



O & M Manual for the RLCM and RLCU Automatic Transfer Switch

Instruction Booklet

New Information

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⚠ WARNING

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

HAZARDOUS VOLTAGES ARE PRESENT INSIDE TRANSFER SWITCH ENCLOSURES THAT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY. FOLLOW PROPER INSTALLATION, OPERATION, AND MAINTENANCE PROCEDURES TO AVOID THESE VOLTAGES.

THE 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.

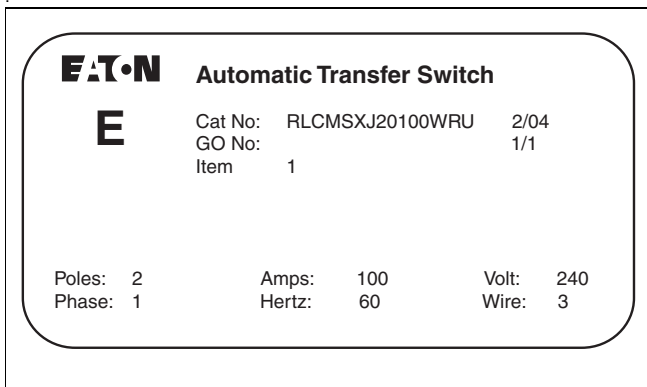


Figure 1. Typical Automatic Transfer Switch Equipment Nameplate.

All possible contingencies that 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 required by the purchaser regarding a particular installation, application, or maintenance activity, please contact an authorized Eaton sales representative or the installing contractor.

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 the Automatic Transfer Switch (ATS). 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, please contact an authorized Eaton sales representative or the installing contractor.

1.1.1 Warranty and Liability Information

No warranties, expressed or implied, including warranties of fitness for a particular purpose of merchantability, 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, standards, and/or regulations must be strictly observed in the installation, application, operation, and maintenance of this device.

⚠ WARNING

THE WARNINGS AND CAUTIONS INCLUDED AS PART OF THE PROCEDURAL STEPS IN THIS DOCUMENT ARE FOR PERSONAL 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 ENSURE THAT PERSONNEL ARE ALERT TO WARNINGS, WHICH APPEAR THROUGHOUT THE DOCUMENT. IN ADDITION, CAUTIONS ARE ALL UPPER CASE AND BOLDFACE.

⚠ CAUTION

READ AND UNDERSTAND THE MATERIAL PRESENTED IN THIS DOCUMENT BEFORE ATTEMPTING INSTALLATION, APPLICATION, OPERATION, OR MAINTENANCE OF THE EQUIPMENT. IN ADDITION, ONLY QUALIFIED PERSONS SHOULD BE PERMITTED TO PERFORM ANY WORK ASSOCIATED WITH THE EQUIPMENT. ANY WIRING INSTRUCTIONS PRESENTED IN THIS DOCUMENT MUST BE FOLLOWED PRECISELY. FAILURE TO DO SO COULD CAUSE PERMANENT EQUIPMENT DAMAGE.

1.2 General Information

ATSs are used to protect critical electrical loads against loss of power. The load's utility (Source 1) power source is backed up by a generator (Source 2) power source. An ATS is connected to both the utility and generator power sources and supplies the load with power from one of these two sources. In the event that power is lost from the utility power source, the ATS transfers the load to the generator power source. Once the utility power is restored, the load is automatically transferred back to the utility power source (Figure 2).

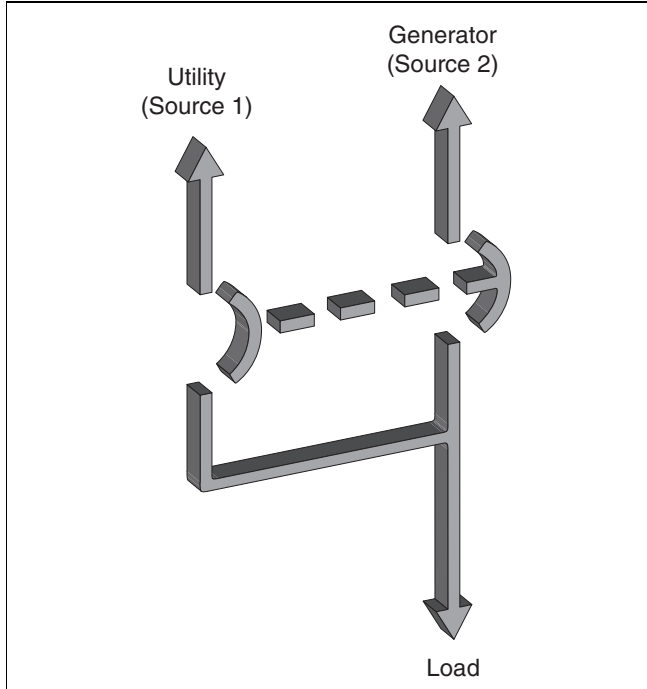


Figure 2. Typical Load Transfer Switch (Contactor) Schematic.

An intelligence system initiates the transfer when the utility power source fails or falls below a preset voltage. An engine start is then initiated and the ATS transfers to the generator power source when sufficient generator voltage is available. When the utility power source is restored, the ATS automatically transfers back and the generator will shut down after a time delay. In the event the utility power source fails and the generator power source does not appear, the ATS remains connected to the utility power source until the generator power source does appear. Conversely, if connected to the generator power source and the generator power source fails while the utility power source is still unavailable, the ATS remains connected to the generator power source.

ATSs automatically perform the transfer function, and include three basic elements.

1. Main contacts to connect and disconnect the load to and from the source of power.
2. Solenoids to make the transfer of the main contacts from source to source.
3. Intelligence/supervisory circuits to constantly monitor the condition of the power sources and thus provide the intelligence necessary for the switch and related circuit operation.

1.2.1 Design Configuration

The Eaton Residential ATS is a rugged, compact design that utilizes contactors to transfer essential loads from one power source to another (see Figure 3). The Residential ATS contains suitable mechanical and electrical interlock switches to eliminate the possibility of connecting the utility service to the generator output. In addition, a manual override lever is provided for the transfer function.

⚠ WARNING

DO NOT MANUALLY TRANSFER THE SWITCH WHILE UNDER LOAD.

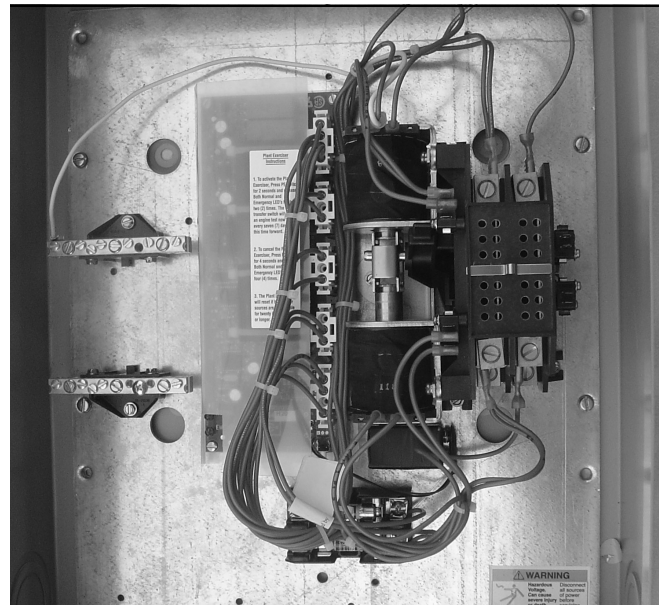


Figure 3. RLCU ATS (100 A).

1.2.2 RLCM/RLCU Differentiation

Physically, there is one main difference between the RLCM and the RLCU series ATSs. The RLCM ATS is equipped with generator engine start terminals (see Figure 4) while the RLCU ATS is equipped with a utility sensing fuse block (see Figure 5).

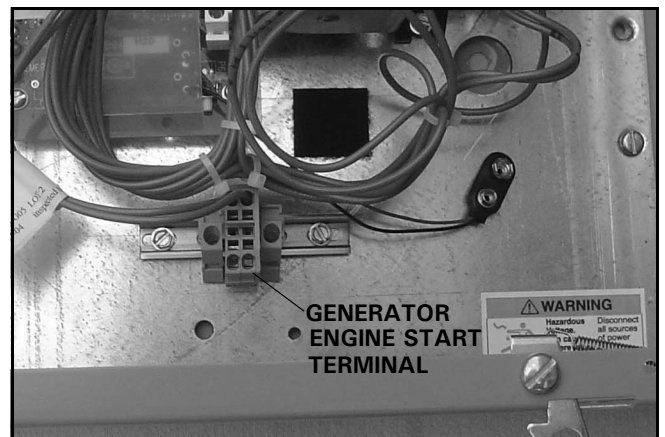


Figure 4. Generator Engine Start Terminals in a RLCM ATS.

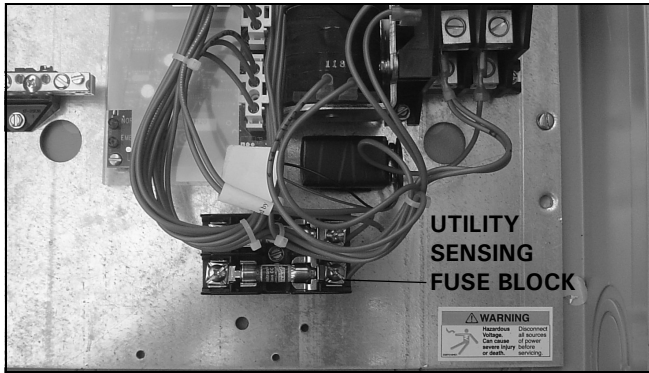


Figure 5. Utility Sensing Fuse Block in a RLCU ATS.

1.2.3 Optional Service Entrance Feature

The ATS can be ordered in either a standard or service entrance (SE) configuration. When ordered as an SE, integral overcurrent protection is built into the switch. Therefore, the ATS can be installed at the point of service entrance without the need for an upstream disconnect device.

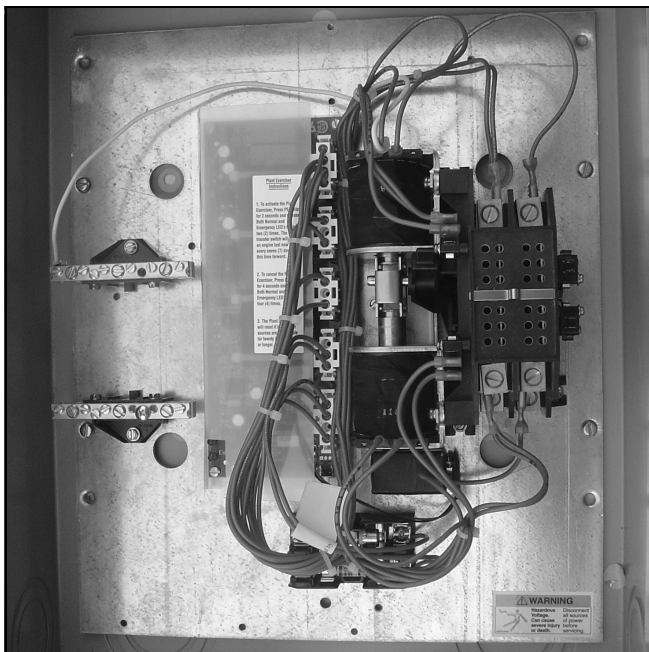


Figure 6. An RLCU 100 A Standard ATS.

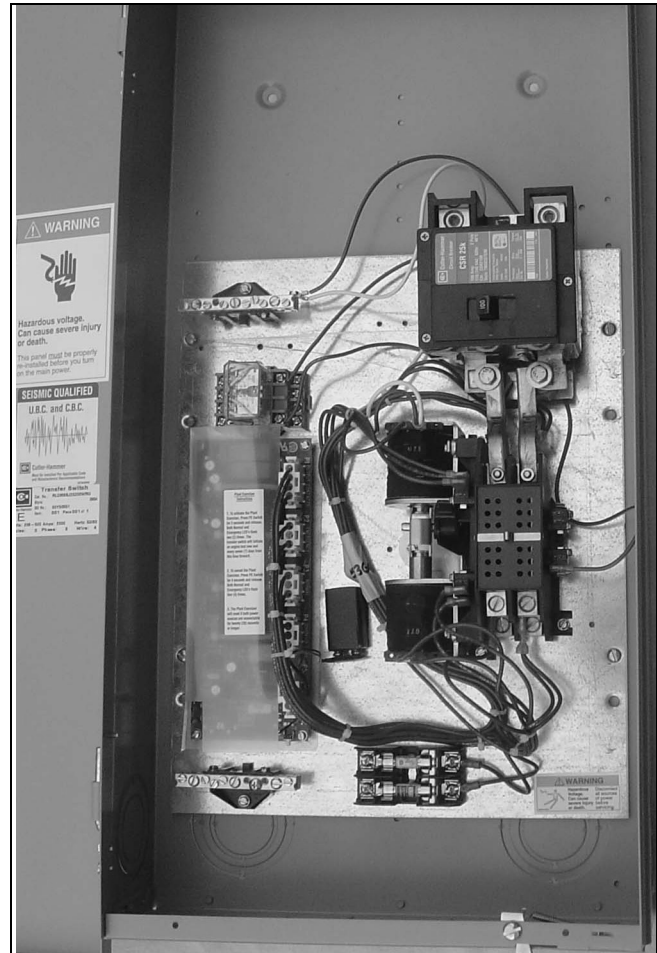


Figure 7. An RLCU 100 A SE ATS.

The benefits of the SE configuration are:

- Combined service disconnect and over-current protection in the ATS reduces the overall equipment and installation costs.
- Fewer components and power connections reduce maintenance requirements.

1.2.4 Optional TVSS Surge Protection

Transient voltage surge suppressor (TVSS) surge protection is available as an optional feature on all ATSs (see Figure 8). If you have ordered an SE ATS, the optional TVSS will be factory installed inside the enclosure of the ATS. If you have ordered an optional TVSS with a standard ATS, the TVSS will be included with the ATS, but it is up to the installer to mount and wire the TVSS and associated fuse block. See example in Figure 9 and see Section 8.1 for complete instruction for installing the optional TVSS.

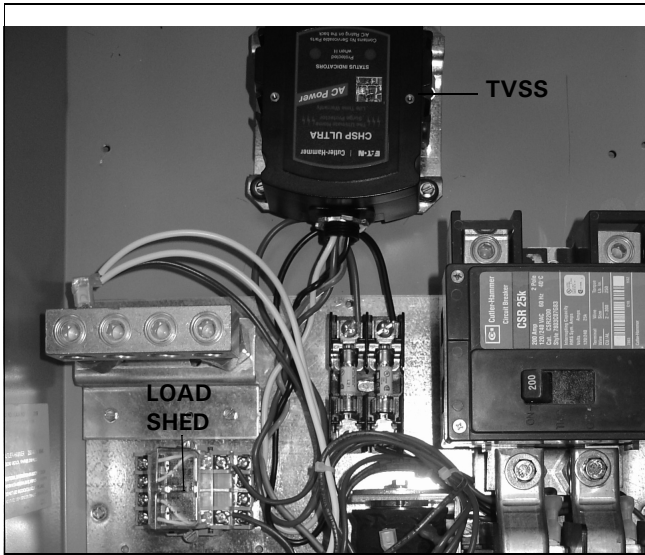


Figure 8. TVSS and Load Shed Mounted in an SE Enclosure.



Figure 9. TVSS Mounted to the Outside of a Standard Enclosure.

1.2.5 Optional Load Shed

Four sets of contacts are available and can be used to control large connected loads on the generator (i.e. air conditioners,

hot tubs, etc.) (See Figure 8). See Section 7.4.1.14 for factory installed and Section 8.4 for non factory installed.

1.2.6 Optional Telephone and Cable Surge Protection

The telephone line surge protection feature offers 4-pair telephone line protection. The feature ships loose for customer mounting convenience (see Section 7.4.1.12).

The TV and satellite cable surge protection feature offers two (2) coaxial line protection (cable/satellite TV). The feature ships loose for customer mounting convenience (see Section 7.4.1.13).

1.3 Transfer Switch Catalog Number Identification

ATS equipment catalog numbers provide a significant amount of relevant information pertaining to a specific piece of equipment. The Catalog Number Identification Table (see Table 1) provides the required interpretation information. An example is offered to initially simplify the process.

Example: Catalog Number (circled numbers correspond to position headings in Table 1).

The catalog number RLCMSXJ20100WRU describes an ATS.

① to ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ to ⑫ ⑬ ⑭ ⑮
RL C M S X J 2 0100 W R U

The intelligence represented by the control panel is microprocessor logic. The frame is for 100A service, and the switch is a 2-pole, fixed mount contactor. The continuous current rating of this equipment is 100A and applicable at 240 Vac, 60 Hz. The ATS equipment is enclosed in a NEMA 3R enclosure and listed for UL applications.

1.4 Environmental and Operational Conditions

Normally, an ATS is applied indoors in an electrical equipment room. It can also be used for normal outdoor applications (with a NEMA 3R enclosure) where the equipment is subject to falling rain, freezing temperatures, and 95% humidity (non-condensing). The ambient temperature range for operation is between -20 and 70°C (-4 and 158°F).

Seismic

With proper installation, these transfer switches have a seismic capability which exceeds the worst case Zone 4 required levels per both the Uniform Building Code and the California Building Code.

Table 1. ATS Catalog Number Explanation.

Positions 1-2	Position 3	Position 4	Position 5	Position 6
Basic Device	Switching Device	Control Panel	Transition	Service Entrance
Residential/Light Commercial RL	Contactor C	Microprocessor M Universal U	Standard S	Standard X Service Entrance E

Position 7	Position 8	Positions 9-12	Position 13	Position 14	Position 15
Switching Device Arrangement	Number of Poles	Ampere Rating	Voltage/Frequency	Enclosure	Listing
Fixed Mount Contactor J	Two 2	100 A – 0100 200 A – 0200	240 Vac/60 Hz W 208 Vac/60 Hz B	NEMA 1 S NEMA 3R R	UL Listed U

SECTION 2: RECEIVING, HANDLING, AND STORAGE

2.1 Receiving

Every effort is made to ensure that the ATS equipment arrives at its destination undamaged and ready for installation. The packing is designed to protect the internal components as well as the enclosure. 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 site and ready to be installed.

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

A shipping label affixed to the shipping container includes a variety of equipment and customer information, such as General Order and Customer numbers. Make certain that this information matches the other shipping paper information.

Each ATS enclosure is packaged in its own box. Heavy-duty cardboard sides surround the enclosure. Do not discard the packing material until the equipment is ready for installation.

Once the top packaging is removed from the shipment, the enclosure door can be opened. A plastic bag of documents will be found in the enclosure. Important documents, such as wiring diagrams and appropriate instruction leaflets are enclosed within the bag and should be filed in a safe place.

2.2 Handling

As previously mentioned, ATS equipment is packaged in its own box. Protect the equipment from impact at all times and do not double stack. Once the equipment is at the installation site and ready to be installed, the packaging material can be removed. Refer to Section 4 of this manual for specific installation instructions.

2.3 Storage

Although well packaged, this equipment is not suitable for outdoor storage. 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 65°C (-4 to 149°F), with a relative humidity of 80% or less. Do not, under any circumstance, stack other equipment on top of an ATS equipment enclosure, whether packaged or not.

SECTION 3: EQUIPMENT DESCRIPTION

3.1 Introduction

The Eaton Residential ATS is assembled and tested at the factory. It is designed to be used in conjunction with standby power distribution equipment to provide an alternate source of power to critical circuits in the event that the primary power source is interrupted.

This ATS monitors both utility (Source 1) and generator (Source 2) power sources and automatically transfers critical load circuits between the two sources, depending on which source is available. The utility power source is preferred and will remain connected to the switch if it is available.

3.2 RLCM ATS Features

The following section describes the standard features in the RLCM ATS.

Note:The time delays are not adjustable.

1. Time Delay Normal (Utility) to Emergency (Generator) (TDNE)

This feature delays the transfer from the utility (Source 1) power source to the generator (Source 2) power source in order to override momentary utility power source outages and/or fluctuations. Timing begins when the generator power source becomes available. It does not affect initiation of the generator engine start circuit. Should the utility power source fail, the generator engine start contact will close and will initiate an generator engine start-up in 10 seconds. The TDNE timer is set for 3 seconds.

2. Time Delay on Engine Starting (TDES)

This feature delays initiation of the generator engine start circuit in order to override momentary utility (Source 1) power source outages and/or fluctuations. It does not affect the ability of the transfer switch to transfer from the utility power source to the generator (Source 2) power source. The TDES timer is set for 10 seconds.

3. Time Delay Emergency (Generator) to Normal (Utility) (TDEN)

This feature delays the transfer from the generator (Source 2) power source to the utility (Source 1) power source to allow the utility power source to stabilize before the transfer is initiated. Timing begins when the utility power source becomes available. If the generator power source fails during timing, the time delay is overridden and an immediate transfer to the utility power source will occur. The TDEN timer is set for 7 minutes.

Failsafe

Failsafe refers to the condition whereby the ATS is connected to the generator (Source 2) power source. In the event that the generator power source fails and the utility (Source 1) power source is available, an immediate retransfer to the utility power source will occur.

4. Time Delay Engine Cool-off (TDEC)

This feature allows the generator engine to run after the ATS returns to the utility (Source 1) power source without load. The TDEC timer is set for 5 minutes.

5B. Undervoltage/Underfrequency Sensing for Emergency (Generator) Source

This feature enables the logic to constantly monitor the generator (Source 2) power source. The logic prevents transfer from the utility (Source 1) power source to the generator power source until the generator power source has reached an acceptable operating voltage and frequency. Dropout is set at 80% of nominal voltage and pickup is set at 90% of nominal voltage. Frequency dropout is set at 58 Hz and pickup is set at 59 Hz.

23. Plant Exerciser

This feature is a 7-day timer and provides automatic testing of the generator (Source 2) power source once each week for 15 minutes with no load.

26. Undervoltage Sensing for Normal (Utility) Source

This feature enables the logic to constantly monitor the utility (Source 1) power source. The logic prevents transfer from the generator (Source 2) power source to the utility power source until the utility power source has reached an acceptable operating voltage. Dropout is set at 80% of nominal voltage and pickup is set at 90% of nominal voltage.

3.3 RLCU ATS Features

The following section describes the standard features in the RLCU ATS.

Note: Note: The time delays are not adjustable.

1. Time Delay Normal (Utility) to Emergency (Generator) (TDNE)

This feature delays the transfer from the utility (Source 1) power source to the generator (Source 2) power source in order to override momentary utility power source outages and/or fluctuations. Timing begins when the generator power source becomes available. It does not affect initiation of the generator engine start circuit. Should the utility power source fail, the generator will startup after its time delay. The TDNE timer is set for 3 seconds.

2. Time Delay on Engine Starting (TDES)

This feature delays initiation of the generator engine start circuit in order to override momentary utility (Source 1) power source outages and/or fluctuations. It does not affect the ability of the transfer switch to transfer from the utility power source to the generator (Source 2) power source. The TDES timer is dependent on the generator.

