Installation Manual

Generator Set with 4BT3.3 Engine and PowerCommand® 1.1 Control

C25 D6 (Spec A)
C30 D6 (Spec A)
C35 D6 (Spec A)
C40 D6 (Spec A)
C50 D6 (Spec A)
C60 D6 (Spec A)

English
Original Instructions

8-2019

A047W865 (Issue 9)

Table of Contents

1 IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS. This manual contains important instructions that should be followed during installation and maintenance of the generator set and batteries.

Safe and efficient operation can be achieved only if the equipment is properly operated and maintained. Many accidents are caused by failure to follow fundamental rules and precautions.

1.1 Warning, Caution, and Note Styles Used in This Manual

The following safety styles and symbols found throughout this manual indicate potentially hazardous conditions to the operator, service personnel, or equipment.

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

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

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

NOTICE
Indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

1.2 General Information

This manual should form part of the documentation package supplied by Cummins with specific generator sets. If this manual has been supplied in isolation, please contact your authorized dealer.

NOTICE
It is in the operator's interest to read and understand all warnings and cautions contained in the documentation relevant to the generator set operation and daily maintenance.

General Safety Precautions

⚠ WARNING

Hot Pressurized Liquid

Contact with hot liquid can cause severe burns.

Do not open the pressure cap while the engine is running. Let the engine cool down before removing the cap. Turn the cap slowly and do not open it fully until the pressure has been relieved.

⚠ WARNING

Moving Parts

Moving parts can cause severe personal injury.

Use extreme caution around moving parts. All guards must be properly fastened to prevent unintended contact.

⚠ WARNING

Toxic Hazard

Used engine oils have been identified by some state and federal agencies to cause cancer or reproductive toxicity.

Do not ingest, breathe the fumes, or contact used oil when checking or changing engine oil. Wear protective gloves and face guard.

⚠ WARNING

Electrical Generating Equipment

Incorrect operation and maintenance can result in severe personal injury or death.

Do not operate equipment when fatigued, or after consuming any alcohol or drug.

Make sure that only suitably trained and experienced service personnel perform electrical and/or mechanical service.

⚠ WARNING

Toxic Gases

Substances in exhaust gases have been identified by some state and federal agencies to cause cancer or reproductive toxicity.

Do not breathe in or come into contact with exhaust gases.

⚠ WARNING

High Noise Level

Generator sets in operation emit noise, which can cause hearing damage.

Wear appropriate ear protection at all times.

⚠ WARNING

Hot Surfaces

Contact with hot surfaces can cause severe burns.

The unit is to be installed so that the risk of hot surface contact by people is minimized. Wear appropriate PPE when working on hot equipment and avoid contact with hot surfaces.

⚠ WARNING

Toxic Hazard

Ethylene glycol, used as an engine coolant, is toxic to humans and animals.

Wear appropriate PPE. Clean up coolant spills and dispose of used coolant in accordance with local environmental regulations.

⚠ WARNING

Combustible Liquid

Ignition of combustible liquids is a fire or explosion hazard which can cause severe burns or death.

Do not store fuel, cleaners, oil, etc., near the generator set. Do not use combustible liquids like ether.

⚠ WARNING

Combustible Gases

Generator sets in operation have combustible gases under pressure, which if ignited can cause eye and ear damage.

Wear appropriate eye and ear protection at all times.

⚠ WARNING

Combustible Gases

Generator sets in operation have combustible gases under pressure, which if ignited can cause severe injury.

Do not operate the generator set with any doors open.

⚠ WARNING

Fire Hazard

Materials drawn into the generator set, as well as accumulated grease and oil, are a fire hazard. Fire can cause severe burns or death.

Keep the generator set and the surrounding area clean and free from obstructions. Make sure the generator set is mounted in a manner to prevent combustible materials from accumulating under the unit.

⚠ WARNING

Automated Machinery

Accidental or remote starting of the generator set can cause severe personal injury or death.

Isolate all auxiliary supplies and use an insulated wrench to disconnect the starting battery cables (negative [–] first).

NOTICE

Keep multi-type ABC fire extinguishers close by. Class A fires involve ordinary combustible materials such as wood and cloth. Class B fires involve combustible and flammable liquid fuels and gaseous fuels. Class C fires involve live electrical equipment. (Refer to NFPA No. 10 in the applicable region.)

NOTICE

Before performing maintenance and service procedures on enclosed generator sets, make sure the service access doors are secured open.

NOTICE

Stepping on the generator set can cause parts to bend or break, leading to electrical shorts, or to fuel leaks, coolant leaks, or exhaust leaks. Do not step on the generator set when entering or leaving the generator set room.

1.3 Generator Set Voltage Is Deadly

- Generator set output connections must be made by a trained and experienced electrician in accordance with all applicable codes.
- This generator set and the public utility may only be connected to house circuits by means of the automatic transfer switch.

⚠ CAUTION

Improper connections can lead to electrocution of utility workers and damage to equipment. Make sure that the connections are installed properly by a trained technician.

- Use caution when working on live electrical equipment. Remove jewelry, and make sure clothing and shoes are dry. Stand on a dry wooden platform.

1.4 Fuel and Fumes Are Flammable

Fire, explosion, and personal injury or death can result from improper practices.

- Do not fill fuel tanks while the engine is running unless the tanks are outside the engine compartment. Fuel contact with hot engine or exhaust is a potential fire hazard.
- Do not permit any flame, cigarette, pilot light, spark, arcing equipment, or other ignition source near the generator set or fuel tank.
- Fuel lines must be adequately secured and free of leaks. Fuel connection at the engine should be made with an approved flexible line. Do not use copper piping on flexible lines as copper will become brittle if continuously vibrated or repeatedly bent.
- Make sure all fuel supplies have a positive shutoff valve.
- Make sure the battery area has been well-ventilated prior to servicing near it. Lead-acid batteries emit a highly explosive hydrogen gas that can be ignited by arcing, sparking, smoking, etc.

1.5 Batteries Can Explode

Batteries can explode, causing severe skin and eye burns and can release toxic electrolytes.

⚠ WARNING

Combustible Gases

Batteries can explode, causing severe skin and eye burns, and can release toxic electrolytes.

Do not dispose of the battery in a fire, because it is capable of exploding. Do not open or mutilate the battery. Do not charge frozen batteries.

⚠ WARNING

Electric Shock Hazard

Batteries present the risk of high short circuit current.

When servicing the generator set:

- ***Remove watches, rings, or other metal objects.***
- ***Use tools with insulated handles.***

NOTICE

Servicing of batteries must be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

- Wear safety glasses.

- Do not smoke.
- Do not charge frozen batteries.
- To prevent arcing when disconnecting the battery:
  1. Press the Off switch from the display and then press the E-Stop button (if equipped).
  2. Disconnect AC power from any battery chargers.
  3. Remove the negative (-) battery cables to prevent starting.
- To prevent arcing when reconnecting the battery:
  1. Reconnect the positive (+) cables.
  2. Reconnect the negative (-) cables.
  3. Reconnect the battery charger to AC power supply.
- When replacing the generator set battery, always replace it with a battery as specified in this manual.

1.6 Moving Parts Can Cause Severe Personal Injury or Death

- Do not wear loose clothing or jewelry near moving parts, such as cooling fans.
- Keep hands away from moving parts.
- Keep guards in place over fans.

1.7 Exhaust Gases Are Deadly

- Provide an adequate exhaust system to properly expel discharged gases away from enclosed or sheltered areas, and areas where individuals are likely to congregate. Visually and audibly inspect the exhaust system daily for leaks per the maintenance schedule. Make sure that exhaust manifolds are secured and not warped. Do not use exhaust gases to heat a compartment.
- Make sure the unit is well ventilated.

Exhaust Precautions

⚠ WARNING

Hot Exhaust Gases
Contact with hot exhaust gases can cause severe burns.
Wear personal protective equipment when working on equipment.

⚠ WARNING

Hot Surfaces

Contact with hot surfaces can cause severe burns.

The unit is to be installed so that the risk of hot surface contact by people is minimized. Wear appropriate PPE when working on hot equipment and avoid contact with hot surfaces.

⚠ WARNING

Toxic Gases

Inhalation of exhaust gases can cause asphyxiation and death.

Pipe exhaust gas outside and away from windows, doors, or other inlets to buildings. Do not allow exhaust gas to accumulate in habitable areas.

⚠ WARNING

Fire Hazard

Contaminated insulation is a fire hazard. Fire can cause severe burns or death.

Remove any contaminated insulation and dispose of it in accordance with local regulations.

The exhaust outlet may be sited at the top or bottom of the generator set. Make sure that the exhaust outlet is not obstructed. Personnel using this equipment must be made aware of the exhaust position. Position the exhaust away from flammable materials - in the case of exhaust outlets at the bottom, make sure that vegetation is removed from the vicinity of the exhaust.

The exhaust pipes may have some insulating covers fitted. If these covers become contaminated they must be replaced before the generator set is run.

To minimize the risk of fire, make sure the following steps are observed:

- Make sure that the engine is allowed to cool thoroughly before performing maintenance or operation tasks.
- Clean the exhaust pipe thoroughly.

1.8 The Hazards of Carbon Monoxide

Carbon monoxide (CO) is an odorless, colorless, tasteless and non-irritating gas. You cannot see it or smell it. Red blood cells, however, have a greater affinity for CO than for oxygen. Therefore, exposure even to low levels of CO for a prolonged period can lead to asphyxiation (lack of oxygen) resulting in death. Mild effects of CO poisoning include eye irritation, dizziness, headaches, fatigue and the inability to think clearly. More extreme symptoms include vomiting, seizures and collapse.

Engine-driven generator sets produce harmful levels of carbon monoxide that can injure or kill you.

Special Risks of CO near the Home

⚠ WARNING

Toxic Gases

Carbon monoxide (CO) gas can cause nausea, fainting, or death. Residents can be exposed to lethal levels of CO when the generator set is running. Depending on air temperature and wind, CO can accumulate in or near the home.

To protect yourself and others from the dangers of CO poisoning, it is recommended that reliable, approved, and operable CO detector alarms are installed in proper locations in the home as specified by their manufacturer.

Protecting Yourself from CO Poisoning

- Locate the generator set in an area where there are no windows, doors, or other access points into the home.
- Make sure all CO detectors are installed and working properly.
- Pay attention for signs of CO poisoning.
- Check the exhaust system for corrosion, obstruction, and leaks every time you start the generator set and every eight hours when you run it continuously.

2 Introduction

2.1 About This Manual

⚠ WARNING

Improper installation can result in severe personal injury, death and damage to equipment. The installation must comply with all applicable building codes (including project permits and inspections). The installer should be properly trained and licensed to perform electrical and mechanical equipment installations (including gaseous fuel installation).

NOTICE

Manuals are updated from time to time to reflect changes in the equipment and its specifications. The most up-to-date version of this manual is found on the QuickServe website (https://quickserve.cummins.com/info/index.html).

This manual is a guide for the installation of the generator set models listed on the front cover. Proper installation is essential for top performance, reliable operation, and safety. Read through this manual before starting the installation. This manual covers outdoor applications only; for other installations, refer to the *T-030: Liquid-Cooled Generator Set Application* manual available from your Cummins distributor.

NOTICE

The installation must comply with all applicable building codes.

See the generator set's specific operator manual for operation and maintenance and specific service manual for service.

Refer to the Model Specifications section for specific information about the system and its components.

Refer to the Outline and System Drawings appendix and the Wiring Diagrams appendix for specific information about installation and wiring connections.

2.2 Related Literature

Before any attempt is made to operate the generator set, the operator should take time to read all of the manuals supplied with the generator set and familiarize themselves with the warnings and operating procedures.

A generator set must be operated and maintained properly if you are to expect safe and reliable operation. The Operator Manual includes a maintenance schedule and a troubleshooting guide. The Health and Safety Manual must be read in conjunction with the Operator Manual for the safe operation of the generator set. The literature provided with the generator set is as follows:

- Health and Safety Manual (0908-0110-00)
- Warranty Statement (A028U870)
- Emissions Component Defect Warranty Statement (A054N449)
- Generator Set Installation Manual (A047W865)
- Generator Set Operator Manual (A047W873)
- 4BT3.3 Engine Operator Manual (3666417)
- Installation Quick Start Guide (A050N805)
- Operator Quick Start Guide (A050N807)

The relevant manuals appropriate to your generator set are also available. The documents below are in English:

- Generator Set Service Manual (A047W877)
- 4BT3.3 Engine Service Manual (4021540)
- Generator Set Parts Manual (A048W980)
- 4BT3.3 Engine Parts Manual (25 kW, 30 kW, 35 kW, 40 kW) (A049Y673)
- 4BT3.3 Engine Parts Manual (50 kW, 60 kW) (A054A174)
- RA Series Transfer Switch Owner's Manual (A046S594) - if applicable
- PowerCommand® 1302 Controller Owner's Manual (900-0661)
- Standard Repair Times (SRT) Manual - GH Family (A049J592)
- Application Manual T-030 - for application information (A040S369)
- Service Tool Manual (A043D529)
- Universal Annunciator Operator Manual (0900-0301)

2.3 Before Installation

Before beginning the installation of the generator set, verify that the unit was correctly selected. Check the following features:

- Model
- Specifications
- Options
- Fuel Supply

2.4 Model Specifications

TABLE 1. MODEL VARIATIONS (60 HZ, 1800 RPM)

Models	4BT3.3 Engine
C25 D6, C30 D6, C35 D6, C40 D6	G5
C50 D6, C60 D6	G7

TABLE 2. COLD WEATHER SPECIFICATIONS (ALL MODELS)

Temperature	Starting Aids	Battery	Factory Options
Above 4 °C (40 °F)	Not required	Standard battery (group 26)	--
-17 to 4 °C (0 to 40 °F)	Coolant heater and battery charger recommended.	Standard battery (group 26)	Available
Below -17 °C (0 °F)	All (battery heater, coolant heater, battery charger) recommended.	Larger battery (group 34)	Available

NOTICE

For NFPA 110 applications, a coolant heater is required. Factory option is available.

TABLE 3. FUEL CONSUMPTION (FULL LOAD)

Rating	C25 D6	C30 D6	C35 D6	C40 D6	C50 D6	C60 D6
Standby	9.16 L/ hr (2.42 gal/hr)	10.63 L/ hr (2.81 gal/hr)	11.95 L/ hr (3.16 gal/hr)	13.85 L/ hr (3.66 gal/hr)	16.08 L/ hr (4.25 gal/hr)	19.07 L/ hr (5.04 gal/hr)
Prime	8.32 L/ hr (2.2 gal/hr)	9.65 L/ hr (2.55 gal/hr)	10.86 L/ hr (2.87 gal/hr)	12.6 L/ hr (3.33 gal/hr)	14.61 L/ hr (3.86 gal/hr)	17.33 L/ hr (4.58 gal/hr)

TABLE 4. ENGINE SPECIFICATIONS

Specification	Value
Engine	4 Cylinder-in-line, liquid-cooled, 4-stroke
Aspiration	Turbocharged
Displacement	3300 cc (199 in^3)
Compression Ratio	*4BT3.3-G5:* 20.8:1
	4BT3.3-G7: 17.3:1
Fuel	ASTM number 2D fuel (Refer to the Engine Operator Manual)
Coolant	50/50 coolant solution (50% pure water and 50% ethylene glycol)
Fuel Flow	Maximum fuel flow: 56.4 L/hr (14.9 gal/hr) Maximum fuel inlet restriction with clean filter: 58.4 mm hg (2.3 in hg) Maximum return restriction: 375.9 mm hg (14.8 in hg)
Lube Oil Capacity	7.9 L (8.35 qt)
Oil Recommendation	15W40 (Refer to the Engine Operator Manual)

TABLE 5. GENERATOR SET SIZE SPECIFICATIONS (25-60 KW 1800 RPM)

Size	Dimensions (L x W x H)
With Sound Level 1 Enclosure, Without Fuel Tank	2384 x 864 x 1156 mm (93.8 x 34 x 45.5 in)

TABLE 6. GENERATOR SET WEIGHT (60 HZ, 1800 RPM, SOUND LEVEL 1, WET)

	C25 D6	C30 D6	C35 D6	C40 D6	C50 D6	C60 D6
Minimum	574 kg (1265 lb)	575 kg (1288 lb)	611 kg (1348 lb)	622 kg (1371 lb)	710 kg (1556 lb)	738 kg (1626 lb)
Maximum	575 kg (1288 lb)	622 kg (1371 lb)	636 kg (1402 lb)	718 kg (1584 lb)	668 kg (1742 lb)	668 kg (1742 lb)

TABLE 7. ALTERNATOR SPECIFICATIONS (60 HZ, 1800 RPM)

Model	Alternator	Power (kVA) 1 Phase/3 Phase		Rated Voltages (V)	
		Standby	Prime	1 Ph	3 Ph
C25 D6	Brushless, 4-pole rotating field, single bearing	25/31.3	22.5/28.1	120/240	277/480 120/208 120/240 347/600
C30 D6		30/37.5	27/33.8		
C35 D6		35/43.8	31.5/39.4		
C40 D6		40/50	36/45		
C50 D6		50/42.5	45/37.5		
C60 D6		60/75	56/67.5		

NOTICE
Maximum I_2= 8%.

TABLE 8. GENERATOR SET DERATING GUIDELINES

Model	Mode	Engine Power Available Up to...		Derate at...	
		Elevation	Ambient Temperature	Elevation per 300 m (985 ft)	Temperature per 10 °C (18 °F)
C25 D6	Standby	3048 m (10000 ft)	50 °C (122 °F)	3%	6%
	Prime	3048 m (10000 ft)		3%	6%
C30 D6	Standby	3048 m (10000 ft)		3%	6%
	Prime	2200 m (7220 ft)		5%	9%
C35 D6	Standby	2896 m (9500 ft)	40 °C (104 °F)	3%	6%
	Prime	2399 m (7870 ft)		5%	9%
C40 D6	Standby	1677 m (5500 ft)		3%	6%
	Prime	1677 m (5500 ft)		5%	9%

Model	Mode	Engine Power Available Up to...		Derate at...	
		Elevation	Ambient Temperature	Elevation per 300 m (985 ft)	Temperature per 10 °C (18 °F)
C50 D6	Standby	1677 m (5500 ft)	50 °C (122 °F)	3%	10%
	Prime	1677 m (5500 ft)		3%	10%
C60 D6	Standby	1280 m (4200 ft)		3%	10%
	Prime	1280 m (4200 ft)		3%	10%

TABLE 9. DC SYSTEM SPECIFICATIONS (ALL MODELS)

Specification	Value
Nominal Battery Voltage	12 VDC
Battery Group	26 standard, 34 high capacity (high capacity battery requires an accessory battery tray)
Battery Type	Maintenance free
Minimum Cold Crank Amps	530 standard, 850 high capacity (high capacity battery requires an accessory battery tray)

2.5 Transfer Switch Requirements

A transfer switch must be a part of every generator set installation. Transfer switches transfer loads to the generator set during power outages.

NOTICE
Cummins offers a variety of transfer switches, including residential and light commercial options.

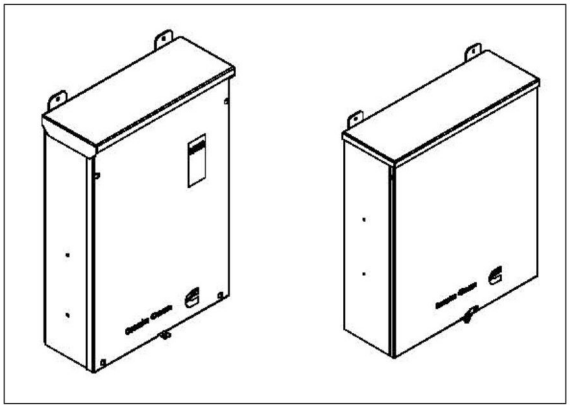

FIGURE 1. CUMMINS TRANSFER SWITCH (RA SERIES)

Before beginning the installation of the transfer switch, verify that the unit was correctly selected. Check the following features:

- Specifications (voltage, amperage, frequency, poles, and phases)
- Enclosure (indoor vs. outdoor)
- Model

Refer to the RA Series Transfer Switch Owner Manual (A046S594) for more detailed information. The RA Series transfer switch is the recommended ATS for use with these generators.

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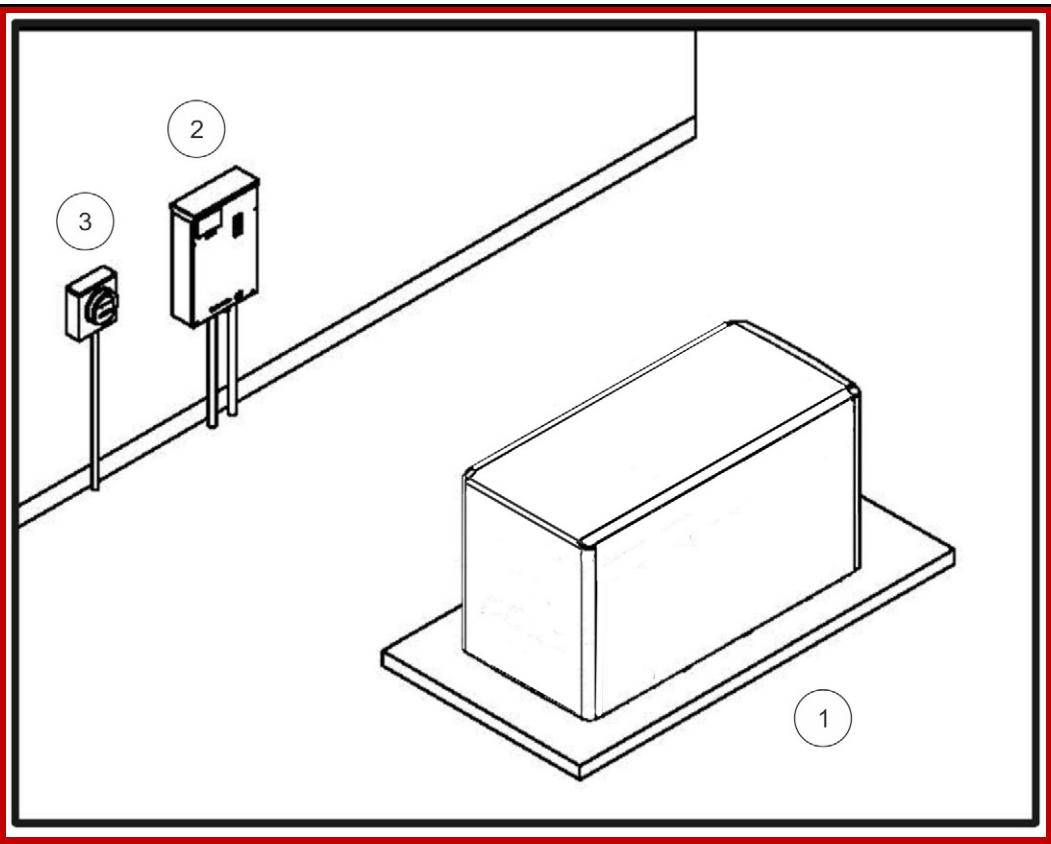
3 Pre-Installation Considerations

3.1 Pre-Installation Considerations

Before installation begins, certain items must be considered. Prior coordination reduces delays and the amount of time power has to be interrupted.

Areas of consideration:



No.	Description	No.	Description
1	Generator Set	3	Transfer Switch
2	Electrical Meter		

FIGURE 2. SITE PREPARATION EXAMPLE

- Location of the generator set - this is one of the first decisions to be made, as it affects all other aspects of the installation, such as:
  - Length of electric wiring
  - Length of fuel lines

    - Site preparation:
        - Access to the site
        - Trenches
        - Site preparation materials needed
- Automatic transfer switch location and connections
- Tools and materials required
- Accessories required (if any) for the customer's application (utility power may be required at the generator set; make plans accordingly)

NOTICE
Depending on the locality and use of the generator set, it may be necessary to obtain an air quality emissions permit before installation begins. Check with local pollution control or air quality authority to determine permit requirements.

3.2 Installation Codes and Standards for Safety

NOTICE
The generator set installer bears sole responsibility for following all applicable local codes and regulations.

The following list of codes and standards may apply to the installation and operation of the generator set. This list is for reference only and not intended to be inclusive of all applicable codes and standards. The address of each agency is listed so that copies of the codes may be obtained for reference. Installation codes and recommendations are subject to change, and may vary by location or over time.

