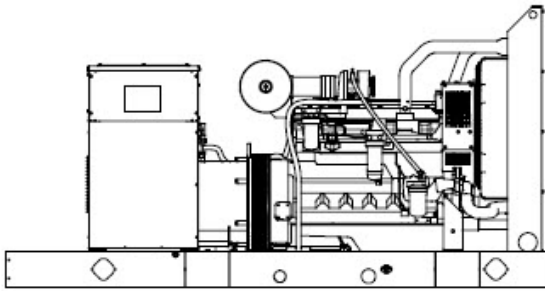

Generator



Kohler Model: **150REOZJF**

This diesel generator set equipped with a 4R13X alternator operating at 120/208 volts is rated for 137 kW/171 kVA. Output amperage: 475

Standard Features:

- Discovery Energy, LLC and its affiliates dba Rehlko provides one-source responsibility for the generating system and accessories.
- Approved for use with certified renewable Hydrotreated Vegetable Oil (HVO) / Renewable Diesel (RD) fuels compliant with EN15940/ASTM D975.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A one-year limited warranty covers all systems and components. Two- and five-year extended warranties are also available.

Applications

- Alternator Protection
- Battery Rack and Cables
- Customer Connection (standard with Decision-Maker 6000 controller only)
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Lit

Other Features:

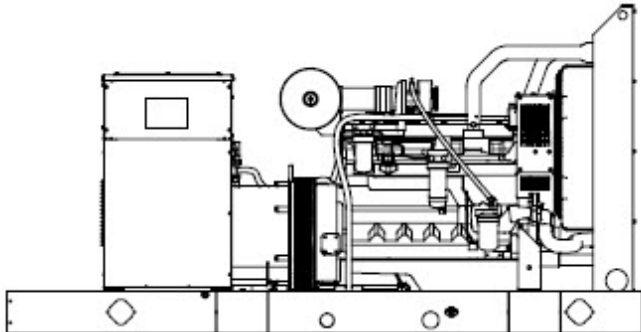
- Rehlko designed controllers for one-source system integration and remote communication.
- The low coolant level shutdown prevents overheating (standard on radiator models only). Integral vibration isolation eliminates the need for under-unit vibration spring isolators.

Alternator Features:

- 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.

Qty	Description	
	150REOZJF Generator System	
1	150REOZJF Generator Set	
	Includes the following:	
	Literature Languages	English
	Approvals and Listings	UL2200 Listing
	Engine	150REOZJF, 12V, 60Hz
	Nameplate Rating	Standby 130C Rise
	Voltage	60Hz, 120/208V, Wye, 3Ph, 4W
	Alternator	4R13X
	Cooling System	Unit Mounted Radiator, 50C
	Skid and Mounting	Skid, 44"
	Air Intake	Standard Duty
	Controller	APM402
	Enclosure Type	Weather
	Enclosure Material	Steel
	Enclosure Silencer	Internal Silencer
	Fuel Tank Type	Standard
	Fuel Runtime (Approx.)	24 Hours
	Subbase Fuel Tank Capacity	298 Gallons
	Starting Aids, Installed	1800W,110-120V
	Electrical Accy.,Installed	Battery, 1/12V, Wet,Battery Charger, 10A,Run Rel Input/5 OutputModule
	Rating, LCB 1	80% Rated
	Amps, LCB 1	600
	Trip Type, LCB 1	Electronic, LSI
	Interrupt Rating LCB 1	35kA at 480V
	Rating, LCB 2	80% Rated
	Amps, LCB 2	250
	Trip Type, LCB 2	Thermal Magnetic
	Interrupt Rating LCB 2	18kA at 480V
	LCB Accy. Installed	Breaker Separation Between LCB
	Ground Fault Relay Indication	Ground Fault Relay Indication
	Fuel Lines, Installed	Flexible Fuel Lines
	Miscellaneous Accy,Installed	Air Cleaner Restriction Ind.,Coolant in Genset,Skid Extension & Caps
	Warranty	Standard
	Testing, Additional	Power Factor Test,0.8,3Ph Only
1	NEC Remote, E-Stop	
1	RSA III, Annunciator only	
1	Lit Kit, 150REOZJF,General Maintenance	

Spec Sheets



Standard Features

- Discovery Energy, LLC and its affiliates dba Rehlko provides one-source responsibility for the generating system and accessories.
- Approved for use with certified renewable Hydrotreated Vegetable Oil (HVO) / Renewable Diesel (RD) fuels compliant with EN15940/ASTM D975.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A one-year limited warranty covers all systems and components. Two- and five-year extended warranties are also available.
- Tier 3 EPA-certified for Stationary Emergency Applications
- Alternator Protection
- Battery Rack and Cables
- Customer Connection (standard with Decision-Maker 6000 controller only)
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Literature

Alternator Features

- 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

- Rehlko designed controllers for one-source system integration and remote communication.
- The low coolant level shutdown prevents overheating (standard on radiator models only). Integral vibration isolation eliminates the need for under-unit vibration spring isolators.
- Mount up to three circuit breakers to allow circuit protection of selected priority loads.

Generator Set Rating

Standby 130C Rise Ratings

Alternator	Voltage	Ph	Hz	Peak kVA	kW/kVA	Amps
4R13X	120/208	3	60	405	137/171	475

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.

Model: 150REOZJF, 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, 120-240
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 RMS	Controller Dependent
One-Step Load Acceptance	100% of rating
Unbalanced load capability	100% of Rated Standby Current
• 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 down stream circuit breakers to trip without collapsing the alternator field. • Self-ventilated and dripproof construction. • Vacuum-impregnated windings with fungus-resistant epoxy varnish for dependability and long life. • Superior voltage waveform from a two-thirds pitch stator and skewed rotor.	

Engine

Engine Specification

Engine Manufacturer	John Deere
Engine Model	6068HF285K
Engine: type	4-Cycle, Turbocharged, Charge Air-Cooled
Cylinder arrangement	6 Inline
Displacement, L (cu. in.)	6.8 (415)
Bore and stroke, mm (in.)	106 x 127 (4.19 x 5.00)
Compression ratio	17.0:1
Piston speed, m/min. (ft./min.)	457 (1500)
Main bearings: quantity, type	7, Replaceable Insert
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	177 (237)
Cylinder head material	Cast Iron
Crankshaft material	Forged Steel
Valve (exhaust) material Intake	Chromium-Silicon Steel
Valve (exhaust) material	Stainless Steel
Governor: type, make/model	JDEC Electronic L16 Denso HP3
Frequency regulation, no-load to-full load	Isochronous
Frequency regulation, steady state	±0.25%
Frequency	Fixed
Air cleaner type, all models	Dry

Model: 150REOZJF, continued

Exhaust

Exhaust System

Exhaust Manifold Type	Dry
Exhaust flow at rated kW, m3/min. (cfm)	33.9 (1197)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	510 (950)
Maximum allowable back pressure, kPa (in. Hg)	7.5 (2.2)

Engine Electrical

Engine Electrical System

Battery charging alternator	12 Volt/24 Volt
Battery charging alternator: Ground (negative/positive)	Negative
Battery charging alternator: Volts (DC)	24-Dec
Battery charging alternator: Ampere rating	65/45
Starter motor rated voltage (DC)	24-Dec
Battery, recommended cold cranking amps (CCA): Qty., CCA rating each	One, 640/Two, 570
Battery voltage (DC)	12

Fuel

Fuel System

Fuel type	Diesel
Fuel supply line, min. ID, mm (in.)	11.0 (0.44)
Fuel return line, min. ID, mm (in.)	6.0 (0.25)
Max. lift, fuel pump: type, m (ft.)	Electronic 1.8 (6.0)
Max. fuel flow, Lph (gph)	96.9 (25.6)
Max. return line restriction, kPa (in. Hg)	20 (5.9)
Fuel prime pump	Manual
Fuel Filter Secondary	2 Microns @ 98% Efficiency
Fuel Filter Primary	30 Microns
Recommended fuel	#2 Diesel/HVO/RD

Lubrication

Lubrication System

Type	Full Pressure
Oil pan capacity, L (qt.)	27.0 (28.5)
Oil pan capacity with filter, L (qt.)	27.9 (29.5)
Oil filter: quantity, type	1, Cartridge
Oil cooler	Water-Cooled

Model: 150REOZJF, continued

Cooling	
Radiator System	
Ambient temperature, °C (°F)	50 (122)
Engine jacket water capacity, L (gal.)	11.3 (3.0)
Radiator system capacity, including engine, L (gal.)	25.7 (6.8)
Engine jacket water flow, Lpm (gpm)	174 (46)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	76.3 (4340)
Heat rejected to air charge cooler at rated kW, dry exhaust, kW (Btu/min.)	31.8 (1810)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	660 (26)
Fan, kWm (HP)	7.7 (10.3)
Max. restriction of cooling air, intake and discharge side of radiator, kPA (in. H2O)	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, m3/min. (scfm) *	226.5 (8000)
Combustion air, m3/min. (cfm)	13.6 (480)
Heat rejected to ambient air: Engine, kW (Btu/min.)	35.9 (2040)
Heat rejected to ambient air: Alternator, kW (Btu/min.)	12.3 (700)
*Air density = 1.20 kg/m3 (0.075 lbm/ft3)	

Fuel Consumption

Diesel, Lph (gph), at % load	Rating
Standby Fuel Consumption at 100% load	44.3 Lph (11.7 gph)
Standby Fuel Consumption at 75% load	35.1 Lph (9.3 gph)
Standby Fuel Consumption at 50% load	26.3 Lph (6.9 gph)
Standby Fuel Consumption at 25% load	16.2 Lph (4.3 gph)



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.)

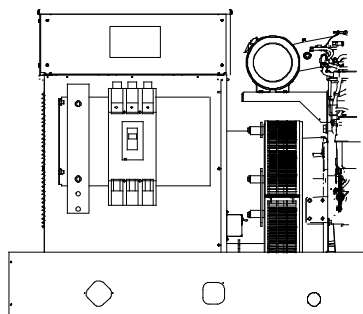
APM402 Available Options

- ☐ **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.

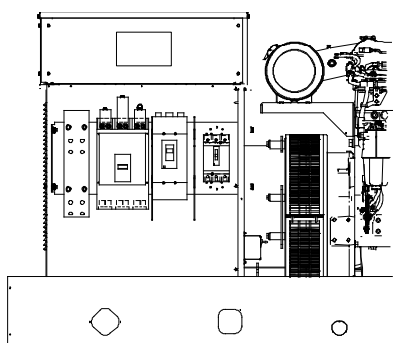
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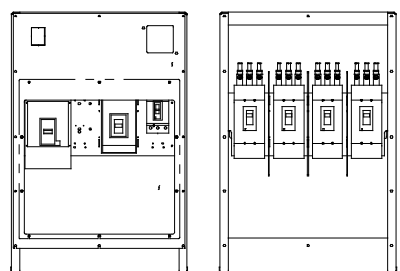
Availability is subject to change without notice. Discovery Energy, LLC and its affiliates dba Rehlko reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local authorized generator set distributor for availability.



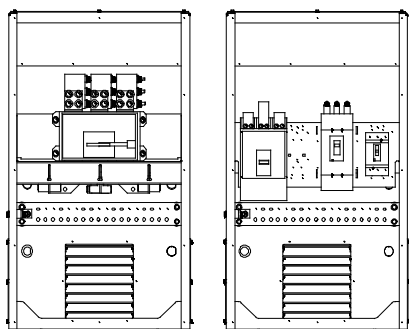
Single Circuit Breaker Kit with Neutral Bus Bar 15-300 kW Model Shown



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 350-2250 kW section.

80% 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
	175-250	Thermal magnetic	JD
	250	Electronic LSI	
	250	Electronic LSI	JG
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	
	250	Electronic LSI	JG
	300-400	Thermal magnetic	LA
	400	Electronic LSI	LG

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
4RX 4S/4SX 4TX/4V 4UA 4M6226	15-150	Thermal magnetic	HD
	60-150	Electronic LSI	
	60-150	Electronic LSI	HG
	175-250	Thermal magnetic	JD
	250	Electronic LSI	
	250	Electronic LSI	JG
	300-400	Thermal magnetic	LA
	400-600	Electronic LSI	LG
4UA 4M6226	1000-1200	Thermal magnetic	PG
		Electronic LSI	
	1200	Thermal Magnetic	PJ
		Electronic LSI	

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
4RX 4S/4SX 4TX 4V 4UA 4M6226	15-150	Thermal magnetic	HD
	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
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

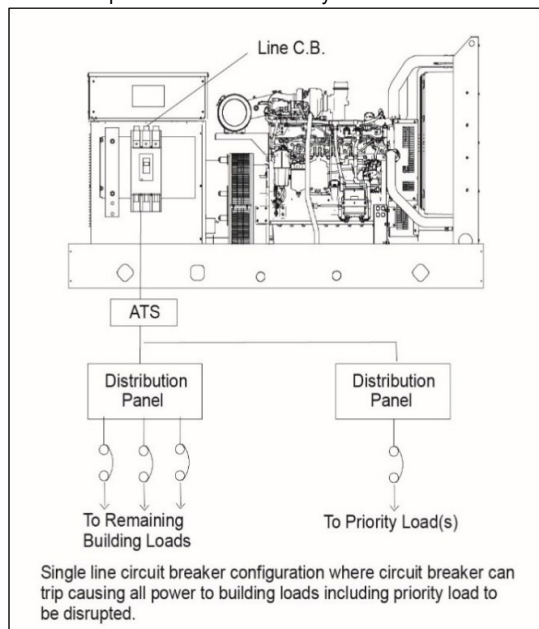
Mechanical Load Lugs Included with H, J, and LG LSI Neutral		
H	60-150	One #14 to 3/0 AL/CU
J	250	One 3/0 to 350 kcmil AL/CU
LG	400-600	Two 4/0 to 500 kcmil AL/CU

15-300* kW Line Circuit Breaker Applications

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

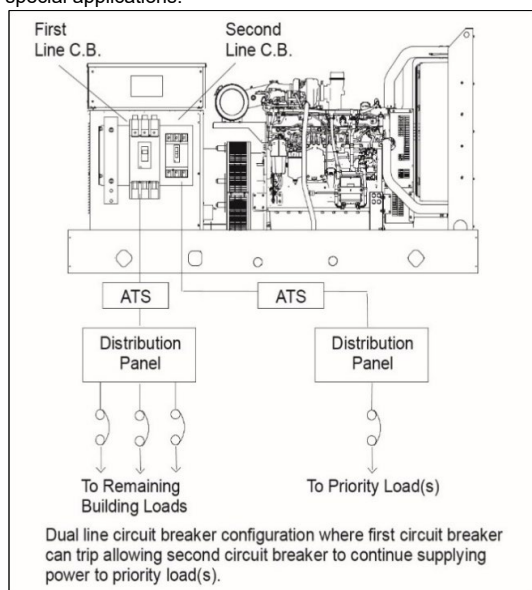
Single Circuit Breaker Installations

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



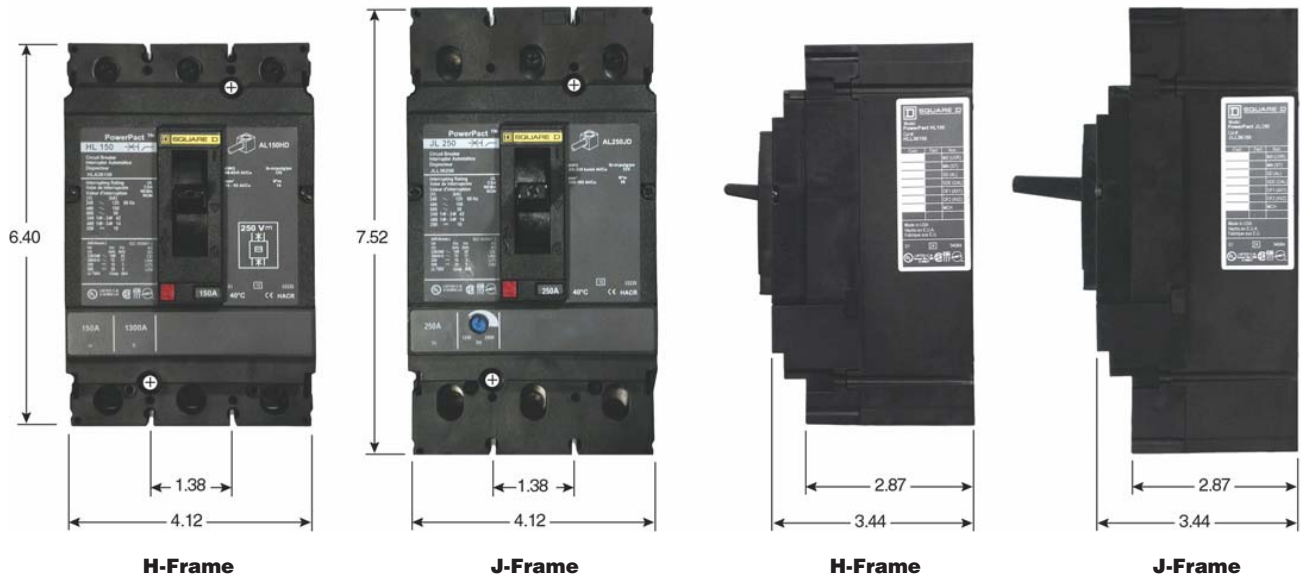
H-Frame 150A



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



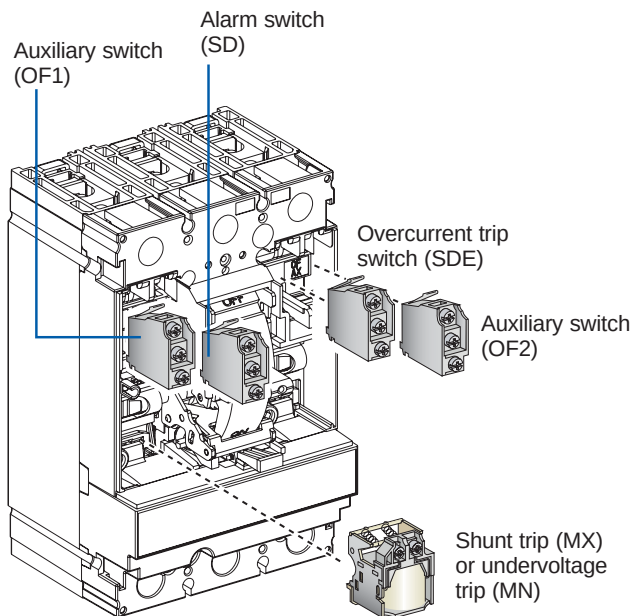
Standardize Designs

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.



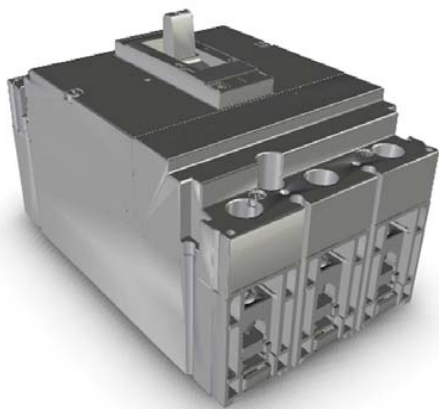
Consolidate Inventory

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.**

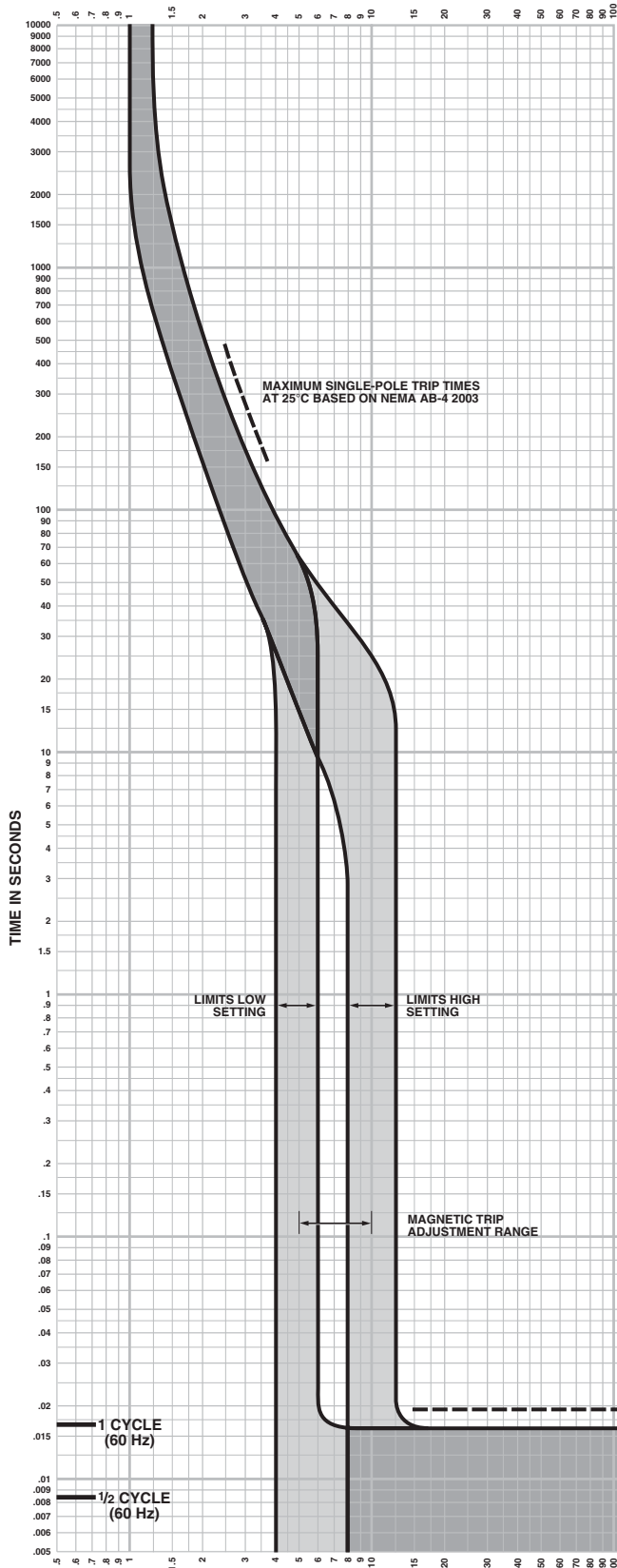
Schneider Electric - North American Operating Division

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

Order Number 0611HO0401

03-04

MULTIPLES OF RATED CURRENT



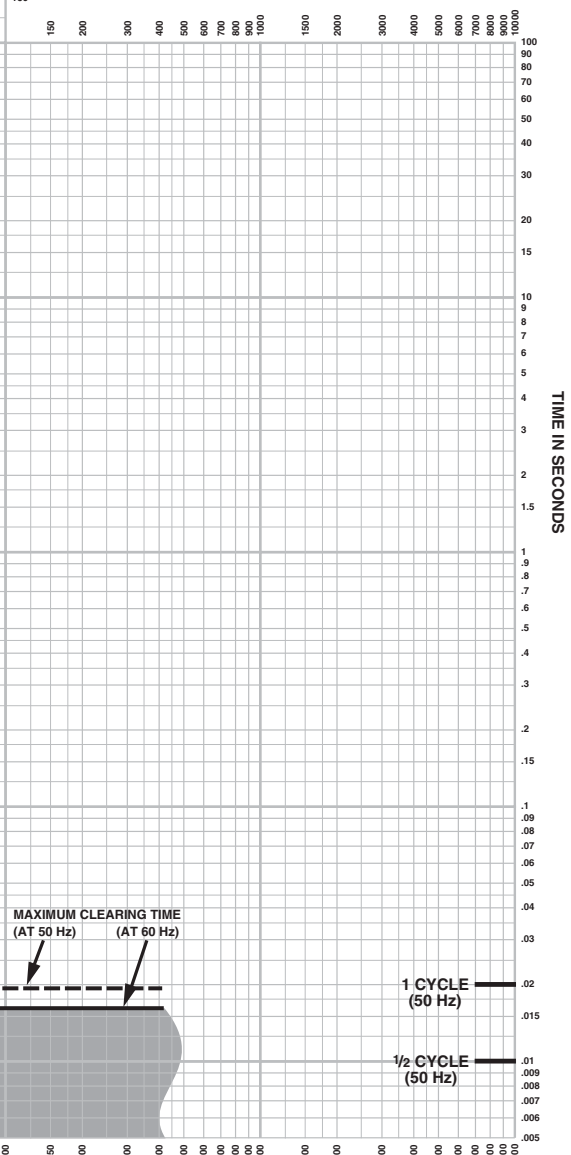
JD, JG, JJ, JL MOLDED CASE CIRCUIT BREAKERS
CHARACTERISTIC TRIP CURVE NO. 50-5

CIRCUIT BREAKER INFORMATION

Circuit Breaker Prefix	Continuous Ampere Rating	Maximum AC Voltage	Number of Poles
JD, JG, JJ, JL	150-250	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.

