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## Generator

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### Kohler Model: 350REOZJD

This diesel generator set equipped with a 4M4019 alternator operating at 120/208 volts is rated for 350 kW/438 kVA. Output amperage: 1214

### Standard Features:

- Kohler Co. 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 listings.
- The generator set accepts rated load in one step.
- The 60 Hz emergency 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

### Other Features:

- Kohler designed controllers for guaranteed 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.
- An electronic, isochronous governor delivers precise frequency regulation.
- Mount up to four circuit breakers to allow circuit protection of selected priority loads.

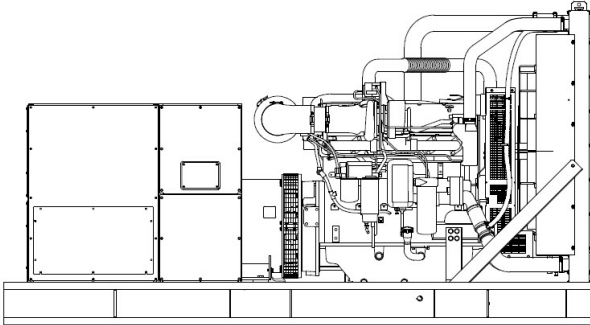
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- The pilot-excited, permanent-magnet (PM) alternator provides superior short-circuit capability.
- The brushless, rotating-field alternator has broad range reconnectability.

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4	<p>350REOZJD Generator Set</p> <p>Includes the following:</p> <table border="0"> <tr> <td>Literature Languages</td> <td>English</td> </tr> <tr> <td>Approvals and Listings</td> <td>UL2200 Listing</td> </tr> <tr> <td>Engine</td> <td>350REOZJD, 24V, 60Hz</td> </tr> <tr> <td>Nameplate Rating</td> <td>Standby 130C Rise</td> </tr> <tr> <td>Voltage</td> <td>60Hz, 120/208V, Wye, 3Ph, 4W</td> </tr> <tr> <td>Alternator</td> <td>4M4019</td> </tr> <tr> <td>Cooling System</td> <td>Unit Mounted Radiator, 50C</td> </tr> <tr> <td>Skid and Mounting</td> <td>Skid</td> </tr> <tr> <td>Air Intake</td> <td>Standard Duty</td> </tr> <tr> <td>Controller</td> <td>APM402</td> </tr> <tr> <td>Enclosure Type</td> <td>Sound</td> </tr> <tr> <td>Enclosure Material</td> <td>Steel</td> </tr> <tr> <td>Fuel Tank Type</td> <td>Standard</td> </tr> <tr> <td>Fuel Runtime (Approx.)</td> <td>24 Hours</td> </tr> <tr> <td>Subbase Fuel Tank Capacity</td> <td>774 Gallons</td> </tr> <tr> <td>Starting Aids, Installed</td> <td>2500W,90-120V,1Ph,w/Valves</td> </tr> <tr> <td>Electrical Accy.,Installed</td> <td>Battery, 2/12V, Wet</td> </tr> <tr> <td>Electrical Accy.,Installed</td> <td>Battery Charger, 10A</td> </tr> <tr> <td>Electrical Accy.,Installed</td> <td>Run Relay</td> </tr> <tr> <td>Electrical Accy.,Installed</td> <td>2 Input/5 OutputModule</td> </tr> <tr> <td>Rating, LCB 1 Right</td> <td>100% Rated</td> </tr> <tr> <td>Amps, LCB 1 Right</td> <td>1600</td> </tr> <tr> <td>Trip Type, LCB 1 Right</td> <td>Electronic, LSI</td> </tr> <tr> <td>LCB 1 Right Interrupt Rating</td> <td>65kA at 480V</td> </tr> <tr> <td>Frame, LCB 1 Right</td> <td>RJ</td> </tr> <tr> <td>Position, LCB 1 Right</td> <td>1</td> </tr> <tr> <td>Fuel Lines, Installed</td> <td>Flexible Fuel Lines</td> </tr> <tr> <td>Exceeds LTL Shipping Height</td> <td>Add'l Shipping Charge Accepted</td> </tr> <tr> <td>Miscellaneous Accy,Installed</td> <td>Coolant in Genset</td> </tr> <tr> <td>Warranty</td> <td>5 Year Comprehensive</td> </tr> <tr> <td>Testing, Additional</td> <td>Power Factor Test,0.8,3Ph Only</td> </tr> </table> <p>Lit Kit, General Maint., 350REOZJD</p>	Literature Languages	English	Approvals and Listings	UL2200 Listing	Engine	350REOZJD, 24V, 60Hz	Nameplate Rating	Standby 130C Rise	Voltage	60Hz, 120/208V, Wye, 3Ph, 4W	Alternator	4M4019	Cooling System	Unit Mounted Radiator, 50C	Skid and Mounting	Skid	Air Intake	Standard Duty	Controller	APM402	Enclosure Type	Sound	Enclosure Material	Steel	Fuel Tank Type	Standard	Fuel Runtime (Approx.)	24 Hours	Subbase Fuel Tank Capacity	774 Gallons	Starting Aids, Installed	2500W,90-120V,1Ph,w/Valves	Electrical Accy.,Installed	Battery, 2/12V, Wet	Electrical Accy.,Installed	Battery Charger, 10A	Electrical Accy.,Installed	Run Relay	Electrical Accy.,Installed	2 Input/5 OutputModule	Rating, LCB 1 Right	100% Rated	Amps, LCB 1 Right	1600	Trip Type, LCB 1 Right	Electronic, LSI	LCB 1 Right Interrupt Rating	65kA at 480V	Frame, LCB 1 Right	RJ	Position, LCB 1 Right	1	Fuel Lines, Installed	Flexible Fuel Lines	Exceeds LTL Shipping Height	Add'l Shipping Charge Accepted	Miscellaneous Accy,Installed	Coolant in Genset	Warranty	5 Year Comprehensive	Testing, Additional	Power Factor Test,0.8,3Ph Only
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**KOHLER®**

# Spec Sheets



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## Generator Set Rating

## Standby 130C Rise Ratings

Alternator	Voltage	Ph	Hz	kW/kVA	Amps
4M4019	120/208	3	60	350/438	1214

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.  
 Prime Power Ratings: At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve.  
 Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time and continuous ratings, consult the factory.

## Model: 350REOZJD, continued

### Alternator Specifications

Specifications	Alternator
Alternator manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Permanent-Magnet, Pilot Exciter
Leads, quantity	12, Reconnectable
Voltage regulator	Solid State, Volts/Hz
Insulation	NEMA MG1
Insulation: Material	Class H, Synthetic, Nonhydroscopic
Insulation: Temperature Rise	130 ° C, 150 ° C Standby
Coupling	Flexible Disc
Amortisseur windings	Full
Rotor balancing (50Hz)	125%
Rotor balancing (60Hz)	125%
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
<ul style="list-style-type: none"> <li>• NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.</li> <li>• Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.</li> <li>• Sustained short-circuit current enabling down stream circuit breakers to trip without collapsing the alternator field.               <ul style="list-style-type: none"> <li>• Self-ventilated and dripproof construction.</li> <li>• Superior voltage waveform from a two-thirds pitch stator and skewed rotor.</li> <li>• Brushless alternator with brushless pilot exciter for excellent load response.</li> </ul> </li> </ul>	

### Engine

#### Engine Specification

Engine Manufacturer	John Deere
Engine Model	6135HFG84B
Engine: type	Turbocharged, Charge Air-Cooled
Cylinder arrangement	6, Inline
Displacement, L (cu. in.)	13.5 (824)
Bore and stroke, mm (in.)	132 x 165 (5.2 x 6.5)
Compression ratio	16.0:1
Piston speed, m/min. (ft./min.)	594 (1950)
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	401 (538)
Crankshaft material	Forged Steel
Valve (exhaust) material Intake	Nickel-Chromium Head
Valve (exhaust) material	Chromium-Silicone Stem
Governor: type, make/model	JDEC Electronic L15
Frequency regulation, no-load to-full load	Isochronous
Frequency regulation, steady state	± 0.25%
Frequency	Fixed
Air cleaner type, all models	Dry

## Model: 350REOZJD, continued

### Exhaust

#### Exhaust System

Exhaust Manifold Type	Dry
Exhaust flow at rated kW, m <sup>3</sup> /min. (cfm)	68 (2387)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	547 (1017)
Maximum allowable back pressure, kPa (in. Hg)	Min. 4 (1.2) Max. 7.5 (2.2)
Exh. outlet size at eng. hookup, mm (in.)	See ADV Drawing

### Engine Electrical

#### Engine Electrical System

Battery charging alternator: Ground (negative/positive)	Negative
Battery charging alternator: Volts (DC)	24
Battery charging alternator: Ampere rating	60
Starter motor rated voltage (DC)	24
Battery, recommended cold cranking amps (CCA): Qty., CCA rating each	Two, 925
Battery voltage (DC)	12

### Fuel

#### Fuel System

Fuel type	Diesel
Fuel supply line, min. ID, mm (in.)	13 (0.50)
Fuel return line, min. ID, mm (in.)	10 (0.38)
Max. lift, fuel pump: type, m (ft.)	Electronic 2.1 (6.8)
Max. fuel flow, Lph (gph)	180.6 (47.7)
Max. return line restriction, kPa (in. Hg)	35 (10.3)
Fuel prime pump	Electronic
Fuel Filter Secondary	2 Microns @ 98% Efficiency
Fuel Filter Primary	10 Microns
Fuel Filter Water Separator	Yes
Recommended fuel	#2 Diesel/HVO/RD

### Lubrication

#### Lubrication System

Type	Full Pressure
Oil pan capacity, L (qt.)	40.0 (42.3)
Oil pan capacity with filter, L (qt.)	42.0 (44.4)
Oil filter: quantity, type	1, Cartridge
Oil cooler	Water-Cooled

## Model: 350REOZJD, continued

### Cooling

#### Radiator System

Ambient temperature, ° C (° F)	50 (122)
Engine jacket water capacity, L (gal.)	18 (4.8)
Radiator system capacity, including engine, L (gal.)	67.2 (17.8)
Engine jacket water flow, Lpm (gpm)	400 (106)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	175 (9661)
Heat rejected to charge air cooling water at rated kW, dry exhaust, Kw Btu/min.	75 (4269)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	965 (38)
Fan, kWm (HP)	18 (24)
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) *	435 (15400)
Cooling air required for generator set when equipped with city water cooling or remote radiator, based on 14 ° C (25 ° F) rise, m3/min. rise and ambient temp. of 29 ° C (85 ° F) m3/min. (cfm)	285 (10067)
Combustion air, m3/min. (cfm)	25 (883)
Heat rejected to ambient air: Engine, kW (Btu/min.)	43 (2448)
Heat rejected to ambient air: Alternator, kW (Btu/min.)	36.6 (2082)

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

### Fuel Consumption

	Rating
Standby Fuel Consumption at 100% load	100.3 Lph (26.5 gph)
Standby Fuel Consumption at 75% load	80.3 Lph (21.2 gph)
Standby Fuel Consumption at 50% load	56.7 (15.0)
Standby Fuel Consumption at 25% load	29.5 (7.8)
Continuous Fuel Consumption at 0% load	

\*\* Volumetric Fuel consumption is up to 4% higher when using HVO/RC than #2 ULSC.

**Kohler® 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.

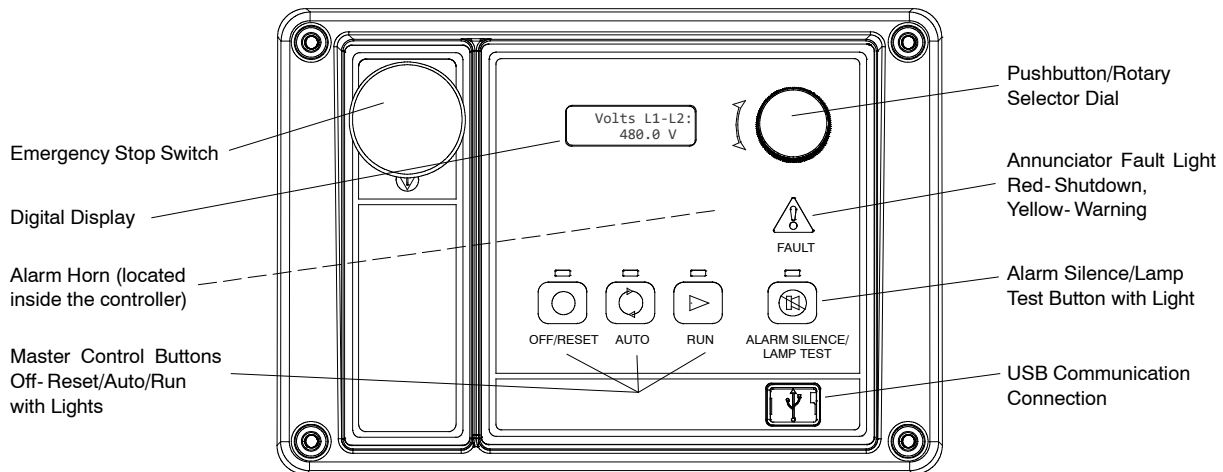
The APM402 controller uses a patented hybrid voltage regulator and unique software logic to manage alternator thermal overload protection features normally requiring additional hardware. Additional features include:

- 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™ or Monitor III software.
- 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.

**APM402**





## 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™ or Monitor III software
- 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 re crank 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 Kohler® 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
<b>Engine Functions</b>		
Critically high fuel level *	○	
ECM communication loss		●
ECM diagnostics	●	●
Engine over speed		●†
Engine start aid active		
Engine under speed		●
Fuel tank leak *	○	○
High battery voltage	●	
High coolant temperature	●	●†
High fuel level *	○	
Low battery voltage	●	
Low coolant level		●
Low coolant temperature	●	
Low cranking voltage	●	
Low engine oil level *	○	○
Low fuel level (diesel models) *	○	○
Low fuel pressure (gas models) *	○	
Low oil pressure	●	●†
No coolant temperature signal		●
No oil pressure signal		●
Overcrank		●†
Speed sensor fault	●	
<b>General Functions</b>		
Alarm horn silenced		
Analog inputs	○	○
Battery charger fault *	●	
Chicago code active *		
Common fault (includes †)		●
Common warning	●	
Digital inputs	○	○
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		
<b>Generator Functions</b>		
AC sensing loss	●	●
Alternator protection		●
Ground fault input *	●	
kW overload		●
Locked rotor		●
Overfrequency		●
Overvoltage (each phase)		●
Underfrequency		●
Undervoltage (each phase)		●

● Standard function

○ 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



KOHLER CO., Kohler, Wisconsin 53044 USA  
 Phone 920-457-4441, Fax 920-459-1646  
 For the nearest sales and service outlet in the  
 US and Canada, phone 1-800-544-2444  
 KOHLERPower.com

Controller Displays as Provided by the Engine ECM	Engine Manufacturer (and Model)						
	Kohler Diesel (KDI M, TM*)	Kohler Diesel (KDI TCR)	Kohler Gas (KG2204, KG2204T)	Kohler Gas (KG6208, KG6208T, KG10V08, KG10V08T)	GM and PSI/Doosan	John Deere	Volvo
Intake air pressure							D
Intake air Temperature		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

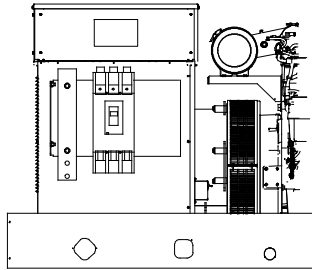
- Float/Equalize Battery Charger** available with 6 or 10 amp output for 12 or 24V DC voltage output. The 10 amp model provides NFPA 110 charging and alarming capability.
- Manual Speed Adjust** available for applications using closed transition ATS. Adjustment range for 60 Hz: 1751- 1849 rpm (58.2- 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 Kohler® 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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 Modbus® is a registered trademark of Schneider Electric.

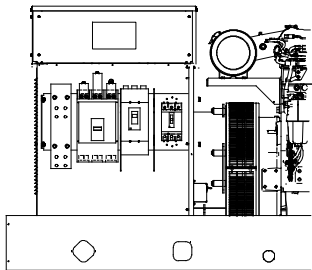
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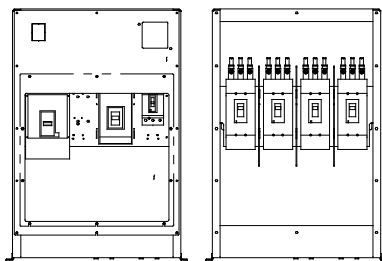
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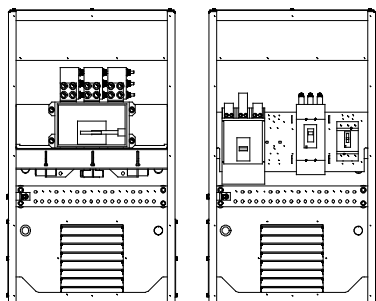
Single Circuit Breaker Kit with Neutral Bus Bar  
15-300 kW Model Shown



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  
700-2500 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.
- Kohler Co. 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.

## 300-2250\* kW Line Circuit Breaker Specifications

\* Includes models 300REZXB and 300RZXB. For models 300REOZJ and 300REZXC, see the 15- 300 kW section. For KD model generator sets, see pages 8 and 9.

### 80% Rating Circuit Breaker

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
4M 5M 7M	15- 150	Thermal Magnetic	HD
	60- 150	Electronic LI	HD
		Electronic LSI	
		Electronic LSIG	
	175- 250	Thermal Magnetic	JD
	250	Electronic LI	
		Electronic LSI	
	60- 150	Electronic LI	HG
		Electronic LSI	
		Electronic LSIG	
	250	Electronic LI	JG
		Electronic LSI	
		Electronic LSIG	
	30	9- 325 A. Mag. Trip	HJ
	50	84- 546 A. Mag. Trip	
	100	180- 1040 A. Mag. Trip	
	150	348- 1690 A. Mag. Trip	
	250	684- 2500 A. Mag. Trip	JJ
	300- 400	Thermal Magnetic	LA
	400	500- 1000 A. Mag. Trip	
		750- 1600 A. Mag. Trip	
		1000- 2000 A. Mag. Trip	
		1125- 2250 A. Mag. Trip	
		1250- 2500 A. Mag. Trip	
		1500- 3000 A. Mag. Trip	
		1750- 3500 A. Mag. Trip	
	2000- 4000 A. Mag. Trip		
	400- 600	Electronic LI	LG
		Electronic LSI	
		Electronic LSIG	
800	Electronic LI	MG	
1000- 1200	Thermal Magnetic	PG	
800- 1200	Electronic LSI		
	Electronic LSIG		
1200	Thermal Magnetic	PJ	
	Electronic LSI		
	Electronic LSIG		
1600- 2500	Thermal Magnetic	RJ	
	Electronic LSI		
	Electronic LSIG		

### 100% Rating Circuit Breaker

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
4M 5M 7M	15- 150	Thermal Magnetic	HD
	60- 150	Electronic LI	
		Electronic LSI	
		Electronic LSIG	
	175- 250	Thermal Magnetic	JD
	250	Electronic LI	
		Electronic LSI	
	60- 150	Electronic LI	HG
		Electronic LSI	
		Electronic LSIG	
	250	Electronic LI	JG
		Electronic LSI	
		Electronic LSIG	
	400	Electronic LI	LG
		Electronic LSI	
	600- 1200	Electronic LSI	PG
		Electronic LSIG	
	1200	Electronic LSI	PJ
Electronic LSIG			
1600- 2500	Electronic LSI	RJ	
	Electronic LSIG		
1600- 3000	Electronic LSI	NW	
	Electronic LSIG		

### 100% Rating Electrically Operated Breakers

For use as paralleling breakers.\*

Alt. Model	Amps	Trip Unit	Frame
4M 5M 7M	250, 400, 600, 800, 1000, 1200	3.0 LI	PJ
		5.0 LSI	PJ
		3.0 LI	PL
	1600, 2000, 2500, 3000	5.0 LSI	PL
		Electronic LSI	NW
		Electronic LSIG	NW

\* P-frame breakers can be used with the Decision-Maker® 6000 Controller/DPS System or APM603 controller.

NW breakers are for use with the APM603 only.

All circuit breakers listed in this table include line side bus and load side lugs, 24VDC motor operators, and 1 type C SDE overcurrent switch contact. P-frame breakers include 2 type C auxiliary contacts. NW breakers include 4 auxiliary contacts.

No second breakers are allowed in combination with these breakers.

### Load Bus Rating

Gen. Set kW	Alt. Model	Rating, Amperes	Type
350- 2250 kW	4M/ 5M/ 7M	3000	Load Bus

## 300- 2250\* kW Line Circuit Breaker Specifications

\* Includes models 300REZXB and 300RZXB. For models 300REOZJ and 300REZXC, see the 15- 300 kW section. For KD model generator sets, see pages 8 and 9.

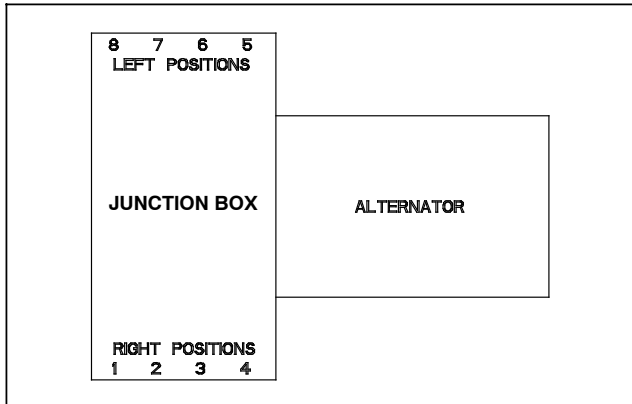
### Interrupting Ratings

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			
NW	100	100	85
PG	65	35	18
PJ	100	65	25
PL	125	65	25
<b>RJ</b>	<b>100</b>	<b>65</b>	<b>25</b>

### 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
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
<b>RJ</b>	<b>1600- 2500</b>	<b>(8) 1/0 to 750 kcmil or (16) 1/0 to 300 kcmil</b>
NW	1600- 3000	(10) 1/0 to 750 kcmil or (20) 1/0 to 300 kcmil

### Breaker Positions



**NOTE:** Breaker and load bus phasing on right positions is A- B- C and on left positions is C- B- A.

**NOTE:** H, HG, J, JG, and LG-frames when selected with LSIG trip require two mounting spaces (one space for the breaker and one space for the LSIG neutral). These combinations are not reflected in the Multiple Circuit Breaker Combinations table on this page.

### Multiple Circuit Breaker Combinations

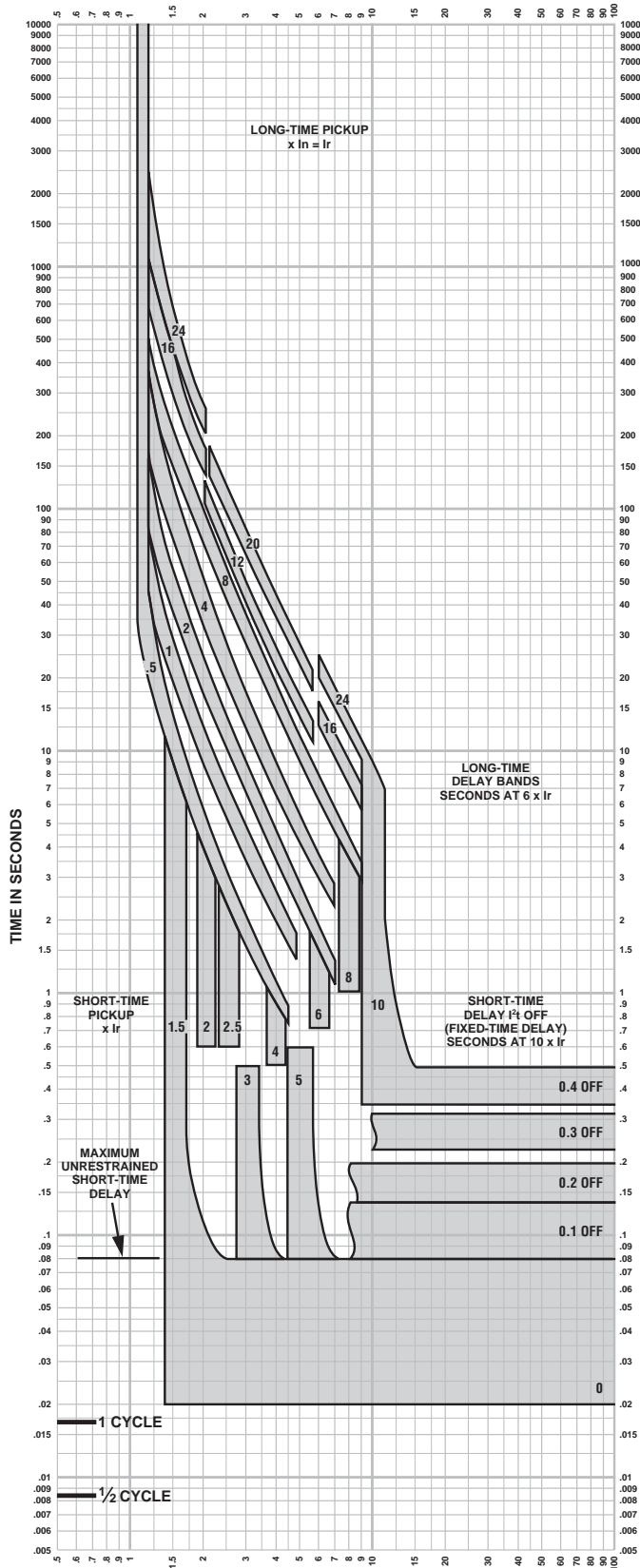
Alternator Model	Positions			
	1 or 5	2 or 6	3 or 7	4 or 8
4M/ 5M/ 7M	H/J			
	H/J	H/J		
	H/J	H/J	H/J	
	H/J	H/J	H/J	H/J
	LA			
	LA	H/J		
	LA	LA		
	LA	H/J	H/J	
	LA	LA	H/J	
	LA	LA	LA	
	LA	H/J	H/J	H/J
	LA	LA	H/J	H/J
	LA	LA	LA	H/J
	LA	LA	LA	LA
	LG			
	LG	H/J		
	LG	LA		
	LG	LG		
	LG	H/J	H/J	
	LG	LA	H/J	
	LG	LA	LA	
	LG	LG	H/J	
	LG	LG	LA	
	LG	LG	LG	
	LG	H/J	H/J	H/J
	LG	LA	H/J	H/J
	LG	LA	LA	H/J
	LG	LA	LA	LA
	LG	LG	H/J	H/J
	LG	LG	LA	LA
	LG	LG	LG	H/J
	LG	LG	LG	LA
LG	LG	LG	LG †	
M/P				
M/P		H/J		
M/P		LA		
M/P		LG		
M/P		M/P ‡		
M/P		H/J	H/J	
M/P		LA	H/J	
M/P		LA	LA	
M/P		LG	H/J	
M/P		LG	LA	
M/P		LG	LG †	
R §				
NW §				
LOAD BUS KIT §				

† Frame size LG is not available in position 4 with 1219 mm (48 in.) junction box.

