SECTION 26 36 23.01 (16496B)
AUTOMATIC TRANSFER SWITCH &
BYPASS ISOLATION AUTOMATIC TRANSFER SWITCH
(CONTACTOR TYPE, ATC-300+ CONTROLLER, FRAME SIZES 1600A AND BELOW)

PART 1 GENERAL

1.01 SCOPE

A. Furnish and install the low voltage automatic transfer switches and bypass isolation automatic transfer switches having the ratings, features/accessories and enclosures as specified herein and as shown on the contract drawings.

1.02 RELATED SECTIONS

1.03 REFERENCES

A. The automatic transfer switches and bypass isolation automatic transfer switches shall be designed, manufactured and tested in accordance with the latest applicable standards of UL and NEMA as follows:
   1. UL 1008: Standard for Safety - Transfer Switch Equipment
   2. CSA C22.2 No. 178: Automatic Transfer Switches
   3. UL 991: Standard for Tests for Safety-Related Controls Employing Solid-State Devices
   4. NFPA 70: National Electrical Code
   5. NFPA 99: Essential Electrical Systems of Health Care Facilities
   6. NFPA 110: Emergency and Standby Power Systems
   7. NEMA ICS 10: Electromechanical AC Transfer Switch Equipment
   8. IEEE 446: Recommended Practice for Emergency and Standby Power Systems

1.04 SUBMITTALS – FOR REVIEW/APPROVAL

A. The following information shall be submitted to the Engineer:
   1. Front view and plan view of the assembly
   2. Schematic diagram
   3. Conduit space locations within the assembly.
   4. Assembly ratings including:
      a. Voltage rating
      b. Continuous current rating
      c. Withstand and closing ratings
   5. Cable terminal sizes
   6. Product data sheets.

B. Where applicable, the following additional information shall be submitted to the Engineer:
   1. Busway connection

2. Connection details between close-coupled assemblies
3. Composite front view and plan view of close-coupled assemblies

1.05 SUBMITTALS – FOR CONSTRUCTION

A. The following information shall be submitted for record purposes:
   1. Final as-built drawings and information for items listed in section 1.04
   2. Wiring diagrams
   3. Certified production test reports
   4. Installation information
   5. Seismic certification as specified

1.06 QUALIFICATIONS

A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.

C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

D. ▯ Provide Seismic tested equipment as follows:
   1. The equipment and major components shall be suitable for and certified by actual seismic testing to meet all applicable seismic requirements of the [latest International Building Code (IBC)] [latest California Building Code (CBC) with OSHPD Amendments]. [The equipment shall have OSHPD Special Seismic Certification (OSP) Pre-Approval.]
   2. The Project Structural Engineer will provide site specific ground motion criteria for use by the manufacturer to establish SDS values required.
   3. The IP rating of the equipment shall be 1.5
   4. The Structural Engineer for the Site will evaluate the SDS values published on the [Manufacturer's] [OSHPD] website to ascertain that they are "equal to" or "greater than" those required for the Project Site.
   5. The following minimum mounting and installation guidelines shall be met, unless specifically modified by the above referenced standards.
      a. The Contractor shall provide equipment anchorage details, coordinated with the equipment mounting provision, prepared and stamped by a licensed civil engineer in the state. Mounting recommendations shall be provided by the manufacturer based upon the above criteria to verify the seismic design of the equipment.
      b. The equipment manufacturer shall certify that the equipment can withstand, that is, function following the seismic event, including both vertical and lateral required response spectra as specified in above codes.
      c. The equipment manufacturer shall document the requirements necessary for proper seismic mounting of the equipment. Seismic qualification shall be considered

▯ Note to Spec. Writer - Optional

achieved when the capability of the equipment, meets or exceeds the specified response spectra.

1.07 REGULATORY REQUIREMENTS

A. Provide a UL1008 certificate of compliance for the transfer switches furnished under this section.

1.08 DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

B. Equipment being stored prior to installation shall be maintained in a clean and dry condition. If stored outdoors, indoor equipment shall be covered and heated, and outdoor equipment shall be heated.

