Powering Business Worldwide

Operation and Maintenance Manual, Automatic Transfer Switch, Bypass Isolation, Dual Drawout, Contactor Type, Open/Closed Transition, ATC-900 Controller, 800/1200/1600A Frame

Instruction Booklet

04/2020

⚠ WARNING

READ AND UNDERSTAND THE INSTRUCTIONS CONTAINED HEREINAFTER BEFORE ATTEMPTING TO UNPACK, ASSEMBLE, OPERATE, OR MAINTAIN THIS EQUIPMENT.

WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E, OSHA AND OTHER APPLICABLE REQUIREMENTS PERTAINING TO OPERATOR SAFETY PRIOR TO SERVICING EQUIPMENT. ALL WORK ASSOCIATED WITH SUCH ELECTRICAL EQUIPMENT SHOULD BE PERFORMED ONLY BY A QUALIFIED/COMPETENT PERSON AS DEFINED BY APPLICABLE REGULATION WHO SHOULD ALSO FOLLOW ALL APPLICABLE PROTECTIVE CLOTHING SYSTEM REQUIREMENTS AND REVIEW APPROPRIATE HAZARD ASSESSMENT AND ENERGY CONTROL PRECAUTIONS AND PROCEDURES. FAILURE TO FOLLOW THIS WARNING COULD LEAD TO DEATH OR SEVERE INJURY.

TRANSFER SWITCH EQUIPMENT COVERED BY THIS INSTRUCTION BOOK IS DESIGNED AND TESTED TO OPERATE WITHIN ITS NAMEPLATE RATINGS. OPERATION OUTSIDE OF THESE RATINGS MAY CAUSE THE EQUIPMENT TO FAIL RESULTING IN DEATH, SERIOUS BODILY INJURY, AND/OR PROPERTY DAMAGE. ALL RESPONSIBLE PERSONNEL SHOULD LOCATE THE DOOR MOUNTED EQUIPMENT NAMEPLATE AND BE FAMILIAR WITH THE INFORMATION PROVIDED ON THE NAMEPLATE. A TYPICAL EQUIPMENT NAMEPLATE IS SHOWN IN FIGURE 1.

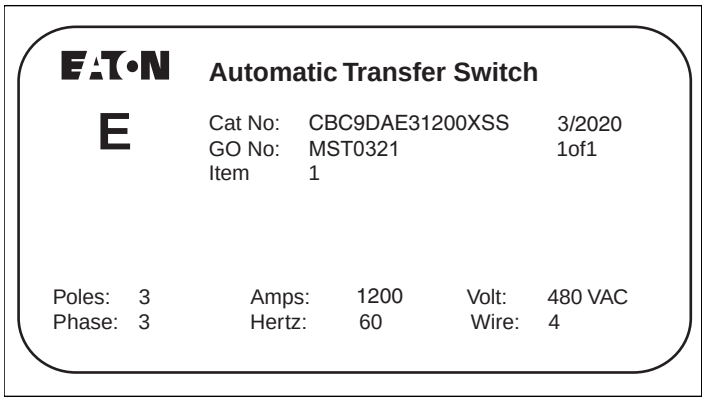

Figure 1. Typical Automatic Transfer Switch Equipment Nameplate.

NOTICE

A FINAL INSPECTION OF THE EQUIPMENT SHOULD BE PERFORMED PRIOR TO ENERGIZING THE TRANSFER SWITCH.

Step 1: Remove any dirt or debris that may have collected during shipment or installation. NEVER use high pressure blowing air. This could drive dirt or other foreign objects into electrical or mechanical components which could cause damage. Use an industrial quality vacuum cleaner to remove any dirt or foreign objects.

Step 2: Be certain all cable connections are correct and that the phase rotation of both sources match.

Step 3: Inspect the engine start connections and verify the correct connection of all control wires.

Step 4: Check all programmable setpoints and adjust as necessary. In addition, adjust any optional accessories as required.

Step 5: Be certain that the actual lug torque values are in keeping with the requirements outlined in this instruction book to insure the integrity of power connections.

Step 6: Check to be sure that all covers and barriers are properly installed and fastened.

ALL POSSIBLE CONTINGENCIES WHICH MAY ARISE DURING INSTALLATION, OPERATION, OR MAINTENANCE, AND ALL DETAILS AND VARIATIONS OF THIS EQUIPMENT DO NOT PURPORT TO BE COVERED BY THESE INSTRUCTIONS. IF FURTHER INFORMATION IS DESIRED BY THE PURCHASER REGARDING HIS PARTICULAR INSTALLATION, OPERATION, OR MAINTENANCE OF PARTICULAR EQUIPMENT, CONTACT AN EATON REPRESENTATIVE.

Section 1: Introduction

1.1 Preliminary Comments and Safety Precautions

This technical document is intended to cover most aspects associated with the installation, application, operation, and maintenance of ATC-900 controlled bypass contactor based transfer switch equipment with ratings from usually 400 through 1600 amperes (A). It is provided as a guide for authorized and qualified personnel only. Please refer to the specific WARNING and CAUTION in Section 1.1.2 before proceeding. If further information is required by the purchaser regarding a particular installation, application, or maintenance activity, contact an Eaton representative (See Section 7.4 for Eaton Care number). For information associated with the control, refer to the separate instruction book for the ATC-900 included in the packet.

1.1.1 Warranty and Liability Information

No warranties, expressed or implied, including warranties of fitness for a particular purpose of merchant-ability, or warranties arising from course of dealing or usage of trade, are made regarding the information, recommendations and descriptions contained herein. In no event will Eaton be responsible to the purchaser or user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss whatsoever, including but not limited to damage or loss of use of equipment, plant or power system, cost of capital, loss of power, additional expenses in the use of existing power facilities, or claims against the purchaser or user by its customers resulting from the use of the information and descriptions contained herein.

1.1.2 Safety Precautions

All safety codes, safety standards, and/or regulations must be strictly observed in the installation, operation, and maintenance of this device.

⚠ WARNING

THE WARNINGS AND CAUTIONS INCLUDED AS PART OF THE PROCEDURAL STEPS IN THIS DOCUMENT ARE FOR PERSONNEL SAFETY AND PROTECTION OF EQUIPMENT FROM DAMAGE. AN EXAMPLE OF A TYPICAL WARNING LABEL HEADING IS SHOWN ABOVE TO FAMILIARIZE PERSONNEL WITH THE STYLE OF PRESENTATION. THIS WILL HELP TO INSURE THAT PERSONNEL ARE ALERT TO WARNINGS, WHICH APPEAR THROUGHOUT THE DOCUMENT. IN ADDITION, CAUTIONS ARE ALL UPPER CASE AND BOLDFACE.

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⚠ CAUTION

DO NOT ATTEMPT TO SERVICE OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. FAILURE TO FOLLOW THIS WARNING COULD LEAD TO DEATH OR SEVERE INJURY. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT PRIOR TO SERVICING. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO OPERATING, INSPECTING OR SERVICING EQUIPMENT.

Section 2: Receiving, Handling, and Storage

2.1 Receiving

Every effort is made to ensure that the transfer switch equipment arrives at its destination undamaged and ready for installation. Crating and packing is designed to protect internal components as well as the enclosure. Transfer switch enclosures are skid mounted and suited for fork lift movement. Care should be exercised, however, to protect the equipment from impact at all times. Do not remove the protective packaging until the equipment is at the installation location and ready for installation.

When the transfer switch equipment reaches its destination, the customer should inspect the shipping container for any obvious signs of rough handling and/or external damage incurred during transportation. Record any external and internal damage observed for reporting to the transportation carrier and Eaton, once a thorough inspection is completed. All claims should be as specific as possible and include the Shop Order and General Order numbers.

A shipping label which includes a variety of equipment and customer information, such as General Order Number (GO #) and Catalog Number (Cat #) is affixed to the top of the shipping container. Make certain that this information matches other shipping paper information.

Each transfer switch enclosure is bolted to a rigid wooden pallet. The pallet is open at two ends for movement by a fork lift. The shipment is secured and further protected with shrink wrap. Do not discard the packing material until the equipment is ready for installation.

A vinyl packet of documents will be found within the enclosure, usually attached to the inside of the door. Important documents, such as test reports, wiring diagrams, and appropriate instruction leaflets, are enclosed within the paclet and should be filed in a safe place. There may also be keys for the unit depending on the options.

2.2 Handling

As previously mentioned, the transfer switch equipment is packaged for fork lift movement. Once the equipment is at the installation location and ready for installation, the packaging material can be removed. Once the enclosure is unbolted from the wooden pallet, it can be installed using the lifting provision located on the top of the structure. The outside brackets are for shipping purposes only. Us the internal seismic washers with bolts as shown in Section 3. The transfer switch weight is from 2100 lbs to 2400 lbs depending on the build.

2.3 Storage

Although well packaged, this equipment is not suitable for storage outdoors. The equipment warranty will not be applicable if there is evidence of outdoor storage. If the equipment is to be stored indoors for any period of time, it should be stored with its protective packaging material in place. Protect the equipment at all times from excessive moisture, construction dirt, corrosive conditions, and other contaminants.

It is strongly suggested that the package-protected equipment be stored in a climate controlled environment of -20° to 85°C (-4° to 185°F) with a relative humidity of 80% or less.

⚠ WARNING

THE CLOSED TRANSITION PRODUCT CONTAINS A SPECIAL CONTACT ARRANGEMENT (OVERLAPPING CONTACTS). MISUSE CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, AND/OR PROPERTY DAMAGE.

2.4 General Information

Transfer switches are used to protect critical electrical loads against loss of power. This is the next generation bypass isolation ATS with enhanced serviceability features for current ratings up to 1600 amps. Additional frame sizes are available within the same product family for current ratings up to 400 amps and up to 3000 amps. The Source 1 power source of the load is backed-up by a Source 2 power source. A transfer switch is connected to both the Source 1 and Source 2 power sources and supplies the load with power from one of these two sources. In the event that power is lost from the Source 1 power source, the transfer switch transfers the load to the Source 2 power source. This open transition transfer can be automatic or manual, depending upon the type of transfer switch equipment being used. Once Source 1 power is restored, the load is automatically or manually transferred back to the Source 1 power source, again depending upon the type of transfer equipment being used.

In addition, the closed transition feature may be applied where it is desirable to avoid any momentary power interruptions. If both sources are acceptable as determined by the ATC-900 controller, a make-before-break transition is performed during a transfer or retransfer operation.

2.4.1 Transfer Switch

Open/closed transition bypass isolation type automatic transfer switches consist of four basic elements.

1. Main contacts to connect and disconnect the load to and from the source of power.
2. Intelligence/supervisory circuits to constantly monitor the condition of the power sources and thus provide the intelligence necessary for the transfer switch and related circuit operation, including safety related logic.
3. Switching devices to effect the transfer of the main contacts from source to source.
4. Voltage selection, bypass selection, and transformer panel.

The Bypass Isolation Switch shown in Figure 2 is designed for applications where maintenance, inspection, and testing must be performed while maintaining continuous power to the load. This is typically required in critical life support systems and standby power situations calling for safe system maintenance with no power disruptions. Such a design allows for the quick removal of either (patented) switching devices for inspection, maintenance, or replacement. See Section 3 for more information.

2.4.2 Design Configuration

The Eaton transfer switch is a rugged, compact design utilizing power contactors to transfer essential loads from one power source to another. Open transition switching devices are interlocked electrically to prevent both switching devices from being closed at the same time.

The switching devices are in a compact vertical arrangement. The logic of the maintenance isolation switch follows the Product Line's smartEST (smart Eaton Switch Technology) switch approach. It contains the patented Dual Automatic Contactor operation. The controller is tied to both contactors making them both totally automatic. A standard maintenance isolation switch (MIS) and slider right door make the switch very safe and easy to maintain and work with. This is the second segment of the new family of contactor Bypass maintenance isolation switches: the 3K, 1600 (&1200), and 400 amp.

The switching devices have a high withstand/close rating (Table 1). Figure 3 shows the schematic of the Bypass Isolation Switch. As mentioned, the unit can also be operated as a redundant automatic switch with the controller being fully activated with the primary (ATS) or redundant (Bypass) switch. There is not a need to move the Bypass contactor to the ATS slot if the ATS contactor is removed for a dual redundant switch to operate. One contactor can perform Open operations. Two contactors are required for Closed operations.

Table 1. 800/1200/1600 Amp Frame Bypass Isolation ATS.

UL 1008 WITHSTAND AND CLOSE-ON RATINGS	480 VOLTS	480 VOLTS	600 VOLTS	600 VOLTS
	Time-based (0.05 sec)	Specific Breaker	Time-based (0.05 sec)	Specific Breaker
100	50,000	65,000	42,000	65,000
200	50,000	65,000	42,000	65,000
400	50,000	65,000	42,000	65,000
600	50,000	65,000	42,000	65,000
800	50,000	65,000	42,000	65,000
1000	50,000	65,000	42,000	65,000
1200	50,000	65,000	42,000	65,000
1600	50,000	65,000	---	---

Tested and listed in accordance with UL1008.

See specific breaker listing for all current breakers listed per UL1008 specification.

When protected by Fuses at test voltage of 600V (1600 consult factory)

-Fuse Rating: 200 kA

-Fuse Types: L,R,J,T

-Max Fuse Amps: 1600A

Figure 2. ATS (#1) or Bypass (#2) Shown in Removal Position.

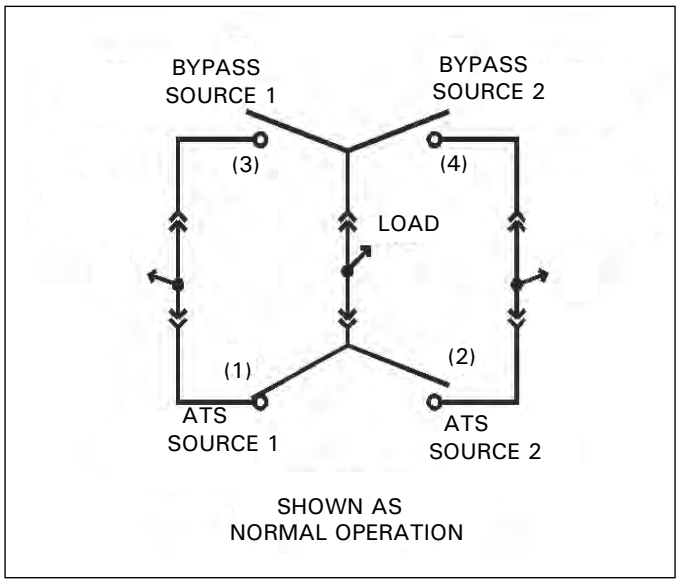

Figure 3. Typical Bypass Isolation Switch, Dual Drawout.

2.5 Draw-out Switching Devices

All switching devices are 100% rated (including the neutral), Underwriters Laboratories (UL) 1008 listed, and are built and tested in an ISO 9001 certified facility to applicable NEMA, ANSI, IEEE, and UL standards.

