



Owner's Manual

For

Automatic Transfer Switch

Model RTSB200A3
Model RTSI200A3

⚠ DANGER!



NOT INTENDED FOR USE IN CRITICAL LIFE SUPPORT APPLICATIONS.



THIS PRODUCT CAN BE INSTALLED BY THE HOMEOWNER. HOWEVER, IF UNCOMFORTABLE WITH THE SKILLS OR TOOLS REQUIRED, HAVE A QUALIFIED ELECTRICIAN OR CONTRACTOR PERFORM THE INSTALLATION.



DEADLY EXHAUST FUMES! OUTDOOR INSTALLATION ONLY!

This manual should remain with the unit.

Reference the Owner's Manual supplied with the generator when using this document.

Para español , visita: <http://www.generac.com/service-support/product-support-lookup>

Pour le français, visiter : <http://www.generac.com/service-support/product-support-lookup>

WARNING!

California Proposition 65

Engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

WARNING!

California Proposition 65

This product contains or emits chemicals known to the state of California to cause cancer, birth defects, and other reproductive harm.

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Section 1 *Safety*

1.1 — Introduction

To prevent accidents or equipment damage, read this manual carefully and comply with all instructions.

While every effort was made to ensure that the contents of this manual were both accurate and complete at the time of release, the manufacturer reserves the right to change, alter or otherwise improve this product or manual at any time without prior notice.

1.2 — General Information



SAVE THESE INSTRUCTIONS! Read the following information carefully before attempting to install, operate or service this equipment. Also read the instructions and information on tags, decals, and labels that may be affixed to the transfer switch. Replace any decal or label that is no longer legible.



DANGER: Connection of a generator to an electrical system normally supplied by an electric utility shall be by means of suitable transfer equipment so as to isolate the electric system from utility distribution system when the generator is operating (Article 701 Legally Required Standby Systems or Article 702 Optional Standby Systems, as applicable). Failure to isolate electric system by these means may result in damage to generator and may result in injury or death to utility workers due to backfeed of electrical energy.

The manufacturer cannot anticipate every possible circumstance that might involve a hazard. The warnings in this manual, and on tags and decals affixed to the unit are, therefore, not all-inclusive. If using a procedure, work method or operating technique the manufacturer does not specifically recommend, ensure that it is safe for others. Also make sure the procedure, work method or operating technique chosen does not render the transfer switch unsafe.

Throughout this publication, and on tags and decals affixed to the generator, DANGER, WARNING, CAUTION and NOTE blocks are used to alert personnel to special instructions about a particular operation that may be hazardous if performed incorrectly or carelessly. Observe them carefully. Their definitions are as follows:

⚠ DANGER!

After this heading, read instructions that, if not strictly complied with, will result in serious personal injury, including death.

⚠ WARNING!

After this heading, read instructions that, if not strictly complied with, could result in serious personal injury, including death.

⚠ CAUTION!

After this heading, read instructions that, if not strictly complied with, might result in minor or moderate injury.

NOTE:

After this heading, read instructions that, if not strictly complied with, may result in damage to equipment and/or property.

These safety warnings cannot eliminate the hazards that they indicate. Common sense and strict compliance with the special instructions while performing the service are essential to preventing accidents.

Four commonly used safety symbols accompany the DANGER, WARNING and CAUTION blocks. The type of information each indicates follows:



This symbol points out important safety information that, if not followed, could endanger personal safety and/or property.



This symbol points out potential explosion hazard.



This symbol points out potential fire hazard.



This symbol points out potential electrical shock hazard.

1.3 — General Hazards

- Any AC generator that is used for backup power if a NORMAL (UTILITY) power source failure occurs, must be isolated from the NORMAL (UTILITY) power source by means of an approved transfer switch. Failure to properly isolate the NORMAL and STANDBY power sources from each other may result in injury or death to electric utility workers, due to backfeed of electrical energy.
- Improper or unauthorized installation, operation, service or repair of the equipment is extremely dangerous and may result in death, serious personal injury, or damage to equipment and/or personal property.
- Extremely high and dangerous power voltages are present inside an installed transfer switch. Any contact with high voltage terminals, contacts or wires will result in extremely hazardous, and possibly LETHAL, electric shock. **DO NOT WORK ON THE TRANSFER SWITCH UNTIL ALL POWER VOLTAGE SUPPLIES TO THE SWITCH HAVE BEEN POSITIVELY TURNED OFF.**
- Competent, qualified personnel should install, operate and service this equipment. Adhere strictly to local, state and national electrical and building codes. When using this equipment, comply with regulations the National Electrical Code (NEC), CSA Standard; C22.1 Canadian Electric Code and Occupational Safety and Health Administration (OSHA) have established.
- Never handle any kind of electrical device while standing in water, while barefoot, or while hands or feet are wet. **DANGEROUS ELECTRICAL SHOCK MAY RESULT.**
- Remove all jewelry (such as rings, watches, bracelets, etc.) before working on this equipment.
- If work must be done on this equipment while standing on metal or concrete, place insulative mats over a dry wood platform. Work on this equipment only while standing on such insulative mats.
- Never work on this equipment while physically or mentally fatigued.
- Keep the transfer switch enclosure door closed and bolted at all times. Only qualified personnel should be permitted access to the switch interior.
- In case of an accident caused by electric shock, immediately shut down the source of electrical power. If this is not possible, attempt to free the victim from the live conductor but **AVOID DIRECT CONTACT WITH THE VICTIM.** Use a nonconducting implement, such as a dry rope or board, to free the victim from the live conductor. If the victim is unconscious, apply first aid and get immediate medical help.
- When an automatic transfer switch is installed for a standby generator set, the generator engine may crank and start at any time without warning. To avoid possible injury that might be caused by such sudden start-ups, the system's automatic start circuit must be disabled before working on or around the generator or transfer switch. Then place a "DO NOT OPERATE" tag on the transfer switch and on the generator. Remove the Negative (Neg) or (–) battery cable.
- Any voltage measurements should be performed with a meter that meets UL3111 safety standards and meets or exceeds overvoltage class CAT III.

Section 2 *General Description*

2.1 — Automatic Transfer Switch (ATS)

The Automatic Transfer Switch (ATS) transfers critical electrical loads from a UTILITY (NORMAL) power source to a GENERATOR (STANDBY) power source. Transfer of electrical loads occurs automatically when the UTILITY power source fails or is substantially reduced and the GENERATOR source voltage and frequency are at an acceptable level. The ATS also prevents electrical feedback between the different power sources and is required by code in all standby installations.

2.2 — Transfer Switches Models

See Figure 2-1. Two transfer switch models are described herein, RTSB (U.S.) and RTSI (Canada).

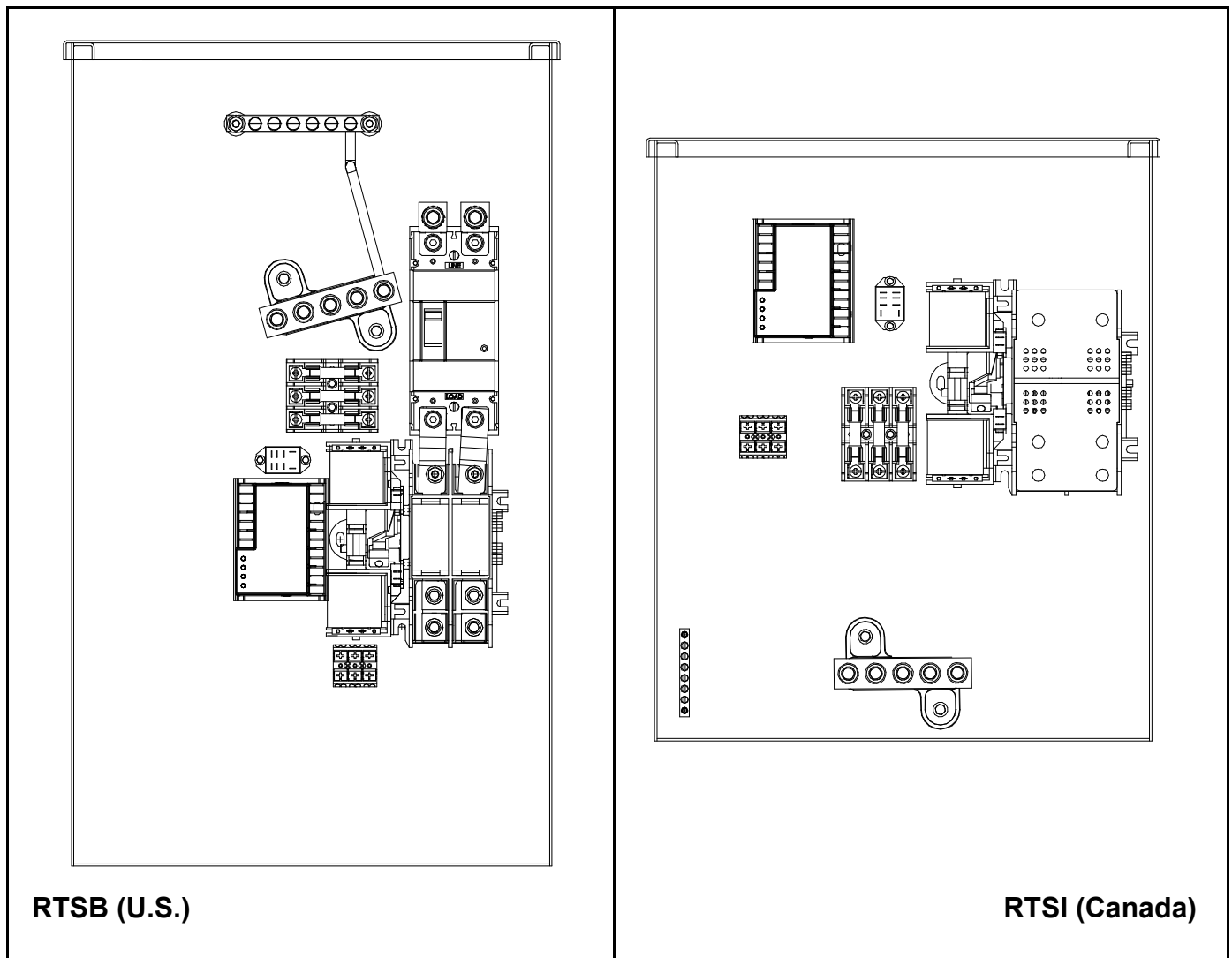


Figure 2-1. Transfer Switch Models

2.3 — Overload Prevention Control Board (OPCB)

⚠ DANGER!



Turn OFF both the UTILITY (NORMAL) and GENERATOR (STANDBY) power supplies before connecting power source and load lines to the transfer switch. Supply voltages are extremely high and dangerous. Contact with high voltage power supply lines causes extremely hazardous, and possibly lethal, electrical shock.

NOTE: All loads greater than 10 kW (9 kW if running on Natural Gas) or 2HP (motors) must be connected to the OPCB.

2.3.1— OPCB/PMM Connection

See Figure 2-2. When fully functional, the Overload Prevention Control Board (OPCB) manages six loads- two A/C units and four general use contactors. The general use contactors are used to power any typical load, such as a well pump, room lighting circuit, etc.

The OPCB is hard wired to control the two A/C units (A/C 1, A/C 2) and comes ready for use without additional parts.

The four general use contactors need additional hardware to become functional. The hardware, which is purchased separately, is contained in two kits as follows:

- Power Management Module (PMM) Starter Kit, Part No. 0061990, includes one PMM with transformer. The transformer, which is mounted to the subplate inside the ATS enclosure, interfaces with the OPCB to generate the 24 Vac signal needed for control of the selected general use contactor (Load 1, 2, 3, or 4).
- Power Management Module (PMM), Part No. 0061860. To achieve full system functionality, a total of three PMMs are required to allow control of the three remaining general use contactors on the OPCB.

NOTE: The Starter Kit must be purchased to enable use of PMMs. PMMs will not function without installation of the transformer included in the Starter Kit.

- See Chapter 5 for additional information.

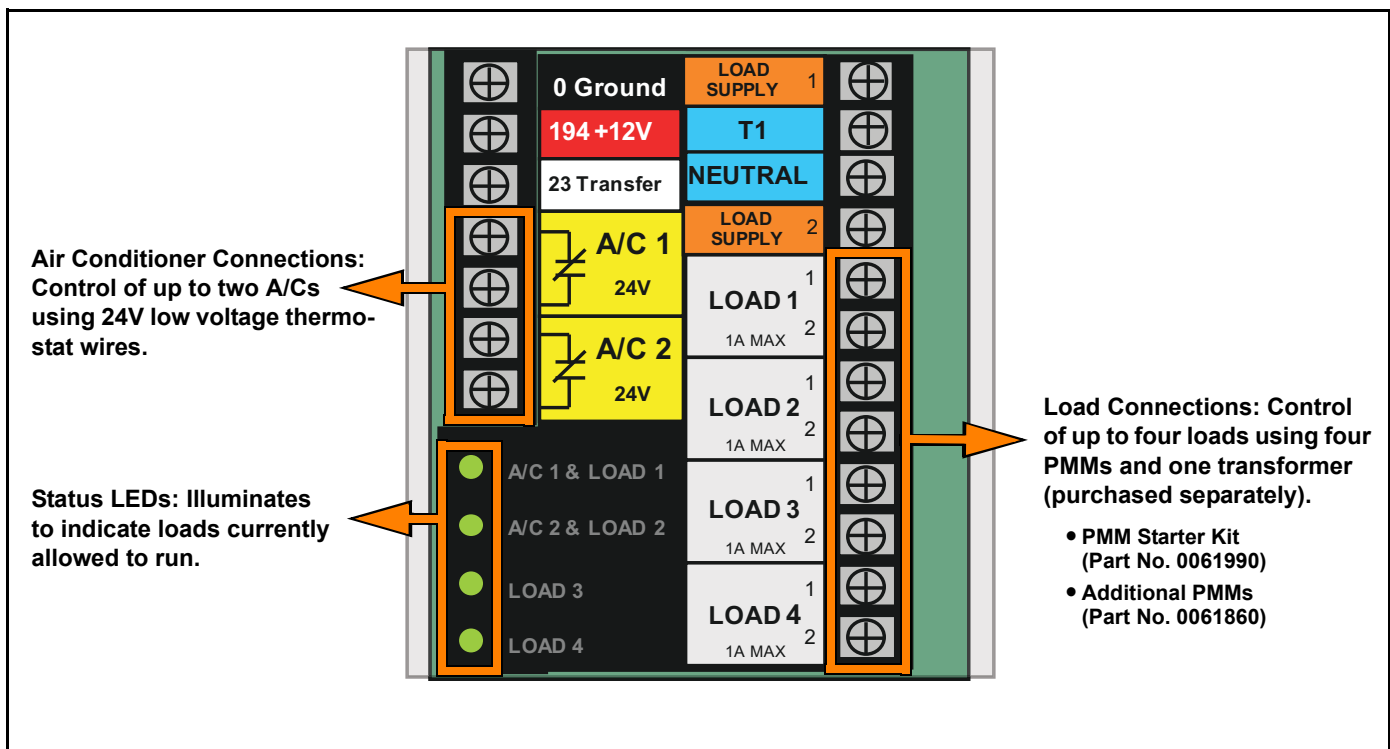


Figure 2-2. Overload Prevention Control Board

2.3.2— Standard Load Shed Mode

When configured for full functionality, six loads are organized into four priority groups. Priority 1 (A/C 1) and the associated general use contactor (Load 1) is the highest priority and is usually the first load(s) reconnected (except in fast load shed mode). Priority 4 (Load 4) is the lowest priority and is usually the last load reconnected (except in fast load shed mode). The priority groups are as follows:

- | | |
|---------------------------|---------------------------|
| • Priority Group 1 | • Priority Group 3 |
| – A/C 1 and Load 1 | – Load 3 |
| • Priority Group 2 | • Priority Group 4 |
| – A/C 2 and Load 2 | – Load 4 |

Since A/C is typically considered the most important, it is hardwired as the two highest priority levels (A/C 1, A/C 2). Two other loads that may be considered of equivalent importance are wired to the associated general use contactors (Load 1, Load 2). Loads of lesser importance are wired to the remaining contactors (Load 3, Load 4).

If the OPCB is fully functional and managing six connected loads, and an event occurs which causes a load to increase beyond the capacity of the generator, the OPCB identifies an overload condition and instantly sheds all loads. After five minutes elapses, the OPCB reconnects the loads associated with Priority Group 1 (A/C 1, Load 1), and then reconnects the remaining loads at fifteen second intervals. If the OPCB sees another overload while it is reconnecting loads, the offending load is shed and locked out for 30 minutes. The next load in the sequence is then reconnected. This process continues until all loads have tried to reconnect. See Figure 2-3.

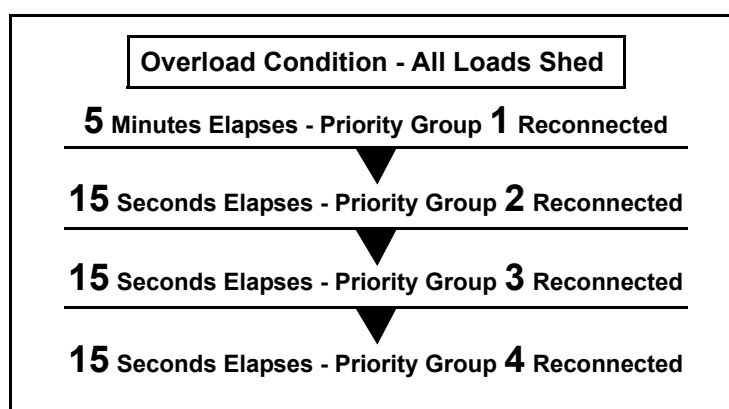


Figure 2-3. Standard Load Shed

2.3.3— Synergy Fast Load Shed Mode

Specially designed for use with the Synergy product, the OPCB features “Fast Load Shed” capability that effectively prevents large loads from stalling the engine.

If the generator senses the application of a large load **greater than 10 kW (9 kW if running on Natural Gas) or 2HP (motor)** while running at low speed, all loads are instantly shed. The engine is then instructed to run at 3600 RPM, and six seconds later, Load 3 is reapplied. Fifteen seconds after application of Load 3, Load 4 is reapplied. After a five minute delay to prevent damage to the air conditioner motors, Load 1 is reapplied. And fifteen seconds after application of Load 1, Load 2 is applied. See Figure 2-4.

