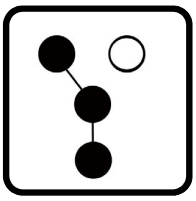
Installation and Operation Manual

Automatic Transfer Switch (ATS)



Models:

100-200 Amp TRX Automatic Transfer Switches

Controller:

For use with generator sets equipped with RDC2 or DC2 controllers

KOHLER® Generators

TP-7442 11/26

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WARNING

This product can expose you to chemicals, including carbon monoxide and benzene, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65warnings.ca.gov

WARNING



This product contains intentionally added per- and poly- fluoroalkyl substances.

Transfer Switch Identification Numbers

Record the product identification numbers from the transfer switch nameplate.

Model Designation: _____

Serial Number: _____

Accessory Number	Accessory Description

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IMPORTANT SAFETY INSTRUCTIONS. Electromechanical equipment, including generator sets, transfer switches, switchgear, and accessories, can cause bodily harm and pose life-threatening danger when improperly installed, operated, or maintained. To prevent accidents be aware of potential dangers and act safely. Read and follow all safety precautions and instructions. SAVE THESE INSTRUCTIONS.

This manual has several types of safety precautions and instructions: Danger, Warning, Caution, and Notice.

DANGER

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

WARNING

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

CAUTION

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

NOTICE

NOTICE is used to address practices not related to physical injury.

Safety decals affixed to the equipment in prominent places alert the operator or service technician to potential hazards and explain how to act safely. The decals are shown throughout this publication to improve operator recognition. Replace missing or damaged decals.

WARNING



This product contains intentionally added per- and poly- fluoroalkyl substances.

Accidental Starting

WARNING



Accidental starting.
Can cause severe injury or death.
Disconnect the battery cables before working on the generator set. Remove the negative (–) lead first when disconnecting the battery. Reconnect the negative (–) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or equipment connected to the set, disable the generator set as follows:

1. Press the generator set off/reset button to shut down the generator set.
2. Disconnect the power to the battery charger, if equipped.
3. Remove the battery cables, negative (–) lead first. Reconnect the negative (–) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

Hazardous Voltage/ Moving Parts

DANGER



Hazardous voltage.
Will cause severe injury or death.
Disconnect all power sources before opening the enclosure.

DANGER



Hazardous voltage. Electric shock.
Will cause severe injury or death.
Close and secure the enclosure door before energizing the transfer switch.

DANGER



Hazardous voltage.
Will cause severe injury or death.
Only authorized personnel should open the enclosure.

DANGER



Hazardous voltage.
Will cause severe injury or death.
This equipment must be installed and serviced by qualified electrical personnel.

Grounding electrical equipment. Hazardous voltage will cause severe injury or death. Electrocution is possible whenever electricity is present. Ensure you comply with all applicable codes and standards. Electrically ground the generator set, transfer switch, and related equipment and electrical circuits. Turn off the main circuit breakers of all power sources before servicing the equipment. Never contact electrical leads or appliances when standing in water or on wet ground because these conditions increase the risk of electrocution.

Short circuits. Hazardous voltage/current will cause severe injury or death. Short circuits can cause bodily injury and/or equipment damage. Do not contact electrical connections with tools or jewelry while making adjustments or repairs. Remove all jewelry before servicing the equipment.

Making line or auxiliary connections. Hazardous voltage will cause severe injury or death. To prevent electrical shock deenergize the normal power source before making any line or auxiliary connections.

Servicing the transfer switch. Hazardous voltage will cause severe injury or death. Deenergize all power sources before servicing. Turn off the main circuit breakers of all transfer switch power sources and disable all generator sets as follows:

1. Press the generator set off/reset button to shut down the generator set.
2. Disconnect power to all battery chargers.
3. Disconnect all battery cables, negative (–) leads first. Reconnect negative (–) leads last when reconnecting the battery cables after servicing. Follow these precautions to prevent the starting of generator sets by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer. Before servicing any components inside the enclosure:

Before servicing any components inside the enclosure:

1. Remove all jewelry.
2. Stand on a dry, approved electrically insulated mat.
3. Test circuits with a voltmeter to verify that they are deenergized.

Heavy Equipment

⚠ WARNING

Unbalanced weight.
Improper lifting can cause severe injury or death and equipment damage.
Use adequate lifting capacity.
Never leave the transfer switch standing upright unless it is securely bolted in place or stabilized.

Notice

Notice

Foreign material contamination.
Cover the transfer switch during installation to keep dirt, grit, metal drill chips, and other debris cycle the contactor to verify that it operates freely. Do not use a screwdriver to force the contactor mechanism.

Notice

Electrostatic discharge damage.
Electrostatic discharge (ESD) damages electronic circuit boards. Prevent electrostatic discharge damage by wearing an approved grounding wrist strap when handling electronic circuit boards or integrated circuits. An approved grounding wrist strap provides a high resistance (about 1 megohm), *not a direct short*, to ground.

This manual provides operation and installation instructions for model TRX automatic transfer switches. See Figure 1 for typical model TRX transfer switch.

The model TRX switch must be connected to a generator set equipped with the RDC2 or DC2 generator/transfer switch controller. The transfer switch is equipped with a combined interface/load management board. The interface board communicates with the RDC2 or DC2 controllers on the generator set.

Note: The DC2 controller was discontinued in 2019.

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This publication is provided for informational purposes only. Discovery Home Energy LLC reserves the right to modify specifications, designs, components, features, configurations, procedures, and publications without notice. This publication does not create any warranty rights or contractual obligations. Warranty coverage is governed solely by the applicable written limited warranty provided with the product.

The manufacturer reserves the right to change this literature and the products represented without notice and without any obligation or liability whatsoever.

Read this manual and carefully follow all procedures and safety precautions to ensure proper equipment operation and to avoid bodily injury.

Failure to properly install, operate, maintain, inspect, or service this equipment may result in equipment damage, property damage, personal injury, death, loss of utility service, loss of warranty coverage, or other consequential losses.

Read and follow the Safety Precautions and Instructions section at the beginning of this manual. Keep this manual with the equipment for future reference.

The equipment service requirements are very important to safe and efficient operation. Contact an authorized distributor/dealer to inspect and service the transfer switch annually and also when any wear, damage, deterioration, or malfunction of the transfer switch or its components is evident or suspected.



Figure 1: Typical Model RXT Transfer Switch - SE Shown

List of Related Literature

This section identifies related literature for the automatic transfer switches and accessories covered in this manual, as listed in the following table.

Only trained and qualified personnel should install, inspect, operate, maintain, troubleshoot, or service the transfer switch and accessories. For purposes of this publication, “qualified personnel” means individuals who are properly trained and experienced in electrical power systems, familiar with applicable electrical codes and safety practices, and licensed or otherwise authorized to perform the work where required by law.

Literature Type	Part Number
Specification Sheet, Model TRX	G11-154
Operation, RDC2 Controller	See Generator Set Operation Manual
Operation Manual, SiteTech™ Software	TP-6701
Installation Instructions, Load Shed Kit	TT-1609

Table 1: Related Literature

Literature Type	Part Number
Installation Instructions, Power Relay Module	TT-1646
Installation Instructions, Auxiliary Switch	TT-1694
Installation Instructions, Auxiliary Circuit Breaker Kit	TT-1836
Installation Instructions, Surge Protector Device (SPD) Kit	TT-1837
Installation Instructions, Emergency Stop (E-Stop) Switch Kit	TT-1839

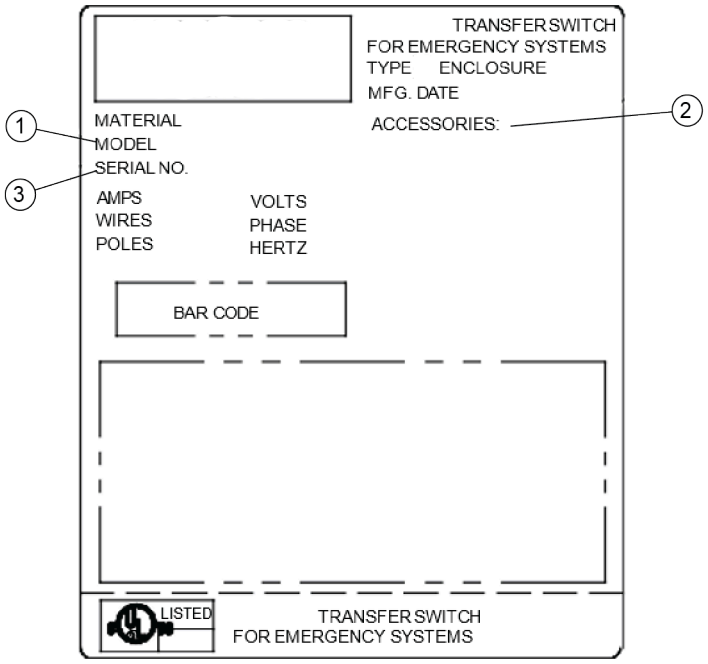
Table 1: Related Literature

Nameplate

A nameplate attached to the inside of the enclosure cover or on the upper right side wall includes a model designation, a serial number, ratings, and other information about the transfer switch. SeeFigure 2.

Check the transfer switch model number from the transfer switch nameplate and verify that it matches the model shown on the front cover of this manual before proceeding with installation.

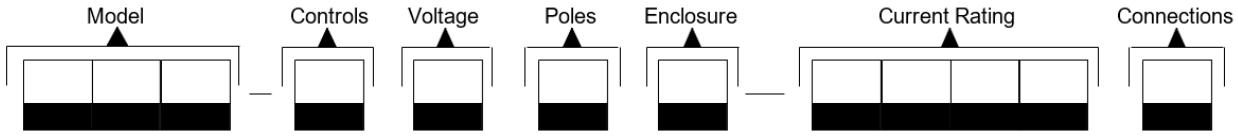
Copy the model designation, serial number, and accessory information from the nameplate to the spaces provided in the Product Identification Information section located inside the front cover of this manual for use when requesting service or parts.



1	Model designation
2	Serial number
3	Factory-installed accessory numbers

Figure 2: Typical Transfer Switch Nameplate

Model Designation



Record the transfer switch model designation in the boxes. The transfer switch model designation defines ratings and characteristics as explained below.

Sample Model Designation: TRX-JFNC-0200A

Model
TRX: Automatic Transfer Switch

Controls
J: Interface board (standard or combined) for RDC2/DC2 Controller

Voltage/Frequency
F: 240 Volts/60 Hz

Number of Poles/Wires
N: 2-pole, 3-wire, solid neutral (120/240 V only)

Enclosure
C: NEMA 3R

Current Rating: Numbers indicate the current rating of the switch in amperes:

STD	SE
100	0100
150	0150
200	0200

Con**nections**
A: No load center
ASE: Service entrance rated
CSE: Service entrance rated with CSA certification (not available for 150 amp models)

Figure 3: Model Designation

Service Assistance

For professional advice and conscientious service, please contact your nearest authorized dealer.

- Visit the company website at kohlergenerators.com
- Look at the labels and decals on your product or review the appropriate literature or documents included with the product.
- Call toll free in the US and Canada 1-833-393-6650.

1.1 Automatic Transfer Switch Description

An automatic transfer switch (ATS) transfers electrical loads from a normal source of electrical power to an emergency source when the normal source voltage or frequency falls below an acceptable level. The normal source is typically utility power. The emergency source is usually a generator set.

Model TRX transfer switches must be connected to a generator set equipped with the RDC2 generator/transfer switch controller.

Voltage sensing data from the ATS is continuously transmitted to the RDC2 controller mounted on the generator set. When the normal source fails, the RDC2 controller signals the emergency source generator set to start. When the emergency source reaches acceptable levels and stabilizes, the ATS transfers the electrical load to the emergency source.

The RDC2 controller signals the ATS to transfer the load back when the normal source returns and stabilizes. See Section 3. Operation for detailed operation descriptions.



Figure 4: Automatic Transfer Switches - SE model shown

Do not modify, bypass, disable, alter, reprogram, or substitute any safety device, controller setting, communication interface, wiring configuration, interlock, protective feature, software function, or component unless expressly approved in writing by Discovery Home Energy LLC. Unauthorized modifications may create unsafe operating conditions, impair product performance, violate applicable codes, and void warranty coverage.

1.2 Service Entrance Models

Service entrance models use a circuit breaker to provide the service disconnect for the utility source.

The Model TRX transfer switch ships standard with the combined interface/load management board connects to the RDC2 or DC2 controller on the generator set.

1.3 Combined Interface/Load Management Board

The combined interface/load management board performs all of the functions of the standard interface board and also provides load add and shed based on generator capacity. The combined interface/load management board can be used with single-phase generator sets equipped with the RDC2 controller only.

Note: Do not install a load shed kit or a load control module (LCM) on a system that includes the combined interface/load management board.

Many appliances do not run continuously. Air conditioners and furnaces, refrigerators, sump pumps, and other appliances cycle on and off as needed. With load management, less critical appliances can be powered by the generator set when the more important appliances are not running, allowing the use of a smaller generator set than would be needed to run all of the building's electrical equipment at the same time.

The combined interface/load management board provides an automatic load management system to comply with NEC requirements. The installer is responsible for ensuring that the power system installation complies with all applicable state and local codes.

When customer-supplied relays, contactors, controls, alarms, communication devices, monitoring equipment, HVAC controls, load management devices, or other third-party equipment are connected to the transfer switch, the installer and system designer remain solely responsible for determining compatibility, suitability, proper installation, and compliance with applicable laws, regulations, standards, and codes. Discovery Home Energy LLC assumes no responsibility for the design, installation, operation, performance, or regulatory compliance of customer-supplied equipment.

The combined interface/load management board automatically manages up to six residential loads.

- Two relays are included to control two independent heating, ventilation, and air conditioning (HVAC) loads.
- Four (4) pilot relays are provided on the combined interface board for connection of load-switching contactors/relays. See Table 16for the specifications of the circuit board relays.

Up to four (4) 50 amp power relay modules (GM92001-KP1-QS) or normally closed power relays can be connected through normally open relay contacts on the circuit board. See Table 17 for specifications for customer-supplied relays. Customer-supplied relays must be either normally closed or double-pole double-throw (DPDT). Note that the load must be connected to the normally closed contacts of the relay. OEM Power Relay Modules are recommended.

Note: Connect only non-essential loads to the load shed kit.

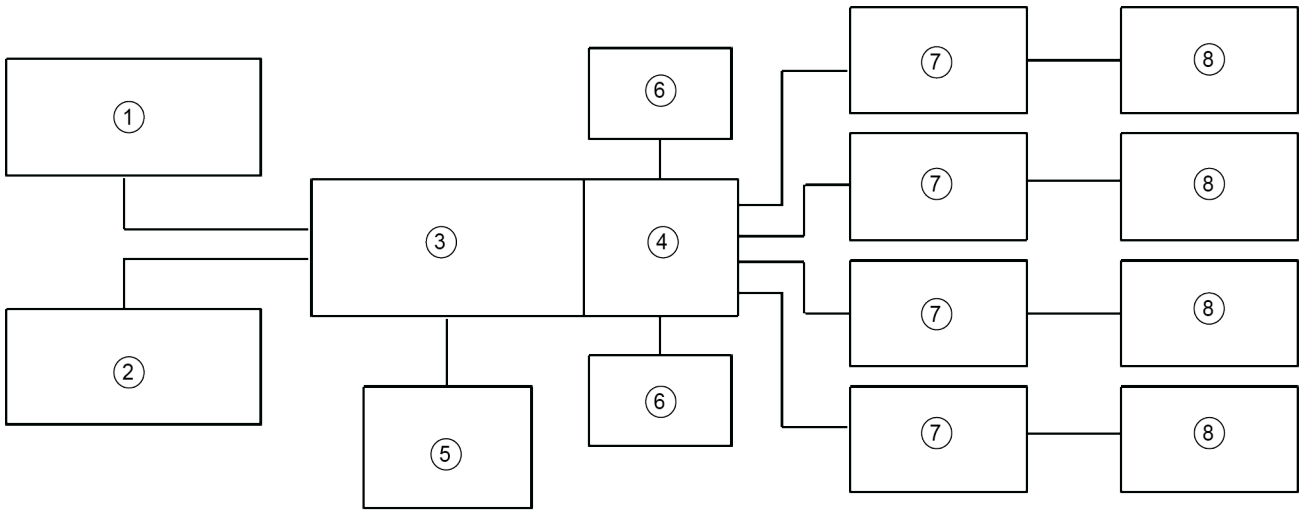
Circuit Board Relays	Contact Rating
Pilot Relays and HVAC Relays (qty. 2)	125VAC, 10 A (general purpose)120VAC, 125VA (pilot duty)

Table 2: Combined Interface Board Relay Specifications

Power Relay Specifications	
Relay Rating	50 A @ 240 VAC
Relay Type	DPST-NC or DPDT
Coil Voltage	120 VAC

Table 3: Customer-Supplied Power Relay Specifications

Figure Figure 5 shows a simple diagram of a power system with load management. For detailed installation and connection instructions, refer to the instructions provided with the power relay modules.