There is no difference in the bottom contactor vs the top contactor. The bottom contactor is referred as the ATS (or #1) and the top contactor is the Bypass (or #2). Figure 4 shows the two contactors in the switch. Either contactor can do all of the transfers for the loads during the life of the switch. Both contactors are mounted with mechanical and electrical safety interlocks, in a "slide" mechanism (Figure 5), allowing the switching device to be "drawn-out"and isolated for testing or further removed for service, maintenance, and/or replacement. After in the isolated position, to further rack out (remove), the door needs to be opened.

Figure 4. Contactor Devices Installed in the Transfer Switch, Both are Identical.

⚠ WARNING

DO NOT ATTEMPT TO REMOVE EITHER CONTACTOR WITHOUT A LIFTING DEVICE AND BEFORE THE SWITCH IS MOUNTED TO THE FLOOR.

2.5.2 Draw-out Switching Devices

The ATS draw-out switching device is a design having three positions with the compartment door closed (RACKED IN, ISOLATED, RAKED OUT). Figure 5 shows the contactor fully disconnected from the transfer switch. It is ready for removal. The ATS draw-out switching device is equipped with both primary and secondary disconnects to provide for the draw-out functioning. The primary contacts (Figure 6) are for the high current S1, S2, and load contacts. The secondary contacts are the control and feedback contacts. The secondary connectors are on the top of the contactor and are somewhat floating for easy racking-in. The operating mechanism is electrically operated and also has a mechanical manual operation if required in an emergency. The user can choose between three modes of operation, Automatic, Non-Automatic, and Manual. When removed, either switching device can be inspected, tested, and minor maintenance performed. The inside of the compartment can also be inspected with the ATS switching device withdrawn. Caution must be taken as there is voltage on the run-backs (copper) in the back of the cell once the contactor is removed.

⚠ WARNING

EXERCISE CAUTION WHEN PERFORMING MAINTENANCE OR SERVICING EQUIPMENT WHILE IT IS ENERGIZED. FAILURE TO FOLLOW THIS WARNING COULD LEAD TO DEATH OR SEVERE INJURY. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING OR OPERATING EQUIPMENT.

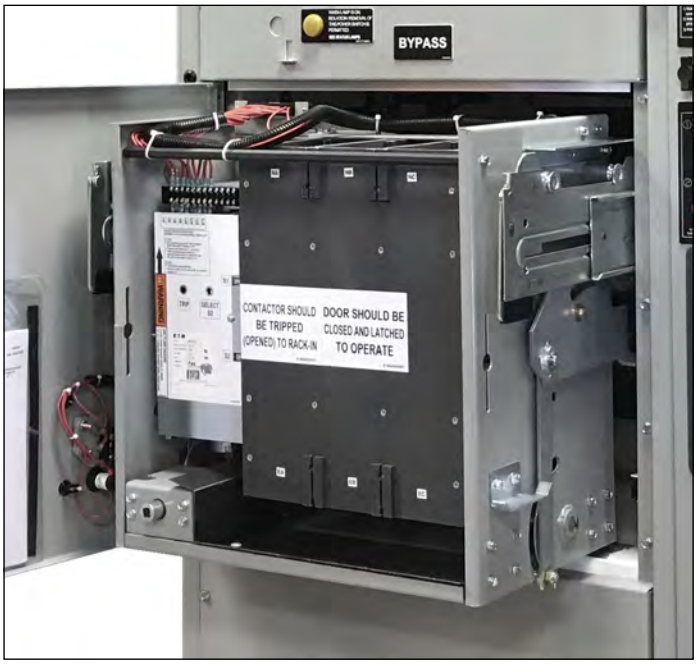

Figure 5. Draw-out Switching Device Extended on Rails for Removal.

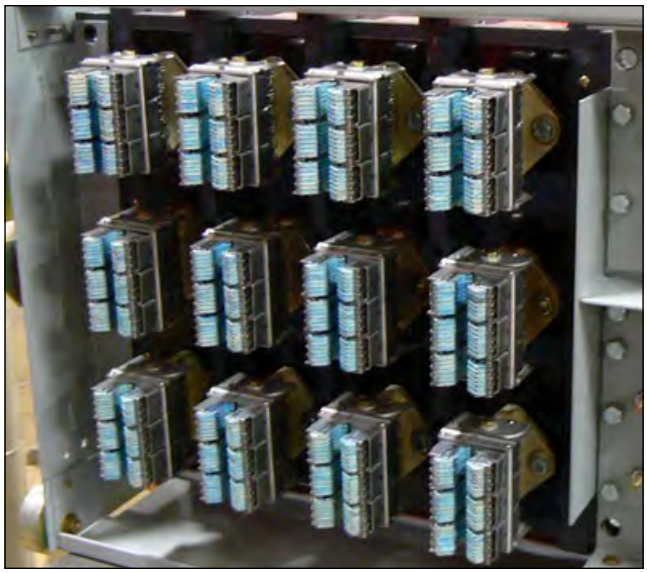

Figure 6. Four Pole Primary Connections on the ATS Switching Device, Secondary Connections (Not Shown) on Top.

2.6 Transfer Switch Catalog Number Identification

Transfer switch equipment catalog numbers provide a significant amount of relevant information that pertains to a particular piece of equipment. The catalog number identification table (Table 2) provides the required interpretation information. An example for an open transition switch is offered to initially simplify the process.

Example: Catalog Number (circled numbers correspond to position headings in Table 2).

①to②	③	④	⑤ to ⑥	⑦	⑧	⑨to⑫	⑬	⑭	⑮
CB	C	9	DA	E	3	1200	X	S	S

The catalog number CBC9DAE31200XSS describes a dual drawout 1200 A bypass isolation transfer switch with the switching devices mounted vertically in the enclosure. The intelligence, represented by the ATC-900 is a microprocessor-based logic package. The contactor is used as the switching device and it is a 3 position type. The continuous current rating of this equipment is 1200A (or 1600A depending on the model). The 1600A is a deeper enclosure, see Figure 13 for the dimensions of both, and is applicable up to 600 Vac, 60 Hz. The transfer switch equipment is enclosed in a NEMA 1 enclosure and is listed for Underwriters Laboratories (UL) and Canadian Standards Association (CSA) applications.

Table 2. Transfer Switch Catalog Number Explanation.

BI C 9 DA E 3 1200 X S S

Type	Orientation	Logic	Frame	Switch	Number of Poles	Amperes	Voltage	Enclosure	Configuration
BI = Automatic, Open Delayed Transition Bypass	C = Contactor	9 = ATC-900	**CA** = 400A **DA** = 1200A **EA** = 1600A **FA** = 3000A **GA** = 3000A **HA** = 800A	E = Draw ATS and Draw Bypass Switch	**2** = 2 pole **3** = 3 pole **4** = 4 pole	**0600** = 600A **0800** = 800A **1000** = 1000A **1200** = 1200A **1600** = 1600A	**A** = 120V, 60Hz **B** = 208V, 50/60Hz **E** = 600V, 60Hz **G** = 220V, 50/60Hz **H** = 380V, 50/60Hz **K** = 600V, 50/60Hz **M** = 230V, 50/60Hz **N** = 400V, 50/60Hz **O** = 415V, 50/60Hz **V** = 416V, 50/60Hz **W** = 240V, 50/60Hz **X** = 480V, 50/60Hz **Z** = 365V, 50/60Hz	**S** = NEMA 1 **J** = NEMA 12 **R** = NEMA 3R **D** = NEMA 4X (304 SS) **E** = NEMA 4X (316 SS)	**S** = Serviceability/Safety

CB = Automatic, Closed Transition Bypass
BT = Automatic, Open Transition Bypass

UL, CSA Certified

2.7 Environmental Conditions

2.7.1 Operational Conditions

Normally, an ATS is applied indoors in an electrical equipment room. The ambient temperature range for operation is between -20 and 60°C (-4 to 140°F), no greater than 90% humidity (non-condensing). A heater option may be required for general heating or condensation.

2.8 Glossary

With respect to their use within this document and as they relate to transfer switch and controller operation, the following terminology is defined. Other specific terms can be found in the ATC-900's instruction booklet.

Automatic Operation
The transfer switch is controlled by the ATC-900 and is self acting in either Open or Closed Transition.

Available
A source is defined as “available” when it is within its undervoltage/overvoltage/ underfrequency/overfrequency (if applicable) setpoint ranges for the nominal voltage and frequency setting.

Bypass
To transfer to another switching device, same source, with no power interruption.

Connected
Connected is defined as when the load is connected to either the preferred or alternate source.

Failed or Fails
A source is defined as “failed” when it is outside of the applicable voltage and frequency setpoint ranges for the nominal voltage and frequency setting for a time exceeding 0.5 seconds after the time delay emergency fail (TDEF) time delays expires.

Failsafe
Failsafe is a feature that prevents disconnection from the only available power source and also forces a transfer or re-transfer operation to the only available power source.

Re-Transfer
Re-transfer is defined as a change of the load connection from the alternate source to the preferred source.

Manual Operation
A transfer between power sources is accomplished using the manual controls located on the face of the switching device.

Monitor Mode
Provides an input to disable automatic control in the ATC-900 controller. The controller continues to accurately monitor source status and set points can be changed, however no action will be initiated by the controller. Unlike Lockout, when Monitor Mode is disabled, the controller does not required to be reset.

Non-Automatic Operation
The transfer switch is not self acting and the user may transfer the load to Source 1, open, or source 2 electrically. The user could remove power to the load if the source switched to is not powered.

Source 1
Source 1 is the primary source (normal source, normal power source, or normal).

Source 2
Source 2 is the secondary source (emergency source, emergency power source, emergency, standby, or backup source).

Source 1: Failed or Fails
Source 1 is defined as “failed” when it is outside of its undervoltage/overvoltage/ underfrequency/overfrequency (if applicable) setpoint ranges for the nominal voltage and frequency setting.

Source 2: Failed or Fails
Source 2 is defined as “failed” when it is outside of its undervoltage/overvoltage/ underfrequency/overfrequency (if applicable) setpoint ranges for the nominal voltage and frequency setting for a time exceeding 0.5 seconds after the Time Delay Emergency Fail (TDEF) time delay expires.

Transfer
Transfer is defined as a change of the load connection from the preferred source to the alternate source.

Trip (Open)
Device is not connected to Source 1/ or Source 2.
The main contacts are open, in the "neutral" position.

Section 3: Equipment Description

3.1 General

The ATS consists of of these main LRUs (Line Replaceable Units):

1. The contactor switching devices;
2. The voltage selection at the transformer CPT panel;
3. The Logic Control (ATC-900);
4. The Logic Controller (LC);
5. The Slider door including the components and customer custom order components.

The transfer switch shown in Figure 7 is depicted with both contactor doors open and the Maintenance slider door also opened. The slider door has all the components including any custom order engineered (COE) items. The COE components are usually near the bottom of the door. The transformer assembly is very accessible and is on the shelf at the bottom or the top depending on rear cable connections. There is an Maintenance (MIS) switch that turns off power to the slider door (see Section 5.4).

The customer connections such as “Engine Start” and user I/Os are on the slider door and are very convenient for the user.

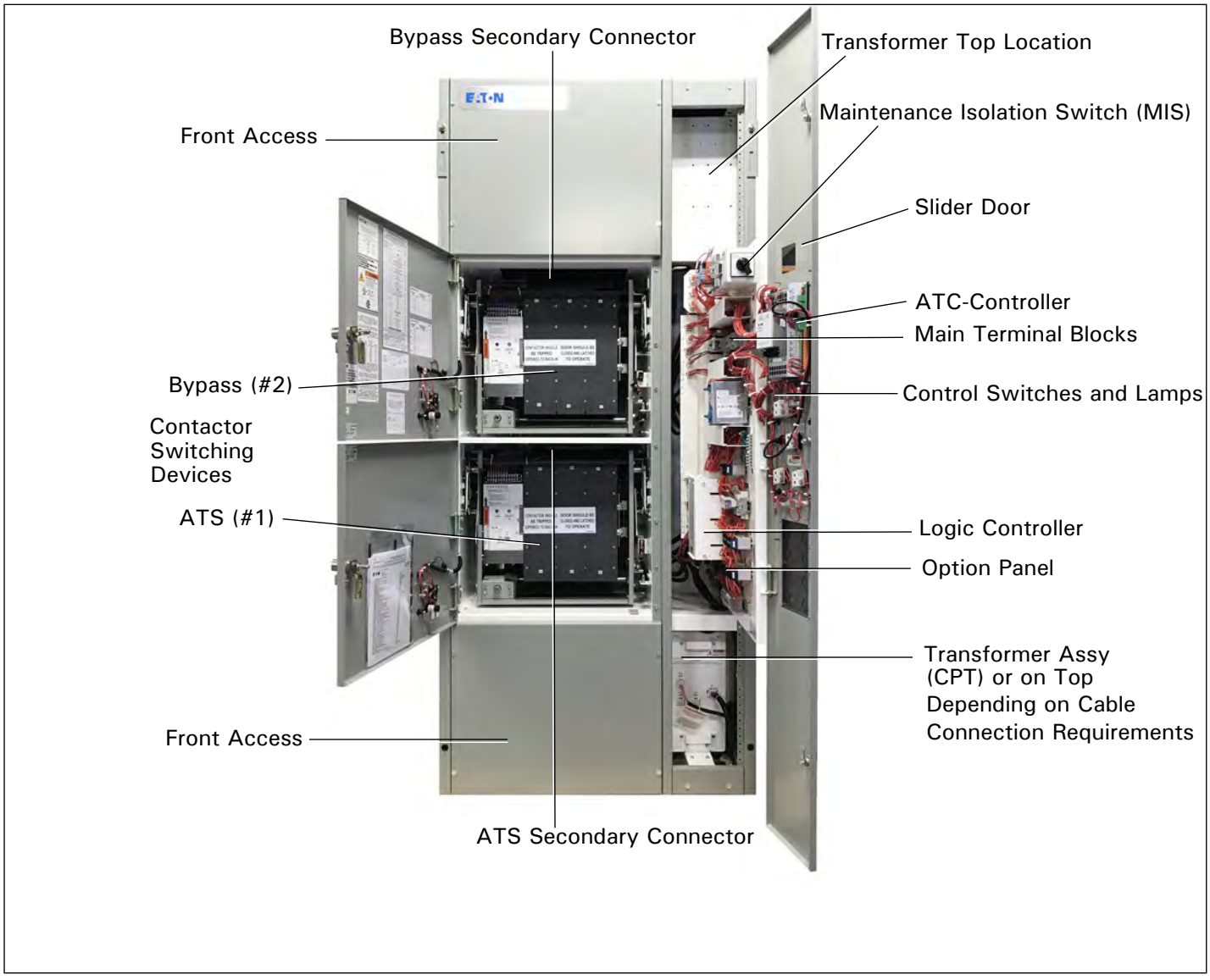

Figure 7. The Bypass Isolation Switch.

3.2 Switching Device (Contactor)

The switching device consists of a means for making load, power, and neutral connections. The main contacts and the switching mechanism are all on one steel frame (see Figure 8). The actual power connections fingers are shown in Figure 9.