‡ Frame sizes M/P are not available in position 3 or 4 with 1219 mm (48 in.) junction box.

§ R breakers, NW breakers, and the load bus kit occupy all four positions on a side.

CURRENT IN MULTIPLES OF  $I_r$  ( $I_r = \text{LONG-TIME SETTING} \times I_n$ )



**MICROLOGIC® 5.0/6.0 A/P/H TRIP UNIT  
CHARACTERISTIC TRIP CURVE NO. 613-4**

Long-time Pickup and Delay  
Short-time Pickup and 1/4 OFF Delay

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

Curves apply from -30°C to +60°C ambient temperature.

**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. The end of the curve is determined by the interrupting rating of the circuit breaker.
3. With zone-selective interlocking on, short-time delay utilized and no restraining signal, the maximum unrestrained short-time delay time band applies regardless of the setting.
4. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
5. For a withstand circuit breaker, instantaneous can be turned OFF. See 613-7 for instantaneous trip curve. See 613-10 for instantaneous override values.
6. Overload indicator illuminates at 100%.

- Merlin Gerin
  - Modicon
  - Square D
  - Telemecanique
  - Federal Pioneer
  - Federal Pacific
- Schneider Electric Brands



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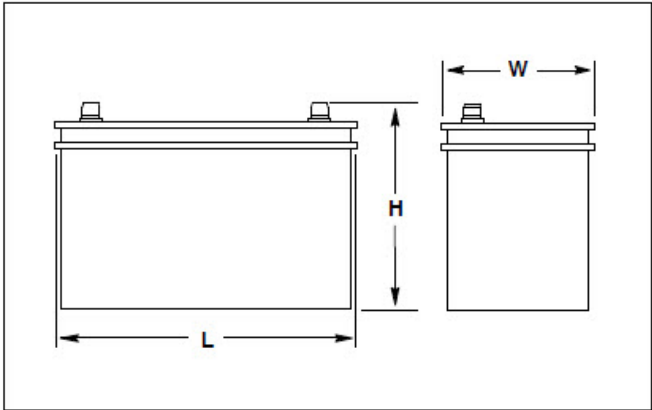
Curve No. 0613TC0004  
December 2000  
Drawing No. B48095-613-04

CURRENT IN MULTIPLES OF  $I_r$   
( $I_r = \text{LONG-TIME SETTING} \times I_n$ )





Typical Overall Dimensions

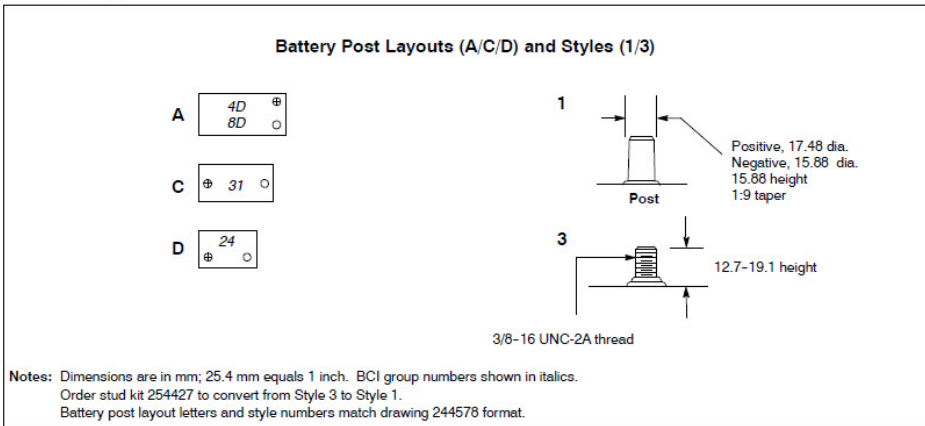


Standard Features

- Kohler Co. 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).

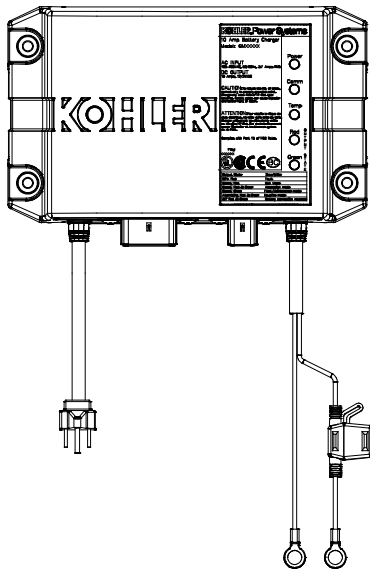
Charge Type*	Battery Part Number	Battery Qty. per Size	BCI Group Size	Battery SAE Dimension, mm (in.)			Cold Cranking Amps at 18°C (0°F) Min.	Reserve Capacity Minutes at 27° (80°F) Min.	Battery Post Layout and Style
				L	W	H			
Wet	324586	2	31	330.2 (13.0)	173.0 (6.8)	239.8 (9.4)	950	185	C/3

Battery Specifications



**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.

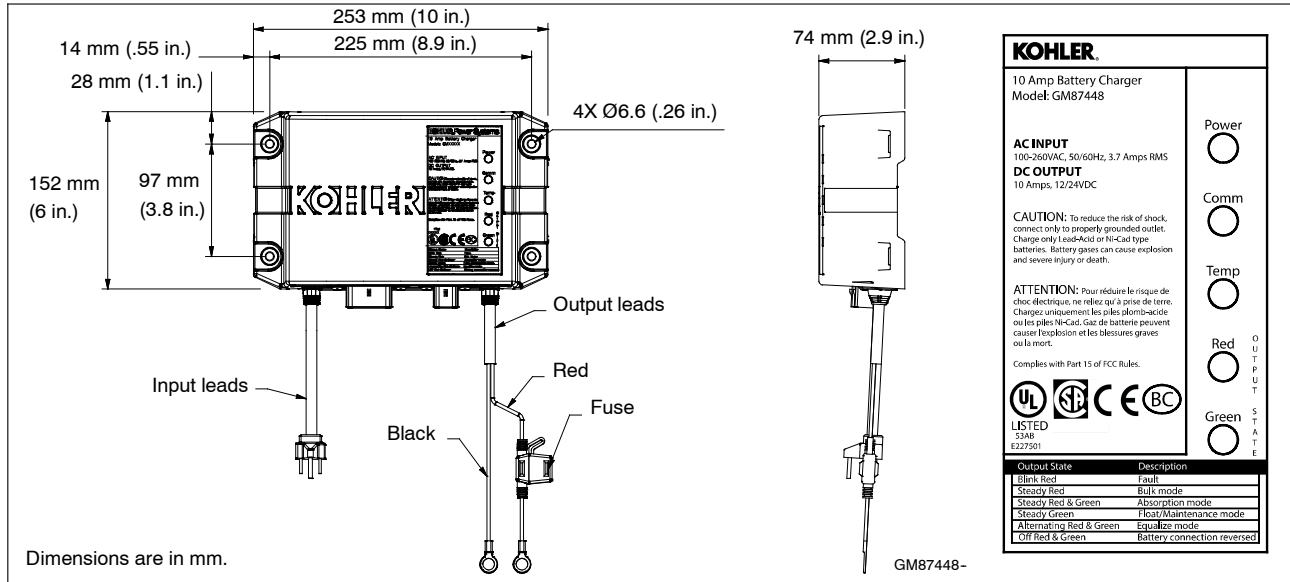
Five LED lights indicate power, communication status, temperature compensation status, charge curve, and charger status.

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 Kohler 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



## Specifications

<b>AC Input</b>	100-260 VAC
<b>Frequency Input</b>	50/60 Hz
<b>DC Output</b>	10 Amps @ 12 VDC or 10 Amps @ 24 VDC (On battery voltage regulation ±1%; current is electronically limited)
<b>Fuse Protection</b>	15 amps ATC
<b>Battery Types</b>	Flooded Lead Acid (FLA) AGM Gel Cell High Performance AGM Nickel-Cadmium (NiCad)
<b>Monitoring</b> LED Indications	Power Communication Temperature compensation Output charger curve and charger status: <ul style="list-style-type: none"> <li>○ Red</li> <li>○ Green</li> </ul>
<b>Environmental</b>	
Operating	-20° to 70°C (-4° to 158° F)
Storage	-40° to 85°C (-40° to 185° F)
Relative Humidity	5 to 95% (non-condensing)
Salt Spray Testing	ASTM B117
Corrosion Resistant	From battery gases

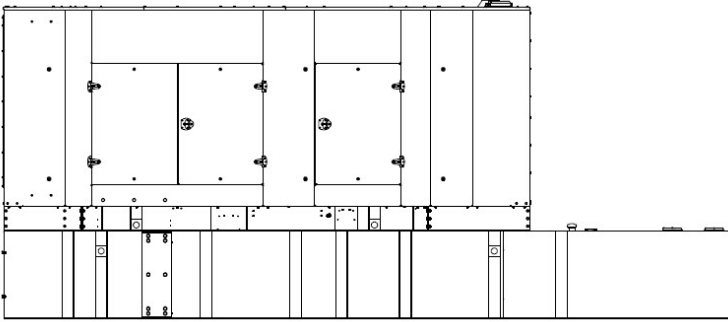
<b>Enclosure</b>	
Environmental Resistant	From rain, snow, dust, and dripping water
<b>Battery Connections</b>	
Lead Length	1.8 m (6 ft.) red and black leads
Battery Connections	9.5 mm (3/8 in.) ring terminals
<b>AC Power Connections</b>	
Lead Length	1.8 m (6 ft.)
Storage	Standard US style 3-prong AC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

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**ISO 9001**  
**KOHLER**  
 POWER SYSTEMS  
 NATIONALLY REGISTERED



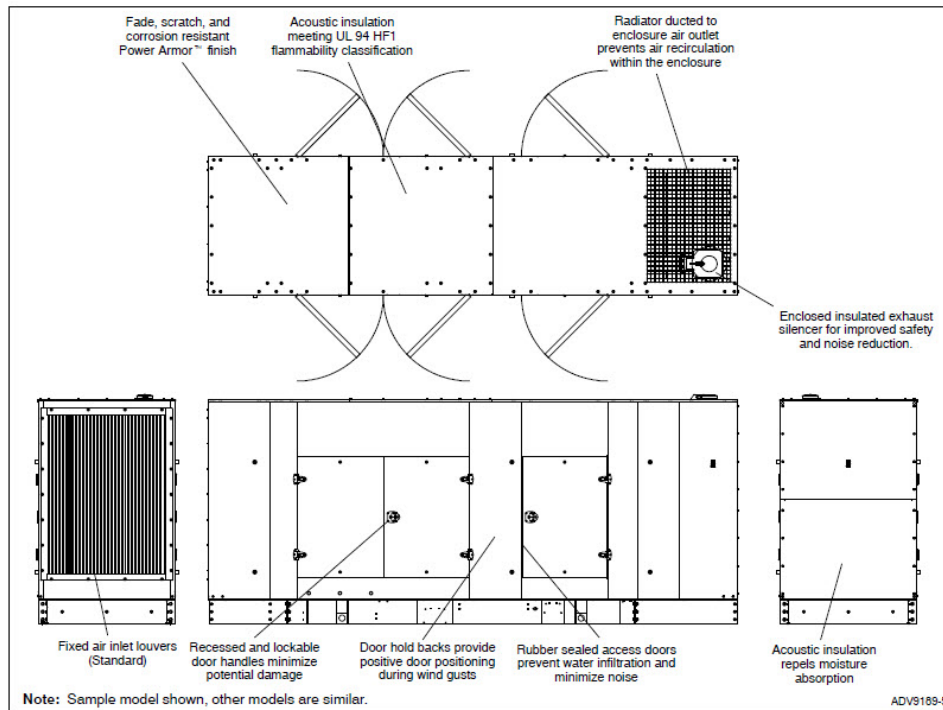
### Sound Enclosure Standard Features

- Internal silencer, flexible exhaust connector and rain cap.
- Mounts to generator set skid. Steel construction with hinged doors.
- Fade-, scratch-, and corrosion-resistant Kohler® Power Armor cream beige automotive-grade textured finish.
- Enclosure has six large access doors which allow for easy maintenance.
- Lockable, flush-mounted door latches.
- Air inlet louvers reduce rain entry.
- Internal vertical discharge plenum directs air up to reduce noise.
- Acoustic insulation that meets UL 94 HF1 flammability classification.
- Sound enclosure offers level 1 sound reduction using acoustic insulation.

### 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 tanks construction protects against fuel leaks or ruptures. The inner (primary) tank is sealed inside the outer (secondary) tank. The outer tank contains the fuel if the inner tank leaks or ruptures.

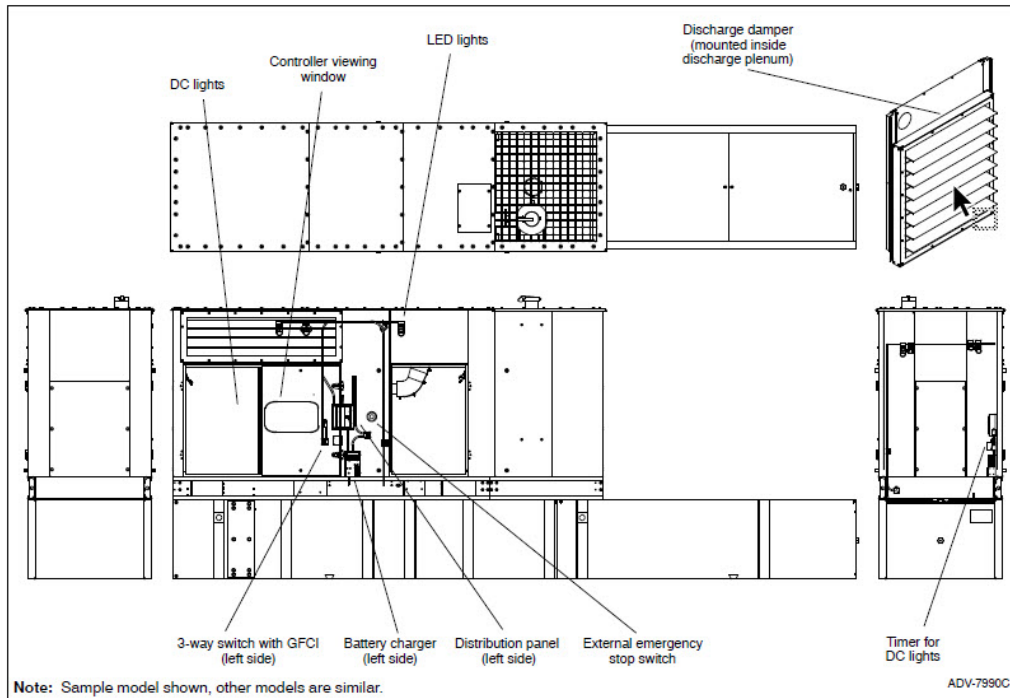
## Level 1 Sound Enclosure



## Sound Enclosure Features

- Heavy-duty formed panels, solid construction. Pre-assembled package offering corrosion resistant, dent resilient structure mounting directly to the generator set skid. Available in 14 gauge steel.
- 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.
- 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.
- Service access. Multi-personnel doors for easy access to generator set control and servicing of the fuel fill, fuel gauge, oil fill, and battery.
- Interchangeable modular panel construction. Allows complete serviceability or replacement without compromising enclosure design.
- Bolted panels facilitate service, future modification upgrades, or field replacement.
- Cooling/combustion air intake. Weather protective designs using fixed air inlet louvers. Sized for maximum cooling airflow.
- Cooling air discharge. Attenuated models offering an internal vertical discharge scoop that redirects cooling air up and above the enclosure to reduce noise.
- Sound-attenuating design using a silencer and acoustic insulation UL 94 HF1 listed for flame resistance.

### Weather and Sound Enclosure Options



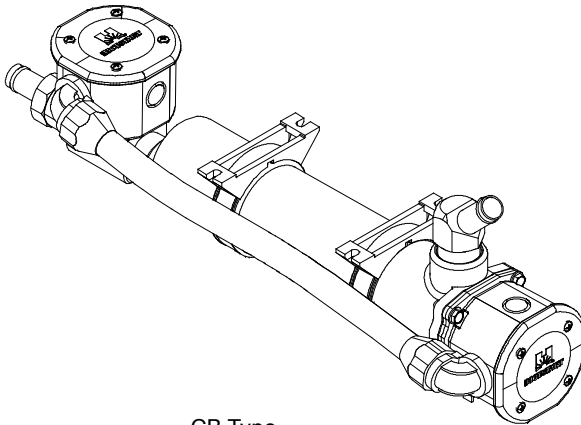
- Extended operation. Usable tank capacities offers full load standby operation of up to 72 hours.
- Power Armor Plus textured epoxy-based rubberized coating that creates an ultra-thick barrier between the tank and harsh environmental conditions like humidity, saltwater, and extreme temperatures, and 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.
- Fuel level sender with fuel level and low and high fuel warning annunciated through the generator set controller.
- 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	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	5520 (217)	1495 (59)	4745 (10460)	2400 (94)	0 (0)	91.3
2930 (774)	24	5761 (227)	1495 (59)	6146 (13549)	3162 (124)	762 (30)	81.7

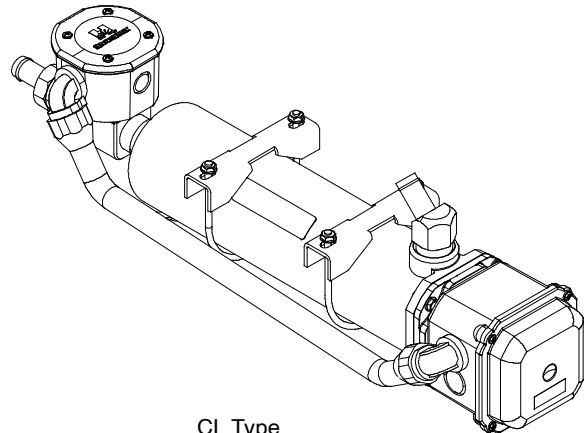
Note: Data in table is for reference only, refer to the respective ADV drawings for details.

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

\* Max. weight includes the generator set (wet) with largest alternator option, enclosure, silencer, and tank (no fuel).

**Engine Block Heater Kits**

CB Type



CL Type

Block Heater Kit, Typical

**Applicable Models**

- 180-200RZXB
- 180-200REZXB
- 230-275REOZJE
- 300-500REOZJ
- 350-500REOZJB
- 350-500REOZJC
- **350-400REOZJD**
- 500REOZVC
- 550-600REOZVB

**Standard Features**

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

**Description**

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

The engine block heater has a fixed setting thermostat that turns ON when the engine coolant temperature reaches 27°C (80°F) and turns OFF when the engine coolant temperature reaches 38°C (100°F).

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

The engine block heater kits are available in 120 V, 208 V, 240 V, and 480 V versions.

## Block Heater Specifications

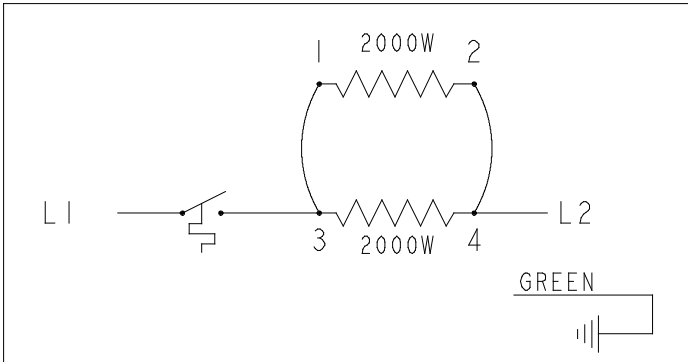
Heating Fluid	Water, Coolant Mix (50% Glycol/50% Water)
Thermostat Temperature Range	27° - 38°C (80° - 100°F)
Temperature High Limit	96°C (205°F)
Max. Pressure	125 psi (860 kPa)
Inlet/Outlet Plumbing	1 in. NPT
System Ingress	NEMA 4

## Specifications

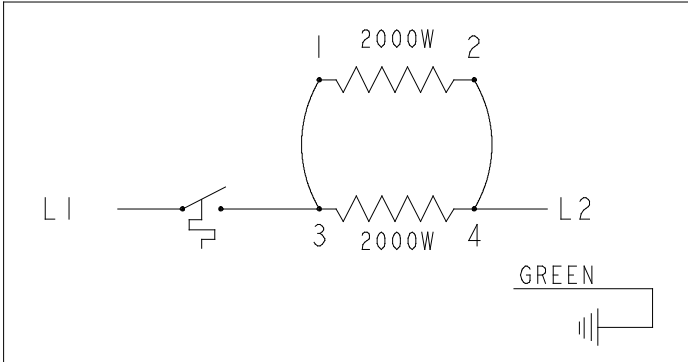
Block Heater Kit Number	Component	Watts	Voltage	Phase
GM75809- KA1	GM76113	2500	90- 120	1
GM75809- KA2	GM76114	2500	190- 208	1
GM75809- KA3	GM76115	2500	210- 240	1
GM75809- KA4	GM76116	2500	380- 480	1
GM76120- KA1	GM76113	2500	90- 120	1
GM76120- KA2	GM76114	2500	190- 208	1
GM76120- KA3	GM76115	2500	210- 240	1
GM76120- KA4	GM76116	2500	380- 480	1
GM79186- KA1	GM79182	4000	190- 208	1
GM79186- KA2	GM79183	4000	210- 240	1
GM79186- KA3	GM79184	4000	380- 480	1
GM79186- KP1	GM79182	4000	190- 208	1
GM79186- KP2	GM79183	4000	210- 240	1
GM79186- KP3	GM79184	4000	380- 480	1
GM79187- KA1	GM79182	4000	190- 208	1
GM79187- KA2	GM79183	4000	210- 240	1
GM79187- KA3	GM79184	4000	380- 480	1
GM79187- KP1	GM79182	4000	190- 208	1
GM79187- KP2	GM79183	4000	210- 240	1
GM79187- KP3	GM79184	4000	380- 480	1
GM84820- KA1	GM76113	2500	90- 120	1
GM84820- KA2	GM76114	2500	190- 208	1
GM84820- KA3	GM76115	2500	210- 240	1
GM84820- KA4	GM76116	2500	380- 480	1