TABLE 10. INSTALLATION CODES AND STANDARDS FOR SAFETY RECOMMENDATIONS

NFPA 70 - National Electrical Code NFPA 37 - Installation and Use of Stationary Combustion Engines and Gas Turbines NFPA 110 - Standard for Emergency and Standby Power Systems	National Fire Protection Association 470 Atlantic Avenue Boston, MA 02210
CSA Electrical Bulletin CSA 22.1 Canadian Electrical Code CSA B139 Installation Code for Oil-Burning Equipment CSA C22.2 No. 100 Motors and Generators CSA C22.2 No. 14 Industrial Control Equipment	Canadian Standards Association Housing and Construction Materials Section 178 Rexdale Blvd. Rexdale, Ontario, Canada M9Q 1R3

California Administrative Code - Title 25 Chapter 3	State of California Documents Section P.O. Box 1015 North Highlands, CA 95660

3.3 Required Items for Installation

Tools and materials are used for the installation of this generator set. These items are identified in the following sections. Please refer to local codes and standards, because they may affect the materials required.

Materials Required

NOTICE
Refer to local codes and standards, which may affect the material requirements.

NOTICE
If a 100% rated breaker is used, 90 °C wire must be used for L1, L2, and L3 with the wire size determined by the 75 °C ampacity tables.

NOTICE
A UL-listed grounding electrode terminal within its ratings and suitable for the application must be installed and labeled “Grounding Electrode Terminal”.

Electrical Materials:

NOTICE
Class 1 wiring methods must be used for connecting the generator set.

- Four code compliant AC power wires; L1, L2, N and Gnd (add another wire for 3-phase for a total of 5 AC wires)
- For RA switches, 4 DC control wires will be needed from the generator to the transfer switch.
- Wire sizes (DC control and power and AC sense only):
  - DC control or AC sense wires under 1000 feet circuit length => 18-14 AWG of the insulation type above

  - DC control or AC sense wires 1000-2000 feet circuit length => 16-14 AWG of the insulation type above
- All AC and DC wires and cables must be rated 75 °C minimum, stranded copper, and rated for wet locations.
  - For wire sizes 14 AWG and larger, use insulation types: RHW, RHW-2, THHW, THW, THW-2, THWN, THWN-2, XHHW, XHHW-2, USE-2, ZW-2
  - For wire sizes 16 and 18 AWG, use insulation types: FFH-2, KFF-2, PAFF, PFF, PGFF, PTFF, RFH-2, RFHH-2, RFHH-3, SFF-2, TFF, TFFN, ZFF
- Code compliant 20 A, 120 VAC, GFCI protected circuit for alternator heaters/battery charger/coolant heater/oil heater/battery heater (if equipped)
- Code compliant conduit for all wires

Mounting Materials:

- Four base tie-down bolts

NOTICE
Regional fuel tanks require six bolts to attach to the ground.

NOTICE
Seismic zone installations require compliance to specific mounting configurations, as determined by the structural engineer of record.

Fuel Materials:

- Flexible fuel line
- UL listed pipe thread sealant
- Fuel pipe to the remote tank

Loose Parts Shipped With the Generator Set

The following loose parts are shipped with the generator set:

- One enclosure key (where applicable)
- Battery tie-down
- Sound level 2 baffle (where applicable)
- Fuel tank vent extensions (where applicable)
- Fuel tank riser blocks (where applicable)
- Literature - Operator Manual, Installation Manual, Health and Safety Manual, and Warranty Statements

3.4 Transfer Switch Mounting

1. Consider the location before mounting the transfer switch.
   - Consider the proximity to the utility service entrance and breaker panel. There must be a service disconnect (circuit breaker or fuses) in the power line ahead of the transfer switch, unless a service entrance rated automatic transfer switch is being used.
   - Keep safety concerns in mind. Never mount the transfer switch near hazardous chemicals or gases.
   - Avoid high humidity areas or areas prone to excessive heat or dust.
2. Make sure that the wall is stable and able to support the weight of the transfer switch.
3. Make sure that the transfer switch is mounted according to all applicable building code requirements.
4. Mount the transfer switch per the instructions in the RA Series Transfer Switch Owner Manual.

NOTICE
Seismic zone installations require compliance to specific mounting configurations.

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4 Installation

4.1 Installation Introduction

NOTICE
The installer is responsible for complying with all applicable installation codes and safety requirements. See the Installation Codes and Standards for Safety section of this manual for more information.

The following sections cover a step-by-step overview of a typical generator set installation.

Review these sections to become familiar with specific procedures and important safety precautions before beginning the installation.

4.2 Site Assessment and Preparation

Proper component location and site preparation have a very important impact on completing a successful installation. The major components and sources of power needed for installation include the following items:

- Generator set
- Transfer switch
- Electrical utility
- Fuel source (diesel)
- Accessories (may be required based on certain conditions)

Picking a Location

⚠ WARNING
Exhaust gas is deadly. Locate the generator set away from doors, windows, and other openings to the house and where exhaust gases will disperse away from the house.

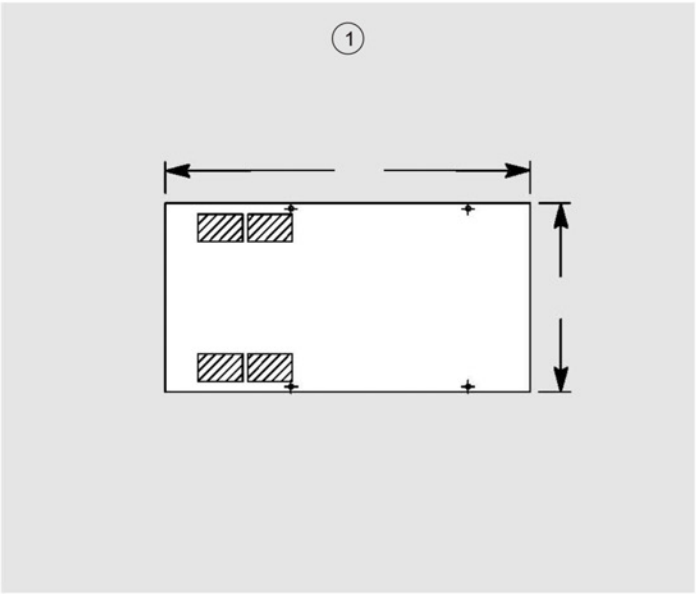
Generator set location is critical for safety and performance. Follow the guidelines below:

- Must comply with applicable codes (NFPA, NEC, IBC, etc.).
- This manual only covers outdoor installations with Cummins factory installed enclosures. For other installation types, contact your local Cummins dealer or reference the Application Manual at the following link: *http://www.cumminspower.com/www/literature/applicationmanuals/t030.pdf*
- Consider access to utilities (electric meters, transfer switch, remote fuel tank location, etc.).

- Call the local utilities to mark the locations of buried utility services (gas, electric, or telephone) before digging.
- Verify the locations of any other buried components (gas, electric or telephone) with the homeowner before digging.

Clearances:

- The exhaust side of the generator set must be located at a minimum of 5 feet from combustible materials (NFPA 37) and any openings in a wall (window, door, vent, etc.).
- The generator must be located such that the exhaust is not able to accumulate in an occupied area.
- The generator must have enough room for installation, service, and maintenance.
- The generator must be located to ensure ventilation openings are not blocked.
- Position the generator set so that cooling air is free to enter and leave the area.
- Locate and position the generator set so that prevailing winds carry exhaust gases and potential fuel leaks away from the house or occupied area.



No.	Description
1	5 ft Clearance (shaded area)

FIGURE 3. CLEARANCES

Laying the Foundation

When laying the foundation:

1. Clear obstructions, and make sure that there is adequate clearance for access.

2. Level the ground, and make sure that the ground is compact and settled. Ensure that it is stable ground, not subject to flooding.
3. Prepare the concrete pad.
   - The pad should be constructed of reinforced concrete with a 28-day compressive strength of at least 2500 psi (17,237 kPa).
   - The pad dimensions should be the same as those indicated in the Outline and System Drawings appendix.

NOTICE
Seismic installations may require a different pad and securing devices.

NOTICE
Local codes and standards may have different requirements.

4. Lift the generator set onto the pad, and secure it.

Lifting and Moving the Generator Set

⚠ WARNING
Heavy Load ***The generator set is heavy. Handle with care.*** ***Dropping the generator set can cause severe personal injury or death. Use appropriate lifting techniques to move the generator set. Keep feet and hands clear when lifting the generator set.***

⚠ CAUTION
The generator set is shipped with oil in the engine crankcase. Keep the generator set upright.

Mounting the Generator Set

Mount the generator set on a substantial and level base such as a concrete pad. A non-combustible material must be used for the pad. Verify that the mounting pad is level by length, by width, and diagonally.

NOTICE
Seismic installation may require specific anchorage.

4.3 Fuel System

NOTICE
The factory-installed sub-base fuel tanks meet the fuel system requirements. Please verify that they also meet local codes and standards.

Cummins engines normally use a diesel fuel specified to ASTM D975 grade 2. Refer to the Engine Operator Manual for additional information.

In all fuel system installations, cleanliness is of the utmost importance. Make every effort to prevent entrance of moisture, dirt, or contaminants of any kind into the fuel system. Clean all fuel system components before installing.

NOTICE
A fuel filter/strainer/water separator of 100-120 mesh or equivalent (approximately 150 microns nominal) must be fitted between the main tank and day tank if a factory sub-base tank is used as a day tank.

Use only compatible metal fuel lines to avoid electrolysis when fuel lines must be buried. Buried fuel lines must be protected from corroding.

NOTICE
Never use galvanized or copper fuel lines, fittings, or fuel tanks. Condensation in the tank and lines combines with the sulfur in diesel fuel to produce sulfuric acid. The molecular structure of the copper or galvanized lines or tanks reacts with the acid and contaminates the fuel, resulting in possible engine damage.

An electric solenoid valve in the supply line is recommended for all installations and required for indoor automatic or remote starting installations that do not use the factory sub-base fuel tank. Connect the solenoid wires to the generator set “Switched B+” circuit to open the valve during generator set operation.

NOTICE
Never install a shutoff device in fuel return line(s). If the fuel return line(s) is blocked or exceeds fuel restriction limit, engine damage will occur.

NOTICE
A base mounted fuel tank may be part of the generator set build. An additional external fuel system may be required if the onboard fuel capacity is not sufficient for the application.

Fuel Selection and Recommendations

For fuel specifications, see the Model Specifications section.

NOTICE

Fuel systems must be installed by qualified service technicians. Improper installation presents hazards of fire and improper operation, resulting in severe personal injury or property damage.

In all fuel system installations, cleanliness is extremely important.

- Make every effort to prevent fuel contamination from:
  - Moisture
  - Dirt
  - Excess thread sealant
  - Contaminants of any kind
- Clean all fuel system components before installing.

Refer to the Engine Operator Manual for complete fuel requirements.

⚠ WARNING

The generator set is heavy. Dropping the generator set can cause severe injury or death. Do not lift the generator set with fuel in the tank (where applicable). Keep hands and feet clear when lifting the generator set.

⚠ WARNING

Do not mix gasoline, alcohol, or gasohol with diesel fuel. This can cause an explosion.

⚠ CAUTION

Due to the precise tolerances of diesel injection systems, it is extremely important that the fuel be kept clean and free from dirt or water. Dirt or water in the system can cause severe damage to both the fuel pump and fuel injectors.

Fuel Return Restrictions (or Pressure) Limit

Fuel return drain restriction (consisting of friction head and static head) between the engine injector return line connection and the fuel tank must not exceed the limit stated in the Model Specifications. Fuel return lines must not contain a shutoff device. Engine damage will occur if the engine is run with the return fuel lines blocked or restricted.

Fuel Lines Routing

⚠ WARNING

Explosive hazard.

Fuel leaks create fire and explosion hazards which can result in severe personal injury or death.

Always use flexible tubing between the engine and fuel supply to avoid line failure and leaks due to vibration. The fuel system must meet all application codes.

⚠ WARNING

Sparks and hot surfaces.

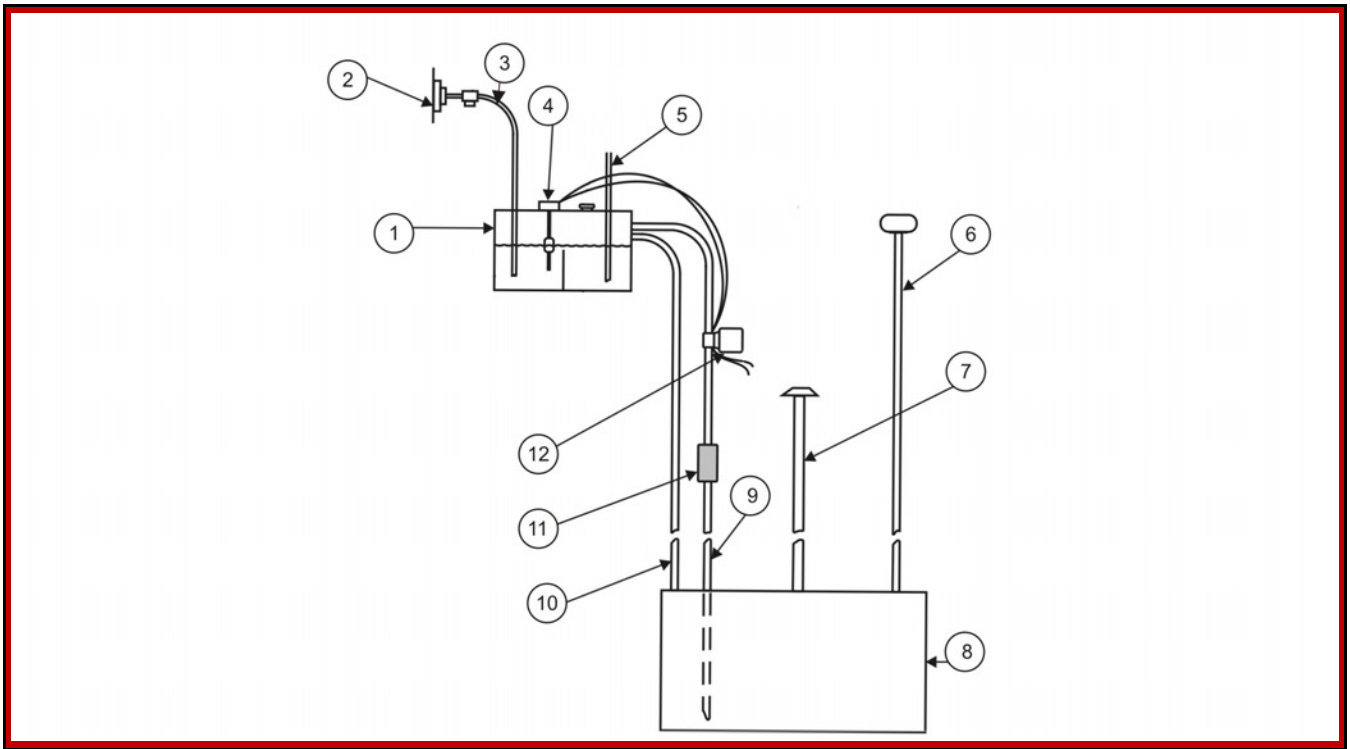
Sparks and hot surfaces can ignite fuel, leading to severe personal injury or death.

Do not route fuel lines near electrical wiring or hot exhaust parts.

NOTICE

Fuel lines must be routed and secured to maintain a 12.7 mm (½ inch) minimum clearance from electrical wiring and a 51 mm (2 inch) minimum clearance from hot exhaust parts.

A flexible fuel hose(s) or section of flexible fuel hose(s) must be used between the engine's fuel system and fuel supply and return line(s) to protect the tank's fuel system from damage caused by vibration, expansion, and contraction. The fuel hose must be installed according to all applicable codes and standards.



No.	Description	No.	Description
1	Day Tank (Sub-Base)	7	Fill Pipe
2	Engine Fuel Pump	8	Main Fuel Tank
3	Supply Line	9	Supply Line
4	Float Switch	10	Overflow Line
5	Return Line	11	120 Mesh Fuel Strainer
6	Vent Pipe	12	Fuel Transfer Pump Electric Motor Driven

FIGURE 4. TYPICAL FUEL SUPPLY INSTALLATION (USING FACTORY SUB-BASE TANK AS DAY TANK)

Engine Fuel Connections

Identification tags are attached to the fuel supply line and fuel return line connections. All models require a fuel return line from the injectors to the tank.

Supply Tank

Locate the fuel tank as close as possible to the generator set and within the restriction limitations of the fuel pump.

Install a fuel tank that has sufficient capacity to supply the generator set operating continuously at full rated load for the planned period of operation or power outage.

If the fuel inlet restriction exceeds the defined limit due to the distance/customer-supplied plumbing between the generator set and the main fuel tank, a transfer tank (sometimes referred to as a day tank) and auxiliary pump will also be required. If an overhead main fuel tank is installed, a transfer tank and float valve will be required to prevent fuel head pressures from being placed on the fuel system components.

Fuel Inlet Pressure/Restriction Limit

Engine performance and fuel system durability is compromised if the fuel inlet pressure or restriction limits are not adhered to. Fuel inlet pressure or restriction must not exceed the limits stated in the model-specific generator set *Specification Sheet*.

Day Tank

Some generator set installations may include a fuel day tank. They are used when fuel inlet restriction limits cannot be met, or the supply tank is overhead and presents problems of high fuel head pressure for the fuel inlet and return lines.

Supply Tank Lower Than Engine

⚠ WARNING

Fuel spillage.

Spilled fuel presents the hazard of fire or explosion which can result in severe personal injury or death.

Provide an overflow line to the supply tank from the day tank.

NOTICE

The supply tank top must be below the day tank top to prevent siphoning from the fuel supply to the day tank.

With this installation, the day tank is installed near the generator set, below the fuel injection system and within the fuel inlet restriction limit. Install a fuel transfer pump, to pump fuel from the supply tank to the day tank. A float switch in the day tank controls operation of the auxiliary fuel pump.

Provide a return line from the engine injection system return connection to the day tank. Plumb the return line to the bottom of day tank. Provide a day tank overflow line to the supply tank in case the float switch fails to shut off the fuel transfer pump.

Supply Tank Higher Than Engine

With this installation, the day tank is installed near the generator set, above the fuel injection system and within the fuel return restriction limit. Include an automatic fuel shutoff valve in the fuel line between the fuel supply tank and the day tank to stop fuel flow when the generator set is off.

Provide a return line from the engine injection system return connection to the day tank. Plumb the return line to the bottom of day tank.

NOTICE

Spilled fuel can create environmental hazards. Check local requirements for containment and prevention of draining to sewer and ground water.

4.4 Engine Exhaust

The exhaust system for this generator set is complete and was designed specifically for this generator set. Do not modify or add to the exhaust system of this generator set.

⚠ WARNING

Exhaust gas is deadly. Make sure that the exhaust system terminates away from building vents, windows, doors, and sheltered spaces that may not have ample fresh air ventilation.

⚠ WARNING

Engine discharge air and exhaust carry carbon monoxide gas (odorless and invisible) which can cause asphyxiation and death. Never use engine discharge air or exhaust for heating a room or enclosed space.

4.5 Electrical Connections

⚠ WARNING

Improper installation can lead to electrocution and damage to property. Electrical connections must be made by a licensed electrician.

⚠ WARNING

Automatic startup of the generator set during installation can cause severe personal injury or death. Make sure the generator set is shut down and disabled:

1. ***Press the generator set's "O" (Off) button to stop the generator set. Allow the generator set to thoroughly cool to the touch.***
2. ***Turn off and disconnect the battery charger from the AC source before disconnecting the battery cables.***
3. ***Disconnect the negative (–) cable from the battery and secure it from contacting the battery terminals to prevent accidental starting.***

NOTICE

Refer to regional codes and the National Electrical Code (NFPA 70) for all electrical installation requirements.

NOTICE

Class 1 wiring methods must be used for connecting the generator set.

AC Connections

⚠ WARNING

Automated Machinery

Accidental or remote starting of the generator set can cause severe personal injury or death.

Isolate all auxiliary supplies and use an insulated wrench to disconnect the starting battery cables, negative (–) cable first.

NOTICE

If a 100% rated breaker is used, 90 °C wire must be used for L1, L2, and L3 with the wire size determined by the 75 °C ampacity tables.

NOTICE

When using a circuit breaker with an adjustable, electronic trip unit, the amperage and trip curve settings may need adjustment to match the generator set load wiring, or downstream loads and circuit breakers. An accessory seal kit (part number A026M166) is available to tamper-proof the adjustable settings.

1. Make sure the generator set is shut down and disabled:
   a. Press the Off switch from the display and then press the E-Stop button to stop the generator set. Allow the generator set to thoroughly cool to the touch.
   b. Turn off and disconnect the battery charger from the AC source before disconnecting the battery cables.
   c. Disconnect the negative (–) cable from the battery and secure it from contacting the battery terminals to prevent accidental starting.
2. Remove the enclosure side panel to access the main circuit breaker box.
3. Place the circuit breaker handle in the OFF position.
4. Remove the four bolts holding the circuit breaker cover.
5. Connect the conductors to the circuit breaker load-side terminals, neutral lug, and equipment grounding lug. For grounding and neutral connections, look for the symbols on the generator set circuit breaker box (shown below, and in the next image at the bottom).

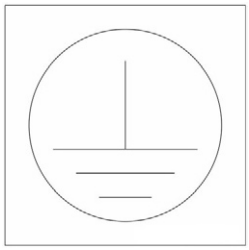
Equipment Grounding Conductor Symbol	Equipment Neutral Connection Symbol
	

FIGURE 5. SYMBOLS ON CIRCUIT BREAKER BOX

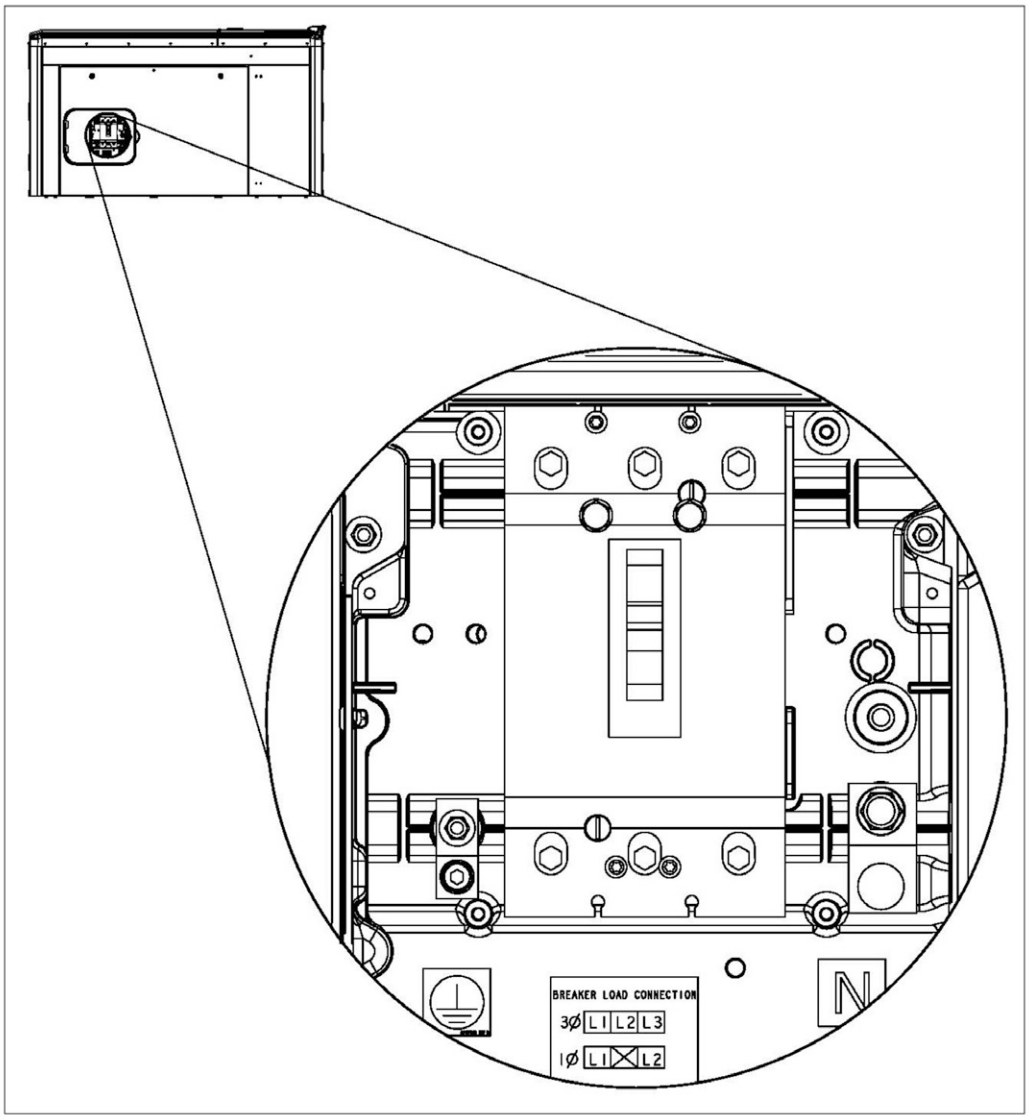


FIGURE 6. CIRCUIT BREAKER AC LOAD CONNECTIONS LOCATION (SYMBOLS SHOWN AT BOTTOM)

6. Torque the circuit breaker terminals per specifications on the circuit breaker label.

7. Torque the neutral lug to 31.1 Nm (275 in-lb).
8. Torque the equipment grounding lug to 13.8 Nm (120 in-lb).
9. Fill in the stub-up openings with an approved duct seal or mastic tape to keep out insects and rodents.
10. Install the circuit breaker cover.

