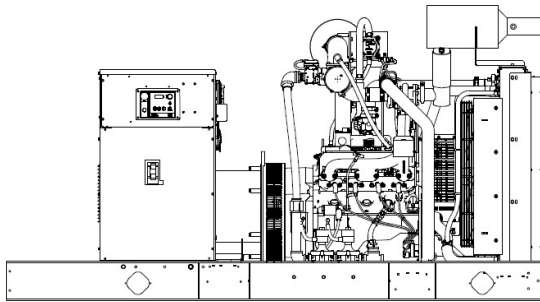

Generator



Kohler Model: **KG100**

This gas generator set equipped with a 4R12X alternator operating at 277/480 volts is rated for 100 kW/125 kVA. Output amperage: 151

Standard Features:

- EPA-Certified for Stationary Emergency Applications
- Discovery Energy, LLC and its affiliates dba Rehlko provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a cULus listing.
- CSA approval is available.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- The generator set accepts rated load in one step.
- A one-year limited warranty covers all generator set systems and components. Two-and five-year extended limited warranties are also available.
- Natural gas, LP gas, and dual fuel models are available.
- Air Cleaner Restrictor Indicator
- Alternator Protection
- Battery Rack and Cables
- Electronic, Isochronous Governor
- Gas Fuel System
- Integral Vibration Isolation
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Lit

Alternator Features:

- Open Unit Accessory Kit
- The unique Fast-Response™ X excitation system delivers excellent voltage response and short-circuit capability using a rare-earth, permanent magnet (PM)-excited alternator.
- The brushless, rotating-field alternator has broad range reconnectability.

Other Features:

**Woodstock Power Company**

4055 Richmond Street
Philadelphia, PA 19137

P: 610-658-3242

W: www.woodstockpower.com

E: sales@woodstockpower.com

Qty**Description****KG100 Generator System**

1

KG100 Generator Set

Includes the following:

Literature Languages

Approvals and Listings

Engine

Nameplate Rating

Voltage

Alternator

Cooling System

Skid and Mounting

Air Intake

Controller

Enclosure Type

Enclosure Material

Starting Aids, Installed

Electrical Accy., Installed

Electrical Accy., Installed

Electrical Accy., Installed

Electrical Accy., Installed

Rating, LCB 1

Amps, LCB 1

Trip Type, LCB 1

Interrupt Rating LCB 1

Miscellaneous Accy, Installed

Warranty

Testing, Additional

1

Flexible Fuel Line (Nat/LP)

English

UL2200 Listing/cUL Genset List

SnglFuel, UL, PreAlarm, NG, Stdby

Standby 130C Rise

60Hz, 277/480V, Wye, 3Ph, 4W

4R12X

Unit Mounted Radiator, 50C

Skid, 44"

Standard Duty

APM402

Weather

Steel

1500W, 110-120V

Battery, 1/12V, Wet

Battery Charger, 6A

Run Relay

2 Input/5 Output Module

100% Rated

150

Thermal Magnetic

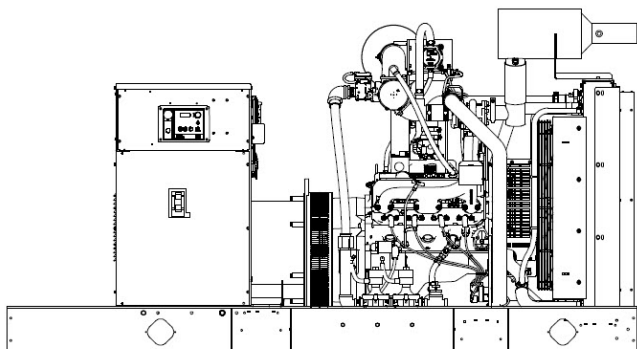
18kA at 480V

Coolant in Genset

5 Year Comprehensive

Power Factor Test, 0.8, 3Ph Only

Spec Sheets



Standard Features

- EPA-Certified for Stationary Emergency Applications
- Discovery Energy, LLC and its affiliates dba Rehlko provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a cULus listing.
- CSA approval is available.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- The generator set accepts rated load in one step.
- A one-year limited warranty covers all generator set systems and components. Two-and five-year extended limited warranties are also available.
- Natural gas, LP gas, and dual fuel models are available.
- Air Cleaner Restrictor Indicator
- Alternator Protection
- Battery Rack and Cables
- Electronic, Isochronous Governor
- Gas Fuel System
- Integral Vibration Isolation
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Literature

Alternator Features

- Open Unit Accessory Kit
- The unique Fast-Response™ X excitation system delivers excellent voltage response and short-circuit capability using a rare-earth, permanent magnet (PM)-excited alternator.
- The brushless, rotating-field alternator has broad range reconnectability.

Generator Set Rating

Alternator	Voltage	Ph	Hz	Peak kVA	Standby 130C Rise Ratings	
					kW/kVA	Amps
4R12X	277/480	3	60	448	100/125	151

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor.

Standby Ratings: The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For

For limited running time and continuous ratings, consult the factory. Obtain technical information bulletin (TIB-101) for ratings guidelines, complete ratings definitions, and site condition derates.

The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

For dual fuel engines, use the natural gas ratings for both the primary and secondary fuels.

Model: KG100, continued

Alternator Specifications

Specifications	Alternator
Alternator manufacturer	Rehlko
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Rare-Earth Permanent-Magnet
Leads, quantity	4RX: 12, Reconnectable, 4TX: 4, 110-120/220-240 V
Voltage regulator	Solid State, Volts/Hz
Insulation	NEMA MG1
Insulation: Material	Class H
Insulation: Temperature Rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load Permanent magnet (PM) alternator	Controller Dependent
One-Step Load Acceptance	100% of rating
Unbalanced load capability	100% of Rated Standby Current
• The unique Fast-Response X excitation system delivers excellent voltage response and short-circuit capability using a rare-earth, permanent magnet (PM) -excited alternator. • The brushless, rotating-field alternator has broadrange reconnectability. • NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting. • Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds. • Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field. • Self-ventilated and dripproof construction. • Superior voltage waveform from two-thirds pitch windings and skewed stator. • Windings are vacuum-impregnated with epoxy varnish for dependability and long life.	

Engine

Engine Specification

Engine Manufacturer	Kohler
Engine Model	KG6208THD 6.2L
Engine: type	Turbocharged, Aftercooled
Cylinder arrangement	V-8
Displacement, L (cu. in.)	6.2 (378)
Bore and stroke, mm (in.)	101.6 x 95.25 (4.00 x 3.75)
Compression ratio	9.8:1
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	152 (204)
Cylinder head material	Cast Aluminum
Piston: type, material	Cast Aluminum
Crankshaft material	Forged Steel
Valve (exhaust) material	Forged Steel
Governor: type, make/model	Electronic
Frequency regulation, no-load to-full load	Isochronous
Frequency regulation, steady state	±1.0%
Frequency	Fixed
Air cleaner type, all models	Dry

Model: KG100, continued

Exhaust

Exhaust System

Exhaust Manifold Type	Dry
Exhaust flow at rated kW, m3/min. (cfm)	24 (848)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	700 (1292)
Maximum allowable back pressure, kPa (in. Hg)	14.9 (4.4)

Engine Electrical

Engine Electrical System

Ignition system	Coil Pack
Battery charging alternator: Ground (negative/positive)	Negative
Battery charging alternator: Volts (DC)	12
Battery charging alternator: Ampere rating	130
Starter motor rated voltage (DC)	12
Battery, recommended cold cranking amps (CCA): Qty., CCA rating each	One, 650
Battery voltage (DC)	12

Fuel

Fuel System

Fuel type	Natural Gas
Fuel supply line inlet	1.5 NPT
Natural gas/LPG fuel supply pressure, kPa (in. H2O). Fuel supply pressure measured at the generator set fuel inlet downstream of any fuel system equipment accessories.	1.74-2.74 (7.11)

Fuel Composition

Fuel Composition

Natural Gas: Methane, % by volume	90 min.
Natural Gas: Ethane, % by volume	4.0 max.
Natural Gas: Propane, % by volume	1.0 max.
Natural Gas: Propene, % by volume	0.1 max.
Natural Gas: C4 and higher, % by volume	0.3 max.
Natural Gas: Sulfur, ppm mass	25 max.
Natural Gas: Lower heating value, kJ/m3 (Btu/ft3), min.	33.2 (890)

* Fuels with other compositions may be acceptable. If your fuel is outside the listed specifications, contact your local distributor for further analysis and advice.

Lubrication

Lubrication System

Type	Full Pressure
Oil pan capacity, L (qt.)	5.7 (6.0)
Oil pan capacity with filter, L (qt.)	9.0 (9.5)
Oil filter: quantity, type	1, Cartridge

Model: KG100, continued

Cooling

Radiator System

Ambient temperature, °C (°F)	50 (122)
Engine jacket water capacity, L (gal.)	7.3 (1.93)
Radiator system capacity, including engine, L (gal.)	28.4 (7.5)
Engine jacket water flow, Lpm (gpm)	126 (33.3)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	73.9 (4207)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	711 (28)
Fan, kWm (HP)	12 (16.1)
Max. restriction of cooling air, intake and discharge side of radiator, kPA (in. H ₂ O)	0.125 (0.5)
* Enclosure with internal silencer reduces ambient temperature capability by 5°C (9°F).	

Operation Requirements

Air Requirements

Radiator-cooled cooling air, m ³ /min. (scfm) *	290 (10241)
Combustion air, m ³ /min. (cfm)	6.9 (244)
Heat rejected to ambient air: Engine, kW (Btu/min.)	30 (1708)
Heat rejected to ambient air: Alternator, kW (Btu/min.)	8 (455)

*Air density = 1.20 kg/m³ (0.075 lbm/ft³)

Fuel Consumption

Natural Gas, m ³ /hr. (cfh) at % load	Rating
Standby Fuel Consumption at 100% load	41.7 m ³ /hr. (1473 cfh)
Standby Fuel Consumption at 75% load	34.7 m ³ /hr. (1224 cfh)
Standby Fuel Consumption at 50% load	26.8 m ³ /hr. (946 cfh)
Standby Fuel Consumption at 25% load	17.7 m ³ /hr. (625 cfh)
Standby Fuel Consumption at 0% load	8.3 m ³ /hr. (292 cfh)



APM402

APM402 Controller

General Description and Function

The APM402 generator set controller provides advanced control, system monitoring, and system diagnostics for optimum performance.

The APM402 controller meets NFPA 110, Level 1 when equipped with the necessary accessories and installed per NFPA standards.

The APM402 controller uses a patented hybrid voltage regulator and unique software logic to manage alternator thermal overload protection features normally requiring additional hardware.

Additional features include:

- A digital display and pushbutton/rotary selector dial provide easy local access to data.
- Measurements selectable in metric or English units.
- The controller can communicate directly with a personal computer via a network or serial configuration using SiteTech™.
- The controller supports Modbus® protocol. Use with serial bus or Ethernet networks. (Ethernet requires an external Modbus®/Ethernet converter module.)
- Scrolling display shows critical data at a glance.
- Digital display of power metering (kW and kVA).
- Integrated hybrid voltage regulator providing $\pm 0.5\%$ regulation.
- Built-in alternator thermal overload protection.

Modbus® is a registered trademark of Schneider Electric.



User Interface Controls and Components

- Emergency stop switch
- Backlit LCD digital display with two lines of 12 characters (see *User Interface Displays* for menus)
- Alarm horn indicates generator set shutdown and warning faults
- Environmentally sealed membrane keypad with three master control buttons with lights
 - Off/Reset (red)
 - Auto (green)
 - Run (yellow)
- Pushbutton/rotary selector dial for menu navigation
 - Rotate dial to access main menus
 - Push dial and rotate to access sub menus
 - Press dial for 3 seconds to return to top of main menu
- Annunciator fault light
 - System shutdown (red)
 - System warning (yellow)
- Alarm silence/lamp test button
 - Alarm silence
 - Lamp test
- USB and RS-485 connections
 - Allows software upgrades
 - Provides access for diagnostics
 - PC communication using SiteTech™
- Dedicated user inputs
 - Remote emergency stop switch
 - Remote 2-wire start for transfer switch
 - Auxiliary shutdown
- Integrated hybrid voltage regulator
- Auto-resettable circuit protection mounted on circuit board.
- One relay output standard. Optional five relay output available.
- One analog and three digital inputs standard. Optional two inputs available.

NFPA 110 Requirements

- In order to meet NFPA 110, Level 1 requirements, the generator set controller monitors the engine/generator functions/faults shown below. Engine functions:
 - Overcrank
 - Low coolant temperature warning
 - High coolant temperature warning
 - High coolant temperature shutdown
 - Low oil pressure shutdown
 - Low oil pressure warning
 - High engine speed
 - Low fuel (level or pressure) *
 - Low coolant level
 - EPS supplying load
 - High battery voltage
 - Low battery voltage
- General functions:
 - Master switch not in auto
 - Battery charger fault *
 - Lamp test
 - Contacts for local and remote common alarm
 - Audible alarm silence button
 - Remote emergency stop *

* Function requires optional input sensors or kits and is engine dependent, see Controller Displays as Provided by the Engine ECM.

User Interface Displays

The listing below has • denoting main menus and ◦ denoting sub-menus.

- Overview
 - Software version
 - Active shutdowns and warnings (if any are present)
 - Engine run time, total hours
 - Average voltage line-to-line
 - Frequency
 - Average current
 - Coolant temperature
 - Fuel level or pressure *
 - Oil pressure
 - Battery voltage
- Engine Metering
 - Engine speed
 - Oil pressure
 - Coolant temperature
 - Battery voltage
- Generator Metering
 - Total power, VA
 - Total power, W
 - Rated power, %
 - Voltage, L- L and L- N for all phases
 - Current, L1, L2, L3
 - Frequency
- GenSet Information
 - Generator set model number
 - Generator set serial number
 - Controller serial number
- GenSet Run Time
 - Engine run time, total hours
 - Engine loaded, hours
 - Number of engine starts
 - Total energy, kWh
- GenSet System
 - System voltage
 - System frequency, 50 or 60 Hz
 - System phase, single or three (wye or delta)
 - Power rating, kW
 - Amp rating
 - Power type, standby or prime
 - Measurement units, metric or English (user selectable)
 - Alarm silence, always or auto only (NFPA 110)
 - Manual speed adjust *
- GenSet Calibration
 - Voltage, L-L and L-N for all phases
 - Current, L1, L2, L3
 - Reset calibration
- Voltage Regulation
 - Adjust voltage, ±10%
- Digital Inputs
 - Input settings and status
- Digital Outputs
 - Output settings and status
- Analog Inputs
 - Input settings and status
- Event Log
 - Event history (stores up to 1000 system events)
- Selector Switch (requires initial activation by SiteTech™)

Controller Features

- **AC Output Voltage Regulator Adjustment.** The voltage adjustment provides a maximum of $\pm 10\%$ of the system voltage.
 - **Alarm Silence.** The controller can be set up to silence the alarm horn only when in the AUTO mode for NFPA-110 application or Always for user convenience.
 - **Alternator Protection.** The controller provides generator set overload and short circuit protection matched to each alternator for the particular voltage/phase configuration.
 - **Automatic Restart.** The controller automatic restart feature initiates the start routine and recrank after a failed start attempt.
 - **Common Failure Relay.** This relay is integrated on the controller circuit board. Contacts are rated 2 amps at 32 VDC or 0.5 amp at 120 VAC.
 - **Communication.** Controller communication is available.
 - **Cyclic Cranking.** The controller has programmable cyclic cranking.
 - **ECM Diagnostics.** The controller displays engine ECM fault code descriptions to help in engine troubleshooting.
 - **Engine Start Aid.** The starting aid feature provides control for an optional engine starting aid.
 - **Event Logging.** The controller keeps a record (up to 1000 entries) for warning and shutdown faults. This fault information becomes a stored record of system events and can be reset.
 - **Historical Data Logging.** Total number of generator set successful starts is recorded and displayed.
 - **Integrated Hybrid Voltage Regulator.** The voltage regulator provides $\pm 0.5\%$ no-load to full-load regulation with three-phase sensing.
 - **Lamp Test.** Press the alarm silence/lamp test button to verify functionality of the indicator lights.
 - **LCD Display.** Adjustable contrast for improving visibility.
 - **Measurement Units.** The controller provides selection of English or metric displays.
 - **Power Metering.** Controller digital display provides kW and kVA.
 - **Programming Access (USB).** Provides software upgrades and diagnostics.
 - **Remote Reset.** The remote reset function resets faults and allows restarting of the generator set without going to the master control switch off/reset position.
 - **Remote Monitoring Panel.** The controller is compatible with the Remote Serial Annunciator.
 - **Run Time Hourmeter.** The generator set run time is displayed.
 - **Time Delay Engine Cooldown (TDEC).** The TDEC provides a time delay before the generator set shuts down.
 - **Time Delay Engine Start (TDES).** The TDES provides a time delay before the generator set starts.
 - **Voltage Selection Menu.** This menu provides the capability of quickly switching controller voltage calibrations. Requires initial activation using SiteTech™ software.
- NOTE:**
Generator set output leads require voltage reconnection.

Controller Functions

The following chart shows which functions cause a warning or shutdown. All functions are available as relay outputs.

Warning causes the fault light to show yellow and sounds the alarm horn signaling an impending problem.

Shutdown causes the fault light to show red, sounds the alarm horn, and stops the generator set.

	Warning Function	Shutdown Function
Engine Functions		
Critically high fuel level *	o	
ECM communication loss		•
ECM diagnostics	•	•
Engine over speed		•†
Engine start aid active		
Engine under speed		•
Fuel tank leak *	o	o
High battery voltage	•	
High coolant temperature	•	•†
High fuel level *	o	
Low battery voltage	•	
Low coolant level		•
Low coolant temperature	•	
Low cranking voltage	•	
Low engine oil level *	o	o
Low fuel level (diesel models) *	o	o
Low fuel pressure (gas models) *	o	
Low oil pressure	•	•†
No coolant temperature signal		•
No oil pressure signal		•
Overcrank		•†
Speed sensor fault	•	
General Functions		
Alarm horn silenced		
Analog inputs	o	o
Battery charger fault *	•	
Chicago code active *		
Common fault (includes †)		•
Common warning	•	
Digital inputs	o	o
Emergency stop		•†
Engine cooldown (delay) active		
Engine start delay active		
Engine started		
Engine stopped		
EPS supplying load		
Generator running		
Input/output communication loss	•	
Internal failure		•
Master switch not in auto	•	
NFPA 110 alarm active		
Remote start		
System ready		
Generator Functions		
AC sensing loss	•	•
Alternator protection		•
Ground fault input *	•	
kW overload		•
Locked rotor		•
Overfrequency		•
Overvoltage (each phase)		•
Underfrequency		•
Undervoltage (each phase)		•

- Standard function

- o Available user function

- * Function requires optional input sensors or kits and is engine dependent; see Controller Displays as Provided by the Engine ECM.

- † Items included with common fault shutdown

Controller Displays as Provided by the Engine ECM	Engine Manufacturer (and Model)						
	KDI M, TM*	KDI TCR	KG2204, KG2204T	KG4V06T, KG6208, KG6208T, KG10V08, KG10V08T	GM and PSI/Doosan	John Deere	Volvo
Intake air pressure							D
Intake air		D		D	D	D	D
Coolant level			D	D	D	D	D
Coolant temperature		D	C/S/D	C/S/D	C/S/D	C/S/D	C/S/D
Crankcase pressure							D
ECM battery voltage	S		S/D	S	S		
Engine speed	C/S/D	C/S/D	C/S/D	C/S/D	C/S/D	C/S/D	C/S/D
Fuel pressure		D		C/S/D	C/S/D	C/S†	C/S/D
Fuel temperature		D				S/D	S
Oil level				S†	S†	S†	S†
Oil pressure		C/S/D	D	C/S/D	C/S/D	C/S/D	C/S/D
Oil temperature			S				SD

C = Value displayed on controller, S = Value displayed in Site Tech, D = ECU diagnostic is supported
 * Electronic governor and ECM are optional on KDI M and TM engines.
 † Controller uses local analog input to obtain this information.

Note: REOZMD/ROZMC (Mitsubishi engines) have an ECM but do not send signals to the generator set controller.

Note: See the generator set specification sheet for engine model identification.

Controller Specifications

- Power source with circuit protection: 12- or 24-volt DC
- Power drain: 200 milliamps at 12 VDC or 100 milliamps at 24 VDC
- Humidity range: 5% to 95% noncondensing
- Operating temperature range: -40°C to +70°C (-40°F to + 158°F)
- Storage temperature range: -40°C to +85°C (-40°F to + 185°F)
- Standards:
 - CE Directive
 - NFPA 99
 - NFPA 110, Level 1
 - CSA 282-09
 - UL 508
 - ASTM B117 (salt spray test)
- Panel dimensions—W x H, 229 x 160 mm (9.0 x 6.3 in.)

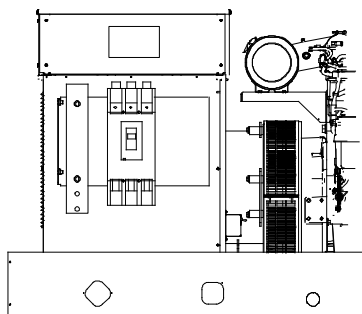
APM402 Available Options

- ☐ **Float/Equalize Battery Charger** available with 6 or 10 amp output for 12 or 24V DC voltage output. The 10 amp model provides NFPA 110 charging and alarming capability.
- ☐ **Manual Speed Adjust** available for applications using closed transition ATS. Adjustment range for 60 Hz: 1751-1849 rpm (58.2-61.8 Hz) and for 50 Hz: 1451-1549 rpm (48.2-51.8 Hz).
- ☐ **Prime Power Switch** prevents battery drain during generator set non-operation periods and when the generator set battery cannot be maintained by an AC battery charger.
- ☐ **Remote Emergency Stop Switch** available as a wall mounted panel to remotely shut down the generator set.
- ☐ **Remote Monitoring Panel.** The Remote Serial Annunciator (RSA) enables the operator to monitor the status of the generator set from a remote location, which may be required for NFPA 99 and NFPA 110 installations, and up to four Automatic transfer switches.
- ☐ **Run Relay** provides a relay indicating that the generator set is running.
- ☐ **Shunt Trip Wiring** provides relay outputs to trip a shunt trip circuit breaker and to signal the common fault shutdowns. Contacts rated at 10 amps at 28 VDC or 120 VAC.
- ☐ **Two Input/Five Output Module** provides a generator set mounted panel with two inputs and five relay outputs.

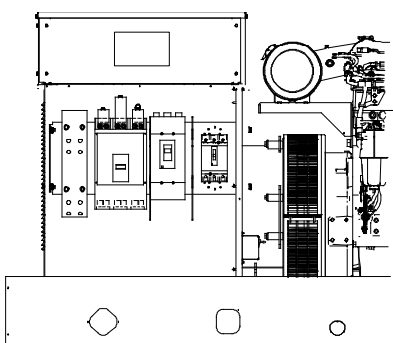
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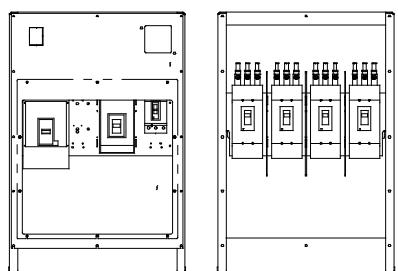
Availability is subject to change without notice. Discovery Energy, LLC and its affiliates dba Rehlko reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local authorized generator set distributor for availability.



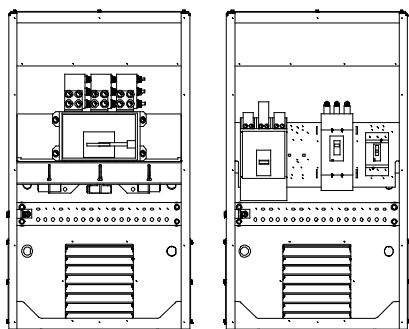
Single Circuit Breaker Kit with Neutral Bus Bar 15-300 kW Model Shown



Multiple Circuit Breaker Kit with Neutral Bus Bar 180-300 kW Model Shown



**Multiple Circuit Breaker Kits with Neutral Bus Bar 350-2250 kW Model Shown
(also applies to some 300 kW models)**



**Circuit Breaker Kits with Neutral Bus Bar
700-3250 kW KD Model Shown**

Standard Features

- The line circuit breaker interrupts the generator set output during a short circuit and protects the wiring when an overload occurs. Use the circuit breaker to manually disconnect the generator set from the load during generator set service.
- Circuit breaker kits are mounted to the generator set and are provided with load-side lugs and neutral bus bar.
- Rehlko offers a wide selection of molded-case line circuit breaker kits including single, dual, and multiple configurations for each generator set.
- Four types of line circuit breakers are available: (see page 2 for definitions and pages 3 and 4 for application details)
 - Magnetic trip
 - Thermal magnetic trip
 - Electronic trip
 - Electronic with ground fault (LSIG) trip
- In addition, line circuit breakers are offered with 80% and 100% ratings.
- Single line circuit breaker kits allow circuit protection of the entire electrical system load.
- Dual line circuit breaker kits allow circuit protection of selected priority loads from the remaining electrical system load.
- Multiple line circuit breaker kits with field connection barrier allow circuit protection for special applications (350-2500 kW models and selected 80-300 kW models).
- Up to four line circuit breakers can be used on 350-2500 kW models.
- Line circuit breakers comply with the following codes and standards unless otherwise stated.
 - UL 489 Molded Case Circuit Breakers
 - UL 1077 Supplementary Protectors
 - UL 2200 Stationary Engine Generator Assemblies

Line Circuit Breaker Types

Magnetic Trip

The magnetic trip features an electromagnet in series with the load contacts and a moveable armature to activate the trip mechanism. When a sudden and excessive current such as a short circuit occurs, the electromagnet attracts the armature resulting in an instantaneous trip.

Thermal Magnetic Trip

Thermal magnetic trip contains a thermal portion with a bimetallic strip that reacts to the heat produced from the load current. Excessive current causes it to bend sufficiently to trip the mechanism. The trip delay is dependent on the duration and excess of the overload current. Elements are factory-calibrated. A combination of both thermal and magnetic features allows a delayed trip on an overload and an instantaneous trip on a short circuit condition.