1.09 FIELD MEASUREMENTS

1.10 OPERATION AND MAINTENANCE MANUALS

A. Equipment operation and maintenance manuals shall be provided with each assembly shipped, and shall include instruction leaflets and instruction bulletins for the complete assembly and each major component.

1.11 EXTRA PRODUCTS

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Eaton

B. □ _____

C. □ _____

D. The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer ten (10) days prior to bid date.

2.02 CONSTRUCTION

A. Transfer switches shall be UL 1008 listed for application in their intended enclosures at 100% of continuous ampere rating and shall meet or exceed UL 1008 endurance test criteria to include rate of operation and number of operation cycles.

1. The transfer switch shall be designed and intended for switching the load connection between two power sources.
2. The transfer switch shall include electrical and mechanical interlocks to prevent unintentional paralleling of the power sources.

□ Note to Spec. Writer – Insert data in blanks

3. The transfer switch shall be of double throw construction and the electrical operator shall be a reliable solenoid mechanism, momentarily energized.
4. There shall be a direct mechanical coupling to facilitate completion of an open in-phase transition such that any inrush current is equal to or less than normal starting current for inductive loads.
5. The transfer switch main contacts shall be of silver composition, electrically operated and mechanically held in position. Inspection of the main contacts shall be possible from the front of the transfer switch without major disassembly.
6. The transfer switch shall include removable arc chutes, housed within an arc chamber constructed of high-dielectric high-strength material, that are mounted over each set of main contacts. Arc chutes shall be constructed of metal plates and a baffle cover designed to extinguish an electrical arc and protect the main contacts.
7. The transfer switch shall include colored, mechanical position indication of the main contacts for source 1 and source 2.
8. The transfer switch will be supplied with a handle for manual operation and shall only be performed with the transfer switch de-energized to allow exercising the main contacts through their full range of motion for inspection.

B. [Transfer switches shall be open transition and provide an in-phase monitor that will permit a transfer or re-transfer between two live sources that have a phase angle difference of +/- 8 degrees or less.]

-- □ OR --

B. [Transfer switches shall be open transition, and provide a time delay in the “neutral position” adjustable from 0 to 120 seconds that will permit a delayed transition, and provide an in-phase monitor that will permit an in-phase transition between two live sources that have a phase angle difference of +/- 8 degrees or less. In the event that the sources do not synchronize to complete an in-phase transition within a time delay period adjustable from 1 to 60 minutes, the transfer switch shall be capable of defaulting to a delayed transition adjustable from 0 to 120 seconds.]

C. The transfer switch shall include a means of deriving control power for electrical operation. Control power transformers shall be multi-tap for ease of voltage adjustment in the field. Control power for all transfer operations shall be derived from the line side of the source to which the load is being transferred.

D. Transfer switches requiring a switched neutral shall include a fully-rated fourth pole that is identical to the other power poles. Switched neutral poles which are add-on, overlap or not capable of breaking full rated load current are not acceptable.

E. Transfer switches requiring a solid neutral shall include a fully rated, solid neutral plate.

F. Transfer switches intended for use as service equipment shall meet the following:
   1. UL1008 listed as a complete assembly to include the transfer switch, service disconnect, and overcurrent protection device(s). UL1008 listed transfer switches with an adjacent compartment or enclosure (used to house service disconnect or overcurrent protection devices), that are listed to UL891 only, will not be accepted.
   2. UL1008 listed and marked “continuous load current not to exceed 100 percent of switch rating”. Transfer switches marked as 80 percent will not be accepted.

□ Note to Spec. Writer – Select one

3. Provide overcurrent protection in the form of a molded case circuit breaker(s) equipped with an electronic trip unit [Eaton Digitrip 310+ or equivalent]. ▯ The electronic trip unit shall have the ability to be configured with energy-reducing maintenance switching [Eaton Arc Flash Reduction Maintenance System (ARMS) or equivalent] as a method to reduce arc energy and clearing time when the trip setting is rated or can be adjusted to 1200A or higher. A door-mounted light [blue] shall provide indication when energy-reducing maintenance switching is enabled.
4. Provide compartmentalized construction (steel barrier or equivalent) separating the transfer switch and overcurrent protection device(s).
5. Include a door-mounted, removable keyed switch that when rotated will disconnect the transfer switch load from the normal power source, trip the circuit breaker, and inhibit the remote engine start circuit.
6. Provide ground fault protection for use with solidly grounded wye electric services of more than 150 volts to ground where the service disconnect rating is 1000A or more.