3. Time Delay Emergency (Generator) to Normal (Utility) (TDEN)

This feature delays the transfer from the generator (Source 2) power source to the utility (Source 1) power source to allow the utility power source to stabilize before the transfer is initiated. Timing begins when the utility power source becomes available. If the generator power source fails during timing, the time delay is overridden and an immediate transfer to the utility power source will occur. The TDEN timer is set for 7 minutes.

Failsafe

Failsafe refers to the condition whereby the ATS is connected to the generator (Source 2) power source. In the event that the generator power source fails and the utility

(Source 1) power source is available, an immediate retransfer to the utility power source will occur.

4. Time Delay Engine Cool-off (TDEC)

This feature allows the generator engine to run after the ATS returns to the utility (Source 1) power source without load. The TDEC timer is set for 5 minutes. The generator will run for its own time delay after this 5 minutes.

5B. Undervoltage/Underfrequency Sensing for Emergency (Generator) Source

This feature enables the logic to constantly monitor the generator (Source 2) power source. The logic prevents transfer from the utility (Source 1) power source to the generator power source until the generator power source has reached an acceptable operating voltage and frequency. Dropout is set at 80% of nominal voltage and pickup is set at 90% of nominal voltage. Frequency dropout is set at 58 Hz and pickup is set at 59 Hz.

23. Plant Exerciser

This feature is a 7-day timer and provides automatic testing of the generator (Source 2) power source once each week for 15 minutes with no load.

26. Undervoltage Sensing for Normal (Utility) Source

This feature enables the logic to constantly monitor the utility (Source 1) power source. The logic prevents transfer from the generator (Source 2) power source to the utility power source until the utility power source has reached an acceptable operating voltage. Dropout is set at 80% of nominal voltage and pickup is set at 90% of nominal voltage.

3.4 Optional Features

The following is a list of optional features for the ATS.

36. Load Shed

Four sets of contacts are available and can be used to control large connected loads on the generator (i.e. air conditioners, hot tubs, etc.).

37. Service Equipment Rated Transfer Switch

This feature provides the label "Suitable for use as Service Equipment" and the features necessary to meet the requirements for the label.

51H. CHSPULTRA

This feature provides a 70KA, 240/120VAC, 1 Ohm surge device. It can be mounted on the Source 1 line.

51J. Telephone Surge Protection

The telephone line surge protection feature offers 4-pair telephone line protection. The feature ships loose for customer mounting convenience.

51K. Cable Surge Protection

The TV and satellite cable surge protection feature offers 2 coaxial line protection (cable/satellite TV). The feature ships loose for customer mounting convenience.

3.5 Standards

Eaton ATS equipment, enclosed in NEMA 3R enclosures, are listed for application by UL. In addition, Eaton ATSs are listed in File E38116 by Underwriters Laboratories, Inc. under Standard UL 1008. This standard covers the requirements for ATSs intended for use in ordinary locations to provide lighting and power as follows:

- a. In standby systems, in accordance with article 702 of the National Electrical Code.

Eaton ATSs are available to meet NFPA 110 for standby power systems.

Eaton ATS equipment are listed for application by CSA. In addition, Eaton ATSs are listed in the Legacy File LR96245 Master Contract 163545 by Canadian Standards Association under Standard 22.2 #178-1978

SECTION 4: INSTALLATION AND WIRING

4.1 General

Eaton ATs are factory wired and tested. Installation requires solidly mounting the enclosed unit and connecting the power cables and the auxiliary pilot circuits. Physical mounting procedures and power cable connections are covered in this section.

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 5 of this manual.

4.2 Mounting Location

Choose a location that offers a flat, rigid mounting surface capable of supporting the weight of the enclosed ATS equipment (see Figure 10, 100 A Standard, Figure 11, 100 A SE, Figure 12, 200 A Standard, or Figure 13, 200 A SE). Protect the transfer switch at all times against excessive moisture, dust, dirt, lint, and corrosive vapors.

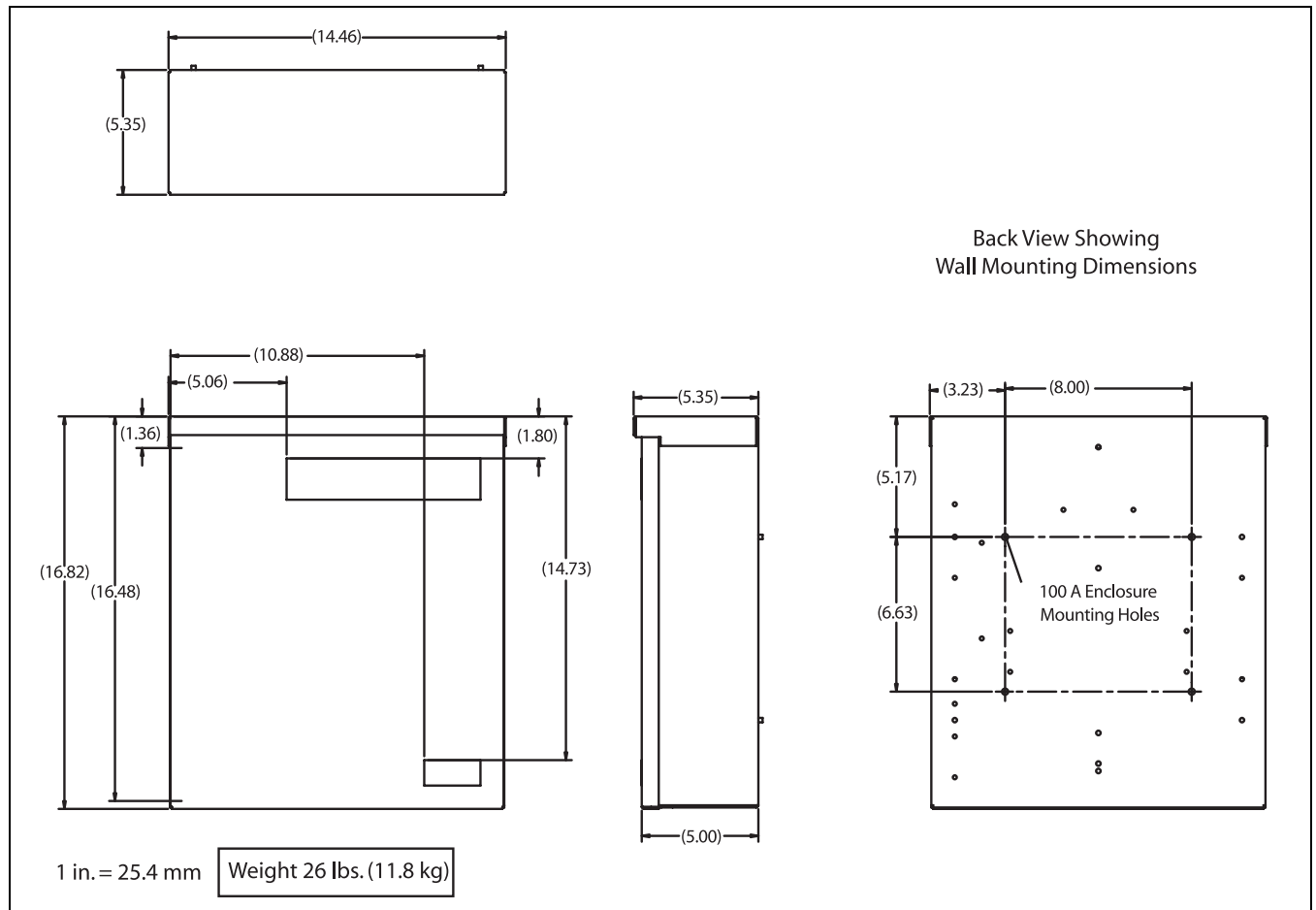


Figure 10. Dimensions and Plan View of a Standard RLCM/RLCU ATS (in.) (100 A).

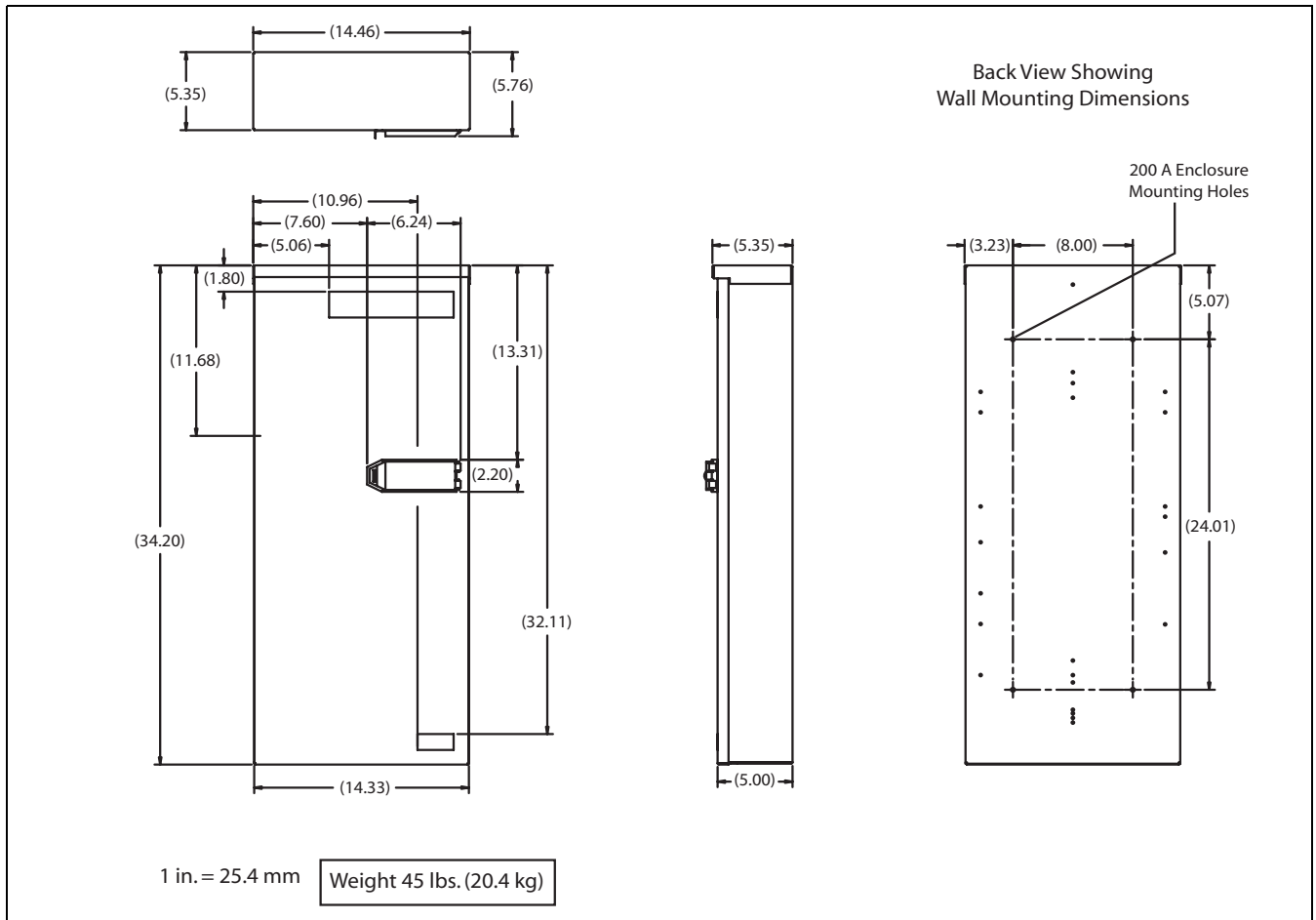


Figure 13. Dimensions and Plan View of a SE RLCM/RLCU ATS (in.) (200 A).

Check to ensure there are no pipes, wires, or other mounting hazards in the immediate mounting area that could create a problem.

Carefully remove all packing material from the ATS enclosure at the installation site. Even though an equipment inspection was performed when the equipment was received, make another careful inspection of the enclosure and the ATS mechanism as the packing material is removed and the enclosure readied for mounting. Be especially alert for distorted metal, loose wires, or damaged components.

4.3 Mounting Procedure

CAUTION

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

NOTICE

THE INSTALLATION MUST FULLY COMPLY WITH ALL APPLICABLE CODES, STANDARDS, AND REGULATIONS.

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

Step 1: Depress the padlockable catch at the bottom of the door and slide the door downward (see Figure 14). Open the door.

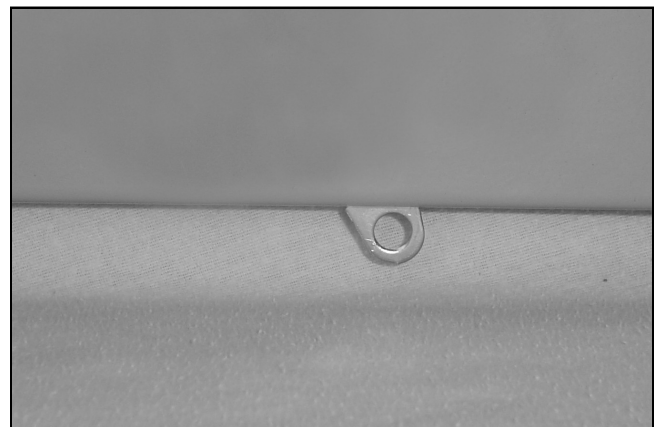


Figure 14. Location of the Door Latch.

Step 2: Use the knockouts for cable entry and control wiring.

NOTICE

RLCM:

FOR CONTROL WIRING (GENERATOR ENGINE START WIRING), THE WIRES MUST BE ISOLATED FROM BOTH THE UTILITY (SOURCE 1) AND GENERATOR (SOURCE 2) POWER SOURCE CABLES.

RLCU:

GENERATOR CONTROL CIRCUIT WIRING MUST BE ENCLOSED IN CONDUIT.

Step 3: Mount the switch to a rigid structure as close to the electrical loads as possible.

4.4 Power Cable Connection

⚠ WARNING

POWER CONDUCTORS MAY HAVE VOLTAGE PRESENT THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. DE-ENERGIZE ALL POWER OR CONTROL CIRCUIT CONDUCTORS TO BE CONNECTED TO THE ATS EQUIPMENT BEFORE BEGINNING TO WORK WITH THE CONDUCTORS AND/OR TERMINATING THEM TO THE EQUIPMENT

⚠ CAUTION

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

Test all power cables prior to connection to the unit to ensure that the conductors or cable insulation has not been damaged while being pulled into position.

Power cables are to be connected to solderless, screw type lugs located on the automatic transfer switching devices. Verify that the lugs supplied will accommodate the power cables being used. Also verify that the cables comply with all local electrical codes. Standard ATS equipment, as supplied from the factory, will accommodate the wire sizes shown in Table 2.

Table 2. Wire Sizes for ATSS.

Transfer Switch Amp Rating	Contactors Wire Size Range	Number of Cables per Phase
100	#14 – 2/0	1
200	#4 – 300 KCMIL	1

Carefully strip the insulation from the power cables to avoid nicking or ringing of the conductor strands. Prepare the stripped conductor termination end by cleaning it with a wire brush. If aluminum conductors are used, apply an appropriate joint compound to the clean conductor surface area.

⚠ CAUTION

IMPROPER POWER CABLE CONNECTIONS CAN CAUSE EXCESSIVE HEAT AND SUBSEQUENT EQUIPMENT FAILURE.

Note: Tighten the cable lugs to the torque identified on the label affixed to the unit's door.

Step 1: Connect cables as follows (see Figures 15 and 16, and Table 2):

- The utility (Source 1) power cables to the utility lugs; or SE breaker if installed
- The generator (Source 2) power cables to the generator lugs;
- The customer load cables to the main distribution panel (load) lugs;
- The neutral cables to the neutral bar; and
- The ground wires to the ground bar.

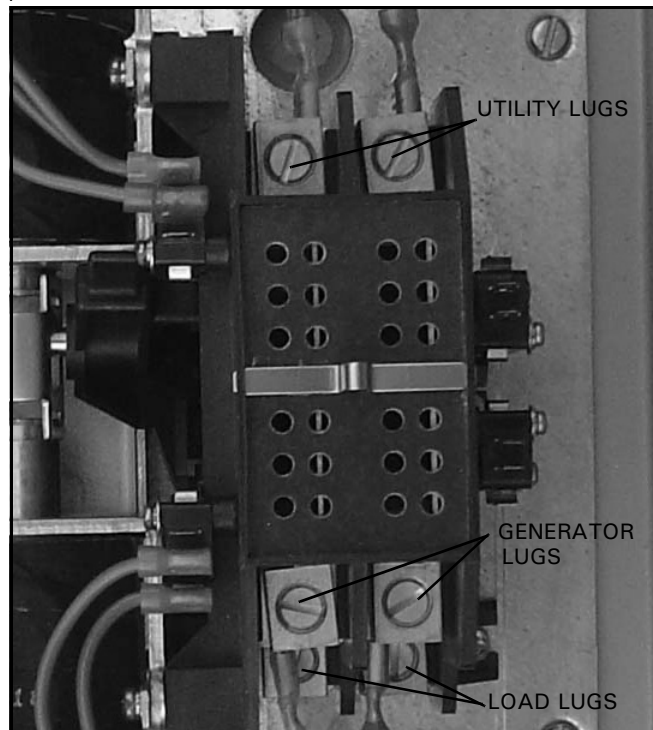


Figure 15. Cable Connection Locations (100 A).

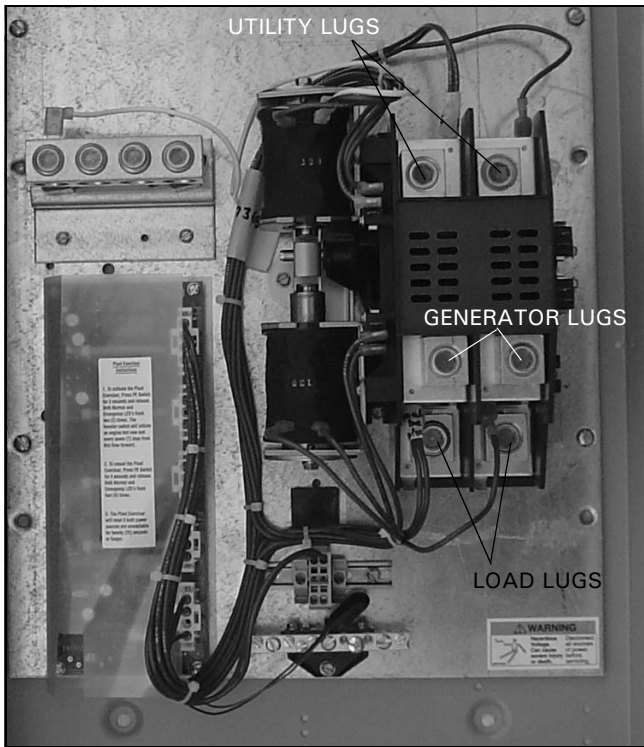


Figure 16. Cable Connection Locations (200 A).

Step 2: RLCM: The generator engine start terminals are tan. They are located at the bottom center of the power panel and are used when the generator has an automatic start feature (see Figure 17). See Section 4.10 for more detailed information on connecting the generator engine start cables.

RLCU: The utility sensing fuse block is located at the bottom center of the power panel and is used to supply 240 Vac to the generator (See Figure 18). See section 4.8 for more detailed information on connecting these inputs.

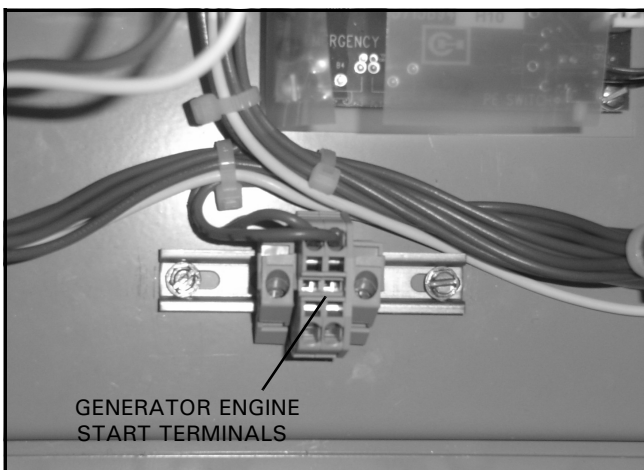


Figure 17. Generator Engine Start Terminals Location.

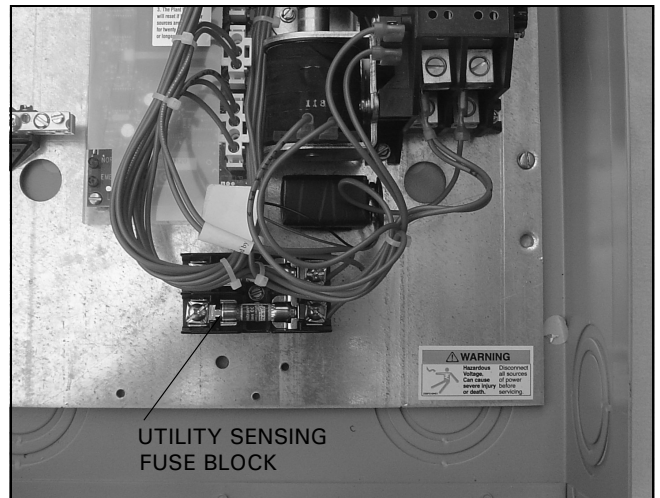


Figure 18. Utility Sensing Fuse block.

Step 3: Tighten all cables and wiring to specifications.

4.5 Wiring

⚠ WARNING

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 ATS EQUIPMENT.

⚠ CAUTION

CHECK THE ATS EQUIPMENT NAMEPLATE FOR RATED VOLTAGE. IT SHOULD BE THE SAME AS THE UTILITY (SOURCE 1) AND GENERATOR (SOURCE 2) LINE VOLTAGES. OPERATING THE EQUIPMENT ON IMPROPER VOLTAGE CAN CAUSE EQUIPMENT DAMAGE.

4.6 Installation

In a typical installation for critical loads (see Figure 19), the ATS (1) and the generator (2) are connected to the power supply. The ATS (1) and emergency distribution panel (3) receive utility (Source 1) power from a dedicated breaker in the utility service panel (4). The ATS and emergency panel receive generator (Source 2) power from the generator (2). Power from the utility feeds the utility panel.

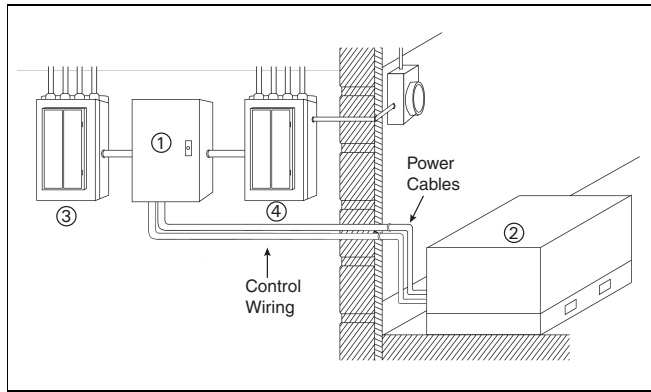


Figure 19. Typical Installation of a Residential or Light Commercial ATS.

The switch (1) and generator (2) are connected to the power supply. The automatic transfer switch is located between the emergency distribution (3) and the utility panel (4).