Automatic Transfer Switch AC Connections

⚠ WARNING

Failure to use an approved transfer switch can lead to the electrocution of personnel working on the utility lines, damage to equipment, fire, or personal injury. An approved switching device must be used to prevent interconnection to the public utility.

Install the transfer switch in accordance with the appropriate RA Series Transfer Switch Owner Manual.

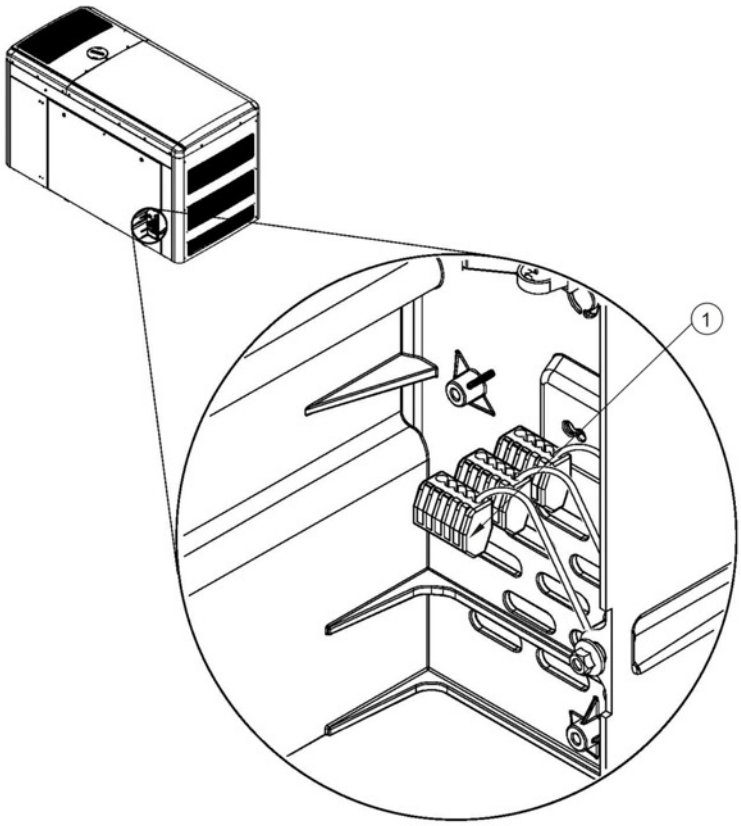
Factory Option and Accessory Connections

NOTICE

Use copper conductors only.

AC powered options or accessories available:

- Battery charger
- Engine coolant heater
- Alternator heater
- Battery warmer
- CCV heater



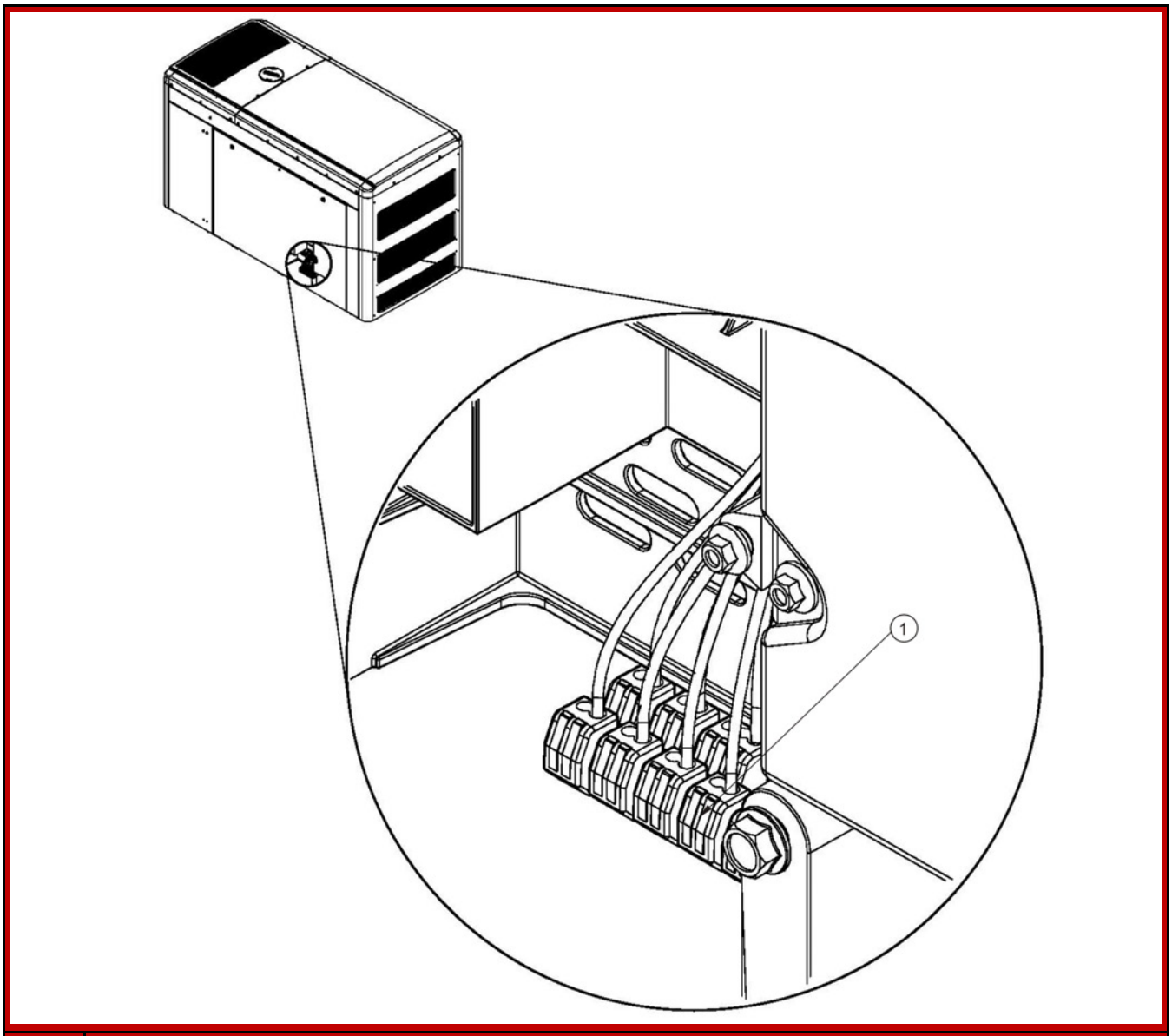
No.	Description	No.	Description
1	AC Distribution Connector(s)		

FIGURE 7. AC ACCESSORY CONNECTIONS

The battery charger, engine coolant heater, alternator heater, CCV heater, and battery warmer require power from a 120 VAC, 20 Amp protected circuit from the Main Distribution Panel. Use 12 AWG 75 °C (167 °F) conductors to make connection to the generator set AC distribution connector.

DC Connections

NOTICE
When selecting and installing conduit to the generator set, account for any needed accessories, such as a remote display, etc.



No.	Description
1	DC Circuit Connector(s)

FIGURE 8. DC CUSTOMER CONNECTIONS

Automatic Transfer Switch DC Connections

⚠ WARNING

Failure to use an approved transfer switch can lead to the electrocution of personnel working on the utility lines, damage to equipment, fire, or personal injury. An approved switching device must be used to prevent interconnection to the public utility.

Install the transfer switch in accordance with the appropriate RA Series Transfer Switch Owner Manual.

The following image is an example that shows the location of the connectors in the generator set where the ATS DC control wires terminate. This is also the location of the connectors where load management control wires (if applicable) terminate.

NOTICE
Load management is only availble with air cooled product.

Refer to the Wiring Diagrams appendix for generator set to RA transfer switch DC customer connections.

NOTICE
Class 1 wiring methods should be used for connecting the generator set and transfer switch signal wiring.

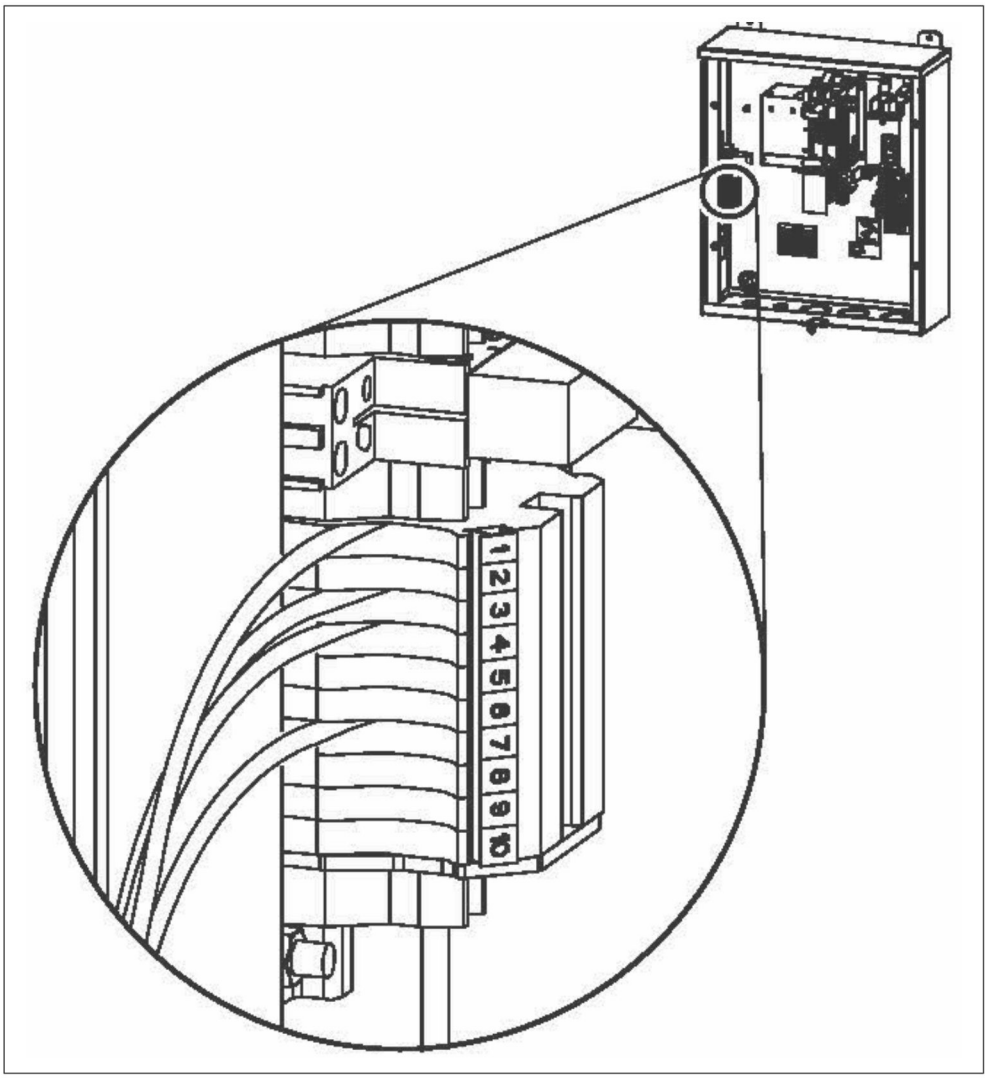


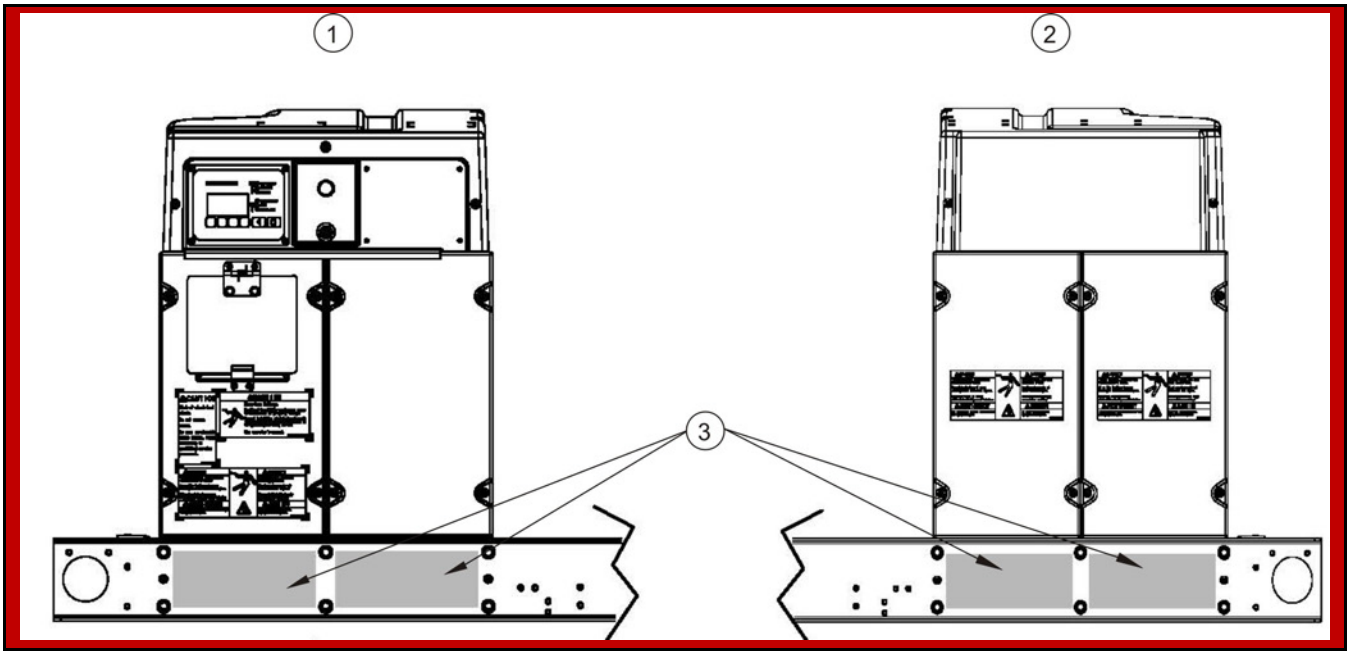
FIGURE 9. EXAMPLE OF RA SERIES TRANSFER SWITCH DC CONNECTIONS LOCATION

Drilling Locations for Electrical Connections

Preferred routing of electrical leads is vertically through conduit that is installed in the mounting pad that terminates in the electrical connection areas.

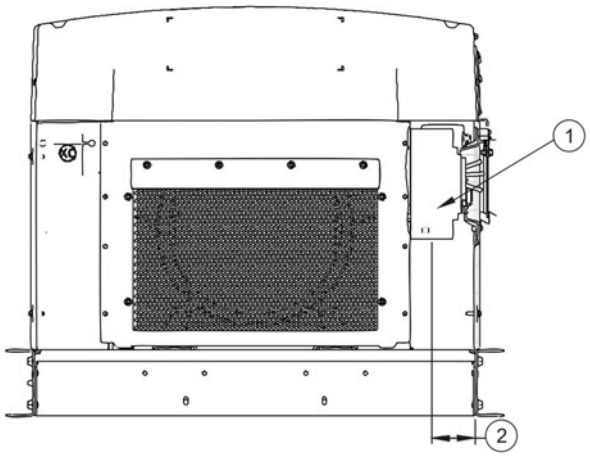
- Refer to the generator set foundation outline drawing in the Outline and System Drawings appendix for location of electrical connection areas.
- In some cases, it may be necessary to route electrical leads horizontally in conduits that pass through the generator set chassis.
- Refer to the figure below for available drilling space for conduit holes in the side of the chassis. Holes up to 7.6 cm (3 in) in diameter can be made in the chassis in the areas shown. Exceeding 7.6 cm (3 in) in diameter may cause failure of the chassis.

- Comply with NEC and local codes and standards for installation of wires for electrical circuits. Refer to NEC standards for required wire bend radius and ampacity of load leads.



No.	Description	No.	Description
1	Circuit Breaker Side	3	Drilling Allowed (Shaded Areas)
2	DC (Left) and AC (Right) Connection Area		

FIGURE 10. DRILLING LOCATIONS FOR SIDE ELECTRICAL CONNECTIONS



No.	Description	No.	Description
1	Circuit Breaker	2	Maximum 7.6 cm (3 in) Bend Radius Gap

FIGURE 11. CABLING ROOM FOR CIRCUIT BREAKER

Grounding

NOTICE

The generator set is shipped from the factory with the neutral and equipment ground not bonded together.

Refer to local codes and standards for grounding procedures.

Battery

⚠ CAUTION

Ensure that the AC power to the battery charger is disconnected when installing the battery.

⚠ CAUTION

Wear proper safety protection when working around batteries. Keep open flames and sparks away from the equipment.

NOTICE

Only personnel knowledgeable of batteries and required precautions should perform or supervise battery servicing.

NOTICE

See the Important Safety Instructions section for complete battery-related safety information.

The generator set requires a 12V battery (negatively grounded) for engine cranking and powering the electronic control system. When the generator set is running, the battery is charged from the engine-driven battery alternator. When the set is not running, an AC powered battery charger is needed to keep the battery charged.

As part of the installation, make sure that the battery is secured to the battery tray with the strap provided.

To connect the battery:

1. Connect the positive battery terminal.
2. Connect the negative battery terminal.
3. Make sure that the black and red battery cable boots are in place.

Refer to the Model Specifications section for battery specifications.

An optional thermostatically controlled battery heater is available for more reliable starting.

To prevent injury due to accidental startup:

- Do not connect the battery cables to the battery until the installation has been completed;
- Make sure tools, rags, and body parts are kept away from any rotating parts or electrically live parts; and
- Make sure it is time to start the generator set.

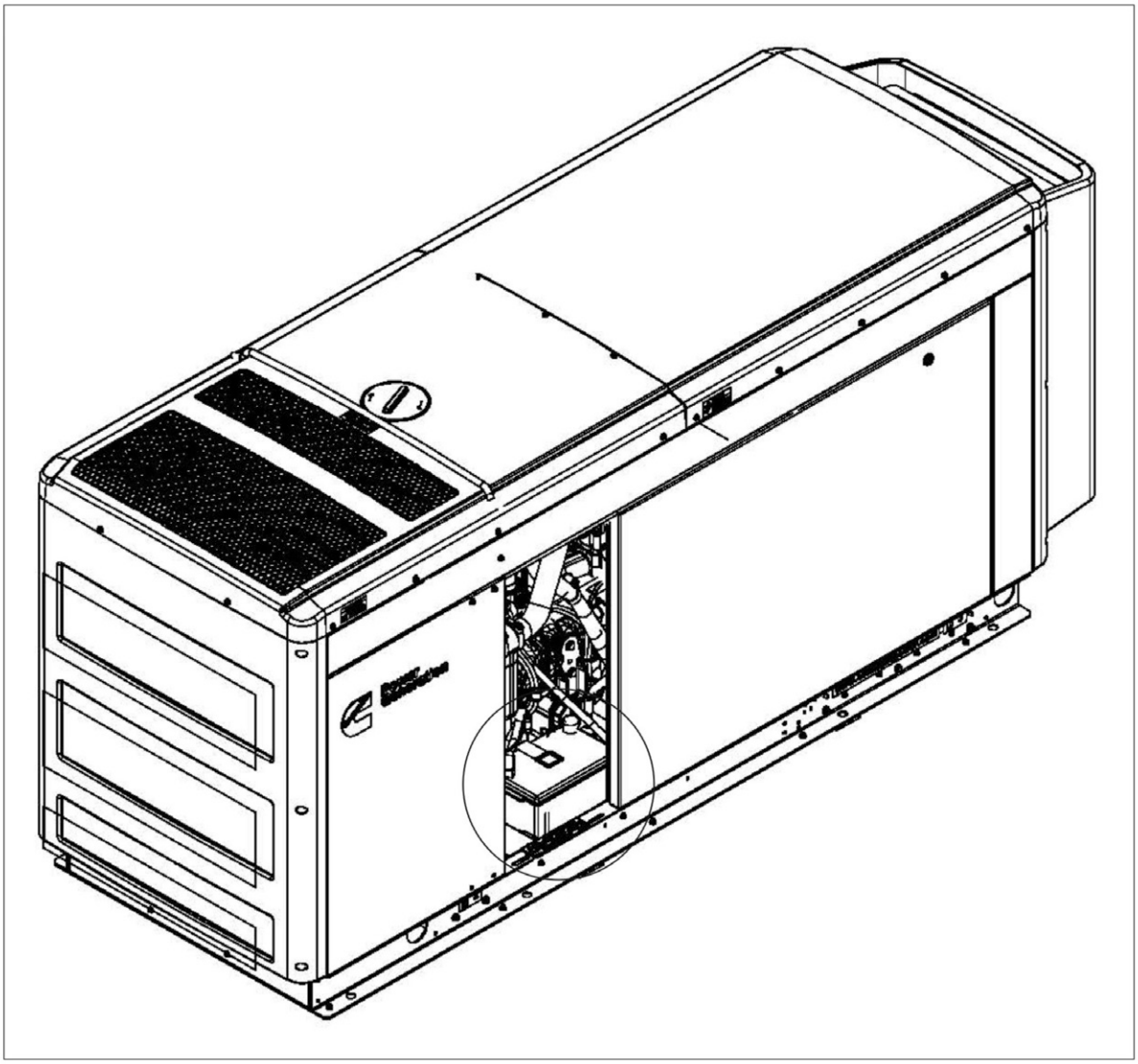


FIGURE 12. TYPICAL BATTERY LOCATION

5 Startup and Configuration

5.1 Exercise Settings

NOTICE
When battery power is lost, these settings must be reset.

NOTICE
Not applicable without a single phase RA series transfer switch.

To access the Clock/Exerciser Menu:

1. From any Information Menu, hold down the up and down arrows simultaneously for two seconds. The Service Menu appears.
2. Navigate through the screens to find and select **Clock/Excr** in the Service Menu.

NOTICE
The following screens represent the standard operator panel (that is, HMI211). If using an in-home operator panel, which may be additionally purchased as an option, the screens may look slightly different. This procedure applies to both operator panels.

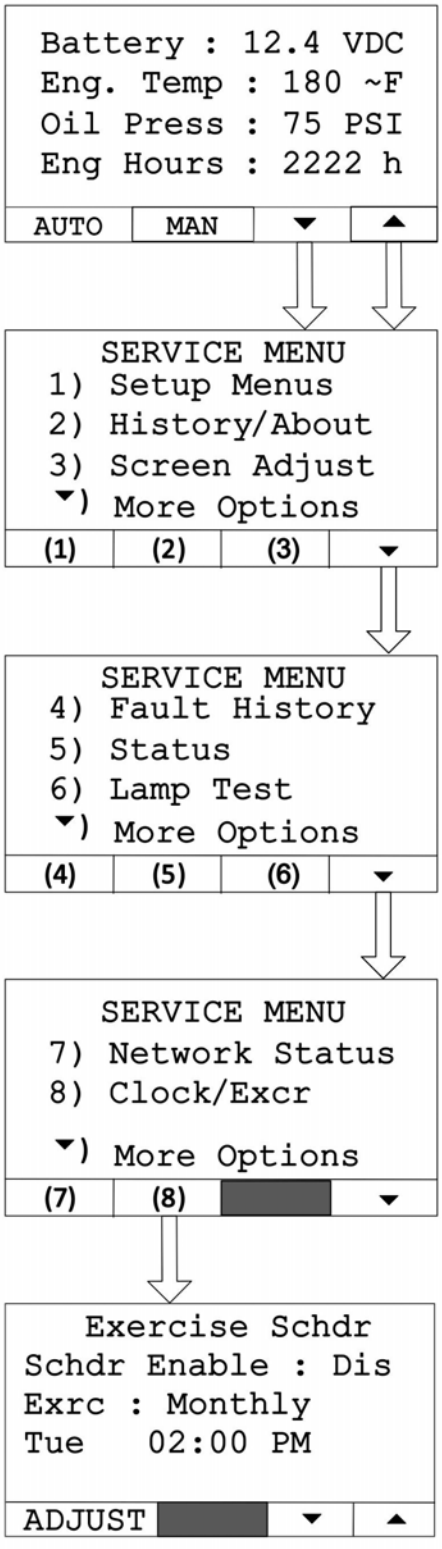


FIGURE 13. CLOCK/EXERCISER MENU NAVIGATION

Updating Exercise Frequency (1-Phase ATS)

NOTICE
Not applicable without a single phase RA series transfer switch.