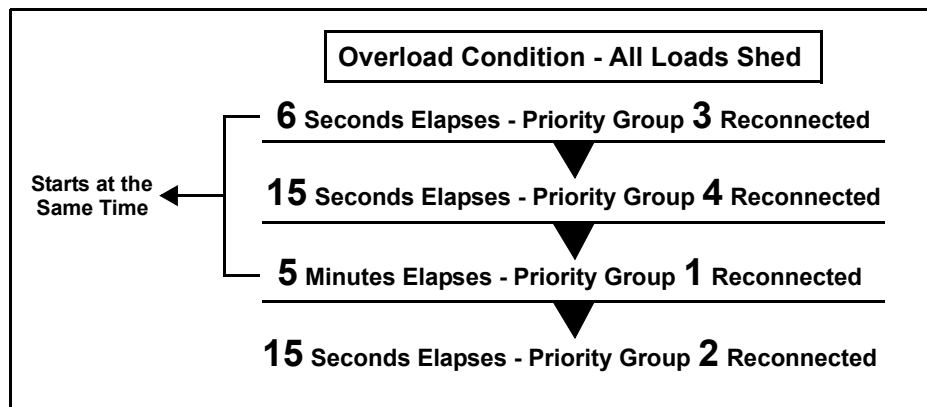


Figure 2-4. Synergy Fast Load Shed

2.4 — Preliminary Instructions

2.4.1— Unpack Transfer Switch

Carefully unpack the transfer switch. Inspect closely for any damage that might have occurred during shipment. The purchaser must file with the carrier any claims for loss or damage incurred while in transit.

Verify that all packing material is removed from the transfer switch prior to installation.

2.4.2— Installing Transfer Switch

The transfer switch was wired and tested at the factory before packaging. Installing the switch involves the following procedures:

- Mount transfer switch; connect utility source, customer load, and generator source leads; connect customer control wires; manually exercise transfer switch.
 - See Section 3 RTSB Mounting and Installation **or** Section 4 RTSI Mounting and Installation.
- Install transformer and PMMs.
 - See Section 5 Load Management.
- Perform functional tests to verify system operation.
 - See Section 6 Testing.

NOTE: Wiring diagrams and physical dimensions of each model are provided in Section 7.

NOTE: All installations must comply with national, state and local codes. It is the responsibility of the installer to perform an installation that passes final electrical inspection.

2.4.3— Safe Use of Transfer Switch

To prevent accidents and/or equipment damage, carefully read the SAFETY RULES in Chapter 1 before installing, operating or servicing this equipment. Post a copy of the SAFETY RULES near the transfer switch for quick and easy reference. Carefully read all information and instructions found on any decals, labels, or tags affixed to the equipment.

Refer to the following publications for additional information on the safe use of transfer switches:

- NFPA 70; National Electrical Code
- NFPA 70E; Standard for Electrical Safety in the Workplace
- UL 1008, Standard For Safety-automatic Transfer Switches

NOTE: Always use the latest version of any standard to ensure the most complete and current information.

Section 3 *RTSB Mounting and Installation*

3.1 — Mount Transfer Switch

3.1.1— Remove Covers

1. Remove thumbscrew and remove outside cover from enclosure. See A of Figure 3-1.
2. Remove hex nut from threaded stud at bottom of enclosure and remove inside cover. See B of Figure 3-1.

NOTE: For best results, disengage slotted tab at bottom of cover from threaded stud before disengaging top from notches in enclosure.

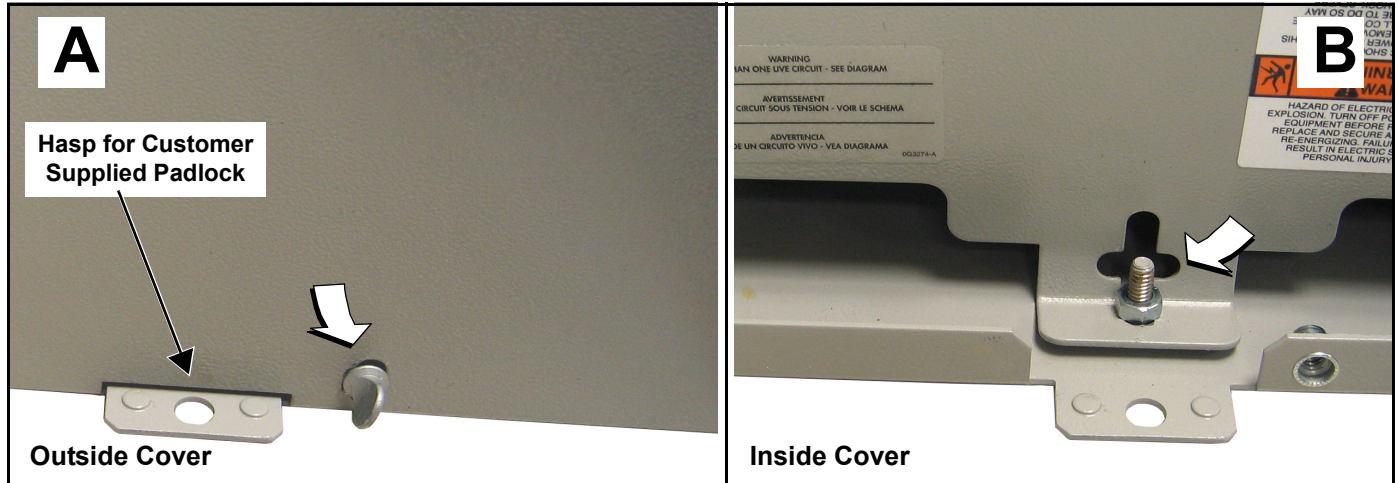


Figure 3-1. Remove Transfer Switch Covers

3.1.2— Record Serial and Model Numbers

The Transfer System Data decal is attached to the inside wall (top left side) of the transfer switch enclosure. See A of Figure 3-2.

Information on the decal is required when requesting information or ordering service parts. For quick and easy reference, record the Serial and Model numbers printed on the decal in the space provided here. See B of Figure 3-2.

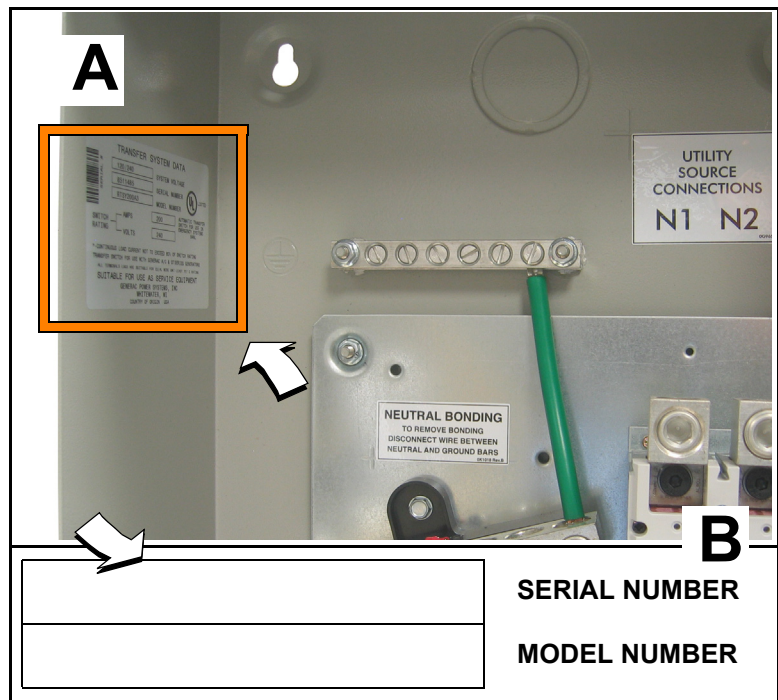


Figure 3-2. Record Serial and Model Numbers

3.1.3— Remove Subplate

1. Using a flat blade screwdriver, loosen terminal screw from grounding bar to release green neutral bonding cable. See A of Figure 3-3.
2. Remove flange nuts from weld studs at each corner of subplate. See A of Figure 3-3.
3. Remove subplate with transfer switch assembly from weld studs. See B of Figure 3-3.
4. Carefully lay subplate on a flat surface to prevent accidental damage.
5. Remove three flat washers from each weld stud.

3.1.4— Mount Enclosure

⚠ CAUTION!



Handle transfer switches with care. Do not drop. Protect against impact at all times. Thoroughly clean enclosure of construction debris and metal chips. Never install a damaged transfer switch.

NOTE: The transfer switch enclosure can be mounted inside or outside. Install the transfer switch no more than six feet from the utility disconnect and as close as possible to the electrical loads to be connected.

1. Determine suitable location for mounting of transfer switch.
2. Obtain appropriate hardware for securely mounting enclosure to solid structural surface or rigid supporting structure (mounting hardware is not provided).
3. Position enclosure vertically against structural surface and use a pencil to trace four mounting holes. See Chapter 6 for wiring diagrams and physical dimensions of enclosure.

NOTE: Centerline of Utility Service Disconnect Circuit Breaker should be no more than six feet from the ground.

4. Securely fasten enclosure to structural surface.
5. Verify that enclosure is level.

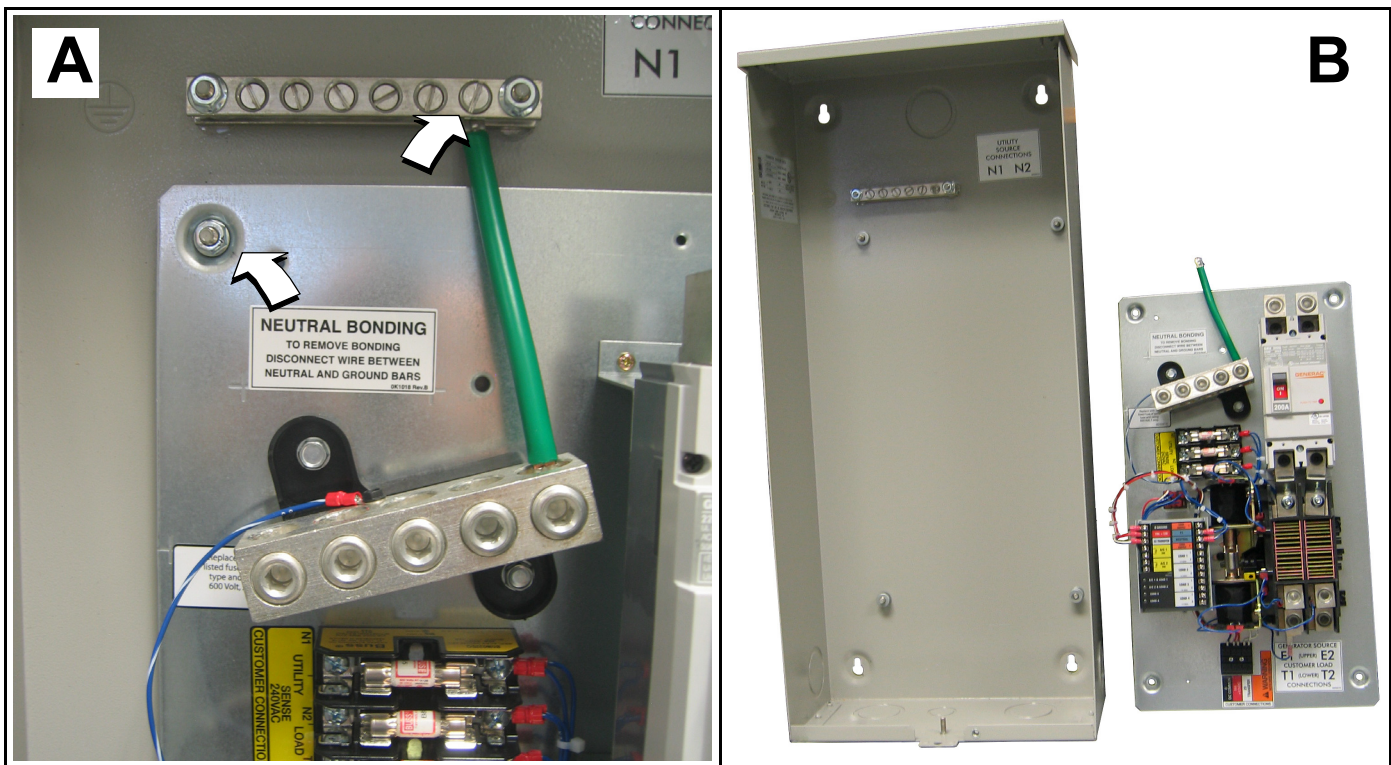


Figure 3-3. Remove Subplate From Enclosure

3.1.5— Route Wiring

1. Run conduit and wires to area of enclosure.
2. Study enclosure to determine entry points for utility source, generator source, and customer load wiring conduit. As many as six knockout plugs are provided.
3. Remove knock out plugs as follows:
 - a. Use a pencil to mark the center of the knock out plug.
 - b. Use a punch to make a divot in center of mark.
 - c. Cover bottom of enclosure with clean shop cloth to catch metal shavings.

NOTE: Metal shavings have sharp edges that can nick, cut or abrade wire insulation, possibly resulting in equipment failure.

- d. Drill pilot hole using divot as a guide.
- e. Install knock out punch (slide hammer) and remove plug.
- f. Use a round file to remove any metal debris around hole and to smooth sharp edges.
- g. Install grommet in knock out plug hole.
- g. Carefully remove shop cloth.
- h. Thoroughly clean area of any metal shavings not captured by the shop cloth.

NOTE: Avoid drilling into the top of the enclosure when the unit is to be located outside. If this is not possible, install RAINTIGHT fitting to prevent water or moisture from entering or accumulating within the enclosure.



Figure 3-4. Install Flat Washers on Studs

3.1.6— Install Subplate

1. Install three flat washers onto each of four weld studs in enclosure. See Figure 3-4.
2. Install subplate with transfer switch assembly onto weld studs.
3. Install four flange nuts onto weld studs and alternately tighten in a crosswise pattern until snug.
4. Install green neutral bonding cable to grounding bar and tighten terminal screw as shown in Table 3-1.

Table 3-1. Neutral Bar Torque Specifications

Switch Rating	Torque
200A	275 in-lbs.

NOTE: Check label attached to front of inside cover to verify torque specification. See B of Figure 3-6.

3.2 — Connect Utility, Customer Load and Generator Leads

3.2.1— Install Utility Source Connections

1. Remove two screws to release plastic divider over utility source lugs. See A of Figure 3-5.
2. Back out terminal screws from utility source lugs (N1, N2). See B of Figure 3-5.
3. Route red and black utility source cables through upper rear hole in enclosure and into lugs until bottomed. Alternately tighten terminal screws to 375 in-lbs (42.3 N-m).

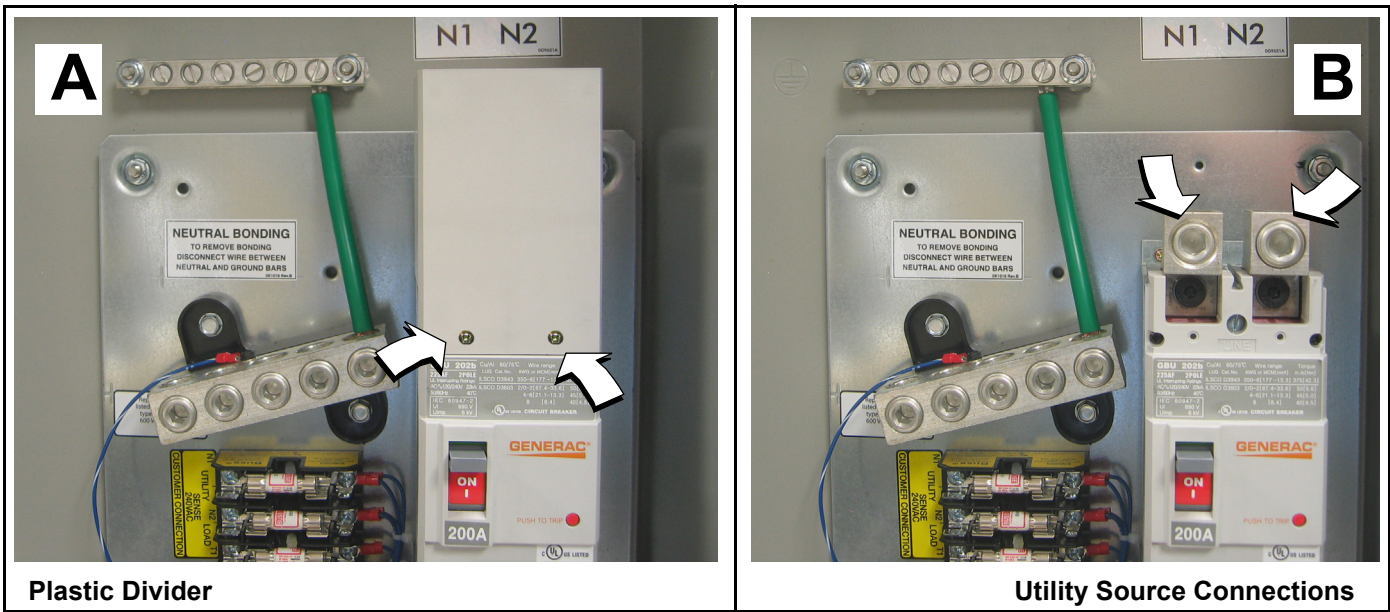


Figure 3-5. Install Utility Source Connections

NOTE: Check label on Utility Service Disconnect Circuit Breaker to verify torque specification. See A of Figure 3-6.

NOTE: For best results, apply NO-OX-ID electrical grease to prevent the formation of corrosion deposits on copper, aluminum, and steel surfaces and conductors.

- 4. Place plastic divider over utility source lugs and install two screws. Alternately tighten screws until snug.

3.2.2— Install Customer Load and Generator Source Connections

3.2.2.1—Customer Load

- 1. Remove wire clip to release insulator board over customer load and utility source lugs. See Figure 3-7.
- 2. Back out terminal screws from customer load lugs (T1, T2). See B of Figure 3-7.
- 3. Route cables through bottom or side holes in enclosure and into lugs until bottomed. Alternately tighten terminal screws as shown in Table 3-2.

Table 3-2. Customer Load and Generator Source Torque Specifications

Switch Rating	Torque
200A	275 in-lbs.

NOTE: Check label attached to front of inside cover to verify torque specification. See B of Figure 3-6.

NOTE: For best results, apply NO-OX-ID electrical grease to prevent the formation of corrosion deposits on copper, aluminum, and steel surfaces and conductors.

3.2.2.2—Generator Source

- 1. Back out terminal screws from generator source lugs (E1, E2). See C of Figure 3-7.
- 2. Route cables through bottom or side holes in enclosure and into lugs until bottomed. Alternately tighten terminal screws as shown in Table 3-2.

NOTE: Check label attached to front of inside cover to verify torque specification. See B of Figure 3-6.