1	Utility power	5	Critical loads, always powered
2	Single-phase generator set equipped with RDC2 controller	6	HVAC load, can add or shed
3	Transfer switch	7	Power relay module
4	Combined Interface/Load Management Board	8	Non-critical load,can add or shed

Note: Connect up to 4 power relay modules.

Figure 5: Power System with Load Management

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2.1 Introduction

The transfer switches are shipped factory-wired, factory-tested, and ready for installation. Have the equipment installed only by trained and qualified personnel and verify that the installation complies with applicable codes and standards. Protect the switch against damage before and during installation.

Transfer switches, controllers, communication wiring, software tools, and connected equipment should be protected from unauthorized physical and electronic access. Failure to maintain appropriate cybersecurity and access controls may result in unintended equipment operation, configuration changes, system malfunction, loss of monitoring capability, interruption of electrical service, or other operational risks.

2.2 Receipt of Unit

2.2.1 Inspection

At the time of delivery, inspect the packaging and the transfer switch for signs of shipping damage. Unpack the transfer switch as soon as possible and inspect the exterior and interior for shipping damage. If damage and/or rough handling is evident, immediately file a damage claim with the transportation company.

2.2.2 Storage

Store the transfer switch in its protective packing until final installation. Protect the transfer switch at all times from moisture, construction grit, and metal chips. Avoid storage in cold or damp areas where moisture could condense on the unit. See Table 4 for acceptable storage temperatures.

Item	Specifications
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Operating Temperature	-20°C to 70°C (-4°F to 158°F)
Humidity	5% to 95% noncondensing
Altitude	0 to 3050 m (10000 ft.) without derating

Table 4: Environmental Specifications

2.2.3 Unpacking

Allow the equipment to warm to room temperature for at least 24 hours before unpacking to prevent condensation on the electrical apparatus. Use care when unpacking to avoid damaging transfer switch components. Use a vacuum cleaner or a dry cloth to remove dirt and packing material that may have accumulated in the transfer switch or any of its components.

Note: Do not use compressed air to clean the switch. Cleaning with compressed air can cause debris to lodge in the components and damage the switch.

2.2.4 Lifting

⚠ WARNING

Unbalanced weight.
Improper lifting can cause severe injury or death and equipment damage.

Use adequate lifting capacity.

Never leave the transfer switch standing upright unless it is securely bolted in place or stabilized.

See Table 5 or the dimensional drawing for the approximate weight of the transfer switch. Use a spreader bar to lift the transfer switch. Attach the bar only to the enclosure's mounting holes or lifting brackets; do not lift the unit any other way. Close and secure the enclosure door before moving the unit.

Amps	Description	Weight *	
		kg	lbs
100	Single phase	11.1	24.5
	Service entrance (ASE)	12.2	27
	Service entrance (CSE)	12.4	27.5
150	Service entrance (ASE)	12.7	28
200	Single phase	11.7	25.75
	Service entrance (ASE)	12.7	26
	Service entrance (CSE)	13.6	30.5

Table 5: Approximate Weights

Amps	Description	Weight *	
		kg	lbs
* Weights are approximate and do not include packaging.			

Table 5: Approximate Weights

2.3 Installation

Note: Foreign material contamination. Cover the transfer switch during installation to keep dirt, grit, metal drill chips, and other debris out of the components. Cover the solenoid mechanism during installation. After installation, use the manual operating handle to cycle the contactor to verify that it operates freely. Do not use a screwdriver to force the contactor mechanism.

Note: The transfer switch may use both American Standard and metric hardware. Use the correct size tools to prevent rounding of the bolt heads and nuts.

Check the system voltage and frequency. Compare the voltage and frequency shown on the transfer switch nameplate to the source voltage and frequency. Do not install the transfer switch if the voltage and frequency are different from the normal (utility) source voltage and frequency or the emergency source voltage and frequency shown on the generator set nameplate. Do not use a single-phase transfer switch in a three-phase application.

Note: Installing the transfer switch in an application that does not match the voltage and phase rating listed on the nameplate can cause non-warrantable damage to the ATS and/or operational problems.

Plan the installation. Use the dimensions given on the enclosure dimension (ADV) drawings in the Diagrams and Drawings section. Select a mounting site that complies with local electrical code restrictions for the enclosure type. Mount the transfer switch as close to the load and power sources as possible. Allow adequate space to open the enclosure and service the switch.

Removing the enclosure's front panel.

1. Remove cover thumb screws and open ats door.
2. Remove panel thumb screws
3. Pull the bottom of the panel out.
4. Remove the inner panel to access the transfer switch components.

.

NEMA 3R enclosures have padlock hasp at the bottom of the enclosure and the door. Use a padlock to lock the door after installation is complete.

Wall mounting. Mount the transfer switch to a wall or other rigid vertical supporting structure. Refer to the dimension drawings in the Section 6. Drawings and Wiring/Schematic Diagrams for hole locations.

Note: Apply silicone sealant at each mounting hole on NEMA 3R enclosures to ensure a watertight seal.

Cover the transfer switch's internal components to protect them from drill chips or debris during installation. Use a vacuum cleaner to remove debris from the enclosure.

Note: Do not use compressed air to clean the switch. Cleaning with compressed air can cause debris to lodge in the components and cause damage.

Clearance holes through the back of each enclosure are provided for mounting. See Section 6. Drawings and Wiring/ Schematic Diagrams.

2.4 Manual Operation Check

Check the manual operation before energizing the transfer switch. Verify that the contactor operates smoothly without binding.

Do not place the transfer switch into service if the contactor does not operate smoothly.

After checking the manual operation, place the contactor in the Normal (utility) position.

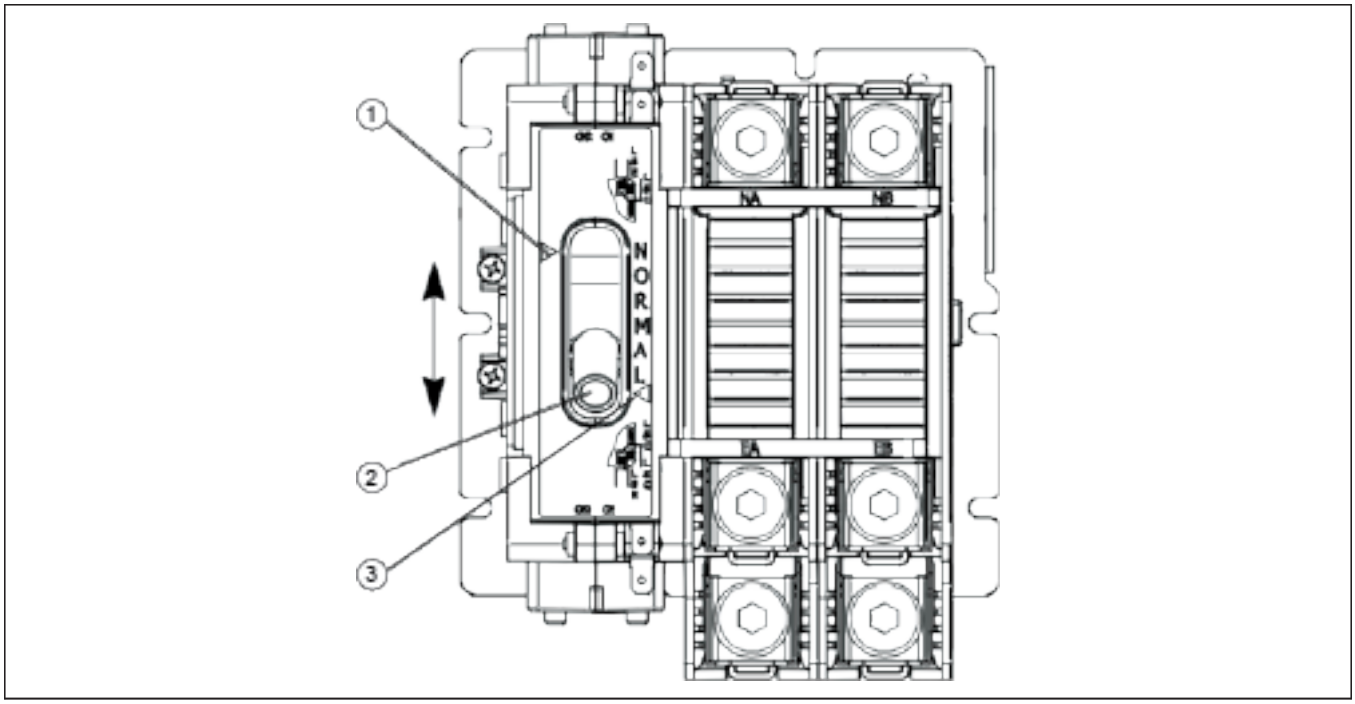


Figure 6: Manual Operation, 100 - 200 Amp Single-Phase Switches

Note:

Never manually operate the transfer switch when the power is connected. Disconnect both power sources before manually operating the switch.

1. Insert a screwdriver or similar tool into the opening in the manual operating lever (2).
2. Move manual operating handle up to Emergency position (1) or Normal position (3) to place the contactor into the desired position.
3. Verify that transfer switch operates smoothly without any binding. If it does not, check for shipping damage or construction debris. Do not place the transfer switch into service if the contactor does not operate smoothly.
4. Move the manual operating handle to return the transfer switch to the Normal position (3).
5. Remove the maintenance handle or tool, if used, and return it to the storage location.

2.5 Electrical Wiring

Refer to the connection diagrams on the transfer switch enclosure door and the wiring diagrams in the Diagrams and Drawings section during installation.

Note: Do not install the transfer switch in an application that does not match the ATS phase and voltage ratings listed on transfer switch nameplate.

Compare the voltage, frequency, and phases shown on the transfer switch nameplate to the source voltage and frequency. Do not install the transfer switch if the voltage and frequency are different from the normal (utility) source voltage and frequency or the emergency source voltage and frequency shown on the generator set nameplate.

All wiring must comply with applicable national, state, and local electrical codes. Use separate conduit for AC power wiring and low-voltage DC, control, and communication system wiring.

WARNING



Accidental starting.
Can cause severe injury or death.

Disconnect the battery cables before working on the generator set. Remove the negative (–) lead first when disconnecting the battery. Reconnect the negative (–) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or equipment connected to the set, disable the generator set as follows:

1. Press the generator set off/reset button to shut down the generator set.
2. Disconnect the power to the battery charger, if equipped.
3. Remove the battery cables, negative (–) lead first. Reconnect the negative (–) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

DANGER



Hazardous voltage.
Will cause severe injury or death.
Disconnect all power sources before opening the enclosure.

Making line or auxiliary connections. Hazardous voltage will cause severe injury or death. To prevent electrical shock deenergize the normal power source before making any line or auxiliary connections.

Grounding electrical equipment. Hazardous voltage will cause severe injury or death. Electrocution is possible whenever electricity is present. Ensure you comply with all applicable codes and standards. Electrically ground the generator set, transfer switch, and related equipment and electrical circuits. Turn off the main circuit breakers of all power sources before servicing the equipment. Never contact electrical leads or appliances when standing in water or on wet ground because these conditions increase the risk of electrocution.

2.5.1 AC Power Connections

Determine the cable size. Refer to the ADV drawings in the Diagrams and Drawings section to determine the cable size required for the transfer switch. Make sure the lugs provided are suitable for use with the cables being installed. See Table 6 and Table 7.

Switch Rating (Amps)	Normal (Per Phase)	Neutral	Ground
100	(1) #14-1/0 AWG	(5) #12-250 KCMIL (Cu) or (5) #10-250 KCMIL (Al)	(9) #14-6 AWG (4) #14-1/0 AWG
200	(1) #6-250 KCMIL		

Table 6: Range of AL-CU Wire Sizes - Standard Models

Switch Rating (Amps)	Normal (Per Phase)	Emergency / Load (Per Phase)	Neutral	Ground
100	(1) #12-2/0 AWG	(1) #14-1/0 AWG	(5) #12-250 KCMIL (Cu) (5) #10-250 KCMIL (Al)	(9) #14-6 AWG (4) #14-1/0 AWG
150 - 200	(1) 4-300 KCMIL	(1) 6-250 KCMIL		

Table 7: Range of AL-CU Wire Sizes - Service Entrances (SE) Models

Conduit. Use separate conduit for AC power wiring and low-voltage DC, control, and communication system wiring. Watertight conduit hubs may be required for outdoor use.

Select the proper cable clamp or use other approved methods for securing the cable or conduit to the enclosure.

Source and load connections. Clean cables with a wire brush to remove surface oxides before connecting them to the terminals. Apply joint compound to the connections of any aluminum conductors.

Refer to the connection diagrams on the transfer switch enclosure door and the wiring diagrams in the Diagrams and Drawings section . The connection points on the transfer switch contactor are labelled Normal, Emergency, and Load. Connect the utility power to Normal. Connect the generator set to Emergency.

Service entrance models. Connect the utility source to the lugs on the normal source disconnect circuit breakers as shown in the service entrance switch wiring diagram in the Diagrams and Drawings section.

On models with built-in load centers, the load lugs are factory-wired to the load center. Connect the load leads to the circuits in the load center and tighten the connections. Check the labels on the breakers for the tightening torques.

2.5.2 Neutral Connection

Connect the neutral from the main panel to the neutral lug in the ATS enclosure.

Ground the system according to NEC and applicable state and local codes.

2.5.3 Neutral Bonding Jumper, Service Entrance Models

The transfer switch is shipped with the neutral-to-ground jumper installed. For non-service entrance applications, disconnect the neutral-to-ground bonding jumper. See Section 6. Drawings and Wiring/Schematic Diagrams.

2.5.4 Securing the Connections

Verify that all connections are consistent with drawings before tightening the lugs. Tighten all cable lug connections to the torque values shown on the label on the switch or the following tables. Carefully wipe off any excess joint compound after tightening the terminal lugs.

Switch Rating (Amps)	Cable Range	in-lb	ft-lb	Nm
Standard Models				
100	#14-10 AWG	50	4.1	5.6
	#8-1/0 AWG	120	10.3	14
150 - 200	All	225	18.7	25.4
Service Entrance (SE) Models				
100	Main Breaker Lugs	50	4.1	5.6
	Contactor Lugs			
	#14-10 AWG	50	4.1	5.6
	#8-1/0 AWG	120	1.0	1.4
150 - 200	Main Breaker Lugs	250	20.8	28.2
	Contactor Lugs	225	18.7	25.4

Table 8: Contactor and Main Breaker Lug Torque

Cable Range	in-lb	ft-lb	Nm
#14-10 AWG	60	5	6.8
#8-3 AWG	120	10	13.6
#2-2/0 AWD	240	20	27.1
3/0-250 KCMIL	275	23	31.3

Table 9: Neutral Lug Torque

Cable Range	Large Hole			Small Hole			
	in-lb	ft-lb	Nm	Cable Range	in-lb	ft-lb	Nm
#14-10 AWG	35	3	4	#14-10 AWG	15	1.3	1.7
#8 AWG	40	3.3	4.5	#8-6 AWG	25	2.1	2.8
#6-4 AWG	45	3.8	5.1				
#2-1/0	50	4.1	5.6				

Table 10: Ground Lug Torque

AWG or Circular MIL Size	Screwdriver Tightening Torque	
	in-lb	Nm
#14-10	35	4.0
#8	40	4.5
#6-4	45	5.1
#2-2/0	50	5.7

Table 11: Screwdriver Tightening Torques Values

Internal Socket Size Across		Internal Socket Tightening Torque	
Flats	In.	in-lb	Nm
1/8	0.125	45	5.1
5/32	0.156	100	11.3
3/16	0.188	120	13.6
7/32	0.219	150	16.9
1/4	0.25	200	22.6
5/16	0.313	275	31.1
3/8	0.375	375	42.4
1/2	0.500	500	56.5
9/16	0.563	600	67.8

Table 12: Internal Socket Tightening Torques

2.5.5 Engine Start Function

The engine start function is controlled by the RDC2/DC2 controller on the generator set. There are no engine start terminals on the Model TRX ATS.