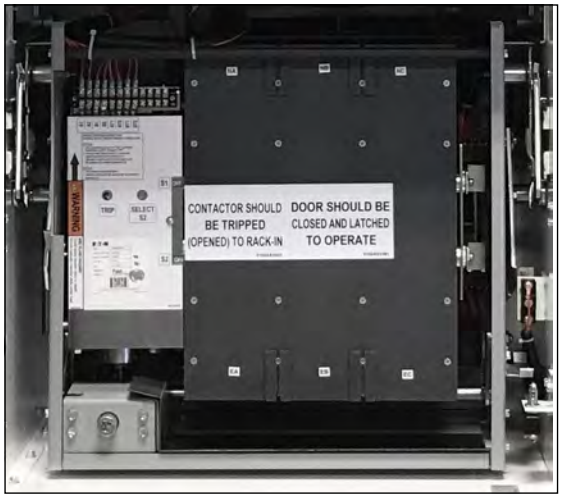

Figure 8. Front View of Switching Device.

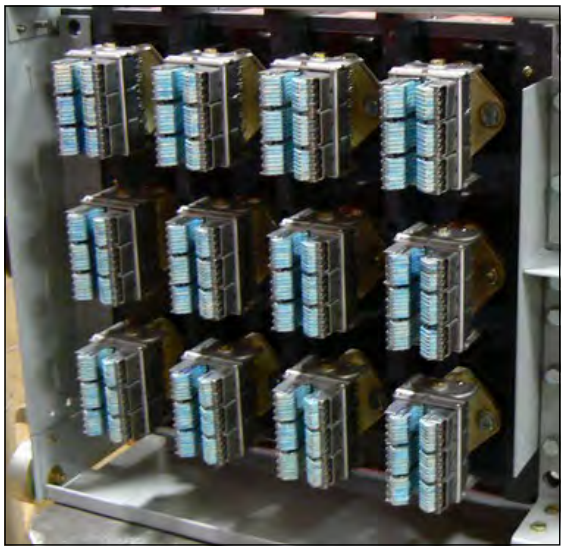

Figure 9. Rear View of Switching Device.

3.2.1 Main Contacts

The main contacts connect and disconnect the load to and from the different power sources. The main contacts for the Source 1, Source 2, and Load power sources are continuous duty devices that are rated for all classes of loads. In addition, they have high dielectric strength, heavy-duty switching and withstand/closing capabilities. As shown in Figure 9, the top row are the S1 connections, the middle row are the Load connections, and the bottom row are the S2 connections.

3.2.2 Switch Device Interlocks

The transfer switch has electrical interlocks to prevent the contactor's main contacts from being closed simultaneously (Source 1 to Source 2). Each individual contactor does not have overlapping contacts so S1 and S2 cannot overlap. (A closed transition is required to use both contactors). If one contactor is removed, set the controller's setpoint from closed to open transition. There are parallel limit timers (watchdog) with a user Terminal block that will close the contacts if the time is over 100 msec as the closed transition's open is required to be less than 100 msec by specification.

When the operation is performed to go from the ATS to the Bypass or the Bypass to the ATS, the same source is closed for about a second. This is normal since both contactors are available for Automatic (patented) operation.

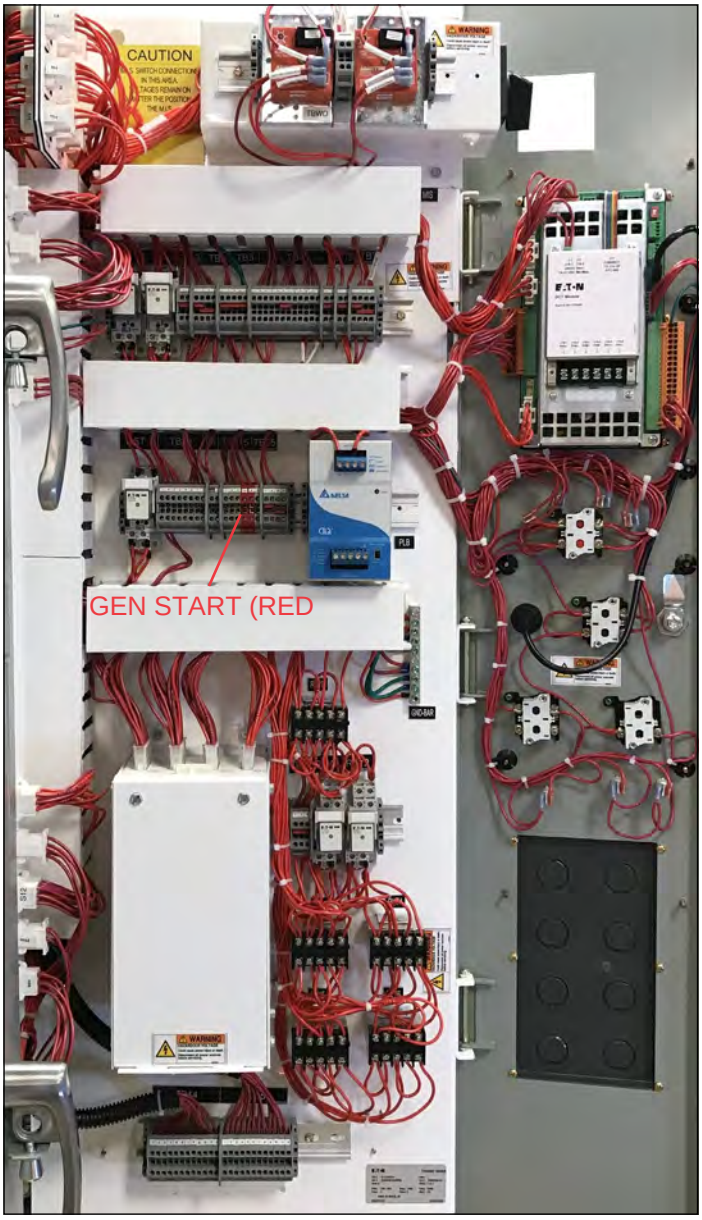

Figure 10. Component Slide-Out Door.

3.2.3 Draw-out Interlocks

The transfer switch has several safety interlocks in the draw-out mechanism to ensure that the switching device is always in the “neutral” position when connecting or disconnecting it from the line and load stabs.

The switching device will close on an available source Automatically (ATS or Bypass) only with the door(s) closed and latched. For example; when a contactor (either one) is isolated or removed and the other contactor is in the automatic mode, it will automatically switch if a power source becomes available. In this case, the contactor that is loaded will require the door to be closed in order for it to operate in the automatic or non-automatic mode. If the automatic operation is not desired, turn the top switch to Non-Auto and the controller will then be placed in Monitor Mode. Please see Section 5, Operation, for more information and usage maps.

3.2.4 Switching Devices

The transfer switch uses contactor switching devices. A colored indicator flag on the contactor shows whether it is in the OFF (OPEN) or ON (CLOSED) position (see Figure 8). These are not visible when the doors are closed and latched. The controller is used to show the user the position of each contactor when the door is closed.

⚠ WARNING

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The contactor switching device is electrically closed or open by momentarily (milliseconds) energizing an internal coil. The mechanism is latched open or closed after the coil is deenergized.

3.2.5 Draw-out Mechanism

The draw-out mechanism is described in detail in Section 6. The draw-out mechanism is designed to operate with the door closed and latched for additional safety. Figure 11 shows the unit being racked-in or out, with a 1/2" socket, from the power runbacks with the door closed and latched. To remove the device after isolation is achieved, the door is required to be opened. Figure 12 shows the switching device drawn out. A lifting device is required to remove a contactor.

⚠ WARNING

DO NOT ATTEMPT WITH DOOR OPEN.

Figure 11. Racked in or Draw-out Mechanism.

Figure 12. Draw-out Switching Device Extended (to Remove) from the Transfer Switch's Runbacks. ATS or Bypass.

3.3 Line Voltage Selection Panel

The voltage selection panel consists of multi-tap transformers, contained in a steel case mounted in the bottom of the control compartment (Figure 13). The cover has two connectors on it, with the one being selectable depending on the voltage applied to S1 and S2. The transformer unit is easily removed by removing the three screws and disconnecting the two plugs. The transformer assembly is very accessible and is on the shelf at the bottom or at the top depending on rear cable connections. The rear of the transformer enclosure has two flanges that are inserted into two slots.

The voltage is selected by simply removing the plug from the default selected voltage on the cover plate and installing the plug to the desired available voltage. Ensure that the plug is inserted into the intended voltage at start-up. There is a similar selection panel for international voltages. Depending on the options of the switch, some may only have a single tap on the transformer.

Figure 13. Transformer Voltage Selection Terminals.

3.4 ATC-900 Controller

The Controller panel provides the intelligence and supervisory circuits which constantly monitor the condition of both the Source 1 and Source 2 power sources, thus providing the required intelligence for transfer operations. Detailed information for controller operation is presented in separate documents:

- ATC-900 Instruction Book (IB140012EN - Open or Closed Transition.
- There is an additional Logic Controller (LC) for controlling the interlocks, the ATS contactor removal/insertion logic, and the bypass functions. It is located on the slider door and is a white metal box. The unit is made to be a Line Replaceable Unit (LRU).
- For current metering, there is a DCT module available that attaches on to the back of the ATC-900, see Figure 23 The DCT also serves as a 24VDC input for backup power to the controller. See the ATC-900 instruction booklet for more information. The DCT module could be used with the buffer to keep the controller powered for about 20 seconds (to keep communications active); which is more than enough to ride through a power outage.
- I/O Modules are available that will increase inputs and outputs (4 in and 4 out per module) if additional I/Os are required. See the ATC-900 instruction booklet for more information.

3.5 Neutrals

All 2-pole and 3-pole transfer switches are equipped with 100% rated neutral connections. Figure 14 shows the interconnect 3-pole bus configuration for the Switch. Figure 15 shows the ground bar. The bus is also marked with S1, S2, and neutral. The 3-pole has a separate neutral.

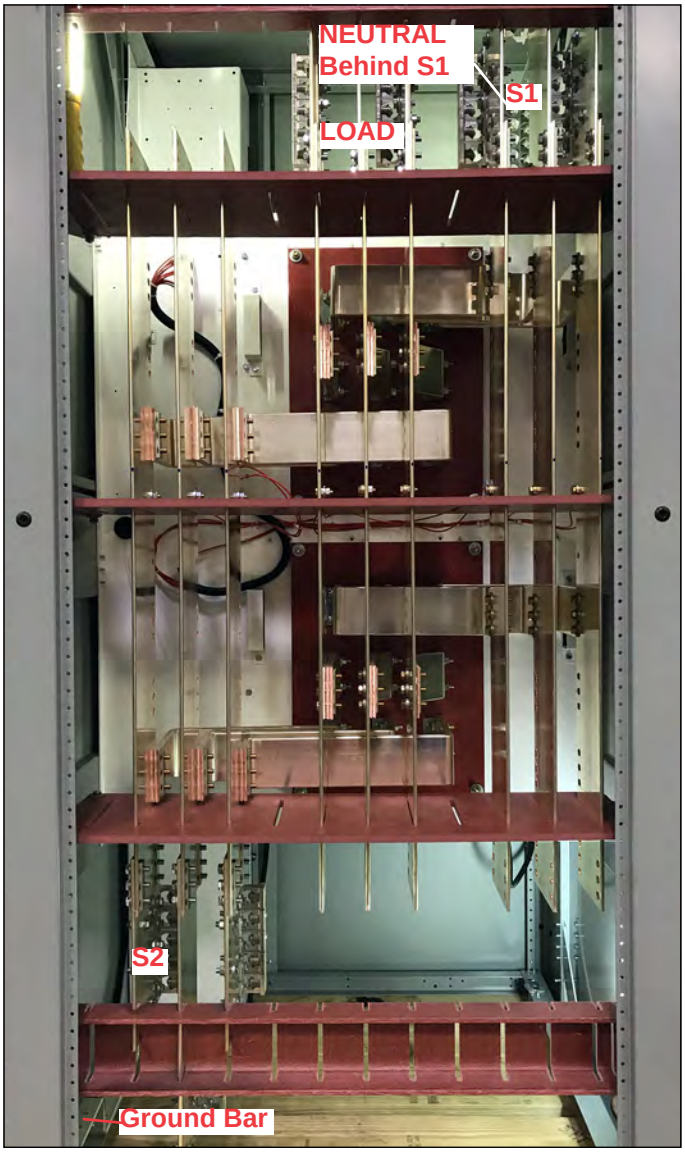

Figure 14. 3 Pole Rear Copper Bus for 1600A.

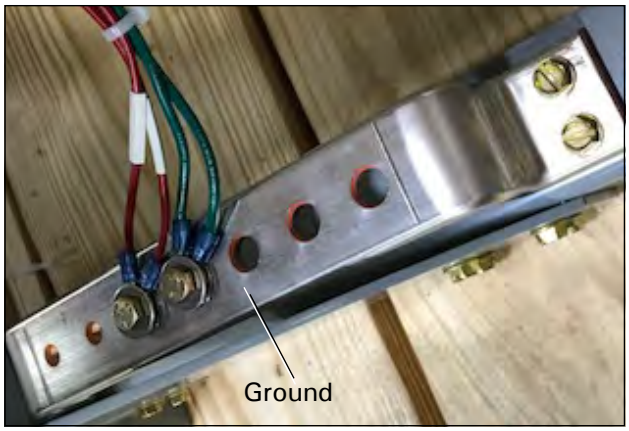

Figure 15. Ground Bar.

3.6 Features/Options

3.6.1 Some Popular Features for the Automatic Transfer Switch

A variety of standard and optional features are available for Eaton ATSs. **All features or combinations of features may not be available on specific ATSs**. All features and/or accessories are Underwriters Laboratories (UL) listed unless noted. The primary function of the controller is to accurately monitor power sources and provide the necessary intelligence to operate a transfer switch in an appropriate and timely manner. In addition, the controllers provides useful present and historical data, reliable two-way communications, and programming through the device's faceplate or communications option.

3.6.1.1 Standard Features

There are a several standard features of the ATC-900 Controller. All features are activated to the user except three items: 1) closed transition, 2) I/O Module(s), and the DCT module. Please see the specific controller Instruction booklet for the many standard features available. A variety of programmable features are available to meet a wide variety of application requirements. Individual features or feature combinations provide the intelligence required to tailor switches to individual needs. The specific variable setpoints associated with standard and factory activated features are stored in a nonvolatile memory and feature setpoints are available for customer adjustments. The USB can be used to download/upload setpoints, and download events.

3.7 Enclosure

The rugged steel switch enclosure is supplied with hinges to insure proper support of the doors and door mounted devices. The hinges have removable hinge pins to facilitate door removal and all doors contain connectors for easy electrical reconnect. The doors are supplied as standard with padlock latches. Cable entry holes are the customer's responsibility. The right-side slider door is used to mount a variety of lights, switches, and push buttons, depending upon the options required for a particular switch. The switch enclosures and some internal steel mounting plates, such as the transformer panel mounting plate, go through a pre-treatment cleaning system prior to painting to insure a durable finish. Should the enclosure become scratched and in need of touch up paint, use ANSI 61. All remaining steel is galvanized. The standard switch enclosure is NEMA Type 1 for general indoor use.

There are many other options for these switches such as metering, Remote Annunciator Control (RAC), ATS-Monitor, Ethernet/Modbus Gateways, and Surge devices. Please consult factory for more features and options.

