

# Submittal Package





# TABLE OF CONTENTS

Section	Sub-Section	Literature
Quote		
Model 500REOZJC Spec Sheets		
Specification Sheet	Controller	G6-161
Specification Sheet	Circuit Breaker	G6-88
Specification Sheet	Circuit Breaker	Circuit Breaker Trip Curves
Specification Sheet	Circuit Breaker	P_R Frame Breaker
Specification Sheet	Battery Charger	G6-146
Specification Sheet	Weather/ Sound Enclosure Packaging	Enclosure Package
Specification Sheet	Engine Block Heater	G6-170
Specification Sheet	Voltage Regulator	Voltage Regulator
Alternator Data		
	Alternator Data Sheet	5M4027
Sound Data		
	Sound Data Sheet	Sound Data
Cooling Data		
	Cooling Systems Data Sheet	Cooling Data
Exhaust System Data		
	Exhaust System Data	Exhaust System Data
	Exhaust System Data	Exhaust System Data
Emissions Data		
	Emissions Data	Emissions Data
	EPA Certificate	EPA Certificate
DimensionalDrawings		
	Generator	ADV-9193
	Accessories	ADV-8527
	Enclosure	ADV-9189
	Subbase Tank	ADV-8528





WiringSchematicDiagrams

Controller Schematic Diagram	ADV-8000
Controller Wiring Diagram	GM77987
Enclosure Wiring	ADV-7035
Voltage Diagram	ADV-5875

Misc

Battery	244578
Battery Charger	GM87448
Battery Charger Assembly	GM94922
Block Heater	GM75809
Block Heater	GM76113
Circuit Breaker	GM24181
Flexible Fuel Line	273614-CMP

Warranty

Warranty	TP-5374
Warranty	TP-5561

Certification

ISO9001 Certificate	G15-152
Wind Load	G18-529
Prototype Test Certificate	G18-511
Prototype Test Certificate	G18-56

Pre-Startup Checklist

Pre-Startup Checklist	PreStartUpCheckList
-----------------------	---------------------



---

## Generator

---

### Kohler Model: 500REOZJC

This diesel generator set equipped with a 5M4027 alternator operating at 277/480 volts is rated for 505 kW/631 kVA. Output amperage: 759





### 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 2 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.

### Alternator Features:

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



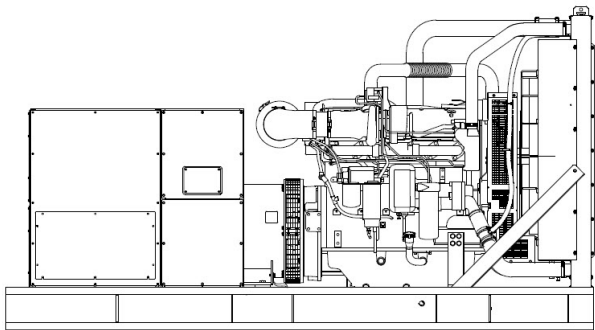
Qty	Description
	500REOZJC Generator System
3	500REOZJC Generator Set
	Includes the following:
	Literature Languages English
	Approvals and Listings UL2200 Listing
	Engine 500REOZJC,24V,60HZ
	Nameplate Rating Standby 130C Rise
	Voltage 60Hz, 277/480V, Wye, 3Ph, 4W
	Alternator 5M4027
	Cooling System Unit 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 894 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 800
	Trip Type, LCB 1 Right Electronic, LSI
	LCB 1 Right Interrupt Rating 35kA at 480V
	Frame, LCB 1 Right PG
	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
3	Literature, General Maint-500REOZJC





# Spec Sheets





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 2 EPA-certified for Stationary Emergency Applications
- Alternator Protection
- Battery Rack and Cables
- Customer Connection (standard with Decision-Maker 6000 controller only)
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Literature

Alternator Features

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

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.

Generator Set Rating

Standby 130C Rise Ratings						
Alternator	Voltage	Ph	Hz	Peak kVA	kW/kVA	Amps
5M4027	277/480	3	60	2200	505/631	759

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: 500REOZJC, continued

### Alternator Specifications

Specifications	Alternator
Alternator manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Permanent-Magnet, Pilot Exciter
Leads, quantity	10/12, 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.</li><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>	

### Engine

#### Engine Specification

Engine Manufacturer	John Deere
Engine Model	6135HFG75
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)	563 (755)
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: 500REOZJC, continued

Exhaust

Exhaust System

Exhaust Manifold Type	Dry
Exhaust flow at rated kW, m3/min. (cfm)	97.2 (3433)
Exhaust temperature at rated kW, dry exhaust, ° C ( ° F)	524 (975)
Maximum allowable back pressure, kPa (in. Hg)	Min. 4 (1.2) Max. 9.8 (2.9)
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

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: 500REOZJC, 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.)	209 (11896)
Heat rejected to charge air cooling water at rated kW, dry exhaust, Kw Btu/min.	116 (6603)
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)	279 (9867)
Combustion air, m3/min. (cfm)	38 (1342)
Heat rejected to ambient air: Engine, kW (Btu/min.)	38 (2163)
Heat rejected to ambient air: Alternator, kW (Btu/min.)	40 (2277)
*Air density = 1.20 kg/m3 (0.075 lbm/ft3)	

Fuel Consumption

	Rating
Standby Fuel Consumption at 100% load	134.5 Lph (35.5 gph)
Standby Fuel Consumption at 75% load	104.6 Lph (27.6 gph)
Standby Fuel Consumption at 50% load	75.3 Lph (19.9 gph)
Standby Fuel Consumption at 25% load	38.8 (10.2)
Continuous Fuel Consumption at 0% load	Fuel consumption is up to 4% higher when using HVO/RD than #2 ULSD.

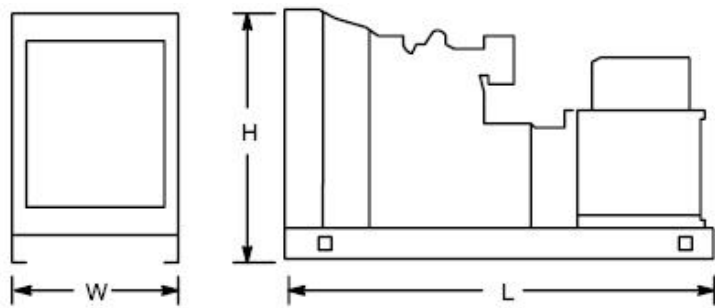
Dimensions and Weights

Dim Weight Spec	Dim Weight Value
Fuel	Diesel
Engine Manufacturer	John Deere
Overall Size, L x W x H, mm (in.):	3630 x 1425 x 1936 (142.9 x 56.1 x 76.2)
Weight (radiator model), wet, kg (lb.):	3883 (8560)



Model: 500REOZJC, continued

---



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.



## **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:

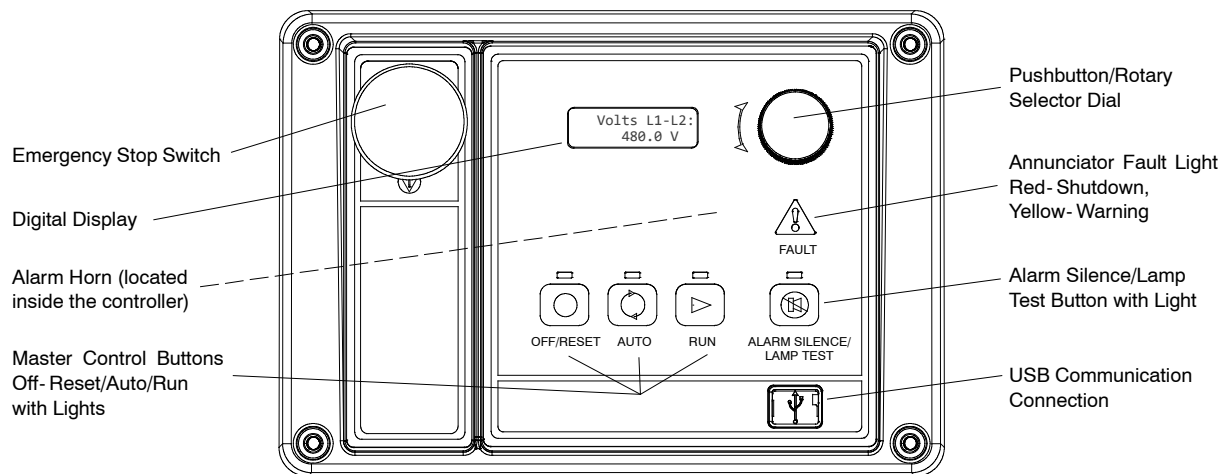
- A digital display and pushbutton/rotary selector dial provide easy local access to data.
- Measurements selectable in metric or English units.
- The controller can communicate directly with a personal computer via a network or serial configuration using SiteTech™ or Monitor III software.
- The controller 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 recrank after a failed start attempt.
- **Common Failure Relay.** This relay is integrated on the controller circuit board. Contacts are rated 2 amps at 32 VDC or 0.5 amp at 120 VAC.
- **Communication.** Controller communication is available.
- **Cyclic Cranking.** The controller has programmable cyclic cranking.
- **ECM Diagnostics.** The controller displays engine ECM fault code descriptions to help in engine troubleshooting.
- **Engine Start Aid.** The starting aid feature provides control for an optional engine starting aid.
- **Event Logging.** The controller keeps a record (up to 1000 entries) for warning and shutdown faults. This fault information becomes a stored record of system events and can be reset.
- **Historical Data Logging.** Total number of generator set successful starts is recorded and displayed.
- **Integrated Hybrid Voltage Regulator.** The voltage regulator provides  $\pm 0.5\%$  no-load to full-load regulation with three-phase sensing.
- **Lamp Test.** Press the alarm silence/lamp test button to verify functionality of the indicator lights.
- **LCD Display.** Adjustable contrast for improving visibility.
- **Measurement Units.** The controller provides selection of English or metric displays.
- **Power Metering.** Controller digital display provides kW and kVA.
- **Programming Access (USB).** Provides software upgrades and diagnostics.
- **Remote Reset.** The remote reset function resets faults and allows restarting of the generator set without going to the master control switch off/reset position.
- **Remote Monitoring Panel.** The controller is compatible with the 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.)

## Communication and PC Software Available Options

Refer to G6-76 Monitor III Software and the communication literature for additional communication and PC software information including Modbus® communication.

- ☐ **Monitor III Software for Monitoring and Control (Windows®-based user interface)**
- ☐ **Converter, Modbus®/Ethernet.** Supports a power system using controllers accessed via the Ethernet. Converter is supplied with an IP address by the site administrator. Refer to G6-79 for converter details.
- ☐ **Converter, RS-232/RS-485.** Supports a power system using controllers accessed via a serial (RS-232) connection.

## 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.

Windows® is a registered trademark of Microsoft Corporation.

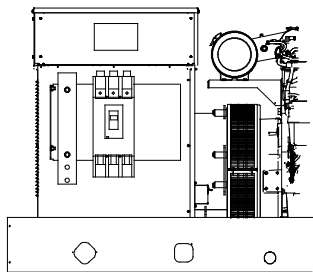
Modbus® is a registered trademark of Schneider Electric.

## DISTRIBUTED BY:

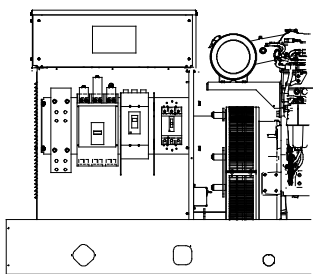
Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator set distributor for availability.

© 2018 Kohler Co., All rights reserved.

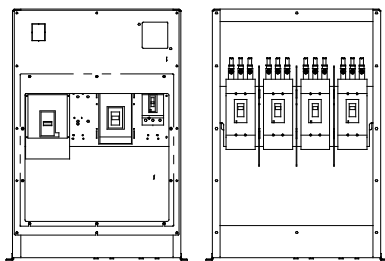




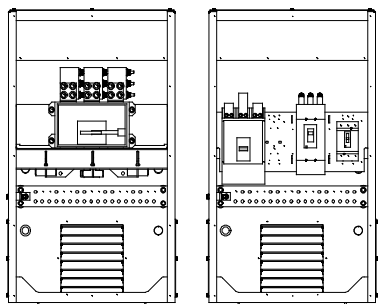
**Single Circuit Breaker Kit with Neutral Bus Bar**  
15-300 kW Model Shown



**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**  
800-2500 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. LSI breakers have all of the LSI breaker features plus ground-fault pickup and delay.

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

### Electronic with Ground Fault Trip

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

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

### 80% Rated Circuit Breaker

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

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

### 100% Rated Circuit Breaker

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

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

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

## Line Circuit Breaker Options

### ☐ Alarm Switch

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

### ☐ Auxiliary Contacts

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

### ☐ Breaker Separators (350- 2500 kW)

Provides adequate clearance between breaker circuits.

### ☐ Bus Bars

Bus bar kits offer a convenient way to connect load leads to the generator set when a circuit breaker is not present.

**15- 300 kW.** Bus bar kits are available on alternators with leads for connection to the generator set when circuit breakers are not ordered.

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

### ☐ Field Connection Barrier

Provides installer wiring isolation from factory connections.

### ☐ Ground Fault Annunciation

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

### ☐ Lockout Device (padlock attachment)

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

### ☐ Lugs

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

### ☐ Overcurrent Trip Switch

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

### ☐ Shunt Trip, 12 VDC or 24 VDC

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

### ☐ Shunt Trip Wiring

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

### ☐ Undervoltage Trip, 12 VDC or 24 VDC

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



## 15- 300\* kW Line Circuit Breaker Specifications

\* Includes models 300REOZJ and 300REZXC. For other 300 kW models, see the 350- 2250 kW section.

### 80% Rating Circuit Breaker

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
4D/4E	15- 150	Thermal magnetic	HD
		Electronic LI	
	60- 150	Electronic LSI	
		Electronic LSIG	
	60- 150	Electronic LI	HG
		Electronic LSI	
		Electronic LSIG	
4P/4PX/ 4Q/4QX	30- 100	Magnetic, UL 1077	E (480 V max.)
		Magnetic, UL 1077 with 12 V shunt trip	
		Magnetic, UL 1077 with 24 V shunt trip	
	15- 150	Thermal magnetic	HD
		Electronic LI	
		Electronic LSI	
		Electronic LSIG	
	60- 150	Electronic LI	HG
		Electronic LSI	
		Electronic LSIG	
	30	Magnetic 9- 325	HJ
		Magnetic 84- 546	
		Magnetic 180- 1040	
		Magnetic 348- 1690	
	175- 250	Thermal magnetic	JD
		Electronic LI	
		Electronic LSI	
		Electronic LSIG	
	250	Electronic LI	JG
		Electronic LSI	
		Electronic LSIG	
	250	Magnetic only 684- 2500	JJ
	300- 400	Thermal magnetic	LA
	400	Magnetic 500- 1000	LA
		Magnetic 750- 1600	
		Magnetic 1000- 2000	
		Magnetic 1125- 2250	
		Magnetic 1250- 2500	
		Magnetic 1500- 3000	
		Magnetic 1750- 3500	
	400	Electronic LI	LG
		Electronic LSI	
		Electronic LSIG	
4RX 4S/4SX 4TX 4V	30- 100	Magnetic, UL 1077	E (480 V max.)
		Magnetic, UL 1077 with 12 V shunt trip	
		Magnetic, UL 1077 with 24 V shunt trip	
	30- 100		

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
4RX 4S/4SX 4TX/4V 4UA 4M6226	15- 150	Thermal magnetic	HD
		Electronic LI	
	60- 150	Electronic LSI	
		Electronic LSIG	
	60- 150	Electronic LI	HG
		Electronic LSI	
		Electronic LSIG	
	30	Magnetic 9- 325	HJ
		Magnetic 84- 546	
		Magnetic 180- 1040	
		Magnetic 348- 1690	
	175- 250	Thermal magnetic	JD
	250	Electronic LI	JG
		Electronic LSI	
		Electronic LSIG	
	250	Magnetic only 684- 2500	JJ
	300- 400	Thermal magnetic	LA
	400	Magnetic 500- 1000	LA
		Magnetic 750- 1600	
		Magnetic 1000- 2000	
		Magnetic 1125- 2250	
		Magnetic 1250- 2500	
		Magnetic 1500- 3000	
	400- 600	Electronic LI	LG
		Electronic LSI	
		Electronic LSIG	
	800	Electronic LSI	PG
		Electronic LSIG	
	800	Electronic LI	MG
4UA 4M6226	1000- 1200	Thermal magnetic	PG
		Electronic LSI	
		Electronic LSIG	
	1200	Thermal Magnetic	PJ
		Electronic LSI	
		Electronic LSIG	



# 15- 300\* kW Line Circuit Breaker Specifications

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

## 100% Rating Circuit Breaker

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

## 100% Rating Electrically Operated Breakers

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

Generator-Mounted P-Frame, 24VDC Electrically Operated			
Alt. Model	Amps	Trip Unit	Frame
4RX 4S/4SX 4TX 4V	250	3.0 LI	PJ
	400	5.0 LSI	PJ
	600	3.0 LI	PL
	800	5.0 LSI	PL
4UA 4M6226	250	3.0 LI	PJ
	400	5.0 LSI	PJ
	600	3.0 LI	PL
	800	5.0 LSI	PL
	1200	5.0 LSI	PL

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

## Interrupting Ratings

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

## Circuit Breaker Lugs Per Phase (Al/Cu)

Frame Size	Ampere Range	Wire Range
E (480 V max.)	30- 100	Up to two wire terminals fitting 10-32 or 1/4-20 stud
H	15- 150	One #14 to 3/0
J	175	One 1/0 to 4/0
	200- 250	One 3/0 to 350 kcmil
LA	300- 400	One #1 to 600 kcmil or Two #1 to 250 kcmil
LG	400- 600	Two 2/0 to 500 kcmil AL/CU
M	800	Three 3/0 to 500 kcmil
P	600-800	Three 3/0 to 500 kcmil
	1000-1200	Four 3/0 to 500 kcmil
Mechanical Load Lugs Included with H, J, and LG LSI SIG Neutrals		
H	60- 150	One #14 to 3/0 AL/CU
J	250	One 3/0 to 350 kcmil AL/CU
LG	400- 600	Two 4/0 to 500 kcmil AL/CU

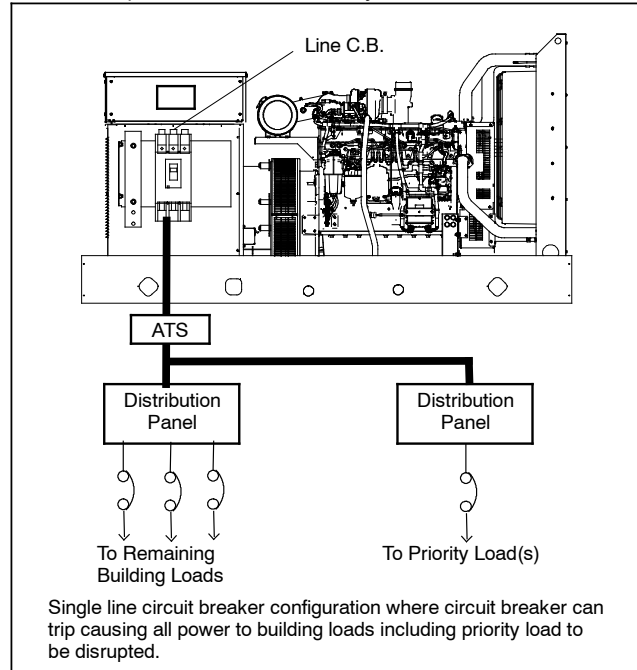


# 15- 300\* kW Line Circuit Breaker Applications

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

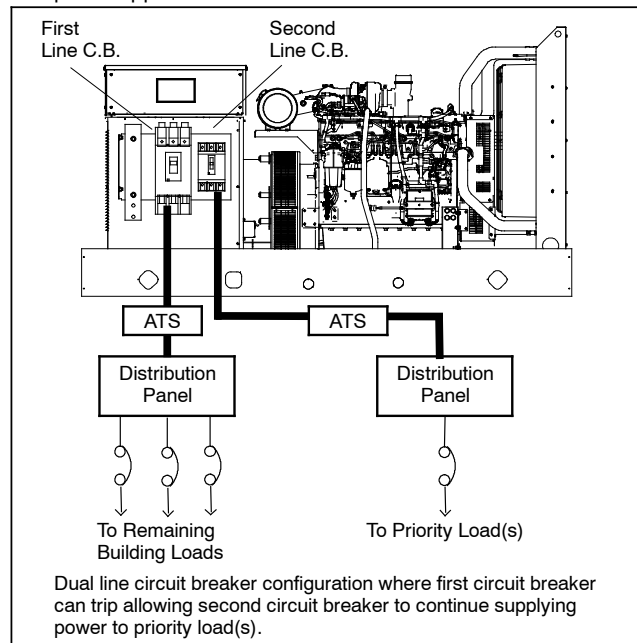
## Single Circuit Breaker Installations

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



## Multiple Circuit Breaker Installations

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



## Circuit Breaker Combinations

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



## 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	
		Electronic LSIG	
	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	JJ
	250	684- 2500 A. Mag. Trip	
	300- 400	Thermal Magnetic	
	400	500- 1000 A. Mag. Trip	LA
		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	
		Electronic LSIG	
	60- 150	Electronic LI	HG
		Electronic LSI	
		Electronic LSIG	
	250	Electronic LI	JG
		Electronic LSI	
		Electronic LSIG	
	400	Electronic LI	LG
		Electronic LSI	
		Electronic LSIG	
	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
		5.0 LSI	PL
	1600, 2000, 2500, 3000	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.

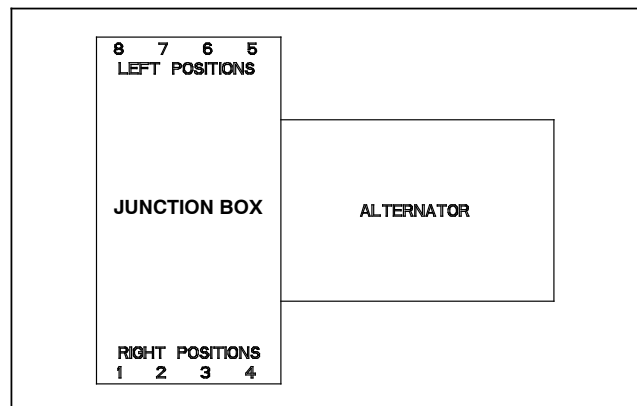
### Interrupting Ratings

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
RJ	100	65	25

### Circuit Breaker Lugs Per Phase (Al/Cu)

Frame Size	Ampere Range	Wire Range
H	15- 150	One #14 to 3/0
J	175	One 1/0 to 4/0
	200- 250	One 3/0 to 350 kcmil
LA	300- 400	One #1 to 600 kcmil or Two #1 to 250 kcmil
LG	400- 600	Two 2/0 to 500 kcmil
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
RJ	1600- 2500	(8) 1/0 to 750 kcmil or (16) 1/0 to 300 kcmil
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.



## 800-2500 kW KD Model Line Circuit Breaker Specifications

### 80% Rating Circuit Breaker

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
KH	15- 150	Thermal Magnetic	HD
	60- 150	Electronic LI	
		Electronic LSI	
		Electronic LSIG	
	60- 150	Electronic LI	HG
		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	
	175- 250	Thermal Magnetic	JD
	250	Electronic LI	
		Electronic LSI	
		Electronic LSIG	
	250	Electronic LI	JG
		Electronic LSI	
		Electronic LSIG	
	250	684- 2500 A. Mag. Trip	JJ
	400	2000-4800 A Mag. Trip	LG
	600	3000- 7200 A Mag. Trip	
	400- 600	Electronic LI	
		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
KH	15- 150	Thermal Magnetic	HD
	60- 150	Electronic LI	
		Electronic LSI	
		Electronic LSIG	
	60- 150	Electronic LI	HG
		Electronic LSI	
		Electronic LSIG	
	175- 250	Thermal Magnetic	JD
	250	Electronic LI	
		Electronic LSI	
		Electronic LSIG	
	250	Electronic LI	JG
		Electronic LSI	
		Electronic LSIG	
	400	Electronic LI	LG
		Electronic LSI	
		Electronic LSIG	
	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 with the APM603 controller.

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

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 Model	Alt. Model	Rating, Amperes	Type
KD800- KD2500	KH	2000 3000 4000 4500	Load Bus



# 800-2500 kW KD Model Line Circuit Breaker Specifications

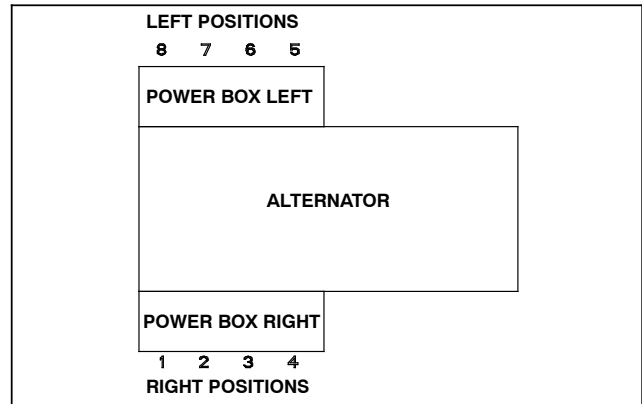
## Interrupting Ratings

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
LG	65	35	18
MG			
PG			
PJ	100	65	25
RJ			
NW	100	100	85

## 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
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
R	1600-2500	(8) 1/0 to 750 kcmil or (16) 1/0 to 300 kcmil
NW	1600-3000	(10) 1/0 to 750 kcmil or (20) 1/0 to 300 kcmil
<b>Mechanical Load Lugs Included with H, J, and LG LSIG Neutrals</b>		
H	60-150	One #14 to 3/0 AL/CU
J	250	One 3/0 to 350 kcmil AL/CU
LG	400-600	Two 4/0 to 500 kcmil AL/CU

## 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, J, 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
KH	H/J			
	H/J	H/J		
	H/J	H/J	H/J	
	H/J	H/J	H/J	H/J
	LG			
	LG	H/J		
	LG	LG		
	LG	H/J	H/J	
	LG	LG	H/J	
	LG	LG	LG	
	LG	H/J	H/J	H/J
	LG	LG	H/J	H/J
	LG	LG	LG	H/J
	LG	LG	LG	LG
	M/P *			
	M/P *		H/J	
	M/P *		LG	
	M/P *		M/P *	
	M/P *		H/J	H/J
	M/P *		LG	H/J
	M/P *		LG	LG
	R §			
	NW §			
	LOAD BUS KIT §			

\* M and P breakers occupy two positions each.

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



## Enclosed Circuit Breakers

The following loose circuit breakers are available in NEMA 1 or NEMA 3R enclosures for remote mounting.

### 80% Rating Circuit Breakers

Ampere Range	Trip Type	C. B. Frame Size
15- 150	Thermal Magnetic	HD
60- 150	Electronic LI	HD
	Electronic LSI	
175- 250	Thermal Magnetic	JD
250	Electronic LI	
	Electronic LSI	
60- 150	Electronic LI	HG
	Electronic LSI	
250	Electronic LI	JG
	Electronic LSI	
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	
800	Electronic LI	MG
1000- 1200	Thermal Magnetic	PG
800- 1200	Electronic LSI	
1200	Thermal Magnetic	PJ
	Electronic LSI	

### 100% Rating Circuit Breakers

Ampere Range	Trip Type	C. B. Frame Size
15- 150	Thermal Magnetic	HD
60- 150	Electronic LI	
	Electronic LSI	
175- 250	Thermal Magnetic	JD
250	Electronic LI	
	Electronic LSI	
60- 150	Electronic LI	HG
	Electronic LSI	
250	Electronic LI	JG
	Electronic LSI	
400	Electronic LI	LG
	Electronic LSI	
600- 800	Electronic LSI	PG
	Electronic LSI G	

### Circuit Breaker Lugs Per Phase (Al/Cu)

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

### Accessories

Accessory	Breaker Frame
Auxiliary Contacts	H, J, LA, LG, M, P
Shunt Trip 12VDC	H, J, LA, LG, M, P
Shunt Trip 24VDC	H, J, LA, LG, M, P
Undervoltage Trip 12VDC	H, J, LA, LG, M, P
Undervoltage Trip 24VDC	H, J, LA, LG, M, P
Alarm Switch	H, J, LA, LG, M, P
Overcurrent Switch	H, J, LA, LG, M, P
<b>Note:</b> LA frame accepts a maximum combination of (2) internal accessories (not including padlock attachment)	



## Enclosed Circuit Breakers

### Enclosure Specifications

Frame Size	Dimensions, L x W x H, mm (in.)	
	NEMA 1	NEMA 3R
H, J	365 x 156 x 797 (14.4 x 6.2 x 31.4)	374 x 156* x 820 (14.8 x 6.2* x 32.3)
LA	388 x 165* x 1130 (15.3 x 6.5* x 44.5)	391 x 200* x 1118 (15.4 X 7.9* X 44.0)
LG †	519 x 293 x 1515 (20.4 x 11.5 x 59.6)	519 x 293 x 1515 (20.4 x 11.5 x 59.6)
M, P	533 x 248 x 1324 (21.0 x 9.58 x 52.1)	533 x 309 x 1324 (21.0 x 12.2 x 52.1)
* Width does not include circuit breaker operating handle.		
† Enclosures accept 80% rated L- frame circuit breakers 600A max OR 100% rated L-frame circuit breakers 400A max.		

### Solid Neutral Assemblies and Ground Kits

Frame Size	Neutral or Ground	Maximum Ampere Rating	Terminals	Conductors per Terminal	Wire Size	Type
H, J	Neutral	100	2	1	#14 to 1/0	CU
					#12 to 1/0	AL
	Neutral	250	2	1 or 2	#1 to 600 #1 to 250	AL or CU
			2	1	#4 to 300	AL or CU
LA	Ground	250	2	1	#6 to 300	AL or CU
	Neutral	400	2	1 or 2	#1 to 600	AL or CU
			2	1 or 2	#1 to 250	AL or CU
	Ground	—	2	1	#10 to 2/0	CU
LG			2	1	#6 to 2/0	AL
	Neutral	200- 1000	2	3	3/0 to 500	AL or CU
	Ground	—	4	1	#6 to 250	AL or CU
M, P	Neutral	1200	8 (4 in, 4 out)	1	3/0 to 500	AL or CU
				2	#6 to 350	AL or CU
	Ground	—	4	1	#6 to 300	AL or CU





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

## Enclosed Circuit Breakers and Fused Disconnect Switches

The following loose circuit breakers and fused disconnect switches are available in NEMA 1 enclosures for remote mounting.

