

GENERAC®



Owner's Manual
For
Automatic Transfer Switch

50 Amp RXG10EZA1W

MODEL NUMBER: _____

SERIAL NUMBER: _____

DATE PURCHASED: _____

WWW.GENERAC.COM

1-888-GENERAC

(1-888-436-3722)

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>

SAVE THIS MANUAL FOR FUTURE REFERENCE

 **WARNING**

CANCER AND REPRODUCTIVE HARM

www.P65Warnings.ca.gov

(000393a)

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Section 1: Introduction and Safety

Introduction

Thank you for purchasing a Generac Power Systems Inc. product. This unit has been designed to provide high-performance, efficient operation, and years of use when maintained properly.

Read This Manual Thoroughly



WARNING

Consult Manual. Read and understand manual completely before using product. Failure to completely understand manual and product could result in death or serious injury. (000100a)

If any section of this manual is not understood, contact the nearest Independent Authorized Service Dealer (IASD) or Generac Customer Service at 1-888-436-3722 (1-888-GENERAC), or visit www.generac.com for starting, operating, and servicing procedures. The owner is responsible for proper maintenance and safe use of the unit.

SAVE THESE INSTRUCTIONS for future reference. This manual contains important instructions that must be followed during placement, operation, and maintenance of the unit and its components. Always supply this manual to any individual that will use this unit, and instruct them on how to correctly start, operate, and stop the unit in case of emergency.

Safety Rules

The manufacturer cannot anticipate every possible circumstance that might involve a hazard. The alerts in this manual, and on tags and decals affixed to the unit, are not all inclusive. If using a procedure, work method, or operating technique that the manufacturer does not specifically recommend, verify that it is safe for others and does not render the equipment unsafe.

Throughout this publication, and on tags and decals affixed to the unit, 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. Alert definitions are as follows:

DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

(000001)

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

(000002)

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

(000003)

NOTE: Notes contain additional information important to a procedure and will be found within the regular text of this manual.

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

Safety Symbols and Meanings



⚠ DANGER

Electrocution. High voltage is present at transfer switch and terminals. Contact with live terminals will result in death or serious injury.

(000129)



⚠ DANGER

Electrocution. Water contact with a power source, if not avoided, will result in death or serious injury.

(000104)



⚠ DANGER

Electrocution. In the event of electrical accident, immediately shut power OFF. Use non-conductive implements to free victim from live conductor. Apply first aid and get medical help. Failure to do so will result in death or serious injury.

(000145)

⚠ DANGER

Electrical backfeed. Use only approved switchgear to isolate generator from the normal power source. Failure to do so will result in death, serious injury, and equipment damage.

(000237)



⚠ DANGER

Electrocution, equipment and property damage. Handle transfer switches carefully when installing. Never install a damaged transfer switch. Doing so could result in death or serious injury, equipment and property damage.

(000195)



⚠ DANGER

Electrocution. Turn utility supply OFF before working on utility connections of the transfer switch. Failure to do so will result in death or serious injury.

(000123)



⚠ DANGER

Electrocution. Do not disable or modify the connection box door safety switch. Doing so will result in death or serious injury.

(000157)

⚠ DANGER

Automatic start-up. Disconnect utility power and render unit inoperable before working on unit. Failure to do so will result in death or serious injury.

(000191)

⚠ DANGER

Equipment malfunction. Installing a dirty or damaged transfer switch will cause equipment malfunction and will result in death or serious injury.

(000119)



⚠ WARNING

Consult Manual. Read and understand manual completely before using product. Failure to completely understand manual and product could result in death or serious injury.

(000100a)

⚠ WARNING

Electric shock. Only a trained and licensed electrician should perform wiring and connections to unit. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage.

(000155a)

⚠ CAUTION

Equipment damage. Verify all conductors are tightened to the factory specified torque value. Failure to do so could result in damage to the switch base.

(000120)

⚠ CAUTION

Equipment damage. Perform functional tests in the exact order they are presented in the manual. Failure to do so could result in equipment damage.

(000121)

⚠ CAUTION

Equipment damage. Exceeding rated voltage and current will damage the auxiliary contacts. Verify that voltage and current are within specification before energizing this equipment.

(000134a)

General Hazards

⚠ DANGER

Electrical backfeed. Use only approved switchgear to isolate generator from the normal power source. Failure to do so will result in death, serious injury, and equipment damage.

(000237)



⚠ DANGER

Electrocution. High voltage is present at transfer switch and terminals. Contact with live terminals will result in death or serious injury.

(000129)



⚠ DANGER

Electrocution. Turn utility supply OFF before working on utility connections of the transfer switch. Failure to do so will result in death or serious injury.

(000123)



⚠ DANGER

Electrocution. Water contact with a power source, if not avoided, will result in death or serious injury.

(000104)



⚠ DANGER

Electrocution. Do not wear jewelry while working on this equipment. Doing so will result in death or serious injury.

(000188)



⚠ DANGER

Electrocution. Only authorized personnel should access transfer switch interior. Transfer switch doors should be kept closed and locked. Failure to do so will result in death or serious injury.

(000213)

⚠ DANGER

Automatic start-up. Disconnect utility power and render unit inoperable before working on unit. Failure to do so will result in death or serious injury.

(000191)



⚠ DANGER

Electrocution. In the event of electrical accident, immediately shut power OFF. Use non-conductive implements to free victim from live conductor. Apply first aid and get medical help. Failure to do so will result in death or serious injury.

(000145)



⚠ WARNING

Loss of life. This product is not intended to be used in a critical life support application. Failure to adhere to this warning could result in death or serious injury.

(000209b)

⚠ WARNING

Equipment damage. This unit is not intended for use as a prime power source. It is intended for use as an intermediate power supply in the event of temporary power outage only. Doing so could result in death, serious injury, and equipment damage.

(000247a)

⚠ WARNING

Sudden start-up. Always set the safety disconnect switch to MANUAL before working on equipment. Failure to do so could result in death or serious injury.

(000194)

- 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 established by the National Electrical Code (NEC), CSA Standard; C22.1 Canadian Electric Code, the Occupational Safety and Health Administration (OSHA), or the local agency for workplace health and safety.
- If working 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.
- Any voltage measurements should be performed with a meter that meets UL3111 safety standards, and meets or exceeds overvoltage class CAT III.

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Section 2: General Information

Unpacking

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.

Check that all packing material is completely removed from the switch prior to installation.

Equipment Description

This automatic transfer switch is used for transferring critical electrical load from a utility (normal) power source to a generator (standby) power source. Such a transfer of electrical loads occurs automatically when the utility power source has failed or is substantially reduced and the generator source voltage and frequency have reached an acceptable level. The transfer switch prevents electrical feedback between two different power sources (such as the utility and generator sources) and, for that reason, codes require it in all standby electric system installations.

The transfer switch consists of a transfer mechanism, a control relay, a terminal strip and fuse holder for connection of sensing wires.

This switch is suitable for control of motors, electric discharge lamps, tungsten filament and electric heating equipment and the tungsten load does not exceed 30% of the switch rating.

This cETLus listed transfer switch is for use in optional standby systems only (NEC article 702).

A 50A rated switch is suitable for use on circuits capable of delivering not more than 10,000 RMS symmetrical amperes, 250 VAC maximum, when protected by a 50A maximum circuit breaker (Square D HOM, General Electric HQL, or Eaton Cutler Hammer BR).

Transfer Switch Features

- cETLus listed to U.S.A. and Canadian safety standards
- Single panels are compatible with single-phase generators rated up to 50 Amps/12 kW
- Flush or Surface Mount NEMA 1 indoor enclosure

This switch is listed for use with the following one inch breakers:

- Siemens / Murray type QP*
- Eaton type BR*
- Square D type HOM

*Including GFCI, AFCI and tandem breakers up to 50 amps.