3.8 Standards

Eaton transfer switch equipment is listed for application by UL and CSA. In addition, Eaton Automatic Transfer Switches are listed under Standard UL 1008. This standard covers requirements for Automatic Transfer Switches intended for use in ordinary locations to provide for lighting and power as follows:

a. In emergency systems, in accordance with articles 517 and 700 in the National Electrical Code (NEC), American National Standards Institute/National Fire Protection Association (ANSI/NFPA) 70 and the NFPA No. 76A and/or

b. In stand-by systems, in accordance with article 702 of the NEC and/or

c. In legally required stand-by systems in accordance with article 701 of the NEC.

d. In Critical Operations Power Systems (COPS) per article 708 of the NEC.

Eaton Automatic Transfer Switches are available to meet NFPA 110 for emergency and stand-by power systems, and NFPA 99 for health care facilities when ordered with the appropriate options.

3.9 Power Off Buffer

For faster switching times when power is removed from the switch, there is a non-maintenance buffer added that keeps power onto the Logic Controller, not the ATC-900, for about 30 seconds. The additional time that the Logic Controller unit is powered prevents it from having to reset when the normal source fails. It is a small device and and is located on the slider door panel.

The buffer is din-rail mounted and is factory set (22-24Volts) with no maintenance required. The green LED on the Buffer will flash when the unit is being discharge or charged, otherwise it will remain on. Since this transfer switch has a buffer, the DCT module could be used with the buffer to keep the controller powered for about 20 seconds (to keep communications active); which is more than enough time to ride through a power outage.

Section 4: Installation and Wiring

4.1 General

Eaton transfer switches are factory wired and automatically tested with a test report included. Installation requires solidly mounting the enclosed unit and connecting the power cables and auxiliary pilot circuits. Physical mounting procedures and power cable connections are covered in this section. All other required wiring or electrical connection references are covered in a separate Customer Wiring Diagram packaged with the transfer switch.

Locate the wiring booklet, review it, and keep it readily available for reference purposes during installation and testing. Once a transfer switch is properly installed and wired, it should be mechanically and electrically checked for proper installation and operation. The procedures for these initial mechanical and electrical checks are outlined in Section 7 of this instruction manual.

4.2 Mounting Location

Choose a location that offers a flat, rigid mounting surface capable of supporting the weight of the enclosed transfer switch equipment. Avoid locations that are moist, hot, or dusty. However, Eaton offers enclosure designs that can be used in special environments. If there are any doubts as to the suitability of the location, discuss it with your Eaton representative.

Check to make certain that there are no pipes, wires, or other hazards in the immediate area that could create a problem. The panels provide ample room for rear cable entry from top, bottom, and sides. At no time should cable be routed to retard the action of relays or cover the logic in a way that restricts adjustments. Maintain proper electrical clearances between live metal parts and grounded metal.

4.3 Unpackaging and Inspection

⚠ CAUTION

SINCE THE ENCLOSED TRANSFER SWITCH MUST BE LIFTED INTO PLACE FOR MOUNTING, BE CERTAIN THAT ADEQUATE RESOURCES ARE AVAILABLE FOR LISTING TO AVOID PERSONNEL INJURIES OR EQUIPMENT DAMAGE.

Proceed with the following four steps.

Step 1: Carefully uncrate the transfer switch. If damage is visible, please contact your local Eaton sales representative or the factory.

Step 2: Visually verify that there are no broken or damaged components or evidence of distorted metal or loose wires as a result of rough handling.

Step 3: A label on the door provides specifications for your transfer switch. Verify that these specifications comply with your requirements.

Step 4: Remove any braces or packing used to protect the transfer switch or internal components during shipping. The switch has 12 bolts holding the unit down into the pallet each with a seismic type washer. Do not throw away the washers as they will be used when mounting the switch on the pad.

⚠ CAUTION

EXTREME CARE SHOULD BE TAKEN TO PROTECT THE TRANSFER SWITCH FROM DRILL CHIPS, FILLINGS, AND OTHER CONTAMINANTS WHEN MAKING THE CABLE ENTRY HOLES AND MOUNTING THE ENCLOSURE TO PREVENT COMPONENT DAMAGE OR A FUTURE MALFUNCTION.

4.4 Mounting Procedure

NOTICE

CABLE ENTRY HOLES ARE NOT PART OF THE ENCLOSURE WHEN SHIPPED FROM THE FACTORY AND MUST BE PROVIDED IN THE FIELD, EITHER BEFORE OR AFTER MOUNTING THE ENCLOSURE.

With the enclosed transfer switch equipment unpacked and ready for mounting, proceed with the following steps.

Step 1: Mounting and cabling access is best provided by removing side and rear covers (when applicable). If required to remove the enclosure covers a 3/8 socket will be required. The back and two sides are similar in that if the lower panels need to be removed, the top panel must be removed first.

Step 2: Gently maneuver the switch into its location using all of the supplied lift brackets.

Step 3: Bolt the enclosure to the base (see Figures 16 & 17). The mechanical washers for the mounting requirements use 12 5/8-11 UNC grade 5 or better hex head bolts with the included washers (Eaton pn. 66A8231H14). Also see the outline drawing for locations.

Step 4: Tighten bolts to 120 ft-lbs (163 N·m).

Figure 16. Mounting With Washer.

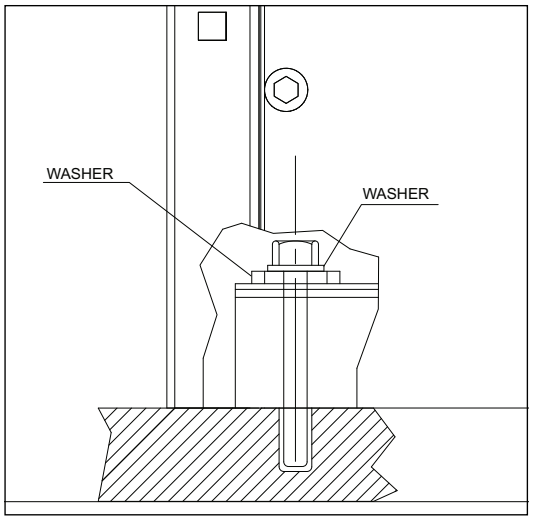

Figure 17. Mounting using 12 Washers.

4.5 Power Cable Connections

The standard outline for the 1200 and 1600 switches are shown in Figure 18. Figure 19 shows the connections for the Switch. The bus is labeled inside the unit as shown in Figure 19. The Ground bar is also shown. The 4-pole would have the neutral on the rear bus copper as shown and a 3-pole would have a separate neutral. All will be 100% rated.

The standard location for S1 and Load are on the top. S2 is standard on the bottom (Figure 19.) The user can choose the location of S2. Depending on the location of S2, the transformer will be on the top or bottom. It is supplied with both transformer mounts (upper and lower) in case the user needs to change the location of S2 (and the transformer.) The user can request different desired bus configurations.

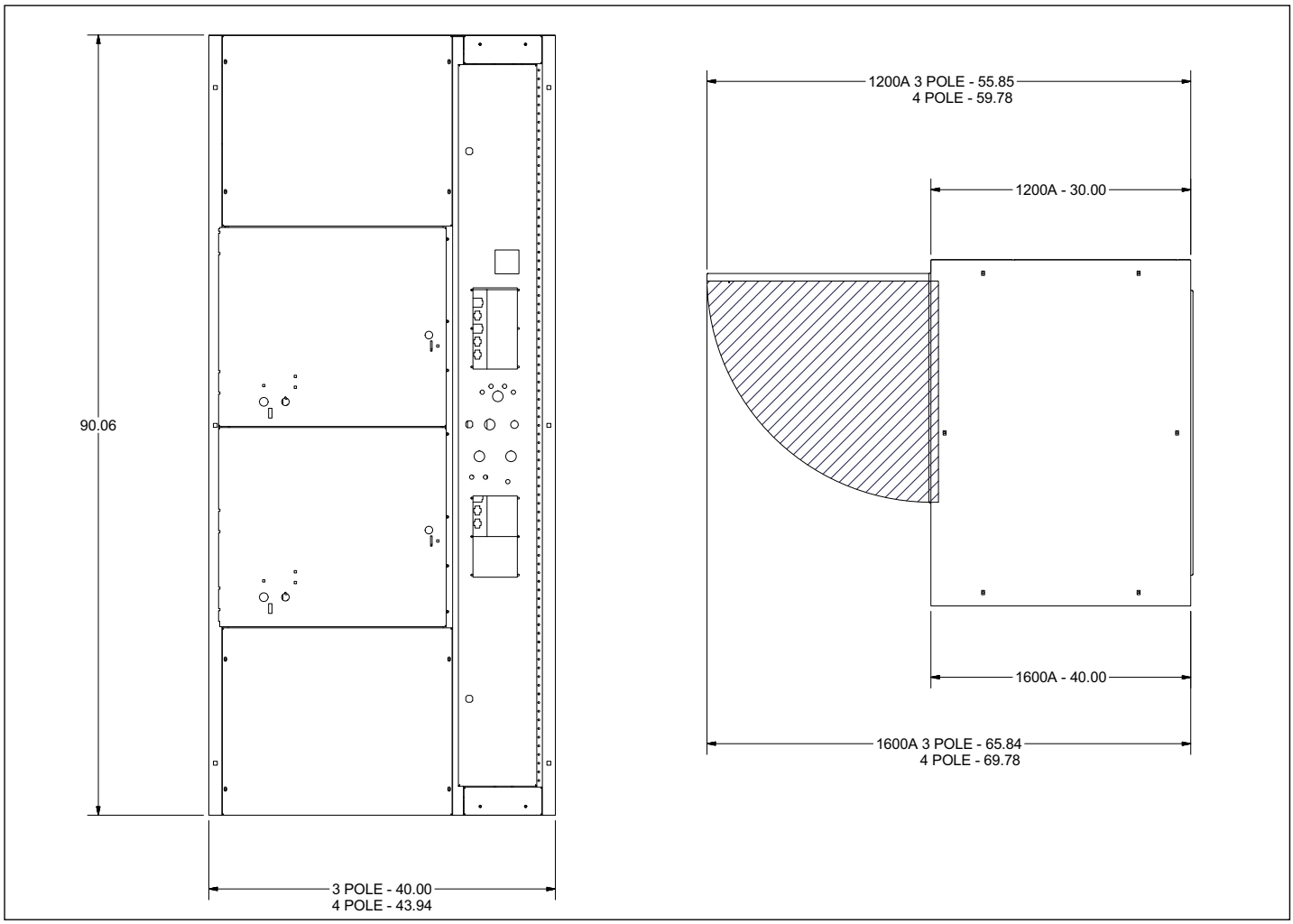

Figure 18. 1200 & 1600 Enclosure Outlines.

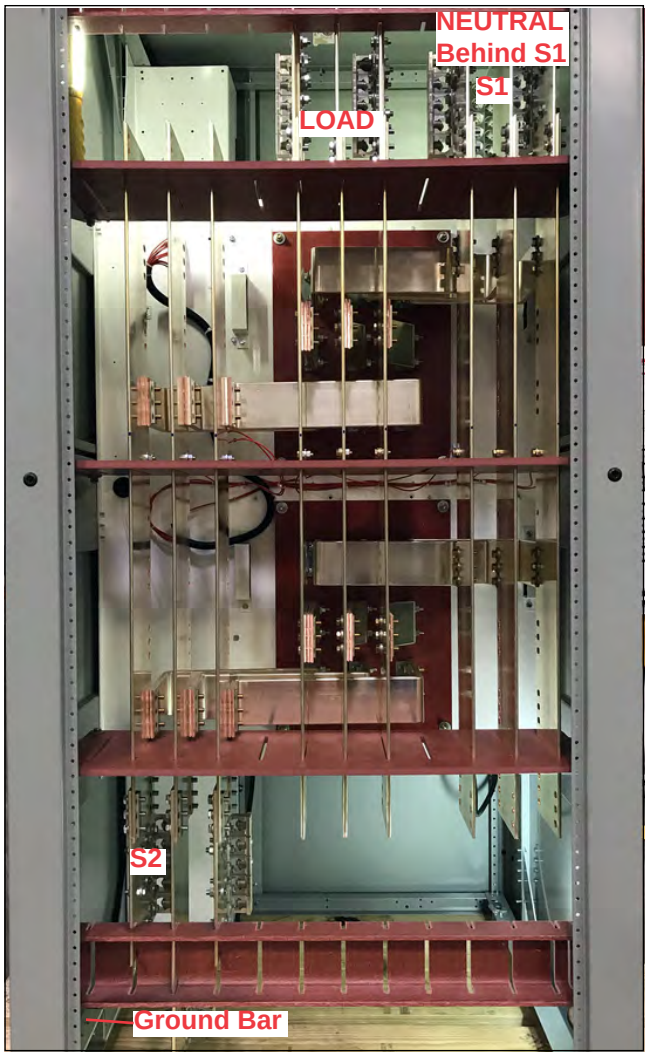

Figure 19. 3 Pole Bus & Ground Bar Shown for 1600A.

⚠ DANGER

POWER CONDUCTORS MAY HAVE VOLTAGE PRESENT THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. DE-ENERGIZE ALL POWER AND CONTROL CIRCUIT CONDUCTORS (FIGURE 19) TO BE CONNECTED TO THE TRANSFER SWITCH EQUIPMENT BEFORE INITIATING WORK WITH THE CONDUCTORS AND/OR TERMINATING THEM TO THE EQUIPMENT. ALWAYS VERIFY THAT NO VOLATGE IS PRESENT ON THE EQUIPMENT PRIOR TO SERVICING. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING EQUIPMENT.

⚠ CAUTION

USE OF CABLE LUGS NOT DESIGNED FOR THE TRANSFER SWITCH APPLICATIONS MAY CAUSE HEATING PROBLEMS.

⚠ CAUTION

TO HELP PREVENT COMPONENT DAMAGE OR FUTURE MALFUNCTIONS, USE EXTREME CARE TO KEEP CONTAMINANTS OUT OF THE TRANSFER SWITCH EQUIPMENT WHEN MAKING POWER CABLE CONNECTIONS.

Proceed with the following steps:

Step 1: Verify that the line and load cables comply with applicable electrical codes.

Step 2: Verify that the transfer switch rated current and voltage (see identification plate on the door of the transfer switch) agree with system current and voltage.

Step 3: After the transfer switch is mounted, provide the conduit or cable openings as required. Ensure that no metal filings contaminate the transfer switch components.

Step 4: Test all power cables before connecting them to the unit to insure that the conductors or the cable insulation have not been damaged while being pulled into position.

Step 5: Carefully strip the insulation from the power cables. Avoid nicking or ringing of the conductor strands. Prepare the stripped conductor termination end by cleaning it with a wire brush.

Step 6: Make the necessary connections of any options using the wiring diagrams supplied with the unit.

Power cables are to be connected to solderless screw type lugs located on the transfer switch switching devices. Refer to the separate Customer Wiring Diagrams supplied with the transfer switch equipment for power termination. Verify that the lugs supplied will accommodate the power cables being used. Also verify that the cables comply with local electrical codes. Standard transfer switch equipment, as supplied from the factory, will accommodate the wire sizes shown in Table 3. Compression lugs are available as an option.

