Submittal Package

KOHLER®

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Pre-Startup Checklist	PreStartUpCheckList

Generator

Kohler Model: 350REOZJD

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

Standard Features:

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

Other Features:

- Kohler designed controllers for guaranteed system integration and remote communication.
- The low coolant level shutdown prevents overheating (standard on radiator models only).Integral vibration isolation eliminates the need for under-unit vibration spring isolators.
- An electronic, isochronous governor delivers precise frequency regulation.
- Mount up to four circuit breakers to allow circuit protection of selected priority loads.

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
	350REOZJD Generator System
4	350REOZJD Generator Set

Includes the following:

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

4	Lit Kit, General Maint., 350REOZJD

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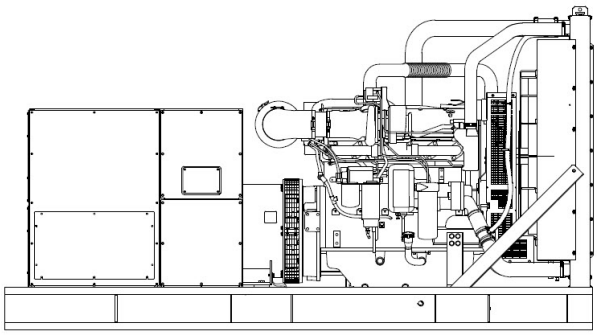
Spec Sheets

KOHLER®

350REOZJD
Diesel



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- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Literature

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- 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	kW/kVA	Amps
4M4019	120/208	3	60	350/438	1214

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor.
Standby Ratings: The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating.
Prime Power Ratings: At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve.
Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time and continuous ratings, consult the factory.

Model: 350REOZJD, continued

Alternator Specifications

Specifications	Alternator
Alternator manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Permanent-Magnet, Pilot Exciter
Leads, quantity	12, Reconnectable
Voltage regulator	Solid State, Volts/Hz
Insulation	NEMA MG1
Insulation: Material	Class H, Synthetic, Nonhydroscopic
Insulation: Temperature Rise	130 ° C, 150 ° C Standby
Coupling	Flexible Disc
Amortisseur windings	Full
Rotor balancing (50Hz)	125%
Rotor balancing (60Hz)	125%
Voltage regulation, no-load to full-load RMS	Controller Dependent
One-Step Load Acceptance	100% of rating
Unbalanced load capability	100% of Rated Standby Current

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling down stream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.
- Brushless alternator with brushless pilot exciter for excellent load response.

Engine

Engine Specification

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

Model: 350REOZJD, continued

Exhaust

Exhaust System

Exhaust Manifold Type	Dry
Exhaust flow at rated kW, m3/min. (cfm)	68 (2387)
Exhaust temperature at rated kW, dry exhaust, ° C (° F)	547 (1017)
Maximum allowable back pressure, kPa (in. Hg)	Min. 4 (1.2) Max. 7.5 (2.2)
Exh. outlet size at eng. hookup, mm (in.)	See ADV Drawing

Engine Electrical

Engine Electrical System

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

Fuel

Fuel System

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

Lubrication

Lubrication System

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

Model: 350REOZJD, continued

Cooling

Radiator System

Ambient temperature, ° C (° F)	50 (122)
Engine jacket water capacity, L (gal.)	18 (4.8)
Radiator system capacity, including engine, L (gal.)	67.2 (17.8)
Engine jacket water flow, Lpm (gpm)	400 (106)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	175 (9661)
Heat rejected to charge air cooling water at rated kW, dry exhaust, Kw Btu/min.	75 (4269)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	965 (38)
Fan, kWm (HP)	18 (24)
Max. restriction of cooling air, intake and discharge side of radiator, kPA (in. H20)	0.125 (0.5)

* Enclosure with internal silencer reduces ambient temperature capability by 5 ° C (9 ° F).

Operation Requirements

Air Requirements

Radiator-cooled cooling air, m3/min. (scfm) *	435 (15400)
Cooling air required for generator set when equipped with city water cooling or remote radiator, based on 14 ° C (25 ° F) rise, m3/min. rise and ambient temp. of 29 ° C (85 ° F) m3/min. (cfm)	285 (10067)
Combustion air, m3/min. (cfm)	25 (883)
Heat rejected to ambient air: Engine, kW (Btu/min.)	43 (2448)
Heat rejected to ambient air: Alternator, kW (Btu/min.)	36.6 (2082)

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

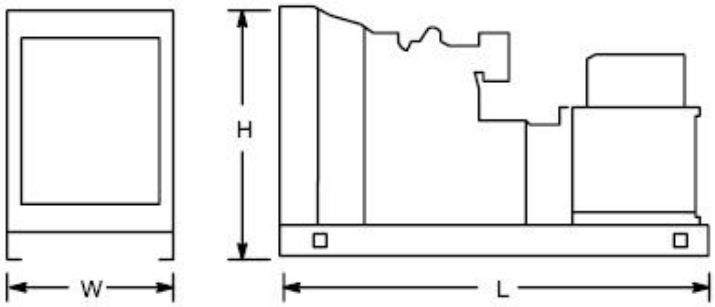
Fuel Consumption

	Rating
Standby Fuel Consumption at 100% load	100.3 Lph (26.5 gph)
Standby Fuel Consumption at 75% load	80.3 Lph (21.2 gph)
Standby Fuel Consumption at 50% load	56.7 (15.0)
Standby Fuel Consumption at 25% load	29.5 (7.8)
Continuous Fuel Consumption at 0% load	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: 350REOZJD, 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.

APM402

Kohler® APM402 Controller

General Description and Function

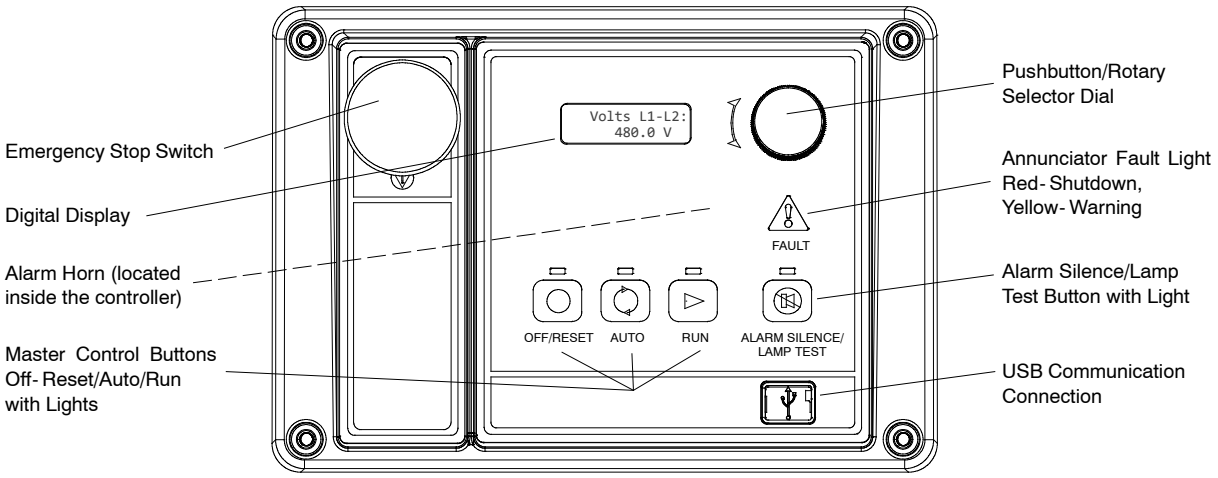
The APM402 generator set controller provides advanced control, system monitoring, and system diagnostics for optimum performance.

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 ±0.5% regulation.
- Built-in alternator thermal overload protection.

Modbus® is a registered trademark of Schneider Electric.



User Interface Controls and Components

- Emergency stop switch
- Backlit LCD digital display with two lines of 12 characters *(see User Interface Displays for menus)*
- Alarm horn indicates generator set shutdown and warning faults
- Environmentally sealed membrane keypad with three master control buttons with lights
  - ○ Off/Reset (red)
  - ○ Auto (green)
  - ○ Run (yellow)
- Pushbutton/rotary selector dial for menu navigation
  - ○ Rotate dial to access main menus
  - ○ Push dial and rotate to access sub menus
  - ○ Press dial for 3 seconds to return to top of main menu
- Annunciator fault light
  - ○ System shutdown (red)
  - ○ System warning (yellow)
- Alarm silence/lamp test button
  - ○ Alarm silence
  - ○ Lamp test
- USB and RS-485 connections
  - ○ Allows software upgrades
  - ○ Provides access for diagnostics
  - ○ PC communication using SiteTech™ 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 ±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 ±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
Engine Functions		
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	●	
General Functions		
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		
Generator Functions		
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.

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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.

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Modbus® is a registered trademark of Schneider Electric.

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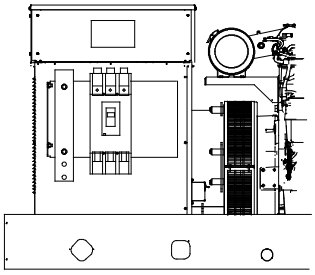
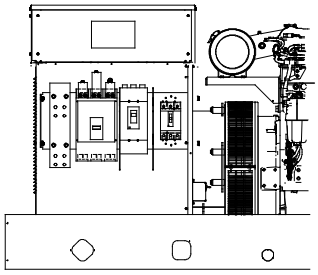
KOHLER®

Industrial Generator Set Accessories

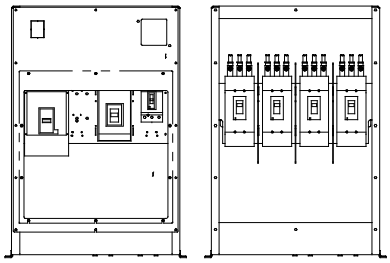
Line Circuit Breakers 15- 3250 kW



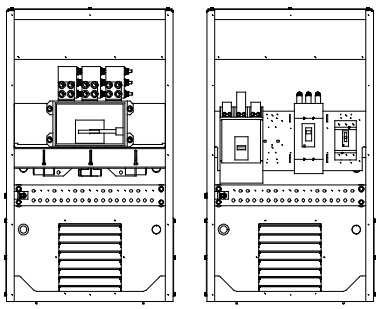
Single Circuit Breaker Kit with Neutral Bus Bar
15- 300 kW Model Shown



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

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

Electronic with Ground Fault Trip

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

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

80% Rated Circuit Breaker

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

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

100% Rated Circuit Breaker

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

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

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

Line Circuit Breaker Options

❑ Alarm Switch

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

❑ Auxiliary Contacts

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

❑ Breaker Separators (350- 2500 kW)

Provides adequate clearance between breaker circuits.

❑ Bus Bars

Bus bar kits offer a convenient way to connect load leads to the generator set when a circuit breaker is not present.
15- 300 kW. Bus bar kits are available on alternators with leads for connection to the generator set when circuit breakers are not ordered.
350- 2500 kW. A bus bar kit is provided when no circuit breaker is ordered. Bus bars are also available in combination with circuit breakers or other bus bars on the opposite side of the junction box. On medium voltage (3.3 kV and above) units, a bus bar kit is standard (not applicable to KD models).

❑ Field Connection Barrier

Provides installer wiring isolation from factory connections.

❑ Ground Fault Annunciation

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

❑ Lockout Device (padlock attachment)

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

❑ Lugs

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

❑ Overcurrent Trip Switch

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

❑ Shunt Trip, 12 VDC or 24 VDC

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

❑ Shunt Trip Wiring

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

❑ Undervoltage Trip, 12 VDC or 24 VDC

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

15- 300* kW Line Circuit Breaker Specifications

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

80% Rating Circuit Breaker

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
4D/4E	15- 150	Thermal magnetic	HD
	60- 150	Electronic LI	
		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
	60- 150	Electronic LI	
		Electronic LSI	
		Electronic LSIG	
	60- 150	Electronic LI	HG
		Electronic LSI	
		Electronic LSIG	
	30	Magnetic 9- 325	HJ
	50	Magnetic 84- 546	
	100	Magnetic 180- 1040	
	150	Magnetic 348- 1690	
	175- 250	Thermal magnetic	JD
	250	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	
		Magnetic1500- 3000	
		Magnetic 1750- 3500	
		Magnetic 2000- 4000	
	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	

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
4RX 4S/4SX 4TX/4V 4UA 4M6226	15- 150	Thermal magnetic	HD
	60- 150	Electronic LI	
		Electronic LSI	
		Electronic LSIG	
	60- 150	Electronic LI	HG
		Electronic LSI	
		Electronic LSIG	
	30	Magnetic 9- 325	HJ
	50	Magnetic 84- 546	
	100	Magnetic 180- 1040	
	150	Magnetic 348- 1690	
	175- 250	Thermal magnetic	JD
	250	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	
		Magnetic1500- 3000	
		Magnetic 1750- 3500	
		Magnetic 2000- 4000	
	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
	60- 150	Electronic LI	
		Electronic LSI	
		Electronic LSIG	
	60- 150	Electronic LI	HG
		Electronic LSI	
		Electronic LSIG	
4P/4PX 4Q/4QX	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	JD
		Electronic LSI	
		Electronic LSIG	
	250	Electronic LI	JG
		Electronic LSI	
		Electronic LSIG	
	400	Electronic LI	LG
		Electronic LSI	
		Electronic LSIG	
4RX 4S/4SX 4TX 4V 4UA 4M6226	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- 800	Electronic LSI	PG
		Electronic LSIG	
4UA 4M6226	1000- 1200	Electronic LSI	PG
		Electronic LSIG	
	1200	Electronic LSI	PJ
		Electronic LSIG	

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	250 400 600 800	3.0 LI	PJ
		5.0 LSI	PJ
		3.0 LI	PL
		5.0 LSI	PL
4UA 4M6226	250 400 600 800 1000 1200	3.0 LI	PJ
		5.0 LSI	PJ
		3.0 LI	PL
		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)

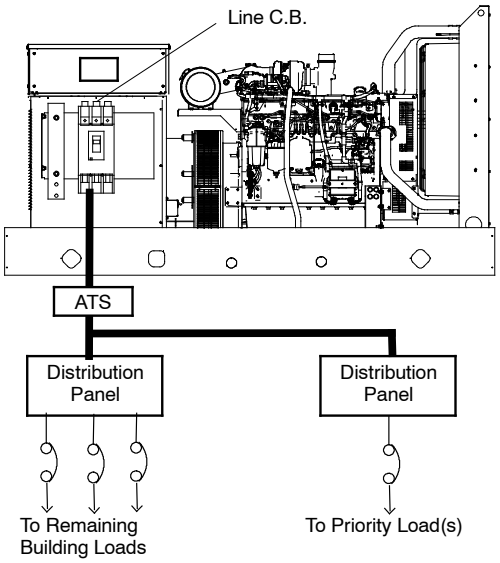
Frame Size	Ampere Range	Wire Range
E (480 V max.)	30- 100	Up to two wire terminals fitting 10-32 or 1/4-20 stud
H	15- 150	One #14 to 3/0
J	175	One 1/0 to 4/0
	200- 250	One 3/0 to 350 kcmil
LA	300- 400	One #1 to 600 kcmil or Two #1 to 250 kcmil
LG	400- 600	Two 2/0 to 500 kcmil AL/CU
M	800	Three 3/0 to 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 LSIG 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

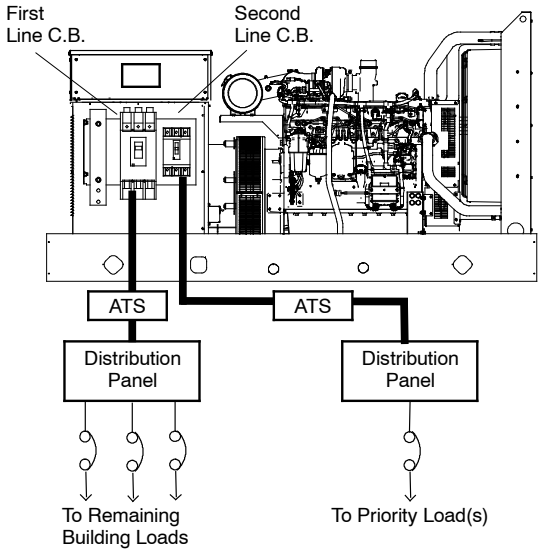
A generator set with a single circuit breaker installed typically feeds a single transfer switch and then a distribution panel. This allows protection of the entire system.



Single line circuit breaker configuration where circuit breaker can trip causing all power to building loads including priority load to be disrupted.

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.



Dual line circuit breaker configuration where first circuit breaker can trip allowing second circuit breaker to continue supplying power to priority load(s).

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		—	
	LG	H, J or LG	—	
4RX 4S/4SX 4TX 4V	M	—	—	All
	P	—	—	All
	H or J	H or J	—	No LSIG
	LA	H, J, or LA	—	
	LG	H, J, LA, or LG	—	
	M			
	P			
	H or J	H or J	H or J	
4UA 4M6226	M or P	—	—	All
	H or J	H or J	—	All
	LA	H, J, or LA	—	
	LG	H, J, LA, or LG	—	
	M or P	H, J, LA, or LG	—	
	P	P	—	No LSIG
	H or J	H or J	H or J	
	LA	H or J	H or J	
		LA	H, J, or LA	
	LG	H or J	H or J	
		LA	H, J, or LA	
		LG	H, J, LA, or LG	
	M or P	H or J	H or J	
		LA	H, J, or LA	
		LG	H, J, or LG	

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	
	250	684- 2500 A. Mag. Trip	JJ
	300- 400	Thermal Magnetic	LA
	400	500- 1000 A. Mag. Trip	
		750- 1600 A. Mag. Trip	
		1000- 2000 A. Mag. Trip	
		1125- 2250 A. Mag. Trip	
		1250- 2500 A. Mag. Trip	
		1500- 3000 A. Mag. Trip	
		1750- 3500 A. Mag. Trip	
		2000- 4000 A. Mag. Trip	
	400- 600	Electronic LI	LG
		Electronic LSI	
		Electronic LSIG	
	800	Electronic LI	MG
	1000- 1200	Thermal Magnetic	PG
	800- 1200	Electronic LSI	
		Electronic LSIG	
	1200	Thermal Magnetic	PJ
		Electronic LSI	
		Electronic LSIG	
	1600- 2500	Thermal Magnetic	RJ
		Electronic LSI	
		Electronic LSIG	

100% Rating Circuit Breaker

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
4M 5M 7M	15- 150	Thermal Magnetic	HD
	60- 150	Electronic LI	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	
	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.

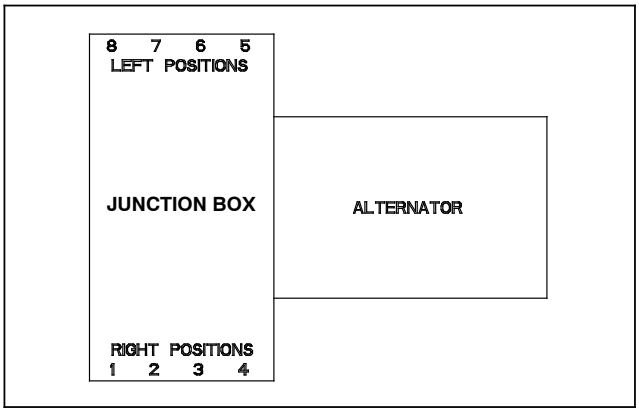
Interrupting Ratings

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	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

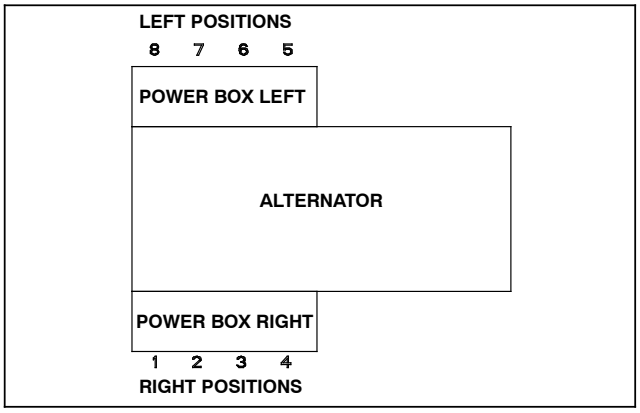
Interrupting Ratings

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
Mechanical Load Lugs Included with H, J, and LG LSIG 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

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 LSIG	

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
Note: 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
	Ground	250	2	1	#6 to 300	AL or CU
LA	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
			2	1	#6 to 2/0	AL
LG	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.

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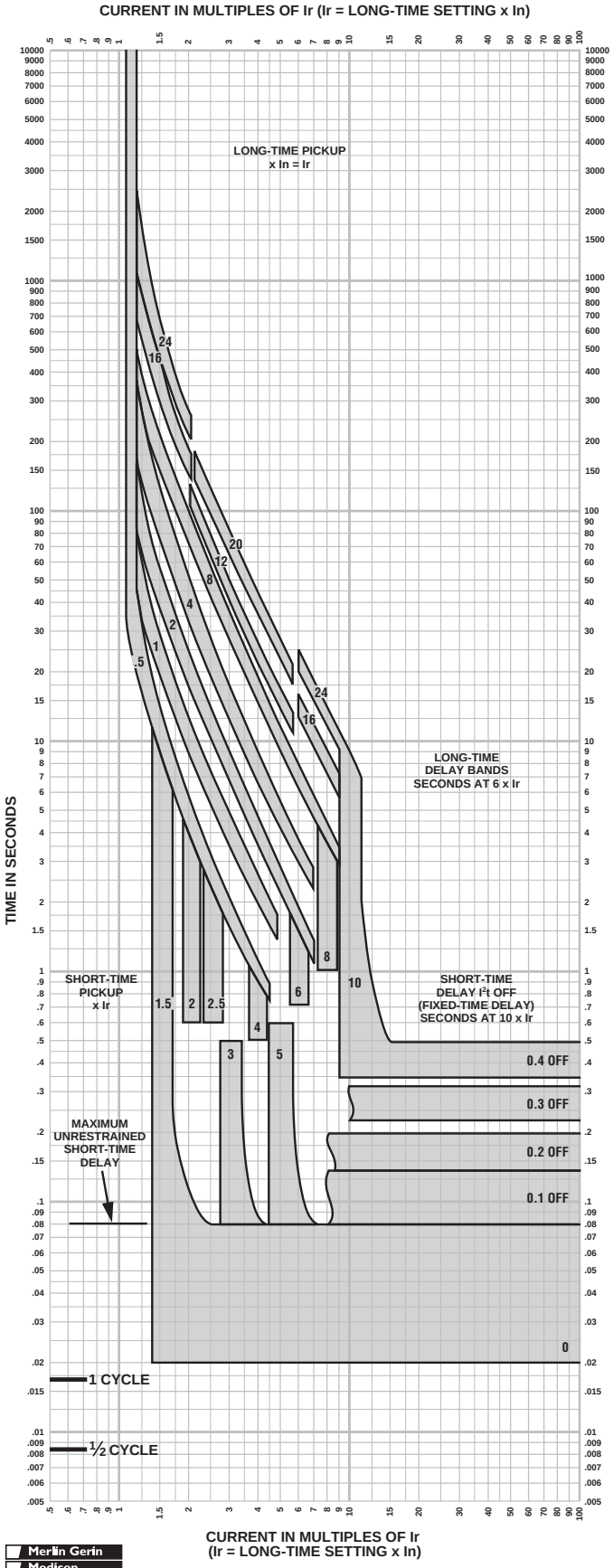


MICROLOGIC® 5.0/6.0 A/P/H TRIP UNIT CHARACTERISTIC TRIP CURVE NO. 613-4

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

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

Merlin Gerin
Modicon
Square D
Telemecanique
Schneider Electric

SQUARE D
Schneider Electric

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.