2.03 ▯ BYPASS ISOLATION AUTOMATIC TRANSFER SWITCHES

A. The bypass isolation automatic transfer switch shall be constructed of an automatic transfer switch (ATS) and a Bypass Switch.

B. [The ATS and the bypass switch shall both be draw-out and front accessible. Field configurable bus links shall be provided to allow any combination of cable termination at the top and bottom for source 1, source 2, and load. The factory cable termination connections shall be with source 1 and load connections at top and source 2 connections at bottom.]

-- ▯ OR --

B. [The ATS shall be draw-out and the bypass switch shall be fixed mounted. Both shall be front accessible. Cable termination connections shall be ▯ [top] [bottom] entry.]

C. Both the ATS and Bypass Switch shall be capable of automatically transferring the load, in either direction, between the power sources. Automatic operation shall be self-acting and managed by the automatic controller. With the ATS isolated or removed, the Bypass Switch shall be capable of automatically initiating and completing a transfer. With the Bypass Switch isolated or removed, the ATS shall be capable of automatically initiating and completing a transfer.

D. Transitioning the load between the ATS and bypass switch shall be accomplished without an interruption of power to the load and without opening the enclosure door. Designs that incorporate a cutout in the enclosure to accommodate handles, and do not provide a continuous steel barrier for worker safety, will not be accepted.

E. The bypass isolation automatic transfer switch shall include electrical and mechanical interlocks to prevent unintentional paralleling of the power sources.

F. The bypass isolation transfer switch shall be constructed with two (2) doors and include the following:

1. the ATS and Bypass Switch shall be housed in separate compartments, with steel barrier, that are isolated from each other to facilitate safety and ease of maintenance. Each compartment shall include a door with pad-lockable handle.

▯ Note to Spec. Writer - Optional

▯ Note to Spec. Writer – Select one

2. A dedicated compartment, with steel barrier, that provides separation from the power conductor connections, ATS and bypass switch. Control wiring shall be harnessed with keyed disconnect plugs for ease of maintenance and customer connections shall be wired to a terminal block mounted inside the compartment.

G. A simple control panel with operator instruction shall include the following:
   1. A 2-position selector switch, labeled 'ATS – Bypass', shall be provided for transitioning the load between the ATS and Bypass Switch.
   2. A 3-position selector switch, labeled 'Source 1 - Off – Source 2', shall be provided to control non-automatic operation of the ATS or Bypass Switch
   3. A 3-position selector switch, labeled ''Test – Off - Manual Bypass', shall be provided.
      a. The 'Test' position shall enable exercising or testing the ATS while in the isolated position. The 3-position selector switch, labeled 'Source 1 – Off – Source 2', shall be used to manually control electrical operation of the ATS while in the isolated position.
      b. The 'Manual Bypass' position shall disable the automatic controller when operating in the bypass mode. The 3-position selector switch, labeled 'Source 1 – Off – Source 2', shall be used to manually control electrical operation of the bypass switch.

H. A racking mechanism shall be provided that is capable of moving the ATS into three different positions: 'connected', 'isolated', and 'disconnected'.
   1. When in the 'connected' position, the ATS shall be fully racked-in and connected to the main power bus and control power.
   2. When in the 'isolated' position the ATS will be disconnected from the main power bus, but remain connected to control power, and shall be capable of being electrically operated (without interruption of power to the load) for test and exercise purposes.
   3. When in the 'disconnected' position, the ATS will be fully racked-out and disconnected from the main power bus and control power. When in the 'disconnected' position, the ATS shall be capable of being removed from the enclosure for inspection or maintenance.