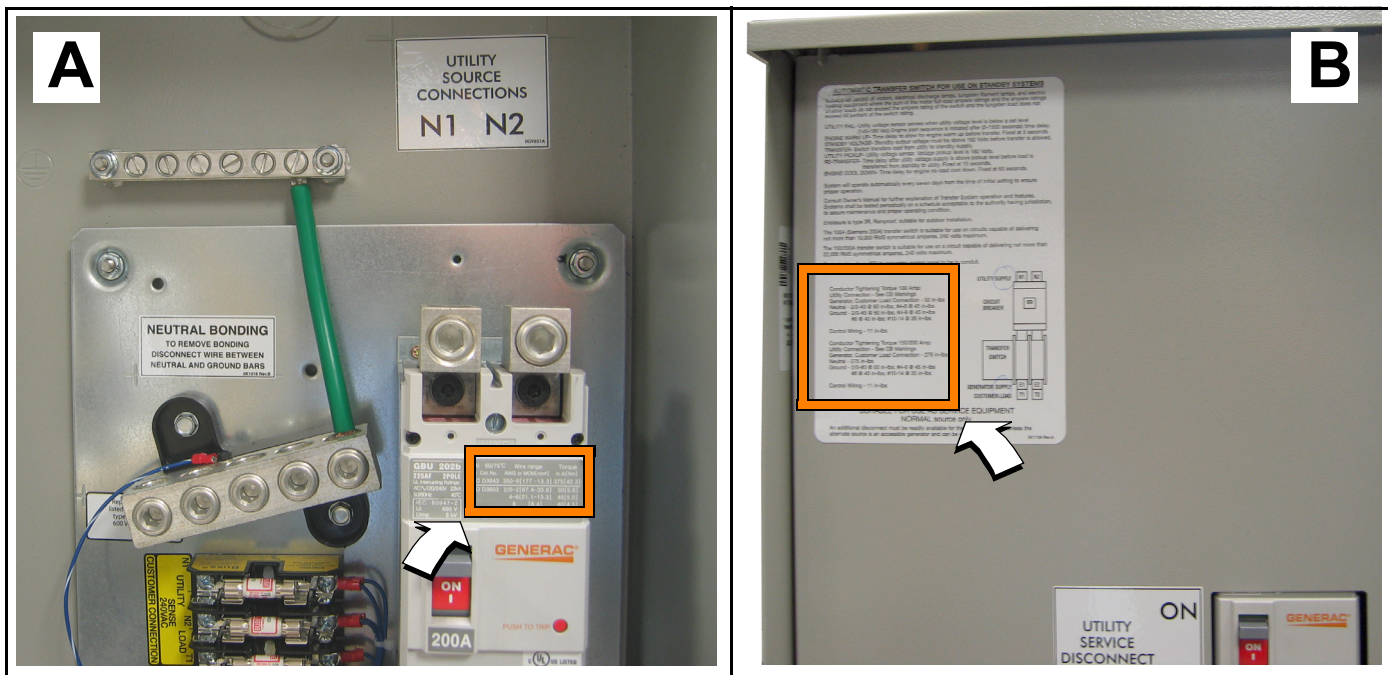


Figure 3-6. Check Labels to Verify Torque Specifications

NOTE: For best results, apply NO-OX-ID electrical grease to prevent the formation of corrosion deposits on copper, aluminum, and steel surfaces and conductors.

- Place insulator board over customer load and generator source lugs and install wire clip to secure.

3.3 — Install Customer Control Connections

3.3.1— General

The length of the wires determines the recommended wire gauge sizes for customer control wires as follows:

Table 3-3. Customer Control Wiring

Maximum Wire Length	Recommended Wire Size
1-115 ft (1-35m)	No. 18 AWG
116-185 ft (36-56m)	No. 16 AWG
186-295 ft (57-89m)	No. 14 AWG
296-460 ft (90-140m)	No. 12 AWG

- Locate six customer control wires exiting the generator source conduit.

NOTE: Wires may be contained in single or separate conduit depending upon NEC and local AHJ requirements.

- Separate wires as follows:

Fuse Block

- Utility sensing wire (N1)
- Utility sensing wire (N2)
- Battery charger wire (T1)

WAGO Connector

- Transfer wire 23
- +12 VDC wire 194
- DC Common wire 0

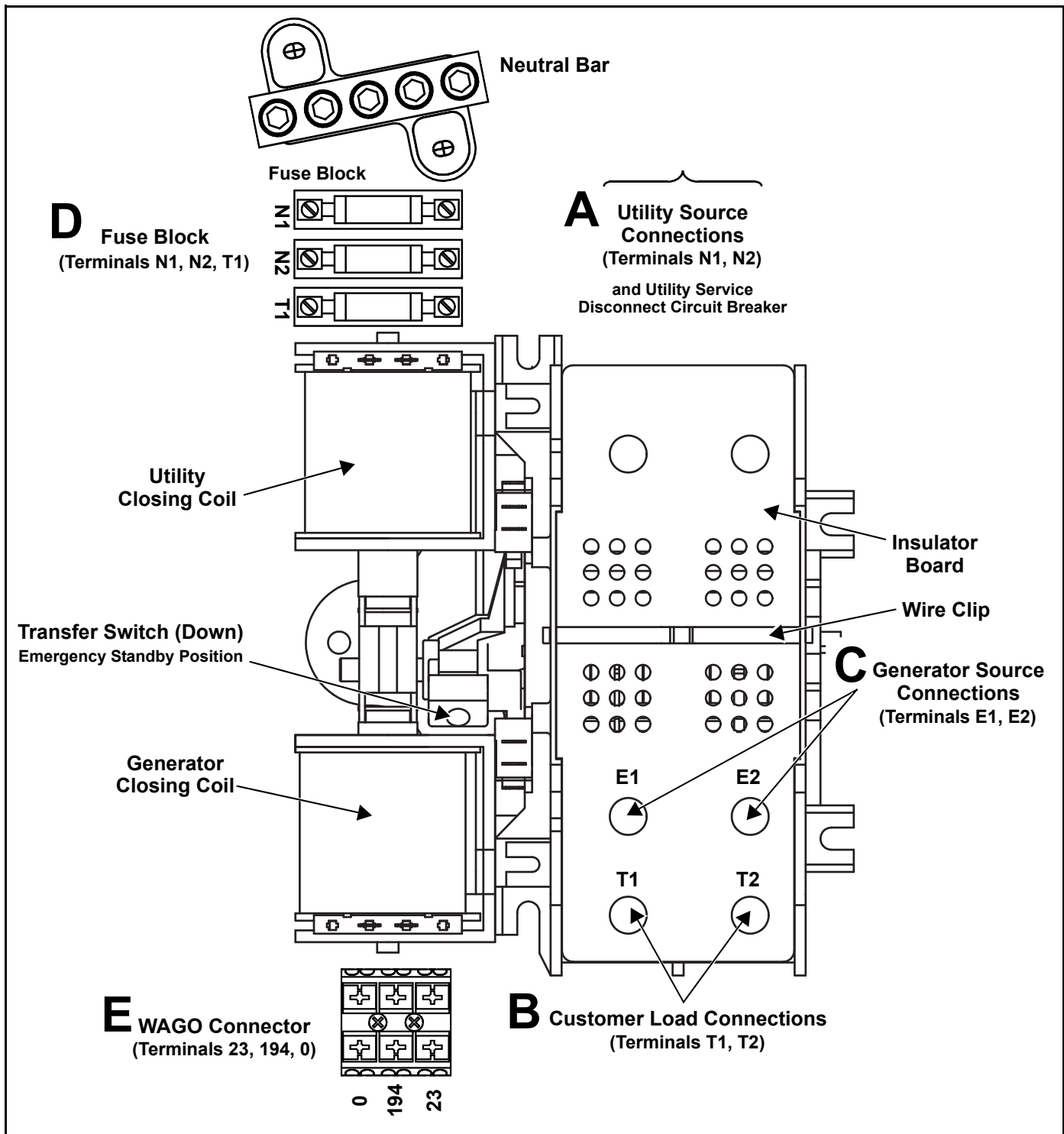


Figure 3-7. Automatic Transfer Switch (RTSI)

3.3.1.1—Install Fuse Block Wires

1. Route three wires to fuse block.
2. Install wires to appropriate terminals using either Phillips screws or spade contacts. See D of Figure 3-7.

NOTE: Wires may be terminated with either ring terminals or female spade contacts. If ring terminals are used, tighten Phillips screw to 11 in-lbs after installation of ring terminal.

3.3.1.2—Install WAGO Connector Wires

1. Strip 3/8 inch of insulation from three wires.
2. Route wires to WAGO connector. See E of Figure 3-7.
3. Firmly press and hold terminal lock, insert wire into appropriate terminal until it bottoms, and then release lock.
4. Gently tug on each wire to verify that it is secure.

3.4 — Exercise Transfer Switch

⚠ CAUTION!



Do NOT manually transfer the electrical source under load. First disconnect transfer switch from all power sources by approved means, such as the main circuit breaker(s).

Verify correct manual operation of the transfer switch BEFORE operating electrically. Proceed as follows:

NOTE: A HANDLE is provided for manual operation of the transfer switch. The handle is fitted to a bracket mounted to the front of the inside cover. See Figure 3-8.

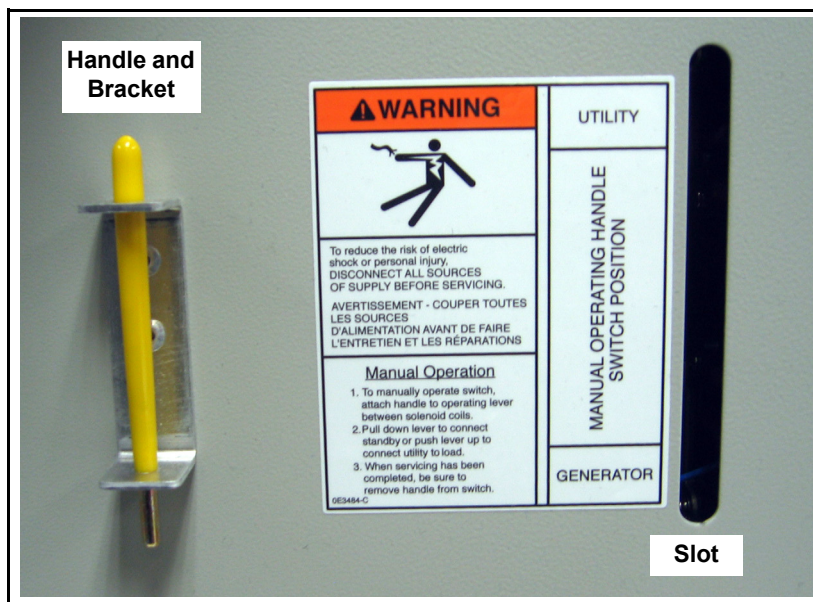


Figure 3-8. Remove Handle From Inside Cover Bracket

1. Observe the position of the handle carrier arm on the transfer switch mechanism. The arm is colored yellow (like the handle) for easy identification and observation.

NOTE: If the inside cover is installed, use the narrow slot next to the handle bracket to perform steps 3 and 5.

2. Remove yellow handle from bracket fastened to front of inside cover.
3. Insert handle into hole in handle carrier arm and proceed as follows:

Move the handle UP:

- CUSTOMER LOAD (T1 and T2) is connected to UTILITY SOURCE (N1 and N2). See A of Figure 3-9.

Move the handle DOWN:

- CUSTOMER LOAD (T1 and T2) is connected to GENERATOR SOURCE (E1 and E2). See B of Figure 3-9.

⚠ CAUTION!



Do not use excessive force when manually operating transfer switch or handle carrier arm may be damaged.

4. Remove handle from carrier arm. Install handle in bracket fastened to front of inside cover.

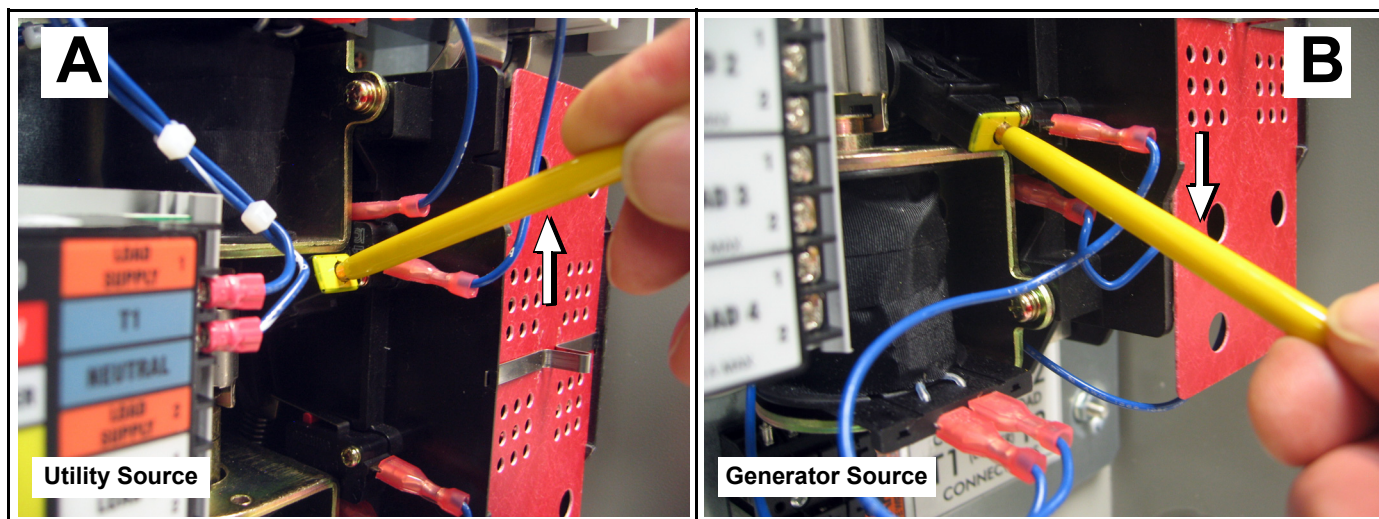


Figure 3-9. Exercise Transfer Switch

3.4.1— Install Covers

1. Place inside cover into enclosure. For best results, first engage top of cover in notches of enclosure before engaging slotted tab at bottom with threaded stud. Install hex nut on threaded stud and tighten until snug. See B of Figure 3-1.
2. Place outside cover into enclosure. Tighten thumbscrew until snug. See A of Figure 3-1.
3. Install customer supplied padlock into hasp at bottom of enclosure.

Section 4 *RTSI Mounting and Installation*

4.1 — Mount Transfer Switch

4.1.1— Remove Cover

1. Remove hex screw (with nylon washer) and remove cover from enclosure. See A of Figure 4-1.

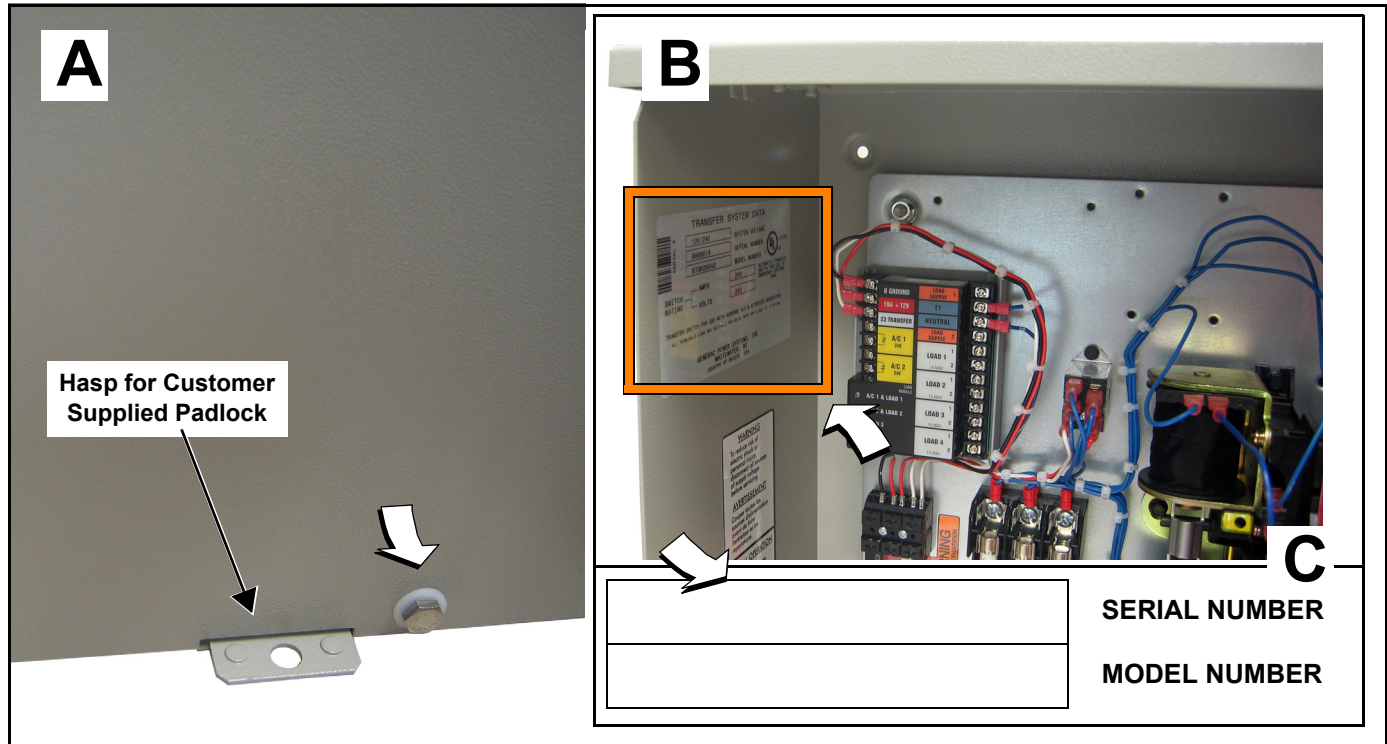


Figure 4-1. Remove Transfer Switch Cover and Record Serial and Model Numbers

4.1.2— Record Serial and Model Numbers

The Transfer System Data decal is attached to the inside wall (top left side) of the transfer switch enclosure. See B of Figure 4-1.

Information on the decal is required when requesting information or ordering service parts. For quick and easy reference, record the Serial and Model numbers printed on the decal in the space provided here. See C of Figure 4-1.

4.1.3— Remove Subplate

1. Remove flange nuts from weld studs at each corner of subplate. See A of Figure 4-2.
2. Remove subplate with transfer switch assembly from weld studs. See B of Figure 4-2.
3. Carefully lay subplate on a flat surface to prevent accidental damage.
4. Remove three flat washers from each weld stud.