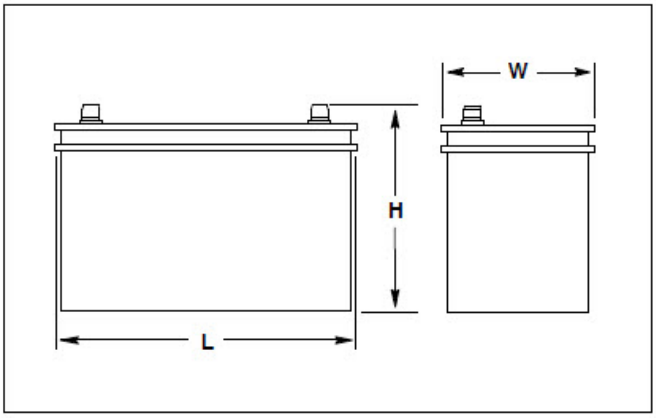
Order Number 0612HO0201

SQUARE D
Schneider Electric

KOHLER®

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

Typical Overall Dimensions

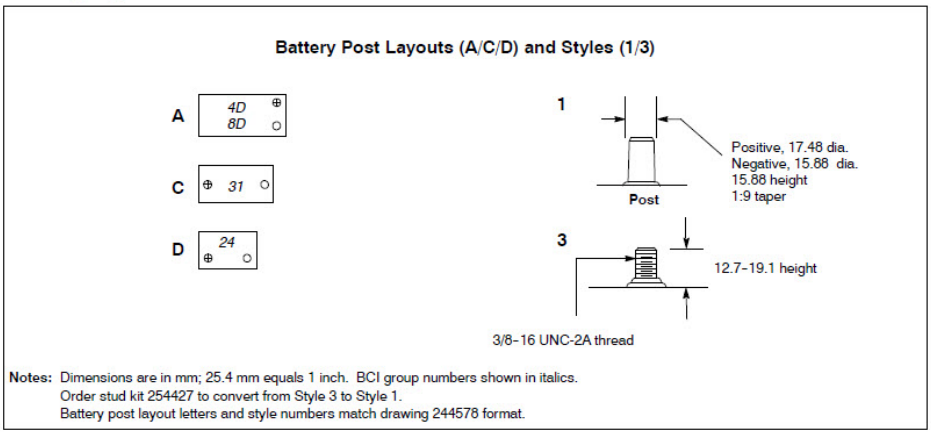


Standard Features

- 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 availabe for 24-volt systems and/or systems with redundant starters.
- Wet- and dry-charged batteries have lead-calcium or lead-antimony plates and use sulferic acide 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

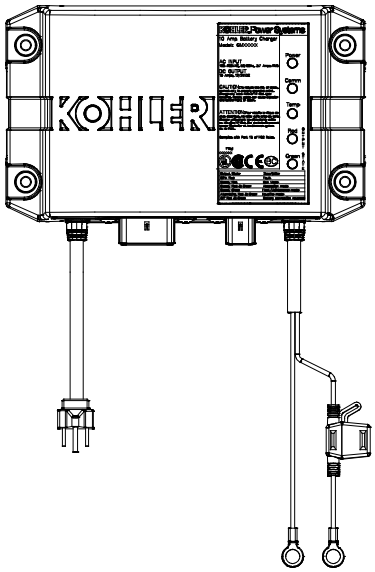
Battery Specifications



KOHLER

Industrial Generator Set Accessories

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



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

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

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

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

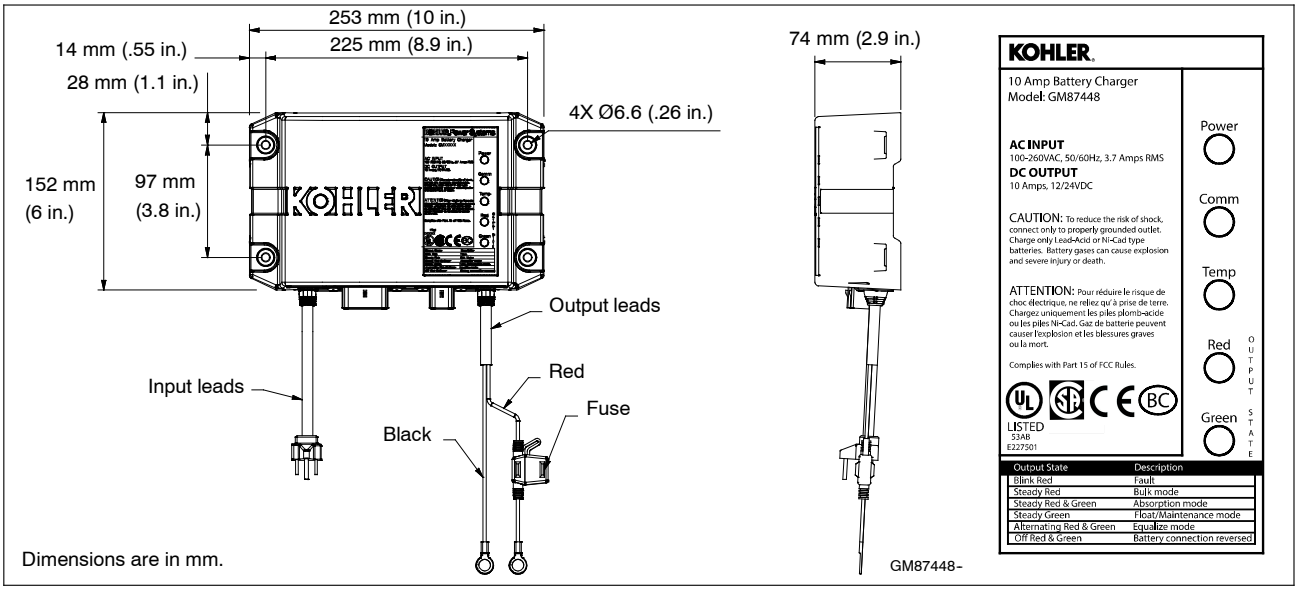
With the optional battery temperature sensor connected, the battery charger can adjust output voltages for optimal charging.

Standard Features

- 12 or 24 VDC output
  - Automatic voltage detection
- Automatic multi-stage charging modes
  - Recovery charge
  - Bulk charge
  - Absorption charge
  - Float charge
  - Equalize charge
- Charges the following type batteries:
  - Flooded lead acid (FLA)
  - AGM
  - Gel cell
  - High performance AGM
  - Nickel-cadmium (NiCad)
- 5 LED status indicators
- Durable potted assembly for waterproofing and vibration resistance
- Reverse-polarity protection
- Short-circuit protection
- Electronically limited output current
- Optional temperature compensation (FLA only)
- User adjustable parameters to support optimal manufacturer recommended charge curve.
- Code compliance:
  - UL 1236 Listed
  - NFPA 110, Level 1 compatible (when used with 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			Shipping Weight	
Volts (Nominal)	Amps	Volts (Nominal)	Amps	**Overall Dimensions** W x D x H	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 ±1%; current is electronically limited
Fuse Protection	15 amps ATC
Battery Types	Flooded Lead Acid (FLA) AGM Gel Cell High Performance AGM Nickel–Cadmium (NiCad)
Monitoring	
LED Indications	Power Communication Temperature compensation Output charger curve and charger status: ○ Red ○ Green
Environmental	
Operating	-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	

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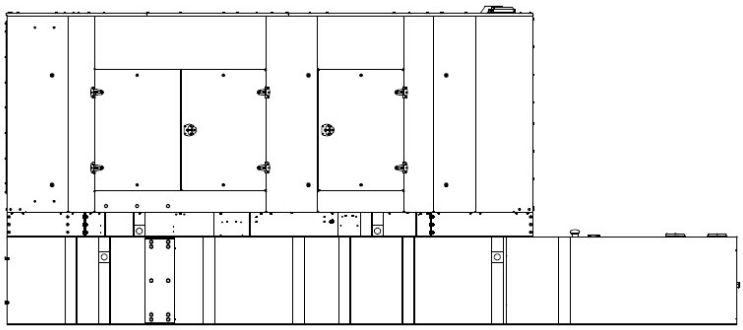
KOHLER®

Sound Enclosure with Subbase Fuel Tank Package

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED



Sound Enclosure Standard Features

• Internal silencer, flexible exhaust connector and rain cap.

• Mounts to generator set skid. Steel construction with hinged doors.

• Fade-, scratch-, and corrosion-resistant Kohler® Power Armor cream beige automotive-grade textured finish.

• Enclosure has six large access doors which allow for easy maintenance.

• Lockable, flush-mounted door latches.

• Air inlet louvers reduce rain entry.

• Internal vertical discharge plenum directs air up to reduce noise.

• Acoustic insulation that meets UL 94 HF1 flammability classification.

• Sound enclosure offers level 1 sound reduction suing acoustic insulation.

Subbase Fuel Tank Features

• The fuel tank has a Power Armor Plus textured epoxy-based rubberized coating.

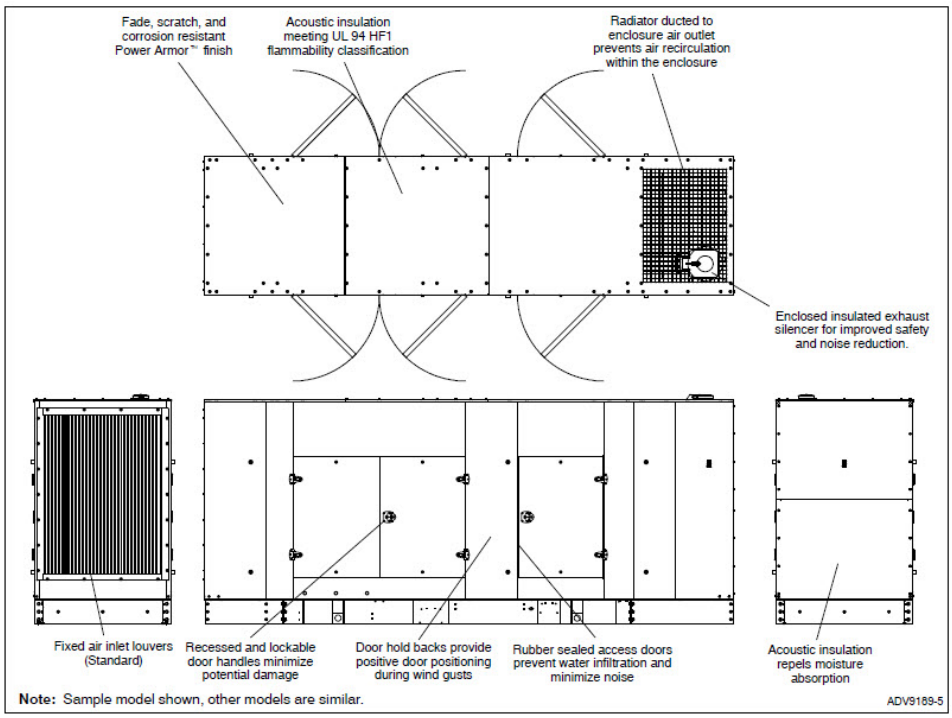
• The above-ground rectangular secondary containment tank mounts directly to the generator set, below the generator set skid (subbase).

• Both the inner and outer tanks have emergency relief vents.

• Flexible fuel lines are provided with subbase fuel tank selection.

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

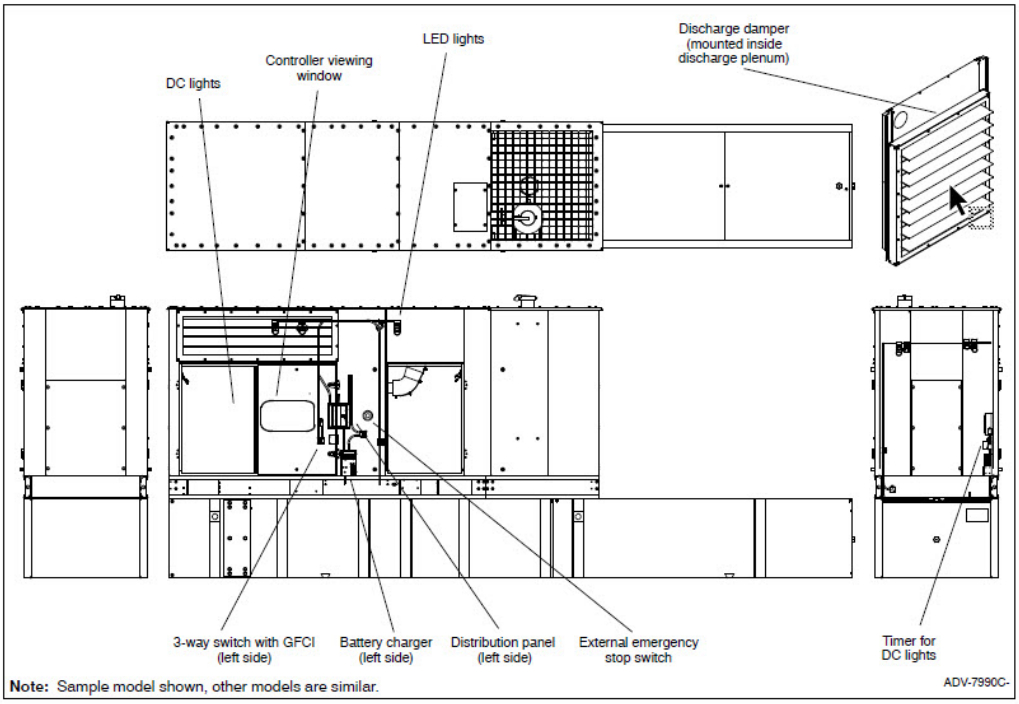
Level 1 Sound Enclosure



Sound Enclosure Features

- Heavy-duty formed panels, solid construction. Pre-assembled package offering corrosion resistant, dent resilient structure mounting directly to the generator set skid. Available in 14 gauge steel.
- Power Armor automotive-grade finish resulting in advanced corrosion and abrasion protection as well as enhanced edge coverage and color retention.
- Internal exhaust silencer offering maximum component life and operator safety.
- Note: Installing an additional length of exhaust tail pipe may increase backpressure levels. Please refer to the generator set spec sheet for the maximum backpressure value.
- Service access. Multi-personnel doors for easy access to generator set control and servicing of the fuel fill, fuel gauge, oil fill, and battery.
- Interchangeable modular panel construction. Allows complete serviceability or replacement without compromising enclosure design.
- Bolted panels facilitate service, future modification upgrades, or field replacement.
- Cooling/combustion air intake. Weather protective designs using fixed air inlet louvers. Sized for maximum cooling airflow.
- Cooling air discharge. Attenuated models offering an internal vertical discharge scoop that redirects cooling air up and above the enclosure to reduce noise.
- Sound-attenuating design using a silencer and acoustic insulation UL 94 HF1 listed for flame resistance.

Weather and Sound Enclosure Options



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

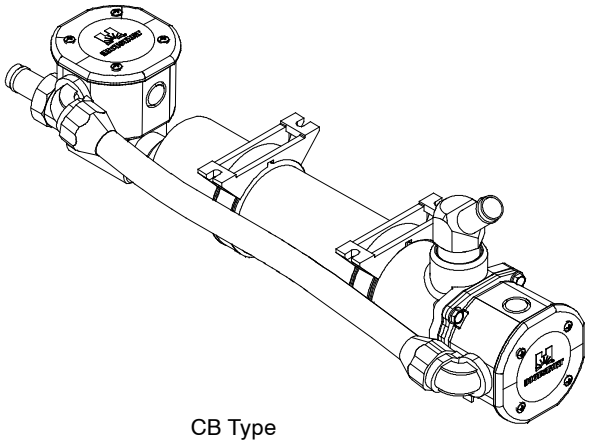
Fuel Tank Capacity, L (gal.)	Est. Fuel Supply Hours at 60 Hz with Full Load	Enclosure and Fuel Tank Length, mm (in.)	Enclosure and Fuel Tank Width, mm (in.)	Enclosure and Fuel Tank Weight, kg (lb.)	Enclosure and Fuel Tank Height, mm (in.)	Fuel Tank Height (H), mm (in.)	Sound Pressure Level, dB(A)
Lift base	0	5520 (217)	1495 (59)	4745 (10460)	2400 (94)	0 (0)	91.3
2930 (774)	24	5761(227)	1495 (59)	6146 (13549)	3162 (124)	762 (30)	81.7

Note: Data in table is for reference only, refer to the respective ADV drawings for details.
Note: Refer to TIB-114 for generator set sound data.
* Max. weight includes the generator set (wet) with largest alternator option, enclosure, silencer, and tank (no fuel).

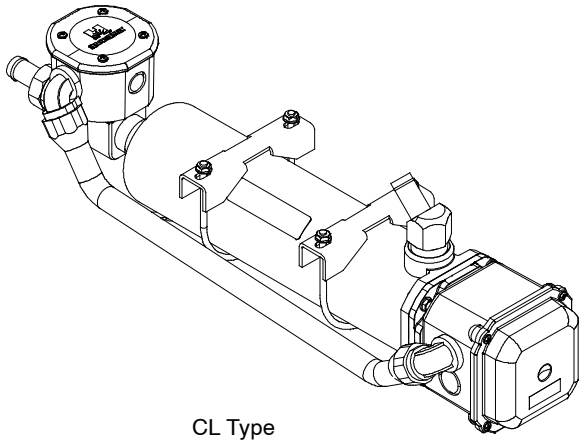
KOHLER®

Industrial Generator Set Accessories

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.

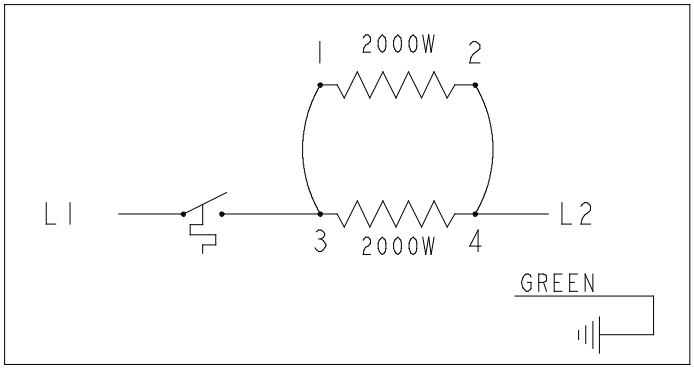
Block Heater Specifications

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

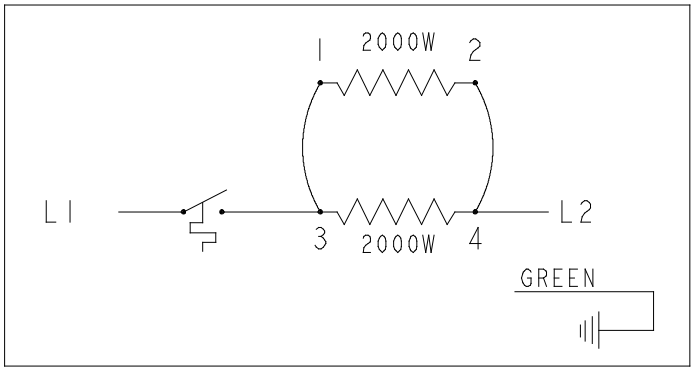
Specifications

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

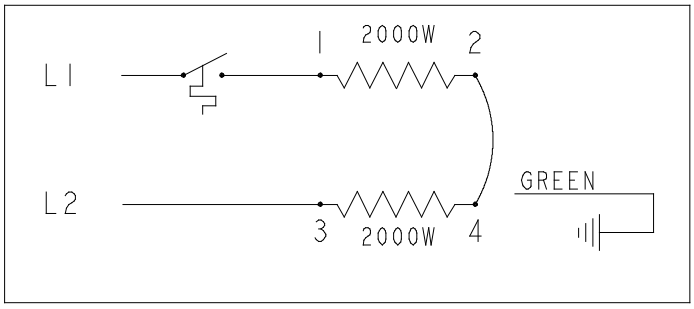
Wiring Diagram



208 VAC single phase- parallel



240 VAC single phase- parallel



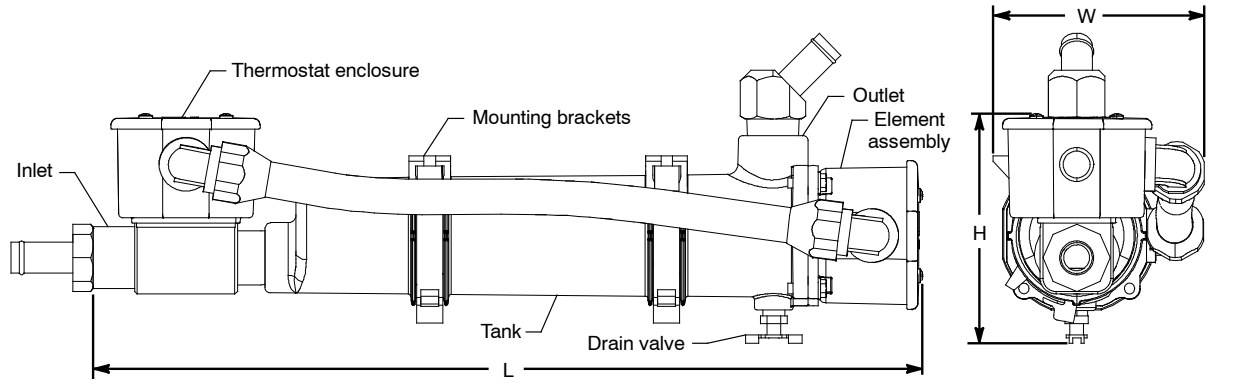
480 VAC single phase- parallel

GM79182

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

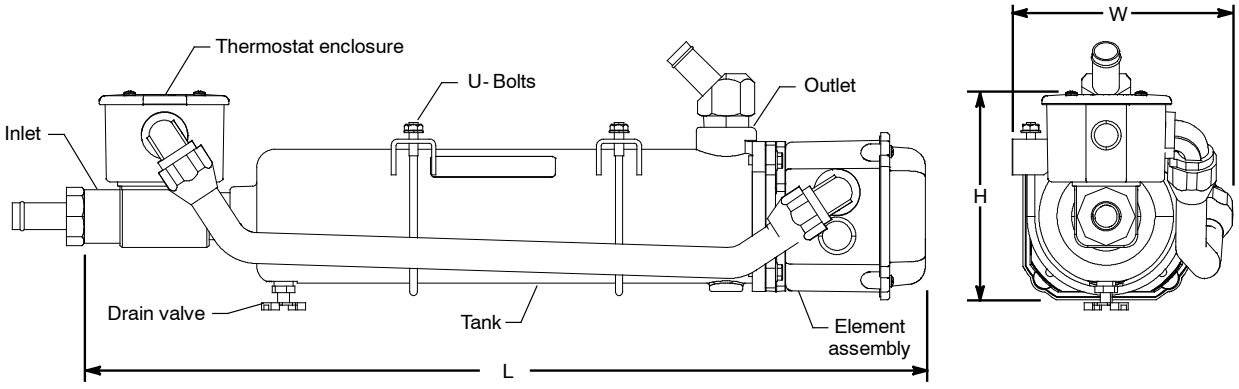
Dimensions and Weights

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)



CB type

GM76113



CL type

GM79182

DISTRIBUTED BY:

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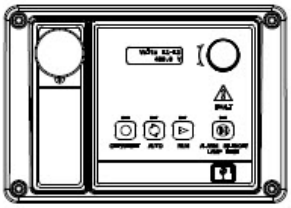
KOHLER®

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

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 voltae 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

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

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

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

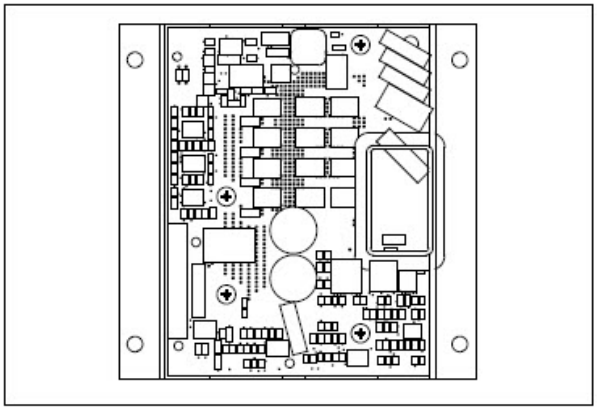
Voltage Regulator Menu

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

Jumpers

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

KOHLER®



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

Modbus® is a registered trademark of Schneider Electric.

