O & M Manual for the 50-400A EGSX Transfer Switch

Contents

Powering Business Worldwide

⚠ 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.

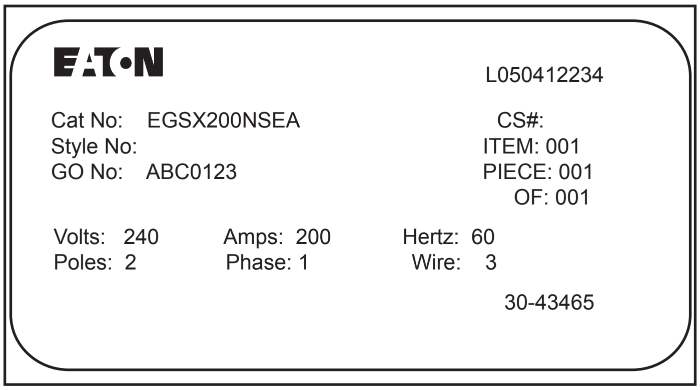

Figure 1. Typical Transfer Switch Equipment Nameplate.

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 Transfer Switch (TS). 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

TSs are used to protect critical electrical loads against loss of power. The load's utility power source is backed up by a generator power source. A TS 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 TS 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).

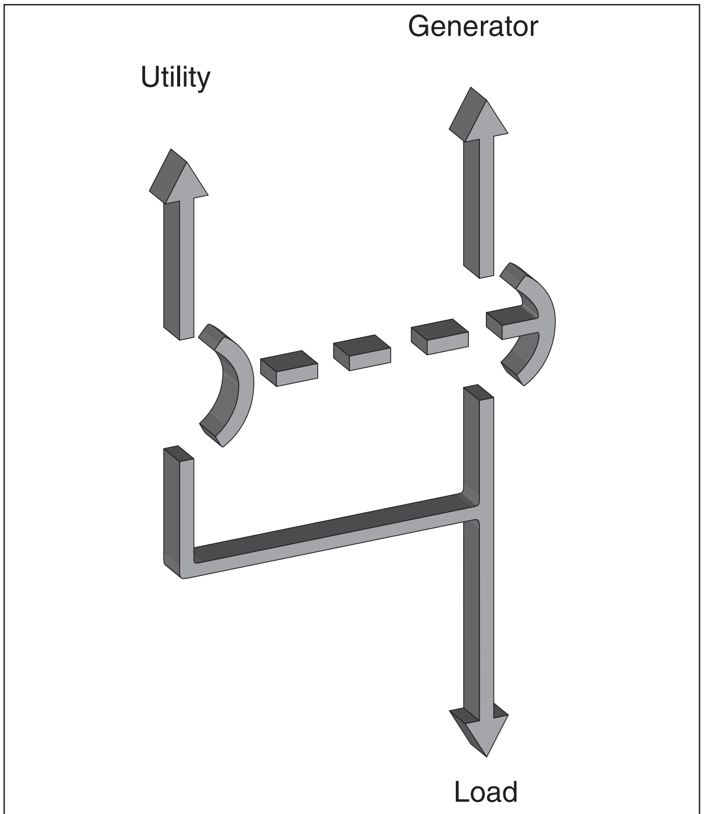

Figure 2. Typical Load Transfer Switch (Contactor) Schematic.

An intelligence system initiates the transfer when the utility power source fails or falls below a preset voltage. An engine start is then initiated by the the generator and the TS transfers to the generator power source when sufficient generator voltage is available. When the utility power source is restored, the TS 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 TS 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 TS remains connected to the generator power source.

TSs 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. Supervisory circuits to transfer from one source to the other.

1.2.1 Design Configuration

The Eaton Residential TS is a rugged, compact design that utilizes power contactors to transfer essential loads from one power source to another (see Figure 3). The Residential TS 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.

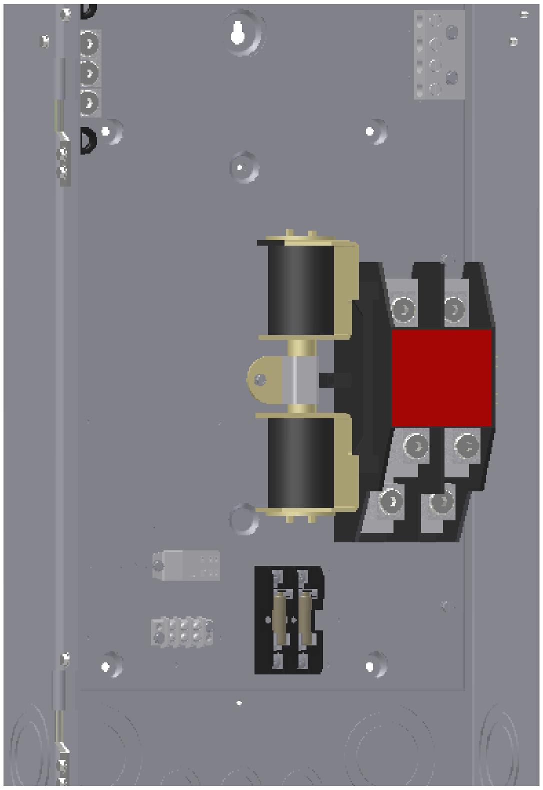

Figure 3. EGSX200A (Typical).

1.2.2 Optional Service Entrance Feature

The TS 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 TS can be installed at the point of service entrance without the need for an upstream disconnect device on the utility or primary source side.

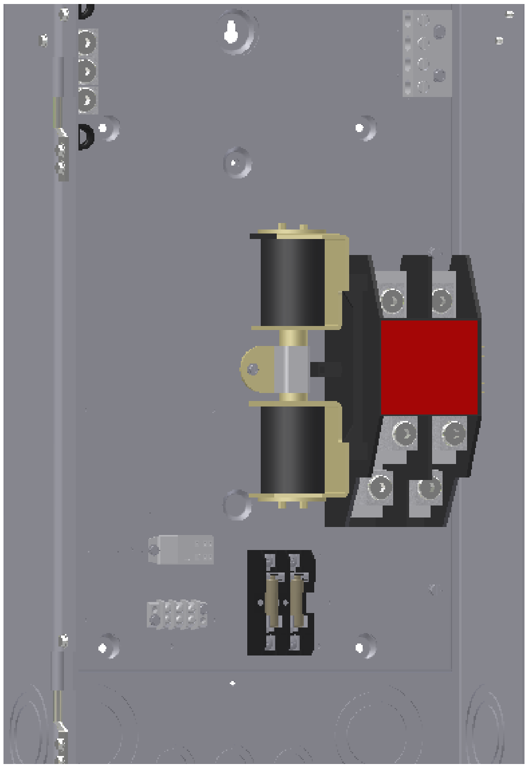

Figure 4. EGSX200A (Typical)

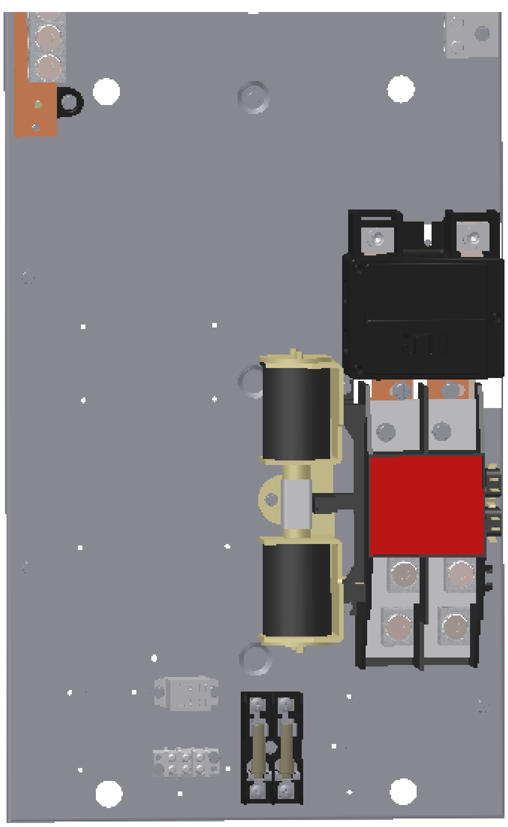

Figure 5. EGSX200NSEA (Typical)

The benefits of the SE configuration are:

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

1.3 Transfer Switch Catalog Number Identification

TS 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.