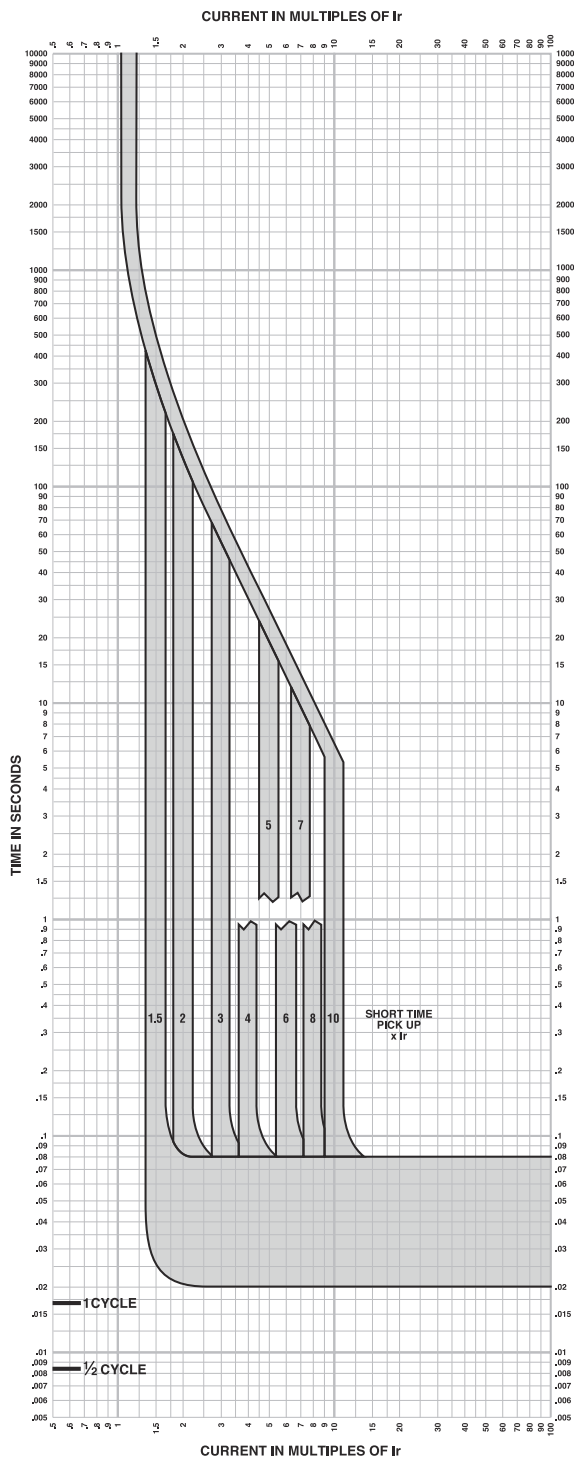


MULTIPLES OF RATED CURRENT

EZ-AMP™

PowerPact™ H-, J-, and L-Frame Circuit Breakers Trip Curves

Figure 104: Micrologic 3.3S and 3.3S-W Electronic Trip Unit Long Time/Short Time Trip Curve



MICROLOGIC™ ELECTRONIC TRIP UNITS Micrologic™ 3.3S and 3.3S-W Long Time/Short Time Trip Curve 600A L-Frame

The time-current curve information is to be used for application and coordination purposes only.

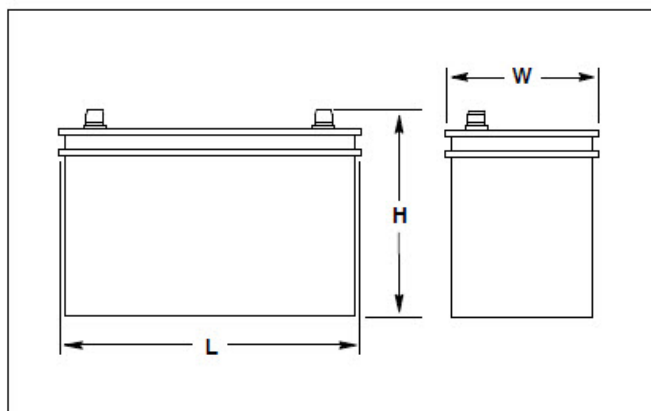
Notes:

1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermal imaging effect comes into play if a current above the long-time delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in a shorter time than normal. The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload. Approximately 20 minutes is required between overloads to completely reset thermal-imaging.
2. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.

Curves apply from -35°C to +70°C (-31°F to +158°F) ambient temperature.



Typical Overall Dimensions

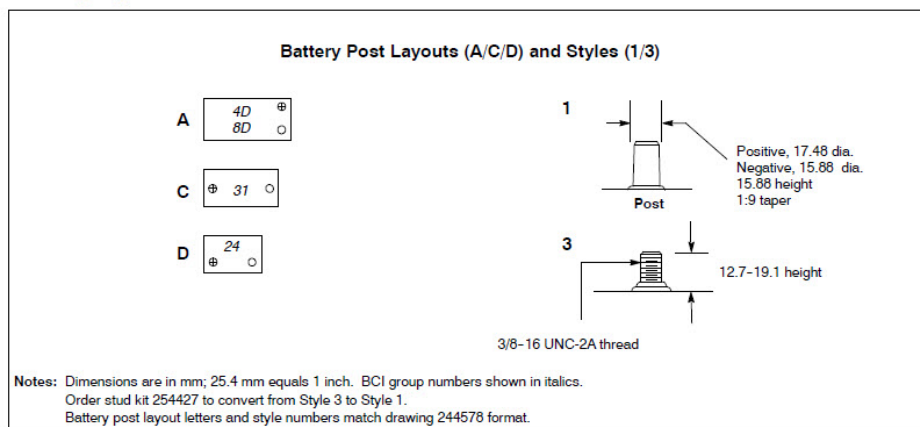


Standard Features

- 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	GM106375	1	31	330.2 (13.0)	171.0 (6.8)	239.8 (9.4)	925	180	C/3

Battery Specifications





Industrial Generator Set Accessories

12/24 Volt, 10 Amp Automatic Multi-Stage Battery Charger



The battery charger is a fully-automatic, high efficiency battery charger that charges batteries rapidly and safely. The battery charger is designed for an industrial environment.

The battery charger is designed for operation with an engine cranking battery.

The battery charger is universal voltage input capable, comes with a standard 120 V/60 Hz AC plug, and charges 12 VDC or 24 VDC battery systems.

Five LED lights indicate power, communication status, temperature compensation status, charge curve, and charger status.

With the optional battery temperature sensor connected, the battery charger can adjust output voltages for optimal charging.

Standard Features

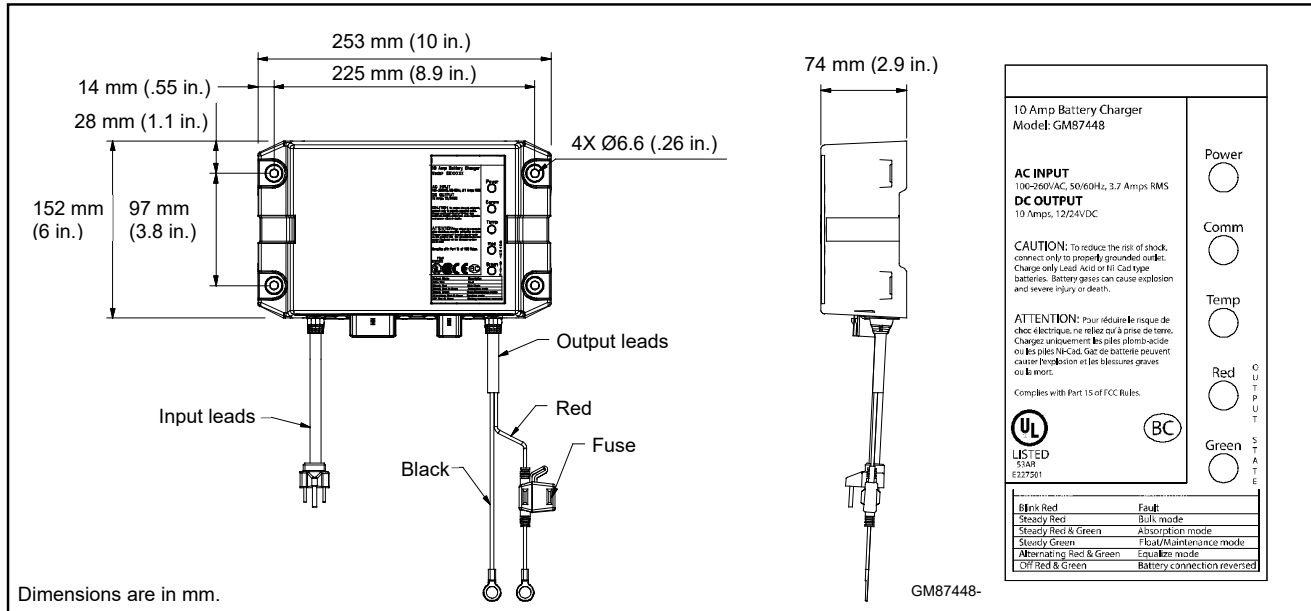
- 12 or 24 VDC output
 - Automatic voltage detection
- Automatic multi-stage charging modes
 - Recovery charge
 - Bulk charge
 - Absorption charge
 - Float charge
 - Equalize charge
- Charges the following type batteries:
 - Flooded lead acid (FLA)
 - AGM
 - Gel cell
 - High performance AGM
 - Nickel-cadmium (NiCad)
- 5 LED status indicators
- Durable potted assembly for waterproofing and vibration resistance
- Reverse-polarity protection
- Short-circuit protection
- Electronically limited output current
- Optional temperature compensation (FLA only)
- User adjustable parameters to support optimal manufacturer recommended charge curve.
- Code compliance:
 - UL 1236 Listed
 - NFPA 110, Level 1 compatible (when used with controller and connected to engine harness)
 - CSA-C22.2 No. 107.2-01
 - FCC-Title 47, Part 15 Class A
 - CE
 - IBC 2015
 - OSHPD

DC Output		AC Input		Overall Dimensions W x D x H	Shipping Weight	
Volts (Nominal)	Amps	Volts (Nominal)	Amps		kgs	lbs
12/24	10	100-260	3.7	253 mm x 152 mm x 74 mm (10.0 in x 6.0 in x 2.9 in)	3.6	7.9



Industrial Generator Set Accessories

12/24 Volt, 10 Amp Automatic Multi-Stage Battery Charger

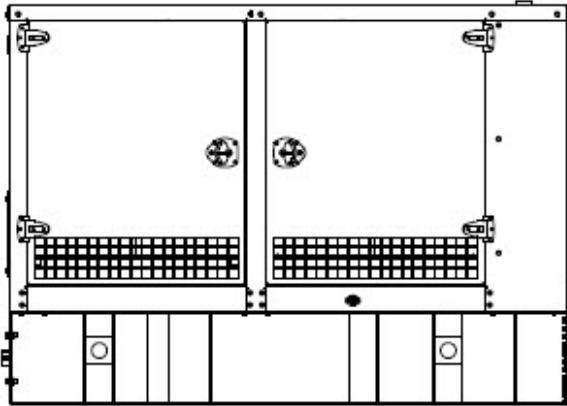


Specifications

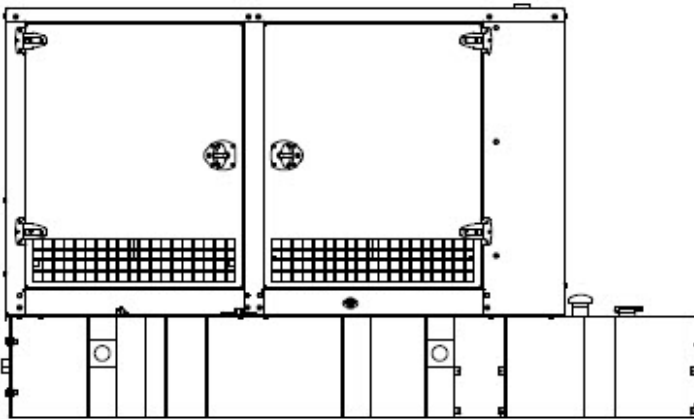
AC Input	100-260 VAC
Frequency Input	50/60 Hz
DC Output	10 Amps @ 12 VDC or 10 Amps @ 24 VDC (On battery voltage regulation $\pm 1\%$; current is electronically limited)
Fuse Protection	15 amps ATC
Battery Types	Flooded Lead Acid (FLA) AGM Gel Cell High Performance AGM Nickel-Cadmium (NiCad)
Monitoring LED Indications	Power Communication Temperature compensation Output charger curve and charger status: - Red - Green
Environmental Operating Storage Relative Humidity Salt Spray Testing Corrosion Resistant	-20° to 70°C (-4° to 158° F) -40° to 85°C (-40° to 185° F) 5 to 95% (non-condensing) ASTM B117 From battery gases

Enclosure Environmental Resistant	From rain, snow, dust, and dripping water (IP-64)
Battery Connections Lead Length Battery Connections	1.8 m (6 ft.) red and black leads 9.5 mm (3/8 in.) ring terminals
AC Power Connections Lead Length Storage	1.8 m (6 ft.) Standard US style 3-prong AC plug
Available Options Temperature compensation	

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.



Enclosure with Standard Subbase Fuel Tank



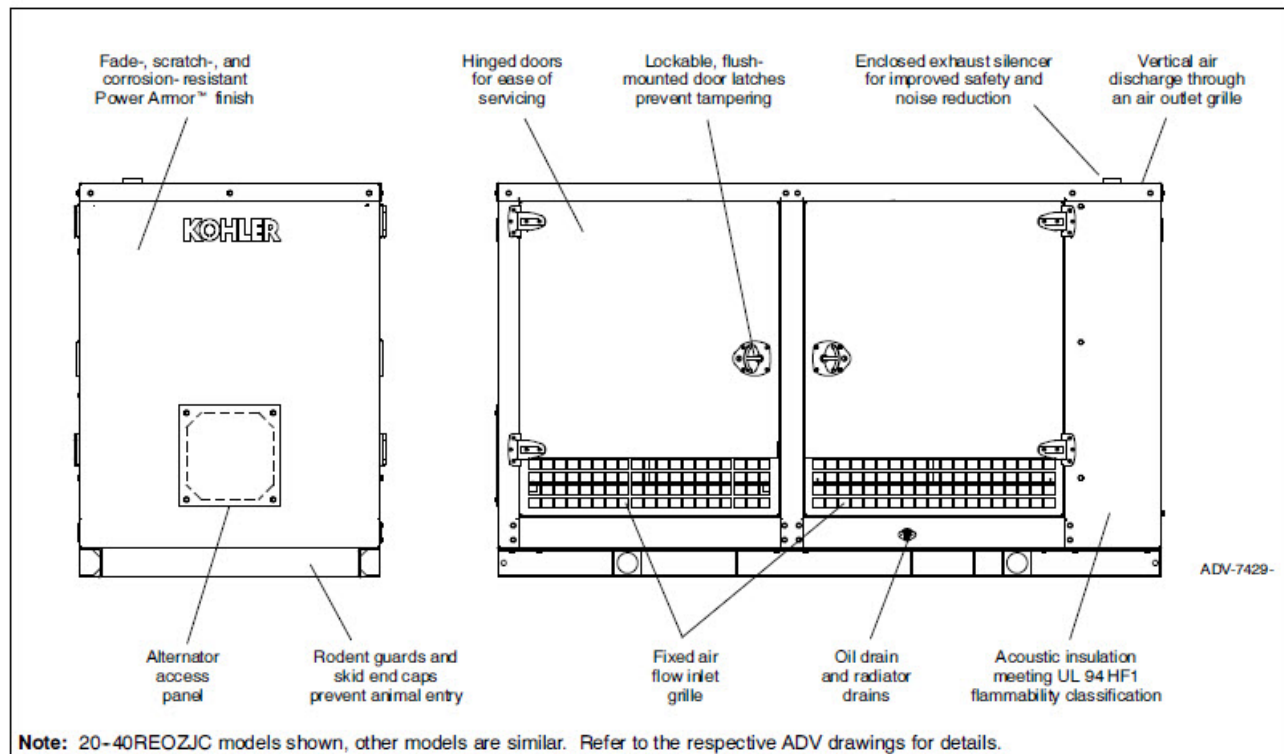
Enclosure with State Code Subbase Fuel Tank

Weather Enclosure Standard Features

- Internal-mounted critical silencer and flexible exhaust connector.
- Lift base-mounted or tank mounted steel construction with hinged doors.
- Fade-, scratch-, and corrosion-resistant Kohler® Power Armor automotive-grade textured finish.
- Power Armor surpasses 3,000-hour salt spray corrosion tests per ASTM B- 1117
- 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.
- Weather enclosure is designed to 150 mph (241 kph) wind load rating.

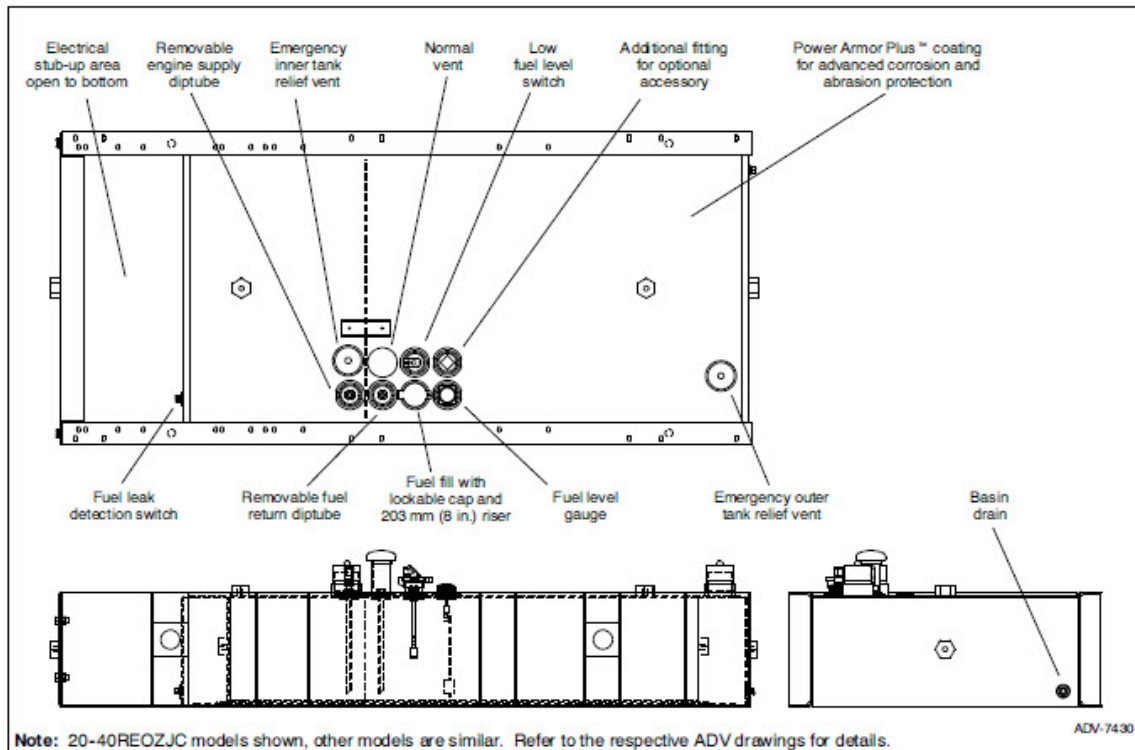
Subbase Fuel Tank Features

- The fuel tank has a Power Armor Plus textured epoxy-based rubberized coating.
- The above-ground rectangular secondary containment tank mounts directly to the generator set, below the generator set skid (subbase).
- Both the inner and outer tanks have emergency relief vents.
- Flexible fuel lines are provided with subbase fuel tank selection.
- The secondary containment generator set base tank meets UL 142 tank requirements. The inner (primary) tank is sealed inside the outer (secondary) tank. The outer tank contains the fuel if the inner tank leaks or ruptures.