KOHLER®

Alternator Data

TECHNICAL INFORMATION BULLETIN

Alternator Data Sheet

Alternator Model: 4M4019 (8-22-11)

Kilowatt ratings at	1800 RPM	60 Hertz	12 LEADS	Standard 3 phase
kW (kVA)	3 Phase	0.8 Power Factor		Dripproof or Open Enclosure

	Class B	Class F					Class H		
Voltage*	80° C ① Continuous	90° C ① Lloyds	95° C ① ABS	105° C ② British Standard	105° C ① Continuous	130° C ① Standby	125° C ② British Standard	125° C ① Continuous	150° C ① Standby
480/240	305 (381)	325 (406)	335 (419)	350 (438)	350 (438)	375 (469)	375 (469)	375 (469)	415 (519)
460/230	305 (381)	325 (406)	330 (413)	345 (431)	345 (431)	370 (463)	370 (463)	370 (463)	395 (494)
440/220	300 (375)	310 (388)	320 (400)	335 (419)	335 (419)	360 (450)	360 (450)	360 (450)	375 (469)
416/208	290 (363)	300 (375)	310 (388)	325 (406)	325 (406)	350 (438)	350 (438)	350 (438)	360 (450)
380/190	275 (344)	285 (356)	300 (375)	305 (381)	305 (381)	305 (381)	305 (381)	305 (381)	305 (381)

① *Rise by resistance method, Mil-Std-705, Method 680.1b.* ② *British Standard Rating per BS 5000*

Submittal Data: 480 Volts*, 375.2 kW, 469 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase STD. CONNECTION

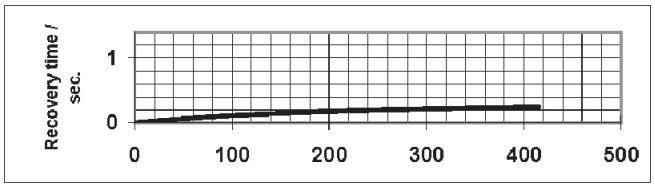
Mil-Std-705B Method	Description	Value
301.1b	Insulation Resistance	>1.5 Meg
302.1a	High Potential Test	
	Main Stator	2000 Volts
	Main Rotor	1500 Volts
	Exciter Stator	1500 Volts
	Exciter Rotor	1500 Volts
	PMG Stator	1500 Volts
401.1a	Stator Resistance, Line to Line	
	High Wye Connection	0.014 Ohms
	Rotor Resistance	0.286 Ohms
	Exciter Stator	22.5 Ohms
	Exciter Rotor	0.022 Ohms
	PMG Stator	2.1 Ohms
410.1a	No Load Exciter Field Amps at 240/480 Volts Line to Line	0.75 A DC
420.1a	Short Circuit Ratio	0.620
421.1a	Xd Synchronous Reactance	2.469 pu
		1.213 ohms
422.1a	X2 Negative Sequence React.	0.197 pu
		0.097 ohms
423.1a	X0 Zero Sequence Reactance	0.036 pu
		0.018 ohms
425.1a	X'd Transient Reactance	0.111 pu
		0.055 ohms
426.1a	X"d Subtransient Reactance	0.096 pu
		0.047 ohms
--	Xq Quadrature Synchronous	0.658 pu
		0.323 ohms
427.1a	T'd Transient Short Circuit Time Constant	0.075 sec.
428.1a	T"d Subtransient Short Circuit Time Constant	0.008 sec.
430.1a	T'do Transient Open Circuit Time Constant	1.55 sec.
432.1a	Ta Short Circuit Time Constant of Armature Winding	0.009 sec.

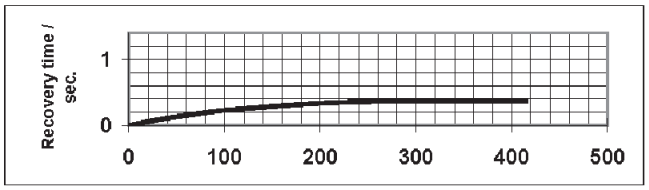
Mil-Std-705B Method	Description	Value
505.3b	Overspeed	2250 RPM
507.1c	Phase Sequence CCW-ODE	ABC
508.1c	Voltage Balance, L-L or L-N	0.20%
601.4a	L-L Harmonic Maximum - Total (Distortion Factor)	5.0%
601.4a	L-L Harmonic Maximum - Single	3.0%
601.1c	Deviation Factor	5.0%
---	TIF (1960 Weightings)	< 50
---	THF (IEC, BS & NEMA Weightings)	< 2 %
652.1a	Shaft Current	< 0.1 ma
---	Main Stator Capacitance to ground	0.019 mfd
	Additional Prototype Mil-Std Methods are Available on Request.	
--	Generator Frame	433
--	Type	MAGNAMAXDVR
--	Insulation	Class H
--	Coupling - Single Bearing	Flexible
--	Amortisseur Windings	Full
--	Excitation	Ext. Voltage Regulated, Brushless
--	Cooling Air Volume	1050 CFM
--	Heat rejection rate	1318 Btu's/min
--	Full load current	564 amps
--	Minimum Input hp required	534.0
	Efficiency at rated load :	94.2%
--	Full load torque	1558 Lb-ft

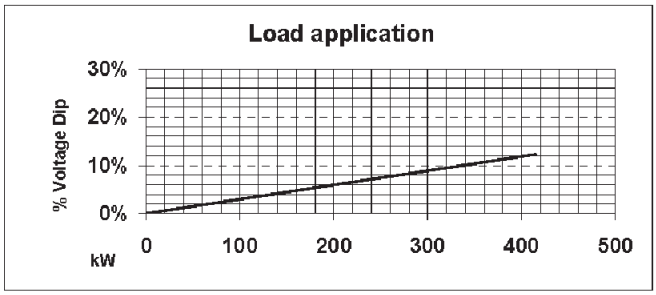
* Voltage refers to wye (star) connection, unless otherwise specified.

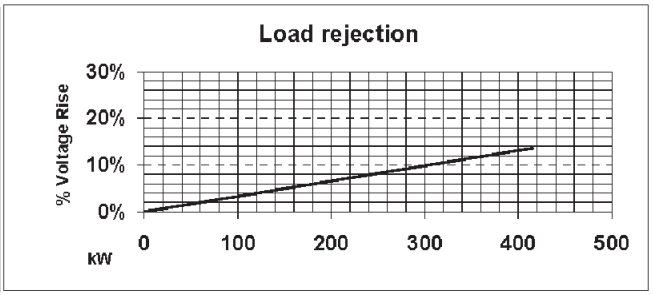
TYPICAL DYNAMIC CHARACTERISTICS

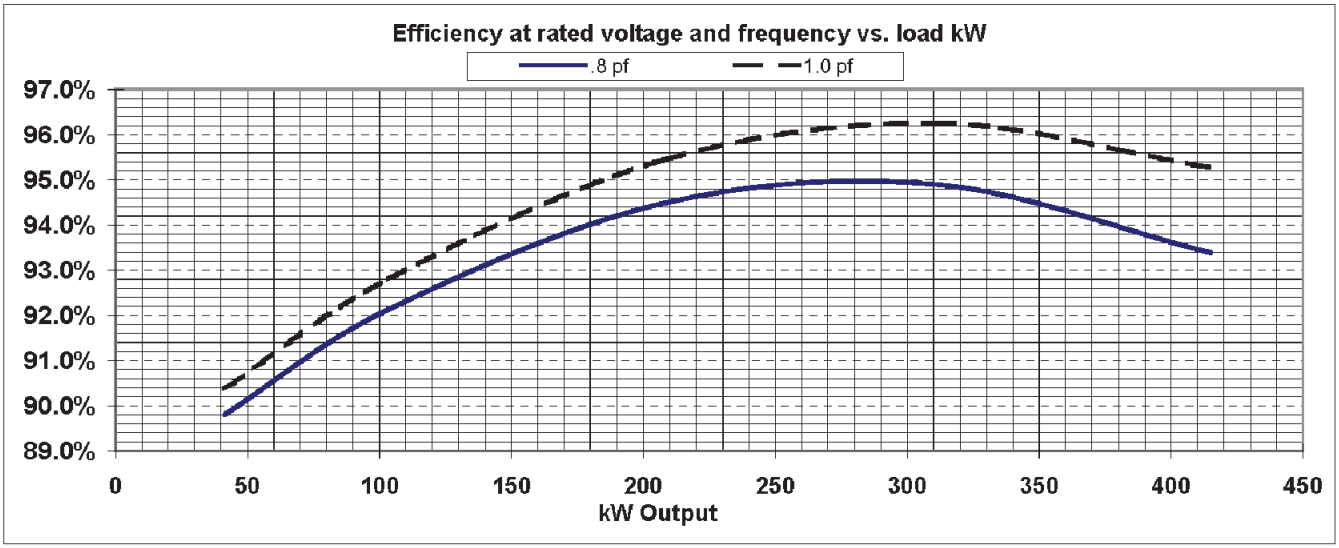
Alternator Model: 4M4019

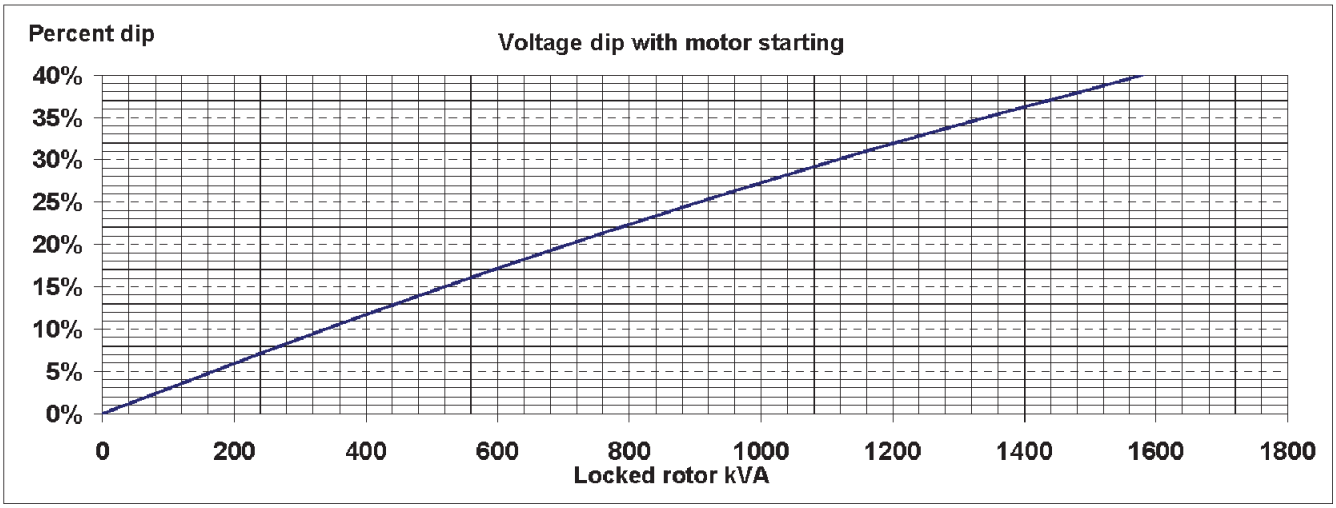








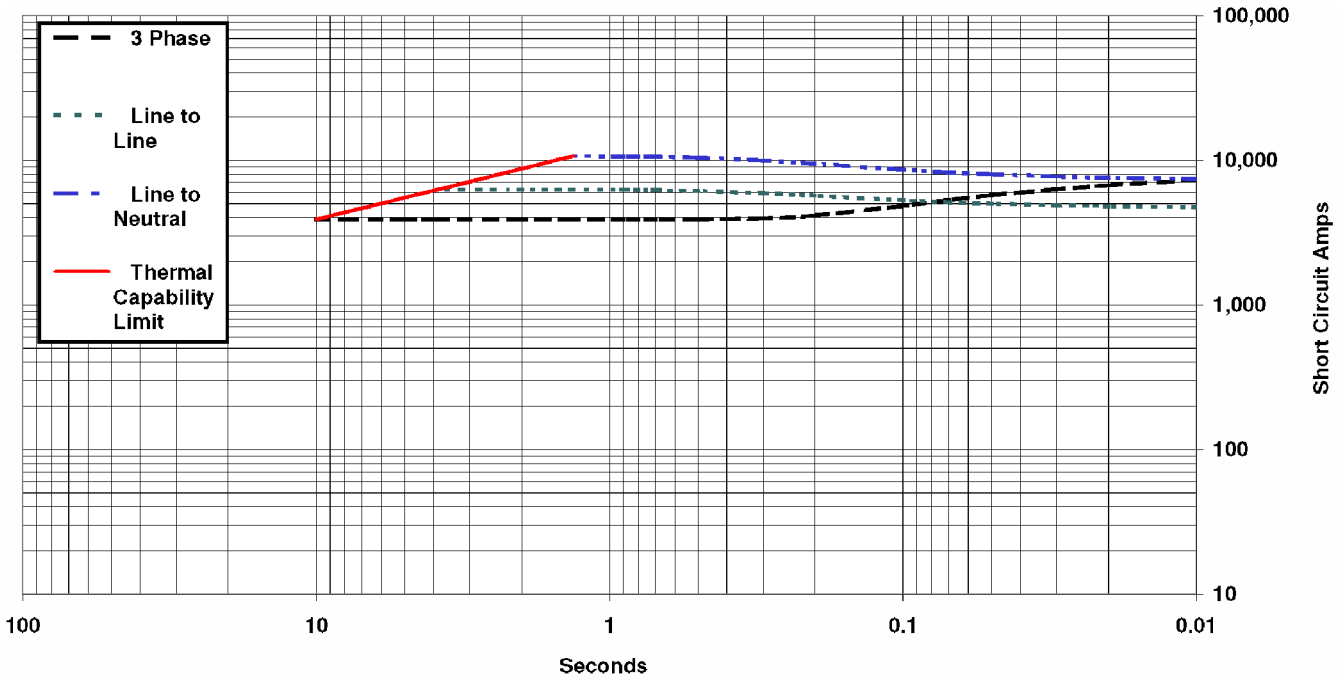




Voltage refers to wye (star) connection, unless otherwise specified.

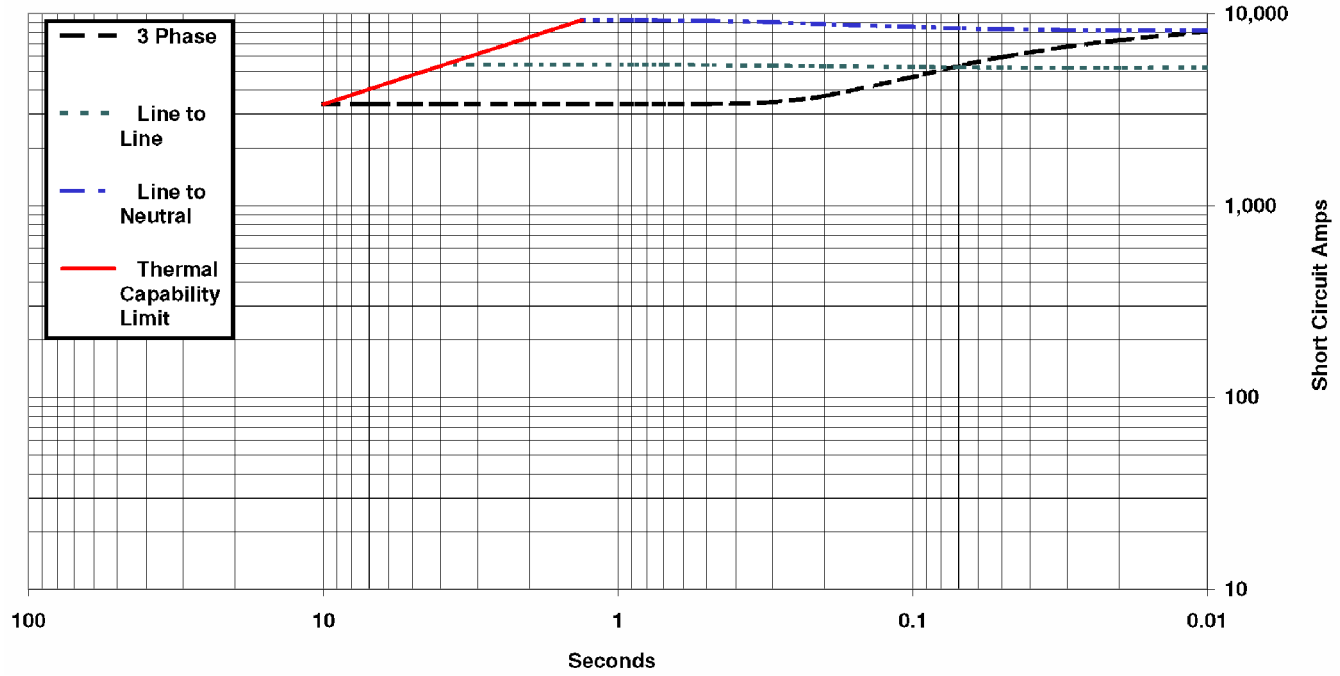
4M4019, 60 Hz, Low Wye Connection
SHORT CIRCUIT DECREMENT CURVE

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



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

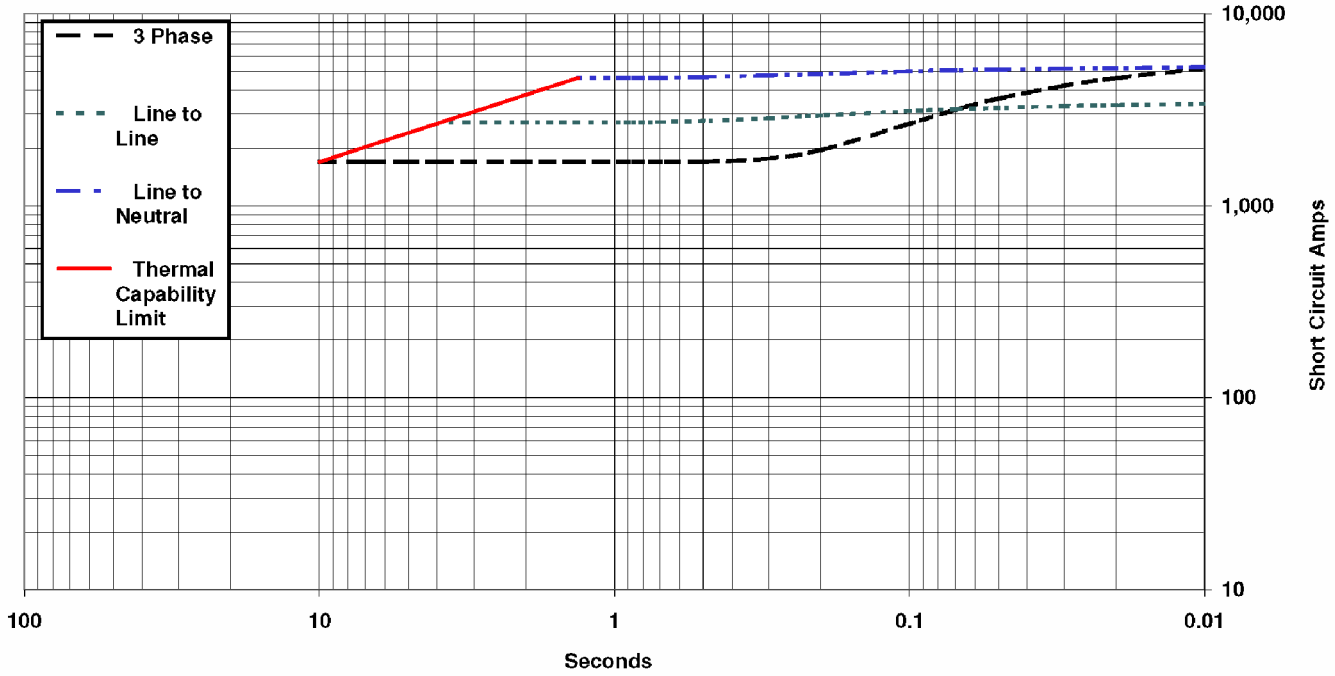
Full Load Current: 1128 Amps **Steady State S.C. Current:** 3384 Amps **Max. 3 ph. Symm. S.C. Current:** 8813 Amps



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

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

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



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

KOHLER®

Cooling Data

TECHNICAL INFORMATION BULLETIN

Generator Set Cooling System Data Sheet

	50°C Ambient Temperature Cooling System								
350REOZJD 60Hz (Standby Duty)	**Total external restriction on open unit[7]**	Pa *(in.H_2O)*	0 (0)	125 (0.5)	187 (0.75)	250 (1)	312 (1.25)	375 (1.5)	**Enclosed Units**
	Maximum allowable ambient temperature	°C *(°F)*	52 (126)	49 (120)	47 (117)	45 (113)	44 (111)	NA (NA)	47 (117)
	Cooling system airflow	m^3/min *(ft^3/min)*	435 (15400)	410 (14500)	395 (13900)	380 (13400)	365 (12900)	NA (NA)	NA (NA)

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

KOHLER®

Sound Data

TECHNICAL INFORMATION BULLETIN

Generator Set Sound Data Sheet

			Sound Pressure Data in dB(A)				
Generator Set Model	**Hz**	**Load**	**Raw Exhaust**	**Open Unit, Isolated Exhaust**	**Weather Enclosure**	**Level 1 Sound Enclosure**	**Level 2 Sound Enclosure**
350REOZJD	60	100% Load	119.5	93.2	91.3	81.7	74.2
		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.