2.6 Interface Connections

The interface connections must be connected to a generator set equipped with the RDC2 or DC2 controller. Connect interface connections on the ATS to the A, B, PWR, and COM connections on the generator set's field-connection terminal block. See Table 13. Refer to generator set Installation Manual for the location of the terminal block.

Connection Location	Description
A	5 VDC Communication Line
B	5 VDC Communication Line
PWR	12 VDC Positive
COM	DC Negative

Table 13: Interface Connections

Note:

Engine start connections 3 and 4 on the generator set are not used with the Model TRX transfer switch.

2.6.1 Required Connections

RBUS Connections A and B

For the RBUS communication connections A and B to the Model TRX transfer switch, optional PIM and/or load shed kit, use 20 AWG shielded, twisted-pair communication cable. Belden #9402 (two-pair) or Belden #8762 (single-pair) or equivalent cable is recommended.

Ground the shielded wire at the generator set.

See Table 14 and Figure 7.

For outdoor installations, including those with buried cables and/or conduit, use outdoor-rated Belden #1075A or equivalent 20 AWG shielded, twisted-pair communication cable.

PWR and COM Connections

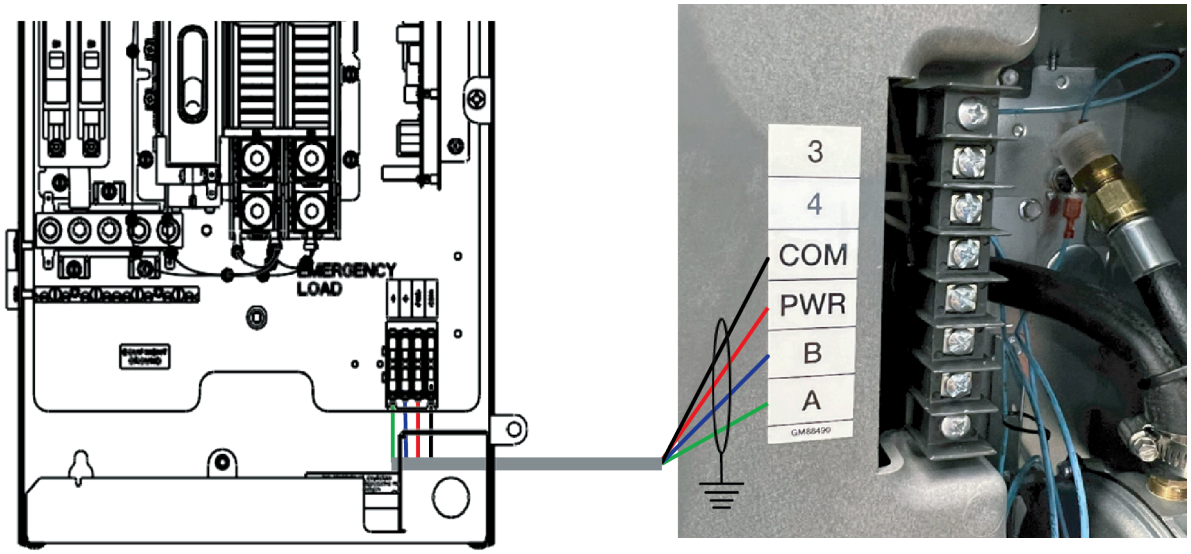
For the PWR and COM connections, the cable size and maximum cable length depends on the number of modules connected.

- For short cable runs shown in the first two rows of table, use one pair in the two-pair communication cable for the A and B connections, and use the second pair for the PWR and COM connections.
- For the longer cable runs shown in the last two rows of table, use 12 or 14 AWG cable for PWR and COM, and use the 20 AWG communication cable specified above for the A and B connections only. In this case, single-pair communication cable such as Belden #8762 can be used for the A and B connections.

The maximum cable length depends on the number of modules connected. See Table 14 for the maximum cable lengths with 1 to 4 modules per cable run.

Cable (TB1-PWR and COM)	Maximum length per run, meters (ft.)							
	Number of Modules (TRX, PIM, and/or load management device) per Run							
	1 Module		2 Modules		3 Modules		4 Modules	
Belden #9402 or equivalent 20AWG for indoor installations	46	150	15	50	5	17	Do not use 20AWG for PWG and COM	
Belden #1075A or equivalent 20AWG for outdoor installations or buried cables	46	150	15	50	5	17	Do not use 20AWG for PWG and COM	
14 AWG *	137	450	137	450	107	350	107	350
12 AWG *	137	450	137	450	137	450	137	450
* Use 12 or 14 AWG cable for PWR and COM connections only. For RBUS connections A and B, use shielded, twisted pair communication cable specified above.								

Table 14: Cable Specifications for PWR and COM Connections



Note: Generator set terminal blocks connections 3 and 4 are NOT USED.

Figure 7: Interface Module Connection to Generator Set Field-Connection Terminal Block

Communication wiring should be installed and protected in a manner that minimizes unauthorized access, tampering, physical damage, and unintended connections. Access to controller configuration software and communication interfaces should be restricted to authorized personnel.

2.6.2 Load Control Connection (Optional)

Connector P11 on the interface module provides a connection point for optional load control circuits. The load control contact provides a delayed contact closure to allow startup of selected loads 5 minutes after transfer to the emergency power source (generator set). Use this contact to delay startup of equipment with large motor-starting loads such as air conditioners.

Move the P11 jumper from terminals 2 and 3 to terminals 1 and 2 to disable the load management function on the combined board.

See Figure 8 for the location of load control connector P11. See Table 15 for contact ratings, connection, and wire size information

Note: Only one load management option can be used with the generator. If a load shed kit is connected, disable the load management function on the combined interface/load management board as described in the Interface Module Connection section.

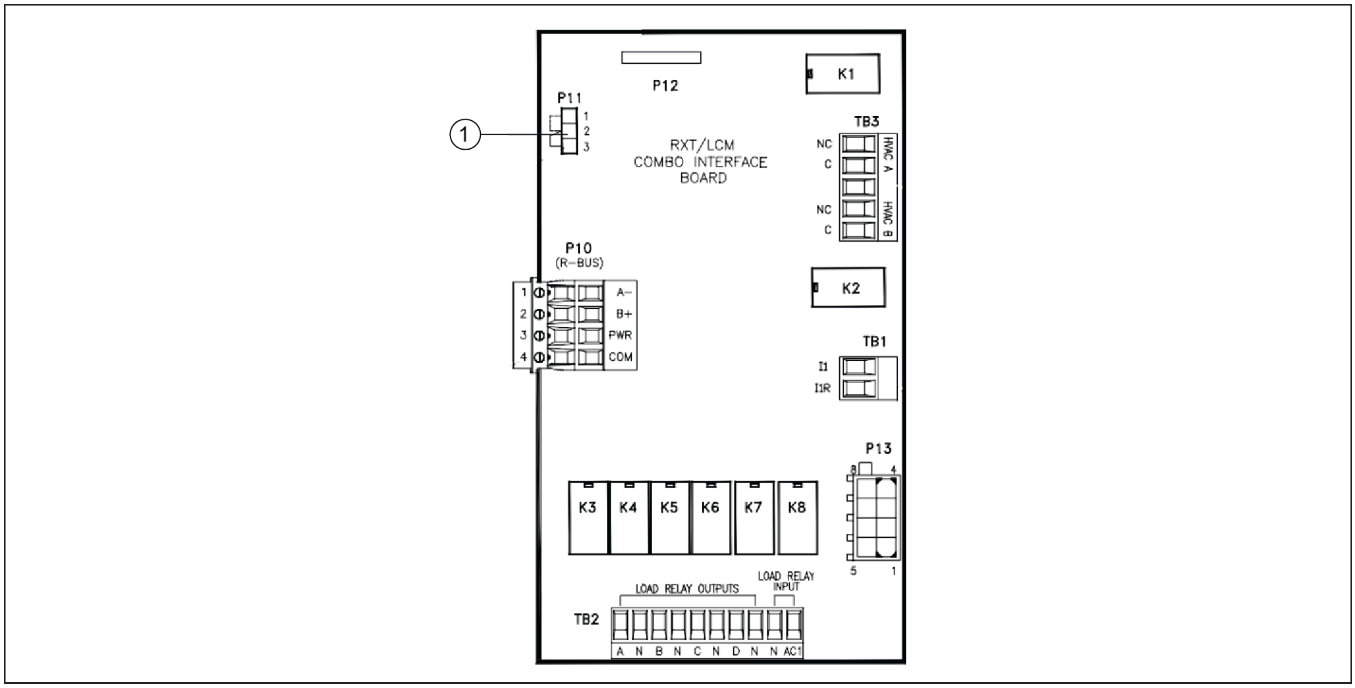


Figure 8: Load Control Connection

Terminal Block	Connection	Designation	Description	Contact Rating	Wire Size
P11	P11-1	LC1	Load Control Output	10A @ 250VAC 1A @ 30VDC	#12-18 AWG
	P11-2	LC2			

Table 15: Load Control Contact P11 Connections

2.7 Combined Interface/Load Management Board

The combined interface/load management board can be used with single-phase generator sets equipped with the RDC2 or DC2 controller only. Follow the instructions in this section to install the current transformer and connect the load management relays. Then connect the interface/load management board to a generator set equipped with the RDC2 or DC2 controller.

Up to four load relays and two HVAC relays can be connected. The load management operation will cycle through all six connections regardless of the number of loads connected. The load management timing is affected by the generator's capacity as described in the Load Management Theory of Operation section.

Note: Only one load management option can be used with the generator. If a load shed kit is connected, disable the load management function on the combined interface/load management board as described in the Interface Module Connection section.

2.7.1 Relay Modules

Up to four power relay modules can be connected for management of non-essential secondary loads. Two (2) 120 VAC loads (shed simultaneously) or a single 240 VAC load can be wired to each relay. Customer-supplied relays must be either normally closed or double-pole double-throw (DPDT).

Discovery Home Energy LLC does not certify, warrant, or guarantee the performance of customer-supplied relays, contactors, controls, or other third-party equipment. Selection, installation, testing, and maintenance of such equipment remain the responsibility of the installer, system designer, and owner.

Note that the load must be connected to the normally closed contacts of the relay. OEM Power Relay Modules are recommended.

Circuit Board Relays	Contact Rating
Pilot Relays and HVAC Relays (qty. 2)	125VAC, 10 A (general purpose)
	120VAC, 125VA (pilot duty)

Table 16: Combined Interface Board Relay Specifications

Power Relay Specifications	
Relay Rating	50A @ 240VAC
Relay Type	DPST-NC or DPDT

Table 17: Customer-Supplied Power Relay Specifications

Power Relay Specifications	
Coil Voltage	120VAC

Table 17: Customer-Supplied Power Relay Specifications

OEM power relay modules include one power relay mounted inside a NEMA type 3R enclosure. Connect up to four (4) power relay modules to the load shed kit.

Before starting the installation, confirm that the generator set is equipped with an RDC2 or DC2 controller. RDC2/DC2 controller firmware version 5.04 or higher is required. Check the version number on the controller and update the firmware, if necessary.

An adequate electrical supply is required for operation of the customer-supplied relays connected to the load shed kit. 120VAC relays require a customer-supplied voltage source. Check the electrical requirements of the customer-provided equipment prior to installation to determine the wire size and circuit protection required. Verify that customer-provided equipment complies with applicable local and national electrical codes.

2.7.2 HVAC Loads

There are two (2) relays available to control two (2) independent heating, ventilation, and air conditioning (HVAC) control loads. The operation of the HVAC relays includes a five-minute start delay and different timing for load add compared to the power relays. See 3.5.1 Load Add for more details about the HVAC relay operation.

2.7.3 Load Add/Shed Priority

Loads are prioritized from priority 1 to priority 6. Priority 1 is considered the most critical; it will add first and shed last. Priority 6 is considered the least critical; it will add last and shed first.

2.7.4 Current Transformers (CTs)

An optional current transformer is required for load management. If the application requires cables that are too large for the inside diameter of the CT provided, or a 500 Amp CT is needed for the 60RCL, order a current transformer or obtain a current transformer that meets the specifications shown in table.

The following kits are available:

	Standard CT	Larger Diameter CT - For larger cables or 48RCL	500 Amp CT - For 60RCL only
Primary Rating	400 Amps	400 Amps	500 Amps
Secondary Rating	3 VAC		
Burden Resistor	16 Ohms		
Burden Resistor Location	Internal		
Outer Diameter (O.D.)	63.5 mm (2.50 in.)	111.8 mm (4.40 in.)	171.5 mm (6.75 in.)
Inner Diameter (I.D.)	28.7 mm (1.13 in.)	57.2 mm (2.25 in.)	108.0 mm (4.25 in.)

2.7.5 Connection Procedure

WARNING



Accidental starting.
Can cause severe injury or death.
Disconnect the battery cables before working on the generator set. Remove the negative (–) lead first when disconnecting the battery. Reconnect the negative (–) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or equipment connected to the set, disable the generator set as follows:

1. Press the generator set off/reset button to shut down the generator set.
2. Disconnect the power to the battery charger, if equipped.
3. Remove the battery cables, negative (–) lead first. Reconnect the negative (–) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

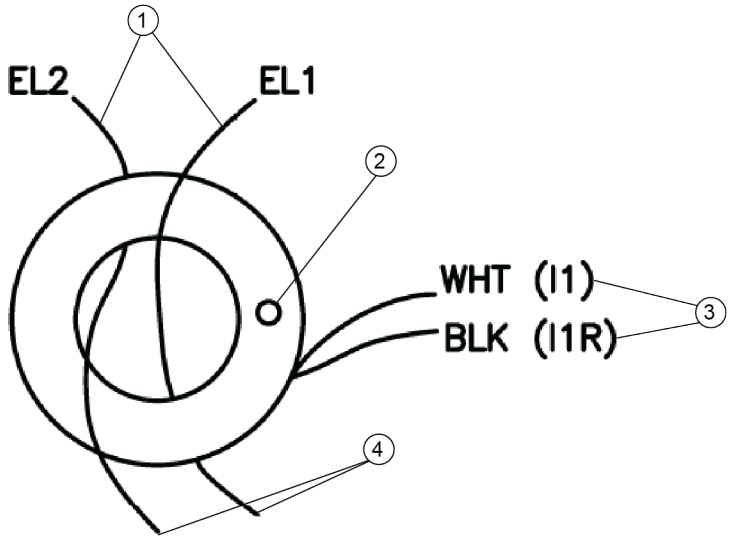
DANGER

Hazardous voltage.
Will cause severe injury or death.
Disconnect all power sources before opening the enclosure.

Making line or auxiliary connections. Hazardous voltage will cause severe injury or death. To prevent electrical shock deenergize the normal power source before making any line or auxiliary connections.

1. Press the OFF button on the generator set controller.
2. Disconnect the utility power to the generator set.
3. Disconnect the generator set engine starting battery(ies), negative (-) lead first.
4. Disconnect power to the transfer switch.
5. Remove the ATS enclosure cover.
6. **Optional CT install**.
   a. Install CT on the emergency source lines inside the transfer switch enclosure.
   b. Locate Dot or H1 on side of current transformer (CT).
   c. Route emergency leads from generator through the current transformer from opposite sides as shown in Figure 9. The emergency leads must cross in opposite directions through the CT.
   d. Connect the CT leads to connector TB1 on the interface/load management circuit board. Extend the leads, if necessary, using customer-supplied wiring. See Figure 10 and Figure 24 for the connector location.