Weather Enclosure Features

- Available in steel (14 gauge) formed panel, solid construction. Preassembled package offering corrosion resistant, dent resilient structure mounting 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 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 fuel fill, fuel gauge, oil fill and battery.
- Cooling air discharge. Weather protective design featuring vertical air discharge. Redirects cooling air up and above to reduce ambient noise.
- Note: Installing an additional length of exhaust tail pipe may increase backpressure levels. Please refer to the generator set spec sheet for the maximum backpressure value.



- Extended operation. Usable tank capacities offers full load standby operation of up to 72 hours.
- Power Armor Plus textured epoxy-based rubberized coating that creates an ultra-thick barrier between the tank and harsh environmental conditions like humidity, saltwater, and extreme temperatures, and provides advanced corrosion and abrasion protection.
- UL listed. Secondary containment generator set base tank meeting UL 142 tank requirements.
- NFPA compliant. Designed to comply with the installation standards of NFPA 30 and NFPA 37.
- Integral external lift lugs. Enables crane with spreader-bar lifting of the complete package (empty tank, mounted generator set, and enclosure) to ensure safety.
- Emergency pressure relief vents. Meets UL requirements; ensures adequate venting of inner and outer tank under extreme pressure and/or emergency conditions.
- Normal vent with cap. Vent is raised above lockable fuel fill.
- Low fuel level switch. Annunciates a 50% low fuel level condition at generator set control.
- Leak detection switch. Annunciates a contained primary tank fuel leak condition at generator set control.
- Electrical stub-up.

Fuel Tank Capacity, L (gal.)	Est. Fuel Supply Hours at 60 Hz with Full Load	Max. Length, mm (in.)	Enclosure and Fuel Tank Length, mm (in.)	Enclosure and Fuel Tank Width, mm (in.)	Enclosure and Fuel Tank Weight, kg (lb.)	Enclosure and Fuel Tank Height, mm (in.)	Fuel Tank Height (H), mm (in.)	Sound Pressure Level, dB(A)
Lift base	0	1153 (45.4)	3532 (139.0)	1153 (45.4)	1860 (4101)	1753 (69)	0 (0)	86
1128 (298)	24/25	3532 (139.0)	1153 (45.4)	2609 (5752)	2222 (87.5)	483 (19)		86

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

Note: Refer to TIB-114 for generator set sound data.

Max. weight includes the generator set (wet), enclosure, silencer, and tank (no fuel). The generator set weight represents using the largest alternator option. The enclosure weight is with acoustic insulation added.

Alternator Data

TECHNICAL INFORMATION BULLETIN
Alternator Data Sheet
Alternator Model: 4R13X
Frequency: 60 Hz
Speed: 1800 RPM
Leads: 12 (6 Lead, 600 Volt)

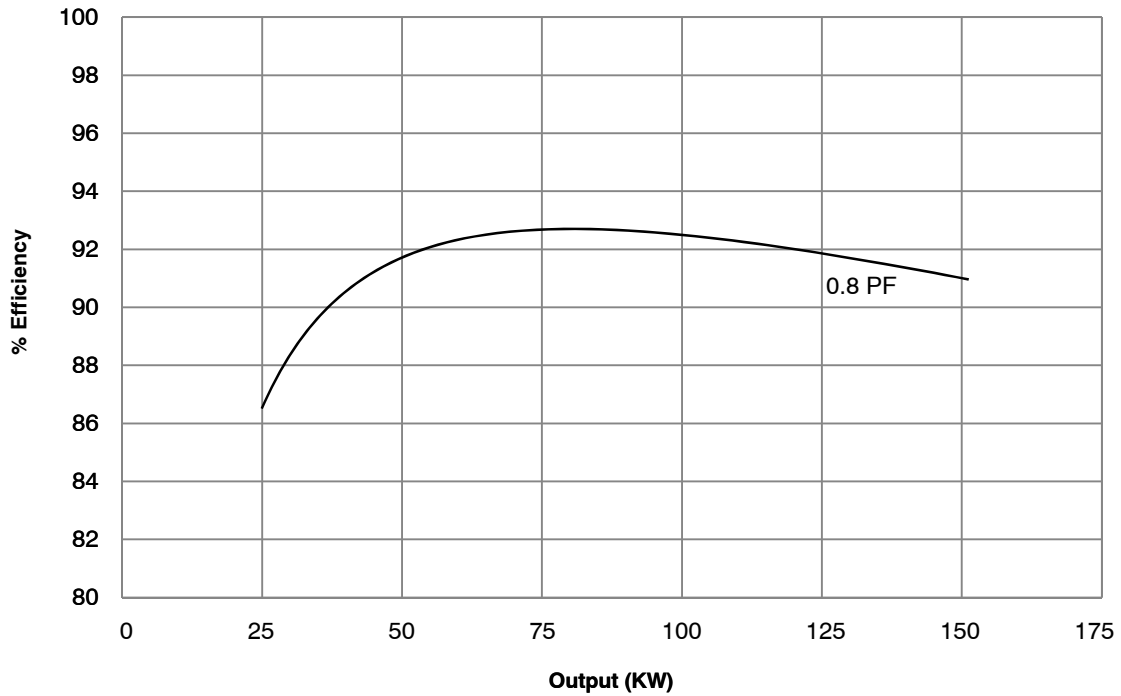
Voltage L-N/L-L	Phase	Power Factor	Connection	kW* (kVA)						
				Class B	Class F				Class H	
				80°C Continuous	90°C Lloyds	95°C ABS	105°C Continuous	130°C Standby	125°C Continuous	150°C Standby
139/240 277/480	3	0.8	Wye	120.5 (150.5)	127.0 (158.5)	130.0 (162.5)	136.5 (170.5)	150.0 (187.5)	147.0 (183.5)	157.0 (196.0)
127/220 254/440	3	0.8	Wye	117.0 (146.0)	123.0 (153.5)	125.5 (156.5)	132.0 (165.0)	143.0 (178.5)	140.5 (175.5)	150.0 (187.5)
120/208 240/416	3	0.8	Wye	114.0 (142.5)	119.5 (149.0)	122.0 (152.5)	128.0 (160.0)	137.0 (171.0)	134.5 (168.0)	144.0 (180.0)
110/190 220/380	3	0.8	Wye	103.5 (129.0)	108.5 (135.5)	111.0 (138.5)	116.0 (145.0)	124.5 (155.5)	122.0 (152.5)	131.0 (163.5)
120/240	3	0.8	Delta	114.0 (142.5)	119.5 (149.0)	122.0 (152.5)	128.0 (160.0)	137.0 (171.0)	134.5 (168.0)	144.0 (180.0)
120/240	1	1.0	Dogleg	91.5 (91.5)	94.5 (94.5)	96.0 (96.0)	99.5 (99.5)	107.0 (107.0)	105.5 (105.5)	109.0 (109.0)
347/600	3	0.8	Wye	99.0 (123.0)	105.0 (131.0)	108.0 (135.0)	114.0 (142.0)	127.0 (158.0)	124.0 (155.0)	136.0 (170.0)

* 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.

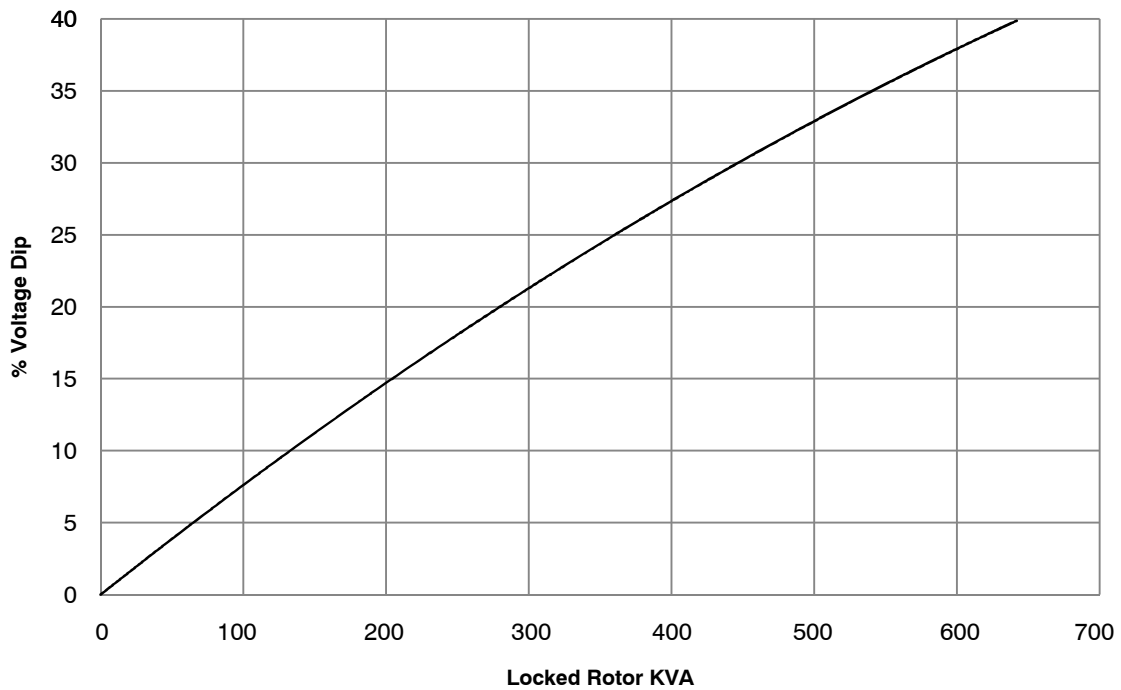
Submittal Data: 139/240 Volts, 0.8 PF, 1800 RPM, 60 Hz, 3 Phase, 130°C Rise

	Symbol	PerUnit	Ohms		Symbol	Value
Typical Cold Resistances				Typical Time Constants		
Phase Resistance		0.026	0.008	Armature Short Circuit	T _a	0.008 sec.
Rotor Resistance		20.96	6.436	Transient Short Circuit	T' _d	0.072 sec.
Typical Reactances				Transient Open Circuit	T' _{do}	0.885 sec.
Synchronous				Typical Field Current		
Direct	X _d	2.872	0.882	Full Load	I _{fFL}	18.5 amps
Quadrature	X _q	1.467	0.451	No Load	I _{fNL}	5.2 amps
Transient				Typical Short Circuit Ratio		
Unsaturated	X' _{du}	0.265	0.082	Harmonic Distortion		
Saturated	X' _d	0.234	0.072	RMS Total Harmonic Distortion		3.22%
Subtransient				Max. Single Harmonic		5th
Direct	X'' _d	0.103	0.032	Deviation Factor (No Load, L-L)		<5%
Quadrature	X'' _q	0.098	0.030	Telephone Influence Factor		<50
Negative Sequence	X ₂	0.101	0.031	Insulation Class		
Zero Sequence	X ₀	0.009	0.003	per NEMA MG1 -1.66	H	
				Phase Rotation		
					ABC	

**4R13X, 60 Hz, 139/240, 277/480 Volts, Wye
TYPICAL ALTERNATOR EFFICIENCY***

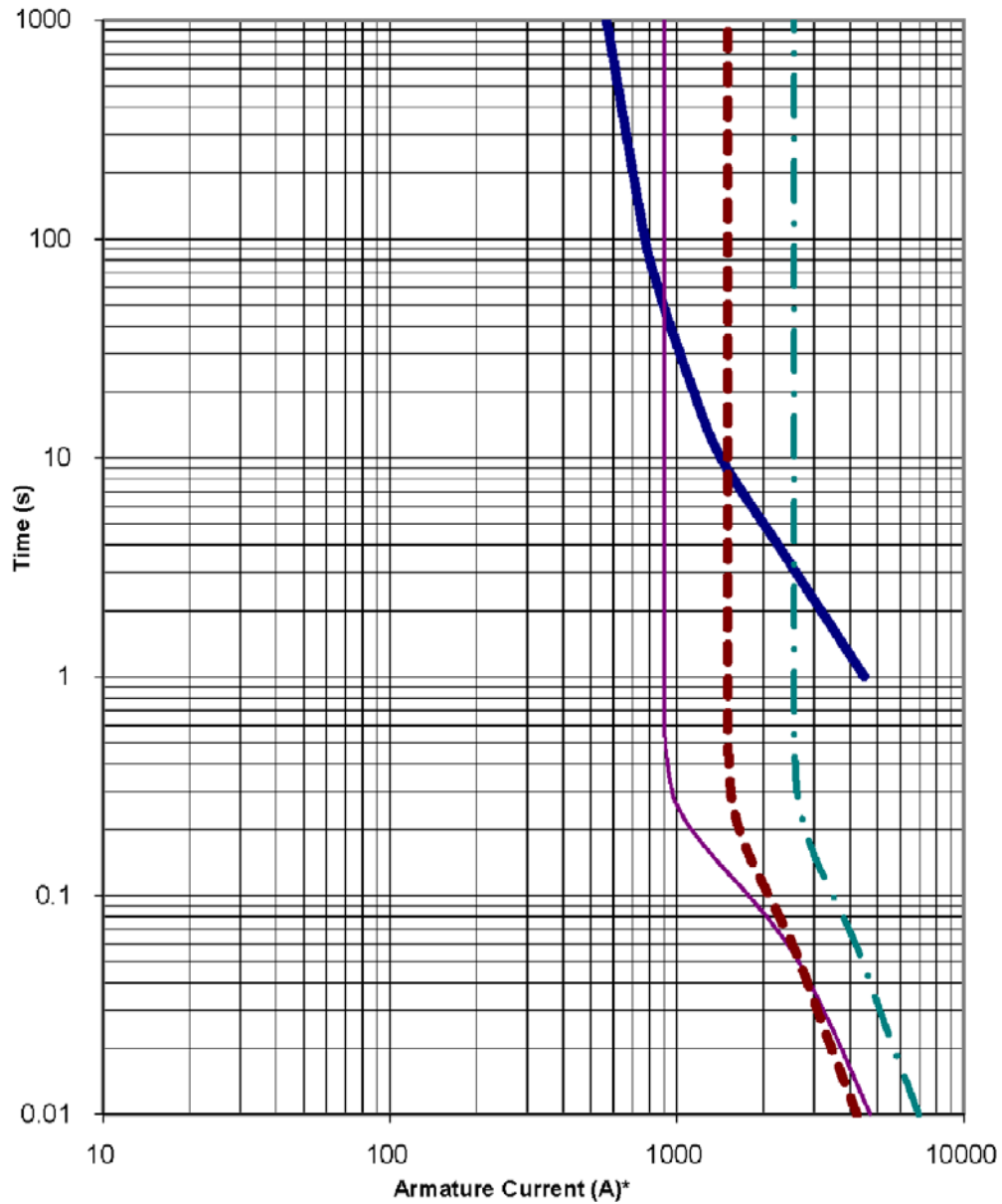


**4R13X, 60 Hz, 139/240, 277/480 Volts, Wye
TYPICAL MOTOR STARTING CHARACTERISTICS***



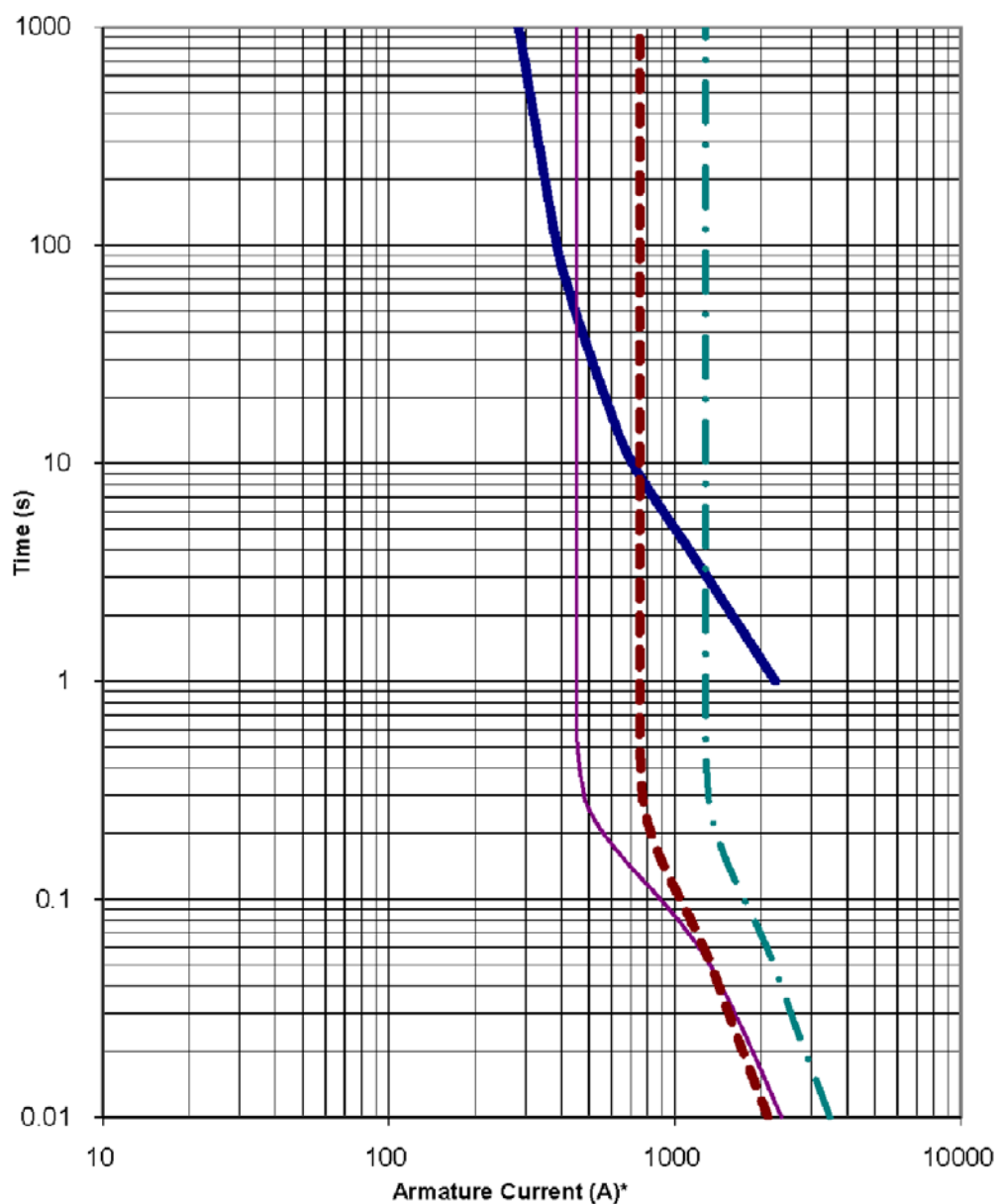
* All data tested in accordance with IEEE Standard 115. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

**4R13X, 60 Hz, Low Wye or Delta Connection
SHORT CIRCUIT DECREMENT CURVE**



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

4R13X, 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	Snow Sound Enclosure
150REOZJF	60	100% Load	99.6	88.4	86.5	75.6	73.3
		No Load	90.1	87.7	85.8	73.7	70.3
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.							

Continued on next page

150REOZJF	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)	Snow Sound	3:00	55.4	63.4	63.3	66.9	61.8	59.8	58.1	50.5	71.2
			1:30	58.0	65.7	61.3	69.0	66.1	63.1	62.1	53.6	73.4
			12:00-Engine	55.8	64.3	65.8	71.6	66.3	64.4	64.1	55.9	75.0
			10:30	59.2	67.2	65.0	71.0	66.6	64.1	62.0	54.1	74.9
			9:00	57.6	65.2	63.6	68.3	65.2	64.3	64.5	54.9	73.5
			7:30	49.2	59.5	64.6	67.2	65.0	62.7	64.6	55.3	72.5
			6:00-Alternator	52.1	61.2	62.4	66.4	64.8	62.6	61.2	51.1	71.6
			4:30	53.9	62.1	64.6	67.8	64.6	63.0	63.1	54.1	72.7
			8-pos. log avg.	56.1	64.2	64.0	68.9	65.3	63.2	62.9	54.0	73.3

				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	53.2	63.0	66.7	70.3	67.0	66.9	63.2	55.4	74.8
			1:30	61.7	66.3	67.6	72.4	66.7	65.5	61.7	52.8	75.9
			12:00-Engine	59.5	64.6	66.0	70.4	68.6	66.7	64.4	53.2	75.3
			10:30	57.5	64.1	69.1	72.2	67.4	66.6	65.1	55.8	76.2
			9:00	59.6	66.5	70.0	69.5	66.8	66.7	65.0	57.7	75.7
			7:30	61.8	68.0	68.3	68.2	67.4	66.5	64.1	56.7	75.4
			6:00-Alternator	54.8	61.0	72.0	69.3	69.0	66.2	60.8	57.2	76.0
			4:30	63.5	68.0	67.6	69.1	68.0	66.0	61.3	56.4	75.4
			8-pos. log avg.	60.1	65.7	68.8	70.4	67.7	66.4	63.5	55.9	75.6

				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	86.5	87.4	81.3	87.6	86.9	87.3	85.4	86.6	86.5

				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	54.7	64.5	79.1	79.3	80.8	82.6	78.9	75.2	88.4
			1:30	51.4	65.6	72.8	81.2	82.8	83.6	81.2	76.3	89.3
			12:00-Engine	51.6	63.0	75.6	80.0	75.4	75.0	70.9	65.3	83.2
			10:30	48.5	61.8	74.2	79.1	85.3	83.6	81.9	76.3	89.5
			9:00	48.4	61.1	76.5	81.6	81.8	82.9	80.8	76.2	88.8
			7:30	47.5	63.3	79.6	81.0	82.4	82.4	81.2	76.1	89.2
			6:00-Alternator	48.4	64.2	78.1	83.0	81.6	76.9	74.8	67.8	87.3
			4:30	52.2	65.3	80.6	81.5	81.3	82.5	79.6	73.5	88.5
			8-pos. log avg.	51.0	63.8	77.8	81.0	82.1	82.0	79.7	74.6	88.4

			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 (No Silencer)	65.9	77.8	83.6	88.2	92.8	94.7	93.6	91.2	99.6

Emissions Data



150REOZJF

60 HZ. DIESEL INDUSTRIAL GENERATOR SET EMISSION DATA SHEET

ENGINE INFORMATION

Model:	John Deere, 6068HF285K	Bore:	106mm (4.19 in.)
Nameplate BHP @ 1800 RPM:	237	Stroke:	127mm (5.0 in.)
Type:	4-Cycle, 6 Cylinder, Inline	Displacement:	6.8 L (415 cu. in.)
Aspiration:	Turbocharged, Charge Air-Cooled	EPA Family:	TJDXL06.8120
Compression Ratio	17.0:1	EPA Certificate:	TJDXL06.8120-006

PERFORMANCE DATA:

Engine bkW @ Stated Load
Fuel Consumption (g/kWh)
Exhaust Gas Flow (m³/min)
Exhaust Temperature (°C)

Table 1

1/4 Standby	1/2 Standby	3/4 Standby	Full Standby
44	89	133	177
250	244	222	214
			34
			510

EXHAUST EMISSION DATA:

HC (Total Unburned Hydrocarbons)
NOx (Oxides of Nitrogen as NO₂)
CO (Carbon Monoxide)
PM (Particulate Matter)

Table 2

EPA D2 Cycle 5-mode weighted

0.12
3.79
1.2
0.12

Values are in g/kWh unless otherwise noted

TEST METHODS AND CONDITIONS

The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and there is no guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, alternate test methods, or other conditions.