When the utility power fails, the ATS will sense the failure, the generator will start, and when sufficient generator voltage is available, the ATS will switch all loads to the emergency panel. All emergency loads will receive power from the generator. A line breaker is required between the generator power source and the transfer switch (see Figure 20). When utility power returns, the ATS will switch all power back to the utility panel and the generator will shut down.

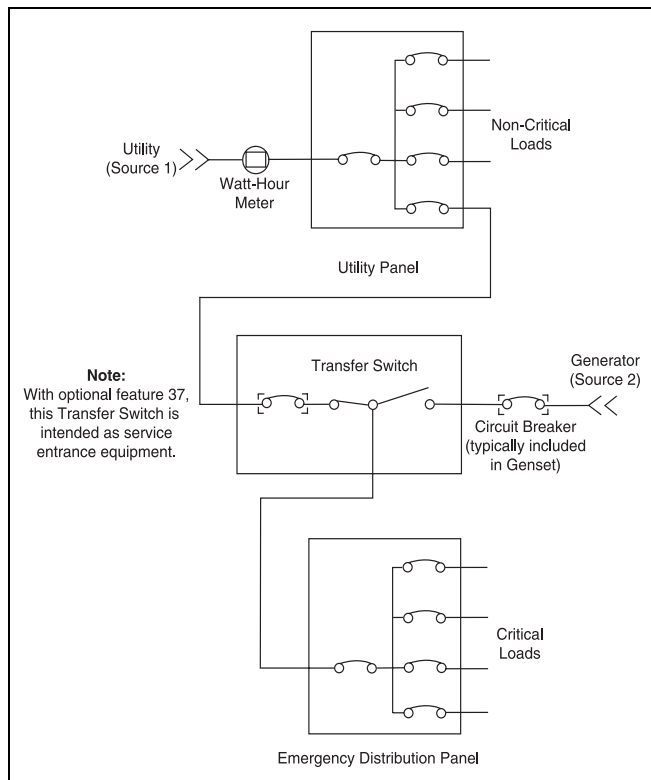


Figure 20. Diagram of a Typical Installation (Critical Loads Only).

In addition, another typical installation for loads can be considered (see Figure 21). Refer to Figure 22 for a loads connection diagram.

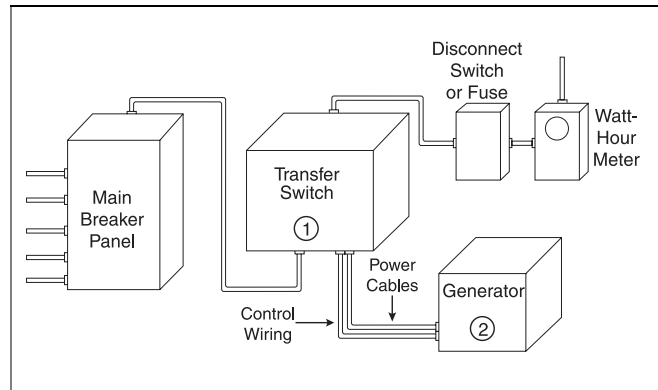


Figure 21. Typical Installation of a Residential or Light Commercial ATS.

The switch (1) and generator (2) are connected to the power supply. The ATS is located between the utility and the loads.

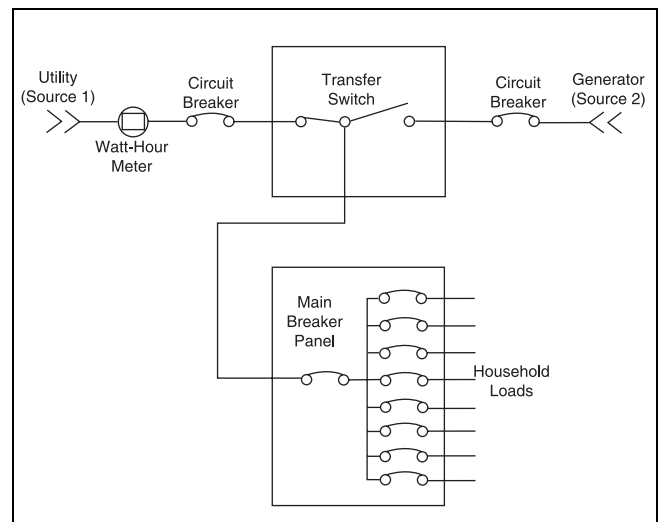


Figure 22. Diagram of a Typical Installation (All Loads).

4.7 Generator Engine Start Connection (RLCM Only)

The generator engine start terminals are located at the bottom center of the power panel of the ATS.

Note: Prior to making the generator engine start connection to the ATS, set the generator control selector switch to the OFF position to prevent an unwanted engine start.

Connect the generator engine start wires to the tan terminal blocks (see Section 4.10, Terminal Block Wire Installation and Removal, for more details). A contact closes between these terminal blocks when a generator engine start signal is provided by the ATS logic. The wiring diagram in Section 7 (see Figure 30) provides additional generator engine start connection information.

4.8 Utility Sensing Fuse Block Connection (RLCU Only)

The generator's 240 Vac utility sensing fuse block is located at the bottom center of the power panel of the ATS (Figure 18).

Note: Prior to making the sensing inputs connection to the ATS, set the generator control selector switch to the OFF position to prevent an unwanted engine start.

Connect the sensing wires to the fuse block. These wires should be connected to the side of the fuse block where there are no existing wires. See the wiring diagram in Section 7 (Figure 31).

4.9 Preliminary Checks

After the ATS enclosure is installed and power cables are connected to the equipment, thoroughly inspect the unit to ensure that no tools were left inside and that the cabinet is free of debris. If necessary, use a vacuum cleaner to remove any and all construction or installation debris from the equipment.

Read and understand all labels on the equipment. Review and understand the wiring diagrams supplied with the equipment. Note any optional accessories that may have been furnished with this unit and review their operation.

Verify that the phase-to-phase line voltages of both the utility (Source 1) and generator (Source 2) power sources are the same and that they match the rated voltage as indicated on the ATS ratings label.

CAUTION

SEVERE EQUIPMENT DAMAGE CAN RESULT IF THE UNIT IS NOT APPLIED AT PROPER VOLTAGE. DO NOT ENERGIZE THE EQUIPMENT IF THE SUPPLY VOLTAGES DO NOT MATCH EQUIPMENT RATINGS LABEL.

4.10 Terminal Block Wire Installation and Removal (RLCM Only)

Proceed with the following steps and associated figures to install or remove terminal block wiring.

Step 1: Figure 23 shows two tension clamp terminal blocks. There is a large one and small one, but the operation is the same for both. A small tool, such as a blade screwdriver, will be pushed into the square hole next to the wire hole and a wire will be inserted into the larger circular hole on the outer edge.

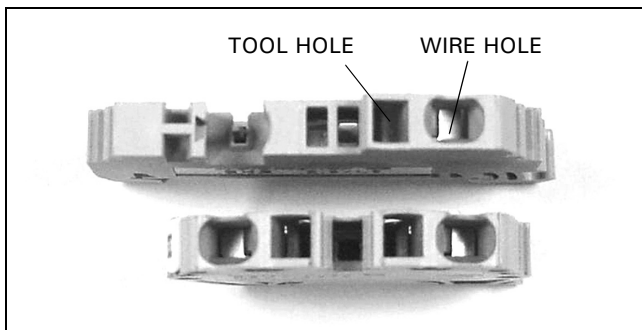


Figure 23. Tension Clamp Terminal Blocks.

Step 2: Begin by inserting a small, blade screwdriver into the square (tool) hole with the flat surface of the screwdriver against the back wall of the hole (see Figure 24). With a little bit of force, push the screwdriver in on a slight angle toward the center of the clamp. Be sure to slide it in until it clicks. You will then see the clamp open in the wire hole.

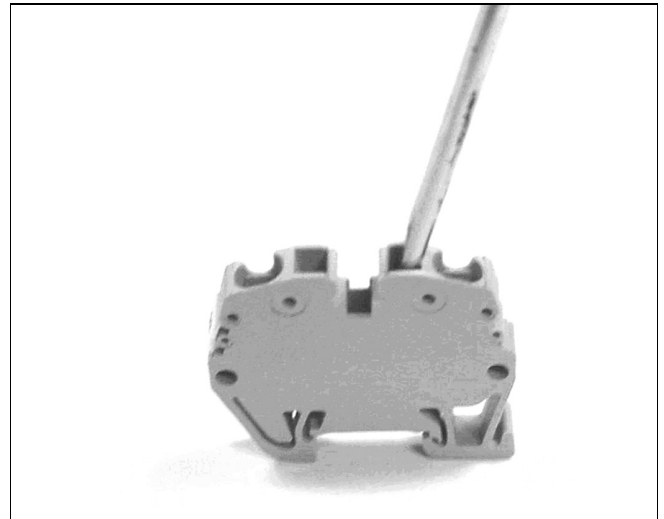


Figure 24. Screwdriver Inserted in the "Tool" Hole.

Step 3: Once the screwdriver is in place, obtain a stripped wire (strip about 0.25 in.) and insert it into the larger circular wire hole. Push the wire in until it can go no further (see Figure 25).

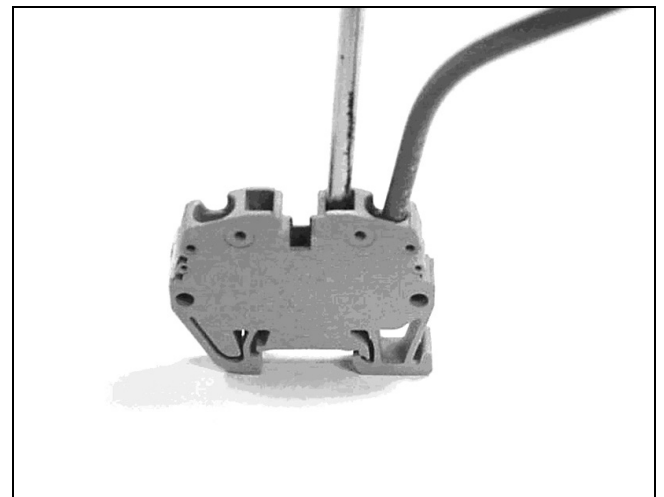


Figure 25. Wire Inserted in the "Wire" Hole.

Step 4: While holding the wire in place, pull the screwdriver out. The wire will now be held securely in the terminal block. Pull on the wire to ensure that it is correctly inserted into the clamp.

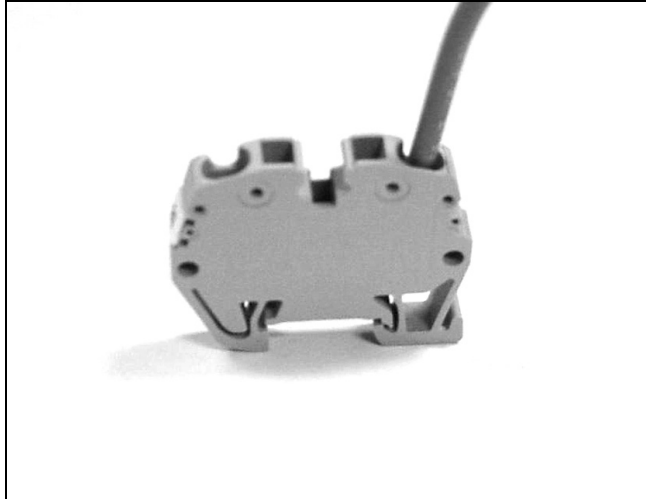


Figure 26. Wire Securely Installed in the Terminal Block.

SECTION 5: FUNCTIONAL TESTING

WARNING

YOU ARE READY TO ENERGIZE THE EQUIPMENT. VOLTAGES WITHIN THE ENCLOSURE ARE CAPABLE OF CAUSING SEVERE PERSONAL INJURY OR DEATH. USE EXTREME CAUTION TO AVOID CONTACT WITH ENERGIZED EQUIPMENT.

5.1 Preliminary Checks

Step 1: Check all loads connected to the ATS to ensure that they are ready to be energized.

5.2 Energize the Switch

Step 1: Close the upstream utility (Source 1) power source breaker or switch to connect the ATS to the utility power source voltage.

Step 2: If the ATS unit is not already in the UTILITY position, the solenoid will engage and the contactor will automatically switch to the UTILITY position.

Step 3: Using a voltmeter, measure the line-to-line and the line-to-neutral voltages across the utility line terminals to ensure the utility voltage is correct.

WARNING

CONTACT WITH ENERGIZED COMPONENTS WILL CAUSE ELECTRICAL SHOCK CAPABLE OF PRODUCING SEVERE PERSONAL INJURY OR DEATH. USE EXTREME CAUTION TO AVOID CONTACT WITH ENERGIZED COMPONENTS WHEN USING A METER FOR VOLTAGE CHECKS.

Step 4: Position the generator control selector switch, located on the standby generator, to the AUTOSTART position. (It may also be labeled REMOTE START.)

Step 5: Close the upstream generator (Source 2) power source breaker or switch to connect the ATS to the generator power supply source.

5.3 Operational Checks

Step 1: Open the upstream utility (Source 1) breaker originally closed in Step 1 of Section 5.2.

NOTICE

THIS WILL SIMULATE AN INTERRUPTION OF THE UTILITY (SOURCE 1) POWER SOURCE.

Step 2: After a time delay, the standby generator engine will start.

Step 3: The ATS Time Delay Normal (Utility) to Emergency (Generator) (TDNE) will begin to time after the generator engine begins to run. After time out, the solenoid will engage and the contactor will automatically switch from the UTILITY to the GENERATOR (Source 2) position.

- Step 4:** Using a voltmeter, measure the line-to-line and line-to-neutral voltages across the generator line terminals to ensure that the generator emergency voltage is correct. If necessary, make adjustments to the voltage regulator on the generator according to the manufacturer's recommendations to correct any voltage deviations. The ATS will only respond to the correct voltage from the generator power source.
- Step 5:** Close the utility breaker described in Step 1 of Section 5.2.
- Step 6:** The ATS Time Delay Emergency (Generator) to Normal (Utility) (TDEN) timer will begin timing, and the solenoid will engage and automatically switch from the GENERATOR to the UTILITY position and the generator will shut down.

SECTION 6: ADJUSTMENTS

6.1 Plant Exerciser (PE) Timer

Feature 23, described in Section 3.2 and 3.3, is a plant exerciser. The plant exerciser is a once every 7-day timer switch used to exercise an engine driven generator.

6.1.1 Timer Programming

Depress the PE switch located on the end of the printed circuit board for 3 seconds then release.

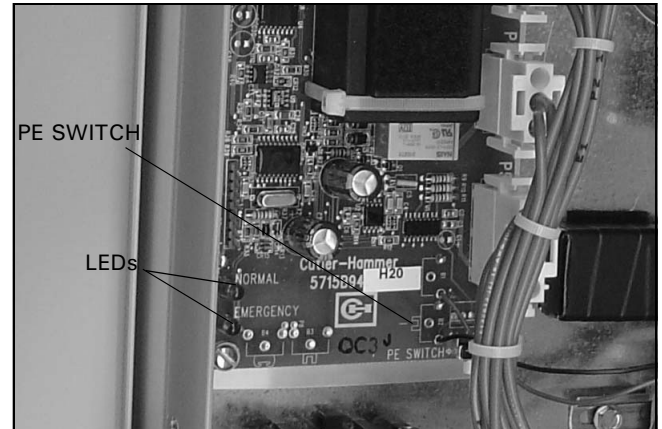


Figure 27. Location of the PE Switch and LEDs.

Both the utility (NORMAL) and generator (EMERGENCY) LEDs will flash twice indicating the plant exerciser is now programmed correctly (see Figure 27). The ATS will initiate a test now and every seven days from this time forward. If, for some reason, both power sources are unavailable for longer than 20 seconds, the plant exerciser will have to be reprogrammed when either power source becomes available. To cancel the plant exerciser, depress the PE switch for 7 seconds and release. Both the utility (Source 1) and generator (Source 2) LEDs will flash 4 times to indicate the plant exerciser is now disabled. After the current exercise is complete, the ATS will transfer back to the utility power source. The plant exerciser will now have to be reprogrammed in order to exercise the generator.

6.1.2 Provisions for Extended PE Memory

Provisions for a 9-volt battery are included in all ATSs to enhance the PE memory duration (see Figures 28 and 29). The 9-volt battery is not included. This provision provides backup power to the microprocessor memory enabling it to retain the PE set point for a maximum of 30 days without any power on the ATS. The 30-day limit may vary depending on the type and amount of charge in the battery. It is recommended that the battery be replaced yearly or after an accumulated number of outage hours equal to 30 days for maximum performance. The customer is not required to use this feature; the standard 20-second memory backup is integral to all Residential ATSs.

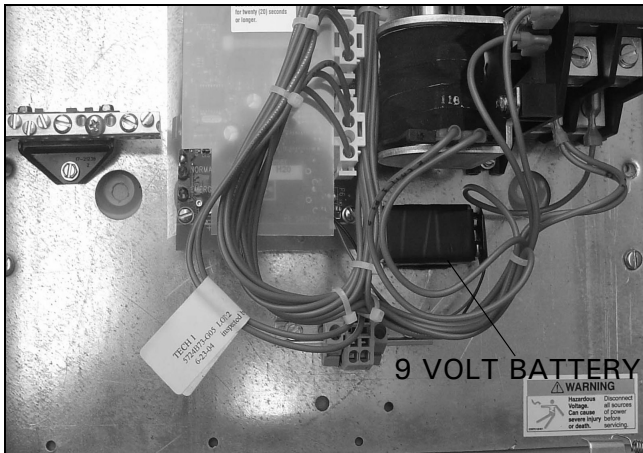


Figure 28. Extended PE Memory 9 Volt Battery Installed in a 100 A ATS.

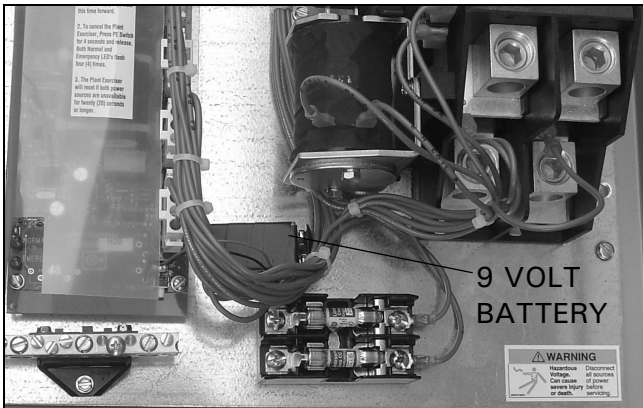


Figure 29. Extended PE Memory 9 Volt Battery Installed in a 200 A ATS.

A typical condition that may use battery power would be during a utility outage with a failure of the generator to start. Please note that even with the 9-volt battery provisions, the built in 20 second plant option is still functional on the board.

SECTION 7: MAINTENANCE AND COMPONENT REPLACEMENT

7.1 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 SEVERE PERSONAL INJURY AND/OR DEATH.

In general, ATS equipment is designed to be relatively maintenance free under normal usage. 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 its 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.

Figure 30 is the wiring diagram for the RLCM ATS switch. Figure 31 is the wiring diagram for the RLCU ATS switch.

Note: Only qualified and experienced personnel should attempt any diagnostic work using this diagram.

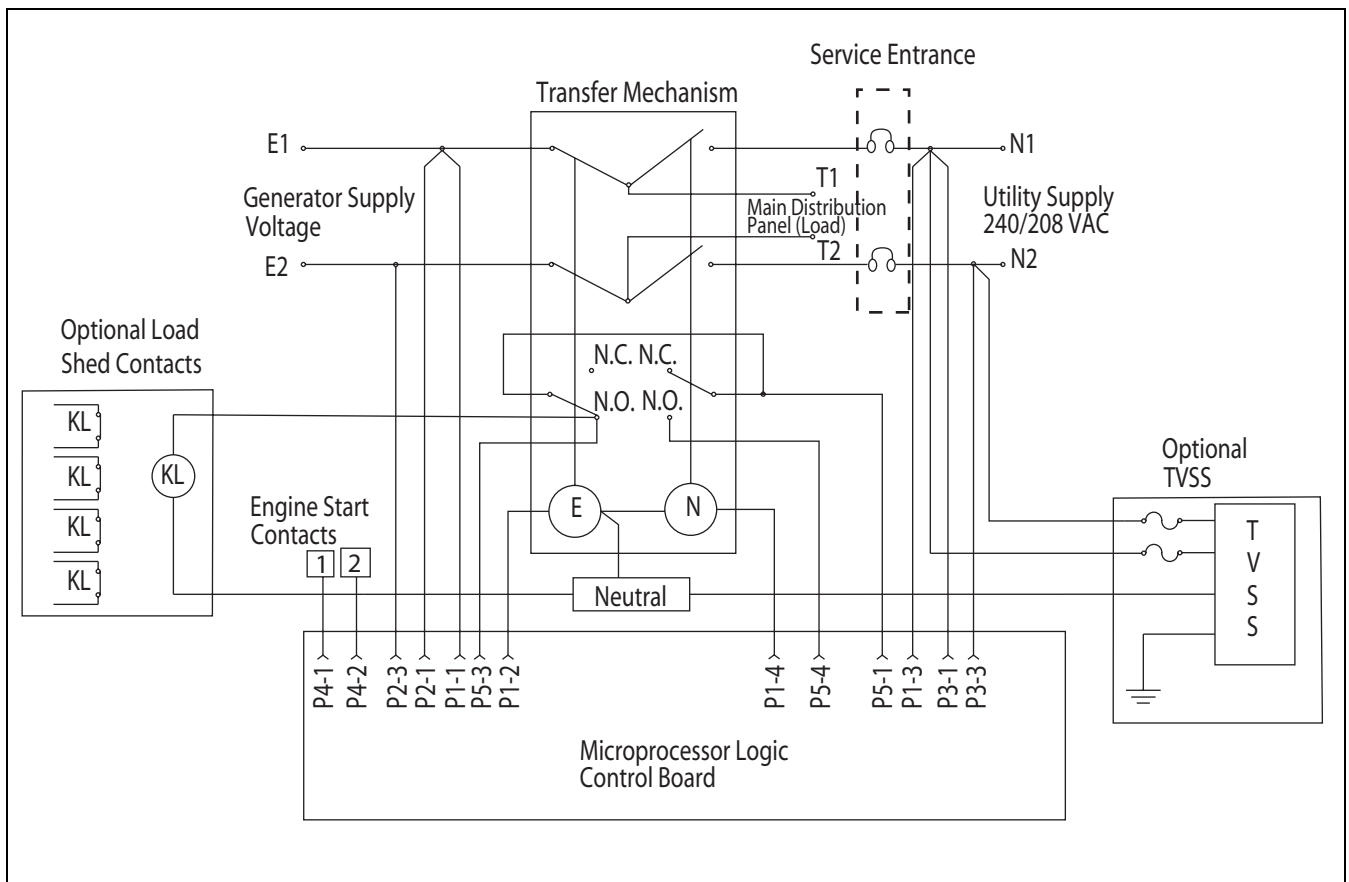


Figure 30. Wiring Diagram for the RLCM ATS.

