode: Provides for normal operation of transfer switch.
      c. Test Mode: Provides for operational testing of bypassed transfer switch without affecting power to load.
      d. Isolate Mode: Provides for complete isolation of transfer switch from all power sources, permitting removal from unit.

W. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, either by color-code or by numbered or lettered wire and cable tape markers at terminations. Color-

coding and wire and cable tape markers are specified in Section 26 05 53 - Identification for Electrical Systems.

1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
4.

~~~ PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
ADJUST SWITCH STATUS INDICATIONS TO INCLUDE REQUIRED ALARMING AND VISUAL INDICATION OF ALARMS FOR SCOPE OF PROJECT.
~~~ END OF PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~~

X. Remote Annunciators:
   1. Remote Annunciator Mounting: Wall-mounted; Provide flush-mounted annunciator for finished areas and surface-mounted annunciator for non-finished areas unless otherwise indicated.
   2. Transfer Switch Status Indications:
      a. Connected to alternate/emergency source.
      b. Connected to primary/normal source.
      c. Alternate/emergency source available.
      d. Primary/normal source available.
      e. Failure of communication link.
      f. Switch in test mode.
   3. LED lamp type with audible signal and silencing switch.
      a. Indicating Lights: Grouped for each transfer switch monitored.
      b. Label each group, indicating transfer switch it monitors, location of switch, and identity of load it serves.
      c. Mounting: Flush, modular, steel cabinet, unless otherwise indicated.
      d. Lamp Test: Push-to-test or lamp-test switch on front panel.
      e. Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
         1) Normal Power Supervision: Green light with nameplate engraved "Normal Source Available".
         2) Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available".

Y. Interface with Other Work:
   1. Interface with engine generators as specified in Section 26 32 13 - Engine Generators.
   2. Interface with elevators as specified in Section 14 21 00 and 14 24 00.
      a. Utilize signal before transfer contacts to disconnect elevator(s) served prior to transfer.
      b.

~~~ PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
COORDINATE BAS SYSTEM INTEGRATION IF REQUIRED WITH DIVISION 23 SCOPE OF WORK.
~~~ END OF PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~~

   3. Interface with building automation system.
   4.

~~~ PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
COORDINATE INTEGRATION INTO EXISTING SYSTEM(S) IF REQUIRED FOR RENOVATION SCOPE OF WORK.
~~~ END OF PROJECT NOTE ~~~~~~~~~~~~~~~~~~~~~~~~~~

   5. Interface with Existing Work: _____.

3.03 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Perform production tests on transfer switches at factory to verify operation and performance characteristics prior to shipment. Include certified test report with submittals.

PART 4 - EXECUTION

4.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of transfer switches are consistent with the indicated requirements.

C. Verify that rough-ins for field connections are in the proper locations.

D. Verify that mounting surfaces are ready to receive transfer switches.

E. Verify that conditions are satisfactory for installation prior to starting work.

4.02 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

B. Install products in accordance with manufacturer's instructions.

C. Arrange equipment to provide minimum clearances and required maintenance access.

D. Provide required support and attachment in accordance with Section 26 05 29 - Hangers and Supports for Electrical Systems.

E. Install transfer switches plumb and level.

F. Unless otherwise indicated, mount floor-mounted transfer switches on properly sized 3 inch high concrete pad constructed in accordance with Section 03 30 00.

G. Provide grounding and bonding in accordance with Section 26 05 26 - Grounding and Bonding for Electrical Systems.

H. Identify transfer switches and associated system wiring in accordance with Section 26 05 53 - Identification for Electrical Systems.

4.03 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Board if necessary to accommodate required wiring.

B. Ground equipment according to Section 26 05 26 - Grounding and Bonding for Electrical Systems.

C. Connect wiring according to Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables.

4.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Provide services of a manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.

C. Prepare and start system in accordance with manufacturer's instructions.

D. Automatic Transfer Switches:
1. Inspect and test in accordance with NETA ATS, except Section 4.
2. Perform inspections and tests listed in NETA ATS, Section 7.22.3. The insulation-resistance tests listed as optional are not required.

E. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

F. Submit detailed reports indicating inspection and testing results and corrective actions taken.

G. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
1. Verify grounding connections and locations and ratings of sensors.

4.05 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

B. Clean equipment internally, on completion of installation, according to manufacturer's written instructions.

4.06 CONTRACTOR STARUP AND REPORTING

A. Engage a factory-authorized service representative to train Board's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below. Refer to Division 01 Section "Demonstration and Training."

B. Coordinate this training with that for generator equipment.

4.07 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

C. Demonstration: Demonstrate proper operation of transfer switches to Board, and correct deficiencies or make adjustments as directed.

D. Training: Train Board's personnel on operation, adjustment, and maintenance of transfer switches.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
2. Provide minimum of four hours of training.
3. Instructor: Manufacturer's authorized representative.
4. Location: At project site.

E. Coordinate with related generator demonstration and training as specified in Section 26 32 13 - Engine Generators.

4.08 PROTECTION

A. Protect installed transfer switches from subsequent construction operations.

4.09 COMMISSIONING AND DEMONSTRATION

A. Contractor shall prepare and submit a complete set of record drawings, test reports, operation and maintenance data, and certificates as outlined in this Section.

B. After system checkout and adjustment, the Contractor shall operate the system for the review of the Board and Architect/Engineer of Record. Necessary adjustments or modifications shall be made as required by the Board or Architect/Engineer of Record.

4.10 MAINTENANCE

A. See Section 01 70 00 - Execution Requirements, for additional requirements relating to maintenance service.

B. Provide to Board a proposal as an alternate to the base bid, a separate maintenance contract for the service and maintenance of transfer switches for two years from date of Preliminary Acceptance; Include a complete description of preventive maintenance, systematic examination, adjustment, inspection, and testing, with a detailed schedule.

C. Conduct site visit at least once every three months to perform inspection, testing, and preventive maintenance. Submit report to Board indicating maintenance performed along with evaluations and recommendations.

D. Provide trouble call-back service upon notification by Board:
1. Provide on-site response within 4 hours of notification.
2. Include allowance for call-back service during normal working hours at no extra cost to Board.
3. Board will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

E. Maintain an on-site log listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced.

END OF SECTION 26 36 00