Data and specifications subject to change without notice.

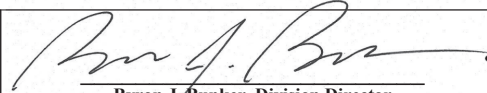


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2026 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: Deere & Company
(U.S. Manufacturer or Importer)
Certificate Number: TJDXL06.8120-006

Effective Date:
07/31/2025
Expiration Date:
12/31/2026


Byron J. Bunker, Division Director
Compliance Division

Issue Date:
07/31/2025
Revision Date:
N/A

Model Year: 2026
Manufacturer Type: Original Engine Manufacturer
Engine Family: TJDXL06.8120

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 130<=kW<225
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Electronic Control, Smoke Puff Limiter, Non-standard Non-After Treatment Device Installed, Engine Design Modification

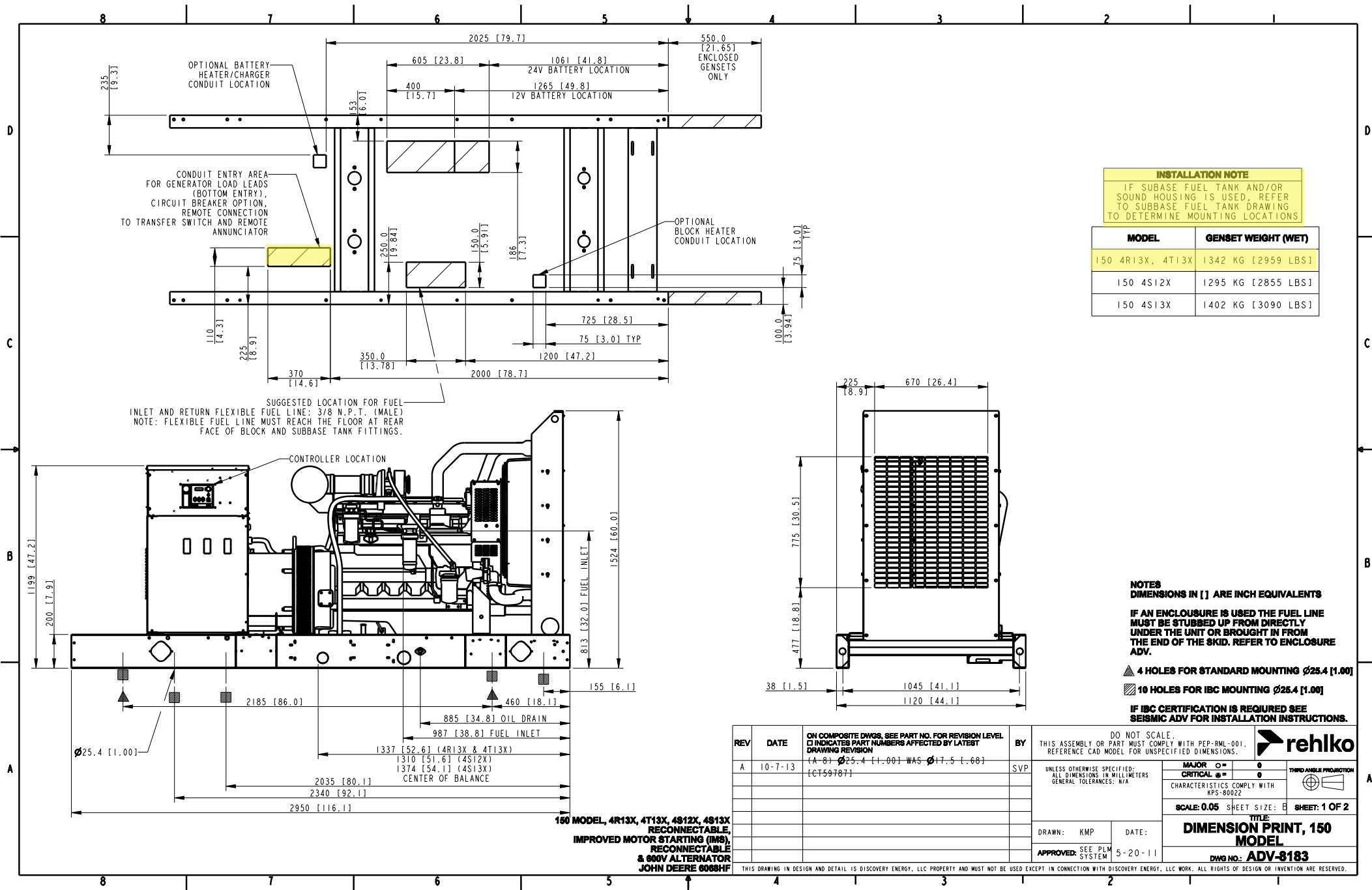
Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

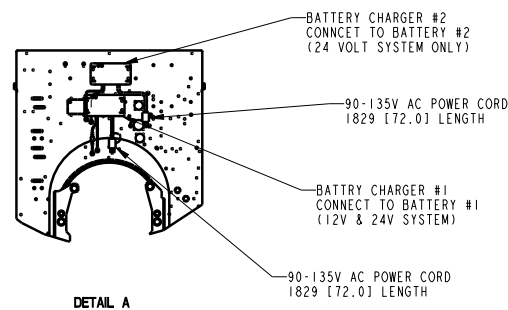
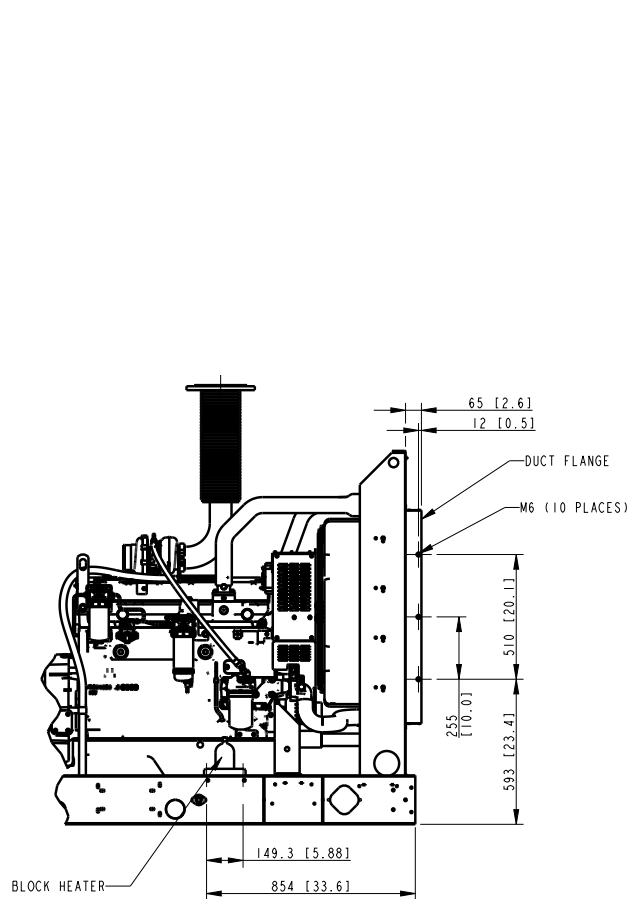
This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 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. 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.

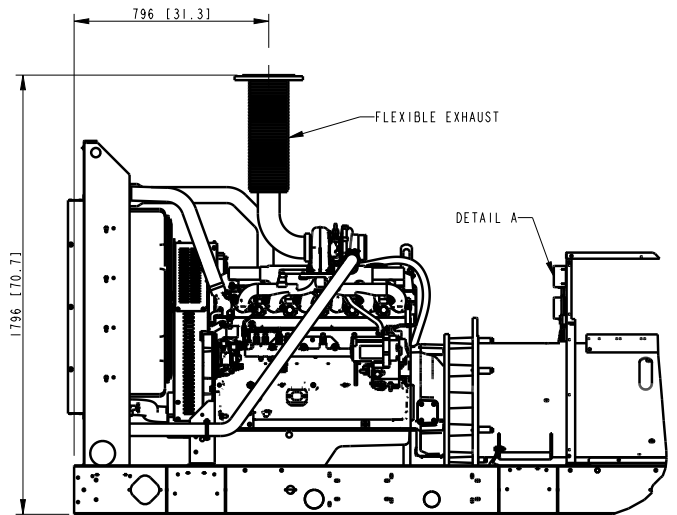
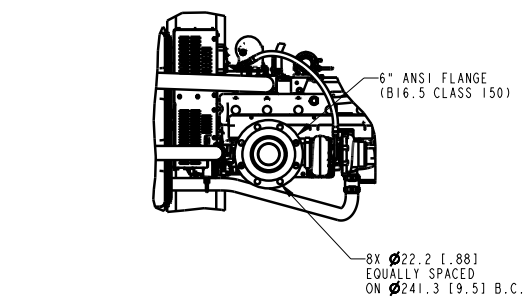
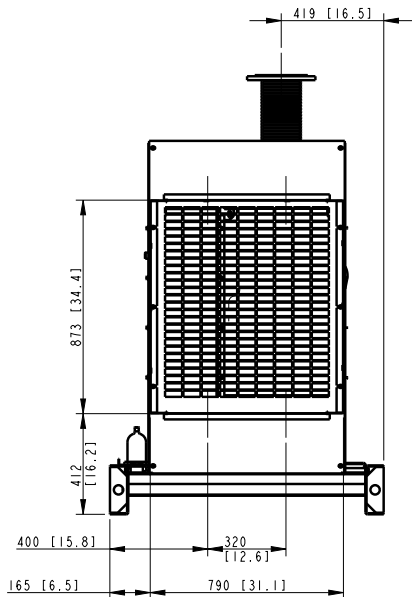
This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Dimensional Drawings





DETAIL A



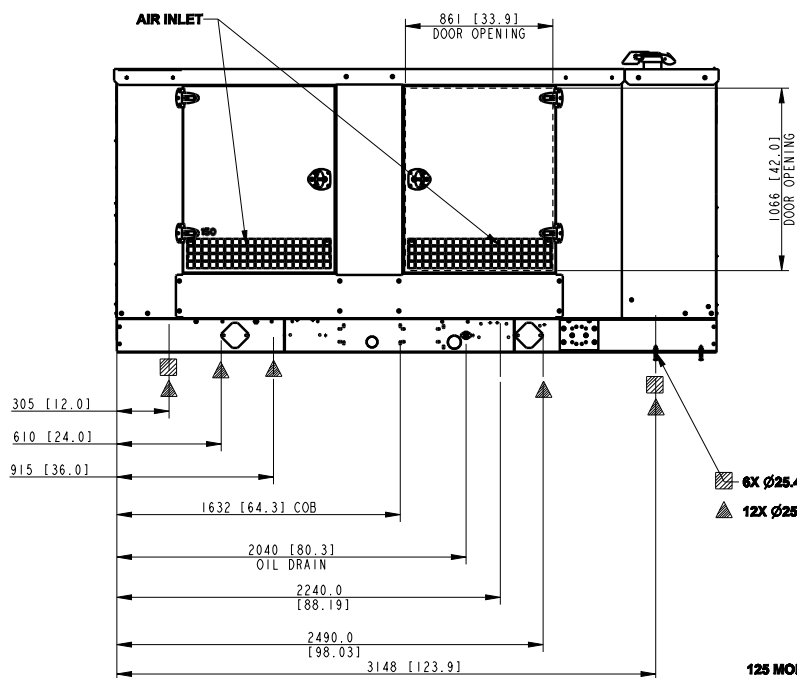
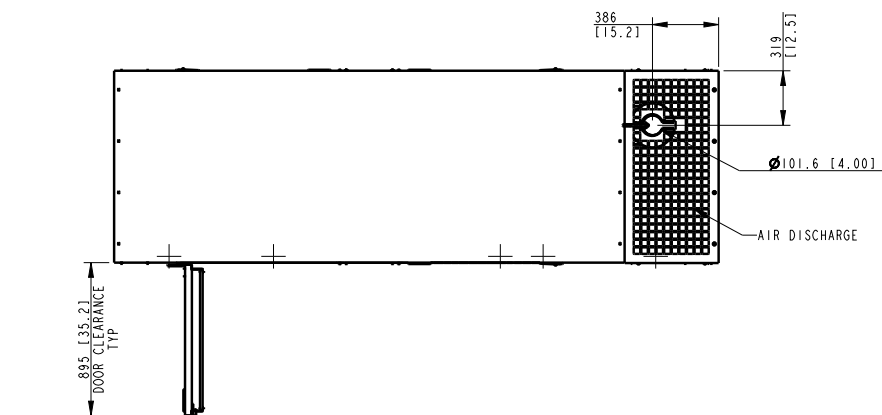
**160 MODEL 4S13, 4S16, 4R13X, 4T13X, 4S12X, 4S13X
IMPROVE MOTOR STARTING (IMS) RECONNECTABLE
600V & 1 PHASE ALTERNATORS
6068HF285 JOHN DEERE TIER III**

DIMENSIONS IN [] ARE INCH EQUIVALENTS

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.	MAJOR CRITICAL	THIRD ANGLE PROJECTION
A	3-30-10	(C,D-2,3) FLEXIBLE EXHAUST: 6" ANSI FLANGE WAS 6" NPT. AND TOP VIEW ADDED. 796 [31.3] WAS 811 [31.9] (C-4) 1796 WAS 1853 [89099]	GFR	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A	0	0
B	1-6-12	(A-8) "DETAIL A" ADDED, (A-4) 150 MODEL NOTE UPDATED [92681]	PKD	DRAWN: MRS APPROVED: SEE PLM SYSTEM	0	0
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.				DATE: 11-6-09	SCALE: 0.05	SHEET SIZE: B SHEET: 1 OF 1
				TITLE: DIMENSION PRINT, ACCESSORIES DWG NO.: ADV-7841		

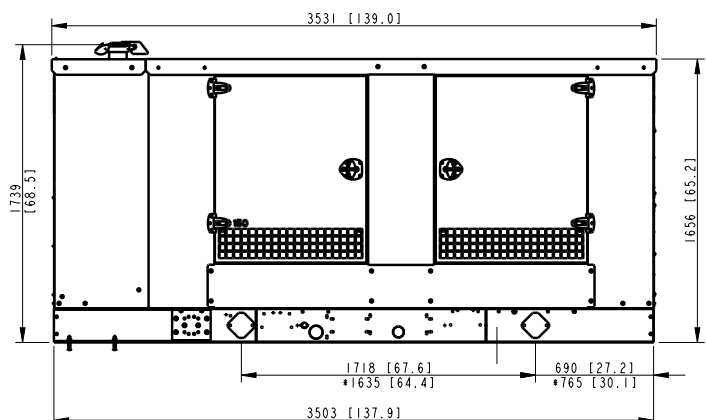
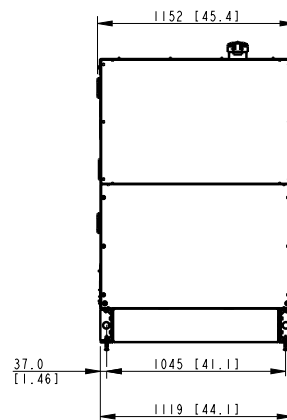
MODEL	ENCLOSURE WEIGHT KG [LBS]
STEEL WEATHER	340 [750]
STEEL SOUND	363 [800]
ALUMINUM SOUND	227 [500]

NOTE:
1. TANK (IF ORDERED) MOUNTS BELOW SKID
2. TANK MAY EXTEND BEYOND ENCLOSURE (DISCHARGE END ONLY)



6X $\phi 25.4$ [1.0] STD MOUNTING HOLES
12X $\phi 25.4$ [1.0] IBC MOUNTING HOLES

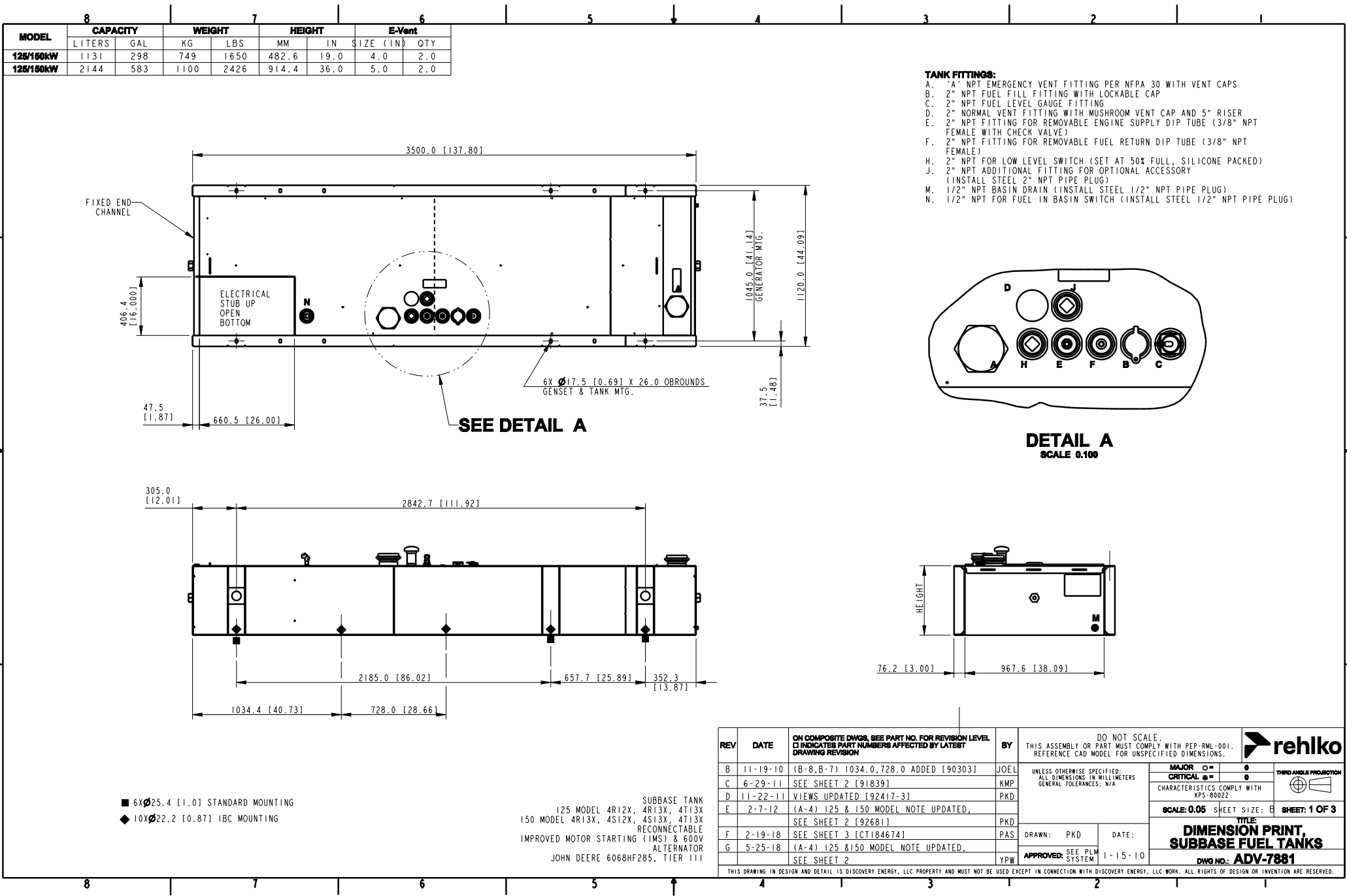
125 MODEL 4811, 4813, 4R12X, 4R13X, 4T11X
150 MODEL 4813, 4815, 4R13X, 4T13X, 4812X, 4813X
RECONNECTABLE
IMPROVE MOTOR STARTING (IMS) RECONNECTABLE
600V & 1 PHASE ALTERNATORS
4045HF285 & 6068HF285 JOHN DEERE TIER III