Specifications

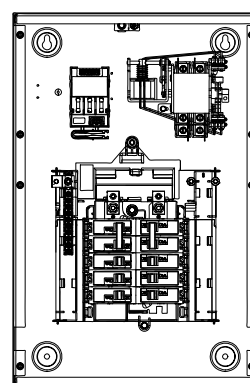
| | |
|--|--|
| Enclosure | NEMA Type 1, Surface or Flush Mount, general purpose, painted metal, for interior use only |
| Transfer Switch | Generator Lugs (E1, E2) |
| Transfer Switch Wire Size | Load Lugs (T1, T2) |
| Ground Lug | #12–20 |
| Neutral Bar | #4–14 AWG |
| Withstand Rating Main Bus (Amps) | 10,000 |
| Meets NEC Wire Bending Space | Yes |
| cETLus Listed | Yes |
| Weight: Without Whips With Whips | 20 lbs (9.1 kg) 39 (17.7 kg) |
| Operating Temperature | –20°F to 140°F (-29°C to 60°C) |

Transfer Switch Data Decal

A data decal is permanently affixed to the transfer switch enclosure. Use this transfer switch only with the specific limits shown on the data decal and on other decals and labels that may be affixed to the switch. This will prevent damage to equipment and property.

When requesting information or ordering parts for this equipment, make sure to include all information from the data decal.

For future reference, record the Model and Serial numbers in the space provided on the front cover of this manual.



000956

Figure 2-1. Panelboard With Operator

Transfer Switch Enclosure

The standard switch enclosure is a National Electrical Manufacturer's Association (NEMA) UL Type 1, rated for indoor use only.

Safe Use of Transfer Switch



⚠ WARNING

Consult Manual. Read and understand manual completely before using product. Failure to completely understand manual and product could result in death or serious injury. (000100a)

Before installing, operating or servicing this equipment, read **Safety Rules** carefully. Comply strictly with all information presented in **Safety Rules** to prevent accidents and/or damage to the equipment. The manufacturer recommends that a copy of **Safety Rules** be posted near the transfer switch. Also, be sure to read all instructions and information found on tags, labels and decals affixed to the equipment.

Two publications that outline the safe use of transfer switches are the following:

- NFPA 70: National Electrical Code
- NFPA 70E: Standard for Electrical Safety in the Workplace
- UL 1008: Standard for Safety—Automatic Transfer Switches
- UL 67: Standard for Safety—Panelboard

NOTE: It is essential to use the latest version of any standard to verify correct and current information.

Section 3: Installation

Introduction

This equipment has been wired and tested at the factory. Installing the switch includes the following procedures:

- Mounting the enclosure.
- Connecting power source and load leads.
- Connecting the generator start and sensing circuit.
- Manually operating switch to set operator toggle.
- Testing functions.

Verify factory torque of conductors as well as electrical harness connections.

Mounting

Mounting dimensions for the NEMA Type 1 Indoor Transfer Switch enclosure are in this manual. Enclosures are typically wall-mounted. See [Drawings and Diagrams](#).



⚠ DANGER

Electrocution, equipment and property damage. Handle transfer switches carefully when installing. Never install a damaged transfer switch. Doing so could result in death or serious injury, equipment and property damage.

(000195)

⚠ DANGER

Equipment malfunction. Installing a dirty or damaged transfer switch will cause equipment malfunction and will result in death or serious injury.

(000119)

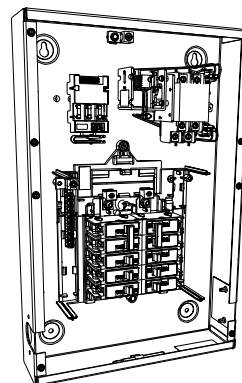
Protect the switch against impact at all times, and against construction grit and metal chips.

1. Locate automatic transfer switch with built-in emergency load center in close proximity to the main distribution panel. The transfer switch can be located to the left or right of the main distribution panel. One foot (0.3 m) is the suggested distance.

NOTE: The transfer switch may be located a different distance from the main panel depending on available mounting area. Using the two foot (0.61 m) conduit connected straight across to the main panel is another option. Always adhere to local electrical codes during installation.

2. Hold transfer switch against the mounting surface. Level the transfer switch and mark the mounting holes.
3. Drill the appropriate size pilot holes.
4. Mount transfer switch with built-in load center to mounting surface with appropriate fasteners.

NOTE: See [Figure 3-1](#). Transfer switch **MUST** be mounted vertically as shown.



004175

Figure 3-1. Mount Transfer Switch

5. Switch service main circuit breaker to OFF (OPEN) before removing cover or any wiring in the main electrical distribution panel. The wires connected to the service main circuit breaker remain LIVE or HOT. Avoid contact with these wires and the service main circuit breaker connection lugs.

NOTE: This switch is equipped with a two feet (0.67 m) whip.

Connecting Power Source and Load Lines



DANGER

Electrocution. Only authorized personnel should access transfer switch interior. Transfer switch doors should be kept closed and locked. Failure to do so will result in death or serious injury. (000213)



DANGER

Electrocution. Turn utility and emergency power supplies to OFF before connecting power source and load lines. Failure to do so will result in death or serious injury. (000116)

WARNING

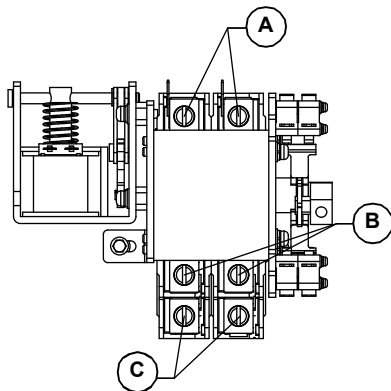
Electric shock. Only a trained and licensed electrician should perform wiring and connections to unit. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage. (000155a)

Installation and interconnection diagrams are provided in this manual.

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

2-Pole Mechanism

See [Figure 3-2](#). These switches are used with a single-phase system when the single-phase NEUTRAL line is to be connected to a Neutral Lug and is not to be switched.



001488

Figure 3-2. Typical 2-Pole Transfer Mechanism

| | |
|----|--------------------------|
| A. | Utility Lugs (N1 & N2) |
| B. | Generator Lugs (E1 & E2) |
| C. | Load Lugs (T1 & T2) |

Solderless, screw-type terminal lugs are standard.

| Switch Rating | Wire Range | Conductor Tightening Torque |
|---------------|------------|-----------------------------|
| 50A | 1/0–14 AWG | 50 in.lbs. (5.65 Nm) |

Conductor sizes must be adequate to handle the maximum current to which they will be subjected, based on the 167° F (75°C) column of tables, charts, etc. used to size conductors. The installation must comply fully with all applicable codes, standards and regulations.

Before connecting wiring cables to terminals, remove any surface oxides from the cable ends with a wire brush. All power cables should enter the switch next to transfer mechanism terminals.

NOTE: If aluminum conductors are used, apply corrosion inhibitor to conductors. After tightening terminal lugs, carefully wipe away any excess corrosion inhibitor.

Tighten terminal lugs to the torque values as noted on the decal located on the inside of the door. After tightening terminal lugs, carefully wipe away any excess corrosion inhibitor.

CAUTION

Equipment damage. Verify all conductors are tightened to the factory specified torque value. Failure to do so could result in damage to the switch base.

(000120)

Connect power source and load conductors to clearly marked terminal lugs on transfer mechanism as follows:

1. Connect utility (normal) power source cables to utility service disconnect circuit breaker.
2. Connect the generator (standby) source power cables to transfer switch terminals E1 and E2. Connect customer LOAD leads to switch terminals T1 and T2.