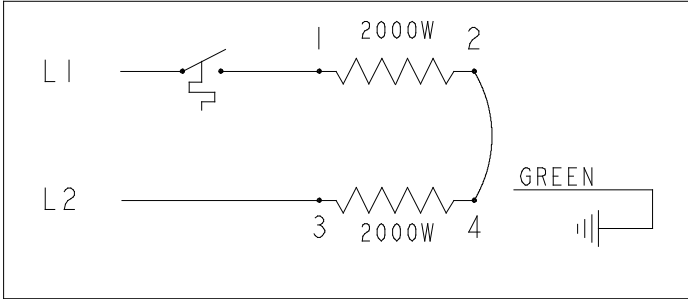
**Wiring Diagram**



208 VAC single phase- parallel



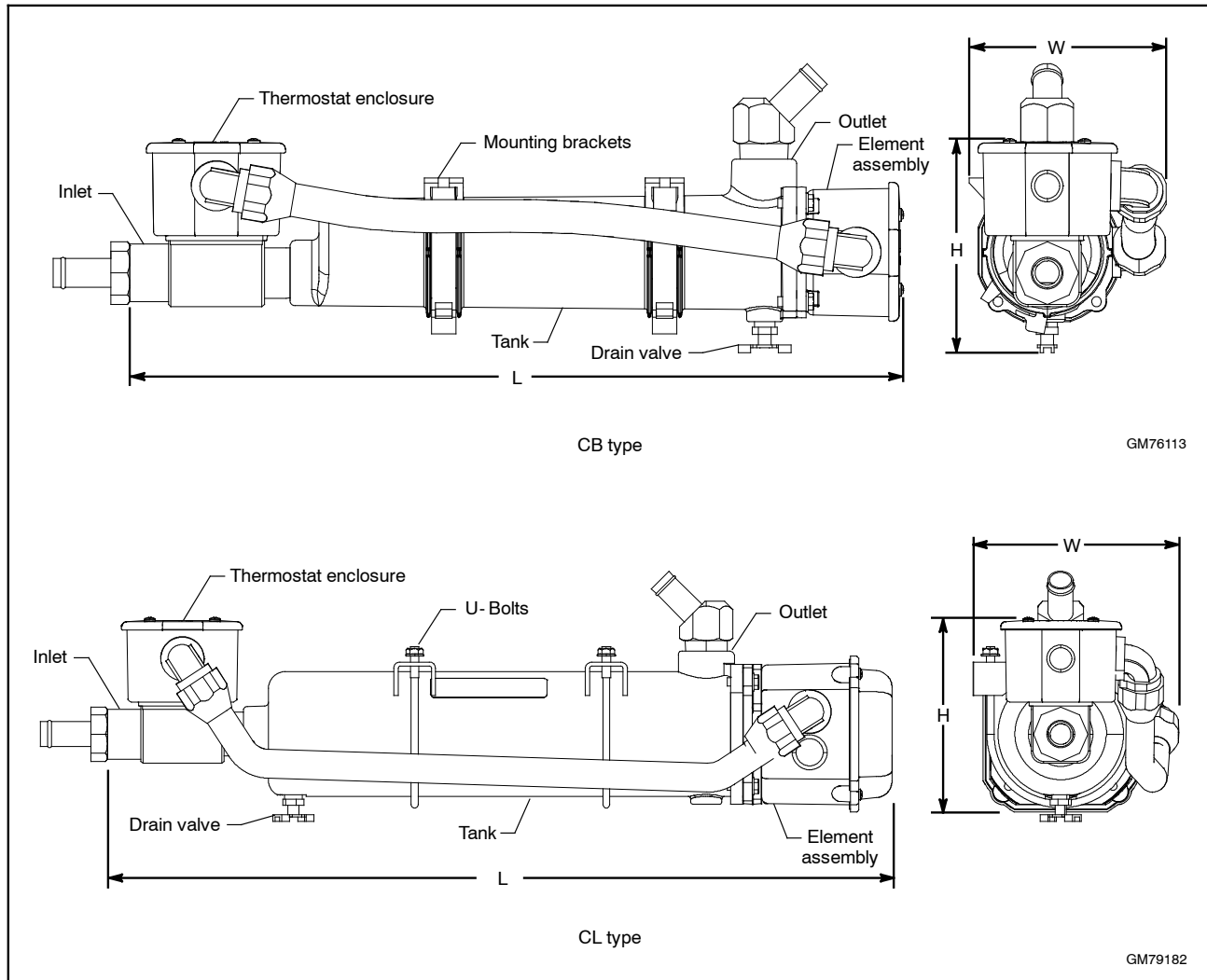
240 VAC single phase- parallel



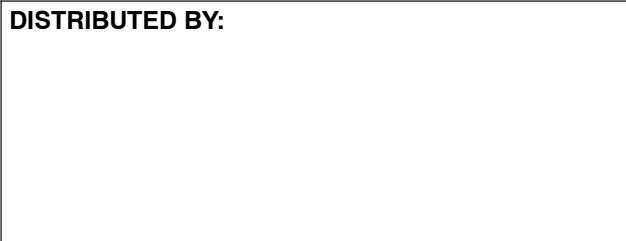
480 VAC single phase- parallel

## Dimensions and Weights

CB type block heater size, L x H x W, mm (in):	510 x 132 x 129 (20.1 x 5.2 x 5.1)
CL type block heater size, L x H x W, mm (in):	597 x 147 x 158 (23.5 x 5.8 x 6.2)
CB type block heater weight, kg (lb):	3 (6.9)
CL type block heater weight, kg (lb):	4.5 (10)



**DISTRIBUTED BY:**

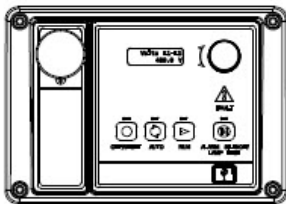


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**Integral Voltage Regulator with Kohler® APM402/ Decision-Maker® 3000 and Menu-Driven Selections (15-1000 kW Generator Set Models)**



**APM402 and Decision-Maker® 3000 Controller with Integral Voltage Regulator**

The voltage regulator is integral to the controller and uses patented hybrid voltage regulator design providing  $\pm 0.5\%$  no-load to full-load regulation using root-mean-square (RMS) voltage sensing. The voltage regulator features three-phase sensing and is available for 12- or 24-volt engine electrical systems.

**Voltage Regulators**

The following information provides general features, specifications, and functions of available voltage regulators.

This information generally applies to a single generator set and multiple generator sets with paralleling applications. Refer to the respective generator set specification sheet and see your authorized distributor for information regarding specific voltage regulator applications and availability.

**Integral Voltage Regulators with APM402/Decision-Maker® 3000 Controllers**

Calibration	Digital Display	Range Settings	Default Selection
Voltage Adjustment	Volt Adj	$\pm 10\%$ of System Voltage	System Voltage
Underfrequency Unload or Frequency Setpoint	Frequency Setpoint	42 to 62 Hz	2.5 Hz Below Nominal Frequency
Underfrequency Unload Scope	Slope	0-10% of System Voltage (Volts per Cycle)	5% of System Voltage



Specification/Feature	Integral with APM402/Decision-Maker® 3000
Generator Set Availability	15-1000 kW
Type	Patented Hybrid Design
Status and Shutdown Indicators	LEDs and Text LCD Display
Operating Temperature	-40 ° C to 70 ° C (-40 ° F to 158 ° F)
Storage Temperature	-40 ° C to 85 ° C (-40 ° F to 185 ° F)
Humidity	5-95% Non-Condensing
Circuit Protection	Solid-State, Redundant Software and Fuses
Sensing, Nominal	100-240 Volts (L-L), 50-60 Hz
Sensing Mode	RMS, Single- or 3-Phase
Input Requirements	8-36 VDC
Continuous Output	5 VDC @ 100mA max. 5.0 ADC with GM88453 Activator Board
Maximum Output	5 VDC @ 100mA max. 5.0 ADC with GM88453 Activator Board
Transition Frequency	42.0-62.0Hz
Exciter Field Resistance	4-30 Ohms with GM88453 Activator Board
No-Load to Full-Load Voltage Regulation	± 0.5%
Thermal Drift	<0.5% (-40 ° C to 70 ° C) [-40 ° F to 158 ° F] Range
Response Time	Less than 5µS
System Voltage Adjust.	± 10%
Voltage Adjustment	Controller Menu Knob
Remote Voltage Adjustment	not available
Paralleling Capability	not available
VAR/PF Control Input	not available

### Integral Voltage Regulator with APM402/Decision-Maker® 3000 Controller

- The APM402/Decision-Maker® 3000 digital display and pushbutton/rotary dial provide access to data. A two-line LCD display provides complete and concise information. A two-line vacuum fluorescent display provides complete and concise information.
- The Decision-Maker® 3000 graphical display and pushbutton/rotary dial provide access to data. A five-line, 35-characters per line LCD display provides complete and concise information include gain, ramp rate, reactive droop, VAR control (P, I, D gains) and PF control (P, I, D gains).
- The controllers provide ISO 8528-5, Class G3, compliance for transient response on some 20-300 kW generator set models. Both controllers support Modbus®.
- These controllers can control Fast Response™ II, Fast Response™ X, and wound field alternators using the GM88453 activator board.

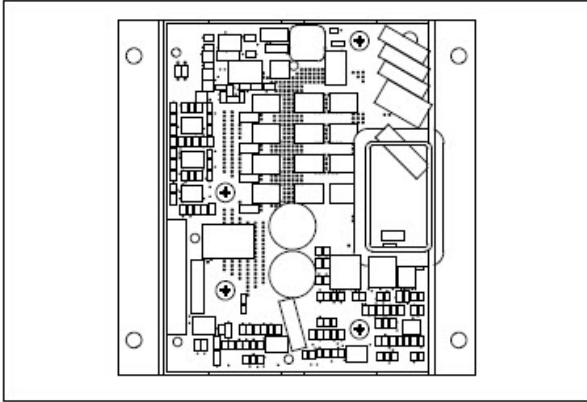
#### Voltage Regulator Menu

- Voltage adjustment, ± 10% of system voltage
- V/Hz cut-in, 42-62 Hz
- Underfrequency unload slope, 0-10% of system voltage

#### Jumpers

- L1-L2 volts
- L2-L3 volts (3-phase)
- L3-L1 volts (3-phase)
- L1-N volts
- L2-N volts
- L3-N volts (3-phase)

# KOHLER®



- Interfaces between the controller and alternator assembly using rotor field leads, auxiliary power windings, and optic board leads.
- Allows the Decision-Maker® controllers the ability to control a wound-field alternator using the same control signal as Fast Response™ alternator.
- Permits the generator set controller to control the current to the exciter field of a wound-field excited alternator.
- Contains two isolated relay driver outputs (RDO) rated at 250 mA. Provides RDO outputs indicating a field over-excitation condition and that the alternator is supplying voltage to the activator.

Modbus® is a registered trademark of Schneider Electric.

**KOHLER®**

# Alternator Data

## TECHNICAL INFORMATION BULLETIN

### Alternator Data Sheet

Alternator Model: **4M4019**

(8-22-11)

Kilowatt ratings at		1800 RPM	60 Hertz		12 LEADS	Standard 3 phase			
kW (kVA)		3 Phase			0.8 Power Factor		Dripproof or Open Enclosure		
Voltage*	Class B	Class F					Class H		
	80° C ∅ Continuous	90° C ∅ Lloyds	95° C ∅ ABS	105° C ∅ British Standard	105° C ∅ Continuous	130° C ∅ Standby	125° C ∅ British Standard	125° C ∅ Continuous	150° C ∅ Standby
480/240	305 (381)	325 (406)	335 (419)	350 (438)	350 (438)	375 (469)	375 (469)	375 (469)	415 (519)
460/230	305 (381)	325 (406)	330 (413)	345 (431)	345 (431)	370 (463)	370 (463)	370 (463)	395 (494)
440/220	300 (375)	310 (388)	320 (400)	335 (419)	335 (419)	360 (450)	360 (450)	360 (450)	375 (469)
416/208	290 (363)	300 (375)	310 (388)	325 (406)	325 (406)	350 (438)	350 (438)	350 (438)	360 (450)
380/190	275 (344)	285 (356)	300 (375)	305 (381)	305 (381)	305 (381)	305 (381)	305 (381)	305 (381)

① Rise by resistance method, Mil-Std-705, Method 680.1b.

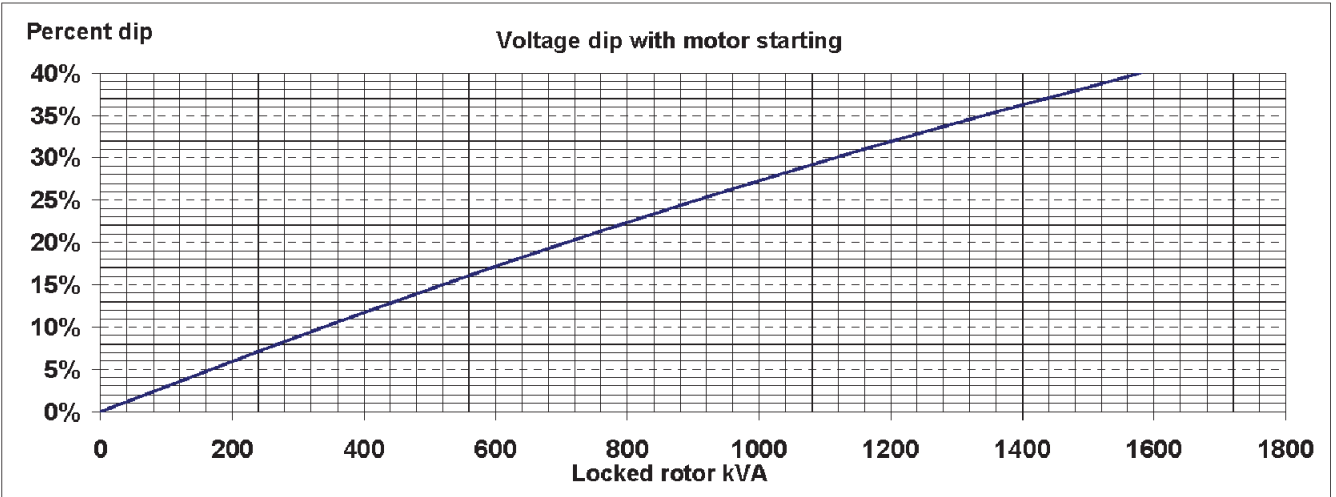
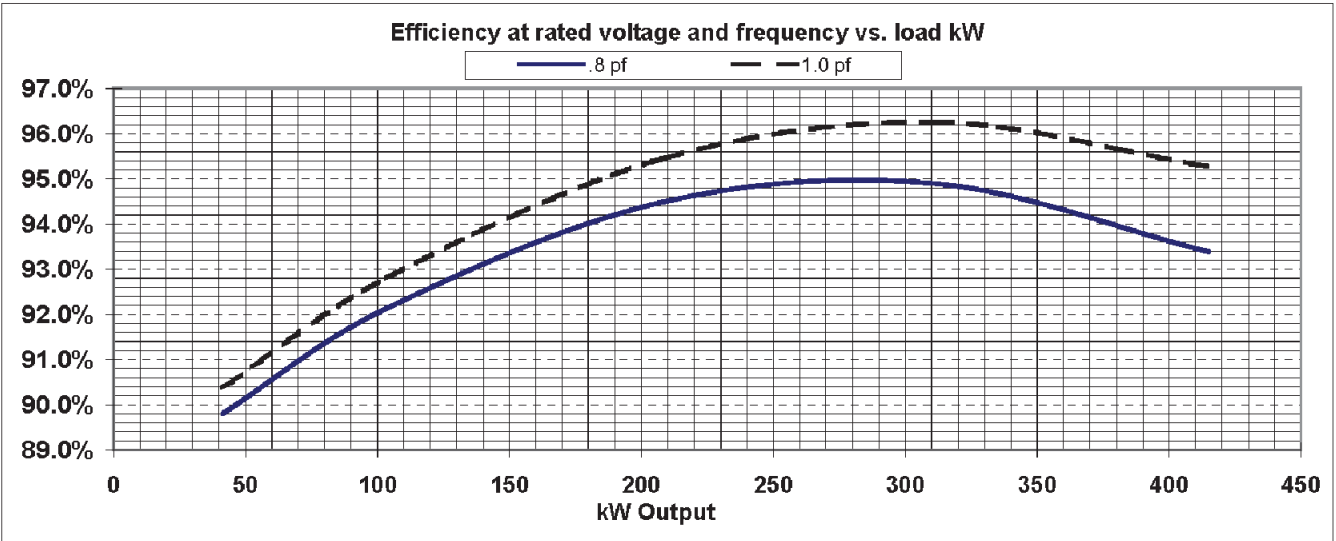
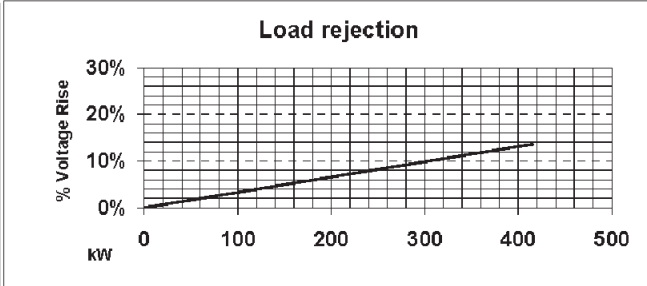
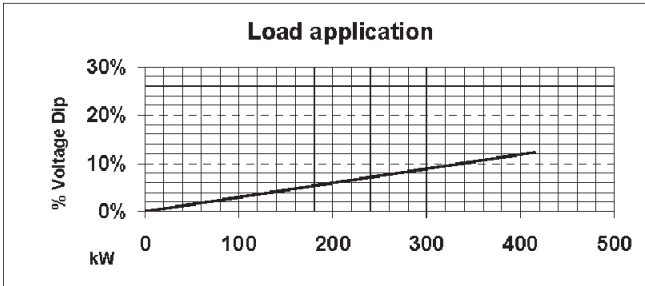
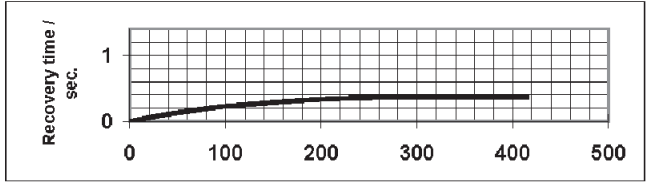
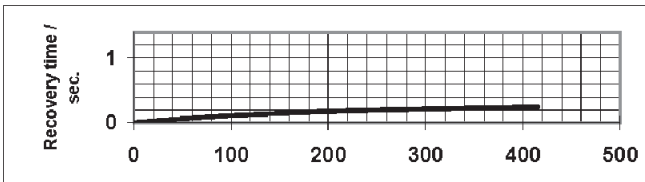
② British Standard Rating per BS 5000

Submittal Data: 480 Volts*, 375.2 kW, 469 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase			STD. CONNECTION		
Mil-Std-705B			Mil-Std-705B		
Method	Description	Value	Method	Description	Value
301.1b	Insulation Resistance	>1.5 Meg	505.3b	Overspeed	2250 RPM
302.1a	High Potential Test		507.1c	Phase Sequence CCW-ODE	ABC
	Main Stator	2000 Volts	508.1c	Voltage Balance, L-L or L-N	0.20%
	Main Rotor	1500 Volts	601.4a	L-L Harmonic Maximum - Total (Distortion Factor)	5.0%
	Exciter Stator	1500 Volts	601.4a	L-L Harmonic Maximum - Single	3.0%
	Exciter Rotor	1500 Volts	601.1c	Deviation Factor	5.0%
	PMG Stator	1500 Volts	---	TIF (1960 Weightings)	< 50
401.1a	Stator Resistance, Line to Line		---	THF (IEC, BS & NEMA Weightings)	< 2%
	High Wye Connection	0.014 Ohms	652.1a	Shaft Current	< 0.1 ma
	Rotor Resistance	0.286 Ohms		Main Stator Capacitance to ground	0.019 mfd
	Exciter Stator	22.5 Ohms		<b>Additional Prototype Mil-Std Methods are Available on Request.</b>	
	Exciter Rotor	0.022 Ohms	--	Generator Frame	433
	PMG Stator	2.1 Ohms	--	Type	MAGNAMAXDVR
410.1a	No Load Exciter Field Amps at 240/480 Volts Line to Line	0.75 A DC	--	Insulation	Class H
420.1a	Short Circuit Ratio	0.620	--	Coupling - Single Bearing	Flexible
421.1a	Xd Synchronous Reactance	2.469 pu	--	Amortisseur Windings	Full
		1.213 ohms	--	Excitation	Ext. Voltage Regulated, Brushless
422.1a	X2 Negative Sequence React.	0.197 pu			
		0.097 ohms			
423.1a	X0 Zero Sequence Reactance	0.036 pu			
		0.018 ohms			
425.1a	X'd Transient Reactance	0.111 pu			
		0.055 ohms			
426.1a	X"d Subtransient Reactance	0.096 pu			
		0.047 ohms			
--	Xq Quadrature Synchronous	0.658 pu	--	Cooling Air Volume	1050 CFM
		0.323 ohms			
427.1a	T'd Transient Short Circuit Time Constant	0.075 sec.	--	Heat rejection rate	1318 Btu's/min
428.1a	T"d Subtransient Short Circuit Time Constant	0.008 sec.	--	Full load current	564 amps
430.1a	T'do Transient Open Circuit Time Constant	1.55 sec.	--	Minimum Input hp required	534.0
432.1a	Ta Short Circuit Time Constant of Armature Winding	0.009 sec.	--	Efficiency at rated load :	94.2%
			--	Full load torque	1558 Lb-ft

\* Voltage refers to wye (star) connection, unless otherwise specified.

## TYPICAL DYNAMIC CHARACTERISTICS

Alternator Model: 4M4019

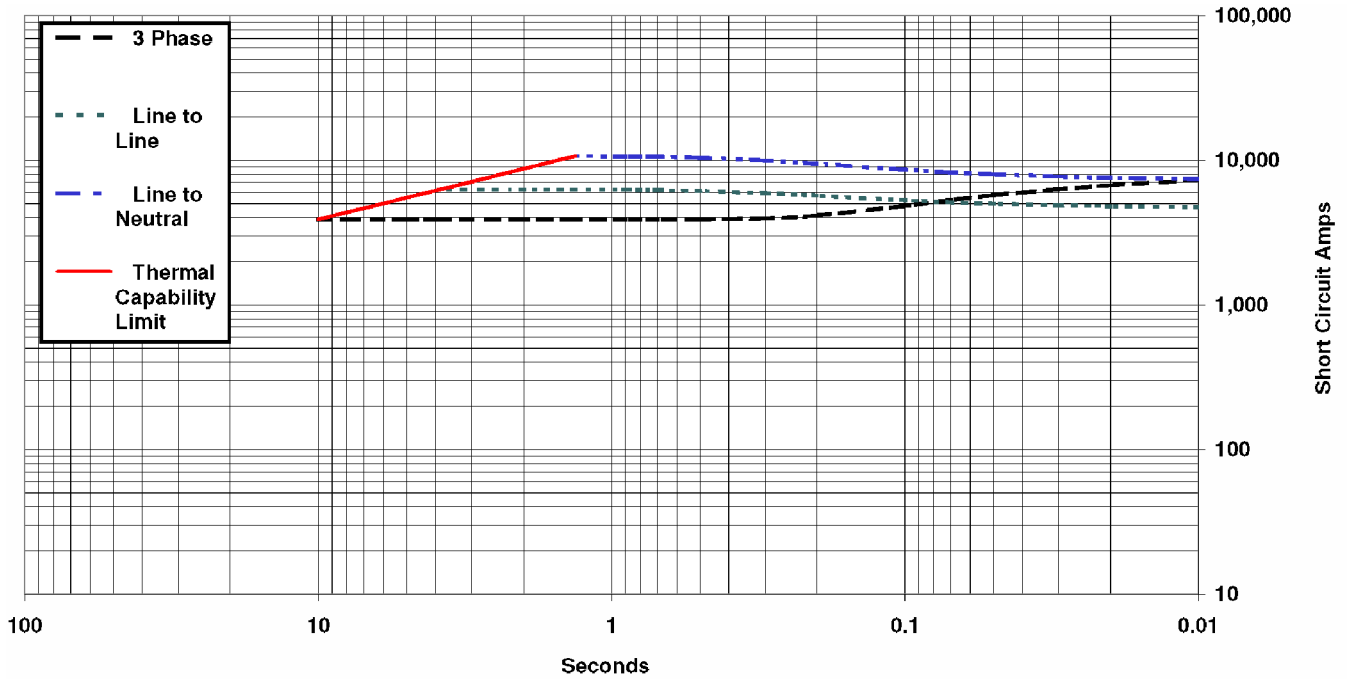


Voltage refers to wye (star) connection, unless otherwise specified.