Table 1. TS Catalog Numbering System.

E GSX 200 NSE

Manufacturer	Type	Ampere Rating	Service Entrance
Eaton	Generator Switch No Control	50=50A 100=100A 150=150A 200=200A 400=400A	Blank - Non SE NSE- Service Entrance Normal Source Only

1.4 Environmental and Operational Conditions

Normally, a TS is applied indoors in an electrical equipment room. It can also be used for normal outdoor applications (with standard 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).

1.5 Glossary

With respect to their use within this document and as they relate to transfer switch and controller operation, the following terminology is defined.

Available

A source is defined as “available” when it is within its undervoltage setpoint ranges for the nominal voltage setting.

Connected

Connected is defined as when the input is shorted by an external contact or connection.

Failed or Fails

A source is defined as “failed” when it is outside of the applicable voltage setpoint ranges.

Failsafe

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

Re-Transfer

Re-transfer is defined as a change of the load connection from the Generator to the Utility.

Utility

Utility is the primary source (normal source, normal power source, or normal).

Generator

Generator is the secondary source (generator emergency source, emergency power source, emergency, standby, or backup source).

Utility: Failed or Fails

Utility is defined as “failed” when it is outside of its undervoltage setpoint ranges for the nominal voltage and frequency setting.

Generator: Failed or Fails

Generator is defined as “failed” when it is outside of its undervoltage/underfrequency/overfrequency (if applicable) setpoint ranges for the nominal voltage and frequency setting.

Transfer

Transfer is defined as a change of the load connection from the Utility to the Generator power source.

Unconnected

Unconnected is defined as when the input is not shorted by an external contact or connection.

Section 2: Receiving, Handling, and Storage

2.1 Receiving

Every effort is made to ensure that the TS 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 TS 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 catalog numbers. Make certain that this information matches the other shipping paper information.

Each TS enclosure is packaged in its own box. Do not discard the packing material until the equipment is ready for installation.

Once the 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, TS 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 70°C (-4 to 158°F), with a relative humidity of 80% or less. Do not, under any circumstance, stack other equipment on top of an TS equipment enclosure, whether packaged or not.

Section 3: Equipment Description

3.1 Introduction

The Eaton Residential TS 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.

3.2 Power Panel

The power panel is used for making load, power, and neutral connections. The power contactor is mounted on a steel baseplate (Figure 6).

3.2.1 Main Contacts

This TS incorporates a power contactor. The main contacts connect and disconnect the load to and from the different power sources. The power contactor is mechanically and electrically interlocked to prevent the two sets of main contacts from being closed simultaneously.

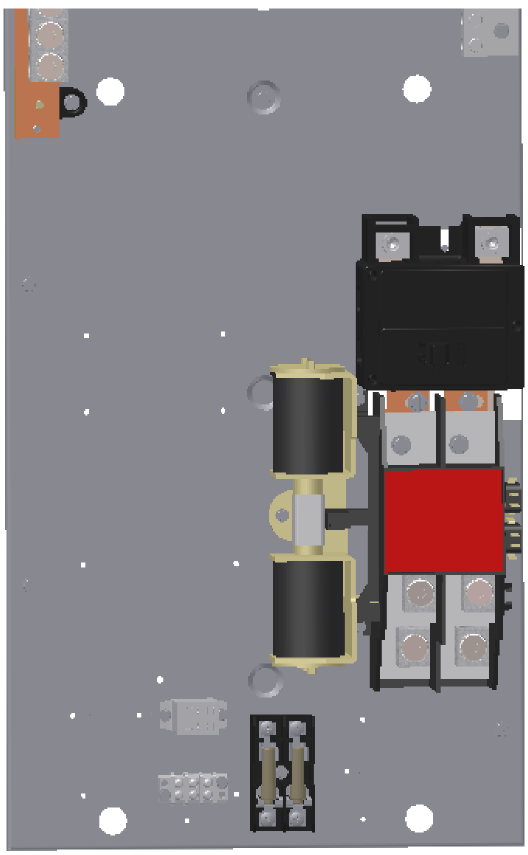

Figure 6. Typical Power Panel for 200 A Service Entrance Model.

3.3 Standards

Eaton TS equipment, enclosed in NEMA 3R enclosures, are listed for application by UL. In addition, Eaton TSs are listed in File E313744 by Underwriters Laboratories, Inc. under Standard UL 1008. This standard covers the requirements for TSs 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 TSs are available to meet NFPA 110 for standby power systems.

Section 4: Installation and Wiring

4.1 General

Eaton TSs are factory wired and tested. Installation requires solidly mounting the enclosed unit and connecting the power cables and the auxiliary sensing 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.

⚠ WARNING

BE CERTAIN THAT THE DEADFRONT IS PROPERLY INSTALLED BEFORE THE TRANSFER SWITCH EQUIPMENT IS PUT INTO SERVICE. THE DEADFRONT PROVIDES PROTECTION FROM DANGEROUS VOLTAGES AT THE LINE AND LOAD TERMINALS WHEN THE EQUIPMENT IS IN OPERATION. FAILURE TO DO SO COULD RESULT IN PERSONAL INJURY OR DEATH.

4.2 Mounting Location

Choose a location that offers a flat, rigid mounting surface capable of supporting the weight of the enclosed TS equipment (see Figures 7 through 13. Protect the transfer switch at all times against excessive moisture, dust, dirt, lint, and corrosive vapors.

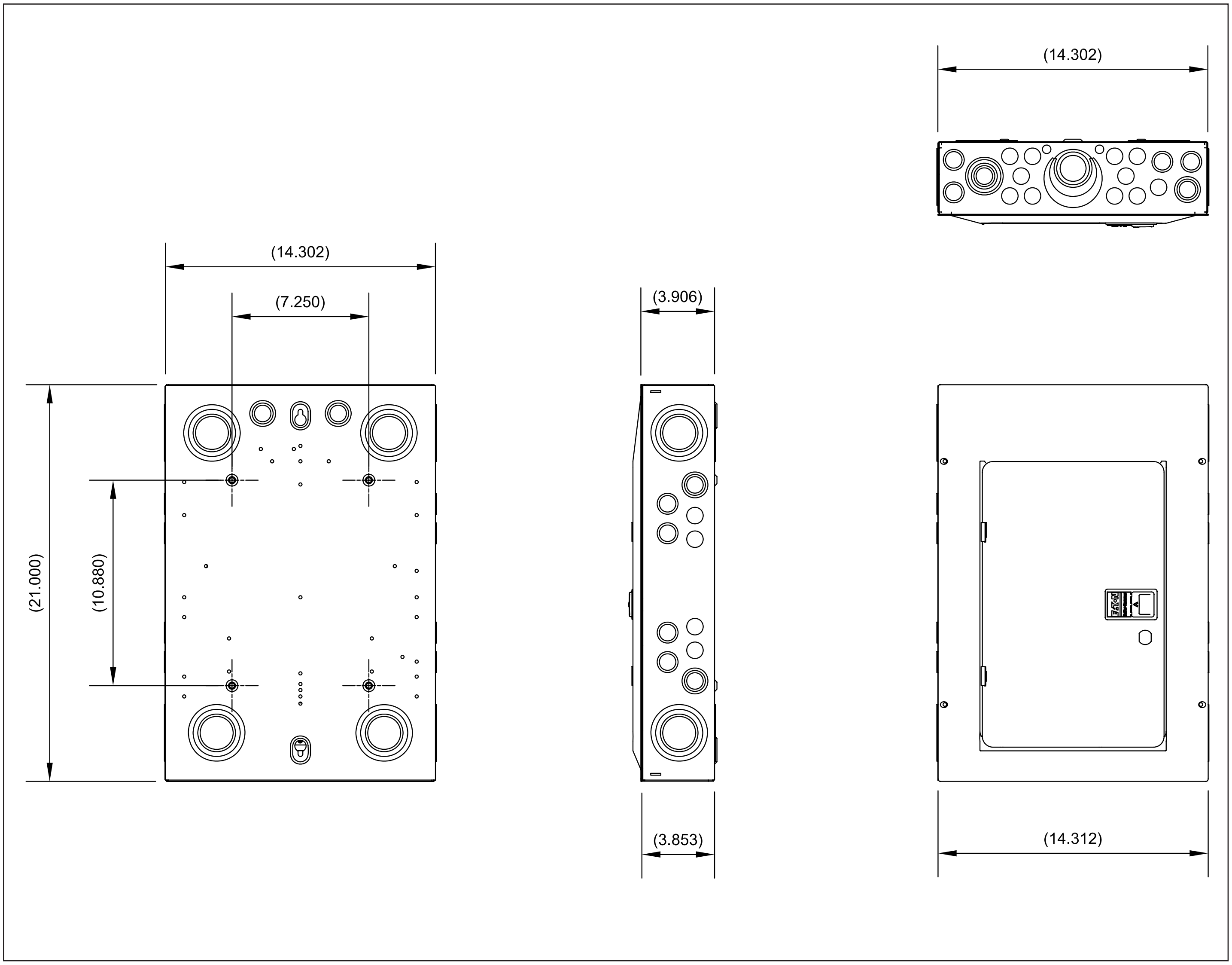

Figure 7. Dimensions and Plan View of a EGSX50L12 (in.)