Electronic Trip

These line circuit breakers use electronic controls and miniature current transformers to monitor electrical currents and trip when preset limits are exceeded.

LI breakers are a combination of adjustable trip functions including long-time ampere rating, long-time delay, and instantaneous pickup. LSI breakers have all of the LI breaker features plus short-time pickup, short-time delay, and defeatable instantaneous pickup. LSIG breakers have all of the LSI breaker features plus ground-fault pickup and delay.

NOTE: MG-frame does not have a long-time delay when selected with LI breakers.

Electronic with Ground Fault Trip

The ground fault trip feature is referred to as LSIG in this document. Models with LSIG compare current flow in phase and neutral lines, and trip when current unbalance exists.

Ground fault trip units are an integral part of the circuit breaker and are not available as field-installable kits. The ground fault pickup switch sets the current level at which the circuit breaker will trip after the ground fault delay. Ground fault pickup values are based on circuit breaker sensor plug only and not on the rating plug multiplier. Changing the rating plug multiplier has no effect on the ground fault pickup values.

80% Rated Circuit Breaker

Most molded-case circuit breakers are 80% rated devices. An 80% rated circuit breaker can only be applied at 80% of its rating for continuous loads as defined by NFPA 70. Circuit conductors used with 80% rated circuit breakers are required to be rated for 100% of the circuit breaker's rating.

The 80% rated circuit breakers are typically at a lower cost than the 100% rated circuit breaker but load growth is limited.

100% Rated Circuit Breaker

Applications where all UL and NEC restrictions are met can use 100% rated circuit breakers where 100% rated circuits can carry 100% of the circuit breaker and conductor current rating.

The 100% rated circuit breakers are typically at a higher cost than the 80% rated circuit breaker but have load growth possibilities.

When applying 100% rated circuit breakers, comply with the various restrictions including UL Standard 489 and NEC Section 210. If any of the 100% rated circuit breaker restrictions are not met, the circuit breaker becomes an 80% rated circuit breaker.

Line Circuit Breaker Options

❑ Alarm Switch

The alarm switch indicates that the circuit breaker is in a tripped position caused by an overload, short circuit, ground fault, the operation of the shunt trip, an undervoltage trip, or the push-to-trip pushbutton. The alarm resets when the circuit breaker is reset.

❑ Auxiliary Contacts

These switches send a signal indicating whether the main circuit breaker contacts are in the open or closed position.

❑ Breaker Separators (350-2500 kW)

Provides adequate clearance between breaker circuits.

❑ Bus Bars

Bus bar kits offer a convenient way to connect load leads to the generator set when a circuit breaker is not present. **15-300 kW.** Bus bar kits are available on alternators with leads for connection to the generator set when circuit breakers are not ordered.

350-2500 kW. A bus bar kit is provided when no circuit breaker is ordered. Bus bars are also available in combination with circuit breakers or other bus bars on the opposite side of the junction box. On medium voltage (3.3 kV and above) units, a bus bar kit is standard (not applicable to KD models).

❑ Field Connection Barrier

Provides installer wiring isolation from factory connections.

❑ Ground Fault Annunciation

A relay contact for customer connection indicates a ground fault condition and is part of a ground fault alarm.

❑ Lockout Device (padlock attachment)

This field-installable handle padlock attachment is available for manually operated circuit breakers. The attachment can accommodate three padlocks and will lock the circuit breaker in the OFF position only.

❑ Lugs

Various lug sizes are available to accommodate multiple cable sizes for connection to the neutral or bus bar.

❑ Overcurrent Trip Switch

The overcurrent trip switch indicates that the circuit breaker has tripped due to overload, ground fault, or short circuit and returns to the deenergized state when the circuit breaker is reset.

❑ Shunt Trip, 12 VDC or 24 VDC

A shunt trip option provides a solenoid within the circuit breaker case that, when momentarily energized from a remote source, activates the trip mechanism. This feature allows the circuit breaker to be tripped by customer-selected faults such as alternator overload or overspeed. The circuit breaker must be reset locally after being tripped. Tripping has priority over manual or motor operator closing.

❑ Shunt Trip Wiring

Connects the shunt trip to the generator set controller. (standard on KD models with the APM802 controller)

❑ Undervoltage Trip, 12 VDC or 24 VDC

The undervoltage trips the circuit breaker when the control voltage drops below the preset threshold of 35%-70% of the rated voltage.

15-300* kW Line Circuit Breaker Specifications

* Includes models 300REOZJ and 300REZXC. For other 300 kW models, see the 300-2250 kW section.

100% Rating Circuit Breaker

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
4D/4E	15-150	Thermal magnetic	HD
	60-150	Electronic LSI	
	60-150	Electronic LSI	HG
4P/4PX 4Q/4QX	15-150	Thermal magnetic	HD
	60-150	Electronic LSI	
	60-150	Electronic LSI	HG
	175-250	Thermal magnetic	JD
	250	Electronic LSI	JD
	250	Electronic LSI	JG
	400	Electronic LSI	LG
	15-150	Thermal magnetic	HD
4RX 4S/4SX 4TX 4V 4UA 4M6226	60-150	Electronic LSI	
	60-150	Electronic LSI	HG
	175-250	Thermal magnetic	JD
	250	Electronic LSI	
	250	Electronic LSI	JG
	400	Electronic LSI	LG
	600-800	Electronic LSI	PG
4UA 4M6226	1000-1200	Electronic LSI	PG
	1200	Electronic LSI	PJ

100% Rating Electrically Operated Breakers

For use as paralleling breakers with the Decision-Maker® 6000 Controller/DPS System or APM603 controller.

Generator-Mounted P-Frame, 24VDC Electrically Operated			
Alt. Model	Amps	Trip Unit	Frame
4RX 4S/4SX 4TX 4V	250	5.0 LSI	PJ
	400		
	600	5.0 LSI	PL
	800		
4UA 4M6226	250	5.0 LSI	PJ
	400		
	600		
	800	5.0 LSI	PL
	1000		
	1200		

All circuit breakers listed in this table include line side bus and load side lugs, 24VDC motor operators, 2 type C auxiliary contacts, and 1 type C SDE overcurrent switch contact. No second breakers are allowed in combination with these breakers.

Interrupting Ratings

Circuit Breaker Frame Size	240 Volt, kA	480 Volt, kA	600 Volt, kA
HD	25	18	14
HG	65	35	18
HJ	100	65	25
JD	25	18	14
JG	65	35	18
JJ	100	65	25
LA	42	30	22
LG	65	35	18
MG			
PG	65	35	18
PJ	100	65	25
PL	125	100	25

Circuit Breaker Lugs Per Phase (Al/Cu)

Frame Size	Ampere Range	Wire Range
H	15-150	One #14 to 3/0
J	175	One 1/0 to 4/0
	200-250	One 3/0 to 350 kcmil
LA	300-400	One #1 to 600 kcmil or Two #1 to 250 kcmil
LG	400-600	Two 2/0 to 500 kcmil AL/CU
M	800	Three 3/0 to 500 kcmil
P	600-800	Three 3/0 to 500 kcmil
	1000-1200	Four 3/0 to 500 kcmil

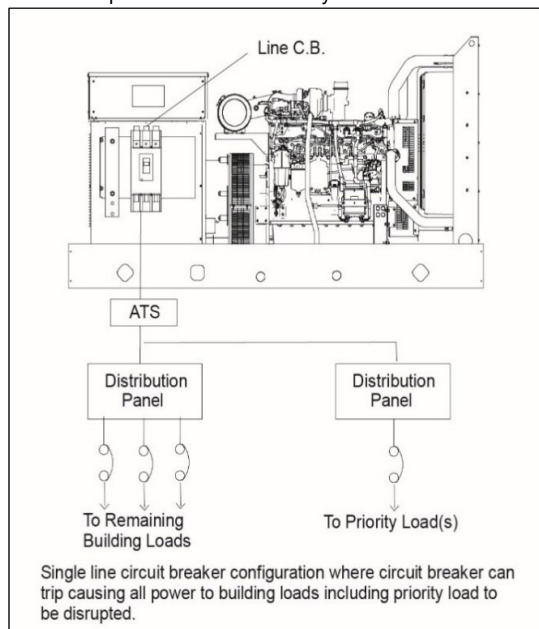
Mechanical Load Lugs Included with H, J, and LG LSI/SG Neutrals		
H	60-150	One #14 to 3/0 AL/CU
J	250	One 3/0 to 350 kcmil AL/CU
LG	400-600	Two 4/0 to 500 kcmil AL/CU

15-300* kW Line Circuit Breaker Applications

* Includes models 300REOZJ and 300REZXC. For other 300 kW models, see the 300-2250 kW section.

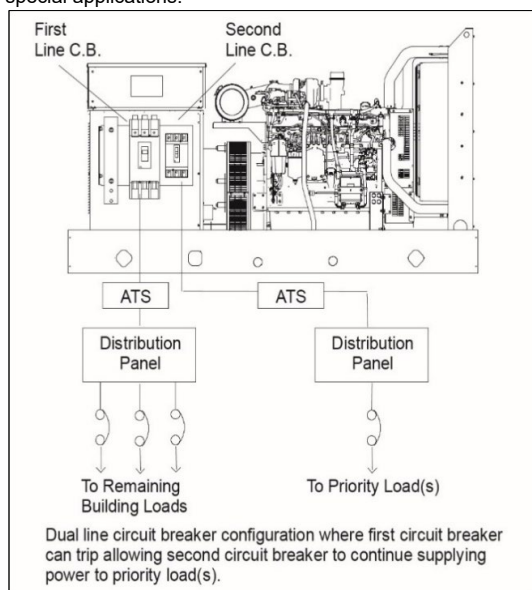
Single Circuit Breaker Installations

A generator set with a single circuit breaker installed typically feeds a single transfer switch and then a distribution panel. This allows protection of the entire system.



Multiple Circuit Breaker Installations

A generator set with dual circuit breakers installed is used to separate critical loads. Typically, one circuit breaker will feed a main transfer switch with noncritical loads and the other circuit breaker will feed a second transfer switch that feeds critical or priority loads. Multiple circuit breakers allow circuit protection for special applications.



Circuit Breaker Combinations

Alternator	First C. B. Frame	Second C. B. Frame	Third C. B. Frame	Trip Type
ALL except 4D/4E	H	—	—	All
	J	—	—	
	LA	—	—	
	LG	—	—	
4D/4E	H	—	—	Standard or LSIG
	H	H	—	No LSIG
4P/4PX 4Q/4QX	H	H or J	—	No LSIG
	J		—	
	LA	H, J or LG	—	
	LG		—	
4RX 4S/4SX 4TX 4V	M	—	—	All
	P	—	—	All
	H or J	H or J	—	No LSIG
	LA	H, J, or LA	—	
	LG	H, J, LA, or LG	—	
	M		—	
	P		—	
	H or J	H or J	H or J	
4UA 4M6226	M or P	—	—	All
	H or J	H or J	—	All
	LA	H, J, or LA	—	
	LG	H, J, LA, or LG	—	
	M or P	H, J, LA, or LG	—	
	P	P	—	No LSIG
	H or J	H or J	H or J	
	LA	H or J	H or J	
		LA	H, J, or LA	
	LG	H or J	H or J	
		LA	H, J, or LA	
		LG	H, J, LA, or LG	
	M or P	H or J	H or J	
		LA	H, J, or LA	
		LG	H, J, or LG	

Powerpack® H- and J-Frame 15A to 250A Molded Case Circuit Breakers

Delivering unmatched application flexibility

Well-suited to a wide range of applications, the Powerpack H- and J-Frame Molded Case Circuit Breakers feature a full complement of field installable accessories, field installable trip units and improved interrupting ratings. These Molded Case Circuit Breakers deliver unmatched design flexibility for 15A to 250A applications and share identical mounting holes, handle locations, trim dimensions and accessories, allowing customers to standardize equipment designs for 15A to 250A applications.



HD and HG 2-Pole



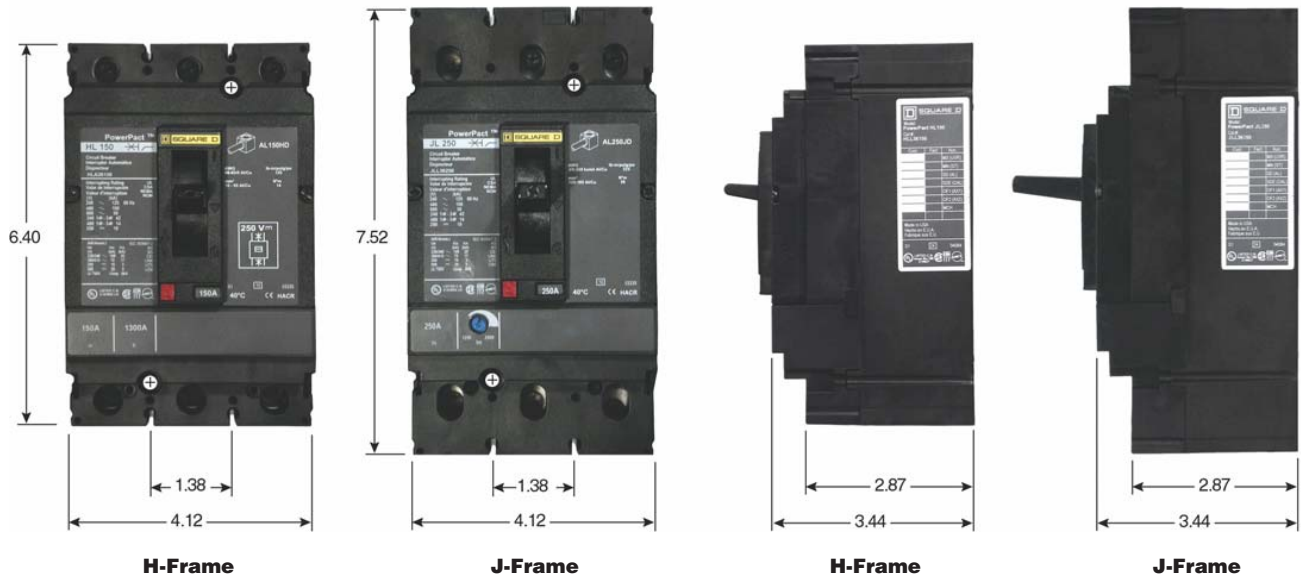
H-Frame 150A



J-Frame 250A

Full-Featured Performance

- H-Frame – 150A available in both standard and 100% ratings with standard amperage ratings from 15 to 150A. Interrupting ratings (AIR) include D-18kA, G-35kA, J-65kA and L-100kA at 480VAC
- J-Frame – 250A available in both standard and 100% ratings with standard amperage ratings from 150A to 250A. Interrupting ratings (AIR) include D-18kA, G-35kA, J-65kA, and L-100kA at 480VAC
- Field installable accessories are common for H- and J-Frame Circuit Breakers to make stocking and installation easy
- Unique snap-in terminals make converting bus bar and lug configurations simple and easy
- Field-installable trip units lower inventory costs and reduce stocking space by configuring products at point of use
- Allows design standardization for 15A to 250A applications with common mounting holes, handle locations, and trim dimensions for both H- and J-Frame Circuit Breakers
- Many configuration options provide application flexibility, with I-Line®, plug-in, drawout, rear connected, distribution lug, crimp lug and din-rail configurations
- Motor operators, rotary handles and cable operators provide options for integrating into a variety of applications
- Certified to global standards, including UL, IEC, CSA and NOM



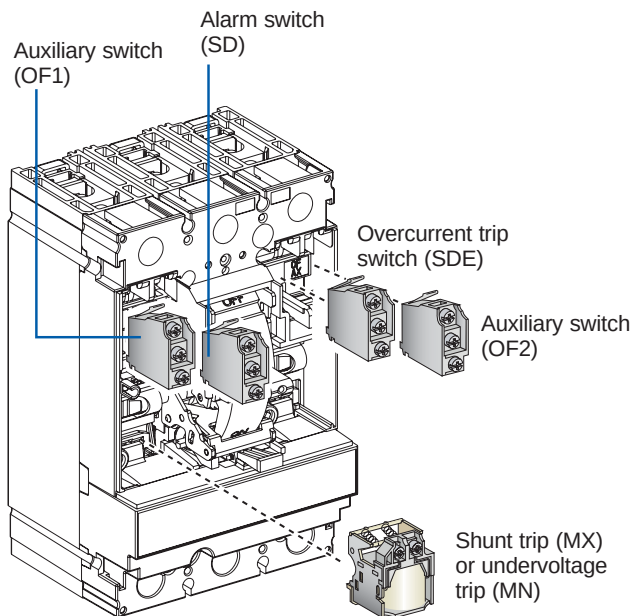
Standardize Designs

Designed to help simplify the design process, the Powerpact H- and J-Frame Molded Case Circuit Breakers feature common mounting holes, handle locations and trim dimensions.



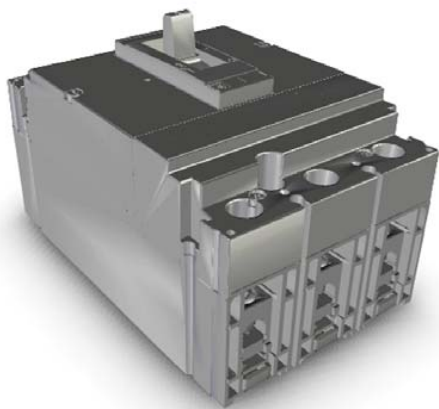
Consolidate Inventory

Reduce inventory costs with the Powerpact H- and J-Frame Molded Case Circuit Breakers. These circuit breakers are designed to work with common components like operating handles, auxiliary switches, shunt trips and many other accessories. They also offer savings in the form of rationalized mounting pans, door trims and enclosures.



Simplify Installation

Field-installable accessories provide flexibility for late specification changes or installation at point of use. Auxiliary switches, shunt trip and undervoltage release are easy to install, reliable and common to many Powerpack Circuit Breakers.



Streamline Design Integration

Comprehensive technical literature, CAD drawings and 3D models are available online to support the Powerpack H- and J-Frame Circuit Breaker line. In addition, 3D models can be downloaded in most CAD formats.

Easy to Convert

Unique snap-in lugs make converting between bus bar and lug options simple and easy. Whether the application calls for lugs on the line side, load side or both, conversions are simple, making the Powerpack H- and J-Frame Molded Case Circuit Breakers ideal for applications that require configuring products at the point of use. The terminal nut or mechanical lug is set on a plastic retainer that slides and snaps into place, without the use of tools.



Bus Bar Option



Lug Option

Powerpack® H- and J-Frame 15A to 250A Molded Case Circuit Breakers

Multiple Configurations



Cradle



Plug-in Base



I-Line



Rear Connected

Ordering Flexibility for Various Applications

- **Purchase Standard Circuit Breaker**
Features fixed trip unit capable of reverse connection.
- **Circuit Breaker and Separate Trip Units***
Save valuable inventory costs by configuring products at point of use. Only three frame sizes are needed to cover the entire range from 15A to 250A (shown below with H-Frame Circuit Breaker).
- **Purchase the Complete Circuit Breaker with Field-Interchangeable Trip Unit***
Respond to last minute specification changes with the flexibility of a field interchangeable trip unit.



**Marked line and load and not suitable for reverse connection*

**Contact your Square D sales
representative for additional information.
Or, visit www.us.SquareD.com.**

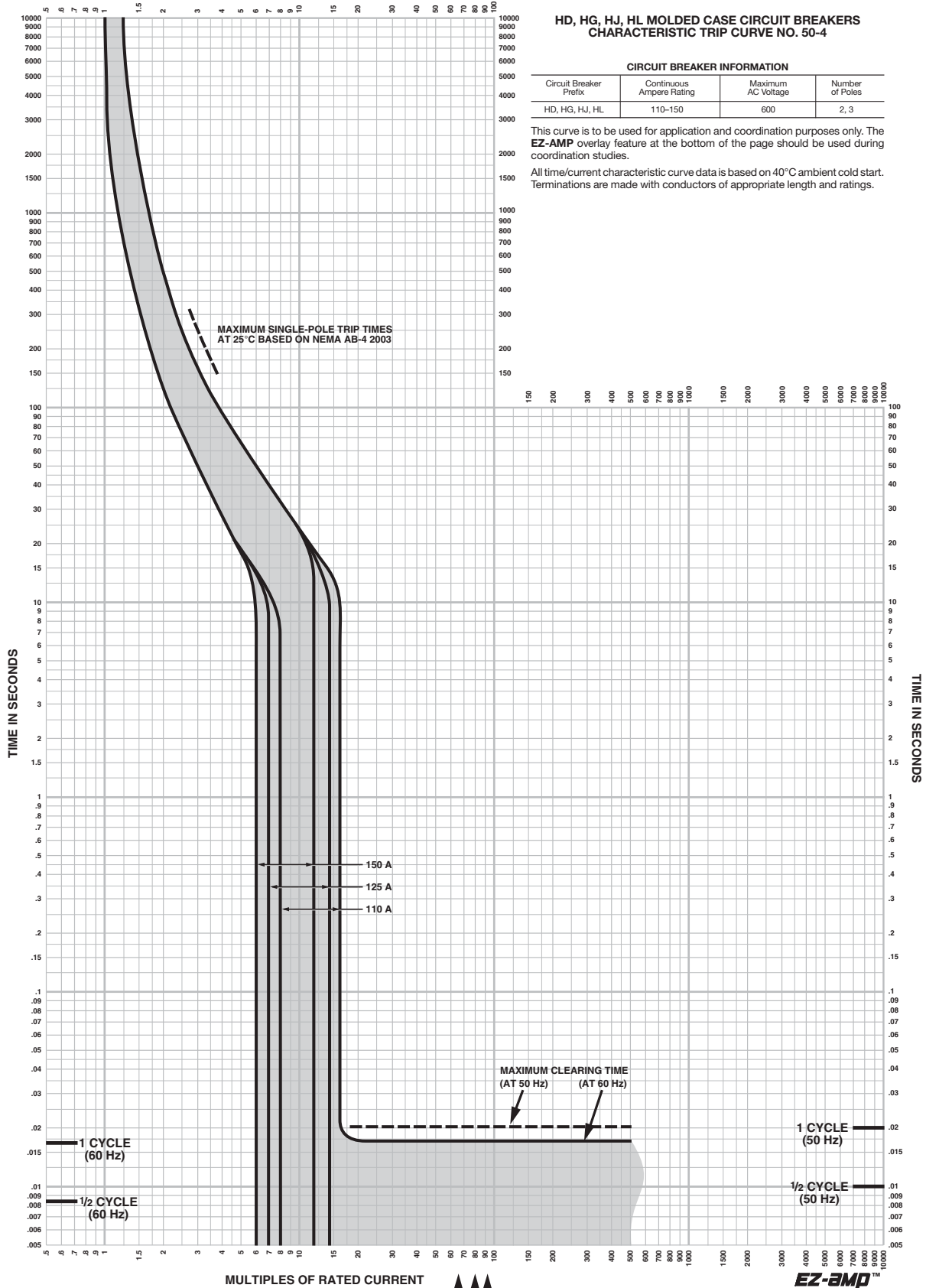
Schneider Electric - North American Operating Division

1415 S. Roselle Road
Palatine, IL 60067
Tel: 847-397-2600
Fax: 847-925-7500

Order Number 0611HO0401

03-04

MULTIPLES OF RATED CURRENT



**HD, HG, HJ, HL MOLDED CASE CIRCUIT BREAKERS
CHARACTERISTIC TRIP CURVE NO. 50-4**

CIRCUIT BREAKER INFORMATION

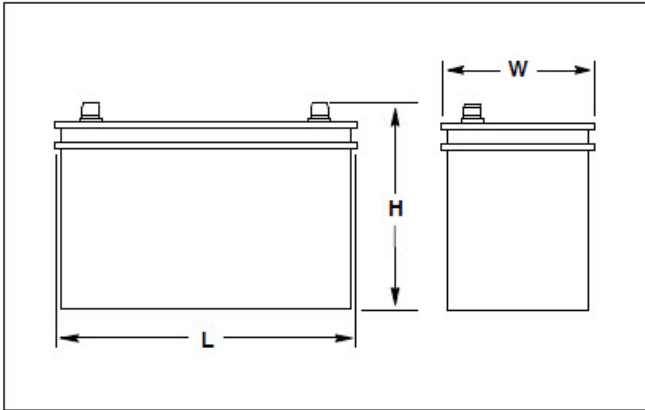
Circuit Breaker Prefix	Continuous Ampere Rating	Maximum AC Voltage	Number of Poles
HD, HG, HJ, HL	110-150	600	2, 3

This curve is to be used for application and coordination purposes only. The **EZ-AMP** overlay feature at the bottom of the page should be used during coordination studies.

All time/current characteristic curve data is based on 40°C ambient cold start. Terminations are made with conductors of appropriate length and ratings.



Typical Overall Dimensions

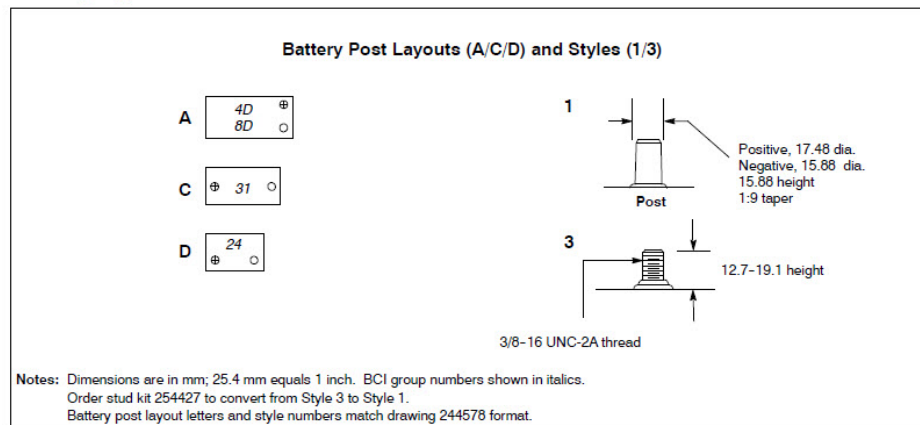


Standard Features

- Rehko selects batteries to meet the engine manufacturer's specifications and to comply with NFPA requirements for engine-cranking cycles.
- Heavy-duty starting batteries are the most cost-effective means of engine cranking and provide excellent reliability in generator set applications.
- Tough polypropylene cases protect against life-shortening vibration and impact damage.
- Batteries are rated according to SAE standard J-537.
- All batteries are 12-volts. Kits that contain two or four batteries are available for 24-volt systems and/or systems with redundant starters.
- Wet- and dry-charged batteries have lead-calcium or lead-antimony plates and use sulfuric acid electrolyte. Removable cell covers allow checking of electrolyte specific gravity.
- Absorbant glass mat (AGM) batteries are sealed and maintenance free.
- Batteries are for applications below and above 0°C (32°F).