To update the exercise frequency and dates on the Clock/Exerciser Menu:

1. From any Information Menu, hold down the up and down arrows simultaneously for two seconds. The Service Menu appears.
2. Access the Time Setup screen by selecting **Clock Exerciser** on the Genset Service Menu.
3. Press the down key on the Time Setup screen to access the Daylight Saving Adjust screen.
4. Select **Adjust**.
5. Press the down key on the Daylight Saving Adjust Start screen.
6. Select **Adjust**.
7. Press **Exercise Schdr** on the Daylight Saving Adjust End screen.
8. Press **Adjust**.

When updating these settings, the functions of the keys are as follows:

- The horizontal right arrow key is used to select successive blocks for editing settings on the screen.
- Use the + or - keys to edit the following settings:
  - Schdr Enable: Enable or Disable
  - Exercise Schedule: Semi-Annual (every six months), Quarterly, Monthly, Bi-Monthly (the first and third week of every month based on the time set when the Bi-Monthly option is selected), or Weekly
  - Exercise Schedule: Day, Hours, Minutes, AM/PM
- Press **Save** to save any changes. After saving, the Save button changes to the Adjust button.

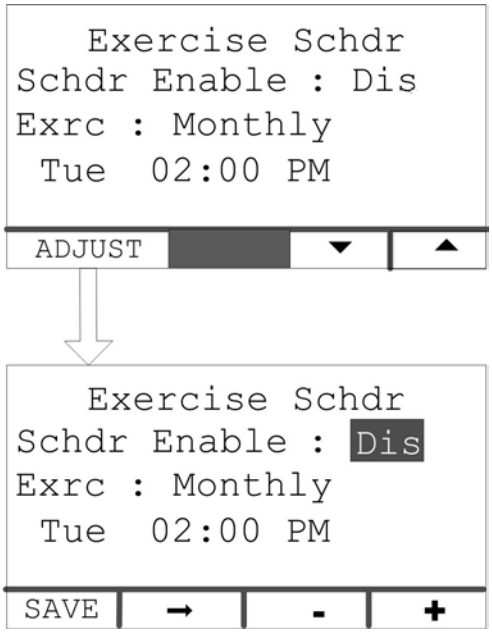


FIGURE 14. EXERCISE FREQUENCY NAVIGATION

Updating Exercise Duration (1-Phase ATS)

NOTICE
Not applicable without a single phase RA series transfer switch.

To update the exercise duration on the Clock/Exerciser Menu:

1. From any Information Menu, hold down the up and down arrows simultaneously for two seconds. The Service Menu appears.
2. Access the Time Setup screen by selecting **Clock Exerciser** on the Genset Service Menu.
3. Press the down key on the Time Setup screen to access the Daylight Saving Adjust screen.
4. Select **Adjust**.
5. Press the down key on the Daylight Saving Adjust Start screen.
6. Select **Adjust**.
7. Press **Exercise Schdr** on the Daylight Saving Adjust End screen.
8. Press the down key on the Exercise Schdr Menu.
9. Press **Adjust**.

When updating these settings, the functions of the keys are as follows:

- The horizontal right arrow key is used to select the duration block for editing exercise duration.
- Use the + or - keys to edit the exercise duration minutes.

- Press **Save** to save any changes. After saving, the Save button changes to the Adjust button.

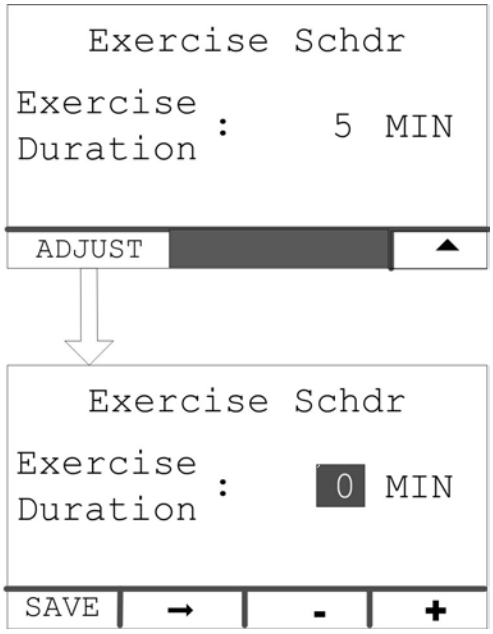


FIGURE 15. EXERCISE DURATION NAVIGATION

5.2 Time Setup (1-Phase ATS)

NOTICE
When battery power is lost, these settings must be reset.

NOTICE
Not applicable without a single phase RA series transfer switch.

To set up the generator set clock for the current date and time:

1. From any Information Menu, hold down the up and down arrows simultaneously for two seconds. The Service Menu appears.
2. Access the Time Setup screen by selecting **Clock Exerciser** on the Genset Service Menu.
3. Select **Adjust**.

When updating these settings, the functions of the keys are as follows:

- The horizontal right arrow key is used to select successive blocks for editing settings on the screen.
- Select the left arrow to return to the previous screen.
- Adjust values by using the + or - keys on the Adjust Menu of the Time Setup screen.

- Press **Save** to save any changes. After saving, the Save button changes to the Adjust button.

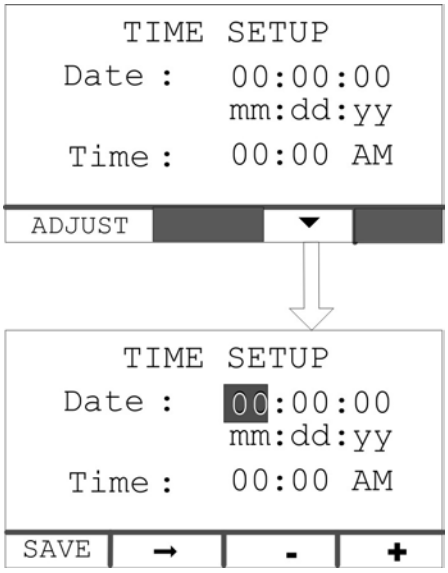


FIGURE 16. TIME SETUP SCREEN

Updating Daylight Saving Adjust Screens

Update Values on the Daylight Saving Adjust Screen

1. From any Information Menu, hold down the up and down arrows simultaneously for two seconds. The Service Menu appears.
2. Navigate to the Genset Service Menu.
3. Select **Clock Exerciser** to access the Time Setup screen.
4. Press the down key on the Time Setup screen to access the Daylight Saving Adjust screen.
5. Select **Adjust**. When updating these settings, the functions of the keys are as follows:

TABLE 11. KEY FUNCTIONS ON THE DAYLIGHT SAVING ADJUST SCREEN

Key/Button	Function
Horizontal right arrow key	Select successive blocks for editing settings on the screen
Left arrow key	Return to the previous screen
+ or - keys	Adjust values on the Adjust screen of the Daylight Saving Adjust screen
Save button	Save any changes; after saving, the **Save** button changes to the **Adjust** button

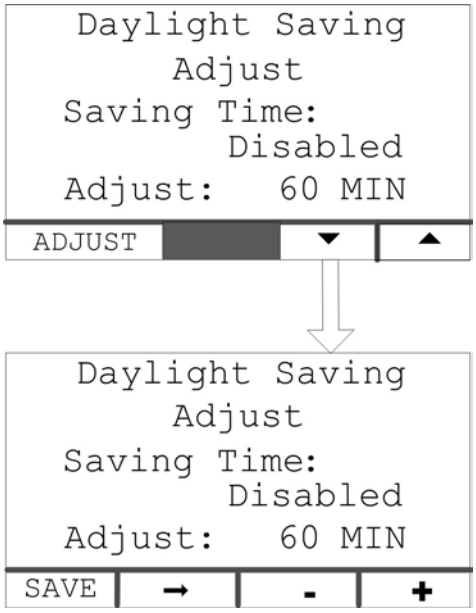


FIGURE 17. "DAYLIGHT SAVING ADJUST SAVING TIME" SCREEN NAVIGATION

Access and Update the Daylight Saving Adjust Start Screen

1. Press the down arrow key on the Daylight Saving Adjust screen.
2. Press **Adjust**. When updating these settings, the functions of the keys are as follows:

TABLE 12. KEY FUNCTIONS ON THE DAYLIGHT SAVING ADJUST START SCREEN

Key/Button	Function
Horizontal right arrow key	Select successive blocks for editing settings on the screen
+ or - keys	Adjust Month, Week, Day or Hour
Save button	Save any changes; after saving, the **Save** button changes to the **Adjust** button

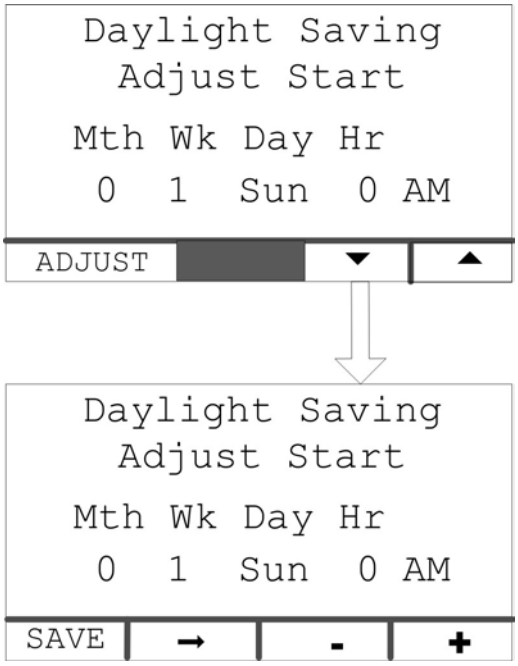


FIGURE 18. DAYLIGHT SAVING ADJUST START SCREEN

Update the Daylight Saving Adjust End Screen

1. Press the down key on the Daylight Saving Adjust Start screen.
2. Press **Adjust**. When updating these settings, the functions of the keys are as follows:

TABLE 13. KEY FUNCTIONS ON THE DAYLIGHT SAVING ADJUST END SCREEN

Key/Button	Function
Horizontal right arrow key	Select successive blocks for editing settings on the screen
+ or - keys	Adjust Month, Week, Day or Hour
Save button	Save any changes; after saving, the **Save** button changes to the **Adjust** button

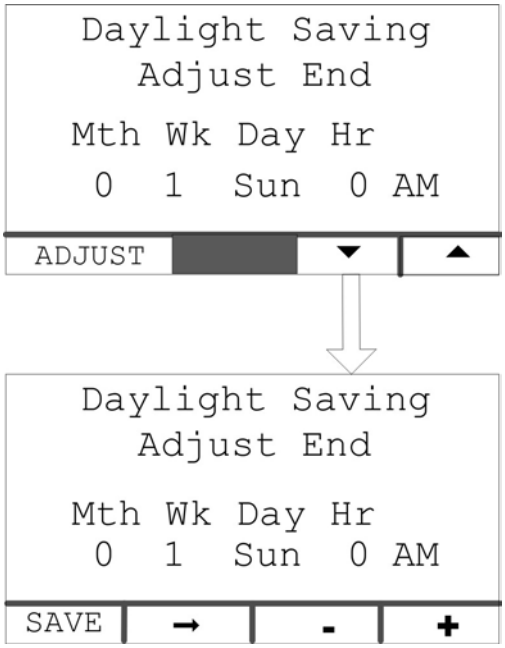


FIGURE 19. DAYLIGHT SAVING ADJUST END SCREEN

5.3 Brightness and Contrast

The Screen Adjust screen allows the contrast, brightness, and units to be set. To access the Screen Adjust screen:

1. From any Information screen, hold down the up and down arrows simultaneously for two seconds to gain access to the Service Menu screen.
2. Select **Screen Adjust**.

To adjust the contrast, brightness, or units from the Screen Adjust screen:

1. From the Screen Adjust screen, select **Adjust** to access the screen variables.
2. Press the right arrow to move between the variables.
3. Adjust settings, and press **Save** to save any changes.

When updating these settings, the functions of the keys are as follows:

- The horizontal right arrow key is used to select successive blocks for editing settings on the screen.
- Select the left arrow to return to the previous screen.
- Adjust values by using the + or - keys on the Adjust screen of the Display Setup screen.
- Press **Save** to save any changes. After saving, the Save button changes to the Adjust button.

NOTICE

The following screens represent the standard operator panel (HMI211). If using an in-home operator panel, which may be additionally purchased as an option, the screens may look slightly different. This procedure applies to both operator panels.

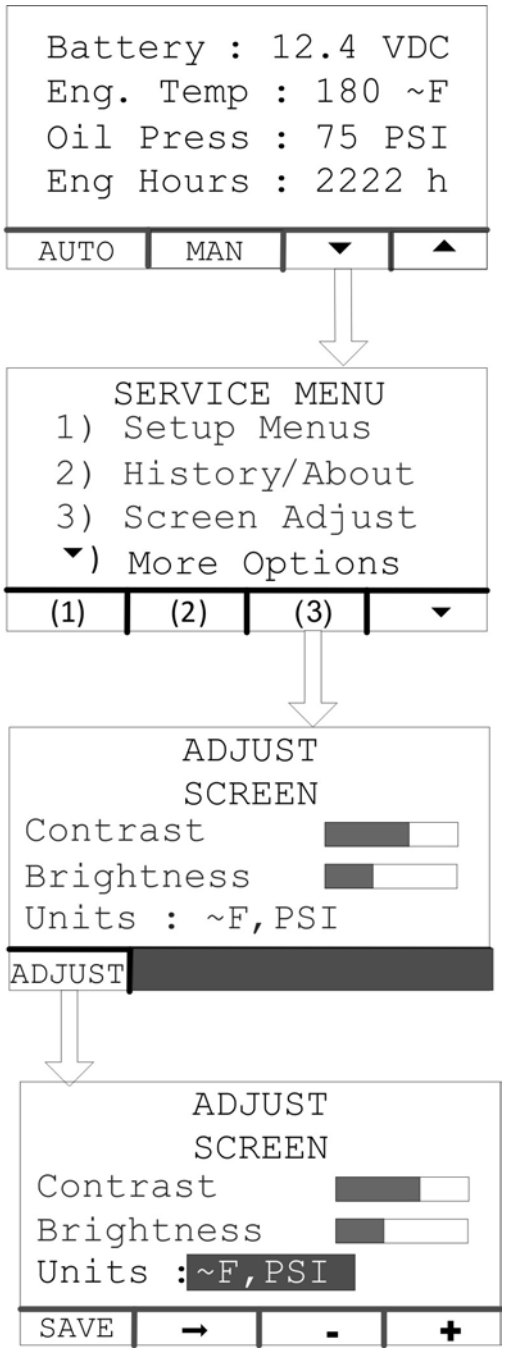


FIGURE 20. BRIGHTNESS AND CONTRAST SCREEN NAVIGATION

NOTICE

Adjusting the brightness on the operator panel adjusts the brightness of both the LCD backlight and the LEDs on the display. The contrast should never be 0 or 100% on any of the screens. The default value for Brightness is 50%.

5.4 History and About Menu

To access the History/About screen:

1. From any Information Menu, hold down the up and down arrows simultaneously for two seconds. The Service Menu appears.
2. Select **History/About**.
3. Advance through the screens to view information about the generator set, control, and display.

NOTICE

The following screens represent the standard operator panel (HMI211). If using an in-home operator panel, which may be additionally purchased as an option, the screens may look slightly different. This procedure applies to both operator panels.

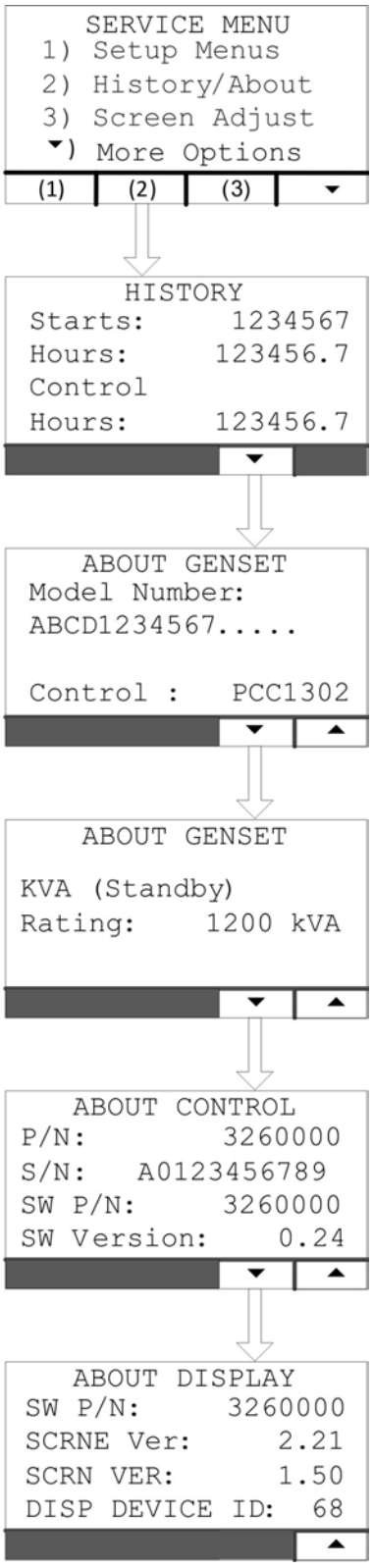


FIGURE 21. HISTORY/ABOUT MENU

5.5 Startup

⚠ WARNING

Automated Machinery

Accidental or remote starting of the generator set can cause severe personal injury or death.

Isolate all auxiliary supplies and use an insulated wrench to disconnect the starting battery cables, negative (–) cable first.

After verifying that the installation was completed correctly, start and test the system. Make sure to connect the battery cables to the battery with the positive (+) cable first.

Read through the Operator Manual and perform the maintenance and pre-start checks as instructed.

The following information applies to C70 N6, C80 N6, and C100 N6 generator set models only: Adaptive learn is an engine ECM function that allows the generator set to "learn" its environment. There are small differences in the performance of each engine and fuel system component, so the ECM uses inputs from the engine sensors to adjust running conditions to operate more consistently for each individual generator set. After installation is complete and while testing the overall system function, the generator set must be run with no active faults under load (that is, transfer switch connected to maximum customer load available) until the engine temperature reaches 80 °C (175 °F) to allow the adaptive learn function to initialize.

The generator set is shipped from the factory with the proper level of engine oil and coolant, but each should be checked before the generator set is started. Start and operate the generator set following all the instructions and precautions in the Operator Manual. Ensure that the bonding bolts are installed into the service panels before leaving the site.

NOTICE

Before leaving the site, if the generator set is ready to be placed in service, put the generator set in Auto mode to provide automatic standby power.

NOTICE

Contact your local Cummins service representative if you encounter a fault code.

5.6 Installation Checklist

Tick	General Items
	Generator set wattage capacity is sufficient to handle maximum anticipated load.
	At least 5 feet of clearance (or greater for housing door) is provided around the entire generator set for service and ventilation.
	The generator set is located in an area not subject to flooding.
	All operating personnel have read and are familiar with the generator set Operator manual, all health and safety procedures, warnings, cautions, precautions, and the other documentation supplied with the generator set.
	All operators have been thoroughly briefed on preventative maintenance procedures.
	All operators have read and understand all important safety instructions.
	Generator Set Support
	The floor, roof, or earth on which the generator set rests is strong enough and will not allow shifting or movement. Observe local codes on soil bearing capacity due to freezing and thawing.
	The generator set is properly supported and retained to an approved base
	The supporting base is large enough and is of non-combustible material, extending 6 inches (152.4 mm) all around the generator set.
	Cooling Air Flow
	Generator set air inlet is faced into direction of strongest, prevailing winds.
	Cooling air outlet is on downwind side of building (if not, wind barrier is constructed).
	Diesel Fuel System
	Fuel tanks meet or exceed all local, state, or national codes (if applicable).
	Fuel lines are properly installed, supported, and protected against damage.
	The fuel filters have been installed (if applicable).
	Strainer or fuel screen (100 to 200 mesh) is installed in the fuel supply line to protect the day tank transfer pump, or float valve seat from fuel tank debris (if applicable).
	The fuel filter assembly shipped with the generator set is installed and operational (if applicable).
	Fuel supply shutoff valves are installed to prevent fuel flow in case of leaks (if applicable).
	No shutoff valves are installed on engine fuel return line.
	External fuel pumps are connected and operational at all times - generator set started or shut down (if applicable).
	Fuel tanks are filled with the correct grade / type of fuel.

Tick	General Items
	Fuel system is properly primed.
	No fuel leaks are found in supply line or engine fuel system.
	Exhaust System
	The breather tube routing is set up to blow the fumes away from the generator set (if applicable)
	Operators are thoroughly briefed on the dangers of carbon monoxide gas.
	Areas around generator set are well ventilated. No possibility of exhaust fumes entering building doors, windows, or intake fans.
	Exhaust gases are piped safely outside and away from building.
	AC and DC Wiring
	Wire sizes, insulation, conduits and connection methods all meet applicable codes.
	AC and DC wires are separated in their own conduit to prevent electrical induction.
	All load, line and generator connections are well made and correct.
	Phase rotation is correct.
	Generator Set Pre-Start
	Generator set engine is properly serviced with oil and coolant.
	Battery charger is installed using the appropriate cable size and is operational (if applicable).
	Battery charger is configured for the proper DC battery voltage, battery type, and float voltage (if applicable).
	Batteries are properly installed, serviced and charged.
	Engine coolant heater is connected and operational (if applicable).
	All generator set covers and safety shields are installed correctly.
	All fuel and coolant shutoff valves are operational (if applicable).

5.7 InPower Service Tool

The InPower™ service tool can be used in troubleshooting to perform tests, verify control inputs and outputs, and test protective functions. Refer to the InPower User's Guide, provided with the InPower software for test procedures.

Disabling the AMF Feature

NOTICE
This procedure must be performed by a qualified technician.

On single-phase units, the control is shipped with the Automatic Mains Failure (AMF) feature enabled. This feature has logic to control the RA Automatic Transfer Switch (ATS), including a 5-minute retransfer to utility delay. If you are not using an RA ATS, you can eliminate the 5-minute retransfer to utility delay by disabling the AMF feature using the instructions below.

NOTICE

This procedure is optional. If you do not disable the AMF feature, the generator set will just run for an additional 5 minutes after the utility has been restored.

NOTICE

These steps cannot be performed with the HMI211; they can only be performed with the InPower service tool.

1. Connect to the PCC 1.1 or PCC 2.3 via InPower.
2. Navigate to the Adjustments->Features->Automatic Transfer Switch folder.
3. Select the Auto Mains Failure Enable parameter.
4. Double-click on Enabled in the Value field.
5. A pop-up will appear with available choices. Select Disabled.
6. Select Device->Save Adjustments from the top menu bar.
7. A pop-up will appear asking if the change is to be saved. Click the Save button.
8. After a pop-up appears confirming that the change has been saved, disconnect InPower from the PCC1302.

Appendix A. Diesel Fuel Piping

Table of Contents

A.0 Diesel Fuel Piping Requirements

- Diesel fuel lines should be constructed from black iron pipe. Cast iron and aluminum pipe and fittings must not be used because they are porous and can leak fuel. Galvanized fuel lines, fittings, and tanks must not be used because the galvanized coating is attacked by the sulfuric acid that forms when the sulfur in the fuel combines with tank condensate, resulting in debris that can clog fuel pumps and filters. Copper lines should not be used because fuel polymerizes (thickens) in copper tubing during long periods of disuse and can clog fuel injectors. Also, copper lines are less rugged than black iron, and thus more susceptible to damage.

NOTICE
Never use galvanized or copper fuel lines, fittings or fuel tanks. Condensation in the tank and lines combines with the sulfur in the diesel fuel to produce sulfuric acid. The molecular structure of the copper or galvanized lines or tanks reacts with the acid and contaminates the fuel.

- Approved flexible fuel hose must be used for connections at the engine to take up generator set movement and vibration.
- Piping from a day tank to the engine should run “downhill" all the way from the tank to the engine, with no overhead loops that can allow air to be entrained in the system.
- Fuel system piping should be properly supported to prevent vibration and breakage due to vibration. The piping should not run close to heating pipes, electrical wiring, or engine exhaust system components. The piping system design should include valves at appropriate locations to allow isolation of system components for repair without draining the entire fuel system.
- Piping systems should be regularly inspected for leaks and general condition. The piping system should be flushed before operation of the engine to remove dirt and other impurities that could damage the engine. Use of plugged “T" connections rather than elbows allows for easier cleaning of the piping system.
- The engine manufacturer's data indicates the maximum fuel inlet and return restrictions, the maximum fuel flow, supply and return, and the fuel consumption. The table below indicates minimum hose and pipe sizes for connections to a supply tank or day tank when it is within 50 feet (15 meters) of the set and at approximately the same elevation.