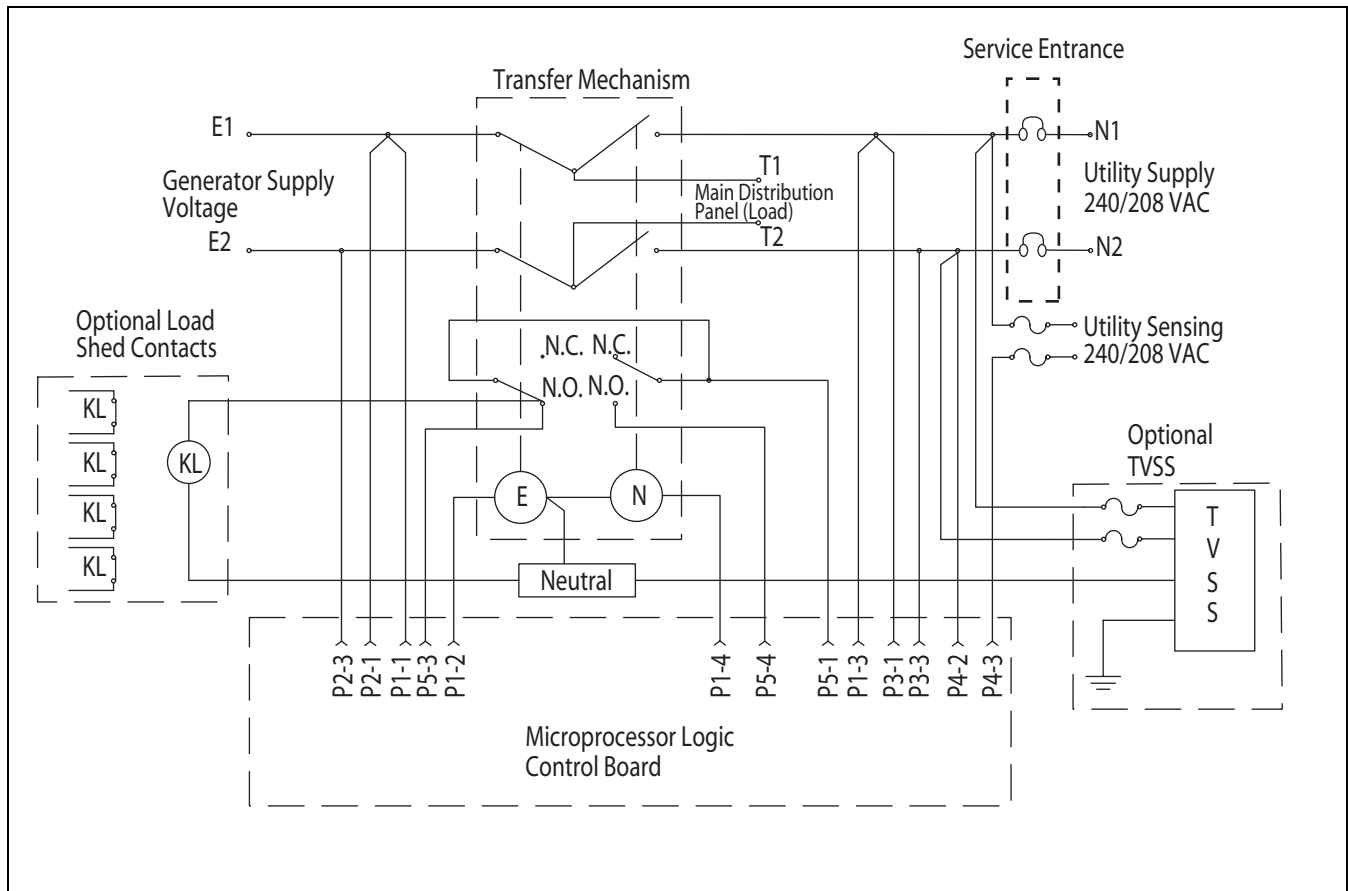


Figure 31. Wiring Diagram for the RLCU ATS.

7.2 Procedures

A suggested maintenance procedure to be followed is outlined in Table 3.

Table 3. Recommended 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.
b. Inspect the structure area for safety hazards or potential maintenance problems.	Inspect the area, especially where the contactor is installed, for any safety hazards, including personal safety and fire hazards. Exposure to certain chemical vapors can cause deterioration of the 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 the conductor insulation, or as pitting or melting of the conductor surfaces due to arcing. Inspect the secondary control connections for damage, and control wiring for insulation integrity.
c. Inspect the contactor for dust, dirt, soot, grease, moisture, or corrosion.	Remove 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 contactor. 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 the terminals and connectors for looseness or signs of overheating.	Overheating will show as discoloration, melting, or blistering of the conductor insulation. Connections that do not have signs of looseness or overheating should not be disturbed.
f. Exercise the contactor if it is not often exercised while in operation. This will permit the wiping action by the contacts.	If a switching device is used for frequent switching during normal operation, this step can be disregarded.
g. Return the transfer switch equipment to service.	Make certain all barriers are in place and the door is closed. Re-apply generator (Source 2) and utility (Source 1) power.
h. Replace the battery.	Replace the battery yearly, unless the number of total power outage days (both power sources off at the same time) exceeds 30 days. Then replace battery after the 30th day.

7.4 Component Replacement

Certain components within the ATS are field replaceable. Figure 32 identifies the field replaceable parts. Table 4 lists

the part numbers to use when ordering replacement components. To order replacement components, contact an authorized Eaton sales representative.

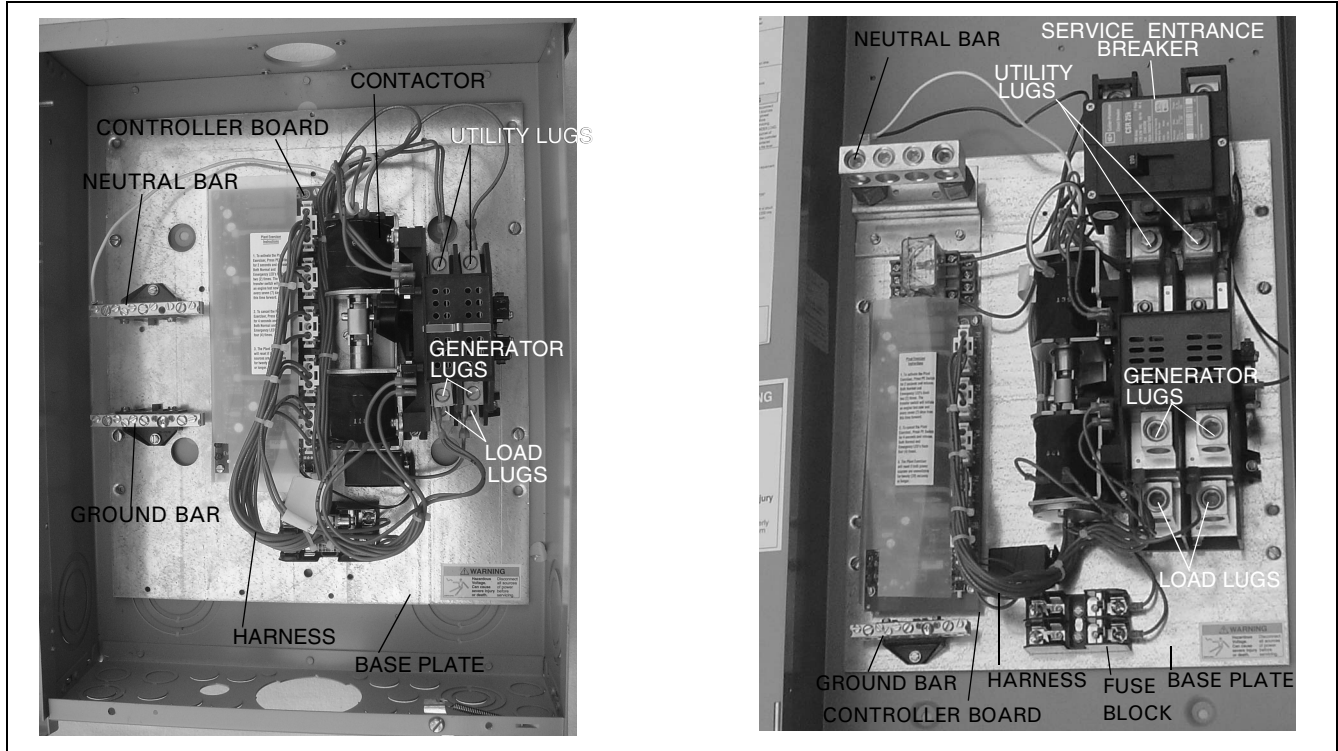


Figure 32. Field Replaceable Components (Left RLCU 100 A Standard, Right RLCU 200 A SE).

Table 4. Field Replaceable Components

Component	Part Number	ATS Model
Contactors	8160A99G51	100 A
Contactors	8160A99G52	200 A
Controller 240V	8160A99G50	100 & 200 A
Controller 208V	8160A99G59	100 & 200 A
Ground Bar	8160A99G55	100 & 200 A
Harness RLCM ¹	8160A99G58	100 & 200 A
Harness RLCU ¹	8160A99G35	100 & 200 A
Load Shed	8160A99G36	100 & 200 A
Lugs	8160A99G56	100 A
Lugs	8160A99G57	200 A
Neutral Bar	8160A99G53	100 A
Neutral Bar	8160A99G54	200 A
Service Entrance Breaker	8160A99G41	100 A
Service Entrance Breaker	8160A99G42	200 A
Service Entrance Cover	8160A99G45	100 & 200 A
Service Entrance Lugs	8160A99G43	100A
Service Entrance Lugs	8160A99G44	200A
SurgTel	8160A99G48	100 & 200 A
SurgCable	8160A99G49	100 & 200 A
TVSS (SE)	8160A99G46	100 & 200 A
TVSS (Standard)	8160A99G47	100 & 200 A

Note:1 When replacing the wiring harness on the 100 A ATS, the flag must be cut off the one white wire and replaced with the appropriate size ring terminal.

WARNING

HIGH VOLTAGES ARE PRESENT IN AND AROUND TRANSFER SWITCH EQUIPMENT. BEFORE ATTEMPTING TO REPLACE ANY COMPONENT, 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 SEVERE PERSONAL INJURY AND/OR DEATH.

ALWAYS TURN THE UTILITY (SOURCE 1) POWER OFF AND TURN THE GENERATOR (SOURCE 2) CONTROL SELECTOR SWITCH TO THE "OFF" POSITION BEFORE ATTEMPTING TO REPLACE ANY COMPONENTS.

NOTICE

APPLY UTILITY (SOURCE 1) POWER AND PLACE THE GENERATOR CONTROL SELECTOR SWITCH IN THE "AUTO" POSITION AFTER THE COMPONENT HAS BEEN REPLACED. TEST THE SYSTEM FOR PROPER FUNCTIONALITY.

7.4.1 Component Replacement Instructions

7.4.1.1 100 A and 200 A Controller Board

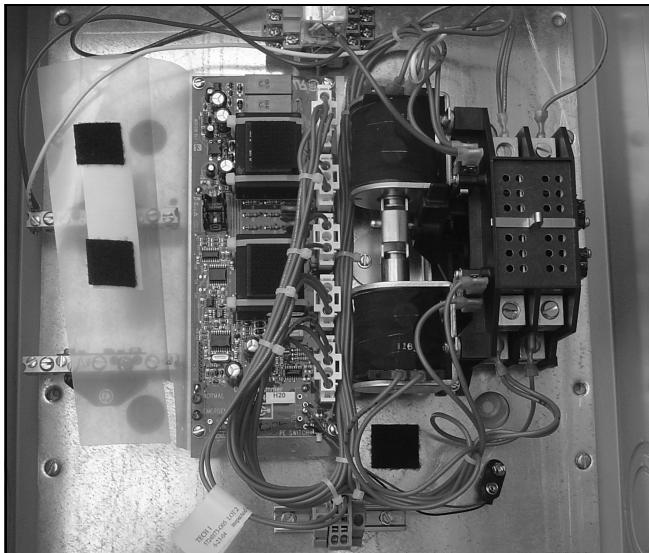


Figure 33. Controller Board Installed in a RLCM/RLCU ATS.

- Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the controller board.
- Step 2:** Open the clear plastic shield by separating the Velcro hold-downs.
- Step 3:** Disconnect the P1, P2, P3, P4, and P5 white plugs from the controller board (see Figure 34).
- Step 4:** Using a blade screwdriver, remove the four (4) small screws located at the corners of the controller board. Remove the controller board (see Figure 34).

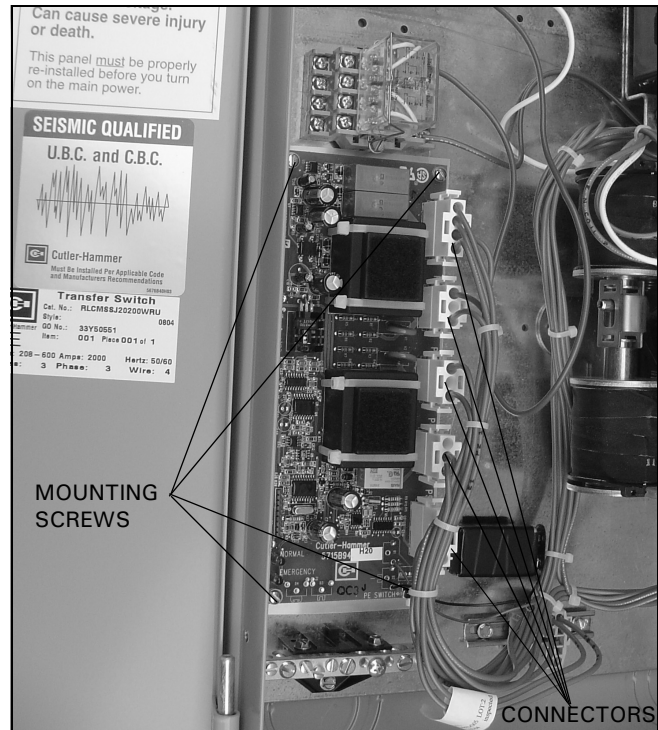


Figure 34. Removing the Controller Board.

- Step 5:** Remove the backing on the supplied Velcro and install it on the new controller board in the same locations as the controller board being replaced.
- Step 6:** Align the new controller board with the mounting holes. Secure the new controller board using the hardware supplied. Tighten the screws.
- Step 7:** Connect the P1, P2, P3, P4, and P5 plugs to their original receptacles.
- Step 8:** Close the original plastic shield by pressing the Velcro hold-downs together.
- Step 9:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the controller board has been replaced. Test the system for proper functionality.

7.4.1.2 100 A Neutral Bar

Note: The 100 A ground and neutral bars are the same. Refer to Figure 35 for the correct location.

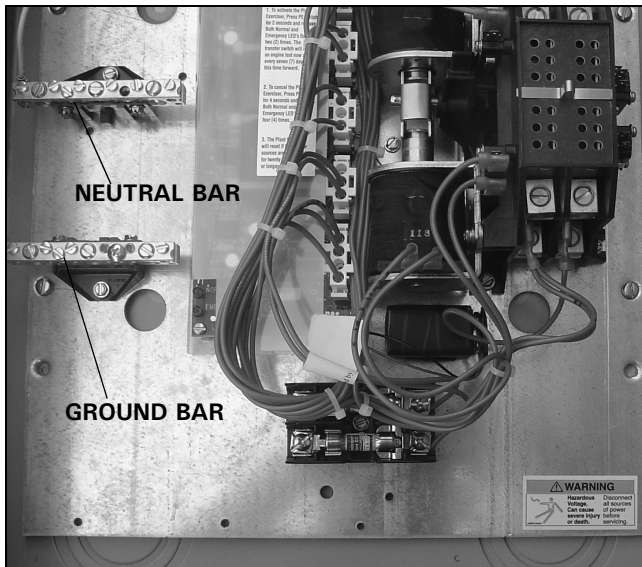


Figure 35. 100 A Neutral Bar

- Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the neutral bar.
- Step 2:** Disconnect all wire cables from the neutral bar.
- Step 3:** If the neutral bar has been grounded, remove the 1.5 in. screw that grounds the neutral bar to the base plate (see Instruction Leaflet supplied with the grounding kit for more information).
- Step 4:** Remove the screw in the black base using a blade screwdriver or 0.25 in. socket or nut driver. Remove the neutral bar (see Figure 36)

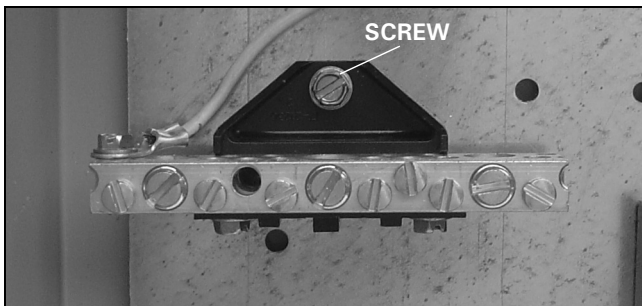


Figure 36. Replacing the 100 A Neutral Bar.

- Step 5:** Remove the screw securing the white wire to the neutral bar using a blade screwdriver or 0.25 in. socket or nut driver.
- Step 6:** Attach the white wire to the new neutral bar using the hardware supplied.
- Step 7:** Mount the neutral bar to the base plate using the hardware supplied.
- Step 8:** If the neutral bar being replaced was grounded, use the 1.5 in. screw removed in Step 3 to ground the neutral bar to the base plate (see Instruction Leaflet supplied with the grounding kit for more information).

Step 9: Reconnect all wire cables to the neutral bar.

Step 10: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the neutral bar has been replaced. Test the system for proper functionality.

7.4.1.3 200 A Neutral Bar

- Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the SE neutral bar.
- Step 2:** Disconnect all wire cables from the neutral bar.
- Step 3:** Disconnect the flag from the wire terminal on the back of the neutral bar (see Figure 37).
- Step 4:** If the neutral bar has been grounded, remove the 10-32 x 0.625 in. screw that grounds the neutral bar to the base plate. Also remove the 1/4-20 x 0.50 in. bolt securing the copper connector to the bottom of the neutral bar (see Instructional Leaflet supplied with the grounding kit for more information).
- Step 5:** Remove the two (2) screws securing the neutral bar bracket to the base plate (see Figure 37) using a blade screwdriver or 0.25 in. socket or nut driver. Remove the neutral bar.

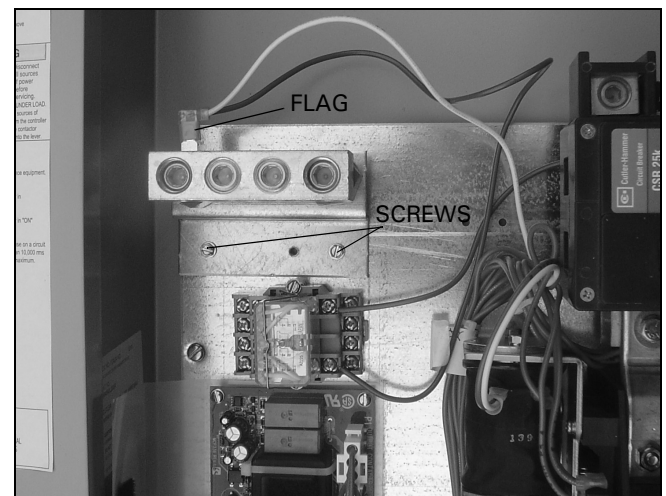


Figure 37. Replacing the 200 A Neutral Bar.

- Step 6:** Secure the new neutral bar assembly to the base plate using the hardware supplied.
- Step 7:** If the neutral bar being replaced was grounded, use the copper connector, 10-32 x 0.625 in. screw, and 1/4-20 x 0.50 in. bolt removed in Step 4 to ground the neutral bar to the base plate (see Instruction Leaflet supplied with the grounding kit for more information).
- Step 8:** Connect the flag to the wire terminal on the back of the neutral bar.
- Step 9:** Reconnect all wire cables to the neutral bar.
- Step 10:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the SE neutral bar has been replaced. Test the system for proper functionality.

7.4.1.4 Ground Bar

Note: The 100 A ground and neutral bars are the same. Refer to Figure 35 for the correct location.

- Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the ground bar
- Step 2:** Disconnect all wire cables from the ground bar.
- Step 3:** Remove the 1.5 in. long screw at the top of the ground bar (see Figure 38) using a Phillips screwdriver.



Figure 38. Replacing the Ground Bar.

- Step 4:** Remove the screw in the black base using a blade screwdriver or 0.25 in. socket or nut driver (see Figure 38). Remove the ground bar.
- Step 5:** Secure the new ground bar to the base plate using the hardware supplied.
- Step 6:** Insert the 1.5 in. long screw into the top of the ground bar. Use the hardware supplied if necessary.
- Step 7:** Reconnect all wire cables to the ground bar.
- Step 8:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the ground bar has been replaced. Test the system for proper functionality.

7.4.1.5. Replacing the Contactor

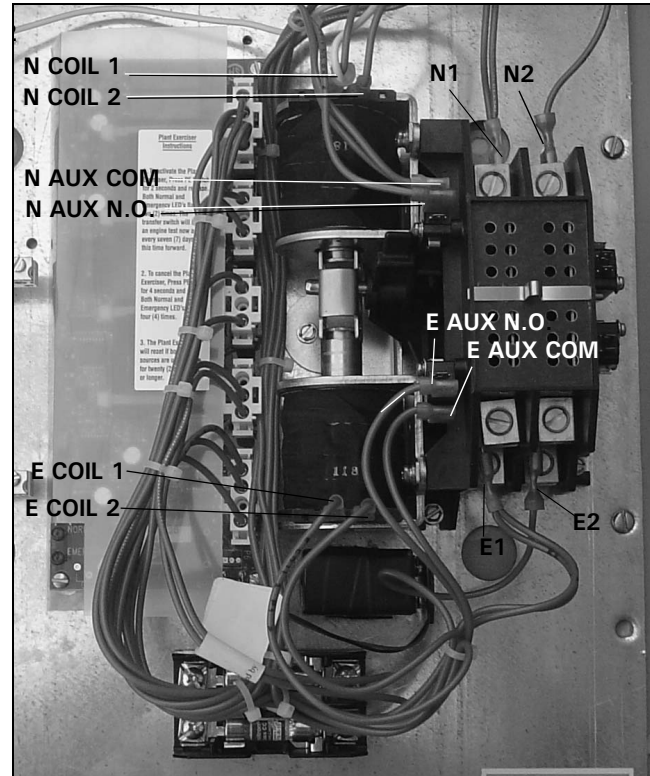


Figure 39. Replacing the Contactor.

Note: If you are replacing the contactor in a 100 A or 200 A SE ATS, the service entrance breaker must first be removed. Follow Steps 1 through 4 in Section 7.4.1.9 before performing the procedure that follows.

- Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the service entrance breaker.

- Step 2:** Note their location then disconnect the twelve (12) red wires from the contactor (see Figure 39).

Note: All wires connected to the contactor are labeled to ease identification.

- Step 3:** Remove the four (4) screws securing the contactor to the base plate using a blade screwdriver or 0.25 in. socket or nut driver. Remove the contactor.

- Step 4:** Following the replacement steps for the 100 A or 200 A lugs (see Sections 7.4.1.7 and 7.4.1.8), remove the lugs from the old contactor then install the lugs on the new contactor.

- Step 5:** Secure the contactor onto the base plate using the hardware supplied.

- Step 6:** Reattach the twelve (12) red wires to the contactor. Examine each wire to find the name then refer to Figure 39 for the correct connection point.