Charge Type*	Battery Part Number	Battery Qty. per Size	BCI Group Size	Battery SAE Dimension, mm (in.)			Cold Cranking Amps at 18°C (0°F) Min.	Reserve Capacity Minutes at 27° (80°F) Min.	Battery Post Layout and Style
				L	W	H			
Wet	GM106373	1	24	260.0 (10.3)	171.0 (6.8)	229.0 (9.0)	650	95	D/1

Battery Specifications





Standard Features

- 12 VDC output. * Use two battery chargers for 24-volt electrical systems
- Automatic 3-stage float/equalize battery charger
- Charges both lead-acid and gel-cell type batteries:
- Indicator lamps: red and green LEDs indicate bulk charge, absorption, and float charge stages
- Durable potted assembly for waterproofing and shockproofing
- Reverse-polarity protection
- Short-circuit protection
- UL 1236 listed
- UL 2200 compliant
- UL 991 compliant for vibration and shock
- UL listed to Canadian safety standards
- UL rated inline fuse
- FCC Class B-compliant for EMI/RFI (Date code 8/26/04 or later)
- One-year warranty
- Easy installation:
 - Integral mounting flanges
 - Ring terminals for battery connection
 - Standard US style 3-prong AC plug

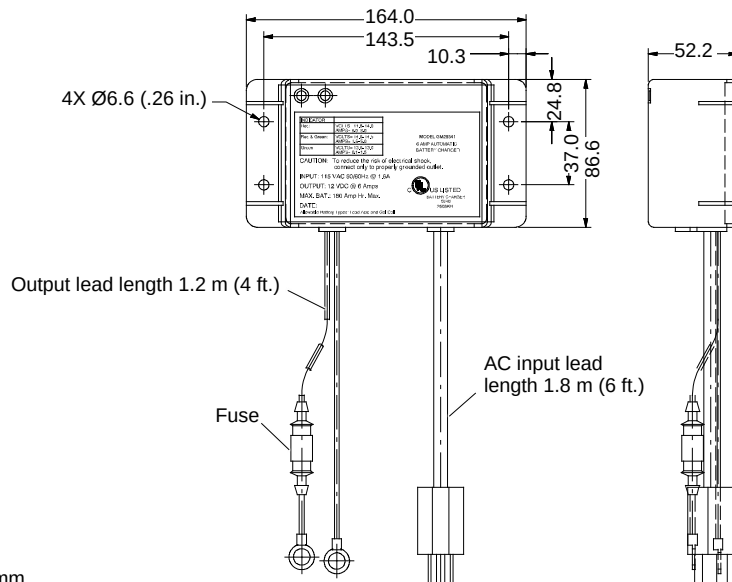
Specifications

Input Voltage	90-135 VAC
Input Frequency	50/60 Hz
DC Output:	
Bulk	11.8-14.0 VDC @ 5.0-6.0 amps
Absorption	14.0-14.5 VDC @ 1.5-5.0 amps
Float	13.3-14.5 VDC @ 0.1-1.5 amps
Steady Full-Load Output Current	6 amps
Current Limit	7 amps
Output Power Limit	70 +2/-5 watts
Line Regulation Across Input Voltage Range	1%
Isolation, Input to Output	2500 V
Dimensions (L x W x D)	164 x 87 x 53 mm (6.4 x 3.5 x 2.1 in)
Weight	1.6 kg (3.5 lb.)
Temperature Range, Operating and Storage	-40° to 70°C (-40° to 158° F)
Humidity	0 to 100% (condensing)



Industrial Generator Set Accessories

12/24 Volt, 6 Amp
Float/Equalize Battery Charger



Dimensions are in mm.

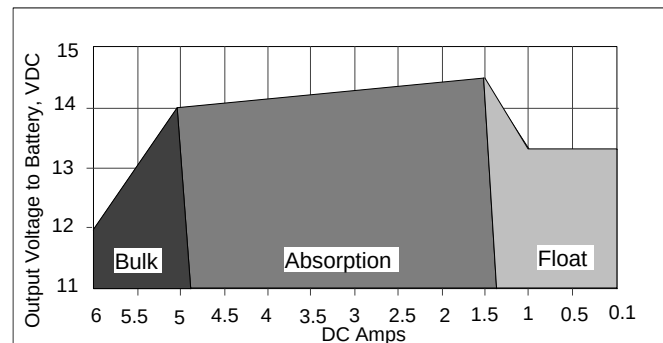
Battery Connections

Lead Length	1.2 m (4 ft.)
Battery Connections	9.5 mm (3/8 in.) ring terminals

AC Power Connections

Lead Length	1.8 m (6 ft.)
Connection	Standard US style 3-prong AC plug

Charging Curves

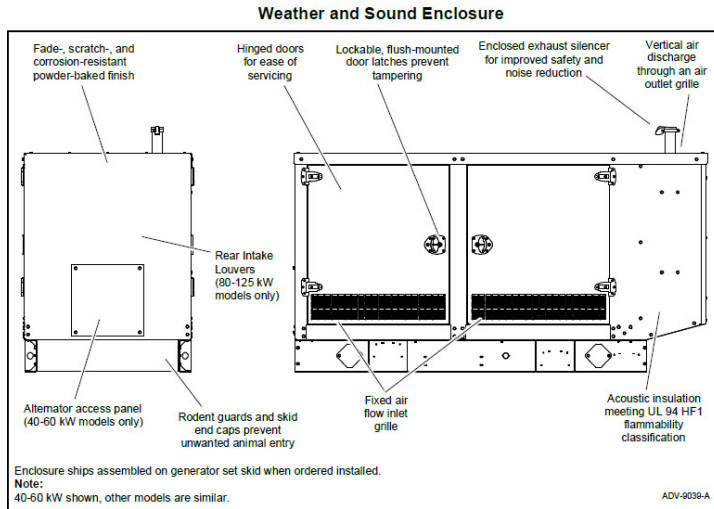


Availability is subject to change without notice. Discovery Energy, LLC and its affiliates dba Rehiko reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local authorized generator set distributor for availability.

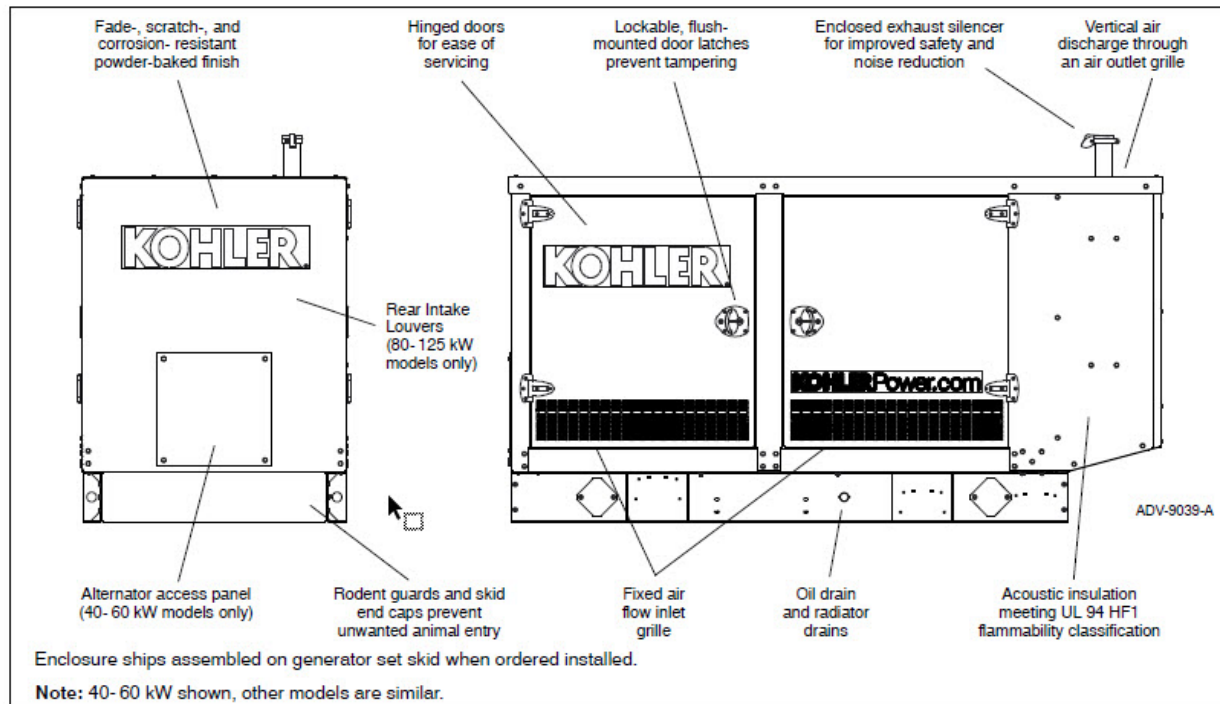


Weather Enclosure Standard Features

- Internal-mounted critical silencer and flexible exhaust connector.
- Skid-mounted, steel construction with hinged doors.
- Fade-, scratch-, and corrosion-resistant Kohler® Power Armor automotive-grade textured finish.
- Enclosure has four access doors which allow for easy maintenance.
- Lockable, flush-mounted door latches.
- Vertical air inlet and outlet discharge to redirect air and reduce noise.
- Steel weather enclosure is designed to 150 mph (241 kph) wind load rating.



Weather and Sound Enclosure



Weather Enclosure Features

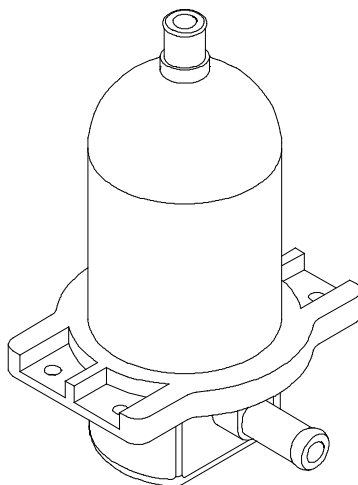
- Available in steel (14 gauge) formed panel, solid construction. Preassembled package offering corrosion resistant, dent resilient structure that mounts directly to lift base or fuel tank.
- Power Armor automotive-grade finish resulting in advanced corrosion and abrasion protection as well as enhanced edge coverage and color retention.
- Internal critical exhaust silencer offering maximum component life and operator safety.
- Interchangeable modular panel construction. Allows complete serviceability or replacement without compromising enclosure design.
- Cooling/combustion air intake with a horizontal air inlet. Sized for maximum cooling airflow.
- Service access. Multi-personnel doors for easy access to generator set control and servicing of the oil fill and battery.
- Cooling air discharge. Weather protective design featuring a vertical air discharge outlet grille. Redirects cooling air up and above enclosures to reduce noise ambient.
- Enclosed critical silencer and three-way catalyst standard on KG100 and KG125 (optional on KG80)

Fuel Tank Capacity, L (gal.)	Est. Fuel Supply Hours at 60 Hz with Full Load	Max. Length, mm (in.)	Max. Width, mm (in.)	Sound Pressure Level, dB(A)	Max. Height, mm (in.)	Weight, kg (lb.)
Lift base	0	3525 (138.8)	1154 (45.4)	81	1713 (67.4)	1605 (3539)

Note: Data in table is for reference only, refer to the respective ADV drawings for details.

Max. weight includes the generator set (wet) with largest alternator option, enclosure, and silencer.

Log average sound pressure level of 8 measured positions around perimeter of the unit at a distance of 7 m (23 ft). Refer to TIB-114 for details.



Block Heater Kit, typical

Applicable Models

- KD80-KD200
- KG25-KG40A
- KG40-KG125
- KG80A
- KG150-KG200
- KG150R
- 25-45REZG
- 25-60REZGB
- 50REZGC/125REZGC/150REZGC
- 50-60REOZJD
- 50REOZJE
- 80REZGD/100REZGD
- 80RZGD/100RZGD
- 80-200REOZJF
- 80-150REOZJG4
- 125RZGC/150RZGC

Standard Features

- UL-C/US listed
- CE compliant
- Controls for automatic operation
- Compact design
- Easy to install

Description

The engine block heater kit heats the engine coolant in cold ambient, warming the cylinders, oil, and charge air circuit which all help to give a faster starting time. The engine block heater uses thermosiphon action to circulate warm coolant into the engine and supplies constant heating to the engine. The engine block heater kit helps to extend element life and gives a significant reduction in electrical consumption.

The engine block heater kit is recommended for ambient temperatures below 10°C (50°F).

The engine block heater kits are available in 120 V, 240 V, and 277 V versions.



Industrial Generator Set Accessories

Engine Block Heater Kits

Block Heater Specifications

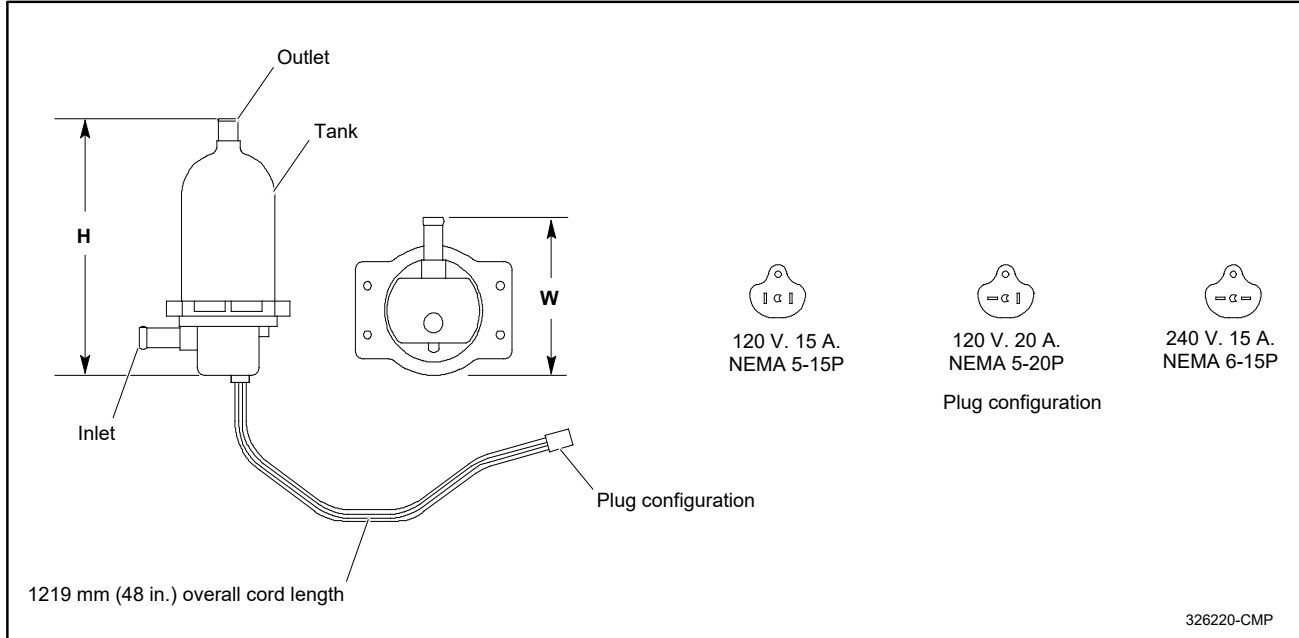
Heating Fluid	Water, Coolant Mix (50% Glycol/50% Water)
Max. Pressure	90 psi (620 kPa)
Heating Element Material	Incoloy 800
Inlet/Outlet Plumbing	0.625 in. hose barb
System Ingress	IP41
Power Connection	NEMA Plug and EURO Plug
Power Chord Length	48 in. (1219 mm)

Specifications

Block Heater Kit Number	Component	Watts	Voltage	Phase	Thermostat Temperature	
					ON	OFF
GM58098-KA1	358311	1000	120	1	27°C (80°F)	38°C (100°F)
GM75536-KA1	326228	1500	120		49°C (120°F)	60°C (140°F)
GM75555-KA5	GM75552	1800	120		27°C (80°F)	38°C (100°F)
GM75555-KA6	GM75553	2000	240			
GM75556-KA1	352945	1500	120			
GM75557-KA1	352945	1500	120			
GM75564-KA1	358311	1000	120			
GM75565-KA1	352945	1500	120			
GM77944-KA1	352945	1500	120			
GM77944-KA2	352946	1500	240			
GM85060-KA1	GM75552	1800	120			
GM85060-KA2	GM75553	2000	240			
GM89427-KA2	GM75552	1800	120			
GM91708-KA1	352945	1500	120			
GM94248-KA1	352945	1500	120			
GM104799-KA1	352945	1500	120			
GM105165-KA1	352945	1500	120			
GM105165-KA2	352946	1500	240			
GM105409-KA1	352945	1500	120			
GM105409-KA2	352946	1500	240			
GM115370-KA1	352945	1500	120			
GM115370-KA2	352946	1500	240			
1021000401-KA1	GM95436	500	120			
10305010400-KA1	352945	1500	120			
10305011301-KA1	352945	1500	120			
10305011401-KA1	GM75552	1800	120			
10305011401-KA2	GM75553	2000	240			
10305012501-KA1	352945	1500	120			
10305012001-KA1	352945	1500	120			
10305012901-KA1	352945	1500	120			

Dimensions and Weights

Overall Size, H x W, mm (in): 199 x 122 (7.8 x 4.8)
 Weight, kg (lb): 0.77 (1.7)



Alternator Data

TECHNICAL INFORMATION BULLETIN
Alternator Data Sheet
Alternator Model: 4R12X
Frequency: 60 Hz
Speed: 1800 RPM
Leads: 12 (6 Lead, 600 Volt)

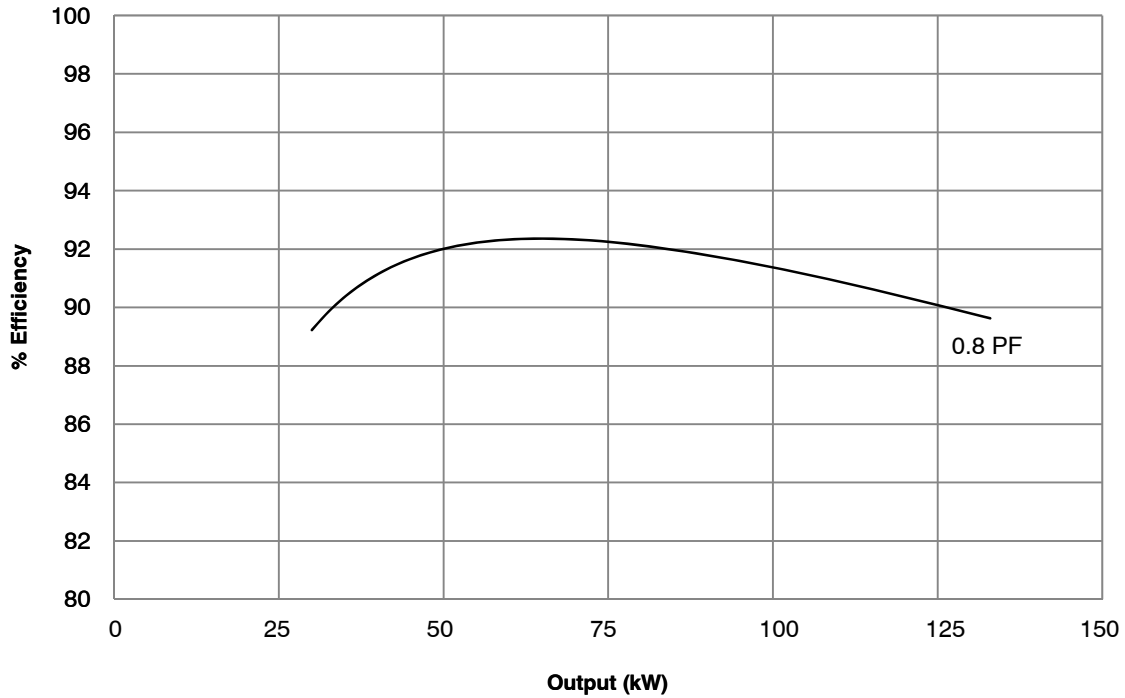
Voltage L-N/L-L	Phase	Power Factor	Connection	kW* (kVA)						
				Class B	Class F				Class H	
				80°C Continuous	90°C Lloyds	95°C ABS	105°C Continuous	130°C Standby	125°C Continuous	150°C Standby
139/240 277/480	3	0.8	Wye	111.0 (138.5)	116.0 (145.0)	119.0 (148.5)	124.0 (155.0)	134.5 (168.0)	132.5 (165.5)	142.5 (178.0)
127/220 254/440	3	0.8	Wye	107.5 (134.0)	113.5 (141.5)	115.5 (144.0)	121.5 (151.5)	130.5 (163.0)	128.5 (160.5)	138.0 (172.5)
120/208 240/416	3	0.8	Wye	104.0 (130.0)	108.5 (135.5)	111.0 (138.5)	115.0 (143.5)	124.0 (155.0)	123.0 (153.5)	131.0 (163.5)
110/190 220/380	3	0.8	Wye	94.0 (117.5)	98.0 (122.5)	100.0 (125.0)	104.0 (130.0)	112.0 (140.0)	111.0 (138.5)	118.5 (148.0)
120/240	3	0.8	Delta	104.0 (130.0)	108.5 (135.5)	111.0 (138.5)	115.0 (143.5)	124.0 (155.0)	123.0 (153.5)	131.0 (163.5)
120/240	1	1.0	Dogleg	76.0 (76.0)	79.5 (79.5)	81.0 (81.0)	84.0 (84.0)	91.0 (91.0)	90.0 (90.0)	96.0 (96.0)
347/600	3	0.8	Wye	102.0 (127.0)	108.0 (135.0)	111.0 (138.0)	116.0 (145.0)	130.0 (162.0)	127.0 (158.0)	139.0 (173.0)

* All data tested in accordance with IEEE Standard 115. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

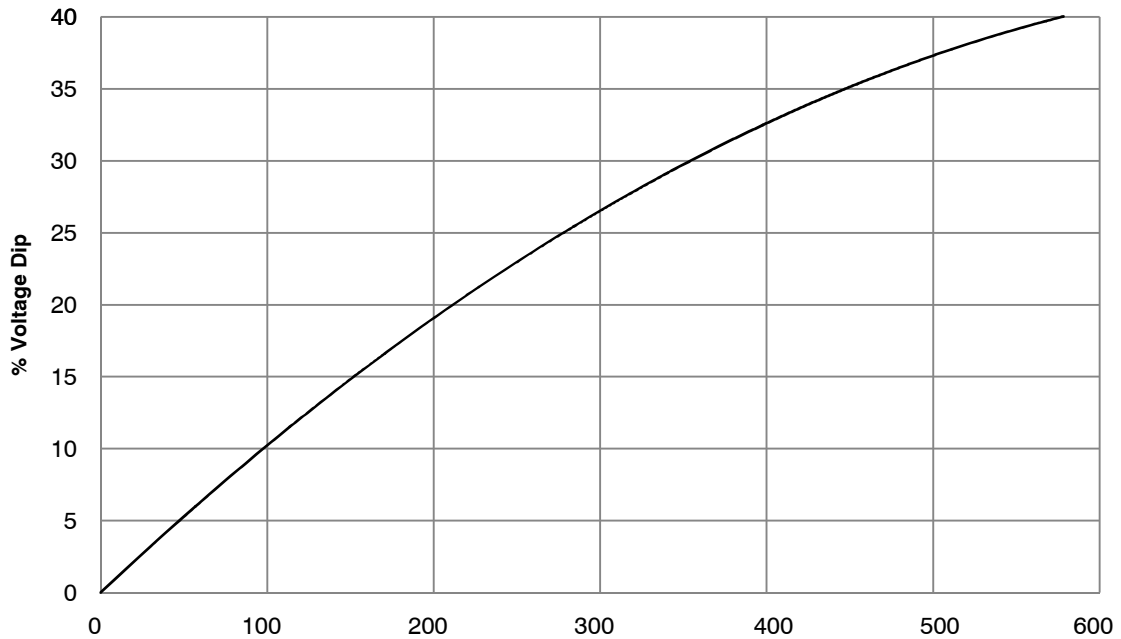
Submittal Data: 139/240 Volts, 0.8 PF, 1800 RPM, 60 Hz, 3 Phase, 130°C Rise

	Symbol	PerUnit	Ohms		Symbol	Value
Typical Cold Resistances				Typical Time Constants		
Phase Resistance		0.029	0.010	Armature Short Circuit	T _a	0.008 sec.
Rotor Resistance		17.83	6.112	Transient Short Circuit	T' _d	0.074 sec.
Typical Reactances				Transient Open Circuit	T' _{do}	0.860 sec.
Synchronous				Typical Field Current		
Direct	X _d	2.973	1.019	Full Load	I _{fFL}	18.9 amps
Quadrature	X _q	1.526	0.523	No Load	I _{fNL}	5.2 amps
Transient				Typical Short Circuit Ratio		0.336
Unsaturated	X' _{du}	0.290	0.099	Harmonic Distortion		
Saturated	X' _d	0.255	0.087	RMS Total Harmonic Distortion		3.25%
Subtransient				Max. Single Harmonic		5th
Direct	X'' _d	0.122	0.042	Deviation Factor (No Load, L-L)		<5%
Quadrature	X'' _q	0.116	0.040	Telephone Influence Factor		<50
Negative Sequence	X ₂	0.119	0.041	Insulation Class		
Zero Sequence	X ₀	0.010	0.003	per NEMA MG1 -1.66		H
				Phase Rotation		ABC