Conductors must be properly supported, of approved insulative qualities, protected by approved conduit, and of the correct wire gauge size in accordance with applicable codes.

Be sure to maintain proper electrical clearance between live metal parts and grounded metal. Allow at least one-half inch (13 mm) for 100-400 amp circuits.

Connecting Start Circuit Wires

Control system interconnections (Electrical Data section) consist of UTILITY 1 (N1), UTILITY 2 (N2) and LOAD (T1), and leads 23 and 194. Recommended wire gauge sizes for this wiring depends on the length of the wire, as recommended in the following chart:

| Maximum Wire Length | Recommended Wire Size |
|-----------------------|-----------------------|
| 1–115 ft (0.3–35 m) | No. 18 AWG |
| 116–185 ft (36–56 m) | No. 16 AWG |
| 186–295 ft (57–89 m) | No. 14 AWG |
| 296–460 ft (90–140 m) | No. 12 AWG |

Exception: Conductors of AC and DC circuits, rated 600 volts, shall be permitted to occupy the same equipment, cable, or conduit. All conductors shall have an insulation rating equal to at least the maximum circuit voltage applied to any conductor within the equipment, cable, or conduit. See NEC 300.3(C)(1).

Circuit Breaker Wiring

NOTE: Balance must be maintained when moving circuit locations from main electrical distribution panel to emergency load center. Circuit breaker positions alternate buss bars vertically. Circuits sharing a neutral wire should either be moved together to adjacent positions in emergency load center or not moved. If unsure of the proper procedure or if the installation differs from that described in this guide, consult a licensed professional at this time.

1. Remove the main electrical distribution panel cover.
2. Remove appropriate size knockout from the right side of the main panel. (As provided, a two feet (0.67 m) flexible conduit is pre-wired from the transfer switch with built-in load center).
3. Remove threaded lock nut from conduit coupling. Feed all wires through knockout into main panel. Slip lock nut over wires and tighten securely onto conduit coupling.

NOTE: Circuits to be moved must be protected by same size breaker. For example, a 15 amp 120 volt circuit in emergency load center will replace a 15 amp 120 volt circuit in main electrical distribution panel.

4. In the main panel, remove the black (hot) wire from the circuit breaker that protects a circuit to be powered in the event of a power failure. Wire nut the black wire to the matching circuit lead wire from the emergency circuit breaker in the load center in the transfer switch. (All circuit wires are color coded and labeled for easy identification). UL listed wire locknuts are included in installation kit.
5. Trace each black (hot) wire connected and wire nut the white (neutral) wire from the same Romex cable (circuit) to the matching circuit number on the

white (neutral) wire from the emergency load center. Repeat for each circuit.

6. Repeat this process with the remaining circuits to be powered by the generator.

NOTE: Both grounded and ungrounded conductors must be moved to the emergency panel and connected to the new wiring from the emergency panel using supplied wire nuts.

7. Install the 50 amp double pole breaker into main electrical distribution panel. This circuit breaker must be compatible with the main electrical distribution panel. It may be necessary to reposition remaining circuit breakers or remove circuit breakers that have been disconnected to accommodate the insertion of the 50 amp double pole circuit breaker.
8. Connect white wire to the main distribution panel neutral bar.
9. Connect solid green wire to main electrical panel ground bar.
10. Connect the black and red wires to the 50 amp double pole circuit breaker.
11. Reinstall the main distribution panel cover.

NOTE: In some applications, installers wish to substitute double-pole circuit breakers for single-pole circuit breakers. In order to accommodate the additional neutral wires, a dual neutral/ground kit can be installed on pre-wired switches. The kit (model G006612-0) provides the additional required landing spaces.

In other applications, local codes may not allow wire nut connections within the main electrical panel. The installer must then add an additional gang box to accommodate these connections. However, an additional gang box is not required with the dual neutral/ground kit. After the auxiliary grounding bar is installed, a jumper wire is installed between the bar and ground post. This allows installers to connect the branch wiring directly to the switch by providing the means to ground each circuit within the pre-wired switches.

NOTE: The dual neutral/ground kit cannot be used in both applications simultaneously. It must be used for either neutral only, or ground only.

Connecting Start Circuit Wires

Control system interconnections consist of N1, N2, and T1, and leads 23 and 194 (see **Figure 3-3**).

NOTE: To simplify installation, Generac Composite Tray Cable control wiring color codes match the label on the control module.

The generator control wiring is a Class 1 signaling circuit. Reference instruction manual of specific engine generator for wiring connection details. Screw heads are straight bladed and cross-bladed, and should be tightened to 3.5 in-lb (0.4 Nm).

Recommended wire gauge is No. 18 AWG.

Exception: Conductors of AC and DC circuits, rated 1000 volts nominal, or less, shall be permitted to occupy the same equipment, cable, or conduit. All conductors shall have an insulation rating equal to at least the maximum circuit voltage applied to any conductor within the equipment, cable, or conduit. See NEC 300.3(C)(1).

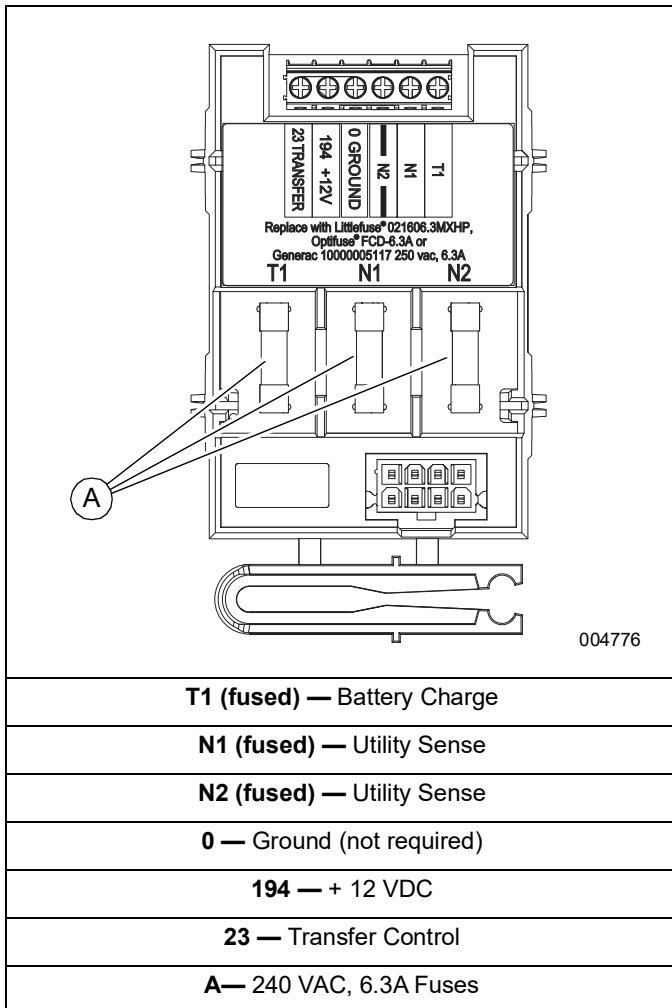


Figure 3-3. Typical Connections

| Table 3-1. Customer Wiring Connections Integrated PCB (non-SACM) | |
|---|--|
| Terminal Numbering Decal | Wire Numbers |
| BLUE* | T1—Fused 120 VAC for battery charger |
| YELLOW | N1—Fused 240 VAC Sensing for utility dropout and pickup |
| YELLOW WITH BLACK STRIPE | N2—Fused 240 VAC Sensing for utility dropout and pickup |
| BLACK | 0—DC (-) Not required |
| RED | 194—DC (+) 12 VDC for transfer controls |
| WHITE | 23—Transfer control signal wire |

* Required to supply utility or generator voltage to the generator battery charger.