- Step 7:** Reconnect all wire cables to the contactor as per their original connections.

Note: If you are replacing the contactor in a 100 A or 200 A SE ATS, the service entrance breaker must be reinstalled at this time. Follow Steps 5 through 10 in Section 7.4.1.9 to complete the procedure.

Step 8: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance breaker has been replaced. Test the system for proper functionality.

7.4.1.6 Wiring Harness

Note: Eaton RLCM ATs are equipped with engine start contacts for remote generator start-up. Therefore, the wiring harnesses used in the RLCM and RLCU ATs are different. To replace a wiring harness, follow the appropriate procedure detailed in this section.

RLCM Wiring Harness Procedure

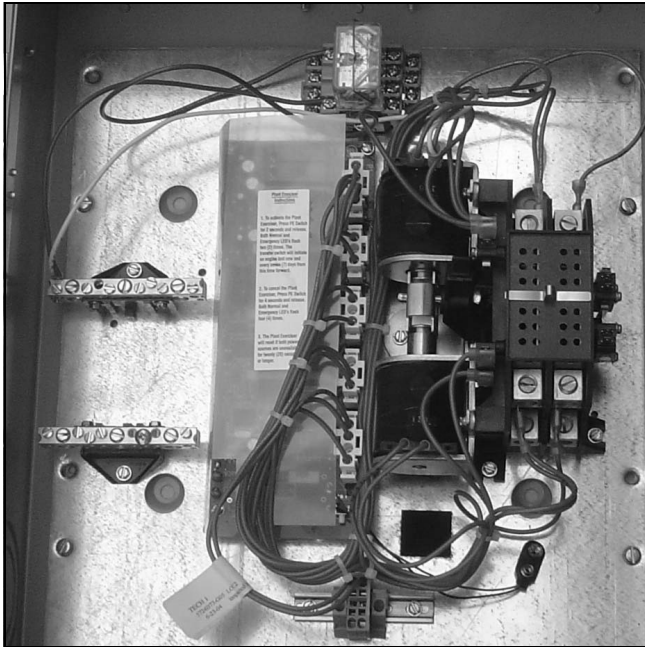


Figure 40. Wiring Harness Installed in a RLCM ATS.

Step 1: Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the wiring harness.

Step 2: Use a small blade screwdriver to release the locks then remove the generator engine start wires from the engine start contacts (tan terminal block).

Step 3: Remove the two (2) screws securing the engine start contacts to the base plate using a blade screwdriver or 0.25 in. socket or nut driver.

Step 4: Note their location then disconnect the ten (12) red wires from the contactor (see Figure 39).

Note: All wires connected to the contactor are labeled to ease identification.

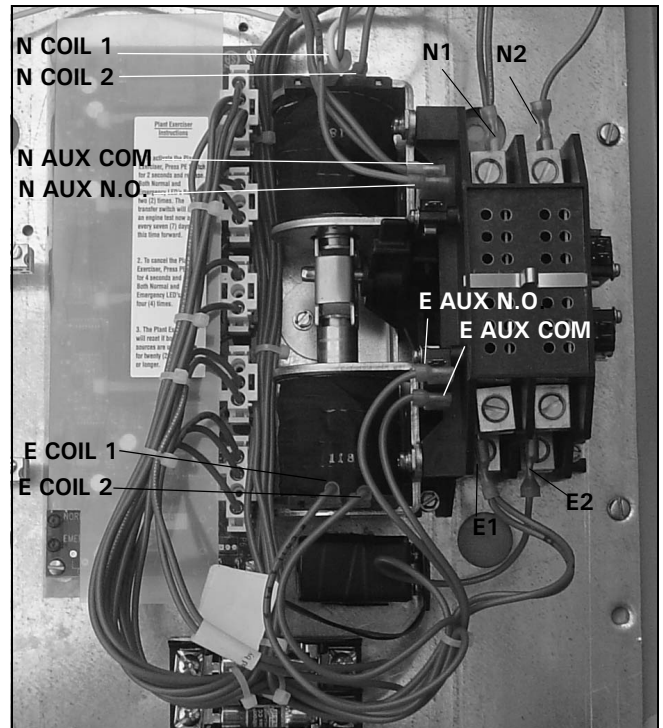


Figure 41. Wires to Disconnect from the Contactor.

Note: If the load shed option has been installed in the ATS, DO NOT remove the red wire running from the load shed to the auxiliary switch on the right side of the contactor.

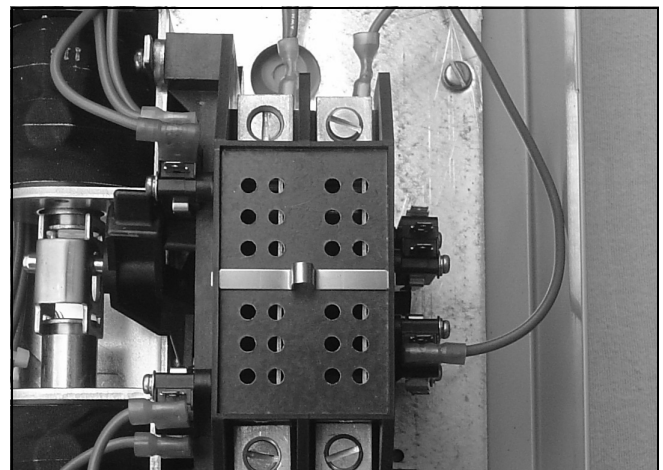


Figure 42. Load Shed Wire Connected to the Auxiliary Switch on the Contactor.

Step 5: Disconnect the P1, P2, P3, P4, and P5 white plugs from the controller board (see Figure 34).

Step 6: Disconnect the white wire connected to the neutral bar. On 100 A ATS, use a blade screwdriver to remove the screw securing the white wire's ring terminal to the neutral bar (see Figure 43).

Note: If an optional load shed and/or TVSS is installed in the 100 A ATS, the screw securing the white wire to the neutral bar is also used to secure the red load shed wire. The red load shed wire and/or TVSS white wire will have to be reattached to the neutral bar when the white wire in the new wiring harness is connected to the neutral bar later in this process.

On 200 A standard and SE ATSS, remove the white wire from the flag connector on the neutral bar (see Figure 43).

Note: If an optional load shed and/or TVSS is installed in a 200 A standard or SE ATS, the female flag connector is also used to connect the red load shed wire and white TVSS wire to the neutral bar. Cut the red load shed and white TVSS wires as close to the connector as possible. They will be reconnected later in this process.

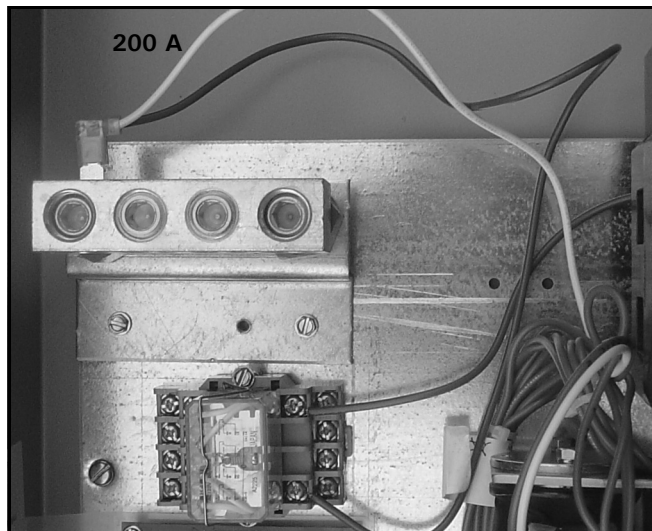
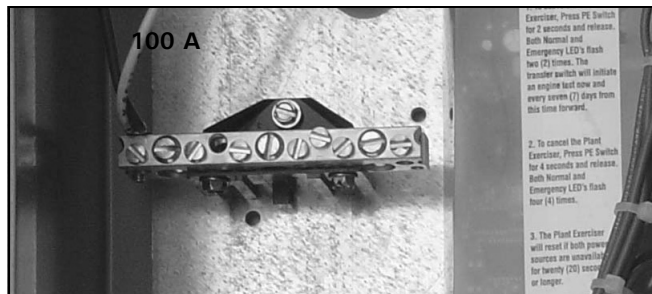


Figure 43. White Wiring Harness, Red Load Shed, and White TVSS Wires Connected to a 100 A and 200 A Neutral Bars.

The wire harness is now free to be removed.

Step 7: Place the new wiring harness and engine start contacts in the ATS.

Step 8: Connect the white wire to the neutral bar. On 100 A ATS, cut the female flag connector from the white wire. Strip 0.25 in. (6.35 mm) of insulation from the wire then crimp the supplied ring terminal onto the wire. Connect the wire to the neutral bar using a blade screwdriver to tighten the screw.

Note: If a optional load shed and /or TVSS is installed in the 100 A ATS, the screw securing the white wire to the neutral bar is also used to secure the red load shed wire and/or white TVSS wire.

On 200 A standard or SE ATSS, install the white wire female flag connector on the male flag terminal on the neutral bar.

Note: If a optional load shed and/or TVSS is installed in a 200 A standard or SE ATS, the female flag connector is also used to connect the red load shed and white TVSS wires to the neutral bar. Cut the female flag connector from the white wiring harness wire. Strip 0.25 in. (6.35 mm) of insulation from the white wiring harness wire, red load shed wire, and white TVSS wire. Crimp the new female flag connector supplied onto the white and red wires then install the female flag connector on the male flag terminal on the neutral bar.

Step 9: Connect the P1 through P5 white plugs to the controller board.

Step 10: Reattach the twelve (12) red wires to the contactor. Examine each wire to find the name then refer to Figure 39 for the correct connection point.

Step 11: Mount the engine start contacts in their original position using the hardware supplied.

Step 12: Insert the generator engine start wires into the receptacles on the engine start contacts terminal blocks.

Step 13: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the wiring harness has been replaced. Test the system for proper functionality.

RLCU Wiring Harness Procedure

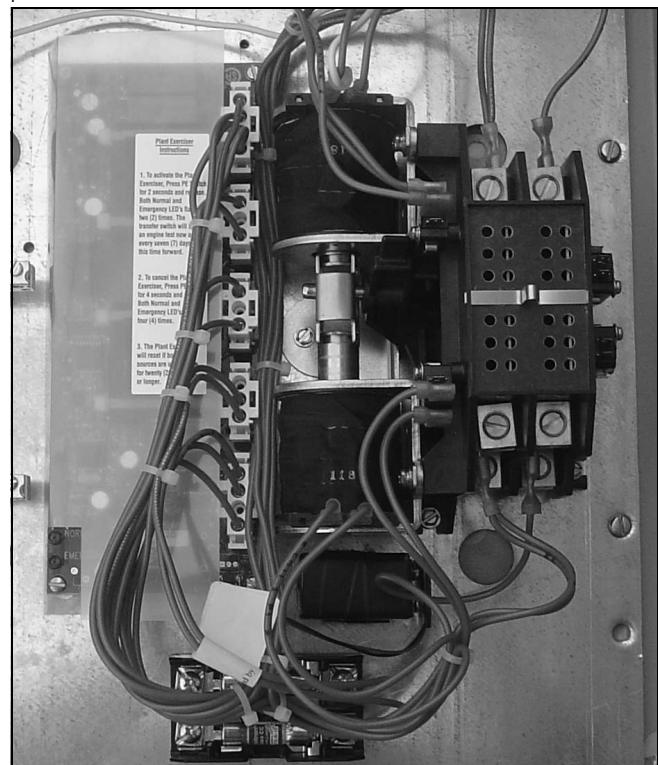


Figure 44. Wiring Harness Installed in a RLCU ATS.

- Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the wiring harness.
- Step 2:** Disconnect the installer-connected control wiring from the utility sensing fuse block.
- Step 3:** Remove the utility sensing fuses from the fuse block to gain access to the fuse block mounting screws (see Figure 45).

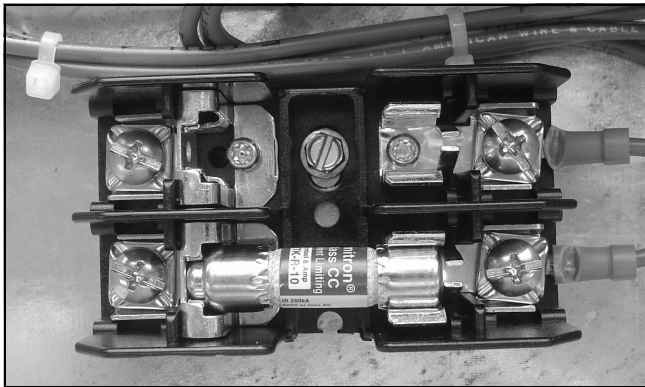


Figure 45. Remove the Fuses to Access the Mounting Screws.

- Step 4:** Remove the two (2) screws securing the current limiting fuse block to the base plate using a blade screwdriver or 0.25 in. nut driver (see Figure 45).
- Step 5:** Note their location then disconnect the twelve (12) red wires from the contactor (see Figure 46).

Note: All wires connected to the contactor are labeled to ease identification.

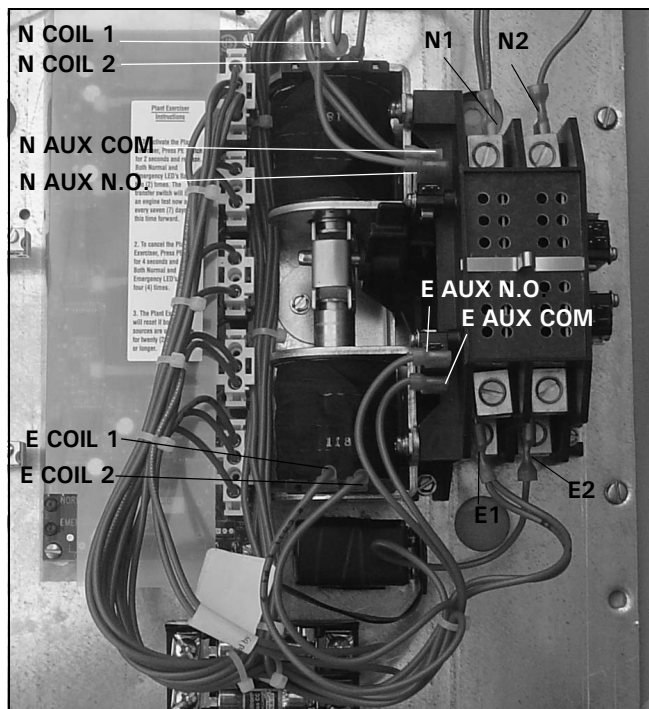


Figure 46. Wires to Disconnect from the Contactor.

Note: If the load shed option has been installed in the ATS, DO NOT remove the red wire running from the load shed to the auxiliary switch on the right side of the contactor.

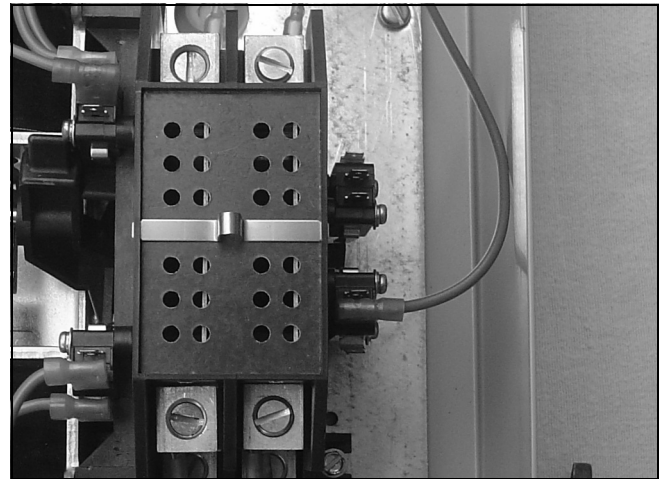


Figure 47. Load Shed Wire Connected to the Auxiliary Switch on the Contactor.

- Step 6:** Disconnect the P1, P2, P3, P4, and P5 white plugs from the controller board.
- Step 7:** Disconnect the white wire connected to the neutral bar. On 100 A ATS, use a blade screwdriver to remove the screw securing the white wire's ring terminal to the neutral bar (see Figure 48).

Note: If an optional load shed and/or TVSS is installed in the 100 A ATS, the screw securing the white wire to the neutral bar is also used to secure the red load shed wire. The red load shed wire and/or the white TVSS wire will have to be reattached to the neutral bar when the white wire in the new wiring harness is connected to the neutral bar later in this process.

On 200 A standard and SE ATSs, remove the white wire from the flag connector on the neutral bar (see Figure 48).

Note: If an optional load shed and/or TVSS is installed in a 200 A standard or SE ATS, the female flag connector is also used to connect the red load shed wire and white TVSS wire to the neutral bar. Cut the red load shed and white TVSS wires as close to the connector as possible. They will be reconnected later in this process.

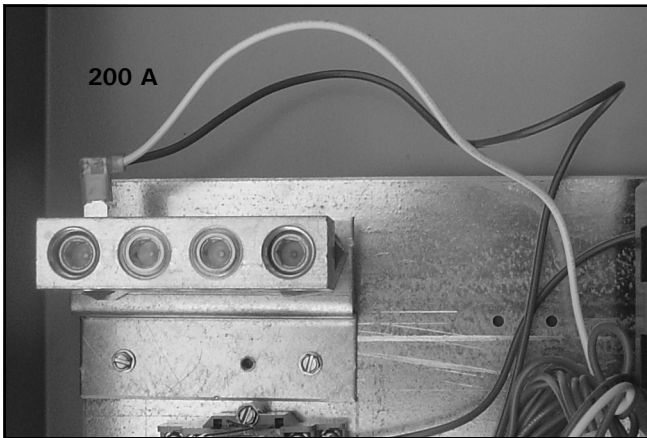


Figure 48. White Wiring Harness, Red Load Shed, and White TVSS Wires Connected to a 100 A and 200 A Neutral Bars.

The wire harness is now free to be removed.

Step 8: Place the new wiring harness and utility sensing fuse block in the ATS.

Step 9: Connect the white wire to the neutral bar. On 100 A ATS, cut the female flag connector from the white wire. Strip 0.25 in. (6.35 mm) of insulation from the wire then crimp the supplied ring terminal onto the wire. Connect the wire to the neutral bar using a blade screwdriver to tighten the screw.

Note: If an optional load shed and/or TVSS is installed in the 100 A ATS, the screw securing the white wire to the neutral bar is also used to secure the red load shed wire and/or the white TVSS wire.

On 200 A standard or SE ATSS, install the white wire female flag connector on the male flag terminal on the neutral bar.

Note: If a optional load shed and/or TVSS is installed in a 200 A standard or SE ATS, the female flag connector is also used to connect the red load shed and white TVSS wires to the neutral bar. Cut the female flag connector from the white wiring harness wire, red load shed wire, and white TVSS wire. Crimp the new female flag connector supplied onto the white and red wires then install the female flag connector on the male flag terminal on the neutral bar.

Step 10: Connect the P1 through P5 white plugs to the controller board.

Step 11: Reattach the twelve (12) red wires to the contactor. Examine each wire to find the name then refer to Figure 39 for the correct connection point.

Step 12: Align the utility sensing fuse block with the holes in the base plate from which the original fuse block was removed. Secure the utility sensing fuse block to the base plate using the hardware supplied.

Step 13: Install the utility sensing fuses in the fuse block.

Step 14: Reconnect the control wiring, removed in Step 2, to the utility sensing fuse block.

Step 15: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the wiring harness has been replaced. Test the system for proper functionality.

7.4.1.7 Replacing the 100 A Lugs

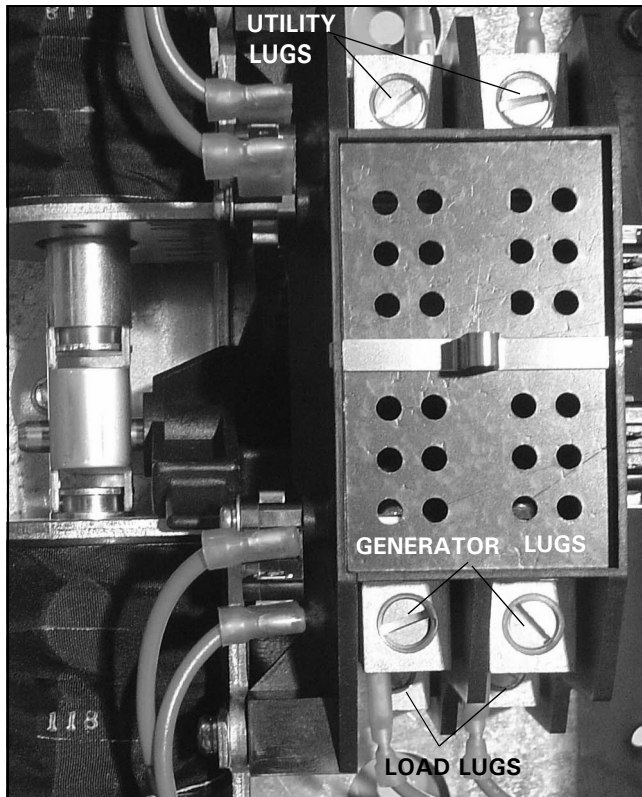


Figure 49. Replacing the 100 A Lugs.

Note: If you are replacing the lugs in a 100 A SE ATS, the service entrance breaker must first be removed. Follow Steps 1 through 4 in Section 7.4.1.9 before performing the procedure that follows.

Step 1: Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the service entrance breaker.

Step 2: Disconnect all wire cables from the contactor.

Step 3: Note their location then disconnect the twelve (12) red wires from the contactor (see Figure 39).

Note: All wires connected to the contactor are labeled to ease identification.

For SE ATSs only

Step 4: Remove the hardware securing the utility bus extensions to the contactor and SE Breaker. Remove the utility bus extension (see Figure 50).

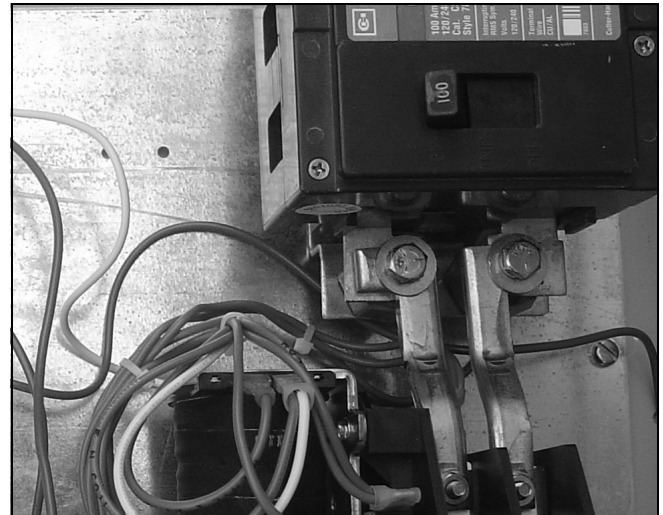


Figure 50. Utility Bus Extension on a 100 A SE ATS.

For All ATSs

Step 5: Remove the four (4) screws securing the contactor to the base plate using a blade screwdriver or 0.25 in. socket or nut driver.

Step 6: Remove the two (2) generator lugs and the two (2) load lugs using a blade screwdriver (see Figure 49).