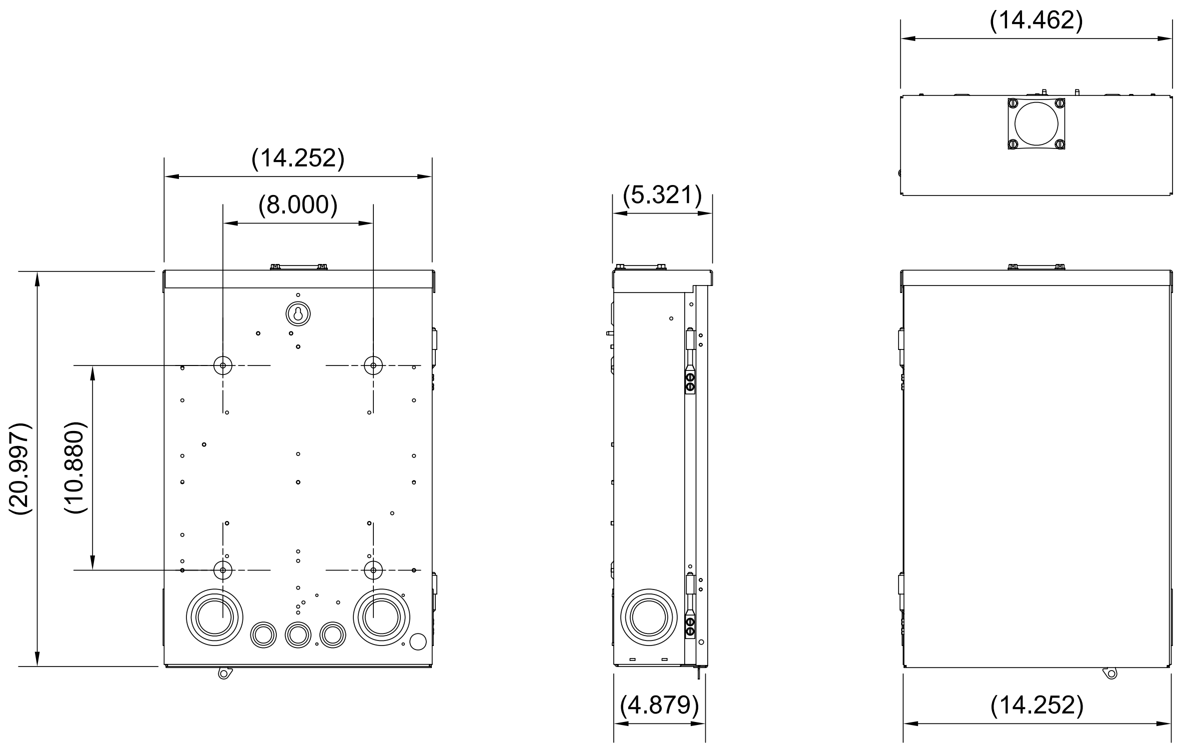

Figure 8. Dimensions and Plan View of a EGSX50L12R (in.)

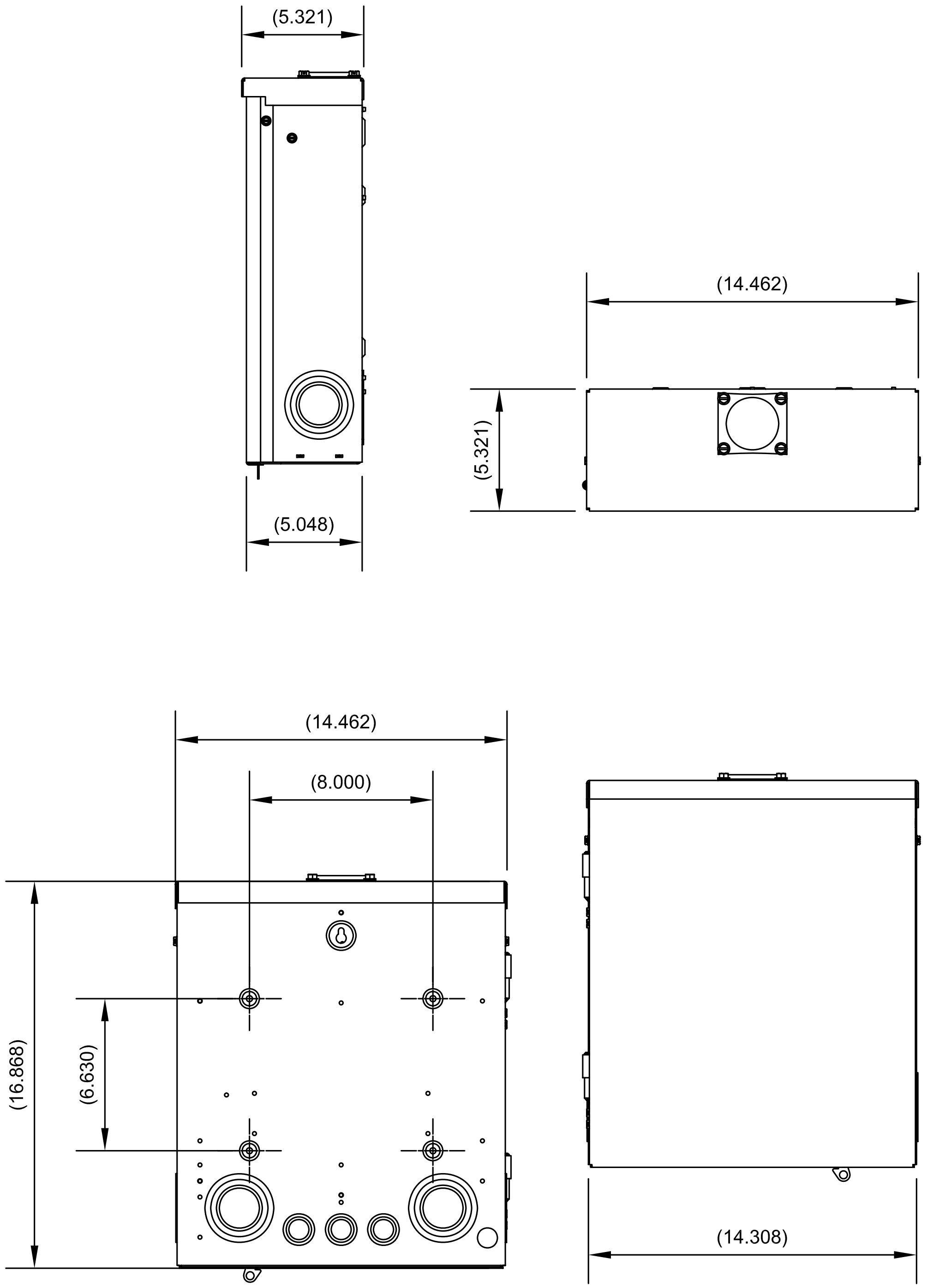

Figure 9. Dimensions and Plan View of a EGSX100A / EGSX100NSEA (in.)