Power sources, load conductors, and control wiring should be connected to locations as indicated in the customer wiring diagram supplied with the ATS equipment.

Table 3. Transfer Switch Equipment Wire Sizes.

TRANSFER SWITCH AMPERE RATING	WIRE SIZE RANGES & NUMBER OF CABLES PER PHASE	TERMINAL TEMPERATURE RATING ° C (° F)
100	(1) #14-3/0	90(194)*
200	(1) #6-300KCMIL	90(194)*
400	(1) 1/0-750	90(194)*
400	(2) 1/0-250	90(194)*
1200-1600	1/0-750	90(194)*

* Cable must be 90C rated but shall be determined based on the ampacity of the wire rated at 75C.

⚠ WARNING

POWER CONDUCTORS AND CONTROL WIRING MAY HAVE VOLTAGE PRESENT THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. DEENERGIZE ALL POWER AND CONTROL CIRCUIT CONDUCTORS BEFORE BEGINNING TO PERFORM ANY WIRING ACTIVITY TO OR WITHIN THE ATS EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT PRIOR TO SERVICING. WHILE ENERGIZED, AN ARC FLASH AND SHOKC HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

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⚠ CAUTION

ENSURE THE ATS VOLTAGE IS SET CORRECTLY ON THE TRANSFORMER PANEL. IT SHOULD BE THE SAME AS THE SOURCE 1 AND SOURCE 2 LINE VOLTAGES. OPERATING THE EQUIPMENT ON IMPROPER VOLTAGE CAN CAUSE EQUIPMENT DAMAGE.

Once the ATS equipment has been installed and wired, perform the initial mechanical and electrical procedures as outlined in Section 6 to verify that the equipment is installed and operating properly.

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⚠ CAUTION

IMPROPER POWER CABLE CONNECTIONS CAN CAUSE EXCESSIVE HEAT AND SUBSEQUENT EQUIPMENT FAILURE. ENSURE ALL CONNECTIONS ARE TORQUED TO VALUES AS INDICATED ON THE LABEL AFFIXED TO THE EQUIPMENT DOOR.

⚠ CAUTION

ENSURE THAT SWITCH IS PROPERLY GROUNDED. IMPROPER GROUNDING CAN CAUSE EQUIPMENT DAMAGE OR EQUIPMENT MALFUNCTION.

4.5.1 Customer Interface Terminal Blocks

There are terminal blocks inside the control compartment on the slider door for customer interface shown in Figure 20 and the table below. Refer to the switch drawings for locations and functions of the terminal blocks. The auxiliary form C position contacts terminal blocks are located on the slider (Figure 21) and contain a total of 3 user form C types on source 1 and 2. Sheet W003 of the transfer switch drawings shows a map of the unused Auxiliary contacts. More form C auxiliary type contacts can be obtained from the outputs of the ATC-900 controller.

TB1	DC+ Volts (Internal Use)
TB2	DC 0 Volts (Internal Use)
TB3	120VAC COM
TB4	User Position Contacts
TB5	S1IN (Internal Use)
TB6T	S2IN (Internal Use)
TB&	120 AC Line
TBJ9	User Controller Inputs
TB9	BP Alarm (120VAC & COM) for relay
TB14 & TB15	More User Position Contacts Sheet W003
TBJ15	Engine Contacts (N.O., COM, & N,C. Source 2 in Red)
TB25	I/O Module(s) power

Contact Ratings (Position Contacts):

	RESISTIVE		LAMP		INDUCTIVE	MOTOR		IN-RUSH	
	NC	NO	NC	NO	NC NO	NC	NO	NC	NO
125VAC	10A		2A	1A	7.5	3A	1.5A	30A	5A
250VAC	10A		1.5A	0.7A	7.5	2A	1A	30A	15A

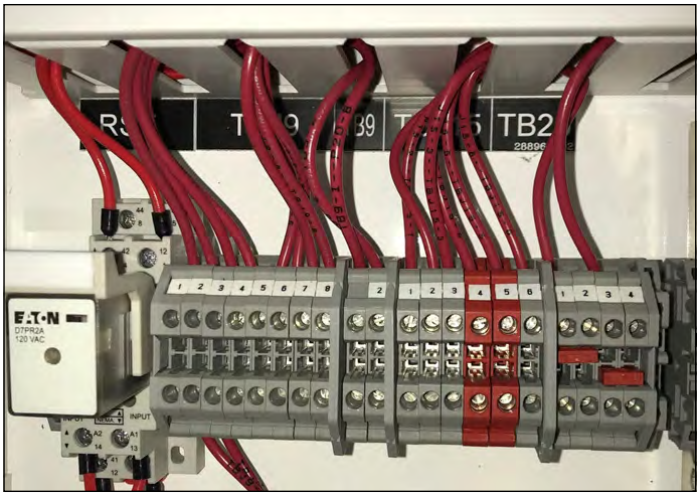

Figure 20. Terminal Blocks for Interface in Easy Access Position Located on the Pull-out Slider Door. Red TBs are N.O. Generator start

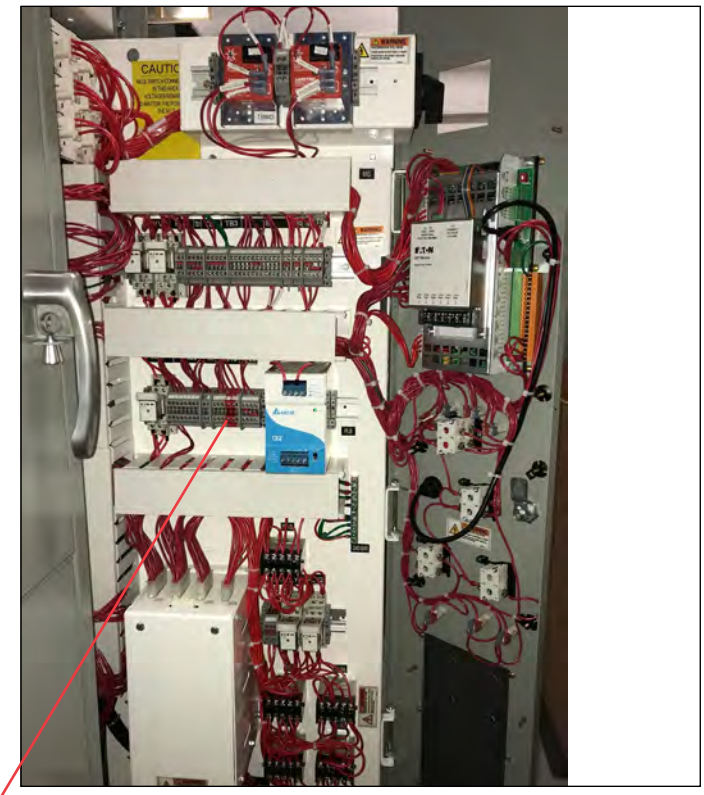

Figure 21. Slider Door with Call-outs.

As shown in Figure 20, there are two KV (decision relays) to allow for more power for the control circuits. There is also an RST relay for internal use. The optional thermostat for a heater is on the left side.

4.6 Voltage Selection Adjustment

The user must assure that the correct voltage for the input is chosen (Figure 22). The voltage is selected by simply removing the plug from the default selected voltage on the cover plate of the transformer panel and installing the plug to the desired available voltage. The voltage selection can be domestic or international voltages. Depending on the options, ie, surge protection device, the unit may have one voltage tap with the unit's voltage ordered. The transformer location can be located at the bottom or the top of the slider door depending on the power cable inputs.

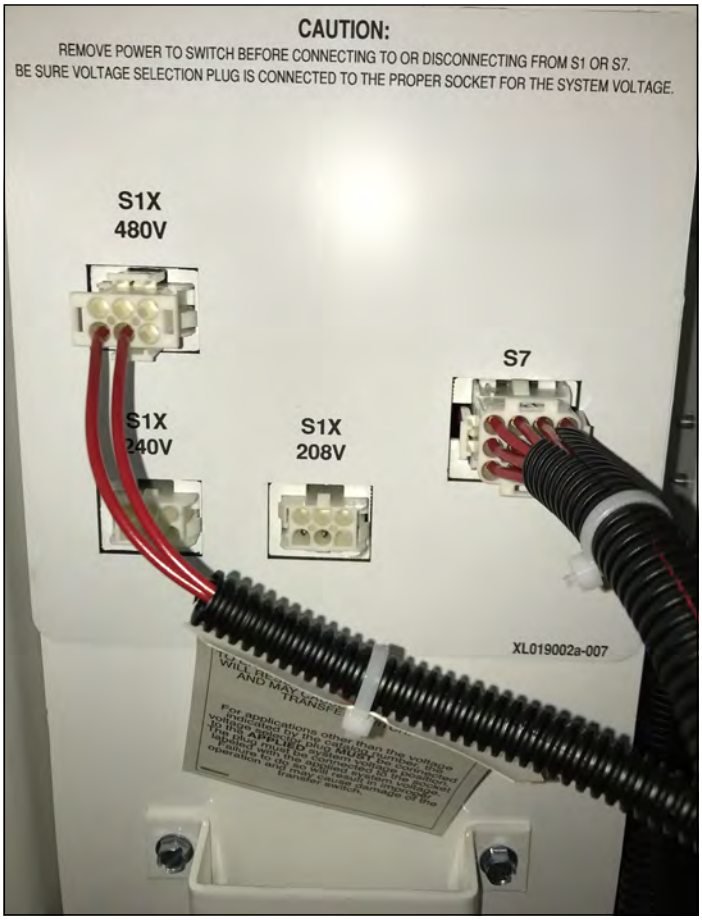

Figure 22. Voltage Selection Adjustment.

⚠ WARNING

DISCONNECT ALL SOURCES OF POWER PRIOR TO SELECTING OPERATING VOLTAGE. THE MIS SWITCH WILL DISCONNECT POWER TO THE TRANSFORMER. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT PRIOR TO SERVICING. WHILE ENERGIZED, AND ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT. FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH.

⚠ CAUTION

BE SURE THAT THE CORRECT VOLTAGE IS SELECTED TO MATCH THE SYSTEM VOLTAGE. AN IMPROPER SELECTION AND/OR CONNECTION COULD RESULT IN EQUIPMENT DAMAGE.

Section 5: Operation of the Bypass Isolation Transfer Switch

5.1 General

A transfer switch provides main contacts to connect and disconnect the load to and from the Source 1 and Source 2 power sources. This transfer switch is unique in that either contactor can be used in the following manner:

1) Both can be used in Automatic operation.
2) Both can be used in Non-Automatic operation.
3) Either one can be drawn out and electrically tested while the the other is in the automatic mode or non-automatic; chosen by the user.

Several of these attributes are patented.

5.1.1 Closed Transition

⚠ WARNING

THE SWITCH CONTAINS A SPECIAL CONTACT ARRANGEMENT (OVERLAPPING CONTACTS). MISUSE CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, AND/OR PROPERTY DAMAGE.

For Closed Transition, if that option is ordered, the unit will arrive from the factory with the Closed Transition provided.

There is the ability to make the unit into an open transition by simply changing the setpoints. Open transitions include in-phase, TDN or LVD. See the ATC-900 instruction booklet as there are many different scenerios that could be used for any requirement. Figure 23 shows a picture of the ATC-900. The IB for the ATC-900 is included and on-line (IB140012EN.)

Note: If one of the contactors is isolated or removed, the unit will be fully automatic in either, including all functions except closed transition. In-Phase, TDN, or Load Voltage Decay. will operate normally with one contactor. If the ATC-900 setpoint is set to closeed transition and one of the contactors is removed, one must change the setpoint to "open" as two contactors are required for closed transition.

5.1.2 Parallel Limit Timer (Watchdog Timer)

For Closed Transition Switches, there are a set of Parallel Limit Timers (watchdog timers) included from National Contacts Corp. It is red and has an adjustment on it from .05 to 1 second. Closed Transitions must be completed within 100ms per code so the timer should be set to around 11:00 or per customer requirements. There are two provided, one for the ATS and one for the Bypass with one single N.O. Terminal Block.

For anything at 100ms or higher, the user can use the terminal block "TBWD" for user interface. It is a NO contact. This can be used to open an upstream breaker should the source parallel over 100ms or whatever the units are set to.

Figure 23. ATC-900 Controller with the Optional DCT Module Attached.

⚠ CAUTION

POWER CONDUCTORS AND CONTROL WIRING MAY HAVE VOLTAGE PRESENT THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. DE-ENERGIZE ALL POWER OR CONTROL CIRCUIT CONDUCTORS BEFORE BEGINNING TO PERFORM ANY WIRING ACTIVITY TO OR WITHIN THE TRANSFER SWITCH EQUIPMENT. USE THE MIS SWITCH. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT PRIOR TO SERVICING. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

5.2 Operator Panel

The design of this transfer switch allows quick removal of either contactor for inspection or maintenance or, if required, quick replacement. Although a contactor may be removed, the other contactor is automatic except for Closed Transition. Figure 24 shows the simple operation panel with some descriptive words.

This side is for the bottom contactor ATS (#1)

Automatic Operation of the ATS Switch. The Bypass Switch can be isolated and electrically tested (with the Test switch in the Enable position) or removed.

Non-Auto operation of the ATS . The controller will display Monitor Mode. The ATS can be electrically-manually operated using the Source Select switch (with the Test switch in the Disable position White lamp on). The Bypass switch can be isolated and electrically tested (with the Test switch in the Enable position) or removed (White lamp off).

The Source Select switch selects the position of either the ATS or Bypass switch when in the isolated position or in the non-auto position. At least one power source is required. Caution: In the non-auto position, the load power can be removed.

Push to test lamps, release to determine which switch can be isolated (Yellow Door lamp will stay on for 2 minutes).

Status lamps for the ATS and Bypass:

Light	Rack Position
Off	Racked-in (for operation)
Solid	Between Positions
Flash 1/sec	Isolated (for testing)
Flash every 5 sec	Racked-out (for removal)

This side is for the top contactor Bypass (#2)

Automatic Operation of the Bypass Switch. The ATS can be isolated and electrically tested (with the Test switch in the Enable position) or removed.

Non-Auto operation of the Bypass. The controller will display Monitor Mode. The Bypass can be electrically-manually operated using the Source Select switch (with the Test switch in the Disable position White lamp on). The ATS switch can be isolated and electrically tested (with the Test switch in the Enable position) or removed (White lamp off).

USB Socket to the ATC-900

Auto & Enable = ATS or Bypass Switch in Isolated test mode, other switch is in automatic (Green Lamp on)

Non-Auto & Disable = Manual operation of ATS or Bypass Switch. Monitor Mode is shown on Controller (White lamp is on)

Non-Auto & Enable = Isolated ATS or Bypass Switch in test. Monitor Mode is shown on Controller (White lamp is off)

Status for both doors.

Off	Doors are closed and latched
Flashing	At lease one door is unlatched*

Figure 24. Operating Panel.

* Door(s) must be closed and latched for the celll that is in Automatic or Non-Auto Operation.