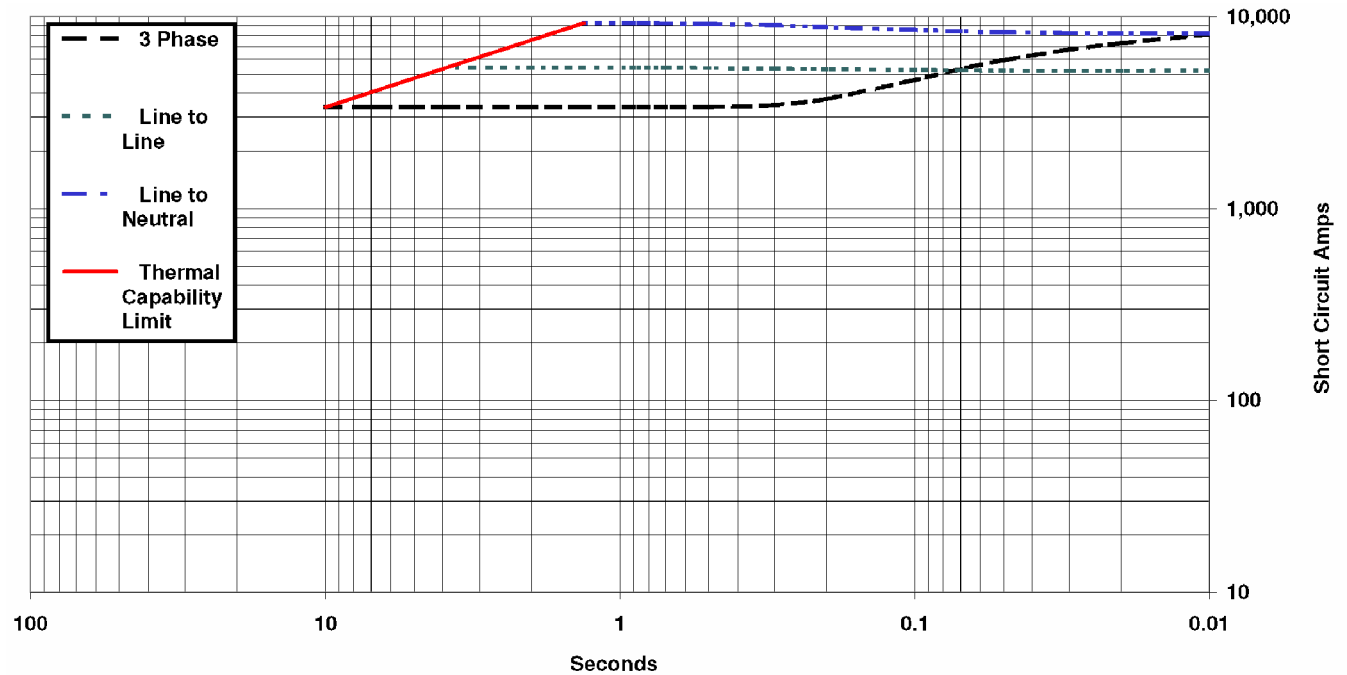
**4M4019, 60 Hz, Low Wye Connection  
SHORT CIRCUIT DECREMENT CURVE**

**Full Load Current:** 1302 Amps    **Steady State S.C. Current:** 3906 Amps    **Max. 3 ph. Symm. S.C. Current:** 10172 Amps



**4M4019, 60 Hz, Delta Connection  
SHORT CIRCUIT DECREMENT CURVE**

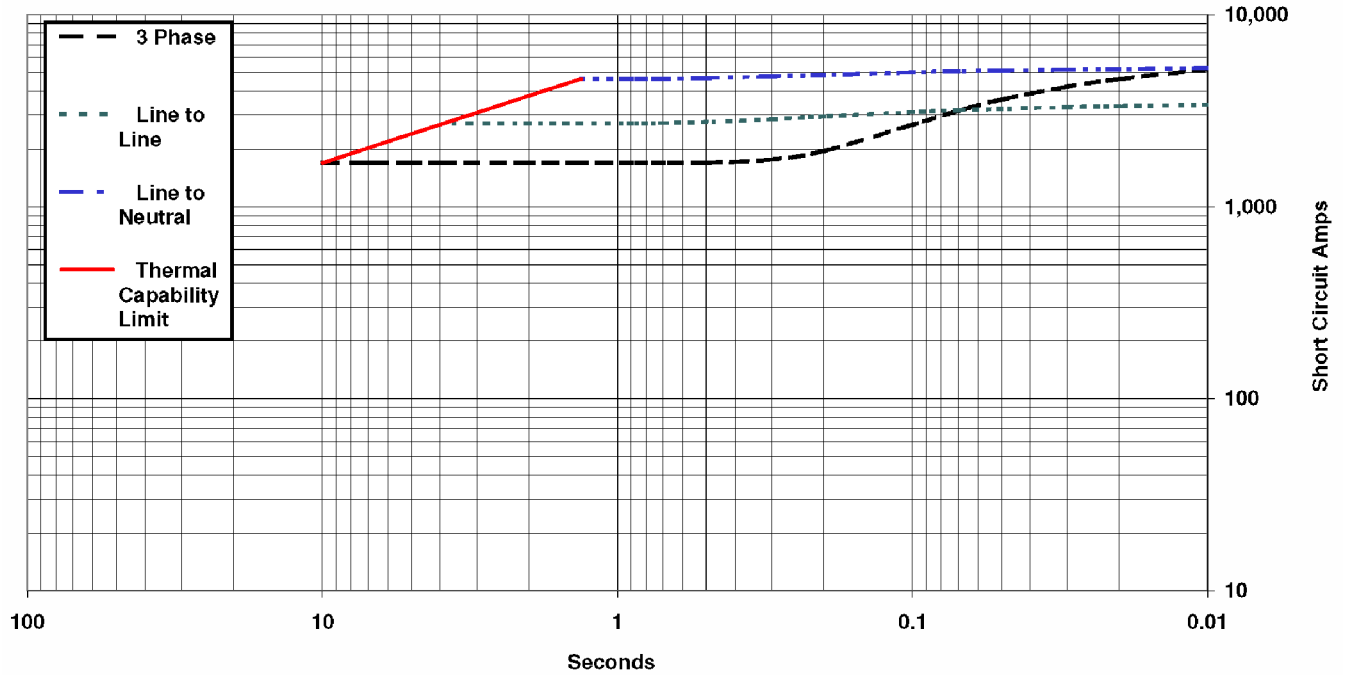
**Full Load Current:** 1128 Amps    **Steady State S.C. Current:** 3384 Amps    **Max. 3 ph. Symm. S.C. Current:** 8813 Amps



NOTE: Symmetrical component values are shown, maximum asymmetrical values are 1.732 times the symmetrical values.

**4M4019, 60 Hz, High Wye Connection  
SHORT CIRCUIT DECREMENT CURVE**

**Full Load Current:** 564 Amps    **Steady State S.C. Current:** 1692 Amps    **Max. 3 ph. Symm. S.C. Current:** 5875 Amps



NOTE: Symmetrical component values are shown, maximum asymmetrical values are 1.732 times the symmetrical values.

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**KOHLER®**

# Cooling Data

**TECHNICAL INFORMATION BULLETIN**

**Generator Set Cooling System Data Sheet**

350REOZJD 60Hz (Standby Duty)	50°C Ambient Temperature Cooling System								
	<b>Total external restriction on open unit<sup>7</sup></b>	Pa <i>(in.H<sub>2</sub>O)</i>	0 (0)	125 (0.5)	187 (0.75)	250 (1)	312 (1.25)	375 (1.5)	<b>Enclosed Units</b>
	<b>Maximum allowable ambient temperature</b>	°C <i>(°F)</i>	52 (126)	49 (120)	47 (117)	45 (113)	44 (111)	NA (NA)	47 (117)
	<b>Cooling system airflow</b>	m <sup>3</sup> /min <i>(ft<sup>3</sup>/min)</i>	435 (15400)	410 (14500)	395 (13900)	380 (13400)	365 (12900)	NA (NA)	NA (NA)

1. The data shown above is the anticipated cooling performance for a typical generator set when following proper installation techniques.
2. Cooling performance is based on operation at 100 m (328 ft.) above sea level. For elevations higher than 100 m (328 ft.), typical cooling performance derate is 1°C (1.8°F) per 250 m (820 ft.).
3. For high ambient conditions, check TIB-101 for the generator set power output derate schedule.
4. Incorrect installation, improper operation, fouling of the cooling system, and other variable conditions may reduce cooling performance.
5. Kohler manufactured sound enclosed models are rated in free air with no additional restriction. Consult factory for other variants or conditions such as additional ducting or hoods.
6. Performance is based on a 50/50 water and ethylene glycol mixture.
7. Total external restriction includes restriction upstream and downstream of the unit – any ducting supplying intake air to the unit and any ducting for the discharge.

**KOHLER®**

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	Level 1 Sound Enclosure	
350REOZJD	60	100% Load	119.5	93.2	91.3	81.7	
		No Load	102.6	90.3	88.4	76.8	

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.

Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Sound Pressure Levels, dB(A)								Overall Level
				Octave Band Center Frequency (Hz)								
				63	125	250	500	1000	2000	4000	8000	
100% Load	7 (23)	Level 1 Sound	3:00	64.0	72.8	67.8	72.1	72.9	70.6	66.1	58.8	79.0
			1:30	61.6	71.0	71.7	75.7	77.2	74.1	70.1	63.8	82.0
			12:00-Engine	65.4	74.0	69.0	77.6	78.0	76.4	72.3	65.0	83.5
			10:30	58.6	70.5	70.8	75.1	77.0	74.8	70.5	63.7	81.8
			9:00	63.8	73.8	70.1	73.9	75.3	73.3	69.3	62.2	81.0
			7:30	61.9	73.0	69.8	75.0	75.6	73.8	68.6	63.5	81.2
			6:00-Alternator	63.5	73.3	71.7	74.7	78.1	79.3	69.0	62.6	83.6
			4:30	61.8	72.3	70.7	72.4	74.0	72.1	65.5	59.2	79.7
8-pos. log avg.			63.0	72.7	70.4	74.9	76.3	75.1	69.4	62.8	81.7	

Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Sound Pressure Levels, dB(A)								Overall Level
				Octave Band Center Frequency (Hz)								
				63	125	250	500	1000	2000	4000	8000	
No Load	7 (23)	Level 1 Sound	3:00	53.4	65.3	69.2	69.1	67.5	61.8	53.9	47.1	74.4
			1:30	53.7	66.4	70.8	69.6	71.1	63.0	55.5	49.4	76.1
			12:00-Engine	53.6	65.0	66.8	70.5	67.4	62.6	56.1	47.3	74.3
			10:30	55.4	67.2	69.6	69.8	69.5	63.9	56.5	49.8	75.6
			9:00	56.6	67.1	70.3	66.7	67.0	63.0	54.8	47.0	74.5
			7:30	54.4	68.7	71.3	69.3	71.0	66.6	59.3	53.9	76.8
			6:00-Alternator	58.2	70.8	70.6	72.3	77.5	75.0	65.2	57.7	81.2
			4:30	56.7	69.0	70.2	70.1	70.6	66.3	58.6	50.9	76.6
8-pos. log avg.			55.6	67.8	70.0	69.9	71.7	68.0	59.2	52.1	76.8	

**KOHLER®**

# Exhaust System Data

## TECHNICAL INFORMATION BULLETIN

### Enclosed Generator Set Exhaust System Data Sheet

Model	Enclosure Type	Consumed Back Pressure (in H2O)	Consumed Back Pressure (in Hg)	Back Pressure Limit(s) (in H2O)	Back Pressure Limit(s) (in Hg)	Flex Exhaust Tube(s)	Silencer	Drawing
350REOZJD	All Weather & Sound Level 1 (SL1) Enclosures	24.0	1.8	16-30	1.2-2.2	GM110933	GM110935	ADV-8189
	All Sound Level 2 (SL2) Enclosures	18.5	1.4	16-30	1.2-2.2	GM110330 Flex GM110329 Cross Tube	GM109791 & GM109792	ADV-8189

1. Total system exhaust back pressure is applicable to generator sets equipped with Kohler standard enclosure packages.
2. For generator sets with multiple exhaust outlets, total system exhaust back pressure value represents each outlet.
3. The total system back pressure should not exceed the manufacturer's recommended limit.
4. The total back pressure only includes exhaust components installed inside the Kohler enclosure. Customers must calculate any additional back pressure caused by piping, extensions, or components added after the silencer outlet. Refer to the installation manual for additional details.



**TECHNICAL INFORMATION BULLETIN**

**Enclosed Generator Set Exhaust System Data Sheet**

Model	Enclosure Type	Consumed Back Pressure (in H2O)	Consumed Back Pressure (in Hg)	Back Pressure Limit(s) (in H2O)	Back Pressure Limit(s) (in Hg)	Flex Exhaust Tube(s)	Silencer	Drawing
350REOZJD	All Weather & Sound Level 1 (SL1) Enclosures	24.0	1.8	16-30	1.2-2.2	GM110933	GM110935	ADV-8189
	All Sound Level 2 (SL2) Enclosures	18.5	1.4	16-30	1.2-2.2	GM110330 Flex GM110329 Cross Tube	GM109791 & GM109792	ADV-8189

1. Total system exhaust back pressure is applicable to generator sets equipped with Kohler standard enclosure packages.
2. For generator sets with multiple exhaust outlets, total system exhaust back pressure value represents each outlet.
3. The total system back pressure should not exceed the manufacturer’s recommended limit.
4. The total back pressure only includes exhaust components installed inside the Kohler enclosure. Customers must calculate any additional back pressure caused by piping, extensions, or components added after the silencer outlet. Refer to the installation manual for additional details.

**KOHLER®**

# Emissions Data



# 350REOZJD

## 60 HZ. DIESEL INDUSTRIAL GENERATOR SET EMISSION DATA SHEET

### ENGINE INFORMATION

Model:	John Deere, 6135HFG84B	Bore:	132mm (5.2 in.)
Nameplate BHP @ 1800 RPM:	538	Stroke:	165mm (6.5 in.)
Type:	4-Cycle, 6 Cylinder, Inline	Displacement:	13.5 L (824 cu. in.)
Aspiration:	Turbocharged, Charge Air-Cooled	EPA Family:	PJDXL13.5146
Compression Ratio	16.0:1	EPA Certificate:	PJDXL13.5146-007

### PERFORMANCE DATA:

Engine bkW @ Stated Load  
 Fuel Consumption (g/kWh)  
 Exhaust Gas Flow (m<sup>3</sup>/min)  
 Exhaust Temperature (°C)

Table 1			
1/4 Standby	1/2 Standby	3/4 Standby	Full Standby
100	201	301	401
249	239	226	212
			68
			547

### EXHAUST EMISSION DATA:

HC (Total Unburned Hydrocarbons)  
 NOx (Oxides of Nitrogen as NO<sub>2</sub>)  
 CO (Carbon Monoxide)  
 PM (Particulate Matter)

Table 2 EPA D2 Cycle 5-mode weighted	
	0.18
	3.56
	1.5
	0.12

Values are in g/kWh unless otherwise noted

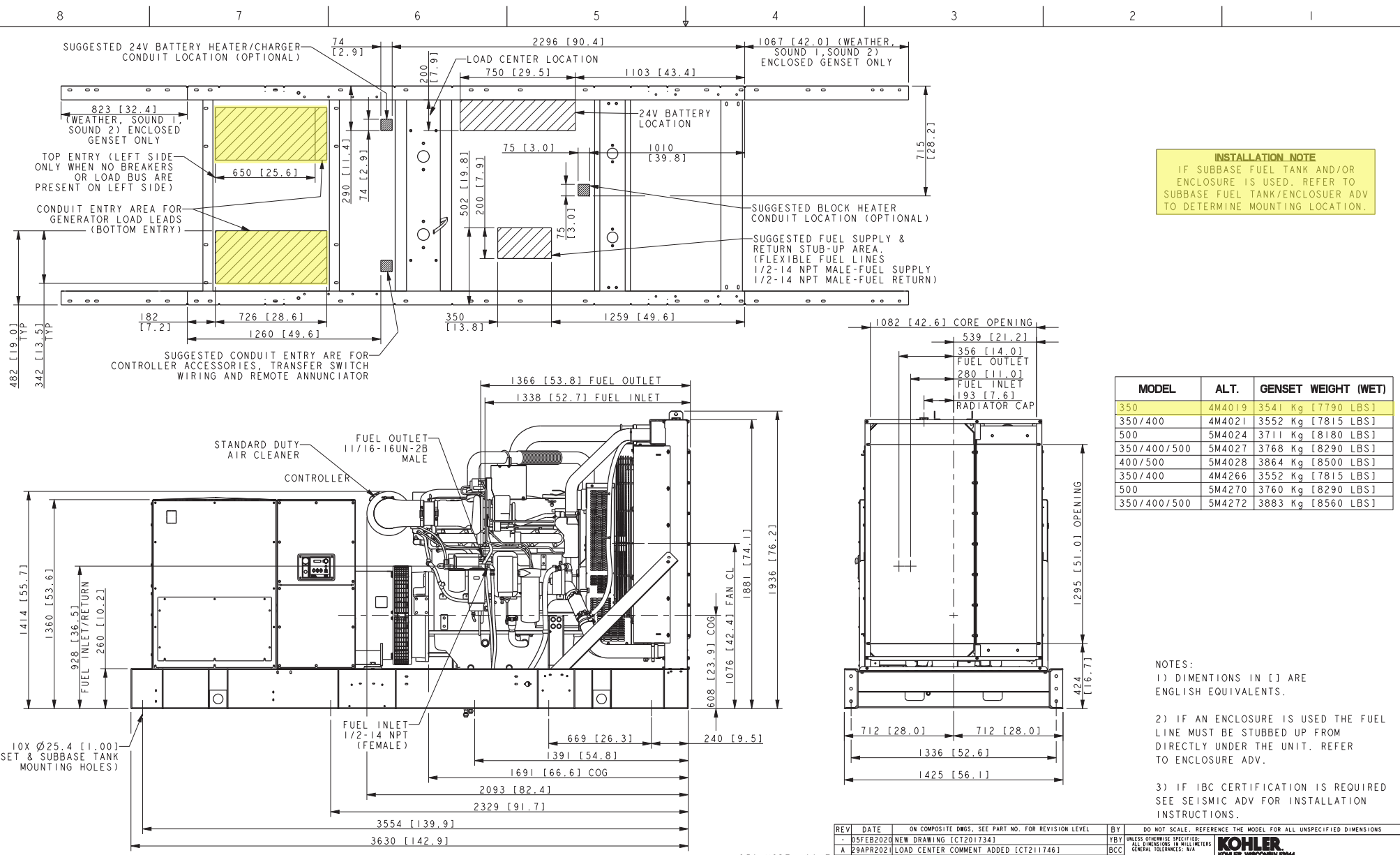
### TEST METHODS AND CONDITIONS

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.

**KOHLER®**

# Dimensional Drawings



**INSTALLATION NOTE**  
 IF SUBBASE FUEL TANK AND/OR ENCLOSURE IS USED, REFER TO SUBBASE FUEL TANK/ENCLOSURE ADV TO DETERMINE MOUNTING LOCATION.

MODEL	ALT.	GENSET WEIGHT (WET)
350	4M4019	3541 Kg [7790 LBS]
350/400	4M4021	3552 Kg [7815 LBS]
500	5M4024	3711 Kg [8180 LBS]
350/400/500	5M4027	3768 Kg [8290 LBS]
400/500	5M4028	3864 Kg [8500 LBS]
350/400	4M4266	3552 Kg [7815 LBS]
500	5M4270	3760 Kg [8290 LBS]
350/400/500	5M4272	3883 Kg [8560 LBS]

- NOTES:
- 1) DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.
  - 2) IF AN ENCLOSURE IS USED THE FUEL LINE MUST BE STUBBED UP FROM DIRECTLY UNDER THE UNIT. REFER TO ENCLOSURE ADV.
  - 3) IF IBC CERTIFICATION IS REQUIRED SEE SEISMIC ADV FOR INSTALLATION INSTRUCTIONS.

350 MODEL 60HZ  
 4M4019, 4M4021, 5M4027, 4M4266, 5M4272  
 400 MODEL 60HZ  
 4M4021, 5M4027, 5M4028, 4M4266, 5M4272  
 500 MODEL 60HZ  
 5M4024, 5M4027, 5M4028, 5M4270, 5M4272  
 RECONN. & 600V ALTERNATORS  
 JOHN DEERE 6135HF, TIER III

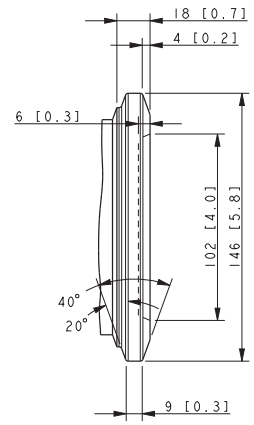
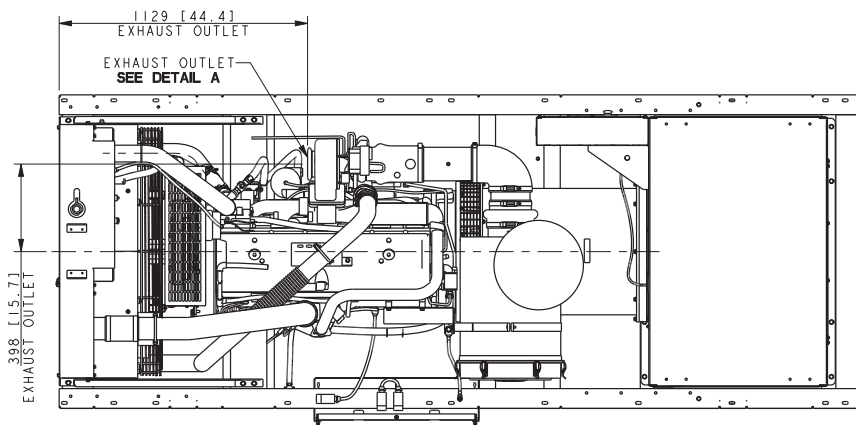
REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS
	05FEB2020	NEW DRAWING [CT201734]	YBY	UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN MILLIMETERS
A	29APR2021	LOAD CENTER COMMENT ADDED [CT211746]	BCC	GENERAL TOLERANCES: N/A

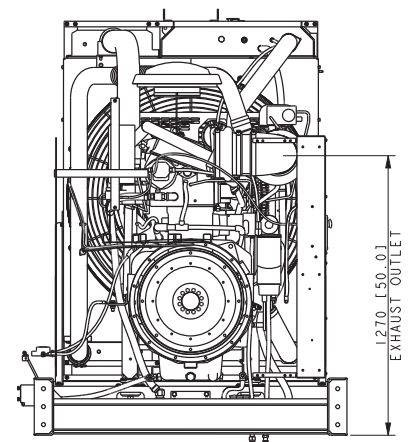
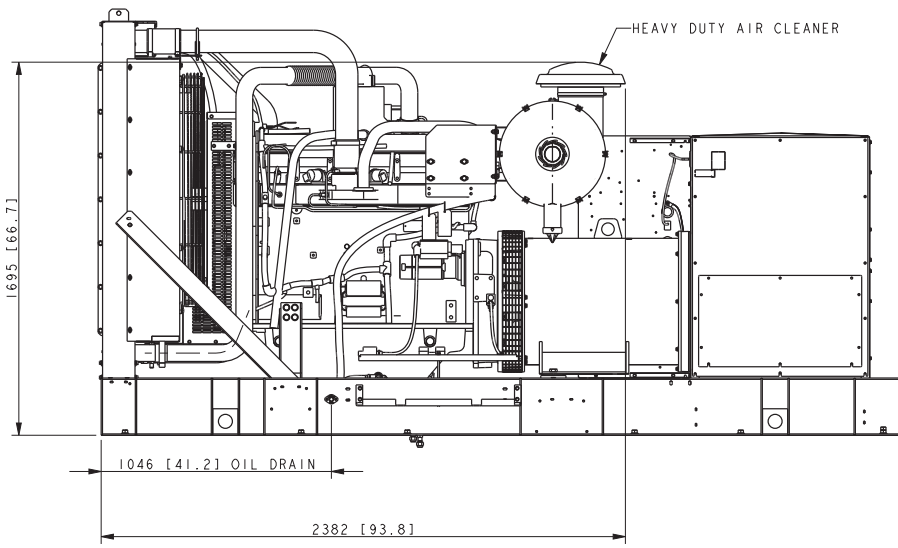
APPROVALS	DATE	<p><b>KOHLER</b>          KOHLER, WISCONSIN 53044          THIS DRAWING IN DESIGN AND DETAIL IS KOHLER CO. PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH KOHLER CO. WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.</p>
DRIVER	YBY 05FEB2020	
CHECKED	KJB 05FEB2020	
APPROVED	DMS 05FEB2020	