For SE ATSs, Skip This Step.

Step 7: Once the load lugs have been removed, insert a blade screwdriver up through the circular hole in the load lug bus and remove screws securing the two (2) generator lugs.

For SE switch, skip this step.

Step 8: Place the new utility lugs on the utility bus so the anti-turn protrusions fit in the holes. Once the lugs are in place, take one (1) supplied control wire terminal and hold it underneath the bus. Using one (1) screw and one (1) washer supplied, tighten the control wire terminal and lug to the utility bus. Repeat the process of the second utility lug. Ensure that no gaps are present between the lugs and bus.

Step 9: Place the new generator lugs on the generator bus. Once the lugs are in place, take one (1) supplied control wire terminal and hold it underneath the bus. Using one (1) screw and one (1) washer supplied, tighten the control wire terminal and lug to the generator bus. Repeat the process of the second generator lug. Ensure that no gaps are present between the lugs and bus.

Step 10: Secure the load lugs to the load bus using the hardware supplied.

Note: The load lugs do not require control wire terminals.

Step 11: Secure the contactor to the base plate using the four (4) screws supplied.

For SE ATSs

Step 12: Align the utility lug extension with the SE breaker and contactor. Secure the utility bus extension to the SE breaker and contactor using the original hardware (see Figure 50).

Note: If you are replacing the lugs in a 100 A SE ATS, the service entrance breaker must be reinstalled at this time. Follow Steps 5 through 10 in Section 7.4.1.9 to complete the procedure.

Step 13: Reattach the twelve (12) red wires to the contactor. Examine each wire to find the name then refer to Figure 39 for the correct connection point.

Step 14: Reconnect all wire cables to the contactor as per their original connections.

Step 15: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance breaker has been replaced. Test the system for proper functionality.

7.4.1.8 200 A LUGS

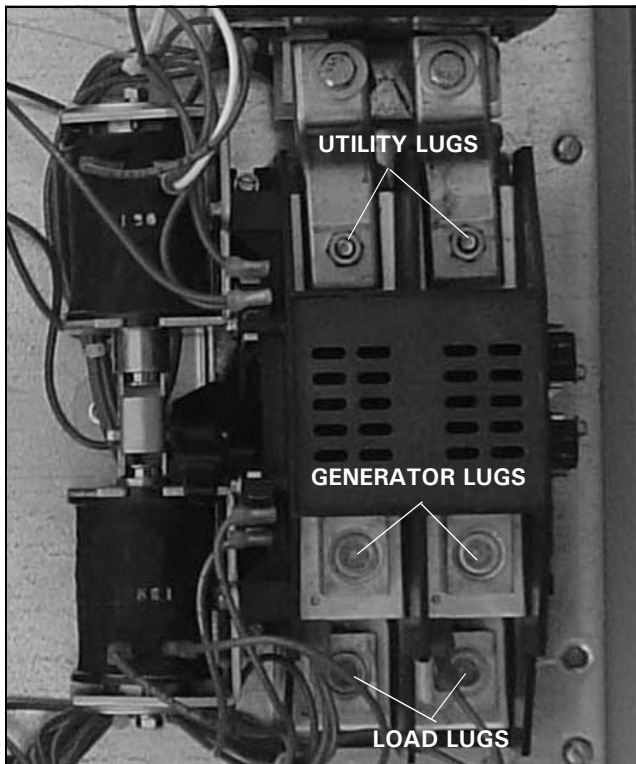


Figure 51. Replacing the 200 A Lug - Lug Location

Note: If you are replacing the lugs in a 200 A SE ATS, the service entrance breaker must first be removed. Follow Steps 1 through 4 in Section 7.4.1.9 before performing the procedure that follows.

Step 1: Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the service entrance breaker.

Step 2: Disconnect all wire cables from the contactor.

Step 3: Note their location then disconnect the twelve (12) red wires from the contactor (see Figure 39).

Note: All wires connected to the contactor are labeled to ease identification.

For SE ATSs only.

Step 4: Remove the hardware securing the utility bus extensions to the contactor and SE Breaker. Remove the utility bus extension.

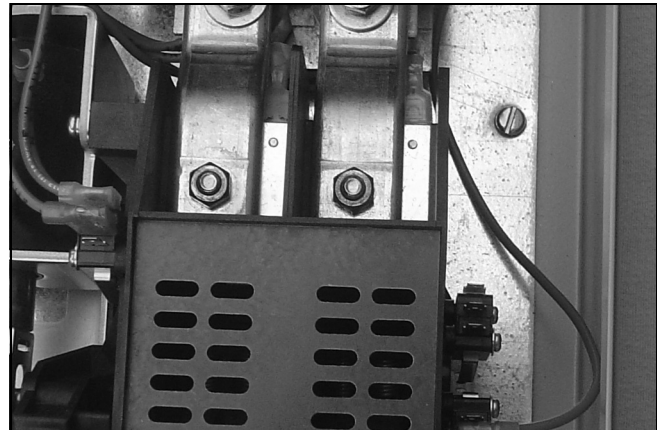


Figure 52. Utility Bus Extensions on a 200 A SE ATS.

For all ATSs.

Step 5: Remove the four (4) screws securing the contactor to the base plate using a blade screwdriver or 0.25 in. socket or nut driver.

Step 6: Remove the load lugs first by removing the four (4) Phillips screws from the back of the contactor using a Phillips screwdriver. The load bus extension and load lugs can now be removed by sliding it away from the contactor (see Figure 53).

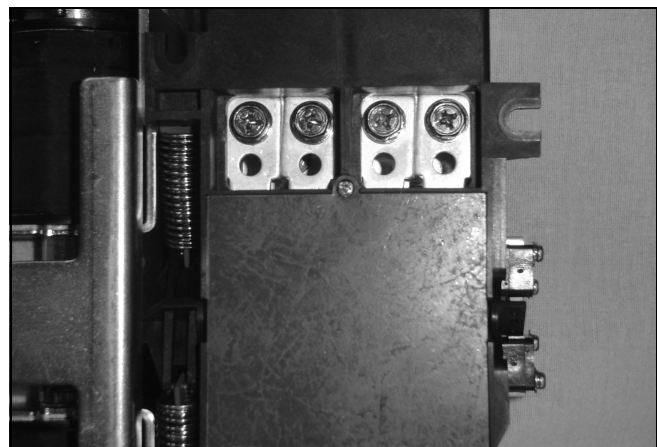


Figure 53. Replacing the 200 A Lugs

Step 7: Remove each load lug from the load bus using a blade screwdriver or 5/16 in. socket or nut driver.

Step 8: Next, insert a blade screwdriver or 5/16 in. socket or nut driver up through the load lug terminal hole and remove the hardware securing the two (2) generator lugs (see Figure 53). Remove the generator lugs.

For SE ATS, skip this step

Step 9: Remove the hardware securing the 2 utility lugs using a blade screwdriver or 5/16 in. socket or nut driver. Remove the utility lugs.

For SE ATS, skip this step.

Step 10: Place the new utility lugs on the utility bus so the anti-turn protrusions fit in the holes (see Figure 51). Once the lugs are in place, secure them to the utility bus using one (1) screw and one (1) washer supplied. Repeat the process of the second utility lug. Ensure that no gaps are present between the lugs and bus.

Step 11: Place the new generator lugs on the generator bus so the anti-turn protrusions fit in the holes (see Figure 51). Once the lugs are in place, secure them to the generator bus using one (1) screw and one (1) washer supplied. Repeat the process of the second generator lug. Ensure that no gaps are present between the lugs and bus.

Step 12: Secure each load lug to the detached load bus using one (1) screw and one (1) washer supplied.

Step 13: Slide the completed load bus extension back into the contactor and secure each extension using the four (4) Phillips screws (see Figure 53).

For SE switches only.

Step 14: Align the utility lug extension with the SE breaker and contactor. Secure the utility bus extension to the SE breaker and contactor using the original hardware.

Note: If you are replacing the lugs in a 200 A SE ATS, the service entrance breaker must be reinstalled at this time. Follow Steps 5 through 10 in Section 7.4.1.9 to complete the procedure.

Step 15: Secure the contactor to the base plate using the four (4) screws supplied.

Step 16: Reattach the twelve (12) red wires to the contactor. Examine each wire to find the name then refer to Figure 39 for the correct connection point.

Step 17: Reconnect all wire cables to the contactor as per their original connections.

Step 18: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance breaker has been replaced. Test the system for proper functionality.

Step 19: Test the system for proper functionality.

7.4.1.9 100 A and 200 A Service Entrance Breakers

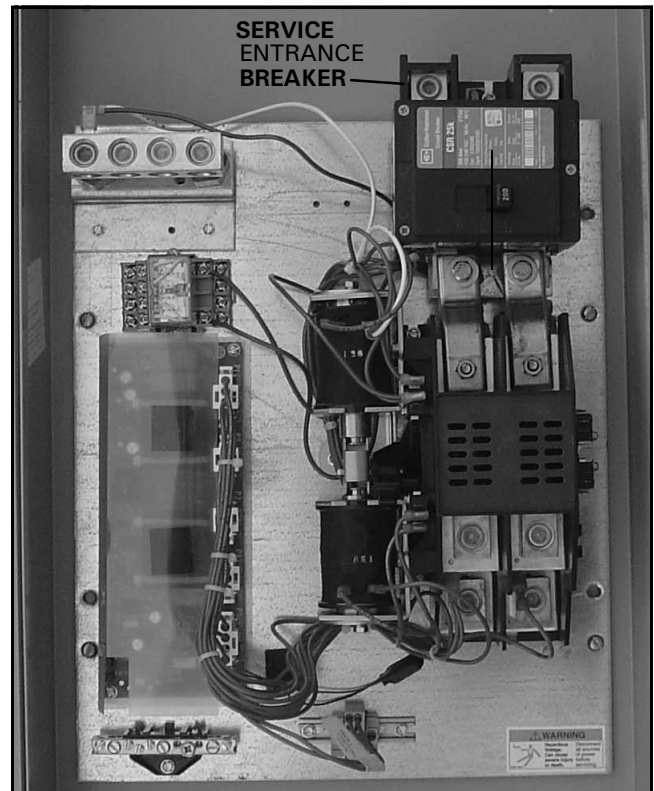


Figure 54. Service Entrance Breakers Installed (200 A SE ATSs).

Step 1: Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the service entrance breaker.

Step 2: Disconnect the cables from the lugs on the service entrance breaker.

Step 3: Remove the two (2) bolts, lock washers, and flat washers securing the service entrance breaker's to the contactor using a 7/16 in. wrench, nut driver, or socket and ratchet (see Figure 55).

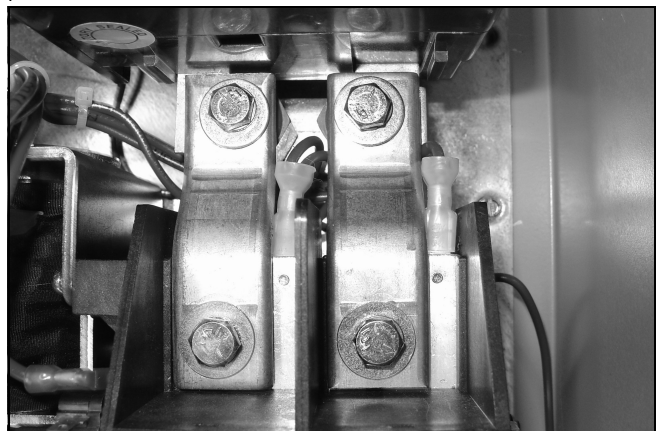


Figure 55. Stab Connections at the Service Entrance Breaker.

Step 4: Remove the screw securing the top of the service entrance breaker to the mounting bracket using a blade screwdriver or 0.25 in. nut driver. Remove the service entrance breaker from the ATS (see Figure 56).

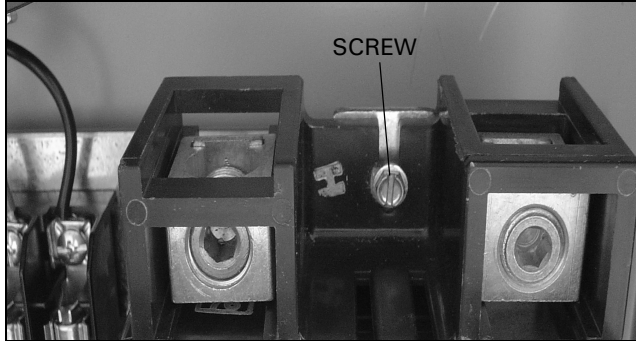


Figure 56. Location of the Top Service Entrance Breaker Mounting Screw.

- Step 5:** Align the new service entrance breaker with the holes in the mounting bracket and the contactor bus connections. Note that the stabs of the service entrance breaker should be between mounting bracket red insulating blocks and the contactor bus connections.
- Step 6:** Loosely secure the top of the service entrance breaker to the mounting bracket using the hardware provided (see Figure 56).
- Step 7:** Firmly secure the service entrance breaker stabs to the contactor bus connections.
- Step 8:** Firmly tighten the screw securing the top of the service entrance breaker to the mounting bracket.
- Step 9:** Reconnect the cables to the load side lugs on the service entrance breaker.
- Step 10:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance breaker has been replaced. Test the system for proper functionality.

7.4.1.10 Service Entrance Lugs (100 and 200 A)

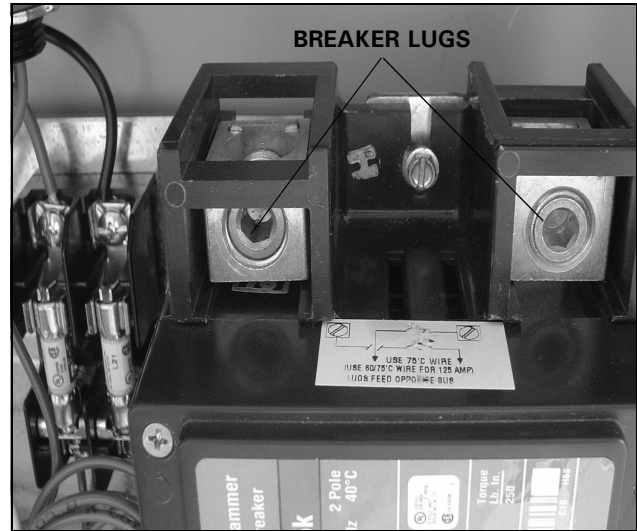


Figure 57. Location of the Service Entrance Breaker Lugs.

- Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the service entrance breaker's load side lugs.
- Step 2:** Remove the service entrance breaker from the ATS by following Steps 1 through 4 of Section 7.4.1.9.
- Step 3:** Working from the rear of the service entrance breaker, remove the two (2) screws securing the lugs to the stabs using a Phillips screwdriver (see Figure 58).

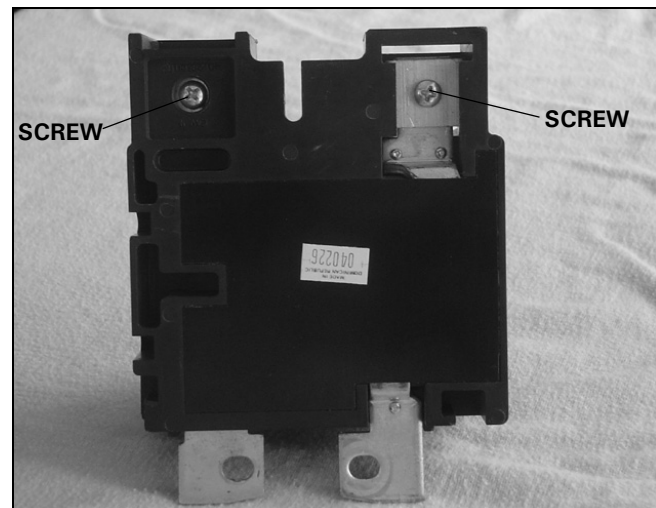


Figure 58. Location of the Screws Securing the Lugs to the Stabs.

- Step 4:** Remove the lugs from the stabs.
- Step 5:** Slide the new lugs over the stabs until the holes in each are aligned.
- Step 6:** Secure the new lugs to the stabs using the hardware.
- Step 7:** Reinstall the service entrance breaker in the ATS by following Steps 5 through 10 in Section 7.4.1.9.

Step 8: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance breaker lugs have been replaced. Test the system for proper functionality.

7.4.1.11 Optional TVSS (Factory Installed)

Note: These instructions are for replacing a factory installed TVSS. If an optional TVSS was added by the installer of the ATS, refer to Section 8.1 – Optional TVSS for installation instructions.

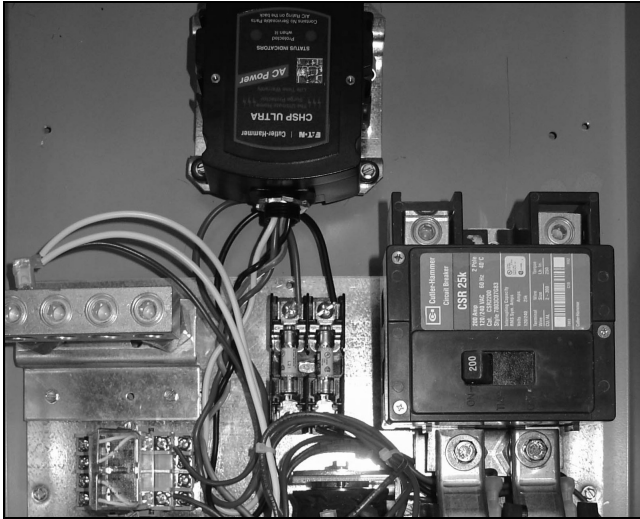


Figure 59. Optional TVSS (Factory Installed in the ATS).

Step 1: Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the TVSS.

Step 2: Remove the two (2) screws securing the TVSS to its mounting bracket using a blade screwdriver or 0.25 in. nut driver (See Figure 60).

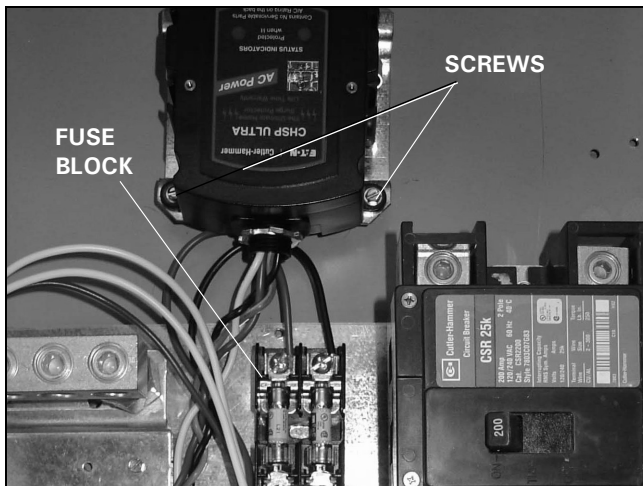


Figure 60. TVSS Mounting Screws and Fuse Block Location.

Step 3: Note the connection points of the four (4) wires leading from the TVSS (Refer to the wiring diagrams in Figures 30 and 31 for connection locations for the TVSS wires).

Note: The length of the four (4) TVSS wires can affect the performance of the TVSS. During factory installation of the TVSS, the wires were kept as short and as close to identical length as possible. Before disconnecting any TVSS wire, note any braiding, coiling, or routing that was done to help achieve these goals.

Step 4: Loosen the screw securing the red TVSS wire to the TVSS fuse block using a blade screwdriver. Remove the red wire from the connection.

Step 5: Loosen the screw securing the black TVSS wire to the TVSS fuse block using a blade screwdriver. Remove the black wire from the connection.

Step 6: On the 100 A ATs, loosen the screw securing the white TVSS wire to the neutral bar using a blade screwdriver. Remove the white wire from the connection.

Note: On 200 A SE ATs, the white TVSS wire is connected to the neutral bar via the female flag connector. This is the same connector used to connect the white wire from the main wiring harness and red wire from the optional load shed if installed. Cut these wires as close as possible to the female flag connector (see Figure 59).

Step 7: Loosen the screw securing the green/yellow TVSS wire to the ground bar using a blade screwdriver. Remove the green/yellow wire from the connection. The TVSS is now completely free from the ATS.

Step 8: Using the wires from the original TVSS as templates, cut the wires of the new TVSS to the correct length then strip 0.25 in. (6.35 mm) of insulation from each wire.

Note: The length of the four (4) TVSS wires can affect the performance of the TVSS. During factory installation of the TVSS, the wires were kept as short and as close to identical length as possible. Before reconnecting any TVSS wire, try to duplicate any braiding, coiling, or routing that was noted on the original installation.

Step 9: Insert the green/yellow wire into the receptacle on the ground bar. Secure the green/yellow wire to the ground bar using a blade screwdriver.

Step 10: On 100 A SE ATs, insert the white wire into one of the smaller holes on the neutral bar. Secure the white wire to the neutral bar using a blade screwdriver.

Note: On 200 A SE ATs, strip 0.25 in. (6.35 mm) of insulation from the white TVSS wire, the white wire from the main wiring harness, and red wire from the option load shed if installed. Crimp the supplied female flag connector on the wires so they can be connected to the male flag connector on the neutral bar.

Step 11: Insert the black wire into its receptacle on the TVSS fuse block. Secure the black wire to the fuse block using a blade screwdriver.

Step 12: Insert the red wire into its receptacle on the TVSS fuse block. Secure the red wire to the fuse block using a blade screwdriver.

Step 13: Align the new TVSS with the holes in the TVSS mounting bracket. Secure the TVSS to the mounting bracket using the hardware removed in Step 2.

Step 14: Make sure the TVSS wires are routed properly and do not interfere with any ATS component.

Step 15: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the TVSS has been replaced. Test the system for proper functionality.

7.4.1.12 *Optional SurgeTel*



Figure 61. SurgeTel Installed with the ATS and TVSS System.

Note: Even though the Eaton SurgeTel is designed to mount directly to the TVSS, if the TVSS was factory installed inside the 100 A or 200 A SE ATS enclosure, the SurgeTel MUST BE mounted outside the ATS. See the Instruction Bulletin supplied with the SurgeTel for more information.



Figure 62. SurgeTel Installed Separate from the TVSS.

Step 1: Disconnect the ground wire from the SurgeTel auxiliary ground strip terminal (if applicable).

Step 2: Remove the SurgeTel cover to access the telephone connection terminals.

Step 3: Note and diagram the connection points of the telephone wires within the SurgeTel. Disconnect and remove the telephone wire.

Note: See the information supplied with the SurgeTel for additional telephone wire connection information.

Step 4: Remove the screws securing the SurgeTel to the mounting surface. Remove the SurgeTel.

Step 5: Remove the screw in the middle of the back of the new SurgeTel using a Phillips head screwdriver. Attach the auxiliary ground terminal strip provided to the back of the SurgeTel using the Phillips head screw just removed.