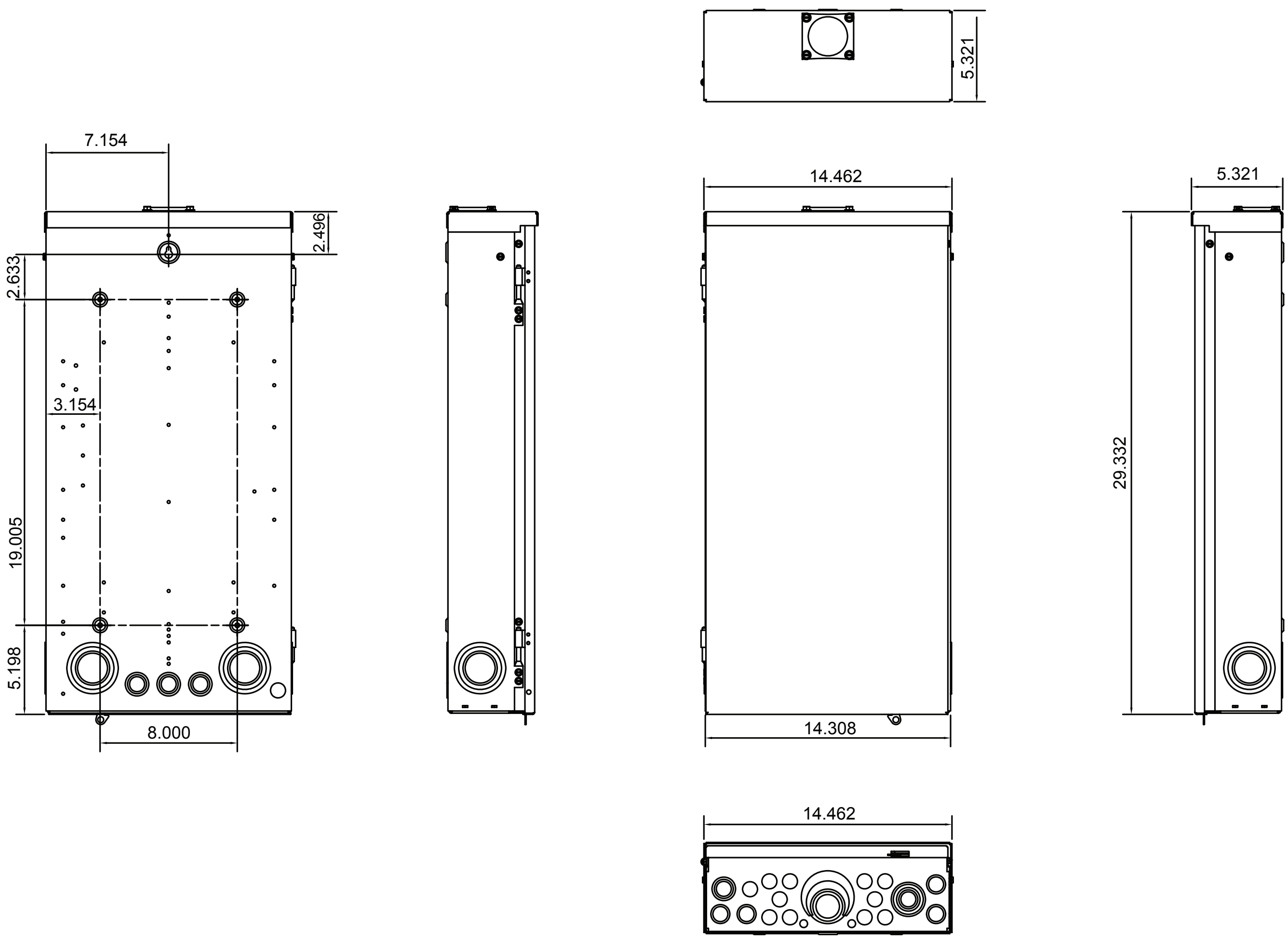

Figure 10. Dimensions and Plan View of a EGSXL24RA (in.)

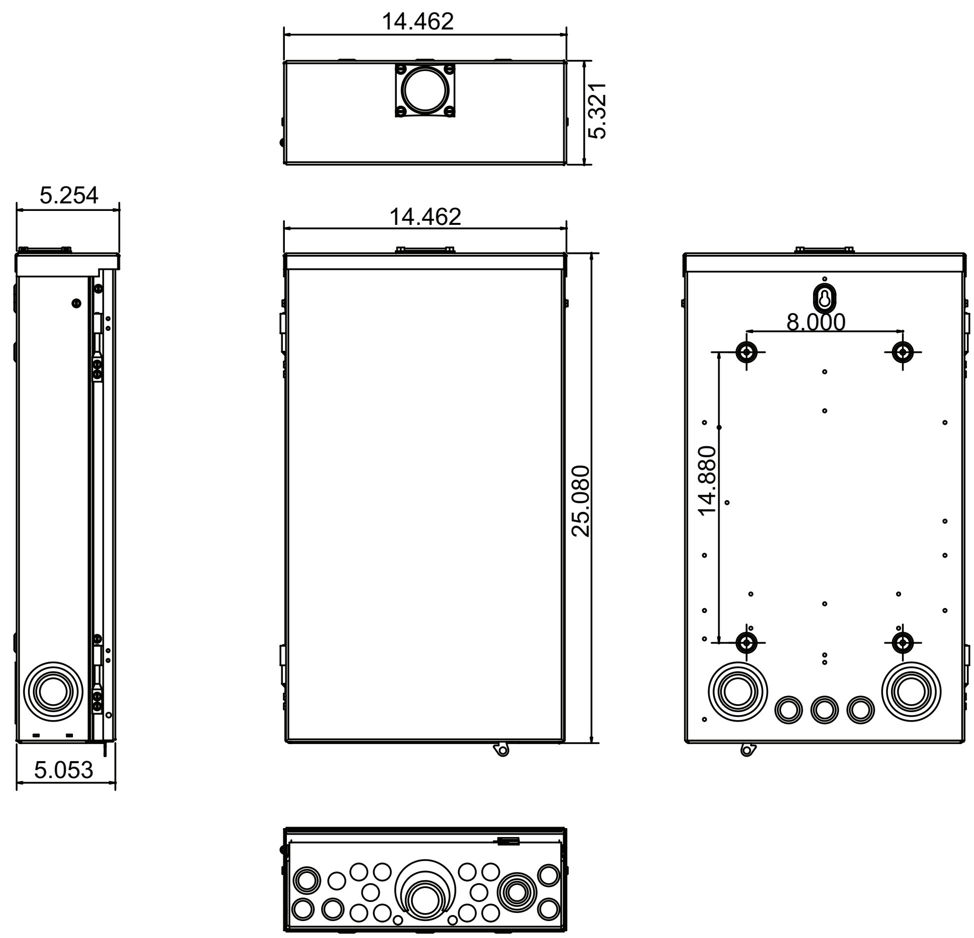

Figure 11. Dimensions and Plan View of a EGSX200A (in.)