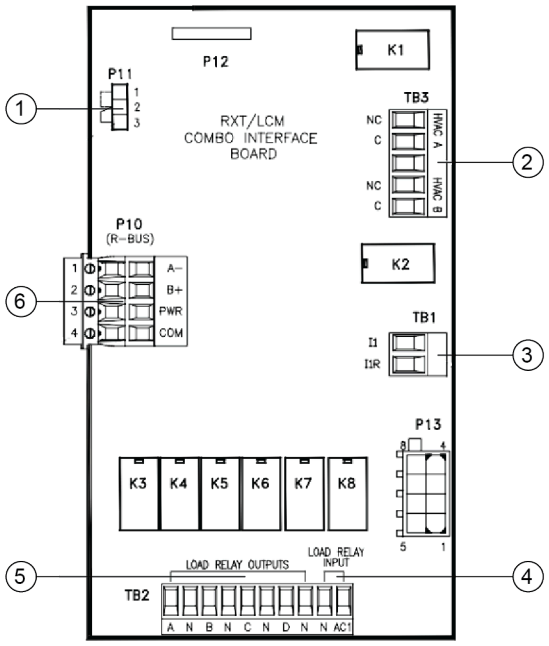
Note: Confirm **dot** or **H1** on CT is on correct side of ct when routing emergency leads.



1	To emergency lugs
2	White dot on side of CT
3	To TB1 on interface board
4	To generator

Note: Emergency source leads (customer-supplied wiring) must cross through CT as shown.

Figure 9: Current Transformer (CT) Wiring



1	P11 jumper pin (factory-installed across 2 and 3 for load management)	4	TB2 120 VAC input connection
2	TB3 HVAC relay connection	5	TB2 connection to customer-supplied power relays (max 4 relays)
3	TB1 connection for current transformer (CT)	6	P10 controller interface RBUS Connections

Figure 10: Combined Interface/Load Management Board Customer Connections

7. RBUS connections: Connect the controller interface connection to A, B, PWR, and COM.

   Note: Use separate conduit for the low-voltage controller communication leads and the load connection wiring. Refer to the wiring diagrams in the Diagrams and Drawings section.

8. **Optional Load relay Install**.

   Note: The combination of four load relay outputs cannot exceed 10 amps total current draw.

   a. Connect the customer-provided load relays to terminal block TB2 for Loads A, B, C, and D. See 2.7.1 Relay Modules for the recommended relay specifications.

   b. Connect 120 VAC power to TB2 connections AC1 and N. See Figure 10.

   c. Connect 120VAC line voltage to terminal AC1.

   d. Connect the neutral to N. The power to this circuit must be backed up by the generator set and not be part of a sheddable circuit.

   e. Verify that the jumper is installed across P11-2 and P11-3 on the combined interface board.

9. **Option HVAC Loads Install**.

   a. Connect HVAC loads to TB3. See Figure 10. Note the priorities of HVAC A and HVAC B relative to Loads A through D.

      The air conditioner control scheme requires splicing into the existing building low voltage wiring from the thermostat to the air conditioner/furnace. In a typical four wire scheme, connect the cooling wire (Y) in series to the respective terminal block on the load shed kit.

   b. Record the names of the loads connected to each relay. For example, Load A may be a sump pump, and HVAC A may be the air conditioner.

   Note: If the Home Energy Management System is used, the load descriptions can be changed remotely. To avoid confusion, make sure that the load description matches the equipment connected to the corresponding relay.

10. For service entrance models with the optional battery charger circuit breaker, see2.8.3 Auxiliary Circuit Breaker - Standard on Service Entrance Models for connections.

11. Install the ATS enclosure cover.

12. Check that the generator set is OFF.

13. Reconnect the utility power to the transfer switch.

14. Reconnect the generator set engine starting battery, negative (-) lead last.
15. Reconnect utility power to the generator set.

2.8 Accessory Connections (Optional)

Factory-installed accessories may require power, input, and/or output connections. Refer to the following sections and to any instructions provided with the accessory kit for instructions to connect optional accessories.

After connecting the accessories, or if there are no accessories, proceed to the Set Exercise section.

2.8.1 Programmable Interface Module (PIM) Connections (Optional)

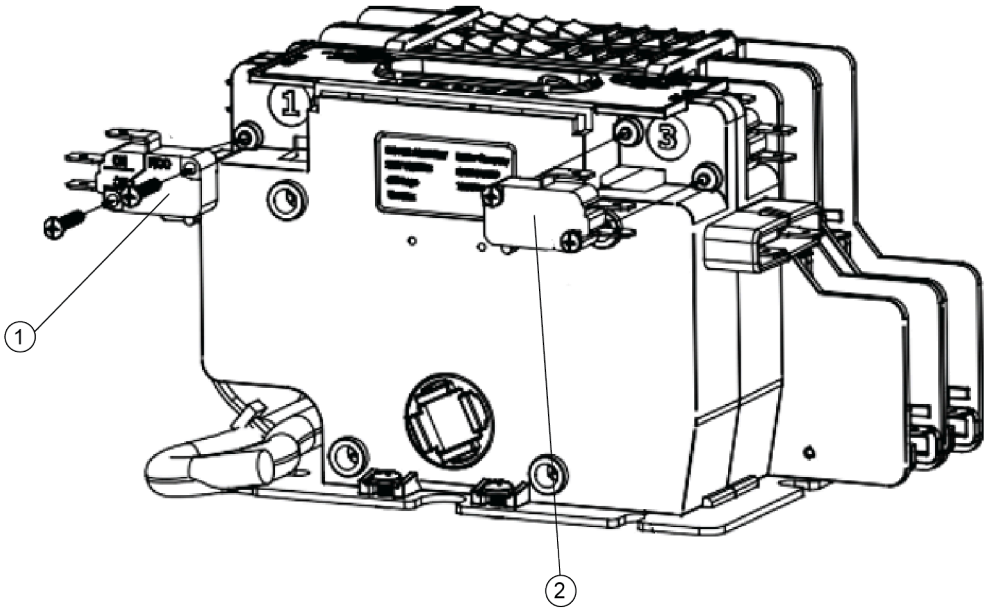
For connection of the optional programmable interface module (PIM), refer to the instructions provided with the module and to the generator set installation manual.

2.8.2 Auxiliary Contacts

One standard and one optional auxiliary contacts are available for TRX models - one normal and one emergency contact location. Contact rating - 15A @ 250VAC.

Auxiliary contacts provide one set of normally open (NO) contacts that close when the transfer switch is in the Normal position and one set of contacts that close when the transfer switch is in the Emergency position. Some auxiliary switches may also be equipped with normally closed (NC) contacts. Use 1/4 in. fast-on connectors to connect the auxiliary contacts to customer-supplied alarms, remote indicators, or other devices.

The auxiliary contacts are located on either the left side or the right side of the contactor. See example Figure 11.



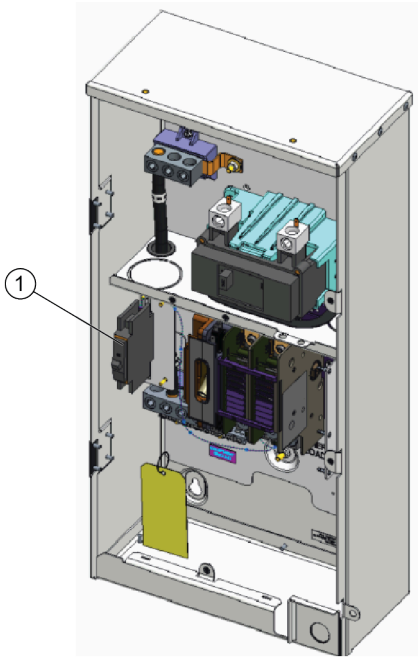
1	Emergency position-indicating contact
2	Normal position-indicating contact

Figure 11: Auxiliary Contacts, Typical 100- 200 Amp Models

2.8.3 Auxiliary Circuit Breaker - Standard on Service Entrance Models

Single-pole 15-amp auxiliary circuit breaker is standard for service entrance model transfer switches. Optional auxiliary circuit breakers available for standard and service entrance model transfer switches.

An auxiliary breaker is recommended for connection of AC power for the generator set battery charger or other AC-powered accessories. The breaker connects to the load side of the transfer switch to provide power that is backed up by the generator set. For connections, see Figure 12 or Figure 24.



1	Auxiliary Circuit Breaker

Figure 12: Auxiliary Circuit Breaker, SE Model Shown

2.9 Set Exercise

Refer to the generator set Operation Manual for instructions to set the RDC2 or DC2 controller for weekly loaded exercise runs to keep the power system in good operating condition.

2.10 Test

Test the transfer switch's automatic control system immediately after installation and monthly thereafter.

Refer to the RDC2/DC2 controller operation manual for instructions to program a loaded exercise.

During the loaded exercise:

- Verify that the expected sequence of operations occurs as the switch transfers the load to the emergency source when a preferred source failure occurs or is simulated.
- Watch and listen for signs of excessive noise or vibration during operation.
- As the exercise ends, verify that the expected sequence of operations occurs when the transfer switch retransfers to the preferred source.

2.11 Warranty

Complete startup procedures in accordance with the applicable installation instructions and register the equipment in the online warranty system within sixty (60) days of initial startup. Warranty coverage is governed exclusively by the written limited warranty applicable to the product. This manual does not expand, modify, or replace the terms of any applicable warranty. Failure to follow installation, operating, maintenance, inspection, testing, or service instructions may affect warranty coverage to the extent permitted by applicable law. Contact an authorized distributor/dealer for additional warranty information.

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3.1 Model TRX Transfer Switch Operation

The Model TRX transfer switch must be connected to a generator set equipped with the RDC2 or DC2 controller. The RDC2/DC2 generator set/transfer switch controller manages automatic transfer switch (ATS) functions when connected to a Model TRX transfer switch through the ATS interface board. The controller receives voltage sensing data from the Model TRX ATS and operates the generator set and transfer switch to provide standby power when utility power is lost.

See the generator set operation manual for:

- ATS status screens and configuration menus.
- Information about loaded exercise.

3.2 Source Availability

The Model TRX transfer switch supplies voltage sensing data to the RDC2 or DC2 controller through the ATS interface board. If the source voltage falls below the undervoltage dropout setting, the source is considered to have failed.

Voltage Sensing Parameter	Setting
Accuracy	±5%
Undervoltage Dropout	90% of Pickup
Undervoltage Pickup	90% of Nominal

Table 18: Voltage Sensing Parameters

3.3 ATS Control Sequence of Operation

This section describes the operation of a transfer switch equipped with the standard interface board. For more information about operation with a combined interface/load management board, please see the Load Management Operation section and the Load Management Theory of Operation section.

See the Time Delays figure for time delay settings.

3.3.1 Normal Source Fails:

1. The load control contact opens.
2. The engine start time delay times out.
3. The generator set is signaled to start.
4. The generator starts and the emergency source becomes available.
5. The normal-to-emergency time delay times out.
6. The transfer switch transfers to the emergency source.

3.3.2 Normal Source Returns:

1. The emergency-to-normal time delay times out.
2. The contactor transfers to the normal source.
3. The engine cooldown time delay times out.
4. The generator is signaled to stop.

3.4 Load Management Operation

The combined interface/load management board provides load add and shed based on generator capacity as described in this section.

Many appliances do not run continuously. Air conditioners and furnaces, refrigerators, sump pumps, and other appliances cycle on and off as needed. With load management, less critical appliances can be powered by the generator set when the more important appliances are not running, allowing the use of a smaller generator set than would be needed to run all of the building's electrical equipment at the same time.

The RDC2/DC2 generator controller receives input from current transformer (provided with the combined interface/load management board for installation in the ATS) and determines whether to add or shed loads. The combined interface/load management board receives commands from the generator controller and energizes or de-energizes the appropriate load relays.

The load management function is activated by the ATS transferring from the utility (normal) source to the generator.

When activated, the load management board sheds all connected loads. After transfer to the generator set, loads are added according to their priority.

If the ATS fails to transfer from the utility source to the generator, the load management board will re-add all loads. When the ATS transfers to utility, the load management board adds all loads that have been previously shed.

For more information about the load add and load shed timing, see Load Management Theory of Operation section.

3.4.1 Power Loads

Up to four customer-supplied power relays can be connected for management of non-essential secondary loads. If two-pole relays are used, two (2) 120VAC loads (shed simultaneously) or a single 240VAC load can be wired to each relay. See the Relay Modules section for more power relay information.

3.4.2 HVAC Loads

There are two (2) relays available to control two (2) independent heating, ventilation, and air conditioning (HVAC) loads.

A 5-minute time delay prevents HVAC loads from adding too quickly. Air conditioning compressors may be damaged if they start too soon after being stopped due to the necessity of starting the compressor against a large residual pressure. Five minutes is a typically accepted time required for an AC compressor to bleed off to a pressure level that the motor can successfully start against.

3.4.3 Load Add/Shed Priority

Loads are prioritized from priority 1 to priority 6. See the Load Priority and Descriptions figure. Priority 1 is considered the most critical; it will add first and shed last. Priority 6 is considered the least critical; it will add last and shed first.

3.5 Load Management Theory of Operation

3.5.1 Load Add

The load management board adds and sheds loads based on the available capacity of the generator set. When the generator has ample available capacity, loads are added quickly. When the available capacity is low, loads are added more slowly to give the generator time to recover and to allow ample time to ensure that any switching loads will come on before adding more load than the generator can handle.

The load add time ranges from 15 to 120 seconds depending on the loading of the generator set. Table 19shows an example of the load add timing for a 20kW generator set with the maximum capacity set to the default setting of 70%. Table 20 shows the HVAC load add timing for a 20kW generator set.

When on Emergency power, there is a 5-minute delay between the addition of Load A and the HVAC load A after all loads are shed. See the HVAC Loads section for more information.

Available Capacity (%)	Load (%)	Load (kW) for a 20 kW Generator	Time (Seconds)
70%	0%	0	15
50%	20%	4	23
37%	33%	6.6	34
30%	40%	8	40
20%	50%	10	48
5%	65%	13	60
<5%	>65%	>13kW	Never Add

Table 19: Example: Power Relay Load Add Timing for a 20 kW Generator

Available Capacity (%)	Load (%)	Load (kW) for a 20 kW Generator	Time (Seconds)
70%	0%	0	30
50%	20%	4	66
37%	33%	6.6	91
30%	40%	8	102
20%	50%	10	120
<20%	>50%	>10kW	Never Add

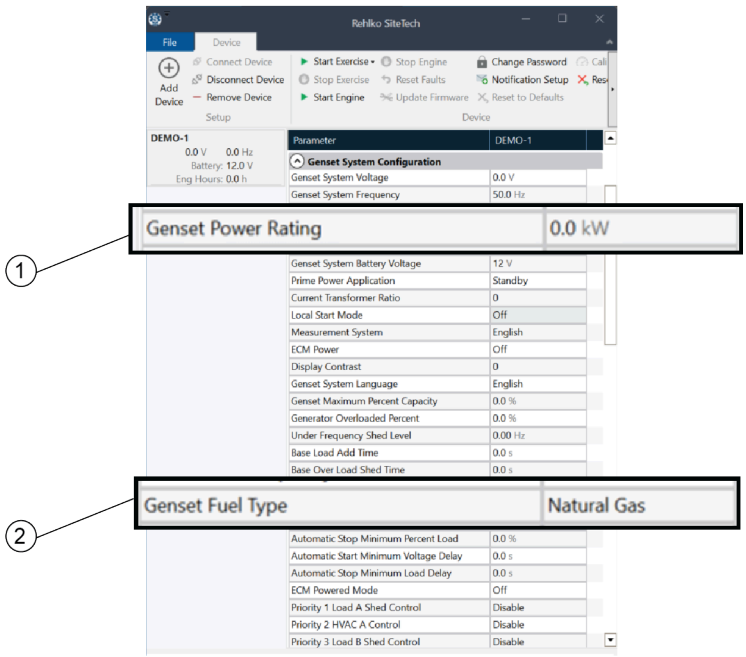
Table 20: Example: HVAC Load Add Timing for a 20 kW Generator

Capacity

The Generator Maximum Percent Capacity setting dictates the maximum level that the load management board will automatically place on the generator. This setting is adjustable using a laptop computer connected to the RDC2 or DC2 controller and SiteTech™ software. See the Changing Settings section.