5.3 Manual Operation

WARNING

DO NOT ATTEMPT TO MANUALLY OPERATE THE ATS WITH THE SWITCH IN THE CONNECTED POSITION. ENSURE THE DEVICE IS IN THE "TEST" ISOLATED POSITION WITH S1 AND S2 DEENERGIZED (TRIPPED-OPEN POSITION). NEVER MANUALLY OPERATE THE FIXED BYPASS CONTACTOR OR ANY OTHER CONTACTOR THAT IS NOT ISOLATED (ATS), UNLESS ALL POWER IS TURNED OFF (S1 & S2) AND LOCKED OUT TAGGED OUT. FAILURE TO HEED THIS WARNING COULD RESULT IN DEATH OR SEVERE INJURY. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

To manually operate.

1. With the ATS drawn-out and the ATS Isolated light illuminated, one can manually switch the ATS contactor.
2. TO TRIP: Depress the “trip” button located on the operating mechanism of the contactor to bring the contactor to neutral (trip) position. Figure 25shows the manual trip location on the mechanism.
3. TO CLOSE ON S1: Locate the manual lever on the left side of the contactor as shown in Figure 26
4. Attach the handle to the manual lever.
5. Rotate the lever up to go to Source 1.
6. Depress the “trip” button located on the operating mechanism of the contactor to bring the contactor to neutral (trip) position.
7. TO CLOSE S2: Depress the “select” button located on the operating mechanism of the controller and rotate the lever up keeping the “select” button depressed to go to Source 2. This procedure is shown in Figure 27
8. Once the manual operation is complete and automatic operation is desired, trip the contactor, close and latch doors, and rack-in.
9. Follow the operation procedure in Section 5 to ensure proper automatic operation.

Note: Closing the contactor to S1 or S2 will require the lever to be pushed up. The only difference when going to S2 is also pushing in the select button. There are directions on the front of the Mechanism.

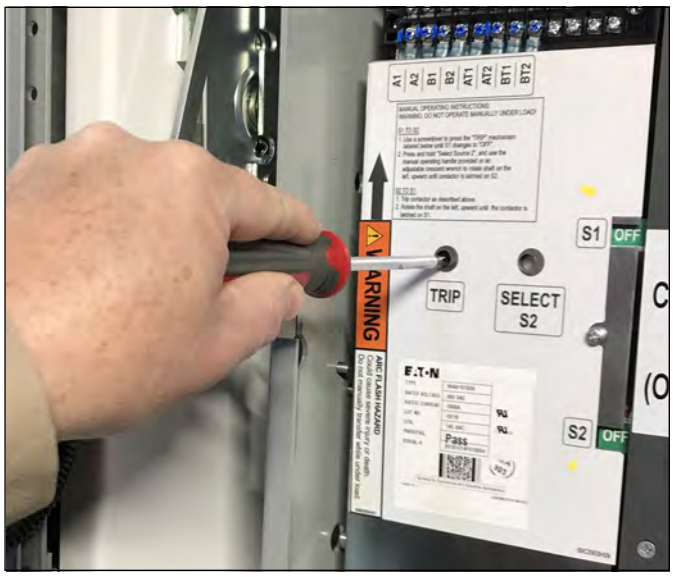

Figure 25. Manual Trip Location on the Mechanism (No Power to Switch).

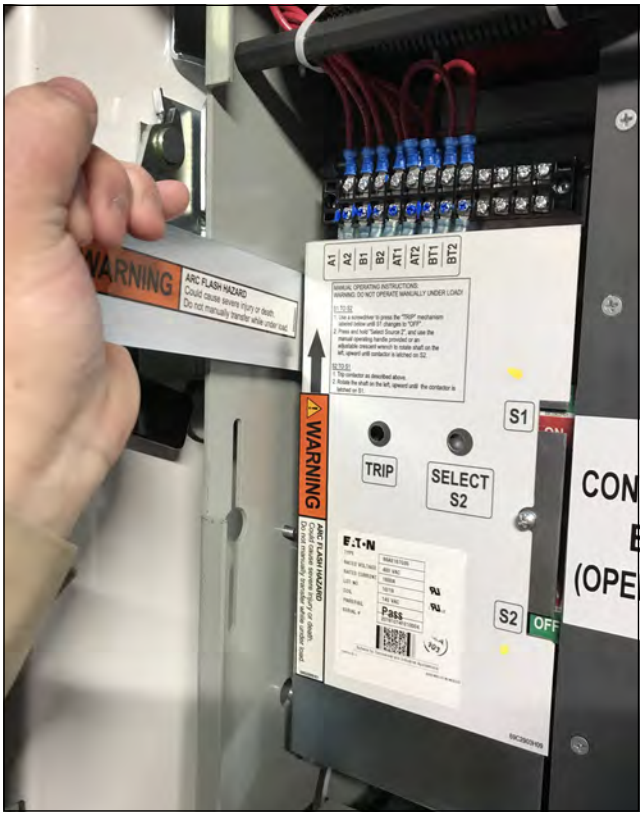

Figure 26. ATS Manual Operating Handle in Use (No Power to Switch).

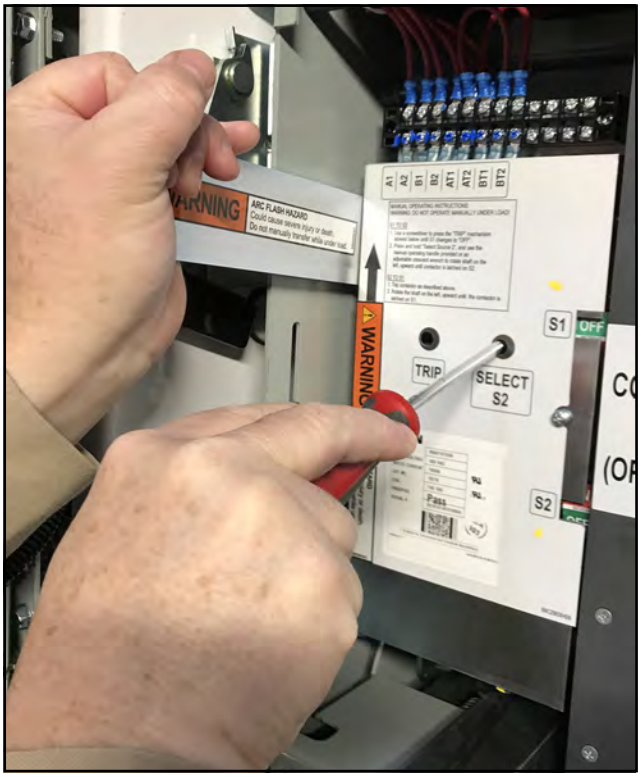

Figure 27. Procedure to Close S2 (No Power to Switch).

5.4 Maintenance Isolation Switch (MIS)

The MIS is a 2-position, maintained contact switch marked "NORMAL OPERATION" and "MAINTENANCE" (see Figure 28). When the switch is turned to the Maintenance position, the compartment power is switched off. Examples of compartment power are sense lines to the controller, power to the transformer, genertor starts, and controller contactor control power. The MIS is placed in the "Normal Operation" position for normal ATS and Bypass operation. The voltage to the stabs in the rear of the switch are still powered when the MIS switch is used. If a meter is incorporated, the CT lines to the DCT module or other meter will still be connected (with power). There is a Terminal Block (TBMS) available (Option 81P) that will house a N.C. contact from the MIS switch that can be used as a contact to show the position of the MIS switch.

⚠ WARNING

THE VOLTAGE TO THE STABS IN BACK OF THE TRANSFER SWITCH ARE STILL POWERED WHEN THE MIS SWITCH IS USED. IF A METER IS INCORPORATED, THE CT LINES TO THE DCT MODULE OR OTHER METERS WILL STILL BE CONNECTED AND HAVE POWER. APPROPRIATE PPE SHOULD BE USED. THE CONNECTIONS AT THE TOP AT THE REAR OF THE MIS SWITCH CONTAIN VOLTAGES THAT ARE NOT REMOVED WHEN THE MIS IS TURNED TO MAINTENANCE.

Figure 28. Maintenance Isolation Switch.

5.5 Automatic Operation

The intelligence/supervisory circuits on Eaton transfer switches constantly monitor the condition of both the Source 1 and Source 2 power sources. These circuits automatically initiate an immediate transfer of power from the Source 1 to the Source 2 power source when the power source fails or the voltage level drops below a preset value. Transfer back to the Source 1 power source is automatic upon return of the Source 1 power source. Monitoring the power source is always performed on the line side of the power source to which the switch is connected. The Source 1 power source is usually the preferred source and the transfer switch will always seek this source when it is available and when it is selected in the ATC-900.

The intelligence/supervisory circuits will continue to function no matter what contactor is being utilized: the ATS (#1) or the Bypass (#2). This feature allows for a redundant automatic switch.

5.6 Transfer to the ATS or the Bypass

⚠ WARNING

THE CLOSED TRANSITION PRODUCT CONTAINS A SPECIAL CONTACT ARRANGEMENT (OVERLAPPING CONTACTS). MISUSE CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, AND/OR PROPERTY.

As mentioned previously, the contactors in the switch are identical. Each can be in automatic (using the ATC-900), isolated for testing, or the Manual mode operation. Each contactor may be removed while the remaining contactor still remains as an automatic (using the ATC-900), isolated for testing, or in Manual mode. If a contactor is being removed and the user does not want the other contactor to switch automatically in a power loss, simply turn the switch to the non-auto position. The Operating Panel shown in Figure 24 is all that is required to control the different modes of operation. The following are the modes of operations and instructions. The ATS (#1) or the Bypass (#2) are shown on the operating panel are marked with the left top side being the ATS and the right top side being the Bypass. The three modes are:

1. Automatic operation using the controller.
2. Non-Automatic electrical operation using the user three position Source Select switch.
3. Manual operation, non-electrical using the paddles and trip button on the front of the contactor.

The ATS or the Bypass can be isolated for testing or removed while the other contactor is on the automatic or non-automatic state.

5.6.1 Automatic (Normal) Operation

1. All doors must be closed and latched. The Door Open light should not be flashing.
2. Turn the 4 position Operation switch to the desired position for Automatic Operation. The Green lamp will illuminate once the contactor is in position.

5.6.2 Non-Automatic Operation

1. All doors must be closed and latched. The Door Open light should not be flashing (unless the other contactor is in the isolated position for testing Section 5.6.3).
2. Rotate Source Select to connected position.
3. Slowly turn the 4 position switch to the desired position for Non-Automatic Operation. The White lamp will illuminate once the contactors is in position. The controller will show a banner (in yellow flashing) of "Monitor Mode" signaling that the switch is not in automatic. The controller's MIMIC bus and display will still show the switch information (monitored) but no action will be performed by the controller.
4. With either or both power sources on, use the Source Select switch to select the position of the contactor: S1-Open-S2.

⚠ CAUTION

THE NON-AUTO OPERATION OF THE CONTACTOR WILL RESULT IN THE CONTROLLER BEING INACTIVE IN CONTROLLING THE CONTACTOR.

⚠ CAUTION

IN THE NON-AUTOMATIC OPERATION, THE USER CAN REMOVE POWER TO THE LOAD BY TURNING TO THE OFF POSITION OR BY SWITCHING TO A SOURCE WITH NO POWER. SIMPLY TURN THE SWITCH TO THE POWER SOURCE AVAILABLE FOR LOAD POWER.

5.6.3 Isolating and Testing Operation

The testing of the isolated contactor may be performed in either the Automatic (Green Lamp) or the Non-Auto (White Lamp) mode of operation. The user can choose whether to allow the non-isolated contactor to be in the Automatic or the Non-Automatic mode. These instructions are also shown on the operator panel of the slider door.

1. With the the ATS or Bypass in the automatic (Green lamp) mode, push and release the Lamp Test (Figure 30, Step1) pushbutton and the yellow door light will remain on (Figure 29). This is the contactor that can be racked out and isolated for testing or removal. If this is not the intended contactor simply rotate the Auto/Non-Auto position and re-depressed the Lamp Test pushbutton.
2. By using the Operation Select switch, if that contactor is required to be in the automatic mode while testing the other contactor, keep at the Green lamp. If that contactor is chosen to be in the non-automatic mode while testing the other contactor, place at the White lamp (Monitor Mode will be present on the controller).
3. Lift the small slider wrench shutter (Figure 29) on the chosen door (one with the yellow light on) and slowly rack out the contactor (counter clock-wise) using a 1/2" socket and extension wrench. After a few turns the status lamp with be on (Figure 30). Continue to rack out the contactor until the status lamp flashes once per second. At this point the contactor is isolated from the stabs but still connected to the secondary connector (for control). The contactor can now be exercised if desired.

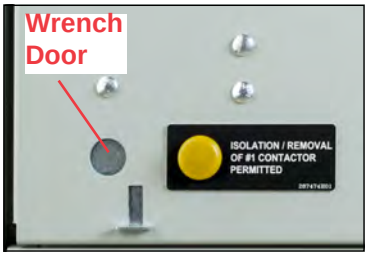

Figure 29. Door with Yellow Light and Racking Shutter Door.

4. Electrical test can be performed on the isolated contactor by using the Source Select switch. Enable the Test switch (Figure 30, Step 3) and now the Source Select exercises the isolated contactor.

   If the enable switch was disabled, the user has control of the racked in contactor if the Operation Select switch was in Non-Auto. By slowly switching to S1 or S2 the contactor will close to the source chosen. If "OFF" the contactor will be in the open position. Only one power source is required to switch to S1 or S2. The isolated contactor door can be opened (recommended to be closed) to run tests but the other door must remain closed. The green and red flags (Figures 27 & 28) show the position of the contactor.

Figure 30. Status Lamps and Controls for Isolation/Test and Removal.

5. If the Contactor is racked out further, (After isolation and to rack out towards removal, the door is required to be opened.) the Status lamp will now flash at once every 5 seconds. At this point the secondary connector is not connected and a non-electrical manual test may be performed by using the procedure as shown in Section 5.3. If the contactor is racked out, pull the rails carefully as the unit is heavy. Once the rails are out, the contactor can be lifted off the rails with a lifting device. Figure 31 shows a contactor (ATS or Bypass) ready to be lifted from the transfer switch. The contactor weighs about 150-lbs. The stabs in the back of the cell are powered and caution must be taken as there is voltage on the run-backs (copper) in the back of the cell once the contactor is removed.

Figure 31. Contactor Racked Out for Removal.

⚠ WARNING

BY DIRECTING THE SOURCE SELECT SWITCH, THE USER COULD SWITCH TO A SOURCE THAT IS NOT ENERGIZED OR IN THE OFF POSITION, THEREFORE REMOVING POWER TO THE LOAD.

6. If not in Automatic mode, simply turn the Operation Select switch to Automatic. The controller will take over and put the locked in contactor in the correct position and green lamp will be on. In the Non-Auto position, the controller does not have control (Monitor Mode).
7. To rack the contactor back into the cell (also see section 6), assure unit is opened (in neutral) and push in (Figure 32), then simply ratchet in clockwise. Close the door when the contactor reaches the isolated position (Status lamp flashing once per second). Racking in more will cause the status lamp to stay on. Once the status lamp goes to Off, turn the ratchet until a hard stop occurs but do not over stress. This is usually about one-two turns after the lamp goes to Off.