### 100% Rating 3P Circuit Breakers, 2500-3250 kW

Amps	Trip Type	Volts	Hz	kW	Approvals
3000	Electronic LI	600	60	2500	UL891
4000		780	60	2500	UL891
4000		600	60	2800/ 3000/ 3250	UL891
5000		380	50	2500/ 2800/ 3250	IEC
5000		480	60	2800/ 3000/ 3250	IEC
3000	Electronic LSIG	600	60	2500	UL891
4000		480	60	2500	UL891
4000		600	60	2800/ 3000/ 3250	UL891
5000		380	50	2500/ 2800/ 3250	IEC
5000		480	60	2800/ 3000/ 3250	IEC

### NEMA 1 Enclosure Specifications, Breakers

Size	Dimensions, L x W x H, mm (in.)	
	mm	in.
3000 A	914.4 x 914.4 x 2324	36 x 36 x 91.5
4000 A	1219 x 1067 x 2324	48 x 42 x 91.5
5000 A	1219 x 1219 x 2324	48 x 48 x 91.5

### Fused Disconnect Switches 50/60 Hz, HVL-CC Switch, UL and IEC

Amps	Trip Type	Poles	Accessories
200 400 600	Fuse	3P	None
			3 Auxiliary Contacts
			3 Auxiliary Contacts and Blown Fuse Indicator
			3 Auxiliary Contacts, Blown Fuse Indicator, and Protective Relay

### NEMA 1 Enclosure Specifications, Fused Disconnect Switches

Size	Dimensions, L x W x H, mm (in.)	
	mm	in.
13.8 kV	946 x 749 x 2591 *	37.25 x 29.5 x 102
4160 V	946 x 883 x 2591 *	37.25 x 34.75 x 102

\* Height includes pull box.

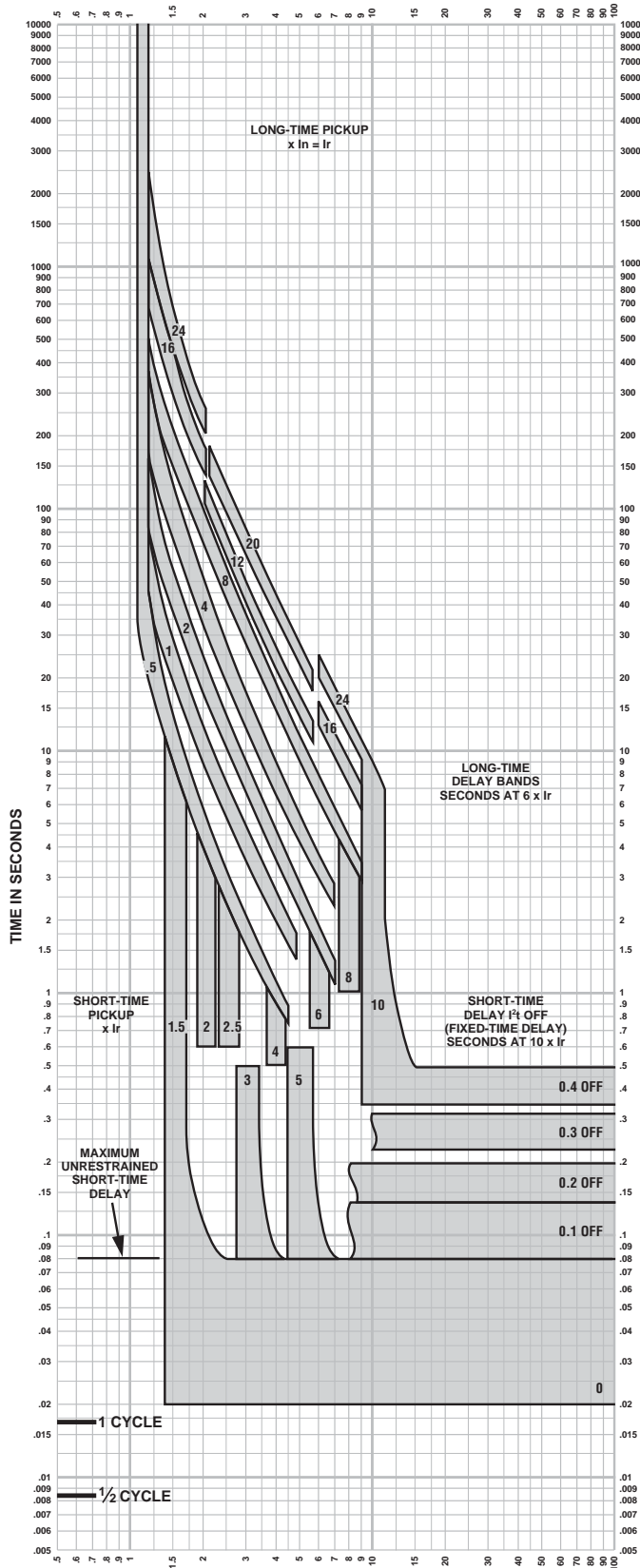
Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator set distributor for availability.

DISTRIBUTED BY:

© 2007 Kohler Co. All rights reserved.



CURRENT IN MULTIPLES OF  $I_r$  ( $I_r$  = 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  $I^2t$  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

**Schneider**  
**Electric**

© 2000 Schneider Electric. all rights reserved

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



## POWERPACT® P- and R-Frame Molded Case Circuit Breakers (Standard or 100% rated up to 2500 A)

*The most compact and innovative molded case circuit breakers*



P-Frame 1200 A



R-Frame

POWERPACT Molded Case Circuit Breakers lead the industry with proven, reliable protection and innovative design. Providing unparalleled performance and control, this generation of P- and R-frame circuit breakers features exclusive MICROLOGIC® Trip Units, which allow for a range of sophisticated applications for metering and monitoring. In addition, units can be interchanged to allow for maximum flexibility and are field-installable for easy upgrades as needed.

The compact P- and R-frame circuit breakers permit smaller footprint and higher density installations using I-LINE® Panelboards and Switchboards. These circuit breakers are available in 100% rated construction up to 2500 A to meet a broad range of commercial and industrial application needs.

### Full-Featured Performance

- P-frame – 1200 A available in both standard and 100% ratings with sensor sizes 250–1200 A. Interrupting ratings (AIR) G-35kAIR, J-65kAIR and L-100kAIR at 480 VAC
- R-frame – 2500 A available in both standard and 100% ratings with sensor sizes 600–2500 A. Interrupting ratings (AIR) G-35kAIR, J-65kAIR and L-100kAIR at 480 VAC
- Compact breaker size allows for smaller footprint installations using I-LINE Panelboards and Switchboards. 9" width on P-frame designs and 15" width on R-frame designs provide increased density installations
- Most field-installable accessories are common to all frame sizes for easier stocking and installation
- Selection of four interchangeable MICROLOGIC Trip Units with POWERLOGIC® power metering and monitoring capabilities available in advanced trip units
- Compatible with POWERLOGIC® systems and high amperage power circuit breakers
- Built-in MODBUS® protocol provides an open communications platform and eliminates the need to purchase additional, proprietary network solutions
- Connection options include bus, cable or I-Line for installation flexibility
- Additional options are available for 5-cycle closing, stored energy mechanisms and draw-out mounting of 1200 A breakers



## POWERPACT® P- and R-Frame Molded Case Circuit Breakers (Standard or 100% rated up to 2500 A)

### Onboard Intelligence

For “smarter breakers,” a range of MICROLOGIC® Trip Units provides advanced functionality, such as a communications interface, and power metering and monitoring capabilities. With the appropriate MICROLOGIC Trip Unit, you can communicate with breakers, gather power information, monitor events and remotely control breakers based on predetermined conditions, leading to substantial savings in electrical system operating costs.

These interchangeable, microprocessor-controlled, plug-in devices provide the next generation of protection, measurement and control functions, delivering not only greater electrical system safety but also improved system integration and coordination.



*MICROLOGIC® Trip Units*

### Choose the Model that Meets Your Needs

#### MICROLOGIC 3.0 and 5.0

- Basic circuit protection including long-time, instantaneous and optional short-time adjustments

#### MICROLOGIC 3.0A, 5.0A and 6.0A

- Long-time, instantaneous and optional short-time adjustments
- Integrated ammeter and phase loading bar graph
- LED trip indicator
- Zone selective interlocking with downstream and upstream breakers
- Optional ground-fault protection
- Optional MODBUS® communications interface

#### MICROLOGIC 5.0P and 6.0P

- Long-time, instantaneous and optional short-time adjustments
- Advanced relay protection (current imbalance, under/over voltage, etc.)
- Inverse Definite Minimum Time Lag (IdmtL) long-time delay curve shaping for improved coordination
- Basic power metering and monitoring functions
- Standard MODBUS communications interface compatibility with POWERLOGIC® installations
- Standard GF alarm on 5.0P. 6.0P has equipment ground-fault tripping protection

#### MICROLOGIC 5.0H and 6.0H

- All 5.0P and 6.0P functions
- Enhanced POWERLOGIC power metering and monitoring capabilities
- Basic power quality (harmonic) measurement
- Waveform capture

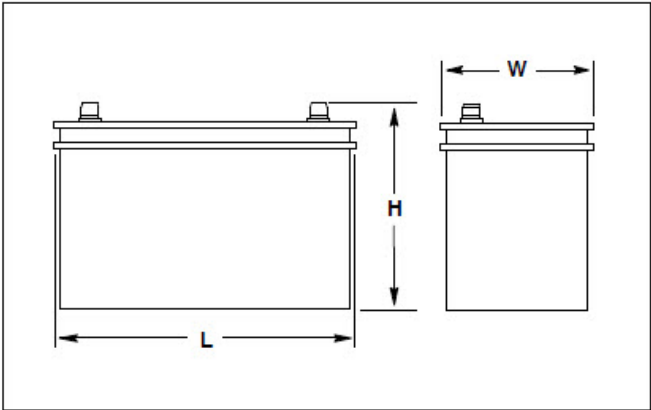
Contact your Square D sales representative for additional information. Or, visit [www.SquareD.com](http://www.SquareD.com).







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

**Battery Post Layouts (A/C/D) and Styles (1/3)**

**A**

**C**

**D**

**1**

**3**

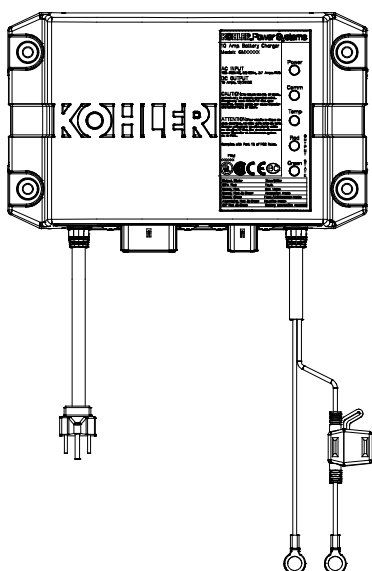
Positive, 17.48 dia.  
Negative, 15.88 dia.  
15.88 height  
1:9 taper

12.7-19.1 height

3/8-16 UNC-2A thread

Notes: Dimensions are in mm; 25.4 mm equals 1 inch. BCI group numbers shown in italics.  
Order stud kit 254427 to convert from Style 3 to Style 1.  
Battery post layout letters and style numbers match drawing 244578 format.





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

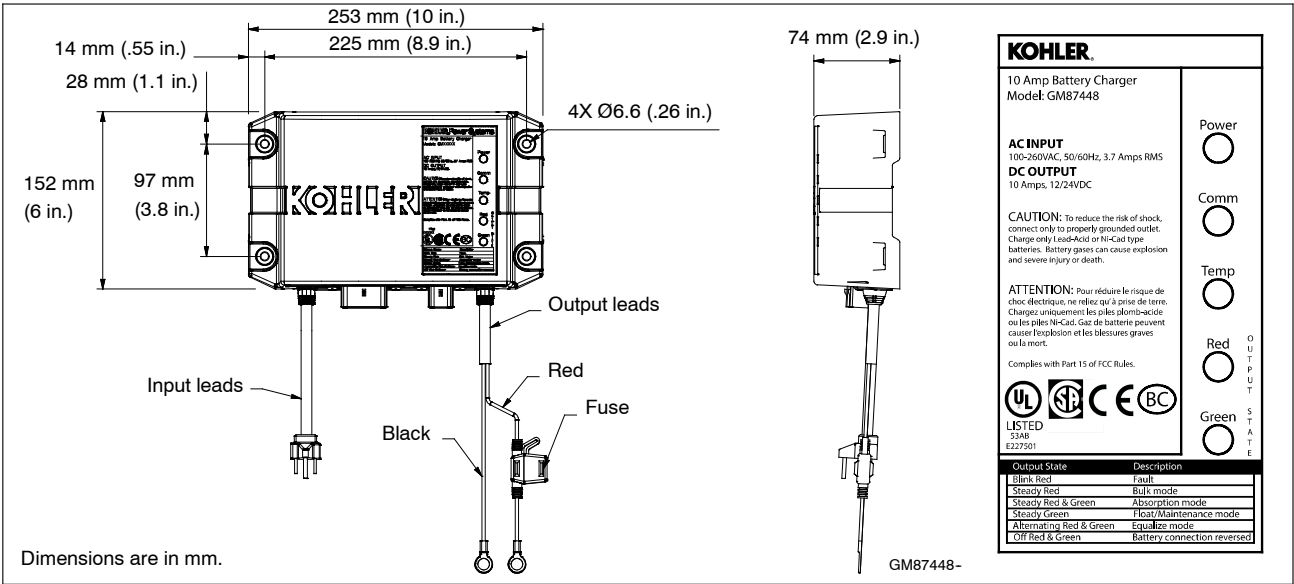
- 12 or 24 VDC output
  - Automatic voltage detection
- Automatic multi-stage charging modes
  - Recovery charge
  - Bulk charge
  - Absorption charge
  - Float charge
  - Equalize charge
- Charges the following type batteries:
  - Flooded lead acid (FLA)
  - AGM
  - Gel cell
  - High performance AGM
  - 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





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



## Specifications

AC Input	100-260 VAC
Frequency Input	50/60 Hz
DC Output	10 Amps @ 12 VDC or 10 Amps @ 24 VDC (On battery voltage regulation $\pm 1\%$ ; current is electronically limited)
Fuse Protection	15 amps ATC
Battery Types	Flooded Lead Acid (FLA) AGM Gel Cell High Performance AGM Nickel-Cadmium (NiCad)
Monitoring LED Indications	Power Communication Temperature compensation Output charger curve and charger status: <ul style="list-style-type: none"><li>Red</li><li>Green</li></ul>
Environmental	
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

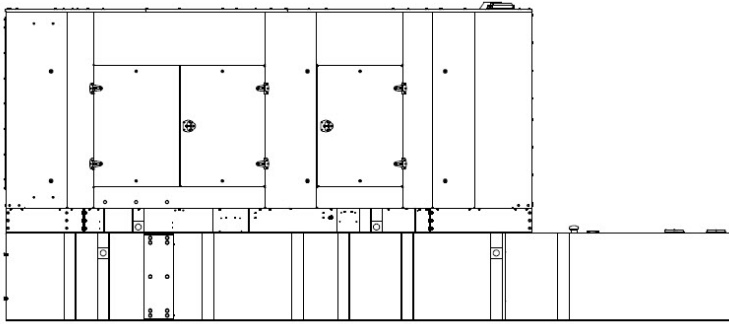
Enclosure	
Environmental Resistant	From rain, snow, dust, and dripping water
Battery Connections	
Lead Length	1.8 m (6 ft.) red and black leads
Battery Connections	9.5 mm (3/8 in.) ring terminals
AC Power Connections	
Lead Length	1.8 m (6 ft.)
Storage	Standard US style 3-prong AC plug
Available Options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

## DISTRIBUTED BY:

Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator distributor for availability.

© 2017, 2019 by Kohler Co. All rights reserved.





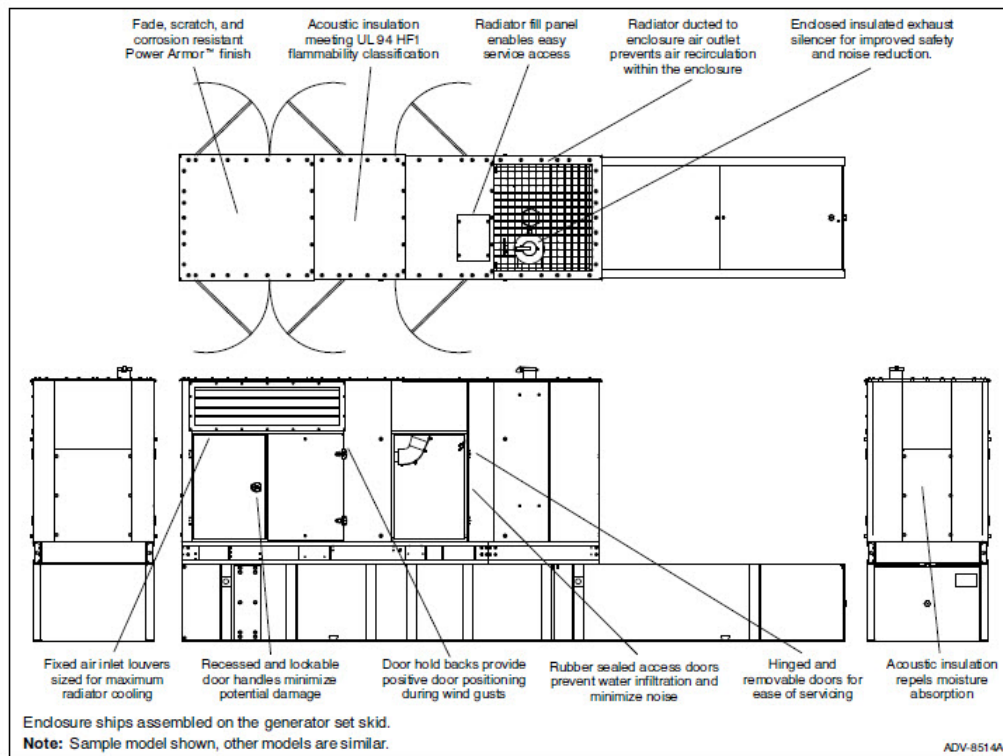
## Sound Enclosure Standard Features

- Internal silencer, flexible exhaust connector and rain cap.
- Mounts to generator set skid. Steel construction with hinged and removable doors.
- Fade-, scratch-, and corrosion-resistant Kohler® Power Armor 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 offering Level 1 or Level 2 around 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.



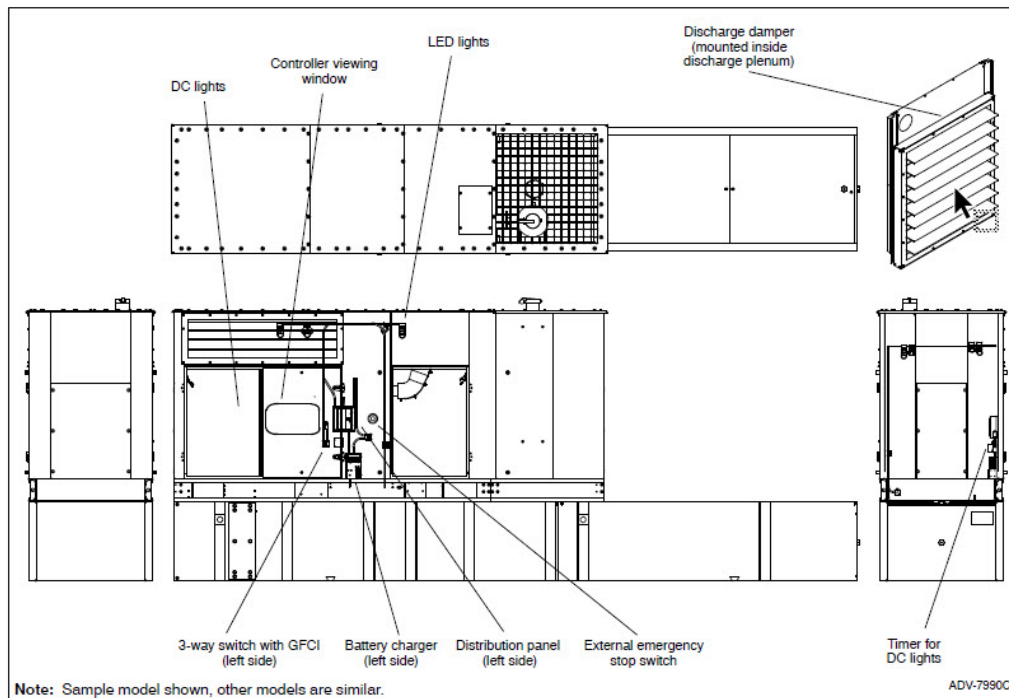


## Sound Enclosure Features

- Heavy-duty formed panels, solid construction. Preassembled 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, and includes rain shield and cap.
- 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 design flexibility without compromising building standards.
- 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. Weather protective design featuring vertical air discharge. Exhausts air through a punched air outlet grille.
- Heavy-duty formed panels, solid construction. Preassembled 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.
- Attenuated 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)	84.7
3384 (894)	24	5761 (227)	1495 (59)	6229 (13732)	3238 (127)	838 (33)	84.7
Lift base	0	5520 (217)	1495 (59)	4346 (9581)	2400 (94)	0 (0)	84.7
3384 (894)	24	5761 (227)	1495 (59)	5830 (12852)	3238 (127)	838 (33)	84.7

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.

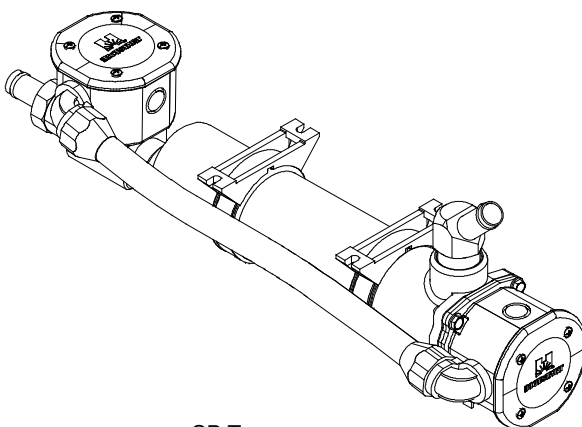
\* Max. weight includes the generator set (wet) with largest alternator option, enclosure, silencer, and tank (no fuel).



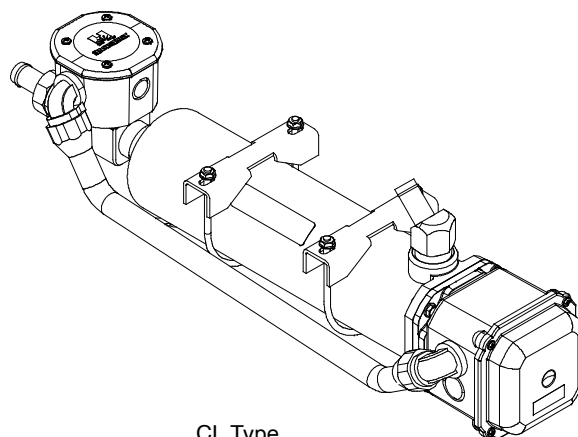
---

**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

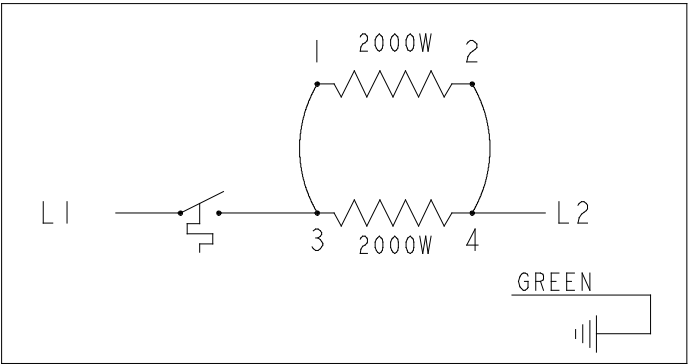
Heating Fluid	Water, Coolant Mix (50% Glycol/50% Water)
Thermostat Temperature Range	27° - 38° C (80° - 100° F)
Temperature High Limit	96° C (205° F)
Max. Pressure	125 psi (860 kPa)
Inlet/Outlet Plumbing	1 in. NPT
System Ingress	NEMA 4

## Specifications

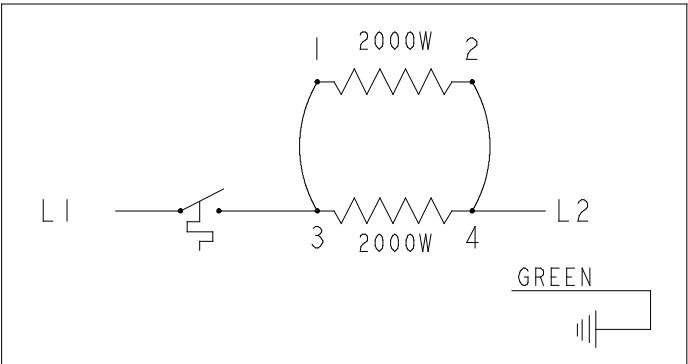
Block Heater Kit Number	Component	Watts	Voltage	Phase
GM75809- KA1	GM76113	2500	90- 120	1
GM75809- KA2	GM76114	2500	190- 208	1
GM75809- KA3	GM76115	2500	210- 240	1
GM75809- KA4	GM76116	2500	380- 480	1
GM76120- KA1	GM76113	2500	90- 120	1
GM76120- KA2	GM76114	2500	190- 208	1
GM76120- KA3	GM76115	2500	210- 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



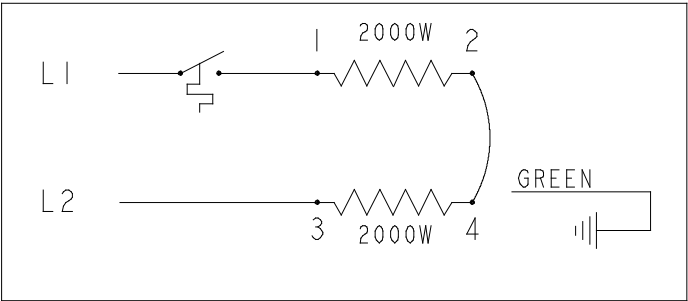
Wiring Diagram



208 VAC single phase- parallel



240 VAC single phase- parallel

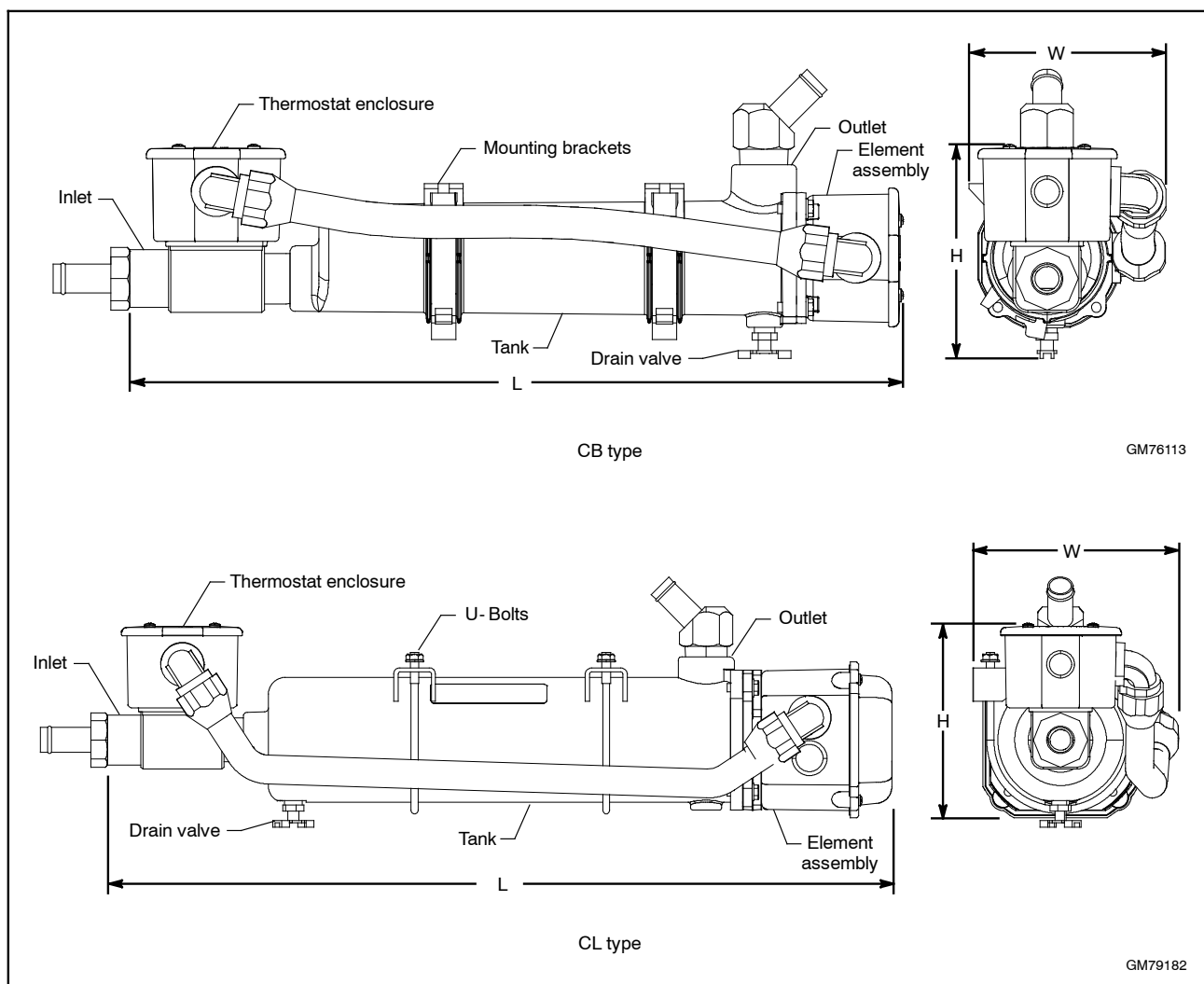


480 VAC single phase- parallel



## 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:**

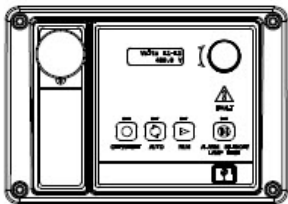
Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator distributor for availability.

© 2020 Kohler Co. All rights reserved.





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 voltagae regulator design providing ±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	± 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.

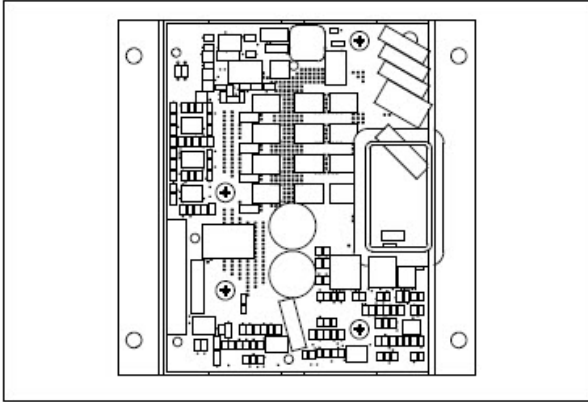
#### Voltage Regulator Menu

- 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)





- 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.