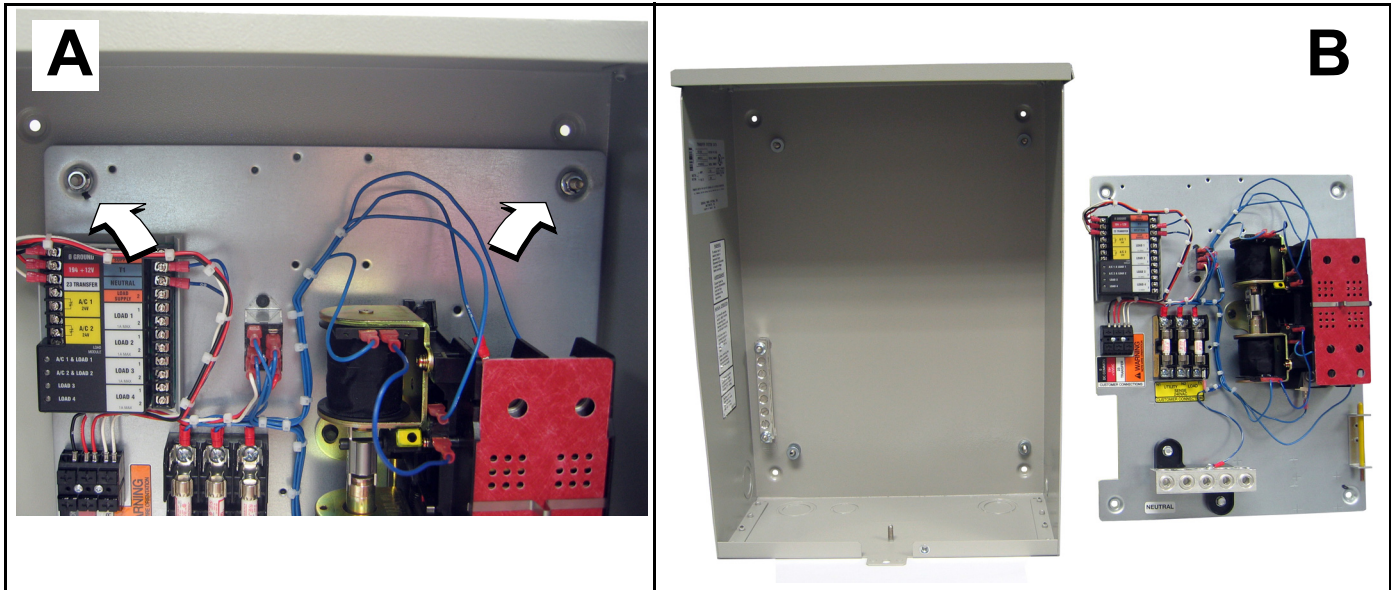


Figure 4-2. Remove Subplate From Enclosure

4.1.4— Mount Enclosure

⚠ CAUTION!



Handle transfer switches with care. Do not drop. Protect against impact at all times. Thoroughly clean enclosure of construction debris and metal chips. Never install a damaged transfer switch.

NOTE: The transfer switch enclosure can be mounted inside or outside. Install the transfer switch no more than six feet from the utility disconnect and as close as possible to the electrical loads to be connected.

1. Determine suitable location for mounting of transfer switch.
2. Obtain appropriate hardware for securely mounting enclosure to solid structural surface or rigid supporting structure (mounting hardware is not provided).
3. Position enclosure vertically against structural surface and use a pencil to trace four mounting holes. See Chapter 6 for wiring diagrams and physical dimensions of enclosure.
4. Securely fasten enclosure to structural surface.
5. Verify that enclosure is level.

4.1.5— Route Wiring

1. Run conduit and wires to area of enclosure.
2. Study enclosure to determine entry points for utility source, generator source, and customer load wiring conduit. As many as five knockout plugs are provided.
3. Remove knock out plugs as follows:
 - a. Use a pencil to mark the center of the knock out plug.
 - b. Use a punch to make a divot in center of mark.

- c. Cover bottom of enclosure with clean shop cloth to catch metal shavings.

NOTE: Metal shavings have sharp edges that can nick, cut or abrade wire insulation, possibly resulting in equipment failure.

- d. Drill pilot hole using divot as a guide.
- e. Install knock out punch (slide hammer) and remove plug.
- f. Use a round file to remove any metal debris around hole and to smooth sharp edges.
- g. Install grommet in knock out plug hole.
- g. Carefully remove shop cloth.
- h. Thoroughly clean area of any metal shavings not captured by the shop cloth.

NOTE: Avoid drilling into the top of the enclosure when the unit is to be located outside. If this is not possible, install RAIN-TIGHT fitting to prevent water or moisture from entering or accumulating within the enclosure.

4.1.6— Install Subplate

1. Install three flat washers onto each of four weld studs in enclosure.
2. Install subplate with transfer switch assembly onto weld studs.
3. Install four flange nuts onto weld studs and alternately tighten in a crosswise pattern until snug.

4.2 — Connect Utility, Customer Load and Generator Leads

4.2.1— Install Utility Source Connections

1. Remove wire clip to release insulator board over customer load and utility source lugs. See Figure 4-4.
2. Back out terminal screws from utility source lugs (N1, N2). See A of Figure 4-4.
3. Route red and black utility source cables through selected hole in enclosure and into lugs until bottomed. Alternately tighten terminal screws as follows.

Table 4-1. Utility Source Torque Specifications

Switch Rating	Torque
200A	275 in-lbs.

NOTE: Check label attached to inside of cover to verify torque specification. See Figure 4-3.

NOTE: For best results, apply NO-OX-ID electrical grease to prevent the formation of corrosion deposits on copper, aluminum, and steel surfaces and conductors.

4.2.2— Install Customer Load and Generator Source Connections

4.2.2.1—Customer Load

1. Back out terminal screws from customer load lugs (T1, T2). See B of Figure 4-4.
2. Route cables through selected holes in enclosure and into lugs until bottomed. Alternately tighten terminal screws as shown in Table 4-2.

Table 4-2. Customer Load and Generator Source Torque Specifications

Switch Rating	Torque
200A	275 in-lbs.

NOTE: Check label attached to inside of cover to verify torque specification. See Figure 4-3.

NOTE: For best results, apply NO-OX-ID electrical grease to prevent the formation of corrosion deposits on copper, aluminum, and steel surfaces and conductors.

4.2.2.2—Generator Source

1. Back out terminal screws from generator source lugs (E1, E2). See C of Figure 4-4.
2. Route cables through bottom or side holes in enclosure and into lugs until bottomed. Alternately tighten terminal screws as shown in Table 4-2.

NOTE: Check label attached to inside of cover to verify torque specification. See Figure 4-3.

NOTE: For best results, apply NO-OX-ID electrical grease to prevent the formation of corrosion deposits on copper, aluminum, and steel surfaces and conductors.

3. Place insulator board over utility source, customer load, and generator source lugs and install wire clip to secure.



Figure 4-3. Check Label to Verify Torque Specifications

4.3 — Install Customer Control Connections

4.3.1— General

The length of the wires determines the recommended wire gauge sizes for customer control wires as follows:

Table 4-3. Control System Wiring

Maximum Wire Length	Recommended Wire Size
1-115 ft (1-35m)	No. 18 AWG
116-185 ft (36-56m)	No. 16 AWG
186-295 ft (57-89m)	No. 14 AWG
296-460 ft (90-140m)	No. 12 AWG

1. Locate six customer control wires exiting the generator source conduit.

NOTE: Wires may be contained in single or separate conduit depending upon NEC and local AHJ requirements.

2. Separate wires as follows:

Fuse Block

1. Utility sensing wire (N1)
2. Utility sensing wire (N2)
3. Battery charger wire (T1)

WAGO Connector

1. Transfer wire 23
2. +12 VDC wire 194
3. DC Common wire 0

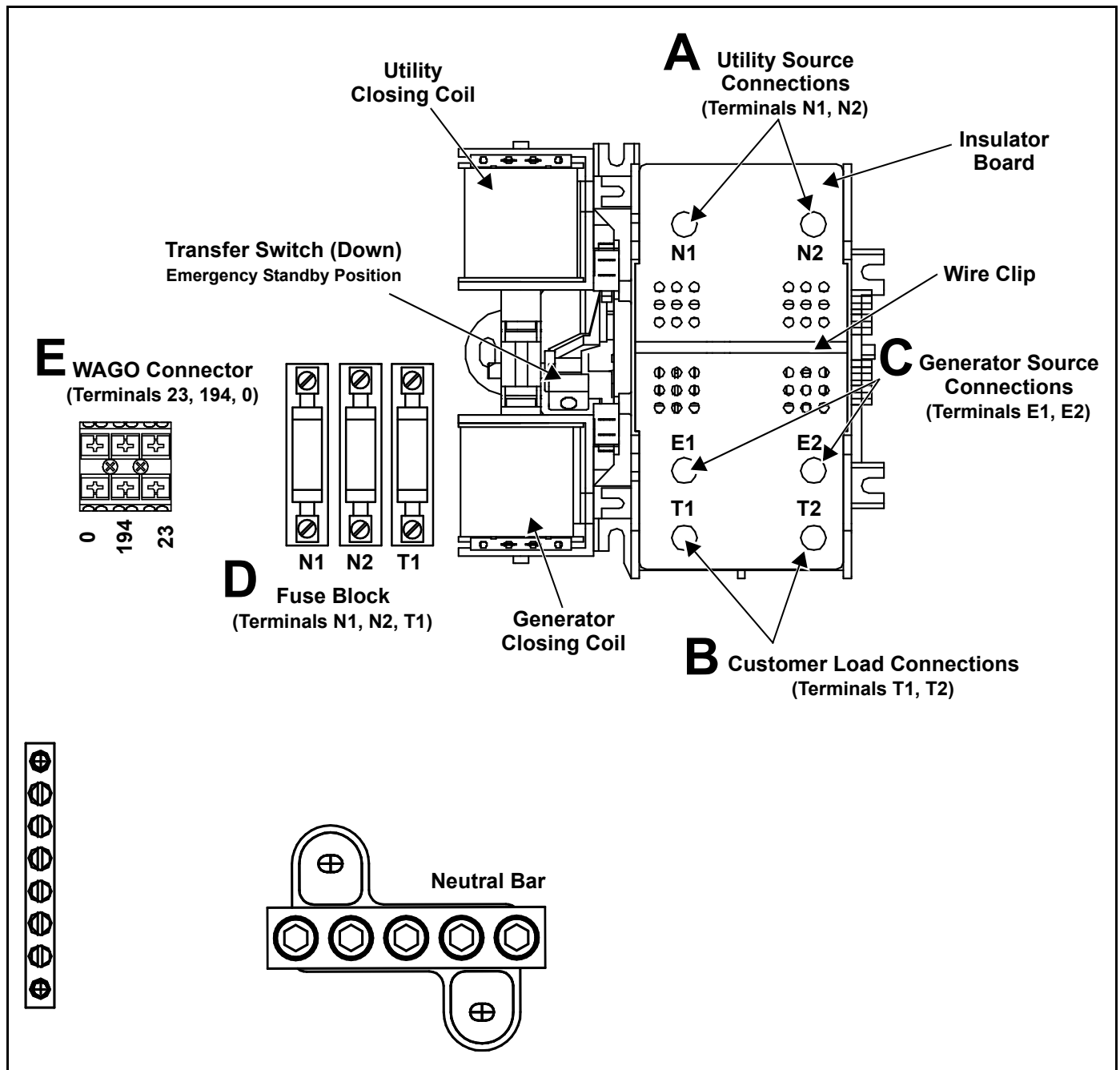


Figure 4-4. Automatic Transfer Switch (RTSI)

4.3.1.1—Install Fuse Block Wires

1. Route three wires to fuse block.
2. Install wires to appropriate terminals using either Phillips screws or spade contacts. See D of Figure 4-4.

NOTE: Wires may be terminated with either ring terminals or female spade contacts. If ring terminals are used, tighten Phillips screw to 11 in-lbs after installation of ring terminal.

4.3.1.2—Install WAGO Connector Wires

1. Strip 3/8 inch of insulation from three wires.
2. Route wires to WAGO connector. See E of Figure 4-4.

3. Firmly press and hold terminal lock, insert wire into appropriate terminal until it bottoms, and then release lock.
4. Gently tug on each wire to verify that it is secure.

4.4 — Exercise Transfer Switch

Verify correct manual operation of the transfer switch BEFORE operating electrically. Proceed as follows:

NOTE: A HANDLE is provided for manual operation of the transfer switch. The handle is fitted to a bracket mounted to the subplate inside the enclosure. See Figure 4-5.

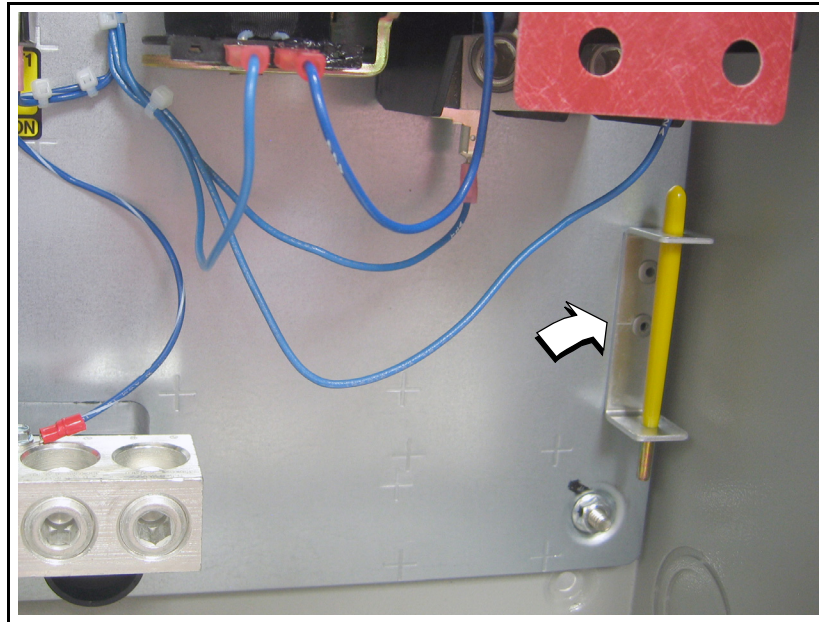


Figure 4-5. Remove Handle From Subplate Bracket

1. Observe the position of the handle carrier arm on the transfer switch mechanism. The arm is colored yellow (like the handle) for easy identification and observation.
2. Remove yellow handle from bracket fastened to subplate.
3. Insert handle into hole in handle carrier arm and proceed as follows:

Move the handle UP:

- CUSTOMER LOAD (T1 and T2) is connected to UTILITY SOURCE (N1 and N2). See A of Figure 4-6.

Move the handle DOWN:

- CUSTOMER LOAD (T1 and T2) is connected to GENERATOR SOURCE (E1 and E2). See B of Figure 4-6.

⚠ CAUTION!



Do not use excessive force when manually operating transfer switch or handle carrier arm may be damaged.

4. Remove handle from carrier arm. Install handle in bracket fastened to subplate.

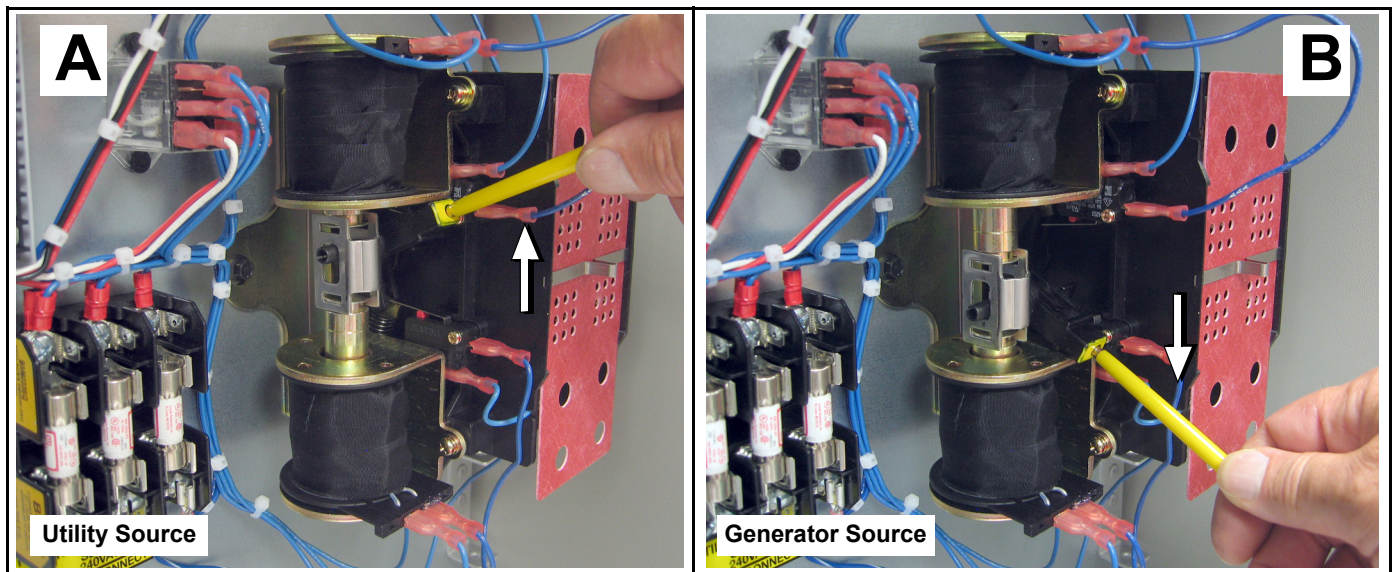


Figure 4-6. Exercise Transfer Switch

4.4.1— Install Cover

1. Place cover into enclosure. Install hex screw (with nylon washer) and tighten until snug. See A of Figure 4-1.
2. Install customer supplied padlock into hasp at bottom of enclosure.

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Section 5 Load Management

5.1 — General

When fully functional, the Overload Prevention Control Board (OPCB) manages six loads- two A/C units and four general use contactors. The general use contactors are used to power any typical load, such as an additional A/C unit, well pump, room lighting circuit, etc. See Figure 5-1.

NOTE: All loads greater than 10 kW (9 kW if running on Natural Gas) or 2HP (motors) must be connected to the OPCB.

5.1.1— Overload Prevention Control Board (OPCB)

The OPCB prevents overloading of the generator.

If a drop in frequency occurs when powering customer loads, the OPCB “sheds” all connected loads. Loads to be “shed” are grouped in four priority levels on the OPCB. See Figure 5-1.

NOTE: Loads are shed when frequency is less than 58Hz for 3 seconds or less than 50Hz for ½ second.