**4R12X, 60 Hz, 139/240, 277/480 Volts, Wye
TYPICAL ALTERNATOR EFFICIENCY***

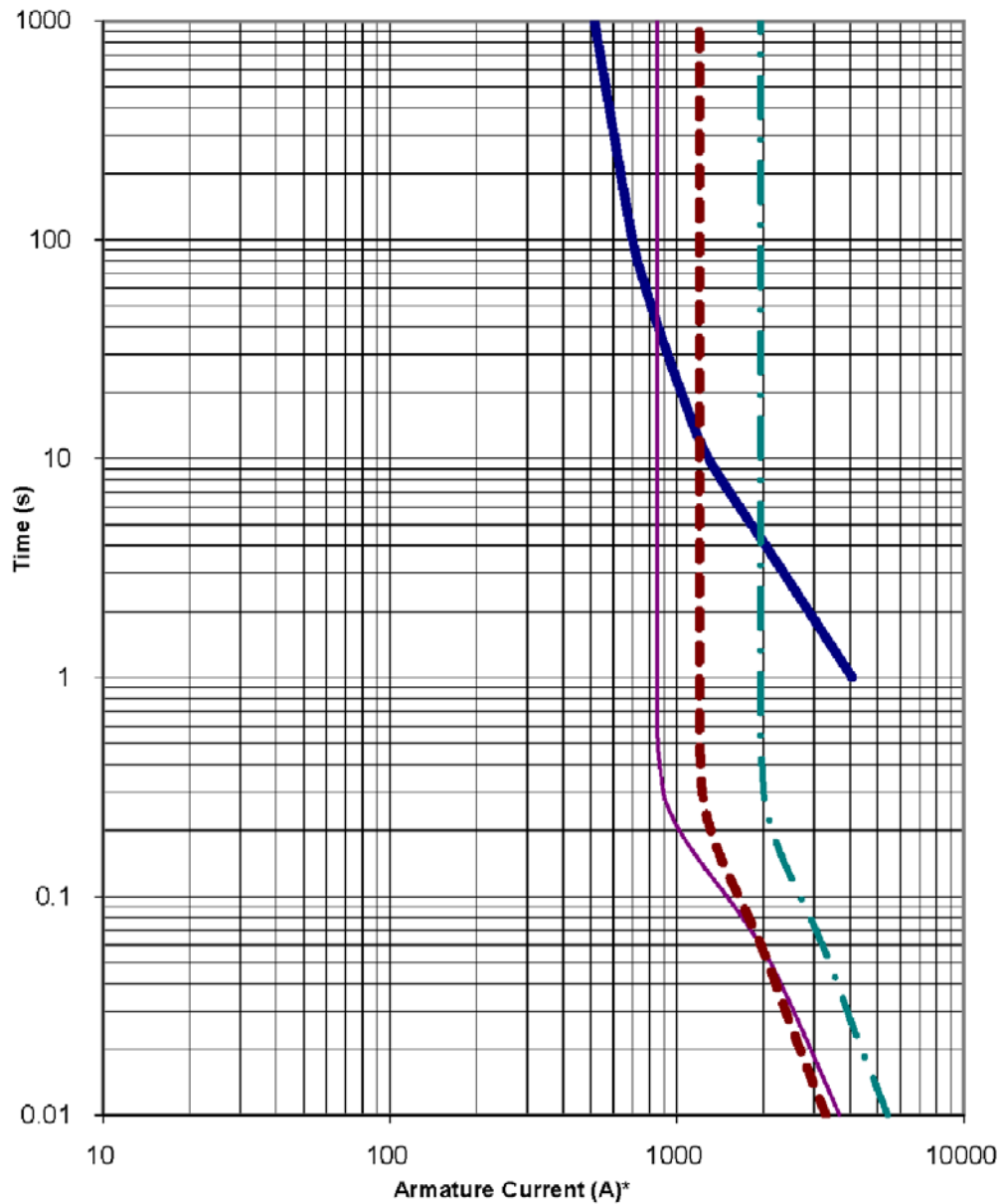


**4R12X, 60 Hz, 139/240, 277/480 Volts, Wye
TYPICAL MOTOR STARTING CHARACTERISTICS***



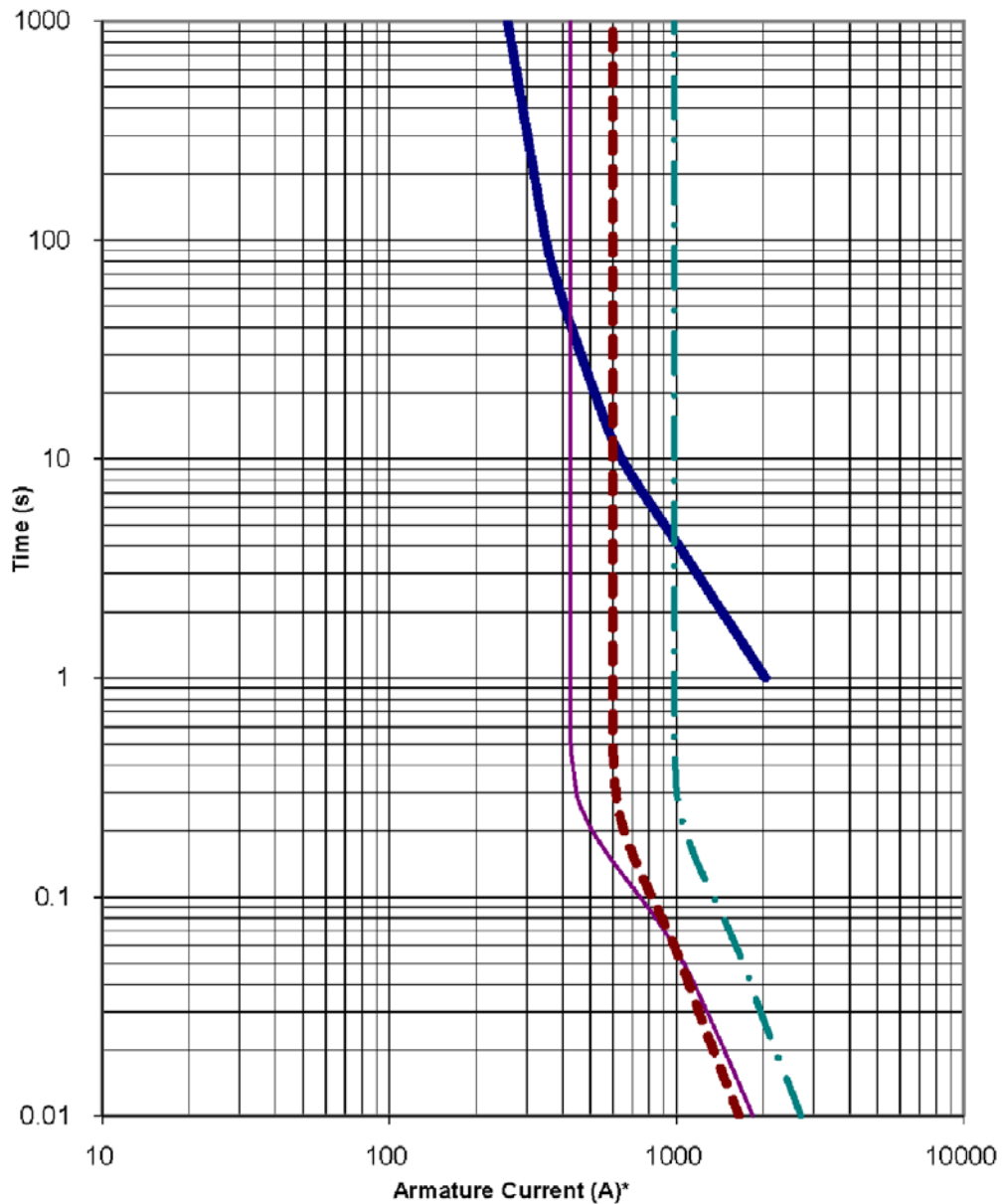
* All data tested in accordance with IEEE Standard 115. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

4R12X, 60 Hz, Low Wye or Delta Connection SHORT CIRCUIT DECREMENT CURVE



*Instantaneous current (t=0) is asymmetric. Divide by 1.73 for symmetrical.

4R12X, 60 Hz, High Wye Connection SHORT CIRCUIT DECREMENT CURVE



*Instantaneous current (t=0) is asymmetric. Divide by 1.73 for symmetric.

Sound Data

TECHNICAL INFORMATION BULLETIN

Generator Set Sound Data Sheet

			Sound Pressure Data in dB(A)			
Generator Set Model	Hz	Load	Raw Exhaust	Open Unit, Isolated Exhaust	Weather Enclosure	Sound Enclosure
KG100	60	100% Load	98.9	83.2	81.3	69.3
		No Load	97.7	81.9	80.0	67.4

Note: Sound pressure data is the logarithmic average of eight perimeter measurement points at a distance of 7 m (23 ft.), except Raw Exhaust data which is a single measurement point at 1 m (3.3 ft.) from the mouth of a straight pipe exhaust.

KG100	60 Hz
-------	-------

				Sound Pressure Levels dB(A)								
Load	Distance, m (ft.)	Enclosure	Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
100% Load	7 (23)	Sound	3:00	46.3	60.4	60.7	62.1	60.7	58.5	53.4	48.0	67.8
			1:30	41.7	56.7	70.0	65.3	58.0	59.9	53.3	50.6	72.0
			12:00-Engine	47.4	61.3	65.1	61.4	61.6	59.5	55.4	51.2	69.5
			10:30	46.0	63.2	63.5	64.5	61.6	60.0	55.0	49.5	70.0
			9:00	46.3	61.5	60.7	63.0	59.7	59.3	52.9	50.1	68.3
			7:30	49.2	58.6	64.3	61.9	61.4	60.9	52.5	47.5	69.0
			6:00-Alternator	50.3	61.7	62.4	60.8	59.7	57.9	53.2	48.4	68.0
			4:30	47.4	58.8	62.0	61.8	60.8	60.1	53.5	48.0	68.1
			8-pos. log avg.	47.4	60.7	64.7	62.9	60.6	59.6	53.8	49.4	69.3

				Sound Pressure Levels dB(A)								
Load	Distance, m (ft.)	Enclosure	Measurement Clock Position	3:00	1:30	12:00 Eng.	10:30	9:00	7:30	6:00 Alt.	4:30	8-pos. log avg.
100% Load	7 (23)	Weather	Overall Levels	81.4	80.7	79.5	82.5	84.3	81.2	76.1	80.9	81.3

				Sound Pressure Levels dB(A)								
Load	Distance, m (ft.)		Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
100% Load	7 (23)	Open Unit, Isolated Exhaust	3:00	49.8	61.9	76.8	76.2	75.2	77.5	74.1	69.2	83.3
			1:30	45.4	58.9	74.8	74.3	78.3	75.3	71.5	67.1	82.6
			12:00-Engine	51.0	64.4	78.4	71.4	72.6	73.6	69.1	62.6	81.4
			10:30	48.9	63.7	76.7	77.3	78.1	78.2	75.0	70.9	84.4
			9:00	46.8	64.8	78.9	76.9	78.7	80.9	75.5	77.2	86.2
			7:30	49.6	61.8	77.3	74.0	76.3	77.0	73.4	68.7	83.1
			6:00-Alternator	49.1	66.4	72.9	72.0	70.2	69.6	64.6	59.1	78.0
			4:30	47.0	63.1	76.2	74.6	75.9	77.1	72.6	67.8	82.8
			8-pos. log avg.	48.8	63.6	76.8	75.0	76.4	77.1	73.0	70.7	83.2

			Sound Pressure Levels dB(A)								
Load	Distance, m (ft.)	Exhaust	Octave Band Center Frequency (Hz)								Overall Level
			63	125	250	500	1000	2000	4000	8000	
100% Load	1 (3.3)	Raw Exhaust with Open Unit Configured Catalyst (No Silencer)	56.4	81.4	90.7	91.3	94.6	91.5	88.1	82.1	98.9

Emissions Data



KG100

60 Hz. Gas Generator Set
EPA Certified for Stationary Emergency Applications
EMISSION DATA SHEET

ENGINE INFORMATION

Model:	KG6208THD	Bore:	101.6mm (4.00 in.)
Nameplate kW @ 1800 RPM:	152 (NG) 131 (LPG)	Stroke:	95.25mm (3.75 in.)
Type:	4-Cycle, V8 Cylinder	Displacement:	6.2 L (378 cu. in.)
Aspiration:	Turbocharged	EPA Family:	TKHXB06.2HNL
Compression Ratio:	9.6:1	EPA Certificate:	TKHXB06.2HNL-009
Catalyst Required:	Yes		

EXHAUST EMISSION DATA (g/kW-hr):

	<u>LPG</u>	<u>NG</u>
CO ₂	908	725
NO _x	0.32	0.12
THC+NO _x *	0.04	0.0
CO	1.51	1.51
BSFC	304	244

*NG fuel is NMHC+NO_x

TEST METHODS AND CONDITIONS

Standby and overload ratings based on ISO 3046. Continuous ratings based on ISO 8528.

Nameplate power rating is measured at the flywheel operating at standard conditions in a test cell.

Production tolerances in engines and installed components can account for power variations of +/- 5%. Corrections for altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.

Electrical ratings are an estimate based on assumed fan and generator losses and may vary depending on actual equipment losses.

Emission rates are based on multi-mode, cycle-weighted testing in accordance with EPA regulations.

BSFC is based on cycle-weighted gross flywheel power rating and does not include fan or generator losses.

Data was taken from a single engine test according to EPA engine test methods, fuel specifications and reference conditions and is subject to instrumentation and engine-to-engine variability. Tests conducted with alternate test methods, instrumentation, fuel or reference conditions may yield different results.

Data and specifications subject to change without notice.

01/2026

Rev. -

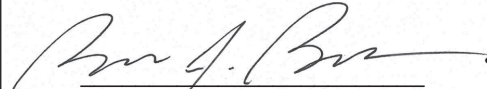


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2026 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: Discovery Energy, LLC.
(U.S. Manufacturer or Importer)
Certificate Number: TKHXB06.2HNL-009

Effective Date:
12/30/2025
Expiration Date:
12/31/2026


Byron J. Bunker, Division Director
Compliance Division

Issue Date:
12/30/2025
Revision Date:
N/A

Manufacturer: Discovery Energy, LLC.
Engine Family: TKHXB06.2HNL
Mobile/Stationary Certification Type: Stationary
Fuel : LPG/Propane
Natural Gas (CNG/LNG)
Emission Standards :
Part 60 Subpart JJJJ Table 1
VOC (g/Hp-hr) : 1.0
NOx (g/Hp-hr) : 2.0
CO (g/Hp-hr) : 4.0
Stationary Part 1048
NMHC + NOx (g/kW-hr) : 2.7
HC + NOx (g/kW-hr) : 2.7
CO (g/kW-hr) : 4.4
Emergency Use Only : Y

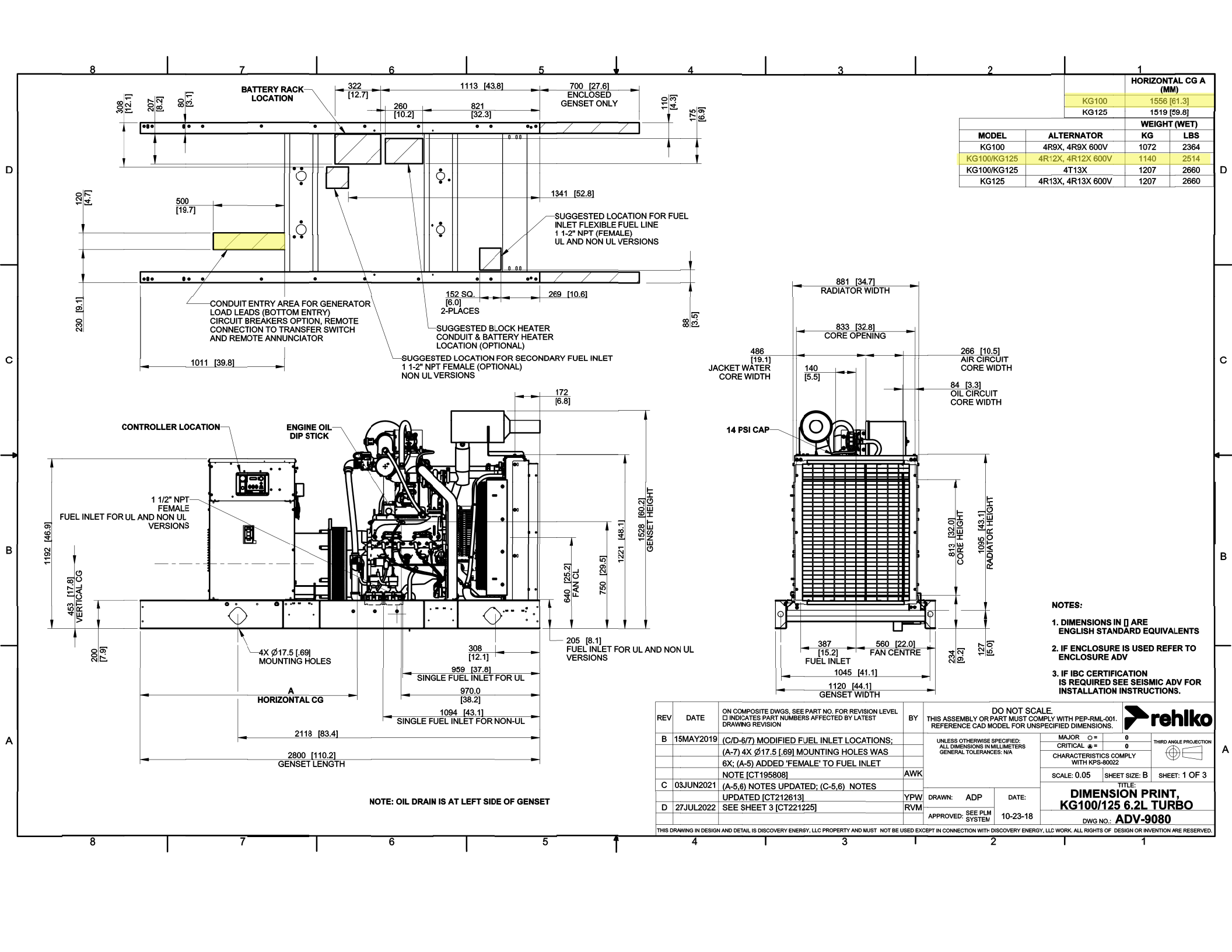
Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 40 CFR Part 60, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60, 40 CFR Part 60 and produced in the stated model year.

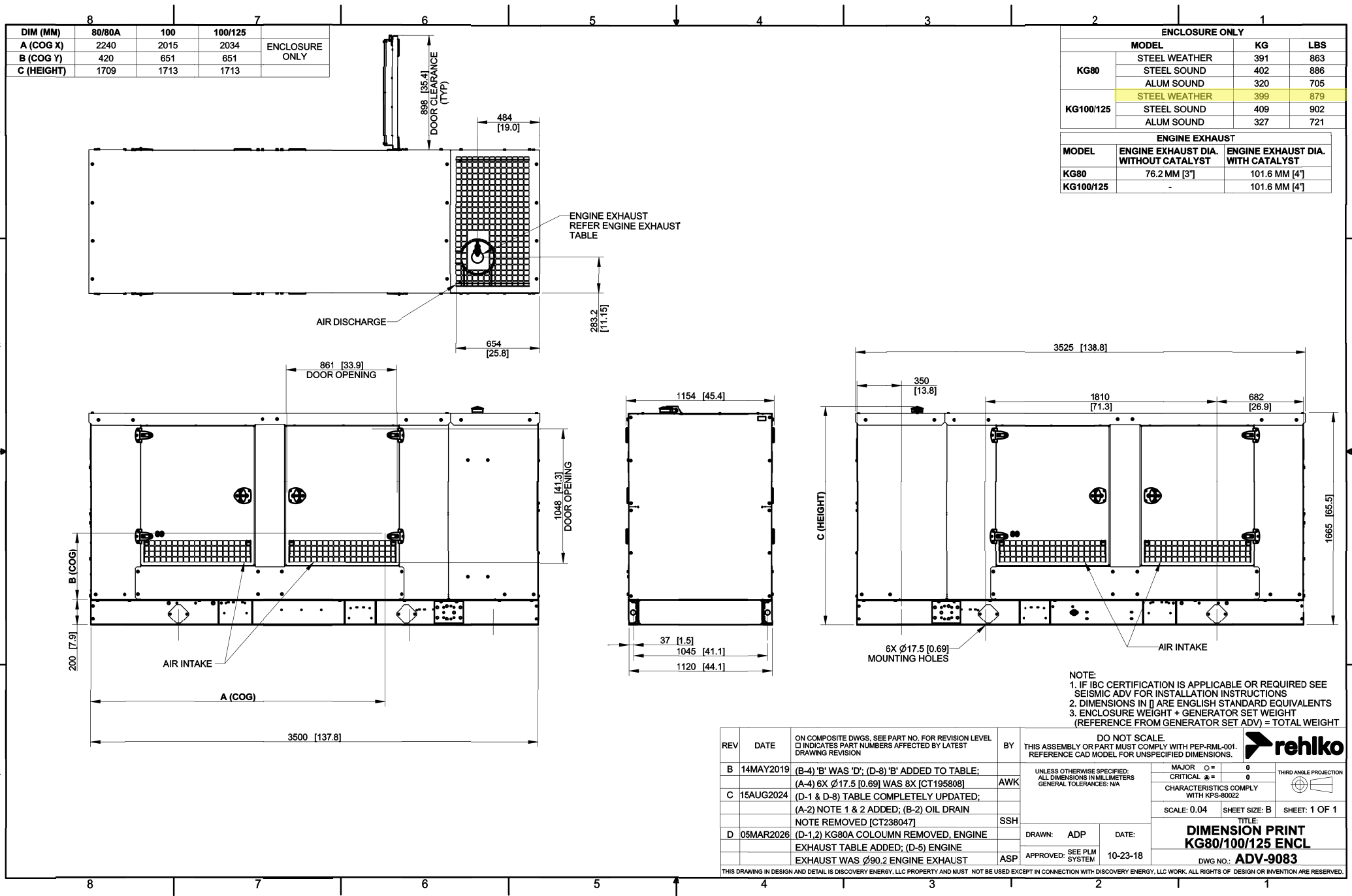
This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60, 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60, 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60, 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60, 40 CFR Part 60.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Dimensional Drawings





DIM (MM)	80/80A	100	100/125	ENCLOSURE ONLY
A (COG X)	2240	2015	2034	
B (COG Y)	420	651	651	
C (HEIGHT)	1709	1713	1713	

ENCLOSURE ONLY			
KG80	MODEL	KG	LBS
	STEEL WEATHER	391	863
	STEEL SOUND	402	886
	ALUM SOUND	320	705
KG100/125	STEEL WEATHER	399	879
	STEEL SOUND	409	902
	ALUM SOUND	327	721

ENGINE EXHAUST		
MODEL	ENGINE EXHAUST DIA. WITHOUT CATALYST	ENGINE EXHAUST DIA. WITH CATALYST
KG80	76.2 MM [3"]	101.6 MM [4"]
KG100/125	-	101.6 MM [4"]

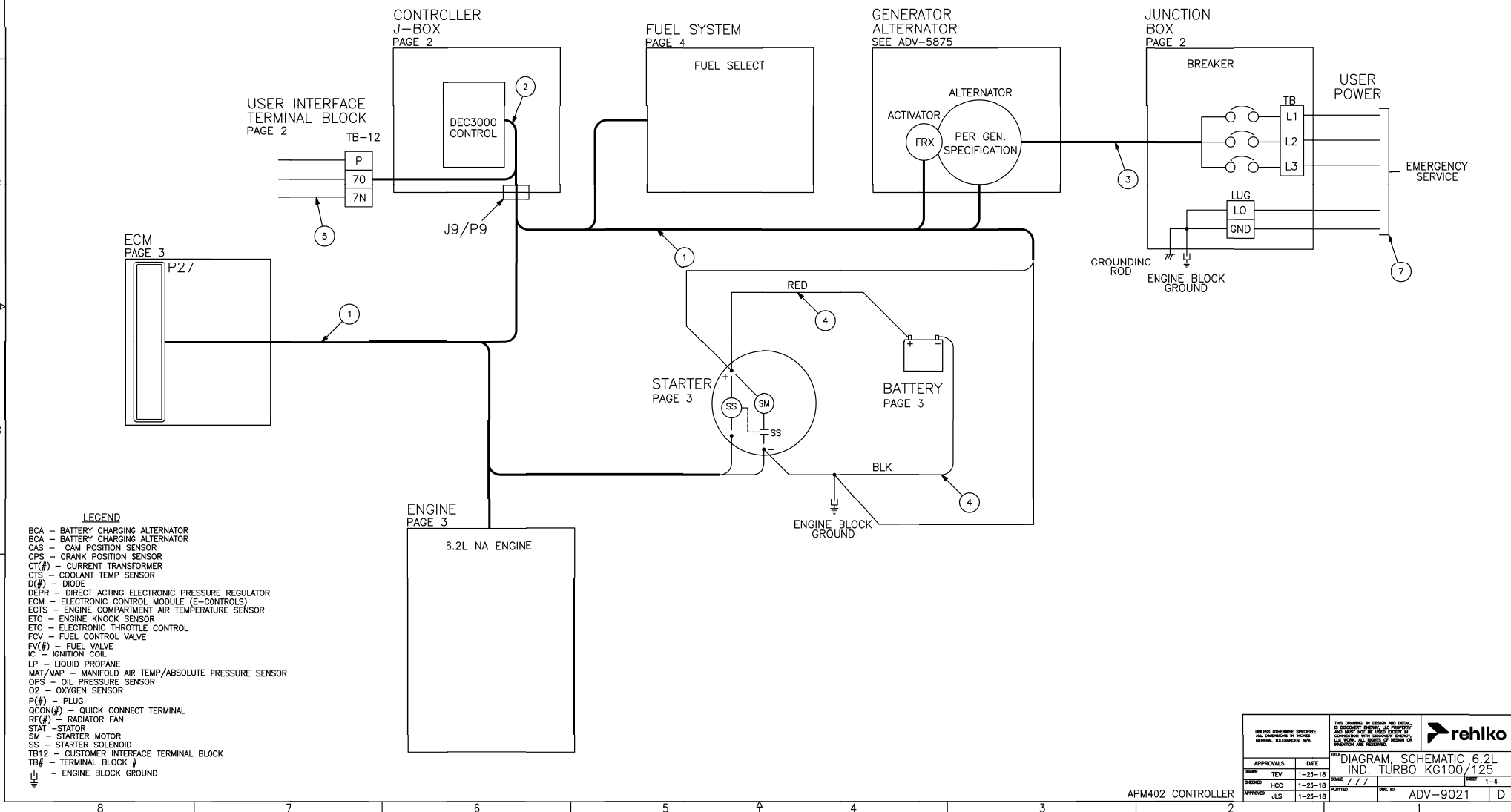
NOTE:
1. IF IBC CERTIFICATION IS APPLICABLE OR REQUIRED SEE SEISMIC ADV FOR INSTALLATION INSTRUCTIONS
2. DIMENSIONS IN [] ARE ENGLISH STANDARD EQUIVALENTS
3. ENCLOSURE WEIGHT + GENERATOR SET WEIGHT (REFERENCE FROM GENERATOR SET ADV) = TOTAL WEIGHT

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL D INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY	DO NOT SCALE. THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001. REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS.		
B	14MAY2019	(B-4) 'B' WAS 'D'; (D-8) 'B' ADDED TO TABLE; (A-4) 6X Ø17.5 [0.69] WAS 8X [CT195808]	AWK	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: NA		
C	15AUG2024	(D-1 & D-8) TABLE COMPLETELY UPDATED; (A-2) NOTE 1 & 2 ADDED; (B-2) OIL DRAIN NOTE REMOVED [CT238047]	SSH	MAJOR $\varnothing$ = 0 CRITICAL $\star$ = 0 THIRD ANGLE PROJECTION 		
D	05MAR2026	(D-1,2) KG80A COLUMN REMOVED, ENGINE EXHAUST TABLE ADDED; (D-5) ENGINE EXHAUST WAS Ø90.2 ENGINE EXHAUST	ASP	DRAWN: ADP APPROVED: SEE PLM SYSTEM	DATE: 10-23-18	
				SCALE: 0.04 SHEET SIZE: B SHEET: 1 OF 1 TITLE: DIMENSION PRINT KG80/100/125 ENCL DWG NO.: ADV-9083		
THIS DRAWING IN DESIGN AND DETAIL IS DISCOVERY ENERGY, LLC PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH DISCOVERY ENERGY, LLC WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.						