350REOZJD		**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	54.7	65.9	64.2	64.9	67.6	62.8	53.4	46.6	72.5
			1:30	54.8	68.0	67.1	66.9	68.6	63.8	55.4	48.3	74.3
			12:00-Engine	55.8	65.1	67.0	68.7	67.2	66.2	60.3	51.0	74.3
			10:30	53.1	67.2	66.1	68.3	68.4	66.2	58.4	50.2	74.5
			9:00	54.4	68.2	68.3	66.2	66.5	65.9	56.3	49.0	74.3
			7:30	55.2	70.6	67.1	65.4	66.9	65.8	54.5	51.5	74.7
			6:00-Alternator	58.4	68.2	69.5	68.5	64.2	65.9	58.5	55.2	74.9
			4:30	53.8	69.5	65.2	63.9	67.7	65.0	52.0	49.4	73.8
			8-pos. log avg.	55.3	68.2	67.1	66.9	67.3	65.3	56.9	50.9	74.2

				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	64.0	72.8	67.8	72.1	72.9	70.6	66.1	58.8	79.0
			1:30	61.6	71.0	71.7	75.7	77.2	74.1	70.1	63.8	82.0
			12:00-Engine	65.4	74.0	69.0	77.6	78.0	76.4	72.3	65.0	83.5
			10:30	58.6	70.5	70.8	75.1	77.0	74.8	70.5	63.7	81.8
			9:00	63.8	73.8	70.1	73.9	75.3	73.3	69.3	62.2	81.0
			7:30	61.9	73.0	69.8	75.0	75.6	73.8	68.6	63.5	81.2
			6:00-Alternator	63.5	73.3	71.7	74.7	78.1	79.3	69.0	62.6	83.6
			4:30	61.8	72.3	70.7	72.4	74.0	72.1	65.5	59.2	79.7
			8-pos. log avg.	63.0	72.7	70.4	74.9	76.3	75.1	69.4	62.8	81.7

				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	91.8	91.2	90.8	92.3	92.8	92.1	86.6	90.2	91.3

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)		Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
100% Load	7 (23)	Open Unit, Isolated Exhaust	3:00	60.6	70.2	81.9	82.2	87.3	89.8	85.1	82.8	93.7
			1:30	56.3	68.1	86.6	86.2	85.9	86.7	82.1	80.8	93.1
			12:00-Engine	63.7	71.8	86.9	81.4	87.9	86.5	80.6	74.6	92.7
			10:30	62.2	72.0	87.3	82.9	88.2	89.3	84.4	78.5	94.2
			9:00	65.5	73.9	85.1	84.0	88.4	91.0	84.6	81.0	94.7
			7:30	64.4	73.3	86.0	82.0	88.0	90.0	83.7	79.1	94.0
			6:00-Alternator	61.7	71.8	83.4	82.9	79.7	81.7	74.3	69.5	88.5
			4:30	59.2	70.0	80.9	81.9	86.1	88.1	83.2	79.0	92.1
			8-pos. log avg.	62.5	71.7	85.3	83.2	87.0	88.6	83.1	79.5	93.2

Load	Distance, m (ft)	Exhaust	Sound Pressure Levels, dB(A)								
			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

350REOZJD	**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

Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Sound Pressure Levels, dB(A)								
				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

Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Sound Pressure Levels, dB(A)							
				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

Load	Distance, m (ft)		Measurement Clock Position	Sound Pressure Levels, dB(A)								
				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

Load	Distance, m (ft)	Exhaust	Sound Pressure Levels, dB(A)								
			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

KOHLER®

Exhaust System Data

TECHNICAL INFORMATION BULLETIN

Enclosed Generator Set Exhaust System Data Sheet

Model	Enclosure Type	Consumed Back Pressure (in H20)	Consumed Back Pressure (in Hg)	Back Pressure Limit(s) (in H20)	Back Pressure Limit(s) (in Hg)	Flex Exhaust Tube(s)	Silencer	Drawing
350REOZJD	All Weather & Sound Level 1 (SL1) Enclosures	24.0	1.8	16-30	1.2-2.2	GM110933	GM110935	ADV-8189
	All Sound Level 2 (SL2) Enclosures	18.5	1.4	16-30	1.2-2.2	GM110330 Flex GM110329 Cross Tube	GM109791 & GM109792	ADV-8189

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

TECHNICAL INFORMATION BULLETIN

Enclosed Generator Set Exhaust System Data Sheet

Model	Enclosure Type	Consumed Back Pressure (in H20)	Consumed Back Pressure (in Hg)	Back Pressure Limit(s) (in H20)	Back Pressure Limit(s) (in Hg)	Flex Exhaust Tube(s)	Silencer	Drawing
350REOZJD	All Weather & Sound Level 1 (SL1) Enclosures	24.0	1.8	16-30	1.2-2.2	GM110933	GM110935	ADV-8189
	All Sound Level 2 (SL2) Enclosures	18.5	1.4	16-30	1.2-2.2	GM110330 Flex GM110329 Cross Tube	GM109791 & GM109792	ADV-8189

1. Total system exhaust back pressure is applicable to generator sets equipped with Kohler standard enclosure packages.
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KOHLER®

Emissions Data

KOHLER®

350REOZJD

60 HZ. DIESEL INDUSTRIAL GENERATOR SET
EMISSION DATA SHEET

ENGINE INFORMATION

Model:	John Deere, 6135HFG84B	Bore:	132mm (5.2 in.)
Nameplate BHP @ 1800 RPM:	538	Stroke:	165mm (6.5 in.)
Type:	4-Cycle, 6 Cylinder, Inline	Displacement:	13.5 L (824 cu. in.)
Aspiration:	Turbocharged, Charge Air-Cooled		
Compression Ratio	16.0:1	EPA Family:	MJDXL13.5146
		EPA Certificate:	MJDXL13.5146-008

Table 1

PERFORMANCE DATA:	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby
Engine bkW @ Stated Load	100	201	301	401
Fuel Consumption (g/kWh)	249	239	226	212
Exhaust Gas Flow (m^3/min)				68
Exhaust Temperature (°C)				547

Table 2

EXHAUST EMISSION DATA:	EPA D2 Cycle 5-mode weighted
HC (Total Unburned Hydrocarbons)	0.18
NOx (Oxides of Nitrogen as NO2)	3.56
CO (Carbon Monoxide)	1.5
PM (Particulate Matter)	0.12

Values are in g/kWh unless otherwise noted

TEST METHODS AND CONDITIONS

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

Data and specifications subject to change without notice.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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: **NJDXL13.5146-008**

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: NJDXL13.5146

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 450<=kW<=560
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.

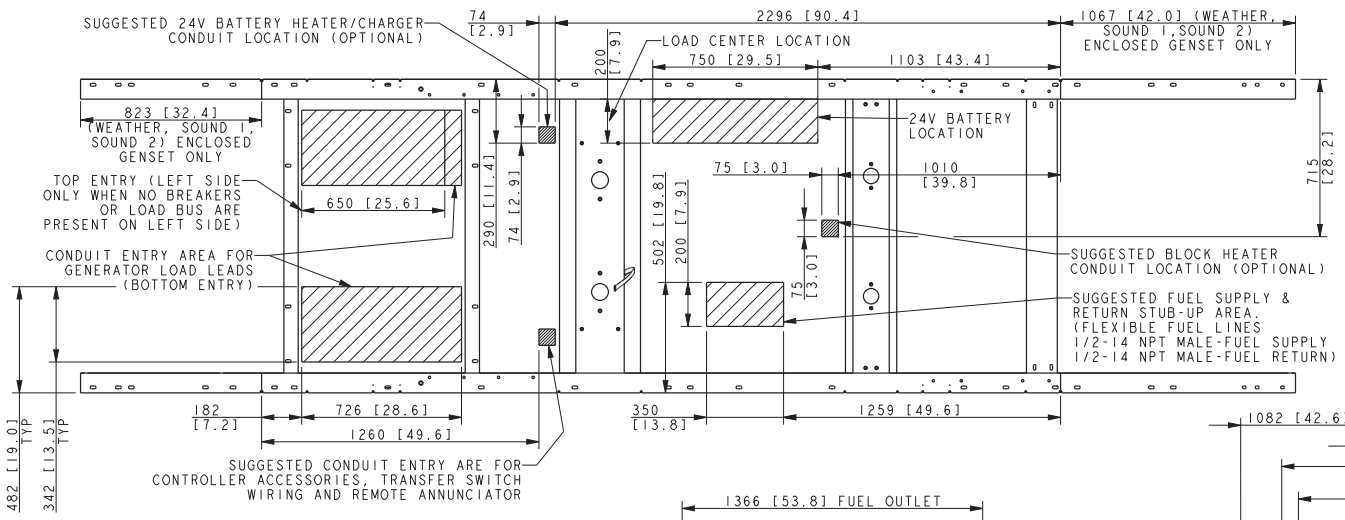
It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified 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.

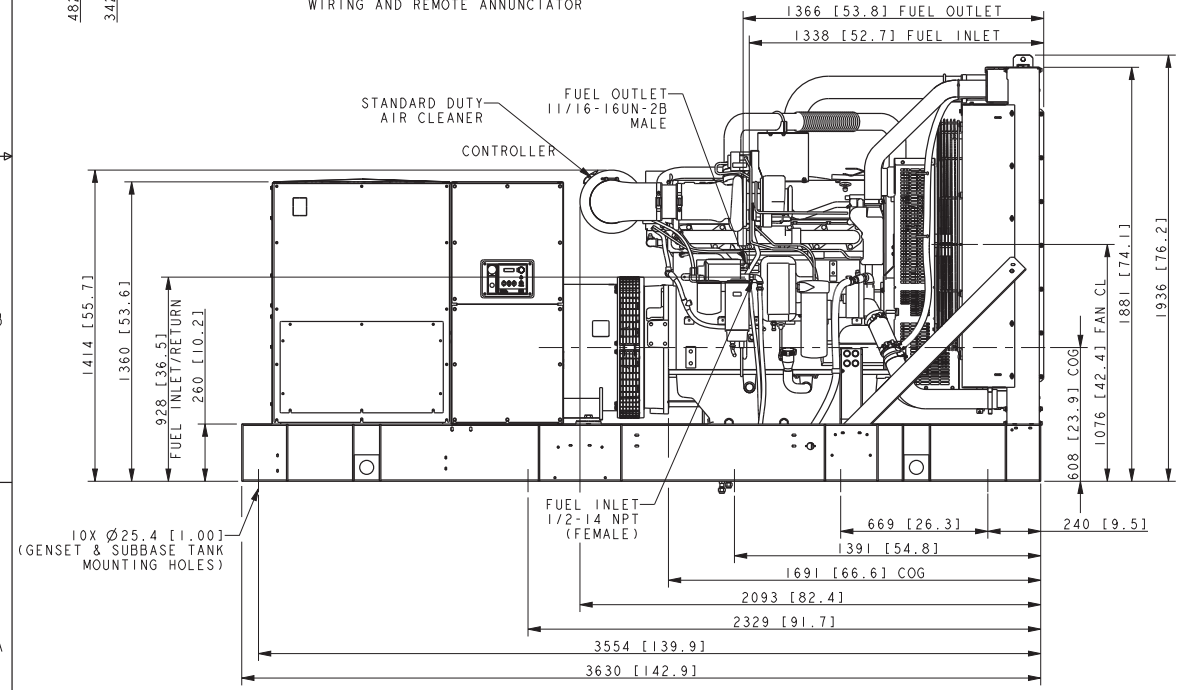
This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

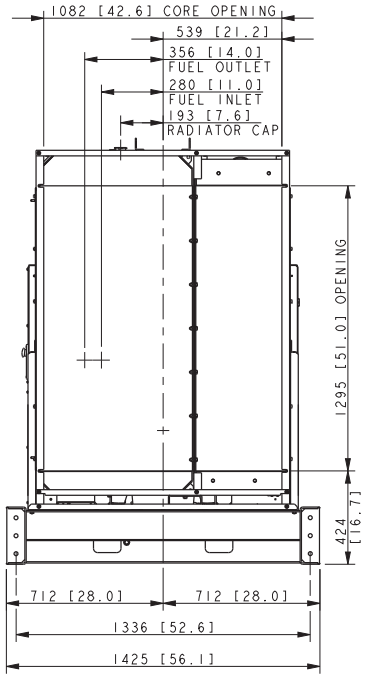
The actual engine power may lie outside the limits of the Emissions Power Category shown above. See the certificate application for details.

KOHLER®

Dimensional Drawings







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

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

NOTES:
1) DIMENTIONS IN [] ARE ENGLISH EQUIVALENTS.

2) IF AN ENCLOSURE IS USED THE FUEL LINE MUST BE STUBBED UP FROM DIRECTLY UNDER THE UNIT. REFER TO ENCLOSURE ADV.

3) IF IBC CERTIFICATION IS REQUIRED SEE SEISMIC ADV FOR INSTALLATION INSTRUCTIONS.

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

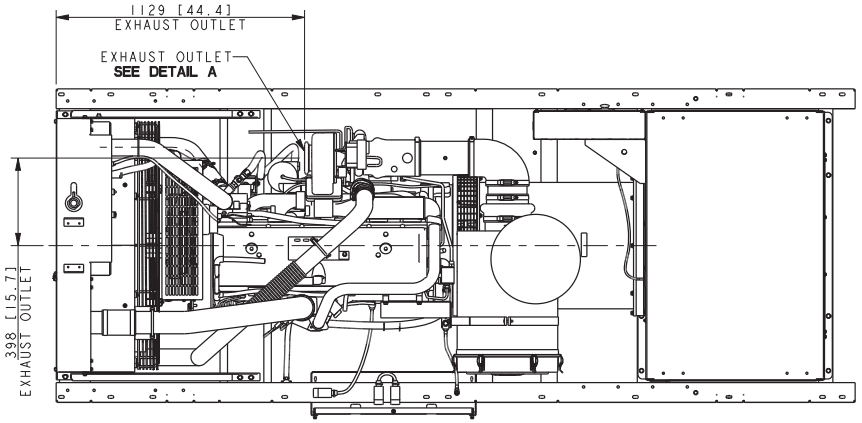
REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	05FEB2020	NEW DRAWING [CT201734]	YBY
A	29APR2021	LOAD CENTER COMMENT ADDED [CT211746]	BCC

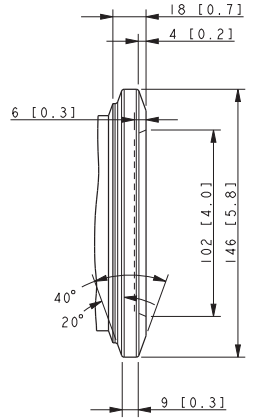
DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS
UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: N/A
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	YBY	05FEB2020
CHECKED	KJB	05FEB2020
APPROVED	DMS	05FEB2020

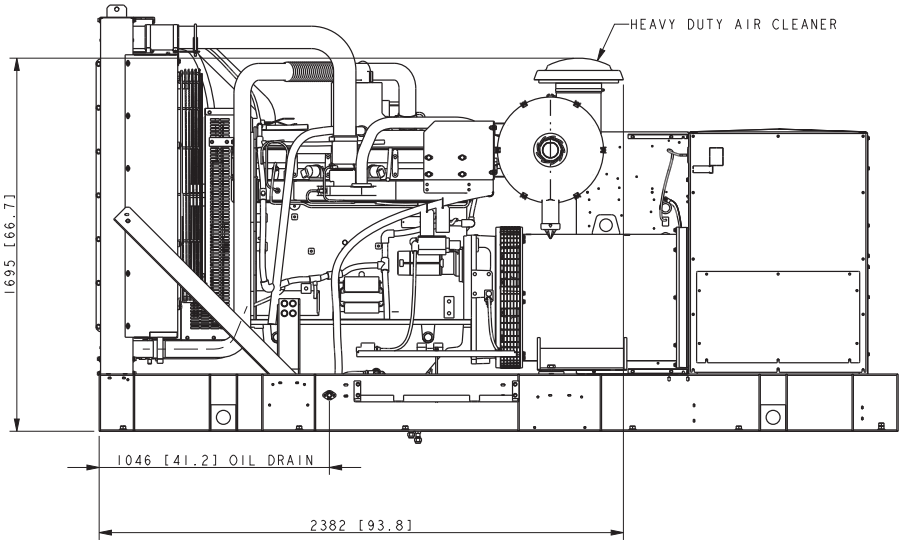
KOHLER
KOHLER, WISCONSIN 53044

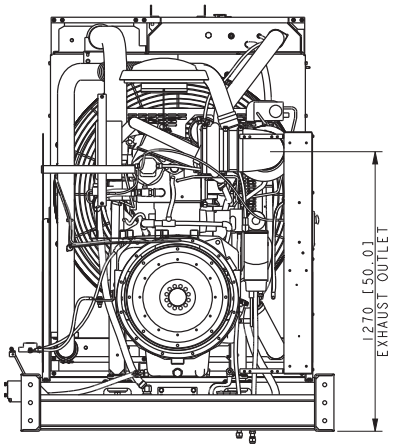
TITLE: DIMENSION PRINT, 350-500 RE0ZJC/D
SCALE: NA | CAD NO. | SHEET 1 of 2
DWG NO.: ADV-9193 | D





EXHAUST OUTLET
DETAIL A





J-BOX HIDDEN FOR CLARITY

DIMENTIONS IN [] ARE ENGLISH EQUIVALENTS.

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

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	05FEB2020	NEW DRAWING [CT201734]	YBY

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: N/A

THIRD ANGLE PROJECTION

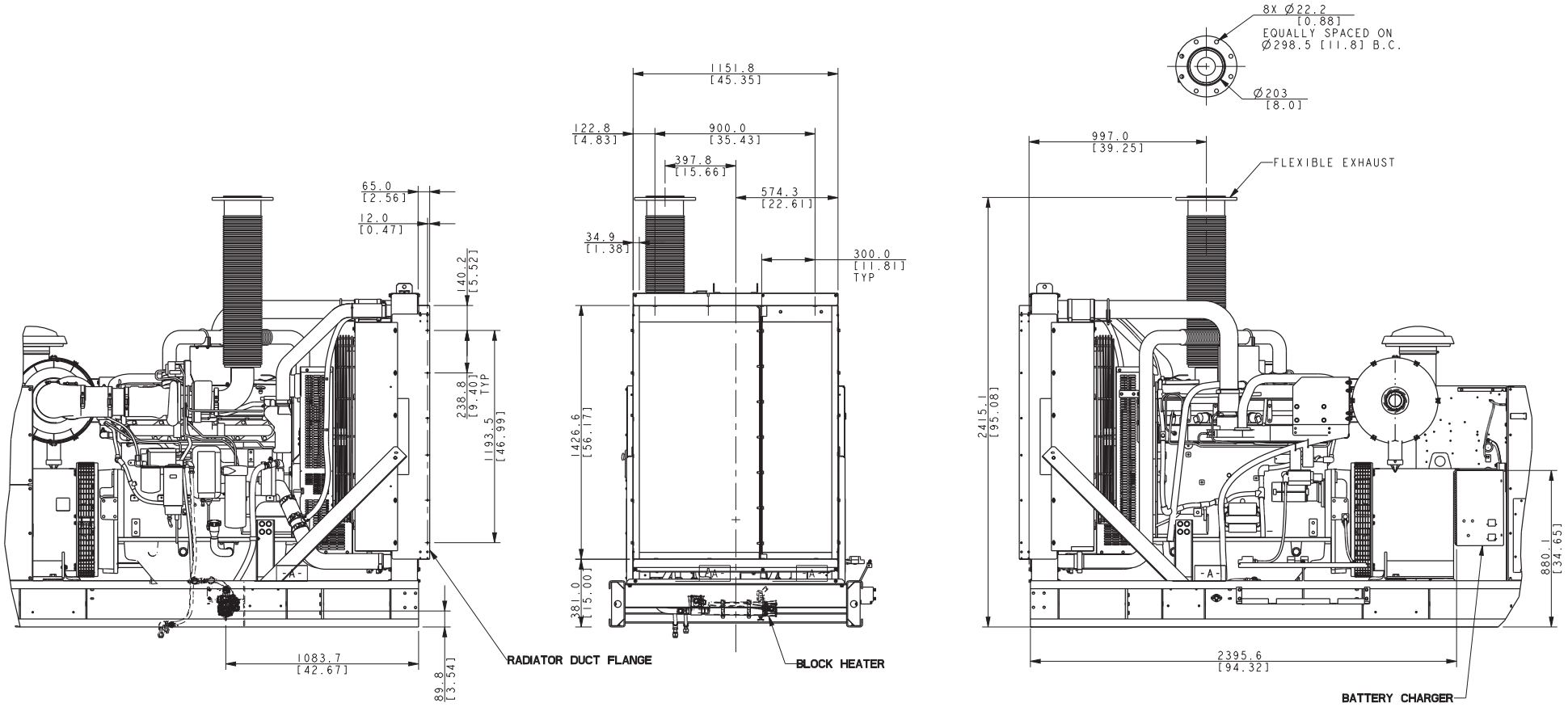
APPROVALS		DATE
DRAWN	YBY	05FEB2020
CHECKED	KJB	05FEB2020
APPROVED	DMS	05FEB2020

KOHLER.
KOHLER, WISCONSIN 53044

TITLE: DIMENSION PRINT, 350-500 RE0ZJC/D

SCALE: NA | CAD NO. | SHEET 2 of 2

DWG NO. ADV-9193 | D



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

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	10-22-12	NEW DRAWING [CT28128]	KNN
A	05-06-14	(D-3) 871.1 DIM. REMOVED & 997.0 DIM. ADDED [CT80055]	SSH

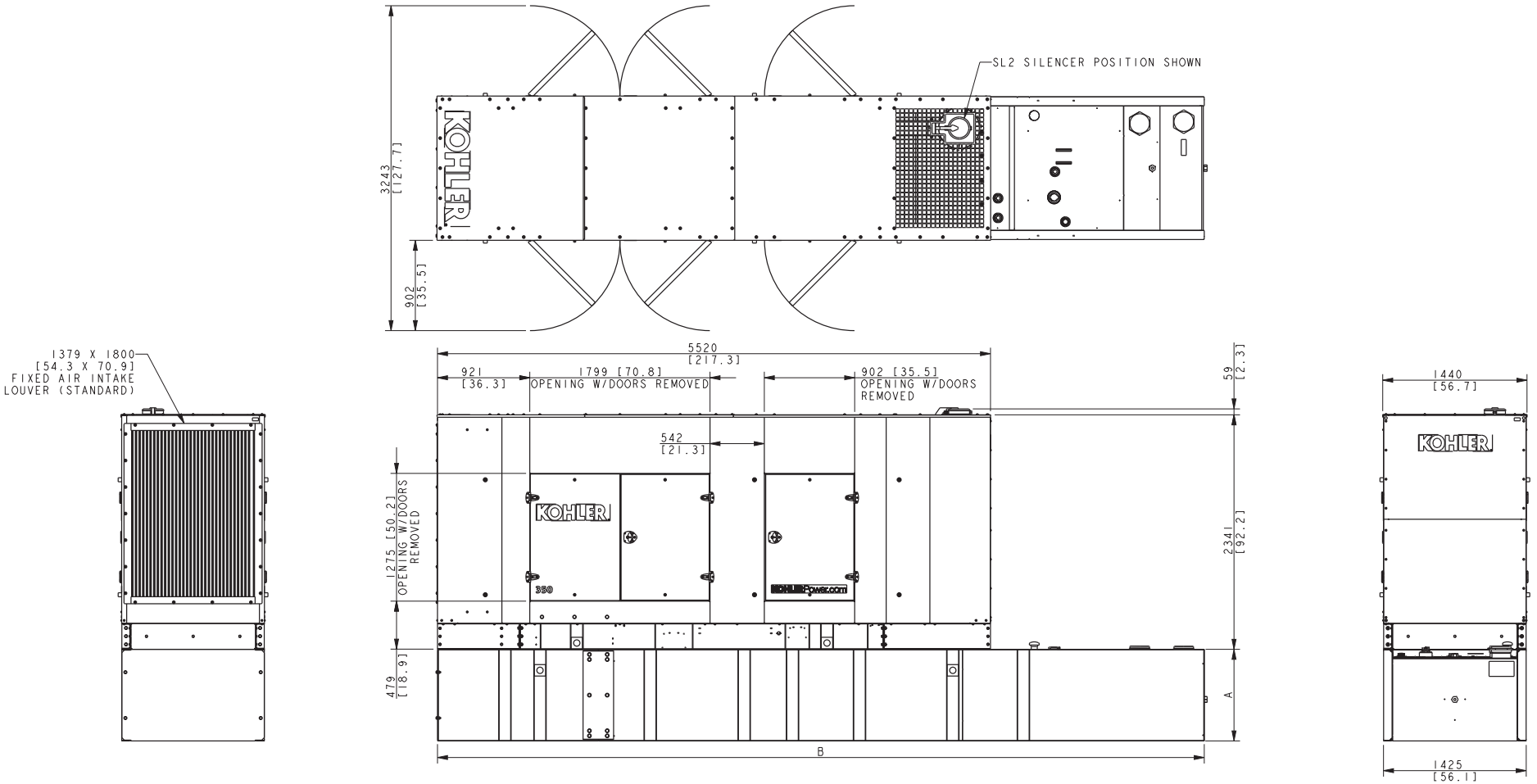
UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X .XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30' SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	KNN	10-22-12
CHECKED	DJV	10-22-12
APPROVED	JDZ	10-22-12

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE
DIMENSION PRINT, 350-500 REOZJB ACCESSORY

SCALE 0.09 | CAD NO. | SHEET 1 of 1
DWG NO. ADV-8527 | D



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

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

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

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	25NOV2019	NEW DRAWING [CT200393]	YBY
A	17AUG2021	SEE SHEET 6 & 7 [CT214138]	RNN
B	1NOV2021	SHEET 8 ADDED; SEE SHEET 7 & 8 [CT215771]	SAK

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0°30'
SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