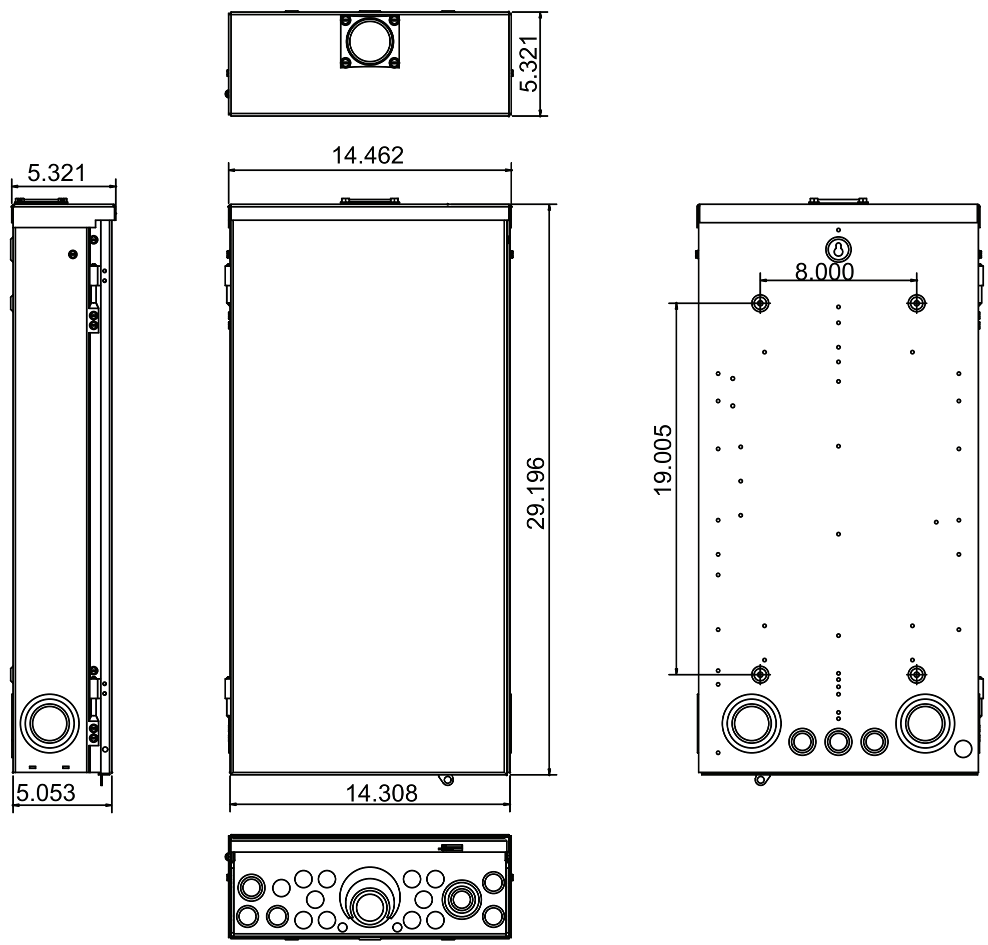

Figure 12. Dimensions and Plan View of a EGSX150NSEA/EGSX200NSEA (in.)

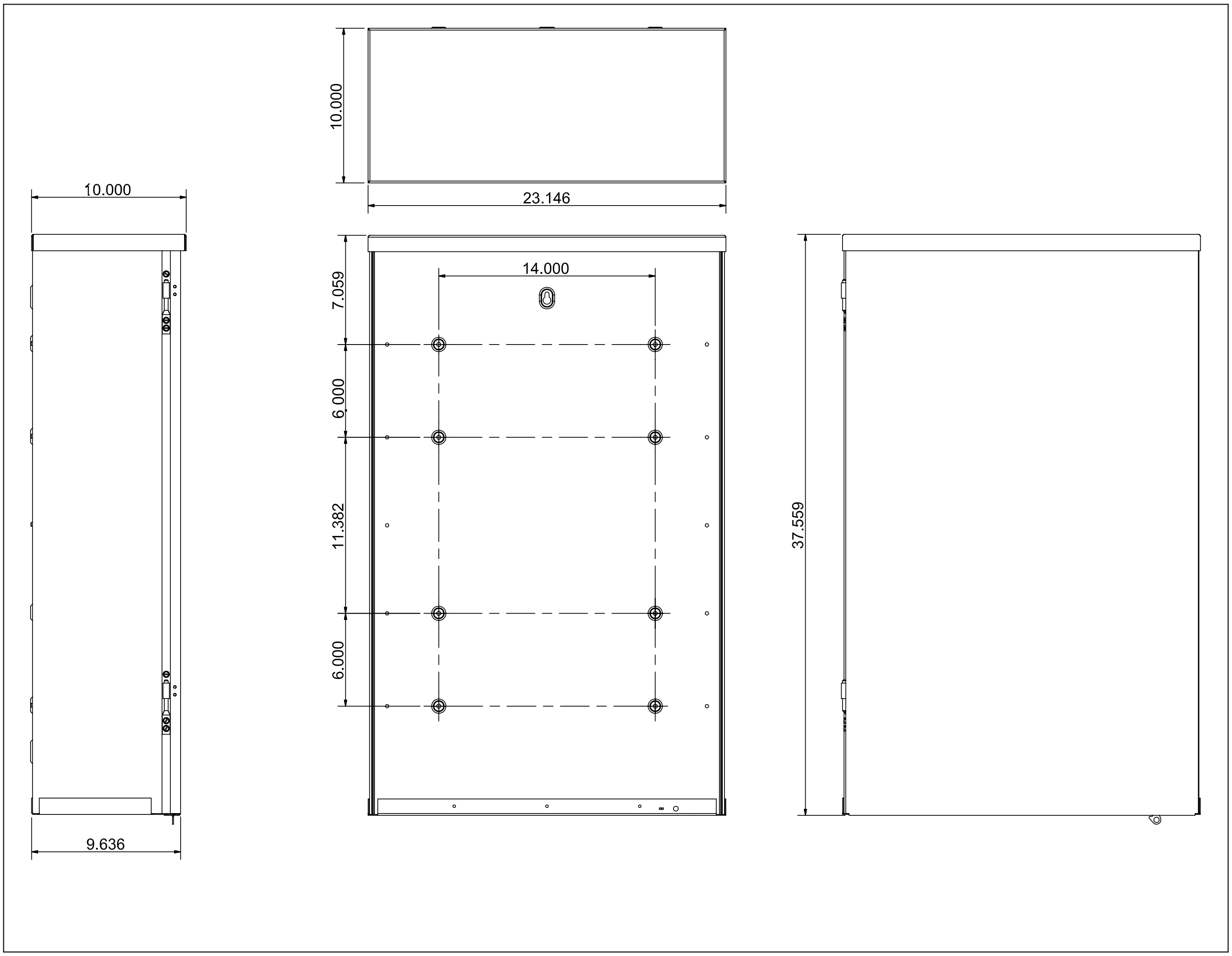

Figure 13. Dimensions and Plan View of a EGSX400NSEA (in.)

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 TS 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 TS 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 TS equipment unpacked and ready for mounting, proceed with the following steps.

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

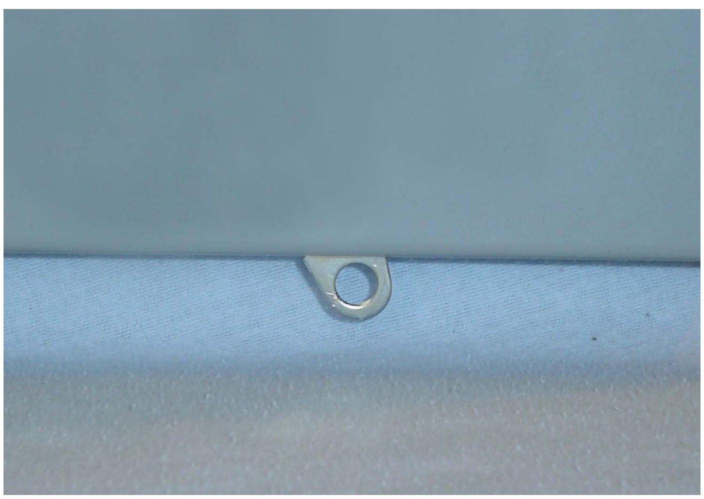

Figure 14. Location of the Door Latch.

NOTICE

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

Step 2: 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 TS 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	Contactor Wire Size Range	Number of Cables per Phase
50	#14 -#6	1
100	#14-2/0	1
150 - 200	#4-300 kcmil	1
400	750 kcmil - 2	1
400	300 kcmil - 1/0	2

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 Figure 15, and Table 2):

- The utility power cables to the utility lugs: or SE breaker if installed;
- The generator 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.

⚠ WARNING

FAILURE TO PROPERLY CONNECT THIS TRANSFER SWITCH PER NFPA 70, THE NATIONAL ELECTRIC CODE, MAY RESULT IN PRODUCT FAILURE, FIRE, LOSS OF PROPERTY, LOSS OF LIFE, ETC.

Figure 15. Cable Connection Locations (200 A Shown) Typical.

Step 2: If your generator requires utility power for engine start sensing then the generator utility sensing connections are located on the fuse block that is installed in the transfer switch (see Figure 16). The utility sensing wires, required for proper generator operations, are connected at this point. See Section 4.7 for more detailed information on connecting the generator utility sensing wires.