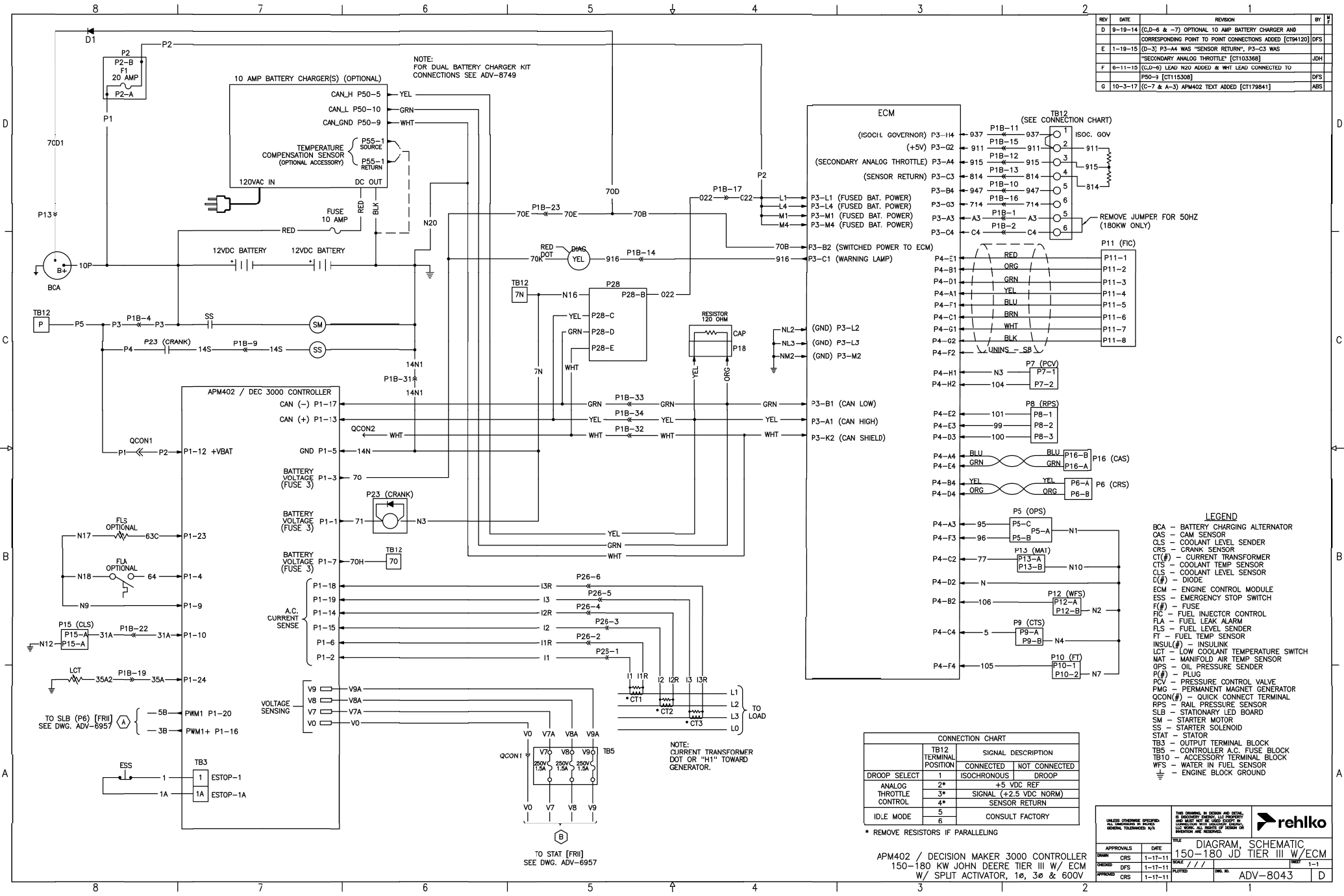
DIMENSIONS IN [] ARE INCH EQUIVALENTS
(*) DESIGNATES 125KW 4045HF ENGINE

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL □ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY	THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001. REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS.	DO NOT SCALE.
C	10-3-13	(A-5) $\phi 25.4$ [1.0] WAS $\phi 17.5$ [.69]; SEE SHEET 2 [CT93181] TO $\phi 101.6$ (4.00) ADDED	SVP	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A	MAJOR ϕ = ϕ CRITICAL ϕ = ϕ
G	8-4-17	SEE SHEET 2 [CT93181] TO $\phi 101.6$ (4.00) ADDED	SRM		CHARACTERISTICS COMPLY WITH KPS-80022
H	9-27-18	ALL VIEWS AND DIMENSIONS UPDATED; SEE SHEET 2 [CT190707]	PAR		SCALE: 0.08 SHEET SIZE: B
				DRAWN: MRS	DATE: 11-5-09
				APPROVED: SEE PLM SYSTEM	TITLE: DIMENSION PRINT
					DWG NO.: ADV-7825

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Wiring Schematics



REV	DATE	REVISION	BY
D	9-19-14	(C,D-6 & -7) OPTIONAL 10 AMP BATTERY CHARGER AND CORRESPONDING POINT TO POINT CONNECTIONS ADDED [CT94120]	DPS
E	1-19-15	(D-3) P3-A4 WAS "SENSOR RETURN", P3-C3 WAS "SECONDARY ANALOG THROTTLE" [CT103368]	JDH
F	6-11-15	(C,D-6) LEAD N20 ADDED & WHT LEAD CONNECTED TO P50-3 [CT115308]	DPS
G	10-3-17	(C-7 & A-3) APM402 TEXT ADDED [CT179841]	ABS

CONNECTION CHART			
DROOP SELECT	TB12 TERMINAL POSITION	SIGNAL DESCRIPTION	
		CONNECTED	NOT CONNECTED
ANALOG THROTTLE CONTROL	1	ISOCHRONOUS	DROOP
	2*	+5 VDC REF	
	3*	SIGNAL (+2.5 VDC NORM)	
	4*	SENSOR RETURN	
IDLE MODE	5		
	6	CONSULT FACTORY	

* REMOVE RESISTORS IF PARALLELING

APM402 / DECISION MAKER 3000 CONTROLLER
150-180 KW JOHN DEERE TIER III w/ECM
w/ SPLIT ACTIVATOR, 1ø, 3ø & 600V

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF. DIMENSIONS IN PARENTHESES ARE RECOMMENDED. SEE REHILKO WEBSITE FOR DIMENSIONAL TOLERANCES. N/A

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APPROVALS	DWG	DATE	1-17-11
DESIGNED	DPS	1-17-11	
APPROVED	CRS	1-17-11	

SCALE	1-1
PLotted	
DATE	ADV-8043
BY	D

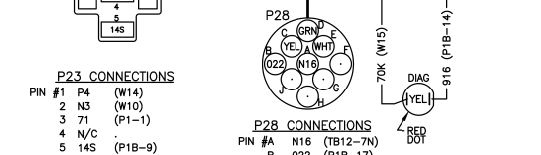
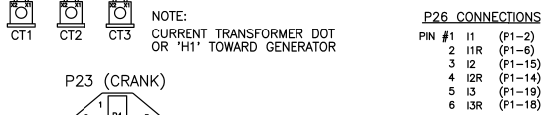
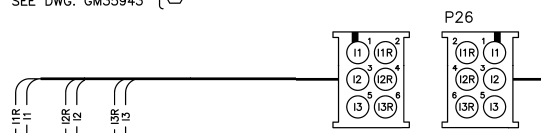
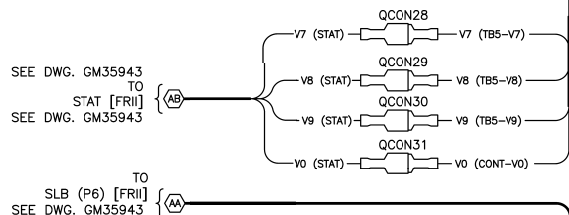
LEGEND

- BCA - BATTERY CHARGING ALTERNATOR
- CAS - CAN SENSOR
- CLS - COOLANT LEVEL SENDER
- CRS - CRANK SENSOR
- CT1(##) - CURRENT TRANSFORMER
- CTF - COOLANT TEMP SENSOR
- CLS - COOLANT LEVEL SENSOR
- D(##) - DIODE
- ECM - ENGINE CONTROL MODULE
- ESS - EMERGENCY STOP SWITCH
- F(##) - FUSE
- FIC - FUEL INJECTOR CONTROL
- FLA - FUEL LEAK ALARM
- FLS - FUEL LEVEL SENDER
- FT - FUEL TEMP SENSOR
- INSUL(##) - INSULINK
- LCT - LOW COOLANT TEMPERATURE SWITCH
- MAT - MANIFOLD AIR TEMP SENSOR
- OPS - OIL PRESSURE SENDER
- P(##) - PLUG
- PCV - PRESSURE CONTROL VALVE
- PMG - PERMANENT MAGNET GENERATOR
- QCON(##) - QUICK CONNECT TERMINAL
- RPS - RAIL PRESSURE SENSOR
- SLB - STATIONARY LED BOARD
- SM - STARTER MOTOR
- SS - STARTER SOLENOID
- STAT - STATOR
- TB3 - OUTPUT TERMINAL BLOCK
- TB5 - CONTROLLER A.C. FUSE BLOCK
- TB10 - ACCESSORY TERMINAL BLOCK
- WFS - WATER IN FUEL SENSOR
- ⏏ - ENGINE BLOCK GROUND

JUNCTION BOX

CONTROLLER BOX

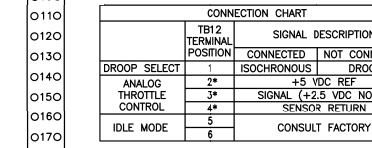
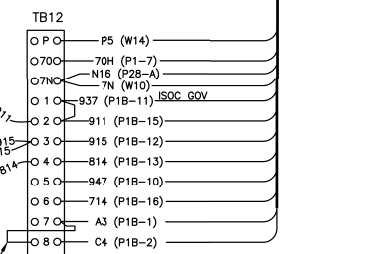
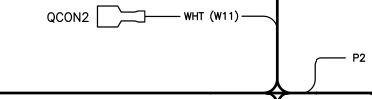
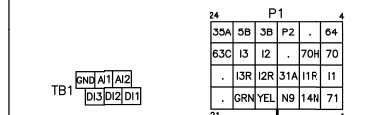
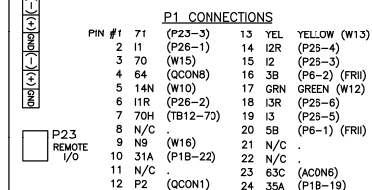
A/C COVER



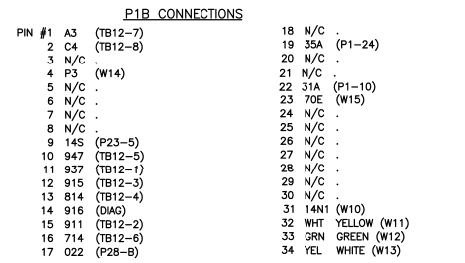
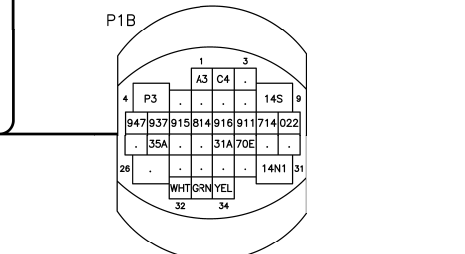
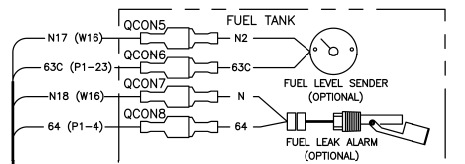
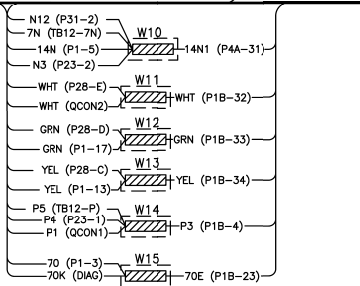
LEGEND

BCA - BATTERY CHARGING ALTERNATOR
CAS - CAM SENSOR
CLS - COOLANT LEVEL SENDER
CT(1) - CURRENT TRANSFORMER
CTS - COOLANT TEMPERATURE SENDER
D(1) - DIODE
DIAG - DIAGNOSTIC LAMP
EBG - ENGINE BLOCK GROUND
ESS - EMERGENCY STOP SWITCH
GP - GLOW PLUGS
GPR - GLOW PLUG RELAY
MAT - MANIFOLD AIR TEMP SENSOR
OPS - OIL PRESSURE SENDER
P(1) - PLUG
QCON(1) - QUICK CONNECT TERMINAL
SLB - STATIONARY LED BOARD
SM - STARTER MOTOR
SS - STARTER SOLENOID
STAT - STATOR
TB1 - CONTROLLER BOARD TERMINAL BLOCK
TB2 - A/D TERMINAL BLOCK
TB3 - OUTPUT TERMINAL BLOCK
TB5 - CONTROLLER A.C. FUSE BLOCK
TB10 - ACCESSORY TERMINAL BLOCK

APM402 / DEC-3000 CONTROLLER

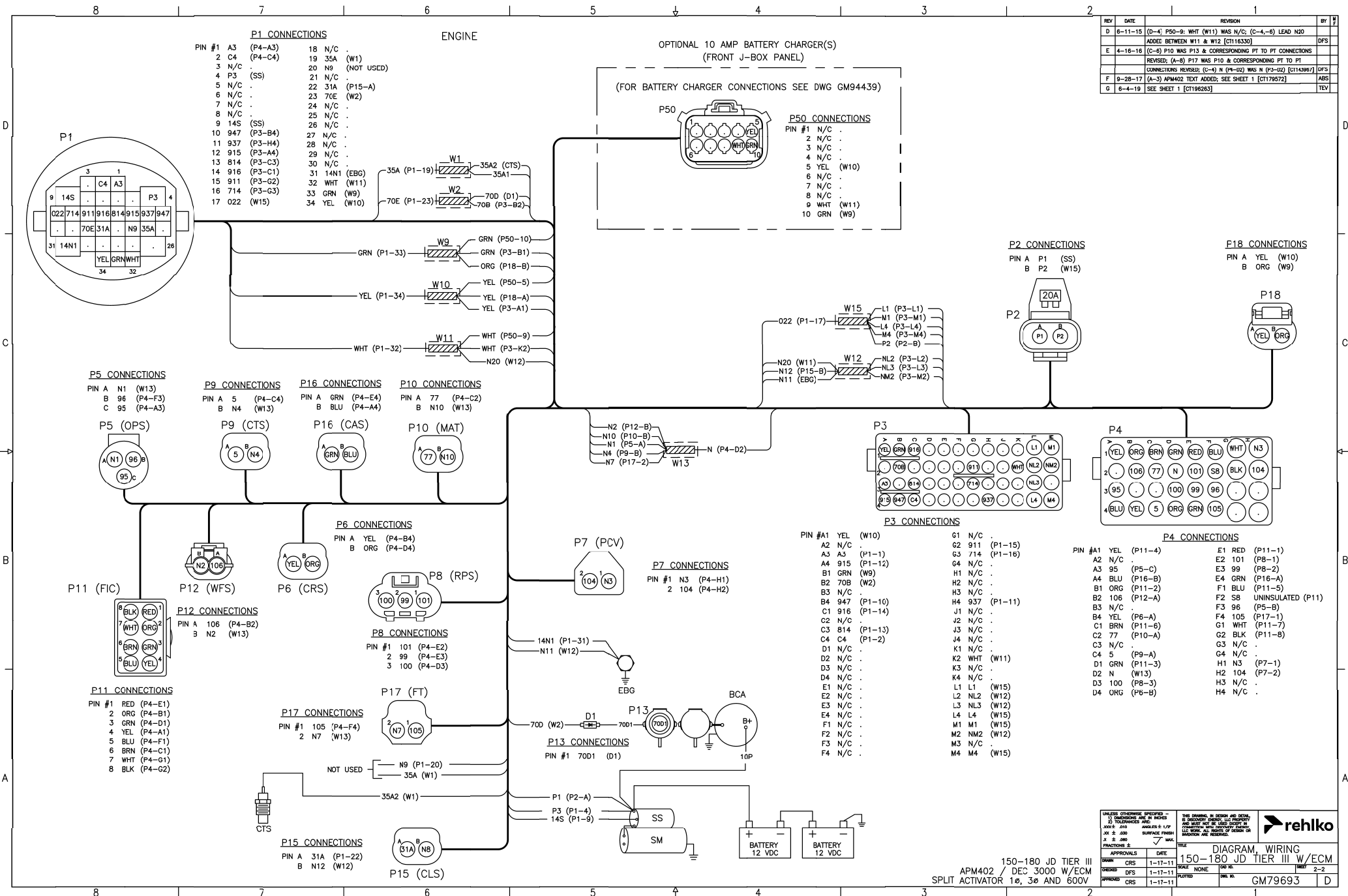


* REMOVE RESISTORS IF PARALLELING



FOR SCHEMATIC SEE ADV-8043

UNLESS OTHERWISE SPECIFIED - 1. DIMENSIONS ARE IN INCHES 2. TOLERANCES ARE: DIMENSIONS < .100 .0010 DIMENSIONS .100 - .499 .0015 DIMENSIONS .500 - .999 .0020 DIMENSIONS 1.000 - 4.999 .0030 DIMENSIONS 5.000 - 9.999 .0040 DIMENSIONS 10.000 - 49.999 .0050 DIMENSIONS 50.000 - 99.999 .0060 DIMENSIONS 100.000 - 499.999 .0070 DIMENSIONS 500.000 - 999.999 .0080 DIMENSIONS 1000.000 - 4999.999 .0100 DIMENSIONS 5000.000 - 9999.999 .0120 DIMENSIONS 10000.000 - 49999.999 .0150 DIMENSIONS 50000.000 - 99999.999 .0200 DIMENSIONS 100000.000 - 499999.999 .0250 DIMENSIONS 500000.000 - 999999.999 .0300 DIMENSIONS 1000000.000 - 4999999.999 .0350 DIMENSIONS 5000000.000 - 9999999.999 .0400 DIMENSIONS 10000000.000 - 49999999.999 .0450 DIMENSIONS 50000000.000 - 99999999.999 .0500 DIMENSIONS 100000000.000 - 499999999.999 .0550 DIMENSIONS 500000000.000 - 999999999.999 .0600 DIMENSIONS 1000000000.000 - 4999999999.999 .0650 DIMENSIONS 5000000000.000 - 9999999999.999 .0700 DIMENSIONS 10000000000.000 - 49999999999.999 .0750 DIMENSIONS 50000000000.000 - 99999999999.999 .0800 DIMENSIONS 100000000000.000 - 499999999999.999 .0850 DIMENSIONS 500000000000.000 - 999999999999.999 .0900 DIMENSIONS 1000000000000.000 - 4999999999999.999 .0950 DIMENSIONS 5000000000000.000 - 9999999999999.999 .1000 DIMENSIONS 10000000000000.000 - 49999999999999.999 .1050 DIMENSIONS 50000000000000.000 - 99999999999999.999 .1100 DIMENSIONS 100000000000000.000 - 499999999999999.999 .1150 DIMENSIONS 500000000000000.000 - 999999999999999.999 .1200 DIMENSIONS 1000000000000000.000 - 4999999999999999.999 .1250 DIMENSIONS 5000000000000000.000 - 9999999999999999.999 .1300 DIMENSIONS 10000000000000000.000 - 49999999999999999.999 .1350 DIMENSIONS 50000000000000000.000 - 99999999999999999.999 .1400 DIMENSIONS 100000000000000000.000 - 499999999999999999.999 .1450 DIMENSIONS 500000000000000000.000 - 999999999999999999.999 .1500 DIMENSIONS 1000000000000000000.000 - 4999999999999999999.999 .1550 DIMENSIONS 5000000000000000000.000 - 9999999999999999999.999 .1600 DIMENSIONS 10000000000000000000.000 - 49999999999999999999.999 .1650 DIMENSIONS 50000000000000000000.000 - 99999999999999999999.999 .1700 DIMENSIONS 100000000000000000000.000 - 4999999
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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

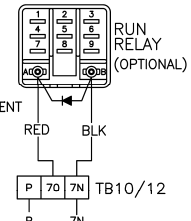
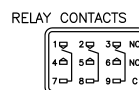
P32 10 AMP RELAY OUTPUT (2.4 & 2.5) CONNECTIONS
P32-NO 2.4 RELAY NORMALLY OPEN
P32-COM 2.4 RELAY COMMON
P32-NC 2.4 RELAY NORMALLY CLOSED
P32-NO 2.5 RELAY NORMALLY OPEN
P32-COM 2.5 RELAY COMMON
P32-NC 2.5 RELAY NORMALLY CLOSED

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 NC CONNECTION
P28-VP2 AGH2 SIGNAL
P28-+5V SUPPLY (0.05 AMP MAX)
P28-GND AGND ANALOG RETURN
P28-VN1 NC CONNECTION
P28-VP1 AGH1 SIGNAL
P28-+5V SUPPLY (0.05 AMP MAX)

P28 DIFFERENTIAL (+/-3V) ANALOG INPUT CONNECTIONS
P28-GND AGND ANALOG REFERENCE
P28-VN2 AGH2 NEGATIVE DIFFERENTIAL SIGNAL
P28-VP2 AGH2 POSITIVE DIFFERENTIAL SIGNAL
P28-+5V SUPPLY (0.05 AMP MAX)
P28-GND AGND ANALOG RETURN
P28-VN1 AGH1 NEGATIVE DIFFERENTIAL SIGNAL
P28-VP1 AGH1 POSITIVE DIFFERENTIAL SIGNAL
P28-+5V SUPPLY (0.05 AMP MAX)

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



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

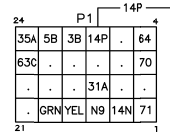
TB2 NOTE:
IF SHUNT TRIP OR FAILURE RELAY IS NOT USED, DISCONNECT & TAPE LEADS 2 & 32A.

APM402 / DEC 3000 CONTROLLER

TB3 NOTE:
NOTE: TRANSFER SWITCH TERMINAL DESIGNATIONS MAY VARY FROM THOSE SHOWN HERE. VERIFY THE CORRECT DESIGNATIONS USING THE APPROPRIATE TRANSFER SWITCH WIRING DIAGRAM.

(TERMINALS 3 AND 4: REMOTE START SWITCH OR ENGINE START CONTACTS ON TRANSFER SWITCH)

P1/TB1 NOTE:
1) DIGITAL INPUT 1 EXISTS IN P1-4 & TB1-D11
2) ANALOG INPUT 1 EXISTS IN P1-24 & TB1-A11
3) ANALOG INPUT 2 EXISTS IN P1-23 & TB1-A12



AUX WARNING SWITCH (CUSTOMER PROVIDED)
NOTE:
NOT AVAILABLE FOR USE ON 40-60RE0ZK MODELS (SEE INSTALLATION NOTE 4)

BATTERY CHARGER CONNECTIONS (OPTIONAL)
61 BATTERY CHARGER FAULT
GROUND FAULT
HIGH ENCLOSURE TEMP (20RE0ZK-C ONLY)

RJ-45 PACTH CABLE

KEY SWITCH (SEE NOTE 6)

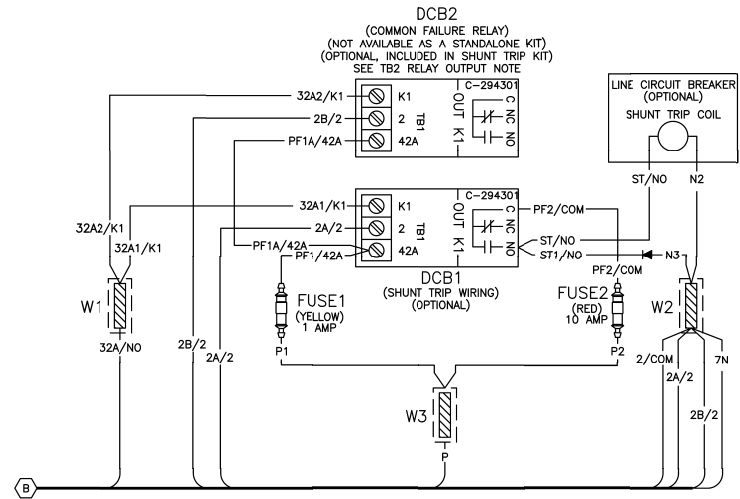
P21 RS485 NON-ISOLATED CONNECTIONS
P21-1 GND
P21-2 +
P21-3 -
P21-4 GND
P21-5 +
P21-6 -

TB1 ANALOG/DIGITAL INPUT FACTORY SETTINGS
TB1-D11 DCH1 LOW FUEL PRESSURE
TB1-D12 DCH2 AUX WARNING
TB1-D13 DCH3 BATTERY CHARGER FAULT WARNING
TB1-A11 AGH1 NO FUNCTION
TB1-A12 AGH2 NO FUNCTION
TB1-GND A/DGND ANALOG/DIGITAL RETURN

NOTE: TB1 A/D INPUTS MAY BE REDEFINED - FACTORY DEFAULTS LISTED. CONTACT AUTHORIZED DISTRIBUTOR FOR DETAILS.