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

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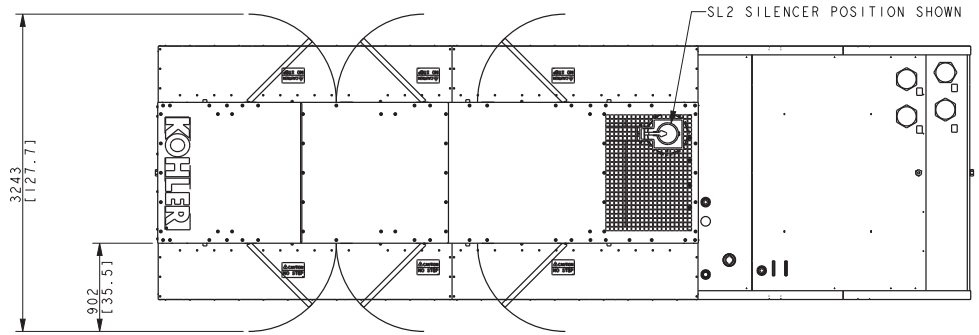
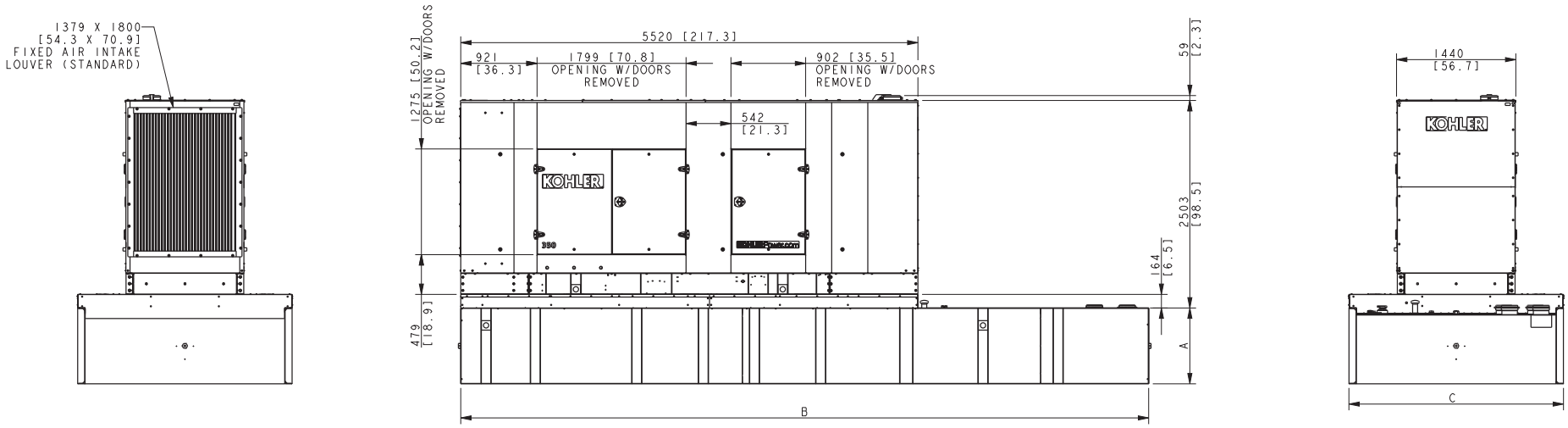
KOHLER, WISCONSIN 53044

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

SCALE 0.05 | CAD NO. | SHEET 1 of 8

DWG NO. **ADV-9189** | **D**





TANK INFORMATION					
LITERS [GALLONS] MIN HOURS	GENSETS	DIM A MM [INCH]	DIM B MM [INCH]	DIM C MM [INCH]	TANK WEIGHT KG [LBS] (NO FUEL)
5042 [1332] 48 HOURS	350KW	711.2 [28.0]	5850.1 [230.3]	1981.2 [78.0]	2751 [6064]
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 [247.3]		2910 [6416]
5852 [1546] 48 HOURS STATE	400KW	711.2 [28.0]	6282 [247.3]		3040 [6702]
6681 [1765] 48 HOURS STATE	500KW	812.8 [32.0]	6282 [247.3]		3184 [7020]
7510 [1984] 72 HOURS	350KW	762.0 [30.0]	5850.1 [230.3]	2590.8 [102.0]	3486 [7686]
8695 [2297] 72 HOURS	400KW	889.0 [35.0]	5850.1 [230.3]		3656 [8061]
9971 [2634] 72 HOURS	500KW	914.4 [36.0]	6028 [237.3]		4021 [8865]
7537 [1991] 72 HOURS STATE	350KW	660.4 [26.0]	6282 [247.3]		3729 [8222]
8748 [2311] 72 HOURS STATE	400KW	762.0 [30.0]	6282 [247.3]		3894 [8585]
9993 [2640] 72 HOURS STATE	500KW	863.6 [34.0]	6282 [247.3]		4063 [8958]
9993 [2640] 96 HOURS STATE	350KW		6282 [247.3]		4063 [8958]
11602 [3065] 96 HOURS STATE	400KW		7264.4 [286.0]		4426 [9758]
13325 [3520] 96 HOURS STATE	500KW		8305.8 [327.0]		4862 [10719]

350-500KW REOZJC/D
STEEL & ALUMINUM ENCL.
48 - 96 HOUR TANKS

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

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	25NOV2019	NEW DRAWING [CT200393]	YBY
A	17AUG2021	SEE SHEET 6 & 7 [CT214138]	RNN
B	1NOV2021	SEE SHEET 7 & 8 [CT215771]	SAK

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0°30'
SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

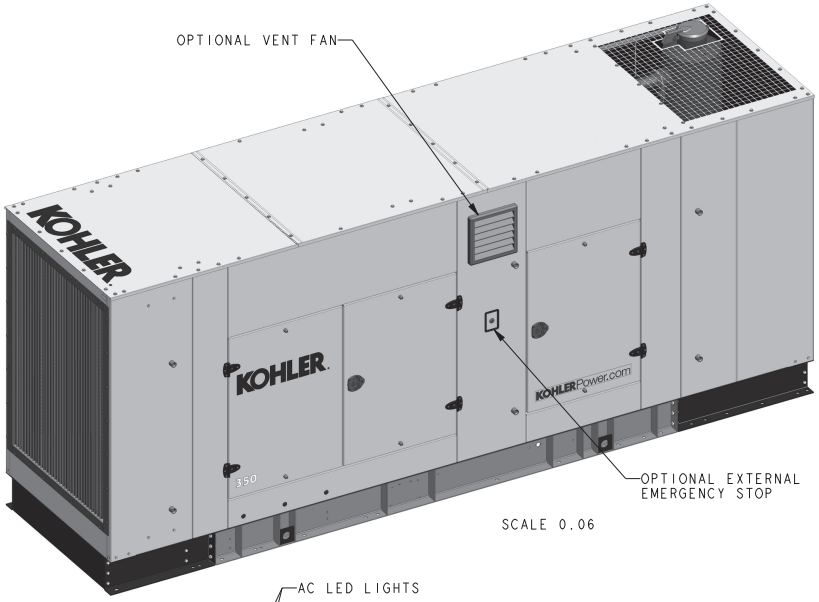
APPROVALS		DATE
DRAWN	YBY	25NOV2019
CHECKED	KJB	25NOV2019
APPROVED	DMS	25NOV2019

KOHLER.
KOHLER, WISCONSIN 53044

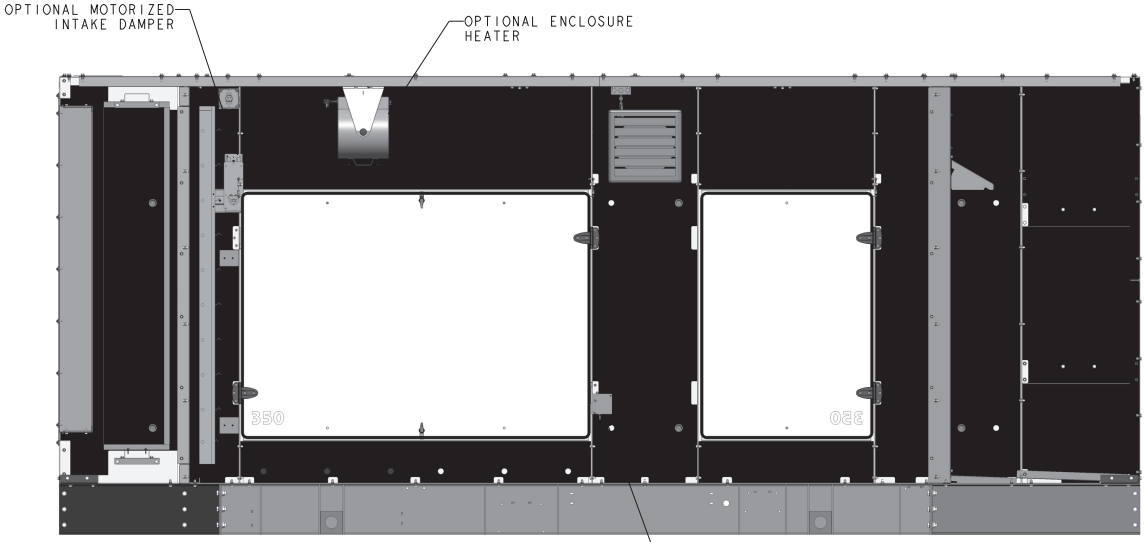
TITLE: DIMENSION PRINT, 350-500REOZJC/D ENCL & TANKS

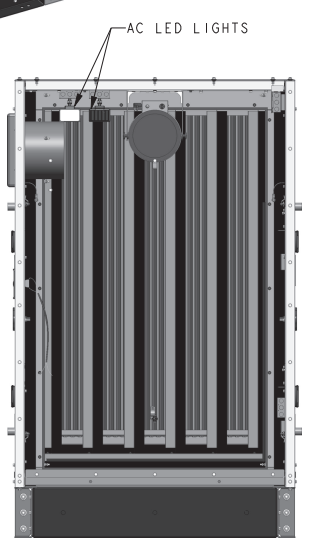
SCALE 0.04 | CAD NO. | SHEET 2 of 8

DWG NO. ADV-9189 | D



SCALE 0.06





350-500KW REOZJC/D
ENCLOSURE OPTIONAL ACCESSORIES

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	25NOV2019	NEW DRAWING [CT200393]	YBY
A	17AUG2021	SEE SHEET 6 & 7 [CT214138]	RNN
B	1NOV2021	SEE SHEET 7 & 8 [CT215771]	SAK

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

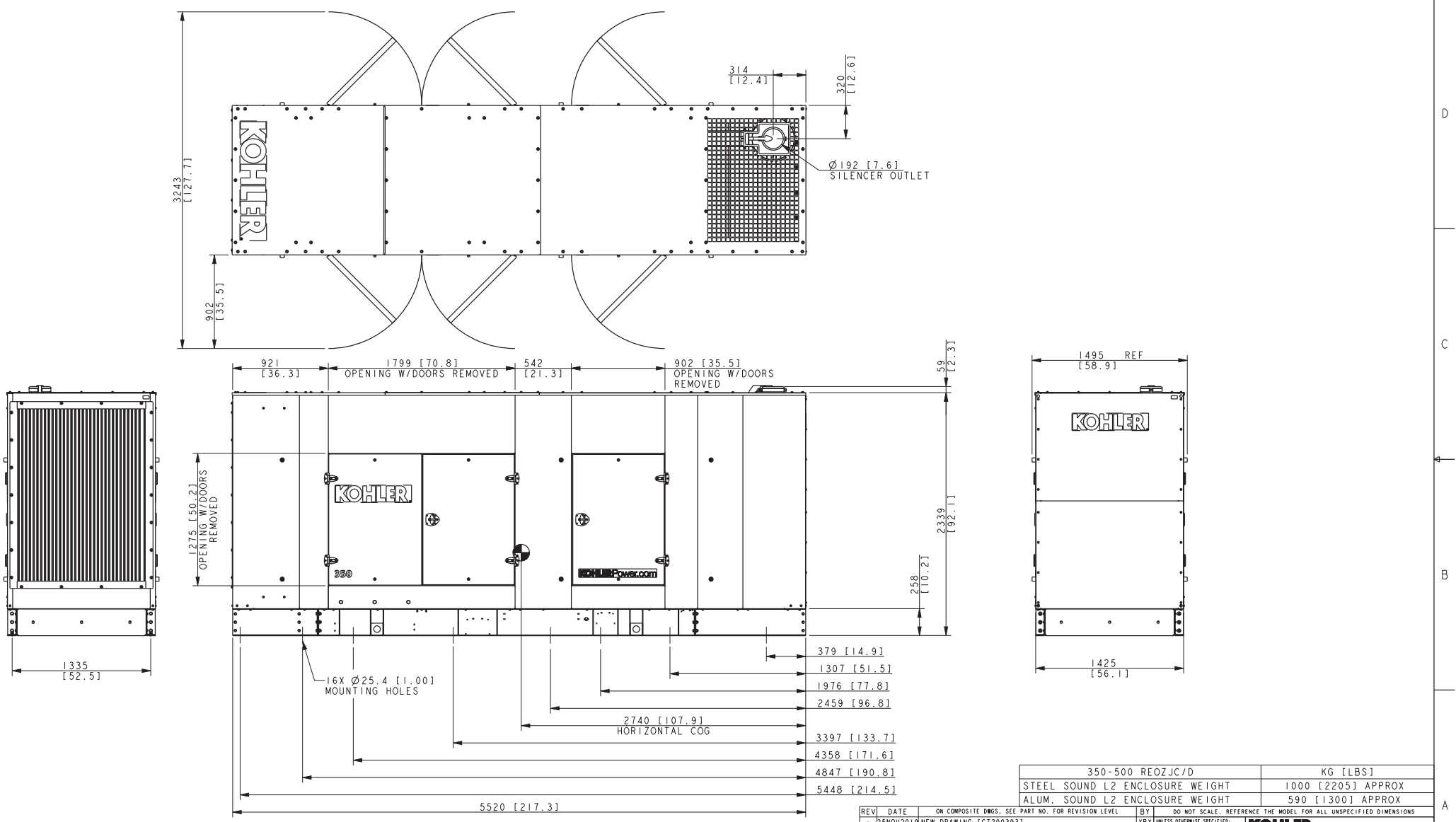
UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0°30'
SURFACE FINISH 63 MAX.
THIRD ANGLE PROJECTION

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

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

SCALE 0.08 | CAD NO. | SHEET 3 of 8

DWG NO. **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

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	25NOV2019	NEW DRAWING [CT200393]	YBY
A	17AUG2021	SEE SHEET 6 & 7 [CT214138]	RNN
B	1NOV2021	SEE SHEET 7 & 8 [CT215771]	SAK

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0°30'
SURFACE FINISH 63 MAX.
THIRD ANGLE PROJECTION

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

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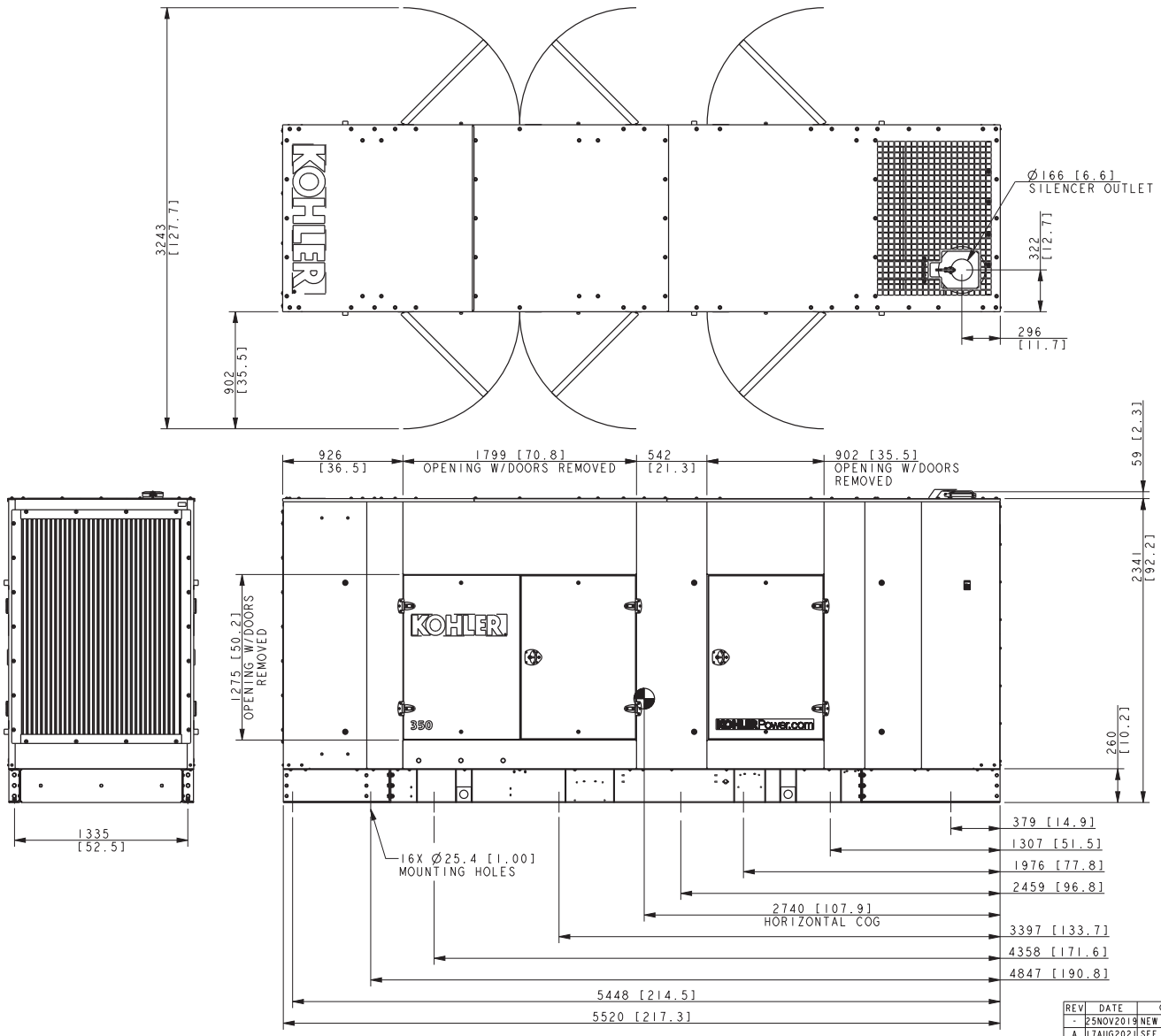
KOHLER, WISCONSIN 53044

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

SCALE 0.06 | CAD NO. | SHEET 4 of 8

DWG NO. ADV-9189 | D

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



350-500 REOZJC/D	KG [LBS]
STEEL SOUND LI ENCLOSURE WEIGHT	870 [1920] APPROX
ALUM. SOUND LI ENCLOSURE WEIGHT	460 [1015] APPROX
STEEL WEATHER ENCLOSURE WEIGHT	850 [1875] APPROX

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	25NOV2019	NEW DRAWING [CT200393]	YBY
A	17AUG2021	SEE SHEET 6 & 7 [CT214138]	RNN
B	1NOV2021	SEE SHEET 7 & 8 [CT215771]	SAK

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0°30'
SURFACE FINISH 3.2 MAX.
THIRD ANGLE PROJECTION

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

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KOHLER, WISCONSIN 53044

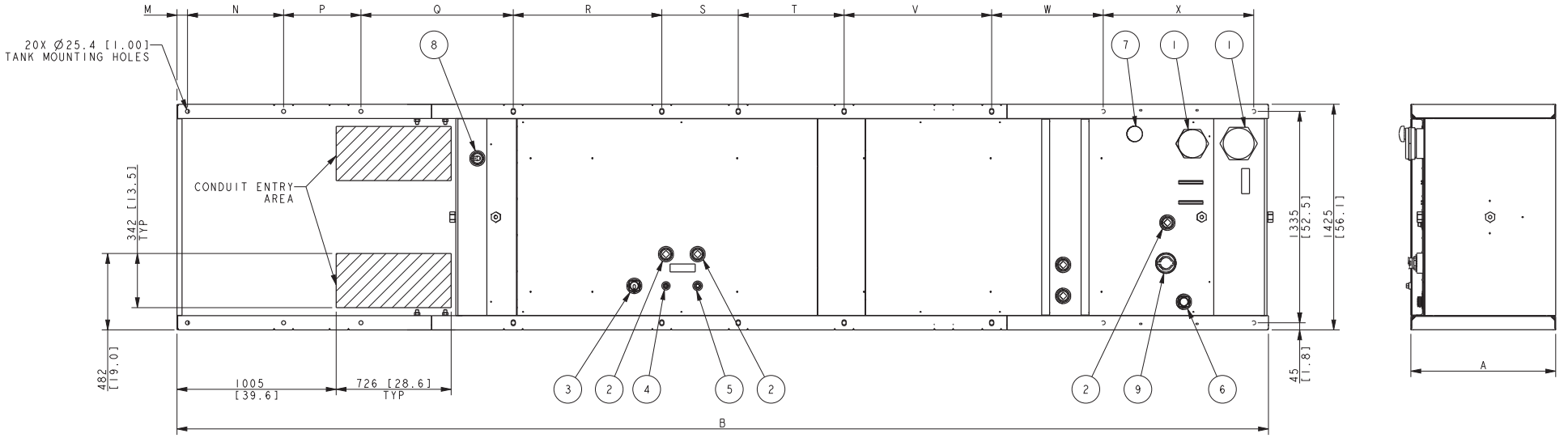
TITLE: DIMENSION PRINT, 350-500REOZJC/D ENCL & TANKS

SCALE 0.06 | CAD NO. | SHEET 5 of 8

DWG NO. ADV-9189 | D

350-500KW REOZJC/D
STEEL & ALUMINUM SL1 ENCL.
STEEL WEATHER ENCL.

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



4396 [1161 GAL.] 36 HOUR STATE TANK SHOWN.