Installing Branch Circuit Conductors – USA Installations

1. Select which branch circuits will be protected by the generator in the normal power panel board.
2. Turn the circuit breaker in the normal power panel board to the off position.
3. Remove the ungrounded (hot) conductor from the circuit breaker and neutral conductor from the neutral terminal bar in the normal power panel board.

NOTE: If the circuit to be protected is part of a multi-wire branch circuit, the entire multi-wire branch circuit has to be relocated to the transfer switch panel board. (See NEC 210.4) The branch circuit wiring can be removed from the normal power panel board and installed in the transfer switch panel board, or spliced onto new branch circuit wiring originating from the transfer switch panel board.

4. If the normal power panel board is being used as a junction box for the protected branch circuit conductors, install an NEC approved conduit(s), raceway(s), or other approved wiring method between the transfer switch panel board and normal power panel board.
5. Install properly sized branch circuit conductors between the transfer switch panel board to the branch circuit conductors to be protected by the transfer switch.
6. Use listed wire nuts or any other approved termination device to connect the branch circuit conductors.
7. Install the provided label on the existing panel board that indicates the location of the disconnecting means for the pass through conductors.

8. If the generator protected branch circuit conductors are being re-installed into the transfer switch panel board, punch the required sized hole(s) for the cable, conduit, or raceway.
9. Route the branch circuit conductors into the transfer switch and terminate the equipment ground conductor on the equipment ground terminal bar, the neutral on the neutral terminal bar, and the ungrounded (hot) on the circuit breaker terminal.
10. Size all conductors, raceways, conduits, and junction boxes, if required, to the applicable NEC code articles and follow the NEC installation requirements for the wiring method(s) selected.

Installing Branch Circuit Conductors – Canadian Installations

1. Select which branch circuits will be protected by the generator in the normal power panel board. Turn the circuit breaker in the normal power panel board to the off position.
2. Remove the ungrounded (hot) conductor from the circuit breaker and neutral conductor from the neutral terminal bar in the normal power panel board.

NOTE: If the circuit to be protected is part of a multi-wire branch circuit, the entire multi-wire branch circuit has to be relocated to the transfer switch panel board.

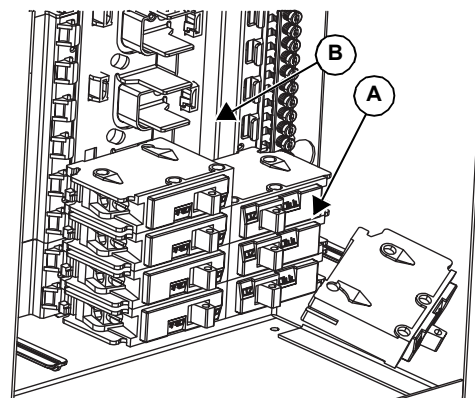
3. The Canadian Electric Code prohibits the use of the normal power panel board as a junction box, the generator protected branch circuit wiring will have to be relocated to a properly sized junction box, or reinstalled into the transfer switch panel board.
4. Punch the required sized hole(s) for the cable, conduit, or raceway.
5. Route the branch circuit conductors into the transfer switch and terminate the equipment ground conductor on the equipment ground terminal bar, the neutral on the neutral terminal bar, and the ungrounded (hot) on the circuit breaker terminal.
6. Size all conductors, raceways, conduits, and junction boxes, if required, to the applicable CEC code articles and follow the CEC installation requirements for the wiring method(s) selected.

Installing Breakers

IMPORTANT NOTE: AFCI and GFCI breakers are not provided by the factory. If the circuits to be protected require AFCI or GFCI protection, or both, then listed protection shall be provided by the installer.

The factory-supplied breakers can be changed by the installer. Install listed and labeled circuit breakers that are compatible with the transfer switch (see [Transfer Switch Features](#)). Follow all applicable NEC and CEC code articles for any field modifications.

See [Figure 3-4](#). Insert the tab on the breaker (A) into the hook on the bus (B). Push the breaker into the bus until it snaps into place.

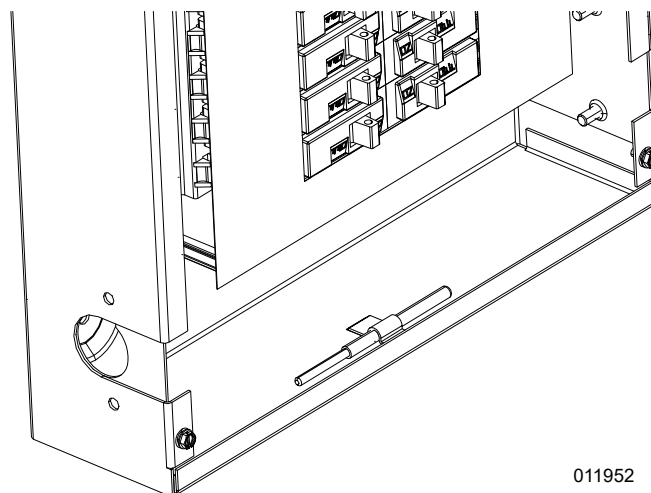


000362

Figure 3-4. Installing Breakers

Installing Manual Operation Handle

1. Expose adhesive on u-clip.
2. Affix to bottom of the enclosure.
3. Insert manual operation handle into u-clip.



011952

Figure 3-5. Installing Manual Operation Handle

NOTE: Do not operate transfer switch in automatic mode with manual operation handle in manual lever.

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Section 4: Operation

Functional Tests and Adjustments

Following transfer switch installation and interconnection, inspect the entire installation carefully. A competent, qualified electrician should inspect it. The installation must comply strictly with all applicable codes, standards, and regulations. When absolutely certain the installation is proper and correct, complete a functional test of the system.

CAUTION

Equipment damage. Perform functional tests in the exact order they are presented in the manual. Failure to do so could result in equipment damage.

(000121)

IMPORTANT: Before proceeding with functional tests, read and make sure all instructions and information in this section is understood. Also read the information and instructions of labels and decals affixed to the switch. Note any options or accessories that might be installed and review their operation.

Manual Operation



DANGER

Electrocution. Do not manually transfer under load. Disconnect transfer switch from all power sources prior to manual transfer. Failure to do so will result in death or serious injury, and equipment damage.

(000132)

See **Figure 4-1**. A manual transfer handle (D) is shipped with the transfer switch.

IMPORTANT NOTE: Manual operation must be done prior to electrical operation. This is to reset the toggle after shipping and to verify there are no wiring obstructions near moving parts. To check manual operation, proceed as follows:

1. Verify the generator is in the OFF mode.
2. Turn OFF or OPEN both UTILTY and EMERGENCY power supplies to the transfer switch, with whatever means provided (such as the main line circuit breakers).
3. Note position of transfer mechanism main contacts by observing the movable contact carrier arm.
 - Manual operation handle towards the top of switch mechanism—LOAD terminals (T1, T2) are connected to STANDBY terminals (E1, E2).
 - Manual operation handle towards the bottom of switch mechanism—LOAD terminals (T1, T2) are connected to UTILITY terminals (N1, N2).

CAUTION

Equipment damage. Do not use excessive force while manually operating the transfer switch. Doing so could result in equipment damage.