TB2 RELAY OUTPUT
TB2-D11 (RELAY COMMON) COMMON FAULT
TB2-COM (RELAY COMMON) COMMON FAULT
TB2-NO (RELAY NORMALLY OPEN) COMMON FAULT
TB2-NC (RELAY NORMALLY CLOSED) COMMON FAULT
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.

USING C-294301 RELAY



REV	DATE	REVISION	BY
L	05JUN2025	SEE SHEET 2 [CT245006]	SBR
M	19SEP2025	(B-2) FOR DCB2 CONNECTION CHANGED FROM PF2/COM TO COM & ST/COM TO NO. SEE SHEET 2 [CT249756]	PBR
N	00DEC2025	SEE SHEET 2 [CT250983]	SBR

LEGEND
P(##) - PLUG
QCON(##) - QUICK CONNECT
TB(##) - TERMINAL BLOCK
W(##) - SONIC WELD

UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: DIMENSIONS: .010 HOLE: .010 SURFACE FINISH: 125 FRACTIONS: 1/16		THIS DRAWING IS DESIGN AND DETAIL IN PROVISION OF THE PROPERTY OF REHIKO, INC. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED ON THE DRAWING. ANY REUSE OF DESIGN OR DIMENSIONS IS PROHIBITED.		rehiko	
APPROVALS		DATE		SHEET 1-3	
DESIGN	CRS	9-16-10	SCALE	DATE	1-3
DESIGN	CRS	9-16-10	PLotted	DATE	1-3
APPROVED	CRS	9-16-10		DATE	1-3

DIAGRAM, DEC3000/APM402 ACCY INTERCONNECTION

GM78246

APM402 / DEC 3000 ACCESSORIES

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

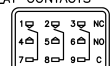
P28-GND AGND ANALOG RETURN
P28-VN2 AGND NO CONNECTION
P28-VP2 AGND SIGNAL
P28-+5V SUPPLY (0.05 AMP MAX)
P28-GND AGND ANALOG RETURN
P28-VN1 AGND NO CONNECTION
P28-VP1 AGND SIGNAL
P28-+5V SUPPLY (0.05 AMP MAX)

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
QCON1 14P
QCON2 14P

BATTERY CHARGER CONNECTIONS (OPTIONAL)

BATTERY CHARGER FAULT
GROUND FAULT
HIGH ENCLOSURE TEMP (20RE0ZK-C ONLY)

RJ-45 PACTH CABLE

B

A

P21: RS485 NON-ISOLATED CONNECTIONS

P21-1 GND
P21-2 +
P21-3 -
P21-4 GND
P21-5 +
P21-6 -

TB1 ANALOG/DIGITAL INPUT FACTORY SETTINGS

TB1-D11 DCH1 LOW FUEL PRESSURE
TB1-D12 DCH2 AUX WARNING
TB1-D13 DCH3 BATTERY CHARGER FAULT WARNING
TB1-A11 AGH1 NO FUNCTION
TB1-A12 AGH2 NO FUNCTION
TB1-GND A/DGND ANALOG/DIGITAL RETURN

NOTE: TB1 A/D INPUTS MAY BE REDEFINED - FACTORY DEFAULTS LISTED. CONTACT AUTHORIZED DISTRIBUTOR FOR DETAILS.

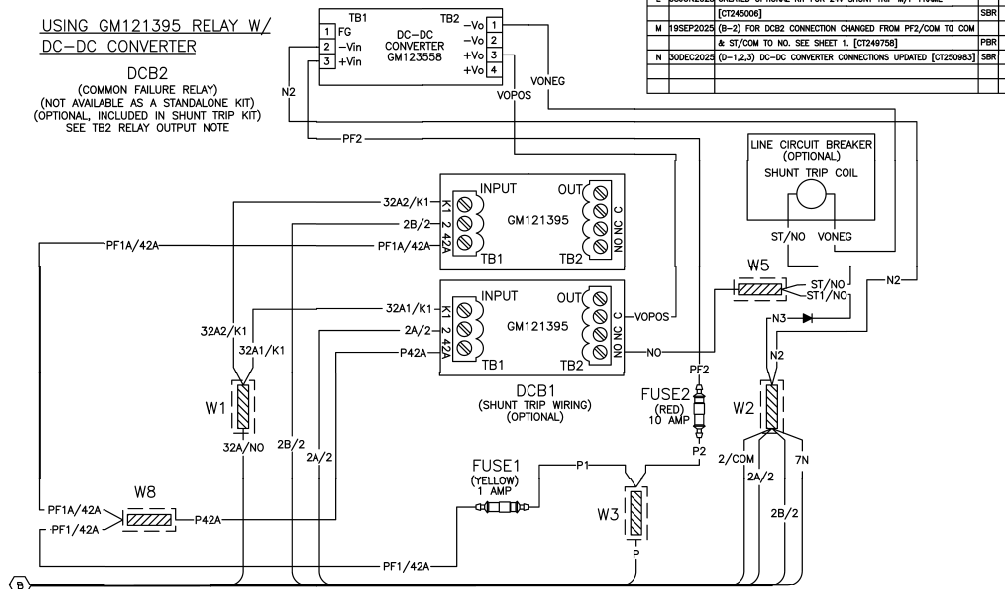
TB2 RELAY OUTPUT

TB2-COM (RELAY COMMON) COMMON FAULT
TB2-COM (RELAY COMMON) COMMON FAULT
TB2-NO (RELAY NORMALLY OPEN) COMMON FAULT
TB2-NC (RELAY NORMALLY CLOSED) COMMON FAULT

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.

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



1

C

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△

RS-485 NETWORK CONNECTIONS

REV	DATE	REVISION	BY	W
-	8-16-19	NEW DRAWING. REPLACES ADV-6990 [CT198499]	TLK	F
A	5-27-22	(B-1-3) CONNECT TO ENGINE START TERMINALS ON ATS (TBF 1&2) WAS CONNECT TO POSITION CONTACTS ON ATS (CLOSED IN EMERGENCY); SEE SHEET 2 [CT220029]		
B	11MAR2026	BRANDING UPDATED	BCC	PSC

DC POWER REQUIREMENTS FOR EACH RSA:
 12/24 VOLT, 1A DC POWER
 IF MULTIPLE RSA'S ARE USED, RESIZE
 2 POWER WIRES AS REQUIRED.
 0-450 FT. [0-138 m], 22 GA.
 450-700 FT. [138-214 m], 20 GA.
 700-1125 FT. [214-344 m], 18 GA.
 1125-1800 FT. [344-550 m], 16 GA.
 1800-2800 FT. [550-856 m], 14 GA.
 (SEE NOTE 4)

GENERATOR SET OUTLINE

GENERATOR
BATTERY
12 OR 24 VDC

ON 550/6000 CONTROLLER, CONNECT TO P20,
 ON APM402 CONTROLLER, CONNECT TO P21,
 ON 8000 CONTROLLER, CONNECT TO RS485(2) BLOCK,
 ON APM802 CONTROLLER, CONNECT TO TB10,
 ON 3500 CONTROLLER, CONNECT TO TB12,
 ON APM603 CONTROLLER, CONNECT TO TB10 OR TB12

BATTERY CHARGE LEADS
 2 WIRES 10 GA. MINIMUM
 (NOT REQUIRED ON GENSET
 MOUNTED BATTERY CHARGERS)

(SEE SHEET 2 FOR
 MASTER/S�AVE NOTE)

RSA
 REMOTE SERIAL
 ANNUNCIATOR
 (MASTER)

RS-485
 (MODBUS RTU)
 (SEE NOTE 5)

RSA
 REMOTE SERIAL
 ANNUNCIATOR
 (SLAVE)

RSA
 REMOTE SERIAL
 ANNUNCIATOR
 (SLAVE)

RSA
 REMOTE SERIAL
 ANNUNCIATOR
 (SLAVE)

(SEE SHEET 2 WHEN USED
 WITH AN ETHERNET NETWORK)

GENSET
 CONTROLLER

BATTERY CHARGER
 W/ FAULT ALARMS

BATTERY CHARGER ALARMS (NON-COMMUNICATION STYLE CHARGER):
 550/6000/APM402/8000/APM802/APM603: 2 WIRES 18-20 GA.
 (NOT REQUIRED ON GENSET MOUNTED BATTERY CHARGERS)

BATTERY CHARGER ALARMS: (COMMUNICATION STYLE CHARGER):
 550/6000/APM402/APM603/3500: FACTORY WIRED CAN COMMUNICATION

ENGINE START WIRES.
 2 WIRES 18-20 GA.
 CONNECT TO ENGINE START TERMINALS ON ATS (TBF 1&2).
 FOR MULTIPLE ATS INSTALLATION, CONNECT START SIGNAL WIRING FROM ALL ATS IN PARALLEL

ATS (AUTOMATIC
 TRANSFER SW.)

ATS (AUTOMATIC
 TRANSFER SW.)

ATS (AUTOMATIC
 TRANSFER SW.)

ATS (AUTOMATIC
 TRANSFER SW.)

RSA III WITH ATS OPTION:
 RS-485 TO ATS REQUIRED
 (MODBUS RTU) (SEE NOTE 5)

NOTES:

1. TYPICAL CUSTOMER WIRING SHOWN DASHED.
2. CUSTOMER RESPONSIBLE FOR ADDITIONAL WIRING SHOWN IF COMPONENTS ARE SHIPPED LOOSE (BATTERY CHARGER, DRY-CONTACT BOX, ETC.)
3. IF BATTERY CHARGER IS SHIPPED LOOSE ADDITIONAL WIRES MAY BE REQUIRED FOR PROPER VOLTAGE SENSING. REFERENCE DRAWING ADV-5971 FOR INTERCONNECT.
4. DC VOLTAGE FOR EACH RSA REMOTE ANNUNCIATOR MAY ALSO BE SUPPLIED BY A LOCALLY MOUNTED 12 OR 24 VDC, 200 mA MIN., AC ADAPTER KIT (GM62466-KP1).
5. USE BELDEN #9841 OR EQUIVALENT. MAXIMUM DISTANCE = 4000 FT. [1219 m]

REFER TO WIRING DIAGRAM GM62554
 (NETWORK COMMUNICATIONS) FOR
 CONNECTION DETAIL.
 INTERCONNECTION DIAGRAM
 CONTROLLER
 WITH RSA ANNUNCIATOR

DIMENSIONS IN [] ARE METRIC EQUIVALENTS.

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APPROVALS DATE		TITLE DIAGRAM, RSA INTERCONNECTION			
DRAWN TLK	8-16-19	SCALE	///	SHEET	1-2
CHECKED TLK	8-16-19	PLOTTED		DWG. NO.	ADV-9169
APPROVED MD	8-16-19				C

RSA III:

A MAXIMUM OF 5 SLAVES CAN BE CONNECTED TO A MASTER RSA III, INCLUDING SLAVES CONNECTED THROUGH THE ETHERNET NETWORK. IF ANY RSA II ANNUNCIATORS ARE ON THE SAME NETWORK AS AN RSA III ANNUNCIATOR, THE RSA II ANNUNCIATORS MUST BE CONFIGURED AS SLAVES. RSA1000 CAN'T BE ON THE SAME NETWORK AS RSAIII. UPGRADE TO RSAIII IF REQUIRED.

RSA III MASTER:

AN RSA SLAVE CONNECTED THROUGH THE ETHERNET NETWORK, REQUIRES AN RSA MASTER BE CONNECTED THROUGH THE ETHERNET NETWORK. THE MASTER REQUIRES A MODBUS/ETHERNET CONVERTER DEDICATED EXCLUSIVELY TO IT.

ETHERNET NETWORK CONNECTIONS

SEE SHEET 1 FOR REQUIRED DC POWER VOLTAGE TO EACH RSA.

RSA
REMOTE SERIAL
ANNUNCIATOR
(SLAVE)

RSA
REMOTE SERIAL
ANNUNCIATOR
(SLAVE)

MODBUS/
ETHERNET
CONVERTER

ETHERNET
(MODBUS TCP/IP)
CATEGORY 5
OR EQUIVALENT

ETHERNET
(MODBUS TCP/IP)
CATEGORY 5
OR EQUIVALENT

ETHERNET
(MODBUS TCP/IP)
CATEGORY 5
OR EQUIVALENT

ETHERNET
(MODBUS TCP/IP)
CATEGORY 5
OR EQUIVALENT

MODBUS/
ETHERNET
CONVERTER

RSA
REMOTE SERIAL
ANNUNCIATOR
(SLAVE)

RSA
REMOTE SERIAL
ANNUNCIATOR
(SLAVE)

SEE SHEET 1 FOR REQUIRED DC POWER VOLTAGE TO EACH RSA.

INTERCONNECTION DIAGRAM
CONTROLLER
WITH RSA ANNUNCIATOR

RS-485
(MODBUS RTU)
(SEE NOTE 5)

SEE SHEET 1 FOR CONTROLLER
CONNECTION POINTS

GENSET CONTROLLER
(SEE SHEET 1 FOR
BATTERY CHARGER
CONNECTIONS)

ON APM802 OR APM603 CONTROLLER,
CONNECT TO ETHERNET MODULE

ON MPAC750, MPAC1200, MPAC1500,
CONNECT TO P13

RSA III SUPPORTED ATS'S:
MPAC750, MPAC1000,
MPAC1200, OR MPAC1500.
SUPPORTS ONE OR UP TO
FOUR ATS'S.

ATS (AUTOMATIC
TRANSFER SWITCH)

ATS (AUTOMATIC
TRANSFER SWITCH)

ATS (AUTOMATIC
TRANSFER SWITCH)

ATS (AUTOMATIC
TRANSFER SWITCH)

SEE SHEET 1 FOR
GENERAL NOTES.

UNLESS OTHERWISE SPECIFIED -
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES ARE:
X.XXX ± .010 ANGLES ±
X.X ± .030 SURFACE FINISH
X ± .000 MAX.

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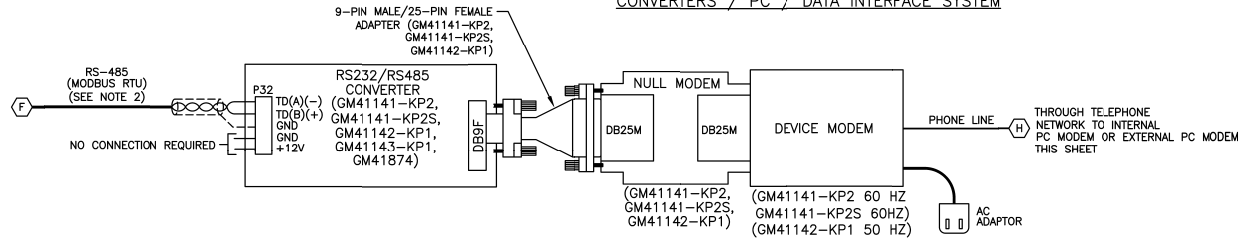


APPROVALS		DATE	TITLE	
DRAWN	TLK	8-16-19	DIAGRAM, RSA INTERCONNECTION	
CHECKED	TLK	8-16-19	SCALE	SHEET 2-2
APPROVED	MD	8-16-19	PLOTTED	DWG. NO. ADV-9169 C

CONVERTERS / PC / DATA INTERFACE SYSTEM

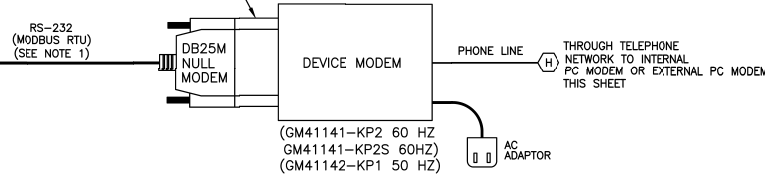
REV	DATE	REVISION	BY
D	9-29-09	SEE SHEET 1 [88186]	TLK
E	12-1-09	SEE SHEET 9 [88773]	TLK
F	4-22-10	DRAWING COMPLETELY REVISED [89745]	TLK
G	4-27-11	(D,B-7) DEC 3000 ADDED TO "I" & "O" CONNECTIONS; (B-8) SERIES 1500 ADDED TO "J" CONNECTION [91516]	TLK
H	4-02-13	ALL REFERENCES TO SHIT. 6 OR 7 WERE SHIT. 5, SHIT. 4 WERE SHIT. 3, (C-5) DEC-3500 ADDED TO "J" & "N"; (B-5) (B,D-5,7) 750 & 1200 ADDED TO SERIES 1500 ATS; (B-5) CONFIGURE AS MASTER	TLK
J	3-06-14	NOTE ADDED TO MODBUS/ETHERNET [C164476]	TLK
K	12-07-16	SEE SHEET 1 [C174427]	TLK
L	3-09-18	(C-8, B-6) P19 ON 550 ADDED TO NOTES; (C-2) "K" CONNECTIONS FOR DIS ADDED [C164506]	TLK
M	10-30-18	(A-1) SHEET 10-8 WAS 5-7 [C185399]	TLK
N	5-30-19	APM603 REFERENCES ADDED [C191583]	TLK
P	6-24-20	SHEET 2-16 WAS 10-12 [C197795]	TLK
R	28APR2022	SEE SHEETS 1, 6, AND 12 [C204963]	TLK
		SEE SHEET 1 & 15 [C212805]	CLN

FROM P20 ON 550 CONTROLLER,
P21 ON 16-LIGHT CONTROLLER,
SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER,
SHEET 4
P20 ON 6000 CONTROLLER,
SHEET 5
TB1 ON SERIES 1000 ATS CONTROLLER,
SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER,
SHEET 14



OPTO ISOLATOR (GM41141-KP2,
GM41141-KP2S,
GM41142-KP1)

FROM P18 ON 550 CONTROLLER
SHEET 3
P18 ON 6000 CONTROLLER
SHEET 5
P19 ON MODBUS/KBUS MODULE
SHEET 13
(GM41141-KP2, -KP2S, GM41142-KP1,
NULL MODEM CABLE)

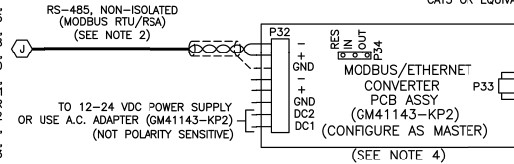


FROM P19 OR P20 ON 550 CONTROLLER,
P21 ON 16-LIGHT CONTROLLER,
J9 ON KPC 1000 CONTROLLER
SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER,
SHEET 4
P19 ON 6000 CONTROLLER,
SHEET 5
TB12, TB10, OR TX1 FOR APM603 CONTROLLER,
SHEET 6, SHEET 7, OR SHEET 8
TB10 FOR APM 802 CONTROLLER,
SHEET 10
RS485(2) ON DEC 8000 CONTROLLER,
SHEET 11
TB12 FOR DEC-3500 CONTROLLER
SHEET 12
TB1 ON SERIES 1000 ATS CONTROLLER,
SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER
SHEET 14

PC (MONITOR II) (MASTER)
PC (SITETECH) (MASTER)
DATA INTERFACE SYSTEM (MASTER)
(CUSTOMER SUPPLIED)
(SEE NOTE 5)

TO DATA INTERFACE SYSTEM (DIS)

FROM P19 OR P20 ON 550 CONTROLLER,
P21 ON 16-LIGHT CONTROLLER,
J9 ON KPC 1000 CONTROLLER
SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER,
SHEET 4
P19 ON 6000 CONTROLLER,
SHEET 5
TB12, TB10, OR TX1 FOR APM603 CONTROLLER,
SHEET 6, SHEET 7, OR SHEET 8
TB10 FOR APM 802 CONTROLLER,
SHEET 10
RS485(2) ON DEC 8000 CONTROLLER,
SHEET 11
TB12 FOR DEC-3500 CONTROLLER
SHEET 12
TB1 ON SERIES 1000 ATS CONTROLLER,
SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER,
SHEET 14



FROM ETHERNET MODULE FOR APM603 CONTROLLER,
SHEET 6, SHEET 7, SHEET 8, SHEET 9
FROM ETHERNET MODULE FOR APM802 CONTROLLER,
SHEET 10
P13 ON MPAC & MPAC-DM ATS CONTROLLERS,
SHEET 14

ETHERNET NETWORK
(CUSTOMER SUPPLIED)

TO RSA II/III MASTER
VIA MODBUS/ETHERNET CONVERTER
SHEET 15 OR SHEET 16
TO RSA II/III SLAVE
VIA MODBUS/ETHERNET CONVERTER
SHEET 15 OR SHEET 16

FROM ETHERNET MODULE FOR APM603 CONTROLLER,
SHEET 6, SHEET 7, SHEET 8, SHEET 9
FROM ETHERNET ON DEC 8000 CONTROLLER,
SHEET 11

TO THE PC'S INTERNAL MODEM
(MONITOR II) OR TO
DATA INTERFACE SYSTEM

ETHERNET
(MODBUS TCP/IP)
CAT5 OR EQUIVALENT

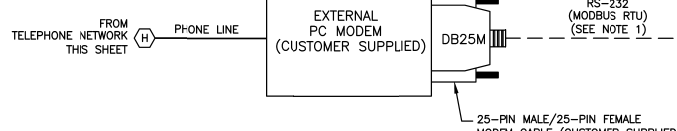
FROM P10 ON DEC 3000/APM402 CONTROLLER,
SHEET 4
PB10 ON APM603 CONTROLLER,
SHEET 6, SHEET 7, SHEET 8, OR SHEET 9
P12 ON DEC3500 CONTROLLER,
SHEET 12
P12 ON MPAC-DM ATS CONTROLLERS,
SHEET 14
P43 ON RSA II/III
SHEET 15 OR SHEET 16

TO THE PC'S RJ45 ETHERNET
CONNECTOR (MONITOR II) OR TO
DATA INTERFACE SYSTEM (DIS)