I. The Bypass Switch shall be capable of functioning as a non-automatic transfer switch and the operator shall have the ability to manually initiate a load transfer between the power sources, with the ATS connected, isolated or disconnected.

J. The ATS shall be capable of being racked-out to the isolated position with the enclosure door closed. A LED light shall be mounted on the control panel to indicate ATS racking position status. Safety interlocks shall be provided to prevent connecting or disconnecting the ATS from the main power bus with the main contacts closed.

K. □ A racking mechanism shall be provided that is capable of moving the Bypass Switch into two different positions: 'connected', and 'disconnected'.
   1. When in the 'connected' position, the Bypass Switch shall be fully racked-in and connected to the main power bus and control power.
   2. When in the 'disconnected' position, the Bypass Switch will be fully racked-out and disconnected from the main power bus and control power. When in 'disconnected' position, the Bypass Switch shall be capable of being removed from the enclosure for inspection or maintenance.

□ Note to Spec. Writer - Optional

L. ▯ The ATS shall be capable of functioning as a non-automatic transfer switch and the operator shall have the ability to manually initiate a load transfer between the power sources, with the Bypass Switch connected or removed.

M. The ATS or bypass switch shall be capable of manual operation when racked-out to the disconnected position.

N. The ATS and the bypass switch shall be constructed to carry full load current and factory interconnected with ▯ [silver plated] [tin plated] copper bus.

O. The bypass isolation automatic transfer switch shall be painted ANSI 61 grey with white interior.

All items specified in 2.02.A-E shall be provided.

2.04 ENCLOSURE

A. Each transfer switch shall be provided in a ▯ [NEMA 1] [NEMA 12] [NEMA 3R] [NEMA 4X] enclosure suitable for use in environments indicated in the drawings.

B. NEMA 1, 12, and 3R enclosures shall be painted with the manufacturer's standard light gray ANSI 61 paint. NEMA 4X shall be ▯ [304] [316] stainless steel.

2.05 MICROPROCESSOR CONTROLLER LOGIC

A. The transfer switch microprocessor controller logic shall be an Eaton ATC-300+ automatic controller. Operation of the transfer switch and monitoring of both sources shall be managed by the controller. The controller shall be hardened against transient voltages.

B. The automatic transfer switch controllers shall meet or exceed the following standards:

1. IEC 61000-4-2 - EMC Testing and Measurement Techniques - Electrostatic Discharge Immunity Test
2. IEC 61000-4-3 - EMC Testing and Measurement Techniques - Radio-frequency, Electromagnetic Field Immunity Test
3. IEC 61000-4-4 - EMC Testing and Measurement Techniques - Electrical Fast Transient/Burst Immunity Test
4. IEC 61000-4-5 - EMC Testing and Measurement Techniques - Surge Immunity Test
5. IEC 61000-4-6 - EMC Testing and Measurement Techniques - Immunity to Conducted Disturbances, Induced by Radio-frequency Fields
6. IEC 61000-4-11 - EMC Testing and Measurement Techniques - Voltage Dips, Short Interrupts and Voltage Variations Immunity Tests
7. CISPR11, Class A - Industrial, Scientific and Medical Radio-frequency Equipment - Electromagnetic Disturbance Characteristics - Limits and Methods of Measurement
8. FCC Part 15, Subpart B, Class A

C. The controller shall have an operating temperature range from -20 to +70 degrees C (-4 to +158 degrees F) and a storage temperature range from -30 to +85 degrees C (-22 to +185 degrees F). The controller faceplate shall be UV resistant.

▯ Note to Spec. Writer - Optional

▯ Note to Spec. Writer – Select one

D. The controller shall be capable of accepting 120Vac supply power from two (2) different sources.

2.06 CONTROLLER DISPLAY AND KEYPAD

A. The microprocessor-based controller faceplate shall be UV resistant and include a 2-line, 16-character, backlit display. The controller shall be capable of displaying transfer switch status, parameters, setpoints, and diagnostic data. All set point parameters shall be password protected.