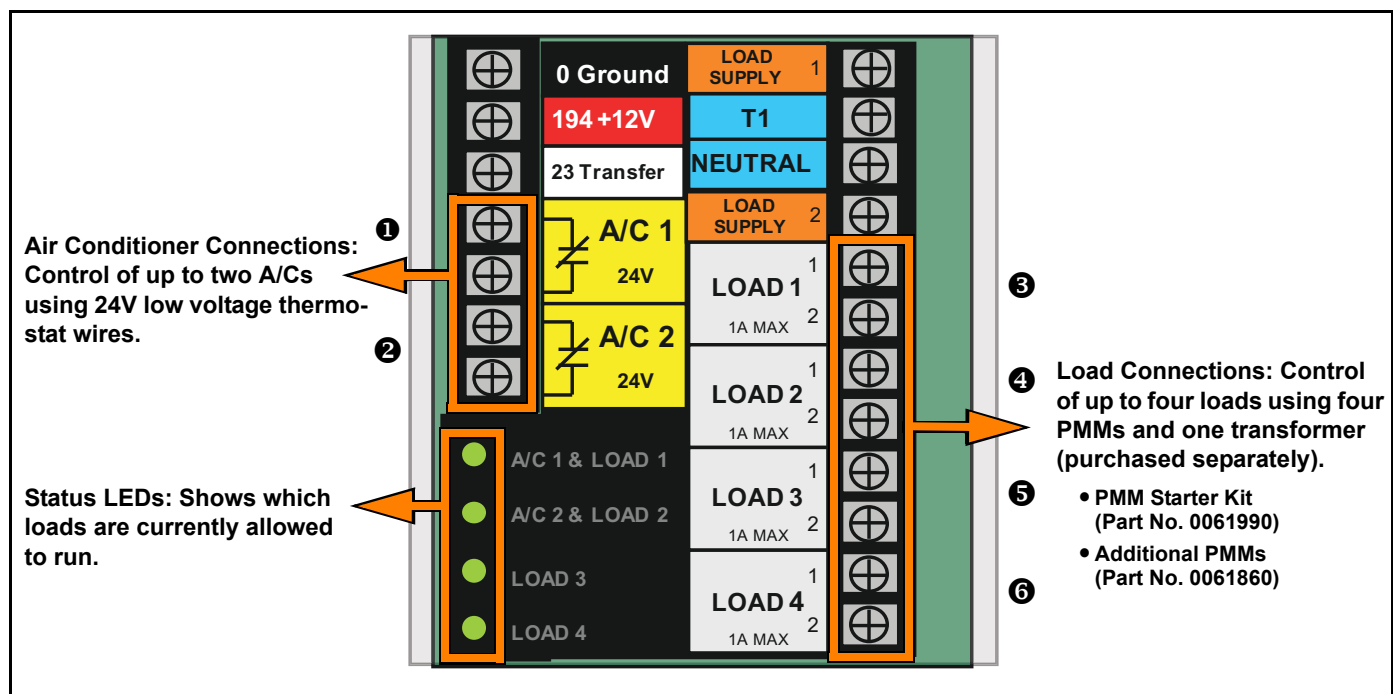


Figure 5-1. Overload Prevention Control Board (OPCB)

- Priorities 1 and 2 (A/C 1, A/C 2) each provide connections for both one air conditioner and one general use contactor. Both the air conditioner and associated contactor can be used at the same time. While no additional equipment is required to control the air conditioners (internal relays interrupt the thermostat 24VAC control signal to disable the air conditioner loads), a PMM is required to enable each contactor (Load 1, Load 2).
- Priorities 3-4 (Load 3, Load 4) provide connection for one general use contactor each, which requires a separate PMM to be operational. Any load, including air conditioners, can be controlled via the PMMs. The OPCB supplies 24VAC to energize the contactor coil in each PMM. The PMMs and required transformer must be purchased separately. For details, see Subsection 5.3.1—Power Management Module (PMM) Kits.
- Four LEDs illuminate to indicate when the associated priority load is enabled. The LEDs are extinguished when the associated load is shed (disabled).

NOTE: Press the Test button at the bottom of the OPCB to simulate an overload condition.

5.2 — Connect A/C 1 and A/C 2 Wiring

An air conditioner can be controlled (using the 24VAC thermostat control Y wire) by wiring it directly to the A/C 1 or A/C 2 terminals on the OPCB terminal strip. The OPCB is hard wired to control the two A/C units and comes ready for use without additional parts.

1. Route the 24VAC thermostat control Y wire (from the furnace to the outdoor air conditioner unit) to the OPCB terminal strip. See Figure 5-2.
2. Connect the wire to the A/C 1 terminal on the OPCB terminal strip. These are normally closed contacts which open upon load shed conditions. Keep wire away from High Voltage wires.
3. If required, connect a second air conditioner to A/C 2 terminal on the OPCB terminal strip.

Contact Ratings	
A/C 1 & A/C 2	24 VAC, 5.0 Amps Max

NOTE: These instructions are for a typical air conditioner installation. Control of heat pump and two-stage air conditioners require special connections or use of Power Management Modules (PMMs).

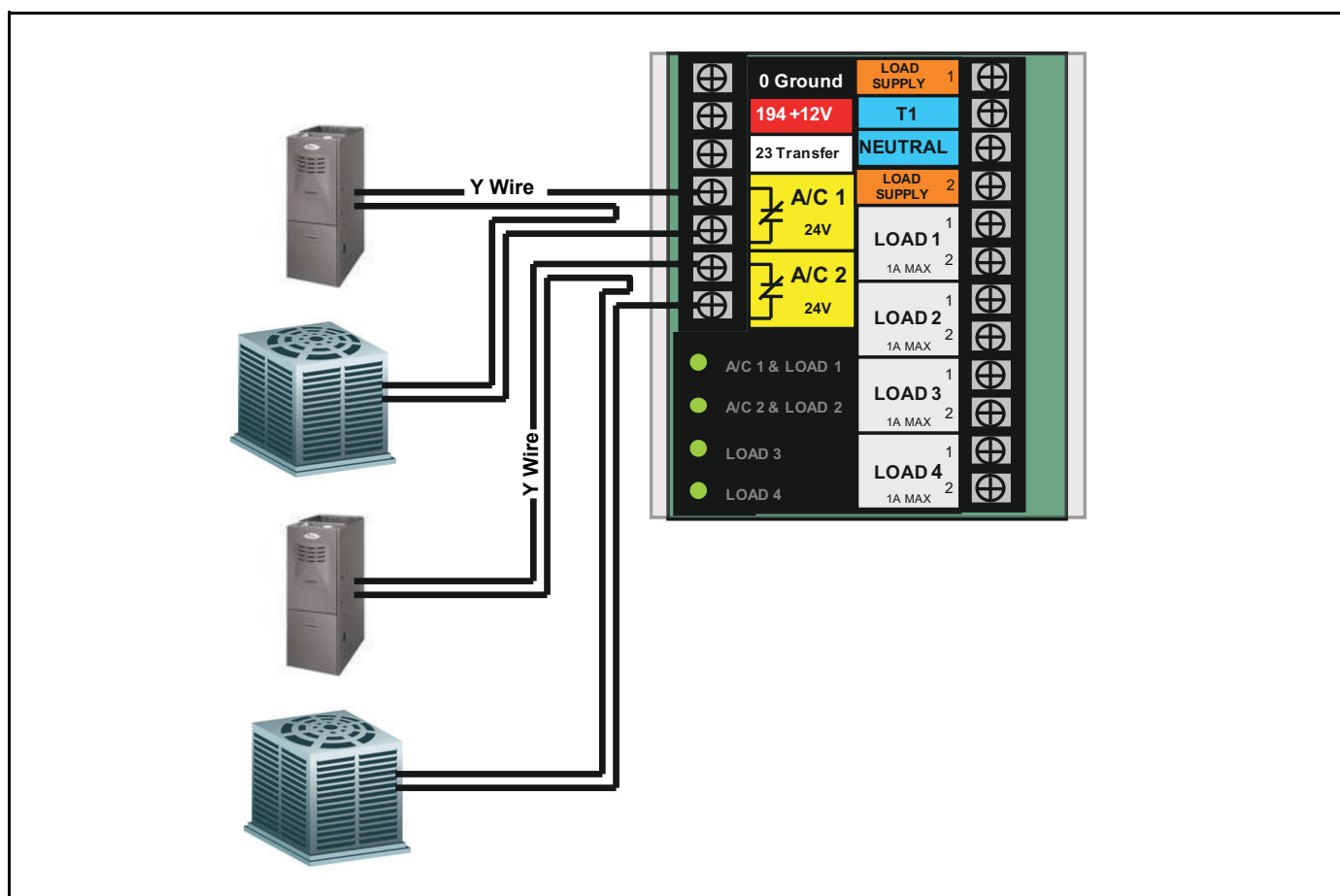


Figure 5-2. Connect A/C 1 and A/C 2 Wiring

5.3 — Connect Transformer and PMM Wiring

5.3.1— Power Management Module (PMM) Kits

The four general use contactors need additional hardware to become functional. The hardware, which must be purchased separately, is contained in two kits as follows:

- **Power Management Module (PMM) Starter Kit**, Part No. 0061990, includes one PMM with transformer. The transformer, which is mounted to the subplate inside the ATS enclosure, interfaces with the OPCB to generate the 24 Vac signal needed for control of the selected general use contactor (Load 1, 2, 3, or 4).
- **Power Management Module (PMM)**, Part No. 0061860. To achieve full system functionality, a total of three PMMs are required to allow control of the three remaining general use contactors on the OPCB.

NOTE: The Starter Kit must be purchased to enable use of PMMs. PMMs will not function without installation of the transformer included in the Starter Kit. See B of Figure 5-4.

5.3.2— Connect Transformer Wiring

1. Obtain Power Management Module (PMM) Starter Kit.
2. Mount the transformer using the existing holes in the subplate. See inset of Figure 5-3.
3. See Figure 5-3. Install transformer wire connections to the OPCB terminal strip as follows:
 - Blue wire - LOAD SUPPLY 1 terminal
 - Black wire - T1 terminal
 - White wire - NEUTRAL terminal
 - Yellow wire - LOAD SUPPLY 2 terminal

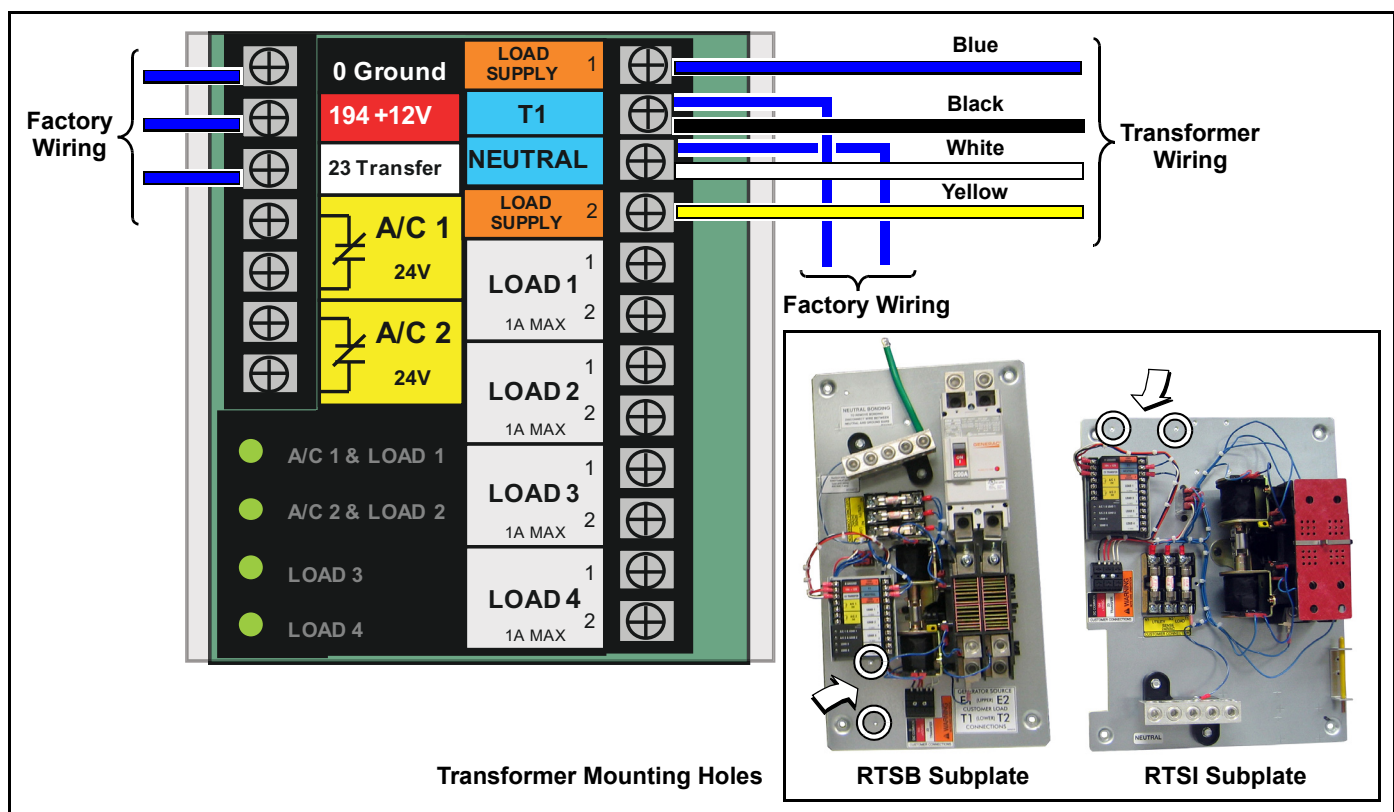


Figure 5-3. Connect Transformer Wiring

5.3.3— Connect PMM Wiring

See A of Figure 5-4.

1. Mount PMM and connect the load to the main contacts.
2. Connect PMM contactor coil to the selected general use contactor on the OPCB terminal strip.
3. Obtain Power Management Module (PMM) as required and connect to remaining general use contactors on the OPCB terminal strip. See C of Figure 5-4.

NOTE: When configuring the system for full functionality, organize the six loads into four priority groups. Priority 1 (A/C 1) and the associated general use contactor (Load 1) is the highest and is usually the first load(s) reconnected (except in fast load shed mode). Priority 4 (Load 4) is the lowest and is usually the last load reconnected (except in fast load shed mode).

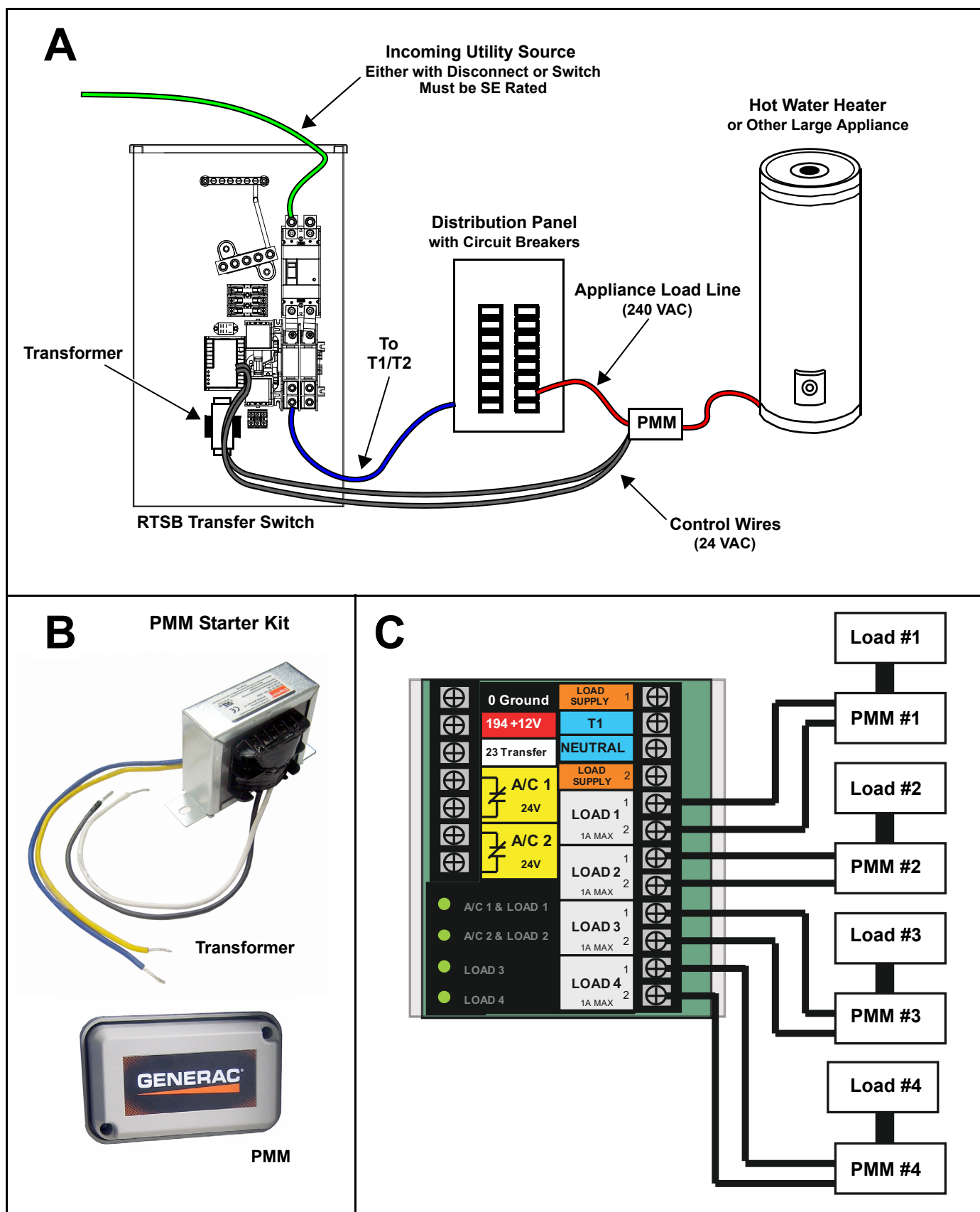


Figure 5-4. Connect PMM Wiring

Section 6 Testing

6.1 — Functional Tests

Contact a independent Authorized Service Dealer to inspect the installation and verify strict compliance with all applicable codes, regulations and standards. Only perform the functional tests when convinced of the integrity of the installation.

NOTE: Perform functional tests in the order presented or transfer switch damage can occur.

IMPORTANT: Before proceeding, read and understand all information and instructions in this section. Become familiar with any and all information found on labels, decals or tags either affixed or attached to the transfer switch. Also, take special note of any special options or accessories that might be installed and thoroughly review their operation.

6.2 — Manual Operation

⚠ CAUTION!

⚠ Do NOT manually transfer the electrical source under load. First disconnect transfer switch from all power sources by approved means, such as the main circuit breaker(s).

Verify correct manual operation of the transfer switch BEFORE operating electrically. Proceed as follows:

NOTE: A HANDLE is provided for manual operation of the transfer switch. The handle is fitted to a bracket mounted to the inside cover of the enclosure. See Figure 6-1.

1. Press OFF on the generator control pad. A red LED illuminates to confirm that the system is in the OFF mode. See A of Figure 6-2.
2. Move the transfer switch UTILITY SERVICE DISCONNECT circuit breaker switch down to the OFF (Open) position (RTSB), or disconnect as required at Utility Distribution Panel (RTSI). See B of Figure 6-2.
3. Move the GENERATOR DISCONNECT Circuit Breaker switch to the OFF (Open) position. See C of Figure 6-2.