Hose and pipe size should be based on the maximum fuel flow rather than on the fuel consumption. It is highly recommended that the fuel inlet and return restrictions be checked before the generator set is placed in service.

TABLE 15. MINIMUM FUEL HOSE AND PIPE SIZES; UP TO 50 FEET (15 METERS) EQUIVALENT LENGTH.

Max Fuel Flow Rate GPH (L/hr)	Flex Hose No.*	NPS Pipe Size (in)	DN Pipe Size (mm)
Less than 80 (303)	10	½	15
81-100 (304-378)	10	½	15
101-160 (379-604)	12	¾	20
161-230 (605-869)	12	¾	20
231-310 (870-1170)	16	1	25
311-410 (1171-1550)	20	1-1/4	32
411-610 (1550-2309)	24	1-1/2	40
611-920 (2309-3480)	24	1-1/2	40

* Generic fuel hose suppliers' size specification.

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Appendix B. Outline and System Drawings

Table of Contents

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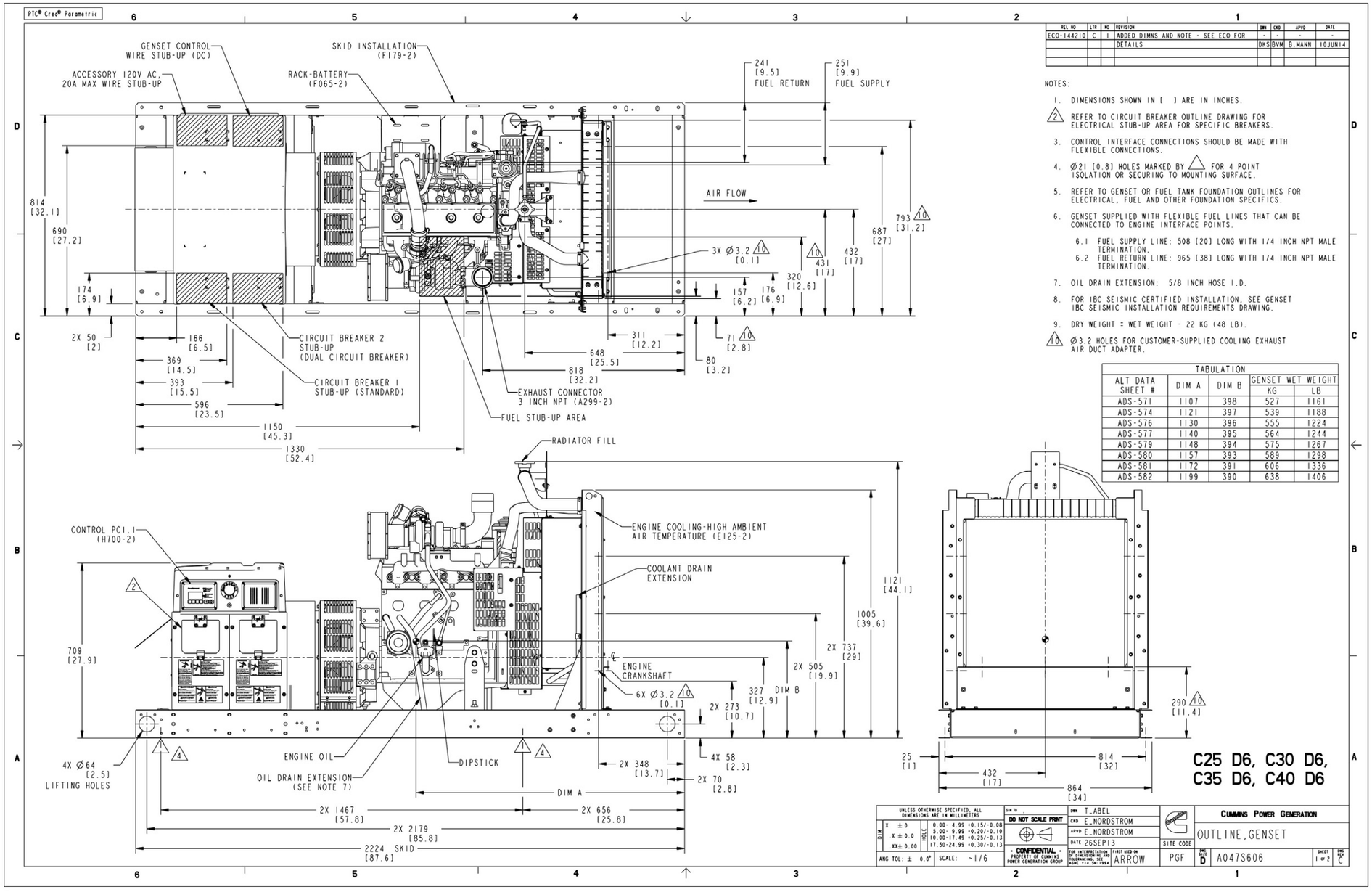


FIGURE 22. GENERATOR SET OUTLINE, OPEN (25 KW, 30 KW, 35 KW, 40 KW) (SHEET 1 OF 2)

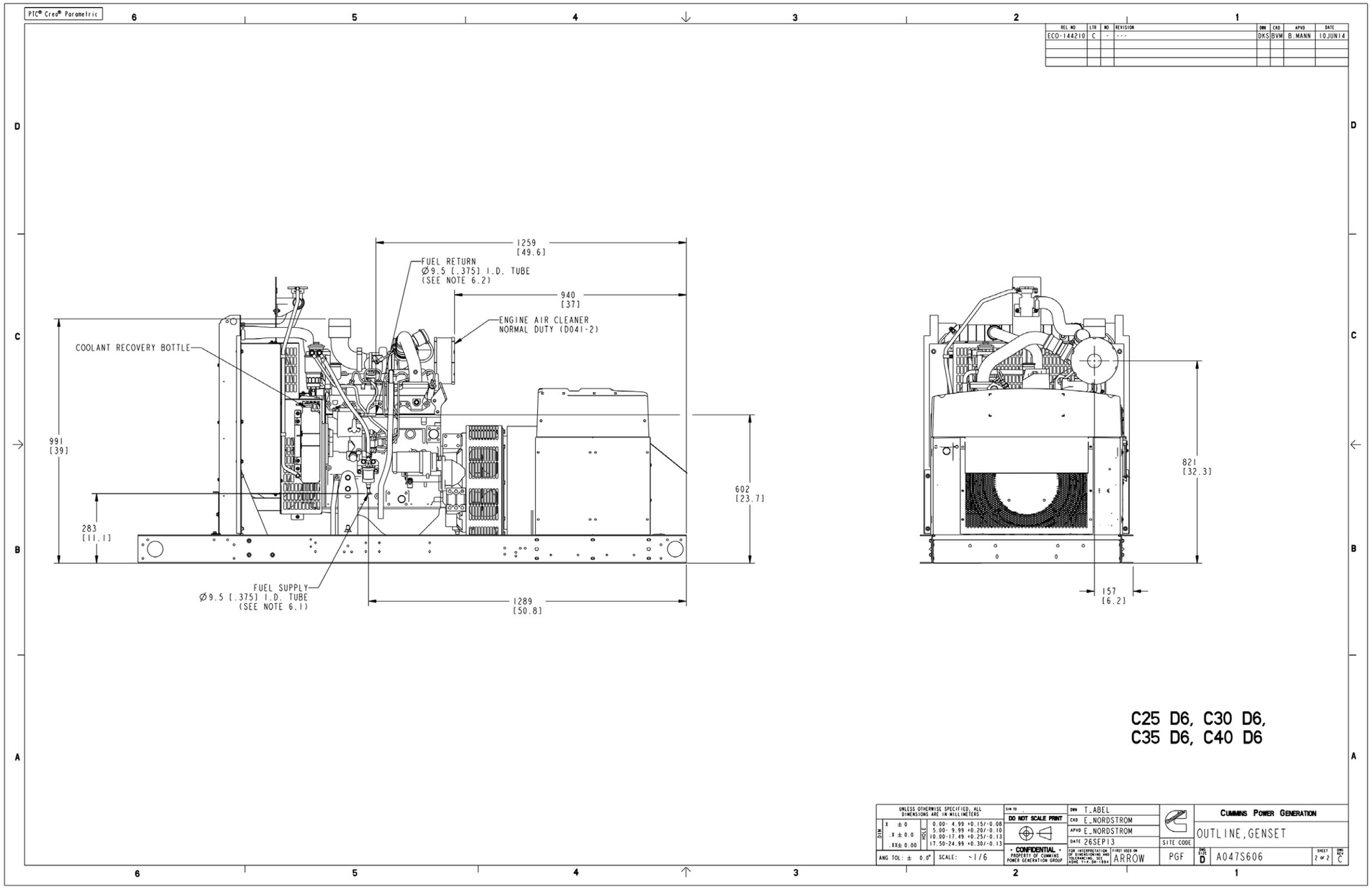


FIGURE 23. GENERATOR SET OUTLINE, OPEN (25 KW, 30 KW, 35 KW, 40 KW) (SHEET 2 OF 2)

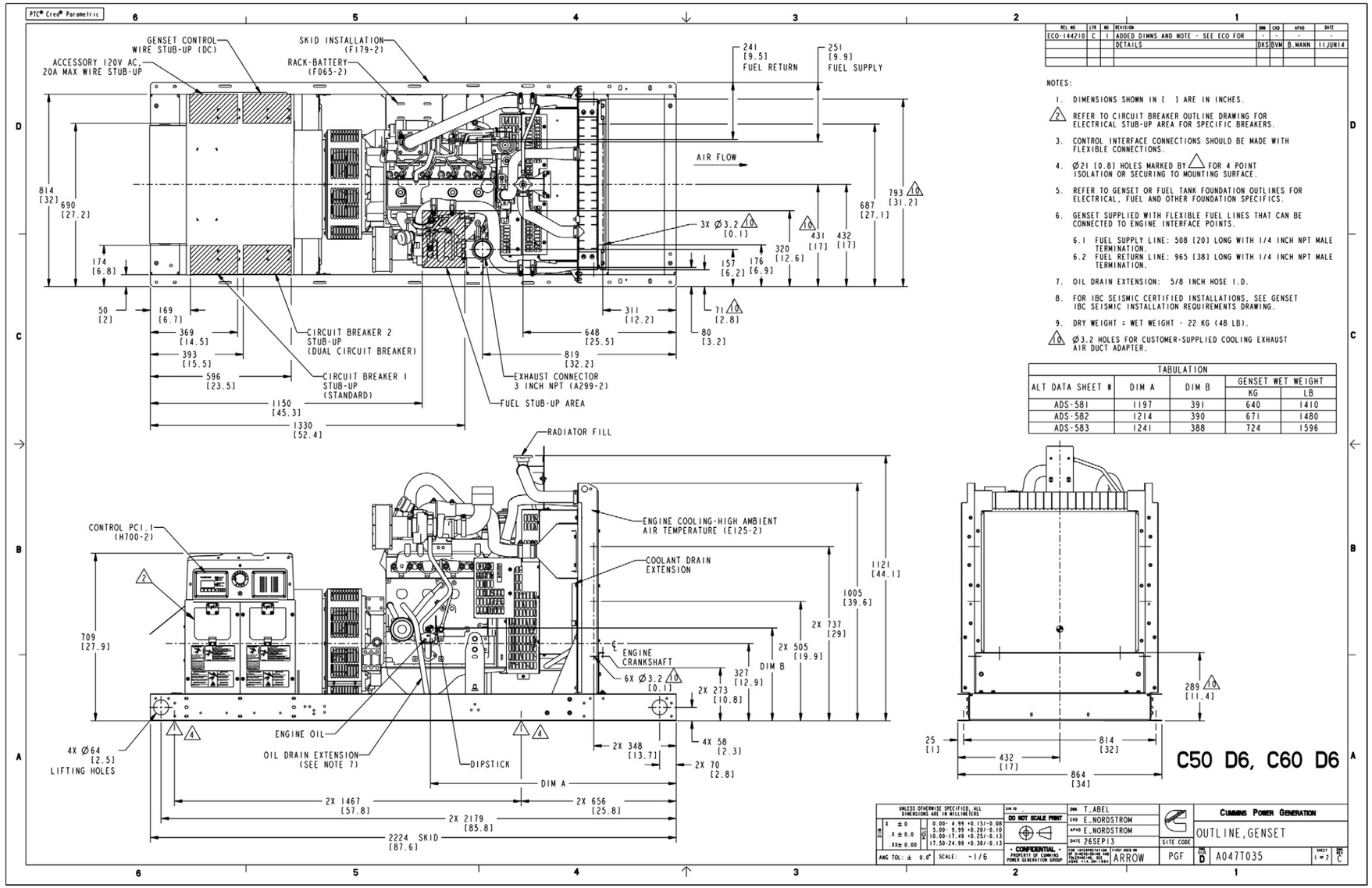


FIGURE 24. GENERATOR SET OUTLINE, OPEN (50 AND 60 KW) (SHEET 1 OF 2)

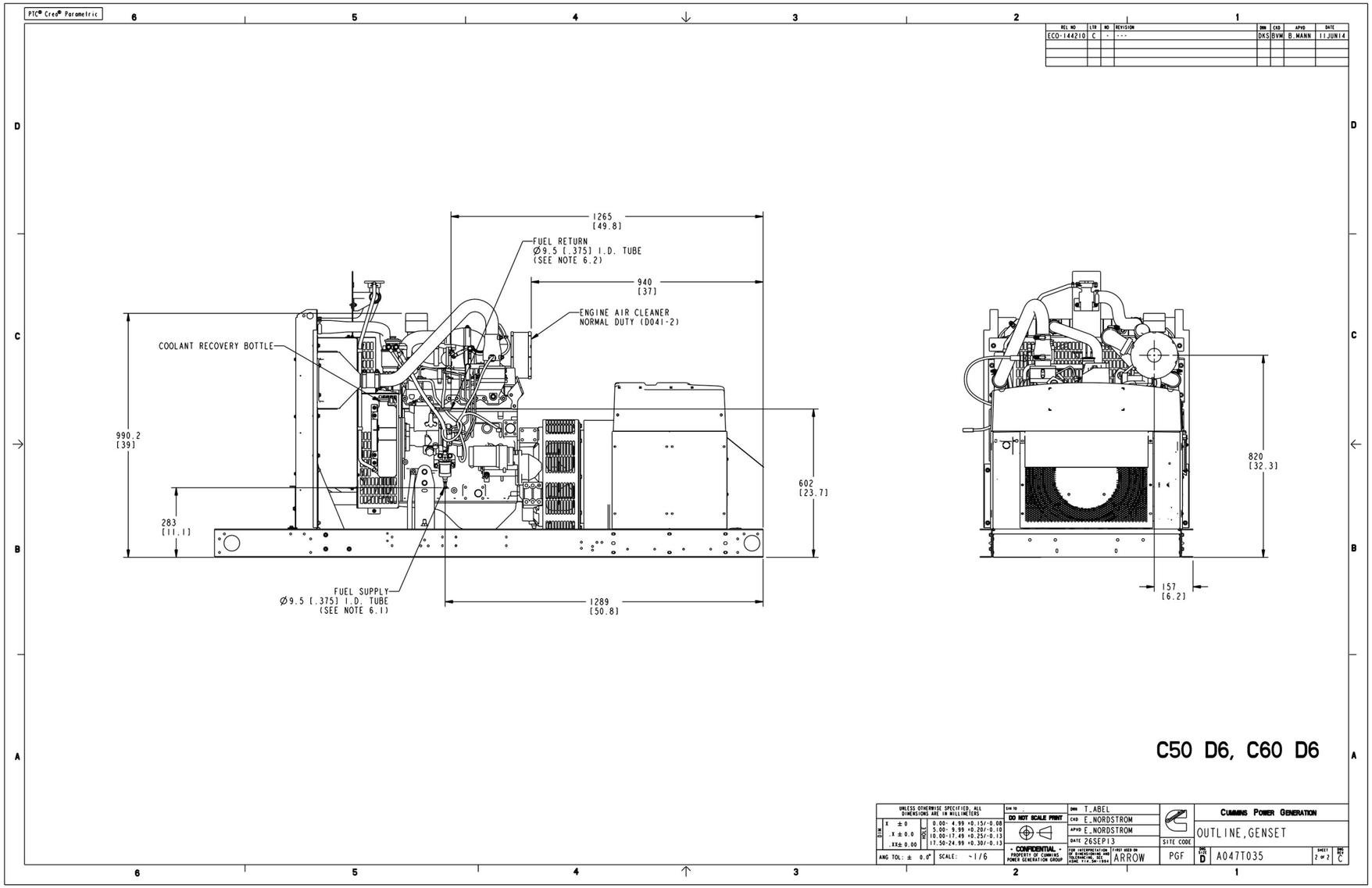


FIGURE 25. GENERATOR SET OUTLINE, OPEN (50 AND 60 KW) (SHEET 2 OF 2)

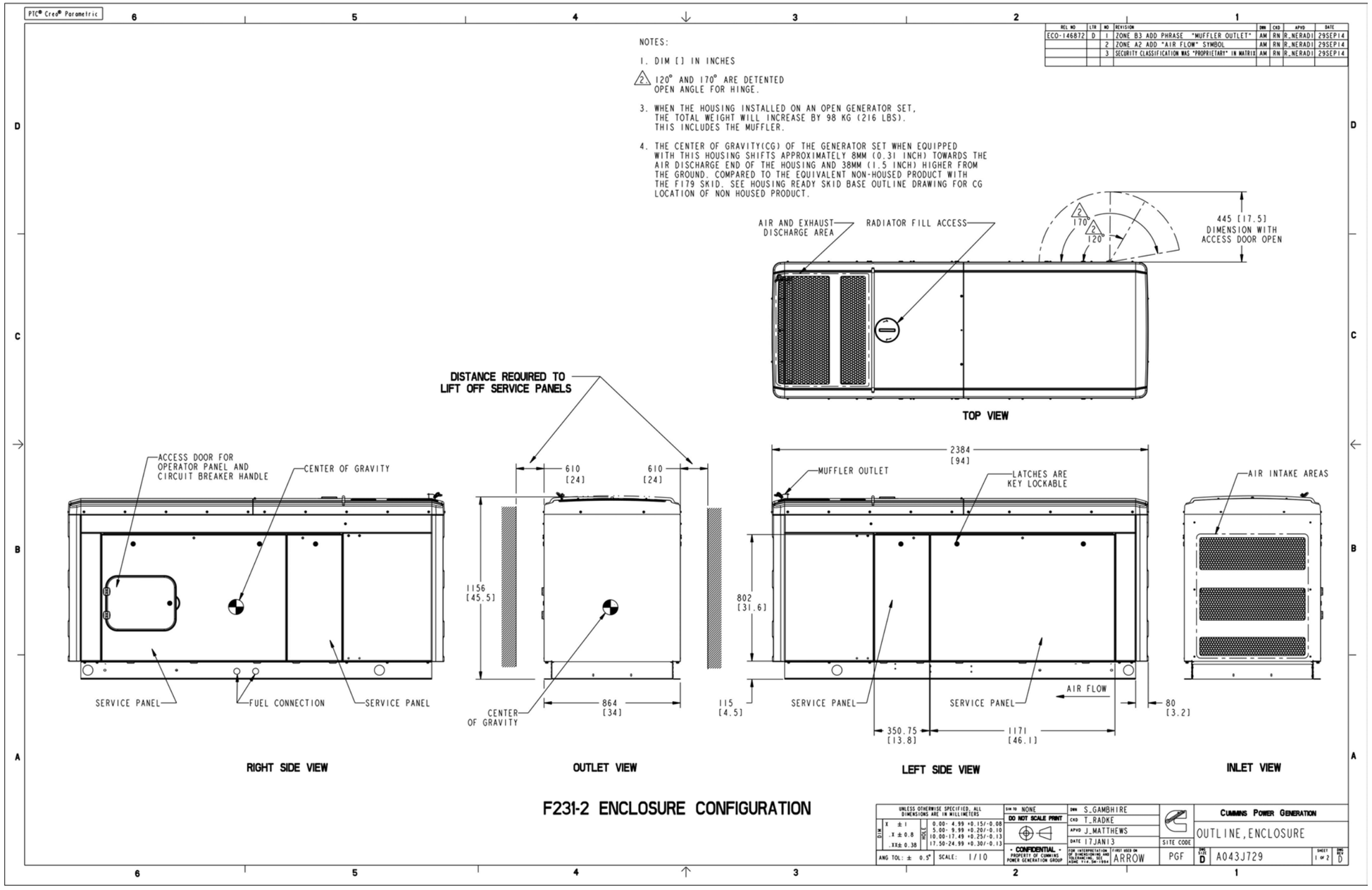


FIGURE 26. SHORT ENCLOSURE OUTLINE, SOUND ATTENTION LEVEL 1 AND LEVEL 2 (SHEET 1 OF 2)

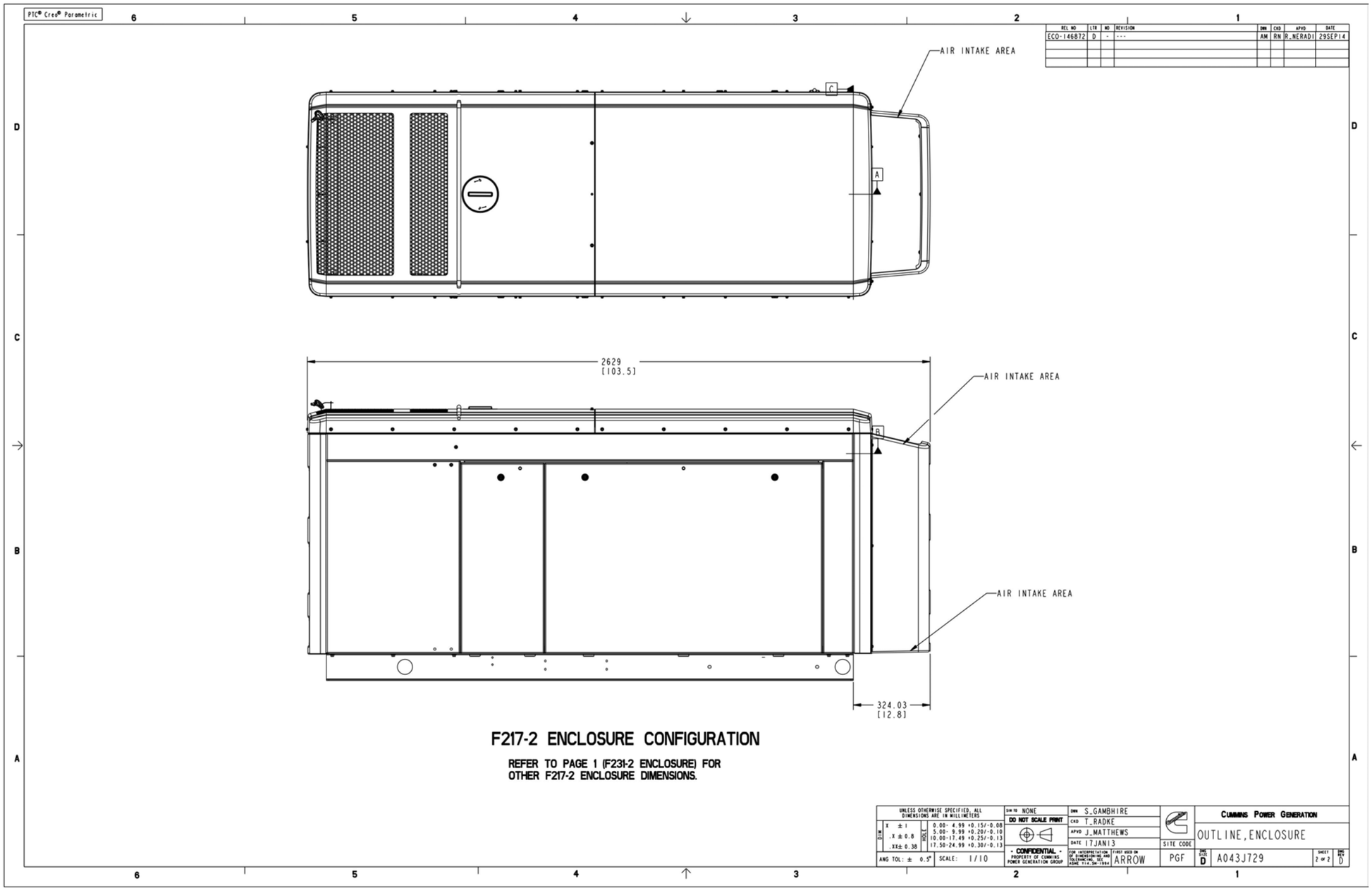


FIGURE 27. SHORT ENCLOSURE OUTLINE, SOUND ATTENTION LEVEL 1 AND LEVEL 2 (SHEET 2 OF 2)