TITLE	DIMENSION PRINT, 350-500
SCALE	NA
CAD NO.	
SHEET	1 of 2
REV	ADV-9193



EXHAUST OUTLET  
DETAIL A

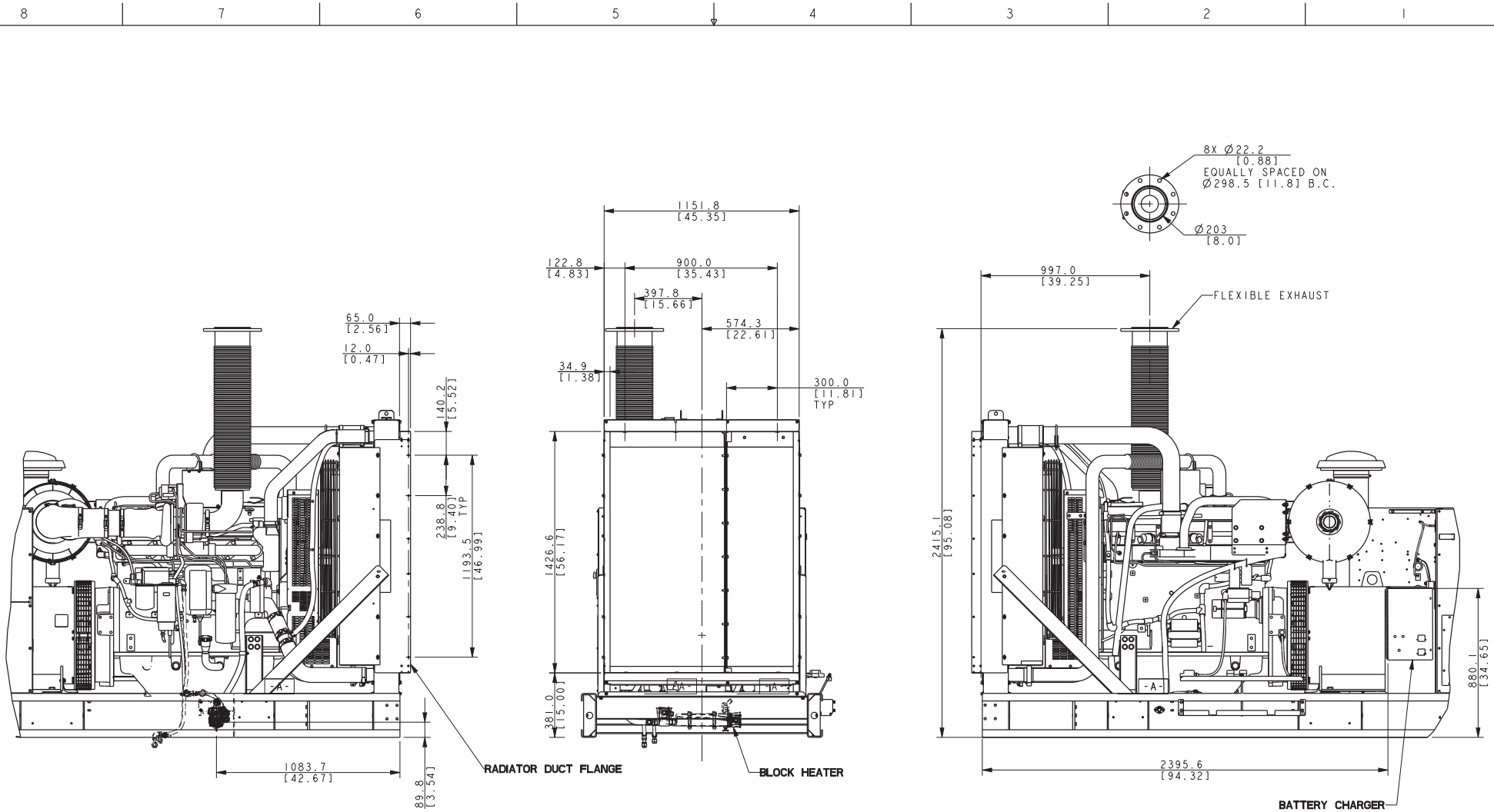


J-BOX HIDDEN FOR CLARITY

DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

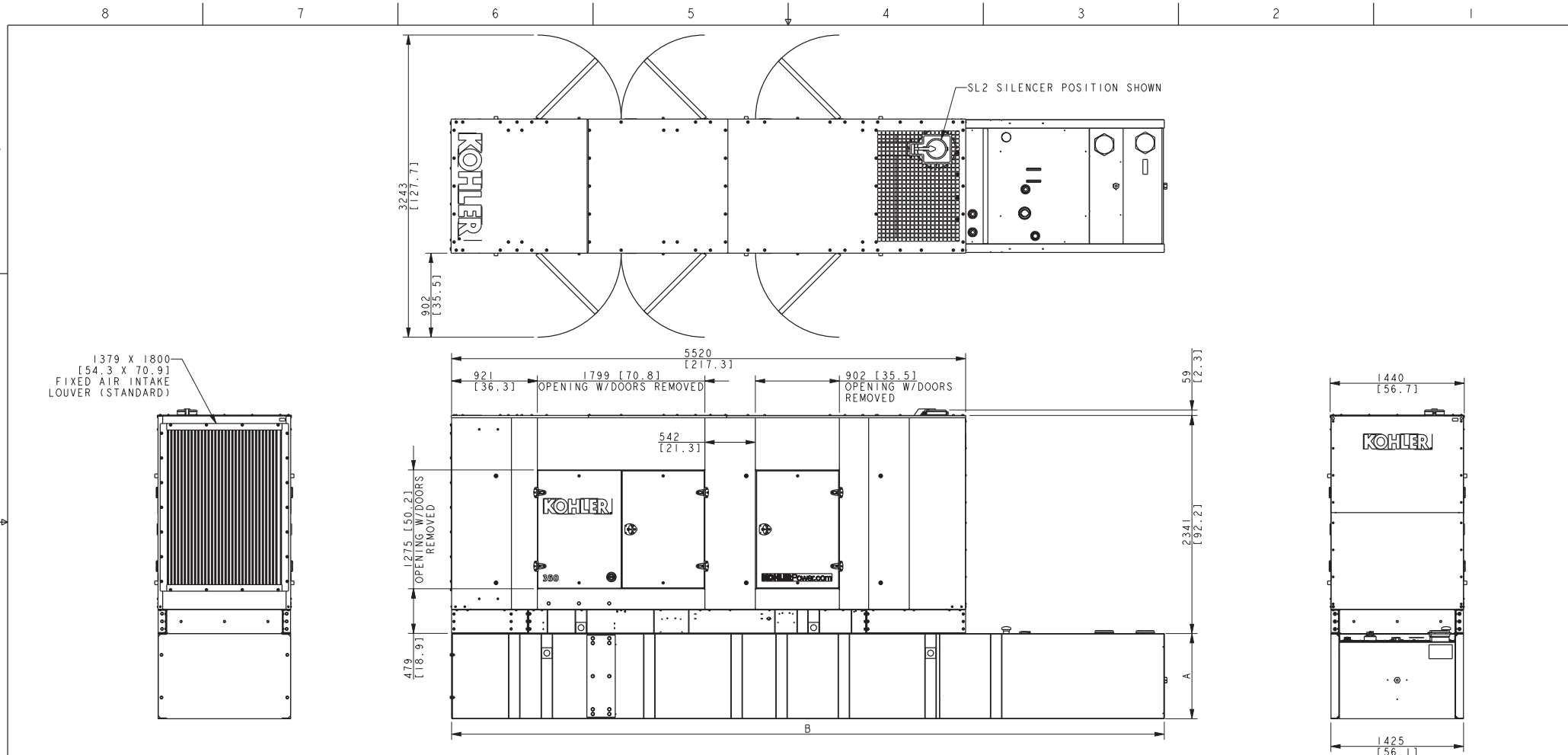
350 MODEL 60HZ  
4M4019, 4M4021, 5M4027, 4M4266, 5M4272  
400 MODEL 60HZ  
4M4021, 5M4027, 5M4028, 4M4266, 5M4272  
500 MODEL 60HZ  
5M4024, 5M4027, 5M4028, 5M4270, 5M4272  
RECONN. & 600V ALTERNATORS  
JOHN DEERE 6135HF, TIER III

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS
1	05FEB2020	NEW DRAWING [CT201734]	YBY	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A
				<p><b>KOHLER</b> KOHLER, WISCONSIN 53044 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.</p>
APPROVALS				
DRAWN BY 05FEB2020				
CHECKED KJB 05FEB2020				
APPROVED DMS 05FEB2020				<p>TITLE: <b>DIMENSION PRINT, 350-500</b> <b>REOZJC/D</b></p> <p>SCALE: NA CAD NO. SHEET 2 of 2 PART NO. <b>ADV-9193</b></p>



350 MODEL 60 HZ  
4M4019, 4M4021, 5M4027, 4M4266, 5M4272  
400 MODEL 60 HZ  
4M4021, 5M4027, 5M4028, 4M4266, 5M4272  
500 MODEL 60 HZ  
5M4024, 5M4027, 5M4028, 5M4270, 5M4272  
RECONN. & 600V ALTERNATORS  
JOHN DEERE 6135HF, TIER III

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 25 DIMENSIONS ARE IN MILLIMETERS 27 TOLERANCES ARE:	TITLE
-	10-22-12	NEW DRAWING [CT28128]	KNN	±.13 ± 0.25 ±.13 ± 0.25 ANGLES ± 0° 30' / MAX.	<b>KOHLER CO.   METRIC   PRO-E</b>
A	05-06-14	(D-3) 871, I DIM. REMOVED & 997.0 DIM. ADDED [CT80055]	SSH		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.
					<b>DIMENSION PRINT, 350-500 REOZJB ACCESSORY</b>
					SCALE 0.09   CAD NO.   SHEET 1 of 1
					APPROVALS DATE DRAWN KNN 10-22-12 CHECKED DJV 10-22-12 APPROVED JDZ 10-22-12
					DWG NO. <b>ADV-8527</b>   <b>D</b>



**TANK INFORMATION**

LITERS [GALLONS]	MIN HOURS	GENSETS	DIM A MM [INCH]	DIM B MM [INCH]	TANK WEIGHT KG [LBS] (NO FUEL)
1530 [404]	12 HOURS	350-400KW	406.4 [16.0]	5760.8[226.8]	1110 [2446]
1771 [468]	12 HOURS	500KW	457.2 [18.0]	5760.8[226.8]	1158 [2554]
2930 [774]	24 HOURS	350-400KW	762.0 [30.0]	5760.8[226.8]	1401 [3089]
3384 [894]	24 HOURS	500KW	838.2 [33.0]	5760.8[226.8]	1484 [3271]
4394 [1161]	36 HOURS	350-400KW	914.4 [36.0]	6459.8[254.3]	1789 [3945]
5047 [1333]	36 HOURS	500KW	914.4 [36.0]	7094.8[279.3]	1986 [4379]
1530 [404]	12 HOURS STATE	350-400KW	381.0 [15.0]	6713.8[264.3]	1299 [2864]
1771 [468]	12 HOURS STATE	500KW	431.8 [17.0]	6713.8[264.3]	1333 [2939]
2930 [774]	24 HOURS STATE	350-400KW	660.4 [26.0]	6713.8[264.3]	1547 [3411]
3384 [894]	24 HOURS STATE	500KW	736.6 [29.0]	6713.8[264.3]	1630 [3594]
4394 [1161]	36 HOURS STATE	350-400KW	914.4 [36.0]	6891.6[271.3]	1847 [4072]
5047 [1333]	36 HOURS STATE	500KW	914.4 [36.0]	7653.6[301.3]	2094 [4616]

350-500 REOZJC/D		KG [LBS]
STEEL SOUND L2 ENCLOSURE WEIGHT		1000 [2205] APPROX
ALUM. SOUND L2 ENCLOSURE WEIGHT		590 [1300] APPROX
STEEL SOUND L1 ENCLOSURE WEIGHT		870 [1920] APPROX
ALUM. SOUND L1 ENCLOSURE WEIGHT		460 [1015] APPROX
STEEL WEATHER ENCLOSURE WEIGHT		850 [1875] APPROX

350-500KW REOZJC/D  
STEEL & ALUMINUM ENCL.  
12 - 36 HOUR TANKS

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS
-	25NOV2019	NEW DRAWING [CT200393]	YBY	
A	17AUG2021	SEE SHEET 6 & 7 [CT214138]	RNN	
B	1NOV2021	SHEET 8 ADDED; SEE SHEET 7 & 8 [CT215771]	SAK	
C	14DEC2021	SHEET 9 & 10 ADDED [CT216616]	MVT	

**KOHLER**  
KOHLER WISCONSIN 8384

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TITLE: **DIMENSION PRINT,**  
**350-500REOZJC/D ENCL. & TANKS**

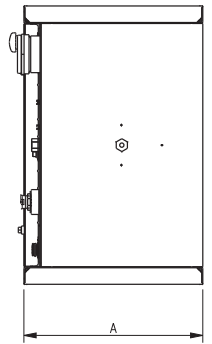
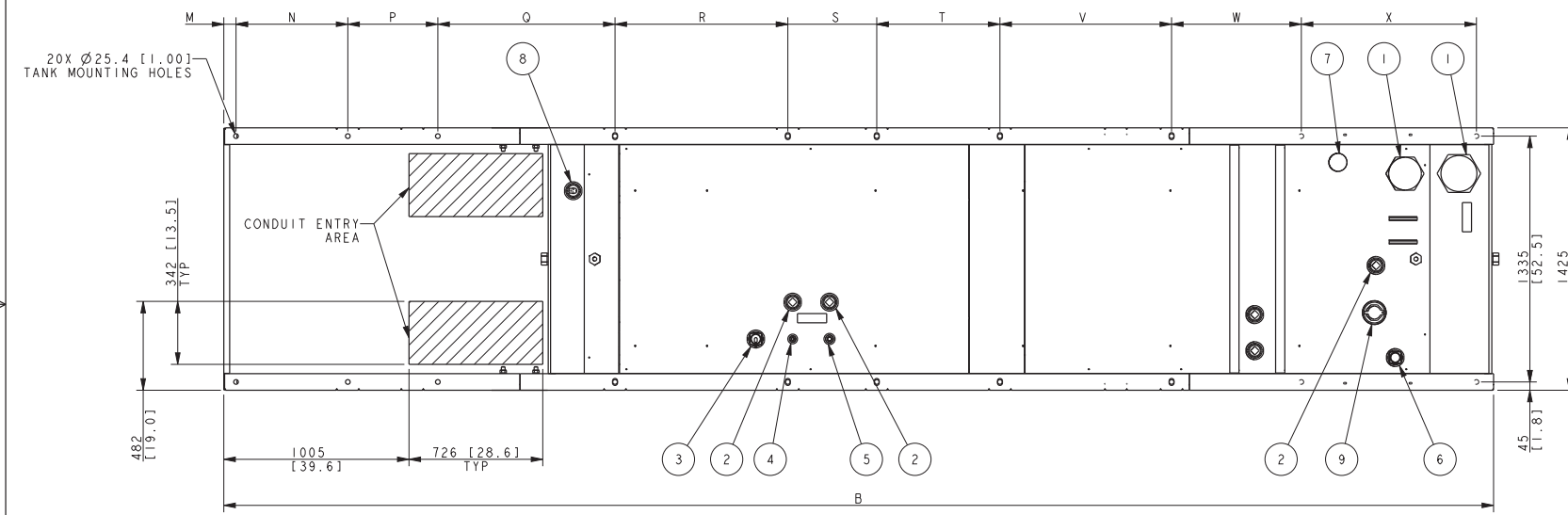
SCALE: 0.05 CAD NO. [ ] SHEET 1 of 10

APPROVALS: DATE: [ ]  
DRAWN: YBY 25NOV2019  
CHECKED: KJB 25NOV2019  
APPROVED: DMS 25NOV2019

ADV-9189



TANK INFORMATION					M	N	P	Q	R	S	T	V	W	X
LITERS [GALLONS]	MIN HOURS	GENSETS	DIM A MM [INCH]	DIM B MM [INCH]										
1530 [404]	12 HOURS	350-400KW	406.4 [16.0]	5760.8 [226.8]										
1771 [468]	12 HOURS	500KW	457.2 [18.0]	5760.8 [226.8]										
2930 [774]	24 HOURS	350-400KW	762.0 [30.0]	5760.8 [226.8]									931.5 [36.67]	523.9 [20.63]
3384 [894]	24 HOURS	500KW	838.2 [33.0]	5760.8 [226.8]										
4394 [1161]	36 HOURS	350-400KW	914.4 [36.0]	6459.8 [254.3]									574.6 [22.62]	648.3 [25.52]
5047 [1333]	36 HOURS	500KW	914.4 [36.0]	7094.8 [279.3]	66.3 [2.61]	606.8 [23.89]	488.5 [19.23]	961.7 [37.86]	937.9 [36.93]	482.6 [19.00]	668.6 [26.32]	931.5 [36.67]	577.0 [22.72]	576.6 [22.70]
1530 [404]	12 HOURS STATE	350-400KW	381.0 [15.0]	6713.8 [264.3]									664.2 [26.15]	812.7 [32.00]
1771 [468]	12 HOURS STATE	500KW	431.8 [17.0]	6713.8 [264.3]										
2930 [774]	24 HOURS STATE	350-400KW	660.4 [26.0]	6713.8 [264.3]										
3384 [894]	24 HOURS STATE	500KW	736.6 [29.0]	6713.8 [264.3]									704.3 [27.73]	772.6 [30.42]
4394 [1161]	36 HOURS STATE	350-400KW	914.4 [36.0]	6891.6 [271.3]										950.4 [37.42]
5047 [1333]	36 HOURS STATE	500KW	914.4 [36.0]	7653.6 [301.3]									891.3 [35.09]	821.1 [32.33]



4396 [1161 GAL] 36 HOUR STATE TANK SHOWN.

ITEM	DESCRIPTION
9	FILL CAP, 2" LOCKABLE W/PIPE RISER
8	SWITCH, FUEL IN BASIN TOP MTD, 2"
7	VENT, NORMAL
6	GAUGE, FUEL LEVEL, DIRECT READ
5	RETURN, FUEL (3/4" NPT)
4	SUPPLY, FUEL (1/2" NPT)
3	GAUGE, FUEL LEVEL, W/ SENDER
2	PLUG, PIPE (2" NPT)
1	CAP, EMERGENCY VENT

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY
-	25NOV2019	NEW DRAWING [CT200393]	YBY
A	17AUG2021	(C-8) 20X Ø25.4 [1.00] ADDED, SEE SHEET 7 [CT214138]	RNN
B	1NOV2021	SEE SHEET 7 & 8 [CT215771]	SAK
C	14DEC2021	SEE SHEET 1, 9 & 10 [CT216616]	MVT

350-500KW REOZJC/D ENCLOSED  
12 - 36 HOUR TANKS

DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

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TITLE: **DIMENSION PRINT,**  
**350-500REOZJC/D ENCL. & TANKS**

SCALE: 0.08 CAD NO. SHEET 9 of 10  
ADV-9189

APPROVALS: DATE: 25NOV2019  
DRAWN: YBY  
CHECKED: KJB  
APPROVED: DMS

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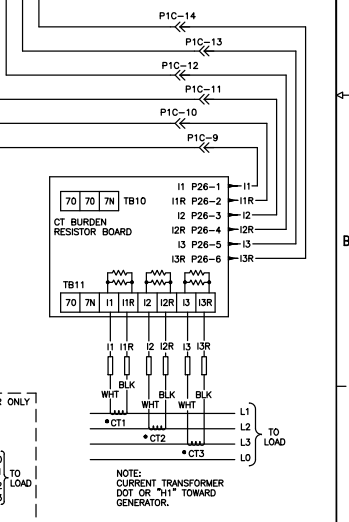
# Wiring Schematics

REV	DATE	REVISION	BY
C	9-23-14	(D-6,-7) OPTIONAL 10 AMP BATTERY CHARGER AND CORRESPONDING POINT TO POINT CONNECTIONS ADDED [C184120]	DFP
D	1-18-15	(B-7,-8) P4-M WAS "SENSOR RETURN", P4-C3 WAS "SECONDARY ANALOG THROTTLE" [C110386]	JBN
E	6-17-15	(C-5) LEAD "2ND" ADDED; (D-6) WHT LEAD CONNECTED TO P50-9 [C115306]	DFP
F	10-4-17	(D-4,-5 & A-3) APM462 TEXT ADDED [C173984]	ABS

**LEGEND**

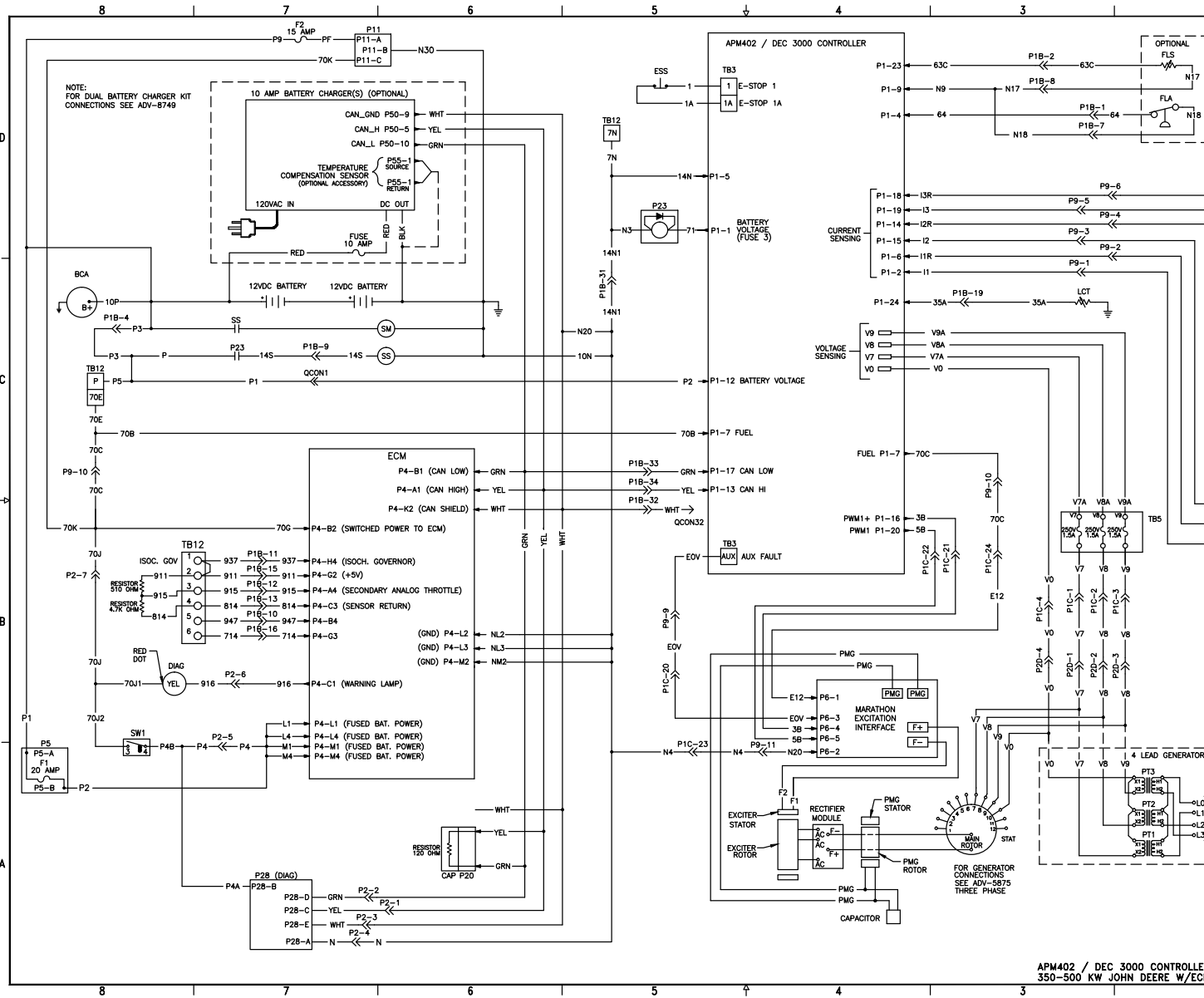
- CU - CONTROLLER INTERFACE UNIT
- CT(#)- CURRENT TRANSFORMER
- D(#)- DIODE
- ESS - EMERGENCY STOP SWITCH
- F# - FUSE
- INSUL(#)- INSULINK
- J(#)- CONNECTOR (JACK)
- LC - LOW COOLANT TEMPERATURE SENDER
- MSA - MANUAL SPEED ADJUST
- P(#)- CONNECTOR (PLUG)
- PL(#)- PANEL LAMP
- PMG - PERMANENT MAGNET GENERATOR
- PT(#)- POTENTIAL TRANSFORMER
- QCON(#)- QUICK CONNECTOR (TERMINAL)
- SM - STARTER MOTOR
- SS - STARTER SOLENOID
- STAT - STATOR
- SW(#)- SWITCH
- TB1 - INTERCONNECTION BOARD TERMINAL BLOCK
- TB2 - A/D TERMINAL BLOCK
- TB3 - OUTPUT TERMINAL BLOCK
- TB4 - DIGITAL INPUT TERMINAL BLOCK
- TB5 - CONTROLLER A.C. FUSE BLOCK
- TB12 - ACCESSORY TERMINAL BLOCK
- CT - CT INPUT TERMINAL BLOCK

⏏ - ENGINE BLOCK GROUND



<b>POWER GENERATION APPROVALS</b> DATE: 2/10/14 DRAWN BY: JBN CHECKED BY: JBN DESIGNED BY: JBN				<b>KOHLER CO.</b> 1200 WEST 150TH AVENUE, SUITE 200 COVINGTON, LA 70038 TEL: 504-535-2000 FAX: 504-535-2001 WWW.KOHLER.COM			
APPROVALS:	DATE:	REV:	BY:	DATE:	REV:		
CRS	11-15-10	1	JBN	11-15-10	1-1		
DFP	11-15-10						
CRS	11-15-10						

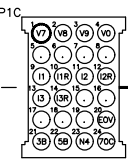
APM402 / DEC 3000 CONTROLLER  
 350-500 KW JOHN DEERE W/ECM  
**DIAGRAM - SCHEMATIC**  
 350-500 KW JD  
 ADV-8000



REV	DATE	REVISION	BY
D	6-17-15	SEE SHEET 2 [C114630]	DFS
E	9-27-17	[D-3 & A-3] APM402 TEXT ADDS; SEE SHEET 2 [C1178572]	AMS
F	3-26-19	SEE SHEET 2 [C119445]	SRH

### P1C CONNECTIONS

- PIN #1 V7 (TB5-V7)
- 2 V8 (TB5-V8)
- 3 V9 (TB5-V9)
- 4 V0 (CONT-V0)
- 5 N/C
- 6 N/C
- 7 N/C
- 8 N/C
- 9 I1 (P8-1)
- 10 I1R (P8-2)
- 11 I2 (P8-3)
- 12 I2R (P8-4)
- 13 I3 (P8-5)
- 14 I3R (P8-6)
- 15 N/C
- 16 N/C
- 17 N/C
- 18 N/C
- 19 N/C
- 20 EDV (P8-9)
- 21 3B (P8-7)
- 22 5B (P8-8)
- 23 N4 (P8-11)
- 24 70C (P8-10)