(000122)

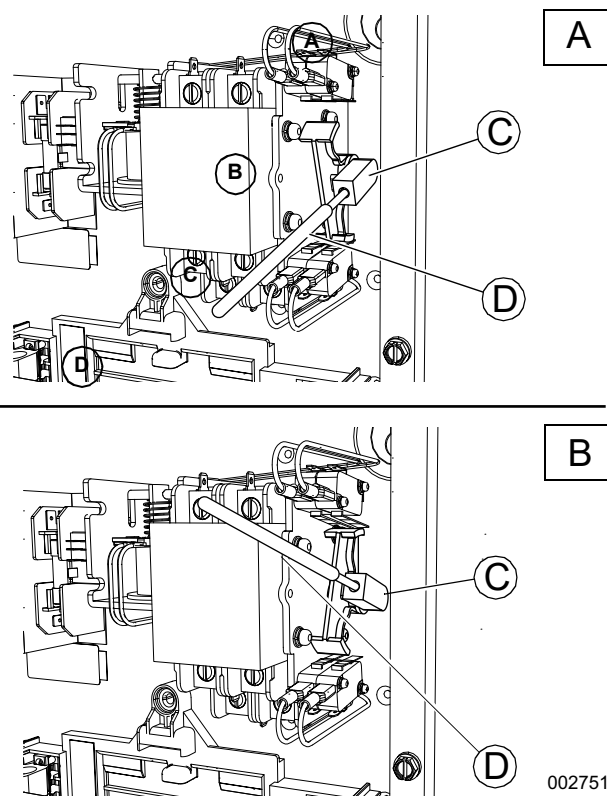
CAUTION

Equipment damage. Return manual operating handle to storage bracket after manual operation. Failure to do so could result in equipment damage.

(000746)

Close to Normal Source Side

See **Figure 4-1**. Before proceeding, verify the position of the switch by observing the position of the transfer switch operating lever (C) and manual transfer handle (D).



| | |
|---|--|
| A | Load connected to standby power source |
| B | Load connected to utility power source |
| C | Transfer switch operating lever |
| D | Manual transfer handle |

Figure 4-1. Actuating Transfer Switch

If the handle is down (A), the contacts are closed in the normal position. No further action is required. If the handle is UP (B), proceed.

With the handle inserted into the actuating shaft, move handle DOWN. Be sure to hold on to the handle as it will move quickly after the center of travel.

Close to Emergency Source Side

See **Figure 4-1**. Before proceeding, verify the position of the switch by observing the position of the manual transfer handle (D).

If the handle is UP, the contacts are closed in the EMERGENCY (Standby) position. No further action is required. If the handle is down, proceed.

With the handle inserted into the actuating shaft, move the handle UP. Be sure to hold on to the handle as it will move quickly after the center of travel.

Return to Normal Source Side

1. Manually actuate switch to return manual operating handle to the DOWN position.



Equipment damage. Return manual operating handle to storage bracket after manual operation. Failure to do so could result in equipment damage.

(000746)

2. Remove manual operating handle from transfer switch contactor.
3. Return handle to storage bracket.

Voltage Checks

NOTE: Use the Digital Multimeter (DMM) LowZ low input impedance setting to collect accurate voltage measurements. LowZ eliminates the possibility of inaccurate ghost voltage readings, also known as phantom voltage or stray voltage readings. See DMM manufacturer’s literature for additional information.

Utility Voltage Checks



Electrocution. High voltage is present at transfer switch and terminals. Contact with live terminals will result in death or serious injury.

(000129)



Electrocution. Turn utility supply OFF before working on utility connections of the transfer switch. Failure to do so will result in death or serious injury.

(000123)

1. Turn ON the UTILITY power supply to the transfer switch with whatever means provided (such as the UTILITY main line circuit breaker).
2. With an accurate AC voltmeter, check for correct voltage. Measure across ATS terminal lugs N1 and N2; N1 to NEUTRAL and N2 to NEUTRAL.
3. When certain that UTILITY supply voltage is correct and compatible with transfer switch ratings, turn OFF the UTILITY supply to the transfer switch.

Generator Voltage Checks



Electrocution. High voltage is present at transfer switch and terminals. Contact with live terminals will result in death or serious injury.

(000129)

1. On the generator panel, select the MANUAL mode of operation. The generator should crank and start.
2. Let the generator stabilize and warm up at no-load for at least five minutes.
3. Set the generator main circuit breaker (CB1) to ON or CLOSED.
4. With an accurate AC voltmeter and frequency meter, check the no-load, voltage and frequency. Measure across ATS terminal lugs E1 to E2; E1 to NEUTRAL and E2 to NEUTRAL.

| | |
|-------------------------|-------------|
| Frequency | 60–62 Hz |
| Terminals E1 to E2 | 240–246 VAC |
| Terminals E1 to NEUTRAL | 120–123 VAC |
| Terminals E2 to NEUTRAL | 120–123 VAC |

5. When certain that generator supply voltage is correct and compatible with transfer switch ratings, turn OFF the generator supply to the transfer switch.
6. Set the generator main circuit breaker (CB1) to OFF or OPEN. Allow the generator to cool down for one minute.
7. On the generator panel, select the OFF mode to shut down the generator.

Do NOT proceed until generator AC output voltage and frequency are correct and 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 voltage is not, the voltage regulator may require adjustment.

Generator Tests Under Load

1. Turn OFF the utility power supply to the transfer switch with whatever means provided (such as the utility main line circuit breaker).
2. Set the generator main circuit breaker to OFF or OPEN.
3. Manually actuate the transfer switch main contacts to the emergency (Standby) position. See [Manual Operation](#). To start the generator, select the MANUAL mode of operation. When engine starts, let it stabilize for a few minutes.
4. Set the generator main circuit breaker to ON or CLOSED. The generator now powers all LOAD circuits. Check generator operation under load as follows:
 - Turn on electrical loads to the full rated wattage/ amperage capacity of the generator. DO NOT OVERLOAD.
 - With maximum rated load applied, check voltage and frequency across transfer switch terminals E1 and E2. Voltage should be greater than 230 volts (240 VAC system); frequency should be greater than 59 Hz.
 - Let the generator run under rated load for at least 30 minutes. With unit running, listen for unusual noises, vibration, overheating, etc., that might indicate a problem.
5. When checkout under load is complete, set main circuit breaker of the generator to the OFF or OPEN position.
6. Let the generator run at no-load for several minutes. Then, shut down by selecting the OFF mode.
7. Move the main switch contacts back to UTILITY.

NOTE: See [Manual Operation](#). Handle and operating lever of transfer switch should be in down position.

8. Turn on the utility power supply to transfer switch, using whatever means provided (such as a utility main line circuit breaker). The utility power source now powers the loads.
9. The system is now set for fully automatic operation.

Checking Automatic Operation

To check the system for proper automatic operation, proceed as follows:

1. Verify generator is in OFF mode.
2. Install front cover of the transfer switch.
3. Turn the utility power supply to the transfer switch ON, using the utility main line circuit breaker.
4. Set the generator main circuit breaker to ON.
5. On the generator panel, select AUTO. The system is now ready for automatic operation.
6. Turn utility power supply to the transfer switch OFF.

With the generator ready for automatic operation, the engine should crank and start when the utility source power is turned OFF after a ten second delay (factory default setting). After starting, the transfer switch should connect load circuits to the standby side after a five second delay. Let the system operate through its entire automatic sequence of operation.

Shutting Generator Down While Under Load

IMPORTANT NOTE: To avoid equipment damage, follow these steps, in order, when shutting the generator down during utility outages. Shutdowns may be required during outages to perform routine maintenance or to conserve fuel.

To turn the generator OFF (while running in AUTO and on-line):

1. Turn the main utility disconnect OFF (OPEN).
2. Turn the generator MLCB (generator disconnect) to OFF (OPEN).
3. Run the generator for approximately one minute for proper cooling.
4. Turn the generator OFF.

To turn the generator back ON:

1. Put the generator into AUTO.
2. Start generator and warm up for a few minutes.
3. Set the MLCB (generator disconnect) to ON (CLOSED).