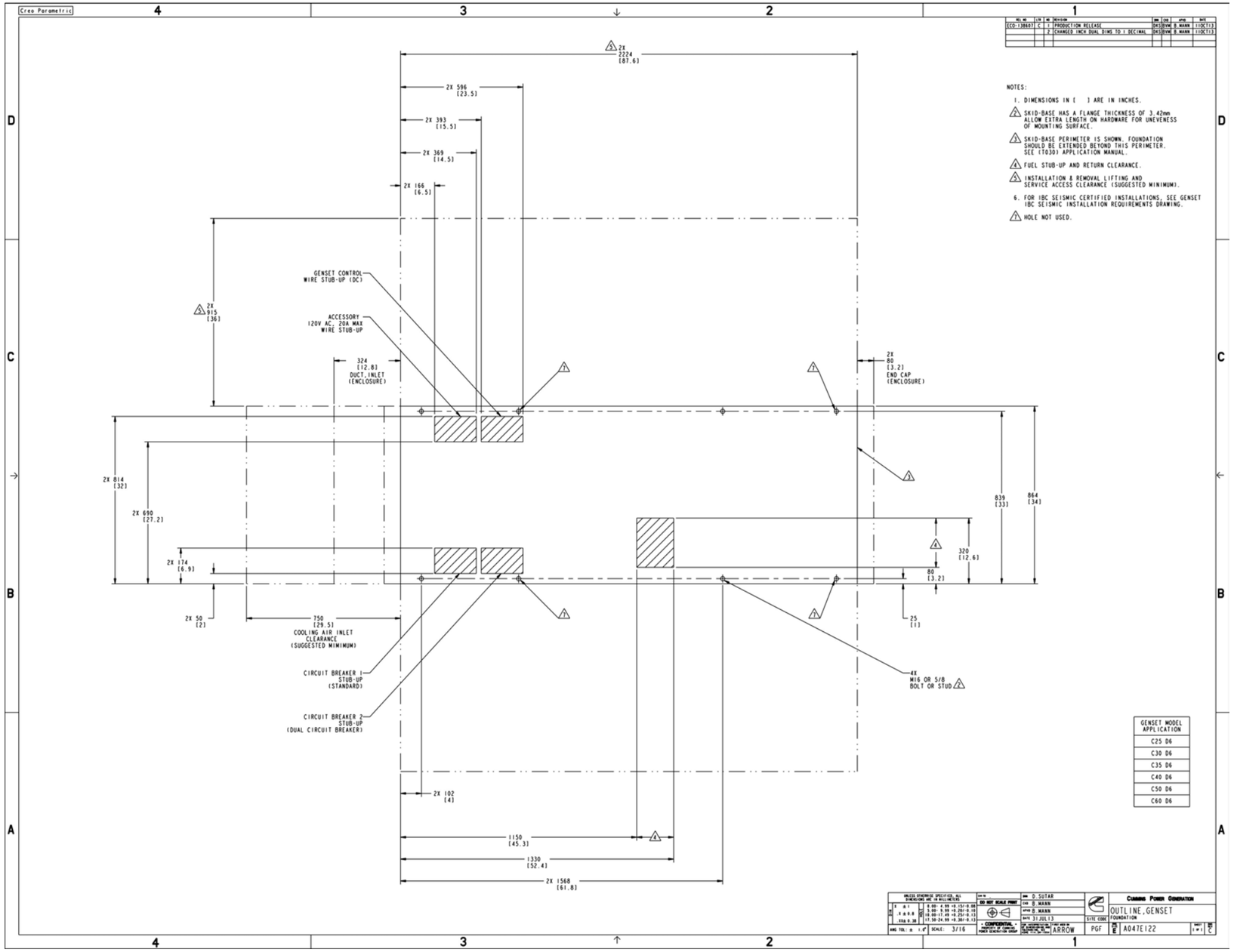


FIGURE 28. FOUNDATION OUTLINE, WITHOUT FUEL TANK (SHEET 1 OF 1)

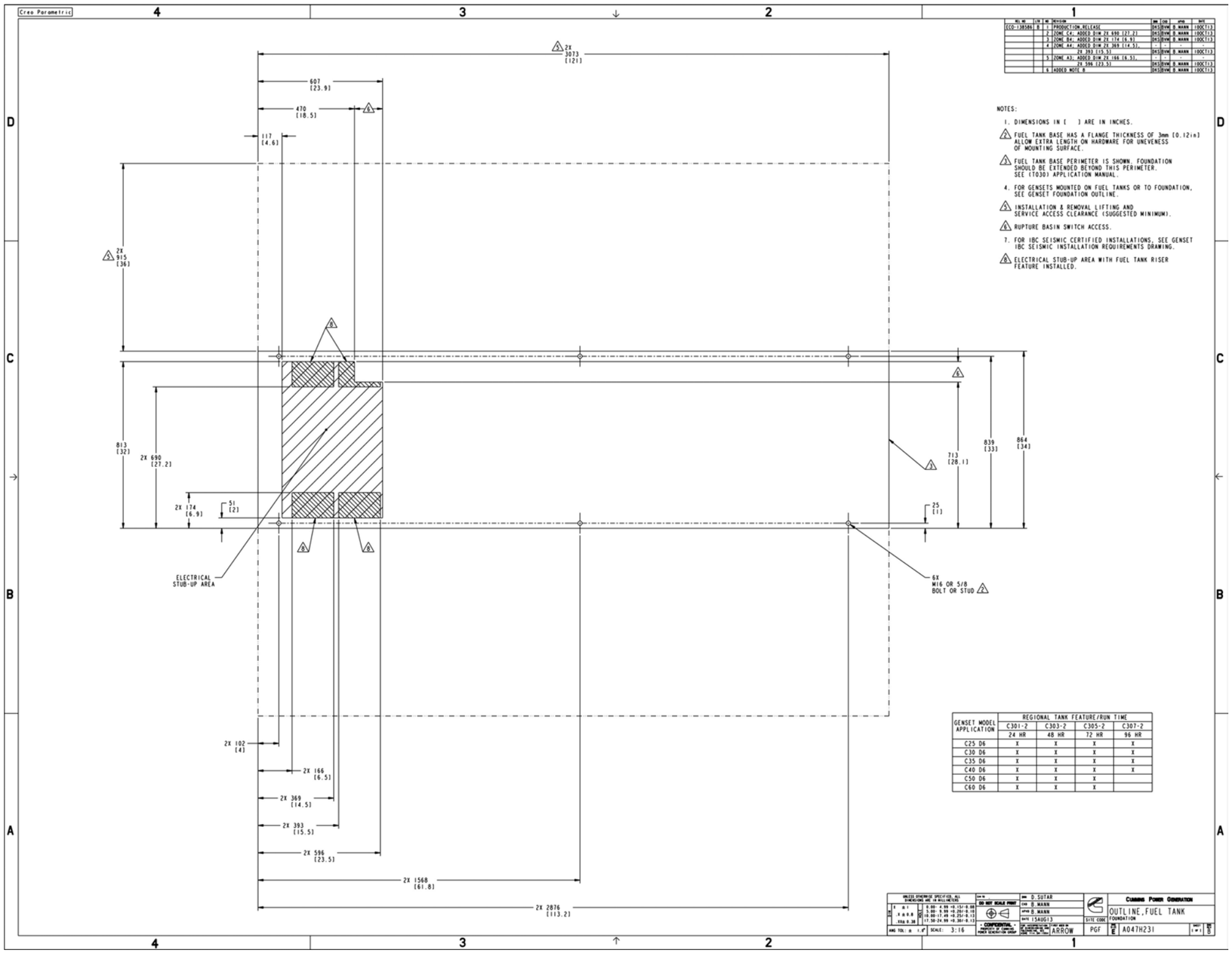
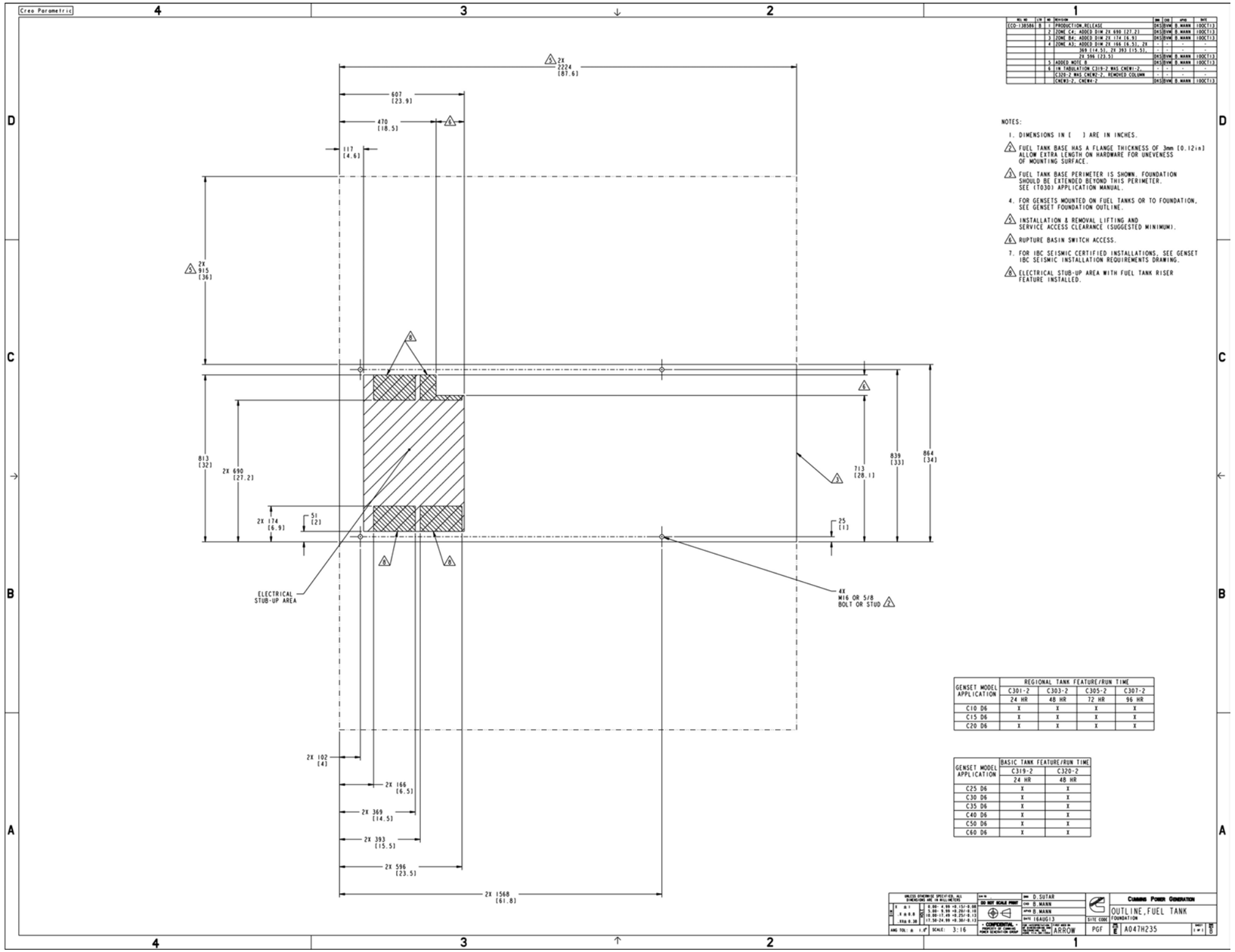


FIGURE 29. FOUNDATION OUTLINE, WITH REGIONAL FUEL TANK (SHEET 1 OF 1)



GENSET MODEL APPLICATION	REGIONAL TANK FEATURE/RUN TIME			
	C301-2	C303-2	C305-2	C307-2
	24 HR	48 HR	72 HR	96 HR
C10 D6	X	X	X	X
C15 D6	X	X	X	X
C20 D6	X	X	X	X

GENSET MODEL APPLICATION	BASIC TANK FEATURE/RUN TIME	
	C319-2	C320-2
	24 HR	48 HR
C25 D6	X	X
C30 D6	X	X
C35 D6	X	X
C40 D6	X	X
C50 D6	X	X
C60 D6	X	X

FIGURE 30. FOUNDATION OUTLINE, WITH BASIC FUEL TANK (SHEET 1 OF 1)

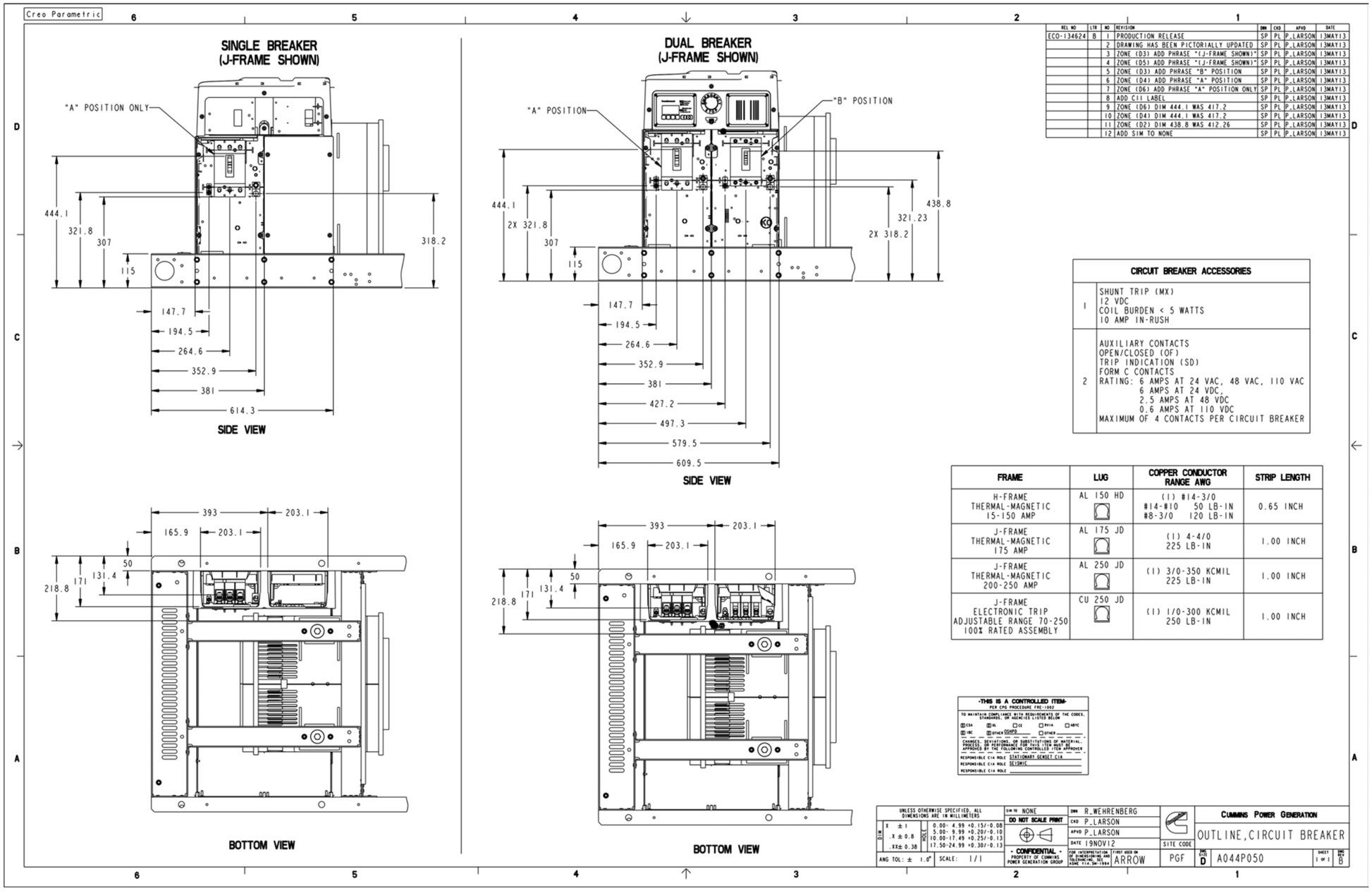


FIGURE 31. CIRCUIT BREAKER OUTLINE (SHEET 1 OF 1)

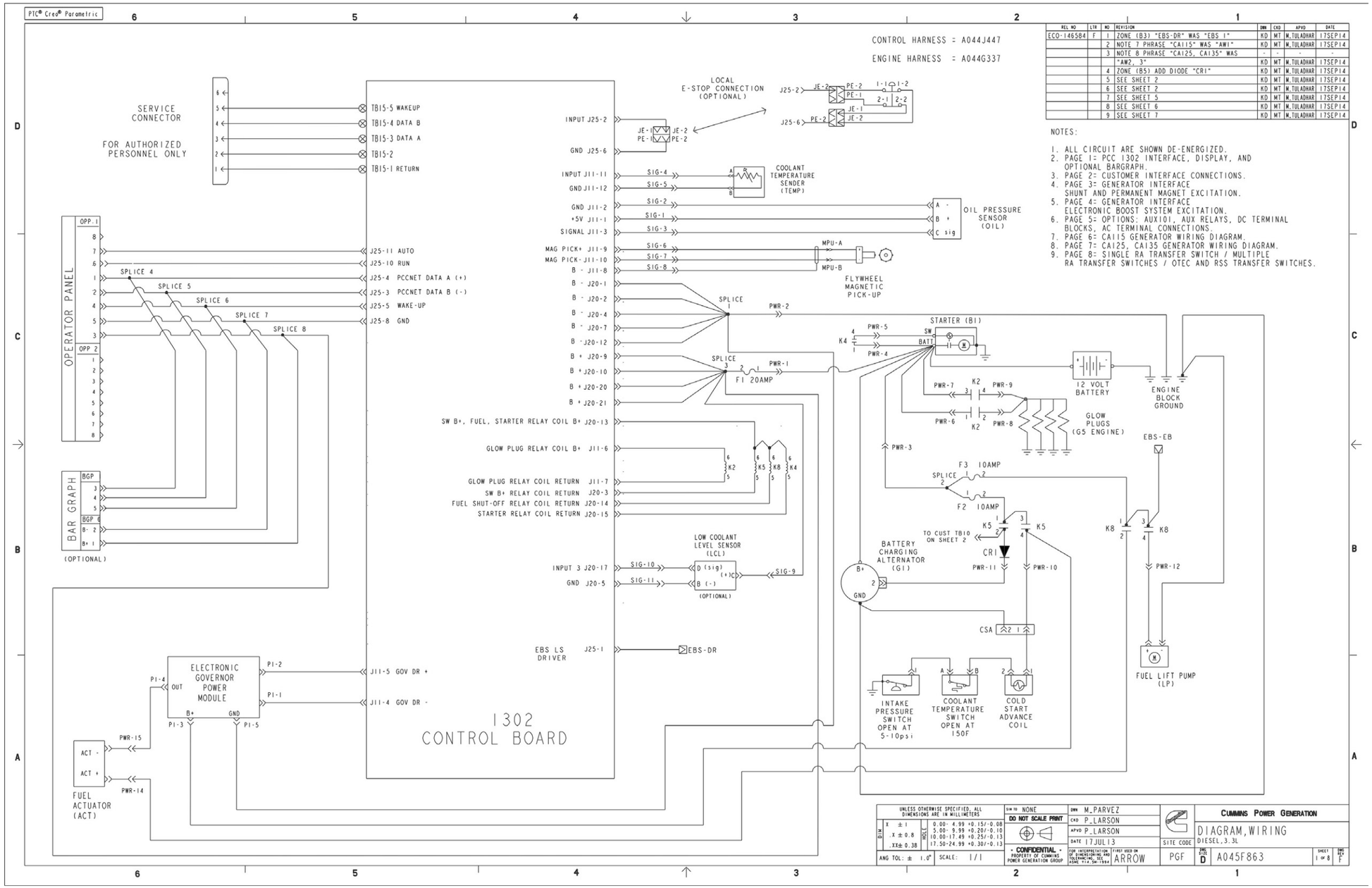


FIGURE 32. WIRING DIAGRAM (SHEET 1 OF 8)

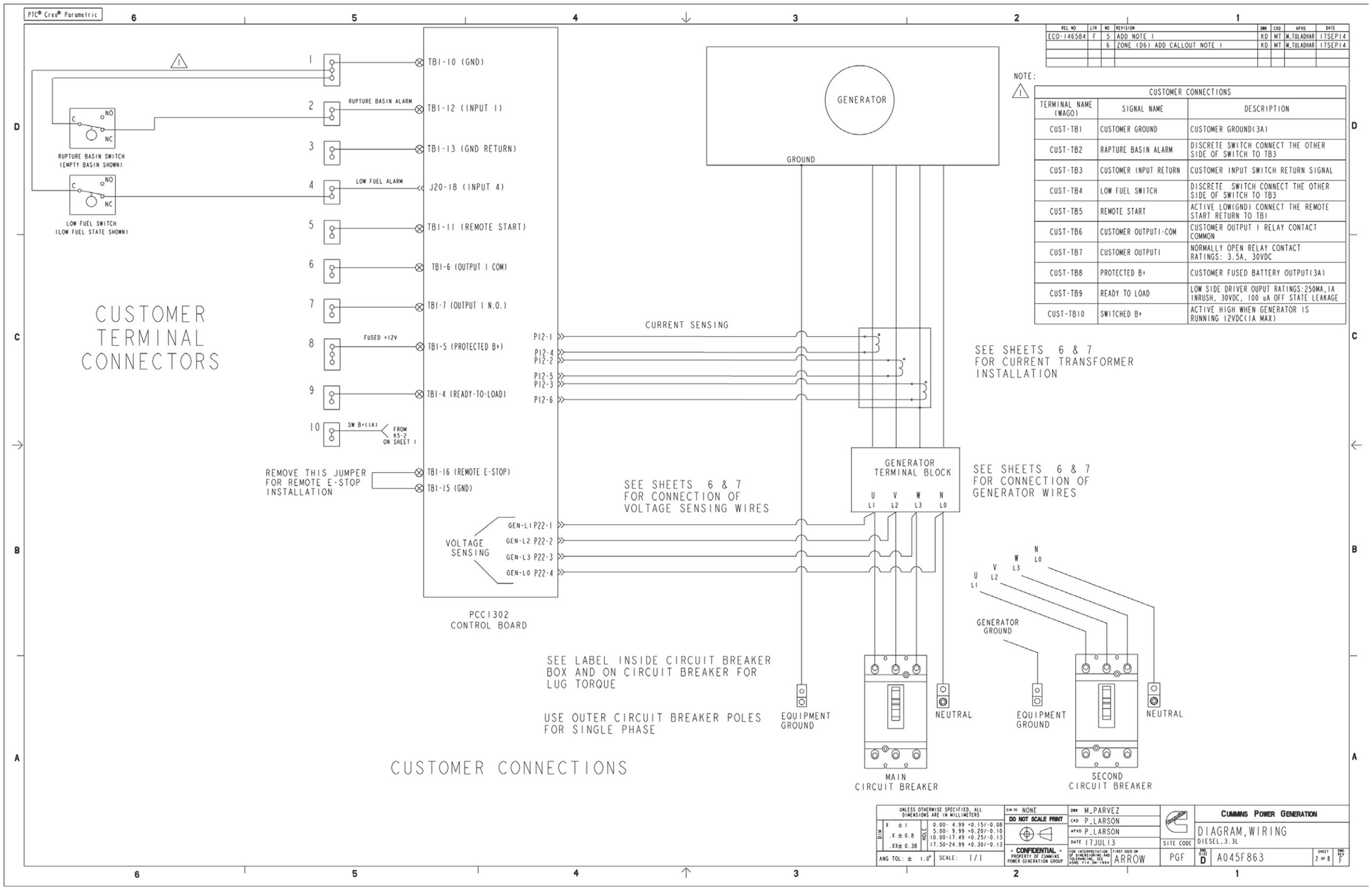


FIGURE 33. WIRING DIAGRAM (SHEET 2 OF 8)