## Alternator Data



## TECHNICAL INFORMATION BULLETIN

### Alternator Data Sheet

Alternator Model: 5M4027

12-MAR-19

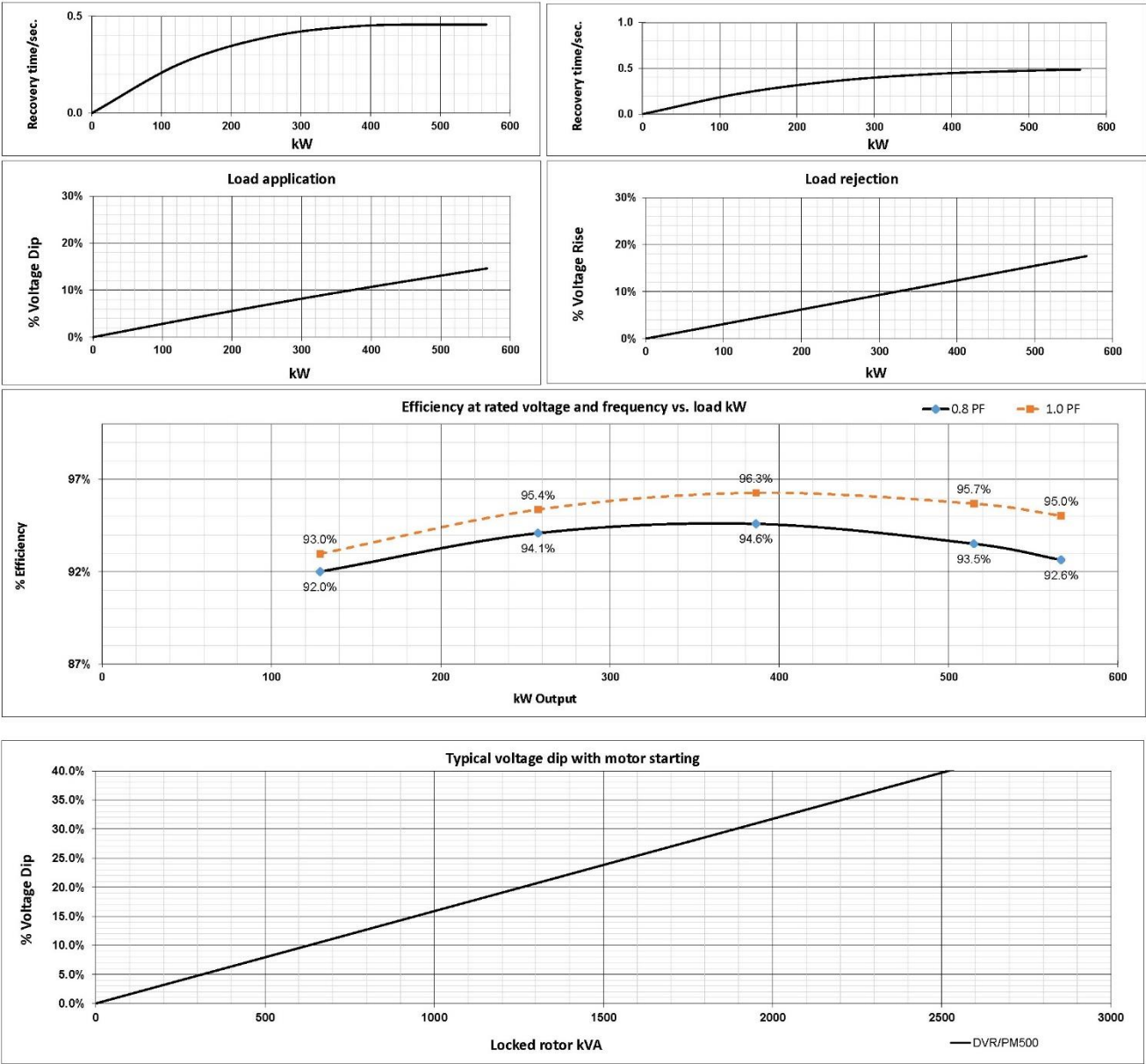
Kilowatt ratings at	1800 RPM	60 Hertz		12 Leads			
kW (kVA)	3 Phase	0.8 Power Factor		Dripproof or Open Enclosure			
	CONTINUOUS ① ②		STANDBY ① ②				
Voltage*	NEMA B / 80 °C	NEMA F / 105 °C	NEMA H / 125 °C	NEMA F / 130 °C	NEMA H / 150 °C		
240/480	440 (550)	500 (625)	515 (644)	515 (644)	560 (700)		
220/440	410 (513)	460 (575)	485 (606)	500 (625)	520 (650)		
208/416	400 (500)	445 (556)	470 (588)	475 (594)	505 (631)		
200/400	382 (478)	427 (534)	441 (551)	443 (554)	459 (574)		
190/380	360 (450)	405 (506)	405 (506)	405 (506)	405 (506)		
① Rise by resistance method, Mil-Std-705, Method 680.1b.                      ② Machine rated for Max Ambient of 40 °C, Max Altitude 3300 ft							
Submittal Data: 480 Volts*, 515 kW, 644 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase				High Wye CONNECTION			
Mil-Std-705B Method	Description	Value	Units	Mil-Std-705C Method	Description	Value	Units
301.1b	Insulation Resistance	>1.5 Meg	Ohms	505.3b	Overspeed	2250	RPM
302.1a	High Potential Test			507.1c	Phase Sequence CCW-ODE	ABC	
	Main Stator	1960	Volts	508.1c	Voltage Balance, L-L or L-N	0.2%	
	Main Rotor	1500	Volts	601.4a	L-L Harmonic Max - Total (Distortion Factor)	5.0%	
	Exciter Stator	1500	Volts				
	Exciter Rotor	1500	Volts	601.4a	L-L Harmonic Max - Single	3.0%	
401.1a	PMG Stator	1500	Volts	601.1c	Deviation Factor	5.0%	
	Stator Resistance, Line to Line	0.01260	Ohms	---	TIF (1960 Weightings)	<50	
	High Wye Connection			---	THF (IEC, BS & NEMA Weightings)	<2%	
	Rotor Resistance	0.398	Ohms				
	Exciter Stator	23	Ohms				
410.1a	Exciter Rotor	0.045	Ohms				
	PMG Stator	2.1	Ohms				
420.1a	No Load Exciter Field Amps at 480 Volts Line to Line	0.7	A DC	Additional Prototype Mil-Std Methods are Available on Request.			
420.1a	Short Circuit Ratio	0.591					
421.1a	Xd Synchronous Reactance	2.670	PU	--	Generator Frame	572	
		0.956	Ohms	--	Type	MagnaMax	
422.1a	X2 Negative Sequence React.	0.226	PU	--	Insulation	Class H	
		0.081	Ohms	--	Coupling - Single Bearing	Flexible	
423.1a	X0 Zero Sequence Reactance	0.056	PU	--	Amortisseur Windings	Full	
		0.020	Ohms	--	Excitation	Ext. Voltage Regulated, Brushless	
425.1a	X'd Transient Reactance	0.162	PU	--	Voltage Regulator	DVR2000E+	
		0.058	Ohms	--	Voltage Regulation	0.25%	
426.1a	X''d Subtransient Reactance	0.137	PU				
		0.049	Ohms				
--	Xq Quadrature Synchronous Reactance	1.100	PU	--	Cooling Air Volume	1520	CFM
		0.394	Ohms	--	Heat rejection rate	2033	Btu's/min
427.1a	T'd Transient Short Circuit Time Constant	0.114	Sec	--	Full load current	774.3	Amps
				--	Minimum Input hp required	738.3	HP
428.1a	T''d Subtransient Short Circuit Time Constant	0.01	Sec	--	Full load torque	2153	Lb-ft
				--	Efficiency at rated load :	93.5%	
430.1a	T'do Transient Open Circuit Time Constant	1.68	Sec				
432.1a	Ta Short Circuit Time Constant of Armature Winding	0.017      Sec					
				--	Weight	2840	lbs

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

The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. © 2015 Kohler Co. All rights reserved.



TYPICAL DYNAMIC CHARACTERISTICS

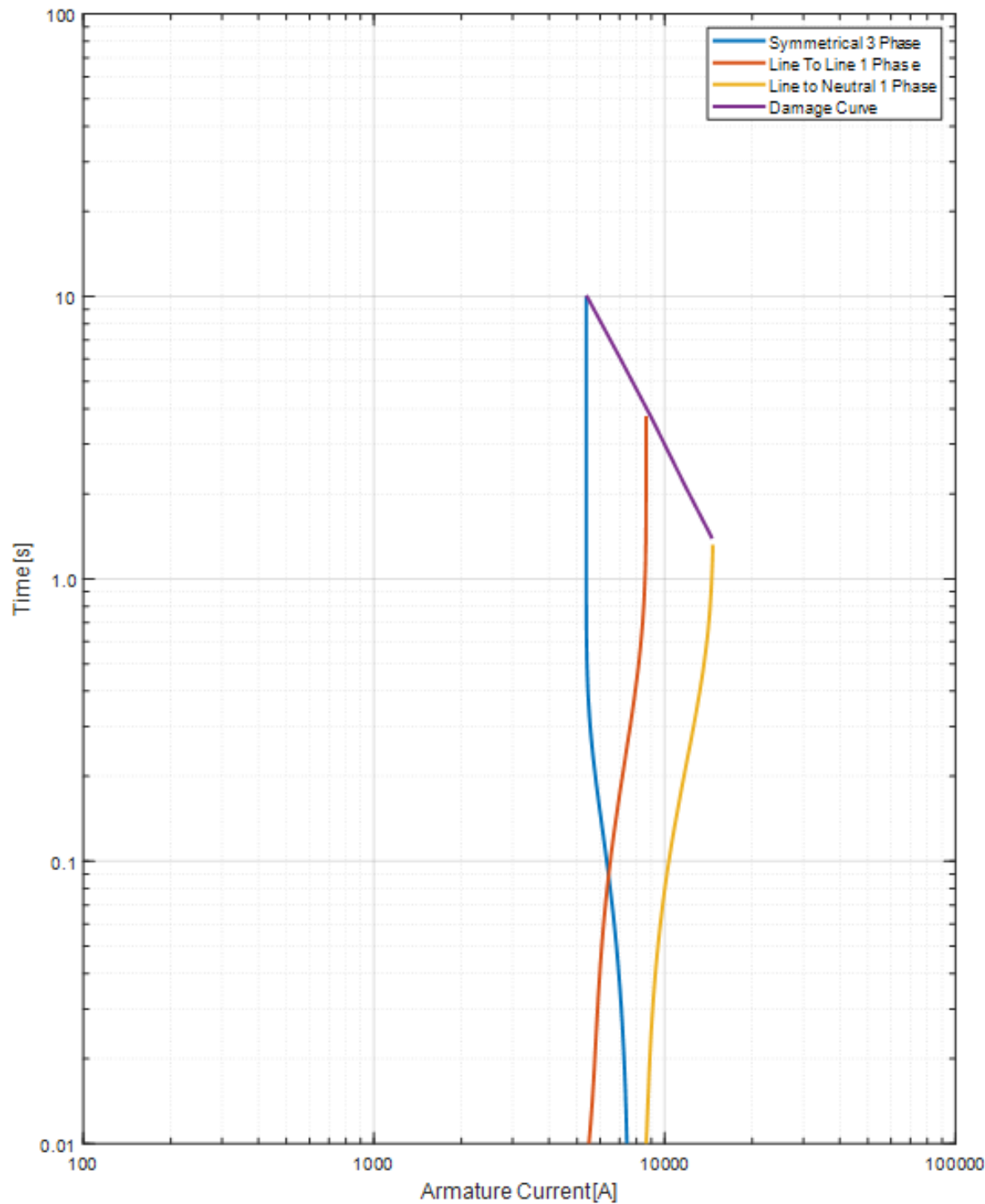


Voltage refers to wye (star) connection, unless otherwise specified..



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

**Full Load Current:** 1788 Amps **Steady State S.C. Current:** 5364 Amps **Max. 3 ph. Symm. S.C. Current:** 9770 Amps

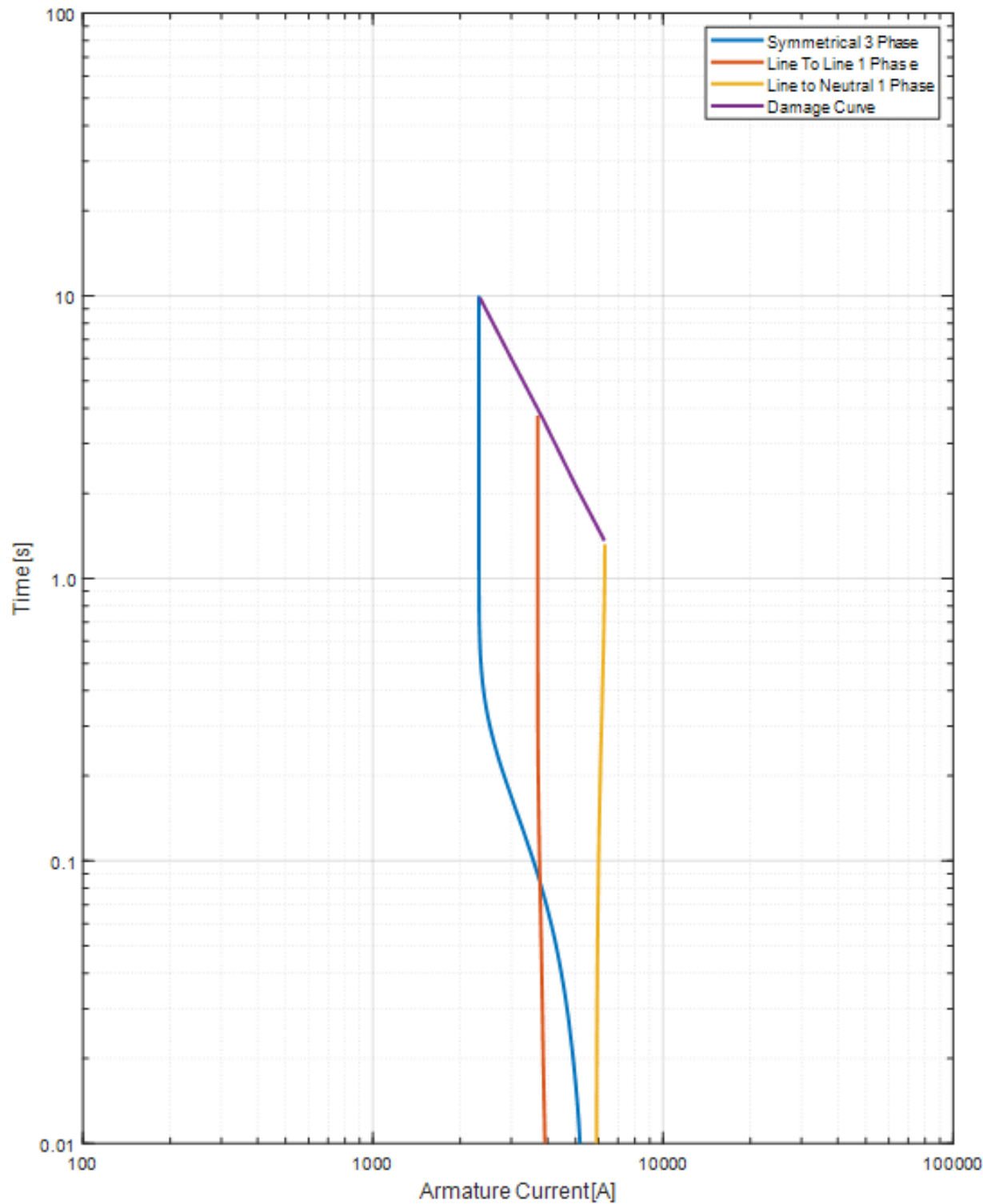


NOTE: Symmetrical component values are shown, maximum asymmetrical values are 1.732 times the symmetrical values.



SHORT CIRCUIT DECREMENT CURVE  
60 Hz, High Wye Connection

Full Load Current: 775 Amps Steady State S.C. Current: 2325 Amps Max. 3 ph. Symm. S.C. Current: 5657 Amps



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





# Cooling Data



---

**TECHNICAL INFORMATION BULLETIN**


---

**Generator Set Cooling System Data Sheet**

500REOZJC 60Hz (Standby Duty)	50°C Ambient Temperature Cooling System								
	Total external restriction on open unit <sup>7</sup>	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)	Enclosed Units
	Maximum allowable ambient temperature	°C (°F)	50 (122)	47 (117)	45 (113)	43 (109)	42 (108)	NA (NA)	45 (113)
	Cooling system airflow	m³/min <i>(ft³/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.





## 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	Level 2 Sound Enclosure
500REOZJC	60	100% Load	119.5	94.8	92.9	84.7	76.0
		No Load	102.6	90.3	88.4	76.8	70.9

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.

500REOZJC		60 Hz		Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
100% Load	7 (23)	Level 2 Sound	3:00	56.0	69.5	65.4	67.1	68.6	65.1	56.3	48.4	74.6
			1:30	54.8	69.0	67.0	69.5	70.7	66.4	58.5	50.8	76.0
			12:00-Engine	56.0	65.7	68.6	71.5	69.5	69.8	64.8	55.7	76.7
			10:30	52.9	69.3	67.4	70.7	70.3	68.3	62.2	53.5	76.6
			9:00	56.0	70.4	69.6	68.6	68.8	68.3	60.7	51.9	76.4
			7:30	56.1	72.3	68.0	67.8	68.2	66.6	56.4	54.5	76.2
			6:00-Alternator	59.4	69.9	69.7	70.3	64.9	66.1	58.9	57.5	75.9
			4:30	54.6	72.1	67.2	66.0	68.1	65.8	54.2	50.0	75.6
			8-pos. log avg.	56.1	70.2	68.1	69.3	68.9	67.3	60.2	53.7	76.0

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
100% Load	7 (23)	Level 1 Sound	3:00	62.4	72.4	68.8	74.6	75.4	74.4	71.2	64.5	81.3
			1:30	60.8	70.3	72.4	78.2	80.9	78.7	74.8	68.5	85.2
			12:00-Engine	64.8	73.1	70.3	80.1	82.8	81.1	76.9	69.9	87.1
			10:30	59.0	71.5	72.3	78.3	81.2	79.4	75.5	68.7	85.6
			9:00	63.4	73.0	72.2	76.5	79.7	77.7	74.4	67.4	84.3
			7:30	61.9	74.5	71.0	77.6	79.3	77.0	72.7	67.2	84.1
			6:00-Alternator	63.9	73.7	71.8	77.0	79.7	79.9	70.5	65.2	84.7
			4:30	62.4	74.9	72.4	75.9	76.9	75.1	70.3	63.0	82.6
			8-pos. log avg.	62.6	73.1	71.6	77.6	80.0	78.4	73.9	67.3	84.7

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	3:00	1:30	12:00 Eng.	10:30	9:00	7:30	6:00 Alt.	4:30	8-pos. log avg.
100% Load	7 (23)	Weather	Overall Levels	93.8	92.5	92.0	94.1	94.5	93.8	87.6	92.0	92.9

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)		Measurement Clock Position	Octave Band Center Frequency (Hz)							Overall Level	
				63	125	250	500	1000	2000	4000		8000
100% Load	7 (23)	Open Unit, Isolated Exhaust	3:00	60.2	71.0	81.2	84.3	88.3	91.6	86.9	87.8	95.7
			1:30	57.6	69.6	86.6	86.9	87.5	87.9	83.9	85.1	94.4
			12:00-Engine	66.3	73.5	87.1	83.0	88.7	88.7	82.6	77.5	93.9
			10:30	64.9	74.7	87.5	85.1	90.3	91.3	86.4	81.8	96.0
			9:00	66.1	75.4	85.3	85.3	89.3	93.2	86.3	84.5	96.4
			7:30	64.1	73.4	86.1	82.8	89.1	92.2	85.8	82.3	95.7
			6:00-Alternator	64.5	73.7	82.8	82.9	81.2	84.0	77.5	74.3	89.5
			4:30	60.9	70.8	79.9	82.4	87.6	89.9	85.3	83.7	93.9
			8-pos. log avg.	63.9	73.1	85.3	84.4	88.3	90.6	85.0	83.6	94.8



				Sound Pressure Levels, dB(A)							
Load	Distance, m (ft)	Exhaust	Octave Band Center Frequency (Hz)								Overall Level
			63	125	250	500	1000	2000	4000	8000	
100% Load	1 (3.3)	Raw Exhaust (No Silencer)	94.7	101.9	106.7	107.4	109.4	114.1	114.4	111.1	119.5

500REOZJC		60 Hz		Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Octave Band Center Frequency (Hz)							Overall Level	
				63	125	250	500	1000	2000	4000		8000
No Load	7 (23)	Level 2 Sound	3:00	52.5	61.6	63.0	62.3	63.5	56.8	47.8	40.9	69.1
			1:30	50.9	63.5	64.8	62.6	66.3	58.0	48.1	41.4	70.8
			12:00-Engine	52.2	62.4	65.6	62.2	64.2	57.6	48.8	39.3	70.2
			10:30	50.8	63.4	63.3	63.2	63.8	57.8	47.9	40.7	69.8
			9:00	53.2	62.3	67.6	61.2	62.1	59.1	48.6	41.4	70.6
			7:30	52.9	63.4	67.5	60.9	63.6	61.0	49.3	43.3	71.1
			6:00-Alternator	56.8	66.0	70.5	64.7	63.6	60.8	54.7	49.6	73.5
			4:30	52.9	64.8	64.8	60.8	64.2	59.9	47.1	42.1	70.4
8-pos. log avg.			53.2	63.6	66.6	62.4	64.1	59.1	49.8	43.7	70.9	

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
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

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	3:00	1:30	12:00 Eng.	10:30	9:00	7:30	6:00 Alt.	4:30	8-pos. log avg.
No Load	7 (23)	Weather	Overall Levels	88.0	89.5	89.6	90.3	88.3	88.2	83.6	86.4	88.4

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)		Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
No Load	7 (23)	Open Unit, Isolated Exhaust	3:00	55.4	66.8	80.9	81.4	85.2	84.4	79.6	70.8	89.9
			1:30	50.7	66.0	86.3	85.9	84.3	83.2	77.6	71.1	91.4
			12:00-Engine	57.2	68.7	87.2	80.3	86.9	83.3	77.6	71.5	91.5
			10:30	57.5	68.8	87.5	81.0	87.0	85.2	80.4	73.0	92.2
			9:00	56.9	70.3	84.4	80.3	84.4	84.4	78.8	71.0	90.2
			7:30	55.8	68.4	85.6	78.1	84.2	83.9	77.8	69.5	90.1
			6:00-Alternator	56.4	67.4	82.4	77.1	78.4	76.8	69.3	60.0	85.5
			4:30	56.6	68.4	79.6	78.9	83.0	83.7	77.4	67.9	88.3
			8-pos. log avg.	56.2	68.3	85.0	81.2	84.8	83.6	78.1	70.4	90.3

				Sound Pressure Levels, dB(A)							
Load	Distance, m (ft)	Exhaust	Octave Band Center Frequency (Hz)								Overall Level
			63	125	250	500	1000	2000	4000	8000	
No Load	1 (3.3)	Raw Exhaust (No Silencer)	80.2	87.3	95.1	95.3	95.3	97.2	92.7	84.2	102.6





# 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
500REOZJC	All Weather & Sound Level 1 (SL1) Enclosures	32.5	2.4	16-40	1.2-2.9	GM110933	GM110935	ADV-8189
	All Sound Level 2 (SL2) Enclosures	29.5	2.2	16-40	1.2-2.9	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
500REOZJC	All Weather & Sound Level 1 (SL1) Enclosures	32.5	2.4	16-40	1.2-2.9	GM110933	GM110935	ADV-8189
	All Sound Level 2 (SL2) Enclosures	29.5	2.2	16-40	1.2-2.9	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.





# Emissions Data





## 500REOZJC

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

#### ENGINE INFORMATION

Model:	John Deere, 6135HFG75A	Bore:	132mm (5.2 in.)
Nameplate BHP @ 1800 RPM:	755	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:	MJDXL13.5132
Compression Ratio	16.0:1	EPA Certificate:	MJDXL13.5132-009

#### 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
141	282	422	563
228	225	207	200
			97
			524

#### 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

0.12
5.60
0.6
0.04

Values are in g/kWh unless otherwise noted

#### TEST METHODS AND CONDITIONS

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

Data and specifications subject to change without notice.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2022 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT

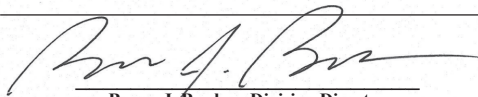
OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105

**Certificate Issued To:** Deere & Company  
(U.S. Manufacturer or Importer)

**Certificate Number:** NJDXL13.5132-010

**Effective Date:**  
08/09/2021

**Expiration Date:**  
12/31/2022

  
Byron J. Bunker, Division Director  
Compliance Division

**Issue Date:**  
08/09/2021

**Revision Date:**  
N/A

**Model Year:** 2022

**Manufacturer Type:** Original Engine Manufacturer

**Engine Family:** NJDXL13.5132

**Mobile/Stationary Indicator:** Stationary

**Emissions Power Category:** 560<kW<=2237

**Fuel Type:** Diesel

**After Treatment Devices:** No After Treatment Devices Installed

**Non-after Treatment Devices:** Electronic Control, Smoke Puff Limiter, Non-standard Non-After Treatment Device Installed, Engine Design Modification

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

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

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

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





# Dimensional Drawings













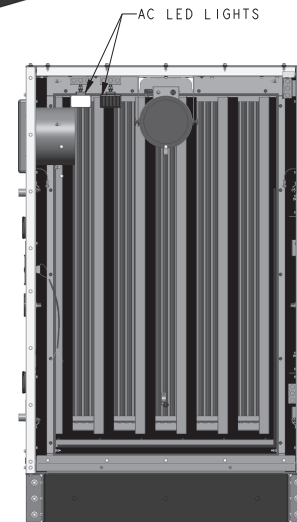
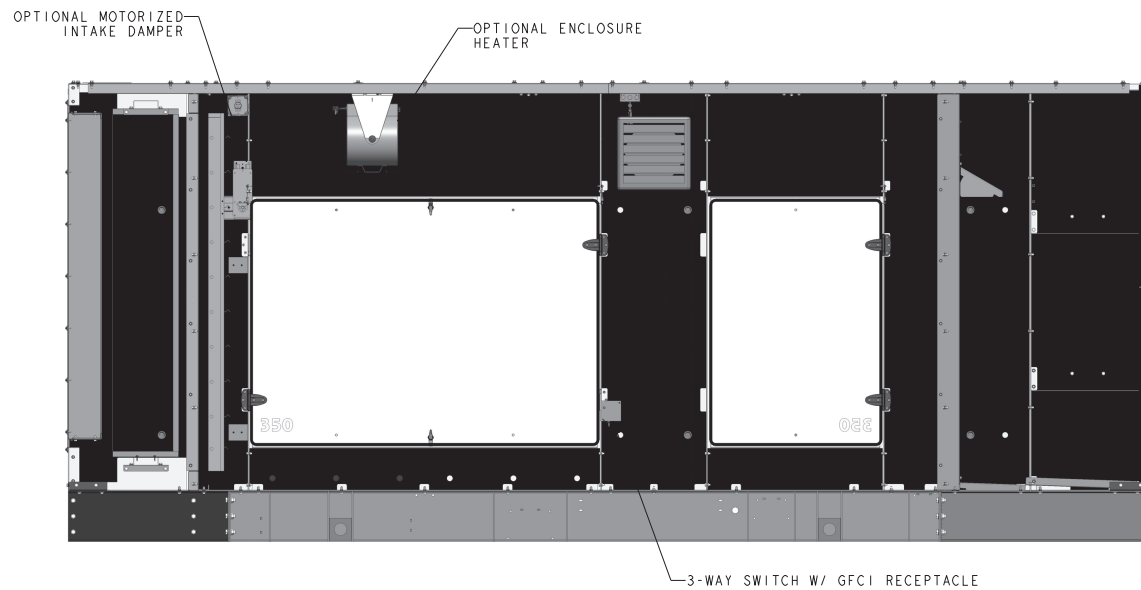
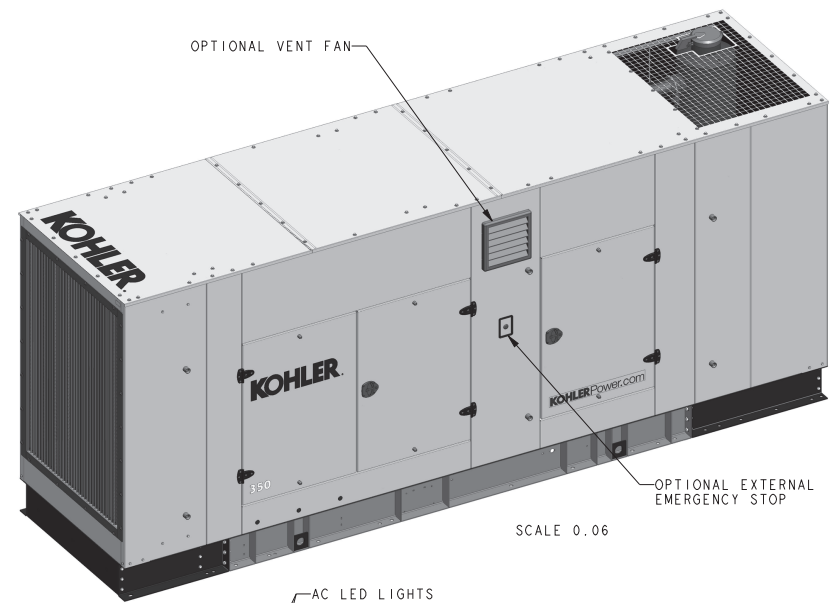






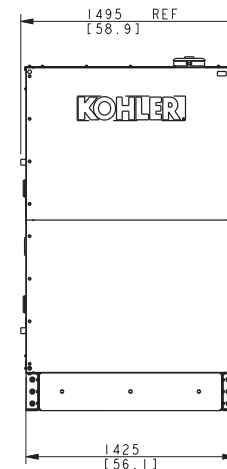
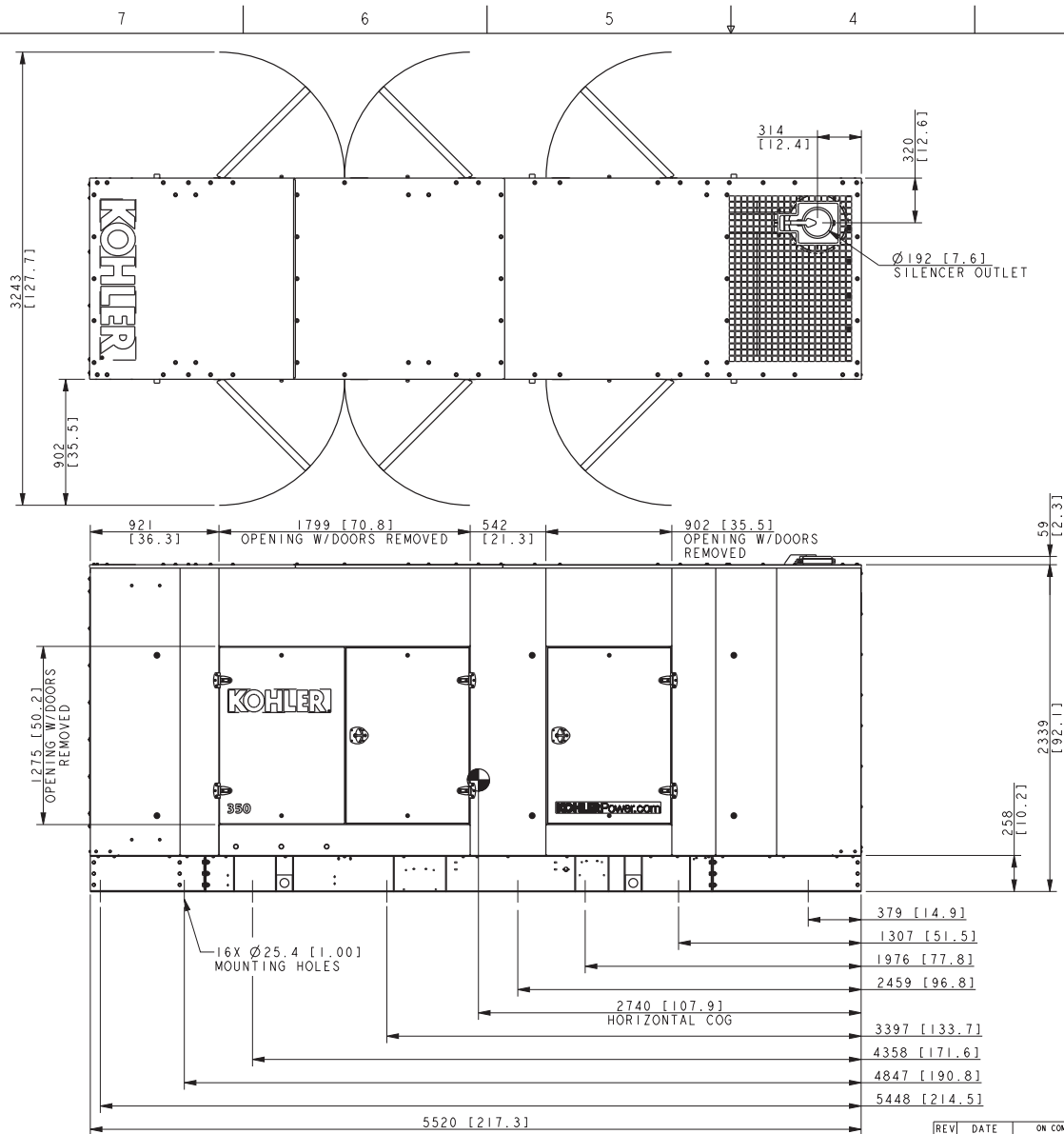







REV	DATE	ON COMPOSITE DWGS. & PART NO. FOR REVISION LEVEL	BY	DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS
A	25NOV2019	NEW DRAWING [CT200393]	YB	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS TOLERANCES: FRACTIONS DECIMALS SURFACE FINISH ± .8 ± .4 ± .3 MAX. ANGLES ± 30°
B	11NOV2021	SEE SHEET 6 & 7 [CT214138] SEE SHEET 7 & 8 [CT215771]	RKN	<b>KOHLER</b> <b>KOHLER WOODWARD COMPANY</b> 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>TITLE</b> <b>DIMENSION PRINT,</b> <b>350-500REJC/JC/D ENCL &amp; TANKS</b>	
			SCALE: 0.08 CAD NO. SHEET 3 of 8	
			ADV-9189 D	





350-500 REOZJC/D		KG [LBS]	
STEEL SOUND L2 ENCLOSURE WEIGHT		1000 [2205] APPROX	
ALUM. SOUND L2 ENCLOSURE WEIGHT		590 [1300] APPROX	
DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS			
REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY
1993		UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS	YBY
214138		GENERAL TOLERANCES:	RNN
215771		FRACTIONS: 1/8" & 1/4" SURFACE FINISH	SAK
		DECIMALS: 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, 10.0	
		ANGLES: 15°, 30°, 45°, 60°, 75°, 90°, 105°, 120°, 135°, 150°, 165°, 180°	
THERMAL PROTECTION			
		TITLE	
APPROVALS		DIMENSION PRINT, & TANKS	
DATE		350-500REOZJC/D ENCL. & TANKS	
BY	25NOV2013		
CHECKED	KJB	SCALE	0.06 CAD NO.
APPROVED	DMS	SHEET 4 of 4	
25NOV2013		ADV-9189	
		D	

350-500KW REOZJC/D  
STEEL & ALUMINUM SL2 ENCL.