Note: DOOR YELLOW LAMP FLASHING
If the contactor is racked in (Status Lamp Off), and the Door's Yellow light flashes (Figure 29), simply close the shutter on the door and the Yellow lamp will go off. The flashing is a reminder to close the wrench shutter.

⚠ WARNING

HAZARDOUS VOLTAGES IN AND AROUND TRANSFER SWITCH EQUIPMENT DURING THE TROUBLE SHOOTING PROCESS CAN CAUSE PERSONAL INJURY AND/OR DEATH. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

IN ADDITION, IMPROPER OPERATION OF THE GENERATOR SET PRESENTS A HAZARD THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. OBSERVE ALL SAFETY PRECAUTIONS IN YOUR GENERATOR SET OPERATIONS AND INSTALLATION MANUALS.

Section 6: Draw-out, Racking-in, and Removal of Either Contactor

6.1 Installing the Contactor Switching Device

The contactors are interlocked and removable as shown in Figure 31. The Bypass contactor is identical to the ATS contactor and both are on slider rails as shown.

⚠ CAUTION

IT IS IMPORTANT TO TAKE GREAT CARE WHEN PLACING A DRAW-OUT CONTACTOR DEVICE INTO THE EXTERNAL RAILS. IF THE DEVICE IS NOT PROPERLY SEATED INTO THE RAILS, IT COULD FALL OUT FROM THE RAILS CAUSING EQUIPMENT DAMAGE AND/OR BODILY INJURY.

⚠ CAUTION

THE DOOR OF THE RACKED IN AND ENERGIZED CONTACTOR SHOULD REMAIN CLOSED AT ALL TIMES.

To install the contactor, check the indication flags to be sure it is tripped open. Electrical interlocks are used to make sure the contactor is tripped (if power is on) before it meets the rear stabs but it is good practice to trip open. A 1/2 inch socket (Figure 11) and ratchet with a double extension, will be required to rack the unit in. The other locked in contactor should remain closed at all times. With the appropriate lifting device, carefully insert the contactor rollers on top of the slides and push in the slides evenly as shown in Figure 32 to the stop and now it is ready to rack in.

Figure 32. Pushing in Contactor.

6.2 To RACK-IN ATS Contactor

⚠ CAUTION

TO RACK-IN, THE SWITCH DEVICE MUST BE IN THE TRIPPED (OPEN) POSITION, AND THE DOOR IS CLOSED AND LATCHED FOR THE LOCKED IN OTHER CONTACTOR.

i

Figure 33. Racked in Contactor Using a Clockwise Ratcheting Motion.

With power is off, there will be no status lamps, of course. Section 5.6.3 shows the operation of the status lamps when power is present.

Figure 34 shows a position label on the side wall of the contactor cell. This is not used when the power is present as the door should be closed when the status lamp is flashing once per second. If no power is present, this is a manual reference when racking the contactor in or out with power off. The label is a reference but not an exact reference.

The “Connect” area of the sticker is where the contactor is Racked In. If power is on, the status lamp will go off when the contactor is on the stabs. Once the status lamp goes to Off, turn the ratchet until a hard stop occurs but do not over stress. This is usually about one-two turns after the lamp goes to Off. If the switch power is off, look at the label and when the unit is in near the "connected" position, rack in slowly to the stop but do not over stress.

⚠ CAUTION

IT IS IMPORTANT TO TAKE GREAT CARE WHEN REMOVING OR INSTALLING A CONTACTOR DEVICE. IF THE DEVICE IS NOT PROPERLY SEATED ON THE APPROPRIATE SLIDE, IT COULD FALL CAUSING EQUIPMENT DAMAGE AND/OR BODILY INJURY.

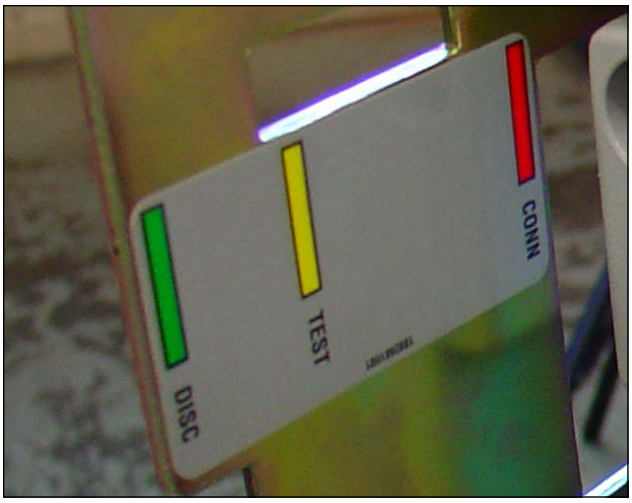

Figure 34. Position Label, Reference Only with No Power.

Section 7: Testing and Problem Solving

7.1 Operation

The most popular reasons for the contactor to not function properly are:1) A contactor(s) is not racked in fully, 2) the doors must be closed and latched for automatic or Non-Automatic usage, 3) the setpoints on the controller are not set correctly and 4) the switch is in Non-Automatic with the controller's yellow banner showing "Monitor Mode".

One can easily test to see if the contactors are racked in fully (Locked In) as the Status lamp(s) should be off. If a contactor is removed or in the isolated position, the other contactor will still be able to perform automatic, see Section 5. Many times the door is not closed and latched. The door light will be flashing. The door must be closed and latched to operate in the following modes:

1. Automatic mode using either Contactor.
2. To go between contactors (Auto/Bypass).
3. To perform the Automatic operation when one contactor is in the isolated Test position. (Door on locked-in contactor must only be closed).
4. To use either of the contactors in non-auto mode.

Notice the controller's top yellow banner. If the banner says "Monitor Mode" than the switch is not in automatic.

Before one leaves the switch:

In the normal automatic operating mode, there should not be any lamps on or flashing (except one green for automatic ATS or Bypass), there should not be any banners on the ATC-900 controller (yellow or red), and there should not be any white lamps on (standard or optional configurations).

7.2 Lights and Logic Panel

A simple lamp test can be performed using the lamp test push button switch on the option panel. All lamps (not the ATC-900 lamps) should light when being tested. Pushing the lamp test on the switch and having the lamps all light is a very good sign that the logic controller (LC) is operating correctly.

7.3 Testing

After the ATS equipment is initially installed or during planned outages, the installation should be tested to ensure that all equipment operates properly. This attention to detail will help avoid unexpected malfunctions. Mechanical and/or electrical tests should be performed as described in this section.

The frequency of subsequent testing should be based on recommendations of the Genset manufacturer. Make sure the generator is supplying the correct voltage and frequency to the switch (Source Available on Controller).

⚠ WARNING

HIGH VOLTAGE ASSOCIATED WITH OPERATIONAL TRANSFER SWITCH EQUIPMENT PRESENT A SHOCK HAZARD THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

IN ADDITION, IMPROPER OPERATION OF THE GENERATOR SET PRESENTS A HAZARD THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. OBSERVE ALL SAFETY PRECAUTIONS IN YOUR GENERATOR SET OPERATIONS AND INSTALLATION MANUALS.

7.3.1 Mechanical and/or Electrical Testing

NOTICE

SINCE TIME DELAY ENGINE COOL-OFF IS A STANDARD FEATURE, AN ENGINE START SIGNAL WILL BE PRESENT FOR A PERIOD OF TIME WHEN THE SWITCH IS FIRST ENERGIZED. THE PERIOD OF TIME IS EQUAL TO THE TIMER SETTING. TO AVOID STARTING THE ENGINE DURING THIS TIME PERIOD, TURN THE GENERATOR CONTROLS TO THE OFF POSITION.

Before energizing the ATS equipment, insure that all safety precautions are taken and that all **WARNINGS** and **CAUTIONS** are observed.

7.3.2 No Voltage Steps

With no voltage available on either power source, proceed as follows.

Step 1: The generator engine start controls should be in the OFF position to prevent an undesired start.

Step 2: Ensure that the ATC-900 and PT transformer (Figure 22) have been set to the proper applied system voltage.

Step 3: Check all ATS loads to ensure that they are ready to be energized.

Step 4: Assure engine start contacts have been connected, see Section 4.5.1 (TBJ15).

NOTICE

AT THIS POINT, AND PRIOR TO MAKING ANY ATTEMPT TO ENERGIZE THE ATS EQUIPMENT, THE ENGINE-DRIVEN GENERATOR SHOULD BE OPERATED. IF NECESSARY, THE VOLTAGE REGULATOR ON THE GENERATOR SHOULD BE ADJUSTED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. THE ATS EQUIPMENT WILL RESPOND ONLY TO THE RATED VOLTAGE AND FREQUENCY PROGRAMMED INTO THE CONTROLLER.

7.3.3 Operational Checks

Step 1: Check to ensure that Source 1 switching device is in the CLOSED position.

Step 2: Initiate an automatic transfer operation from the Source 1 to the Source 2 power source by pressing the **< Engine Test>** pushbutton. The initial password for the is 0900. Use the up-down, left-right to set this password for running an engine test and don't forget to push the "Enter" button after the password is entered.

Note: The Logic Controller provides the capability to set the Engine Test function to:

0. No Load Engine Test;
1. Load Engine Test; or
2. Disabled.

The factory default is set to:

1. Load Engine Test
   - **a.** After the Time Delay Engine Starting (TDES) has timed out, the engine should start, run, and build up to normal voltage and frequency.
   - **b.** The transfer switch will transfer to the Source 2 power source after the Time Delay Normal to Emergency (TDNE) times out.

Step 3: Initiate, if desired, an automatic transfer operation back to the Source 1 power source by pressing the **< Engine Test>** pushbutton one time. The factory default setpoint for the engine run in engine test is 30 minutes.

1. After the Time Delay Emergency to Normal timer (TDEN) has timed out, the transfer switch will transfer back to the Source 1 power source.
2. The Time Delay for Engine Cool-Off (TDEC) will allow the engine to run unloaded for a preset time after transfer to the Source 1 power source is completed.

7.3.4 Alternate Tests

1. Alternate operational tests may be possible depending upon the options provided with any given ATS. Refer to the drawings provided with the ATS equipment, along with the specification nameplate, to determine the exact options provided.

Before one leaves the switch:

In the normal automatic operating mode, there should not be any lamps on or flashing (except one green for automatic ATS or Bypass), there should not be any banners on the ATC-900 controller (yellow or red), and there should not be any white lamps on (standard or optional configurations).

7.4 Problem Solving

WARNING

ONLY PROPERLY TRAINED PERSONNEL, FAMILIAR WITH THE ATS EQUIPMENT AND ITS ASSOCIATED EQUIPMENT, SHOULD BE PERMITTED TO PERFORM THE TROUBLE SHOOTING FUNCTION. IF AN INDIVIDUAL IS NOT QUALIFIED TO PERFORM THE TROUBLE SHOOTING, THE INDIVIDUAL SHOULD NOT ATTEMPT ANY OF THESE PROCEDURES. NEVER ATTEMPT TO SERVICE OR PERFORM MAINTENANCE ON EQUIPMENT WHILE ENERGIZED. USE THE MIS SWITCH. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT BEFORE SERVICING OR INSPECTING. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

A basic problem-solving effort is the first step to take prior to calling for assistance. Frequently, the effort will successfully address most problems encountered. Remember, only qualified individuals familiar with the ATS equipment and the system in which it is applied should attempt these problem solving procedures.

If a problem persists after having completed the problem solving procedure, contact a Eaton representative for further assistance. When calling for assistance the following is the minimum information required to properly address the need:

1. Style number (GO Number) of ATS, on door, silver label;
2. Catalog number of ATS on door, silver label;
3. Actual location of the ATS (type of facility, address, etc.);
4. Company name and name and position of individual representing company;
5. Basic description of the situation as it exists; and
6. Any results of the problem solving steps taken and/or readings taken.

Eaton Care for assistance
877-386-2273 option 2, option 4, and then option 3

7.4.1 Contactor's Contact Resistance

Contact resistance should not be considered a reliable measure of a contactor's ability to carry rated current. Contact resistance is usually measured with low currents from a low voltage supply flowing through the contacts, and the resistance value is heavily dependent on transient contact surface conditions. The transient surface conditions can vary with factors such as contact material, gaseous ambient, and the current level. The resistance can decrease with the flow of current.

The milli-volt drop procedure outlined in NEMA Standards Publication AB 4 can be used to assess the electrical integrity of connections and contacts within a contactor. Again, the millivolt drop can be affected by contact surface conditions which can change with contactor operation and arcing. The millivolt drop is only one factor in determining the thermal loading of a contactor, and the total system must be considered prior to judging a contactor to be unacceptable. If resistance and millivolt drop test data raises concerns with regard to contactor integrity, a proper thermal test must be performed. The contactors are listed to UL 1008 which does not contain specific resistance requirements. It does require specific temperature rise requirements that are to be met after overload testing.

Section 8: Maintenance

8.1 Introduction

⚠ WARNING

HIGH VOLTAGES ARE PRESENT IN AND AROUND TRANSFER SWITCH EQUIPMENT. BEFORE INSPECTING OR MAINTAINING THIS EQUIPMENT, DISCONNECT THE LINE POWER FROM THE EQUIPMENT BEING SERVICED BY OPENING AND LOCKING OUT, IF POSSIBLE, THE NEXT HIGHEST DISCONNECT DEVICE. FAILURE TO FOLLOW THIS PROCEDURE COULD CAUSE PERSONAL INJURY AND/OR DEATH.

⚠ WARNING

THE CLOSED TRANSITION PRODUCT CONTAINS A SPECIAL CONTACT ARRANGEMENT (OVERLAPPING CONTACTS). MISUSE CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, AND/OR PROPERTY DAMAGE.

In general, transfer switch equipment is designed to be relatively maintenance free under normal usage. The equipment should be exercised on a regular schedule. However, because of the variability of application conditions and the importance placed on dependable operation by this type of equipment, inspection and maintenance checks should be made on a regularly scheduled basis. Since equipment maintenance will consist mainly of keeping the equipment clean, the frequency of maintenance will depend, to a large extent, on the cleanliness of the surroundings. If a significant amount of dust or foreign matter is present, a more frequent maintenance schedule should be followed.

It is suggested that visual inspections of the equipment be made on a regular basis, not just during regularly scheduled periods. Always be alert for an accumulation of dirt in and around the structure, loose parts and/or hardware, cracks and/or discoloration to insulation, and damaged or discolored components.

8.2 Maintenance Procedures

A suggested maintenance procedure to follow is outlined in Table 4.

Table 4. Periodic Maintenance Procedures.