B. The microprocessor-based controller shall include one (1) unit status LED (3mm) and a mimic power bus consisting of four (4) LED's (3mm) for indicating the following:

1. Availability status of Source 1
2. Availability status of Source 2
3. Connection status of Load to Source 1
4. Connection status of Load to Source 2

C. The controller keypad shall include the following pushbutton controls:

1. ENGINE TEST, for use with a generator source.
2. PREVOUS, and NEXT for ease of navigation
3. INCREMENT, DECREMENT, and ENTER for programming.
4. HELP/LAMP TEST, for operator assistance and diagnostics
5. BYPASS TIMER, to bypass time delay countdown

D. The controller shall display voltage and frequency for source 1, source 2, and the load.

E. The controller shall display the voltage dropout and pickup setpoints, for source 1 and source 2, in volts.

F. The controller shall display the frequency dropout and pickup setpoints, for source 1 and source 2, in hertz.

2.07 CONTROLLER VOLTAGE AND FREQUENCY MONITORING

A. The controller shall monitor voltage and frequency for source 1 and source 2.

B. The controller shall have a voltage range of 0-790 Vrms with an accuracy of +/- 1%. Nominal voltage shall be adjustable in 1 volt increments from 120 to 600 Vac.

C. The controller shall have a frequency range of 40-70 Hz with an accuracy of +/- 0.3 Hz. Nominal frequency shall be adjustable as 50 or 60Hz.

D. The normal and emergency sources shall include phase reversal protection. The preferred rotation is programmable as ABC or CBA.

E. Voltage and frequency dropout and pickup setpoints, for source 1 and source 2, shall be adjustable as a percentage of nominal per the table below. Pickup and dropout setpoints for overvoltage, underfrequency, overfrequency, and voltage unbalance / phase loss shall be capable of being disabled.

Setpoint	Sources	Dropout	Pickup
Undervoltage	Source1 and 2	70 – 97%	(DO + 2%) - 99%
Overvoltage	Source 1 and 2	105 – 110%	103% - (DO – 2%)
Underfrequency	Source 1 and 2	90 – 97%	(DO + 1Hz) – 99%
Overfrequency	Source 1 and 2	103 – 105%	101% - (DO – 1Hz)
Voltage Unbalance	Source 1 and 2	5 – 20%	3% to (DO – 2%)

2.08 CONTROLLER TIME DELAYS

A. A time delay shall be provided for transfer from source 1 to source 2, adjustable from 0 to 1800 seconds.

B. A time delay shall be provided on retransfer from source 2 to source 1, adjustable from 0 to 1800 seconds.

C. A time delay shall be provided for actuation of an engine start signal, adjustable from 0 to 120 seconds, for overriding momentary power fluctuations.

D. A time delay shall be provided allowing the load connection to remain in the “neutral position” (disconnected from source 1 and source 2), adjustable from 0 to 120 seconds.

E. A time delay shall be provided that allows the generator to run unloaded, adjustable from 0 to 0-1800 seconds, for cool-off prior to shut down.

F. A time delay shall be provided to postpone the generator source from being declared unavailable, fixed at 6 seconds, for overriding momentary power fluctuations.

G. A time delay shall be provided for actuation of a pre-transfer signal, adjustable from 0 to 120 seconds. The contact shall be a form-c contact rated for 10-Amp at 250-Vac and 10-Amp at 30-Vdc.

H. A time delay shall be provided to allow synchronization of sources, adjustable from 0 to 60 minutes (0 to 600 seconds), for use with in-phase transition transfer.

I. A time delay shall be provided for voltage unbalance, adjustable from 10 to 30 seconds.

J. All time delays shall be programmable, using the controller keypad, without the use of special tools.

2.09 CONTROLLER ADDITIONAL FEATURES

A. A setpoint shall be provided for entering a four-digit password, adjustable from 0000-9999, for controlling user access to programmable time delays, inputs, outputs, and other system settings.