TO PID SHEET 2

### P9 CONNECTIONS

- PIN #1 I1 (P1-2)
- 2 I1R (P1-6)
- 3 I2 (P1-15)
- 4 I2R (P1-14)
- 5 I3 (P1-19)
- 6 I3R (P1-18)
- 7 3B (P1-16)
- 8 5B (P1-20)
- 9 EDV (TB3-AUX)
- 10 70C (W1)
- 11 N4 (W2)
- 12 N/C

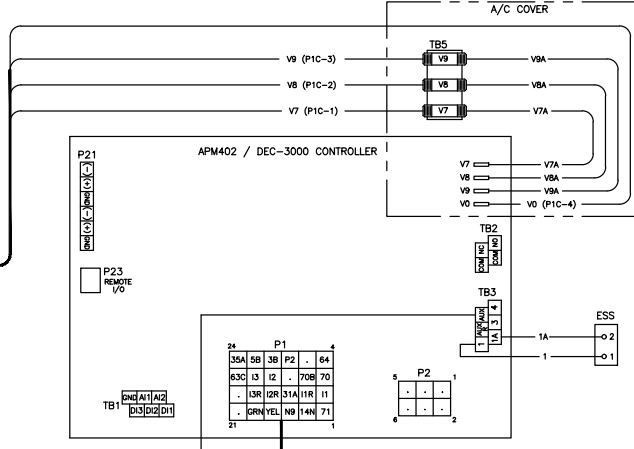


### P8 CONNECTIONS

- PIN #1 I1 (P1C-9)
- 2 I1R (P1C-10)
- 3 I2 (P1C-11)
- 4 I2R (P1C-12)
- 5 I3 (P1C-13)
- 6 I3R (P1C-14)
- 7 3B (P1C-21)
- 8 5B (P1C-22)
- 9 EDV (P1C-20)
- 10 70C (P1C-24)
- 11 N4 (P1C-23)
- 12 N/C

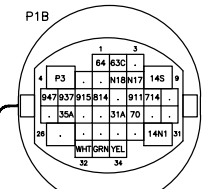


### CONTROLLER COMPARTMENT



### P1 CONNECTIONS

- PIN #1 71 (P23-3)
- 2 I1 (P9-1)
- 3 70 (P18-23)
- 4 64 (P18-1)
- 5 14N (W2)
- 6 I1R (P9-2)
- 7 70B (W1)
- 8 N/C
- 9 N9 (W4)
- 10 31A (P18-22)
- 11 N/C
- 12 P2 (OCON1)
- 13 YEL YELLOW (P18-34)
- 14 I2R (P9-4)
- 15 I2 (P9-3)
- 16 3B (P9-7)
- 17 GRN GREEN (P18-33)
- 18 I3R (P9-6)
- 19 I3 (P9-5)
- 20 5B (P9-8)
- 21 N/C
- 22 N/C
- 23 63C (P18-2)
- 24 35A (P18-19)

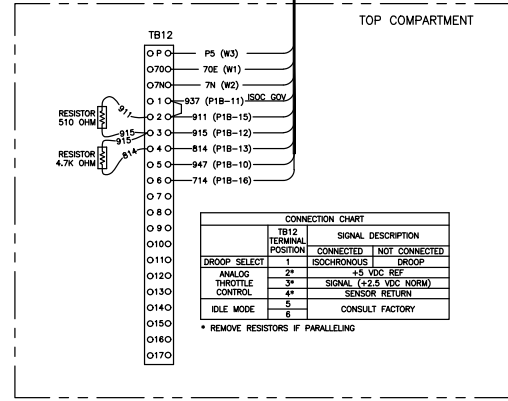


### P1B CONNECTIONS

- PIN #1 64 (P1-4)
- 2 63C (P1-23)
- 3 N/C
- 4 P3 (W3)
- 5 N/C
- 6 N/C
- 7 N18 (W4)
- 8 N17 (W4)
- 9 14S (P23-5)
- 10 947 (TB12-5)
- 11 937 (TB12-1)
- 12 915 (TB12-3)
- 13 814 (TB12-4)
- 14 N/C
- 15 911 (TB12-2)
- 16 714 (TB12-6)
- 17 N/C
- 18 N/C
- 19 35A (P1-24)
- 20 N/C
- 21 N/C
- 22 31A (P1-10)
- 23 70 (P1-3)
- 24 N/C
- 25 N/C
- 26 N/C
- 27 N/C
- 28 N/C
- 29 N/C
- 30 N/C
- 31 14N1 (W2)
- 32 WHT (OCON32)
- 33 GRN (P1-17)
- 34 YEL (P1-13)

### P23 CONNECTIONS

- PIN #1 P (W2)
- 2 N3 (W2)
- 3 71 (P1-1)
- 4 N/C
- 5 14S (P18-9)



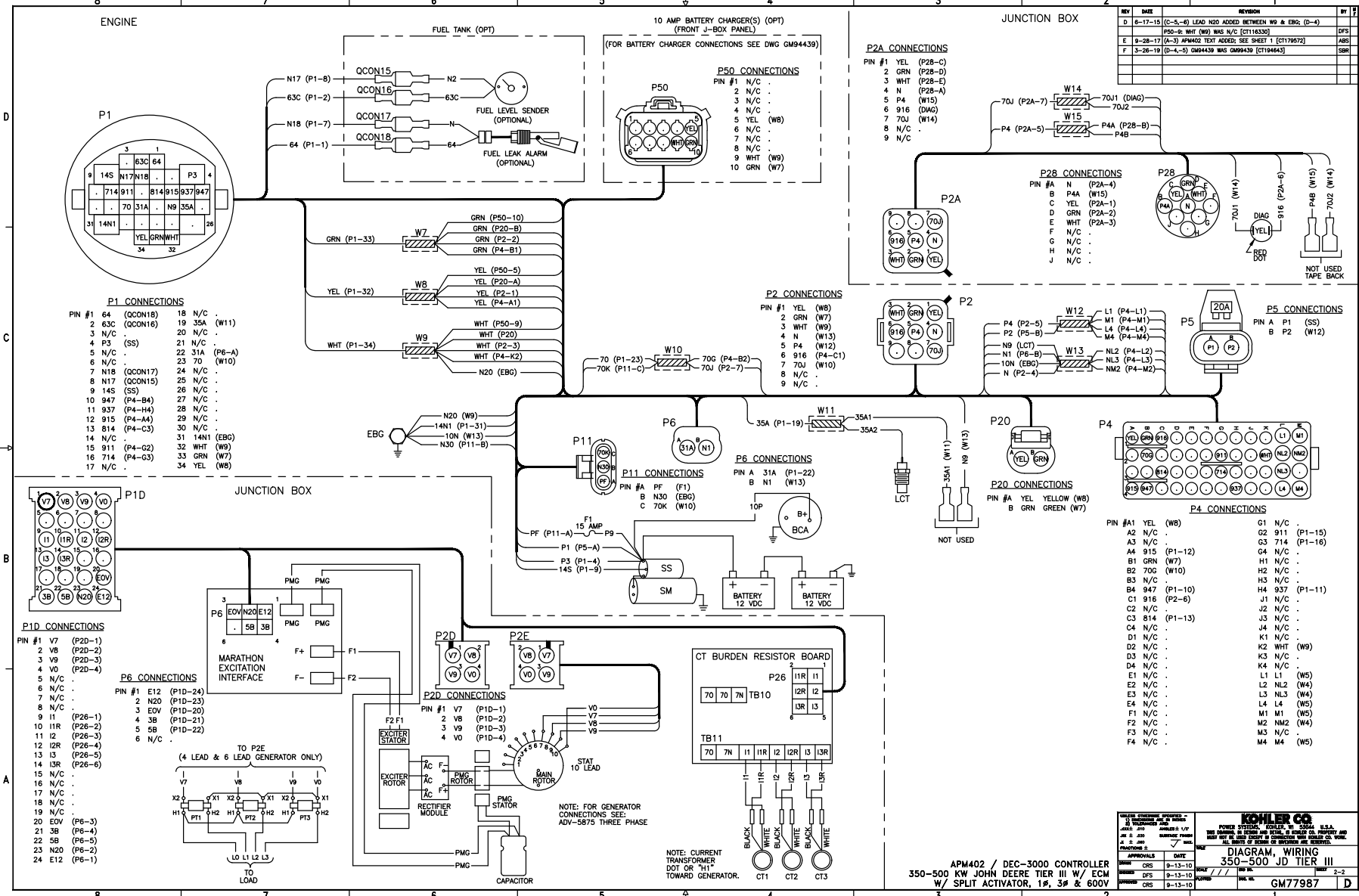
- LEGEND**
- BCA - BATTERY CHARGING ALTERNATOR
  - CLS - COOLANT LEVEL SENDER
  - CT(I) - CURRENT TRANSFORMER
  - D(I) - DIODE
  - EBG - ENGINE BLOCK GROUND
  - ECM - ENGINE CONTROL MODULE
  - ESS - EMERGENCY STOP SWITCH
  - GND - CONTROLLER BOX GROUND
  - IB - INTERFACE BOARD
  - K20 - STARTER RELAY
  - LCT - LOW COOLANT TEMPERATURE SWITCH
  - OPS - OIL PRESSURE SENSOR
  - P(I) - CONNECTOR
  - POND - CONTROLLER PANEL GROUND
  - PL(I) - PANEL LAMP
  - QCON(I) - QUICK CONNECT
  - SM - STARTER MOTOR
  - SS - STARTER SOLENOID
  - STAT - STATOR
  - SW(I) - SWITCH
  - TB1 - INTERCONNECTION BOARD TERMINAL BLOCK
  - TB2 - A/D TERMINAL BLOCK
  - TB3 - OUTPUT TERMINAL BLOCK
  - TB4 - ANALOG INPUT TERMINAL BLOCK
  - TB5 - CONTROLLER A.C. FUSE BLOCK
  - TB10 - ACCESSORY TERMINAL BLOCK
  - TB12 - VSG TERMINAL BLOCK

FOR SCHEMATIC SEE ADV-8000

APM402 / DEC-3000 CONTROLLER  
350-500 KW JOHN DEERE TIER III W/ECM  
W/SPLIT ACTIVATOR, 1#, 3# & 600V

<p><b>KOHLER CO.</b> POWER SYSTEMS, ESCALANTE, UT, U.S.A. THE QUALITY OF KOHLER POWER SYSTEMS IS GUARANTEED BY THE KOHLER QUALITY ASSURANCE PROGRAM. MAY NOT BE USED WITHOUT THE WRITTEN PERMISSION OF KOHLER CO.</p>	
<p><b>DIAGRAM, WIRING</b> <b>350-500 JD TIER III</b></p>	
<p>APPROVALS</p> <p>DATE</p>	<p>DATE</p> <p>BY</p>
<p>CRS 9-13-10</p> <p>DFS 9-13-10</p> <p>CRS 9-13-10</p>	<p>GM77987</p>

REV	DATE	REVISION	BY
D	6-17-15	(C-5-B) LEAD N20 ADDED BETWEEN W9 & EBG; (D-4)	DFPS
E	9-28-17	(A-3) WPM42 TEST ADDR; SEE SHEET 1 (T179672)	ASB
F	3-26-19	(D-4-5) GM94439 WAS GM94319 (T1194643)	SRR



APM402 / DEC-3000 CONTROLLER  
350-500 KW JOHN DEERE TIER III W/ ECM  
W/ SPLIT ACTIVATOR, 1 $\phi$ , 3 $\phi$  & 600V

**KOHLER CO.**  
POWER SYSTEMS GROUP • CHINA, U.S.A.  
1000 KOHLER DRIVE • MILWAUKEE, WI 53015  
TEL: 414-224-2000 • FAX: 414-224-2001  
WWW.KOHLER.COM

DIAGRAM, WIRING  
350-500 JD TIER III  
REV 2-2  
GM77987

**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

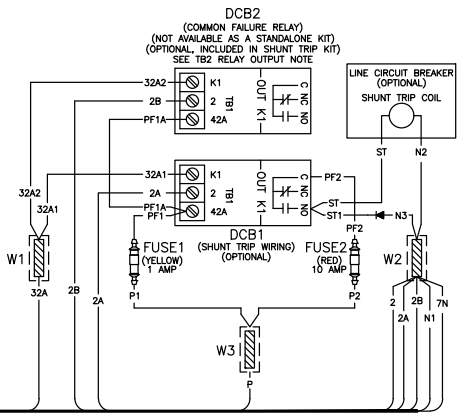
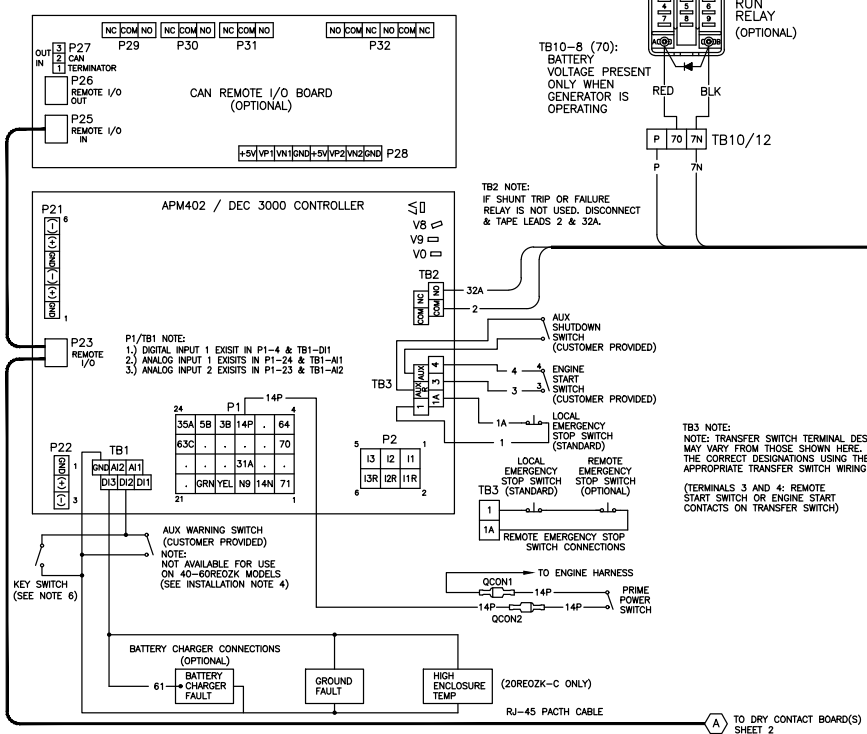
**P28 SINGLE-ENDED (0-5V) ANALOG INPUT CONNECTIONS.**  
 P28-GND AGND ANALOG RETURN  
 P28-VN2 NO CONNECTION  
 P28-VP2 ACH2 SIGNAL  
 P28-+5V SUPPLY (0.05 AMP MAX)  
 P28-GND AGND ANALOG RETURN  
 P28-VN1 NO CONNECTION  
 P28-VP1 ACH1 SIGNAL  
 P28-+5V SUPPLY (0.05 AMP MAX)

**P28 DIFFERENTIAL (+/-3V) ANALOG INPUT CONNECTIONS.**  
 P28-GND AGND ANALOG REFERENCE  
 P28-VN2 ACH2 NEGATIVE DIFFERENTIAL SIGNAL  
 P28-VP2 ACH2 POSITIVE DIFFERENTIAL SIGNAL  
 P28-+5V SUPPLY (0.05 AMP MAX)  
 P28-GND AGND ANALOG RETURN  
 P28-VN1 ACH1 NEGATIVE DIFFERENTIAL SIGNAL  
 P28-VP1 ACH1 POSITIVE DIFFERENTIAL SIGNAL  
 P28-+5V SUPPLY (0.05 AMP MAX)

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

REV	DATE	REVISION	BY
F	04-28-10	(0-2-3) COMMENT "NOT AVAILABLE AS A STANDALONE KIT", "OPTIONAL, INCLUDED IN SHUNT TRIP KIT" ARE ADDED. SEE SHEET 2 (01168997)	SSR
G	2-6-10	[A-B-6, 7, 8] ADDED GROUND FAULT RELAY INPUT; TB1-D11 LOW FUEL PRESSURE WAS EXISTING OVER VOLTAGE (AL3AL2M) [A-B-1, 2, 3] ADDED NOTE 5 AND 6 IN INSTALLATION NOTES [01193015]	SSR

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



**INSTALLATION NOTES:**

- FOR FIELD INSTALLATION A MAXIMUM OF TWO WIRE TERMINALS PER TERMINAL STRIP SCREW IS RECOMMENDED UNLESS OTHERWISE NOTED ON THE WIRING DIAGRAM. DO NOT EXTEND ABOVE THE TERMINAL STRIP BARRIER.
- GENERATOR SETS WITH FUEL TANKS HAVE THE FUEL IN BASIN SWITCH TIED TO DIGITAL INPUT 1 (TB1-D11) VIA P1-4 AND FUEL LEVEL SENDER TIED TO ANALOG INPUT 2 (TB1-AI2) VIA P1-23
- COOLANT LEVEL SENSOR ON ALL GENSETS IS TIED TO ANALOG INPUT 1 (TB1-AI2) VIA P1-24.
- 40-60 REOZK MODELS HAVE COLD START IGNITION RELAY TIED TO DIGITAL INPUT 2 (TB1-DI2)
- GROUND FAULT WARNING : CONNECT TO REMOTE I/O BOARD ON 20REOZK-C.
- KEYSWITCH AVAILABLE ON SELECT MODELS ONLY.

**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-A1 ACH1 NO FUNCTION  
 TB1-A2 ACH2 NO FUNCTION  
 TB1-GND A/DGND ANALOG/DIGITAL RETURN

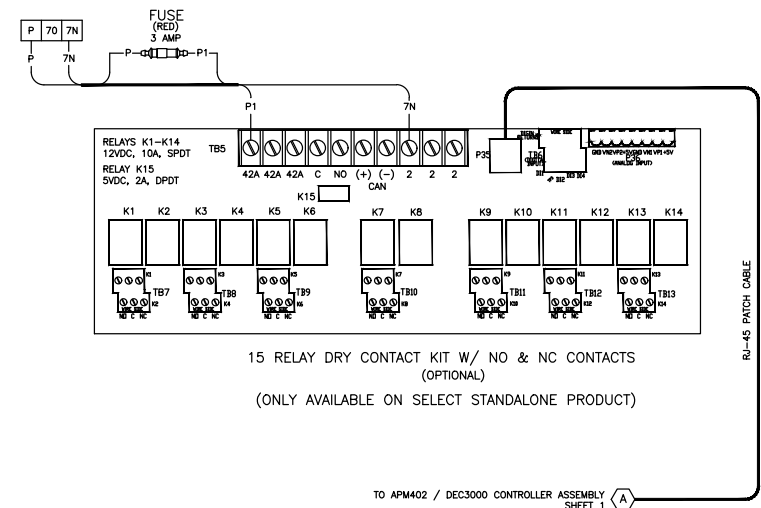
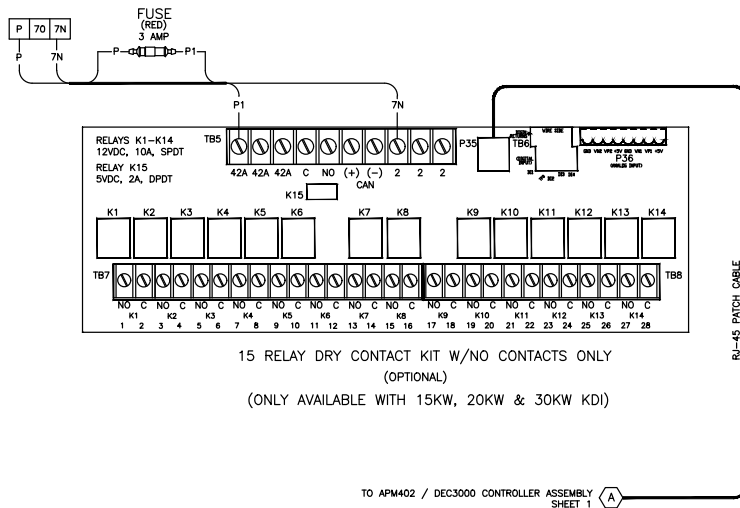
NOTE: TB1 A/D INPUTS MAY BE REDEFINED - FACTORY DEFAULTS LISTED. CONTACT AUTHORIZED DISTRIBUTOR FOR DETAILS.

**TB2 RELAY OUTPUT**  
 TB2-D11 DCH1 (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 DEFAULTS 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.

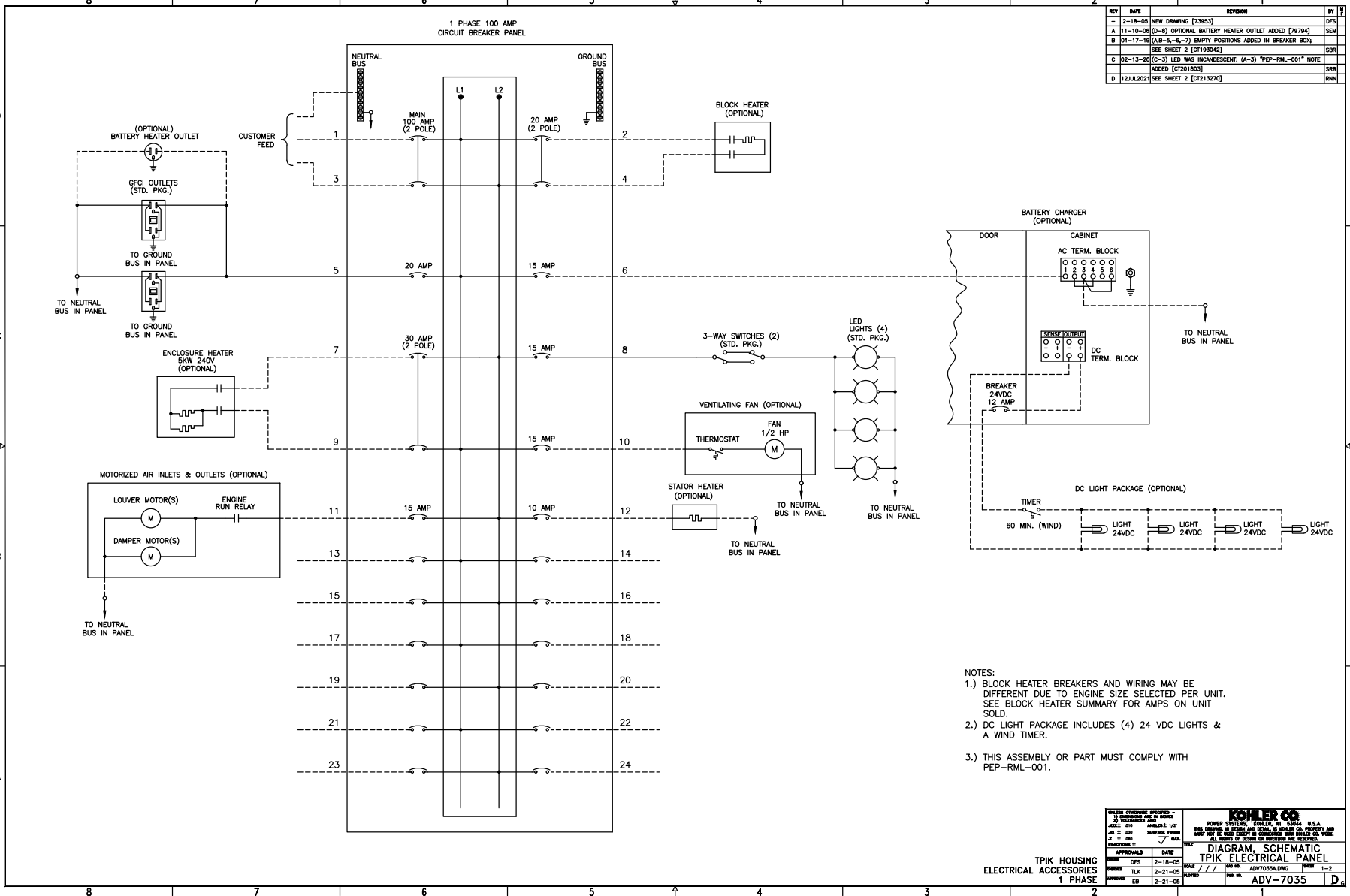
<p>UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES AND FRACTIONS THEREOF. DIMENSIONS IN PARENTHESES ARE ALTERNATE DIMENSIONS. DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED. DIMENSIONS TO SURFACE UNLESS OTHERWISE SPECIFIED. DIMENSIONS TO CENTER UNLESS OTHERWISE SPECIFIED. DIMENSIONS TO SURFACE UNLESS OTHERWISE SPECIFIED.</p>	
<p><b>WORLDWIDE POWER SYSTEMS</b>                  3500 W. 10th Street, Suite 100, Phoenix, AZ 85042 U.S.A.                  PHONE: 602-998-1100 FAX: 602-998-1101                  WWW: WWW.WORLDWIDEPOWER.COM</p>	
<p>DIAGRAM, DEC3000/APM402                  ACCY INTERCONNECTION</p>	
<p>DATE: 09-16-10                  DRAWN: DPS                  CHECKED: CRS                  APPROVED: CRS</p>	<p>DATE: 09-16-10                  DRAWN: DPS                  CHECKED: CRS                  APPROVED: CRS</p>
<p>REV: 1-2                  GM78246</p>	<p>D</p>