Wiring Schematics

No.	Part Numbers	Description	Options	Field
1	GM114085	Harness, Engine, 6.2L Ind. Turbo KG100/125	-	-
2	GM120587	Harness, Control, 6.2L Ind. Turbo, KG80/100/125	-	-
3	GMXXXX	48/60RCLB Voltage hookup cables	-	-
4	GMXXXX	Battery Cables	-	-
5	N/A	Utility wiring	-	X
6	N/A	Site network cables	-	X
7	N/A	Site emergency service wiring	-	X
8	-	-	-	-
9	-	-	-	-
10	-	-	-	-

REV	DATE	REVISION	BY
-	4-25-18	NEW DRAWING [CT186971]	TEV
A	1-29-19	UPDATES FROM PRE-PRO BUILD [CT193360]	TEV
B	5-6-19	SEE SHEETS 3 & 4 [CT195555]	SMH
C	04-16-20	SEE SHEET 3 [CT203384]	SBR
D	23AUG2023	0-8) UPDATED PARTS 1 & 2; SEE SHEET 3 [CT229742]	DAT

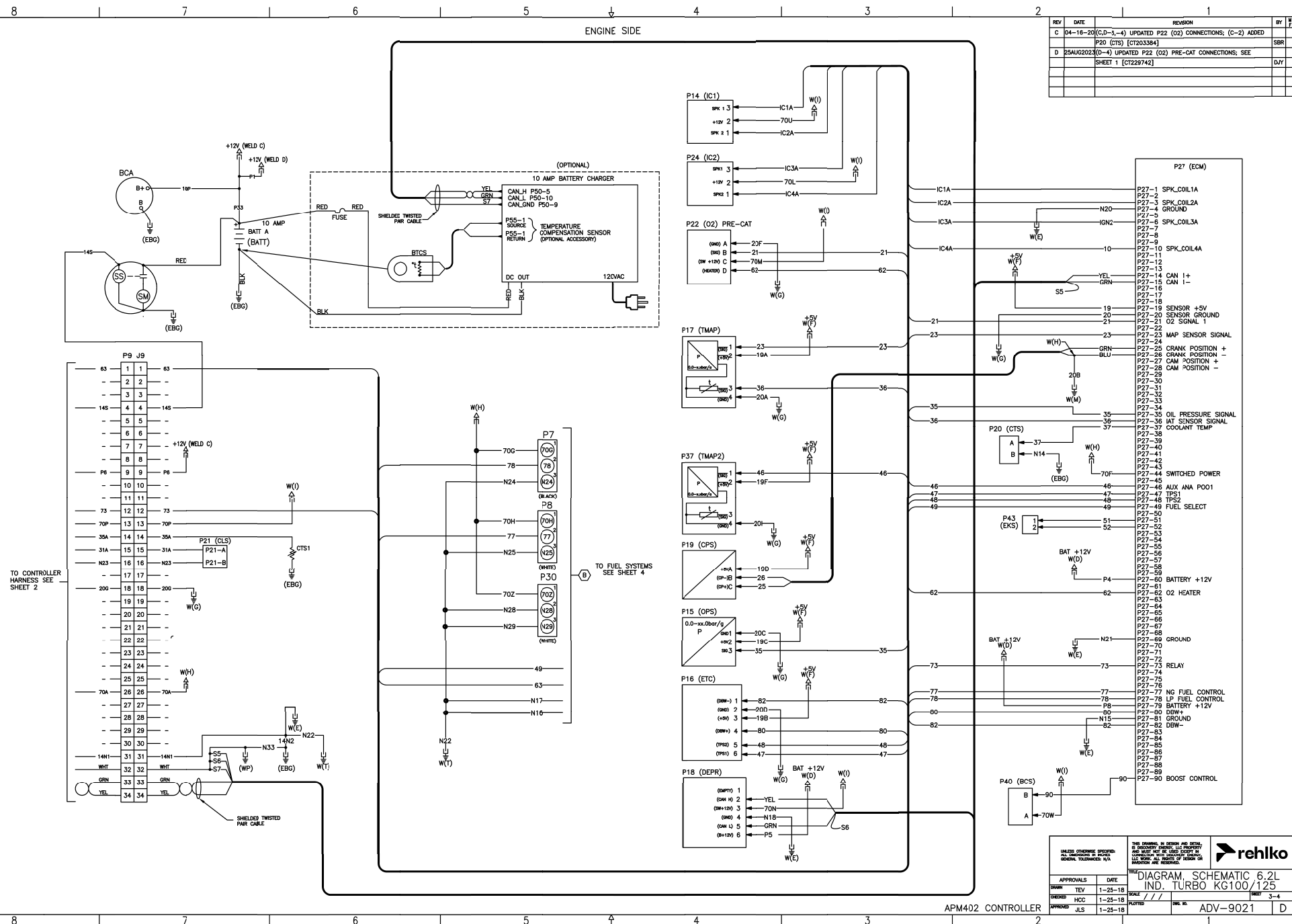


UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN INCHES GENERAL TOLERANCES: N/A		THIS DRAWING IS DESIGN AND DETAIL. IT IS THE PROPERTY OF REHLKO, LLC. NO PARTS MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT PERMISSION IN WRITING FROM REHLKO, LLC. ALL WORK AND RESULTS OF DESIGN OR CONSTRUCTION ARE PRESERVED.		rehlko	
APPROVALS		DATE		SHEET 1-4	
DESIGN TEV		1-25-18		SCALE 1-4	
CHECKED HCC		1-25-18		PLotted	
APPROVED JLS		1-25-18		DWG. NO. ADV-9021	

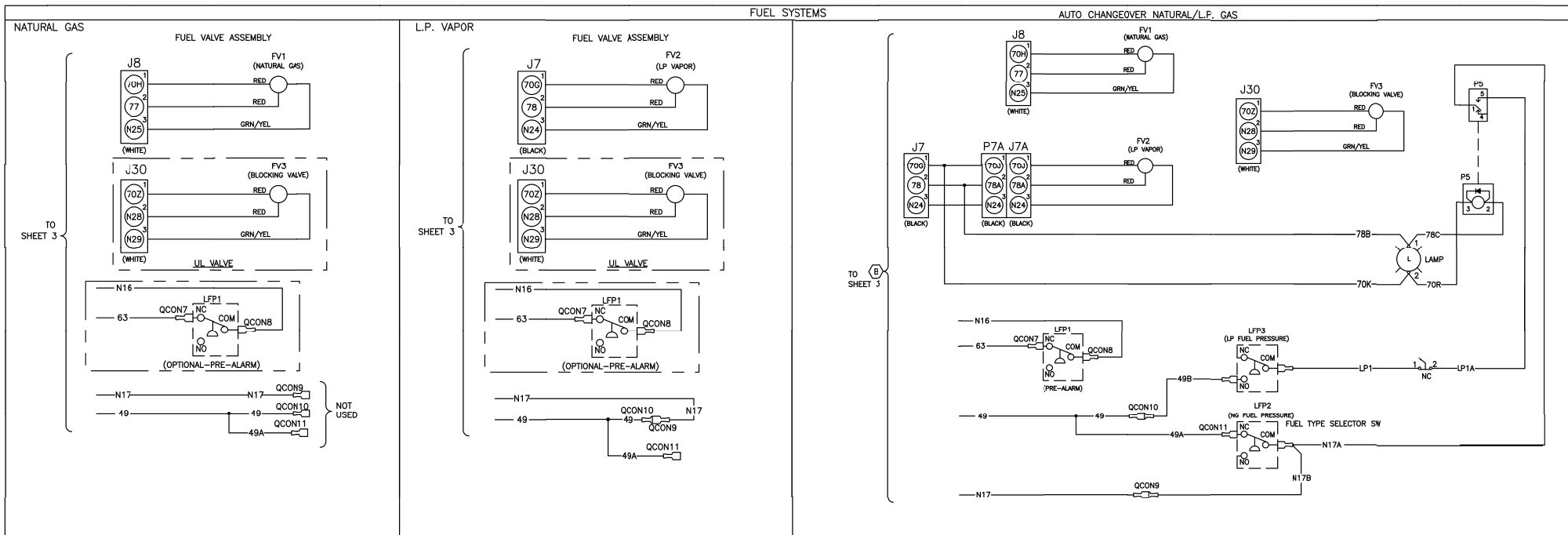
APM402 CONTROLLER

C

A

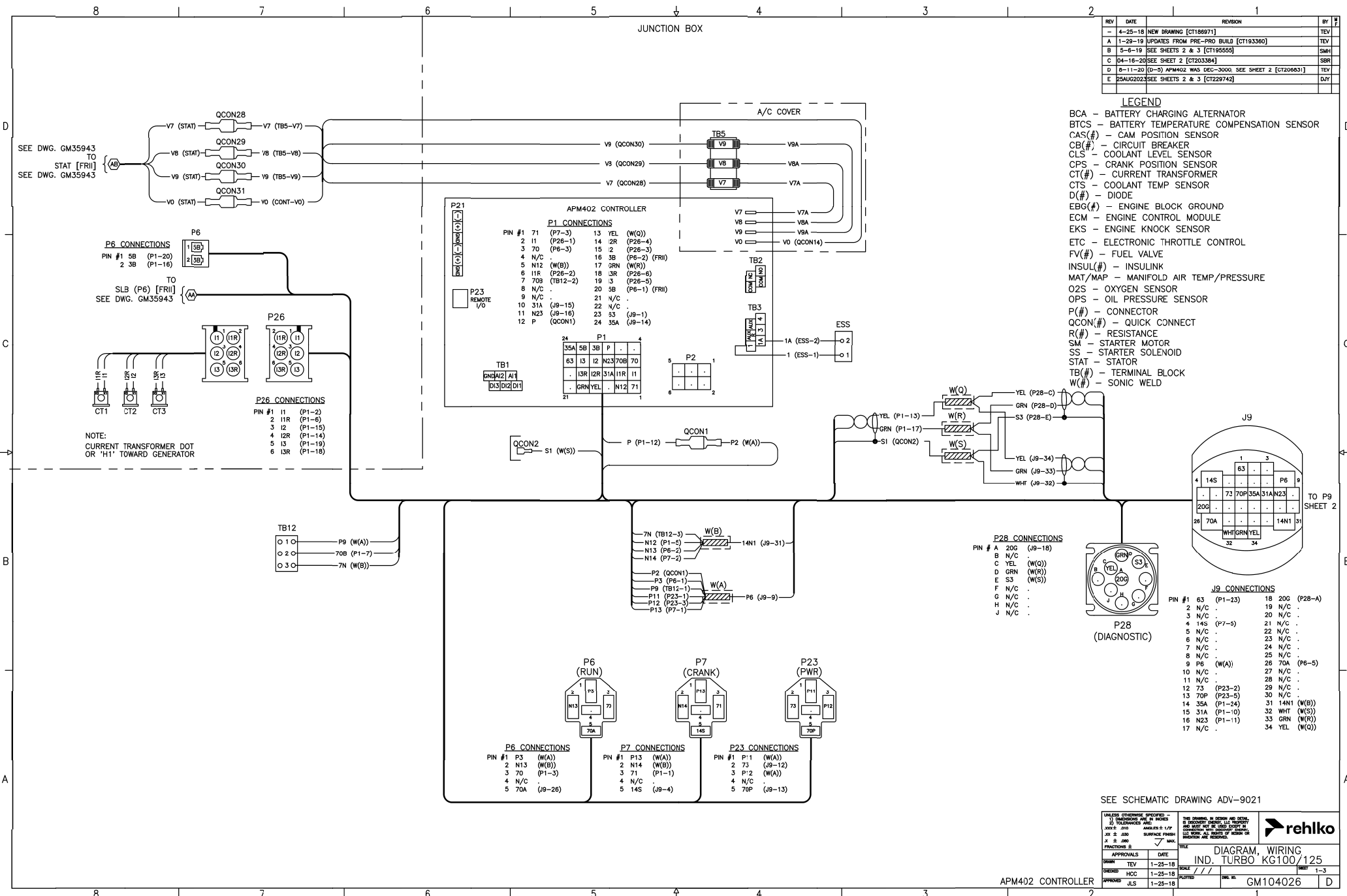


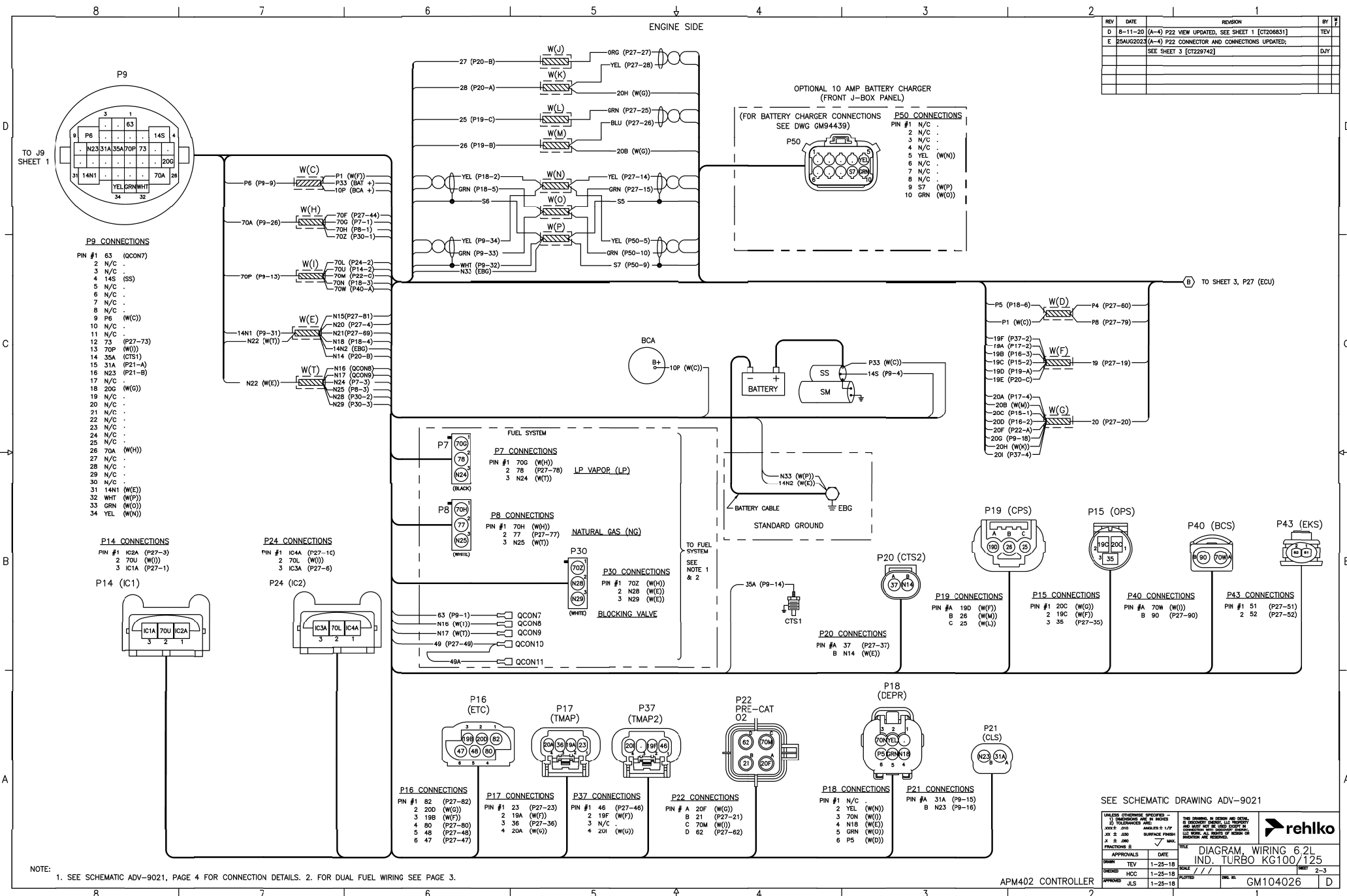
REV	DATE	REVISION	BY
-	4-25-18	NEW DRAWING [CT186971]	TEV
A	1-29-19	UPDATES FROM PRE-PRO BUILD [CT193360]	TEV
B	5-6-19	(B,C-2-3-4) AUTO CHANGEOVER LAYOUT IS UPDATED; SEE SHEET 3 [CT195555]	SMH
C	04-16-20	SEE SHEET 3 [CT2203394]	SMH
D	25AUG2023	SEE SHEET 1 & 3 [CT229742]	DJY



UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN INCHES GENERAL TOLERANCES: FRA		THIS DRAWING IS DESIGN AND DETAIL. NO MODIFICATIONS SHALL BE MADE WITHOUT THE WRITTEN APPROVAL OF THE DESIGNER. ALL MODIFICATIONS SHALL BE MADE IN THE MARGIN OF THIS DRAWING.		rehiko	
APPROVALS	DATE	TITLE: DIAGRAM, SCHEMATIC 6.2L IND. TURBO KG100/125		REV	4-4
DESIGN: TEV	1-25-18	SCALE: 1-25-18	PLotted	REV. NO.	ADV-9021
CHECKED: HCC	1-25-18	PLotted			
APPROVED: JLS	1-25-18				

APM402 CONTROLLER





NOTE: 1. SEE SCHEMATIC ADV-9021, PAGE 4 FOR CONNECTION DETAILS. 2. FOR DUAL FUEL WIRING SEE PAGE 3.

REV	DATE	REVISION	BY
D	8-11-20	SEE SHEET 1 & 2 [CT206831]	TEV
E	25AUG2023	(B-1) UPDATED DESTINATION FOR WIRES 21 AND 62; SEE SHEET 2 [CT229742]	DJY

(OPTIONAL)

J7 CONNECTIONS

PIN #1 70G (W(U))
2 78 (W(V))
3 N24 (P7A-3)

P7A CONNECTIONS

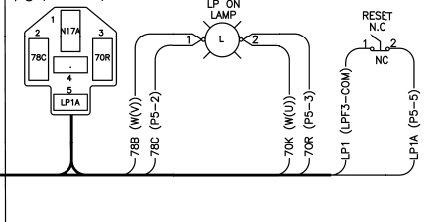
PIN #1 70J (W(U))
2 78A (W(V))
3 N24 (J7-3)

DUAL FUEL RESET BOX

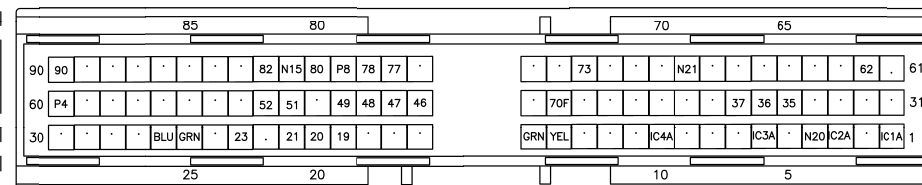
P5 CONNECTIONS

PIN #1 N17A (LPF2-COM)
2 78C (LAMP-1)
3 70R (LAMP-2)
4 N/C
5 LP1A (RESET N.C-2)

P5 (DUAL FUEL)



P27 (ENGINE ECU)



P27 CONNECTIONS

PIN #1	IC1A (P14-3)	PIN #46	46 (P37-1)
2	N/C	47	47 (P16-6)
3	IC2A (P14-1)	48	48 (P16-5)
4	N20 (W(E))	49	49 (QCON10)
5	N/C	50	N/C
6	IC3A (P24-3)	51	51 (P43-1)
7	N/C	52	52 (P43-2)
8	N/C	53	N/C
9	N/C	54	N/C
10	IC4A (P24-1)	55	N/C
11	N/C	56	N/C
12	N/C	57	N/C
13	N/C	58	N/C
14	YEL (W(N))	59	N/C
15	GRN (W(O))	60	P4 (W(D))
16	N/C	61	N/C
17	N/C	62	62 (P22-D)
18	N/C	63	N/C
19	19 (W(F))	64	N/C
20	20 (W(G))	65	N/C
21	21 (P22-B)	66	N/C
22	N/C	67	N/C
23	23 (P17-1)	68	N/C
24	N/C	69	N21 (W(E))
25	GRN (W(L))	70	N/C
26	BLU (W(M))	71	N/C
27	N/C	72	N/C
28	N/C	73	73 (P9-12)
29	N/C	74	N/C
30	N/C	75	N/C
31	N/C	76	N/C
32	N/C	77	77 (P8-2)
33	N/C	78	78 (P7-2)
34	N/C	79	P8 (W(D))
35	35 (P15-3)	80	80 (P16-4)
36	36 (P17-3)	81	81 N15 (W(E))
37	37 (P20-A)	82	82 (P16-1)
38	N/C	83	N/C
39	N/C	84	N/C
40	N/C	85	N/C
41	N/C	86	N/C
42	N/C	87	N/C
43	N/C	88	N/C
44	70F (W(H))	89	N/C
45	N/C	90	90 (P40-B)

TO SHEET 2 (B)

SEE SCHEMATIC DRAWING ADV-9021

UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: DIMENSIONS > 10mm ± 0.1mm DIMENSIONS ≤ 10mm ± 0.05mm 3) SURFACE FINISH: A: 0.8μm B: 0.4μm C: 0.2μm	THIS DRAWING IS DESIGNED AND DETAIL IS SUBJECT TO CHANGE. ALL DIMENSIONS AND WEIGHTS ARE TO BE USED EXCEPT IN CASES WHERE THE WEIGHTS OF MATERIALS AND WEIGHTS ARE SPECIFIED.	reliko
APPROVALS	DATE	SCALE
TEV	1-25-18	3-3
HCC	1-25-18	PLATED
JLS	1-25-18	DRG. NO.
DIAGRAM, WIRING 6.2L IND. TURBO KG100/25		CM104026

APM402 CONTROLLER

2

1

D

8

3

2

1

P29 2 AMP RELAY OUTPUT (2.1) CONNECTIONS.

P29-NC 2.1 RELAY NORMALLY CLOSED
P29-COM 2.1 RELAY COMMON
P29-NO 2.1 RELAY NORMALLY OPEN

P30 2 AMP RELAY OUTPUT (2.2) CONNECTIONS.

P30-NC 2.2 RELAY NORMALLY CLOSED
P30-COM 2.2 RELAY COMMON
P30-NO 2.2 RELAY NORMALLY OPEN

P31 2 AMP RELAY OUTPUT (2.3) CONNECTIONS.

P31-NC 2.3 RELAY NORMALLY CLOSED
P31-COM 2.3 RELAY COMMON
P31-NO 2.3 RELAY NORMALLY OPEN

P32 10 AMP RELAY OUTPUT (2.4 & 2.5) CONNECTIONS.

P32-NO 2.4 RELAY NORMALLY OPEN
P32-COM 2.4 RELAY COMMON
P32-NC 2.4 RELAY NORMALLY CLOSED
P32-NO 2.5 RELAY NORMALLY OPEN
P32-COM 2.5 RELAY COMMON
P32-NC 2.5 RELAY NORMALLY CLOSED

P27 CAN TERMINATOR CONNECTIONS.

PLACE THE P27 JUMPER ON THE "IN" PINS

P28 SINGLE-ENDED (0-5V) ANALOG INPUT CONNECTIONS.

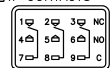
P28-GND AGND ANALOG RETURN
P28-VN2 AGND NO CONNECTION
P28-VP2 AGND SIGNAL
P28-+5V SUPPLY (0.05 AMP MAX)
P28-GND AGND ANALOG RETURN
P28-VN1 AGND NO CONNECTION
P28-VP1 AGND SIGNAL
P28-+5V SUPPLY (0.05 AMP MAX)

P28 DIFFERENTIAL (+/-3V) ANALOG INPUT CONNECTIONS.