B. A setpoint shall be provided for configuring retransfer operation mode, adjustable as [automatic, manual].

C. A setpoint shall be provided to change date, time, and enable daylight saving time (DST).

D. A setpoint shall be provided for configuring in-phase transition operation, adjustable as [disabled, enabled].

E. A setpoint shall be provided for configuring a frequency difference range between sources for in-phase transition, adjustable from 0 to 3 hertz nominal.

F. A setpoint shall be provided for configuring serial communication baud rate [9600-19200] and Modbus address [1-247].

2.10 CONTROLLER DATA LOGGING

A. The controller shall record, store and display a cumulative counter history of the following parameters. Each counter shall have the ability to be reset and indicate the last reset date.

1. Source 1 Available time
2. Source 2 Available time
3. Source 1 Connected time
4. Source 2 Connected time
5. Engine Run time
6. Load Energized Time
7. Number of Transfers
8. Date, Time and Reason for Last Sixteen (16) transfers

2.11 CONTROLLER PLANT EXERCISER

A. The controller shall provide a programmable engine plant exerciser.

B. Each engine plant exerciser shall provide the following user programmable setpoints that are only applicable during an engine test:

1. Test schedule, adjustable to [disabled, daily, 7-day interval, 14-day interval, 28-day interval].
2. Start time in hours and minutes, AM or PM.
3. Day of the week (Sun, Mon, Tues, Wed, Thurs, Fri, Sat)
4. Test mode, adjustable to [disabled, no load transfer, loaded transfer].
5. Run time, adjustable from 0 to 600 minutes (0 to 6000 seconds).

C. A failsafe shall initiate an automatic retransfer to source 1 if source 2 should fail during an engine test.

2.12 CONTROLLER INPUTS

A. The controller shall include two (2) dedicated inputs for monitoring the position of the main contacts (source 1 and source 2).

B. The controller shall include five (5) control inputs that provide 10mA @ 24-Vdc. Each input shall be capable of accepting an external dry contact and will be configured with following functionality:

1. Monitor mode – disable automatic operation of the controller while continuing to display status information and allow set point programming.
2. Lockout – disable automatic operation of the controller and lock-out an integral overcurrent protection device (circuit breaker).
3. Manual retransfer - remotely initiate a retransfer from source 2 to source 1.

4. Go to emergency - initiate a transfer of the load to the emergency source (source 2). A failsafe shall initiate an automatic retransfer to source 1 if source 2 should fail.
5. Emergency inhibit/shed – remotely inhibit transfer of the load to the emergency source (source 2) or shed the load from the emergency source (source 2) if already connected.

2.13 CONTROLLER OUTPUTS

A. The controller shall provide four (4) dedicated Form A relay outputs for controlling the power switch device.

B. The controller shall provide one (1) dedicated Form A relay output for an engine start signal, for use with a generator source. The contact shall be rated for 5A @ 250-Vac / 5A @ 30-Vdc.

C. The controller shall provide one (1) dedicated Form C relay output for Pre-transfer and the contacts shall be rated for 10A @ 250-Vac / 10A @ 30-Vdc.

D. The controller shall provide one (1) dedicated Form C relay output for General Alarm and the contacts shall be rated for 10A @ 250-Vac / 10A @ 30-Vdc.

2.14 CONTROLLER COMMUNICATION

A. Serial communication (RS-485) with support for Modbus RTU protocol shall be provided with an integral network termination resistance that can be switched on/off.

B. □ Ethernet communication □ [Serial-Ethernet adapter] [Serial-Ethernet gateway] shall be provided.

2.15 AUTOMATIC TRANSFER SWITCH OPTIONAL ACCESSORIES

A. □ Non-automatic control (open transition ATS): Provide a 2-position selector switch, maintained contact, marked: “Automatic” and “Non-Automatic”. Provide a 2-position, maintained contact, selector switch labeled “Source 1” and “Source 2”. The transfer switch shall be electrically operated by manually actuating the 2-position selector switch labeled “Source 1” and “Source 2”. A 30mm pilot light shall be provided labeled “Not in Automatic”.