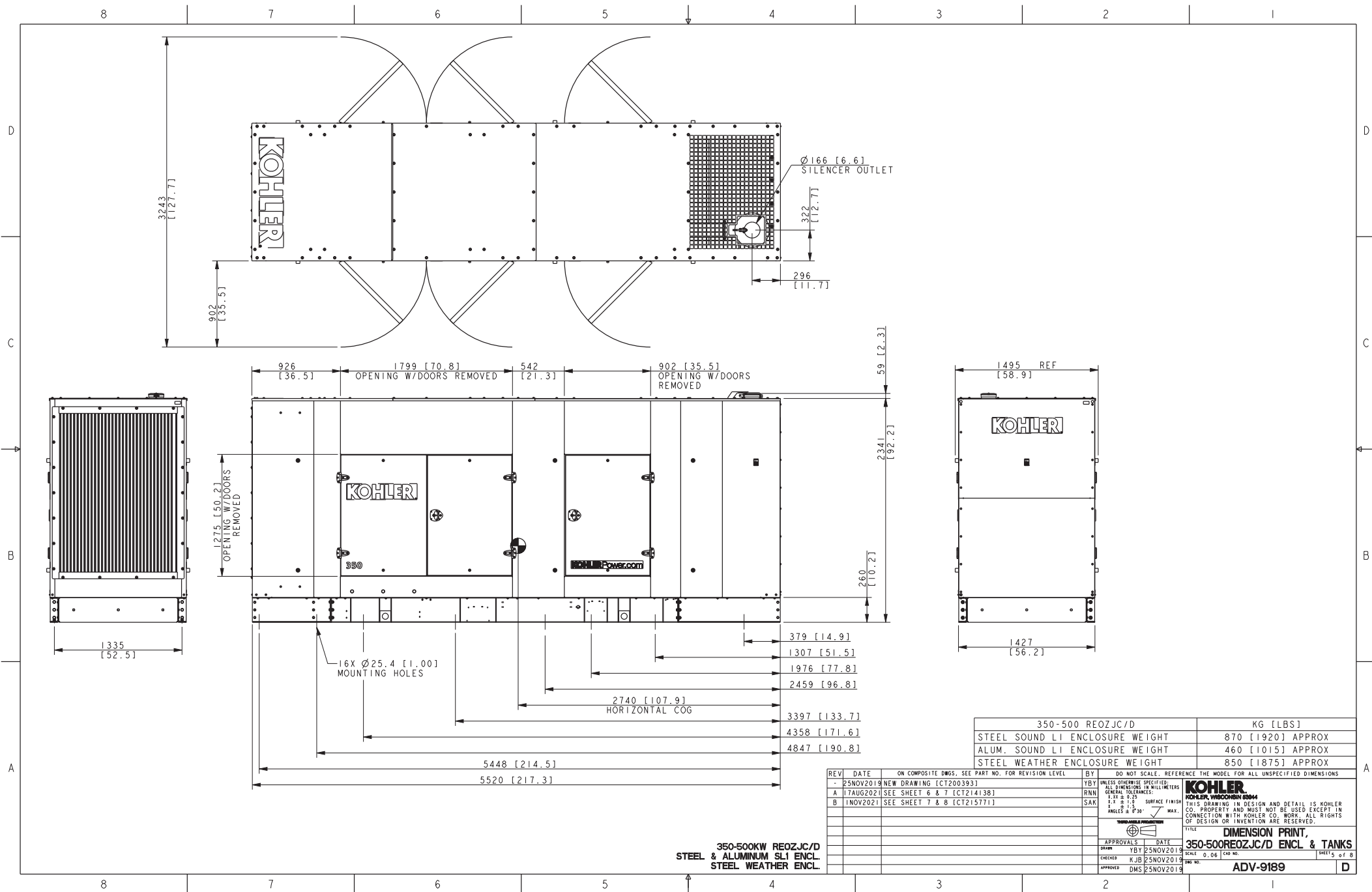
**KOHLER**  
KOHLEK VIBROCONTROL 60044  
THIS DRAWING IN DESIGN AND DETAIL IS KOHLER CO. PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH KOHLER CO. WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.

TITLE  
**350-500REOZJC/D ENCL. & TANKS**

SCALE 0.06 CAD NO. SHEET 2 of 8

ADV-9189



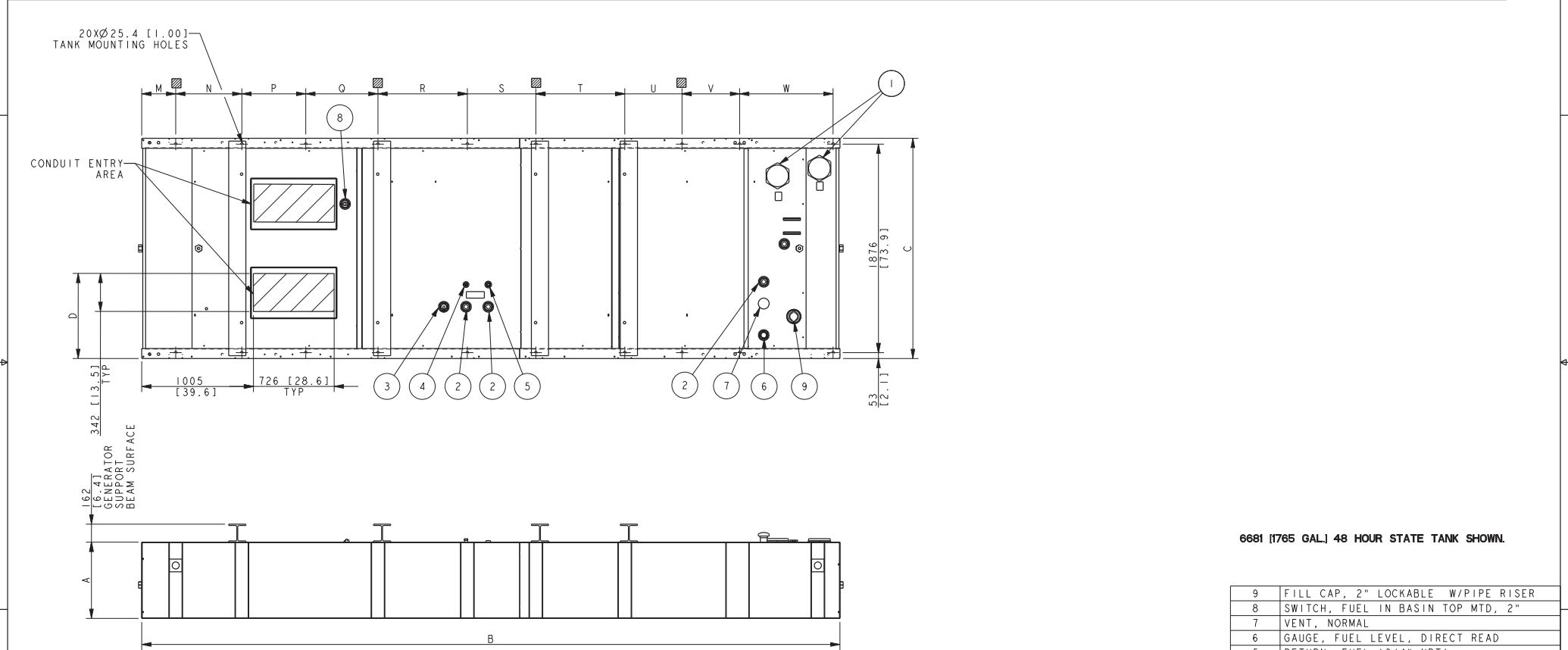








TANK INFORMATION																			
LITERS [GALLONS]	MIN HOURS	GENSETS	DIM A MM [INCH]	DIM B MM [INCH]	DIM C MM [INCH]	DIM D MM [INCH]	TANK WEIGHT KG [LBS] (NO FUEL)	M	N	P	Q	R	S	T	U	V	W	X	Y
5042 [1332]	48 HOURS	350KW	711.2 [28.0]	5850.1 [230.3]	1981.2 [78.0]	816.1 [32.1]	2751 [6064]	305.8 [12.0]	595.1 [23.4]	575.0 [22.6]	649.5 [25.6]	804.0 [31.7]	616.5 [24.3]	800.1 [31.5]	515.0 [20.3]	518.3 [20.4]	840.6 [33.10]	-	-
5818 [1537]	48 HOURS	400KW	812.8 [32.0]	5850.1 [230.3]			2887 [6364]												
6651 [1757]	48 HOURS	500KW	914.4 [36.0]	5850.1 [230.3]			3029 [6678]												
5061 [1337]	48 HOURS STATE	350KW	635.0 [25.0]	6282.0 [247.3]			2953 [6510]												
5852 [1546]	48 HOURS STATE	400KW	711.2 [28.0]	6282.0 [247.3]			3077 [6784]												
6681 [1765]	48 HOURS STATE	500KW	812.8 [32.0]	6282.0 [247.3]			3214 [7087]												



6681 [1765 GAL.] 48 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
ITEM	DESCRIPTION
DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS	
UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: ± 0.5 ± 0.25 SURFACE FINISH ± 0.5 ± 0.25 MAX. ANGLES & 0° 30' ✓	
TYPED AND SIGNED	
APPROVALS DATE	
DRAWN BY 25NOV2019	
CHECKED KJB 25NOV2019	
APPROVED DMS 25NOV2019	
TITLE 350-500REOZJC/D ENCL. & TANKS SCALE 0.05 CAD NO. SHEET 7 of 8	
ADV-9189	

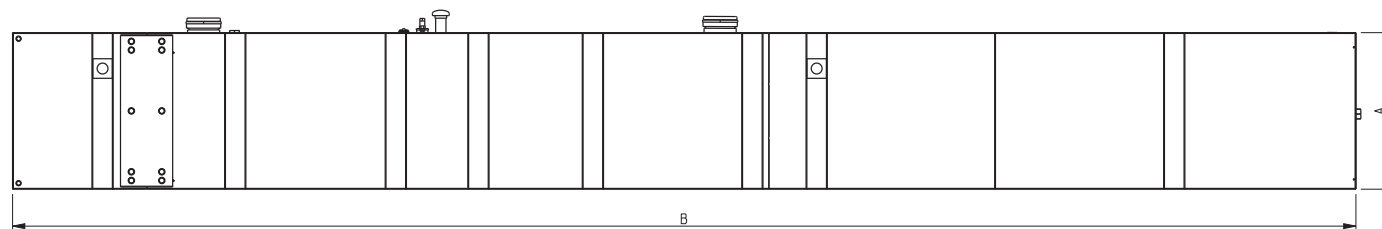
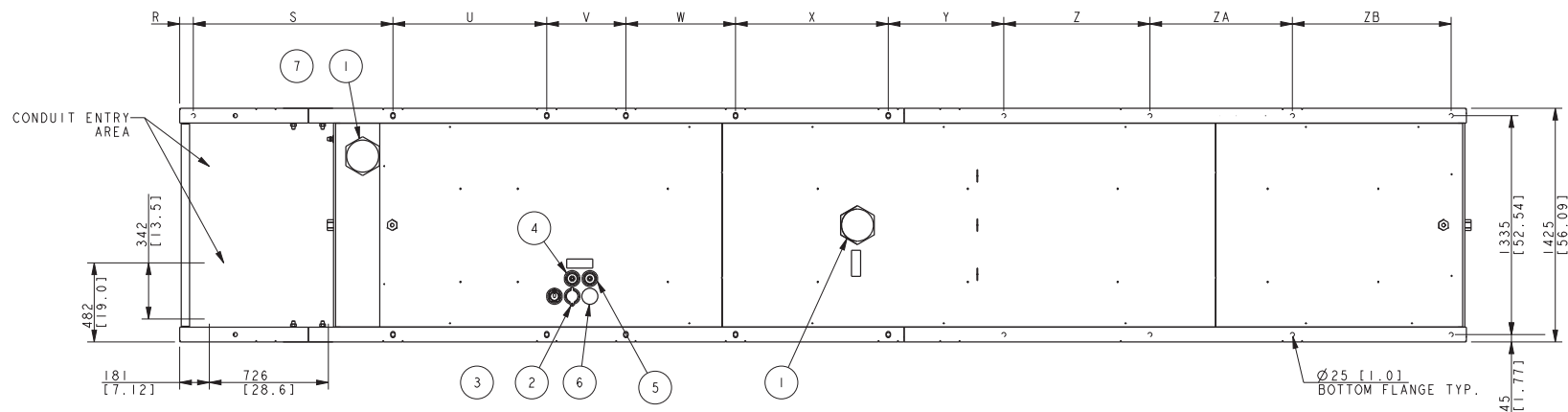
350-500KW REOZJC/D ENCLOSED  
48 HOUR TANKS







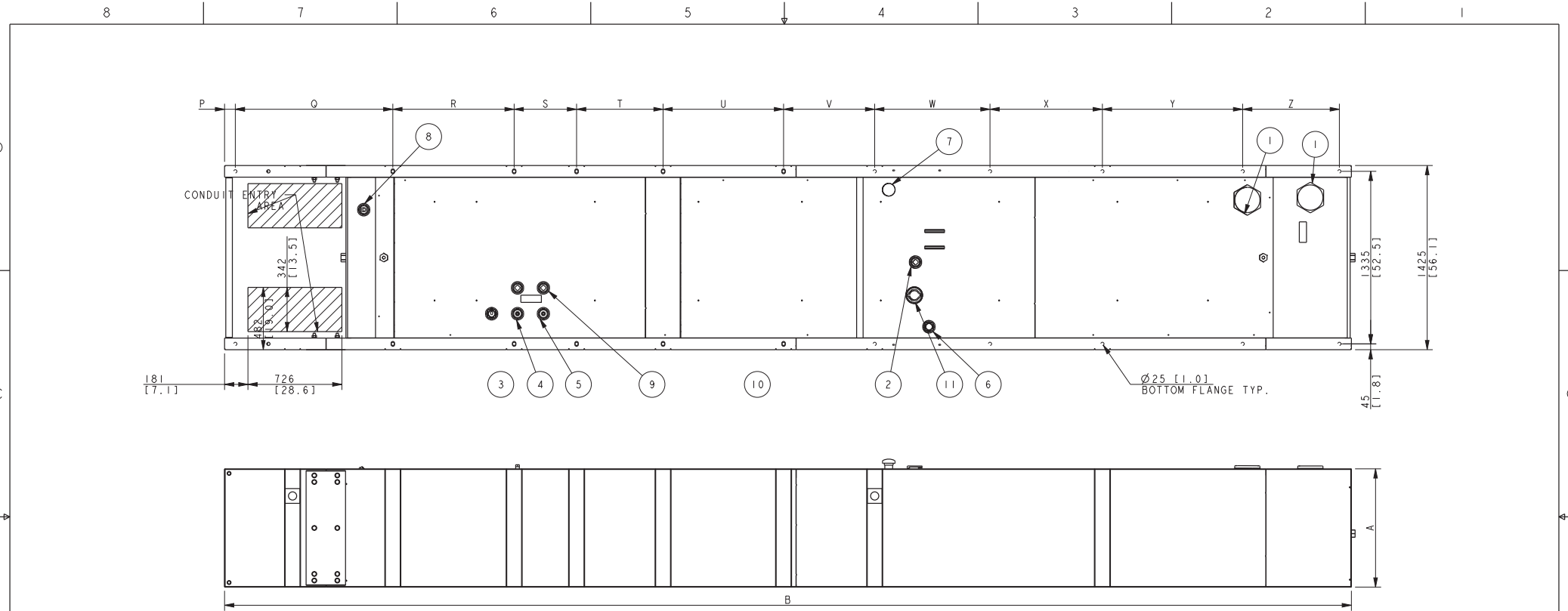
8				7			6			5			4			3			2			1									
TANK W/OPEN UNIT																															
LITERS [GALLONS] MIN HOURS				GENSETS		WEIGHT KG [LBS]		A		B		R		S		U		V		W		X		Y		Z		ZA		ZB	
1530 [404] 12 HOURS				350-400KW		1110 [2446]		406.4 [16.0]		4939.2 [194.4]		83.1 [3.27]		1217.6 [47.94]		937.9 [36.93]		482.6 [19.00]		668.6 [26.32]		931.5 [36.67]		523.9 [20.63]		648.3 [25.52]		576.6 [22.70]		704.6 [27.74]	
1771 [468] 12 HOURS				500KW		1158 [2554]		457.2 [18.0]																							
2930 [774] 24 HOURS				350-400KW		1401 [3089]		762.0 [30.0]																							
3384 [894] 24 HOURS				500KW		1484 [3271]		838.2 [33.0]																							
4394 [1161] 36 HOURS				350-400KW		1789 [3945]		914.4 [36.0]		5637.2 [221.9]																					
5046 [1333] 48 HOURS				350KW		1982 [4370]				6272.2 [246.9]																					
5765 [1523] 48/36 HOURS				400/500KW		2228 [4911]				6983.4 [274.9]																					
6674 [1763] 48 HOURS				500KW		2524 [5565]				7847.0 [308.9]																					



IS31 [404GAL.] 12 HOUR TANK SHOWN.	
7	SWITCH, FUEL IN BASIN
6	VENT, NORMAL
5	RETURN, FUEL (1 1/2" NPT)
4	SUPPLY, FUEL (1 1/2" NPT)
3	GAUGE, FUEL LEVEL, W/ SENDER
2	FILL CAP, 2" LOCKABLE W/PIPE RISER
1	CAP, EMERGENCY VENT
ITEM	DESCRIPTION

REV	DATE	BY	DESCRIPTION	APP'D	CHECKED	DATE	TITLE
A	10-25-12	NEW DRAWING	[CT78128]	KNN	DJV	10-25-12	PAPER SYSTEMS, KOHLER, HJ 53044 U.S.A.
B	10-10-13	SEE SHEET 3	[CT95978]	SVP	HJZ	10-25-12	THIS DRAWING IN DESIGN AND DETAIL IS KOHLER CO. PROPERTY AND MUST NOT BE REPRODUCED OR USED IN CONNECTION WITH KOHLER CO. WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.
A	2-3-17	SEE SHEET 3	[CTI70345]	PAS			DIMENSION PRINT, 350-60E02CJB TANKS





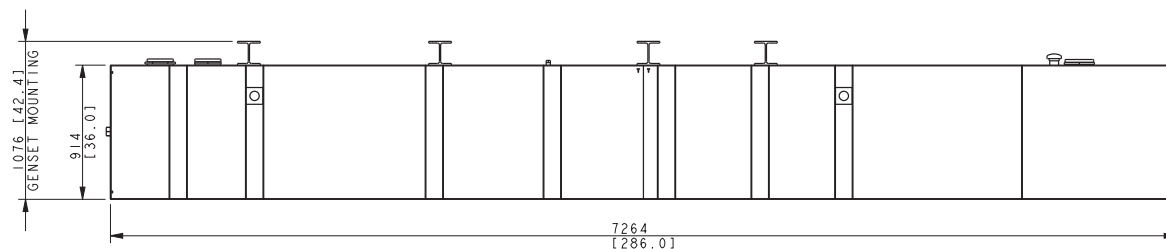
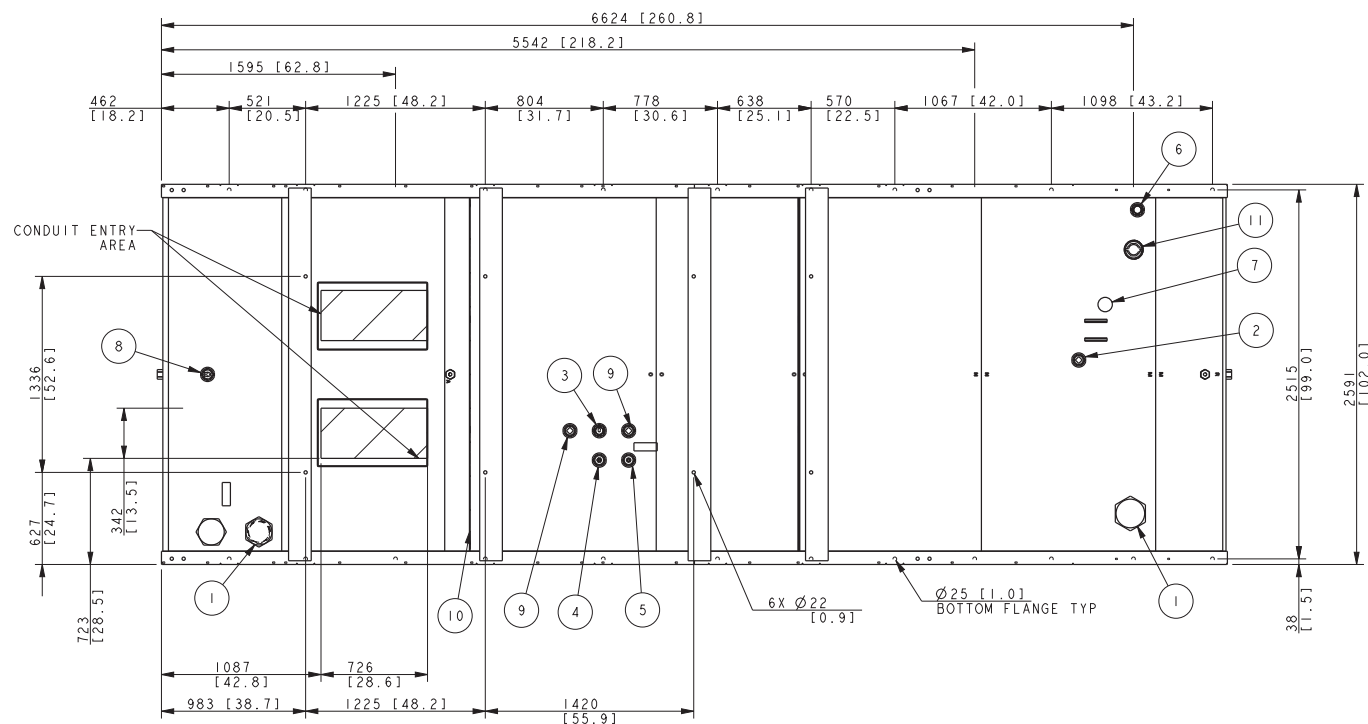
TANK W/OPEN UNIT																
LITERS [GALLONS]	MIN HOURS	GENSETS	WEIGHT KG [LBS]	A	B	P	Q	R	S	T	U	V	W	X	Y	Z
1530 [404]	12 HOURS STATE	350-400KW	1281 [2825]	381.0 [15.0]	5891.2 [231.9]	83.1 [3.27]	1217.6 [47.94]	937.9 [36.93]	482.6 [19.00]	668.6 [26.32]	931.5 [36.67]	664.2 [26.15]	812.7 [32.00]			
1771 [468]	12 HOURS STATE	500KW	1326 [2923]	431.8 [17.0]												
2930 [774]	24 HOURS STATE	350-400KW	1547 [3411]	660.4 [26.0]												
3384 [894]	24 HOURS STATE	500KW	1630 [3594]	736.6 [29.0]												
4394 [1161]	36 HOURS STATE	350-400KW	1874 [4072]	6069.0 [238.9]	914.4 [36.0]							704.3 [27.73]	772.6 [30.42]			
5046 [1333]	48 HOURS STATE	350KW	2094 [4616]	6831.0 [268.9]												
5765 [1523]	48/36 HOURS STATE	400/500KW	2329 [5134]	7669.2 [301.9]												
6674 [1763]	48 HOURS STATE	500KW	2656 [5855]	8710.6 [342.9]												

1531 [404 GAL] 12 HOUR TANK SHOWN.	
11	FILL CAP, 2" LOCKABLE W/PIPE RISER
10	PLUG, PIPE (1/2"NPTF)
9	PLUG, PIPE (2"NPT)
8	SWITCH, FUEL IN BASIN TOP MTD, 2"
7	VENT, NORMAL
6	GAUGE, FUEL LEVEL, DIRECT READ
5	RETURN, FUEL (1/2" NPT)
4	SUPPLY, FUEL (1/2" NPT)
3	GAUGE, FUEL LEVEL, W/ SENDER
2	PLUG, PIPE (2" NPT)
1	CAP, EMERGENCY VENT
ITEM	DESCRIPTION

12 - 48 HOUR  
350-500KW STATE TANK  
OPEN UNIT

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: KNN X .XX ± 0.25 P .P ± 1.5 PAS ANGLES A 0° 30° MAX.	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.	TITLE
-	10-25-12	NEW DRAWING [CT28128]	KNN			KOHLER CO. METRIC PRO-E
A	10-10-13	SEE SHEET 3 [CT59787]	SVP			DIMENSION PRINT, 350-500REOZJB TANKS
B	2-3-17	SEE SHEET 3 [CT170345]	PAS			SCALE 0.40 CAD NO. SHEET 2 of 3
						ADV-8528
						D





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

[illegible]

TANK W/OPEN UNIT			
LITERS [GALLONS]	MIN HOURS	GENSETS	WEIGHT KG [LBS]
10009 [2644]	72 HOURS STATE	350-400KW	3582 [7898]
		500KW	