The system now operates in automatic mode. The main utility disconnect can be turned ON (CLOSED).

To shut the unit off, repeat this entire process.

Installation Summary

1. Verify the installation has been properly performed as outlined by the manufacturer and that it meets all applicable laws and codes.
2. Verify proper operation of the system as outlined in the appropriate Installation and Owner's Manuals.
3. Educate the end user on the proper operation, maintenance and service call procedures.

Fuse Removal and Installation

See [Figure 4-2](#). A fuse removal and installation tool (A) is included in the control housing.

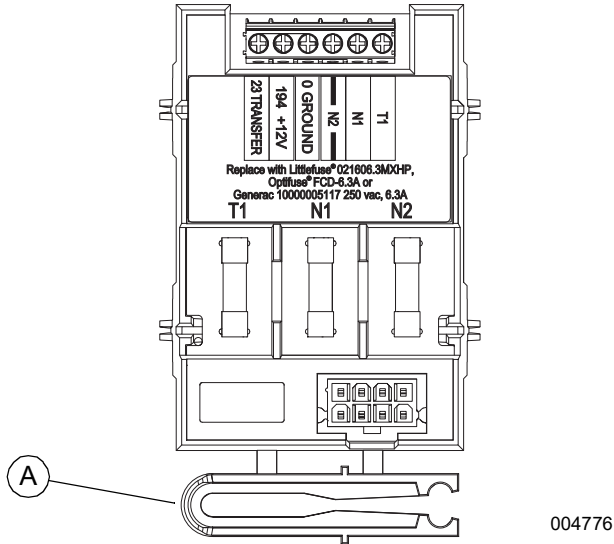


Figure 4-2. Fuse Removal and Installation Tool

If a fuse requires replacement, snap the tool free with an appropriate tool such as diagonal pliers, and use it to replace the fuse. The tool can be stored in the control housing retainer directly above the fuses, with the large thumb tab facing out.

Use only Generac replacement fuses—part number 10000005117, rated 240 VAC, 6.3 Amps, 10,000 AIC.

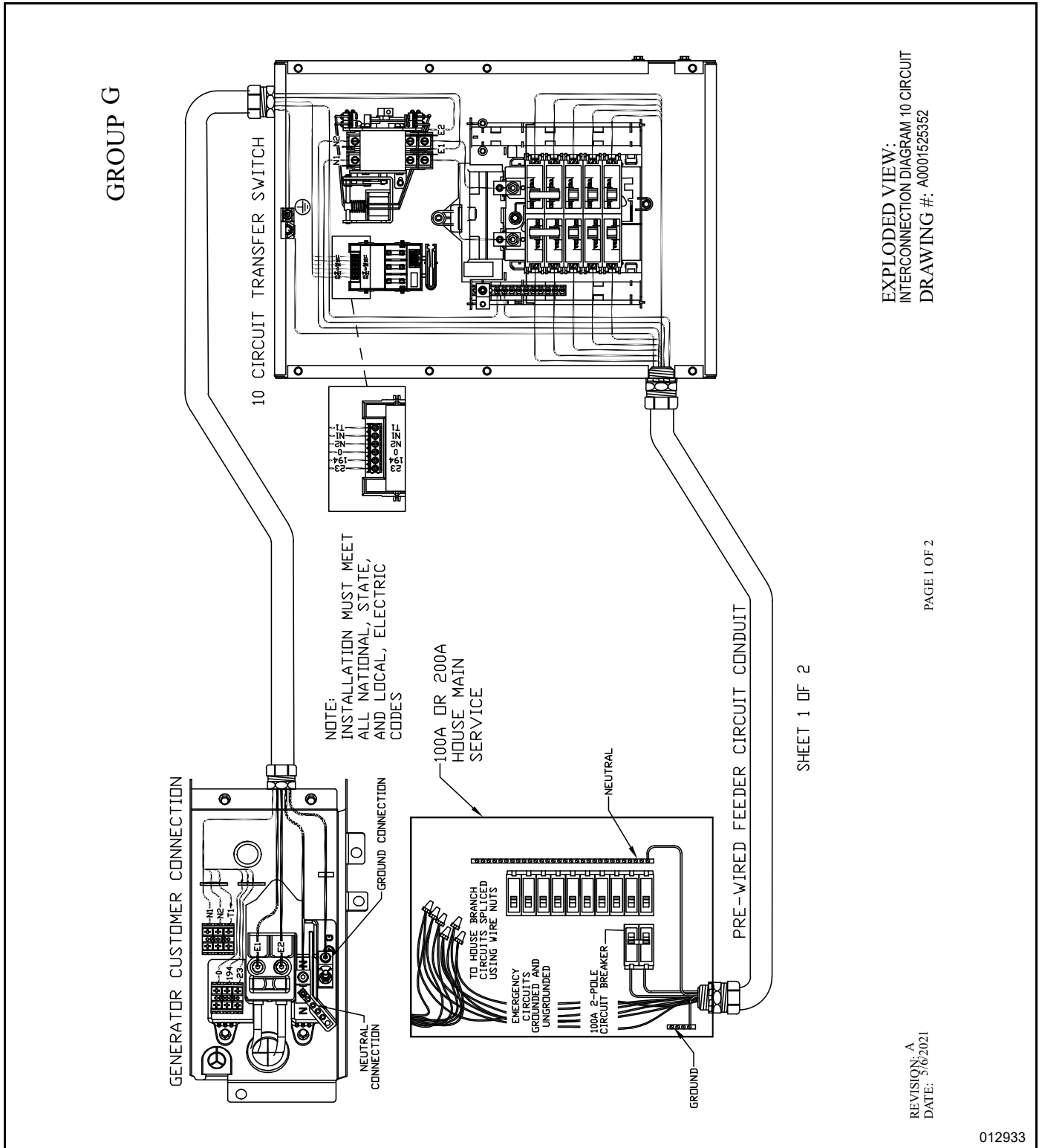
Alternative fuses are Littelfuse® 021606.3MXHP or Optifuse® FCD-6.3.

NOTE: If the Fuses are OK, but the transfer switch is not operating properly, a malfunction may have occurred within the 50 Amp contactor. If the 50 Amp contactor fails to properly operate, it has an integrated self resetting circuit breaker. Once every several minutes, the circuit breaker will attempt to operate the transfer switch contactor to correct itself. Allow at least ten minutes for a self reset to occur before considering the switch to have malfunctioned. Failure to manually operate the contactor mechanism during commissioning and installation is the typical cause for the contactor to enter a self reset mode.

Section 5: Drawings and Diagrams

Installation Drawing (USA)

No. A0001525352-A (Part 1 of 2)