REV	DATE	REVISION	BY
F	04-26-18	(8-6-2) COMMENT "APM402 / DEC 3000 ACCESSORIES" IS ADDED	SRH
G	2-6-19	SEE SHEET 1 (C118097)	SRH
G	2-6-19	SEE SHEET 1 (C1182515)	SRH



APPROVALS DESIGNED: DFS 9-18-15 CHECKED: CRS 9-18-15 APPROVED: DFS 9-18-15	DATE 9-18-15 9-18-15 9-18-15	<b>KOHLER CO.</b> POWER SYSTEMS DIVISION 1000 W. WASHINGTON ST. / P.O. BOX 1000 MILWAUKEE, WI 53214 U.S.A. ALL RIGHTS OF OTHERS OR PATENTS ARE RESERVED.	<b>DIAGRAM, DEC3000/APM402 ACCY INTERCONNECTION</b> SHEET 2-2
APPROVED: DFS 9-18-15		DRAWN: DFS 9-18-15	PART NO. GM78246

REV	DATE	REVISION	BY
-	2-18-05	NEW DRAWING [73953]	DFS
A	11-10-06	(D-8) OPTIONAL BATTERY HEATER OUTLET ADDED [78794]	SEM
B	01-17-10	(A-3, 4, 7) EMPTY POSITIONS ADDED IN BREAKER BOX. SEE SHEET 2 [1183042]	SRB
C	02-13-20	(C-3) LED WAS INCANDESCENT; (A-3) "PEP-RML-001" NOTE ADDED [1201803]	SRB
D	12/01/2022	SEE SHEET 2 [1213270]	FRN

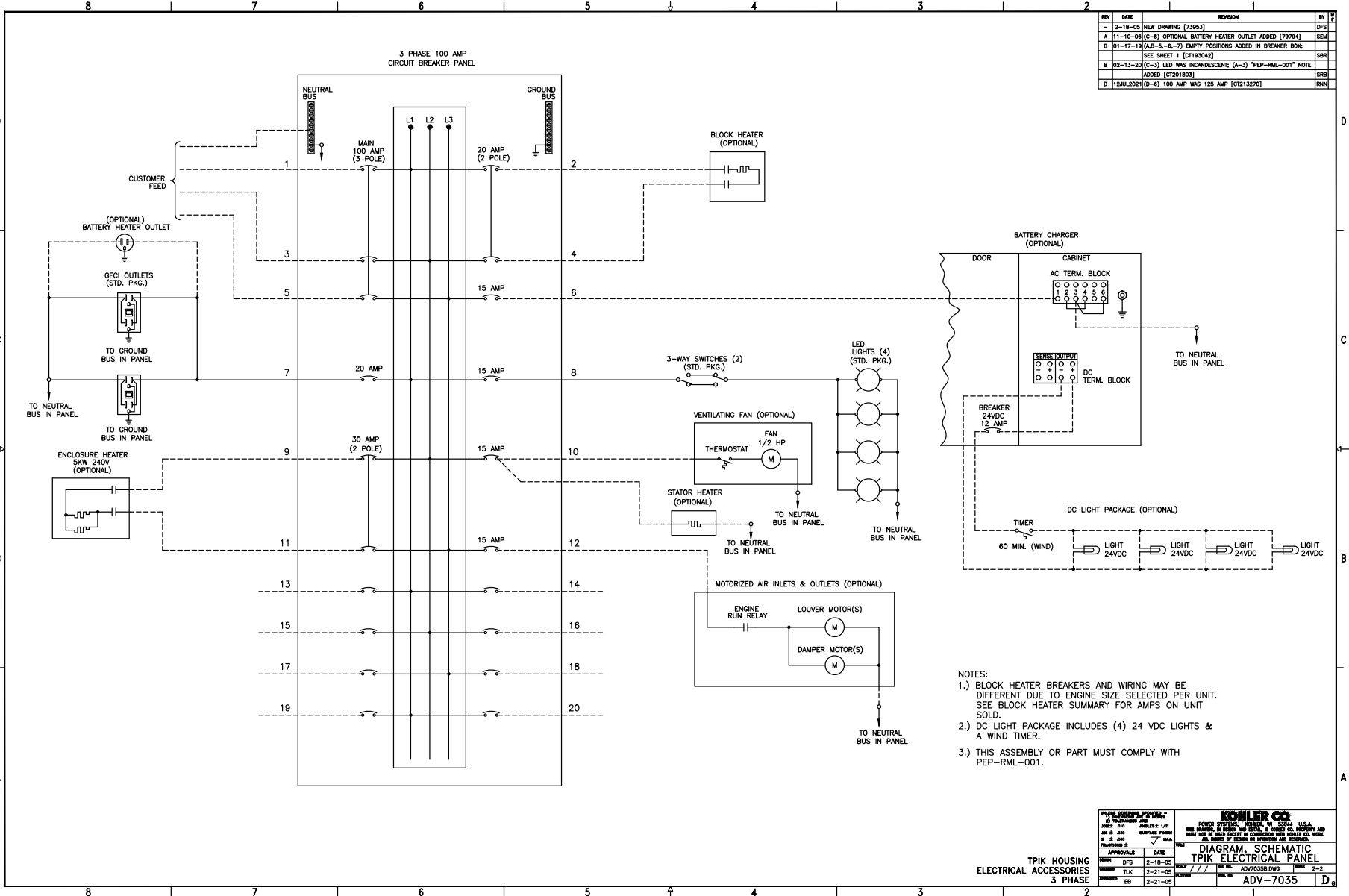


- NOTES:
- 1.) BLOCK HEATER BREAKERS AND WIRING MAY BE DIFFERENT DUE TO ENGINE SIZE SELECTED PER UNIT. SEE BLOCK HEATER SUMMARY FOR AMPS ON UNIT SOLD.
  - 2.) DC LIGHT PACKAGE INCLUDES (4) 24 VDC LIGHTS & A WIND TIMER.
  - 3.) THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001.

TPIK HOUSING ELECTRICAL ACCESSORIES 1 PHASE		<b>KOHLER CO.</b> POWER SYSTEMS - COLEMAN, MO. U.S.A. THIS DRAWING IS DESIGN AND SPEC. IS UNLESS OTHERWISE NOTED AND DOES NOT IMPLY ACCEPTANCE OF ANY LIABILITY OR WARRANTY. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.	
APPROVALS DESIGNED: DFS DRAWN: TLK CHECKED: EB		DATE 2-18-05 2-21-05 2-21-05	
TPIK ELECTRICAL PANEL ADV-7035		TIME: 1-2	



REV	DATE	REVISION	BY
-	2-18-05	NEW DRAWING [73953]	DFS
A	11-10-06	(C-8) OPTIONAL BATTERY HEATER OUTLET ADDED [76794]	SEM
B	01-17-18	(A-3,4,7) EMPTY POSITIONS ADDED IN BREAKER BOX; SEE SHEET 1 [17183042]	SRB
B	02-13-20	(C-3) LED WAS INCANDESCENT; (A-3) "PEP-RML-001" NOTE ADDED [17201803]	SRB
D	12AUL202 [10-6]	100 AMP WAS 125 AMP [17213270]	RNN



**NOTES:**

1.) BLOCK HEATER BREAKERS AND WIRING MAY BE DIFFERENT DUE TO ENGINE SIZE SELECTED PER UNIT. SEE BLOCK HEATER SUMMARY FOR AMPS ON UNIT SOLD.

2.) DC LIGHT PACKAGE INCLUDES (4) 24 VDC LIGHTS & A WIND TIMER.

3.) THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001.

<b>TPIK HOUSING ELECTRICAL ACCESSORIES 3 PHASE</b>		<b>KOHLER CO.</b>	
<small>DESIGNED BY J. K. COLEMAN DRAWN BY M. J. GARDNER CHECKED BY M. J. GARDNER DATE 2-18-05</small>	<small>APPROVED BY D. S. FARR DATE 2-21-05</small>	<small>FOR USE WITH KOHLER GENERATORS ONLY SEE LISTING IN SPECIFICATIONS FOR LIMITED WARRANTY AND OTHER INFORMATION SEE KOHLER WEBSITE WWW.KOHLER.COM OR CALL 1-800-451-4243 OR CONTACT YOUR LOCAL KOHLER SALES OFFICE</small>	<small>FOR USE WITH KOHLER GENERATORS ONLY SEE LISTING IN SPECIFICATIONS FOR LIMITED WARRANTY AND OTHER INFORMATION SEE KOHLER WEBSITE WWW.KOHLER.COM OR CALL 1-800-451-4243 OR CONTACT YOUR LOCAL KOHLER SALES OFFICE</small>
<b>DIAGRAM, SCHEMATIC TPIK ELECTRICAL PANEL</b>		<b>ADV-7035</b>	
<small>DATE 2-18-05</small>		<small>TIME 2-2</small>	

**KOHLER®**

Miscellaneous

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

**BATTERY TYPES TO BE CHARGED:**

- LEAD ACID
- AGM
- GEL CELL
- HIGH PERFORMANCE AGM
- FLOODED
- NICKEL CADMIUM (NiCd)

**INPUT AC:**

INPUT VOLTAGE: 90-265V SINGLE PHASE  
 INPUT FREQUENCY: 47-63 Hz

**INPUT LEAD:**

APPROXIMATELY 1.8M (72") (REF) TYPE SJTOW -40°C TO 105°C UL RATED WIRE AND INSULATION. TERMINATED IN PRE-MOLDED UL RATED 3 PRONG NEMA 5-15 MALE AC PLUG.

**DC OUTPUT:**

10A @ 12V  
 10A @ 24V  
 VOLTAGE REGULATION: +/-1% (VOLTAGE AT EACH STAGE IS TOPOLOGY DEPENDENT)

**OUTPUT LEAD:**

APPROX. 1.8M (72") (REF) TYPE SJTOW -40°C TO 105°C UL RATED WIRE WITH RED AND BLACK WIRE INSULATION. TERMINATED IN 9.5 mm (REF) RING STYLE TERMINALS.

**FUSES:**

THE FUSE MUST BE LOCATED APPROXIMATELY 6" FROM RING TERMINAL ON RED OUTPUT LEAD.  
 20A ATC

**ENVIRONMENTAL:**

STORAGE TEMPERATURE RANGE: -40 TO +85°C (-40 TO +185°F)  
 OPERATING TEMPERATURE RANGE: -20 TO +70°C (-4 TO +158°F)  
 HUMIDITY: 5 TO 95% (NON-CONDENSING)  
 SALT SPRAY TESTING - ASTM B117  
 CORROSION RESISTANT FROM GASSING OF BATTERIES

**REVERSE POLARITY PROTECTION:**

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

**MOUNTING:**

4 NON-THREADED THROUGH HOLES FOR M6 FASTENERS TO PASS THROUGH

**ENCLOSURE:**

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

**INDICATORS:**

POWER: INDICATES THE ACCEPTABILITY OF AC INPUT TO THE CHARGER  
 COMMUNICATION: INDICATES THE STATE OF THE COMMUNICATION SYSTEM  
 TEMPERATURE COMPENSATION: INDICATES THE STATE OF THE TEMPERATURE COMPENSATION SUBSYSTEM WHEN INSTALLED  
 VOLTAGE OUTPUT: INDICATES THE STATE OF THE BATTERY AND CERTAIN FAULT CONDITIONS.

**DOCUMENTATION:**

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

**CERTIFICATIONS (US AND CANADA):**

- UL1236
- CSA - C22.2 NO 107.2-01
- FCC- TITLE 47, PART 15 CLASS A
- CE
- EN 61000-6-2
- CEC AND DOE
- NFPA-110 LEVEL 1 (WHEN SUPPORTED WITH APPLICABLE KOHLER CONTROLLER)
- IBC

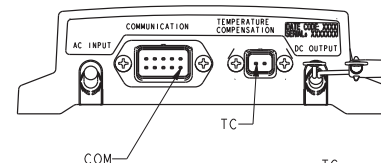
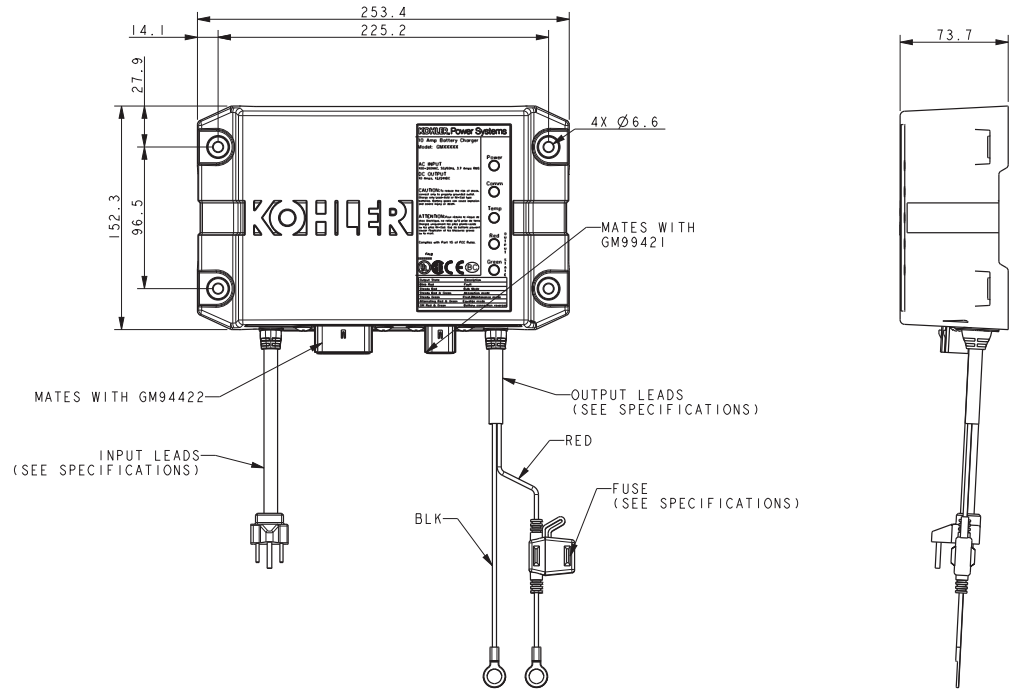
**PRODUCT LABELING:**

THE LABEL ATTACHED TO THE CHARGER SHALL HAVE THE FOLLOWING INFORMATION:

- UL LISTING
- KOHLER PART NUMBER
- DESCRIPTION OF ALL INDICATOR
- OUTPUT CURRENT AND VOLTAGE
- INPUT VOLTAGE AND FREQUENCY

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

**WARRANTY:**  
 2 YEAR FROM DATE OF PURCHASE FROM MANUFACTURE.



- COM PIN 1 N/C  
 2 ID SEL 1  
 3 ID SEL 2  
 4 N/C  
 5 CAN-H  
 6 N/C  
 7 ID SEL 1 RTN  
 8 ID SEL 2 RTN  
 9 CAN-GND  
 10 CAN-L
- I.C. PIN 1 TC SENSOR W1  
 2 TC SENSOR W2

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 Z .X ± 1.5 SURFACE FINISH ANGLES ± 0° 30' MAX.	TITLE
-	9-22-14	NEW DRAWING [CT91634]	SAM		<b>KOHLER CO. METRIC PRO-E</b>
A	5-9-17	(C-4, 2) MATING NOTE ADDED (A-2, 4) PIN CONNECTIONS ADDED [CT174256]	SAM		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. BOM. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.
					<b>CHARGER, BATTERY 10 AMP</b>
					SCALE 0.50 CAD NO. SHEET 1 of 1
					DWG NO. <b>GM87448</b> D

**KOHLER®**

Warranty

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

Your Kohler product has been manufactured and inspected with care by experienced craftsmen. If you are the original end user, Kohler Co. 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, Kohler Co. will repair, replace, or make appropriate adjustment at Kohler Co.'s option if the product, upon Kohler Co.'s inspection, is found to be properly installed, maintained, and operated in accordance with Kohler Co.'s instruction manuals. A Kohler distributor, dealer, or authorized service representative must perform startup.

## Kohler 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 Kohler Co.'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 Kohler Co.'s factory.

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 Kohler 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. Additional expenses for repairs performed after normal business hours, i.e. overtime or holiday labor rates.
8. Rental of equipment during the performance of warranty repairs.
9. Removal and replacement of non-Kohler-supplied options and equipment.
10. Non-Kohler replacement parts. Replacement of a failed Kohler part with a non-Kohler part voids the warranty on that part.
11. Radiators replaced rather than repaired.
12. Fuel injection pumps not repaired by an authorized Kohler service representative.
13. Non-Kohler-authorized repair shop labor without prior approval from Kohler Co. Warranty Department.
14. Engine fluids such as fuel, oil, or coolant/antifreeze.
15. Shop supplies such as adhesives, cleaning solvents, and rags.
16. Expenses incurred investigating performance complaints unless the problem is caused by defective Kohler materials or workmanship.
17. Maintenance items such as fuses, lamps, filters, spark plugs, loose or leaking clamps, and adjustments.
18. Travel time and mileage exceeding 300 miles round trip.

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

**KOHLER CO. 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.

# KOHLER®

KOHLER CO., Kohler, Wisconsin 53044  
Phone 920-457-4441, Fax 920-459-1646  
For the nearest sales/service outlet in the US and Canada, phone 1-800-544-2444  
KOHLERPower.com

TP-5374 12/15f

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

Your Kohler product has been manufactured and inspected with care by experienced craftsmen. If you are the original end user, Kohler Co. 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, Kohler Co. will repair, replace, or make appropriate adjustment at Kohler Co.'s option if the product, upon Kohler Co.'s inspection, is found to be properly installed, maintained, and operated in accordance with Kohler Co.'s instruction manuals. A Kohler distributor, dealer, or authorized service representative must perform startup.

## Kohler Product

Stationary Standby Generator Set & Accessories

## Warranty Coverage

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

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

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

1. Normal wear, routine tuneups, tuneup parts, adjustments, and periodic service.
2. Damage, including but not limited to damage caused by accidents, improper installation or handling, faulty repairs not performed by an authorized Kohler 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-Kohler-supplied options and equipment.
11. Non-Kohler replacement parts. Replacement of a failed Kohler part with a non-Kohler part voids the warranty on that part.
12. Radiators replaced rather than repaired.
13. Fuel injection pumps not repaired by an authorized Kohler service representative.
14. Non-Kohler-authorized repair shop labor without prior approval from Kohler Co. 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 Kohler 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 Kohler service representative or write Kohler Co., Service Department, MS072, Kohler, WI 53044 USA.

**KOHLER CO. 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.

# KOHLER®

KOHLER CO. Kohler, Wisconsin 53044  
Phone 920-457-4441, Fax 920-459-1646  
For the nearest sales/service outlet in the  
US and Canada, phone 1-800-544-2444  
KOHLERPower.com

TP-5561 9/23g

**KOHLER®**

Certification

# Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Kohler Power Systems  
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.

For and on behalf of BSI:

  
\_\_\_\_\_  
Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 1995-02-28

Latest Revision Date: 2021-10-29

Effective Date: 2021-11-07

Expiry Date: 2024-11-06

Page: 1 of 2



...making excellence a habit.™



Certificate No: **FM 727336**

Location	Registered Activities
Kohler Power Systems - GK 900 Highland Drive Bldg 604 Kohler Wisconsin 53004 USA	Manufacture of leads and harness, automatic transfer switches and switchgear. Distribution of generator sets.
Kohler Power Systems N7650 Lakeshore Road Sheboygan Wisconsin 53083 USA	Design, manufacture, and distributor support for electrical generators, automatic transfer switches and switchgear.
Kohler Power Systems 300 N Dekora Woods Blvd Saukville Wisconsin 53080 USA	Manufacture of fuel tanks, skids, fabricated components and generators.
Kohler Power Systems Muth Warehouse 2821 Muth Court Sheboygan Wisconsin 53083 USA	The distribution of generator sets.
Kohler Power Systems 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: 2021-10-29

Effective Date: 2021-11-07

Expiry Date: 2024-11-06

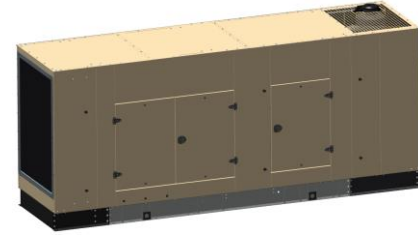
Page: 2 of 2

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

An electronic certificate can be authenticated [online](http://www.bsigroup.com/ClientDirectory). Printed copies can be validated at [www.bsigroup.com/ClientDirectory](http://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 8PR. Tel: + 44 345 080 9000  
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.  
A Member of the BSI Group of Companies.

G15-152 10/21

**REPORT HOLDER:**KOHLER POWER SYSTEMS  
7650 LAKESHORE ROAD  
SHEBOYGAN, WI 53083 USA  
(920) 457-4441 | KOHLERPOWER.COM**KOHLER®**Florida Building Code Sixth & Seventh Editions (2017 & 2020)  
International Building Code (2012, 2015 & 2018)**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.**

This Product Evaluation Report is being issued in accordance with the requirements of the **International Building Code (2012, 2015, & 2018)** and the **Florida Building Code Sixth & Seventh Editions (2017 & 2020)** per ASCE 7, FBC Building Ch. 16, FBC Building Sections 104.11 and 453.25.5, FBC Existing Building Sections 707.1 and 707.2, FBC Residential M1202.1 and M1301.1, FMC 301.15, and FS 471.025. The product noted on 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 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 rational analysis to qualify the following design criteria:

- Maximum rated wind pressures via Components & Cladding methodology.
- Structural component connection integrity, verified by a unity check between tension and shear.
- Anchorage integrity for unit and tank mounts.

Calculation summary is included in this TER and appears below. NOTE: No 33% increase in allowable stress has been used in the design of this product.

**INSTALLATION:**

The product(s) listed above shall be installed in strict compliance with this TER &amp; manufacturer-provided enclosure model specifications.

The product components shall be of the material specified in the manufacturer-provided product specifications. All screws, bolts and rivet must be installed in accordance with the applicable provisions &amp; anchor manufacturer's published installation instructions.

**LIMITATIONS & CONDITIONS OF USE:**

Use of this product shall be in strict accordance with this TER as noted herein. Adjustment factors noted herein and the applicable codes must be considered, where applicable. Installation shall conform to the minimum standards stated in the referenced building code(s) in addition to tie-down details and limitations stated herein.

See final page for complete limitations &amp; conditions of use.

**UNIT CASING MATERIAL:**

1/8" Al 5052-H32 top and side panels and 1/4" steel ASTM A36 for bottom skids, secured with 3/16" Ø SS GR. 50, M6 low carbon steel drill screws, M6 class 4.8 machine screws, 5/16" A2-70 SS bolts and M12 bolts class 8.8. (see enclosure, component drawings per manufacturer for specific locations).

**TERMINOLOGY:**

See list of abbreviations on the final page of this report.

**NOTE: THE GRAPHICAL DEPICTIONS IN THIS REPORT ARE FOR ILLUSTRATIVE PURPOSES ONLY AND MAY DIFFER IN APPEARANCE.****OPTIONS:**

This evaluation is valid for KOHLER 350-500REOZJC/D Sound Level 2 Aluminum Enclosures described herein.

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

**STRUCTURAL PERFORMANCE:**

Models referenced herein are subject to the following design limitations:

**Maximum Rated Wind Pressure\*:  
+/- 65 psf**

- Required design 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 pressures shall be less than or equal to the maximum pressures listed herein.
- \*Maximum Rated Wind Pressures indicate the maximum pressures that all units listed herein are approved for. Valid for at-grade applications only. See limitations herein.
- Site-specific wind analysis may produce alternate limitations provided maximum rated wind pressures stated herein are not exceeded.

**VISIT [ECALC.IO/259651](https://ecalculator.com/259651)**FOR ENGINEER CERTIFIED ORIGINALS & MORE  
INFORMATION ABOUT THIS DOCUMENT OR SCAN  
THE QR CODE TO THE RIGHT >**VISIT [ENGINEERINGEXPRESS.COM/STORE](https://engineeringexpress.com/store) FOR  
ADDITIONAL PLANS, REPORTS & RESOURCES****ORIGINAL SIGNATURE AND RAISED SEAL  
OR DIGITAL SEAL REQUIRED TO BE VALID PER CODE:****PE SEAL REQUIRED**

August 21, 2020

Frank Bennardo, P.E., SECB

 If Checked, Certifying

ENGINEERING EXPRESS®

Engineer and PE #

FL PE #0046549

FLCA #9885

Appear Above

**DIGITAL SEAL NOTICE:** IF THIS DOCUMENT IS DIGITALLY SIGNED, THIS SHEET IS PART OF A DIGITALLY SIGNED FILE. IT SHALL REMAIN IN DIGITAL FORMAT, SHALL BE VERIFIED BY ELECTRONIC MEANS, & **PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED.** VISIT [ECALC.IO/DS](https://ecalculator.com/ds) FOR MORE INFORMATION.**PRINTED DOCUMENT NOTICE:** IF THIS DOCUMENT IS PRINTED & DOES NOT CONTAIN AN ENGINEER'S ORIGINAL SIGNATURE & SEAL, THIS DOCUMENT IS VOID & NOT VALID FOR USE. PHOTOCOPIES ARE NOT PERMITTED FOR USE.