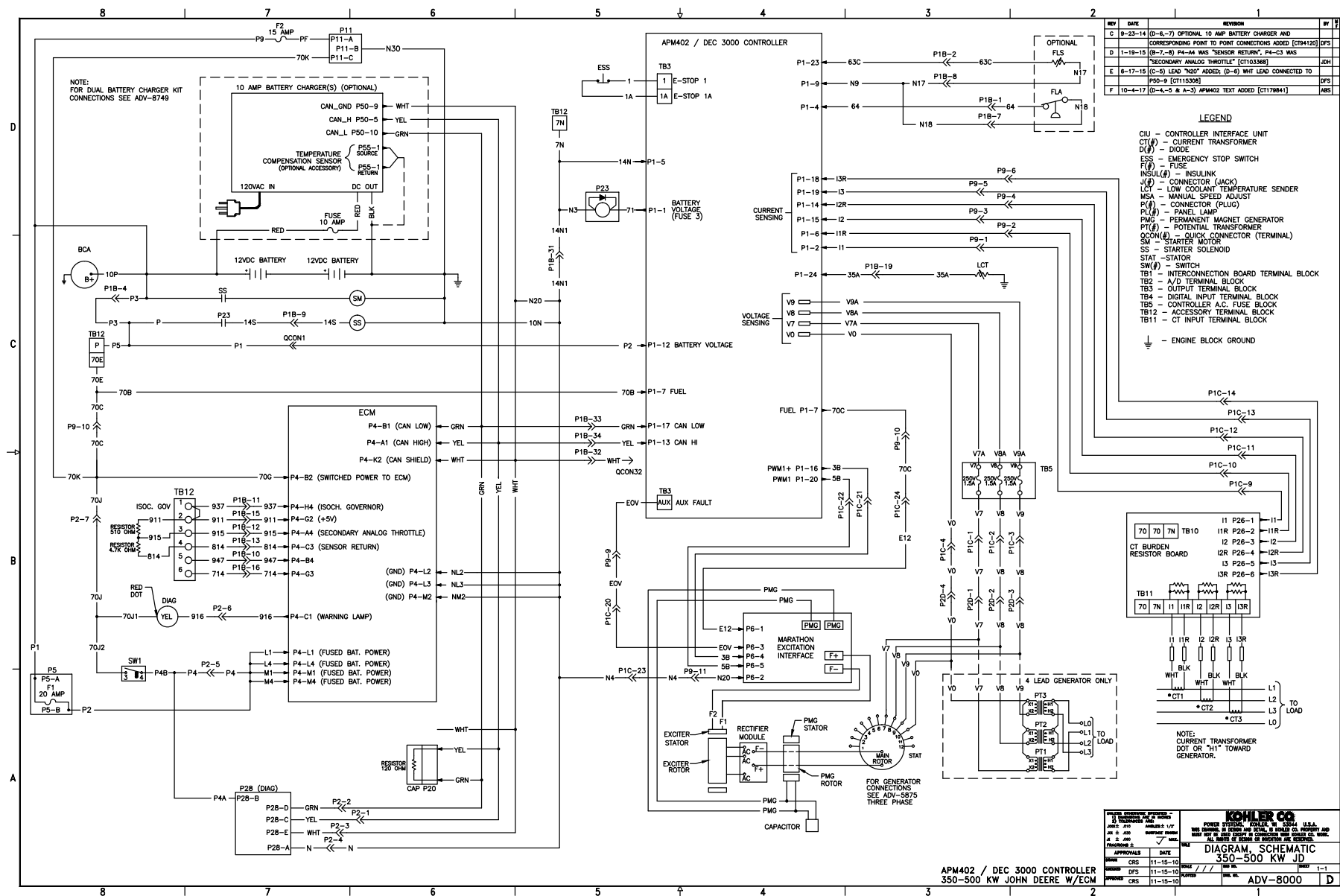
350-500kW 72 HOUR STATE TANK OPEN UNIT



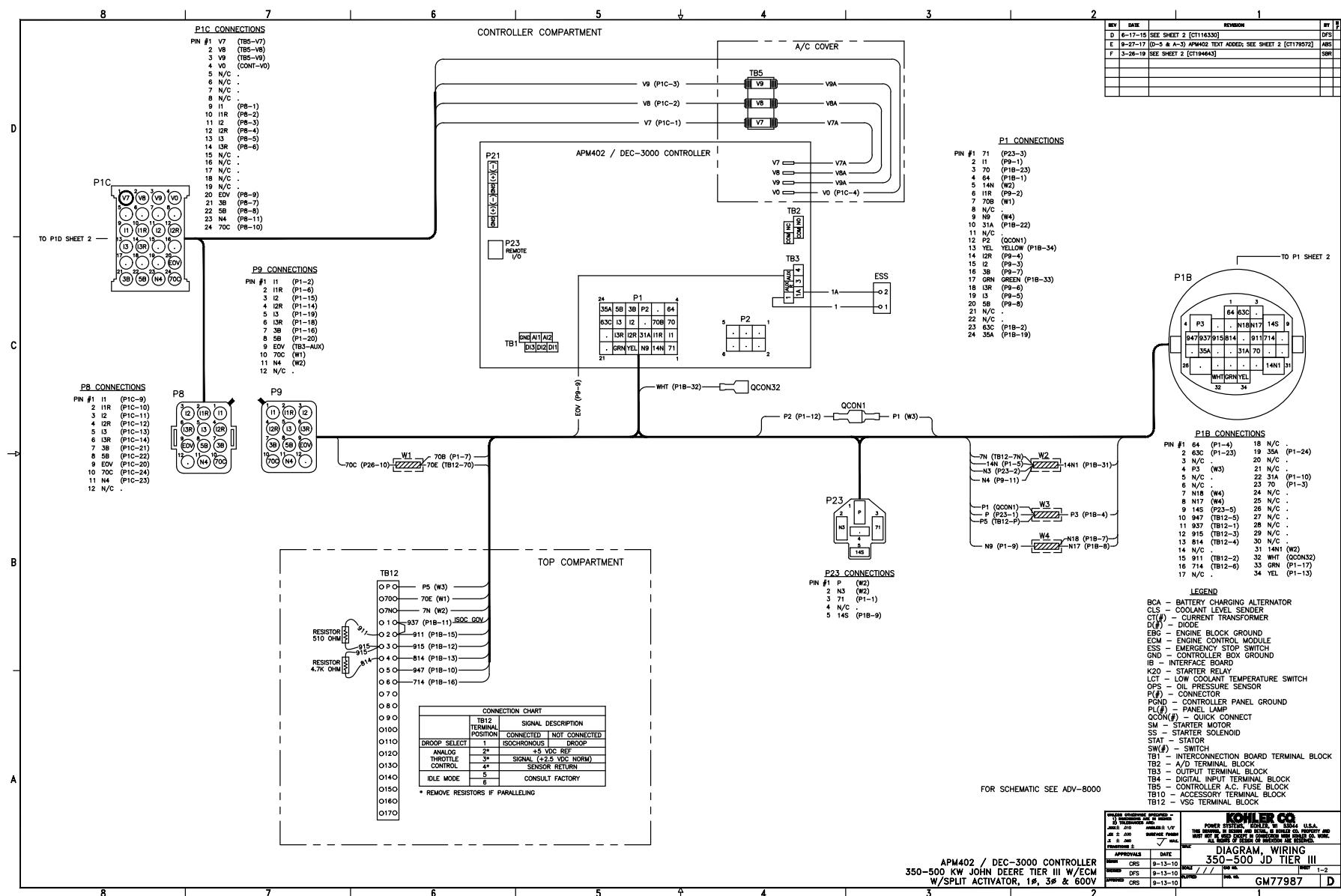


# Wiring Schematics

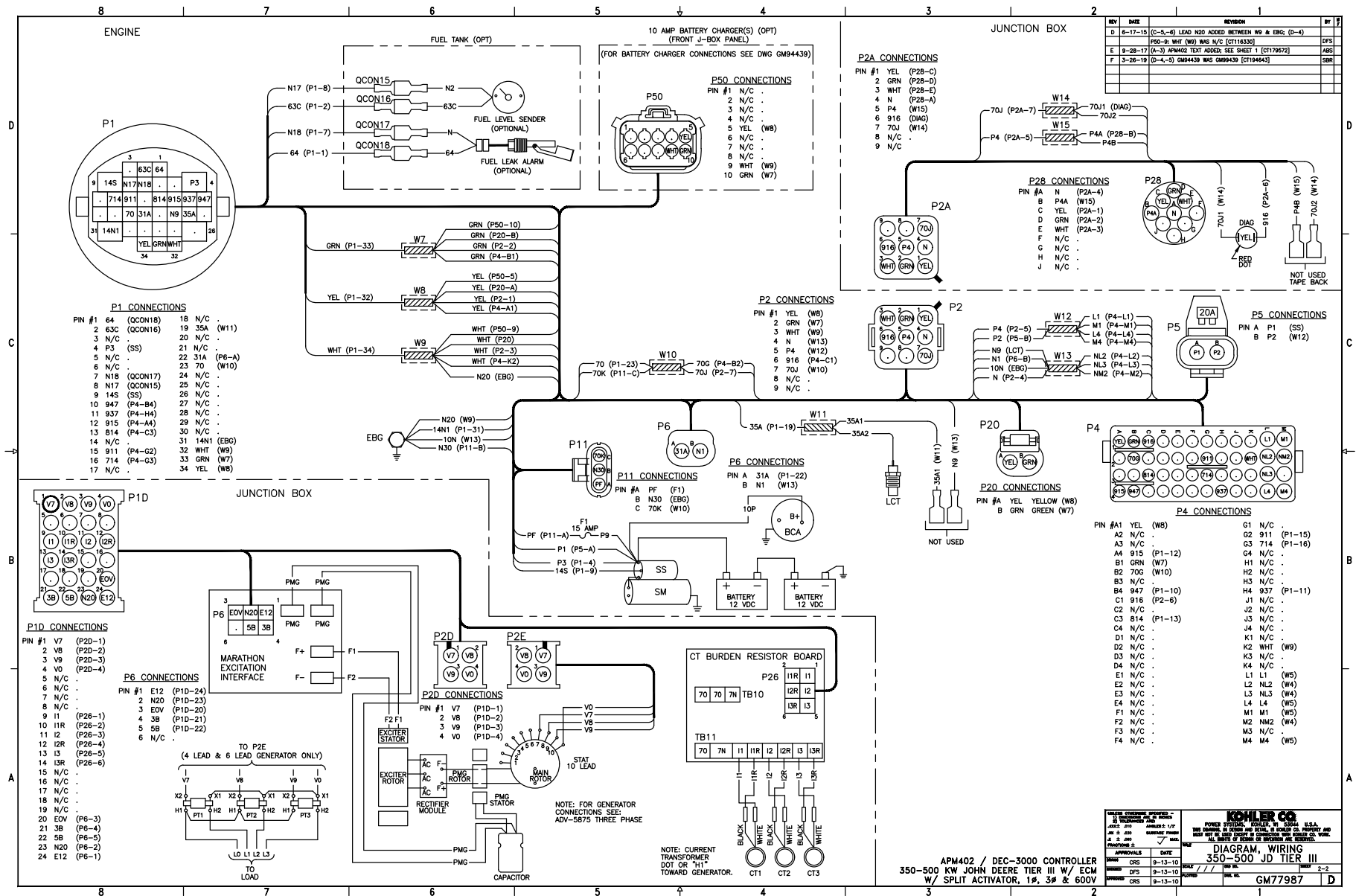




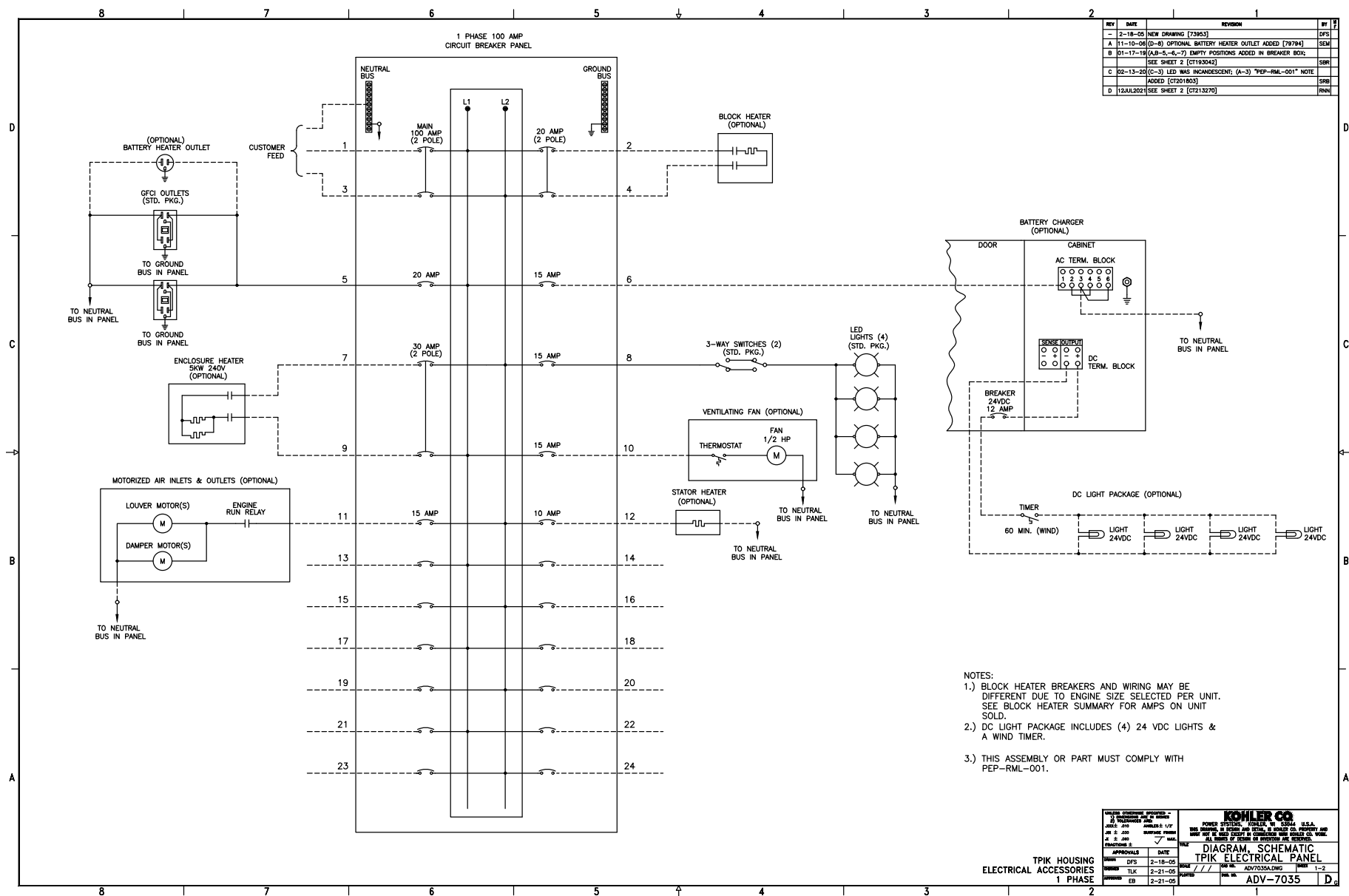




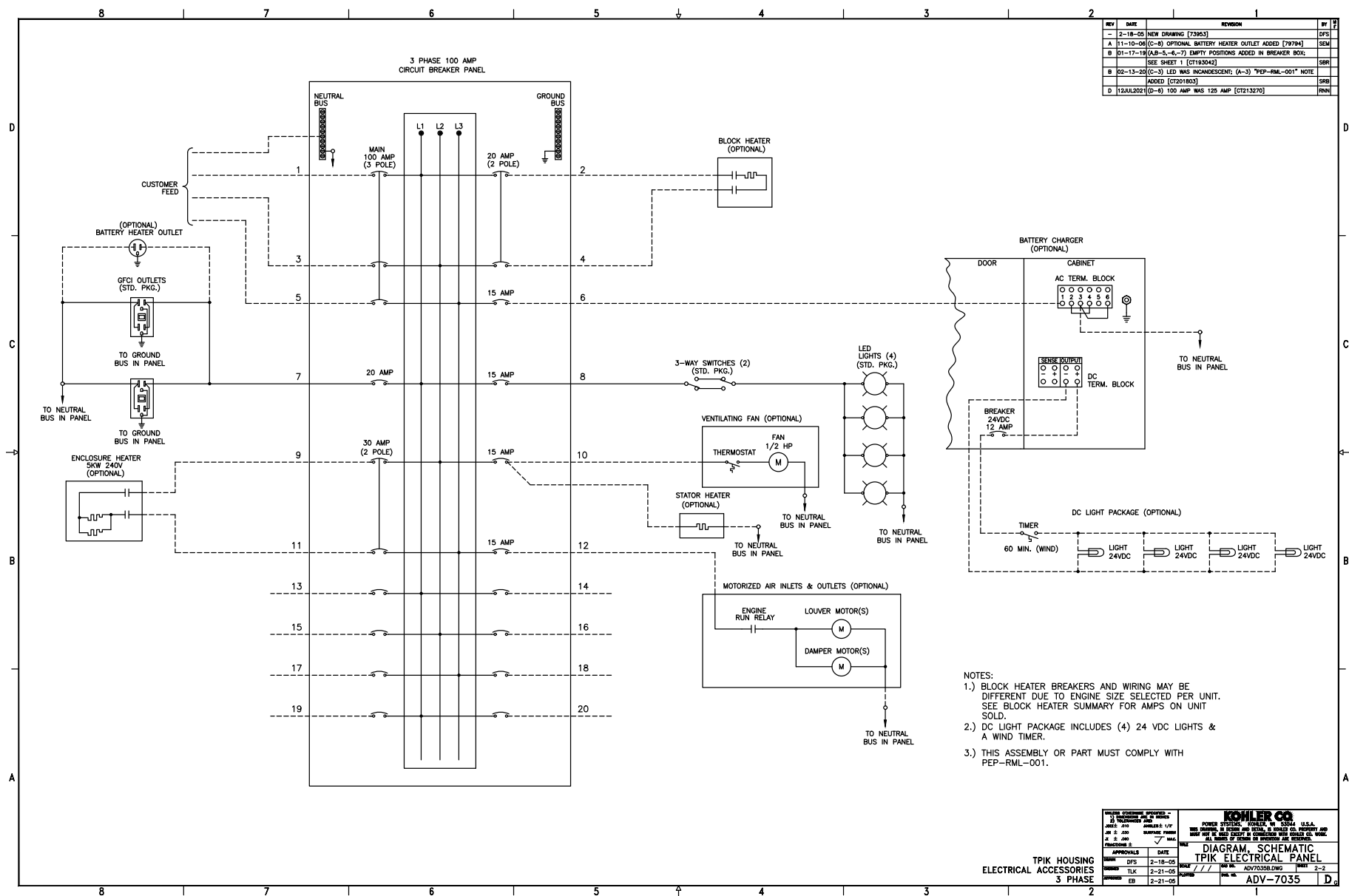




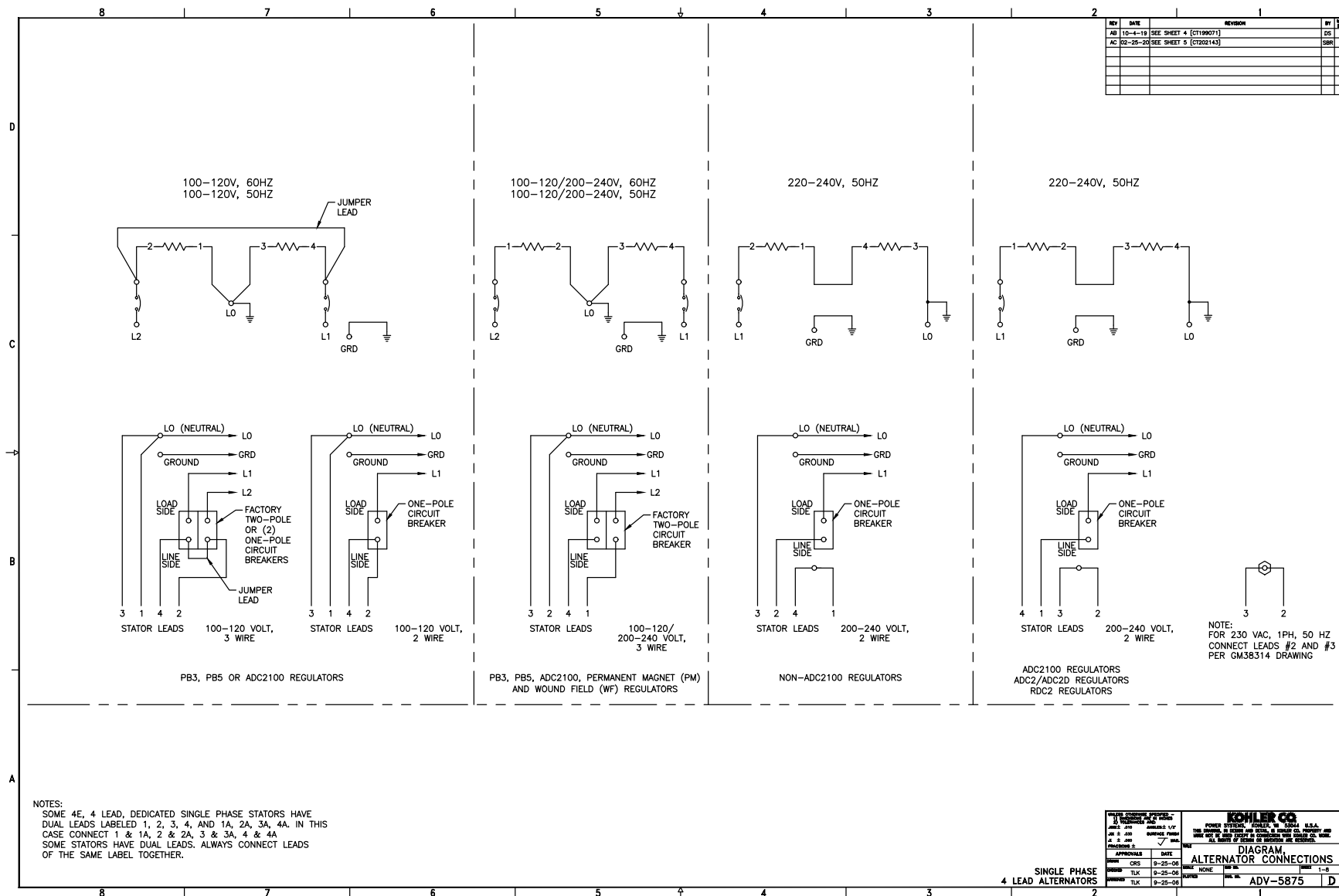












NOTES:  
SOME 4E, 4 LEAD, DEDICATED SINGLE PHASE STATORS HAVE DUAL LEADS LABELED 1, 2, 3, 4, AND 1A, 2A, 3A, 4A. IN THIS CASE CONNECT 1 & 1A, 2 & 2A, 3 & 3A, 4 & 4A. SOME STATORS HAVE DUAL LEADS, ALWAYS CONNECT LEADS OF THE SAME LABEL TOGETHER.

**SINGLE PHASE  
4 LEAD ALTERNATORS**

**KOHLER CO.**  
POWER SYSTEMS GROUP, A DIVISION OF  
THE KOHLER CO. POWER SYSTEMS GROUP, INC.  
PO BOX 100, KOHLER, WI 53045-0100  
ALL RIGHTS OF INVENTION ARE RESERVED.

**DIAGRAM  
ALTERNATOR CONNECTIONS**

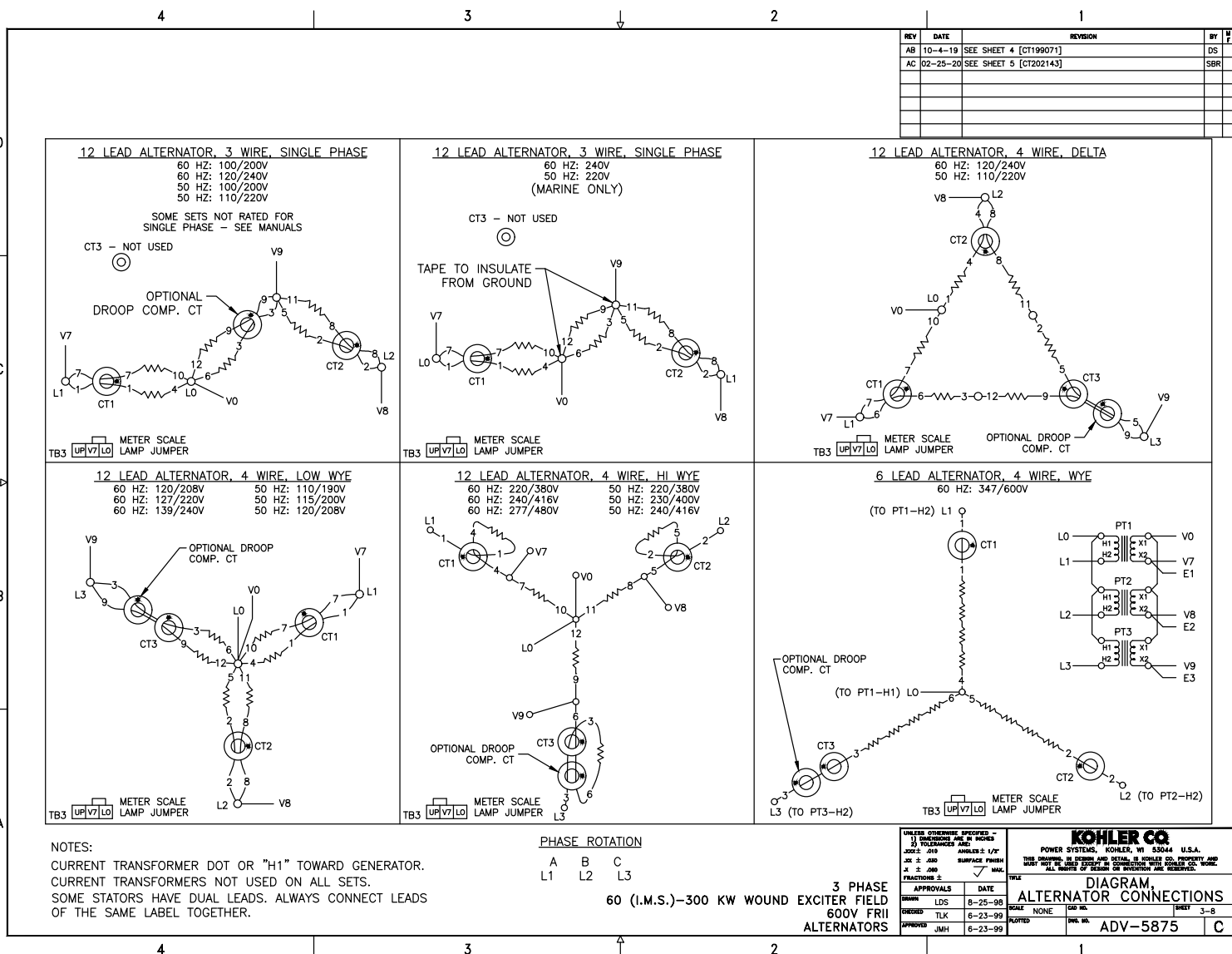
ADV-5875

APPROVED	DATE	REV	1-8
DESIGN	0-25-05	NONE	1-8
REVISION	0-25-06	NONE	1-8
REVISION	0-25-06	NONE	1-8





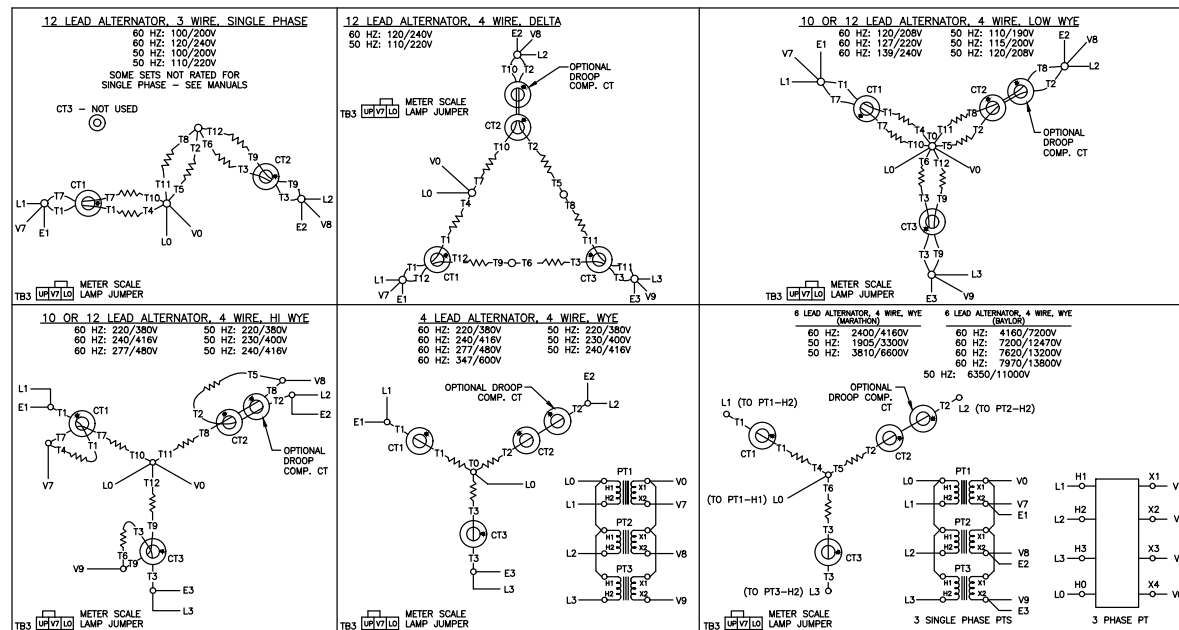




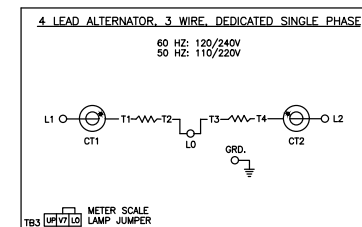


REV	DATE	REVISION	BY
AB	10-4-19	12 LEAD ALTERNATOR: 3 WIRE, SINGLE PHASE & 4 WIRE, DELTA RECONNECTION DIAGRAM UPDATED [CT190071]	DS
AC	02-25-20	SEE SHEET 5 [CT2002143]	SBN

### 3 PHASE GENERATOR CONNECTIONS



### SINGLE PHASE GENERATOR CONNECTIONS



### NOTES:

ON 10 LEAD GENERATORS, LEADS T10, T11 & T12 ARE ALL BROUGHT OUT TOGETHER AND LABELED "T0".

CURRENT TRANSFORMER DOT OR "H1" TOWARD GENERATOR. CURRENT TRANSFORMERS NOT USED ON ALL SETS.

SOME STATORS HAVE DUAL LEADS. ALWAYS CONNECT LEADS OF THE SAME LABEL TOGETHER.