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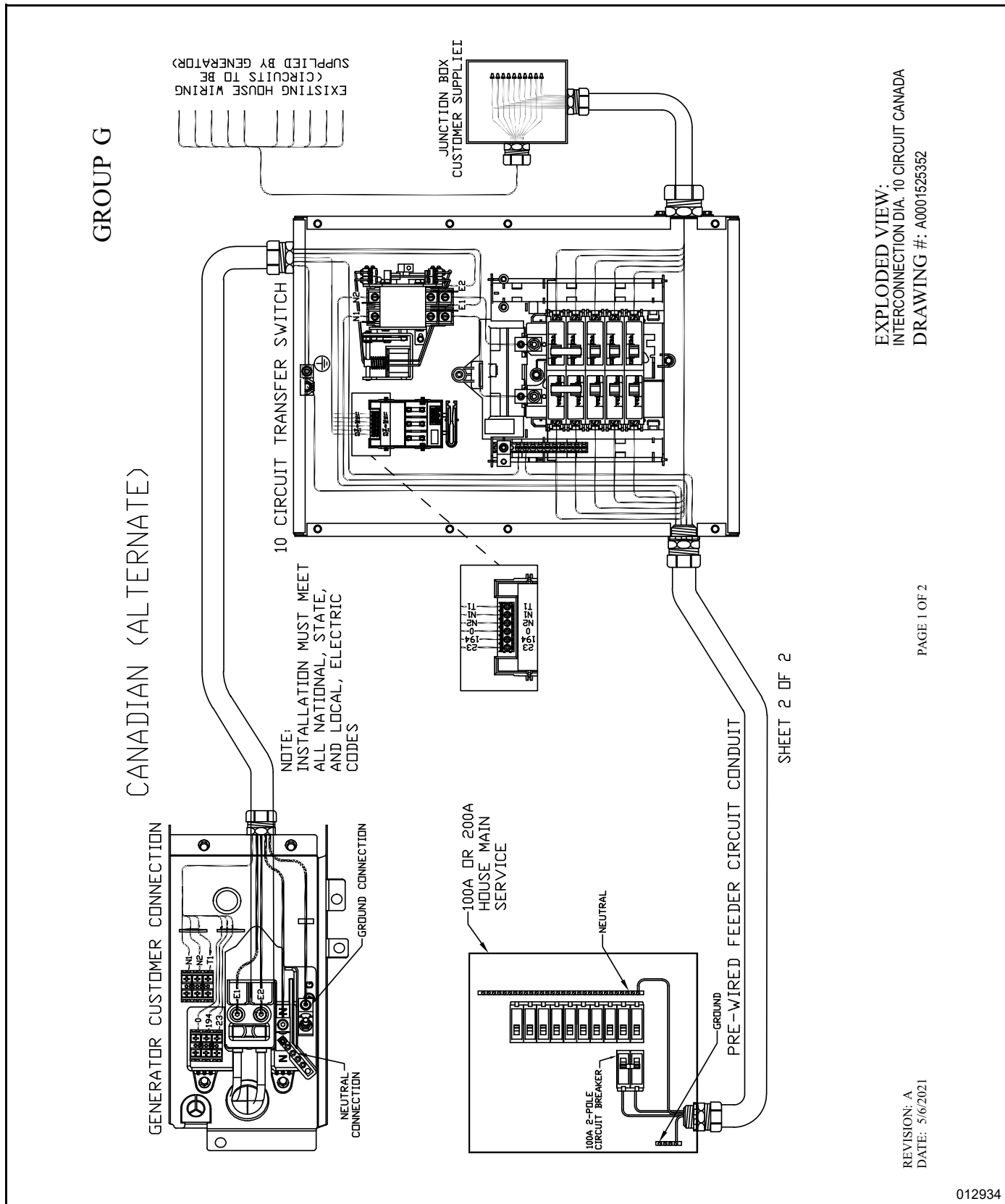
SHEET 1 OF 2

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DATE: 5/6/2021

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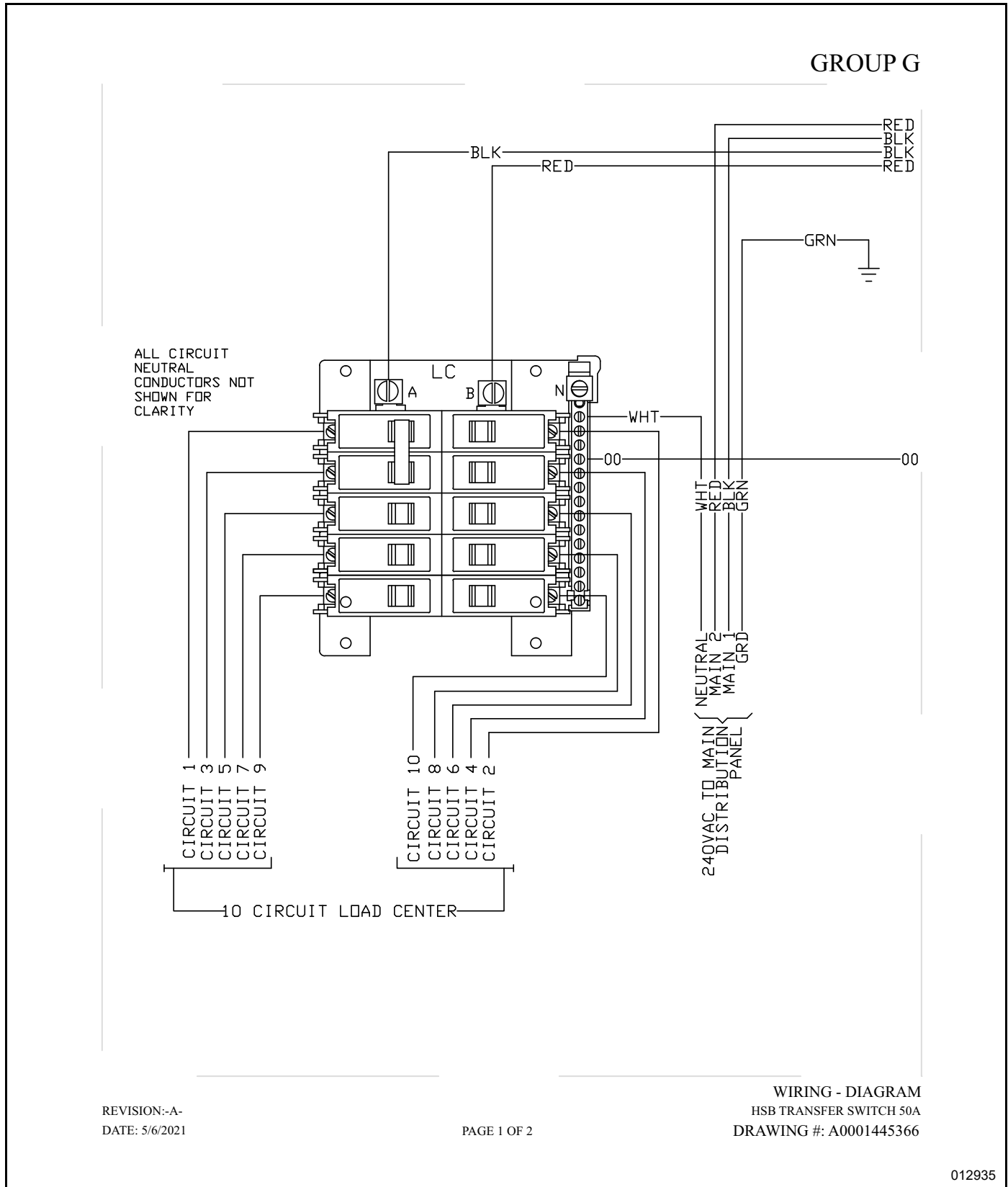
Installation Drawing (Canada)

No. A0001525352-A (Part 2 of 2)



Wiring Diagram

No. A0001445366-A (Part 1 of 2)