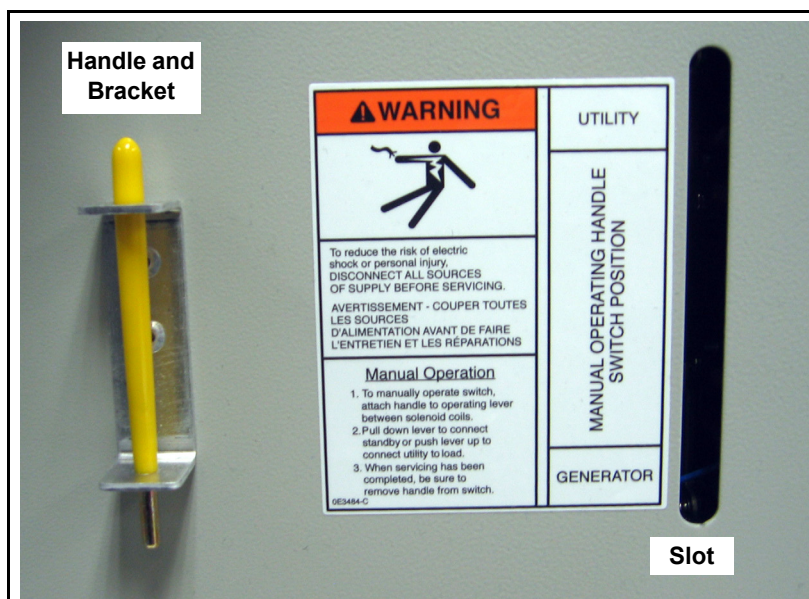


Figure 6-1. Remove Handle From Bracket (RTSB Shown)

4. Observe the position of the handle carrier arm on the transfer switch mechanism. The arm is colored yellow (like the handle) for easy identification and observation.

NOTE: If the inside cover is installed on RTSB models, use the narrow slot next to the handle bracket to perform the following steps.

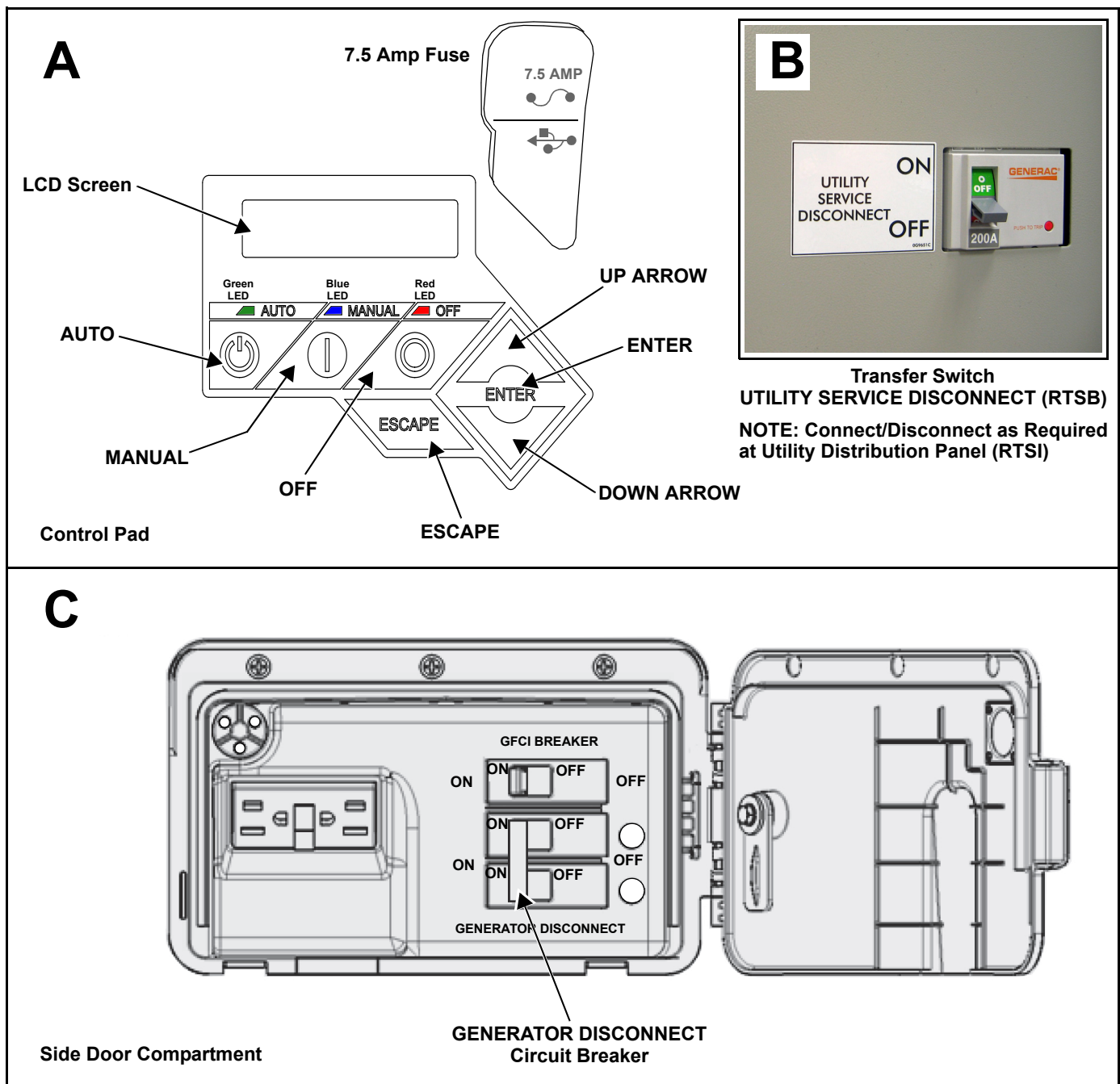


Figure 6-2. Generator Controls and Switches

5. Remove yellow handle from bracket fastened to front of inside cover (RTSB) or subplate (RTSI).
6. Insert handle into hole in handle carrier arm and proceed as follows:

Move the handle UP:

 - CUSTOMER LOAD (T1 and T2) is connected to UTILITY SOURCE (N1 and N2). See A of Figure 6-3.

Move the handle DOWN:

- CUSTOMER LOAD (T1 and T2) is connected to GENERATOR SOURCE (E1 and E2). See B of Figure 6-3.

NOTE: Do not use excessive force when manually operating transfer switch or handle carrier arm may be damaged.

7. Remove handle from carrier arm. Install handle in bracket fastened to front of inside cover (RTSB) or subplate (RTSI).

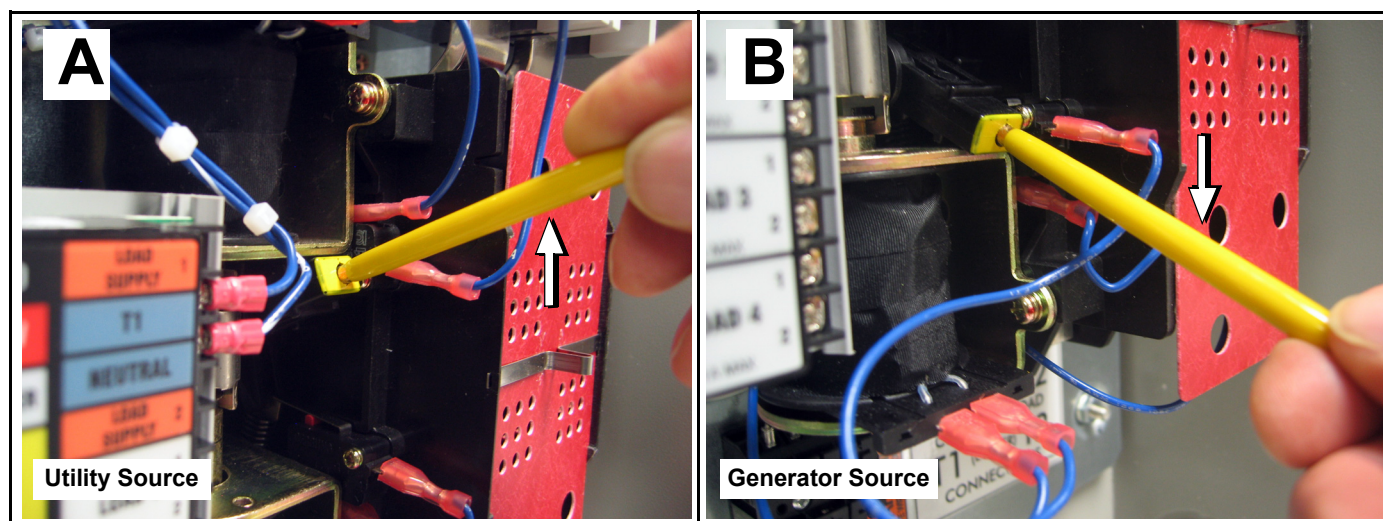


Figure 6-3. Manually Actuate Transfer Switch (RTSB Shown)

6.3 — Voltage Checks

1. Move the transfer switch UTILITY SERVICE DISCONNECT circuit breaker switch up to the ON (Closed) position (RTSB), or connect as required at Utility Distribution Panel (RTSI).
2. Turn off all loads.

⚠ DANGER!



Proceed with caution. The transfer switch is now electrically hot. Contact with live terminals results in extremely hazardous and possibly fatal electrical shock.

3. Using an AC voltmeter, verify that no load voltage measured across the transfer switch terminals is as follows. See A, B, and C of Figure 6-4.

Table 6-1. Utility Voltage Checks

Check	Approximate Measurement
N1 to N2	240 VAC
N1 to NEUTRAL	120 VAC
N2 to NEUTRAL	120 VAC

4. If UTILITY supply voltage is correct and compatible with transfer switch ratings, turn OFF the UTILITY supply to the transfer switch.
5. Press MANUAL on the generator control pad to start the generator.
6. Allow the generator to run at no load for at least five minutes.
7. Move the GENERATOR DISCONNECT Circuit Breaker switch to the ON (Closed) position.

⚠ DANGER!



Proceed with extreme caution. Generator output voltage is now being delivered to transfer switch terminals. Contact with live terminals can result in extremely dangerous and possibly fatal electrical shock.

8. Using a frequency meter and AC voltmeter, verify that frequency and no load voltage measured across the transfer switch terminals is as follows. See D, E, and F of Figure 6-4.

Table 6-2. Generator Frequency and Voltage Checks

Check	Measurement
Frequency	60-62 Hertz
E1 to E2	240-246 VAC
E1 to NEUTRAL	120-123 VAC
E2 to NEUTRAL	120-123 VAC

9. Move the GENERATOR DISCONNECT Circuit Breaker switch to the OFF (Open) position.
10. Press OFF on the generator control pad to shut down the generator. A red LED illuminates to confirm that the system is in the OFF mode.

NOTE: Do NOT proceed until generator frequency and AC output voltage are within stated limits. If the no load voltage is correct, but no load frequency is incorrect, the engine governed speed may require adjustment. If no load frequency is correct, but output voltage is not, the voltage regulator may require calibration (see generator Installation Manual).

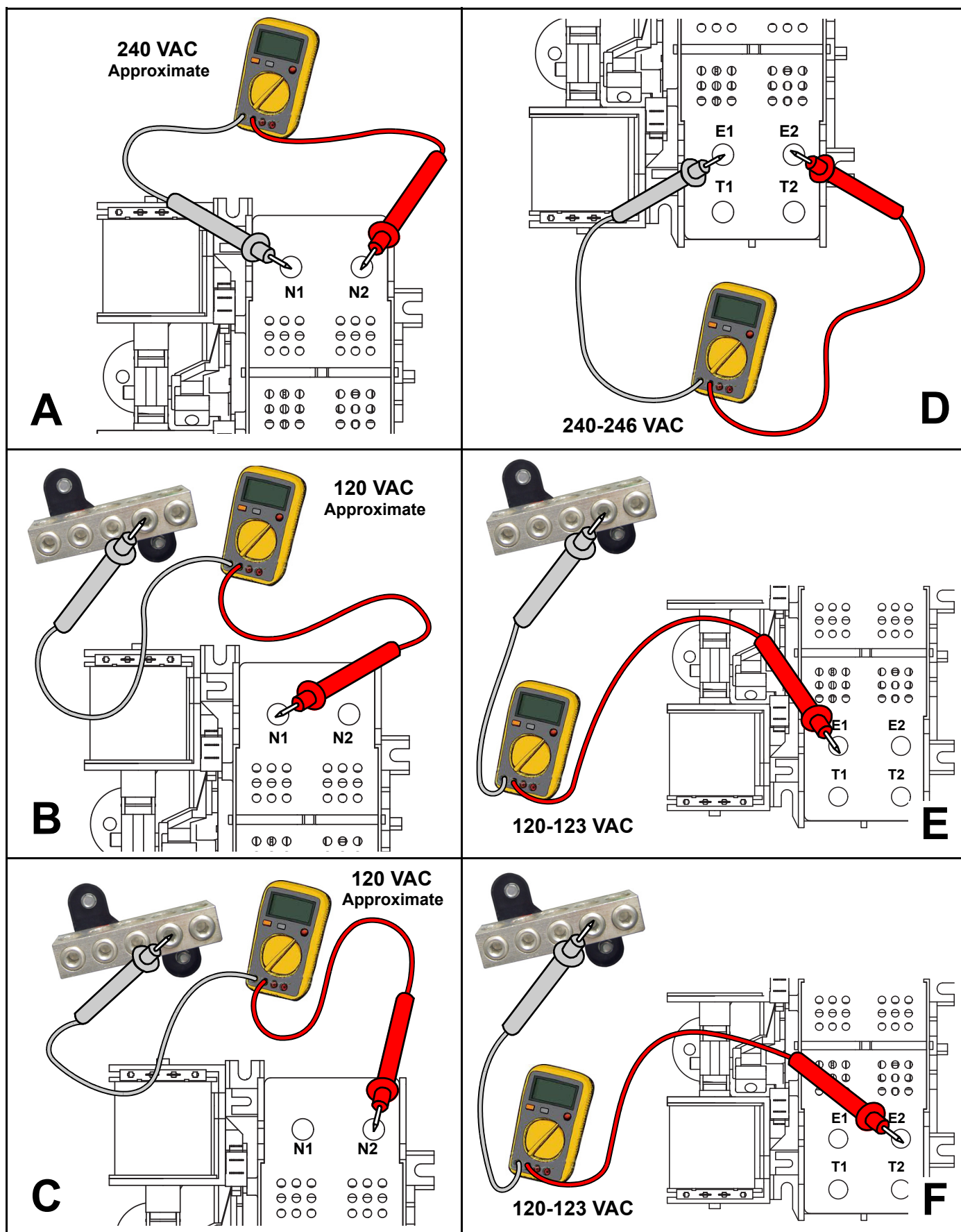
6.4 — Test Generator Under Load

1. Move the GENERATOR DISCONNECT Circuit Breaker switch to the OFF (Open) position.
2. Move the transfer switch UTILITY SERVICE DISCONNECT circuit breaker switch down to the OFF (Open) position (RTSB), or disconnect as required at Utility Distribution Panel (RTSI).
3. Remove yellow handle from bracket fastened to front of inside cover (RTSB) or subplate (RTSI).
4. Insert handle into hole in handle carrier arm of transfer switch.
5. Move the handle DOWN to connect CUSTOMER LOAD (T1 and T2) to GENERATOR SOURCE (E1 and E2). See B of Figure 6-3.
6. Press MANUAL on the generator control pad to start the generator.
7. Once the generator is running, IMMEDIATELY move the GENERATOR DISCONNECT Circuit Breaker switch to the ON (Closed) position. This prevents the speed from ramping down before the load is applied, a condition which could cause the engine to stall. The generator now powers all LOAD circuits.
8. Check generator operation under load as follows:
 - Turn ON electrical loads to the full rated wattage/ampere capacity of the generator. DO NOT OVERLOAD.
 - With maximum rated load applied, perform frequency and voltage checks across ATS terminals E1 and E2. Frequency must be greater than 59 Hertz and voltage must be greater than 220 VAC.
 - Verify that gas pressure remains within specification (see Installation Guidelines Manual, Part Number 0K2503).
 - Allow the generator to run under rated load for at least 30 minutes. While the unit is running, check for unusual noises, excessive vibration, overheating, or other signs that may indicate problems.
9. Once the inspection is complete, move the GENERATOR DISCONNECT Circuit Breaker switch to the OFF (Open) position.
10. Allow the generator to run at no load for several minutes.
11. Press OFF on the generator control pad. A red LED illuminates to confirm that the system is in the OFF mode.

6.5 — Check Automatic Operation

Check the system for proper automatic operation as follows:

1. Verify that the generator is in the OFF mode. A red LED illuminates to confirm that the system is in the OFF mode.

**Figure 6-4. Voltage Checks**

2. If removed, install cover(s) onto transfer switch enclosure.
3. Turn ON the utility power supply to the transfer switch using the means provided (such as a utility main line circuit breaker).

NOTE: Transfer Switch transfers back to the Utility position.

4. Move the GENERATOR DISCONNECT Circuit Breaker switch to the ON (Closed) position.
5. Press AUTO on the generator control pad. A green LED illuminates to confirm that the system is in the AUTO mode. The system is now ready for automatic operation.
6. Turn OFF the utility power supply to the transfer switch. With the generator ready for automatic operation, the engine will crank and start when the utility source power is turned OFF after a **ten** second delay (factory default setting). After starting, the transfer switch will connect load circuits to the standby side after a **five** second delay. Allow the system to operate through its entire automatic sequence of operation.
7. With the generator running and loads powered by generator AC output, turn ON the utility power supply to the transfer switch. The following should occur:
 - After approximately **fifteen** seconds, the switch transfers loads back to the utility power source.
 - About **one** minute later, the engine shuts down.

NOTE: With the generator in the AUTO mode, the system is now set for fully automatic operation.

6.6 — Test Overload Prevention Control Board (OPCB)

A Test button at the bottom of the OPCB is used to test the functional operation of the system. The Test button works in both the Utility Source and Generator Source positions. See Figure 6-5.

Proceed as follows:

1. Turn ON the Utility supply to the ATS.
2. Press the TEST button.
3. Verify that all connected loads are shed (disabled) and that all status LEDs on the OPCB are extinguished. The method of verification will depend on the type of load.
4. After **five minutes** has elapsed, verify that A/C 1 and Load 1 are energized and that the associated status LED on the OPCB is illuminated.
5. **Fifteen seconds** after A/C 1 and Load 1 are energized, verify that A/C 2 and Load 2 are energized and that the associated status LED is illuminated.
6. **Fifteen seconds** after A/C 2 and Load 2 are energized, verify that Load 3 is energized and the associated status LED is illuminated.
7. **Fifteen seconds** after Load 3 is energized, verify that Load 4 is energized and the associated status LED is illuminated.

6.7 — Installation Summary

1. Ensure that the installation has been properly performed and that it meets all applicable codes and regulations.
2. Test and confirm proper system operation as described in the appropriate owner's and installation manuals.
3. Educate end users on the proper operation, maintenance and service procedures.

6.8 — Removal From Service During Utility Outages

If, during prolonged utility outages, the user wishes to remove the unit from service to conserve fuel, reduce run hours, or to perform maintenance tasks, then complete the steps listed below.

IMPORTANT NOTE: Failure to abide by this procedure can result in equipment damage.