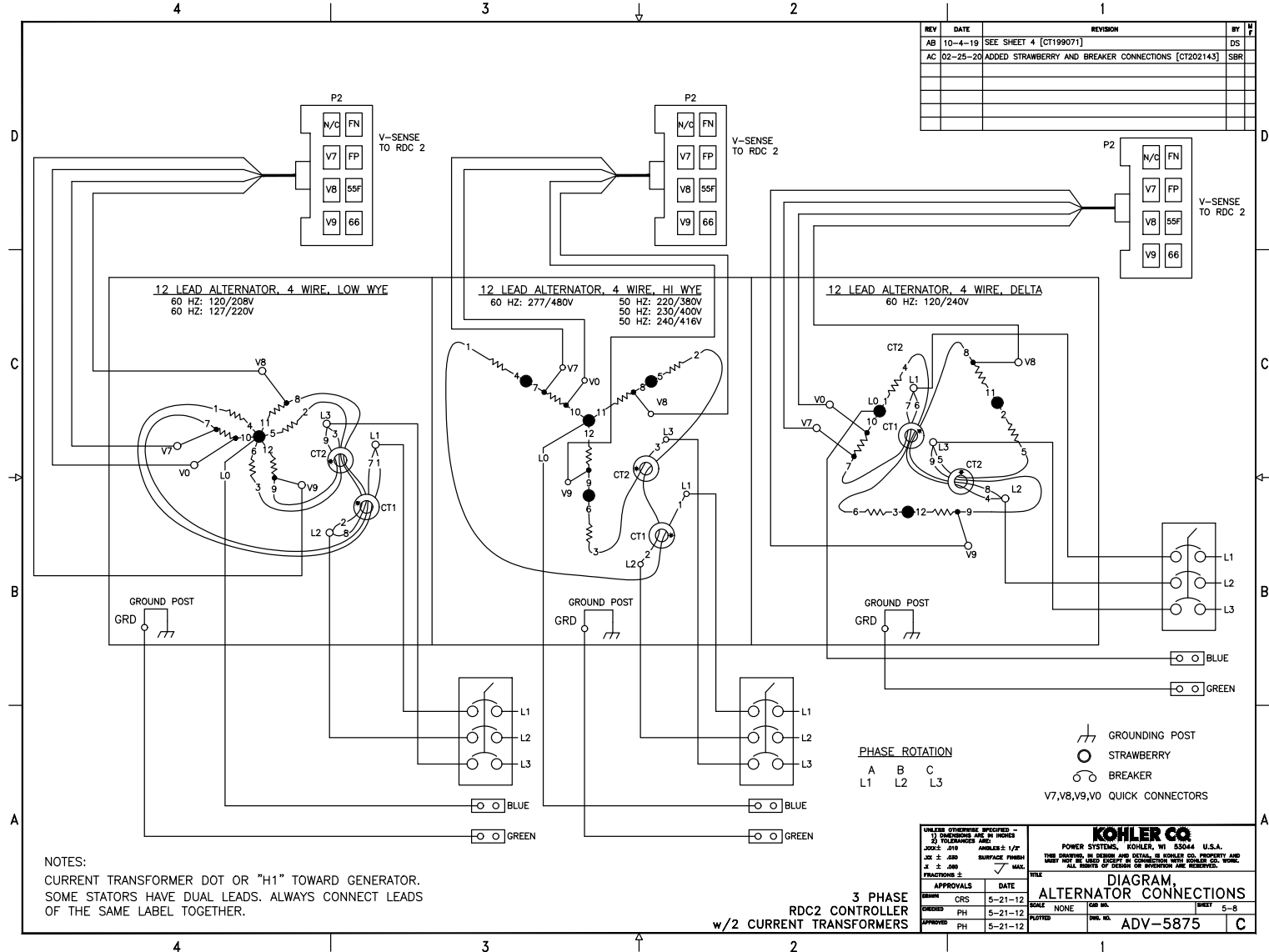
<b>KOHLER CO.</b> POWER SYSTEMS - POWER & LIGHT - U.S.A. THE POWER OF EXCELLENCE AND INNOVATION IS BUILT ON INTEGRITY AND WE'VE GOT IT. WE'VE GOT IT IN COMMON. WE'VE GOT IT RIGHT. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.		<b>DIAGRAM</b> <b>ALTERNATOR CONNECTIONS</b>	
APPROVALS	DATE	REV	DATE
DESIGN	05-27-04	1	05-27-04
CHECKED	05-27-04	2	05-27-04
APPROVED	05-27-04	3	05-27-04
NONE ADV-5875		NONE ADV-5875	

MARATHON ALTERNATORS

ADV-5875

D



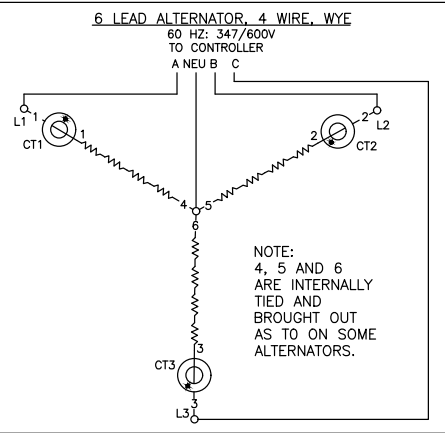
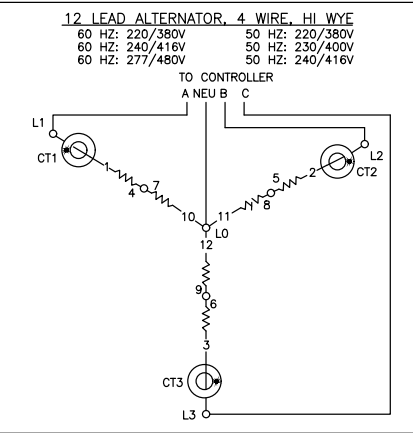
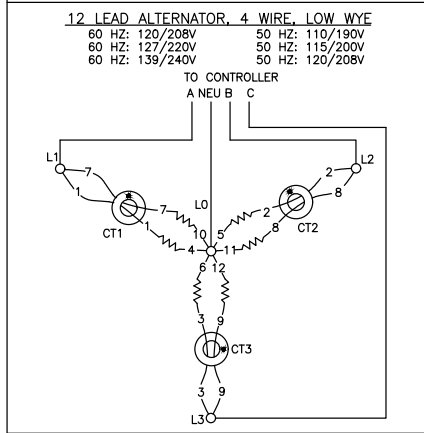
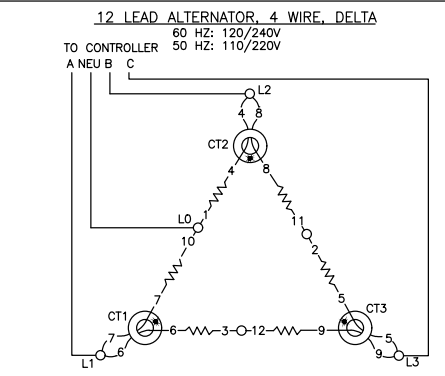
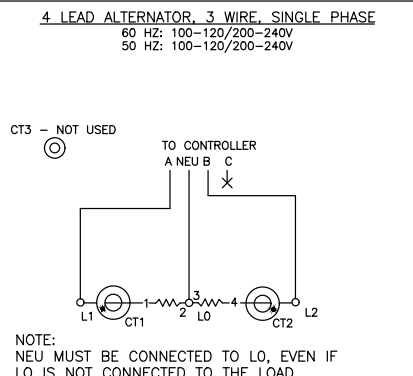
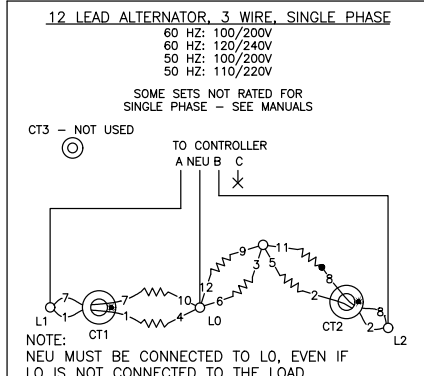


REV	DATE	REVISION	BY	W
AB	10-4-19	SEE SHEET 4 [CT199071]	DS	F
AC	02-25-20	ADDED STRAWBERRY AND BREAKER CONNECTIONS [CT202143]	SBR	

UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: FRACTIONS ± DECIMALS ± ANGLES ± SURFACE FINISH MAX.		<b>KOHLER CO.</b> POWER SYSTEMS, KOHLER, WI 53044 U.S.A. THIS DRAWING IS THE PROPERTY OF KOHLER CO. AND SHALL BE KEPT IN CONFIDENTIALITY. NO PARTS OF THIS DRAWING ARE TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.	
APPROVALS		DATE	TITLE
DESIGN	CRS	5-21-12	SCALE NONE
CHECKED	PH	5-21-12	DWG. NO. ADV-5875
APPROVED	PH	5-21-12	SHEET 5-8



REV	DATE	REVISION	BY
AB	10-4-10	SEE SHEET 4 (CT190071)	DS
AC	02-29-20	SEE SHEET 5 (CT202143)	SR



**PHASE ROTATION**

A B C  
 L1 L2 L3

NOTES:  
 CURRENT TRANSFORMER DOT OR "H1" TOWARD GENERATOR.  
 CURRENT TRANSFORMERS NOT USED ON ALL SETS.  
 SOME STATORS HAVE DUAL LEADS. ALWAYS CONNECT LEADS OF THE SAME LABEL TOGETHER.

APM603 CONTROLLER  
 DEC3500 CONTROLLER

**KOHLER CO.**  
 POWER SYSTEMS - TOLLEDO, OH, U.S.A.  
 THIS PRODUCT IS COVERED BY PATENT, A TRADE OR SERVICE MARK OF KOHLER CO. OR ITS AFFILIATES.  
 ALL RIGHTS OF INVENTION ARE RESERVED.

DIAGRAM:  
 ALTERNATOR CONNECTIONS

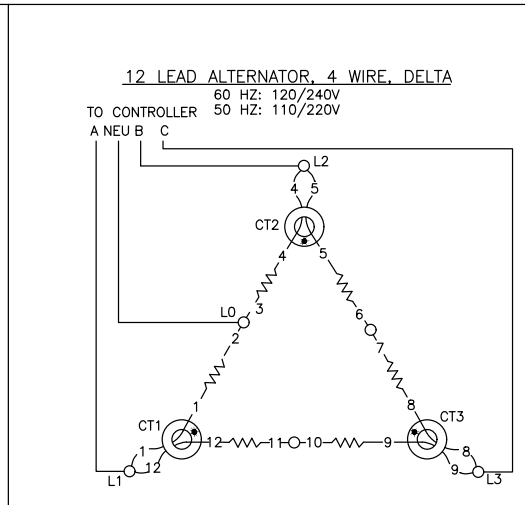
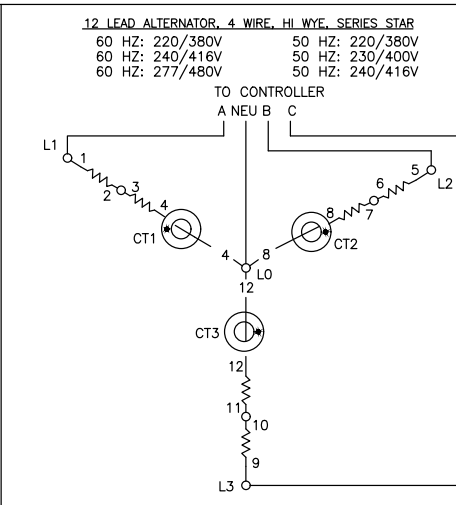
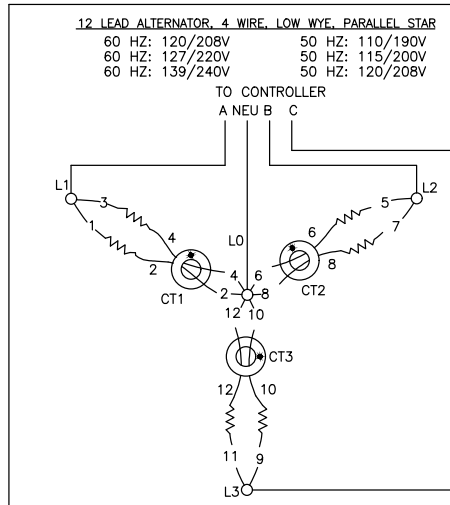
REV: 5-27-04  
 DATE: 5-27-04  
 NAME: NONE  
 DES. NO.: ADV-5875  
 SHEET: 6-8







REV	DATE	REVISION	BY
1	10-14-10	SEE SHEET 4 (CT199071)	DS
2	02-25-20	SEE SHEET 5 (CT202143)	DS



NOTES:  
CURRENT TRANSFORMER DOT OR "H1" TOWARD GENERATOR.  
CURRENT TRANSFORMERS NOT USED ON ALL SETS.  
SOME STATORS HAVE DUAL LEADS. ALWAYS CONNECT LEADS  
OF THE SAME LABEL TOGETHER.

#### PHASE ROTATION

A B C  
L1 L2 L3

APM802 CONTROLLER  
DEC3500 CONTROLLER  
MECC ALTE ALTERNATOR

APPROVALS				DATE			
DESIGNED	BY	DATE	5-27-04	CHECKED	BY	DATE	5-27-04
DRAWN	BY	DATE	5-27-04	APPROVED	BY	DATE	5-27-04
REVIEWED	BY	DATE	5-27-04				

**KOHLER CO.**  
POWER SYSTEMS - TOLLEDO, OH, U.S.A.  
THIS PRODUCT IS COVERED BY PATENT, A TRADE OR SERVICE MARK  
OF KOHLER CO. OR ITS AFFILIATES. ALL RIGHTS OF INVENTION ARE RESERVED.

DIAGRAM:  
ALTERNATOR CONNECTIONS  
REV. 6-8  
ADV-5875



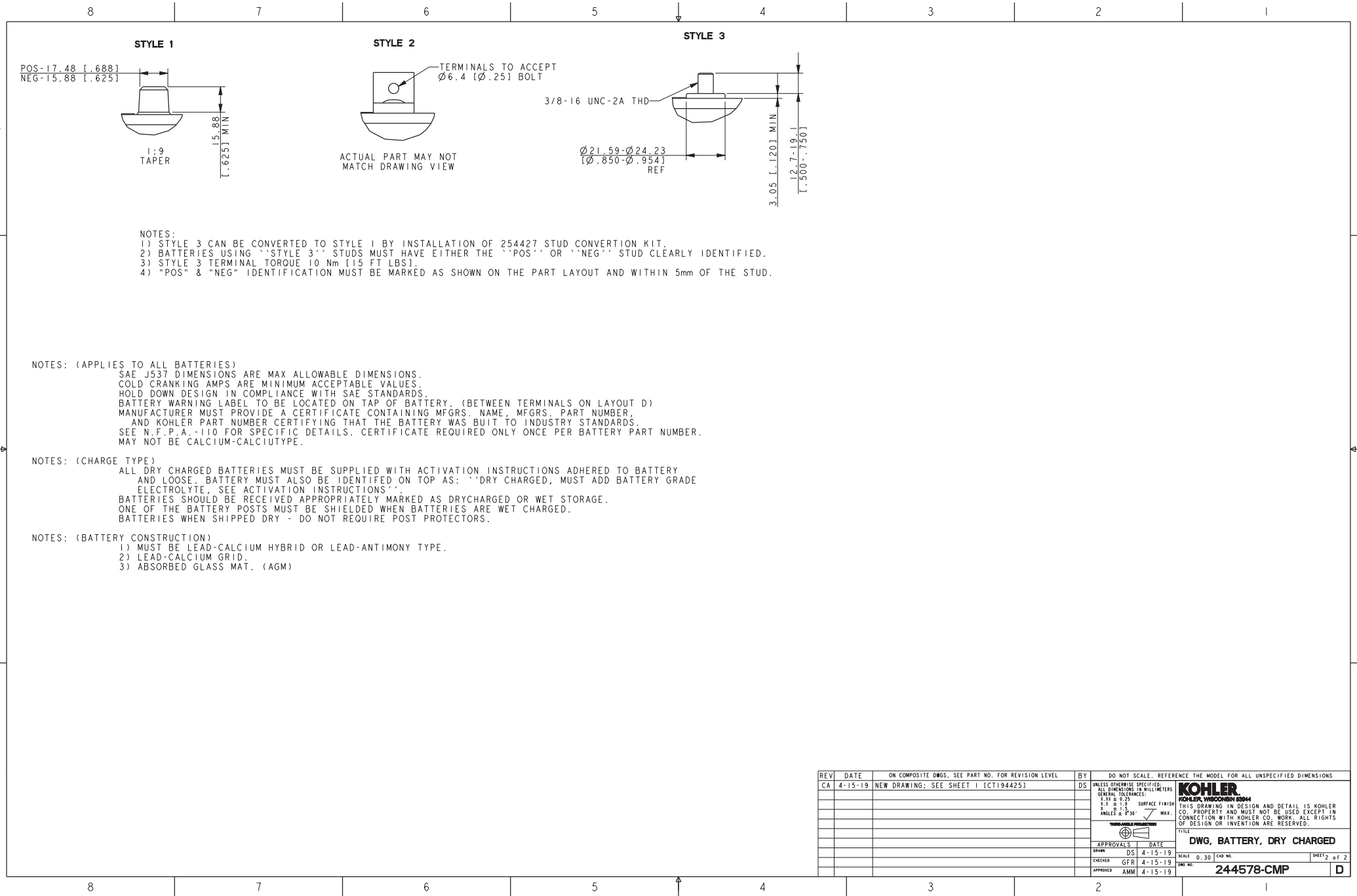


# Miscellaneous









REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS
CA	4-15-19	NEW DRAWING; SEE SHEET 1 [CT194425]	DS	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: X .125 ± 0.25 X .125 ± 0.25 SURFACE FINISH X .125 ± 0.25 MAX. ANGLES & Ø 30° ✓
				<b>KOHLER</b> KOHLER HYDROLYTE 63044 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.
				TITLE <b>DWG, BATTERY, DRY CHARGED</b>
				APPROVALS DATE DS 4-15-19 GFR 4-15-19 AMM 4-15-19
				SCALE 0.30 CAD NO. SHEET 2 of 2 DWG NO. <b>244578-CMP</b>



8

7

6

5

4

3

2

1

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  
CORROSIN 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 THOUGH

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.

14.1

253.4

225.2

27.9

152.3

96.5

4X Ø6.6

MATES WITH GM99421

MATES WITH GM94422

INPUT LEADS  
(SEE SPECIFICATIONS)

OUTPUT LEADS  
(SEE SPECIFICATIONS)

RED

BLK

FUSE  
(SEE SPECIFICATIONS)

73.7

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

TC

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 X.X ± 1.5 ANGLES ± 0° 30' MAX.
-	9-22-14	NEW DRAWING [CT91634]	SAM	
A	5-9-17	(C-4,2) MATING NOTE ADDED (A-2, 4) PIN CONNECTIONS ADDED [CT174256]	SAM	

APPROVALS	DATE
DRWN	9-22-14
CHECKED	9-22-14
APPROVED	9-22-14
AGT	9-22-14

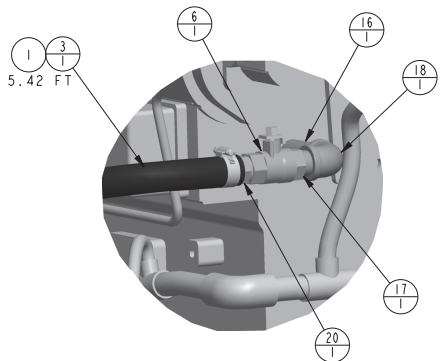
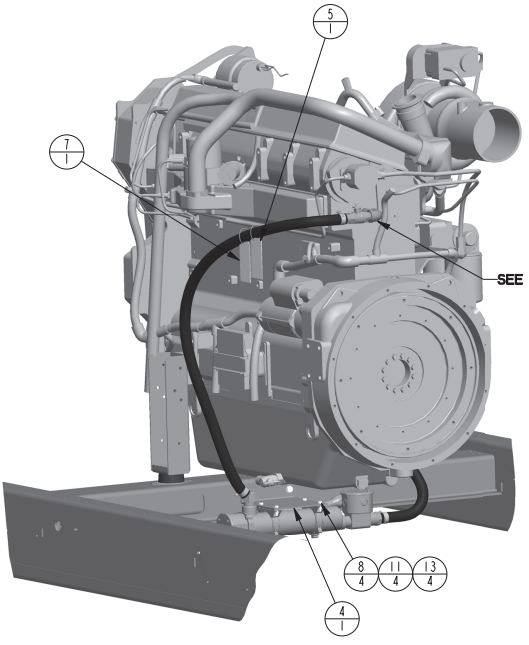
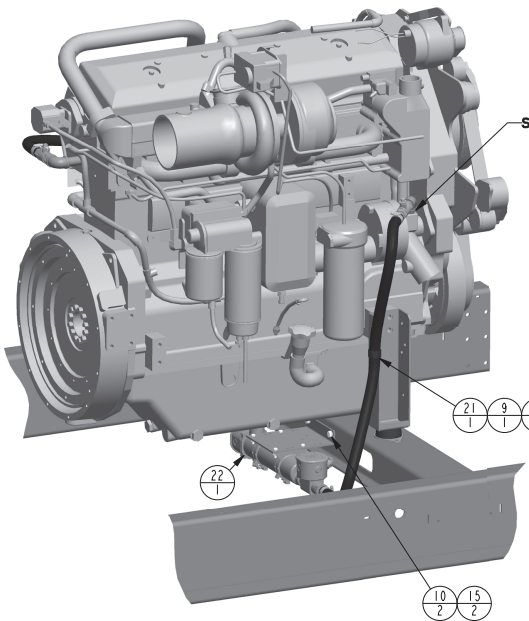
KOHLER CO. METRIC PRO-E	
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.	
THIS DRAWING IN DESIGN AND DETAIL IS KOHLER CO. PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH KOHLER CO. WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.	
TITLE	
CHARGER, BATTERY 10 AMP	
SCALE	0.50 CAD NO.
DWG NO.	GM87448
SHEET 1 of 1	
D	



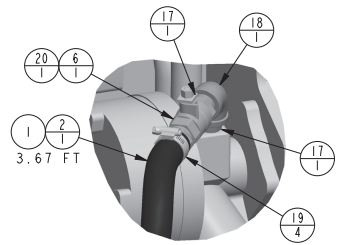




KIT NO.	ITEM	PART NO	QTY	DESCRIPTION
GM75809-KB	1	25452-00075	9.09FT	BASE GROUP, BLOCK HEATER
	2	X-6367-1 (REF)	1	HOSE, COOLANT
	3	X-6367-9 (REF)	1	HOSE, COOLANT 44"
	4	274431	1	HOSE, COOLANT 65"
	5	279047	1	BRACKET, SUPPORT
	6	GM19666	2	TAG, INSTRUCTION
	7	GM39752	1	VALVE, SHUTOFF (3/4-14NPT)
	8	M125A-06-80	1	TAG, HANG
	9	M125A-08-80	4	WASHER, PLAIN 6.4 ID X 12.0 OD
	10	M125A-10-80	1	WASHER, PLAIN 8.4 ID X 16.0 OD
	11	M6923-06-80	2	WASHER, PLAIN 10.5 ID X 20.0 OD
	12	M6923-08-80	4	NUT, HEX 6MM
	13	M933-06025-60	1	NUT, HEX 8MM
	14	M933-08025-60	4	SCREW, HEX CAP
	15	M933-10025-60	1	SCREW, HEX CAP
	16	X-206-6	2	SCREW, HEX CAP
	17	X-206-9	1	PIPE (3/4"NPT X 3.50")
	18	X-215-2	3	PIPE (3/4"NPT X 1.38") (KM)
	19	X-426-12	2	ELBOW, PIPE (90 DEG X 3/4"NPT)
	20	X-582-8	4	CLAMP, HOSE, .69/1.25 IN.
	21	X-672-20	2	CONNECTOR, HOSE + VIBRA SEAL
	22	X-672-20	1	CLAMP, INSULATED, 1.25 IN.
GM75809-KA1	22	GM76113	1	BLOCK HEATER, 2500W, 90/120V 1PH
GM75809-KA2	22	GM76113	1	BLOCK HEATER
GM75809-KA3	22	GM76114	1	BLOCK HEATER, 2500W,190/208V 1PH
GM75809-KA4	22	GM76115	1	BLOCK HEATER
GM75809-KA4	22	GM76115	1	BLOCK HEATER, 2500W,210/240V 1PH
GM75809-KA4	22	GM76116	1	BLOCK HEATER, 2500W,380/480V 1PH
				THIS IS AN AUTOMATED TABLE. ALL UPDATES MUST BE MADE IN THE ASSEMBLY. ITEMS 1-3 & 26 ARE FIXED. ITEM 1 IS A MANUAL BALLOONS.



DETAIL B  
SCALE 0.40



DETAIL A  
SCALE 0.40

NOTE: FOR PROPER ASSEMBLY METHOD OF HARDWARE, USE G-585 AS A GUIDELINE.

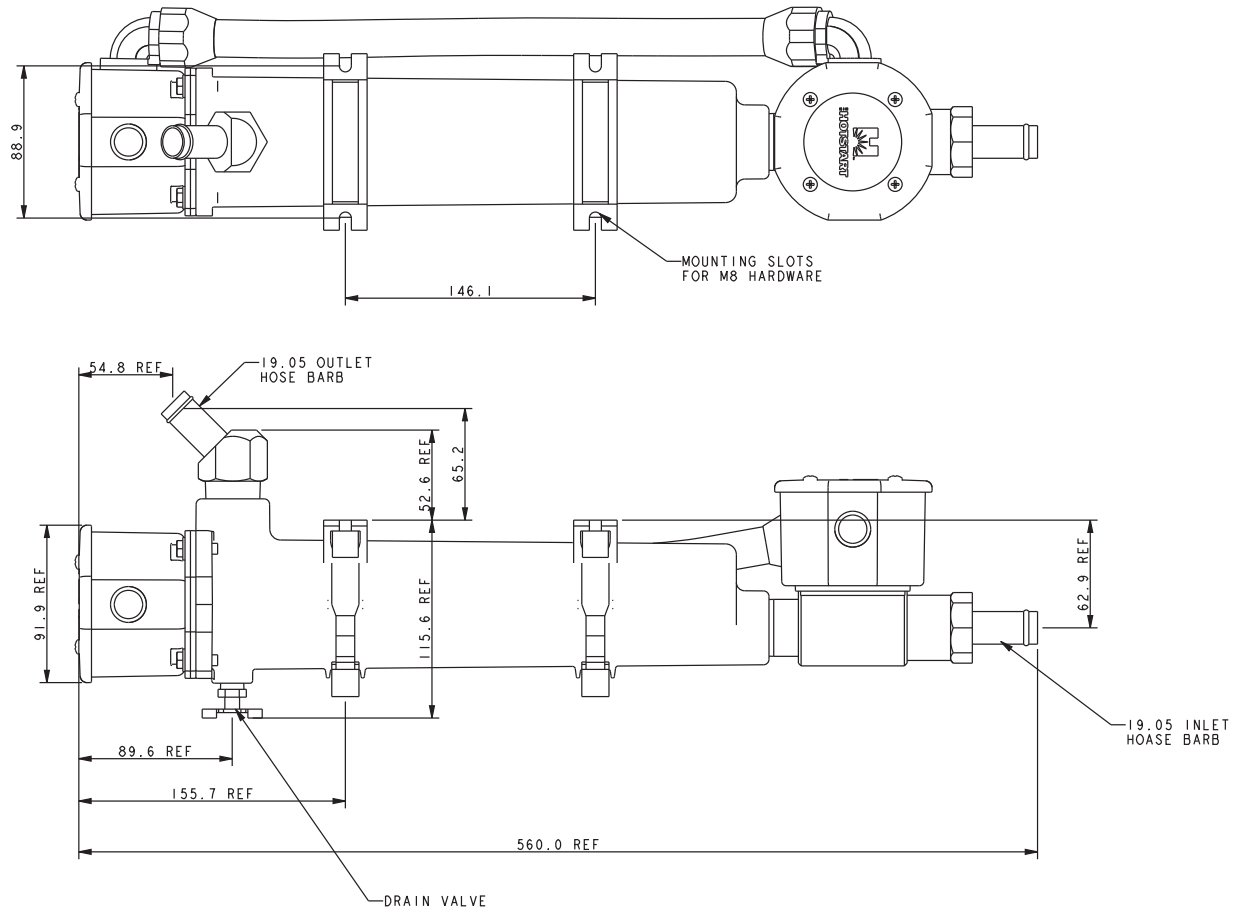
REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X .XX ± 0.25 Y .X ± 0.5 Z .X ± 1.5 ANGLES A 0° 30' MAX. SURFACE FINISH MAX.
-	8-10-10	NEW DRAWING [90056-3]	DJV	
A	12-1-10	(D-8) M125A-08-80 QTY 1 WAS 2, M6923-08-80		
		QTY 1 WAS 2; X-672-4 QTY 1 WAS 2; (C/D-1:2)		
		COOLANT HOSE ROUTING UPDATED [90686-3]	DJV	
B	3-31-11	(C-8) X-672-20 WAS X-672-4; (D-8) M125A-06-80		
		WAS X-22-11; X-206-9 WAS X-206-2 [91353-3]	DJV	
C	9-14-11	274431 WAS GM51263 [92293-3]		
			APPROVED	
			DATE	
			8-10-10	
			8-10-10	
			8-10-10	
			8-10-10	

**KOHLER CO. METRIC PRO-E**  
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.  
THIS DRAWING IN DESIGN AND DETAIL IS KOHLER CO. PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH KOHLER CO. WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.  
TITLE: **DWG, ASSY BLOCK HEATER**  
SCALE: 0.14 CAD NO.:  
SHEET 1 of 1  
DWG NO.: **GM75809** D

BLOCK HEATER KITS  
350-500 MODELS  
JOHN DEERE



PART NO	REV	WATTS	VOLTS	AMPS	TEMP RANGE	REPLACEMENT ELEMENT
GM76113	A		90/120	15.6/20.8	27/38° C [80/100° F]	GM29477
GM76114	A		190/208	11.0/12.0		GM29478
GM76115	A	2500	210/240	9.1/10.4		GM29474
GM76116	A		380/480	4.1/5.2		GM29479
ES-75616	A		240/227	7.8/9.0		ES-75542



200/350 KW JD

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED:	KOHLER CO.   METRIC   PRO-E
-	6-9-10	NEW DRAWING [89933-1]	SAM	1) DIMENSIONS ARE IN MILLIMETERS	
A	12-9-10	(D-8) ES-75616 ADDED. GM76113: 15.6/20.8 WAS 27.8/20.8, GM76114: 11.0/12.0 WAS 13.2/12.0, GM76115: 9.1/10.4 WAS 11.9/10.4, GM76116: 4.1/5.2 WAS 6.6/5.2 [90699]	SAM	2) TOLERANCES ARE: X.XX ± 0.25 X.X ± 0.5 X ± 1.5 ANGLES ± 0° 30' MAX. SURFACE FINISH:  MAX.	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.
				APPROVALS	TITLE
				DATE	HEATER, BLOCK
				SAM 6-9-10	SCALE 0.70 CAD NO.
				JMS 6-9-10	DWG NO.
				WRD 6-9-10	GM76113

SHEET 1 of 1







# MATERIAL TYPE SPECIFICATION

**TYPE 1** RECOMMENDED FOR FUEL FILTERS, ENGINE COOLANT LINES AND HOT 150° C [300° F] LUBE OIL LINES.  
HIGH TEMP, MEDIUM PRESSURE HOSE THAT MEETS OR EXCEEDS FMVSS 106-74, TYPE A1, SAE J1019 AND SAE J1402 TABLE A1 SPECIFICATIONS

TUBE: NITRILE, OIL AND HEAT RESISTANT SYNTHETIC RUBBER.  
REINFORCEMENT: SINGLE BRAID OF HIGH TENSILE STEEL WIRE OVER ONE BRAID OF POLYESTER  
COVER: OIL AND HEAT RESISTANT TEXTILE BRAID IMPREGNATED WITH SYNTHETIC RUBBER.  
TEMP. RANGE: -40° C TO +150° C [-40° F TO +300° F]  
WORK: 2.07 MPa [300 PSI]  
BURST: 6.21 MPa [900 PSI]

**TYPE 2** BUTANE-PROPANE APPLICATION ON LP GAS ENGINE. UL LISTING MH6044 OR MH5761

TUBE: SYNTHETIC RUBBER TUBE  
REINFORCEMENT: STEEL WIRE BRAID  
COVER: SYNTHETIC RUBBER IMPREGNATED TEXTILE BRAID  
TEMP. RANGE: -40° C TO +150° C [-40° F TO +300° F]  
WORK: 2.4 MPa [350 PSI]  
BURST: 12.0 MPa [1750 PSI]

**TYPE 3** MUST MEET ALL REQUIREMENTS FOR USCG#46 DIESEL FUEL LINES. DIESEL FUEL, HOT LUBE OIL, WATER AND AIR.

TUBE: SYNTHETIC RUBBER  
REINFORCEMENT: SINGLE PARTIAL STEEL WIRE BRAID  
COVER: SYNTHETIC RUBBER IMPREGNATED FABRIC COVER.  
TEMP. RANGE: -40° C TO +150° C [-40° F TO +300° F]  
WORK: 1.7 MPa [250 PSI]  
BURST: 6.9 MPa [1000 PSI]