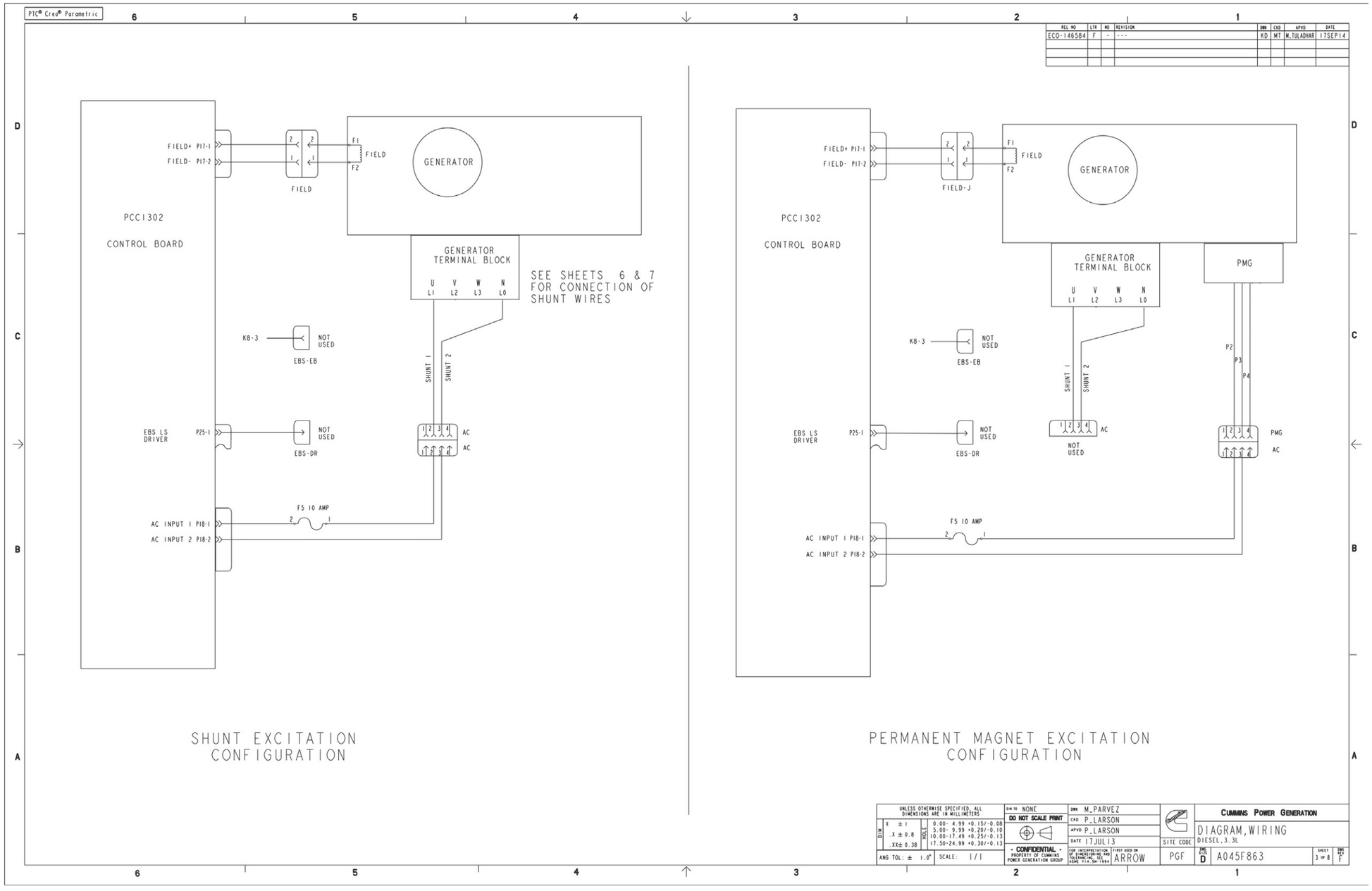


FIGURE 34. WIRING DIAGRAM (SHEET 3 OF 8)

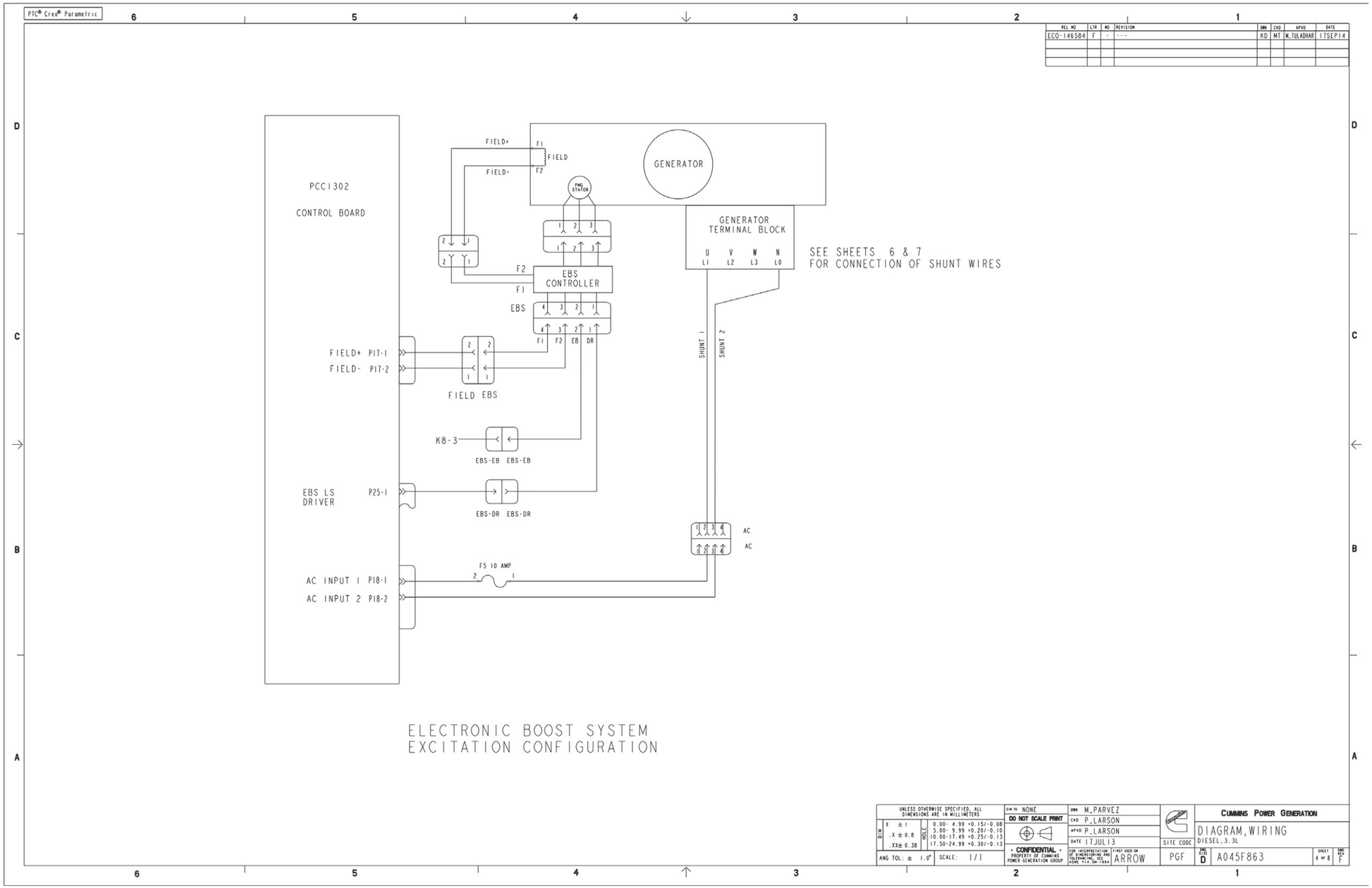


FIGURE 35. WIRING DIAGRAM (SHEET 4 OF 8)

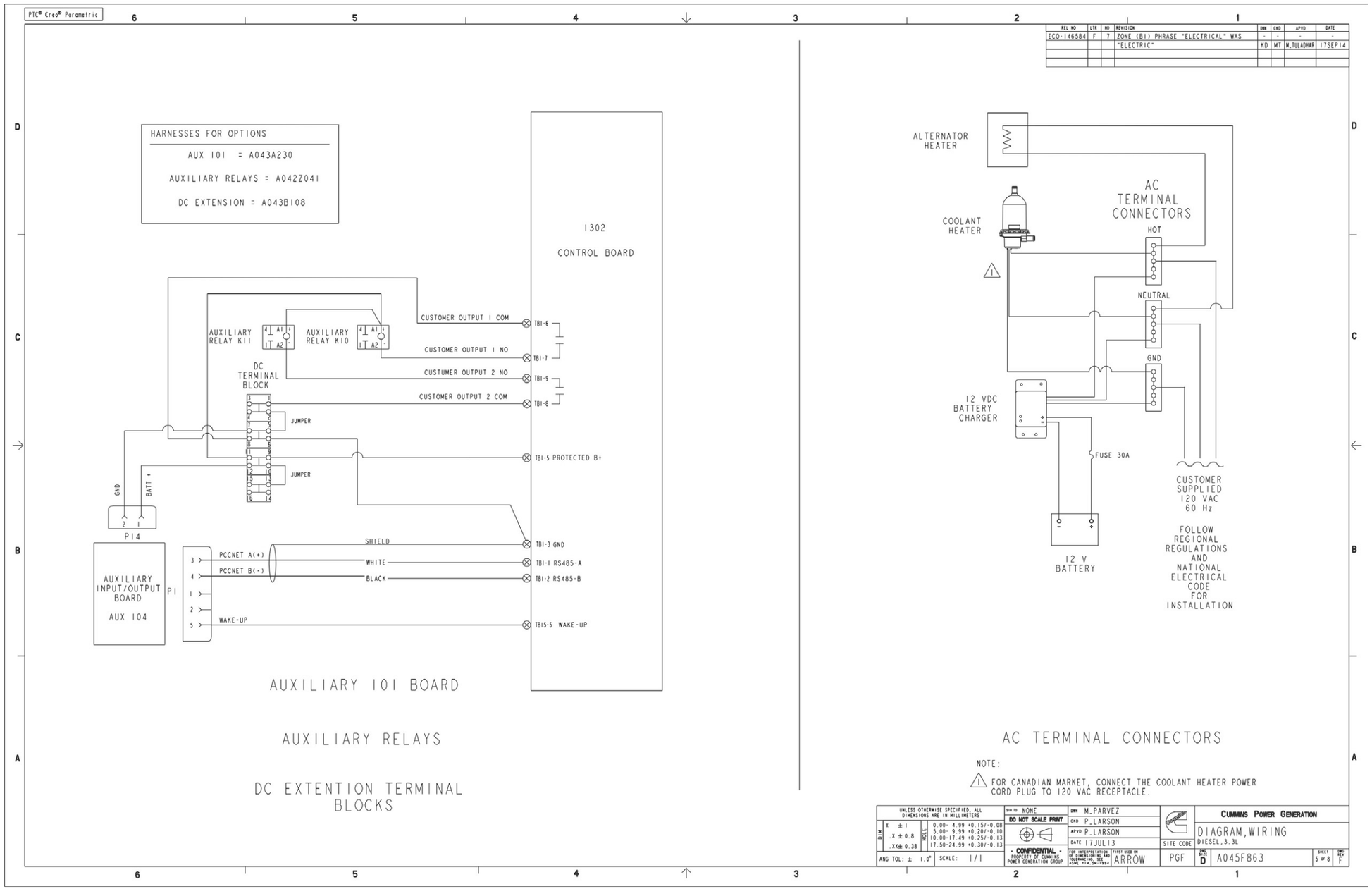


FIGURE 36. WIRING DIAGRAM (SHEET 5 OF 8)

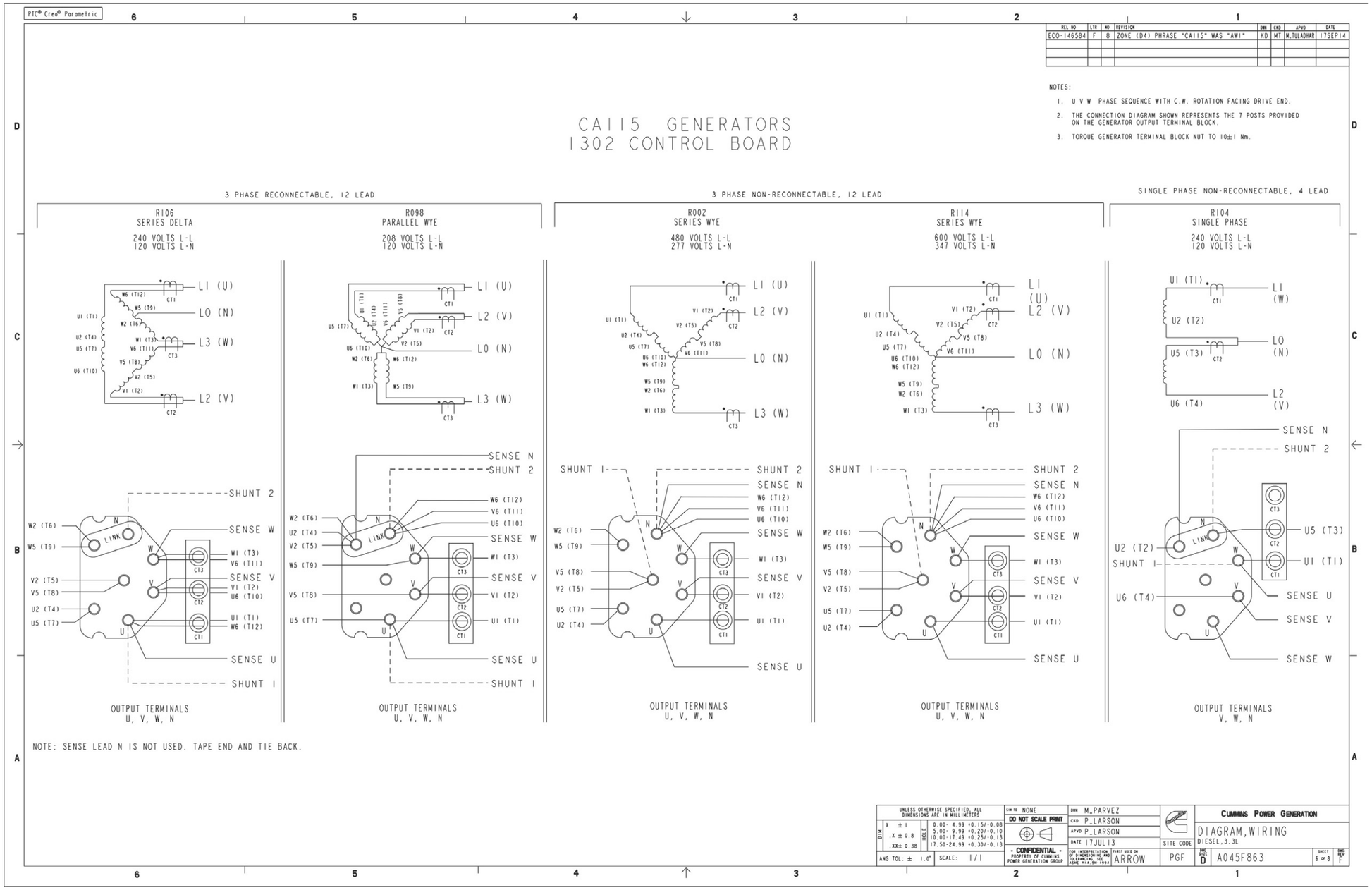


FIGURE 37. WIRING DIAGRAM (SHEET 6 OF 8)

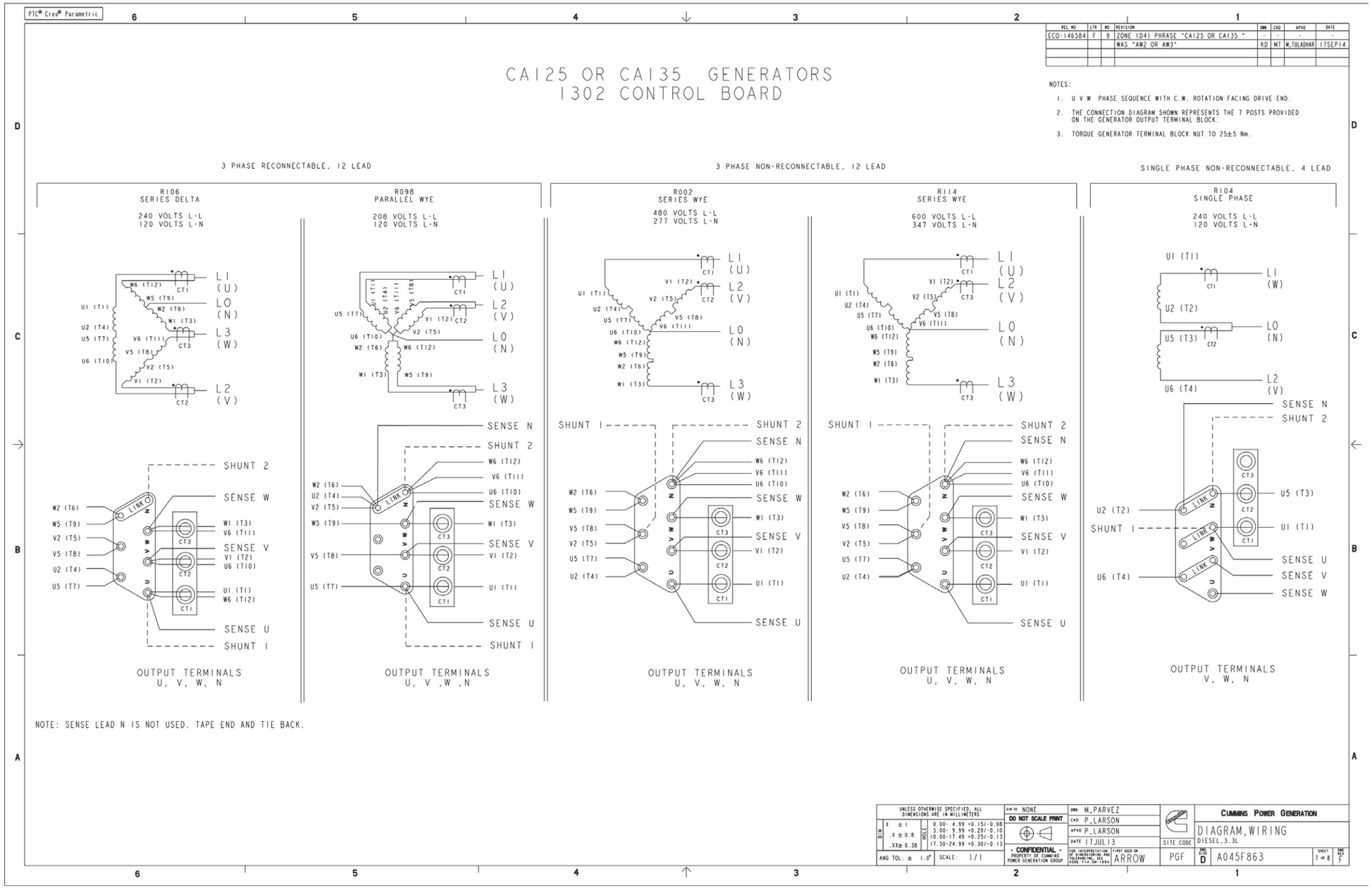


FIGURE 38. WIRING DIAGRAM (SHEET 7 OF 8)

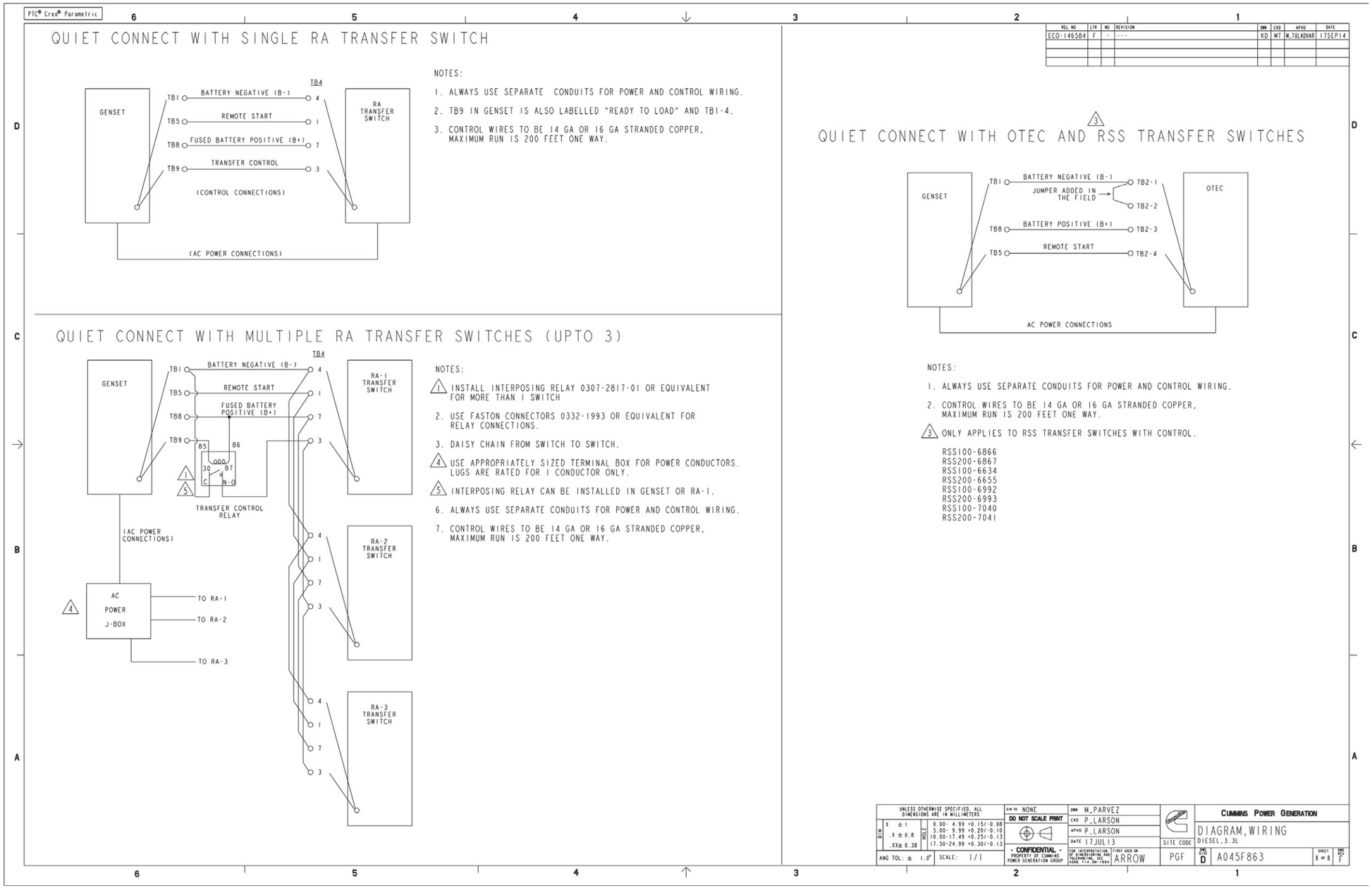


FIGURE 39. WIRING DIAGRAM (SHEET 8 OF 8)