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

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

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0°30'
SURFACE FINISH MAX.
THIRD ANGLE PROJECTION

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

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

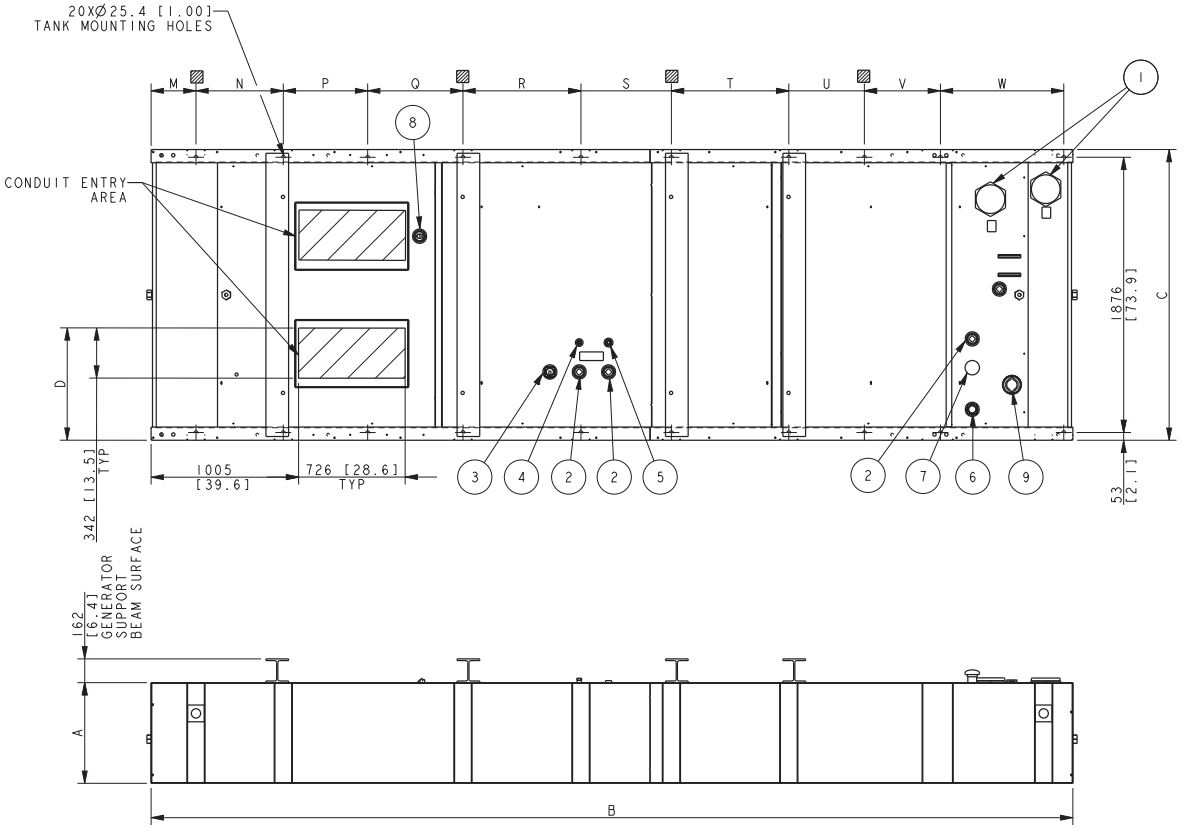
SCALE 0.08 | CAD NO. | SHEET 6 of 8

DWG NO. ADV-9189 | D

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

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)
I	CAP, EMERGENCY VENT

▨ GROUND CLEARANCE I-BEAM MOUNTING HOLE

350-500KW REOZJC/D ENCLOSED 48 HOUR TANKS

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
B	1NOV2021	72 HOURS AND 92 HOURS TANKS MOVED ON SHEET	
		8; 48 HOURS TANK VIEWS ADDED; (D-4) DIM W	
		ADDED & TABLE UPDATED FOR W; SEE SHEET 8	
		[CT215771]	SAK

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0°30'
SURFACE FINISH 125 MAX.
THIRD-ANGLE PROJECTION

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

KOHLER.
KOHLER, WISCONSIN 53044

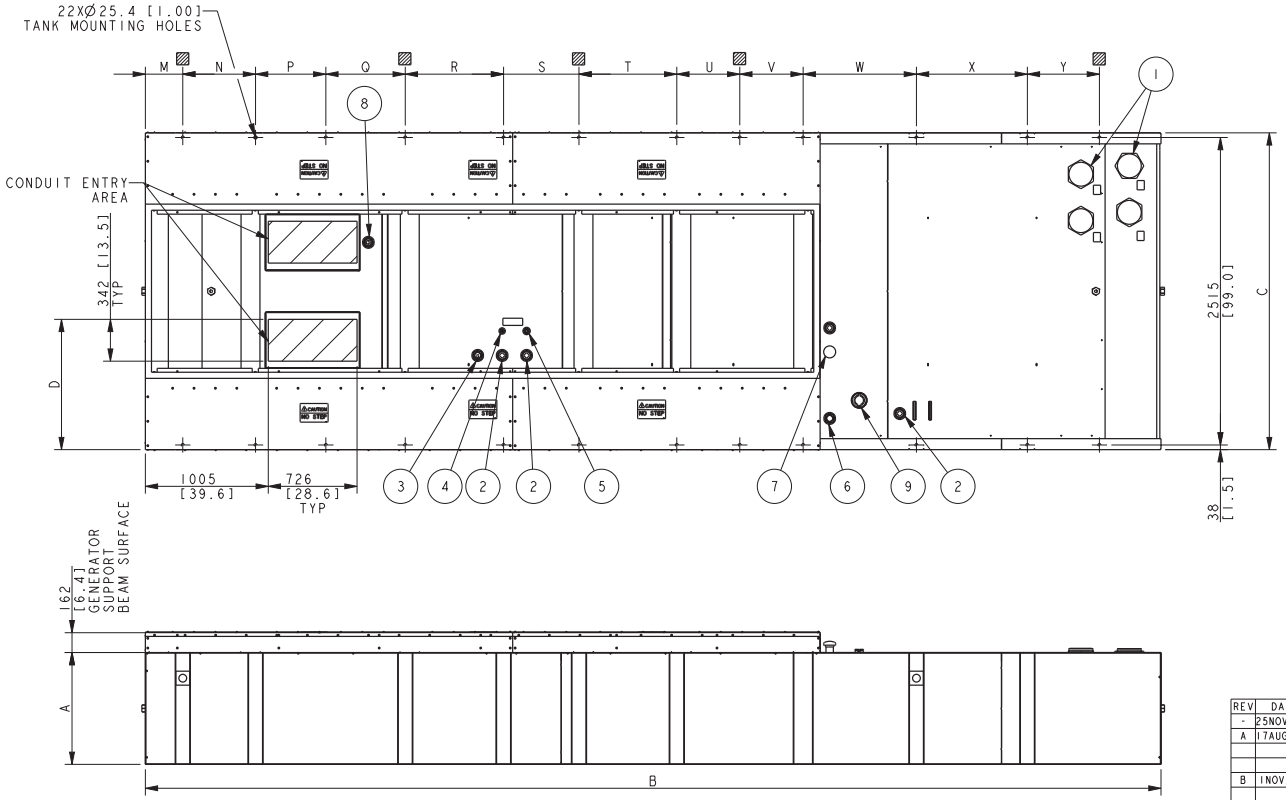
TITLE: **DIMENSION PRINT, 350-500REOZJC/D ENCL & TANKS**

SCALE 0.05 | CAD NO. | SHEET 7 of 8

DWG NO. **ADV-9189** | **D**

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
7510 [1984] 72 HOURS	350KW	762.0 [30.0]	5850.1 [230.3]	2590.8 [102.0]	1120.9 [44.13]	3486 [7686]	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]	-	-	-
8695 [2297] 72 HOURS	400KW	889.0 [35.0]	5850.1 [230.3]			3656 [8061]												
9971 [2634] 72 HOURS	500KW	914.4 [36.0]	6028.0 [237.3]			3901 [8600]												
7537 [1991] 72 HOURS STATE	350KW	660.4 [26.0]	6282.0 [247.3]			3263 [7193]												
8748 [2311] 72 HOURS STATE	400KW	762.0 [30.0]	6282.0 [247.3]			3415 [7529]												
9993 [2640] 72 HOURS STATE	500KW	863.6 [34.0]	6282.0 [247.3]			4063 [8958]												
9993 [2640] 96 HOURS STATE	350KW		6282.0 [247.3]			4063 [8958]												
11602 [3065] 96 HOURS STATE	400KW		7264.4 [286.0]			4426 [9758]										926.5 [36.5]	465.0 [18.3]	442.2 [17.4]
13325 [3520] 96 HOURS STATE	500KW		8305.8 [327.0]			4863 [10720]											907.2 [35.7]	589.2 [23.2]



13325 [3520 GAL.] 96 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

▨ GROUND CLEARANCE I-BEAM MOUNTING HOLE

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	25NOV2019	NEW DRAWING [CT200393]	YBY
A	17AUG2021	(C-8) Ø25.4 [1.00] ADDED; (D-5) DIM D COLUMN ADDED; (B-8) 1066 REMOVED AND UPDATED IN TABLE, SEE SHEET 6 [CT214138]	RNN
B	1NOV2021	72 HOURS AND 92 HOURS TANKS VIEWS ADDED FROM SHEET 7 [CT215771]	SAK

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0°30'
SURFACE FINISH MAX.
THIRD-ANGLE PROJECTION

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

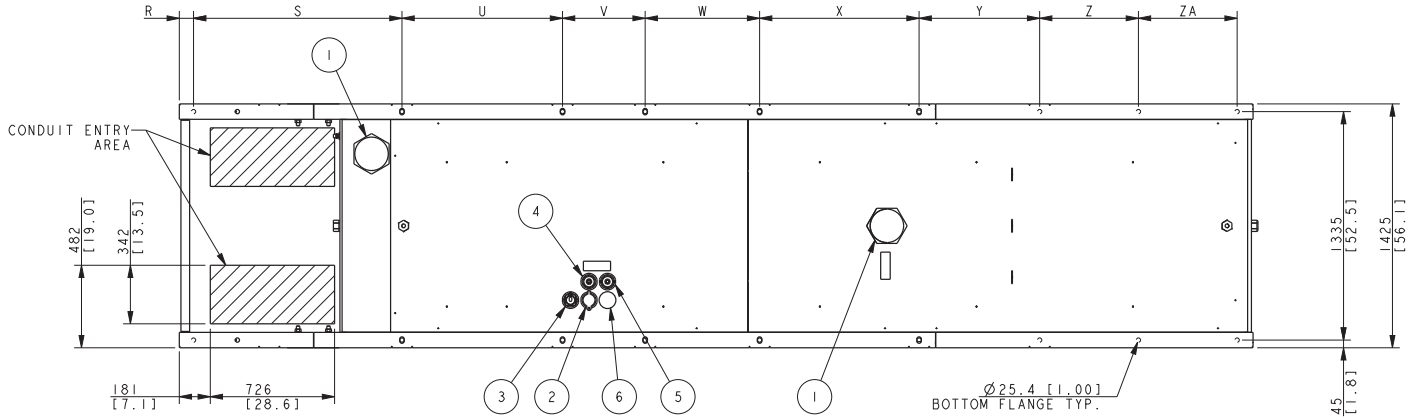
KOHLER.
KOHLER, WISCONSIN 53044

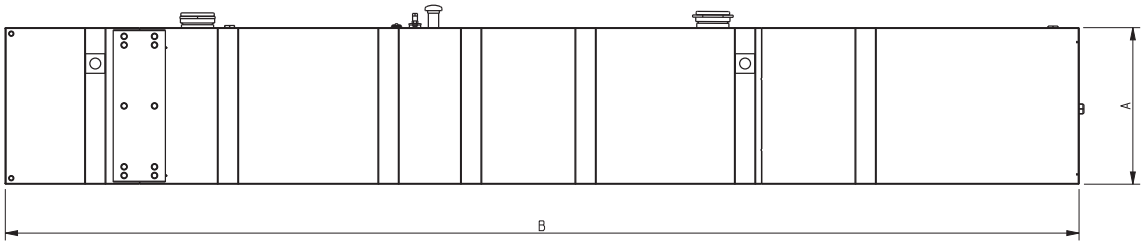
TITLE: DIMENSION PRINT, 350-500REOZJC/D ENCL & TANKS
SCALE 0.05 | CAD NO. | SHEET 8 of 8
DWG NO. ADV-9189 | D

350-500KW REOZJC/D ENCLOSED 96 HOUR TANKS

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]	-	-	-
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]							574.6 [22.62]	648.3 [25.52]		
5046 [1333] 36 HOURS	500KW	1986 [4379]	914.4 [36.0]	7094.8 [279.3]	83.1 [3.27]	2040.2 [80.32]	937.9 [36.93]	482.6 [19.00]	668.6 [26.32]	931.5 [36.67]	704.3 [27.73]	577.0 [22.72]	576.6 [22.70]	





5046 [1333 GAL.] 36 HOUR STANDARD TANK SHOWN.

ITEM	DESCRIPTION
6	VENT, NORMAL
5	RETURN, FUEL (1/2" NPT)
4	SUPPLY, FUEL (1/2" NPT)
3	GAUGE, FUEL LEVEL, W/ SENDER
2	FILL CAP, 2" LOCKABLE W/PIPE RISER
1	CAP, EMERGENCY VENT

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	06FEB2020	NEW DRAWING [CT201734]	YBY

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A

THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	YBY	06FEB2020
CHECKED	KJB	06FEB2020
APPROVED	DMS	06FEB2020

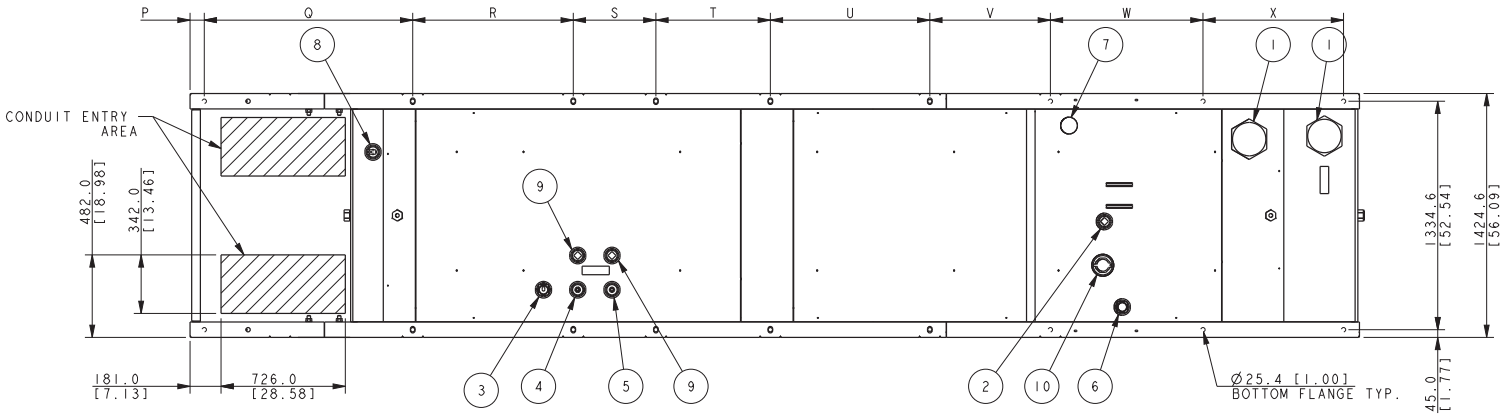
KOHLER.
KOHLER, WISCONSIN 53044

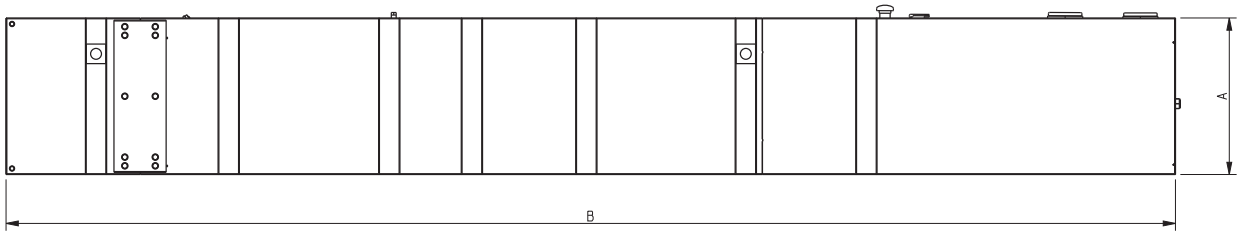
TITLE: DIMENSION PRINT, 350-500REOZJC/D ENCL & TANKS

SCALE: NA | CAD NO. | SHEET 1 of 4

DWG NO.: ADV-9191 | D

12 - 36 HOUR
350-500kW STD TANK
OPEN UNIT





TANK W/OPEN UNIT

LITERS [GALLONS] MIN HOURS	GENSETS	WEIGHT KG [LBS]	A	B	P	Q	R	S	T	U	V	W	X
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]								704.3 [27.73]	772.6 [30.42]	
2930 [774] 24 HOURS STATE	350-400KW	1547 [3411]	660.4 [26.0]									772.6 [30.42]	
3384 [894] 24 HOURS STATE	500KW	1630 [3594]	736.6 [29.0]									950.4 [37.42]	
4394 [1161] 36 HOURS STATE	350-400KW	1874 [4072]	914.4 [36.0]	6069.0 [238.9]								891.3 [35.09]	821.1 [32.33]
5046 [1333] 36 HOURS STATE	500KW	2094 [4616]	914.4 [36.0]	6831.0 [268.9]									

5046 [1333 GAL.] 36 HOUR STATE TANK SHOWN.

ITEM	DESCRIPTION
10	FILL CAP, 2" LOCKABLE W/PIPE RISER
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

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	06FEB2020	NEW DRAWING [CT201734]	YBY

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A

THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	YBY	06FEB2020
CHECKED	KJB	06FEB2020
APPROVED	DMS	06FEB2020

KOHLER.
KOHLER, WISCONSIN 53044

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

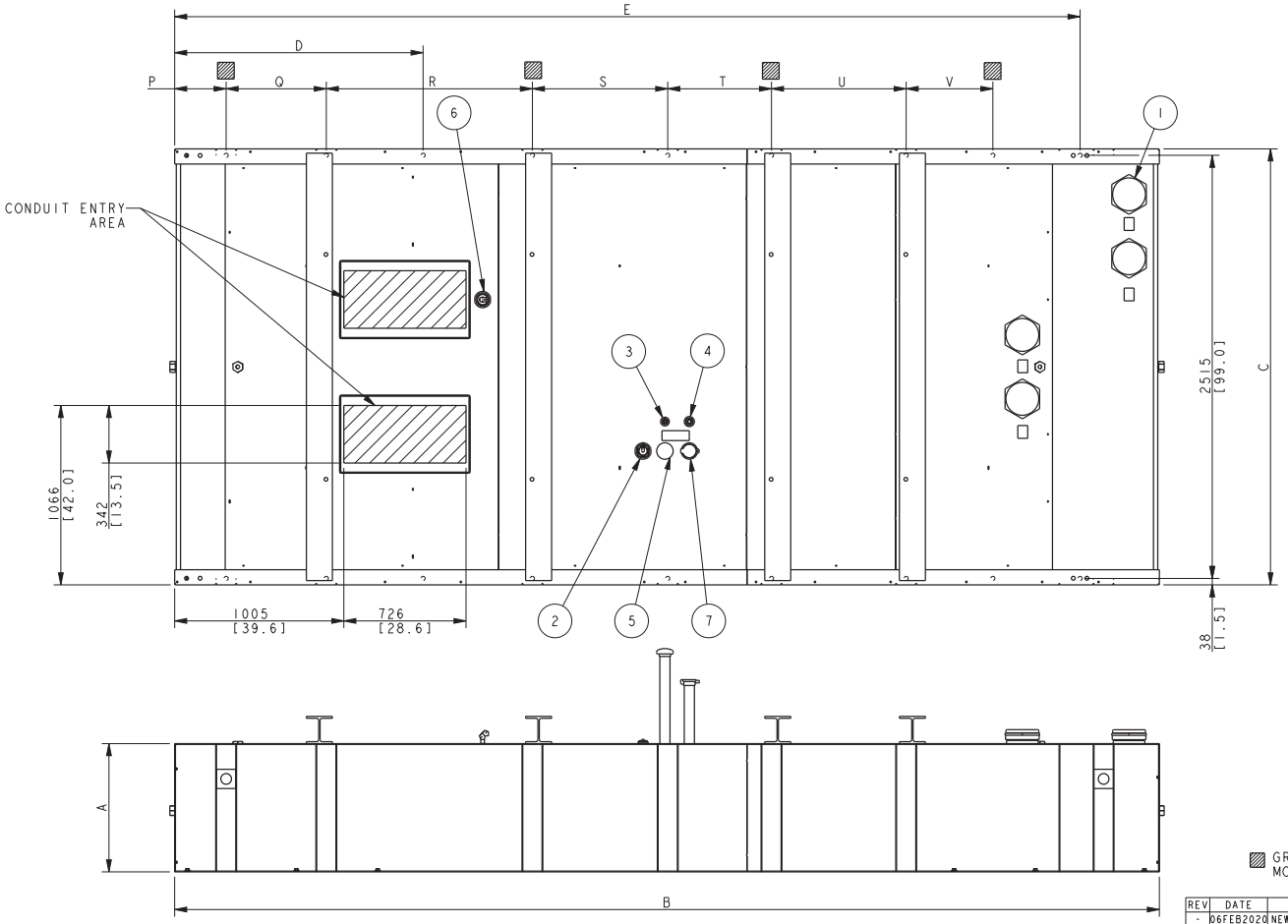
SCALE: NA | CAD NO. | SHEET 2 of 4

DWG NO.: ADV-9191 | D

12 - 36 HOUR 350-500kW STATE TANK OPEN UNIT

TANK INFORMATION

LITERS [GALLONS] MIN HOURS	GENSETS	DIM A MM [INCH]	DIM B MM [INCH]	DIM C MM [INCH]	TANK WEIGHT KG [LBS] (NO FUEL)	D	E	P	Q	R	S	T	U	V
5042 [1332] 48 HOURS	350KW	711.2 [28.0]	5850.1[230.3]	1981.2[78.0]	2751 [6064]	1475.9 [58.1]	5379.3 [211.8]	305.8 [12.0]	595.1 [23.4]	224.5 [48.2]	804.0 [31.7]	616.5 [24.3]	800.1 [31.5]	515.0 [20.3]
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]									
7510 [1984] 72 HOURS	350KW	762.0 [30.0]	5850.1[230.3]	2590.8[102.0]	3486 [7686]									
8695 [2297] 72 HOURS	400KW	889.0 [35.0]	5850.1[230.3]		3656 [8061]									
9971 [2634] 72 HOURS	500KW	914.4 [36.0]	6028[237.3]		3901 [8600]									



7510 [1984 GAL.] 72 HOUR STANDARD TANK SHOWN.

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

▨ GROUND CLEARANCE I-BEAM MOUNTING HOLE

48 - 72 HOUR
350-500kW STANDARD TANK
OPEN UNIT

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	06FEB2020	NEW DRAWING [CT201734]	YBY

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A

THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	YBY	06FEB2020
CHECKED	KJB	06FEB2020
APPROVED	DMS	06FEB2020

KOHLER.
KOHLER, WISCONSIN 53044

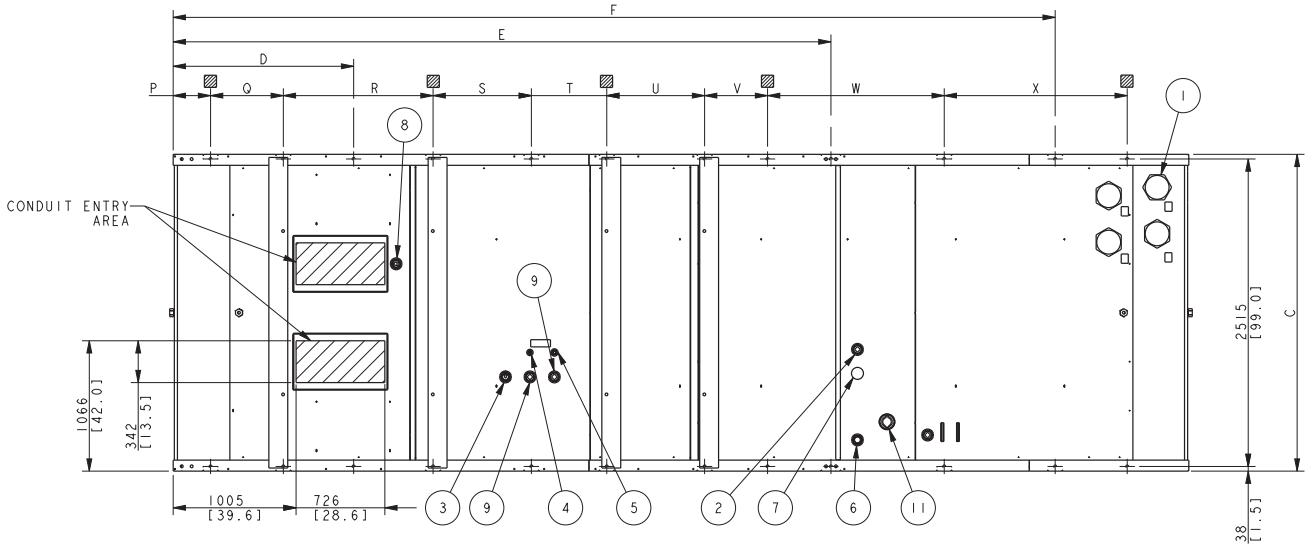
TITLE: **DIMENSION PRINT, 350-500REOZJC/D ENCL & TANKS**

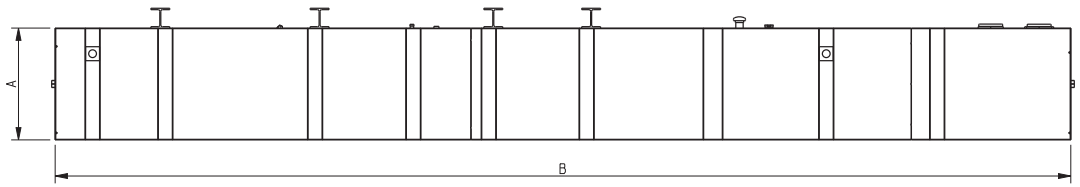
SCALE: NA | CAD NO. | SHEET 3 of 4

DWG NO.: **ADV-9191** | **D**

TANK INFORMATION

LITERS [GALLONS] MIN HOURS	GENSETS	DIM A MM [INCH]	DIM B MM [INCH]	DIM C MM [INCH]	TANK WEIGHT KG [LBS] (NO FUEL)	D	E	F	P	Q	R	S	T	U	V	W	X
5061 [1337] 48 HOURS STATE	350KW	635.0 [25.0]	6282[247.3]		2953 [6510]												
5852 [1546] 48 HOURS STATE	400KW	711.2 [28.0]	6282[247.3]	1981.2[78.0]	3077 [6784]											1358.9 [53.5]	
6681 [1765] 48 HOURS STATE	500KW	812.8 [32.0]	6282[247.3]		3214 [7087]												
7537 [1991] 72 HOURS STATE	350KW	660.4 [26.0]	6282[247.3]		3263 [7193]			-									-
8748 [2311] 72 HOURS STATE	400KW	762.0 [30.0]	6282[247.3]		3415 [7529]											1358.9 [53.5]	
9993 [2640] 72 HOURS STATE	500KW		6282[247.3]		4063 [8958]	1475.9 [58.1]	5379.3 [211.8]		305.8 [12.0]	595.1 [23.4]	224.5 [48.2]	804.0 [31.7]	616.5 [24.3]	800.1 [31.5]	515.0 [20.3]		
9993 [2640] 96 HOURS STATE	350KW		6282[247.3]	2590.8[102.0]	4063 [8958]												
11602 [3065] 96 HOURS STATE	400KW	863.6 [34.0]	7264.4[286.0]		4426 [9758]			6770.7 [266.6]								1444.8 [56.9]	907.2 [35.7]
13325 [3520] 96 HOURS STATE	500KW		8305.8[327]		4863 [10720]			7213 [283.9]									1496.4 [58.9]





13325 [3520 GAL.] 96 HOUR STATE TANK SHOWN.