The maximum load is calculated by multiplying the Generator Maximum Percent Capacity by the Genset Power Rating, which is a setting in the RDC2/DC2 controller. The Genset Power Rating, in kW, is factory-set to the natural gas rating. If the generator has been converted to LP fuel, use SiteTech™ to verify that the fuel type has been changed on the controller and the Genset Power Rating is correct. Refer to the generator set specification sheet for the new rating, and change the fuel type using the controller keypad or the Genset System Configuration in SiteTech™. See Figure 13 or TP-6701, SiteTech™ Software Operation Manual.

The load management function will operate if the rating setting is not changed, but loads will be shed at a kW level based on the factory default rating, rather than the rating of the reconfigured generator set.



1	Genset Power Rating setting
2	Genset Fuel Type setting

Figure 13: Genset Power Rating in SiteTech™

3.5.2 Load Shed

Less important (larger priority number) loads are shed when the generator is unable to support them. This permits more important loads to continue to receive power from the generator. The less important loads are re-added after the generator loading has gone down enough to support them again. The load management board sheds less important loads before the power quality of the generator suffers from the overload.

Loads are shed in two ways – Overload and Under Frequency.

3.5.3 Overload Shed

Loads are shed on a time scale which is based on the total generator overload. The loads will shed slowly when the generator is not heavily overloaded. Loads are shed much more quickly when the overload is higher. The timing variation allows consistent overloads to be removed, instantaneous excessive overloads to be very quickly removed and normal overloads (such as motor inrush) to remain online until the transient overload condition is removed.

Table 21 shows the overload shed timing for a 20 kW generator set with the generator overloaded percent set to the default setting of 85%. If the overload condition persists, the load shed timing can be affected by load shed acceleration. See the Load Shed Acceleration section.

The Generator Overload Percent setting is the maximum load that the load management board will accept without shedding. The setting is adjustable using a laptop computer connected to the RDC2 or DC2 controller and SiteTech™ software. See the Changing Settings section. Set the Generator Overload Percent at least 10% higher than the Generator Maximum Percent Capacity.

Generator Overload (%)	Load (%)	Load (kW) for a 20 kW Generator	Time (Seconds)
0%	<85%	17kW	Never Shed
0%	85%	17	40
10%	95%	19	28

Table 21: Overload Shed Timing for a 20 kW Generator

Generator Overload (%)	Load (%)	Load (kW) for a 20 kW Generator	Time (Seconds)
13%	98%	19.6	24
15%	100%	20	22
20%	105%	21	17
<35%	>120%	>24kW	0.5

Table 21: Overload Shed Timing for a 20 kW Generator

3.5.4 Under Frequency Shed

Loads are shed on a time scale which is based on the generator frequency droop. The loads will shed quickly when the frequency droop is high (output frequency is lower), and more slowly when the generator is running close to rated frequency. The timing variation allows large overloads to be shed very quickly, while allowing the generator to ride through normal transients (such as starting an AC compressor).

Table 22 shows the under frequency shed timing for a 60 Hz generator set. If the underfrequency condition persists, the load shed timing can be affected by load shed acceleration. See the Load Shed Acceleration section.

Frequency (Hz)	Frequency Droop (Hz)	Time (seconds)
>59 Hz	<1 Hz	Never Shed
58.5	1.5	5.4
57	3	4.3
56	4	3.4
54	6	1.8
<52.5 Hz	>7.5 Hz	0.3

Table 22: Under Frequency Shed Timing for a 60Hz Generator

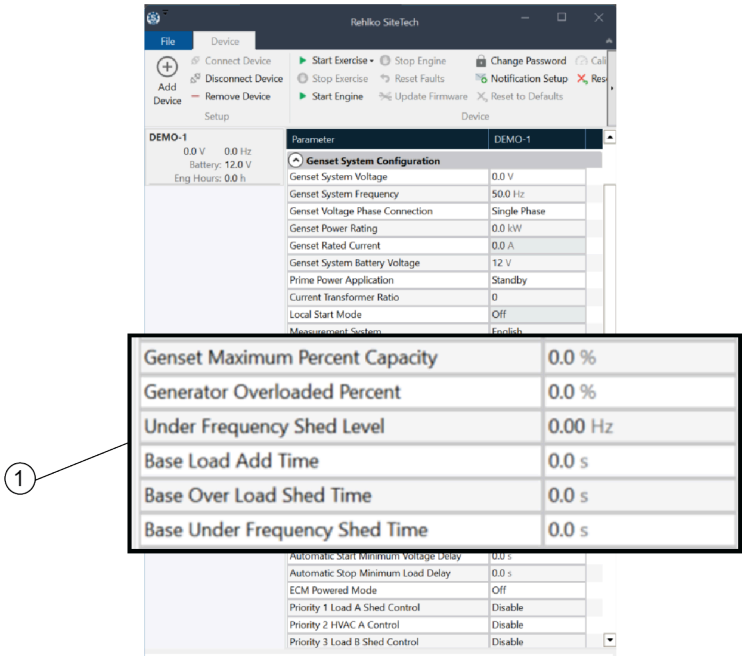
3.5.5 Load Shed Acceleration

Load shed acceleration is used to shed loads more quickly if an overload or underfrequency condition persists. If an overload condition is not cleared by shedding a load, each subsequent load will shed more quickly. The acceleration is more pronounced for an underfrequency shed.

3.5.6 Changing Settings

The settings described in the Load Add section through the Load Shed Acceleration section, including Generator Maximum Percent Capacity and Generator Overloaded Percent, can be changed using a laptop computer connected to the RDC2 or DC2 controller and SiteTech™ software. The load control settings are found in the Genset System Configuration group. See Figure 14 or TP-6701, SiteTech™ Software Operation Manual.

Set the Generator Overload Percent at least 10% higher than the Generator Maximum Percent Capacity.



1	Load shed settings

Figure 14: Load Shedding Settings

3.6 Time Delays

Time delays are factory-set to the values shown in Table 23. An authorized distributor/dealer can adjust time delays using a personal computer and SiteTech™ software.

Time delays shown in Table 23 operate only when the RDC2 or DC2 generator set controller is connected to a Model TRX transfer switch.

The engine start and load transfer time delays prevent engine start and load transfer caused by brief variations in the utility power source.

Time Delay	Setting	Description
Engine Start	3 seconds	Time delay after utility source is lost until the engine start cycle begins. Guards against starting the generator set because of a brief change in the utility source.
Transfer, Normal to Emergency	3 seconds	Time delay after emergency source becomes available until transfer to emergency source.
Transfer, Emergency to Normal	2 minutes	Time delay after the utility source returns until transfer back to normal. Ensures that the utility source is stable before transferring from the emergency source.
Load Control (standard interface board only)	5 minutes	Allows delayed connection of selected loads to the generator set. Prevents simultaneous starting of large motors after transfer to the emergency source. Recommended for delayed starting of air conditioners.

Table 23: Time Delays

3.7 Accessory Circuit Breaker (SE Model)

A single-pole 15- amp circuit breaker for the generator set battery charger is standard for the service entrance model transfer switch.

Circuit Breaker Trip/Reset

The trip indication window appears red when the breaker is tripped. Identify and correct the cause of the overcurrent trip before resetting the breaker.

To reset the circuit breaker, move the breaker handle to the O/OFF position and then back to I/ON.

Note: This section applies only to service entrance model transfer switches, which are identified with the letters SE at the end of the model designation.

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This section applies only to service entrance model transfer switches, which are identified with the letters SE at the end of the model designation.

DANGER



Hazardous voltage.
Will cause severe injury or death.
This equipment must be installed and serviced by qualified electrical personnel.

WARNING



Accidental starting.
Can cause severe injury or death.
Disconnect the battery cables before working on the generator set. Remove the negative (–) lead first when disconnecting the battery. Reconnect the negative (–) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or equipment connected to the set, disable the generator set as follows:

1. Press the generator set off/reset button to shut down the generator set.
2. Disconnect the power to the battery charger, if equipped.
3. Remove the battery cables, negative (–) lead first. Reconnect the negative (–) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

4.1 Service Disconnect Procedure

Use the following procedure to disconnect the utility source on service entrance model transfer switches.

Note: Power is still present on the input side of the utility source circuit breaker after this procedure.

1. Prevent the emergency generator set from starting:
   a. Press the OFF button on the generator set controller.
   b. Disconnect power to the generator set battery charger.
   c. Disconnect the generator set engine starting battery, negative (-) lead first.
2. On the transfer switch, remove the outer enclosure door only.
3. Move the utility source circuit breaker to the OFF position.

   Note: Power is still present on the input side of the utility source circuit breaker. Do not remove the protective barrier around the utility source connection lugs
4. To lock out the transfer switch, replace the outer door and attach a padlock to the hasp. See the Service Entrance Model figure for the location of the hasp.

4.2 Source Circuit Breaker Reset

The utility source circuit breaker can trip due to an overcurrent condition. Identify and correct the cause of the overcurrent condition before resetting the circuit breaker. Contact an authorized distributor/dealer for service if necessary.

When the circuit breaker trips, the handle moves to an intermediate position. To reset a tripped circuit breaker, move the handle to the extreme OFF position and then to the ON position.

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5.1 Introduction

Regular preventive maintenance ensures safe and reliable operation and extends the life of the transfer switch. Preventive maintenance includes periodic testing, cleaning, inspection, and replacement of worn or missing components.

An authorized distributor/dealer can provide complete preventive maintenance and service to keep the transfer switch in top condition. Inspection and maintenance intervals may need to be increased based on environmental conditions, operating frequency, duty cycle, contamination exposure, local regulatory requirements, utility conditions, or other site-specific factors. The owner remains responsible for maintaining the equipment in a safe operating condition.

Unless otherwise specified, have maintenance or service performed by an authorized distributor/dealer in accordance with all applicable codes and standards. See the Service Assistance section in this manual for how to locate a local distributor/dealer.

Keep records of all maintenance or service.

Replace all barriers and close and lock the enclosure door after maintenance or service and before reapplying power.

WARNING



Accidental starting.
Can cause severe injury or death.
Disconnect the battery cables before working on the generator set. Remove the negative (–) lead first when disconnecting the battery. Reconnect the negative (–) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or equipment connected to the set, disable the generator set as follows:

1. Press the generator set off/reset button to shut down the generator set.
2. Disconnect the power to the battery charger, if equipped.
3. Remove the battery cables, negative (–) lead first. Reconnect the negative (–) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

DANGER



Hazardous voltage.
Will cause severe injury or death.
Disconnect all power sources before opening the enclosure.

DANGER



Hazardous voltage.
Will cause severe injury or death.
Only authorized personnel should open the enclosure.

Grounding electrical equipment. Hazardous voltage will cause severe injury or death. Electrocution is possible whenever electricity is present. Ensure you comply with all applicable codes and standards. Electrically ground the generator set, transfer switch, and related equipment and electrical circuits. Turn off the main circuit breakers of all power sources before servicing the equipment. Never contact electrical leads or appliances when standing in water or on wet ground because these conditions increase the risk of electrocution.

Servicing the transfer switch. Hazardous voltage will cause severe injury or death. Deenergize all power sources before servicing. Turn off the main circuit breakers of all transfer switch power sources and disable all generator sets as follows:

1. Press the generator set off/reset button to shut down the generator set.
2. Disconnect power to all battery chargers.
3. Disconnect all battery cables, negative (–) leads first. Reconnect negative (–) leads last when reconnecting the battery cables after servicing. Follow these precautions to prevent the starting of generator sets by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer. Before servicing any components inside the enclosure:

Short circuits. Hazardous voltage/current will cause severe injury or death. Short circuits can cause bodily injury and/or equipment damage. Do not contact electrical connections with tools or jewelry while making adjustments or repairs. Remove all jewelry before servicing the equipment.

NOTICE

Electrostatic discharge damage. Electrostatic discharge (ESD) damages electronic circuit boards. Prevent electrostatic discharge damage by wearing an approved grounding wrist strap when handling electronic circuit boards or integrated circuits. An approved grounding wrist strap provides a high resistance (about 1 megohm), not a direct short, to ground.

5.2 Inspection and Service

Contact an authorized distributor/dealer to inspect and service the transfer switch annually and also when any wear, damage, deterioration, or malfunction of the transfer switch or its components is evident or suspected.

Have an authorized distributor/dealer perform scheduled maintenance, service, and other maintenance that ensures the safe and reliable operation of the transfer switch, including but not limited to:

- Accumulations of dirt, dust, moisture, or other contaminants
- Worn, missing, or broken components
- Loose hardware
- Wire or cable insulation deterioration, cuts, or abrasion
- Signs of overheating or loose connections
- Test the transfer switch’s automatic control system.

Diagram or Drawing	Drawing No.
Enclosure Dimension Drawings	
100-200 Amp Single-Phase	ADV-10144
Wiring/Schematic Diagrams	
Schematic Diagrams	ADV-10126
Wiring Diagram: 100-200 Amp Single-Phase	GM125450

Table 24: Standard Models

Diagram or Drawing	Drawing No.
Enclosure Dimension Drawings	
100-200 Amp Single-Phase, Service Entrance	ADV-10143
Wiring/Schematic Diagrams	
Schematic Diagrams	ADV-10126
Wiring Diagram: 100-200 Amp Single-Phase	GM125450