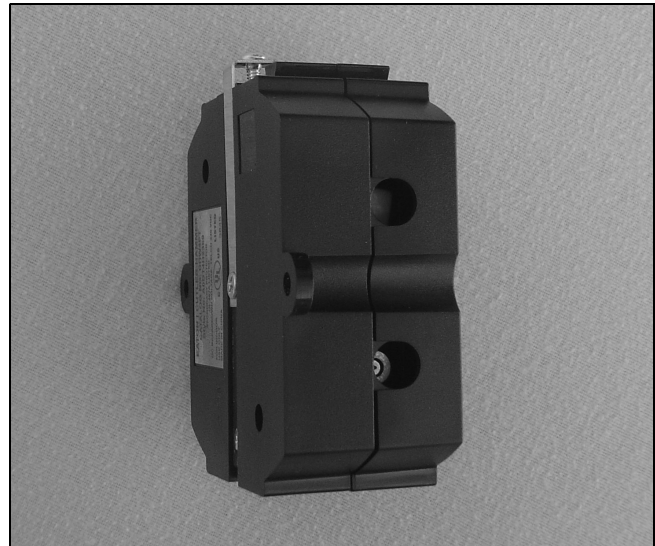


Figure 63. Auxiliary Ground Strip Mounted to the SurgeTel.

Step 6: Align the new SurgeTel with the holes in the mounting surface from which the original was removed. Secure the SurgeTel to the mounting surface using the original screws.

Step 7: Connect the ground wire to the auxiliary ground strip using the screw provided.

Step 8: Remove the SurgeTel cover. Connect the telephone wires to the SurgeTel as noted in Step 3. Install the cover.

Step 9: Check for a dial tone on a telephone connected to the system.

Step 10: Place an outgoing call and have someone call you back to ensure that the system is working.

7.4.1.13 *Optional SurgeCable*



Figure 64. SurgeCable Installed with the ATS and TVSS System.

Note: Even though the Eaton SurgeCable is designed to mount directly to the TVSS, if the TVSS was factory installed inside the 100 A or 200 A SE ATS enclosure, the SurgeCable MUST BE mounted outside the ATS. See the Instruction Bulletin supplied with the SurgeCable for more information.

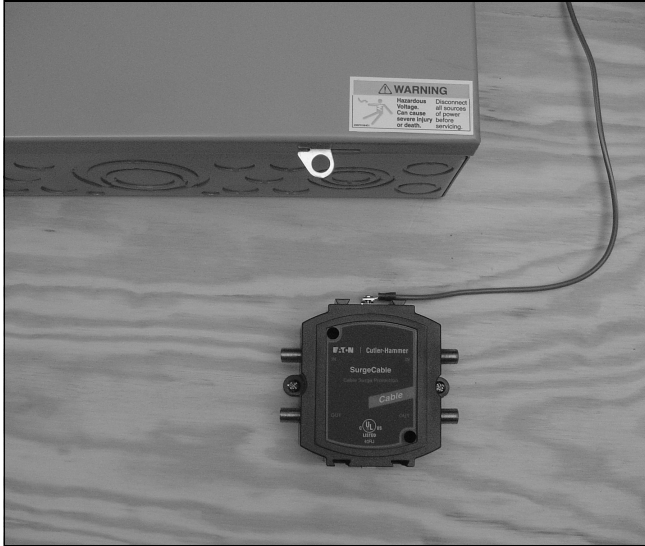


Figure 65. SurgeCable Installed separate from the TVSS.

Step 1: Disconnect the ground wire from the SurgeCable auxiliary ground strip terminal.

Step 2: Note and diagram the coaxial cable connections at the SurgeCable. Disconnect the coaxial cables.

Note: See the information supplied with the SurgeCable for additional connection information.

Step 3: Remove the screws securing the SurgeCable to the mounting surface. Remove the SurgeCable.

Step 4: Remove the screw in the middle of the back of the new SurgeCable using a Phillips head screwdriver. Attach the auxiliary ground terminal strip provided to the back of the SurgeTel using the Phillips head screw just removed.



Figure 66. Auxiliary Ground Strip Mounted to the SurgeCable.

Step 5: Align the new SurgeCable with the holes in the mounting surface from which the original was removed. Secure the SurgeCable to the mounting surface using the original screws.

Step 6: Connect the ground wire to the auxiliary ground strip using the screw provided.

Step 7: Connect the coaxial cables to the SurgeCable as noted in Step 2.

Step 8: After ensuring that all connections are tight, turn on the protected equipment and check for proper functioning.

7.4.1.14 Optional Load Shed (Factory Installed)

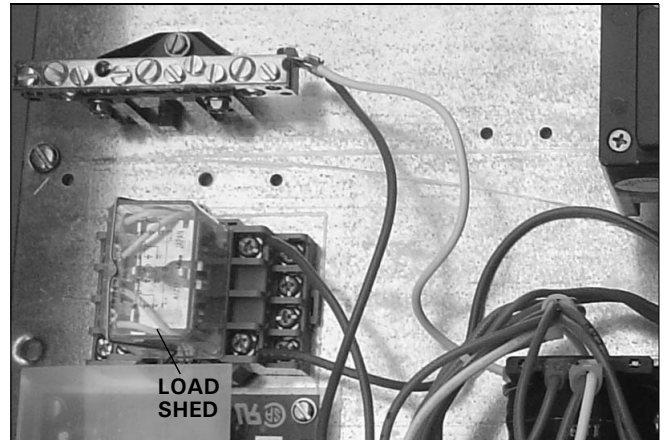


Figure 67. Optional Load Shed (Factory Installed in the ATS).

Step 1: Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the load shed.

Step 2: Note the connection points (terminals 13 [-] and 14 [+]) of the two (2) main wires connected to the load shed (Refer to the wiring diagrams in Figures 30 and 31 for connection locations for the load shed wires).

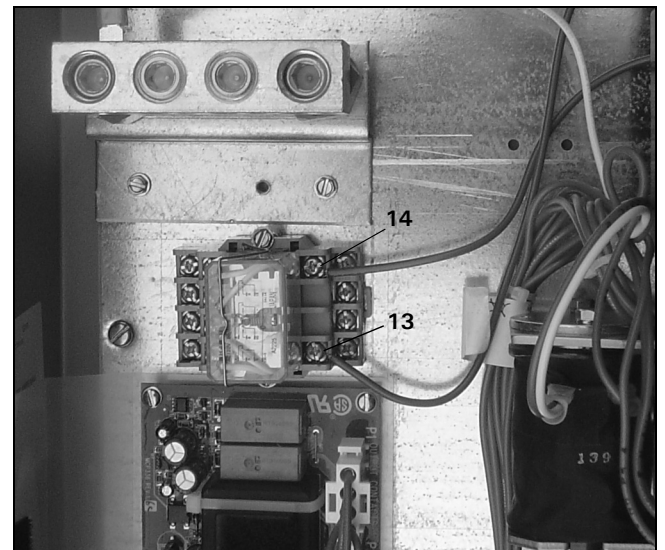


Figure 68. Main Wire Connections at the Load Shed.

Step 3: Loosen the screws securing the wires to terminals 13 and 14 of the load shed using a blade screwdriver. Remove the wires from the terminals.

Note: Terminals 1 through 12 on the load shed provide a number of options for taking advantage of the functionality of the load shed. Refer to Figure 69 for a diagram illustrating the use of these terminals to take advantage of its functionality.

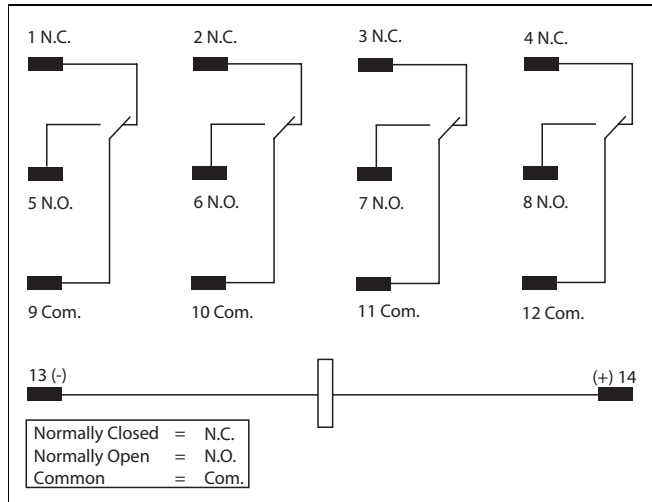


Figure 69. Additional Connections at the Load Shed.

Step 4: After noting and diagramming the other connections at the load shed, mark for identification then remove all wires connected to terminals 1 through 12 of the load shed.

Step 5: Remove the two (2) screws securing the load shed to the base plate using a blade screwdriver or 0.25 in. nut driver. Remove the load shed from the ATS.

Step 6: Align the new load shed with the holes from which the original was removed.

Step 7: Secure the new load shed to the base plate using the hardware supplied.

Step 8: Refer to the notes and diagram made in Step 4 and reconnect any wires originally attached to terminals 1 through 12 as per the original installation.

Step 9: Route the main load shed wires to terminals 13 (-) and 14 (+). Secure the main load shed wires to the terminals by tightening the screws.

Step 10: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the load shed has been replaced. Test the system for proper functionality.

7.4.1.15 Service Entrance Cover

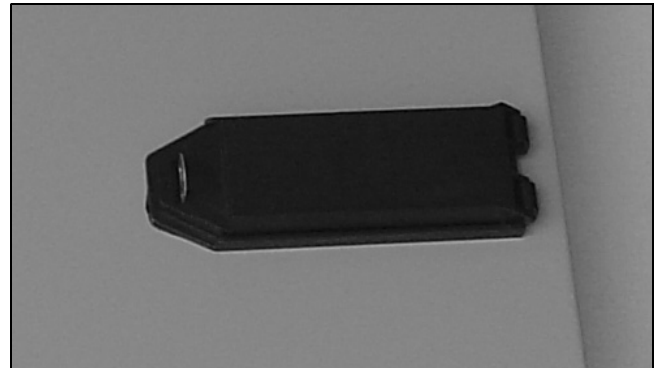


Figure 70. Service Entrance Cover Installed on the ATS Door.

Step 1: Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the service entrance cover.

Step 2: Open the service entrance cover door.

Step 3: Remove the three (3) screws securing the service entrance cover to the ATS door using a blade screwdriver or 0.25 in. nut driver. Remove the service entrance cover (see Figure 71).

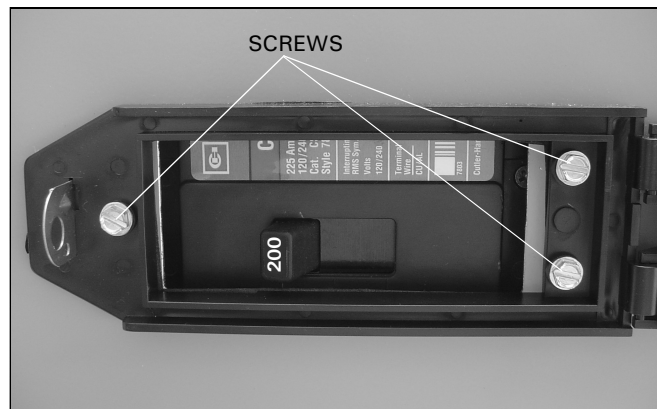


Figure 71. Location of the Service Entrance Cover Screws.

Step 4: Open the new service entrance cover door and align it with the holes in the ATS door.

Step 5: Secure the new service entrance cover to the ATS door using the hardware supplied.

Step 6: Close the service entrance cover door.

Step 7: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance cover has been replaced. Test the system for proper functionality.

7.5 Troubleshooting

Table 5 contains troubleshooting information for the RLCM/RLCU ATS. If a problem still exists after completing the troubleshooting procedures, contact an authorized Eaton sales representative.

Table 5 Troubleshooting Chart

Problem	Cause	Correction
The automatic transfer switch does not transfer to the generator.	<ol style="list-style-type: none">1. The generator breaker is open.2. The generator voltage is not acceptable.	<ol style="list-style-type: none">1. Reset the generator circuit breaker.2. Refer to the generator User's Manual.
The automatic transfer switch does not transfer to the utility.	<ol style="list-style-type: none">1. The service disconnect breaker is open.2. The utility voltage is not acceptable.	<ol style="list-style-type: none">1. Reset the service disconnect breaker.2. Wait for the utility voltage to return to normal.
The generator is still running after the transfer switch transfers to the utility.	Engine cool down period.	The engine should stop after the cool down.

SECTION 8: INSTALLING OPTIONAL COMPONENTS

8.1 Optional TVSS

8.1.1 Installing an Optional TVSS in a Standard 100 A and 200 A RLCM or RLCU

If you have ordered a standard RLCM or RLCU ATS and an optional TVSS, follow the steps outlined below to install the optional TVSS.

Note: Because of the size of the enclosure, if you have ordered either a 100 A or 200 A standard ATS, the TVSS CANNOT be installed inside the enclosure. It will have to be mounted on the outside of the enclosure in a suitable position (see Figure 72).



Figure 72. Possible Location for and Externally Mounted TVSS.

- Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to install the externally mounted TVSS.
- Step 2:** After the ATS has been mounted, determine the desired location for mounting the TVSS. An existing 0.50 in. (1.25 cm) knockout can be used or a 0.50 in. (1.25 cm) hole can be drilled in the enclosure.

CAUTION

EXTREME CARE SHOULD BE TAKEN TO PROTECT THE ATS FROM DRILL CHIPS, FILINGS, AND OTHER CONTAMINANTS WHEN MAKING THE TVSS MOUNTING HOLE TO PREVENT DAMAGE OR A FUTURE MALFUNCTION

CAUTION

TO MEET APPLICABLE CODES, AN EXTERNALLY MOUNTED TVSS MUST BE MOUNTED BELOW THE LEVEL OF THE BOTTOM LUGS (LOAD LUGS) OF THE CONTACTOR.

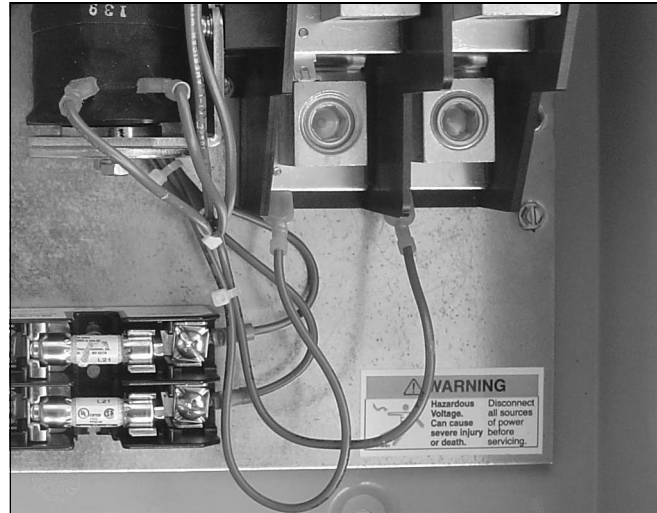


Figure 73. TVSS Must be Mounted Below the Level of the Load Lugs.

Step 3: Remove the lock nut from the nipple of the TVSS.

Step 4: Feed the TVSS wires and mounting nipple through the knockout or hole drilled in the ATS enclosure.

Step 5: Secure the TVSS to the ATS enclosure using the lock nut removed in Step 3. Be sure to firmly secure the TVSS using an appropriate tool to fully tighten the lock nut (see Figure 74).

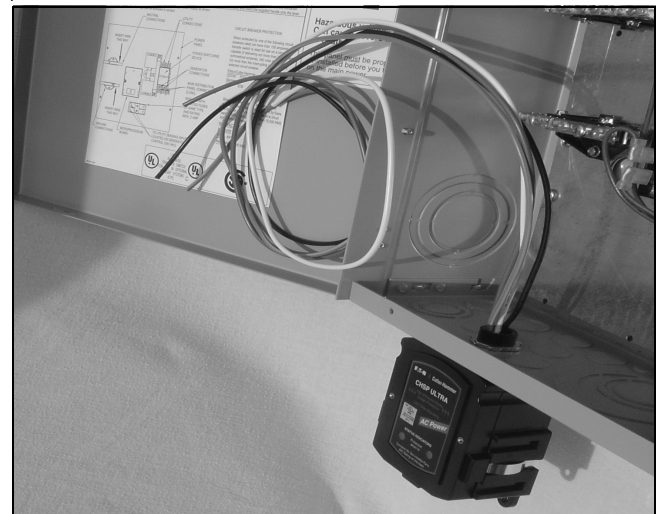


Figure 74. TVSS Secured to the ATS Enclosure.

Note: The length of the four (4) TVSS wires can affect the performance of the TVSS. During installation, the wires should be kept as short and as close to identical length as possible. In keeping the length of the wires as equal as possible, they should be "braided" to increase the effectiveness of the TVSS.

Step 6: Mount the TVSS fuse block to the existing holes on the ATS base plate using the hardware provided. For standard 100 A and 200 A ATSS, the mounting holes are directly above the contactor.

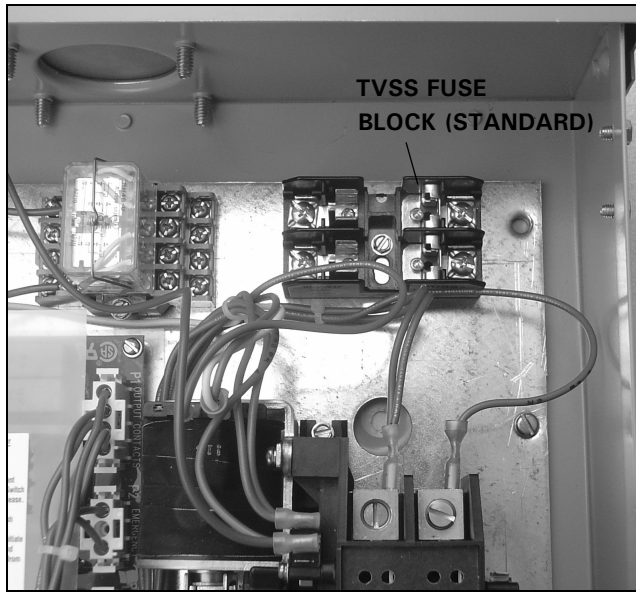


Figure 75. TVSS Fuse Block Mounted in a Standard ATS.

Step 7: Install the supplied fuses in the TVSS fuse block.

Step 8: Based on the following connection points and wire routing, determine which TVSS wire(s) will be the longest.

Wire Color	Connection Point
Red	TVSS fuse block
Black	TVSS fuse block
White	ATS neutral bar
Green/Yellow	ATS ground bar

Cut all four (4) wires to the same length necessary to reach the furthest connection point. Braid any excess wire length for the other connection points.



Figure 76. Braided TVSS Wires.

Step 9: The red and black wires from the TVSS are to be connected to the terminals of the TVSS fuse block. Strip 0.25 in. (6.35 mm) of insulation from the end of the wires.

Step 10: Connect the red and black TVSS wires to the TVSS fuse block, using a blade screwdriver (see Figure 77).

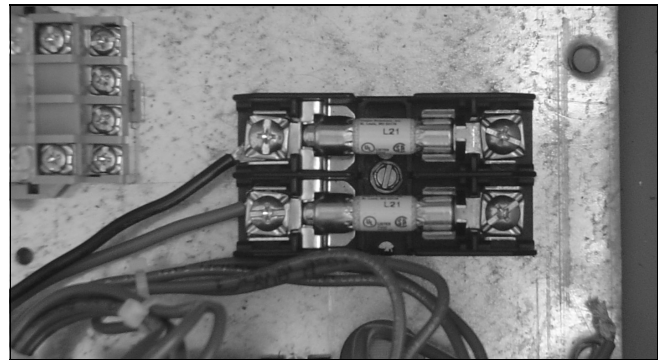


Figure 77. TVSS Red and Black Wires Connected to the TVSS Fuse Block.

Step 11: The white wire from the TVSS will be connected to the neutral bar. Cut the white wire to a suitable length to connect to the neutral bar then strip 0.25 in. (6.35 mm) of insulation from the end of the wire.

Step 12: On 100 A standard ATSS, secure the white TVSS wire to a receptacle on the neutral bar using a blade screwdriver (see Figure 78).

Note: On 200 A standard ATSS, the white TVSS wire must be connected to the male flag receptacle on the neutral bar. Remove the female flag connector from the neutral bar. Cut the female flag connector off of the white wire from the main wiring harness and the red wire from the optional load shed if installed. Strip 0.25 in. (6.35 mm) of insulation from the white TVSS wire, the white wire from the main wiring harness, and red wire from the option load shed if installed. Crimp the supplied female flag connector on the wires so they can be connected to the male flag terminal on the neutral bar.

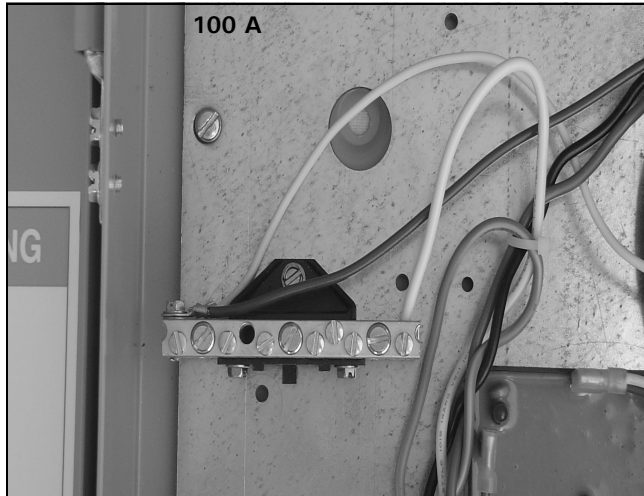


Figure 78. TVSS White Wire Connected to the 100 A and 200 A Neutral Bars.

Step 13: The green / yellow wire from the TVSS will be connected to the ground bar. Cut the green / yellow wire to a suitable length to connect to the ground bar then strip 0.25 in. (6.35 mm) of insulation from the end of the wire.

Step 14: Secure the green / yellow TVSS wire to a receptacle on the ground bar using a blade screwdriver (see Figure 79).

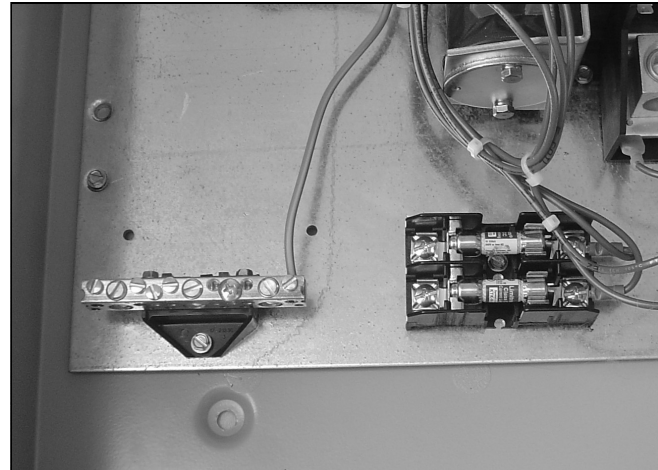


Figure 79. TVSS Green / Yellow Wire Connected to the Ground Bar.

Step 15: Using the wires cut from the red and black TVSS wires in Step 8 (if long enough), or 600 V 14 AWG wire, make two (2) wire leads that will run from the TVSS fuse block to the male spade connectors at the utility lugs on the contactor.