GROUND CLEARANCE I-BEAM MOUNTING HOLE

ITEM	DESCRIPTION
10	FILL CAP, 2" LOCKABLE W/PIPE RISER
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

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	06FEB2020	NEW DRAWING [CT201734]	YBY

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A

THIRD-ANGLE PROJECTION

APPROVALS		DATE
DRAWN	YBY	06FEB2020
CHECKED	KJB	06FEB2020
APPROVED	DMS	06FEB2020

KOHLER.
KOHLER, WISCONSIN 53044

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

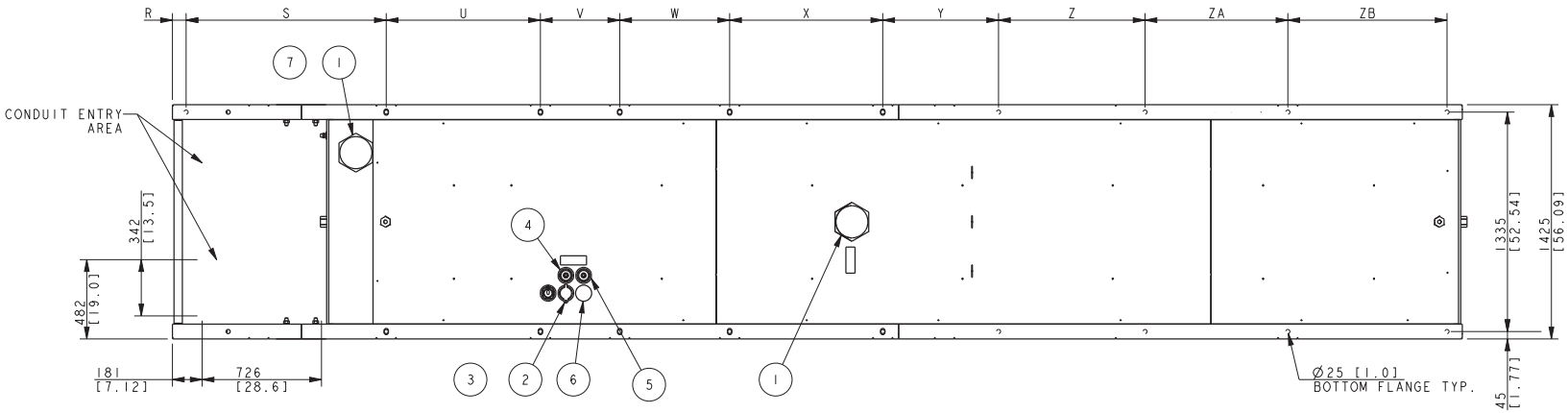
SCALE: NA | CAD NO. | SHEET 4 of 4

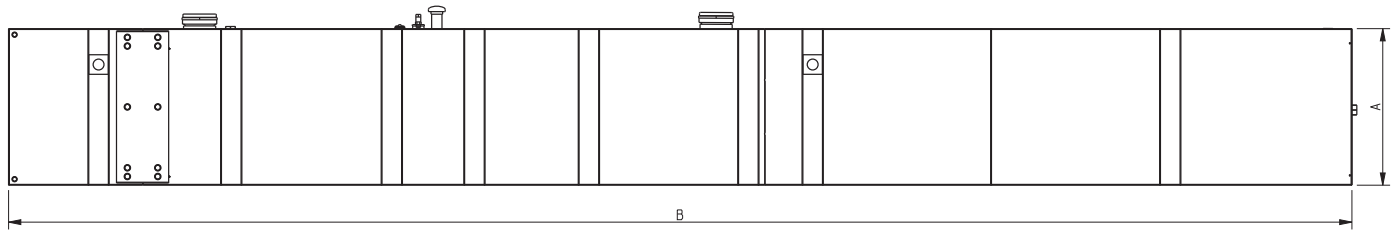
DWG NO.: ADV-9191 | D

48 - 96 HOUR
350-500kW STATE TANK
OPEN UNIT

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]			
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]							574.6 [22.62]	648.3 [25.52]		
5046 [1333] 48 HOURS	350KW	1982 [4370]		6272.2 [246.9]							704.3 [27.73]	577.0 [22.72]	576.6 [22.70]	
5765 [1523] 48/36 HOURS	400/500KW	2228 [4911]		6983.4 [274.9]							684.3 [26.94]	591.3 [23.28]	588.9 [23.19]	704.6 [27.74]
6674 [1763] 48 HOURS	500KW	2524 [5565]		7847.0 [308.9]							704.3 [27.73]	891.3 [35.09]	868.9 [34.21]	969.2 [38.12]





1531 [404GAL.] 12 HOUR TANK SHOWN.

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

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	10-25-12	NEW DRAWING [CT28128]	KNN
A	10-10-13	SEE SHEET 3 [CT59787]	SVP
B	2-3-17	SEE SHEET 3 [CT170345]	PAS

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30'
SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	KNN	10-25-12
CHECKED	DJV	10-25-12
APPROVED	JDZ	10-25-12

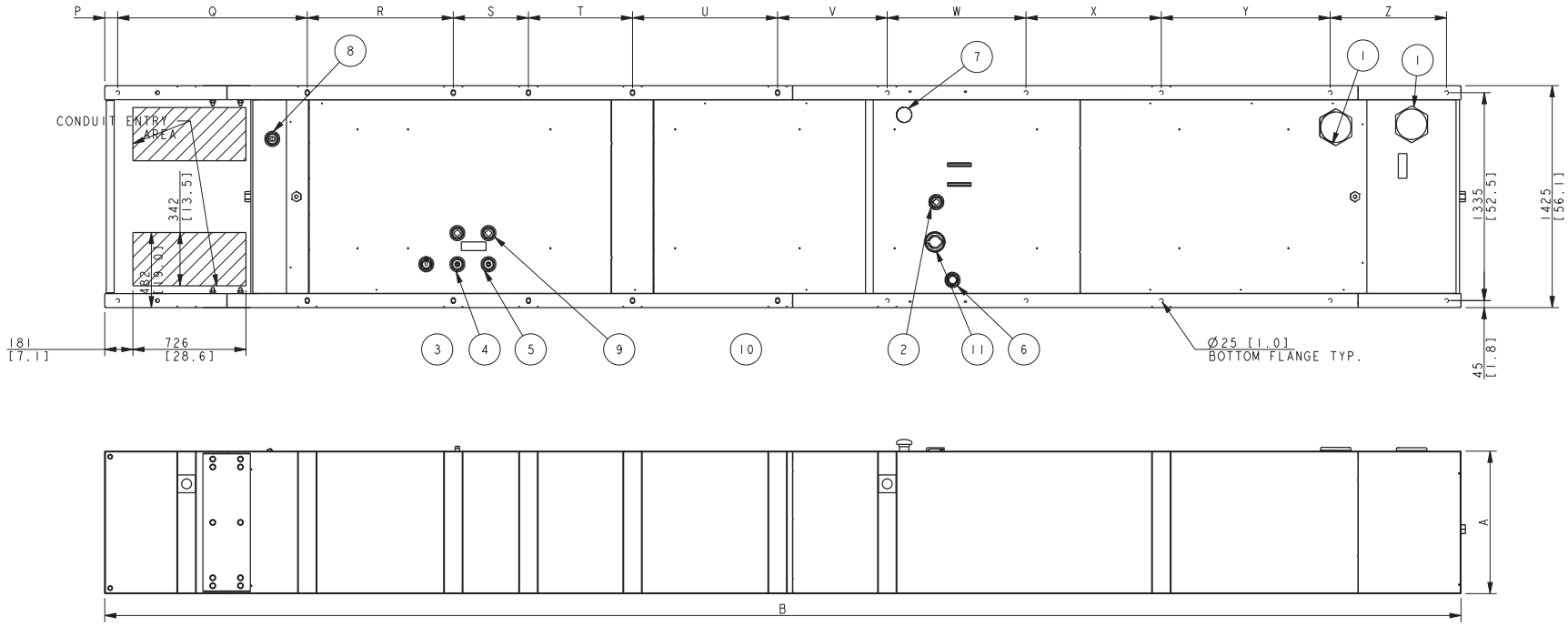
KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DIMENSION PRINT, 350-500REOZJB TANKS

SCALE 0.07 | CAD NO. | SHEET 1 of 3

DWG NO. ADV-8528 | D

12 - 48 HOUR
350-500kW STD TANK
OPEN UNIT



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]								704.3 [27.73]	772.6 [30.42]			
3384 [894] 24 HOURS STATE	500KW	1630 [3594]	736.6 [29.0]									772.6 [30.42]			
4394 [1161] 36 HOURS STATE	350-400KW	1874 [4072]	914.4 [36.0]	6069.0 [238.9]								950.4 [37.42]			
5046 [1333] 48 HOURS STATE	350KW	2094 [4616]		6831.0 [268.9]								891.3 [35.09]	821.1 [32.33]		
5765 [1523] 48/36 HOURS STATE	400/500KW	2329 [5134]		7669.2 [301.9]								891.3 [35.09]	868.9 [34.21]	790.4 [31.12]	
6674 [1763] 48 HOURS STATE	500KW	2656 [5855]		8710.6 [342.9]								891.3 [35.09]	868.9 [34.21]	1084.3 [42.69]	747.5 [29.43]

1531 [404 GAL.] 12 HOUR TANK SHOWN.

ITEM	DESCRIPTION
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

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	10-25-12	NEW DRAWING [CT28128]	KNN
A	10-10-13	SEE SHEET 3 [CT59787]	SVP
B	2-3-17	SEE SHEET 3 [CT170345]	PAS

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30' SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	KNN	10-25-12
CHECKED	DJV	10-25-12
APPROVED	JDZ	10-25-12

KOHLER CO. METRIC | PRO-E

POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

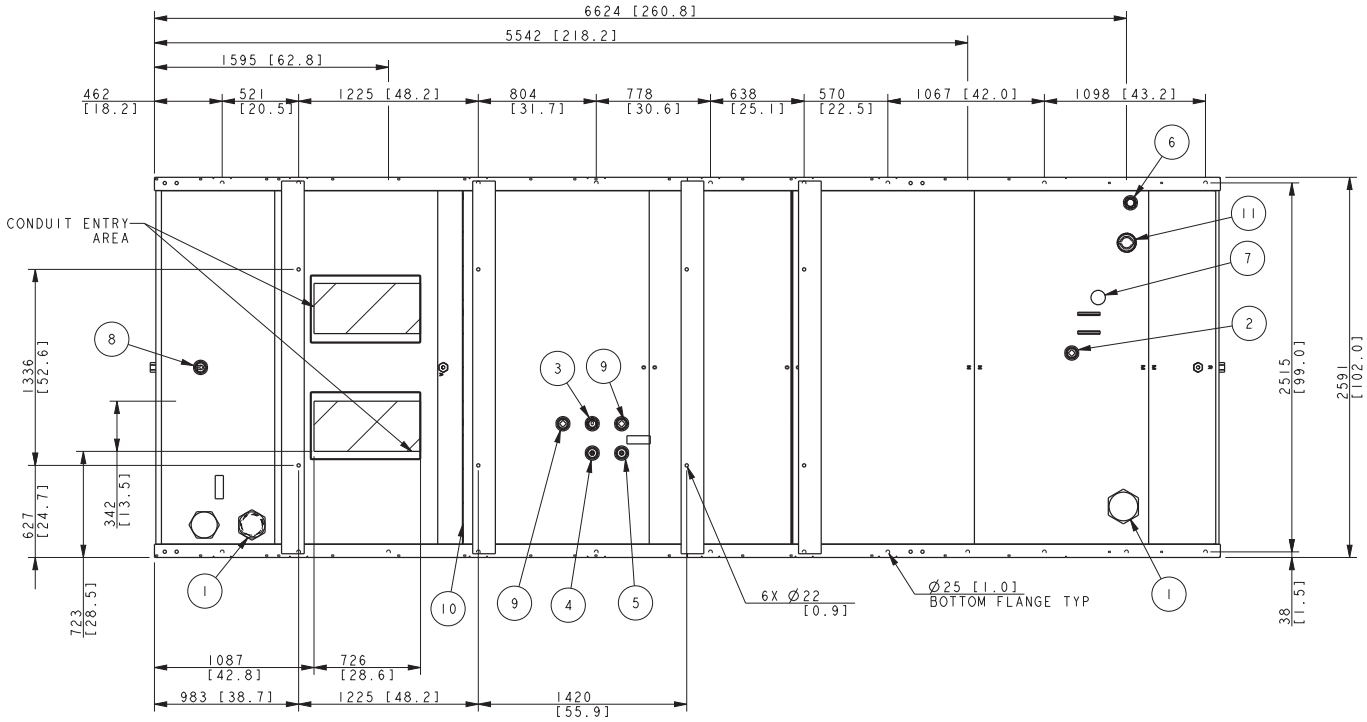
TITLE
DIMENSION PRINT, 350-500REOZJB TANKS

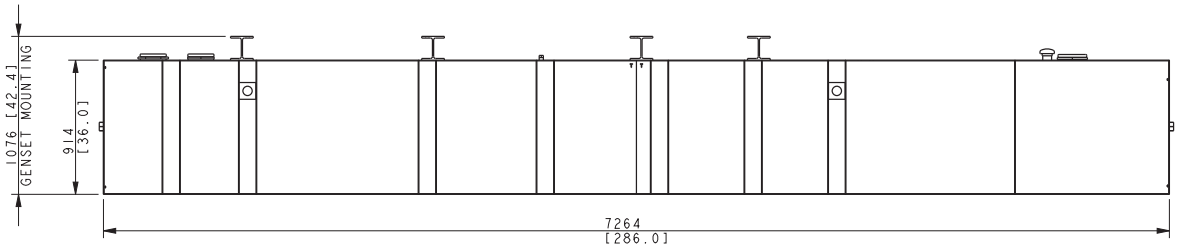
SCALE 0.40 | CAD NO. | SHEET 2 of 3

DWG NO. **ADV-8528** | **D**

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

STATE TANK





ITEM	DESCRIPTION
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

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

72 HOUR
350-500kW STATE TANK
OPEN UNIT

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	10-25-12	NEW DRAWING [CT28128]	KNN
A	10-10-13	(D-7) 1595 [62.8], (D-6) 5542 [218.2] & 6624 [260.8]	
		ADDED [CT59787]	SVP
B	2-3-17	VIEWS UPDATED FOR LIFTING PLATES [CT1703451]	PAS

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X .XX ± 0.25
X .X ± 1.0
X ± 1.5
ANGLES ± 0° 30'
SURFACE FINISH MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	KNN	10-25-12
CHECKED	DJV	10-25-12
APPROVED	JDZ	10-25-12

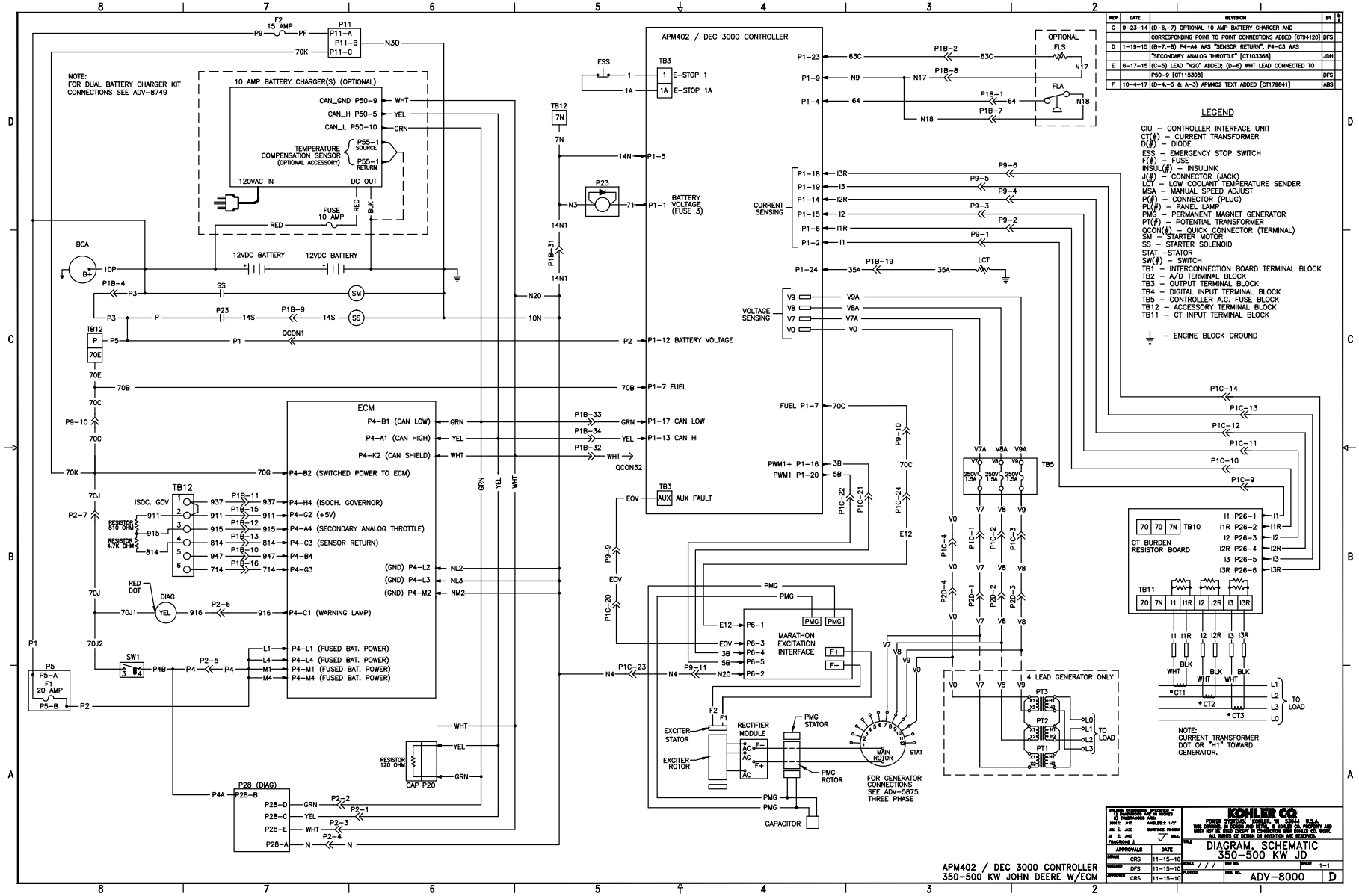
TITLE: DIMENSION PRINT, 350-500REOZJB TANKS