P28-GND AGND ANALOG REFERENCE
P28-VN2 AGND NEGATIVE DIFFERENTIAL SIGNAL
P28-VP2 AGND POSITIVE DIFFERENTIAL SIGNAL
P28-+5V SUPPLY (0.05 AMP MAX)
P28-GND AGND ANALOG RETURN
P28-VN1 AGND NEGATIVE DIFFERENTIAL SIGNAL
P28-VP1 AGND POSITIVE DIFFERENTIAL SIGNAL
P28-+5V SUPPLY (0.05 AMP MAX)

NOTE: CONTACT AUTHORIZED DISTRIBUTOR TO DEFINE P28 A/D INPUTS.

RELAY CONTACTS



RUN RELAY (OPTIONAL)

TB10-8 (70): BATTERY VOLTAGE PRESENT ONLY WHEN GENERATOR IS OPERATING

TB2 NOTE: IF SHUNT TRIP OR FAILURE RELAY IS NOT USED. DISCONNECT & TAPE LEADS 2 & 32A.

AUX SHUTDOWN SWITCH (CUSTOMER PROVIDED)

ENGINE START SWITCH (CUSTOMER PROVIDED)

LOCAL EMERGENCY STOP SWITCH (STANDARD)

REMOTE EMERGENCY STOP SWITCH (OPTIONAL)

REMOTE EMERGENCY STOP SWITCH CONNECTIONS

TO ENGINE HARNESS

PRIME POWER SWITCH

GROUND FAULT

HIGH ENCLOSURE TEMP (20RE0ZK-C ONLY)

RJ-45 PACTH CABLE

TO DRY CONTACT BOARD(S) SHEET 3

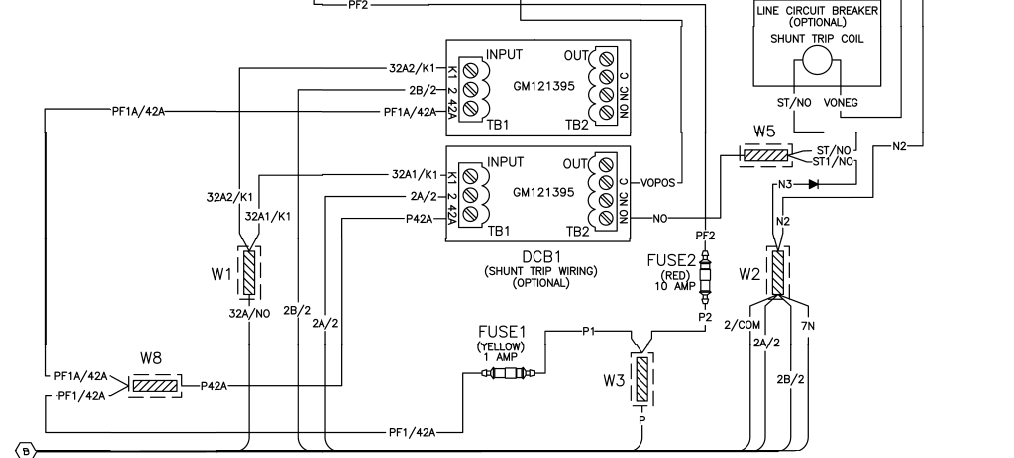
NOTE: TB2 RELAY OUTPUT MAY BE REDEFINED - FACTORY DEFAULT LISTED. CONTACT AUTHORIZED DISTRIBUTOR FOR DETAILS. CUSTOMER TO CONNECT TO TB2 UNLESS SHUNT TRIP IS USED. IF SHUNT TRIP IS USED, CUSTOMER TO CONNECT TO DCB2 FOR COMMON FAULT.

NOTE: TB2 RELAY OUTPUT MAY BE REDEFINED - FACTORY DEFAULT LISTED. CONTACT AUTHORIZED DISTRIBUTOR FOR DETAILS.

NOTE: TB2 RELAY OUTPUT MAY BE REDEFINED - FACTORY DEFAULT LISTED. CONTACT AUTHORIZED DISTRIBUTOR FOR DETAILS.

USING GM121395 RELAY W/ DC-DC CONVERTER

DCB2 (COMMON FAILURE RELAY) (NOT AVAILABLE AS A STANDALONE KIT) (OPTIONAL, INCLUDED IN SHUNT TRIP KIT) SEE TB2 RELAY OUTPUT NOTE



Miscellaneous

OVERVIEW:
THE AUTOMATIC MULTI-LEVEL FLOAT/ EQUALIZE CHARGER SPECIFIED BELOW IS INTENDED TO CHARGE ENGINE STARTING BATTERIES EITHER INDEPENDENT OR IN CONJUNCTION WITH AN ENGINE DRIVEN CHARGING SYSTEM.

BATTERY TYPES TO BE CHARGED:
LEAD ACID
GEL CELL

INPUT:
INPUT VOLTAGE: 90-135 VOLTS AC
INPUT FREQUENCY: 50/60 Hz

INPUT LEAD:
APPROXIMATELY 2.5M (96") (REF) TYPE SJTOW -40°C TO 105°C UL RATED WIRE.
TERMINATED IN PRE-MOLDED US STYLE 120 V 3 PRONG AC PLUG.

DC OUTPUT:
AUTOMATIC FLOAT EQUALIZE
STEADY FULL LOAD CURRENT: 6 AMPS
BULK
ABSORPTION VOLTAGE: 14.0-14.5 VOLTS @ 1.5-5.0 AMPS
FLOAT VOLTAGE: 13.3-14.5 VOLTS @ 0.1-1.5 AMPS
BULK TO ABSORPTION TRANSITION: 14.0 VOLTS
ABSORPTION TO FLOAT TRANSITION: 1.5 AMPS
CURRENT LIMIT 7 AMPS
OUTPUT POWER LIMITS: 70 +2/-5 WATTS
FLOAT TO ABSORPTION TRANSITION: 2.06 VOLTS PER CELL
LINE REGULATION ACROSS INPUT
VOLTAGE RANGE: 1%
SPARK PROTECTION
CONNECTION AND OPERATION

OUTPUT LEAD:
APPROX. 2.5M (96") (REF) TYPE SJTOW -50°C TO 105°C UL RATED WIRE WITH RED AND BLACK WIRE INSULATION. TERMINATED IN 9.5 mm (REF) RING STYLE TERMINALS.

FUSES:
THE FUSE MUST BE LOCATED APPROXIMATELY 5" FROM RING TERMINAL ON RED OUTPUT LEAD.
DC OUTPUT: RATED PER UL (125% RATED OUTPUT)

ISOLATION:
INPUT TO OUTPUT: 2500V

ENVIRONMENTAL:
STORAGE TEMPERATURE RANGE: -40 TO +70°C (-40 TO +158°F)
OPERATING TEMPERATURE RANGE: -40 TO +70°C (-40 TO +158°F)
HUMIDITY: 0 TO 100% (CONDENSING)
VIBRATION AND SHOCK: UL991

REVERSE POLARITY PROTECTION:
THE CHARGER SHALL SUSTAIN NO DAMAGE WHEN INCORRECTLY CONNECTED TO THE BATTERY IN REVERSE ORIENTATION.

MOUNTING:
SHALL HAVE INTEGRAL MTG. FLANGES.

ENCLOSURE:
SHALL PROTECT THE CHARGER COMPONENTS FROM RAIN, SNOW, DUST AND DRIPPING WATER. ALL INTERNAL COMPONENTS PROTECTED FROM WATER DROPLETS.

INDICATORS:
SHALL HAVE CHARGE INDICATOR LAMP TO INDICATE BULK CHARGE AND FLOAT CHARGE CYCLES.

OPERATIONAL:
CAPABLE OF WITHSTANDING AN INDEFINITE OUTPUT SHORT CIRCUIT WITHOUT DAMAGE TO THE CHARGER.
SHALL OPERATE PROPERLY AND SUSTAIN NO DAMAGE WHEN CONNECTED TO INPUT POWER WHILE CONNECTED TO THE BATTERY AND CHARGING SYSTEM OF ENGINE WHILE ENGINE IS CRANKED, RUNNING OR SHUTDOWN.

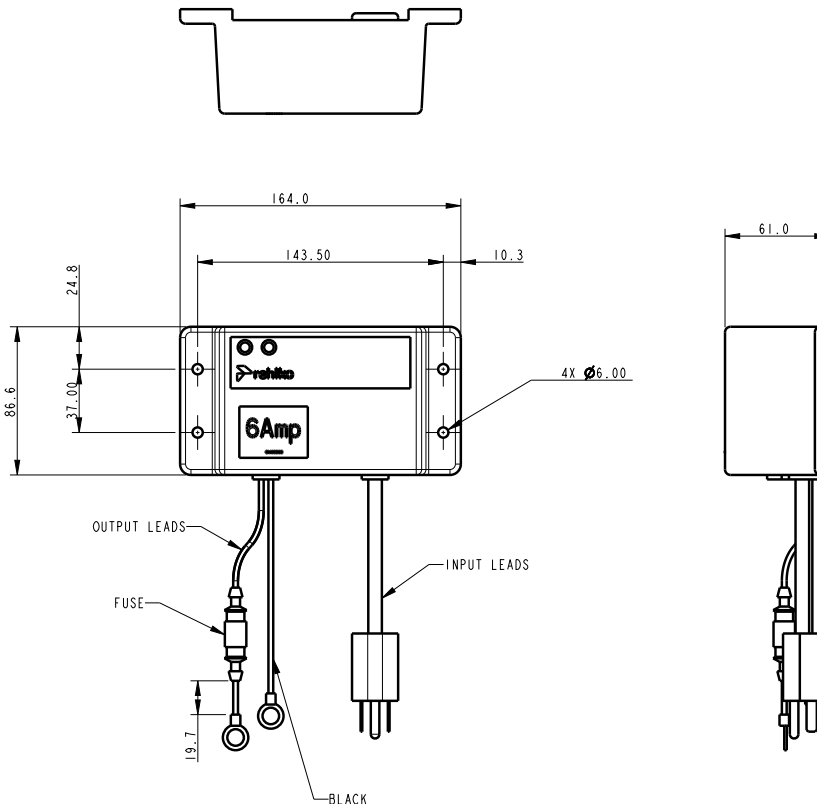
DOCUMENTATION:
THERE SHALL BE AN INSTALLATION / OPERATIONAL MANUAL SUPPLIED WITH EACH CHARGER.
PER SUPPLIED ARTWORK.

CERTIFICATIONS (US AND CANADA):
MUST COMPLY WITH UL2200
UL1236
MUST MEET CSA REQUIREMENTS
EMI / RFI FCC CLASS B COMPLIANT AFTER CHARGER DATE CODE 8/26/04

PRODUCT LABELING:
THE LABEL ATTACHED TO THE CHARGER SHALL HAVE THE FOLLOWING INFORMATION:
UL LISTING
PART NUMBER
DESCRIPTION OF ALL INDICATOR
ALLOWABLE RANGE OF BATTERY UNIT CAPACITY
ALLOWABLE BATTERY TYPES
OUTPUT CURRENT AND VOLTAGE
INPUT VOLTAGE AND FREQUENCY

PACKAGING LABEL:
THE PACKAGING LABEL SHALL CONTAIN THE FOLLOWING INFORMATION:
P/N
DESCRIPTION - BATTERY CHARGER
MFG. MODEL NO.
MFG. PART NUMBER
DATE CODE

WARRANTY:
2 YEAR FROM DATE OF PURCHASE FROM MANUFACTURE.



REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL □ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY	DO NOT SCALE. THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001. REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS.	
-	11-8-16	NEW DRAWING [CT164513]	SAM	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: X.XX ± 0.25 X.X ± 1.0 SURFACE FINISH X.X ± 1.0 BEND ANGLES ± 30° MAX.	MAJOR 0 CRITICAL 0 THIRD ANGLE PROJECTION
A	28AUG2025	(C-4) BRANDING UPDATE; (D-8) 2.5M (96") WAS 1.8M (72"); (C-8) 2.5M (96") WAS 1.2M (48")	PSC	DRAWN: SAM DATE: 11-8-16 APPROVED: SEE PLM SYSTEM	CHARACTERISTICS COMPLY WITH KPS-80022 SCALE: 0.35 SHEET SIZE: B SHEET: 1 OF 1 TITLE: BATTERY CHARGER 12V, 6A DWG NO.: GM96383

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8		7		6		5		4		3		2		1	
PART NO.	PART REV	DESCRIPTION	AMPS	INTERRUPT kA @480 VAC	CONNECTION TYPE		POLES	RATING	TRIP TYPE	MAGNETIC TRIP ONLY		SQUARE D PART NO.			
					LINE	LOAD				FULL LOAD AMPS	ADJUSTABLE TRIP RANGE				
GM47475-8	C	BREAKER, CIRCUIT 150A HDL	150	18	AL150HD LUGS	AL150HD LUGS	3	80%	THERMAL MAGNETIC	-	-	HDL38150			
GM47475-48	D	BREAKER, CIRCUIT 150A HDP		18	TERMINAL NUTS	AL150HD LUGS	3	80%	THERMAL MAGNETIC	-	-	HDP38150TX			
GM47475-49	D	BREAKER, CIRCUIT 150A HDP		18	TERMINAL NUTS	AL150HD LUGS	3	100%	THERMAL MAGNETIC	-	-	HDP38150CTX			
GM47475-50	D	BREAKER, CIRCUIT 150A HJP		65	TERMINAL NUTS	AL150HD LUGS	3	-	MAGNETIC ONLY	58-130	348-1690	HJP38150M74TX			
GM47475-77	-	BREAKER, CIRCUIT 150A HDP		18	TERMINAL NUTS	AL150HD LUGS	3	80%	MICROLOGIC 3.2 LI	-	-	HDP38150U31XTX			
GM47475-78	-	BREAKER, CIRCUIT 150A HDP		18	TERMINAL NUTS	AL150HD LUGS	3	80%	MICROLOGIC 3.2S LSI	-	-	HDP38150U33XTX			
GM47475-79	-	BREAKER, CIRCUIT 150A HDP		18	TERMINAL NUTS	AL150HD LUGS	3	80%	MICROLOGIC 6.2A LSIG	-	-	HDP38150U44XTX			
GM47475-80	-	BREAKER, CIRCUIT 150A HDP		18	TERMINAL NUTS	AL150HD LUGS	3	100%	MICROLOGIC 3.2 LI	-	-	HDP38150CU31XTX			
GM47475-81	-	BREAKER, CIRCUIT 150A HDP		18	TERMINAL NUTS	AL150HD LUGS	3	100%	MICROLOGIC 3.2S LSI	-	-	HDP38150CU33XTX			
GM47475-82	-	BREAKER, CIRCUIT 150A HDP		18	TERMINAL NUTS	AL150HD LUGS	3	100%	MICROLOGIC 6.2A LSIG	-	-	HDP38150CU44XTX			
GM47475-83	-	BREAKER, CIRCUIT 150A HGP		35	TERMINAL NUTS	AL150HD LUGS	3	80%	MICROLOGIC 3.2 LI	-	-	HGP38150U31XTX			
GM47475-84	-	BREAKER, CIRCUIT 150A HGP		35	TERMINAL NUTS	AL150HD LUGS	3	80%	MICROLOGIC 3.2S LSI	-	-	HGP38150U33XTX			
GM47475-85	-	BREAKER, CIRCUIT 150A HGP		35	TERMINAL NUTS	AL150HD LUGS	3	80%	MICROLOGIC 6.2A LSIG	-	-	HGP38150U44XTX			
GM47475-86	-	BREAKER, CIRCUIT 150A HGP		35	TERMINAL NUTS	AL150HD LUGS	3	100%	MICROLOGIC 3.2 LI	-	-	HGP38150CU31XTX			
GM47475-87	-	BREAKER, CIRCUIT 150A HGP		35	TERMINAL NUTS	AL150HD LUGS	3	100%	MICROLOGIC 3.2S LSI	-	-	HGP38150CU33XTX			
GM47475-88	-	BREAKER, CIRCUIT 150A HGP		35	TERMINAL NUTS	AL150HD LUGS	3	100%	MICROLOGIC 6.2A LSIG	-	-	HGP38150CU44XTX			
GM47475-89	-	BREAKER, CIRCUIT 150A HDP		18	TERMINAL NUTS	AL150HD LUGS	2	100%	THERMAL MAGNETIC	-	-	HDP28150CTX			
GM47475-102	- □	BREAKER, CIRCUIT 150A HGL, 2P		35	AL150HD LUGS	AL150HD LUGS	2	80%	THERMAL MAGNETIC	-	-	HGL28150			
GM47475-103	- □	BREAKER, CIRCUIT 150A HGL, 3P		35	AL150HD LUGS	AL150HD LUGS	3	80%	THERMAL MAGNETIC	-	-	HGL38150			
GM47475-104	- □	BREAKER, CIRCUIT 150A HGL, 2P		35	AL150HD LUGS	AL150HD LUGS	2	100%	THERMAL MAGNETIC	-	-	HGL28150C			
GM47475-105	- □	BREAKER, CIRCUIT 150A HGL, 3P		35	AL150HD LUGS	AL150HD LUGS	3	100%	THERMAL MAGNETIC	-	-	HGL38150C			
GM47475-106	- □	BREAKER, CIRCUIT 150A HGL, 2P		35	AL150HD LUGS	AL150HD LUGS	2	80%	MICROLOGIC 3.2 LI	-	-	HGL28150U31X			
GM47475-107	- □	BREAKER, CIRCUIT 150A HGL, 3P		35	AL150HD LUGS	AL150HD LUGS	3	80%	MICROLOGIC 3.2 LI	-	-	HGL38150U31X			
GM47475-108	- □	BREAKER, CIRCUIT 150A HGL, 2P		35	AL150HD LUGS	AL150HD LUGS	2	100%	MICROLOGIC 3.2 LI	-	-	HGL28150CU31X			
GM47475-109	- □	BREAKER, CIRCUIT 150A HGL, 3P		35	AL150HD LUGS	AL150HD LUGS	3	100%	MICROLOGIC 3.2 LI	-	-	HGL38150CU31X			
GM47475-116	- □	BREAKER, CIRCUIT 150A HLL, 3P		100	AL150HD LUGS	AL150HD LUGS	3	80%	THERMAL MAGNETIC	-	-	HLL38150			
GM47475-117	- □	BREAKER, CIRCUIT 150A HLL, 2P		100	AL150HD LUGS	AL150HD LUGS	2	80%	THERMAL MAGNETIC	-	-	HLL28150			
GM47475-118	- □	BREAKER, CIRCUIT 150A HLL, 3P		100	AL150HD LUGS	AL150HD LUGS	3	100%	THERMAL MAGNETIC	-	-	HLL38150C			
GM47475-119	- □	BREAKER, CIRCUIT 150A HLL, 2P		100	AL150HD LUGS	AL150HD LUGS	2	100%	THERMAL MAGNETIC	-	-	HLL28150C			
GM47475-120	- □	BREAKER, CIRCUIT 150A HLL, 3P		100	AL150HD LUGS	AL150HD LUGS	3	80%	MICROLOGIC 3.2 LI	-	-	HLL38150U31X			
GM47475-121	- □	BREAKER, CIRCUIT 150A HLL, 3P		100	AL150HD LUGS	AL150HD LUGS	3	100%	MICROLOGIC 3.2 LI	-	-	HLL38150CU31X			

SQUARE D H-FRAME
800V

REV

DATE

ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL.
□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION

BY

-

22APR2022

ADDED SHEET 3; (C-2-8) ADDED

GM47475-102 THRU GM47475-109 &

GM47475-116 THRU -121; [CT216232]

ZHK

DO NOT SCALE.

THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001. REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS.

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES:
XX ± 0.25
XX ± 1.0
X ± 1.5
ANGLES 40° BY
BEND ANGLES ± 1°

SURFACE FINISH

✓ MAX.

MAJOR ○ = 0

CRITICAL ● = 0

THIRD ANGLE PROJECTION

CHARACTERISTICS COMPLY WITH KPS-80022

SCALE: 1.25

SHEET SIZE: B

SHEET: 3 OF 4

DRAWN: WSD

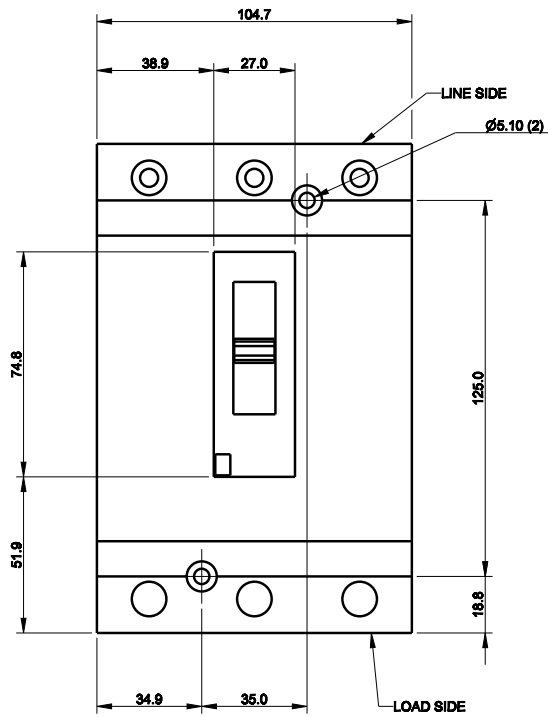
DATE: 16NOV2021

APPROVED: SEE PLAN SYSTEM

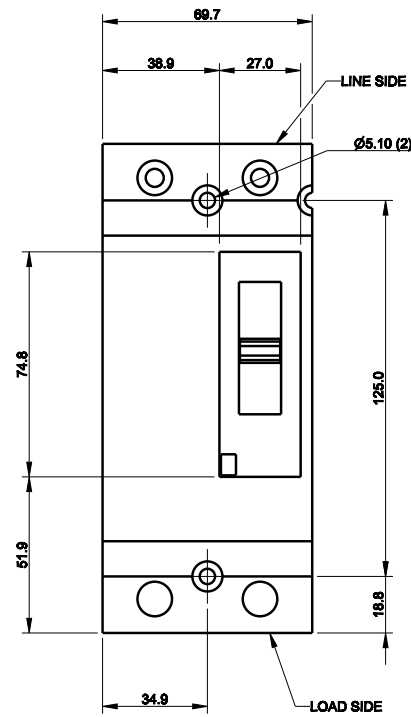
TITLE: DWG, CIRCUIT BREAKER

DWG NO.: GM47475-CMP

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3 POLE BREAKER



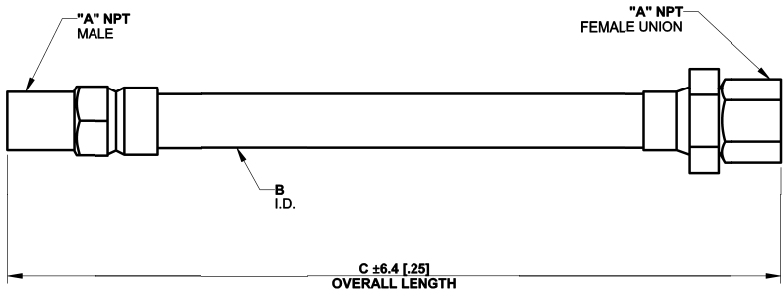
2 POLE BREAKER

SQUARE D H-FRAME
600V

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL □ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY	DO NOT SCALE. THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001. REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS.		
F	11-4-15	SEE SHEET 2 [CT127756]	DDH	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: XX ± 0.25 XX ± 1.0 X ± 1.5 ANGLES 45° BY BEND ANGLES ± 1°		
G	10-24-17	SEE SHEETS 1 & 2 [CT180597]	WSD			
H	22APR2022	SEE SHEET 2 & 3 [CT216232]	ZHK			
				SURFACE FINISH MAX.		
				DRAWN: WSD	DATE:	
				APPROVED: SEE PLM SYSTEM	4-13-12	
				MAJOR ○ = 0 CRITICAL ● = 0 THIRD ANGLE PROJECTION SCALE: 0.62 SHEET SIZE: B SHEET: 4 OF 4 TITLE: DWG, CIRCUIT BREAKER DWG NO.: GM47475-CMP		

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PART NO.	REV		A	B	C		SERVICE ONLY
					MM	IN	
X-504-1	AT	☐	1/2	1/2	304.8	12	
X-504-2	AS		3/4	3/4	304.8	12	X
X-504-12	AS		3/8	3/8	385.8	15 3/16	
X-504-16 *	AT	☐	2	2	457.2	18	
X-504-17	AS		1	1	508.0	20	X
X-504-18	AS		3/4	3/4	730.3	28 3/4	X
X-504-20 *	AT	☐	1	1	736.6	29	
X-504-21 *	AV	☐	1	1	457.2	18	
X-504-22 *	AV	☐	1 1/2	1 1/2	717.6	28 1/4	
X-504-23	AS		1	1	342.9	13 1/2	
X-504-25 *	AU	☐	1/4	3/8	1066.8	42	
X-504-26 *	AU	☐	3	3	838.2	33	
X-504-27 *	A	☐	2	2	825	32 1/2	
THIS IS A MANUAL TABLE							



NOTE:
PAINT MALE ENDS OF FUEL LINE
1200° F, HIGH TEMPERATURE BLACK.

MATERIAL:
ANNULAR CORRUGATED BRONZE/STAINLESS STEEL HOSE WITH BRONZE/
STAINLESS STEEL TUBULAR WIRE BRAID OR EQUIV.

FITTINGS:
FEMALE UNION - STEEL OR BRASS (NO GALVANIZED FITTING)
ALL FLUX USED IN BRAZING MUST BE REMOVED.
INSTALL HAND TIGHT.
* PRODUCT SHALL MEET UL 536 AND
ULC ORD-C536 FOR CANADA
-USE-
NATURAL GAS, LP FUEL, GASOLINE, DIESEL FUEL, WATER & OIL.