TO THE PC'S
USB PORT
(MONITOR III OR
SITETECH)

USB KEY
(REQUIRED FOR MONITOR III)
(GM41141-KP1, GM41141-KP1S,
GM41141-KP2, GM41141-KP2S)

TO THE PC'S 9-PIN SERIAL PORT
(MONITOR III), SITETECH (550/6000 ONLY),
OR DATA INTERFACE SYSTEM

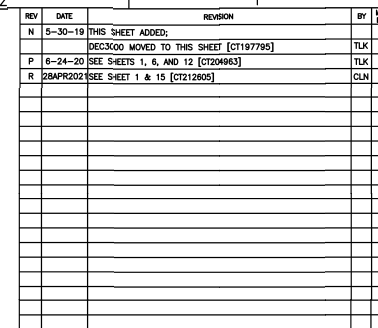


RS-232
(MODBUS RTU)
(SEE NOTE 1)

RS-232
(MODBUS RTU)
(SEE NOTE 1)

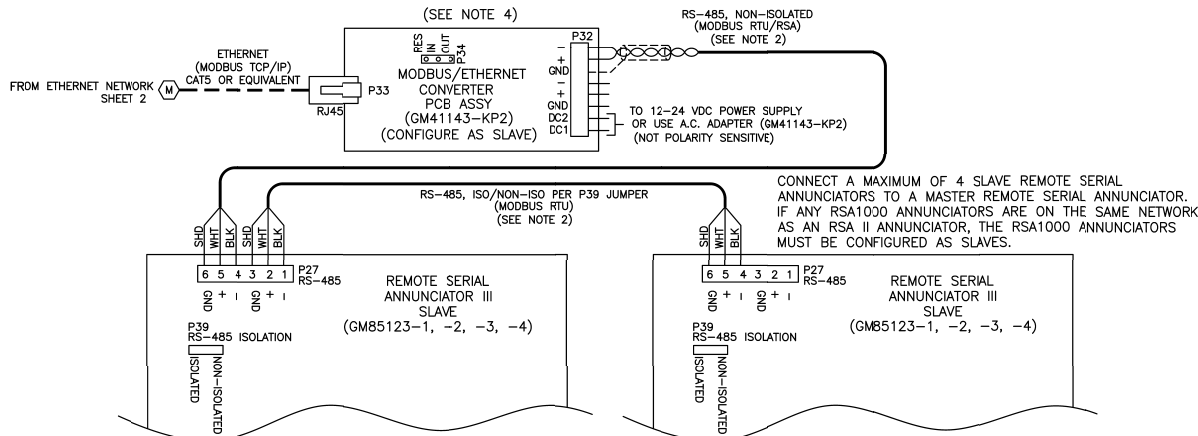
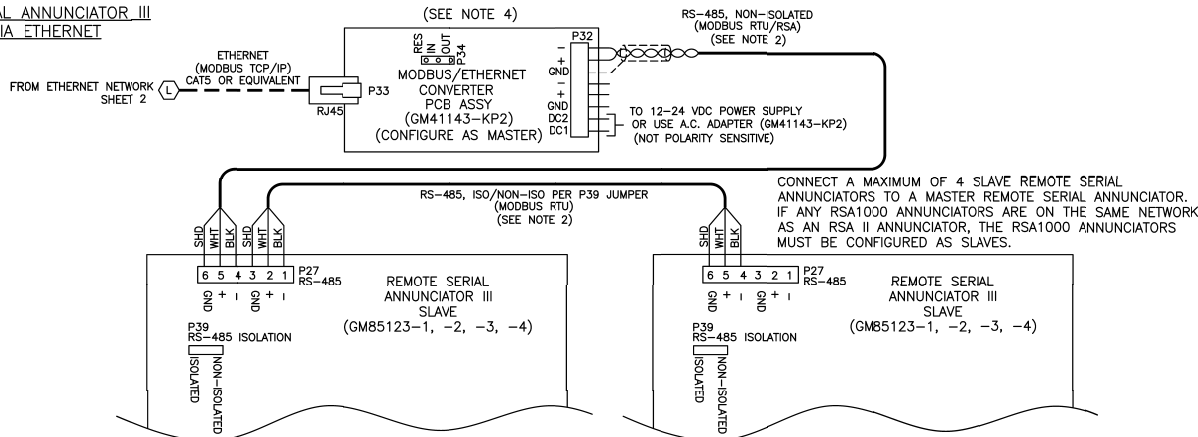
FOR GENERAL NOTES, SEE SHEET 1

UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: DIM. 0.005 0.010 0.015 0.020 0.030 0.040 0.050 0.060 0.070 0.080 0.090 0.100 0.125 0.150 0.1875 0.250 0.3125 0.375 0.500 0.625 0.750 0.875 1.000 1.250 1.500 1.875 2.000 2.500 3.000 3.500 4.000 5.000 6.000 7.000 8.000 9.000 10.000 12.000 15.000 18.000 20.000 25.000 30.000 35.000 40.000 45.000 50.000 60.000 70.000 80.000 90.000 100.000 125.000 150.000 180.000 200.000 250.000 300.000 350.000 400.000 450.000 500.000 600.000 700.000 800.000 900.000 1000.000 1250.000 1500.000 1800.000 2000.000 2500.000 3000.000 3500.000 4000.000 4500.000 5000.000 6000.000 7000.000 8000.000 9000.000 10000.000 12500.000 15000.000 18000.000 20000.000 25000.000 30000.000 35000.000 40000.000 45000.000 50000.000 60000.000 70000.000 80000.000 90000.000 100000.000 125000.000 150000.000 180000.000 200000.000 250000.000 300000.000 350000.000 400000.000 450000.000 500000.000 600000.000 700000.000 800000.000 900000.000 1000000.000 1250000.000 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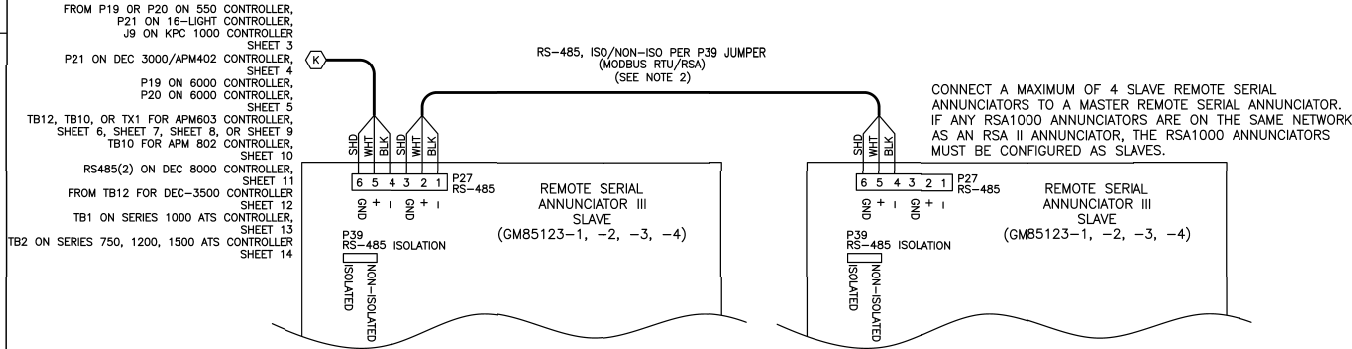


UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XXXL ±.010 ANGLES ± 1/8" .XXX ±.030 SURFACE FINISH .X ±.060 ☒ MAX.		THIS DRAWING, IN DESIGN AND DETAIL, REPRESENTS THE PROPERTY OF REHLKO AND MUST NOT BE USED EXCEPT IN CONNECTION WITH THE PROJECT AND ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.			
APPROVALS DATE		TITLE DIAGRAM, WIRING NETWORK COMMUNICATIONS			
DESIGN	TLK	5-30-19	SCALE ///		DWG. NO. CM62554 SHEET 4-16
CHECKED	TLK	5-30-19	PLOTTED ///		
APPROVED	MD	5-30-19			

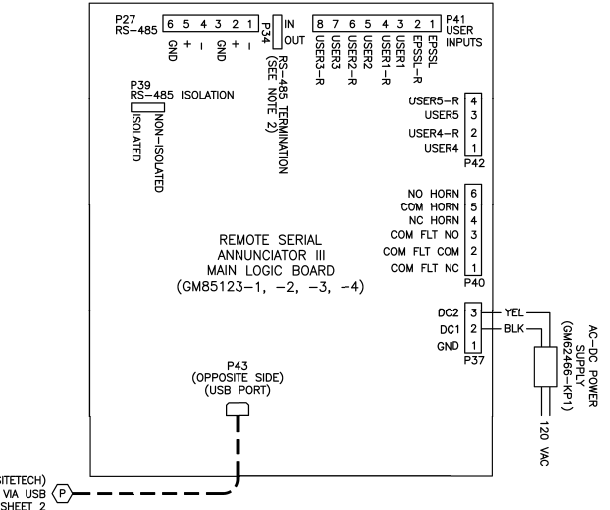
REMOTE SERIAL ANNUNCIATOR III CONNECTED VIA ETHERNET



REMOTE SERIAL ANNUNCIATOR III DIRECT CONNECTED



REV	DATE	REVISION	BY
H	11-20-13	THIS SHEET ADDED [C764476]	TLK
J	3-06-14	SEE SHEET 1 [C774427]	TLK
K	12-07-16	(A-7) P19 ON 550 ADDED TO NOTE [C7164509]	TLK
L	3-09-18	(A-8) SHEET 12-8 WAS 7-7 [C7185399]	TLK
M	10-30-18	(A-9) APM603 REFERENCE ADDED [C7191563]	TLK
N	5-30-19	SHEET 16-16 WAS 12-12 [C7197793]	TLK
P	6-24-20	SEE SHEETS 1, 6, AND 12 [C7204963]	TLK
R	28APR2021	SEE SHEET 1 & 15 [C7212605]	CLN



P41 INPUT CONNECTIONS

- P41-8 USER INPUT 3 RETURN
- P41-7 USER INPUT 3
- P41-6 USER INPUT 2 RETURN
- P41-5 USER INPUT 2
- P41-4 USER INPUT 1 RETURN
- P41-3 USER INPUT 1
- P41-2 LOCAL ATS EMERGENCY ON INPUT RETURN (16-LIGHT ONLY) (SUPPLIED VIA MODBUS ON 550/8000/3000/APM402/3500 GENSET CONTROLLER AND SERIES 1000/750/1200/1500 ATS CONTROLLERS)
- P41-1 LOCAL ATS EMERGENCY ON INPUT

P42 INPUT CONNECTIONS

- P41-4 USER INPUT 5 RETURN
- P41-3 USER INPUT 5
- P41-2 USER INPUT 4 RETURN
- P41-1 USER INPUT 4

P40 OUTPUT CONNECTIONS

- P40-6 HORN RELAY NORMALLY OPEN
- P40-5 HORN RELAY COMMON
- P40-4 HORN RELAY NORMALLY CLOSED
- P40-3 COMMON FAULT RELAY NORMALLY OPEN
- P40-2 COMMON FAULT RELAY COMMON
- P40-1 COMMON FAULT RELAY NORMALLY CLOSED

P37 PWR/CAN CONNECTIONS

- P37-3 12/24 VDC BATTERY INPUT2 (NOT POLARITY SENSITIVE)
- P37-2 12/24 VDC BATTERY INPUT1 (NOT POLARITY SENSITIVE)
- P37-1 GROUND

P37/P40/P41 WIRE SIZE REQUIREMENTS

- 700 FT. - 20 AWG
- 1125 FT. - 18 AWG
- 1800 FT. - 16 AWG
- 2800 FT. - 14 AWG

FOR GENERAL NOTES, SEE SHEET 1

UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: DIMENSIONS < 1/8" .010 DIMENSIONS 1/8" - 1/2" .015 DIMENSIONS 1/2" - 1" .020 DIMENSIONS 1" - 2" .030 DIMENSIONS > 2" .040		THIS DRAWING IS DESIGNED AND DETAIL BY REHLKO ENGINEERING, INC. (REHLKO) AND SHALL NOT BE USED WITHOUT THE WRITTEN PERMISSION OF REHLKO ENGINEERING, INC. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE REHLKO STANDARD SPECIFICATIONS.			
APPROVALS	DATE	SCALE	SHEET 16-16		
DESIGNED TLK	11-20-13	1:1			
CHECKED EDA	11-20-13	1:1			
PART NO.			GM62554		

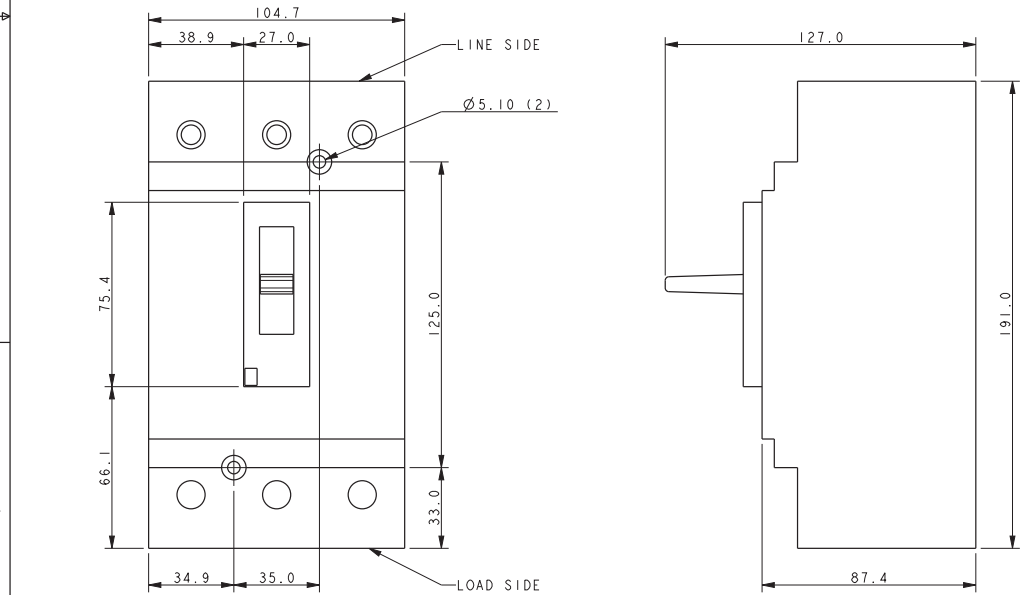
Miscellaneous

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.

8			7		6		5		4		3		2		1	
PART NO.	PART REV	DESCRIPTION	AMPS	INTERRUPT KA @480 VAC	CONNECTION TYPE		POLES	RATING	TRIP TYPE	MAG TRIP ONLY		SQUARE D PART NO.				
					LINE	LOAD				FULL LOAD AMPS	ADJUSTABLE TRIP RANGE					
GM47476-1	B	BREAKER, CIRCUIT 175A JDL	175	18	AL175JD LUGS	AL175JD LUGS	3	80%	THERMAL MAGNETIC	-	-	JDL36175	⚠ DENOTES A CRITICAL CHARACTERISTIC THAT MUST BE ADDRESSED IN THE PRODUCTION CONTROL PLAN. TOTAL QUANTITY OF CRITICAL CHARACTERISTICS ON THIS DRAWING = 0			
GM47476-6	C	BREAKER, CIRCUIT 175A JDP		18	TERMINAL NUTS	AL175JD LUGS	3	80%	THERMAL MAGNETIC	-	-	JDP36175TX				
GM47476-7	C	BREAKER, CIRCUIT 175A JDP		18	TERMINAL NUTS	AL175JD LUGS	3	100%	THERMAL MAGNETIC	-	-	JDP36175CTX				
GM47476-27	-	BREAKER, CIRCUIT 175A JDP	200	18	TERMINAL NUTS	AL175JD LUGS	2	100%	THERMAL MAGNETIC	-	-	JDP26175CTX	⚠ DENOTES A MAJOR CHARACTERISTIC THAT MUST BE ADDRESSED IN THE PRODUCTION CONTROL PLAN. TOTAL QUANTITY OF MAJOR CHARACTERISTICS ON THIS DRAWING = 0			
GM47476-2	B	BREAKER, CIRCUIT 200A JDL		18	AL250JD LUGS	AL250JD LUGS	3	80%	THERMAL MAGNETIC	-	-	JDL36200				
GM47476-5	B	BREAKER, CIRCUIT 200A JDP		18	TERMINAL NUTS	AL250JD LUGS	2	100%	THERMAL MAGNETIC	-	-	JDP26200CTX				
GM47476-8	C	BREAKER, CIRCUIT 200A JDP	225	18	TERMINAL NUTS	AL250JD LUGS	3	80%	THERMAL MAGNETIC	-	-	JDP36200TX				
GM47476-9	C	BREAKER, CIRCUIT 200A JDP		18	TERMINAL NUTS	AL250JD LUGS	3	100%	THERMAL MAGNETIC	-	-	JDP36200CTX				
GM47476-3	B	BREAKER, CIRCUIT 225A JDL		18	AL250JD LUGS	AL250JD LUGS	3	80%	THERMAL MAGNETIC	-	-	JDL36225				
GM47476-10	C	BREAKER, CIRCUIT 225A JDP	250	18	TERMINAL NUTS	AL250JD LUGS	3	80%	THERMAL MAGNETIC	-	-	JDP36225TX				
GM47476-11	C	BREAKER, CIRCUIT 225A JDP		18	TERMINAL NUTS	AL250JD LUGS	3	100%	THERMAL MAGNETIC	-	-	JDP36225CTX				
GM47476-4	B	BREAKER, CIRCUIT 250A JDL		18	AL250JD LUGS	AL250JD LUGS	3	80%	THERMAL MAGNETIC	-	-	JDL36250				
GM47476-12	C	BREAKER, CIRCUIT 250A JDP	250	18	TERMINAL NUTS	AL250JD LUGS	3	80%	THERMAL MAGNETIC	-	-	JDP36250TX				
GM47476-13	C	BREAKER, CIRCUIT 250A JDP		18	TERMINAL NUTS	AL250JD LUGS	3	100%	THERMAL MAGNETIC	-	-	JDP36250CTX				
GM47476-14	C	BREAKER, CIRCUIT 250A JJP		65	TERMINAL NUTS	AL250JD LUGS	3	-	MAGNETIC ONLY	114-217	684-2500	JJP36250M75TX				
GM47476-15	-	BREAKER, CIRCUIT 250A JDP	250	18	TERMINAL NUTS	AL250JD LUGS	3	80%	MICROLOGIC 3.2 LI	-	-	JDP36250U31XTX				
GM47476-16	-	BREAKER, CIRCUIT 250A JDP		18	TERMINAL NUTS	AL250JD LUGS	3	80%	MICROLOGIC 3.2S LSI	-	-	JDP36250U33XTX				
GM47476-17	-	BREAKER, CIRCUIT 250A JDP		18	TERMINAL NUTS	AL250JD LUGS	3	80%	MICROLOGIC 6.2A LSIG	-	-	JDP36250U44XTX				
GM47476-18	-	BREAKER, CIRCUIT 250A JDP	250	18	TERMINAL NUTS	AL250JD LUGS	3	100%	MICROLOGIC 3.2 LI	-	-	JDP36250CU31XTX				
GM47476-19	-	BREAKER, CIRCUIT 250A JDP		18	TERMINAL NUTS	AL250JD LUGS	3	100%	MICROLOGIC 3.2S LSI	-	-	JDP36250CU33XTX				
GM47476-20	-	BREAKER, CIRCUIT 250A JDP		18	TERMINAL NUTS	AL250JD LUGS	3	100%	MICROLOGIC 6.2A LSIG	-	-	JDP36250CU44XTX				
GM47476-21	-	BREAKER, CIRCUIT 250A JGP	250	35	TERMINAL NUTS	AL250JD LUGS	3	80%	MICROLOGIC 3.2 LI	-	-	JGP36250U31XTX				
GM47476-22	-	BREAKER, CIRCUIT 250A JGP		35	TERMINAL NUTS	AL250JD LUGS	3	80%	MICROLOGIC 3.2S LSI	-	-	JGP36250U33XTX				
GM47476-23	-	BREAKER, CIRCUIT 250A JGP		35	TERMINAL NUTS	AL250JD LUGS	3	80%	MICROLOGIC 6.2A LSIG	-	-	JGP36250U44XTX				
GM47476-24	-	BREAKER, CIRCUIT 250A JGP	250	35	TERMINAL NUTS	AL250JD LUGS	3	100%	MICROLOGIC 3.2 LI	-	-	JGP36250CU31XTX				
GM47476-25	-	BREAKER, CIRCUIT 250A JGP		35	TERMINAL NUTS	AL250JD LUGS	3	100%	MICROLOGIC 3.2S LSI	-	-	JGP36250CU33XTX				
GM47476-26	-	BREAKER, CIRCUIT 250A JGP		35	TERMINAL NUTS	AL250JD LUGS	3	100%	MICROLOGIC 6.2A LSIG	-	-	JGP36250CU44XTX				

Ⓐ DENOTES A CRITICAL CHARACTERISTIC THAT MUST BE ADDRESSED IN THE PRODUCTION CONTROL PLAN. TOTAL QUANTITY OF CRITICAL CHARACTERISTICS ON THIS DRAWING = 0

Ⓑ DENOTES A MAJOR CHARACTERISTIC THAT MUST BE ADDRESSED IN THE PRODUCTION CONTROL PLAN. TOTAL QUANTITY OF MAJOR CHARACTERISTICS ON THIS DRAWING = 0



CONNECTION CHART		
CONNECTION TYPE	CONNECTION (PER PHASE)	TORQUE
AL175JD LUGS	(1) #4-4/0 AL/CU	25 Nm [225 IN-LB]
AL250JD LUGS	(1) 3/0-350 KCMIL AL/CU	25 Nm [225 IN-LB]
TERMINAL NUTS	(1) M8	9-10.2 Nm [80-90 IN-LB]

NOTE: 2-POLE BREAKERS HAVE AN UNPOPULATED CENTER POLE.

KOHLER PART NUMBER TO BE CLEARLY VISIBLE ON CIRCUIT BREAKER AND ON INDIVIDUAL PACKAGING.