Table 25: Service Entrance Models

Diagram or Drawing	Drawing No.
Dimension print, ATS Accessories	ADV-10211

Table 26: Loose Parts

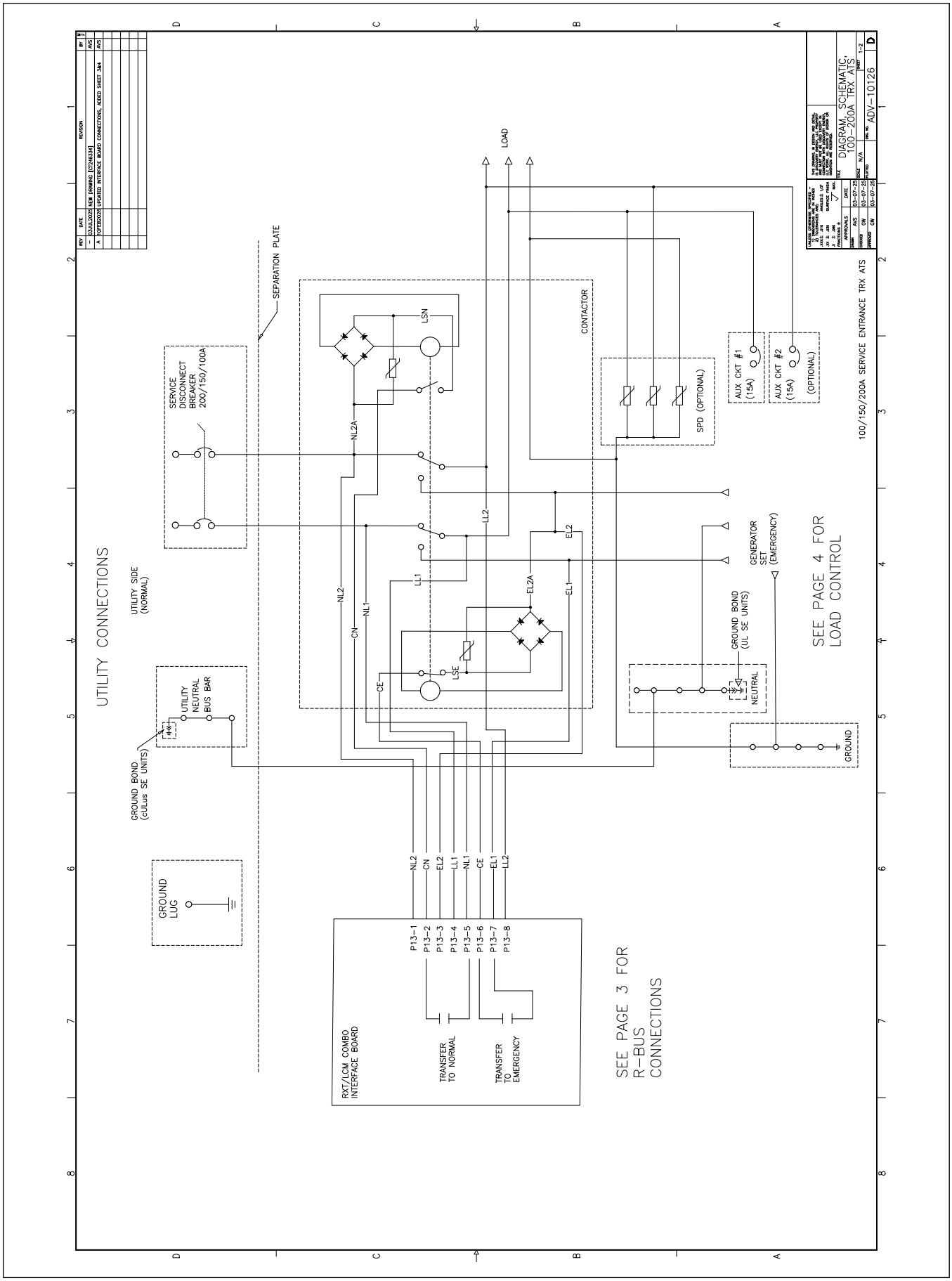

Figure 15: Schematic Diagram, 100-200 A, ADV-10126, Sheet 1

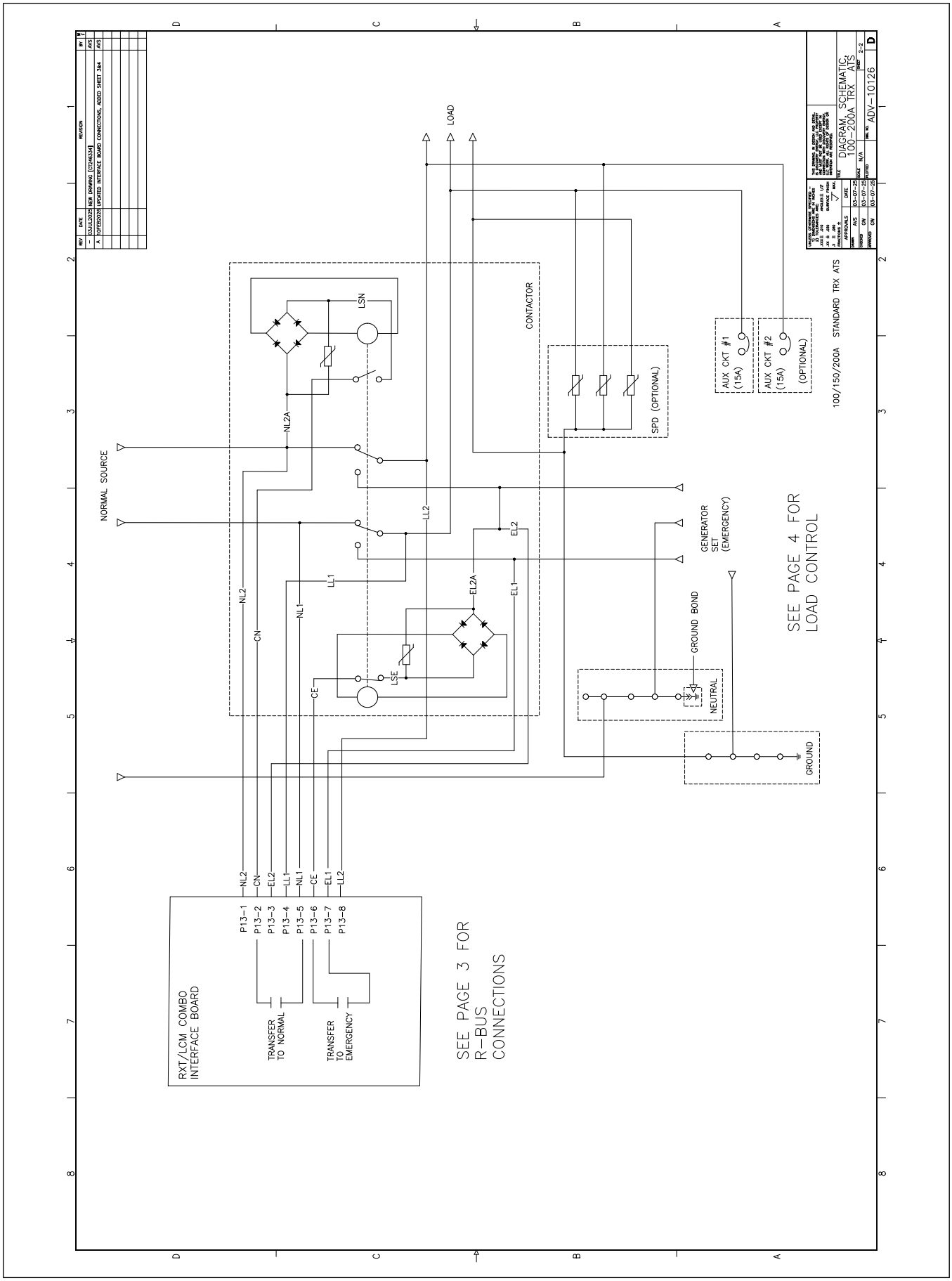

Figure 16: Schematic Diagram, 100-200 A, ADV-10126, Sheet 2

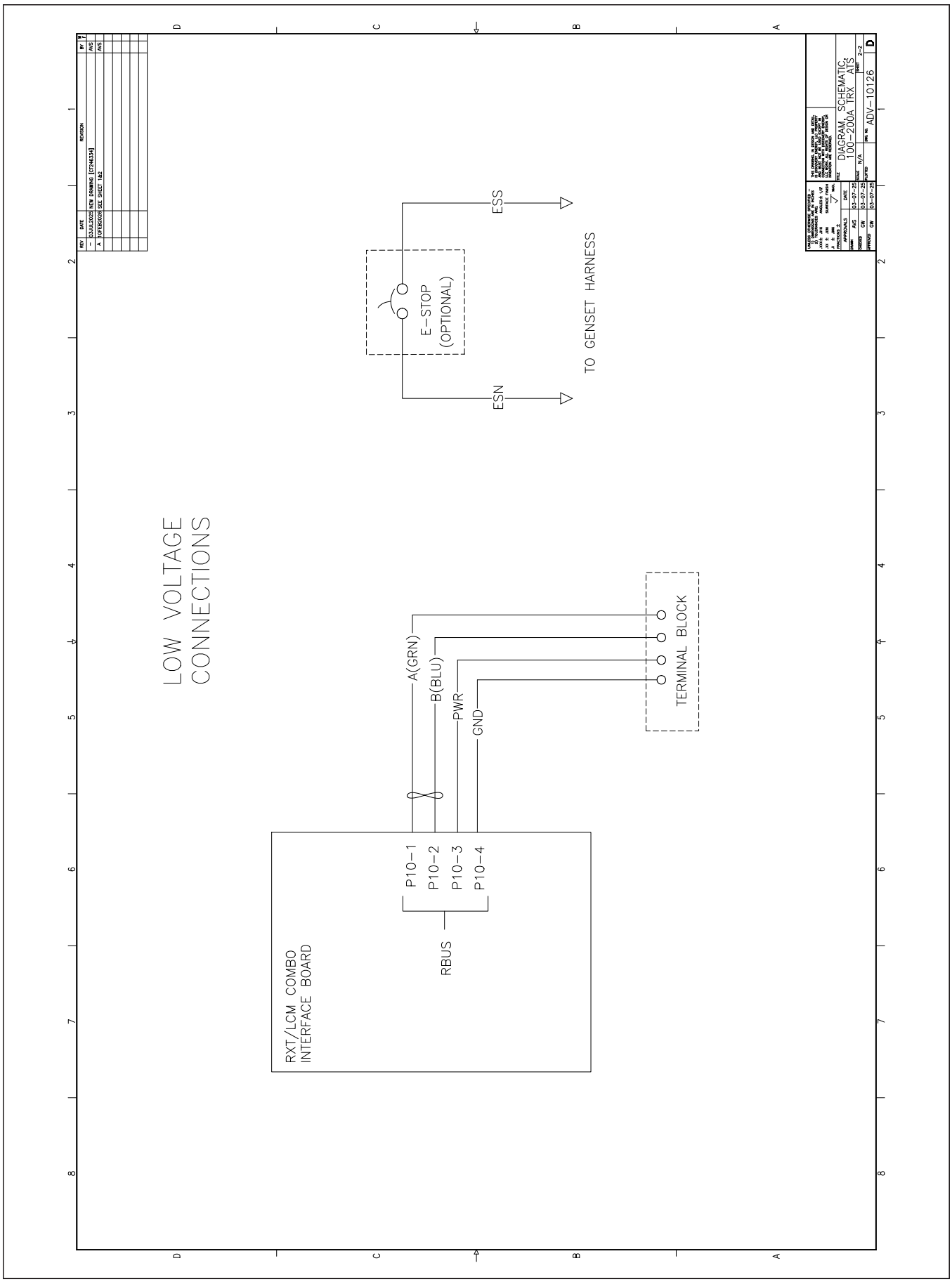

Figure 17: Schematic Diagram, 100-200 A, ADV-10126, Sheet 3

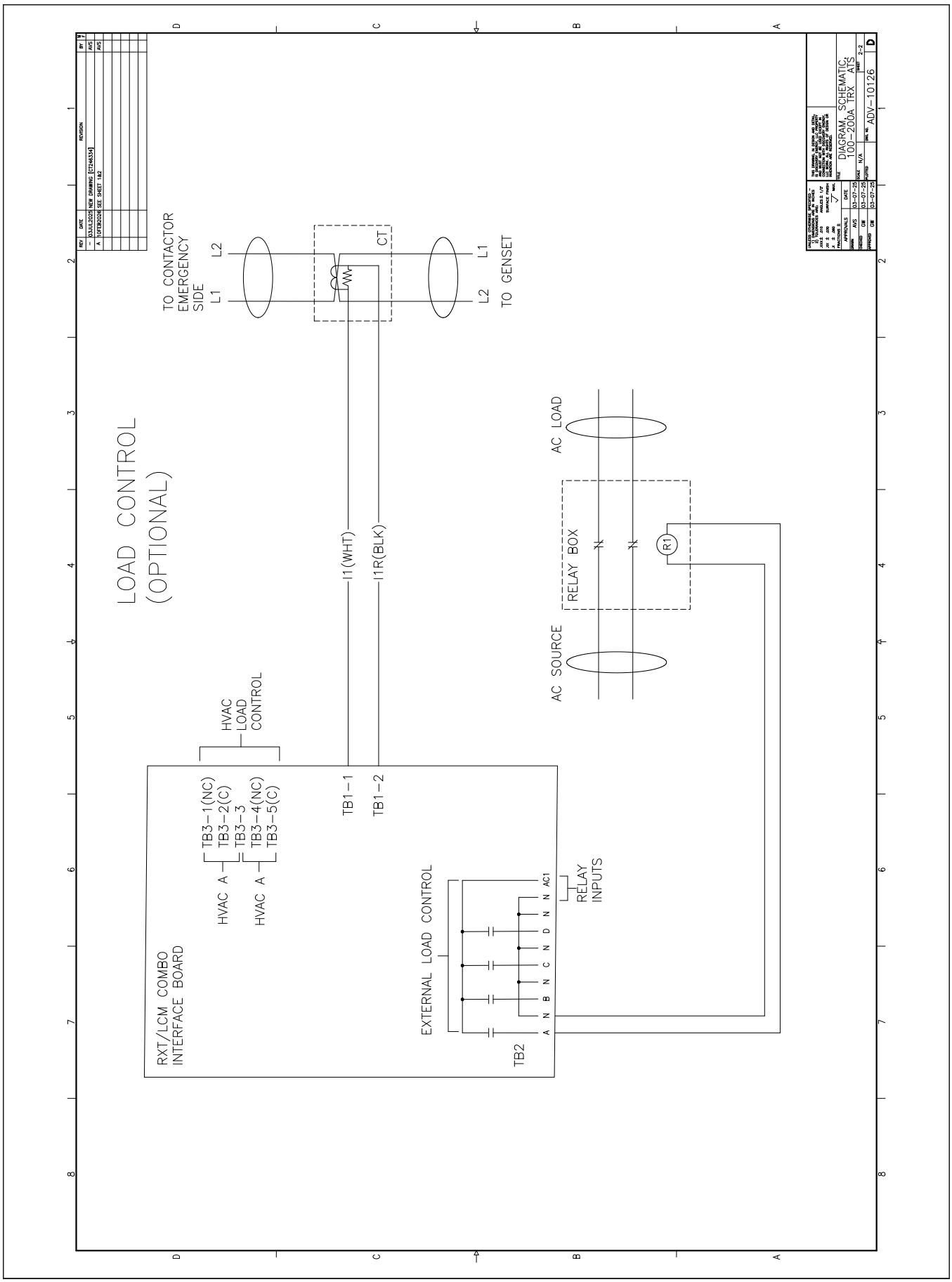

Figure 18: Schematic Diagram, 100-200 A, ADV-10126, Sheet 4

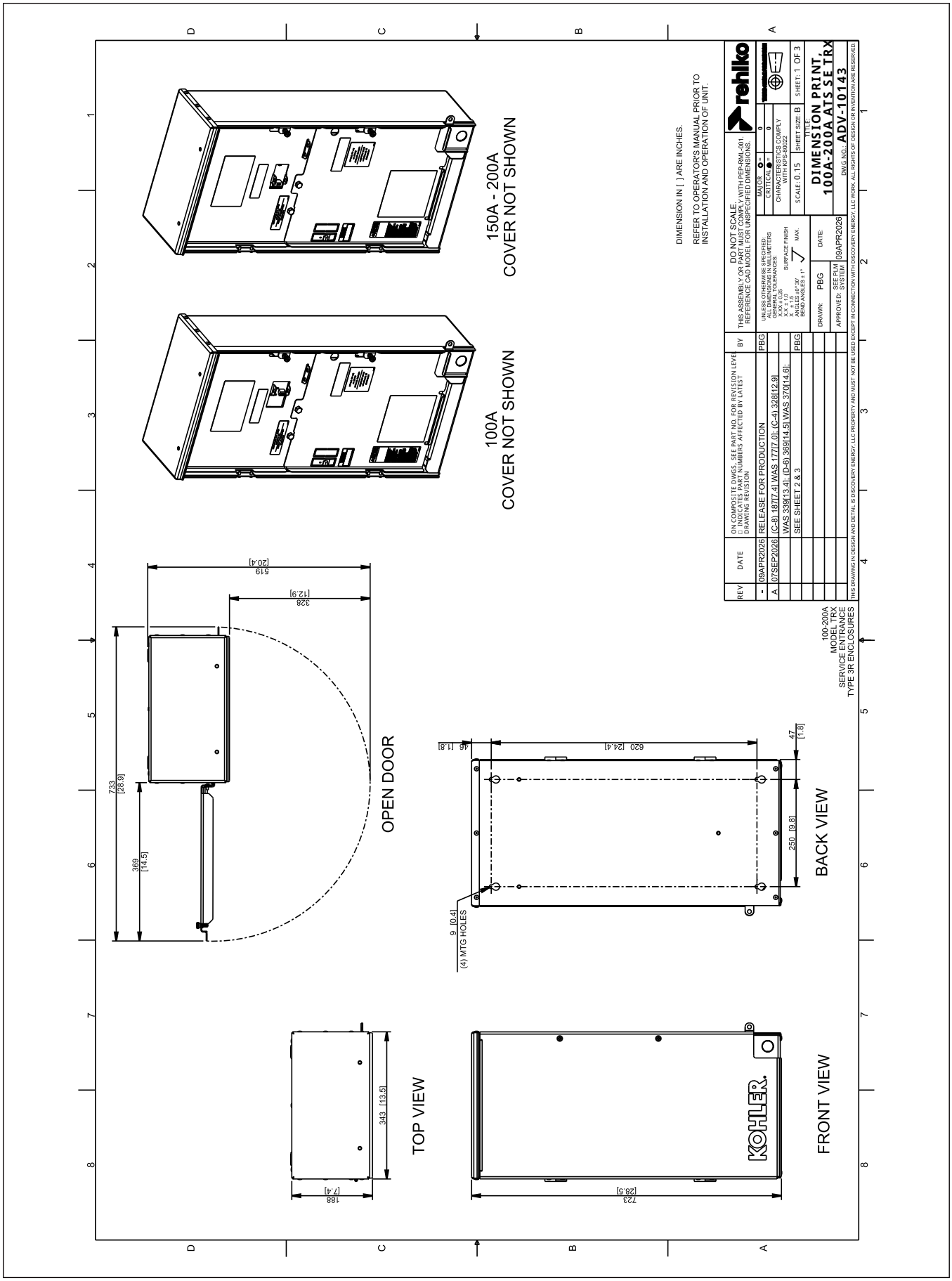

Figure 19: Wiring Diagram, 100-200 A Single-Phase, Service Entrance, ADV-10143, Sheet 1