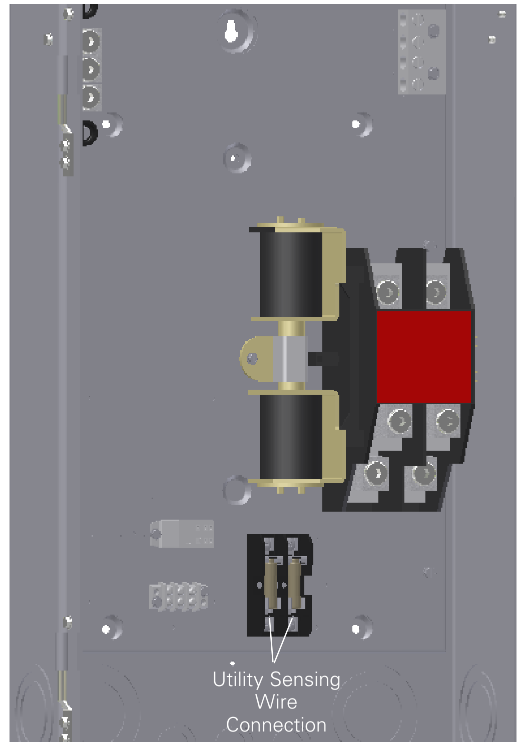

Figure 16. Generator Utility Sensing Wires Connection (Typical).

Step 3: Tighten all cables and wiring to specifications located on door.

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 AND GENERATOR LINE VOLTAGES. OPERATING THE EQUIPMENT ON IMPROPER VOLTAGE CAN CAUSE EQUIPMENT DAMAGE.

4.6 Installation

In a typical installation for critical loads (see Figure 17), the TS (1) and the generator (2) are connected to the power supply. The TS (1) and emergency distribution panel (3) receive utility power from a dedicated breaker in the utility service panel (4). The TS and emergency panel receive generator power from the generator (2). Power from the utility feeds the utility panel.

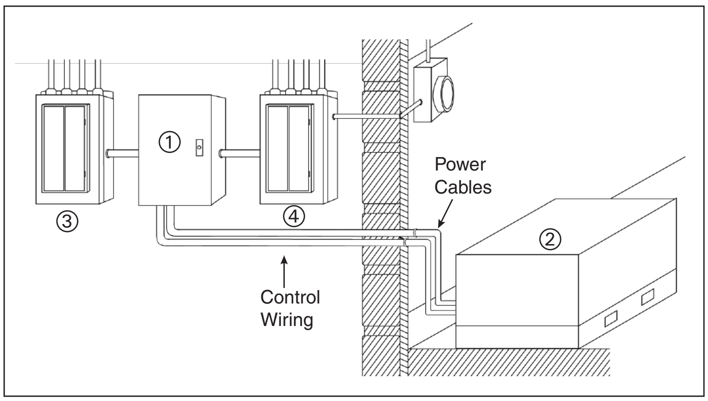

Figure 17. Typical Installation of a Residential TS

The TS (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 generator will sense the failure, the generator will start, and when sufficient generator voltage is available, the TS 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 18). When utility power returns, the TS will switch all power back to the utility panel and the generator will shut down.

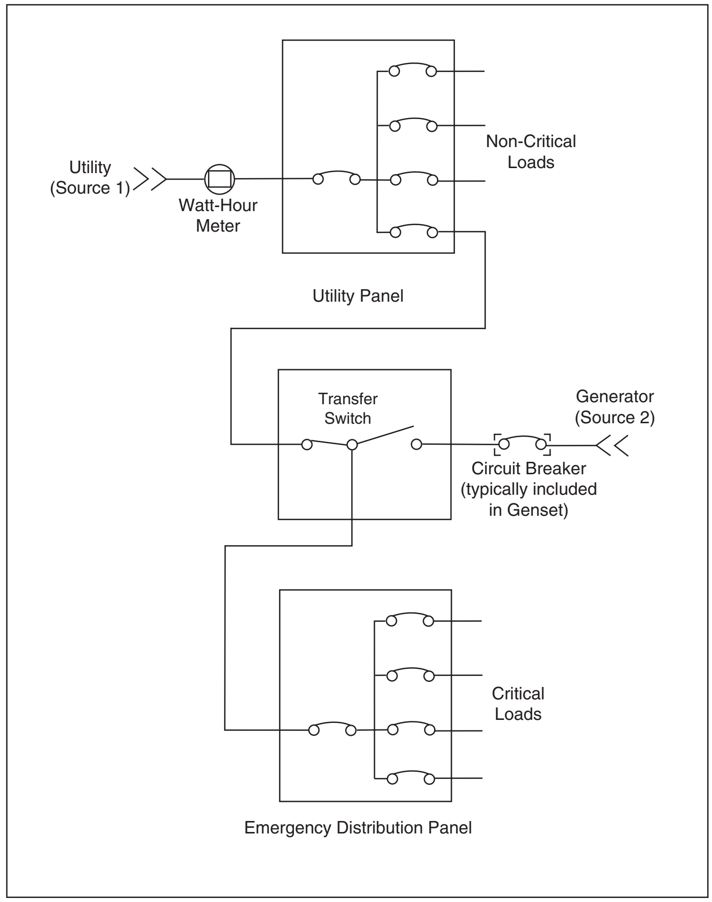

Figure 18. Diagram of a Typical Installation (Critical Loads Only)

In addition, another typical installation for loads can be considered (see Figure 19). Refer to Figure 20 for a loads connection diagram.

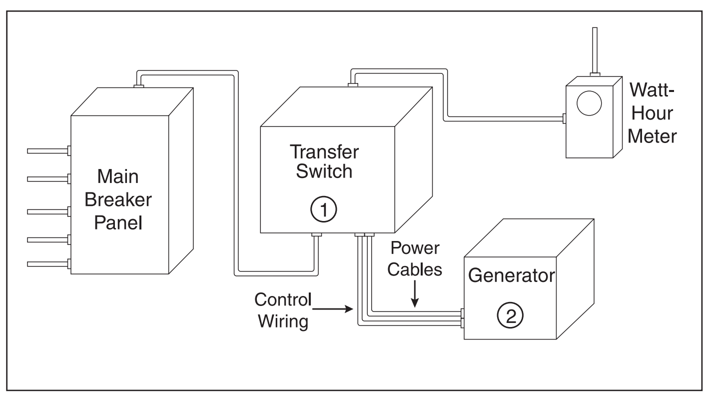

Figure 19. Typical Installation of a Residential ATS.

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

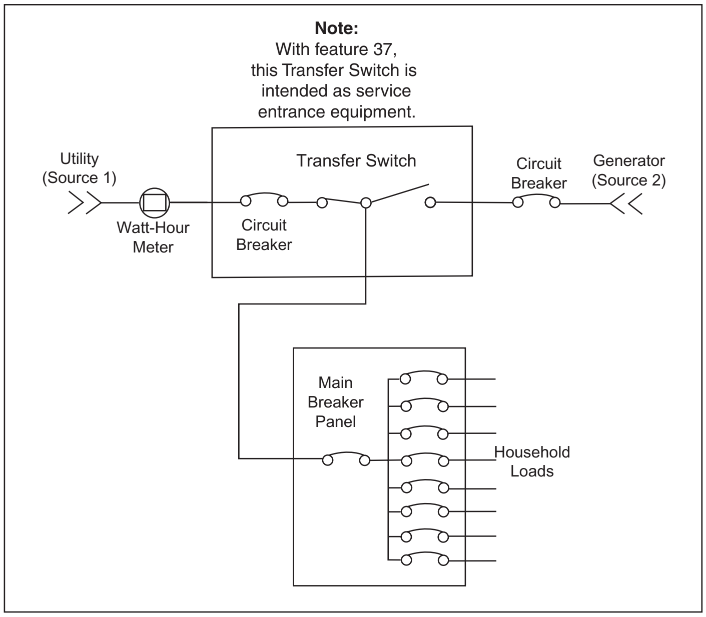

Figure 20. Diagram of a Typical Installation (All Loads).

4.7 Control Wire Connections

4.7.1 Generator Utility Sensing Connections

The generator utility sensing connections are located on the fuse block that is installed on the power panel. The fuse block is labeled "Utility 240 VAC". The fuse block shall be connected to terminals N1 and N2 in the generator. This connection allows the generator to sense when utility is or is not available. The generator will auto start, if the engine start switch is in the AUTO position, when utility power is not "Available".

4.7.2 Transfer Control Connections

The generator has built in transfer control. This allows the generator to determine when the transfer switch connects the load to either the generator or to the utility supply. The terminal block located in the transfer switch connects directly to the terminal block located in the generator. Connect terminal number 23 in the transfer switch to terminal number 23 in the generator. Connect terminal number 192 in the transfer switch to terminal number 192 in the generator. Your transfer switch is now ready to be tested.

4.8 Preliminary Checks

After the TS 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 and generator power sources are the same and that they match the rated voltage as indicated on the TS 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.