B. □ Non-automatic control (open delayed transition ATS): Provide a 2-position selector switch, maintained contact, marked: “Automatic” and “Non-Automatic”. Provide a 3-position, maintained contact, selector switch labeled “Source 1”, “Off”, and “Source 2”. The transfer switch shall be electrically operated by manually actuating the 3-position selector switch labeled “Source 1”, “Off”, and “Source 2”. A 30mm pilot light shall be provided labeled “Not in Automatic”.

C. □ Manual retransfer control: Provide a pushbutton, momentary contact, marked: “Manual Retransfer”. The ATS shall remain connected to the emergency source (source 2) after the normal source (source 1) becomes available until a momentary pushbutton contact closure signal initiates the retransfer. Should a failure of the emergency source occur while waiting for the pushbutton contact closure, the retransfer shall occur automatically.

D. □ Emergency inhibit/shed: Provide a 2-position keyed selector switch, maintained contact. The selector switch shall be wired to a controller input to inhibit transfer of the load to the

□ Note to Spec. Writer – Select one
□ Note to Spec. Writer - Optional

emergency source (source 2) or shed the load from the emergency source if already connected. Provide a 30mm white pilot light indicating inhibit status.

E. □ Go to emergency: Provide a 2-position selector switch, maintained contact. The selector switch shall be wired to a controller input to initiate transfer of the load to the emergency source (source 2). A failsafe shall initiate an automatic retransfer upon failure of the emergency source.

F. □ Monitor mode: Provide a 2-position selector switch, maintained contact. The selector switch shall be wired to a controller input to disable automatic operation of the controller while continuing to display status information and allow setpoint programming.

G. □ Surge protection device: Provide a □ [50KA] [80KA] [100KA] [200KA] surge protection device as indicated on the drawings.

H. □ Space heater: Provide a 100W rated space heater with thermostat.

I. □ Metering

Provide power metering per the following:

Note to Spec. Writer:

Select devices as required. Refer to section 26 27 13.11 (16901) for detailed specification of "Microprocessor-Based Metering Equipment" as follows:

Power Xpert Series, PXM4000/6000/8000 (Paragraph 2.02.A)

Power Xpert Series, PXM2250/2260/2270/2280/2290 (Paragraph 2.02.B)

IQ-250/260 Series (Paragraph 2.02.C)

IQ100 Series (Paragraph 2.02.D)

J. □ HMi Remote Annunciator Controller:

1. Provide a flush mount panel operator interface device that is capable of remotely managing up to eight (8) automatic transfer switches and includes the following:
   a. Color touchscreen display
   b. Single overview screen that allows an operator to view the status of up to eight (8) automatic transfer switches.
   c. Single overview screen that allows an operator to view the detailed status and vitals of each automatic transfer switch.
   d. Mimic power bus that displays a unique designation for each automatic transfer switch monitored and includes indication of source available, source connected, and preferred source.
   e. Monitoring and indication of the following:
      1. source 1 and source 2 available
      2. source 1 and source 2 connected
      3. source 1 and source 2 preferred
      4. under/over voltage
      5. under/over frequency
      6. engine test active

□ Note to Spec. Writer – Select one

□ Note to Spec. Writer - Optional

7. transfer in progress
8. waiting for manual retransfer
9. event history
10. delay timer countdown
11. go to emergency active
12. emergency inhibit
13. monitor mode / lockout
14. communication link failure.

f. Control of the following with password protection:
1. Start/stop engine test.
2. Initiate go to emergency / cancel go to emergency
3. Alarm silence
4. Remote alarm reset
5. Bypass timers
6. Manual retransfer

g. Electrical Metering
1. Voltage and frequency for source 1, source 2, and load
2. □ Current and power for the load

h. Remotely manage controller setpoints.

i. Communication compatible with ATS controller.

2. □ Provide a HMi remote annunciator controller wall mount enclosure.