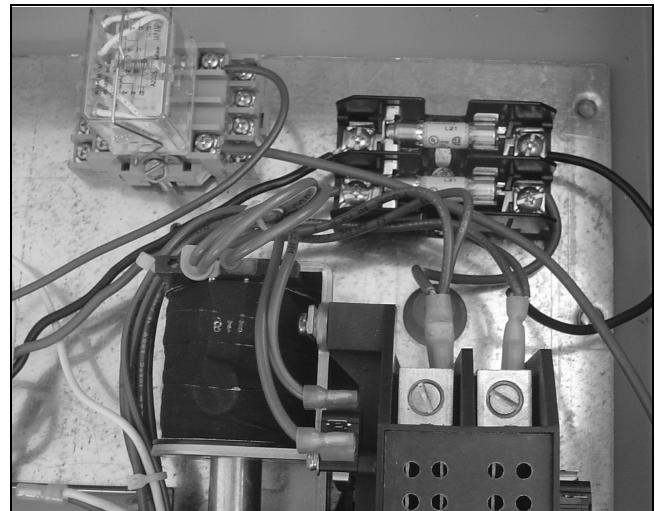


Figure 80. Connection Points at the TVSS Fuse Block and Utility Lugs.

Step 16: Remove the wiring harness connections at the male flag terminal at the N-1 utility lug. Remove the crimp on female flag connector. Strip 0.25 in. (6.35 mm) of insulation from the end of the TVSS wire and the N-1 harness wires. Using the new crimp-on female flag connector supplied, connect the N-1 harness wires with one of the TVSS leads.

Step 17: Repeat the process for the N-2 wires.

Step 18: Reconnect the N-1 and N-2 female flag connectors to the N-1 and N-2 male flag terminals at the utility lugs.

Step 19: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the externally mounted TVSS has been installed. Test the system for proper functionality.

8.1.2 Installing an Optional TVSS in an SE 100 A and 200 A RLCM and RLCU

If you already have an SE RLCM or SE RLCU ATS and want to install an optional TVSS inside the enclosure, follow the steps outlined below.

Note: Even though there is ample room and existing mounting holes within an SE RLCM and RLCU ATS to install an optional TVSS, it can also be mounted externally on the ATS. If you want to externally mount the TVSS, follow the instructions in Section 8.1.1.

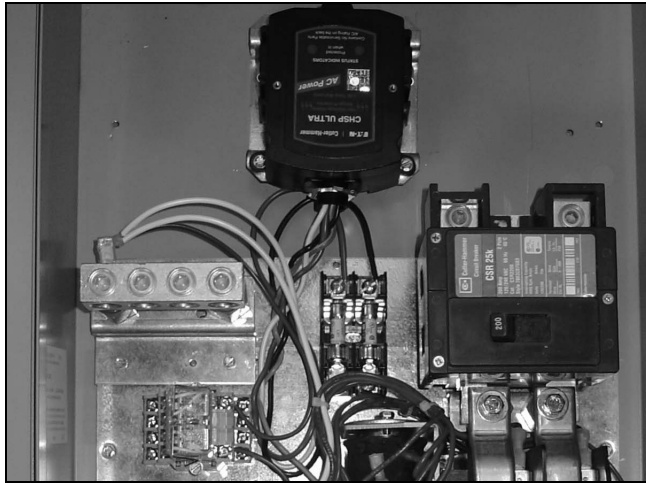


Figure 81. TVSS Installed Inside an SE ATS.

- Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the TVSS.
- Step 2:** Align the TVSS Mounting bracket with the existing holes in the back of the enclosure, located above the back plate. Secure the mounting bracket to the enclosure using the hardware provided and a flat blade screwdriver (see Figure 82).

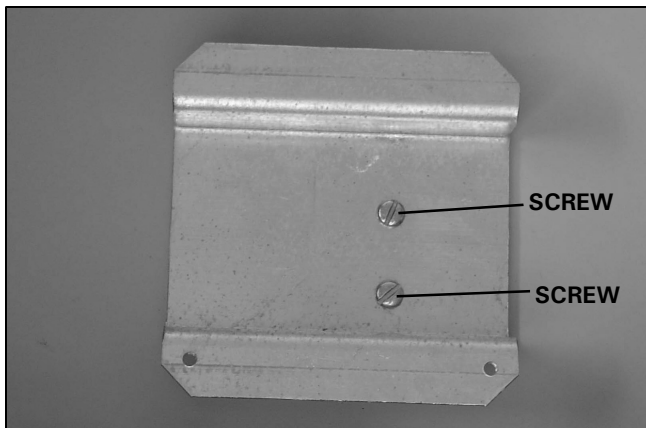


Figure 82. TVSS Mounting Bracket Secured to the Back of the Enclosure.

- Step 3:** Align the TVSS with the holes in the mounting bracket. Secure the TVSS to the mounting brackets using the hardware provided and a flat blade screwdriver or 0.25 in. nut driver. Note that the TVSS wires should facing the ATS back plate and installed components (see Figure 83).

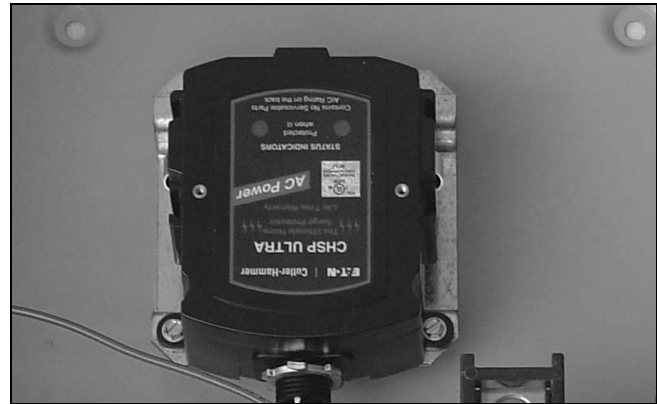


Figure 83. TVSS Installed on the Mounting Bracket.

- Step 4:** Mount the TVSS fuse block to the existing holes on the ATS base plate using the hardware provided. For 100 A and 200 A SE ATSs, the holes are directly to the left of the contactor.
- Step 5:** Install the supplied fuses in the TVSS fuse block (see Figure 84).

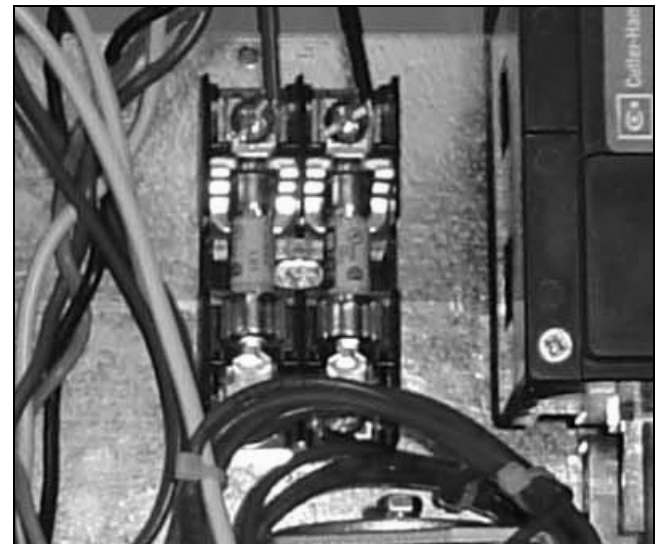


Figure 84. TVSS Fuse Block Mounted in an SE ATSs.

Note: The length of the four (4) TVSS wires can affect the performance of the TVSS. During installation, the wires should be kept as short and as close to identical length as possible. In keeping the length of the wires as equal as possible, they should be "braided" to increase the effectiveness of the TVSS.

- Step 6:** Based on the following connection points and wire routing, determine which TVSS wire(s) will be the longest.

Wire Color	Connection Point
Red	TVSS fuse block
Black	TVSS fuse block
White	ATS neutral bar
Green/Yellow	ATS ground bar

Cut all four (4) wires to the same length necessary to reach the furthest connection point. Braid any excess wire length for the other connection points.

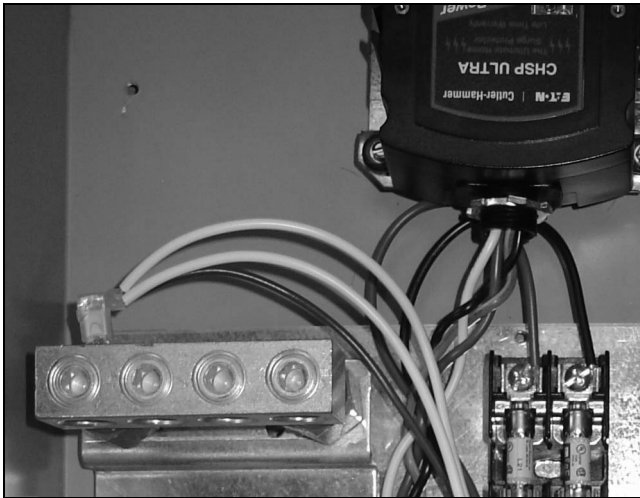


Figure 85. Braided TVSS Wires.

Step 7: The red and black wires from the TVSS are to be connected to the terminals of the TVSS fuse block. Strip 0.25 in. (6.35 mm) of insulation from the end of the wires.

Step 8: Connect the red and black TVSS wires to the TVSS fuse block, as shown, using a blade screwdriver (see Figure 85).

Step 9: The white wire from the TVSS will be connected to the neutral bar. Cut the white wire to a suitable length to connect to the neutral bar then strip 0.25 in. (6.35 mm) of insulation from the end of the wire.

Step 10: On 100 A SE ATs, secure the white TVSS wire to a receptacle on the neutral bar using a blade screwdriver (see Figure 86).

Note: On 200 A SE ATs, the white TVSS wire must be connected to the male flag receptacle on the neutral bar. Remove the female flag connector from the neutral bar. Cut the female flag connector off of the white wire from the main wiring harness and the red wire from the optional load shed if installed. Strip 0.25 in. (6.35 mm) of insulation from the white TVSS wire, the white wire from the main wiring harness, and red wire from the optional load shed if installed. Crimp the supplied female flag connector on the wires so they can be connected to the male flag terminal on the neutral bar (see Figure 86).

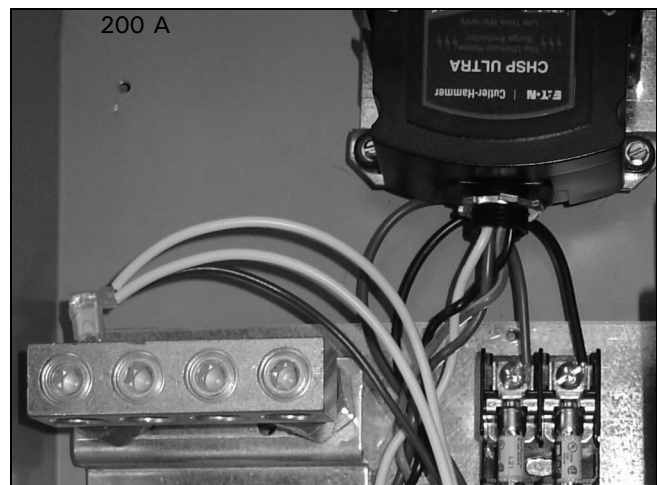


Figure 86. TVSS White Wire Connected to the 100 A and 200 A Neutral Bars.

Step 11: The green / yellow wire from the TVSS will be connected to the ground bar. Cut the green / yellow wire to a suitable length to connect to the ground bar then strip 0.25 in. (6.35 mm) of insulation from the end of the wire.

Step 12: Secure the green / yellow TVSS wire to a receptacle on the ground bar using a blade screwdriver.



Figure 87. TVSS Green / Yellow Wire Connected to the Ground Bar.

Step 13: Using the wires cut from the red and black TVSS wires in Step 6 (if long enough), or 600 V 14 AWG wire, make two (2) wire leads that will run from the TVSS fuse block to the male spade connectors at the utility lugs on the contactor.

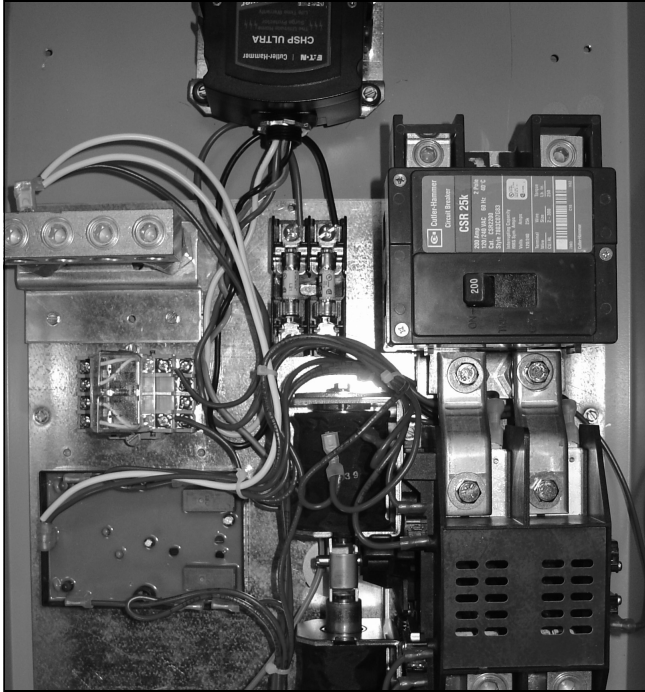


Figure 88. Connection Points at the TVSS Fuse Block and Utility Lugs.

Step 14: Remove the wiring harness connections at the male flag terminal at the N-1 utility lug. Remove the crimp on female flag connector. Strip 0.25 in. (6.35 mm) of insulation from the end of the TVSS wire and the N-1 harness wires. Using the new crimp-on female flag connector supplied, connect the N-1 harness wires with one of the TVSS leads.

Step 15: Repeat the process for the N-2 wires.

Step 16: Reconnect the N-1 and N-2 female flag connectors to the N-1 and N-2 male flag terminals at the utility lugs.

Step 17: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the internally mounted TVSS has been installed. Test the system for proper functionality.

8.2 Optional SurgeTel



Figure 89. SurgeTel Installed on the TVSS.

Note: The Eaton SurgeTel is designed to mount directly to the TVSS when it is externally mounted to the ATS enclosure. If the TVSS was factory installed inside the 100 A or 200 A SE ATS enclosure, the SurgeTel MUST BE mounted outside the enclosure. See Section 7.4.1.12 for installation/replacement information and the Instruction Bulletin supplied with the SurgeTel for additional information.

Note: If the SurgeTel will be mounted to the TVSS, no ground wire is required between the SurgeTel and ATS. The TVSS ground will also ground the SurgeTel.

Step 1: Align the quick connector with the receptacle on the right side, left side, or bottom of the TVSS. Slide the SurgeTel into the receptacle until completely seated (see Figure 90).

Note: The SurgeTel can also be mounted to other Eaton surge protection devices that incorporate the quick connect feature.



Figure 90. SurgeTel Mounted to the TVSS.

Step 2: Route the telephone service wire(s) to the SurgeTel.

- Step 3:** Remove the cover from the SurgeTel.
- Step 4:** Connect the telephone service wires to the SurgeTel connectors.
- Note:** See the Instruction Bulletin supplied with the SurgeTel for complete telephone wire connection information.
- Step 5:** Check for a dial tone on a telephone connected to the system.
- Step 6:** Place and outgoing call and have someone call you back to ensure that the system is working.

8.3 Optional SurgeCable



Figure 91. SurgeCable Installed on the TVSS.

Note: The Eaton SurgeCable is designed to mount directly to the TVSS when it is externally mounted to the ATS enclosure. If the TVSS was factory installed inside the 100 A or 200 A SE ATS enclosure, the SurgeCable MUST BE mounted outside the ATS and wired into the ATS. See Section 7.4.1.13 for installation/replacement information and the Instruction Bulletin supplied with the SurgeCable for additional information.

Note: If the SurgeCable will be mounted to the TVSS, no ground wire is required between the SurgeCable and ATS. The TVSS ground will also ground the SurgeCable.

Step 1: Align the quick connector with the receptacle on the right side, left side, or bottom of the TVSS. Slide the SurgeCable into the receptacle until completely seated (see Figure 92).

Note: The SurgeCable can also be mounted to other Eaton surge protection devices that incorporate the quick connect feature.



Figure 92. SurgeCable Mounted to the TVSS.

Step 2: Reroute the coaxial cables to the SurgeCable.

Step 3: Connect the coaxial cables to the applicable “In” and “Out” terminals on the SurgeCable.

Note: See the Instruction Bulletin supplied with the SurgeCable for additional connection information.

Step 4: After ensuring that all connections are tight, turn on the protected equipment and check for proper functioning.

8.4 Optional Load Shed (100 A and 200 A ATS)

If you have ordered a standard ATS and an optional load shed, or have decided to add an optional load shed to a previously installed ATS, follow the steps outlined below to install the option.



Figure 93. Load Shed Installed in a Standard ATS.

Step 1: Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to install the load shed.

Step 2: Align the load shed with the existing holes near the top of the base plate, directly above the contactor, for standard ATSS, and directly below the neutral for SE ATSS. Secure the load shed to the base plate using the hardware supplied.

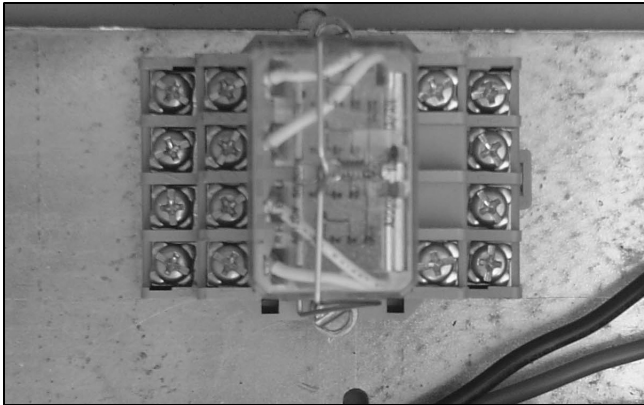


Figure 94. Load Shed Installed on the Base Plate.

Step 3: Connect one of the supplied wires to terminal # 14 on the load shed. Route the wire from the load shed to the neutral bar. On 100 A ATSS, cut the wire to the proper length, strip 0.25 in. (6.35 mm) of insulation from the end of the wire, then crimp the supplied ring terminal onto the wire. Using a blade screwdriver, remove the screw securing the white wire of the main wiring harness to the neutral bar. Align the ring terminal of the white wire with the load shed wire ring terminal and secure both to the neutral bar using the screw just removed (Refer to the wiring diagrams in Figures 30 and 31 for connection locations for the load shed wires) (see Figure 95).



Figure 95. Load Shed Wire Connected to the Neutral Bar (100 A).

On 200 A ATSS, remove the female flag connector from the male flag terminal on the neutral bar. Cut the female flag connector from the white wire in the main wiring harness and the white wire from the optional TVSS if installed. Cut the load shed wire to the proper length. Strip 0.25 in. (6.35 mm) of insulation from the end of each of the wires, then crimp the supplied larger female flag connector onto the wires. Connect the female flag connector to the male flag terminal on the neutral bar (Refer to the wiring diagrams in Figures 30 and 31 for connection locations for the load shed wires) (see Figure 96).

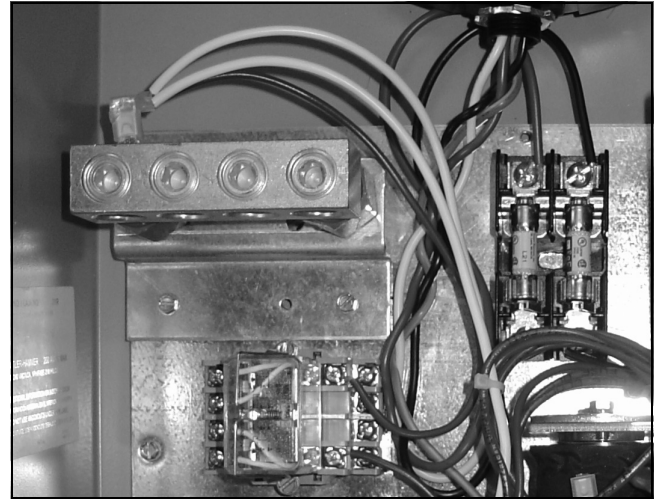


Figure 96. Load Shed Wire Connected to the Neutral Bar (200 A).

Step 4: Connect one of the supplied wires to terminal # 13 on the load shed. Route the wire from the load shed to the auxiliary switch on the right side of the contactor. Cut the wire to the proper length and strip 0.25 in. (6.35 mm) of insulation from the end of the wire. Crimp the smaller female flag connector supplied onto the end of the wire. Connect the female flag connector to the male flag terminal on the auxiliary switch (see Figure 97).

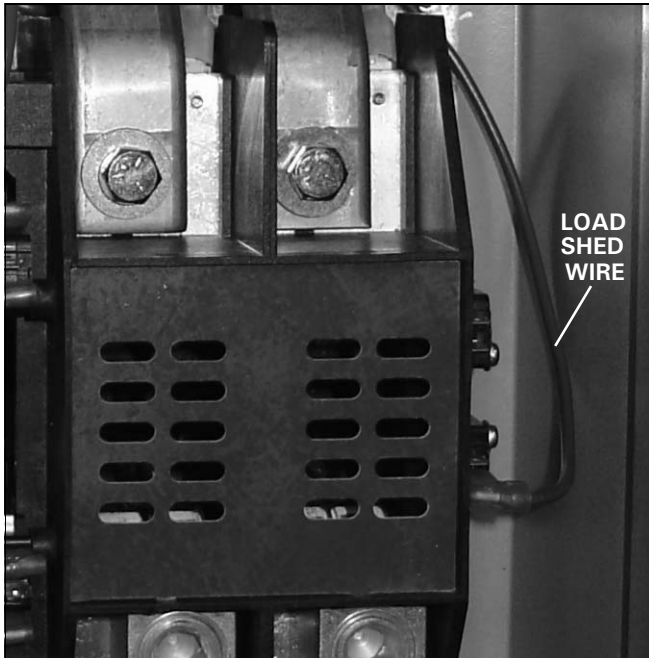


Figure 97. Load Shed Wire Connected to the Auxiliary Switch (100 A and 200 A).

Note: Terminals 1 through 12 on the load shed provide a number of options for taking advantage of the functionality of the load shed. Refer to Figure 98 for a diagram illustrating the use of these terminals to take advantage of its functionality.

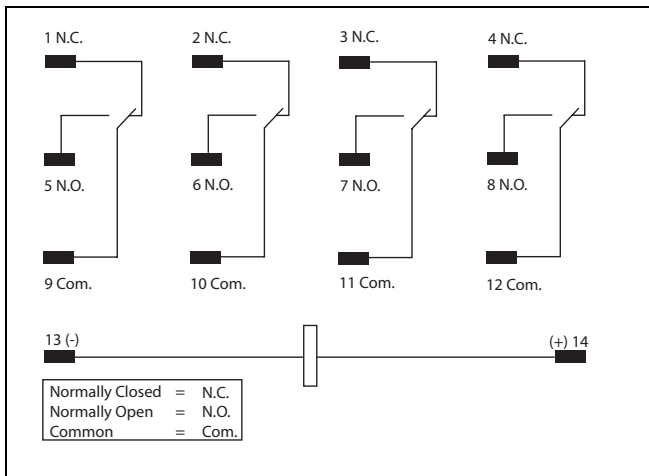


Figure 98. Additional Connections at the Load Shed.

Step 5: Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the load shed has been replaced. Test the system for proper functionality.

Notes

Notes

Notes

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