4.9 Protection

For Catalog #EGSX50L12 and EGSX50L12R

When protected by one of the following circuit breakers rated not more than 60 amperes, this transfer switch is rated for use on a circuit capable of delivering not more than 5,000 RMS symmetrical amperes, 240 volts maximum, but not more than the interrupting capacity of the selected circuit breaker.

- Eaton
  - QC QCHW BR BRH
  - BRHH CHQ CL
- Siemens
  - Q
- Square D
  - QO QOH HOM
- GE
  - THQL

For Catalog #EGS100A Only

When protected by circuit breakers without adjustable short-time response only or by fuses this transfer switch is rated for use on a curcuit capable of delivering not more than 10,000 RMS symmetrical amperes at 240V AC.

MANUFACTURER-ANY

BREAKER-ANY

TYPE-ANY

AMPS MAX-PER NEC

For Catalog #EGS100SEA Only

This switch is equipped with integral over-current protection. Continuous load current not to exceed 80 percent of switch rating. This Transfer Switch is rated for use on a circuit capable of delivering not more than 10,000 rms symmetrical amperes, 240 volts maximum.

For Catalog #EGS100L24R Only

When protected by one of the following circuit breakers rated not more than 150 amperes, this transfer switch is rated for use on a circuit capable of delivering not more than 25,000 RMS symmetrical amperes, 240 volts maximum, but not more than the interrupting capacity of the selected circuit breaker.

- Eaton
  - BR CH FDC CSR CSH
  - BRHH BWH
- Siemens
  - CED6 ED6 ED4 HED6 HED4

When protected by circuit breakers without adjustable short-time response only or by fuses this transfer switch is rated for use on a circuit capable of delivering not more than 10,000 RMS symmetrical amperes at 240V AC.

MANUFACTURER-ANY

BREAKER-ANY

TYPE-ANY

AMPS MAX-PER NEC

For Catalog # EGSX200A Only

When protected by one of the following circuit breakers rated not more than 400 amperes, this transfer switch is rated for use on a circuit capable of delivering not more than 25,000 RMS symmetrical amperes, 240 volts maximum, but not more than the interrupting capacity of the selected circuit breaker.

- Eaton

DK	KD	KDB	HKD	JDC	KDC
LCL	LA	JDB	JD	HJD	CSR
BW	BWH	FD	FDC		

- Siemens

FD6-A	FXD6-A	HFD6	CFD6

- Square D

KI	LE	LX	LXI

- GE

SF	SFL	SFP

When protected by circuit breakers without adjustable short-time response only or by fuses this transfer switch is rated for use on a circuit capable of delivering not more than 10,000 RMS symmetrical amperes at 240 VAC.

- MANUFACTURER-ANY
- BREAKER-ANY
- TYPE-ANY
- AMPS MAX-PER NEC

For Catalog #EGSX200NSEA and EGSX150NSEA Only

This switch is equipped with integral over-current protection. Continuous load current not to exceed 80 percent of switch rating.

This Transfer Switch is rated for use on a circuit capable of delivering not more than 25,000 rms symmetrical amperes, 240 volts maximum.

For Catalog #EGSX400NSEA and EGSX400NSE Only

This switch is equipped with integral over-current protection. Continuous load current not to exceed 80 percent of switch rating. This Transfer Switch is rated for use on a circuit capable of delivering not more than 35,000 rms symmetrical amperes, 240 volts maximum.

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 TS to ensure that they are ready to be energized.

5.2 Energize the Switch

Step 1: 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.

Step 2: Close the upstream utility power source breaker or switch to connect the TS to the utility power source voltage.

Step 3: If the TS unit is not already in the UTILITY position, and the voltage is acceptable, the solenoid will engage and the contactor will automatically switch to the UTILITY position.

⚠ 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 OFF position.

5.3 Operational Checks

Step 1: Open the upstream utility breaker originally closed in step 2 of section 5.2

Step 2: Open the generator breaker

Step 3: Place the generator in the Manual position and allow it to start.

Step 4: Verify Line to Line and Line to Neutral voltages to ensure that the generator output is correct. If necessary, make adjustments to the voltage regulator on the generator according to the manufacturer's recommendations to correct any voltage deviations.

Step 5: Place the generator in the OFF position

Step 6: Close the generator breaker

NOTICE:

THE FOLLOWING OPERATION WILL SIMULATE AN INTERRUPTION OF THE UTILITY POWER SOURCE.

Step 7: Place the generator in the AUTO position. After completing the start up menus, the generator will start. A time delay will occur and the transfer switch will transfer to the GENERATOR position.

Step 8: Close the upstream UTILITY breaker. After a time delay, the transfer switch will transfer to the UTILITY position. The generator will then run a time delay cool down and shut off.

5.4 Manual Operation (not valid for 50 amp TS)

⚠ WARNING

DO NOT ATTEMPT TO MANUALLY OPERATE THE ATS WITH THE UTILITY OR GENERATOR AVAILABLE.

⚠ WARNING

HIGH VOLTAGES ARE PRESENT IN AND AROUND TRANSFER SWITCH EQUIPMENT. BEFORE ATTEMPTING TO MANUALLY TRANSFER, 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 POWER OFF AND TURN THE GENERATOR (IF A GENERATOR) CONTROL SELECTOR SWITCH TO THE "OFF" POSITION BEFORE ATTEMPTING A MANUAL TRANSFER.

⚠WARNING

INSURE THE DEADFRONT IS INSTALLED PRIOR TO ENERGIZING THE TRANSFER SWITCH.

To Manually Operate

Step 1: Disconnect both the Utility and Generator power supplies.

Step 2: Manually switch the contactor to the position required. This can be done by locating the manual handle (shipped loose) and installing it on the manual operator of the contactor (located between the two operating coils, Figure 21 typical). The rotate the manual handle to the desired position.

Step 3: Reconnect power from the desired source.

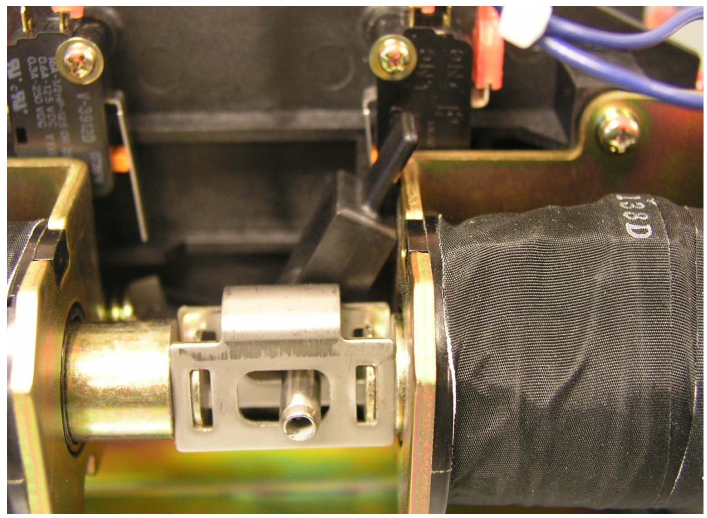

Figure 21. TS Manual Operating Handle (Typical)

Section 6: Maintenance and Component Replacement

6.1 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, TS 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.

Figures 22 and 23 are the wiring diagrams for the EGSX TS switch.