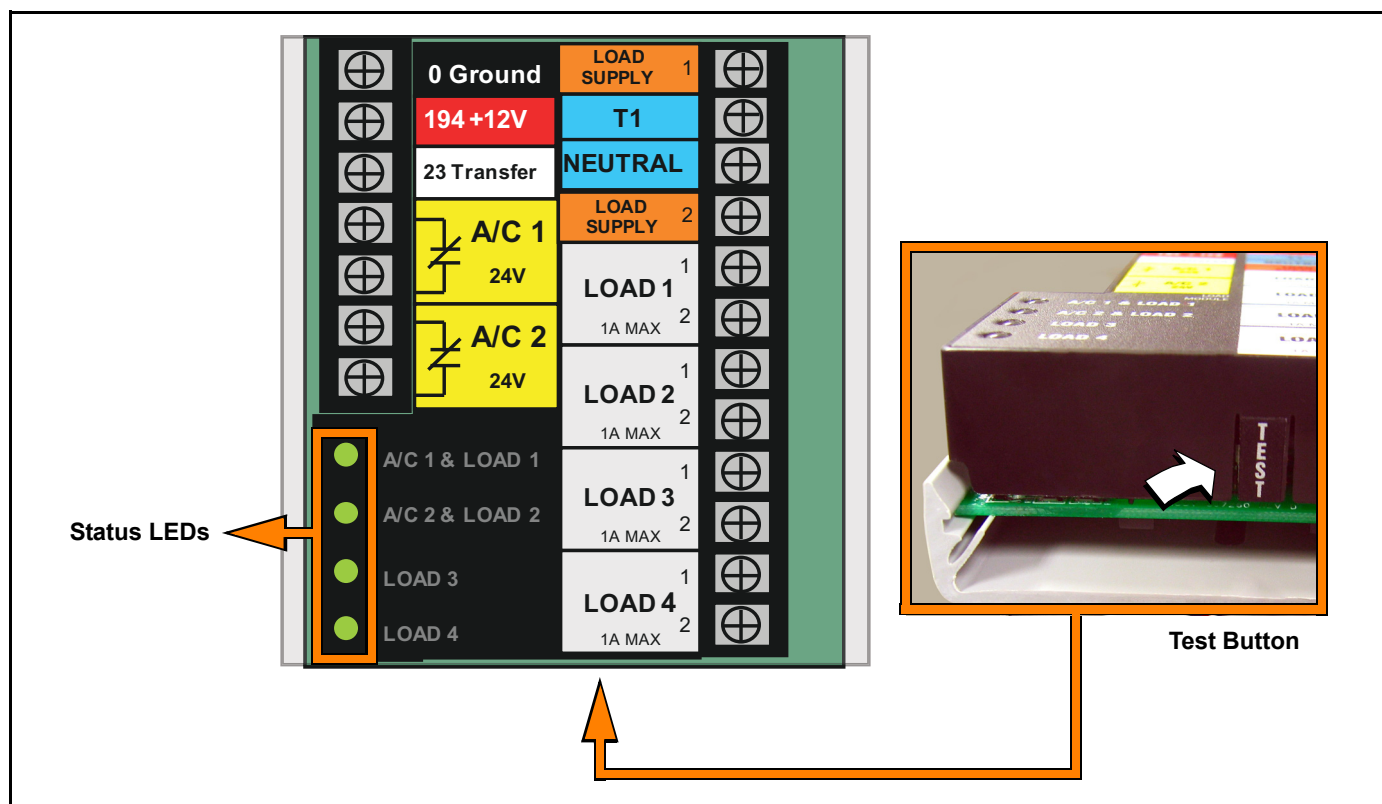


Figure 6-5. OPCB Test Button and LEDs

To remove the generator from service while running in AUTO and online, proceed as follows:

1. Turn the main utility disconnect to OFF (Open).
2. Move the GENERATOR DISCONNECT Circuit Breaker switch to the OFF (Open) position.
3. Press OFF on the generator control pad. A red LED illuminates to confirm that the system is in the OFF mode.

NOTE: If inspection and/or maintenance tasks are to be performed, complete the additional steps listed below.

IMPORTANT NOTE: If the generator has been running, allow one hour to elapse for unit to cool down and fans to stop. Failure to do so can result in damage to the AVR electronics.

4. Remove T1 fuse from transfer switch. See Figure 6-6.
5. Pull up rubber flap next to generator control pad and remove 7.5 amp fuse.
6. Remove battery negative cable (black) from battery negative (-) terminal.
7. Place a DO NOT OPERATE tag or placard on both the control pad and transfer switch.

To return the generator to service, proceed as follows:

NOTE: If inspection and/or maintenance tasks were performed, start with step 1. If the unit was just shut down to conserve fuel or to reduce run hours, start at step 5.

1. Install battery negative cable (black) onto battery negative (-) terminal.

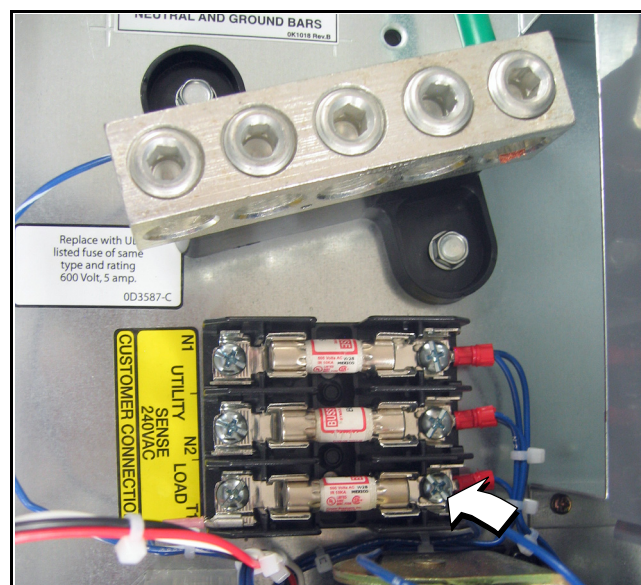


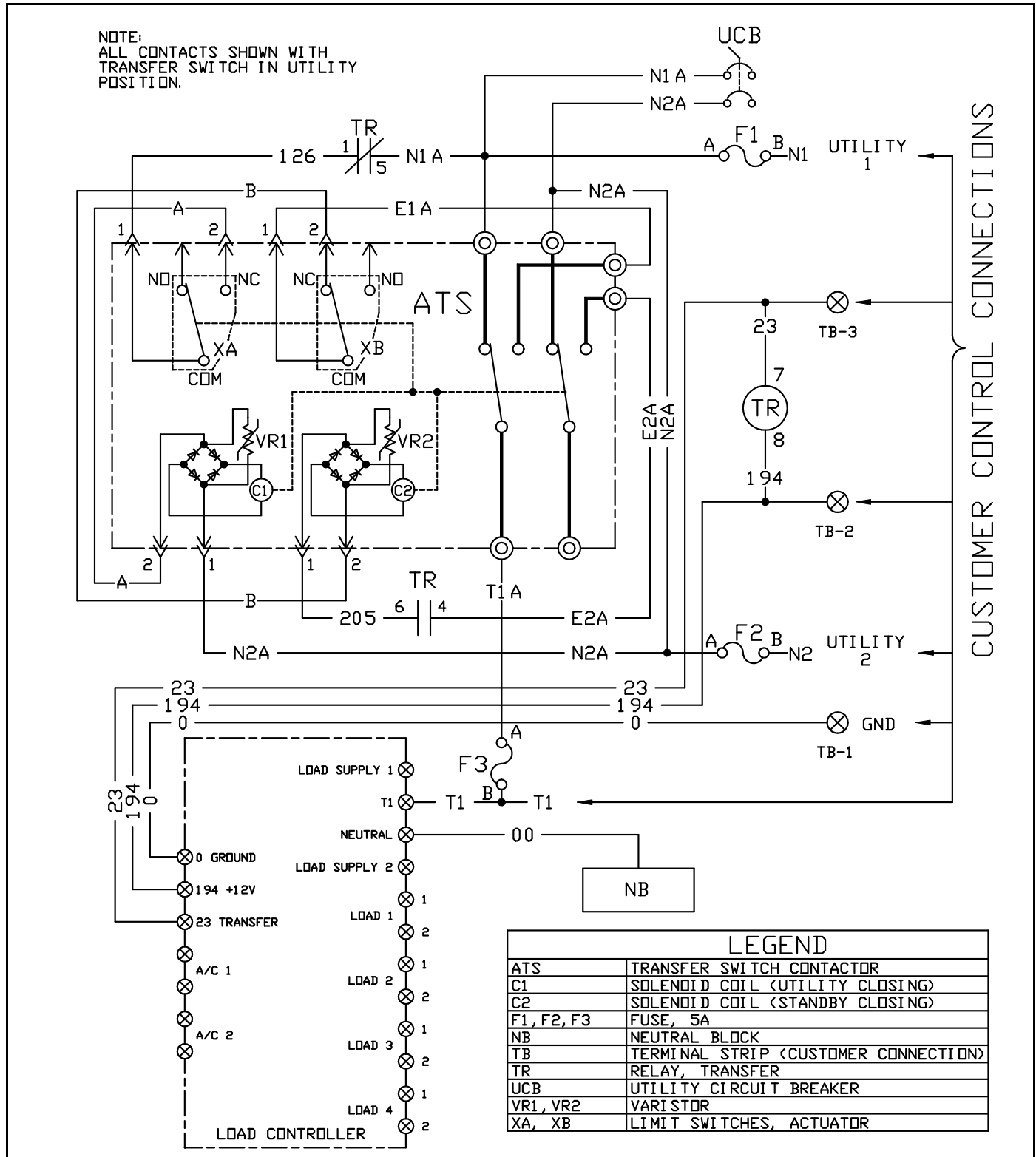
Figure 6-6. Remove T1 Fuse (RTSB Shown)

2. Pull up rubber flap next to generator control pad and install 7.5 amp fuse.
3. Install T1 fuse in transfer switch. See Figure 6-6.
4. Remove the DO NOT OPERATE tag or placard from both the control pad and transfer switch.
5. Press AUTO on the generator control pad. A green LED illuminates to confirm that the system is in the AUTO mode.
6. Once the generator is running, IMMEDIATELY move the GENERATOR DISCONNECT Circuit Breaker switch to the ON (Closed) position. This prevents the speed from ramping down before the load is applied, a condition which could cause the engine to stall.
7. Turn the main utility disconnect to ON (Closed).

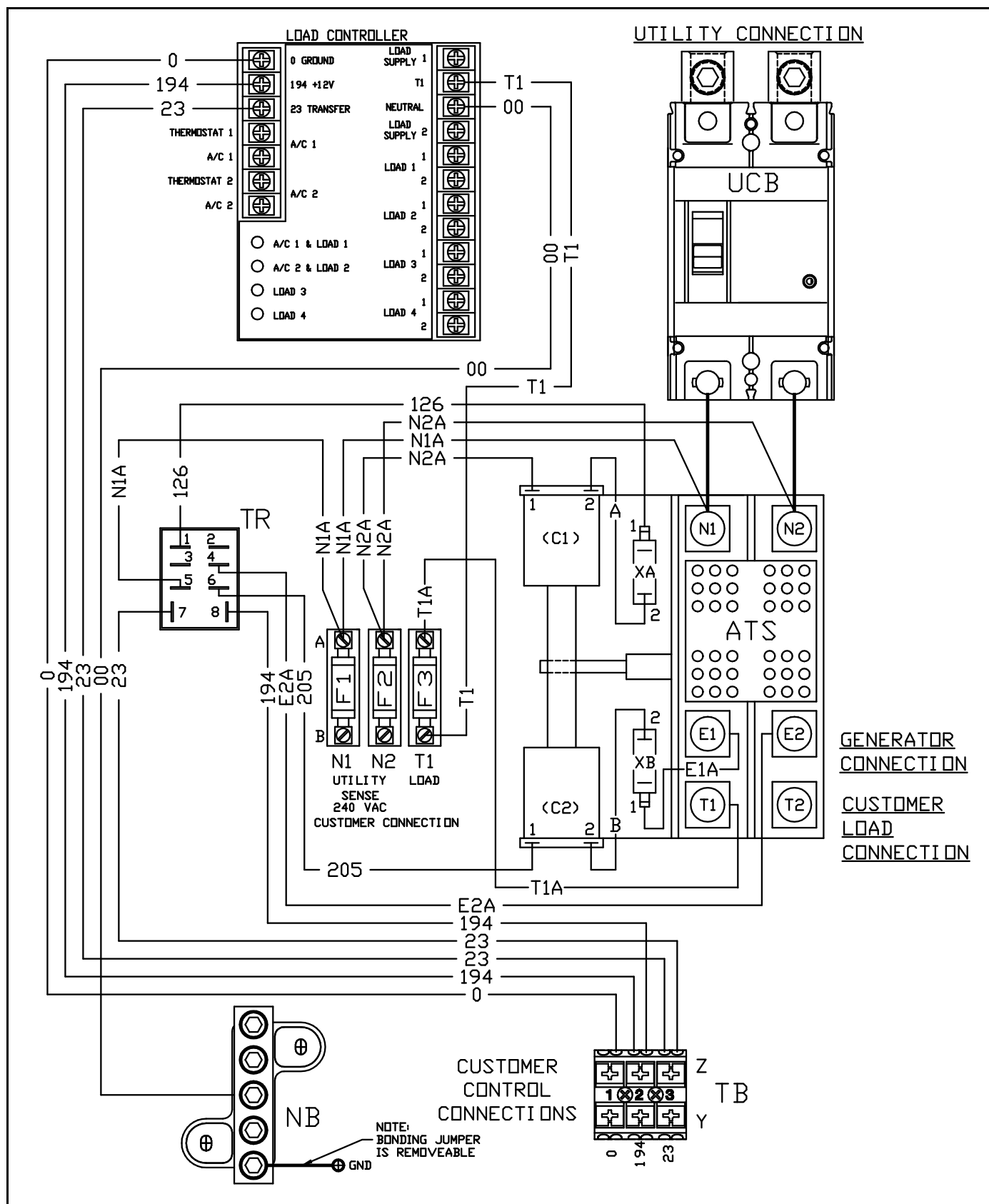
Section 7 Wiring and Installation Diagrams

7.1 — RTSB Transfer Switch

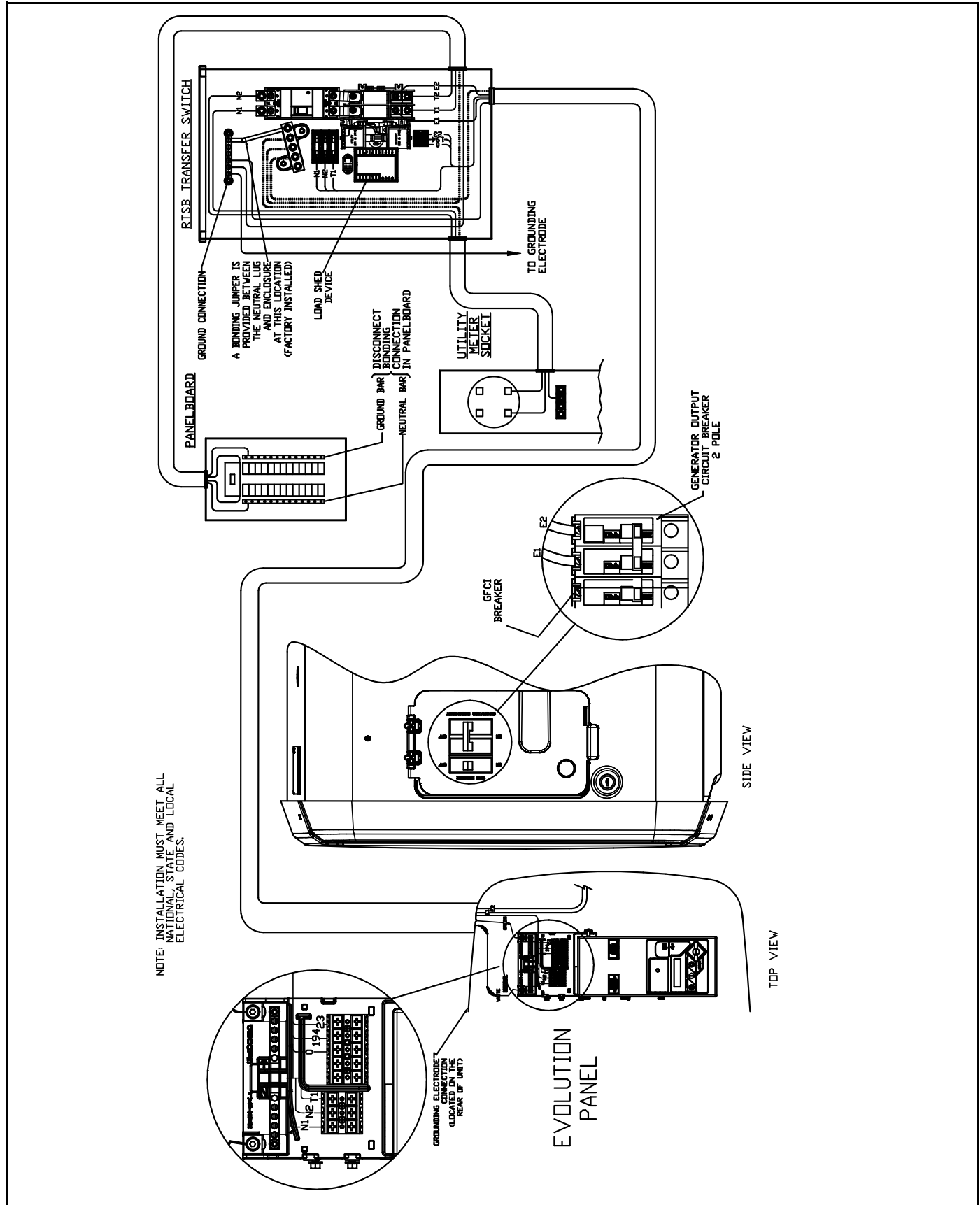
7.1.1— RTSB 200A Transfer Switch Wiring Diagram (Page 1 of 2)