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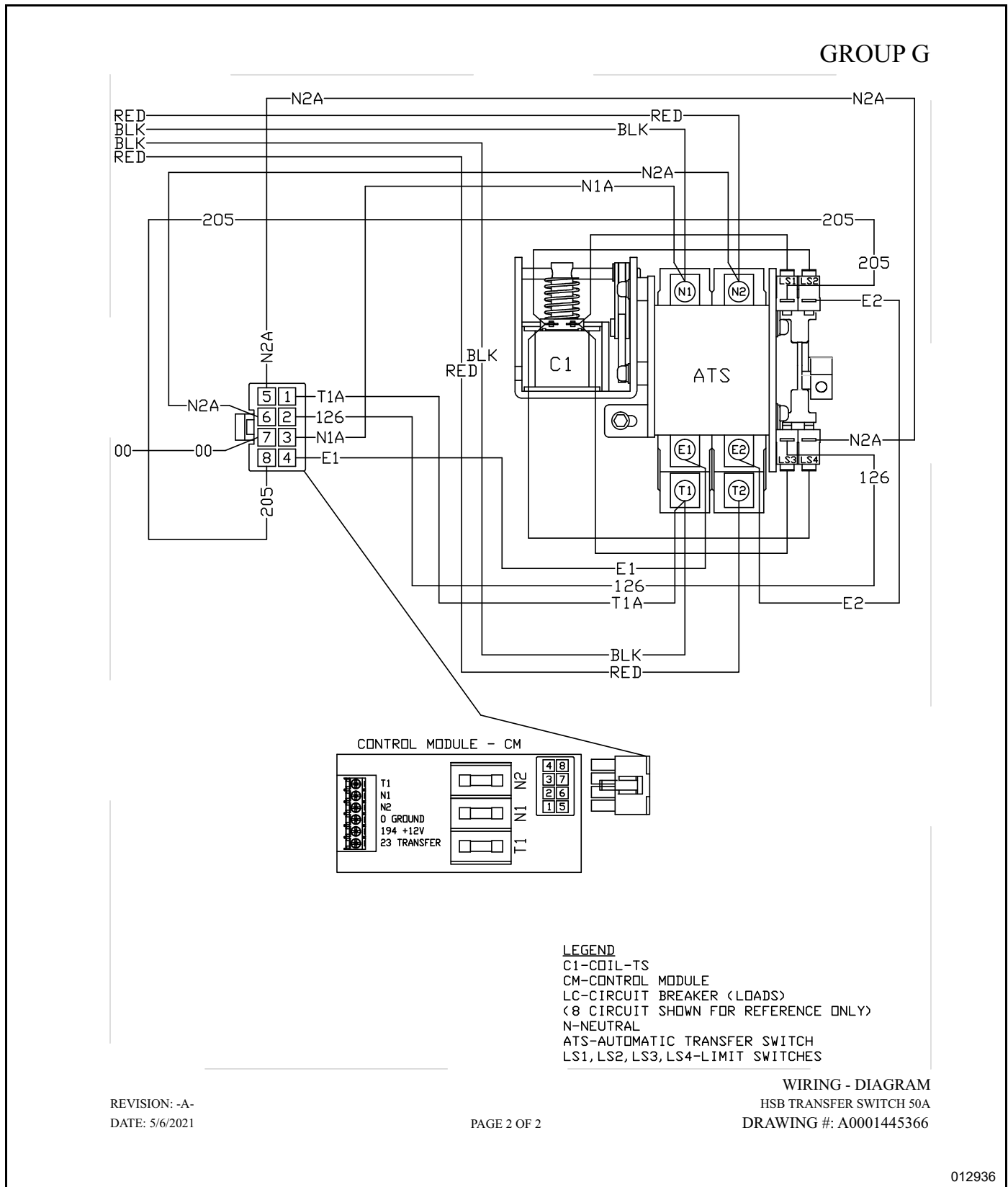
PAGE 1 OF 2

WIRING - DIAGRAM
HSB TRANSFER SWITCH 50A
DRAWING #: A0001445366

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Wiring Diagram

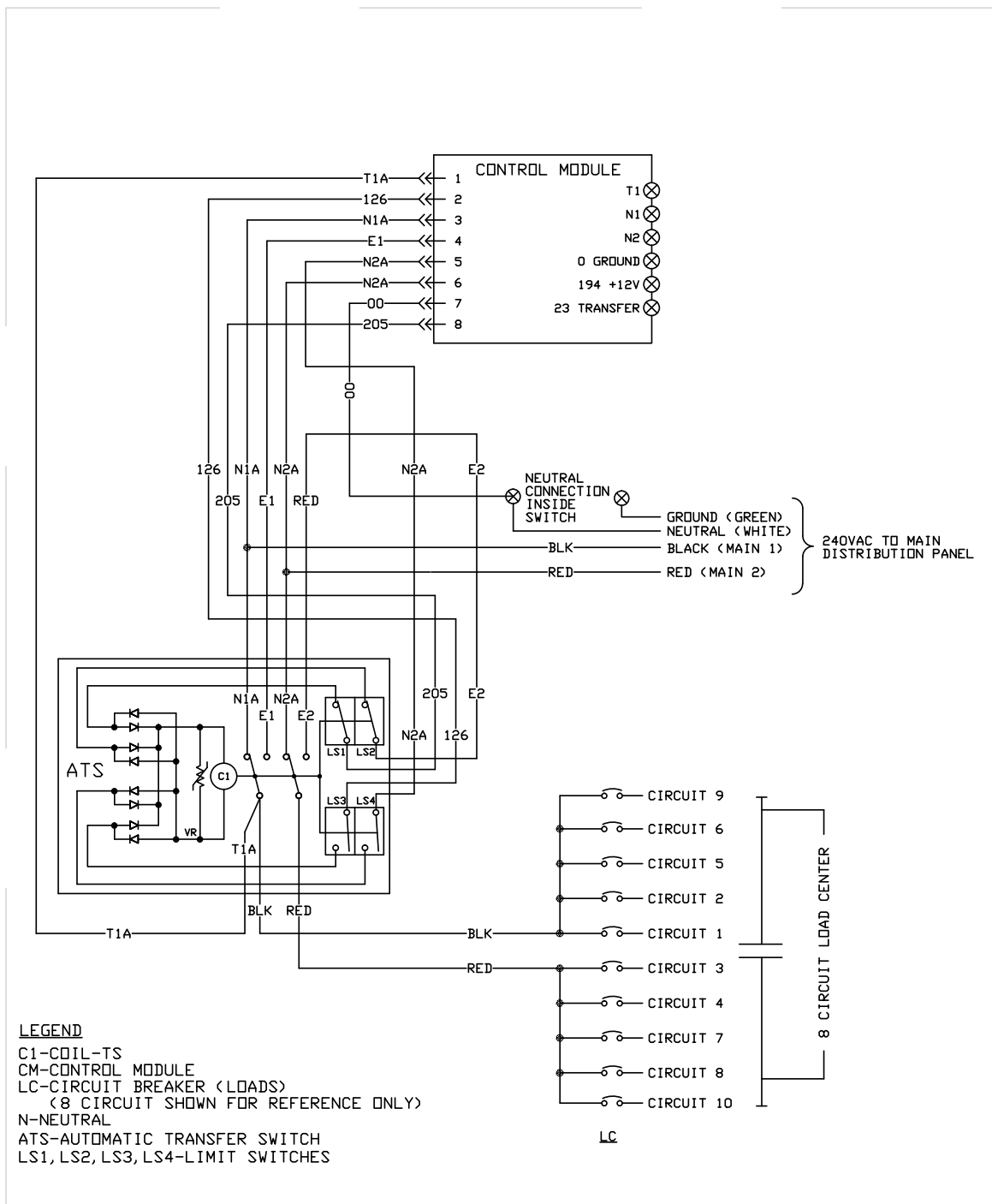
No. A0001445366-A (Part 2 of 2)



Schematic Diagram

No. A0001445361-A

GROUP G



LEGEND
 C1-COIL-TS
 CM-CONTROL MODULE
 LC-CIRCUIT BREAKER (LOADS)
 (8 CIRCUIT SHOWN FOR REFERENCE ONLY)
 N-NEUTRAL
 ATS-AUTOMATIC TRANSFER SWITCH
 LS1, LS2, LS3, LS4-LIMIT SWITCHES

SCHMATIC - DIAGRAM
 HSB TRANSFER SWITCH 50A
 DRAWING #: A0001445361

REVISION: -A-
 DATE: 5/6/2021

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Part No. A0001446296 Rev. A 07/19/2021

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