STEP	ACTION
a. Make the transfer switch equipment safe for inspection and/or maintenance.	Disconnect the line power from the equipment being serviced by opening next highest disconnect device. Make certain that any accessory control power is switched off and the logic plugs are disconnected. Use proper Lock-out-Tagout procedures. The MIS switch could also be used to remove power from the components area on the slider door if that is the only area needed to be inspected.
b. Inspect the structure area for any safety hazards or potential maintenance problems.	Inspect the area, especially where switching devices are installed, for any safety hazards, including personnel safety and fire hazards. Exposure to certain chemical vapors can cause deterioration of electrical connections. Inspect for accumulated dirt, loose hardware, or physical damage. Examine the primary insulation for evidence of cracking or overheating. Overheating will show as discoloration, melting or blistering of conductor insulation, or as pitting or melting of conductor surfaces due to arcing. Inspect the secondary control connections for damage and the control wiring for insulation integrity
c. Inspect the switching devices for dust, dirt, soot, grease, moisture, or corrosion.	Remove the dust, dirt, soot, grease, moisture, and corrosion contamination from the surface of the switching device using a dry, soft lint-free cloth, dry, soft bristle brush, and vacuum cleaner. Do not blow debris into the switching device or nearby the contactor structure. If contamination is found, look for the source and fix the problem.
d. Check for material integrity, uneven wear, discoloration, or loose hardware.	Severe material cracking will require replacement and loose hardware will need to be tightened.
e.Check all terminals and connectors for looseness or signs of overheating.	Overheating will show as discoloration, melting, or blistering of conductor insulation. Connections that do not have signs of looseness or overheating should not be disturbed.
f. Contact Inspection Procedure	Loosen the arc chute retaining screws on the top rear of the contactor, then slide the molded cover toward the back of the contactor (Figures 35). The arc chute can then be lifted out of the molded case and the contacts can be inspected. Contact Eaton Care (1-877-ETN-CARE, Option-2, Option-4, Option-3) if the contacts have excessive wear. Reinstall the arc chute, slide the cover forward and tighten the retaining screw. For more information see section 7.4.1 on contact resistance.
g. Exercise the switching devices if they are not often exercised while in operation. This will permit a wiping action by the contacts.	If a switching device is used for frequent switching during normal operation, this step can be disregarded. There are two automatic exercisers through the ATC-900 that are available to the user.
h. Inspect NEMA 3R filters for blockage or contamination.	For NEMA 3R enclosed transfer switches with venting, check that the air filters, if used are clean and uncompromised. Replace the filters as necessary.
i. Return the transfer switch equipment to automatic service.	Make certain that all barriers are in place and the doors are closed. Reapply the Source 1 and Source 2 power. Assure that the controller does not show "Monitor Mode" and the door lamps are not flashing.

Figure 35. Contacts Behind ARC Chutes.

Section 9: Renewal Parts Guide

9.1 General

Refer to Figure 36 for assistance with selecting and ordering selected ATS renewal parts.

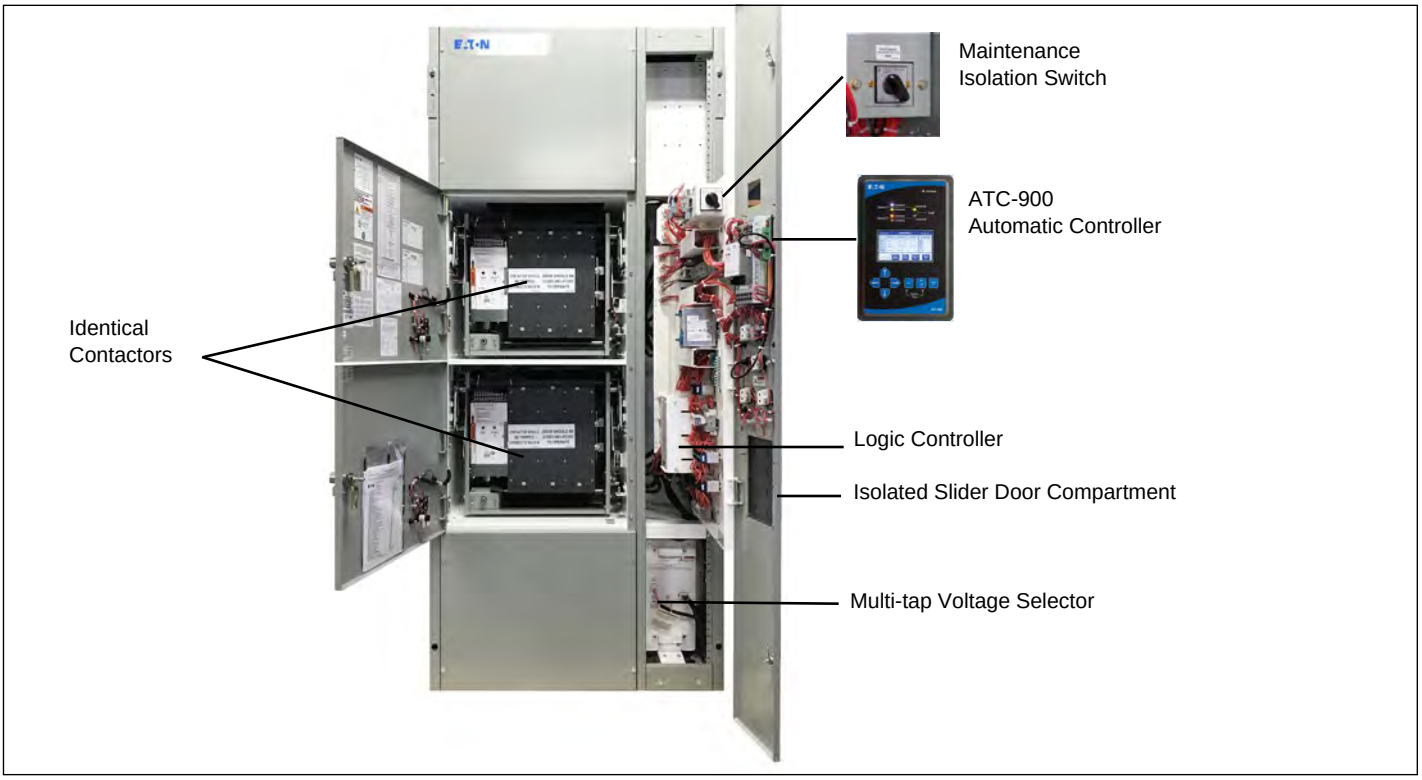

Figure 36. 1200 or 1600, 3-Pole, ATS Interior Components.

Replacement Parts List
Replacement parts can vary depending on the specifications of the unit ordered and should be based on the ACTUAL General Order Number / Catalog Number and/or Manufacturing Information generated from the Bidmanager file. This list represents some of the most common replacement parts available.

FUNCTION / DEVICE	PART NUMBER	QTY. PER SWITCH	DESCRIPTION
TRANSFORMER ASSEMBLY	66A8272G01	1	TRANSFORMER BOX ASSY, JUST METAL
INDIVIDUAL TRANSFORMER	1268C19G09 Domestic	2	1 EACH FOR S1 AND S2
	1268C19G11 International	2	1 EACH FOR S1 and S2
CONTACTOR (Ready to Insert) (480V)	66A8279G01	2	800A 2 pole ATS contactor
	66A8279G02	2	800A 2 pole Bypass contactor
	66A8279G03	2	800A3 pole ATS contactor
	66A8279G04	2	800A 3 pole Bypass contactor
	66A8279G05	2	800A 4 pole ATS contactor
	66A8279G06	2	800A 4 pole Bypass contactor
	66A8279G07	2	1200A 2 pole ATS contactor
	66A8279G08	2	1200A 2 pole Bypass contactor
	66A8279G09	2	1200A 3 pole ATS contactor
	66A8279G10	2	1200A 3 pole Bypass contactor
	66A8279G11	2	1200A 4 pole ATS contactor
	66A8279G12	2	1200A 4 pole Bypass contactor

Replacement Parts List (Continued)

FUNCTION / DEVICE	PART NUMBER	QTY. PER SWITCH	DESCRIPTION
	66A8279G13	2	1600A 2 pole ATS contactor
	66A8279G14	2	1600A 2 pole Bypass contactor
	66A8279G15	2	1600A 3 pole ATS contactor
	66A8279G16	2	1600A 3 pole Bypass contactor
	66A8279G17	2	1600A 4 pole ATS contactor
	66A8279G18	2	1600A 4 pole Bypass contactor
	69D8288G01	1	ATS Contactor 15G & H Aux Harness
	69D8289G01	1	BP Contactor 15G & H Aux Harness
CONTACTOR (Ready to Insert) (600V)			
	66A8279G19	2	1200A 3 pole ATS contactor
	66A8279G20	2	1200A 3 pole Bypass contactor
	66A8279G21 r	2	1200A 4 pole ATS contacto
	66A8279G22	2	1200A 4 pole Bypass cont
WIRE HARNESS ASSEMBLIES			
	288350G01	1	UPPER DOOR HARNESS (BP)
	288351G01	1	LOWER DOOR HARNESS (ATS)
	288776G01	1	1216 CONTACTOR BYPASS MAIN LOGIC PANEL WIRE HARNESS ASSEMBLY ATC-900 CONTROLLER
	288353G01	1	SOURCE SENSING INTER-CONNECT
	288356G01	2	GP1 - (12 PIN) INTERCONNECT WIRE HARNESS
	288357G01	2	GP2 - (6 PIN) INTERCONNECT WIRE HARNESS
	288358G01	1	ATS - LOWER DOOR - INTERNAL INTER-CONNECT
	288359G01	1	BYPASS - UPPER DOOR - INTERNAL INTER-CONNECT
	288360G01	1	ATS LIMIT SWITCH INDICATION
	288361G01	1	BP LIMIT SWITCH INDICATION
	288756G01	1	I/O MODULE POWER WIRE HARNESS ASSEMBLY
	69C2775G01	1	SOURCE SENSING
	69D8280G01	1	1600A - CONTACTOR 1 (ATS) ATC-900/ATC-800/ATC-300+
	69D8288G01	1	1600A OPT. 15G/H-CONT. 1 (ATS) ATC-900/ATC-800/ATC-300+ (ADD TO G01)
	69D8283G01	1	1600A - CONTACTOR 2 (BP) ATC-900/ATC-800/ATC-300+
	69D8289G01	1	1600A OPT. 15G/H-CONT. 2 (BP) ATC-900/ATC-800/ATC-300+ (ADD TO G02)
	288746G01	1	MIS
	288777G01	1	CONTACTOR 1 "ATS" INTER-CONNECT ATC-900
	288778G01	1	CONTACTOR 1 (ATS) POSITION INDICATION TERMINAL BLOCK HARNESS ATC-900
	288779G01	1	CONTACTOR 2 "BYPASS" INTER-CONNECT ATC-900
	288780G01	1	CONTACTOR 2 (BYPASS) POSITION INDICATION TERMINAL BLOCK HARNESS ATC-900
	288781G01	2	1216 BYPASS CONTACTOR INTER-CONNECT WIRE HARNESS - GENERIC 12 PIN (MALE / FEMALE)
CONTROLLER	8160A90G01	1	ATC-900 CONTROLLER Open Transition
	8160A90G64	1	ATC-900 CONTROLLER Closed Transition
CONTROL RELAYS	D9PR8BA	4	NO 4P RELAY, 120VAC, 30A (EATON)
CONTROL RELAYS	D9PR10BA	1	NO/NC RELAY, 120VAC, 30A (EATON)
CONTROL RELAYS	D7PR2A	5	RELAY: PLUG-IN, 10A, 120VAC
LOGIC CONTROLLER	288304G01	1	NEXT GEN. BP LC3 ASSEMBLY

Replacement Parts List (Continued)

FUNCTION / DEVICE	PART NUMBER	QTY. PER SWITCH	DESCRIPTION
COMPONENTS			
	E34PB1	1	SWITCH; E34 PUSHBUTTON, BLACK
	E34VFBL1	1	SWITCH; SELECTOR
	E34VHBL1	1	SWITCH; SELECTOR
	E34VTBL1	1	SEL SW 4P MA C7 BK LVR
	10250T3	1	C-H 10250T CONTACT BLOCK, 2-NC
	10250T2	3	2 N.O CONTACT BLOCK
	10250T53	1	1 N.O CONTACT BLOCK
	3050-4-13-38310	1	RED LIGHT
	3050-4-13-38320	2	AMBER LIGHT
	3050-4-13-38330	2	WHITE LIGHT
	3050-4-13-38340	2	GREEN LIGHT
	M22-USB-SA	1	EATON USB BULKHEAD
	PSG960B24RM	1	POWER BUFFER DRB-24V040A
	E47BMS42	2	LIMIT SWITCH
	C22-L-Y-24	2	24VDC INDICATING LIGHT - Yellow
	288753G01	1	BP - S2 SECONDARY TERMINAL BLOCK ASSEMBLY
	288752G01	1	BP - S1 SECONDARY TERMINAL BLOCK ASSEMBLY
	288745G01	1	MIS SWITCH ASSEMBLY

Section10: ATS Quick Start Instructions

WARNING

THESE QUICK START INSTRUCTIONS ARE NOT A COMPLETE SOURCE OF INFORMATION ON THE ATC 900 CONTROLLED ATS EQUIPMENT. INSTALLATION SHOULD NOT BE STARTED UNTIL THE ENTIRE INSTRUCTION BOOK HAS BEEN REVIEWED AND UNDERSTOOD. FAILURE TO FOLLOW THE FULL INSTRUCTIONS CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, OR PROPERTY DAMAGE. APPROPRIATE PPE SHOULD ALWAYS BE APPLIED.

Step 1: Mount the ATS on a flat rigid surface. See section 4.

Step 2: Install the power cables. Cables must be sized and installed per National Electrical Code. The cables must be sized within the specified cable size range on the side of the cable connectors.

Connect the cables and torque to the correct value.

1.Load Cables* (T1, T2, T3);

2.Source 1 or Utility Supply (N1, N2, N3); and

3.Source 2 or Generator Supply (E1, E2, E3).

For 4 pole transfer switches, connect the load cables (TN), Source 1 or utility supply (NN), and Source 2 or generator supply (EN).

Step 3: Turn the generator OFF at the generator control panel. This will prevent unexpected activation of the generator.

Step 4: Connect the Engine Generator Start wires to terminal blocks TBJ15-4 & 5 for N.O. contacts (Red Terminals). (See Section 4.5.1 and Figure 38 below. This contact is CLOSED whenever the engine generator is needed, and should be connected to a generator controller. **NEVER** connect directly to a starter solenoid or ignition system. See the Genset manufacturer instruction leaflet for recommended wire sizes and location procedures.

The ATC-900 Input (TBJ9) connections are brought out to terminal blocks in the same area. See the switch drawings on sheet 7. Assure that the CPT transformer shows the correct voltage selection for the voltage being supplied.

Step 5: Make sure the Doors are both closed and latched. Using the ATC-900, apply Utility (Source 1) power. If the switch is properly applied for the system voltage ordered, the display should work and the Source 1 Available LED on the controller should light. Using a voltmeter, check for proper system voltage on Source 1 and load terminals. Check all phases on a 3-phase switch. Voltage measurements should be taken phase to phase and phase to neutral.

Step 6: To view the setpoints, press the view setpoints on the button switch below the display menu. To change the setpoints push the button under that menu and put in the password, default 0900.

This is an example. Please use the this IB and the Controller Instruction Booklet for more detailed instructions and setpoint information.

Figure 37. Quick Start. User Terminal Blocks & Transformer (PT).

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