**SECTION 1 SUMMARY**

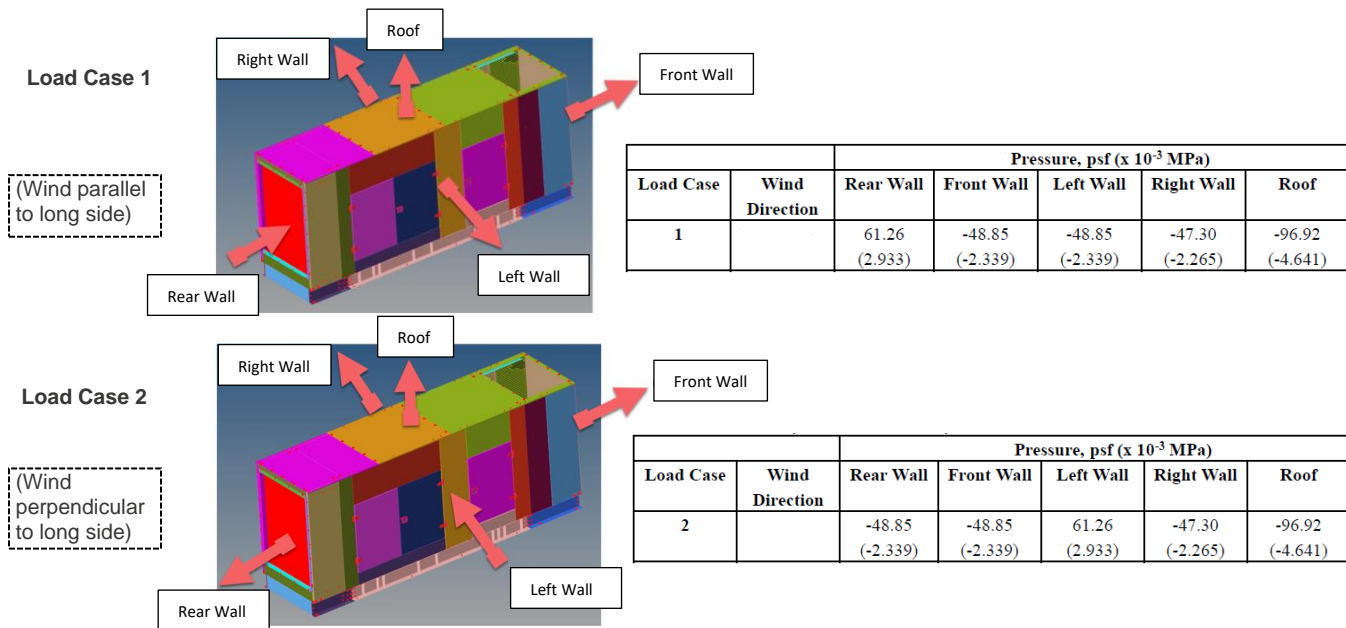
Engineering Express has reviewed the design requirements per the Florida Building Code Sixth & Seventh Editions (2017 & 2020) and ASCE 7 for the structural integrity of the Kohler aluminum housing units with steel skid to withstand the maximum rated wind pressures stated herein. This TER certifies the enclosures listed herein for maximum uniform static wind loading pressures stated herein and anchorage integrity only. Our analysis includes the unit framing and housing only and requires a permanent near-grade (non-rooftop) attachment to a concrete, metal, or wood host structure as certified/verified by others. Steel skid tie-down anchor locations shall conform to Section 3 of this TER. Additionally, the unit shall not be installed in a location susceptible to channeling effects from upwind obstacles. It shall be the installer’s responsibility to ensure that the criteria for the unit housing integrity, as listed above, is applicable for use at the location of installation and the mounting method meets or exceeds the requirements of the local code and it is approved by the appropriate local authority before installation.

This certification is intended to certify the structural capacity and integrity of the structural framing members, wall and roof sheet metal skins, generator skid and internal structural connections only for the sound aluminum enclosures listed herein to resist the stated maximum rated uniform wind pressures. Design of the generator itself, mechanical designs, energy/electrical criteria, generator slab support, anchorage and tie-down method accompanying components and all non-structural items shall be verified by others and outside the scope of this certification. Upon analysis of the aluminum housing unit vs. the critical ultimate design loads illustrated below, this engineer has concluded that the aluminum housing enclosure provides adequate resistance to the specified ultimate design loads.

**Structural Engineering Calculations**

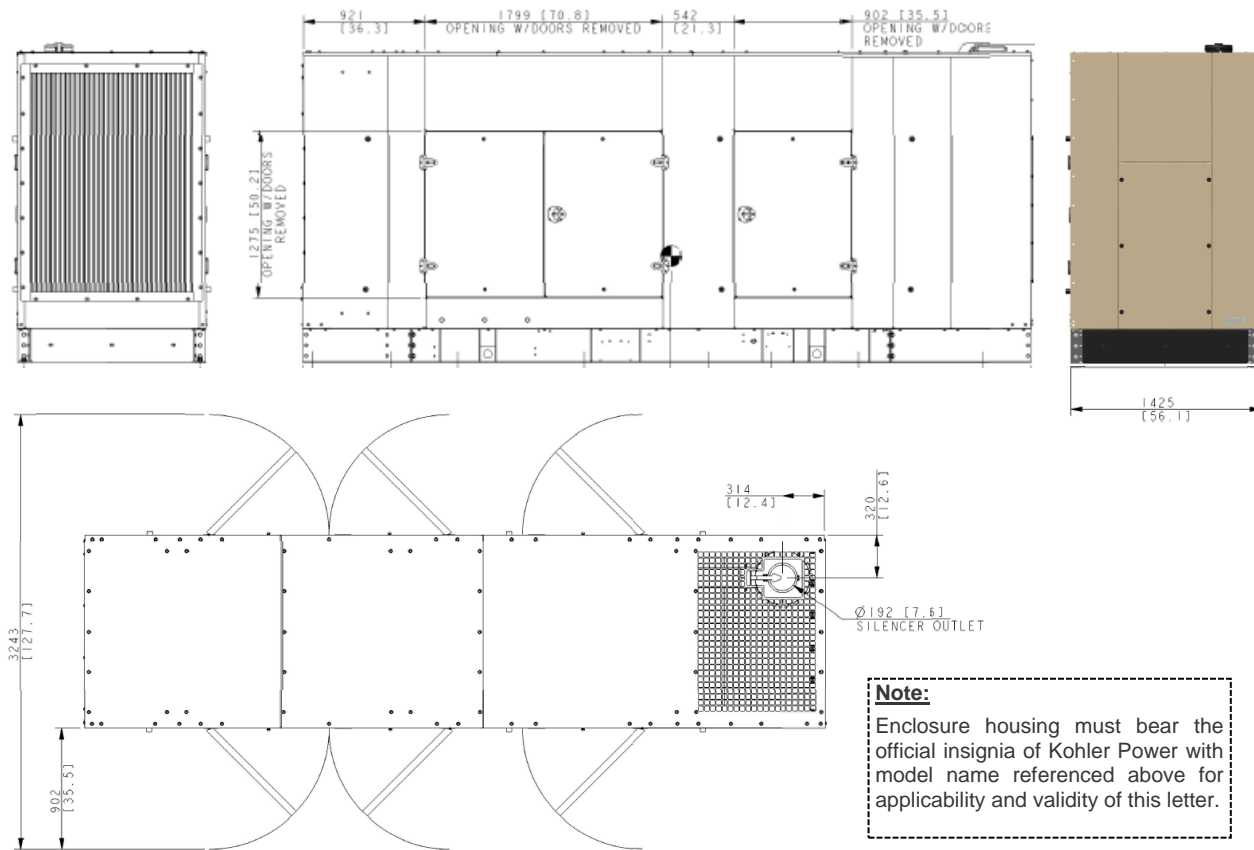
Structural engineering calculations have been prepared which evaluate the aluminum unit housing based on rational analysis using Finite Element Analysis to qualify the following design criteria:

1. Maximum ultimate design pressures as evaluated below:

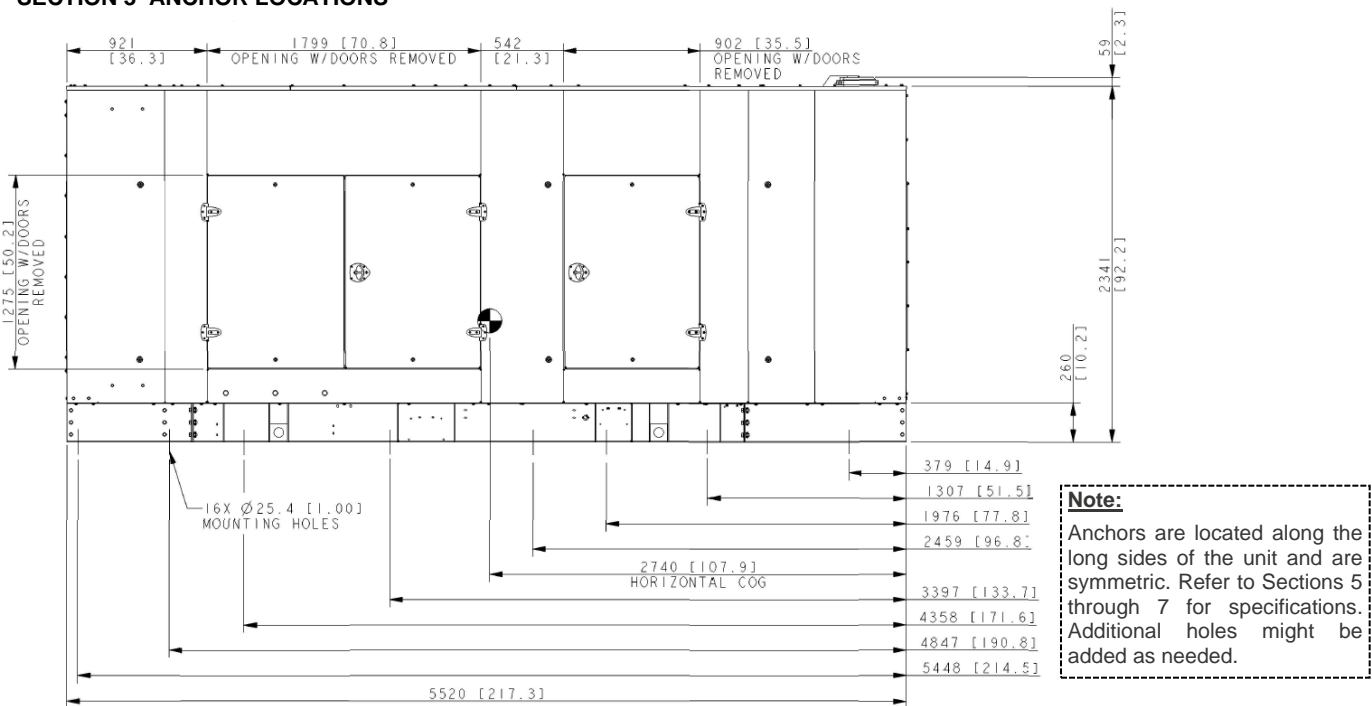


2. Supplemental FEA has been performed to evaluate the front and left walls of the enclosure to +/- 65 psf. Upon thorough review of the results, it is the opinion of this engineer that the results, coupled with the FEA above, satisfactorily indicate the enclosure and skid stresses remain below ultimate tensile stress and thus, provide adequate resistance to the maximum wind pressures stated herein.
3. Maximum housing unit dimensions: 218" L x 57" W x 93" H. For exact enclosure dimensions, see ADV-9189. Enclosure weight shall be between 1000 lb and 2000 lb. Weights outside of this range shall be approved by this office.
4. Enclosure materials have been analyzed for yield and ultimate tensile stresses using Von Mises stress criteria in accordance with the 2015 Aluminum Design Manual & AISC Steel Construction Manual 14th Edition. For both load cases, Von Mises stresses were below the ultimate tensile stresses of the respective materials; therefore, the sound aluminum enclosure will provide enough structural capacity to resist wind pressures shown.
5. All internal connection capacities, including bolted and welded components, have been checked for applicable tension and shear by applying a unity interaction equation where applicable and have been approved by this office.

**SECTION 2 DIMENSIONS & ELEVATIONS**



**SECTION 3 ANCHOR LOCATIONS**



**IN ALL CONDITIONS IT IS THE RESPONSIBILITY OF THE PERMIT HOLDER TO ENSURE THE HOST STRUCTURE IS CAPABLE OF WITHSTANDING THE RATED GRAVITY, LATERAL, AND UPLIFT FORCES BY SITE-SPECIFIC DESIGN. NO WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED, IS OFFERED BY ENGINEERING EXPRESS AS TO THE INTEGRITY OF THE HOST STRUCTURE TO CARRY DESIGN FORCE LOADS INCURRED BY THIS UNIT.**

**SECTION 4 ENCLOSURE MODELS INCLUDED**

GENERATOR	ENCLOSURE TYPE	ENCLOSURE DRAWING NUMBER	REVISION & DATE	RETROFIT DRAWING NUMBER	REVISION & DATE
350-500REOZJC 350-400REOZJD	350-500REOZJC/D Sound Level 2 Aluminum Enclosure	GM110077	Rev A - 1/17/20	GM109392	Rev - 2/4/20

**SECTION 5 ANCHOR DIRECTIVE**

GENSET MODELS	FUEL TANK		A - ANCHOR			B - EMBEDMENT (in.)	C - MIN. EDGE DISTANCE (in.)	D - MIN. CONCRETE THICKNESS (in.)	# OF ANCHORS FOR TANK TO CONCRETE*	# OF THRU-BOLTS FOR SKID TO TANK
	LITERS	GAL	ANCHOR BRAND	MODEL	DIAMETER (IN.)					
350REOZJC/D 400REOZJC/D 500REOZJC	NO TANK		HILTI	KWIK BOLT 3 (CARBON STEEL) ESR-2302	0.75	4.75	6	8	16**	-
	1529-5047	404-1333							18	16***
	5042-9993	1332-2640							18	12****
	11602-13325	3065-3520							24	12****

**ANCHOR DIRECTIVE NOTES**

- Refer to ADV-9189 and Section 7 for additional specifications. NOTE: Only anchorage integrity is being certified for I-beams and tanks.

\*For tank anchorage to concrete, it is allowed for ground I-beams to be used as an intermediary between tank and concrete as opposed to mounting the tank directly to concrete. See Ground I-Beam Directive below for the required minimum number of I-beams for this condition. I-beams shall have a min. spacing of 18", typ. (Note: I-beams and tank flanges shall be 3/16" min. thick and Fy = 36 ksi min. steel.

GROUND I-BEAM DIRECTIVE			
FUEL TANK		I-BEAMS REQUIRED	
LITERS	GAL	ALONG LENGTH OF ENCLOSURE	ALONG REMAINING TANK LENGTH
1529-5047	404-1333	7	1 FOR EVERY 48" IN TANK LENGTH BEYOND ENCLOSURE LENGTH
5042-9993	1332-2640	6	
11602-13325	3065-3520	5	

- For each I-beam top connection to tank, employ (2) M20 UNC GR. 8.8 steel thru-bolts with 2" min. OD washers top and bottom, (1) thru-bolt per side, typ. Position thru-bolt no more than 6" away from the end of the I-beam, typ. Provide 1.5" min. edge distance between the thru-bolt and any edge of the members in contact (tank flange and I-beam flange).

- For each I-beam bottom connection to concrete, employ (2) 3/4" Ø HILTI KWIK BOLT 3 Carbon Steel Expansion Anchors with 4-3/4" embedment and 18" min. spacing from neighboring anchors, (1) anchor per side, typ. Provide 6" min. edge distance between the anchor and any edge of the concrete, typ. Provide 1.5" min. edge distance between the anchor and any edge of I-beam flange. Position anchor no more than 6" away from the end of the I-beam, typ. Provide 8" min. thick 4 ksi concrete (concrete by others).

\*\*For the case in which no tank is used, the genset skid shall mount directly to the concrete using the starred number of anchors with the specifications stated in the directive. Skid flange shall be 3/16" min. thick and Fy = 36 ksi min. steel.

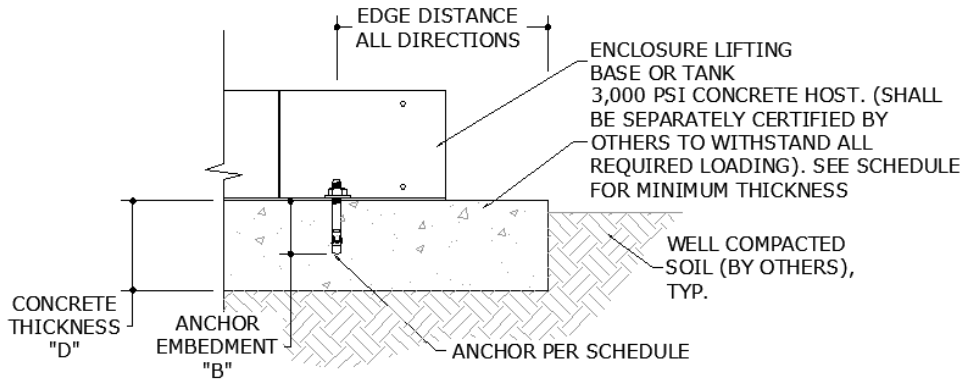
\*\*\*The unit skid shall mount directly to the tank with the specified number of M20 UNC GR.8.8 thru-bolts with 2" min. OD washers top and bottom, typ. Provide 1.5" min. edge distance from edge of members in contact (skid flange and tank flange). Members in contact shall be 3/16" min. thick Fy = 36 ksi min. steel.

\*\*\*\*For skid anchorage to tank, it is allowed for I-beams to be used as an intermediary between skid and tank as opposed to mounting the tank directly to concrete for the associated starred cases only, in which the width of the tank exceeds the width of the unit. A minimum of (6) I-beams with 18" min. spacing shall be implemented for this condition. Skid flange, tank flange, and I-beams shall be 3/16" min. thick Fy = 36 ksi min. steel.

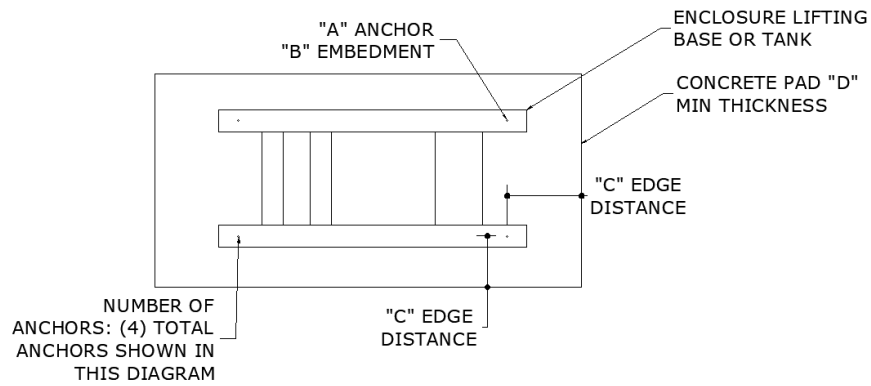
- For each I-beam top connection to skid, employ (2) M20 UNC GR. 8.8 steel thru-bolts with 2" min. OD washers top and bottom, (1) thru-bolt per side, typ. Position thru-bolt no more than 6" away from the end of the I-beam, typ. Provide 1.5" min. edge distance between the thru-bolt and any edge of the members in contact (skid flange and I-beam flange). (12) total thru-bolts min., (6) min. per long side.

- For each I-beam bottom connection to tank, employ (2) M20 UNC GR. 8.8 steel thru-bolts with 2" min. OD washers top and bottom, (1) thru-bolt per side, typ. Position thru-bolt no more than 6" away from the end of the I-beam, typ. Provide 1.5" min. edge distance between the thru-bolt and any edge of the members in contact (I-beam flange and tank flange). (12) total thru-bolts min., (6) min. per long side.

SECTION 6 ANCHOR ILLUSTRATIONS



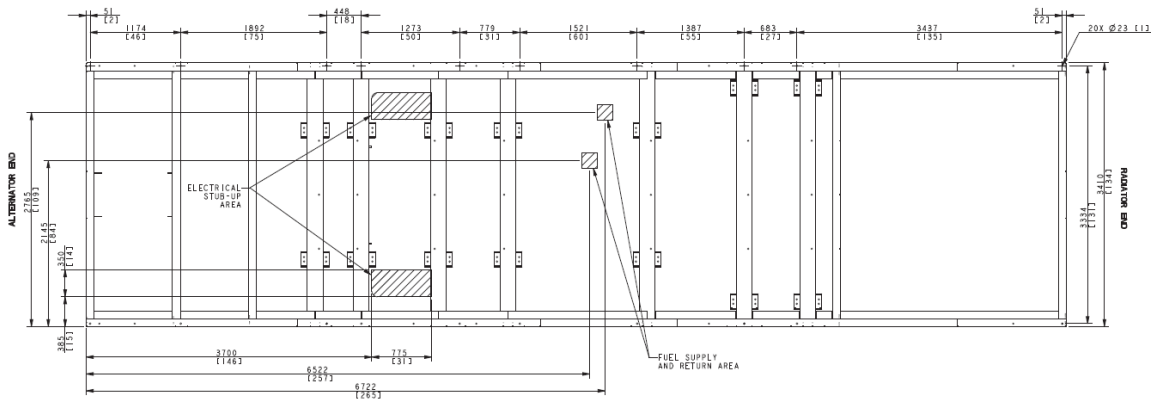
**DETAIL A**



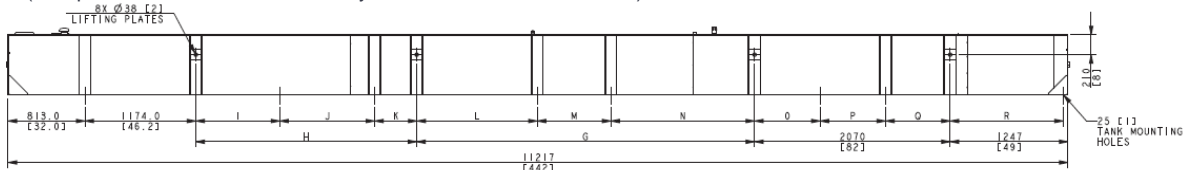
**ANCHORAGE PLAN VIEW ILLUSTRATION**

**Instructions:**

1. For enclosures anchored directly to host without fuel tank, go to ADV-9189 and place the specified anchors using the mounting locations. See below example for a sample lifting base's mounting holes:
2. (Sample lifting base for illustration only. Not included in certification)



3. For enclosures mounted on fuel tanks and anchored to host, go to ADV-9189 and place the specified anchors using the mounting locations. See below example for fuel tank's mounting holes:  
(Sample fuel tank for illustration only. Not included in certification)



4. Refer to KOHLER ADV-9189 for additional installation instruction directives.

CORP. OFC: 160 SW 12<sup>TH</sup> AVENUE SUITE 106, DEERFIELD BEACH, FLORIDA 33442

**SECTION 7: WIND INSTALLATION REQUIREMENTS:**

The following are requirements for wind-rated installation:

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 reference 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 loading.
4. Anchors must be installed in the locations specified in the Kohler ADV-9189 dimension print in correlation with signed and sealed engineering herein. The more stringent requirement from either document shall apply in cases of uncertainty.
5. Anchor plates from Kohler must be installed at each anchor location between anchor head and 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 ACI 318 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 evaluation and is 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 requirements 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 Kohler 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 to satisfy only the anchor bolt requirements. The pad must be designed by the project structural engineer of record.

**TERMINOLOGY (CONTINUED):**

The following abbreviations may appear in this report: “ASCE” for “American Society of Civil Engineers”, “ASD” for “Allowable Stress Design”, “FBC” for “Florida Building Code”, “FLCA” for “Florida Certificate of Authorization”, “FMC” for “Florida Mechanical Code”, “GR.” For “grade”, “HVAC” for “heating, ventilation, and air conditioning”, “max.” for “maximum”, “min.” for “minimum”, “NTS” for “not to scale”, “OD” for “outer diameter”, “PE” for “Professional Engineer”, “psf” for “pounds per foot squared (lb/ft2)”, “SAE” for “Society of Automotive Engineering”, “SECB” for “Structural Engineering Certification Board”, “SMS” for “sheet metal screws”, “SS” for “stainless steel”, “TER” for “Technical Evaluation Report”, “typ.” For “typical”, “U.N.O.” for “unless noted otherwise”, “w/o” for “without”, “#” for “number”, and “Ø” for “diameter”. For additional abbreviation/terminology clarifications, please contact this office.

**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:

This evaluation report is valid for a newly installed unit and does not include certification of the product beyond a design event if impacted. Inspections shall be implemented during annual equipment maintenance or after a 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 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 which 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:

As described above, this certification pertains to the structural integrity of the unit components listed herein, subject to the limitations and criteria stated herein. Operability and water infiltration are outside the bounds of this certification. No other certifications are intended. This evaluation alone does not offer any evaluation for large missile impact debris or cyclic wind requirements; see TER-20-25965.2 for these evaluations.

Remarks	Drawn	Checked	Date
Initial Issue	EPR	RWN	7/29/20
Amend Anchor Directive	EPR	RWN	8/7/20



# 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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