□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION

SQUARE D J-FRAME
600V

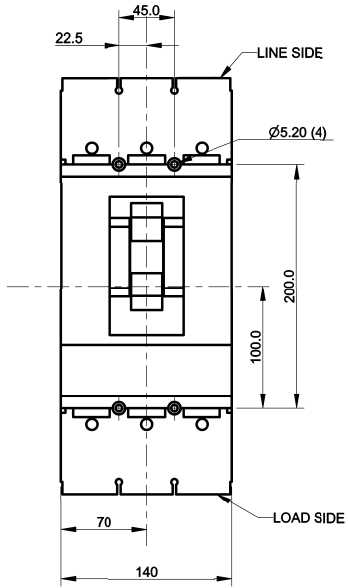
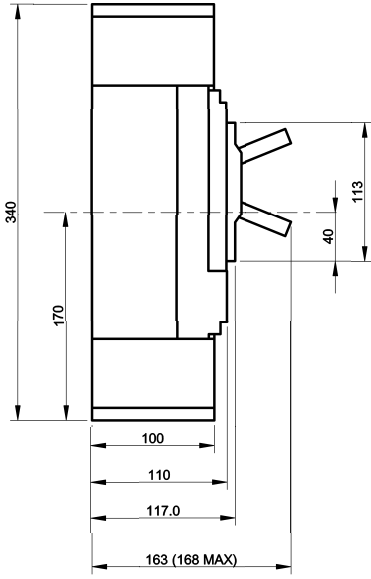
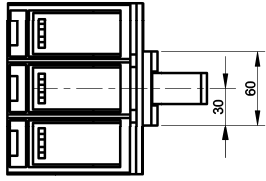
REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X .XX ± 0.25 X .X ± 1.5 X .X ± 1.5 SURFACE FINISH ANGLES A 0° 30° MAX.
B	11-16-10	REDRAWN IN PRO-E & CHART UPDATED, GM47476-5 ADDED; [90604-1]	BTW	
C	1-6-11	GM47476-6 THRU -14 ADDED [90647-15]	WSD	
D	4-13-12	GM47476-15 THRU -26 ADDED; (A-1) GM47476-CMP WAS GM47476 [CT14516]	WSD	
E	12-6-13	(D-8) GM47476-27 ADDED [CT66339]	WSD	
F	10-24-17	UPDATE LOAD CONNECTION TEXT FOR 100% LCBS FROM CU TO AL; (B-8) CU250 LUGS REMOVED FROM CHART [CT180597]	WSD	

APPROVALS	DATE	TITLE
CHIEF	RAC 10-21-05	DWG, CIRCUIT BREAKER
CHECKED	JMS 6-13-06	
APPROVED	SLJ 6-15-06	

SCALE	CAD NO.	SHEET 1 of 1

KOHLER CO. METRIC PRO-E	POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
THIS DRAWING IN DESIGN AND DETAIL IS KOHLER CO. PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH KOHLER CO. WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.	
DWG. CIRCUIT BREAKER	
GM47476-CMP	

8			7	6		5		4		3		2	1						
PART NO.	PART REV	SERVICE ONLY	DESCRIPTION	AMPS	INTERRUPT kA @480 VAC	CONNECTION TYPE		POLES	VOLTS	RATING	TRIP TYPE	SQUARE D PART NO.							
						LINE	LOAD												
GM85432-10	-		BREAKER, CIRCUIT 250A LGP	250	35	BUS	AL400L61K3 LUGS	3	600	80%	MICROLOGIC 3.3 LI	LGP36250U31XY029							
GM85432-11	-		BREAKER, CIRCUIT 250A LGP								MICROLOGIC 3.3S LSI	LGP36250U33XY029							
GM85432-12	-		BREAKER, CIRCUIT 250A LGP								MICROLOGIC 3.3 LI	LGP36250CU31XY029							
GM85432-13	A	□ SO	BREAKER, CIRCUIT 250A LGP	400	35	BUS	AL600LS52K3 LUGS	3	600	100%	MICROLOGIC 3.3S LSI	LGP36250CU33XY029							
GM85432-1	A		BREAKER, CIRCUIT 400A LGP								MICROLOGIC 3.3 LI	LGP36400U31XY029							
GM85432-2	A		BREAKER, CIRCUIT 400A LGP								MICROLOGIC 3.3S LSI	LGP36400U33XY029							
GM85432-3	A		BREAKER, CIRCUIT 400A LGP							MICROLOGIC 6.3A LSIG	LGP36400U44XY029								
GM85432-4	A		BREAKER, CIRCUIT 400A LGP							MICROLOGIC 3.3 LI	LGP36400CU31XY029								
GM85432-5	A		BREAKER, CIRCUIT 400A LGP							MICROLOGIC 3.3S LSI	LGP36400CU33XY029								
GM85432-6	A		BREAKER, CIRCUIT 400A LGP							MICROLOGIC 6.3A LSIG	LGP36400CU44XY029								
GM85432-14	-		BREAKER, CIRCUIT 400A LGP		65	AL600LS52K3 LUGS	BUS				MICROLOGIC 1.3 M (MAG ONLY)	LGP36400M37XY029							
GM85432-16	-		BREAKER, CIRCUIT 400A LJP, 3P								MICROLOGIC 3.2 LI	LJP36400U31X							
GM85432-17	-		BREAKER, CIRCUIT 400A LJP, 3P								MICROLOGIC 3.2 LI	LJP36400CU31X							
GM85432-18	-		BREAKER, CIRCUIT 400A LLP, 3P		100						MICROLOGIC 3.2 LI	LLP36400U31X							
GM85432-19	-		BREAKER, CIRCUIT 400A LLP, 3P								MICROLOGIC 3.2 LI	LLP36400CU31X							
GM85432-7	A		BREAKER, CIRCUIT 600A LGP	600	35	BUS	AL600LS52K3 LUGS	3	600	80%	MICROLOGIC 3.3 LI	LGP36600U31XY029							
GM85432-8	A		BREAKER, CIRCUIT 600A LGP								MICROLOGIC 3.3S LSI	LGP36600U33XY029							
GM85432-9	A		BREAKER, CIRCUIT 600A LGP							80%	MICROLOGIC 6.3A LSIG	LGP36600U44XY029							
GM85432-15	-		BREAKER, CIRCUIT 600A LGP								MICROLOGIC 1.3 M (MAG ONLY)	LGP36600M37XY029							



CONNECTION CHART		
CONNECTION TYPE	CONNECTIONS (PER PHASE)	TORQUE
BUS	(1) M10	50 Nm [442 IN-LB]
AL400L61K3 LUGS	(1) #2-600 KCMIL CU OR (1) #2-500 KCMIL AL	50 Nm [442 IN-LB]
AL600LS52K3 LUGS	(2) 2/0-500 KCMIL AL/CU	50 Nm [442 IN-LB]

NOTE:
(4) M5 X 85 MOUNTING SCREWS, WASHERS AND NUTS INCLUDED.
(3) M10 X 25 BUS CONNECTION SCREWS AND SPRING WASHERS INCLUDED.

PART NUMBER TO BE CLEARLY VISIBLE ON CIRCUIT BREAKER AND ON INDIVIDUAL PACKAGING.

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL □ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY	THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001. REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS.	DO NOT SCALE.	
B	25APR2021	(C,D-3-8) ADDED GM85432-16 THRU -19; [CT216232]	ZHK		UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: XX ± 0.25 X ± 1.0 X ± 1.5 ANGLES 40° 30' BEND ANGLES ± 1°	
C	16MAR2026	(D-8) SERVICE ONLY COLUMN ADDED	ASP		SURFACE FINISH MAX.	THIRD ANGLE PROJECTION
				DRAWN: WSD	DATE: 4-3-12	SCALE: 0.25 SHEET SIZE: B SHEET: 1 OF 1
				APPROVED: SEE PLM SYSTEM		TITLE: DWG, CIRCUIT BREAKER
						DWG NO.: GM85432-CMP

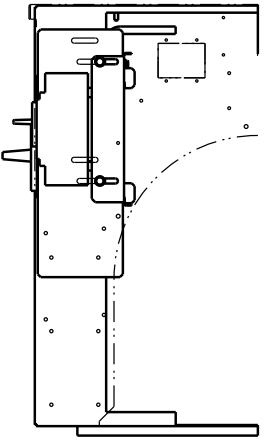
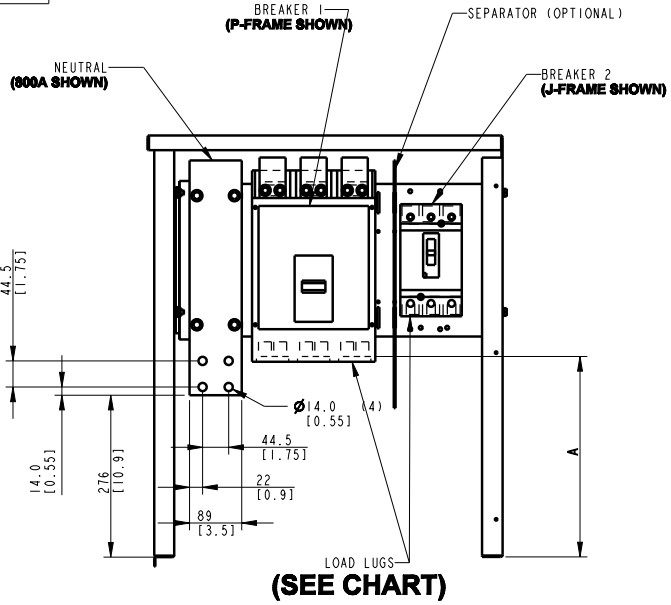
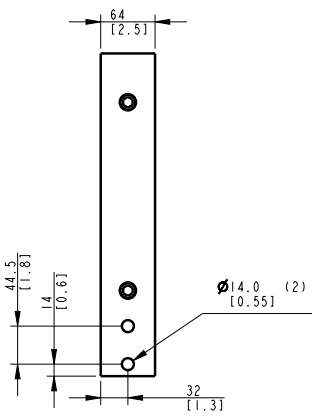
SQUARE D L-FRAME POWERPACT BREAKERS

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AL/CU MECHANICAL LOAD LUGS PER PHASE			WIRE BENDING SPACE
BREAKER FRAME	AMPS	WIRE RANGE	
H	15-150	(1) #14 TO 3/0	427 [16.8]
J	175	(1) 1/0 TO 4/0	413 [16.3]
	200-250	(1) 3/0 TO 350 KCMIL	
LA	300-400	(1) #1 TO 600 KCMIL OR (2) #1 TO 250 KCMIL	369 [14.5]
LG	400-600	(2) 2/0 TO 500 KCMIL AL/CU	362 [14.2]
M	800		
P	250-800	(3) 3/0 TO 500 KCMIL	341 [13.4]
MECHANICAL LOAD LUGS INCLUDED WITH H, J & LG L&SIG NEUTRALS			
H	60-150	(1) #14 TO 3/0 AWG AL/CU	
J	250	(1) 3/0 TO 350 KCMIL AL/CU	
LG	400-600	(2) 4/0 TO 500 KCMIL AL/CU	

STANDARD BREAKER COMBINATIONS			
BREAKER 1	BREAKER 2	BREAKER 3	TRIP TYPE
H OR J	-	-	ALL
LA	-	-	ALL
LG	-	-	ALL
M	-	-	ALL
P	-	-	ALL
H OR J	H OR J	H OR J	NO L&SIG
LA	H, J OR LA	-	NO L&SIG
LG	H, J, LA OR LG	-	NO L&SIG
M OR P	H, J, LA OR LG	-	NO L&SIG

- NOTES:
- 1) SEE UNIT DIMENSION PRINT (ADV-XXXX) FOR ADDITIONAL DIMENSIONS, JUNCTION BOX AND STUB-UP LOCATION.
 - 2) ADD SKID DEPTH TO WIRE BENDING HEIGHTS ON THIS PRINT TO ARRIVE AT FULL WIRE-BENDING SPACE.
 - 3) CONSULT FACTORY FOR BREAKER COMBINATIONS NOT SHOWN ON THIS PRINT.
 - 4) MECHANICAL LUGS ARE AVAILABLE FOR NON-L&SIG NEUTRAL. SEE ADV-7376. H, J & LG L&SIG NEUTRALS INCLUDE LUGS (SEE CHART).
 - 5) NEUTRALS ARE BONDED TO GROUND AS STANDARD. CONSULT LOCAL CODES OR SYSTEM REQUIREMENTS.
 - 6) CIRCUIT BREAKER FRAMES REFER TO STANDARD SQUARE-D PRODUCT.
 - 7) STANDARD NEUTRALS PROVIDED ARE SIZED FOR MAXIMUM UNIT AMPS. L&SIG NEUTRALS ARE MATCHED TO THEIR CIRCUIT BREAKER AMPS.
 - 8) DIMENSIONS ARE MM, DIMENSIONS IN [] ARE INCHES.



ELECTRONIC TRIP UNITS		
FRAME	TRIP UNIT	
H	LI	MICROLOGIC 3.2
	LSI	MICROLOGIC 3.2S
	LSIG	MICROLOGIC 6.2A
J	LI	MICROLOGIC 3.2
	LSI	MICROLOGIC 3.2S
	LSIG	MICROLOGIC 6.2A
LG	LI	MICROLOGIC 3.3
	LSI	MICROLOGIC 3.3S
	LSIG	MICROLOGIC 6.3A
M	LI	ET 1.0
	I	ET 1.01
	LSI	MICROLOGIC 3.0
P	LI	MICROLOGIC 5.0
	LSIG	MICROLOGIC 6.0A

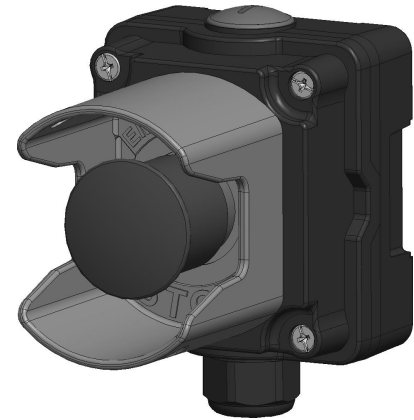
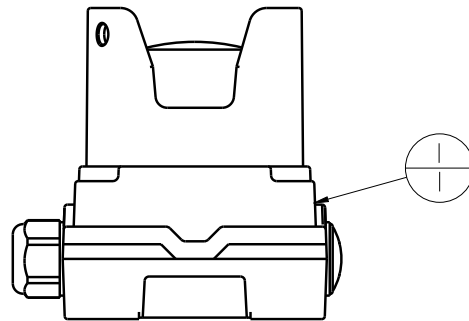
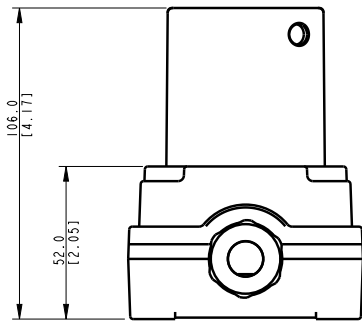
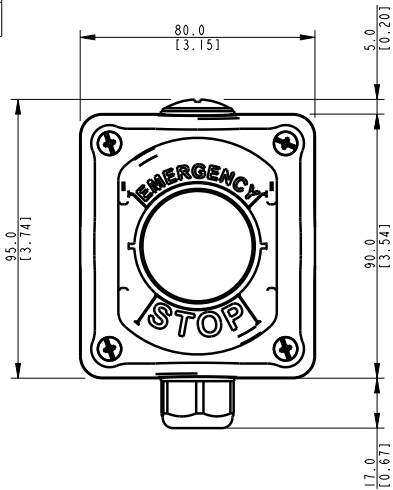
UL INTERRUPT kA RATINGS			
BREAKER	@ 240V	@ 480V	@ 600V
HD	25	18	14
HG	65	35	18
HJ	100	65	25
JD	25	18	14
JG	65	35	18
JJ	100	65	25
LA	42	30	22
LG	65	35	18
MG	65	35	18
PG	65	35	18
PJ	100	65	25
PL	125	100	25

ELECTRICALLY OPERATED BREAKERS FOR DEC6000 DPS OR APM603 PARALLELING ONLY NO 2ND BREAKERS ARE ALLOWED			
RATING	AMPS	TRIP TYPE	FRAME
100%	250	ELECTRONIC LI OR LSI	PJ OR PL
	400		
	600		
	800		

LCB KITS 48,4V,4RX,4TX,4SX ALTERNATOR FRAMES

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.	rehlko	
C	11-2-16	(D-8) REMOVED SEPARATE LINES FOR H & J 100% LUGS; (D-4) UPDATED TABLE AND ADDED 3RD LCBS		UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A	MAJOR ○ = 0 CRITICAL ● = 0	THIRD ANGLE PROJECTION
D	3-26-19	(A-7B) 14DB6 TABLE ADDED [CT194577]	WSD		CHARACTERISTICS COMPLY WITH KPS-80022	SCALE: 0.12 SHEET SIZE: B SHEET: 1 OF 1
E	5-24-19	(A-6) 1000 & 1200A REMOVED [CT19606]	WSD			TITLE: PRINT, DIMENSION
F	6-23-21	(D-8) M 800A WAS 700 & 800, LI WAS I [CT212837]	WSD			DWG NO.: ADV-7371
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KIT NO.	ITEM	PART NO	QTY	DESCRIPTION
GM103743				E-STOP, NEC REMOTE
	1	GM103743-1	1	E-STOP W/ YELLOW SHROUD, LOTO
	2	GM103743-2	4	#10 X 1.25 Sheetmetal Screw
	3	GM103743-3	1	TERMINAL, FAST-ON, MALE, 18-22 AWG
	4	GM103743-4	1	TERMINAL, FAST-ON, FEMALE, 18-22 AWG
	5	GM103743-5	2	TERMINAL, SPADE, 22-16 AWG
	6	GM103743-6	1	LITERATURE, TT-1736
THIS IS AN AUTOMATED TABLE. ALL UPDATES MUST BE MADE IN THE ASSEMBLY.				



SCALE 0.75

NOTE:
DIMENSIONS IN [] ARE IN INCH EQUIVALENTS.
SCREWS AND TERMINALS ARE TO BE BAGGED

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL □ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY	DO NOT SCALE. AND PLACED IN THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001. REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS.	BOX
-	2-12-18	NEW DRAWING [CT176728]	CCL	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: X.XX ± 0.25 X.X ± 1.0 SURFACE FINISH X:1.5 ANGLES 30° MAX. BEND ANGLES 1°	reihko
				DRAWN: BTW DATE: 2-12-18	MAJOR 0 = 0 CRITICAL 0 = 0
				APPROVED: SEE PLM SYSTEM	CHARACTERISTICS COMPLY WITH NPS-80022
					SCALE: 0.60 SHEET SIZE: B SHEET: 1 OF 1
					TITLE: E-STOP, NEC REMOTE
					DWG NO.: GM103743

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Warranty

Stationary Standby and Prime Power Industrial Generator Set One-Year or Two Thousand (2000)-Hour 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

One (1) year from registered startup or two thousand (2000) hours (whichever occurs first). In any event, the warranty period will expire not later than thirty (30) months from the date of shipment from the manufacturer's factory.

Stationary Prime Power Generator Set & Accessories

One (1) year from registered startup or two thousand (2000) hours (whichever occurs first). In any event, the warranty period will expire not later than thirty (30) months from the date of shipment from the manufacturer's factory.

Standby rated generators may only be used in Stationary "emergency" applications, where the generator set is the secondary power source, and a dependable utility is the primary power source. Use of a standby rated generator in a stationary "non-emergency" application, or any non-stationary application, is not allowed and voids all factory warranties.

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. Original installation charges and startup costs.
6. Starting batteries and the following related expenses:
 - a. Labor charges related to battery service.
 - b. Travel expenses related to battery service.
7. Engine coolant heaters, heater controls, and circulating pumps after the first year of the warranty period.
8. Additional expenses for repairs performed after normal business hours, i.e. overtime or holiday labor rates.
9. Rental of equipment during the performance of warranty repairs.
10. Removal and replacement of non-Rehlko-supplied options and equipment.
11. Non-Rehlko replacement parts. Replacement of a failed part with a non-Rehlko part voids the warranty on that part.
12. Radiators replaced rather than repaired.
13. Fuel injection pumps not repaired by an authorized service representative.
14. Non-authorized repair shop labor without prior approval from the manufacturer Warranty Department.
15. Engine fluids such as fuel, oil, or coolant/antifreeze.
16. Shop supplies such as adhesives, cleaning solvents, and rags.
17. Expenses incurred investigating performance complaints unless the problem is caused by defective materials or workmanship.
18. Maintenance items such as fuses, lamps, filters, spark plugs, loose or leaking clamps, and adjustments.
19. 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-5374 12/24h

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

This certificate remains the property of BSI and shall be returned immediately upon request.

An electronic certificate can be authenticated [online](https://www.bsigroup.com/ClientDirectory). Printed copies can be validated at www.bsigroup.com/ClientDirectory

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

BSI Assurance UK Limited, registered in England under number 7805321 at Seventh and Eighth Floors, The Acre, 90 Long Acre, London, WC2E 9RA, UK.

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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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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								

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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	ADV- 8919	HILTI	KWIK BOLT TZ2	0.75	4.75	8	8	22
			19381	5120								
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								

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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.

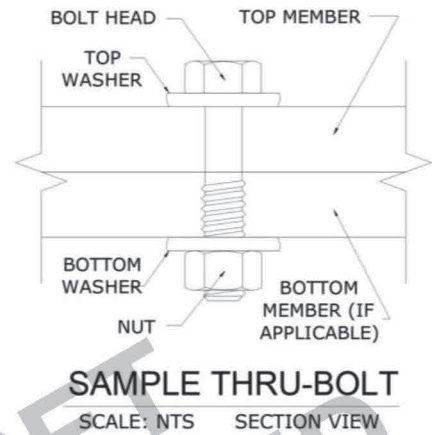
WIND INSTALLATION REQUIREMENTS

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 ecalx.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: **150REOZJF**
Model Tested: **150REOZJE**
Cooling System Tested: **50C**

Alternator Tested: **4S13**
Engine Tested: **6068HF285**
Voltage Tested: **208V**

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 exceeds ISO8528-5 requirements and to verify compliance with steady state speed control specifications.

± 0.25 % 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.

Full Load Acceptance

20.3 % Voltage Dip

2.40 Seconds of Recovery Time

21.5 % Frequency Dip

2.50 Seconds of Recovery Time

Full Load Rejection

1.70 % Voltage Overshoot

1.90 Seconds of Recovery Time

4.50 % Frequency Overshoot

0.40 Seconds of Recovery Time

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

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)

PROTOTYPE TEST REPORT



Models Covered: **150REOZJF**
Model Tested: **150REOZJE**
Cooling System Tested: **50C**

Alternator Tested: **4S13**
Engine Tested: **6068HF285**
Voltage Tested: **208V**

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.

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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	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.