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

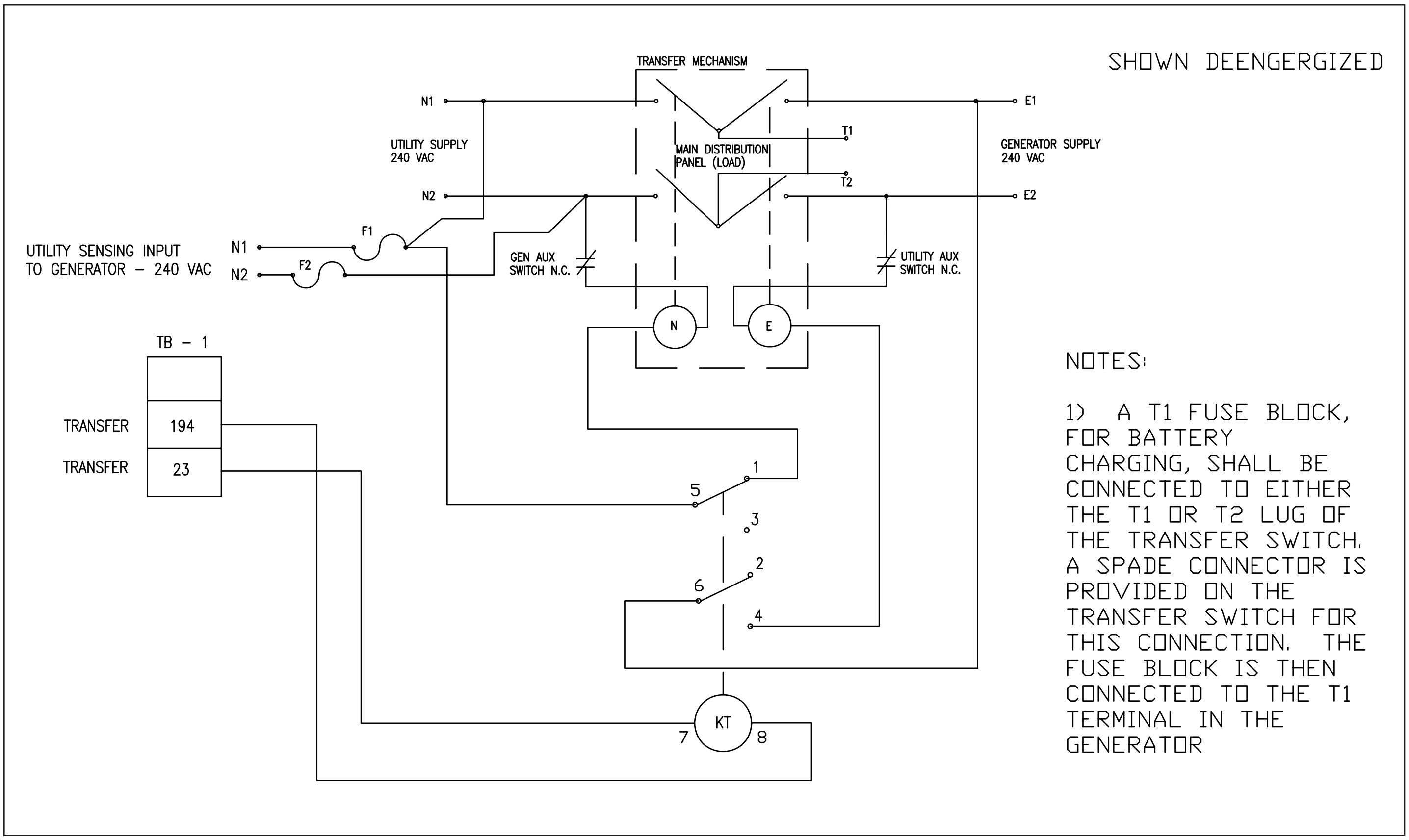

Figure 22. Wiring Diagram for the 50 Amp. EGSX TS (Shown Deenergized and Connected to Source 1).

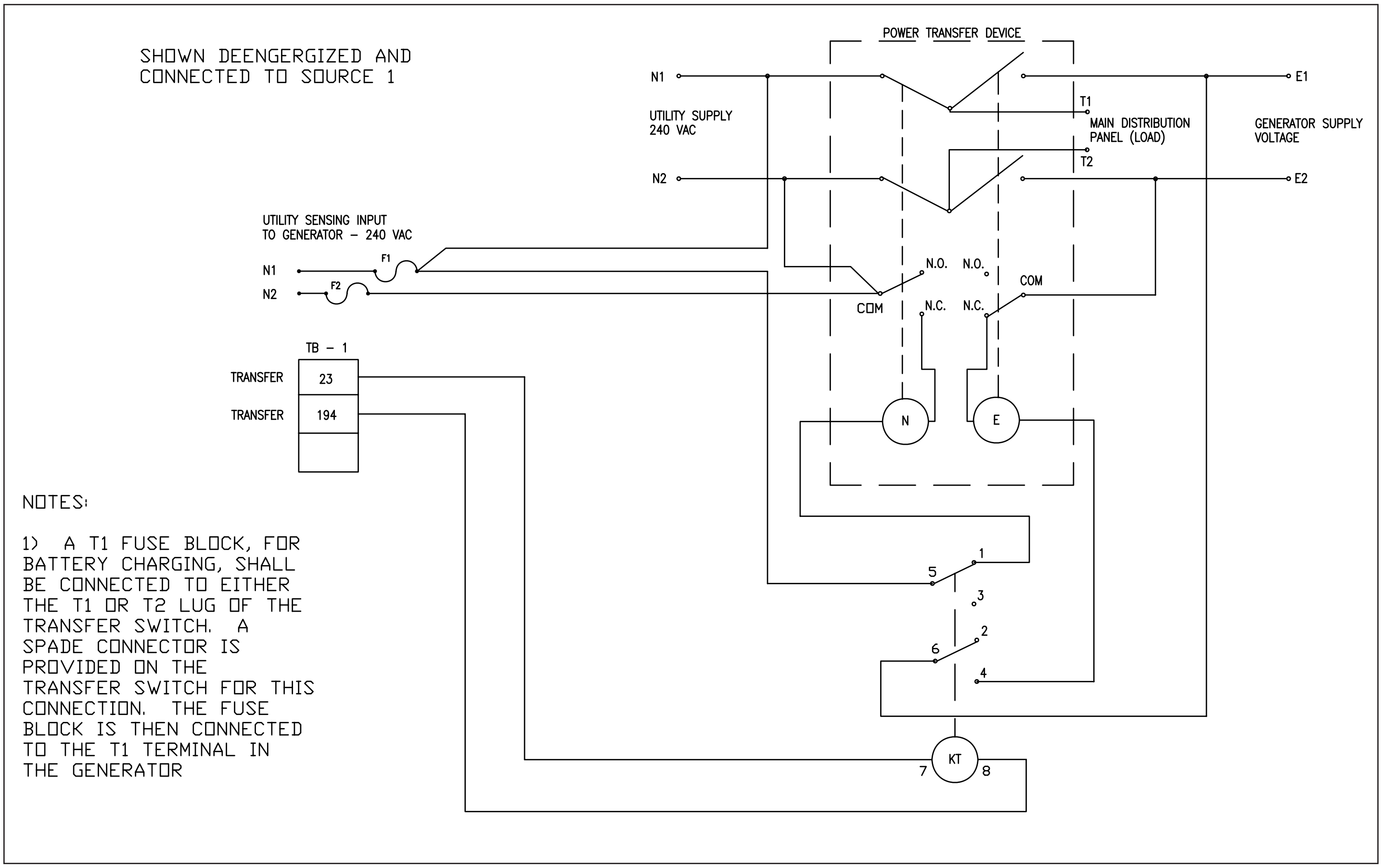

Figure 23. Wiring Diagram for the 100-400 Amp. EGSX TS (Shown Deenergized and Connected to Source 1).

6.2 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 and utility power.

6.3 Maintenance Log

Date	Action
Example: 01/01/04	Inspected and cleaned.

6.4 Component Replacement

Certain components within the TS are field replaceable. Table 4 lists the part numbers to use when ordering replacement components. To order replacement components, contact an authorized Eaton Sales Representative.

Table 4. EGSX Replaceable Components.

Component	50 AMP	100 AMP	150 AMP	200 AMP	400 AMP
Contactor	99-5643	99-5638	99-5702-15	99-5702-15	99-5702-16
Wire Harness	99-5643-7	99-5638-13	99-5702-17	99-5702-17	99-5702-18
Neutral Bar	99-5643-6	99-5638-7	99-5702-6	99-5702-6	99-5702-13
Ground Lugs	99-5643-4	99-5638-5	99-5702-4	99-5702-4	99-5702-4
Service Entrance Breaker	N/A	99-5638-4	BWH2150	BWH2200	KD2400
Lugs	99-5643-5	99-5638-6	99-5702-5	99-5702-5	99-5702-12

⚠ 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.

6.5 Troubleshooting

Table 5 contains troubleshooting information for the EGSX TS. 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.	1 The generator breaker is open. 2. The generator voltage is not acceptable 3. Connections to 23 and 194 are not made..	1. Reset the generator circuit breaker. 2. Refer to the generator User's Manual. 3. Make connections per Section 4.7 of this manual
The automatic transfer switch does not transfer to the utility.	1. The service disconnect breaker is open. 2. The utility voltage is not acceptable.	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.

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