**TYPE 4** PETROLEUM AND WATER BASED HYDRAULIC FLUIDS

TUBE: SYNTHETIC RUBBER TUBE  
REINFORCEMENT: DOUBLE SPIRAL REINFORCED WITH A HELICAL SPIRAL WIRE  
COVER: NEOPRENE SYNTHETIC RUBBER  
TEMP. RANGE: -40° C TO +135° C [-40° F TO +275° F]  
WORK: 1.7 MPa [250 PSI]  
BURST: 6.9 MPa [1000 PSI]  
0.084 MPa [125 IN HG]

**TYPE 9** FUEL FEED APPLICATION MEETING J1527 AND USCG TYPE A1-15

TUBE: CHEMIVIC SYNTHETIC RUBBER  
REINFORCEMENT: POLYESTER SPIRAL WITH NYLON BARRIER  
COVER: OIL AND HEAT RESISTANT SLEEVE COVERING FITTINGS.  
THE REST OF THE FUEL LINE IS NITRILE SYNTHETIC RUBBER  
TEMP. RANGE: (-29 C TO 82 C)  
WORK: 200 PSI  
BURST: 400 PSI

**TYPE 11** HOSE MUST MEET OR EXCEED SAE 100R17 SPECIFICATION.

TUBE: SYNTHETIC RUBBER COMPOUND TO RESIST GASOLINE, OIL, DIESEL & OTHER FUELS.  
REINFORCEMENT: HIGH STRENGTH SYNTHETIC TEXTILE.  
COVER: OIL AND GASOLINE RESISTANT AND WITHSTANDS EXPOSURE TO FUEL, VAPOR, MOISTURE  
TEMP. RANGE: -40°C TO 100°C [-40°F TO 212°F]  
WORKING PRESSURE: 21.0 MPa [3000 PSI] FOR HOSE UP TO 31.5 [1.25]" ID

**TYPE 5** HOSE MUST MEET OR EXCEED SAE J30R7 SPECIFICATION.

TUBE: SYNTHETIC RUBBER COMPOUND TO RESIST GASOLINE, OIL, DIESEL & OTHER FUELS.  
REINFORCEMENT: HIGH STRENGTH SYNTHETIC TEXTILE.  
COVER: OIL AND GASOLINE RESISTANT AND WITH STANDS EXPOSURE TO FUEL, VAPOR, MOISTURE AND HIGH HEAT UP TO 125°C [257°F]  
TEMP. RANGE: UP TO 125°C [257°F]  
MAX. OPERATING PRESSURE: .34 MPa [50 PSI] UP TO & INCLUDING 3/8" ID HOSE AND .24 MPa [25 PSI] OVER 3/8" HOSE  
MIN. BURST PRESSURE: 1.7 MPa [250 PSI] UP TO & INCLUDING 3/8" ID HOSE & 1.2 MPa [175 PSI] OVER 3/8 ID HOSE

**TYPE 6** SAE 100R14 TYPE A BRAIDED HOSE FOR HOT OIL & FLUID AND GREASY ENVIRONMENT, EXCEEDS J30R7 SPECIFICATION.

TUBE: TYPE A-NONCONDUCTIVE, SMOOTH BORE (PTFE)  
REINFORCEMENT: ONE BRAID OF 300 SERIES STAINLESS STEEL WIRE  
TEMP. RANGE: -54°C TO 204°C [-65°F TO 400°F]  
MAX. OPERATING PRESSURE: 5.5 MPa [800 PSI]  
BURST PRESSURE: 3.4 MPa [5000 PSI]

**TYPE 7** SAE 1527 USING TYPE A1 ISO 7840-A1 HOSE

TUBE: TYPE C (NITRILE) OIL AND HEAT RESISTANT  
REINFORCEMENT: BRAIDED, HIGH TENSILE STEEL WIRE  
COVER: TYPE 2 (MODIFIED NITRILE)  
TEMP. RANGE: -20°C TO 100°C [-4°F TO 212°F]  
MAX. OPERATING PRESSURE: 3.45 MPa [500 PSI]

**TYPE 8** PROPANE APPLICATION ON LP GAS ENGINE  
MUST MEET INDUSTRY STANDARDS: AGA-AS/NZS1896D/UL21

TUBE: SYNTHETIC RUBBER  
REINFORCEMENT: ONE FIBER AND ONE STAINLESS STEEL WIRE BRAID  
COVER: FIBER BRAID

**TYPE 10** HOSE MUST MEET OR EXCEED SAE J30R7 SPECIFICATION.

TUBE: SYNTHETIC RUBBER COMPOUND TO RESIST GASOLINE, OIL, DIESEL & OTHER FUELS.  
REINFORCEMENT: HIGH STRENGTH SYNTHETIC TEXTILE.  
COVER: OIL AND GASOLINE RESISTANT AND WITHSTANDS EXPOSURE TO FUEL, VAPOR, MOISTURE AND HIGH HEAT UP TO 125°C [257°F]  
TEMP. RANGE: .34 MPa [50 PSI] UP TO & INCLUDING 3/8" ID HOSE AND .24 MPa [25 PSI] OVER 3/8" HOSE  
MAX. OPERATING PRESSURE: 1.7 MPa [250 PSI] UP TO & INCLUDING 3/8" ID HOSE & 1.2 MPa [175 PSI] OVER 3/8 ID HOSE  
MIN. BURST PRESSURE: -0.069 MPa [-10 PSI] WITHOUT COLLAPSE

NOTES:  
DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

FITTINGS: APPROPRIATE FOR APPLICATION, BURST PRESSURE AND OPERATING PRESSURE. CONNECTION TYPE TO BE AS SPECIFIED. FITTINGS MAY NOT APPEAR EXACTLY AS SHOWN.

MATERIAL CERTIFICATION REQUIRED FOR TYPES 1, 2, 3, 5 AND 6

BLUE OR BLACK COVER COLOR ACCEPTABLE.  
NO CHANGE IN COLOR ARE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL FROM KOHLER

CONSIDER USING D-001 FOR SPECIFICATION OF HOSE LINE.

THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001.  
☐ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION

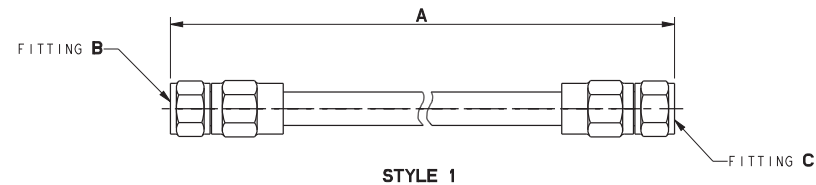
REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X .XX ± 0.25 X .X ± 0.5 X .X ± 1.5 SURFACE FINISH ANGLES ± 0° 30' MAX.
JA	5-8-18	(A-2)SAE STANDARD J30R3 NOTE DELETED (A-6)HOSE TOLERANCE NOTE CHANGED. SEE SHEET 3 [CT186807]RMJ		
JB	10-29-18	TYPE 4, TYPE 7 TUBE NOTE: "BLACK" REMOVED; TYPE 1 & TYPE 9 TUBE & COVER NOTE: "BLACK" REMOVED; TYPE 6 TUBE NOTE: "WHITE" REMOVED; (A-3) BLUE OR BLACK COVER COLOR NOTE ADDED [CT189809]		
JC	2-25-19	SEE SHEET 3 & 8 [CT193537]	PAR	APPROVALS JJC 2-5-97
JD	10-23-19	(A-3) "... PEP-RML-001" ADDED & SEE SHEET 2 & 5 [CT210155]	SUD	CHECKED EB 2-5-97
			PAS	APPROVED RGH 2-5-97

HOSE ASSEMBLY OVERALL LENGTH "A" TOLERANCE				
0-610 [0-24]	610.1-1524 [24.01-60]	1524.1-1905 [60.01-75]	1905.2-UP [75.01-UP]	
±6.4 [1.25]	±12.7 [1.50]	±19.1 [1.75]	±1%	

<b>KOHLER CO.</b>	<b>METRIC</b>	<b>PRO-E</b>
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.		
TITLE: <b>DWG, FUEL LINE, FLEXIBLE</b>		
SCALE	CAD NO.	SHEET 1 of 9
DWG NO.	<b>273614-CMP</b>	
		<b>D</b>



8			7			6			5		
PART NO	REV	A	FITTING B	FITTING C	HOSE ID	STYLE	MATL TYPE				
GM51589	EL		1270 [50.0]	[1/4-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	6.4 [.25]	I 5				
ES-71131	ER		1270 [50.0]	[1/4-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	6.4 [.25]	I 6				
GM38483	EJ		1270 [50.0]	[1/4-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	I 5				
GM75369	FW		1524 [60.0]	[1/4] NPSM FEMALE SWIVEL-GLX	[1/4] NPSM FEMALE SWIVEL-GLX	6.4 [.25]	I 2				
GM75758	FP		1650 [65.0]	[1/4-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	10.4 [.41]	I 6				
GM38482	EJ		1650 [65.0]	[1/4-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	I 5				
GM28340	EJ		584 [23.0]	[3/8-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	I 5				
GM23505	EJ		1650 [65.0]	[3/8-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	I 5				
GM75759	FP		1956 [77.0]	[3/8-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	10.4 [.41]	I 6				
GM59340	EZ		1956 [77.0]	[3/8-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	I 5				
225204	EJ		432 [17.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	4.8 [.19]	I 5				
273614	FW		737 [29.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	4.8 [.19]	I 5				
GM69928	FG		762 [30.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[3/4-16] THD FEMALE 45° FLARE SWIVEL	10.4 [.41]	I 7				
344206	EJ		813 [32.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	7.9 [.31]	I 3				
273629	EJ		940 [37.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	4.8 [.19]	I 1				
344205	EJ		940 [37.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	7.9 [.31]	I 3				
GM22836	EJ		1016 [40.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	6.4 [.25]	I 5				
324608	EJ		1092 [43.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	4.8 [.19]	I 5				
ES-71219	ET		1092 [43.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	4.8 [.19]	I 6				
GM86395	B		1778 [70.0]	[7/16-20] THD FEMALE JIC 45° FLARE SWIVEL	[7/16-20] THD FEMALE JIC 45° FLARE SWIVEL	7.9 [.31]	I 3				
ES-70101	EK		1874 [74.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	7.9 [.31]	I 3				
ES-70104	EM		2192 [86.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	7.9 [.31]	I 3				
GM93651	-		1270 [50.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[5/8-18] THD FEMALE 45° FLARE SWIVEL	9.5 [.38]	I 6				
GM31751	EJ		2210 [87.0]	[7/16-20] THD FEMALE JIC 37° FLARE SWIVEL	[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL	12.7 [.50]	I 5				
ES-73270	FC		3810 [150.0]	[7/16-20] THD FEMALE JIC 37° FLARE SWIVEL	[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL	12.7 [.50]	I 5				



NOTE: DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X .XX ± 0.25 X.X ± 0.5 X ± 1.5 ANGLES ± 0° 30' MAX.	THROW AWAY PRODUCTION	APPROVALS	DATE	TITLE	
HR	11-15-16	SEE SHEET 5 OF 9 [CT165574]	BGP			PAR	JJC	2-5-97	KOHLER CO. METRIC PRO-E
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGP			SUD	EB	2-5-97	POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
HW	2-20-17	SEE SHEET 6 [CT170738]	CER			PAS	EB	2-5-97	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.
HY	5-24-17	SEE SHEETS 5 AND 7 [CT171684]	SAM						
JA	5-8-18	SEE SHEET 1 AND 3 [CT186807]	RMJ						
JB	10-29-18	SEE SHEET 1 [CT189809]							
JC	2-25-19	SEE SHEET 3 & 8 [CT193537]							
JD	10-23-19	(C-8) REVISION FOR PART 273614 UPDATED TO "FW" & SEE SHEET 1 & 5 [CT210155]							

SCALE

CAD NO.

SHEET 2 of 9

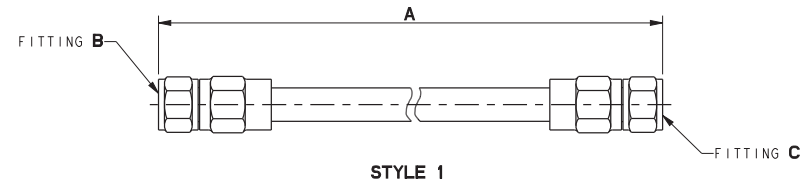
DWG NO.

273614-CMP

D



8			7			6			5			4
PART NO	REV	A	FITTING B			FITTING C			HOSE ID	STYLE	MATL TYPE	SERVICE ONLY
ES-71567	ET	4330 [170.5]	[7/16-20] THD FEMALE JIC 37° FLARE SWIVEL			[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL			12.7 [.50]	I	5	-
ES-78818	-	4700 [185.0]	[7/16-20] THD FEMALE JIC 45° FLARE SWIVEL			[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL			12.7 [.50]	I	5	-
324512	EJ	432 [17.0]	[1/2-20] THD FEMALE 45° FLARE SWIVEL			[1/2-20] THD FEMALE 45° FLARE SWIVEL			6.4 [.25]	I	I	-
274733	EL	584 [23.0]	[1/2-20] THD FEMALE INVERTED FLARE			[1/2-20] THD FEMALE 45° FLARE SWIVEL			6.4 [.25]	I	I	XX
324377	EJ	737 [29.0]	[1/2-20] THD FEMALE 45° FLARE SWIVEL			[1/2-20] THD FEMALE 45° FLARE SWIVEL			6.4 [.25]	I	I	-
GM16960	EJ	813 [32.0]	[1/2-20] THD FEMALE 45° FLARE SWIVEL			[1/2-20] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	3	-
GM10887	EJ	914 [36.0]	[1/2-14] NPT FEMALE			[3/4-16] THD FEMALE JIC 37° FLARE SWIVEL			12.7 [.50]	I	5	-
273630	EJ	1219 [48.0]	[9/16-18] THD FEMALE 37° FLARE SWIVEL			[1/2-20] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	I	-
336863	EJ	1219 [48.0]	[9/16-18] THD FEMALE 37° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			12.7 [.50]	I	5	-
GM89284	-	450 [17.7]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			[3/4-16] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	2	-
343603	EJ	508 [20.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			[5/8-18] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	5	-
ES-71691	EV	508 [20.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			[5/8-18] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	6	-
324481	EJ	1092 [43.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			[5/8-18] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	5	-
274738	CT	1600 [63.0]	[5/8-18] THD FEMALE INVERTED FLARE			[5/8-18] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	I	XX
GM91721	A	1981 [78.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			[5/8-18] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	I	-
354591	EJ	2159 [85.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			[5/8-18] THD FEMALE 45° FLARE SWIVEL			10.4 [.41]	I	I	-
GM105629	-	2050 [80.7]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			[1/2-24] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	I	-
ES-79685	-	607 [24.0]	[11/16-16] UN-2B FEMALE PER SAE J1453, SWIVEL			[3/4-16] THD FEMALE 45° FLARE SWIVEL			9.5 [.38]	I	6	-
GM69927	FG	762 [30.0]	[11/16-16] UN-2B FEMALE PER SAE J1453, SWIVEL			[3/4-16] THD FEMALE 45° FLARE SWIVEL			10.4 [.41]	I	7	-
GM48025	EJ	813 [32.0]	[11/16-16] UN-2B FEMALE PER SAE J1453, SWIVEL			[1/2-20] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	3	-
ES-70103	EY	2281 [90.0]	[11/16-16] UN-2B FEMALE PER SAE J1453, SWIVEL			[1/2-20] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	3	-
ES-70102	EY	2355 [93.0]	[11/16-16] UN-2B FEMALE PER SAE J1453, SWIVEL			[1/2-20] THD FEMALE 45° FLARE SWIVEL			7.9 [.31]	I	3	-
ES-73031	FA	762 [30.0]	[3/4-16] THD FEMALE 45° FLARE SWIVEL			[3/4-16] THD FEMALE 45° FLARE SWIVEL			9.7 [.38]	I	5	-
GM39501	EJ	1400 [55.0]	[3/4-16] THD FEMALE 45° FLARE SWIVEL			[11/16-16] ORFS SAE J1453 (FEMALE)			9.5 [.38]	I	5	-
8			7			6			5			4



NOTE: DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

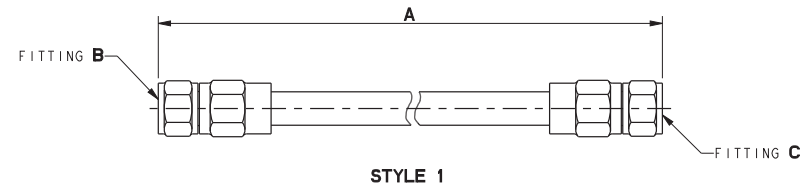
□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X .XX ± 0.25 X.X ± 0.5 X ± 1.5 ANGLES ± 0° 30' MAX.	THROWABLE PRODUCTION	APPROVALS	DATE	TITLE
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGW			PAR	6-8-99	<b>KOHLER CO. METRIC PRO-E</b>
HW	2-20-17	SEE SHEET 6 [CT170738]	CEK			PAR	6-8-99	POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
HY	5-24-17	SEE SHEETS 5 AND 7 [CT171684]	SAM			PAR	6-8-99	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.
JA	5-8-18	(B-8)GM105629 ADDED, GM91721 HOSE ID 7.9 [.31] WAS 9.5 [.38], SEE SHEET 1 [CT186807]	RMJ			PAR	6-8-99	
JB	10-29-18	SEE SHEET 1 [CT189809]	PAR			PAR	6-8-99	
JC	2-25-19	(B-8) 274738 REINSTATED; (D-8) 274733 REINSTATED; SEE SHEET 8 [CT193537]	SUD			PAR	6-8-99	
JD	10-23-19	SEE SHEET 1, 2 & 5 [CT210155]	PAS			PAR	6-8-99	

SCALE	CAD NO.	SHEET 3 of 9
DWG. FUEL LINE, FLEXIBLE	273614-CMP	D



8			7			6			5		
PART NO	REV	A	FITTING B			FITTING C			HOSE ID	STYLE	MATL TYPE
GM78802	FU	1400 [55.0]	[3/4-16] THD FEMALE 45° FLARE SWIVEL			[11/16-16] ORFS SAE J1453 (FEMALE)			9.5 [1.38]	I	6
343604	EJ	1778 [70.0]	[3/4-16] THD FEMALE 45° FLARE SWIVEL			[3/4-16] THD FEMALE 45° FLARE SWIVEL			12.7 [1.50]	I	5
ES-71690	FK	1778 [70.0]	[3/4-16] THD FEMALE 45° FLARE SWIVEL			[3/4-16] THD FEMALE 45° FLARE SWIVEL			10.4 [1.41]	I	6
ES-72845	EY	3175 [125.0]	[3/4-16] THD FEMALE 45° FLARE SWIVEL			[11/16-16] ORFS SAE J1453 (FEMALE)			9.5 [1.38]	I	5
274503	EJ	432 [17.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			12.7 [1.50]	I	1
GM38634	EJ	609 [24.0]	[7/8-14] THD FEMALE 37° FLARE SWIVEL			[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL			15.8 [1.62]	I	5
GM67464	FE	760 [30.0]	[7/8-14] THD FEMALE JIC 45° FLARE SWIVEL			[7/8-14] THD FEMALE JIC 45° FLARE SWIVEL			12.7 [1.50]	I	7
ES-80186	-	813 [32.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			9.5 [1.38]	I	5
274502	EJ	889 [35.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			12.7 [1.50]	I	1
274632	EJ	1143 [45.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			12.7 [1.50]	I	1
361547	EJ	1219 [48.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			15.8 [1.62]	I	1
274633	EJ	1245 [49.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			12.7 [1.50]	I	1
274634	EJ	1499 [59.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			12.7 [1.50]	I	1
274228	EJ	1600 [63.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			12.7 [1.50]	I	5
ES-71689	FK	1600 [63.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			12.7 [1.50]	I	6
354570	EJ	1600 [63.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			15.8 [1.62]	I	1
GM31750	EJ	1750 [68.9]	[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL			[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL			15.8 [1.62]	I	5
GM20684	EJ	2134 [84.0]	[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL			[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL			15.8 [1.62]	I	5
274736	EJ	2159 [85.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			12.7 [1.50]	I	1
ES-35703	EK	2337 [92.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			12.7 [1.50]	I	1
ES-35702	EK	2438 [96.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			[7/8-14] THD FEMALE 45° FLARE SWIVEL			12.7 [1.50]	I	1
GM20683	EJ	2438 [96.0]	[7/8-14] THD FEMALE 37° FLARE SWIVEL			[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL			15.8 [1.62]	I	5
347640	CG	711 [28.0]	[1 1/16-14] THD FEMALE 45° FLARE SWIVEL			[1 1/16-14] THD FEMALE 45° FLARE SWIVEL			19.0 [1.75]	I	5
GM47365	EJ	1041 [41.0]	[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL			[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL			15.8 [1.62]	I	1
344358	CF	1245 [49.0]	[1 1/16-14] THD FEMALE 45° FLARE SWIVEL			[1 1/16-14] THD FEMALE 45° FLARE SWIVEL			19.0 [1.75]	I	5



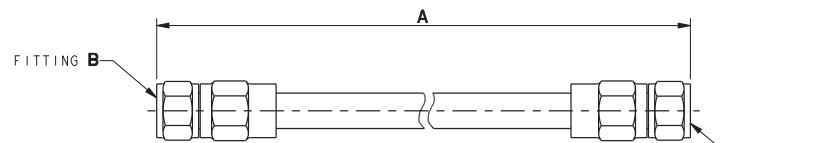
NOTE: DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION

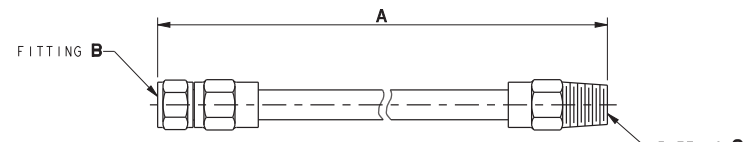
REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES AND MILLIMETERS 1/2" TOLERANCES ARE: FRACTIONS DECIMALS X .125 0.005 X .125 0.010 X .125 0.015 X .125 0.020 X .125 0.030 X .125 0.040 X .125 0.050 X .125 0.060 X .125 0.070 X .125 0.080 X .125 0.090 X .125 0.100 X .125 0.125 X .125 0.150 X .125 0.175 X .125 0.200 X .125 0.250 X .125 0.300 X .125 0.375 X .125 0.500 X .125 0.625 X .125 0.750 X .125 0.875 X .125 1.000 X .125 1.250 X .125 1.500 X .125 1.750 X .125 2.000 X .125 2.500 X .125 3.000 X .125 3.750 X .125 4.000 X .125 4.500 X .125 5.000 X .125 5.500 X .125 6.000 X .125 6.500 X .125 7.000 X .125 7.500 X .125 8.000 X .125 8.500 X .125 9.000 X .125 9.500 X .125 10.000 X .125 10.500 X .125 11.000 X .125 11.500 X .125 12.000 X .125 12.500 X .125 13.000 X .125 13.500 X .125 14.000 X .125 14.500 X .125 15.000 X .125 15.500 X .125 16.000 X .125 16.500 X .125 17.000 X .125 17.500 X .125 18.000 X .125 18.500 X .125 19.000 X .125 19.500 X .125 20.000 X .125 20.500 X .125 21.000 X .125 21.500 X .125 22.000 X .125 22.500 X .125 23.000 X .125 23.500 X .125 24.000 X .125 24.500 X .125 25.000 X .125 25.500 X .125 26.000 X .125 26.500 X .125 27.000 X .125 27.500 X .125 28.000 X .125 28.500 X .125 29.000 X .125 29.500 X .125 30.000 X .125 30.500 X .125 31.000 X .125 31.500 X .125 32.000 X .125 32.500 X .125 33.000 X .125 33.500 X .125 34.000 X .125 34.500 X .125 35.000 X .125 35.500 X .125 36.000 X .125 36.500 X .125 37.000 X .125 37.500 X .125 38.000 X .125 38.500 X .125 39.000 X .125 39.500 X .125 40.000 X .125 40.500 X .125 41.000 X .125 41.500 X .125 42.000 X .125 42.500 X .125 43.000 X .125 43.500 X .125 44.000 X .125 44.500 X .125 45.000 X .125 45.500 X .125 46.000 X .125 46.500 X .125 47.000 X .125 47.500 X .125 48.000 X .125 48.500 X .125 49.000 X .125 49.500 X .125 50.000 X .125 50.500 X .125 51.000 X .125 51.500 X .125 52.000 X .125 52.500 X .125 53.000 X .125 53.500 X .125 54.000 X .125 54.500 X .125 55.000 X .125 55.500 X .125 56.000 X .125 56.500 X .125 57.000 X .125 57.500 X .125 58.000 X .125 58.500 X .125 59.000 X .125 59.500 X .125 60.000 X .125 60.500 X .125 61.000 X .125 61.500 X .125 62.000 X .125 62.500 X .125 63.000 X .125 63.500 X .125 64.000 X .125 64.500 X .125 65.000 X .125 65.500 X .125 66.000 X .125 66.500 X .125 67.000 X .125 67.500 X .125 68.000 X .125 68.500 X .125 69.000 X .125 69.500 X .125 70.000 X .125 70.500 X .125 71.000 X .125 71.500 X .125 72.000 X .125 72.500 X .125 73.000 X .125 73.500 X .125 74.000 X .125 74.500 X .125 75.000 X .125 75.500 X .125 76.000 X .125 76.500 X .125 77.000 X .125 77.500 X .125 78.000 X .125 78.500 X .125 79.000 X .125 79.500 X .125 80.000 X .125 80.500 X .125 81.000 X .125 81.500 X .125 82.000 X .125 82.500 X .125 83.000 X .125 83.500 X .125 84.000 X .125 84.500 X .125 85.000 X .125 85.500 X .125 86.000 X .125 86.500 X .125 87.000 X .125 87.500 X .125 88.000 X .125 88.500 X .125 89.000 X .125 89.500 X .125 90.000 X .125 90.500 X .125 91.000 X .125 91.500 X .125 92.000 X .125 92.500 X .125 93.000 X .125 93.500 X .125 94.000 X .125 94.500 X .125 95.000 X .125 95.500 X .125 96.000 X .125 96.500 X .125 97.000 X .125 97.500 X .125 98.000 X .125 98.500 X .125 99.000 X .125 99.500 X .125 100.000 X .125 100.500 X .125 101.000 X .125 101.500 X .125 102.000 X .125 102.500 X .125 103.000 X .125 103.500 X .125 104.000 X .125 104.500 X .125 105.000 X .125 105.500 X .125 106.000 X .125 106.500 X .125 107.000 X .125 107.500 X .125 108.000 X .125 108.500 X .125 109.000 X .125 109.500 X .125 110.000 X .125 110.500 X .125 111.000 X .125 111.500 X .125 112.000 X .125 112.500 X .125 113.000 X .125 113.500 X .125 114.000 X .125 114.500 X .125 115.000 X .125 115.500 X .125 116.000 X .125 116.500 X .125 117.000 X .125 117.500 X .125 118.000 X .125 118.500 X .125 119.000 X .125 119.500 X .125 120.000 X .125 120.500 X .125 121.000 X .125 121.500 X .125 122.000 X .125 122.500 X .125 123.000 X .125 123.500 X .125 124.000 X .125 124.500 X .125 125.000 X .125 125.500 X .125 126.000 X .125 126.500 X .125 127.000 X .125 127.500 X .125 128.000 X .125 128.500 X .125 129.000 X .125 129.500 X .125 130.000 X .125 130.
-----	------	--	----	--



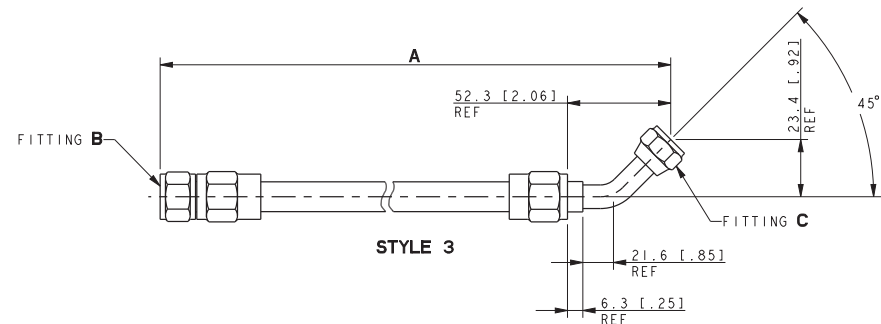
PART NO	REV	A	FITTING B	FITTING C	HOSE ID	STYLE	MATL TYPE
347494	CF	1575 [62.0]	[1 1/16-14] THD FEMALE 45° FLARE SWIVEL	[1 1/16-14] THD FEMALE 45° FLARE SWIVEL	19.0 [.75]	1	5
347495	CF	1829 [72.0]	[1 1/16-14] THD FEMALE 45° FLARE SWIVEL	[1 1/16-14] THD FEMALE 45° FLARE SWIVEL	19.0 [.75]	1	5
ES-70739	EM	4826 [190.0]	[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL	[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL	15.8 [.62]	1	1
ES-74881	FM	4826 [190.0]	[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL	[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL	19.0 [.75]	1	5
GM95059	-	2159 [85.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL	[5/8-18] THD FEMALE 45° FLARE SWIVEL	9.5 [.38]	1	3
GM95060	-	2540 [100.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL	[1 1/16-16] ORFS SAE J1453 (FEMALE)	9.5 [.38]	1	3
GM89918	A	1270 [50.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL	[1/4-18] NPT MALE	9.5 [.38]	2	6
GM89919	A	1270 [50.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL	[9/16-18] THD FEMALE 37° FLARE SWIVEL	9.5 [.38]	1	6
GM116358	-	304.8 [12.0]	(1/2-20) THD FEMALE 37 JIC SWIVEL	(1/2-20) THD MALE 37 JIC	6.4 [.25]	2	5
273615	EJ	1092 [43.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	4.8 [.19]	3	5
GM37515	EJ	1600 [63.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	4.8 [.19]	3	5
ES-71278	ES	1600 [63.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[7/16-20] THD FEMALE 45° FLARE SWIVEL	4.8 [.19]	3	6



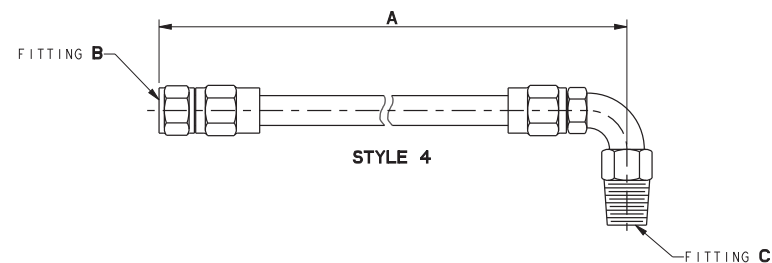
STYLE 1



STYLE 2



STYLE 3



STYLE 4

NOTE: DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

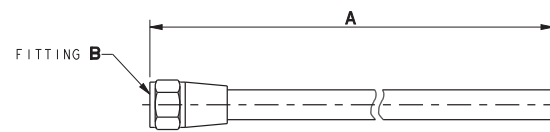
□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X .XX ± 0.25 X .X ± 0.5 X .X ± 1.5 ANGLES ± 0° 30' MAX.	THROWABLE PRODUCTION	APPROVALS	DATE	SCALE	CAD NO.	SHEET 5 of 9	
HW	2-20-17	SEE SHEET 6 [CT170738]	CER								
HY	5-24-17	(D-8) ES-70739 VOIDED, SEE SHEET 7 [CT171684]	SAM								
JA	5-8-18	SEE SHEET 1 AND 3 [CT186807]	RMJ								
JB	10-29-18	SEE SHEET 1 [CT189809]	PAR								
JC	2-25-19	SEE SHEET 3 & 8 [CT193537]	SUD								
JD	10-23-19	(C-8) GM116358 ADDED & SEE SHEET 1 & 2 [CT210155]	PAS								