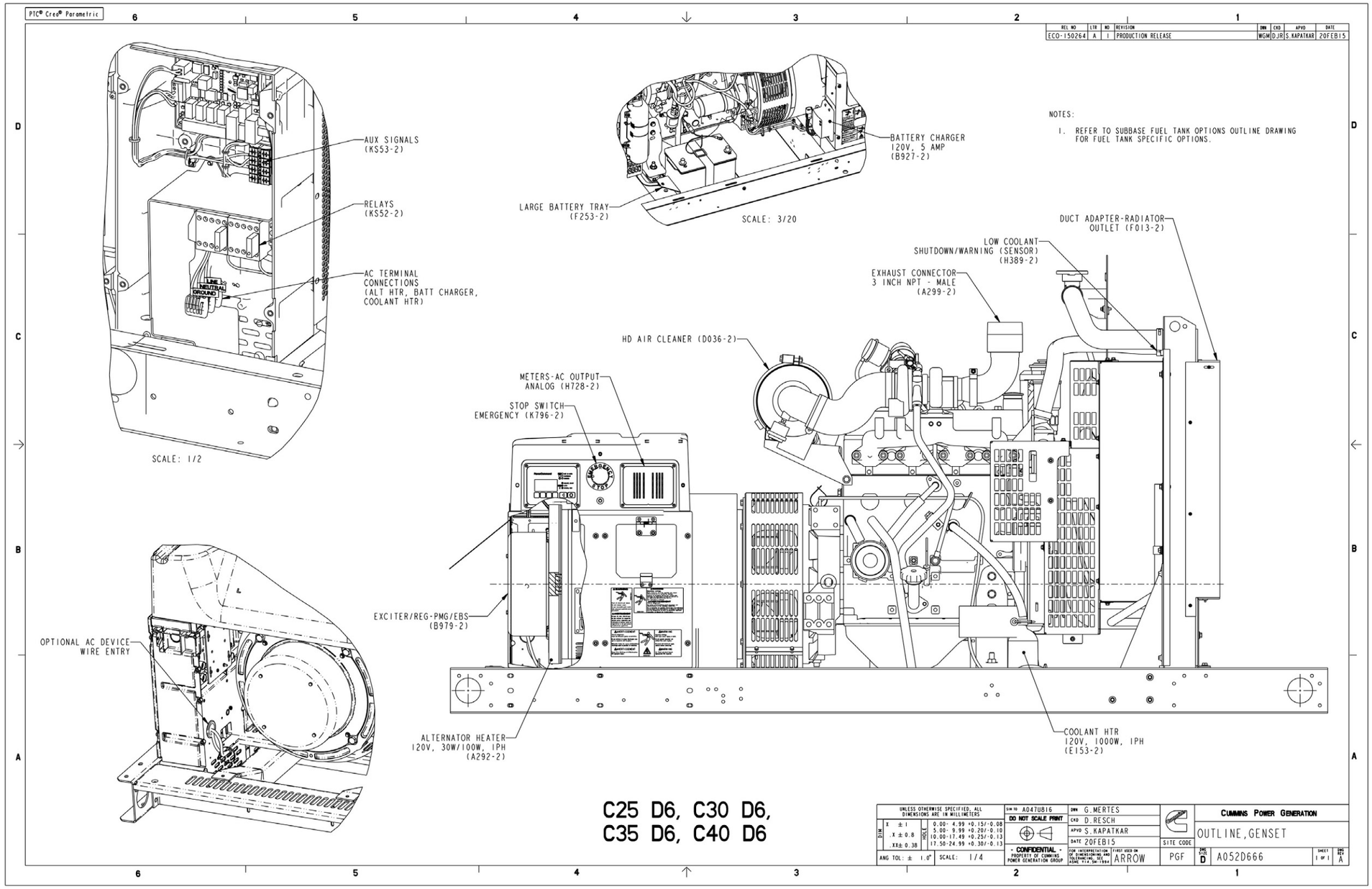


FIGURE 40. OUTLINE DRAWING (SHEET 1 OF 1)

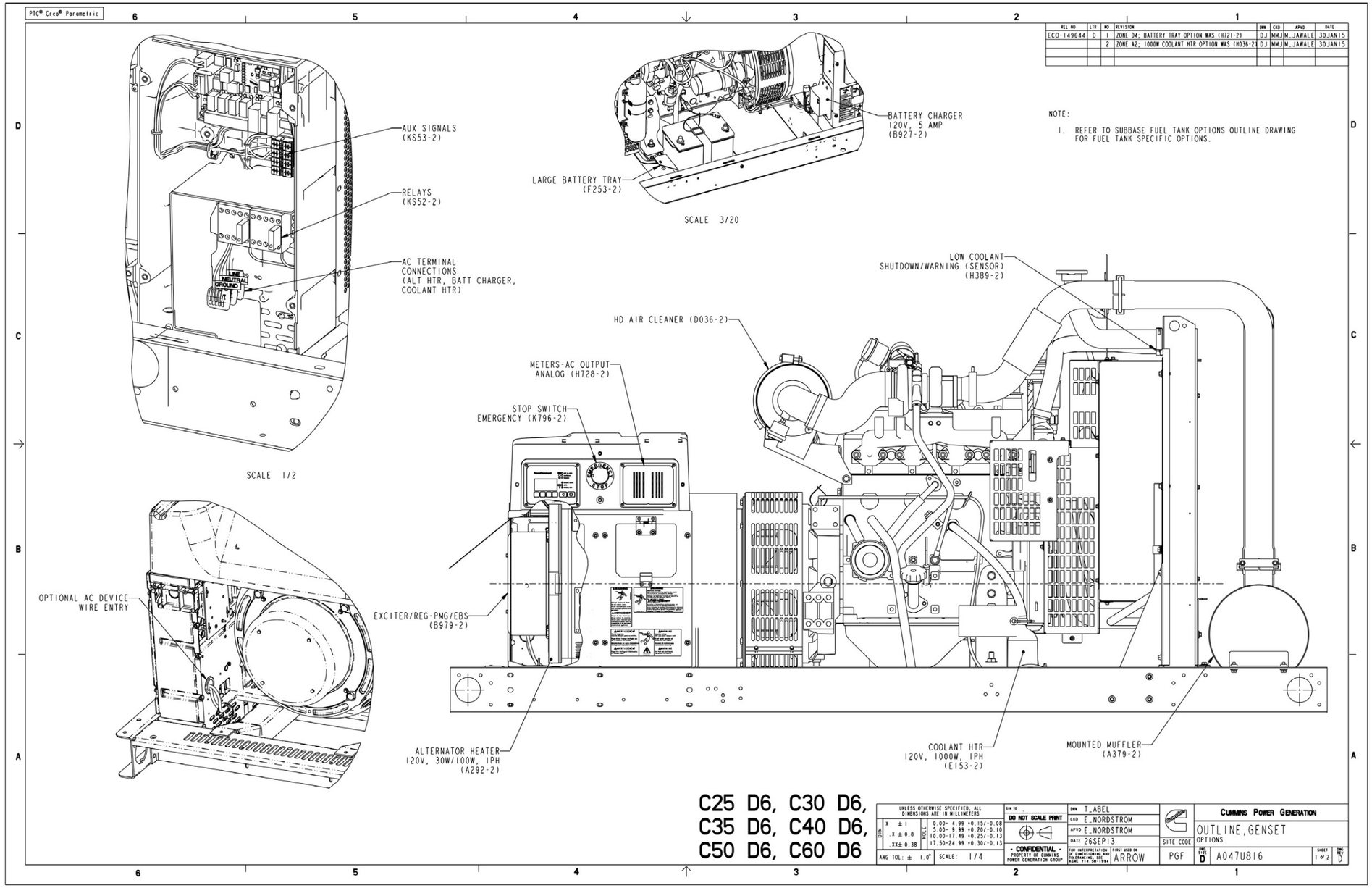


FIGURE 41. OUTLINE DRAWING (SHEET 1 OF 2)

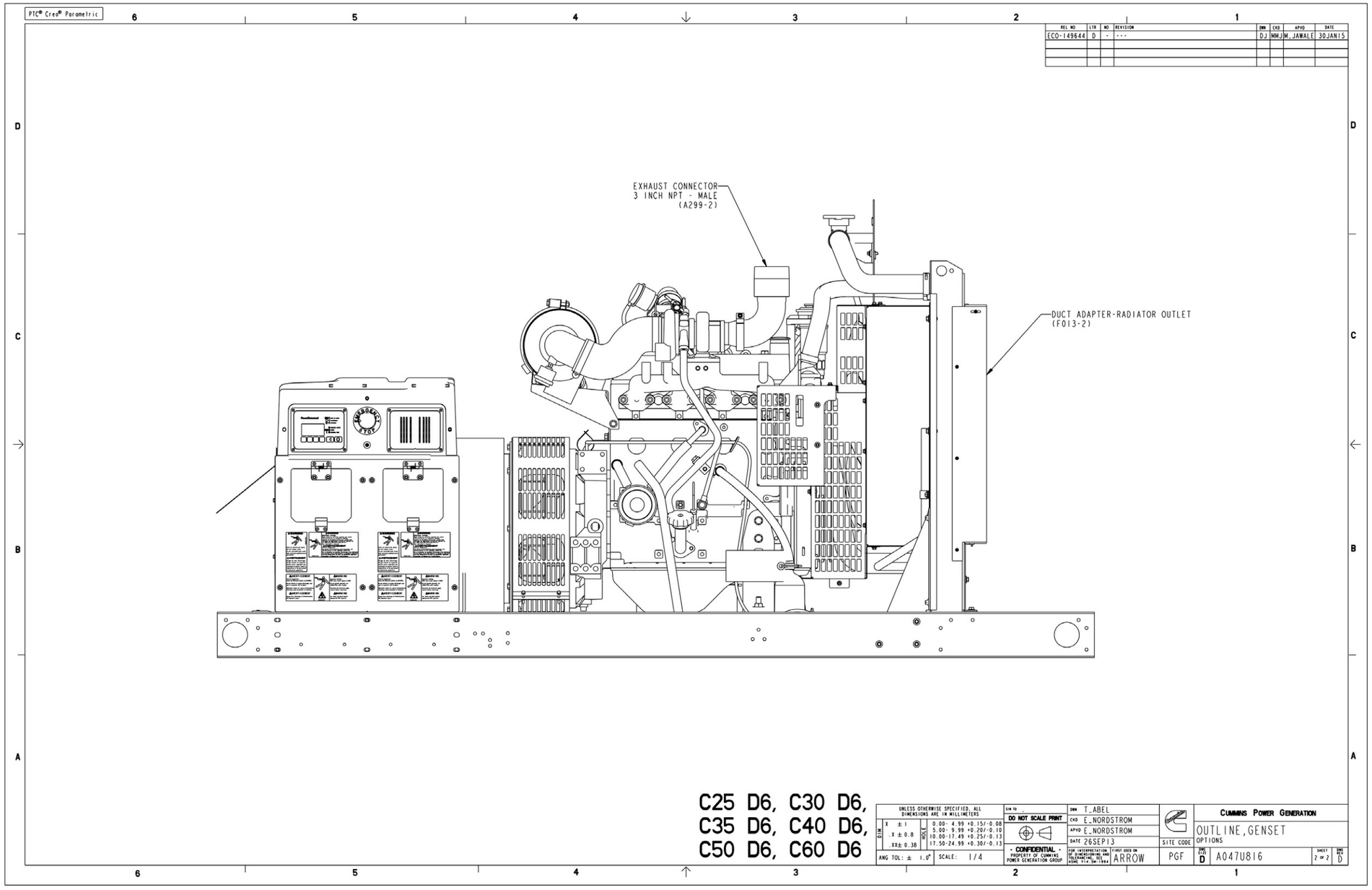


FIGURE 42. OUTLINE DRAWING (SHEET 2 OF 2)

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Appendix C. Seismic Requirements

Table of Contents

The drawings included in this section are representative. For current complete information, refer to the drawing package that was shipped with the unit.

C.1 Seismic Installation Instructions

REL NO	LTR	NO	REVISION	DRN	CKD	APVD	DATE
ECO-142491	F	1	UPDATED DRAWING-SEE ECO	PT	NK	D.GILLETT	27MAR14
		2	ADD SHEET 6	PT	NK	D.GILLETT	27MAR14
		3	ADD SHEET 7	PT	NK	D.GILLETT	27MAR14

SEISMIC INSTALLATIONS NOTES:

1. THE DESIGN OF POST-INSTALLED ANCHORS IN CONCRETE USED FOR THE COMPONENT ANCHORAGE IS PRE-QUALIFIED FOR SEISMIC APPLICATIONS IN ACCORDANCE WITH "ACI 355.2-07" AND DOCUMENTED IN A REPORT BY A REPUTABLE TESTING AGENCY. (EX. THE EVALUATION SERVICE REPORT ISSUED BY THE INTERNATIONAL CODE COUNCIL)

2. ANCHORS MUST BE INSTALLED TO AN EMBEDMENT DEPTH AS RECOMMENDED IN THE PRE-QUALIFICATION TEST REPORT AS DEFINED IN NOTE 1. FOR "CBC 2013" APPLICATIONS.

3. ANCHORS MUST BE INSTALLED IN MINIMUM 3000 PSI COMPRESSIVE STRENGTH NORMAL WEIGHT STRUCTURAL CONCRETE. CONCRETE AGGREGATE MUST COMPLY WITH "ASTM C33".

4. ANCHORS MUST BE INSTALLED TO THE TORQUE SPECIFICATION AS RECOMMENDED BY THE ANCHOR MANUFACTURER.

5. ANCHORS MUST BE INSTALLED IN LOCATIONS SPECIFIED ON THIS INSTALLATION DRAWING.

6. WASHERS MUST BE INSTALLED AT EACH ANCHOR LOCATION BETWEEN THE ANCHOR HEAD AND EQUIPMENT FOR TENSION LOAD DISTRIBUTION. WASHERS MUST BE TYPE A OR B PLAIN WASHERS MEETING ASME B18.21.1-2009. WASHER SIZE TO MATCH ANCHOR DIAMETER.

7. CONCRETE FLOOR SLAB AND CONCRETE HOUSEKEEPING PADS MUST BE DESIGNED AND REBAR REINFORCED FOR SEISMIC APPLICATIONS IN ACCORDANCE WITH "ACI 318-11".

8. ALL HOUSEKEEPING PAD THICKNESSES MUST BE DESIGNED IN ACCORDANCE WITH THE PRE-QUALIFICATION TEST REPORT AS DEFINED IN NOTE 1 OR A MINIMUM OF 1.5X THE ANCHOR EMBEDMENT DEPTH, WHICHEVER IS LARGEST (UNLESS NOTED OTHERWISE).

9. ALL HOUSEKEEPING PADS MUST BE DOWELLED OR CAST INTO THE BUILDING STRUCTURAL FLOOR SLAB AND DESIGNED FOR SEISMIC APPLICATION PER "ACI 318-11" AND AS APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.

10. (NOTE REMOVED)

11. FLOOR MOUNTED EQUIPMENT (WITH OR WITHOUT A HOUSEKEEPING PAD) MUST BE INSTALLED TO A STEEL REINFORCED STRUCTURAL CONCRETE FLOOR THAT IS SEISMICALLY DESIGNED AND APPROVED BY THE ENGINEER OF RECORD TO RESIST ALL LOADS FROM EQUIPMENT BEING ANCHORED TO THE FLOOR.

12. COORDINATE REINFORCEMENT OF SUPPORT STRUCTURE WITH EQUIPMENT ANCHOR LOCATIONS.

13. ATTACHING SEISMIC CERTIFIED EQUIPMENT TO FLOOR OTHER THAN THOSE DESIGNED TO ACCEPT THE SEISMIC LOADS FROM CERTIFIED EQUIPMENT BY THE STRUCTURAL ENGINEER OF RECORD IS PROHIBITED.

14. (NOTE REMOVED)

15. (NOTE REMOVED)

16. INSTALLATION ONTO A STEEL ROOF STRUCTURE OR MANUFACTURED STEEL CURB SHALL BE COORDINATED WITH THE STRUCTURAL ENGINEER OF RECORD.

17. (NOTE REMOVED)

18. CONNECTIONS TO THE EQUIPMENT, INCLUDING BUT NOT LIMITED TO CONDUIT, WIRING FROM CABLE TRAYS, OTHER ELECTRICAL SERVICES OR OTHER CONNECTIONS, ARE THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR AND BEYOND THE SCOPE OF THIS DOCUMENT. FLEXIBLE ATTACHMENTS MUST BE USED FOR SEISMIC CONNECTIONS TO ISOLATED COMPONENTS OR ISOLATED EQUIPMENT. THE FLEXIBLE ATTACHMENT MUST PROVIDE FOR ENOUGH RELATIVE DISPLACEMENT TO REMAIN CONNECTED TO THE EQUIPMENT AND FUNCTIONAL DURING AND AFTER A SEISMIC EVENT.

-THIS IS A CONTROLLED ITEM-
PER CPG PROCEDURE FRE-1002
TO MAINTAIN COMPLIANCE WITH REQUIREMENTS OF THE CODES, STANDARDS, OR AGENCIES LISTED BELOW
☐CSA ☐UL ☐CE ☐RINA ☐ABYC
☑IBC ☑OTHER OSHPD ☐OTHER ☐OTHER
PROCESS, SPECIFICATIONS, OR SUBSTITUTIONS OF MATERIAL, SHALL BE APPROVED BY THE FOLLOWING CONTROLLED ITEM APPROVER
RESPONSIBLE CHA ROLE Seismic
RESPONSIBLE CHA ROLE
RESPONSIBLE CHA ROLE

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS
DIM: X ±1 | .X ±0.8 | .XX± 0.38
DECI: 0.00- 4.99 +0.15/-0.08 | 5.00- 9.99 +0.20/-0.10 | 10.00-17.49 +0.25/-0.13 | 17.50-24.99 +0.30/-0.13
ANG TOL: ± 1.0° SCALE: 1/1

SHR TO NONE
DO NOT SCALE PRINT
* CONFIDENTIAL * PROPERTY OF CUMMINS POWER GENERATION GROUP

DRN T.ABEL
CKD T.SORENSON
APVD D.GILLETT
DATE 18JAN13
FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994 | FIRST USED ON ALL

CUMMINS POWER GENERATION
INSTALLATION, GENSET
SEISMIC REQUIREMENTS
SITE CODE PGF
SIZE D | DWG NO A044H911 | SHEET 1 OF 7 | REV

FIGURE 43. SEISMIC INSTALLATION SPECIFICATIONS

REL NO	LTR	NO	REVISION	DRN	CKD	APVD	DATE
ECO-142491	F	1	UPDATED DRAWING-SEE ECO	PT	NK	D.GILLETT	27MAR14

GRADE MOUNTED GENERATOR SETS

CUMMINS GENSET MODEL	CONFIGURATION	ATTACHMENT TO STEEL		ATTACHMENT TO CONCRETE					
		EVALUATION PARAMETERS	STEEL BOLTS	EVALUATION PARAMETERS	CONCRETE ANCHORS	ANCHOR EMBEDMENT	ANCHOR SPACING	DISTANCE TO NEAREST EDGE	CONCRETE SLAB THICKNESS
C20 N6 C22 N6 C25 N6 C30 N6 C36 N6 C40 N6 C30 N6H C36 N6H C40 N6H C45 N6H C50 N6H C60 N6H	GENERATOR SET WITH OR WITHOUT ENCLOSURE	CBC 2013/IBC 2012 Sds <= 2.5 Ip <= 1.5 ap/Rp <= 2.5/2.0 z/h = 0	(QTY 4) 5/8" DIAMETER ASTM 307 BOLTS WITH WASHER THROUGH THE BASE RAIL MOUNTING HOLES.	CBC 2013/IBC 2012 Sds <= 2.5 Ip <= 1.5 ap/Rp <= 2.5/2.0 z/h = 0 Ω = 2.5	(QTY 4) 5/8" DIAMETER HILTI KB-TZ EXPANSION ANCHORS (ICC-ESR-1917) WITH WASHERS THROUGH BASE RAIL MOUNTING HOLES.	3-1/8" MINIMUM	4-3/4" MINIMUM	6" MINIMUM	5" MINIMUM

ROOF MOUNTED GENERATOR SETS

CUMMINS GENSET MODEL	CONFIGURATION	ATTACHMENT TO STEEL	
		EVALUATION PARAMETERS	STEEL BOLTS
C20 N6 C22 N6 C25 N6 C30 N6 C36 N6 C40 N6 C30 N6H C36 N6H C40 N6H C45 N6H C50 N6H C60 N6H	GENERATOR SET WITH OR WITHOUT ENCLOSURE	CBC 2013/IBC 2012 Sds <= 2.5 Ip <= 1.5 ap/Rp <= 2.5/2.0 z/h <= 1	(QTY 4) 5/8" DIAMETER ASTM 307 BOLTS WITH WASHERS THROUGH THE BASE RAIL MOUNTING HOLES.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS
DIM: X ±1 | .X ±0.8 | .XX± 0.38
DECIMAL: 0.00- 4.99 +0.15/-0.08 | 5.00- 9.99 +0.20/-0.10 | 10.00-17.49 +0.25/-0.13 | 17.50-24.99 +0.30/-0.13
ANG TOL: ± 1.0° SCALE: 1/1
SIM TO NONE
DO NOT SCALE PRINT
- CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP
DRN T.ABEL
CKD T.SORENSON
APVD D.GILLETT
DATE 18JAN13
FOR INTERPRETATION OF DIMENSIONS AND TOLERANCES SEE ASME Y14.5M-1994
FIRST USED ON ALL
SITE CODE PGF
CUMMINS POWER GENERATION
INSTALLATION,GENSET
SEISMIC REQUIREMENTS
SIZE D | A044H911 | SHEET 2 of 7 | REV F

FIGURE 44. SEISMIC INSTALLATION NOTES

REL NO	LTR	NO	REVISION	DRN	CKD	APVD	DATE
ECO-142491	F	1	UPDATED DRAWING-SEE ECO	PT	NK	D.GILLETT	27MAR14

GRADE MOUNTED GENERATOR SETS

CUMMINS GENSET MODEL	CONFIGURATION	ATTACHMENT TO STEEL		ATTACHMENT TO CONCRETE					
		EVALUATION PARAMETERS	STEEL BOLTS	EVALUATION PARAMETERS	CONCRETE ANCHORS	ANCHOR EMBEDMENT	ANCHOR SPACING	DISTANCE TO NEAREST EDGE	CONCRETE SLAB THICKNESS
C10 D6 C15 D6 C20 D6 C25 D6 C30 D6 C35 D6 C40 D6 C50 D6 C60 D6	GENERATOR SET WITH OR WITHOUT ENCLOSURE NO FUEL TANK	CBC 2013/IBC 2012 Sds <= 2.5 Ip <= 1.5 ap/Rp <= 2.5/2.0 z/h = 0	(QTY 4) 5/8" DIAMETER ASTM A490 BOLTS WITH WASHERS THROUGH BASE RAIL MOUNTING HOLES.	CBC 2013/IBC 2012 Sds <= 2.5 Ip <= 1.5 ap/Rp <= 2.5/2.0 z/h = 0 Ω = 2.5	(QTY 4) 5/8" DIAMETER HILTI KB-TZ EXPANSION ANCHORS (ICC-ESR-1917) WITH WASHERS THROUGH BASE RAIL MOUNTING HOLES.	4" MINIMUM	4.25" MINIMUM	6" MINIMUM	6" MINIMUM

ROOF MOUNTED GENERATOR SETS

CUMMINS GENSET MODEL	CONFIGURATION	ATTACHMENT TO STEEL		
		EVALUATION PARAMETERS		STEEL BOLTS
C10 D6 C15 D6 C20 D6 C25 D6 C30 D6 C35 D6 C40 D6 C50 D6 C60 D6	GENERATOR SET WITH OR WITHOUT ENCLOSURE, WITH FUEL TANK. FUEL TANKS: A045T328, A045T334, A045T336, A045T330, A045T332, A045D209	GRADE MOUNTED CBC 2013/IBC 2012 Sds <= 2.5 Ip <= 1.5 ap/Rp <= 2.5/2.0 z/h = 0	ROOF MOUNTED CBC 2013/IBC 2012 Sds <= 2.0 Ip <= 1.5 ap/Rp <= 2.5/2.0 z/h <= 1	(QTY 4) 5/8" DIAMETER ASTM A490 BOLTS WITH WASHERS THROUGH BASE RAIL MOUNTING HOLES OR FUEL TANK MOUNTING HOLES
C25 D6 C30 D6 C35 D6 C40 D6 C50 D6 C60 D6	GENERATOR SET WITH OR WITHOUT ENCLOSURE, WITH FUEL TANK. FUEL TANKS: A045T340, A045T342, A045T344, A046U786, A046U828	GRADE MOUNTED CBC 2013/IBC 2012 Sds <= 2.5 Ip <= 1.5 ap/Rp <= 2.5/2.0 z/h = 0	ROOF MOUNTED CBC 2013/IBC 2012 Sds <= 2.0 Ip <= 1.5 ap/Rp <= 2.5/2.0 z/h <= 1	(QTY 6) 5/8" DIAMETER ASTM A490 BOLTS WITH WASHERS THROUGH BASE RAIL MOUNTING HOLES OR FUEL TANK MOUNTING HOLES

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS
DIM: X ±1 | .X ±0.8 | .XX± 0.38
HOLE: 0.00- 4.99 +0.15/-0.08 | 5.00- 9.99 +0.20/-0.10 | 10.00-17.49 +0.25/-0.13 | 17.50-24.99 +0.30/-0.13
ANG TOL: ± 1.0° SCALE: 1/1
SURF TO NONE
DO NOT SCALE PRINT
- CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP
DRN T.ABEL
CKD T.SORENSON
APVD D.GILLETT
DATE 18JAN13
FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, REF. ASME Y14.5M-1994
FIRST USED ON ALL
SITE CODE PGF
CUMMINS POWER GENERATION
INSTALLATION, GENSET
SEISMIC REQUIREMENTS
SIZE D | A044H911 | SHEET 3 of 7 | REV F

FIGURE 45. SEISMIC INSTALLATION REQUIREMENTS

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