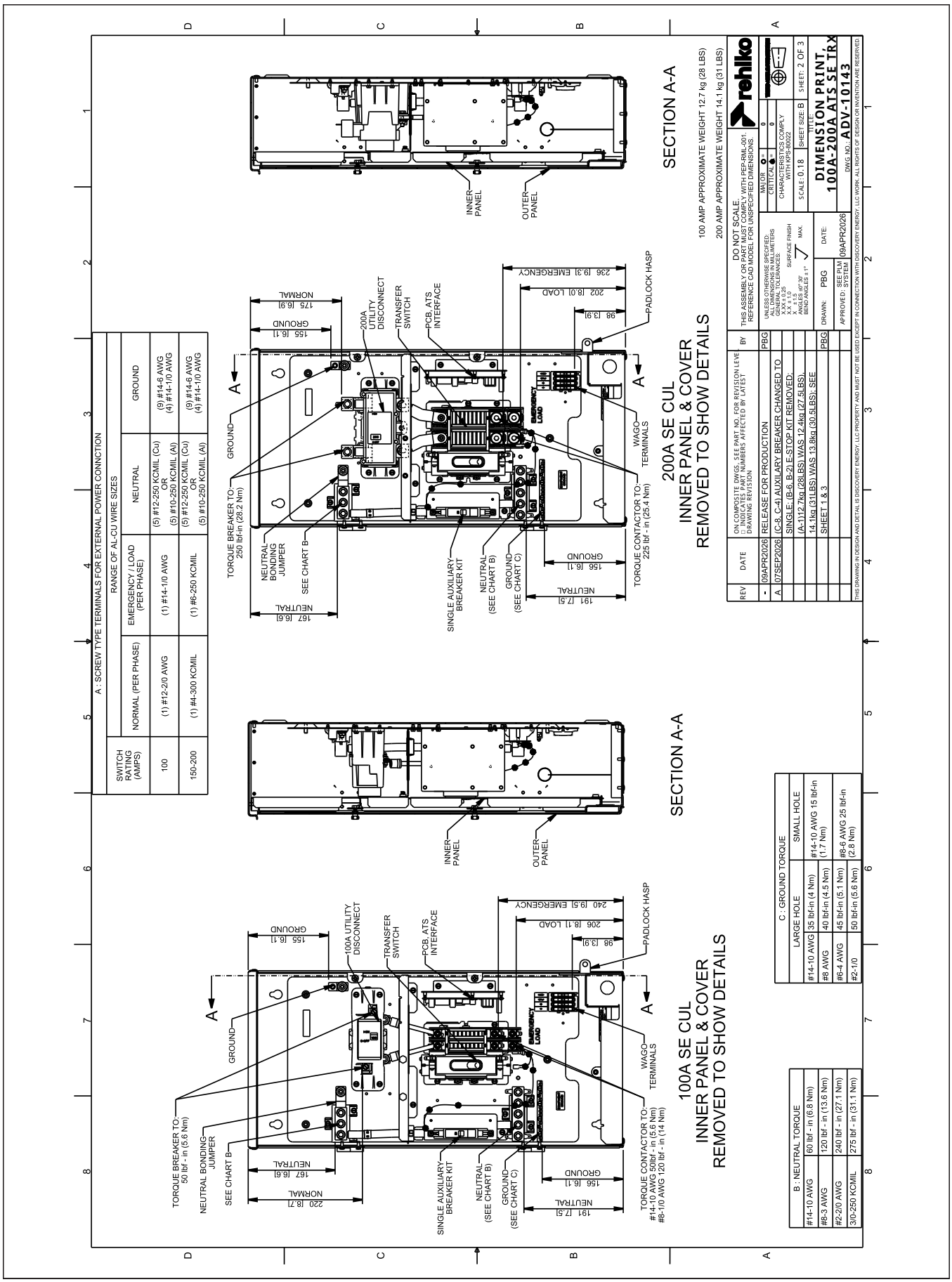

Figure 20: Wiring Diagram, 100-200 A Single-Phase, Service Entrance, ADV-10143, Sheet 2

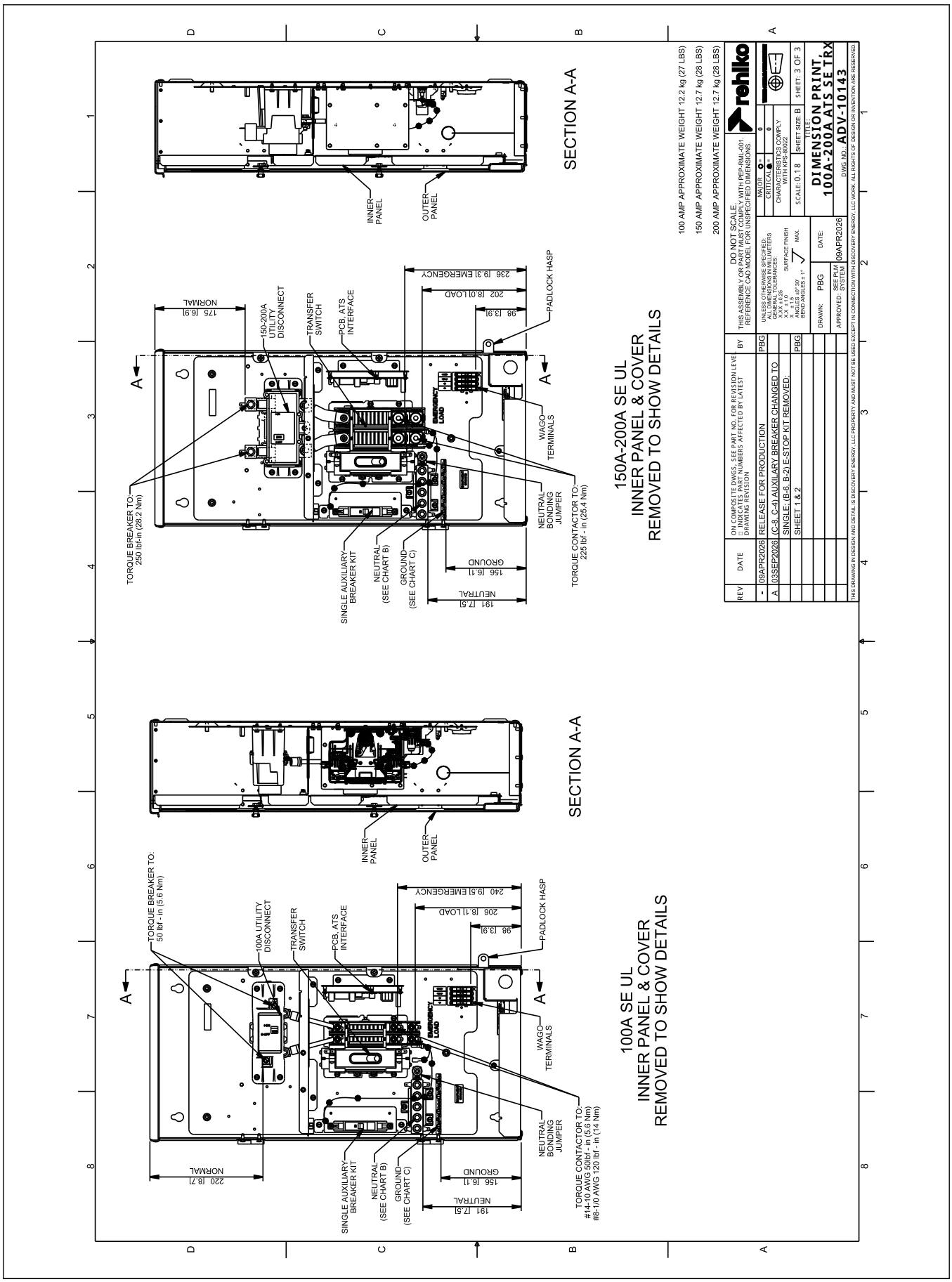

Figure 21: Wiring Diagram, 100-200 A Single-Phase, Service Entrance, ADV-10143, Sheet 3