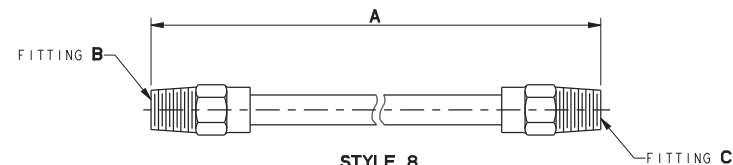
**KOHLER CO. METRIC PRO-E**  
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.  
THIS DRAWING IN DESIGN AND DETAIL IS KOHLER CO. PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH KOHLER CO. WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.  
TITLE: **DWG, FUEL LINE, FLEXIBLE**  
SCALE: **273614-CMP**  
SHEET 5 of 9



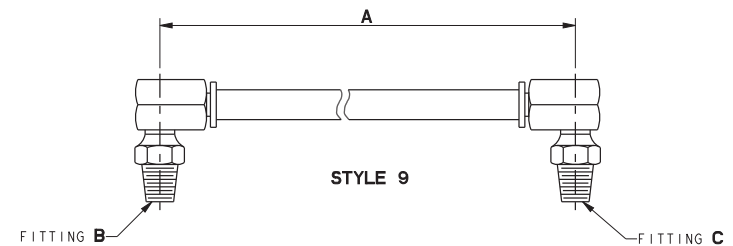
8			7			6			5		
PART NO	REV	A	FITTING B			FITTING C			HOSE ID	STYLE	MATL TYPE
225676	EJ	635 [25.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			4.8 [.19]	5	I
ES-32511	EJ	813 [32.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			4.8 [.19]	5	I
344210	EJ	940 [37.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			7.9 [.31]	5	3
GM34010	EJ	1092 [43.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			9.5 [.38]	5	5
GM45890	EJ	1524 [60.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			9.5 [.38]	5	5
225675	EJ	203 [8.0]	[1/2-20] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			7.9 [.31]	5	I
ES-33534	EJ	381 [15.0]	[1/2-20] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			7.9 [.31]	5	I
276283	EJ	737 [29.0]	[1/2-20] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			7.9 [.31]	5	I
GM34009	EJ	737 [29.0]	[1/2-20] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			9.5 [.38]	5	5
GM91237	A	275 [10.8]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			7.9 [.31]	5	5
ES-32512	EJ	483 [19.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			7.9 [.31]	5	I
GM102407	-	725 [28.5]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			7.9 [.31]	5	5
GM91238	B	991 [39.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			6.4 [.25]	5	5
GM94127	-	838 [33.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			6.4 [.25]	5	5
ES-71218	ET	1092 [43.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			7.9 [.31]	5	6
GM21201	EJ	1092 [43.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			7.9 [.31]	5	5
GM102408	-	1120 [44.1]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			6.4 [.25]	5	5
GM37610	EJ	1270 [50.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			9.5 [.38]	5	5
GM89283	-	1270 [50.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			9.5 [.38]	5	6
ES-81540	-	1270 [50.0]	[3/4-16] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			9.5 [.38]	5	5
GM29505	EJ	660 [26.0]	[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL			NOT REQUIRED			7.9 [.31]	5	5
GM29559	EJ	813 [32.0]	[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL			NOT REQUIRED			7.9 [.31]	5	5
ES-80182	-	1270 [50.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			9.5 [.38]	5	5
ES-83774	A	1118 [44.0]	[3/4-16] THD FEMALE 45° FLARE SWIVEL			NOT REQUIRED			9.5 [.38]	5	5



STYLE 5



STYLE 8



STYLE 9

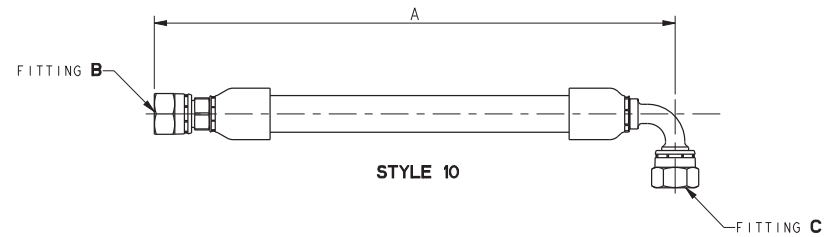
NOTE: DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: FRACTIONS DECIMALS ANGLES SURFACE FINISH MAX.	COHLEH CO. METRIC PRO-E
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGM	±.005 ±.01 ±.01	POWER SYSTEMS, KOHLER, WI. 53044 U.S.A.
HU	1-24-17	(A-8) ADDED ES-83774 [CT169865]	IMM	±.005 ±.01 ±.01	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.
HV	1-30-17	(A-8) ES-83774 LENGTH WAS 1073 [CT170133]	IMM	±.005 ±.01 ±.01	TITLE: DWG, FUEL LINE, FLEXIBLE
HW	2-21-17	(B-8) GM102407 & GM102408 ADDED [CT170738]	CEK	±.005 ±.01 ±.01	SCALE: 1"=1'-0"
HY	5-24-17	SEE SHEETS 5 AND 7 [CT171684]	SAM	±.005 ±.01 ±.01	DWG NO: 273614-CMP
JA	5-8-18	SEE SHEET 1 AND 3 [CT186807]	RMJ	±.005 ±.01 ±.01	SHEET 6 of 9
JB	10-29-18	SEE SHEET 1 [CT189809]	PAR	±.005 ±.01 ±.01	
JC	2-25-19	SEE SHEET 3 & 8 [CT193537]	SUD	±.005 ±.01 ±.01	
JD	10-23-19	SEE SHEET 1, 2 & 5 [CT210155]	PAS	±.005 ±.01 ±.01	



8		7		6		5		4		3		2		1	
PART NO	REV	A		FITTING B		FITTING C		HOSE ID	STYLE	MATL TYPE					
GM29506	EK	914 [36.0]		[7/16-20] THD FEMALE 45° FLARE SWIVEL		[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		12.7 [.50]	10	5					
GM78801	GA	1651 [65.0]		[1/2-14] NPT FEMALE		[3/4-16] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		10.4 [.41]	10	6					
GM10886	EJ	1651 [65.0]		[1/2-14] NPT FEMALE		[3/4-16] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		12.7 [.50]	10	5					
ES-60215	EJ	1727 [68.0]		[9/16-18] THD FEMALE JIC 37° FLARE SWIVEL		[9/16-18] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		10.4 [.41]	10	1					
GM93426	A	1270 [50.0]		[5/8-18] THD FEMALE 45° FLARE SWIVEL		[9/16-18] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		9.5 [.38]	10	6					
324967	EJ	1270 [50.0]		[3/4-16] THD FEMALE 45° FLARE SWIVEL		[3/4-16] THD FEMALE 45° SWIVEL 90° ELBOW		12.7 [.50]	10	5					
GM29558	EJ	965 [38.0]		[7/8-14] THD FEMALE 45° FLARE SWIVEL		[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		12.7 [.50]	10	5					
GM29543	EJ	1143 [45.0]		[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL		[9/16-18] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		12.7 [.50]	10	5					
365236	EJ	1219 [48.0]		[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL		[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		15.8 [.62]	10	5					
365202	EK	2134 [84.0]		[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL		[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		15.8 [.62]	10	1					
365232	FD	2438 [96.0]		[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL		[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		15.8 [.62]	10	5					
GM69835	FF	432 [17.0]		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		19.0 [.75]	10	5					
364027	EJ	625 [24.6]		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		15.8 [.62]	10	1					
GM69834	FF	711 [28.0]		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		19.0 [.75]	10	5					
ES-71079	EN	1270 [50.0]		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		16.0 [.63]	10	6					
ES-70503	EH	1499 [59.0]		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		15.8 [.62]	10	6					
GM69794	FT	1651 [65.0]		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		19.0 [.75]	10	5					
ES-76590	GA	1651 [65.0]		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW *		22.4 [.88]	10	6					
GM69795	FV	1880 [74.0]		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		19.0 [.75]	10	5					
ES-66538	EJ	2286 [90.0]		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		16.0 [.63]	10	1					
ES-66002	EJ	4572 [180.0]		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL		[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW		16.0 [.63]	10	1					
GM93584	-	1066.8 (42.0)		[11/16-16 UN-2B] THD FEMALE, ORFS, SWIVEL		[11/16-16 UN-2B] THD FEMALE, ORFS, SWIVEL 90° ELBOW		9.5 (.375)	10	9					



\* ES-76590 FITTING **C**: USE OF REDUCING ADAPTERS ACCEPTABLE.

NOTE: DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X .XX ± 0.25 X .X ± 0.5 X .X ± 1.5 ANGLES ± 0° 30' MAX.	THIRD ANGLE PROJECTION	APPROVALS	DATE	TITLE
HP	9-29-16	SEE SHEETS 2, 3 AND 6 [CT143502]	SAM					<b>KOHLER CO. METRIC PRO-E</b>
HR	11-15-16	SEE SHEET 5 OF 9 [CT165574]	BGF					POWER SYSTEMS, KOHLER, WI. 53044 U.S.A.
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGF					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.
HW	2-20-17	SEE SHEET 6 [CT170738]	CEK					
HY	5-24-17	(A-8) ES-66538 VOIDED, SEE SHEET 5 [CT171684]	SAM					
JA	5-8-18	SEE SHEET 1 AND 3 [CT186807]	RMJ					
JB	10-29-18	SEE SHEET 1 [CT189809]	PAR					
JC	2-25-19	SEE SHEET 3 & 8 [CT193537]	SUD					
JD	10-23-19	SEE SHEET 1,2 & 5 [CT210155]	PAS					

SCALE

CAD NO.

DWG NO.

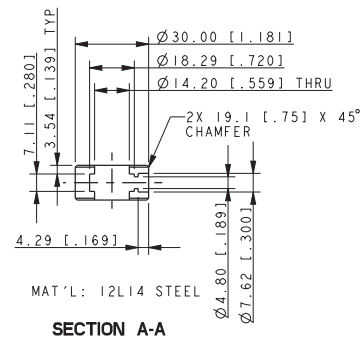
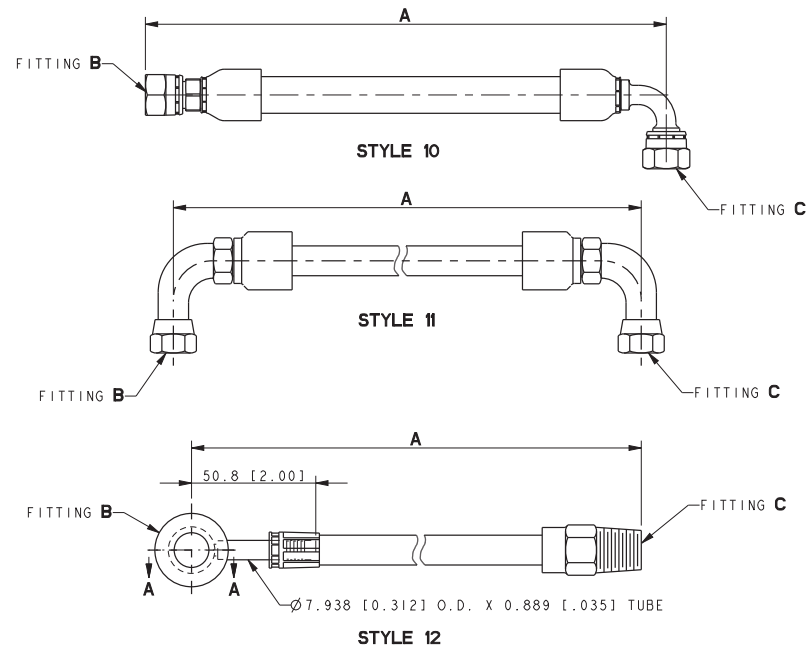
273614-CMP

SHEET 7 of 9

D



PART NO	REV	A	FITTING B	FITTING C	HOSE ID	STYLE	MATL TYPE
361283	EJ	559 [22.0]	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	22.4 [.88]	10	I
361468	EJ	991 [39.0]	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	22.4 [.88]	10	I
361098	EJ	1270 [50.0]	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	22.4 [.88]	10	I
ES-76589	FX	1270 [50.0]	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	22.4 [.88]	10	6
GM10689	EJ	1651 [65.0]	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	22.4 [.88]	10	I
ES-66802	EJ	3302 [130.0]	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	22.4 [.88]	10	I
GM95672	-	584 [23.0]	(11/16-16 UN-2B) THD FEMALE, ORFS, SWIVEL	(11/16-16 UN-2B) THD FEMALE, ORFS, SWIVEL 90° ELBOW	9.5 (.375)	10	9
GM107378	-	1270 [50.0]	[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL	[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	19.0 [.75]	10	5
364514	EJ	700 [27.6]	[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	15.8 [.62]	11	5
364028	EJ	1067 [42.0]	[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	[1 1/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	15.8 [.62]	11	5
ES-66539	EJ	2667 [105.0]	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	[1 5/16-12] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	22.4 [.88]	11	I
GM93585	A	1778 [70.0]	(11/16-16 UN-2B) THD FEMALE, ORFS, SWIVEL 90° ELBOW	(11/16-16 UN-2B) THD FEMALE, ORFS, SWIVEL 90° ELBOW	9.5 (.375)	11	9
GM93885	-	1016 [40.0]	(11/16-16 UN-2B) THD FEMALE, ORFS, SWIVEL 90° ELBOW	(11/16-16 UN-2B) THD FEMALE, ORFS, SWIVEL 90° ELBOW	9.5 (.375)	11	9



NOTE: DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

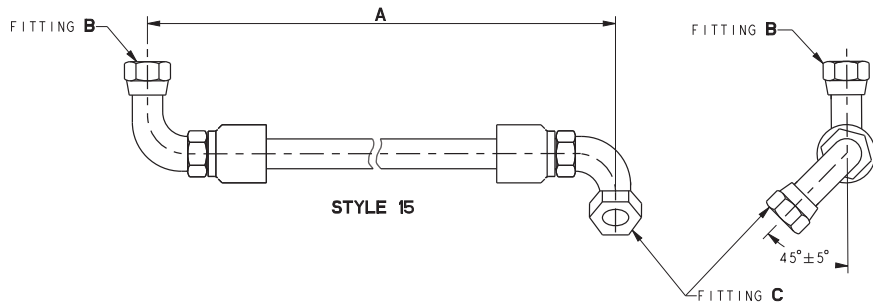
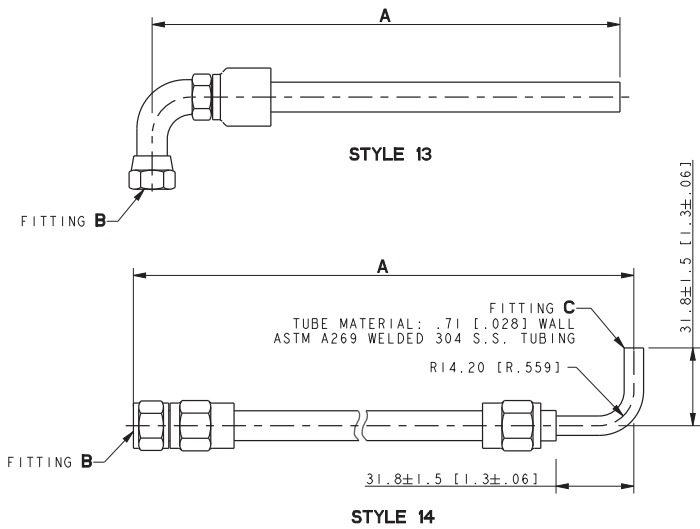
□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X.XX ± 0.25 X.X ± 0.15 ANGLES A 0°-30° MAX.	SURFACE FINISH	DATE	SCALE	CAD NO.	SHEET 8 of 9
HP	9-29-16	SEE SHEETS 2, 3 AND 6 [CT143502]	SAM						
HR	11-15-16	SEE SHEET 5 OF 9 [CT165574]	BGR						
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGR						
HW	2-20-17	SEE SHEET 6 [CT170738]	CEK						
HY	5-24-17	SEE SHEETS 5 AND 7 [CT171684]	SAM						
JA	5-8-18	SEE SHEET 1 AND 3 [CT186807]	RMJ						
JB	10-29-18	SEE SHEET 1 [CT189809]	PAR						
JC	2-25-19	[C-8] GM107378 ADDED; SEE SHEET 3 [CT193537]	SUD						
JD	10-23-19	SEE SHEET 1, 2 & 5 [CT210155]	PAS						

**KOHLER CO.** **METRIC** **PRO-E**  
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.  
THIS DRAWING IN DESIGN AND DETAIL IS KOHLER CO. PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH KOHLER CO. WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.  
TITLE: **DWG, FUEL LINE, FLEXIBLE**  
SCALE: **273614-CMP**  
DWG NO: **D**



PART NO	REV	A	FITTING B	FITTING C	HOSE ID	STYLE	MATL TYPE
ES-70206	EJ	1016 [40.0]	[7/8-14] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	NOT REQUIRED	9.5 [.38]	13	5
GM65606	FC	1676 [66.0]	[7/16-20] THD FEMALE JIC 45° FLARE SWIVEL	[1/4] O.D. TUBE	4.8 [.19]	14	5
ES-76764	FZ	1676 [66.0]	[7/16-20] THD FEMALE JIC 45° FLARE SWIVEL	[1/4] O.D. TUBE	4.8 [.19]	14	6
GM91498	A	1470 [57.9]	[9/16-18] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	[9/16-18] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	9.5 [.38]	15	6
GM91499	A	1070 [42.1]	[9/16-18] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	[9/16-18] THD FEMALE JIC 37° FLARE SWIVEL 90° ELBOW	9.5 [.38]	15	6



NOTE: DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X .XX ± 0.25 X .X ± 1.5 X ± 1.5 ANGLES ± 0° 30' MAX.	THIRD ANGLE PROJECTION	APPROVALS	DATE	TITLE
HP	9-29-16	SEE SHEETS 2, 3 AND 6 [CT143502]	SAM					<b>KOHLER CO.</b> [METRIC] [PRO-E]
HR	11-15-16	SEE SHEET 5 OF 9 [CT165574]	BGF					POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGF					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.
HW	2-20-17	SEE SHEET 6 [CT170738]	CEK					
HY	5-24-17	SEE SHEETS 5 AND 7 [CT171684]	SAM					
JA	5-8-18	SEE SHEET 1 AND 3 [CT186807]	RMJ					
JB	10-29-18	SEE SHEET 1 [CT189809]	PAR					
JC	2-25-19	SEE SHEET 3 & 8 [CT193537]	SUD					
JD	10-23-19	SEE SHEET 1, 2 & 5 [CT210155]	PAS					

SCALE	CAD NO.	SHEET 9 of 9
DWG NO.	273614-CMP	D





# 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).

**This warranty is effective only upon Kohler Co.'s receipt of an extended warranty registration form and warranty fee within one year of registered startup.** The comprehensive limited warranty start date is determined by the standard limited warranty requirements and runs concurrent with the standard limited warranty during the first year. To receive extended comprehensive limited warranty coverage, the provisions of the standard limited warranty registration must be met.

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 8/16f





# 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.™

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

An electronic certificate can be authenticated [online](https://www.bsigroup.com/ClientDirectory). Printed copies can be validated at [www.bsigroup.com/ClientDirectory](https://www.bsigroup.com/ClientDirectory). To be read in conjunction with the scope above or the attached appendix.

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP. Tel: + 44 345 080 9000  
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.  
A Member of the BSI Group of Companies.

G15-152 10/21



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](https://www.bsigroup.com/ClientDirectory). Printed copies can be validated at [www.bsigroup.com/ClientDirectory](https://www.bsigroup.com/ClientDirectory). To be read in conjunction with the scope above or the attached appendix.

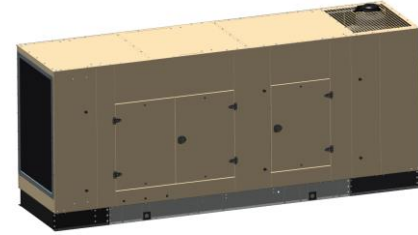
Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PR. Tel: + 44 345 080 9000  
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.  
A Member of the BSI Group of Companies.

G15-152 10/21



EVALUATION SUBJECT: 350-500REOZJC/D Sound Level 2 Aluminum Enclosure

TER-20-25965.1

**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 & 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 & 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 & 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://www.ecalc.io/259651)**

FOR ENGINEER CERTIFIED ORIGINALS & MORE  
INFORMATION ABOUT THIS DOCUMENT OR SCAN  
THE QR CODE TO THE RIGHT >

VISIT [ENGINEERINGEXPRESS.COM/STORE](https://www.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

ENGINEERING EXPRESS®

FL PE #0046549

FLCA #9885

☐ If Checked, Certifying  
Engineer and PE #

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://www.ecalc.io/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

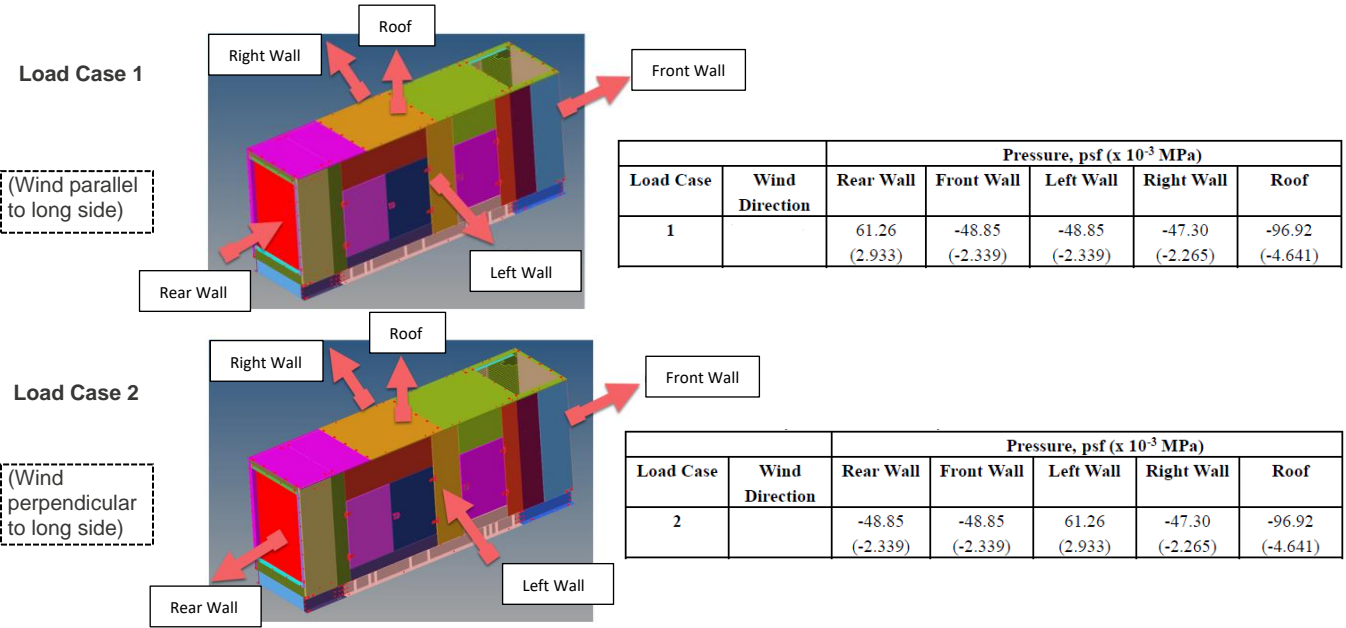
Engineering Express has reviewed the design requirements per the Florida Building Code Sixth & Seventh Editions (2017 & 2020) and ASCE 7 for the structural integrity of the Kohler aluminum housing units with steel skid to withstand the maximum rated wind pressures stated herein. This TER certifies the 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:

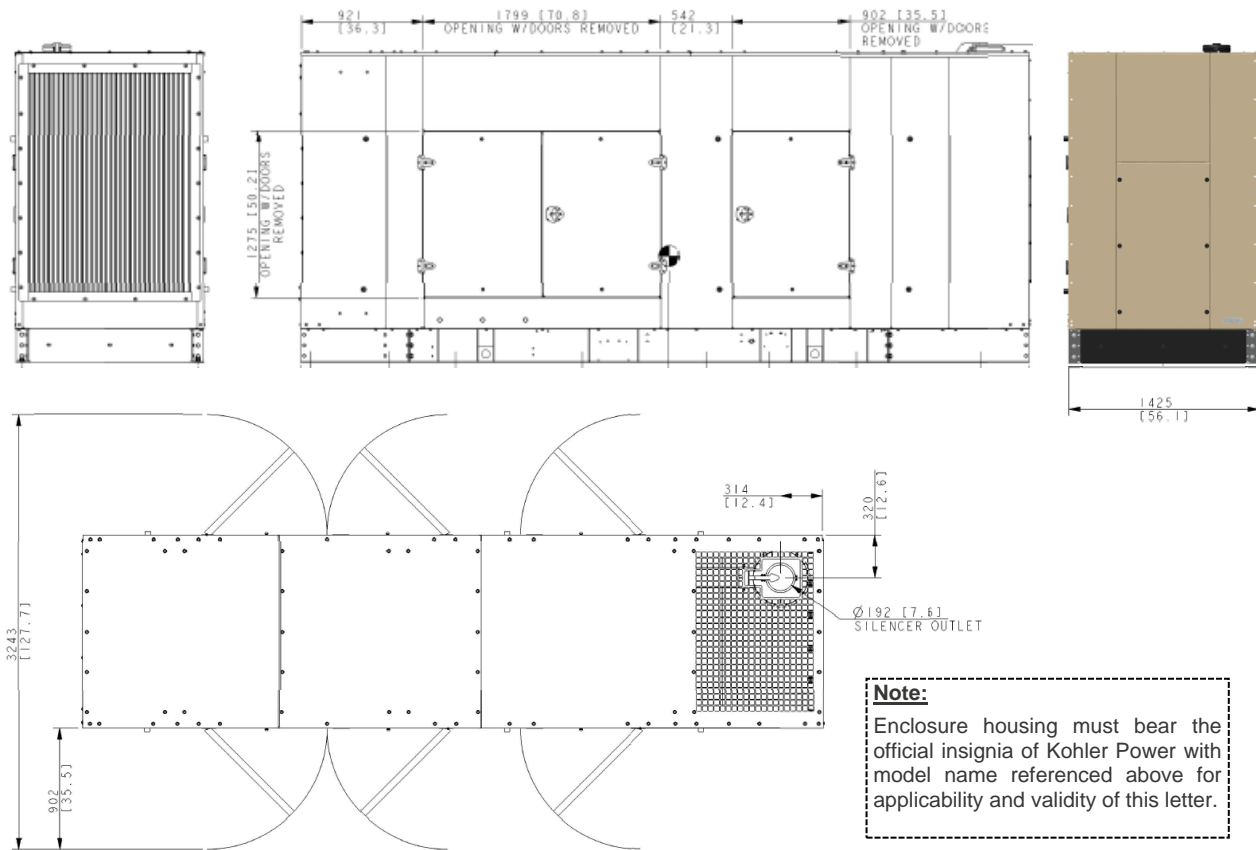
- 1. Maximum ultimate design pressures as evaluated below:



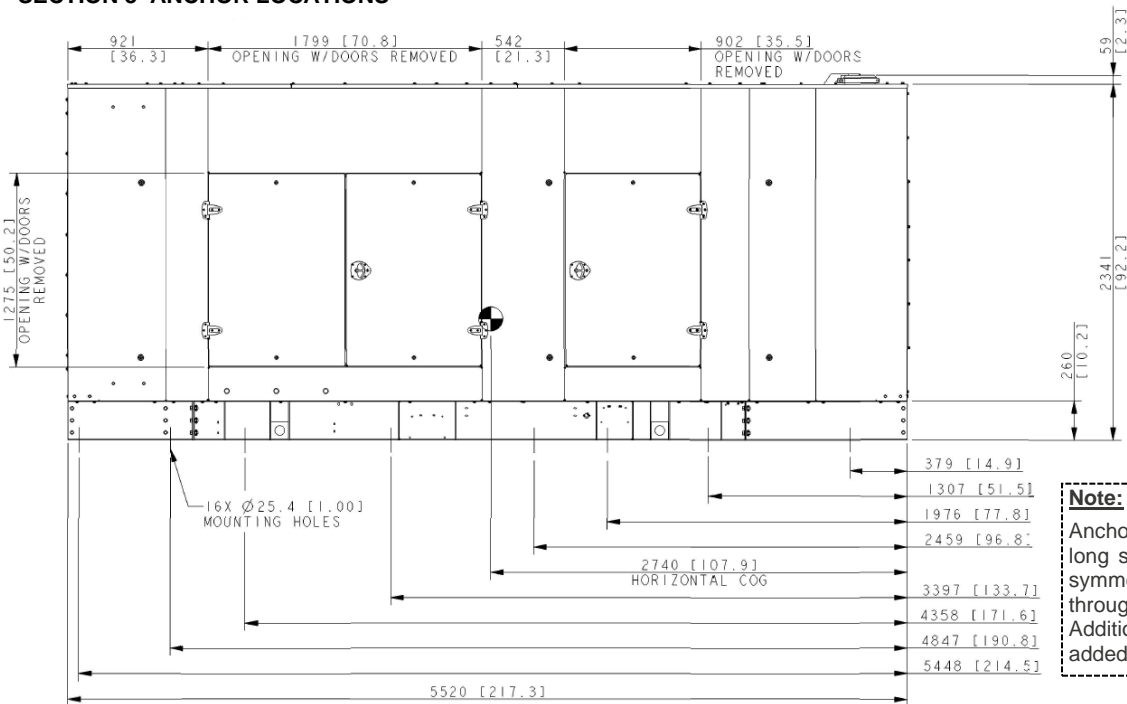
- 2. Supplemental FEA has been performed to evaluate the front and left walls of the enclosure to +/- 65 psf. Upon thorough review of the results, it is the opinion of this engineer that the results, coupled with the FEA above, satisfactorily indicate the enclosure and skid stresses remain below ultimate 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 &amp; 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 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/ft<sup>2</sup>)", "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.

**KOHLER®**

KOHLER CO. Kohler, Wisconsin 53044  
Phone 920-565-3381, Fax 920-459-1646  
For the nearest sales/service outlet in the  
US and Canada, phone 1-800-544-2444  
KohlerPowerSystems.com





# PreStartup Checklist



## Generator Set/Transfer Switch Installation Checklist

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

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

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



## Generator Set/Transfer Switch Startup Checklist

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

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

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