□ Note to Spec. Writer - Optional

PART 3 ADDITIONAL REQUIREMENTS

Note to Spec Writer:
Select from the table below to fill in the data required for 3.01

TABLE 1

SHORT-CIRCUIT WITHSTAND CLOSING RATING (KA)

TRANSFER SWITCH AMPERES	WITHSTAND CLOSING RATING, SPECIFIC BREAKER, 480V MAX	WITHSTAND CLOSING RATING, SPECIFIC BREAKER, 600V MAX	WITHSTAND CLOSING RATING, SPECIFIC FUSE, 600V MAX	WITHSTAND CLOSING RATING, SPECIFIC BREAKER, BYPASS ISOLATION, 480V MAX	WITHSTAND CLOSING RATING, SPECIFIC BREAKER, BYPASS ISOLATION, 600V MAX	WITHSTAND CLOSING RATING, SPECIFIC FUSE, BYPASS ISOLATION, 600V MAX
40	50 (30[1])	35 (22[1])	200 (100[1])	50	35	200
80	50 (30[1])	35 (22[1])	200 (100[1])	50	35	200
100	50 (30[1])	35 (22[1])	200 (100[1])	50	35	200
150	50 (30[1])	35	200 (100[1])	50	35	200
200	50 (30[1])	35	200 (100[1])	50	35	200
225	50	65	200	50	65	200
260	50	65	200	50	65	200
400	50	65	200	50	65	200
600	65	65	200	65	65	200
800	65	65	200	65	65	200
1000	65	65	200	65	65	200
1200	65	65	200	65	65	200
1600	65	NA	200 (<= 480V)	65	NA	200 (<= 480V)

Note 1: WCR values shown in parenthesis only apply to open transition transfer switches with an in-phase monitor (first selectable option in 2.02.B) that are not constructed for delayed transition.

3.01 WITHSTAND AND CLOSING RATING

A. The transfer switch shall be UL1008 listed and rated for use in a circuit capable of delivering the short-circuit current shown on the contract drawings.

B. The transfer switch shall have a short-circuit withstand and closing rating of ▯_____ KA at ▯ _____ volts when protected by a specific circuit breaker.

C. The transfer switch shall have a short-circuit withstand and closing rating of ▯_____ KA at ▯ _____ volts when protected by a specific fuse.

▯ Note to Spec. Writer – Insert data in blanks

PART 2

4.01 EXAMINATION

4.02 FACTORY TESTING

A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of UL and NEMA standards.
   1. Insulation check to ensure the integrity of insulation and continuity of the entire system
   2. Visual inspection to ensure that the switch matches the specification requirements and to verify that the fit and finish meet quality standards
   3. Mechanical tests to verify that the switch's power sections are free of mechanical hindrances
   4. Electrical tests to verify the complete electrical operation of the switch and to set up time delays and voltage sensing settings of the logic

B. The manufacturer shall provide a certified copy of factory test reports.

C. Transfer switch shall include a label indicating order number, catalog number and date

4.03 INSTALLATION

A. The contractor shall install all equipment per the manufacturer’s recommendations and in accordance with the contract drawings

B. All necessary hardware to secure the assembly in place shall be provided by the contractor.

4.04 FIELD QUALITY CONTROL

A. ☐ Provide the services of a qualified factory-trained manufacturer’s representative to assist the contractor in installation and start-up of the equipment specified under this section for a period of ☐ ____ working days. The manufacturer’s representative shall provide technical direction and assistance to the contractor in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained therein.

4.05 MANUFACTURER’S CERTIFICATION

A. ☐ A qualified factory-trained manufacturer’s representative shall certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer’s recommendations.

B. The contractor shall provide a copy of the manufacturer’s representative’s certification.

4.06 TRAINING

A. ☐ The [contractor] OR [manufacturer’s qualified representative] shall conduct a training session for up to five (5) owner’s representatives for ☐____ normal workdays at a jobsite location determined by the owner. The training program shall consist of the instruction on the operation of the transfer switch and the major components within the assembly.

☐ Note to Spec. Writer - Optional

☐ Note to Spec. Writer – Insert data in blanks

4.07 FIELD SERVICE ORGANIZATION

A. The manufacturer of the ATS shall also have a national service organization that is available throughout the contiguous United States and is available on call 24 hours a day, 365 days a year.