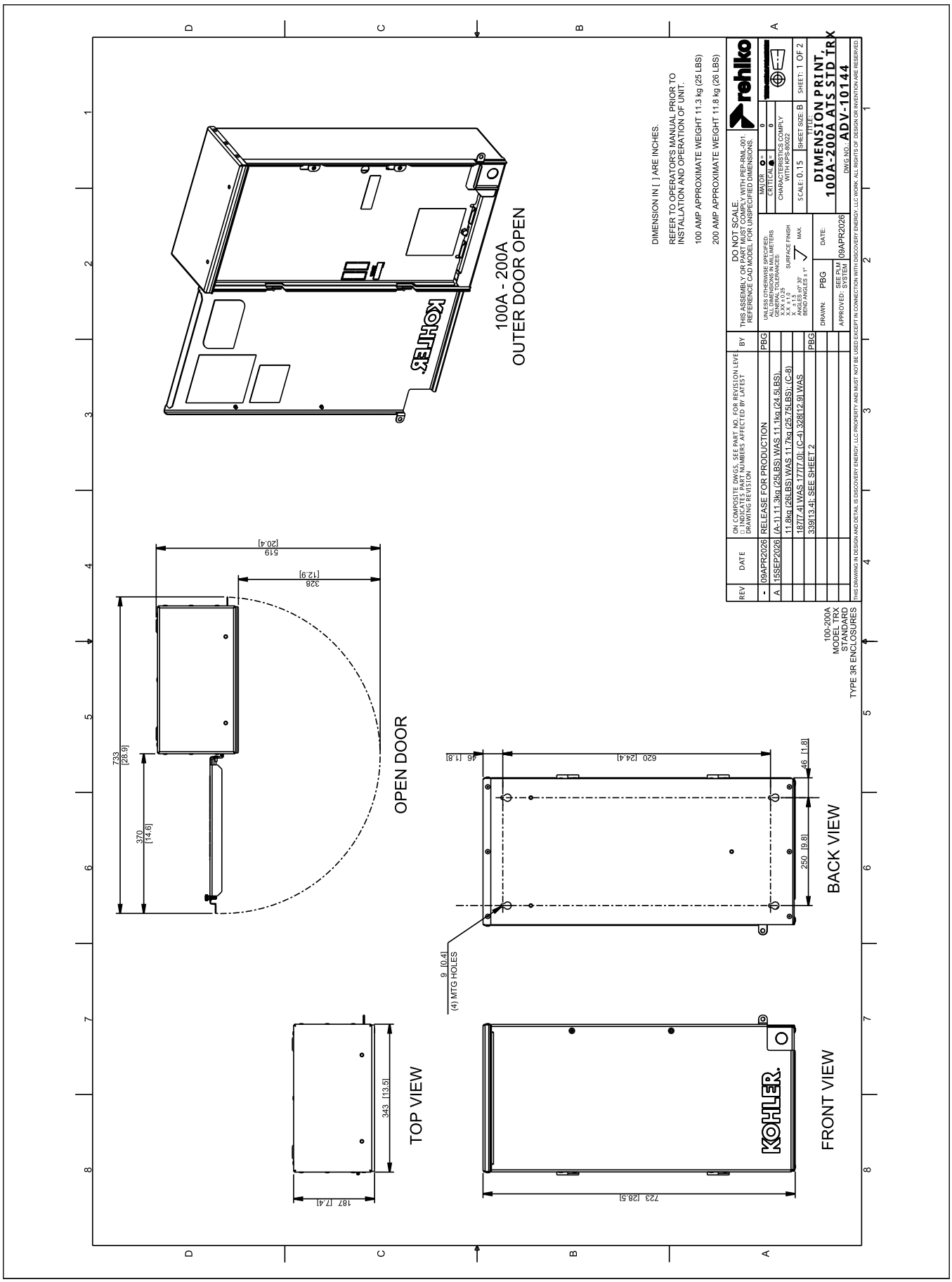

Figure 22: Wiring Diagram, 100-200 A Single-Phase, ADV-10144, Sheet 1

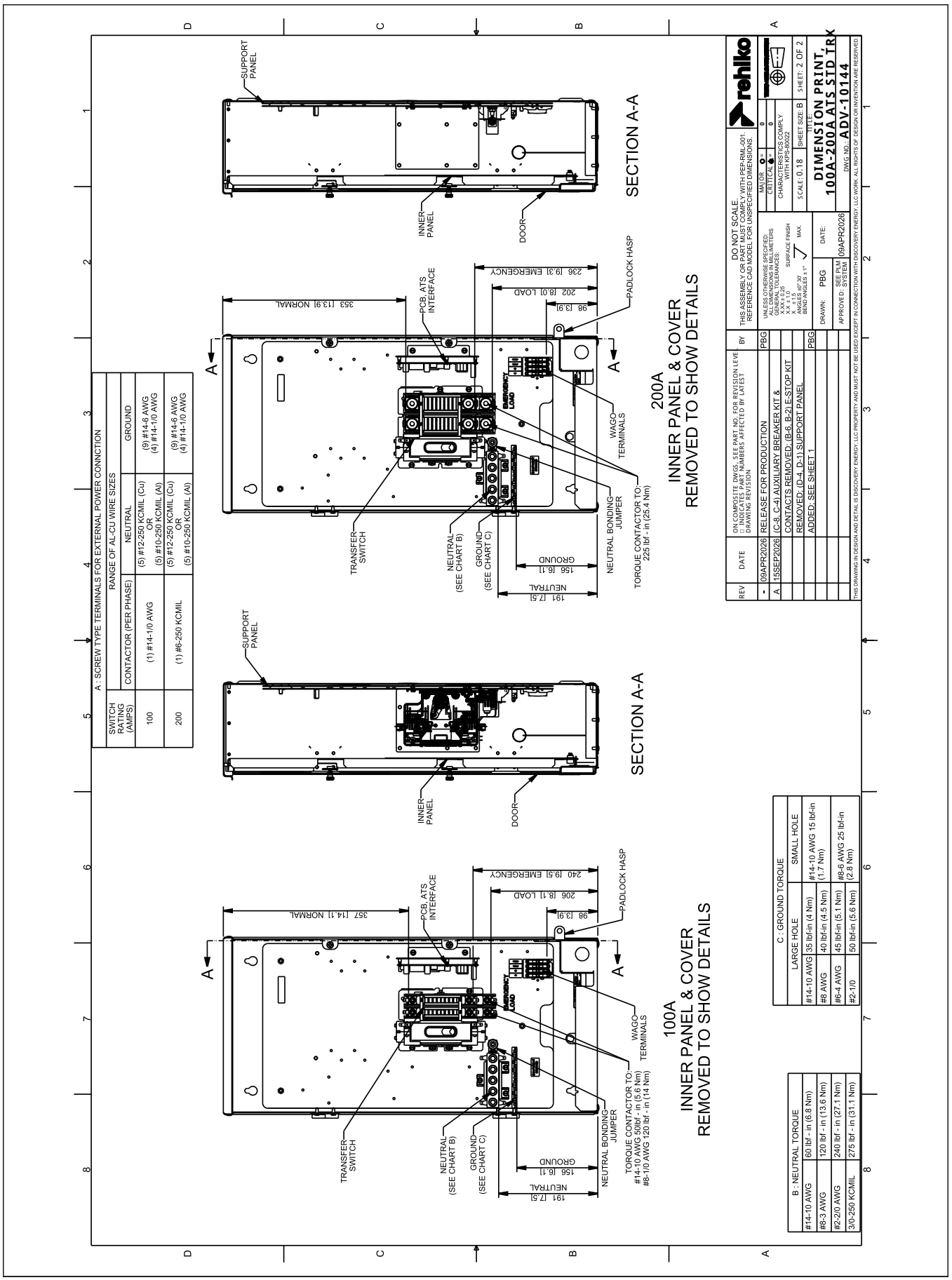

Figure 23: Wiring Diagram, 100-200 A Single-Phase, ADV-10144, Sheet 2

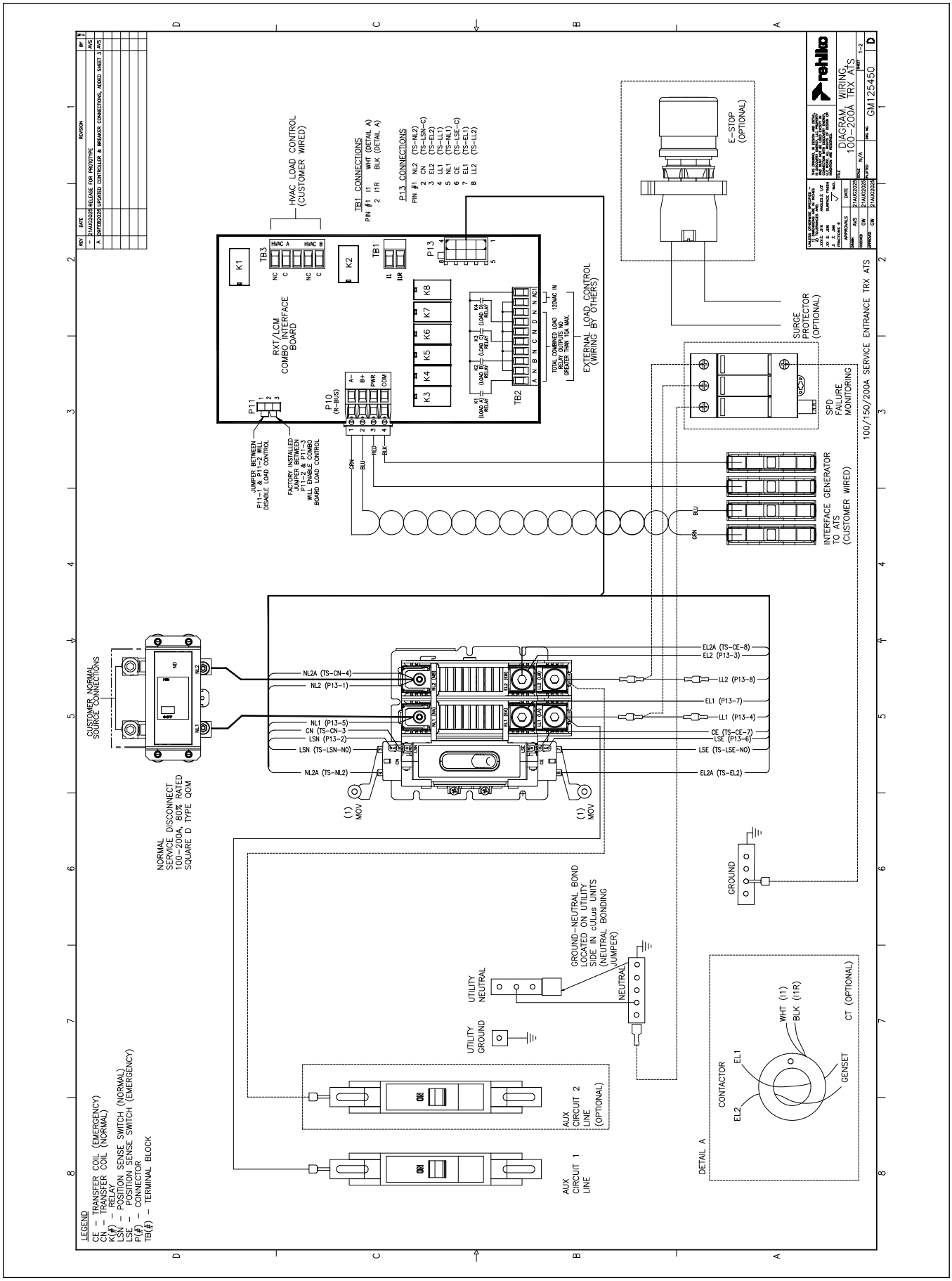

Figure 24: Wiring Diagram, 100-200 A Single-Phase, Standard Models, GM125450, Sheet 1

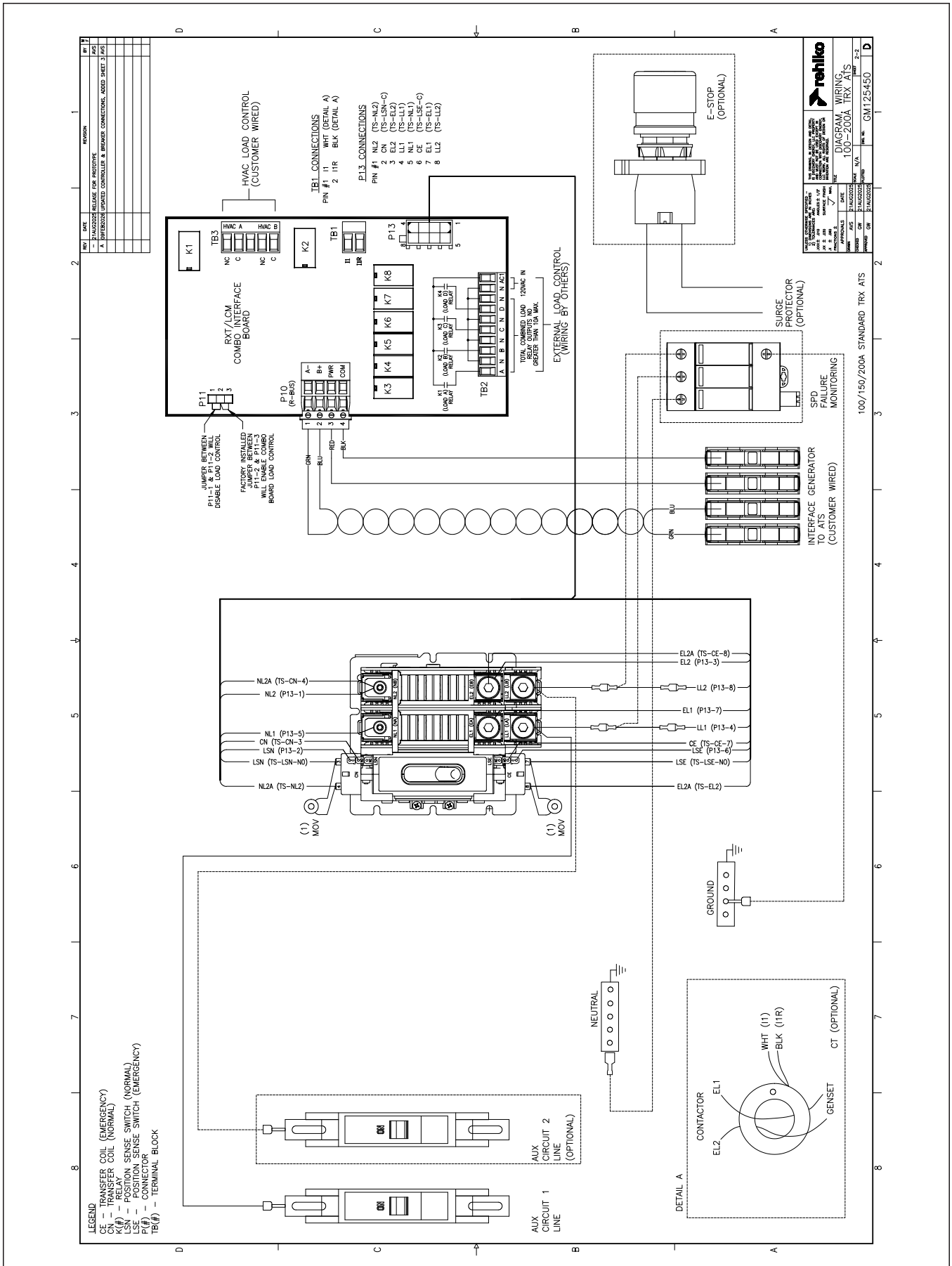

Figure 25: Wiring Diagram: 100-200 A Single-Phase, Service Entrance Models, GM125450, Sheet 2

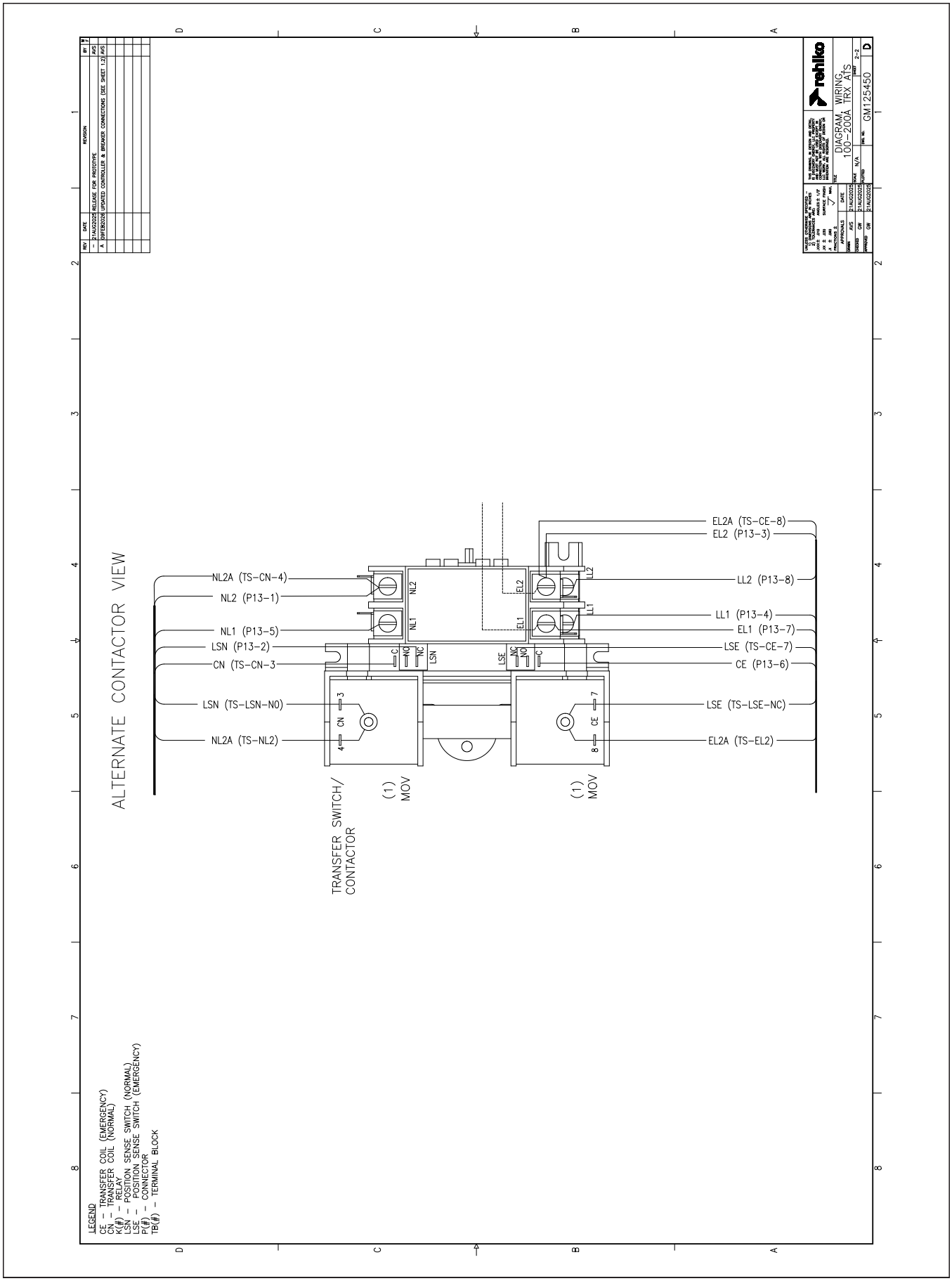

Figure 26: Wiring Diagram: 100-200 A Single-Phase, Service Entrance Models, GM125450, Sheet 3

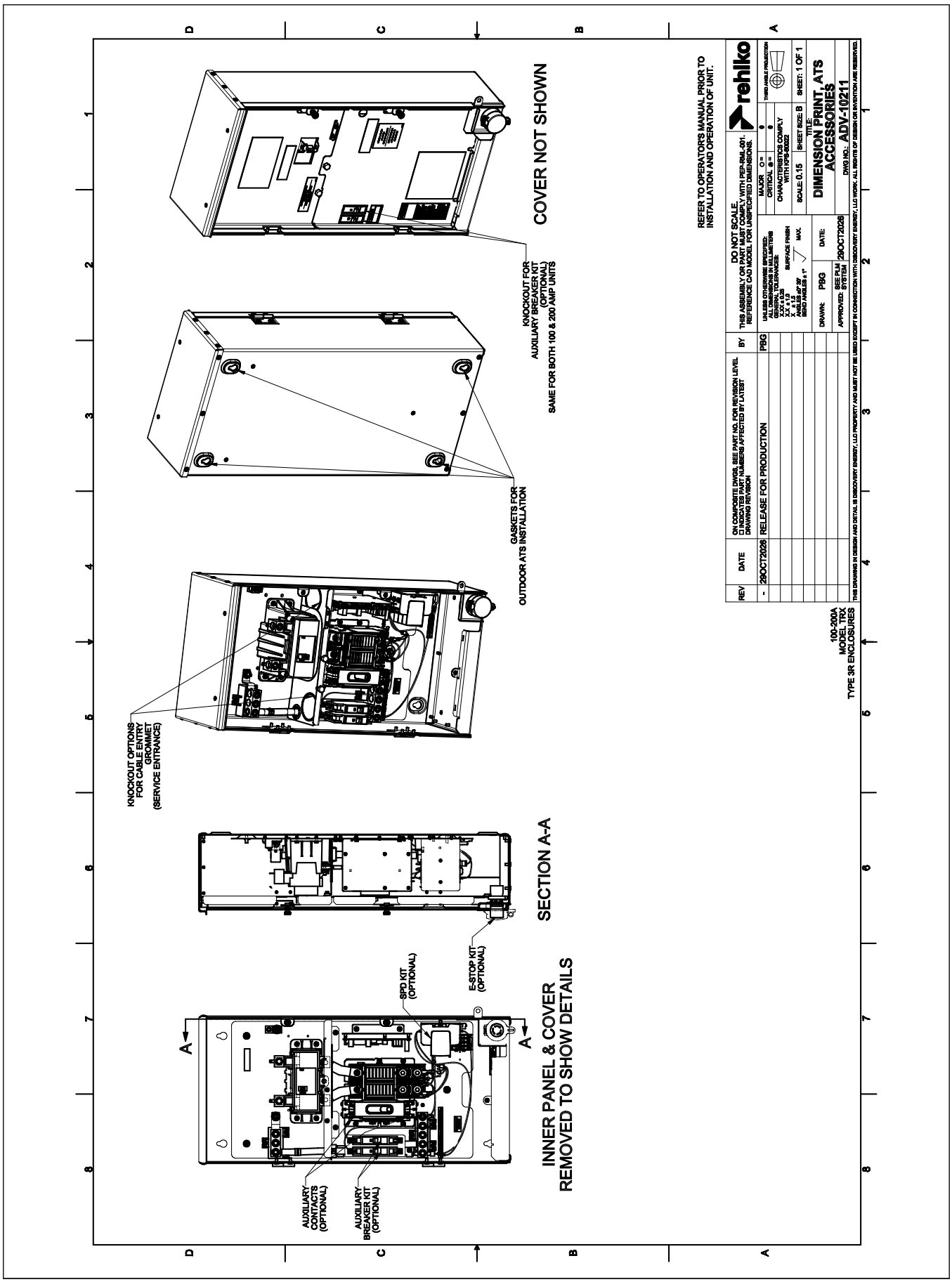

Figure 27: Dimension print, ATS Accessories, Sheet 1

KOHLER®
Generators

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Original Instructions (English)

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