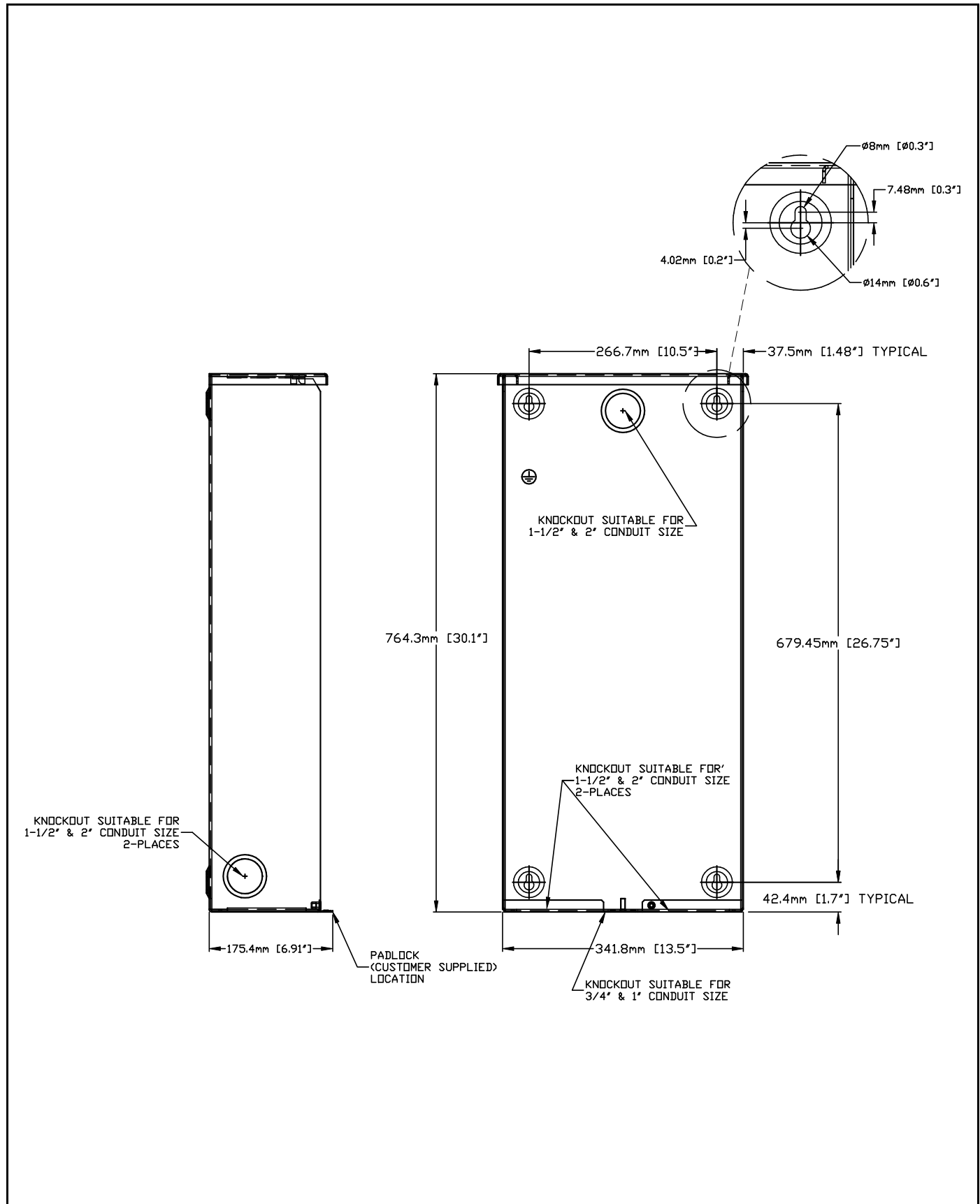
7.1.2— RTSB 200A Transfer Switch Wiring Diagram (Page 2 of 2)



7.1.3— RTSB 200A SE Transfer Switch Interconnection Drawing

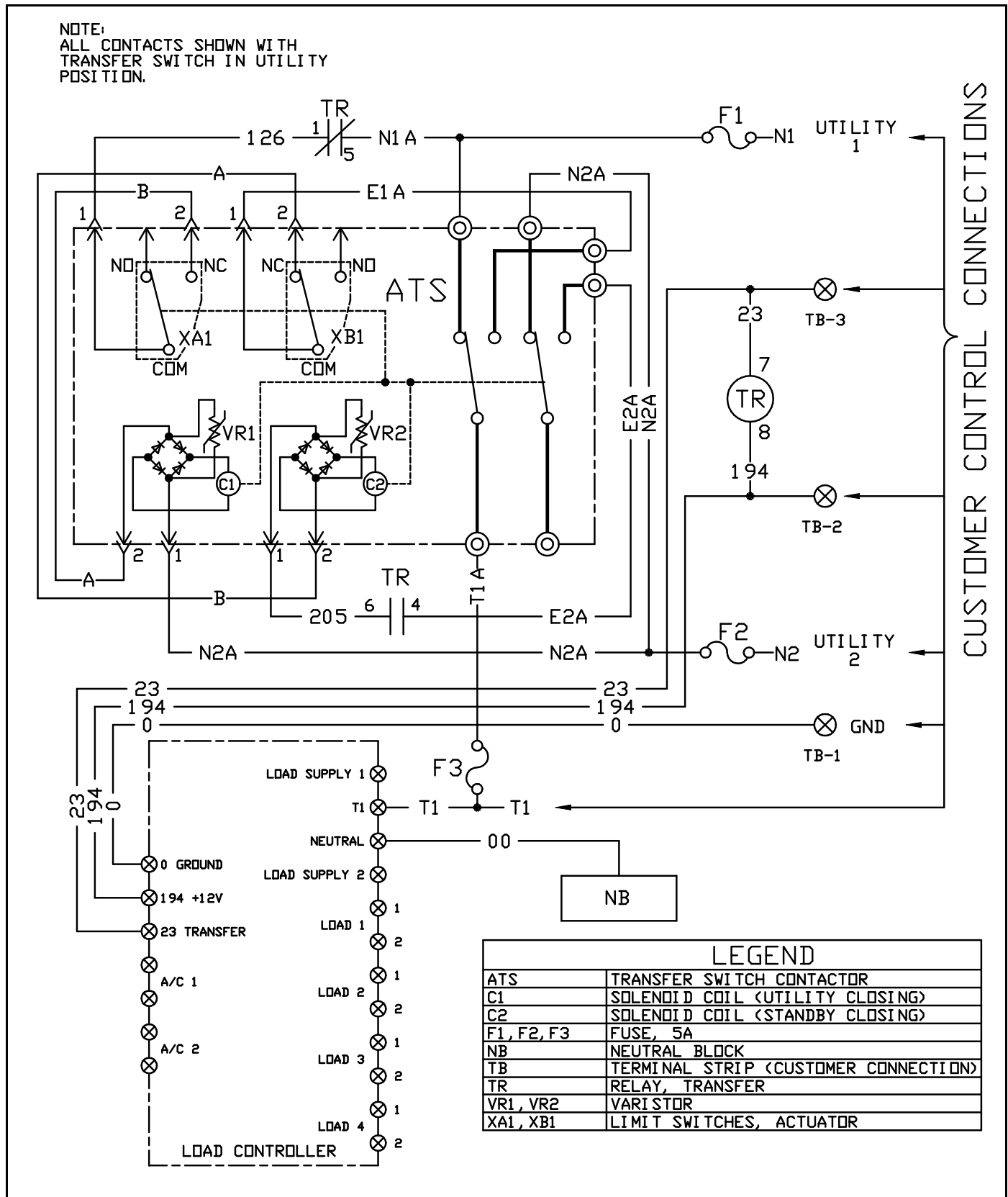


7.1.4— RTSB 200A SE Transfer Switch Installation Drawing

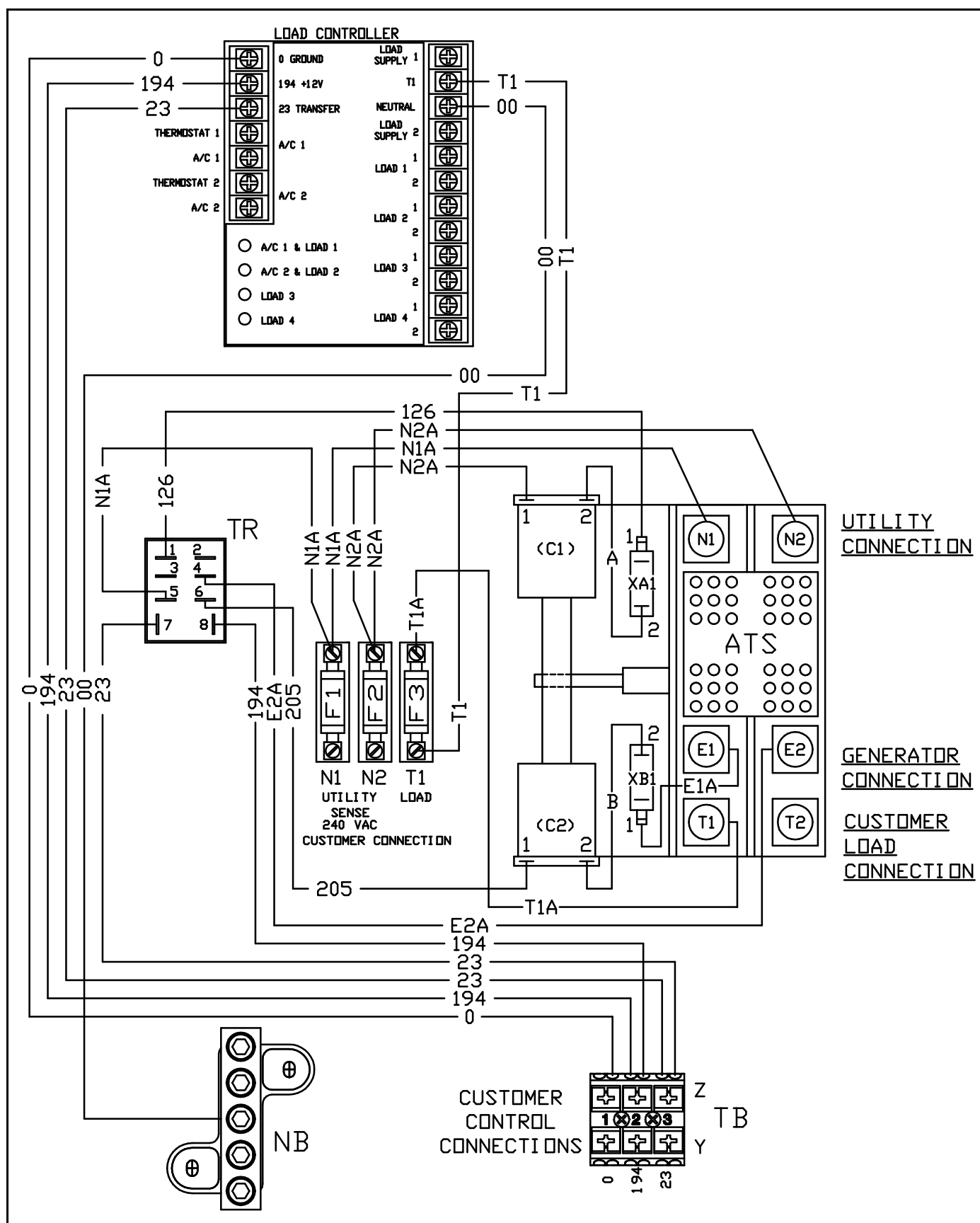


7.2 — RTSI Transfer Switch

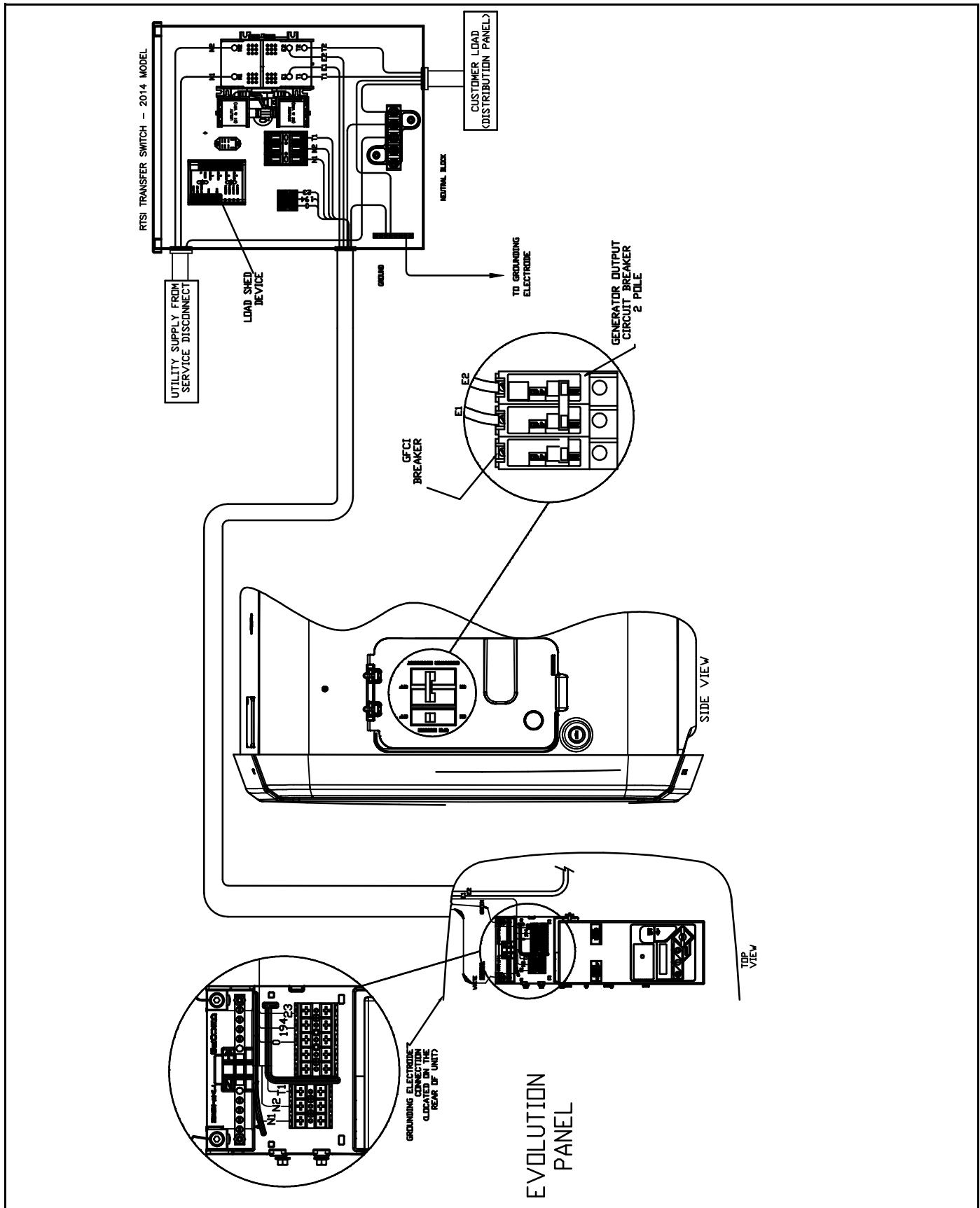
7.2.1— RTSI 200A Transfer Switch Wiring Diagram (Page 1 of 2)



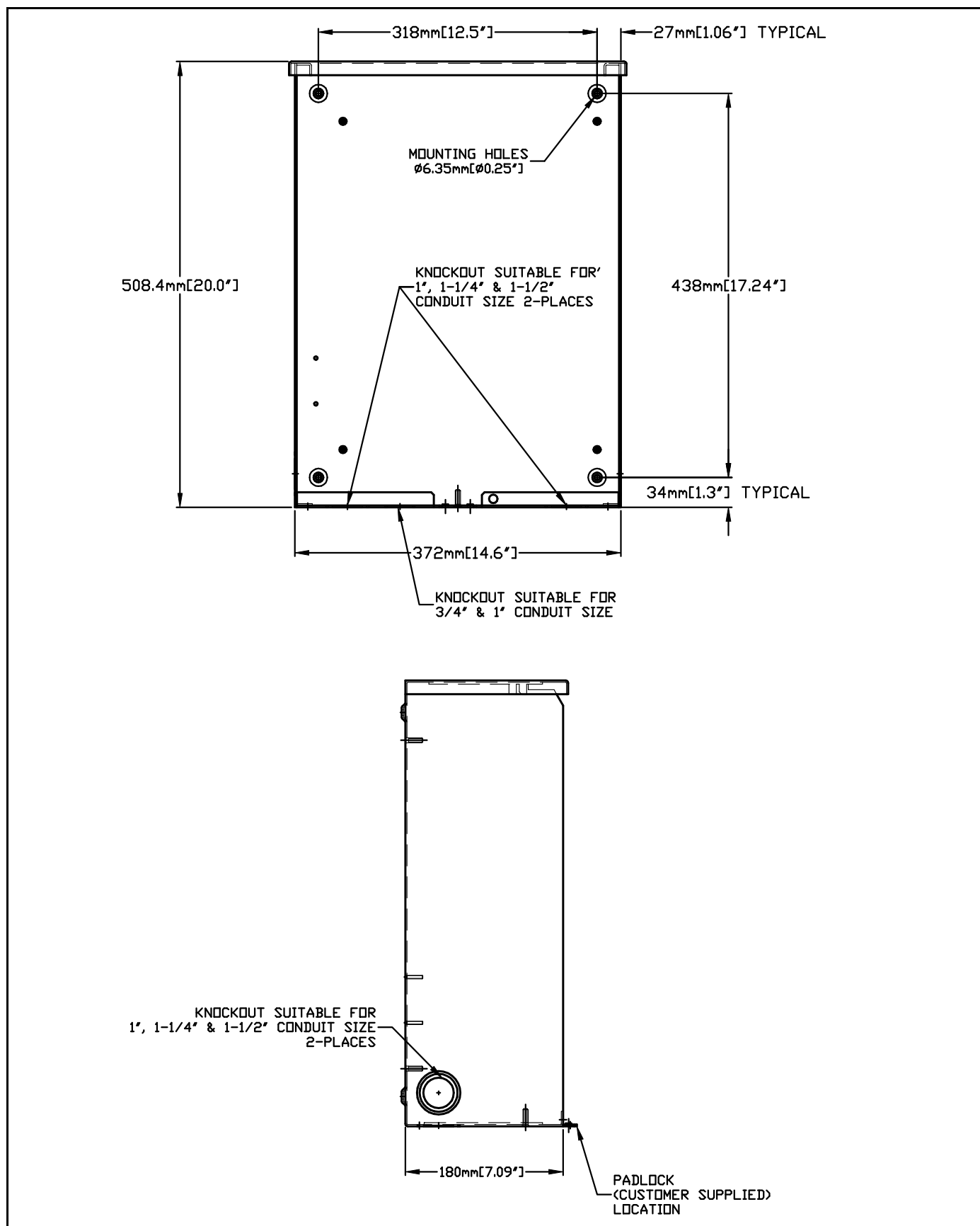
7.2.2— RTSI 200A Transfer Switch Wiring Diagram (Page 2 of 2)



7.2.3— RTSI 200A Non-SE Transfer Switch Interconnection Drawing



7.2.4— RTSI 200A Non-SE Transfer Switch Installation Drawing



Section 8 *Specifications*

8.1 — RTSB Transfer Switch

Model	RTSB200A3
Amps	200A
Voltage	120/240V 1 Phase
Load Transition Type (Automatic)	Open Transition Service Rated
Enclosure	NEMA/UL 3R
Withstand Rating (Amps)	22,000

8.2 — RTSI Transfer Switch

Model	RTSI200A3
Amps	200A
Voltage	120/240V 1 Phase
Load Transition Type (Automatic)	Open Transition Service Rated
Enclosure	NEMA/UL 3R
Withstand Rating (Amps)	10,000

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