REV		DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL □ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY	DO NOT SCALE. THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001. REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS.			
BA	10-9-19	(B-1,2) NOTE "PRODUCT SHALL MEET UL 536...CANADA" WAS "MUST MEET CSA B149"; (C-1,2) MATERIAL NOTE UPDATED; (D-4) X-504-1: "" SYMBOL REMOVED; (B-4) "PEP-RML-001" NOTE ADDED; (D-1,2) VIEW & NOTES UPDATED [CT199012]	DKO	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: X.XX ± 0.25 X.X ± 1.0 X ± 1.5 ANGLES 40° 30' BEND ANGLES ± 1°  MAX.	MAJOR 	0	 THIRD ANGLE PROJECTION	
			CRITICAL 		0			
			CHARACTERISTICS COMPLY WITH KPS-80022					
					SCALE: 0.85	SHEET SIZE: B	SHEET: 1 OF 1	
			YBY	DRAWN: DKO	DATE:	TITLE: DWG, LINE, FLEX FUEL		
				APPROVED: SEE PLM SYSTEM	11-19-62	DWG NO.: X-504		
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Warranty

Stationary Standby Industrial Generator Set Extended Five-Year or Three Thousand (3000)-Hour Comprehensive Limited Warranty

Your product has been manufactured and inspected with care by experienced craftsmen. If you are the original end user, Discovery Energy, LLC and its affiliates dba Rehlko -hereafter referred to as "the manufacturer"- warrants, for the period indicated below, each product to be free from defects in materials and workmanship. In the event of a defect in materials or workmanship, the manufacturer will repair, replace, or make appropriate adjustment at the manufacturer's option if the product, upon the manufacturer's inspection, is found to be properly installed, maintained, and operated in accordance with the manufacturer's instruction manuals. A distributor, dealer, or authorized service representative must perform startup.

Product

Stationary Standby Generator Set & Accessories

Warranty Coverage

Five (5) years from registered startup or three thousand (3000) hours (whichever occurs first).

Extended warranty purchase must take place prior to expiration of standard warranty. Extended warranty is effective upon submission of purchase order in the online warranty system.

The following will **not** be covered by the warranty:

1. Normal wear, routine tuneups, tuneup parts, adjustments, and periodic service.
2. Damage, including but not limited to damage caused by accidents, improper installation or handling, faulty repairs not performed by an authorized service representative, improper storage, or acts of God.
3. Damage caused by operation at speeds, or with fuel, loads, conditions, modifications or installation contrary to published specifications.
4. Damage caused by negligent maintenance such as:
 - a. Failure to provide the specified type and sufficient quantity of lubricating oil.
 - b. Failure to keep the air intake and cooling fin areas clean.
 - c. Failure to service the air cleaner.
 - d. Failure to provide sufficient coolant and/or cooling air.
 - e. Failure to perform scheduled maintenance as prescribed in supplied manuals.
 - f. Failure to regularly exercise the generator set under load (stationary applications only).
5. Damage to exterior or interior components resulting from extreme environmental conditions, including but not limited to heat, cold, humidity, flooding, salt, and high winds.
6. Damage caused by operation when emergency battle mode is enabled.
7. Original installation charges and startup costs.
8. Starting batteries and the following related expenses:
 - a. Labor charges related to battery service.
 - b. Travel expenses related to battery service.
9. Engine coolant heaters, heater controls, and circulating pumps after the first year of the warranty period.
10. Additional expenses for repairs performed after normal business hours, i.e. overtime or holiday labor rates.
11. Rental of equipment during the performance of warranty repairs.
12. Removal and replacement of non-Rehlko-supplied options and equipment.
13. Non-Rehlko replacement parts. Replacement of a failed part with a non-Rehlko part voids the warranty on that part.
14. Radiators replaced rather than repaired.
15. Fuel injection pumps not repaired by an authorized service representative.
16. Non-Rehlko-authorized repair shop labor without prior approval from the manufacturer Warranty Department.
17. Engine fluids such as fuel, oil, or coolant/antifreeze.
18. Shop supplies such as adhesives, cleaning solvents, and rags.
19. Expenses incurred investigating performance complaints unless the problem is caused by defective materials or workmanship.
20. Maintenance items such as fuses, lamps, filters, spark plugs, loose or leaking clamps, and adjustments.
21. Travel time and mileage exceeding 300 miles round trip.

To obtain warranty service, call 1-800-544-2444 for your nearest authorized service representative or write the manufacturer Service Department, MS072, Kohler, WI 53044 USA.

THE MANUFACTURER SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, AND/OR CONSEQUENTIAL DAMAGES OF ANY KIND including, but not limited to, incidental and/or consequential labor costs, installation charges, telephone charges, or transportation charges in connection with the replacement or repair of defective parts.

This is our exclusive written warranty. We make no other express warranty nor is anyone authorized to make any on our behalf.

ANY IMPLIED OR STATUTORY WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IS EXPRESSLY LIMITED TO THE DURATION OF THIS WARRANTY. Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental and/or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.



Discovery Energy, LLC
200 Twin Oaks Road, Kohler, WI 53044 USA
For the nearest sales and service outlet in the
US and Canada, phone 1-800-544-2444
powersystems.rehlko.com

TP-5561 6/25i

Certification

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Discovery Energy
Rehko
N7650 Lakeshore Road
Sheboygan
Wisconsin
53083
USA

Holds Certificate No:

FM 727336

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

Design, manufacture, and distributor support for electrical generators, alternators, fuel tanks, automatic transfer switches and switchgear, including the manufacture of leads and harness, skids, and fabricated components with distribution of generator sets supported by warehouse operations.

For and on behalf of BSI:



Jessica Patel, Senior Vice President, Assurance Americas

Original Registration Date: 1995-02-28

Latest Revision Date: 2025-12-03

Effective Date: 2024-11-07

Expiry Date: 2027-11-06

Page: 1 of 2



...making excellence a habit.™

Certificate No: **FM 727336**

Location	Registered Activities
Discovery Energy Rehlko - GK 200 Twin Oaks Road Kohler Wisconsin 53004 USA	Manufacture of leads and harness, automatic transfer switches and switchgear. Distribution of generator sets.
Discovery Energy Rehlko N7650 Lakeshore Road Sheboygan Wisconsin 53083 USA	Design, manufacture, and distributor support for electrical generators, automatic transfer switches and switchgear.
Discovery Energy Rehlko 300 N Dekora Woods Blvd Saukville Wisconsin 53080 USA	Manufacture of fuel tanks, skids, fabricated components and generators.
Discovery Energy Rehlko Muth Warehouse 2821 Muth Court Sheboygan Wisconsin 53083 USA	The distribution of generator sets.
Discovery Energy Rehlko KWIP Warehouse 4327 County EE Sheboygan Wisconsin 53081 USA	Receiving, sequencing and warehousing of generator components.

Original Registration Date: 1995-02-28

Latest Revision Date: 2025-12-03

Effective Date: 2024-11-07

Expiry Date: 2027-11-06

Page: 2 of 2

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To be read in conjunction with the scope above or the attached appendix.

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP. Tel: + 44 345 080 9000

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ENGINEER DIGITAL OR ORIGINAL HAND SEAL REQUIRED FOR USE.
COPIES ARE NOT VALID FOR PERMIT.****For Reference Only – to obtain the latest code edition, including any revisions please visit EngineeringExpress.com****EVALUATION SUBJECT: ANCHORAGE FOR QUALIFYING ENCLOSURE MODELS****TER-24-76917****REPORT HOLDER:**DISCOVERY ENERGY, LLC.
200 TWIN OAKS ROAD
KOHLER, WI 53044, USA**NOTE: THE GRAPHICAL DEPICTIONS IN THIS REPORT ARE FOR
ILLUSTRATIVE PURPOSES ONLY AND MAY DIFFER IN APPEARANCE.****SCOPE OF EVALUATION (compliance with the following codes):**

**THIS IS A STRUCTURAL (WIND) PERFORMANCE EVALUATION ONLY.
NO ELECTRICAL OR TEMPERATURE PERFORMANCE RATINGS OR
CERTIFICATIONS ARE OFFERED OR IMPLIED HEREIN.
UNDER NO CIRCUMSTANCE DOES THIS PERFORMANCE EVALUATION
GUARANTEE, IMPLY, OR STATE PERFORMANCE OF THE UNIT IS
MAINTAINED DURING OR AFTER A DESIGN EVENT.**

This Product Evaluation Report is being issued in accordance with the requirements of the **Florida Building Code Eighth Edition (2023)** per ASCE 7, FBC Building Ch. 16, FBC Building Sections 104.11 & 1522.2, FBC Existing Building Sections 707.1 & 707.2, FBC Mechanical 301.15, FBC Residential M1202.1 & M1301.1, FS 471.025, and Broward County Administrative Provisions 107.3.4. This report is also in accordance with the **International Building & Residential Codes (2012, 2015, 2018, & 2021)**. The product noted in this report has been tested and/or evaluated as summarized herein.

**IN ACCORDANCE WITH THESE CODES EACH OF THESE REPORTS
MUST BEAR THE ORIGINAL SIGNATURE & RAISED SEAL OR DIGITAL
SEAL OF THE EVALUATING ENGINEER.**

SUBSTANTIATING DATA:**• Product Evaluation Documents**

Substantiating documentation has been submitted to provide this TER and is summarized in the sections below.

• Structural Engineering Calculations

Structural engineering calculations have been prepared which evaluate the product based on comparative and/or rational analysis to qualify the following design criteria:

- Maximum rated wind pressures stated herein
- Anchor connection integrity, verified by a unity check between tension and shear.

Calculation summary is included in this TER and appears herein.

LIMITATIONS & CONDITIONS OF USE:

Use of the product(s) listed herein shall be in strict accordance with this TER as noted herein and manufacturer-provided model specifications. Installation shall conform to the minimum standards stated in the referenced building code(s) in addition to the specifications and limitations stated herein. See herein for complete limitations & conditions of use.

OPTIONS:

This evaluation is valid for the models listed herein. This evaluation includes standard product only. Contact Rehlko for Engineering Special (ES) orders. Any structural changes outside of the design as described herein would void this certification.

UNIT CASING MATERIALS:

See "Uniform (Static) Wind Loading" Technical Evaluation Report for the respective enclosure model and model-specific unit construction information.

TERMINOLOGY:

See herein for definitions of abbreviations used in this report.

**THIS ADDENDUM EVALUATION IS ONLY VALID WHEN PAIRED
WITH THE SIGNED AND SEALED "UNIFORM (STATIC) WIND
LOADING" TECHNICAL EVALUATION REPORT BY THIS FIRM FOR
THE RESPECTIVE MODEL.**

STRUCTURAL PERFORMANCE:

Models referenced herein are subject to the following design limitations:

**Maximum-Rated ASD Wind Pressures*:
± 65 psf Lateral, 65 psf Uplift**

Maximum pressure rating determined based on the design parameters of:
Vult = 186 mph, Exposure D, flat terrain, at-grade.

- Required design wind pressures shall be determined on a site-specific basis in accordance with ASCE 7 and applicable sections of the building code(s) being referenced in accordance with ASD methodology.
- Required design wind pressures shall be less than or equal to the maximum pressures listed herein.
- *Maximum-Rated ASD Wind Pressures indicate the maximum pressures that all units listed herein are approved for. Valid for at-grade applications. See limitations herein.
- Valid for use inside and outside the High-Velocity Hurricane Zone (HVHZ).
- Site-specific wind analysis may produce alternate limitations provided that the maximum-rated wind pressures stated herein are not exceeded.

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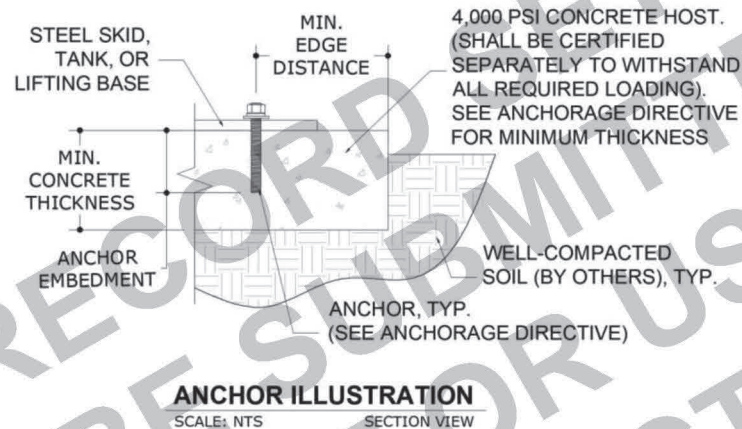
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ANCHORAGE DIRECTIVE INSTRUCTIONS

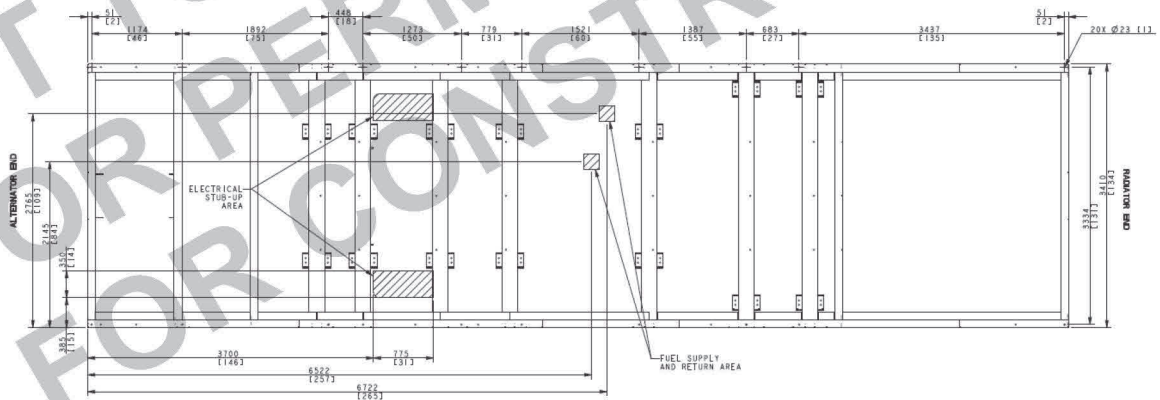
The following set of instructions is intended for use with the "Anchorage Directive" table shown on the following pages.

To determine anchorage specifications:

1. Locate the Generator model in the left-most column of the "Anchor Directive" table herein. (Note: "Anchorage Directive" table spans multiple pages.) The two columns right describe the associated Enclosure name and respective dimensional print (ADV).
2. Reading table data from left to right, select the correct size fuel tank where applicable, otherwise select "No Tank".
3. Continue reading across from left to right for Anchor Specifications, which state: Anchor brand, model, nominal diameter, embedment, minimum edge distance, minimum concrete thickness, and total number of anchors, respectively. See the Anchor Illustration below. Note: Edge distance to concrete applies in all directions (i.e. any edge of concrete).

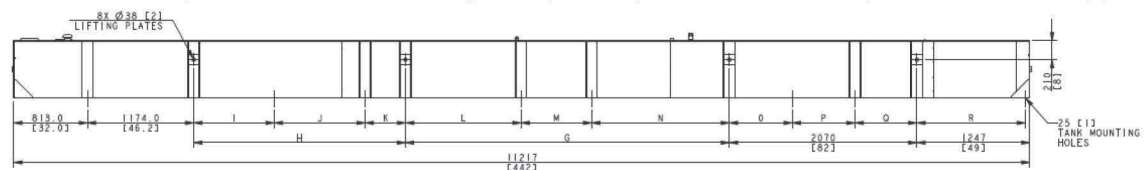


4. **A: For enclosures anchored directly to host without a fuel tank:**
Go to the respective enclosure ADV and install the specified number of anchors at the delineated mounting hole locations. See the below example for the lifting base's mounting holes: (The sample lifting base shown is for illustration only.)



- B: For enclosures mounted on fuel tanks and tanks anchored to the host:**

Go to the respective fuel tank ADV and install the specified number of anchors at the delineated mounting hole locations. See the below example for the fuel tank's mounting holes: (The sample fuel tank in the example is for illustration only.)



5. Refer to Rehlko ADV-9107 and the "Wind Installation Requirements" section herein for additional installation instructions and directives.

ANCHORAGE DIRECTIVE

Genset Models	Enclosure		Fuel Tank			Anchor Specifications						
	Name	ADV	Liters	Gal	ADV	Ancho r Brand	Model	Diam. (in)	Embed . (in)	Min. Edge Distance (in)	Min. Concrete Thicknes s (in)	# of Anchor s
40-60 REOZK	Sound Aluminum	ADV- 8740	No Tank			HILTI	KWIK BOLT TZ2	0.625	4	6	6	4
			505	133	ADV- 8753	HILTI	KWIK BOLT TZ2	0.625	4	6	6	6
			868	229								
			1043	275								
			1527	403								
			541	142								
			898	237								
			1057	279								
			1520	401								
			2028	535	ADV- 8753	HILTI	KWIK BOLT TZ2	0.625	4	6	6	8
KG25	KG25-60 Sound Aluminum Enclosure *	ADV- 9039	No Tank			HILTI	KWIK BOLT TZ2	0.625	4	6	6	4
KG30												
KG40												
KG40A												
KG45												
KG50												
KG60												
KG25-60	Sound Aluminum	ADV- 10023	No Tank			HILTI	KWIK BOLT TZ2	0.625	4	6	6	4
KG80	Sound Aluminum	ADV- 9083	No Tank			HILTI	KWIK BOLT TZ2	0.625	4	6	6	6
KG80 w / Catalyst												
KG80A*	*Same as KG80 offerings listed above, except with modified internal rear intake ducts (permitted change by Engineering Express). See KG80 specificaions above.											
KG100-125	Sound Aluminum	ADV- 9083	No Tank			HILTI	KWIK BOLT TZ2	0.625	4	6	6	6
80-100 REZGD	Sound Aluminum	ADV- 7892	No Tank			HILTI	KWIK BOLT TZ2	0.625	4	6	6	6
125-150 REZGC	Sound Aluminum	ADV- 8459	No Tank			HILTI	KWIK BOLT TZ2	0.625	4	6	6	6

SEE NEXT PAGES FOR ADDITIONAL ANCHORAGE DIRECTIVE ENTRIES

ANCHORAGE DIRECTIVE NOTES

See "Anchorage Directive Instructions" on page 2 for additional information on "Anchorage Directive" table. Anchorage calculations were based on ADV-9107 provided by Rehlko. See "Anchorage Directive Instructions" section, Rehlko ADV-9107, and the "Wind Installation Requirements" section herein for additional installation specifications.

ANCHORAGE DIRECTIVE, CONTINUED

Genset Models	Enclosure		Fuel Tank			Anchor Specifications						
	Name	ADV	Liters	Gal	ADV	Ancho r Brand	Model	Diam. (in)	Embed (in)	Min. Edge Distance (in)	Min. Concrete Thicknes s (in)	# of Anchor s
80-100 REOZJF	Sound Aluminum	ADV- 7647	No Tank			HILTI	KWIK BOLT TZ2	0.75	3.75	6	8	6
			791	209	ADV- 8519	HILTI	KWIK BOLT TZ2	0.75	3.75	6	8	8
			815	215	ADV- 8522	HILTI	KWIK BOLT TZ2	0.75	3.75	6	8	16
			1317	348	ADV- 8519	HILTI	KWIK BOLT TZ2	0.75	3.75	6	8	8
			1570	415	ADV- 8522	HILTI	KWIK BOLT TZ2	0.75	3.75	6	8	16
			1696	448	ADV- 8519	HILTI	KWIK BOLT TZ2	0.75	3.75	6	8	8
			3089	816	ADV- 8522	HILTI	KWIK BOLT TZ2	0.75	3.75	6	8	6
125REOZJG 150REOZJF	Sound Aluminum	ADV- 7825	No Tank			HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	6
			1128	298	ADV- 7881	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	10
			1198	316								
			2207	583								
			2255	595	ADV- 7881	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	8
4402	1163											
180REOZJG 200REOZJF	Sound Aluminum	ADV- 7854	No Tank			HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	10
			1514	400	ADV- 7859	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	12
			2869	758								
			5742	1517	ADV- 7859	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	14
			1576	416								
2896	765											
180-200 REZXB	Sound Aluminum	ADV- 7669	No Tank			HILTI	KWIK BOLT TZ2	0.625	4.75	6	8	8
KG 150-200	Sound Aluminum	ADV- 9110	No Tank			HILTI	KWIK BOLT TZ2	0.625	4.75	6	8	12
230-275 REOZJE	Sound Aluminum	ADV- 7644	No Tank			HILTI	KWIK BOLT TZ2	0.75	4.75	12	14	12
			1787	472	ADV- 7645	HILTI	KWIK BOLT TZ2	0.75	4.75	12	14	14
			2102	555								
			3573	944								

SEE PREVIOUS / NEXT PAGES FOR ADDITIONAL ANCHORAGE DIRECTIVE ENTRIES

ANCHORAGE DIRECTIVE NOTES

See "Anchorage Directive Instructions" on page 2 for additional information on "Anchorage Directive" table. Anchorage calculations were based on ADV-9107 provided by Rehlko. See "Anchorage Directive Instructions" section, Rehlko ADV-9107, and the "Wind Installation Requirements" section herein for additional installation specifications.

ANCHORAGE DIRECTIVE, CONTINUED

Genset Models	Enclosure		Fuel Tank			Anchor Specifications						
	Name	ADV	Liters	Gal	ADV	Ancho r Brand	Model	Diam. (in)	Embed (in)	Min. Edge Distance (in)	Min. Concrete Thicknes s (in)	# of Anchor s
300REOZJ	Sound Aluminum	ADV- 7664	No Tank			HILTI	KWIK BOLT TZ2	0.75	4.75	12	14	12
			2067	546	ADV- 7645	HILTI	KWIK BOLT TZ2	0.75	4.75	12	14	14
			2102	555								
			4066	1074								
250REZXB 300REZXC	Sound Aluminum	ADV- 7718	No Tank			HILTI	KWIK BOLT TZ2	0.75	4.75	10	12	8
300-350 REZXB	Sound Aluminum	ADV- 8162	No Tank			HILTI	KWIK BOLT 3	0.75	5	12	12	8
400-450 REZXB	Sound Aluminum	ADV- 8163										
350-500 REOZJB	Sound Level 2 Aluminum	ADV- 8515	No Tank			HILTI	KWIK HUS-EZ	0.75	4	6	8	14
			1529- 4394	404- 1161	ADV- 8528	HILTI	KWIK HUS-EZ	0.75	4	6	8	18
			5046	1333	ADV- 8528	HILTI	KWIK HUS-EZ	0.75	4	6	8	20
			5765	1523	ADV- 8528	HILTI	KWIK HUS-EZ	0.75	4	6	8	22
			6674	1763	ADV- 8528	HILTI	KWIK HUS-EZ	0.75	4	6	8	24
			10008	2664								

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ANCHORAGE DIRECTIVE NOTES

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ANCHORAGE DIRECTIVE, CONTINUED

Genset Models	Enclosure		Fuel Tank			Anchor Specifications						
	Name	ADV	Liters	Gal	ADV	Anchor Brand	Model	Diam. (in)	Embed. (in)	Min. Edge Distance (in)	Min. Concrete Thickness (in)	# of Anchors
350-500 REOZJ	Sound Level 2 Aluminum	ADV-7990	No Tank			HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	12
			1507	398	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	14
			1529	404	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	16
			1733	458	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	14
			1772	468	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	16
			2903	767	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	14
			2930	774	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	16
			3346	884	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	14
			3384	894	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	16
			4296	1135	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	14
			4395	1161	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	16
			4974	1314	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	14
			5046	1333	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	18
			5765	1523								
			6674	1763								
			10084	2664	ADV-8045	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	14
500REOZVC 550-600 REOZVB	Sound Aluminum	ADV-8417	No Tank			HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	14
			2048	541	ADV-8417	HILTI	KWIK BOLT TZ2	0.75	4.75	6	8	20
			2037	538								
			3910	1033								
			3923	1038								
			5727	1513								
			5754	1520								
			7643	2019								
			7658	2023								
			11553	3052								

SEE PREVIOUS / NEXT PAGES FOR ADDITIONAL ANCHORAGE DIRECTIVE ENTRIES

ANCHORAGE DIRECTIVE NOTES

See "Anchorage Directive Instructions" on page 2 for additional information on "Anchorage Directive" table. Anchorage calculations were based on ADV-9107 provided by Rehiko. See "Anchorage Directive Instructions" section, Rehiko ADV-9107, and the "Wind Installation Requirements" section herein for additional installation specifications.

ANCHORAGE DIRECTIVE, CONTINUED

Genset Models	Enclosure		Fuel Tank			Anchor Specifications						
	Name	ADV	Liters	Gal	ADV	Ancho r Brand	Model	Diam. (in)	Embed (in)	Min. Edge Distance (in)	Min. Concrete Thicknes s (in)	# of Anchor s
KD 800-1000	Sound Level 2 Aluminum	ADV- 8919	No Tank			HILTI	KWIK BOLT TZ2	0.75	4.75	8	8	14
			3475	918	ADV- 8919	HILTI	KWIK BOLT TZ2	0.75	4.75	8	8	20
			6621	1749								
			10573	2793								
			12969	3426								
			15740	4158								
			19381	5120	ADV- 8919	HILTI	KWIK BOLT TZ2	0.75	4.75	8	8	22
KD 1250A-1750	Sound Level 2 Aluminum	ADV- 8927	No Tank			HILTI	KWIK BOLT TZ2	0.75	4.75	12	12	16
			5863	1549	ADV- 8927	HILTI	HAD-P	M16	7.5	8	12	18
			9860	2605								
			11204	2960	ADV- 8927	HILTI	HAD-P	M16	7.5	8	12	20
			19214	5076								
			21985	5808								
KD 2000-2500	Sound Level 2 Aluminum	ADV- 9075	No Tank			HILTI	KWIK BOLT TZ2	0.75	4.75	12	12	20
			8577	2266	ADV- 9075	HILTI	HAD-P	M16	7.5	8	12	24
			14130	3733								
			16451	4346								

SEE PREVIOUS PAGES FOR ADDITIONAL ANCHORAGE DIRECTIVE ENTRIES

ANCHORAGE DIRECTIVE NOTES

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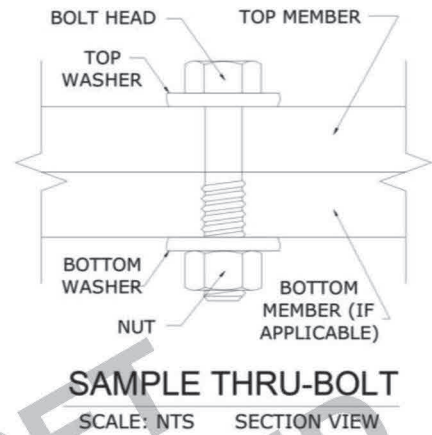
WIND INSTALLATION REQUIREMENTS

The following are requirements for wind-rated installations:

1. The design of post-installed anchors in concrete used for the component anchorage has been evaluated by this engineer for wind applications in accordance with ASCE 7 as referenced herein.
2. Anchors must be installed in minimum 4000 psi compressive strength normal weight concrete. Concrete aggregate must comply with ASTM C33. Installation in structural lightweight concrete is not permitted unless otherwise approved by the structural Engineer of Record.
3. Anchors must be installed to the torque specification as recommended by the anchor manufacturer to obtain maximum capacity.
4. Anchors must be installed in the locations specified in the Rehlko dimensional print (ADV) in correlation with the signed and sealed engineering herein. The more stringent requirement from either document shall apply in cases of uncertainty.
5. Anchor plates from Rehlko must be installed at each anchor location between the anchor head and the equipment for tension load distribution.
6. Concrete floor slab and concrete housekeeping pads must be designed, and rebar reinforced for wind applications in accordance with the current editions of the ACI "Building Code Requirements for Structural Concrete" and ASCE 7 as referenced herein.
7. All housekeeping pad thicknesses must be designed in accordance with pre-qualification test report or a minimum of 1.5x the anchor embedment depth, whichever is largest.
8. All housekeeping pads must be doweled or cast into the building structural floor slab and designed for wind application per appropriate code requirements for the subject jurisdiction and as approved by the structural Engineer of Record.
9. Wall-mounted equipment must be installed to a rebar reinforced structural concrete wall that is designed for wind applications and approved by the Engineer of Record to resist the added wind loads from the components being anchored to the wall.
10. Floor-mounted equipment (with or without housekeeping pad) must be installed to a rebar reinforced structural concrete floor that is designed for wind applications and approved by the Engineer of Record to resist the added wind loads from components being anchored to the floor.
11. When installing to a floor, rebar interference must be considered.
12. Attaching equipment to any floor other than those constructed of structural concrete and designed to accept the wind loads from said equipment is not permitted by this specification and beyond the scope of this certification.
13. Attaching equipment to any concrete block walls or cinder block walls is not permitted by this specification and beyond the scope of this certification.
14. Rooftop installations are not permitted by this specification and are beyond the scope of this certification.
15. Installation upon rooftop curbs shall be coordinated with the curb manufacturer and the Structural Engineer of Record. Any curb or concrete pad that supports the RTU unit is beyond the scope of this certification.
16. Anchor locations, size, type and load requirements shall be as specified on the certified installation specification. Mounting requirement details such as brand, type, embedment depth, edge spacing, anchor spacing, concrete strength, wall bracing, and special inspection must be outlined and approved by the project Structural Engineer of Record to withstand the wind anchor loads as defined on the certified installation specification. The installing contractor is responsible for the proper installation of all anchors and mounting hardware, observing the mounting requirement details outlined by the Engineer of Record. Contact Rehlko if a detailed Wind Installation Calculation Package is required.
17. Electrical wiring, piping, duct and other connections to the equipment is the responsibility of the installing contractor. It is necessary that these remain intact, functional and do not inhibit the functionality of the generator set after a wind event.
18. Concrete pad dimensions are minimum values designed to satisfy only the anchor requirements. The pad must be designed by the project Structural Engineer of Record.

TERMINOLOGY

The following abbreviations may appear in this report: "Addtl." for "additional", "AHJ" for "Authority Having Jurisdiction", "alum" for "aluminum", "ASCE" for "American Society of Civil Engineers", "ASD" for "Allowable Stress Design", "ASTM" for "American Society for Testing and Materials", "EA" for "each", "E.D." for "edge distance", "EDDS" for "extra deep drawing steel", "e.g." for "exempli gratia" or "for example", "equiv." for "equivalent", "FBC" for "Florida Building Code", "FEA" for "Finite Element Analysis", "FLCA" for "Florida Certificate of Authorization", "FS" for "Florida Statutes", "Fu" for "ultimate tensile strength" or "ultimate tensile stress", "Fy" for "yield strength" or "yield stress", "GA" for "gauge", "GR." or "Gr." for "grade", "HVAC" for "heating, ventilation, and air conditioning", "HVHZ" for "High-Velocity Hurricane Zone", "i.e." for "id est" or "in other words", "in" for "inch", "lb" for "pound (force)", "max." for "maximum", "min." for "minimum", "mm" for "millimeter", "NTS" for "not to scale", "O.C." for "on center", "OD" for "outer diameter", "pcf" for "pounds (force) per cubic foot", "PE" for "Professional Engineer", "qty" for "quantity", "SAE" for "Society of Automotive Engineering", "SMS" for "sheet metal screws", "SS" for "stainless steel", "TER" for "Technical Evaluation Report", "typ." for "typical", "ult" for "ultimate loads", "U.N.O." for "unless noted otherwise", "UTS" for "ultimate tensile strength" or "ultimate tensile stress", "WLL" for "working load limit", "w/o" for "without", "YS" for "yield strength" or "yield stress", "#" for "number", "&" for "and", and "Ø" for "diameter". Please visit ecalculator.io/glossary for additional abbreviation clarifications.



Note: The term "Thru-Bolt" or through bolt, if used herein, refers to a bolt passing through the member(s) in contact and is fastened by a nut at the end opposite the screw head. Nut shall be equivalent to or exceed the strength of the bolt U.N.O. Nut shall be sized to accommodate the same nominal diameter as the bolt U.N.O. See diagram above-right for a sample thru-bolt configuration.

Note: For instances herein which list material specifications as "[material type] or stronger":

U.N.O. herein, the term "stronger" refers to a material with a UTS value equal to or greater than the UTS value of the stated material type. Consult appropriate literature for established material UTS values.

Note: Equivalent steel gauge thicknesses as used in this evaluation, U.N.O., are as follows:

22 GA (.030"), 20 GA (.036"), 18 GA (.048"), 16 GA (.060"), 14 GA (.075"), 12 GA (.098").

LIMITATIONS & CONDITIONS OF USE, CONTINUED

Host Structure: The supporting host structure shall be designed to resist all superimposed loads as determined by others on a site-specific basis as may be required by the Authority Having Jurisdiction. No evaluation is offered for the host supporting structure by use of this document.

Production Drawings: The following drawings shall be accessible if required for a full permit application to be submitted to the Authority Having Jurisdiction in conjunction with this TER:

- Electrical schematic(s)
- Final assembly drawings and parts lists sufficient to detail primary components, operator controls, and their locations
- Complete set of mechanical drawings for all machined parts
- Complete part specifications (including manufacturer's model numbers, size, ratings, etc.) for all purchased parts
- Specification sheets for all parts/components
- Drawings showing all construction details
- Product label drawing(s) showing all required marking information. The label drawing shall show the proposed label location on the equipment and artwork showing the manufacturer's name, address, model and serial numbers, equipment ratings, warning markings.

Drawing and Change Control: The manufacturer shall establish a system of product configuration control that shall allow no unauthorized changes to the product. Changes to critical documents, identified in this Technical Evaluation Report, must be reported to, and authorized by, this office prior to implementation for production.

Survivability: Evaluation reports are valid for a newly installed unit and do not include certification of the product beyond a design event or if impacted by any debris. Inspections shall be implemented annually by the end user and after every named storm. All fasteners and cabinet components are to be verified, and all damaged, loose, corroded, and/or broken fasteners and cabinet components shall be replaced to ensure structural integrity against hurricane wind forces. Contact this office for any reevaluation needs or as designated by the Authority Having Jurisdiction.

Durability: Components or component assemblies shall not deteriorate, crack, fail, or lose functionality due to galvanic corrosion or weathering. All supporting components that are permanently installed shall be protected against corrosion, contamination, and other such damage at all times. Each component or component assembly shall be supported and oriented in its intended installation position. All exposed plastic components shall be certified to resist sunlight exposure as specified by ASTM B117, or ASTM G155 in Broward or Miami-Dade counties.

Extent of Certification: Certification pertains to the anchorage of the generator enclosure and/or fuel tank to the host structure by others, subject to the limitations and criteria stated herein. Operability during or after a design event is not included in this certification. Water infiltration is outside the bounds of this certification. No other certifications are intended other than as described herein. This evaluation alone does not offer any evaluation for uniform static wind loading, large missile impact debris, or cyclic wind requirements unless specifically stated herein.

Proj. #	Remarks	By	Checked	Date	Proj. #	Remarks	By	Checked	Date
18-6258.25	Initial Issue	LAO	LAO	04/01/19	24-76917	2023 FBC Update	EPR	EPR	06/21/24
18-6258.25	KG200 Added	LAO	LAO	12/20/19	24-76917	ADV-9107 Revision	MARH	EPR/RWN	03/25/25
20-28238	2020 FBC Update	JC, ER	EPR	05/04/21	24-76917	Branding Changes	MARH	RWN	05/09/25

PROTOTYPE TEST REPORT



Models Covered: **KG100**
Model Tested: **KG100**
Cooling System Tested: **50C**

Alternator Tested: **4R9X**
Engine Tested: **KG6.2L TA**
Voltage Tested: **480V**

GENSET

Maximum power test to assure that the prime mover and alternator have sufficient capacity to operate within specifications.

Meets Rated Load

Steady-state load test to ensure voltage stability meets or exceed ISO8528-5 requirements and to verify compliance with steady state speed control specifications.

Natural Gas

± 1.00 % Frequency Band

± 0.50 % Voltage Deviation

LP Gas

± 1.00 % Frequency Band

± 0.50 % Voltage Deviation

Transient load tests per NEMA MG1-32.18, and ISO 8528 to verify specifications of transient voltage regulation, voltage dip, voltage overshoot, recovery voltage, and recovery time. Values shown for model tested above. Please contact factory for additional details.

Natural Gas

Full Load Acceptance

45.2 % Voltage Dip

1.39 Seconds of Recovery Time

27.7 % Frequency Dip

2.33 Seconds of Recovery Time

G2 ISO8528-5 Class (G1, G2, G3)

Full Load Rejection

15.6 % Voltage Overshoot

0.62 Seconds of Recovery Time

7.39 % Frequency Overshoot

3.68 Seconds of Recovery Time

LP Gas

Full Load Acceptance

43.9 % Voltage Dip

5.37 Seconds of Recovery Time

26.9 % Frequency Dip

11.0 Seconds of Recovery Time

G2 ISO8528-5 Class (G1, G2, G3)

Full Load Rejection

15.3 % Voltage Overshoot

0.63 Seconds of Recovery Time

10.3 % Frequency Overshoot

3.71 Seconds of Recovery Time

PROTOTYPE TEST REPORT



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Voltage Tested: **480V**

GENSET

NFPA 110 one step testing to determine the amount of time required for the generator set to reach 90% voltage and frequency to allow the ATS to transfer.

Complies with NFPA 110 Type 10

Vibrational analysis, to verify that generator vibrations are within acceptable limits per ISO 8528-9.

Complies

Torsional analysis data, to verify torsional effects are not detrimental and that the generator set will provide dependable service as specified.

Complies

Generator set cooling and air flow tests to verify maximum operating ambient temperature. (Cooling system test results are available on TIB-118)

Acoustical noise intensity and sound attenuation effects tests. (Acoustical noise results are available on TIB-114 & 115)

Exhaust Back Pressure test completed to demonstrate within engine limitation (Exhaust back pressure test results are available on TIB-119)

ALTERNATOR

Alternator temperature rise test per NEMA MG1-32.6. Standby and prime ratings of the alternator are established during this test.

Alternator overload test per NEMA MG1-32.8. Motor starting tests per NEMA MG1-32.18.5 to evaluate capabilities of generator, exciter, and regulator system.

Three-phase symmetrical short-circuit test per NEMA MG1-32.13 to demonstrate short circuit performance, mechanical integrity, ability to sustain short-circuit current.

Harmonic analysis, voltage waveform deviation per NEMA MG1-32.10 to confirm that the generator set is producing clean voltage within acceptable limits.

(Alternator detailed test results are available on TIB-102)

Kohler Standby/Prime Generator Set Test Program

Testing is an integral part of quality assurance. In keeping with our uncompromising commitment to quality, safety, and reliability, every Kohler Standby/Prime power generator set undergoes an extensive series of prototype and production testing.

Prototype Testing

Prototype testing includes the potentially destructive tests necessary to verify design, proper function of protective devices and safety features, and reliability expectations. Kohler's prototype testing includes the following:

- Alternator temperature rise test per NEMA MG1-32.6. Standby and prime ratings of the alternator are established during this test.
- Maximum power test to assure that the prime mover and alternator have sufficient capacity to operate within specifications.
- Alternator overload test per NEMA MG1-32.8.
- Steady-state load test to ensure voltage regulation meets or exceeds ANSI C84.1, NEMA MG1-32.17 requirements and to verify compliance with steady-state speed control specifications.
- Transient test to verify speed controls meets or exceeds specifications.
- Transient load tests per NEMA MG1-32.18, and ISO 8528 to verify specifications of transient voltage regulation, voltage dip, voltage overshoot, recovery voltage, and recovery time.
- Motor starting tests per NEMA MG1-32.18.5 to evaluate capabilities of generator, exciter, and regulator system.
- Three-phase symmetrical short-circuit test per NEMA MG1-32.13 to demonstrate short circuit performance, mechanical integrity, ability to sustain short-circuit current.
- Harmonic analysis, voltage waveform deviation per NEMA MG1-32.10 to confirm that the generator set is producing clean voltage within acceptable limits.

Torsional analysis data, to verify torsional effects are not detrimental and that the generator set will provide dependable service as specified, is available upon request.

Kohler offers other testing at the customer's request at an additional charge. These optional tests include power factor testing, customized load testing for specific application, witness testing, and a broad range of MIL-STD-705c testing. A certified test report is also available at an additional charge.

- Generator set cooling and air flow tests to verify maximum operating ambient temperature.
- Reliability tests to demonstrate product durability, followed by root cause analysis of discovered failures and defects. Corrective action is taken to improve the design, workmanship, or components.
- Acoustical noise intensity and sound attenuation effects tests.

Production Testing

In production, Kohler Standby/Prime generator sets are built to the stringent standards established by the prototype program. Every Kohler generator set is fully tested prior to leaving the factory. Production testing includes the following:

- Stator and exciter winding high-potential test on all generators. Surge transient tests on stators for generators 180 kW or larger. Continuity and balance tests on all rotors.
- One-step, full-load pickup tests to verify that the performance of each generator set, regulator, and governor meets published specifications.
- Regulation and stability of voltage and frequency are tested and verified at no load, 1/4 load, 1/2 load, 3/4 load, and full-rated load.
- Voltage, amperage, frequency and power output ratings verified by full-load test.
- The proper operation of controller logic circuitry, prealarm warnings, and shutdown functions is tested and verified.
- Any defect or variation from specification discovered during testing is corrected and retested prior to approval for shipment to the customer.

KOHLER®

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For the nearest sales/service outlet in the
US and Canada, phone 1-800-544-2444
KohlerPowerSystems.com

PreStartup Checklist

Generator Set/Transfer Switch Installation Checklist

This document has generic content and some items may not apply to some applications. Check only the items that apply to the specific application. Read and understand all of the safety precautions found in the Operation and Installation Manuals. Make the following installation checks before performing the Startup Checklist.

Note: Use this form as a general guide, along with any applicable codes or standards. Comply with all applicable codes and standards. Improper installation voids the warranty.

Equipment Room or Weather Housing			Does Not Yes Apply	
☐	☐	1.	Is the equipment installed in a fire-resistant room (made of non-combustible material) or in an outdoor weather housing?	
☐	☐	2.	Is there adequate clearance between the engine and floor for service maintenance?	
☐	☐	3.	Is there emergency lighting available at the equipment room or weather housing?	
☐	☐	4.	Is there adequate heating for the equipment room or outdoor weather housing?	
☐	☐	5.	Is the equipment room clean with all materials not related to the emergency power supply system removed?	
☐	☐	6.	Is the equipment room protected with a fire protection system?	
Engine and Mounting				
☐	☐	7.	Is the mounting surface(s) properly constructed and leveled?	
☐	☐	8.	Is the mounting surface made from non-combustible material?	
☐	☐	9.	Was the generator-to-engine alignment performed after attaching the skid to the mounting base? Generator sets with two-bearing generators require alignment.	
Lubrication				
☐	☐	10.	Is the engine crankcase filled with the specified oil?	
Cooling and Ventilation				
☐	☐	11.	Is the cooling system filled with the manufacturer's specified coolant/antifreeze and purged of air?	
☐	☐	12.	Is there adequate inlet and outlet air flow (electric louvers adjusted and ventilation fan motor(s) connected to the corresponding voltage)?	
☐	☐	13.	Is the radiator duct properly sized and connected to the air vent or louver?	
☐	☐	14.	Are flexible sections installed in the cooling water lines?	
Fuel				
☐	☐	15.	Is there an adequate/dedicated fuel supply?	
☐	☐	16.	Are the fuel filters installed?	
☐	☐	17.	Are the fuel tanks and piping installed in accordance with applicable codes and standards?	
☐	☐	18.	Is there adequate fuel transfer tank pump lift capacity and is the pump motor connected to the corresponding voltage?	
☐	☐	19.	Is the fuel transfer tank pump connected to the emergency power source?	
☐	☐	20.	Are flexible fuel lines installed between the engine fuel inlet and fuel piping?	
☐	☐	21.	Is the specified gas pressure available at the fuel regulator inlet?	
☐	☐	22.	Does the gas solenoid valve function?	
☐	☐	23.	Are the manually operated fuel and cooling water valves installed allowing manual operation or bypass of the solenoid valves?	
Exhaust				
☐	☐	24.	Is the exhaust line sized per guidelines and does it have flexible connector(s)? Is the flexible connector(s) straight?	
☐	☐	25.	Is there an exhaust line condensate trap with a drain installed?	
☐	☐	26.	Is the specified silencer installed and are the hanger and mounting hardware tightened?	
☐	☐	27.	Is a heat-isolating thimble(s) installed at points where exhaust lines pass through combustible wall(s) or partition(s)?	
☐	☐	28.	Is the exhaust line free of excessive bends and restrictions? Is the backpressure within specifications?	
☐	☐	29.	Is the exhaust line installed with a downward pitch toward the outside of the building?	
☐	☐	30.	Is the exhaust line protected from entry by rain, snow, and animals?	
☐	☐	31.	Does the exhaust system outlet location prevent entry of exhaust gases into buildings or structures?	
☐	☐	32.	Are individuals protected from exposure to high temperature exhaust parts and are hot parts safety decals present?	
AC Electrical System				
☐	☐	33.	Does the nameplate voltage/frequency of the generator set and transfer switch match normal/utility source ratings?	
☐	☐	34.	Do the generator set load conductors have adequate ampacity and are they correctly connected to the circuit breakers and/or the emergency side of the transfer switch?	
☐	☐	35.	Are the load conductors, engine starting cables, battery charger cables, and remote annunciator leads installed in separate conduits?	
☐	☐	36.	Is the battery charger AC circuit connected to the corresponding voltage?	
Transfer Switch, Remote Control System, Accessories				
☐	☐	37.	Is the transfer switch mechanism free of binding? Note: Disconnect all AC sources and operate the transfer switch manually.	
☐	☐	38.	Are the transfer switch AC conductors correctly connected? Verify lead designations using the appropriate wiring diagrams.	
☐	☐	39.	Is all other wiring connected, as required?	
Batteries and DC Electrical System				
☐	☐	40.	Does the battery(ies) have the specified CCA rating and voltage?	
☐	☐	41.	Is the battery(ies) filled with electrolyte and connected to the battery charger?	
☐	☐	42.	Are the engine starting cables connected to the battery(ies)?	
☐	☐	43.	Do the engine starting cables have adequate length and gauge?	
☐	☐	44.	Is the battery(ies) installed with adequate air ventilation?	
☐	☐	45.	Are the ends of all spark plug wires properly seated onto the coil/distributor and the spark plug?	
Special Requirements				
☐	☐	46.	Is the earthquake protection adequate for the equipment and support systems?	
☐	☐	47.	Is the equipment protected from lightning damage?	

Generator Set/Transfer Switch Startup Checklist

This document has generic content and some items may not apply to some applications. Check only the items that apply to the specific application. Read and understand all of the safety precautions found in the Operation and Installation Manuals. Complete the Installation Checklist before performing the initial startup checks. Refer to Service Bulletin 616 for Warranty Startup Procedure Requirements regarding generator set models with ECM-controlled engines.

☐ Does Not Yes Apply	☐ Does Not Yes Apply
☐ ☐ 1. Verify that the engine is filled with oil and the cooling system is filled with coolant/antifreeze.	☐ ☐ 29. Close the normal source circuit breaker or replace fuses to the transfer switch.
☐ ☐ 2. Prime the fuel system.	☐ ☐ 30. Check the normal source voltage, frequency, and phase sequence on three-phase models. The normal source must match the load.
☐ ☐ 3. Open all water and fuel valves. Temporarily remove the radiator cap to eliminate air in the cooling system. Replace radiator cap in step 21.	☐ ☐ 31. Open the normal source circuit breaker or remove fuses to the transfer switch.
☐ ☐ 4. Place the generator set master switch in the OFF/RESET position. Observe Not-in-Auto lamp and alarm, if equipped, on the controller.	☐ ☐ 32. Manually transfer the load to the normal source.
☐ ☐ 5. Press the lamp test, if equipped on controller. Do all the alarm lamps on the panel illuminate?	☐ ☐ 33. Close the generator set main line circuit breakers, close the safeguard breaker, and/or replace the fuses connected to the transfer switch.
☐ ☐ 6. Open the main line circuit breakers, open the safeguard breaker, and/or remove fuses connected to the generator set output leads.	☐ ☐ 34. Place the generator set master switch in the RUN position.
☐ ☐ 7. Turn down the speed control (electronic governor) or speed screw (mechanical governor).*	☐ ☐ 35. Check the generator set voltage, frequency, and phase sequence on three-phase models. The generator set must match normal source and load.
☐ ☐ 8. Verify the presence of lube oil in the turbocharger, if equipped. See the engine and/or generator set operation manual.	☐ ☐ 36. Place the generator set master switch in the OFF/RESET position.
☐ ☐ 9. Place the generator set master switch in the RUN position. Allow the engine to start and run for several seconds.	☐ ☐ 37. Open the generator set main line circuit breakers, open the safeguard breaker, and/or remove the fuses connected to the transfer switch.
☐ ☐ 10. Verify that the day tank, if equipped, is energized.	☐ ☐ 38. Reconnect the power switching device and logic controller wire harness at the inline disconnect plug at the transfer switch.
☐ ☐ 11. Place the generator set master switch in the OFF/RESET position. Check for oil, coolant, and exhaust leaks.	☐ ☐ 39. Close the normal source circuit breaker or replace fuses to the transfer switch. Place the generator set master switch to the AUTO position.
☐ ☐ 12. Turn on the water/oil heaters and fuel lift pumps.	☐ ☐ 40. Close the generator set main line circuit breakers, close the safeguard breaker, and/or replace the fuses connected to the transfer switch.
☐ ☐ 13. Check the battery charger ammeter for battery charging indication.	☐ ☐ 41. Place the transfer switch in the TEST position (load test or open normal source circuit breaker). NOTE: Obtain permission from the building authority before proceeding. This procedure tests transfer switch operation and connects building load to generator set power.
☐ ☐ 14. Place the generator set master switch in the RUN position. Verify whether there is sufficient oil pressure. Check for oil, coolant, and exhaust leaks.	☐ ☐ 42. Readjust frequency to 50 or 60 Hz with total building loads.*
☐ ☐ 15. Close the safeguard circuit breaker. Adjust the engine speed to 50/60 Hz if equipped with an electronic governor or to 52.8/63 Hz if equipped with a mechanical governor.*	☐ ☐ 43. Verify that the current phase is balanced for three phase systems.
☐ ☐ 16. If the speed is unstable, adjust according to the appropriate engine and/or governor manual.*	☐ ☐ 44. Release the transfer switch test switch or close the normal circuit breaker. The transfer switch should retransfer to the normal source after appropriate time delay(s).
☐ ☐ 17. Adjust the AC output voltage to match the load voltage using the voltage adjusting control. See the generator set/controller operation manual.	☐ ☐ 45. Allow the generator set to run and shut down automatically after the appropriate cool down time delay(s).
☐ ☐ 18. Allow the engine to reach normal operating coolant temperature.	☐ ☐ 46. Set the plant exerciser to the customer's required exercise period, if equipped.
☐ ☐ 19. Check the operating temperature on city water-cooled models and adjust the thermostatic valve as necessary.	☐ ☐ 47. Verify that all options on the transfer switch are adjusted and functional for the customer's requirements.
☐ ☐ 20. Manually overspeed the engine to cause an engine shutdown (68-70 Hz on 60 Hz models and 58-60 Hz on 50 Hz models). Place the generator set master switch in the OFF/RESET position.*	☐ ☐ 48. If possible, run the building loads on the generator set for several hours or perform the load bank test if required.
☐ ☐ 21. Check the coolant level, add coolant as necessary, and replace the radiator cap. Verify that all hose clamps are tight and secure.	☐ ☐ 49. Verify that all the wire connections from the generator set to the transfer switch and optional accessories are tight and secure.
☐ ☐ 22. Place the generator set master switch in the RUN position.	☐ ☐ 50. Verify that the customer has the appropriate engine/generator set and transfer switch literature. Instruct the customer in the operation and maintenance of the power system.
☐ ☐ 23. Verify the engine low oil pressure and high coolant temperature shutdowns.*	☐ ☐ 51. Fill out the startup notification at this time and send the white copy to the Generator Warranty Dept. Include the warranty form if applicable.
☐ ☐ 24. Check the overcrank shutdown.*	
☐ ☐ 25. Place the generator set master switch in the OFF/RESET position.	
☐ ☐ 26. Open the normal source circuit breaker or remove fuses to the transfer switch.	
☐ ☐ 27. Disconnect the power switching device and logic controller wire harness at the inline disconnect plug at the transfer switch.	
☐ ☐ 28. Manually transfer the load to the emergency source.	

* Some models with an Engine Electronic Control Module (ECM) may limit or prohibit adjusting the engine speed or testing shutdowns. Refer to appropriate documentation available from the manufacturer.