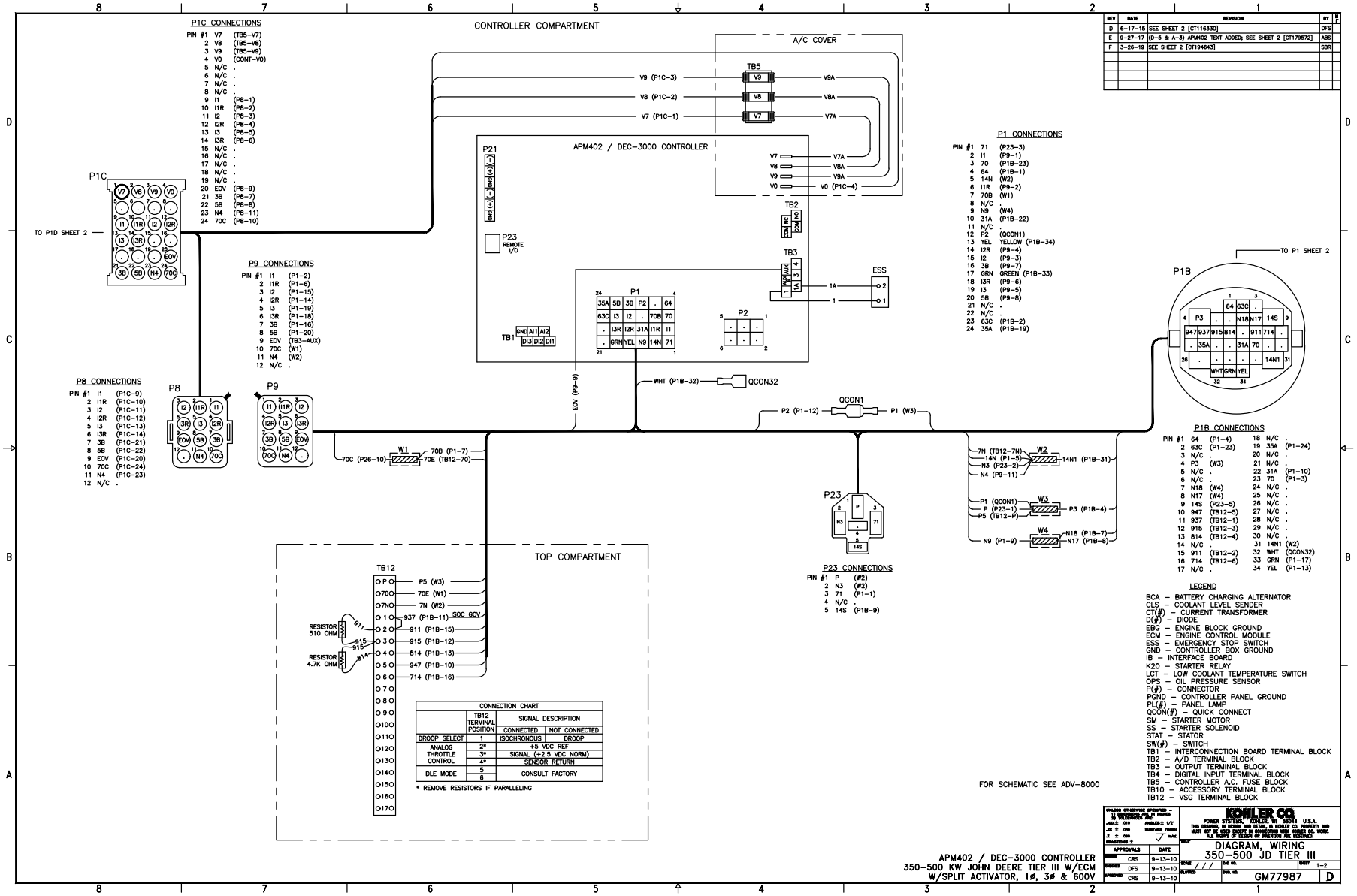
SCALE 0.40 | CAD NO. | SHEET 3 of 3

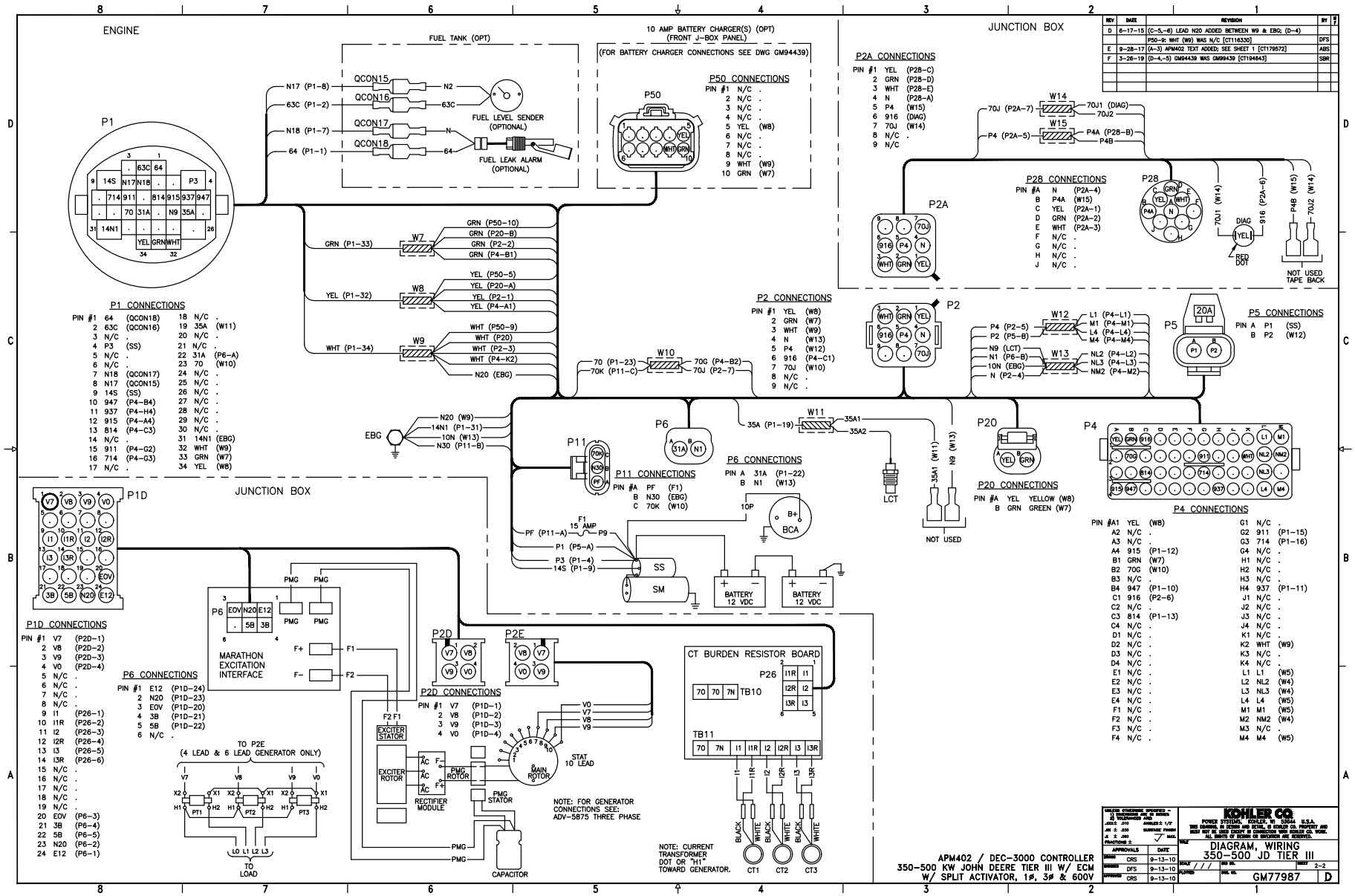
DWG NO. ADV-8528 | D

KOHLER®

Wiring Schematics


APM402 / DEC 3000 CONTROLLER
ECM
10 AMP BATTERY CHARGER(S) (OPTIONAL)
NOTE:
FOR DUAL BATTERY CHARGER KIT
CONNECTIONS SEE ADV-8749
12VDC BATTERY
12VDC BATTERY
BCA
MARATHON
EXCITATION
INTERFACE
RECTIFIER
MODULE
EXCITER
STATOR
EXCITER
ROTOR
PMG
STATOR
PMG
ROTOR
MAIN
ROTOR
STAT
CAPACITOR
FOR GENERATOR
CONNECTIONS
SEE ADV-5875
THREE PHASE
4 LEAD GENERATOR ONLY
OPTIONAL
CT BURDEN
RESISTOR BOARD
TO
LOAD
NOTE:
CURRENT TRANSFORMER
DOT OR "H1" TOWARD
GENERATOR.
LEGEND
CIU – CONTROLLER INTERFACE UNIT
CT(#) – CURRENT TRANSFORMER
D(#) – DIODE
ESS – EMERGENCY STOP SWITCH
F(#) – FUSE
INSULK(#) – INSULINK
J(#) – CONNECTOR (JACK)
LCT – LOW COOLANT TEMPERATURE SENDER
MSA – MANUAL SPEED ADJUST
P(#) – CONNECTOR (PLUG)
PL(#) – PANEL LAMP
PMG – PERMANENT MAGNET GENERATOR
PT(#) – POTENTIAL TRANSFORMER
QCON(#) – QUICK CONNECTOR (TERMINAL)
SM – STARTER MOTOR
SS – STARTER SOLENOID
STAT –STATOR
SW(#) – SWITCH
TB1 – INTERCONNECTION BOARD TERMINAL BLOCK
TB2 – A/D TERMINAL BLOCK
TB3 – OUTPUT TERMINAL BLOCK
TB4 – DIGITAL INPUT TERMINAL BLOCK
TB5 – CONTROLLER A.C. FUSE BLOCK
TB12 – ACCESSORY TERMINAL BLOCK
TB11 – CT INPUT TERMINAL BLOCK
– ENGINE BLOCK GROUND
REV DATE REVISION BY
C 9-23-14 (D-6,-7) OPTIONAL 10 AMP BATTERY CHARGER AND CORRESPONDING POINT TO POINT CONNECTIONS ADDED [CT94120] DFS
D 1-19-15 (B-7,-8) P4-A4 WAS "SENSOR RETURN", P4-C3 WAS "SECONDARY ANALOG THROTTLE" [CT103368] JDH
E 6-17-15 (C-5) LEAD "N20" ADDED; (D-6) WHT LEAD CONNECTED TO P50-9 [CT115308] DFS
F 10-4-17 (D-4,-5 & A-3) APM402 TEXT ADDED [CT179841] ABS
KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
DESIGN AND DETAIL
APPROVALS DATE
DRAWN CRS 11-15-10
CHECKED DFS 11-15-10
APPROVED CRS 11-15-10
DIAGRAM, SCHEMATIC
350-500 KW JD
DRG NO. ADV-8000
SHEET 1-1
SIZE D
APM402 / DEC 3000 CONTROLLER
350-500 KW JOHN DEERE W/ECM


CONTROLLER COMPARTMENT
A/C COVER
APM402 / DEC-3000 CONTROLLER
TOP COMPARTMENT
TO P1D SHEET 2
TO P1 SHEET 2
P1C CONNECTIONS
PIN #1 V7 (TB5-V7)
2 V8 (TB5-V8)
3 V9 (TB5-V9)
4 V0 (CONT-V0)
5 N/C .
6 N/C .
7 N/C .
8 N/C .
9 I1 (P8-1)
10 I1R (P8-2)
11 I2 (P8-3)
12 I2R (P8-4)
13 I3 (P8-5)
14 I3R (P8-6)
15 N/C .
16 N/C .
17 N/C .
18 N/C .
19 N/C .
20 EOV (P8-9)
21 3B (P8-7)
22 5B (P8-8)
23 N4 (P8-11)
24 70C (P8-10)
P9 CONNECTIONS
PIN #1 I1 (P1-2)
2 I1R (P1-6)
3 I2 (P1-15)
4 I2R (P1-14)
5 I3 (P1-19)
6 I3R (P1-18)
7 3B (P1-16)
8 5B (P1-20)
9 EOV (TB3-AUX)
10 70C (W1)
11 N4 (W2)
12 N/C .
P8 CONNECTIONS
PIN #1 I1 (P1C-9)
2 I1R (P1C-10)
3 I2 (P1C-11)
4 I2R (P1C-12)
5 I3 (P1C-13)
6 I3R (P1C-14)
7 3B (P1C-21)
8 5B (P1C-22)
9 EOV (P1C-20)
10 70C (P1C-24)
11 N4 (P1C-23)
12 N/C .
P1 CONNECTIONS
PIN #1 71 (P23-3)
2 I1 (P9-1)
3 70 (P1B-23)
4 64 (P1B-1)
5 14N (W2)
6 I1R (P9-2)
7 70B (W1)
8 N/C .
9 N9 (W4)
10 31A (P1B-22)
11 N/C .
12 P2 (QCON1)
13 YEL YELLOW (P1B-34)
14 I2R (P9-4)
15 I2 (P9-3)
16 3B (P9-7)
17 GRN GREEN (P1B-33)
18 I3R (P9-6)
19 I3 (P9-5)
20 5B (P9-8)
21 N/C .
22 N/C .
23 63C (P1B-2)
24 35A (P1B-19)
P1B CONNECTIONS
PIN #1 64 (P1-4)
2 63C (P1-23)
3 N/C
4 P3 (W3)
5 N/C .
6 N/C .
7 N18 (W4)
8 N17 (W4)
9 14S (P23-5)
10 947 (TB12-5)
11 937 (TB12-1)
12 915 (TB12-3)
13 814 (TB12-4)
14 N/C .
15 911 (TB12-2)
16 714 (TB12-6)
17 N/C .
18 N/C .
19 35A (P1-24)
20 N/C .
21 N/C .
22 31A (P1-10)
23 70 (P1-3)
24 N/C .
25 N/C .
26 N/C .
27 N/C .
28 N/C .
29 N/C .
30 N/C .
31 14N1 (W2)
32 WHT (QCON32)
33 GRN (P1-17)
34 YEL (P1-13)
P23 CONNECTIONS
PIN #1 P (W2)
2 N3 (W2)
3 71 (P1-1)
4 N/C .
5 14S (P1B-9)
LEGEND
BCA – BATTERY CHARGING ALTERNATOR
CLS – COOLANT LEVEL SENDER
CT(#) – CURRENT TRANSFORMER
D(#) – DIODE
EBG – ENGINE BLOCK GROUND
ECM – ENGINE CONTROL MODULE
ESS – EMERGENCY STOP SWITCH
GND – CONTROLLER BOX GROUND
IB – INTERFACE BOARD
K20 – STARTER RELAY
LCT – LOW COOLANT TEMPERATURE SWITCH
OPS – OIL PRESSURE SENSOR
P(#) – CONNECTOR
PGND – CONTROLLER PANEL GROUND
PL(#) – PANEL LAMP
QCON(#) – QUICK CONNECT
SM – STARTER MOTOR
SS – STARTER SOLENOID
STAT – STATOR
SW(#) – SWITCH
TB1 – INTERCONNECTION BOARD TERMINAL BLOCK
TB2 – A/D TERMINAL BLOCK
TB3 – OUTPUT TERMINAL BLOCK
TB4 – DIGITAL INPUT TERMINAL BLOCK
TB5 – CONTROLLER A.C. FUSE BLOCK
TB10 – ACCESSORY TERMINAL BLOCK
TB12 – VSG TERMINAL BLOCK
FOR SCHEMATIC SEE ADV-8000
CONNECTION CHART
TB12 TERMINAL POSITION
SIGNAL DESCRIPTION
CONNECTED
NOT CONNECTED
DROOP SELECT 1 ISOCHRONOUS DROOP
ANALOG THROTTLE CONTROL 2* +5 VDC REF
3* SIGNAL (+2.5 VDC NORM)
4* SENSOR RETURN
IDLE MODE 5
6 CONSULT FACTORY
* REMOVE RESISTORS IF PARALLELING
RESISTOR 510 OHM
RESISTOR 4.7K OHM
ISOC GOV
W1
W2
W3
W4
QCON1
QCON32
ESS
REMOTE I/O
APM402 / DEC-3000 CONTROLLER
350-500 KW JOHN DEERE TIER III W/ECM
W/SPLIT ACTIVATOR, 1Ø, 3Ø & 600V
REV DATE REVISION BY
D 6-17-15 SEE SHEET 2 [CT116330] DFS
E 9-27-17 (D-5 & A-3) APM402 TEXT ADDED; SEE SHEET 2 [CT179572] ABS
F 3-26-19 SEE SHEET 2 [CT194643] SBR
KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
APPROVALS DATE
DRAWN CRS 9-13-10
CHECKED DFS 9-13-10
APPROVED CRS 9-13-10
DIAGRAM, WIRING
350-500 JD TIER III
SCALE NONE SHEET 1-2
DWG NO. GM77987 D



REV	DATE	REVISION	BY
D	6-17-15	(C-5,-6) LEAD N20 ADDED BETWEEN W9 & EBG; (D-4)	
		P50-9: WHT (W9) WAS N/C [CT116330]	DFS
E	9-28-17	(A-3) APM402 TEXT ADDED; SEE SHEET 1 [CT179572]	ABS
F	3-26-19	(D-4,-5) GM94439 WAS GM99439 [CT194643]	SBR

APPROVALS	DATE
CRS	9-13-10
DFS	9-13-10
CRS	9-13-10

SHEET 2-2

REV	DATE	REVISION	BY
F	04-26-18	(D-2,-3) COMMENT "NOT AVAILABLE AS A STANDALONE KIT", "OPTIONAL, INCLUDED IN SHUNT TRIP KIT" ARE ADDED, SEE SHEET 2 [CT186997]	SBR
G	2-6-19	(A,B-6,-7,-8) ADDED GROUND FAULT REALY INPUT; TB1-DI1 LOW FUEL PRESSURE WAS EXCITATION OVER VOLTAGE (4M,5M,7M) (A,B-1,-2,-3) ADDED NOTE 5 AND 6 IN INSTALLATION NOTES [CT193515]	SBR

P29 2 AMP RELAY OUPUT (2.1) CONNECTIONS
P29-NC 2.1 RELAY NORMALLY CLOSED
P29-COM 2.1 RELAY COMMON
P29-NO 2.1 RELAY NORMALLY OPEN

P30 2 AMP RELAY OUPUT (2.2) CONNECTIONS
P30-NC 2.2 RELAY NORMALLY CLOSED
P30-COM 2.2 RELAY COMMON
P30-NO 2.2 RELAY NORMALLY OPEN

P31 2 AMP RELAY OUPUT (2.3) CONNECTIONS
P31-NC 2.3 RELAY NORMALLY CLOSED
P31-COM 2.3 RELAY COMMON
P31-NO 2.3 RELAY NORMALLY OPEN

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

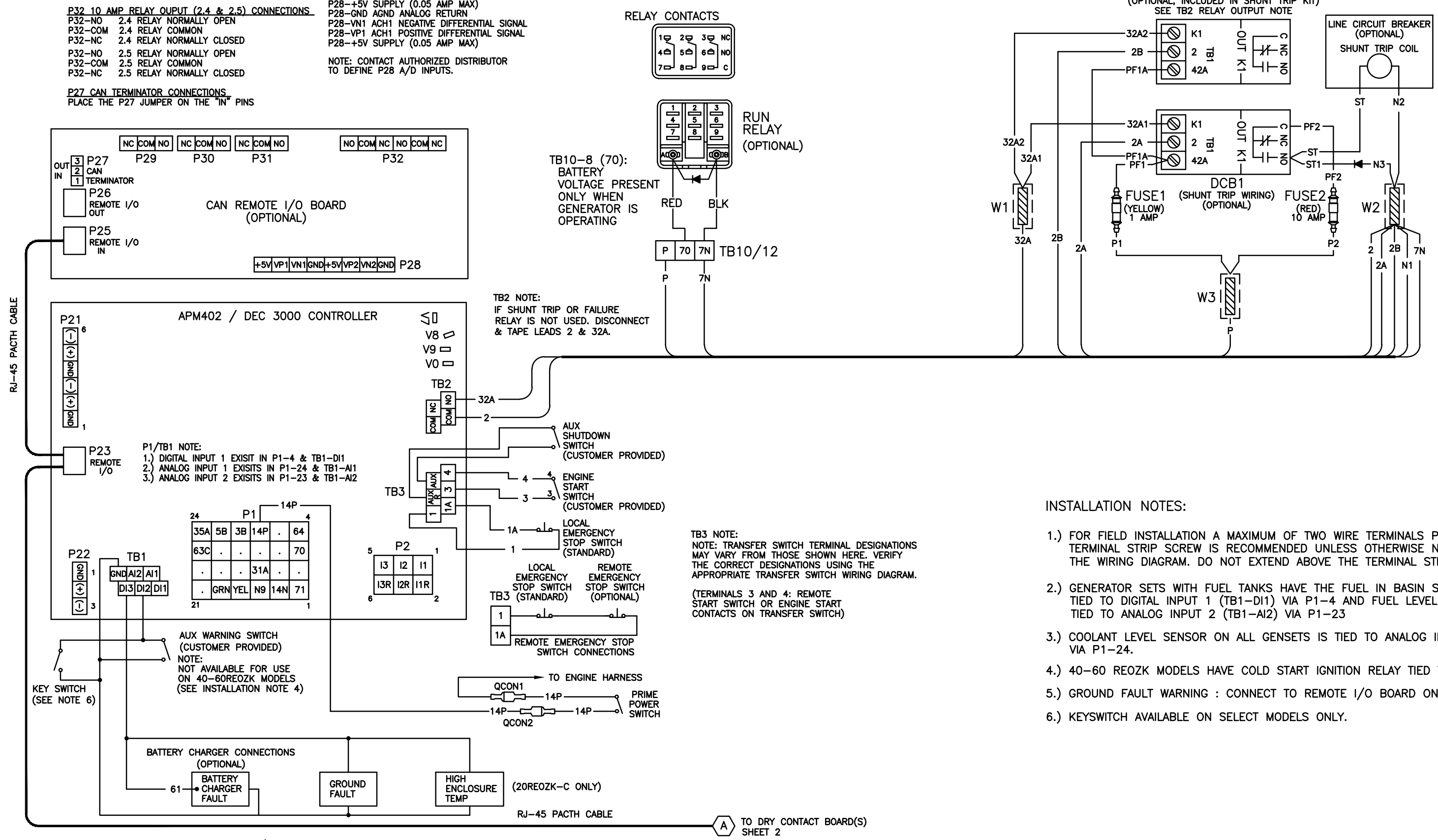
P27 CAN TERMINATOR CONNECTIONS
PLACE THE P27 JUMPER ON THE "IN" PINS

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

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

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

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



INSTALLATION NOTES:

1.) FOR FIELD INSTALLATION A MAXIMUM OF TWO WIRE TERMINALS PER TERMINAL STRIP SCREW IS RECOMMENDED UNLESS OTHERWISE NOTED ON THE WIRING DIAGRAM. DO NOT EXTEND ABOVE THE TERMINAL STRIP BARRIER.

2.) GENERATOR SETS WITH FUEL TANKS HAVE THE FUEL IN BASIN SWITCH TIED TO DIGITAL INPUT 1 (TB1-DI1) VIA P1-4 AND FUEL LEVEL SENDER TIED TO ANALOG INPUT 2 (TB1-AI2) VIA P1-23

3.) COOLANT LEVEL SENSOR ON ALL GENSETS IS TIED TO ANALOG INPUT 1 (TB1-AI2) VIA P1-24.

4.) 40-60 REOZK MODELS HAVE COLD START IGNITION RELAY TIED TO DIGITAL INPUT 2 (TB1-DI2)

5.) GROUND FAULT WARNING : CONNECT TO REMOTE I/O BOARD ON 20REOZK-C.

6.) KEYSWITCH AVAILABLE ON SELECT MODELS ONLY.

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

TB1 ANALOG/DIGITAL INPUT FACTORY SETTINGS
TB1-DI1 DCH1 LOW FUEL PRESSURE
TB1-DI2 DCH2 AUX WARNING
TB1-DI3 DCH3 BATTERY CHARGER FAULT WARNING
TB1-AI1 ACH1 NO FUNCTION
TB1-AI2 ACH2 NO FUNCTION
TB1-GND A/DGND ANALOG/DIGITAL RETURN

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

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

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

APM402 / DEC 3000 ACCESSORIES

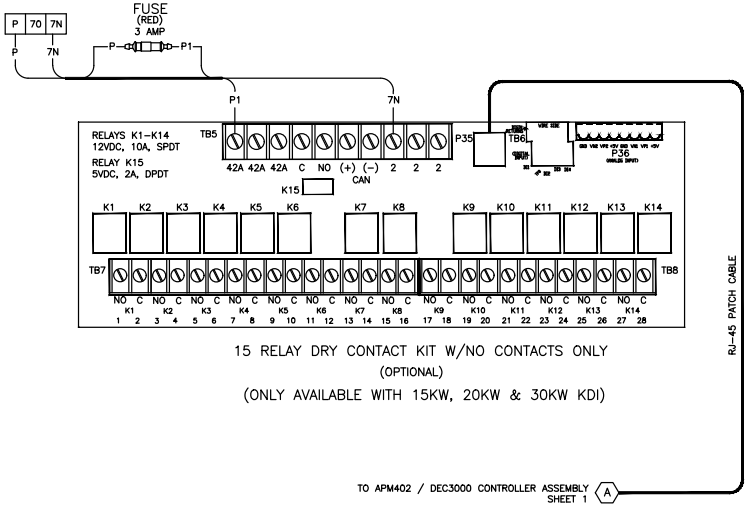
KOHLER CO. POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

DIAGRAM, DEC3000/APM402 ACCY INTERCONNECTION

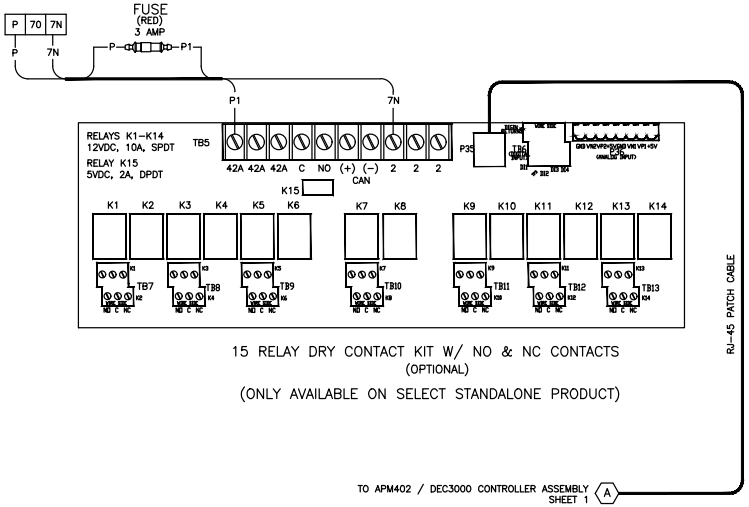
APPROVALS		DATE
DRAWN	CRS	9-16-10
CHECKED	DFS	9-16-10
APPROVED	CRS	9-16-10

SHEET 1-2 GM78246 D

REV	DATE	REVISION	BY	M F
F	04-26-18	(B-6,-2) COMMENT "APM402 / DEC 3000 ACCESSORIES" IS ADDED		
		SEE SHEET 1 [CT186997]	SBR	
G	2-6-19	SEE SHEET 1 [CT193515]	SBR	



15 RELAY DRY CONTACT KIT W/NO CONTACTS ONLY
(OPTIONAL)
(ONLY AVAILABLE WITH 15KW, 20KW & 30KW KDI)



15 RELAY DRY CONTACT KIT W/ NO & NC CONTACTS
(OPTIONAL)
(ONLY AVAILABLE ON SELECT STANDALONE PRODUCT)

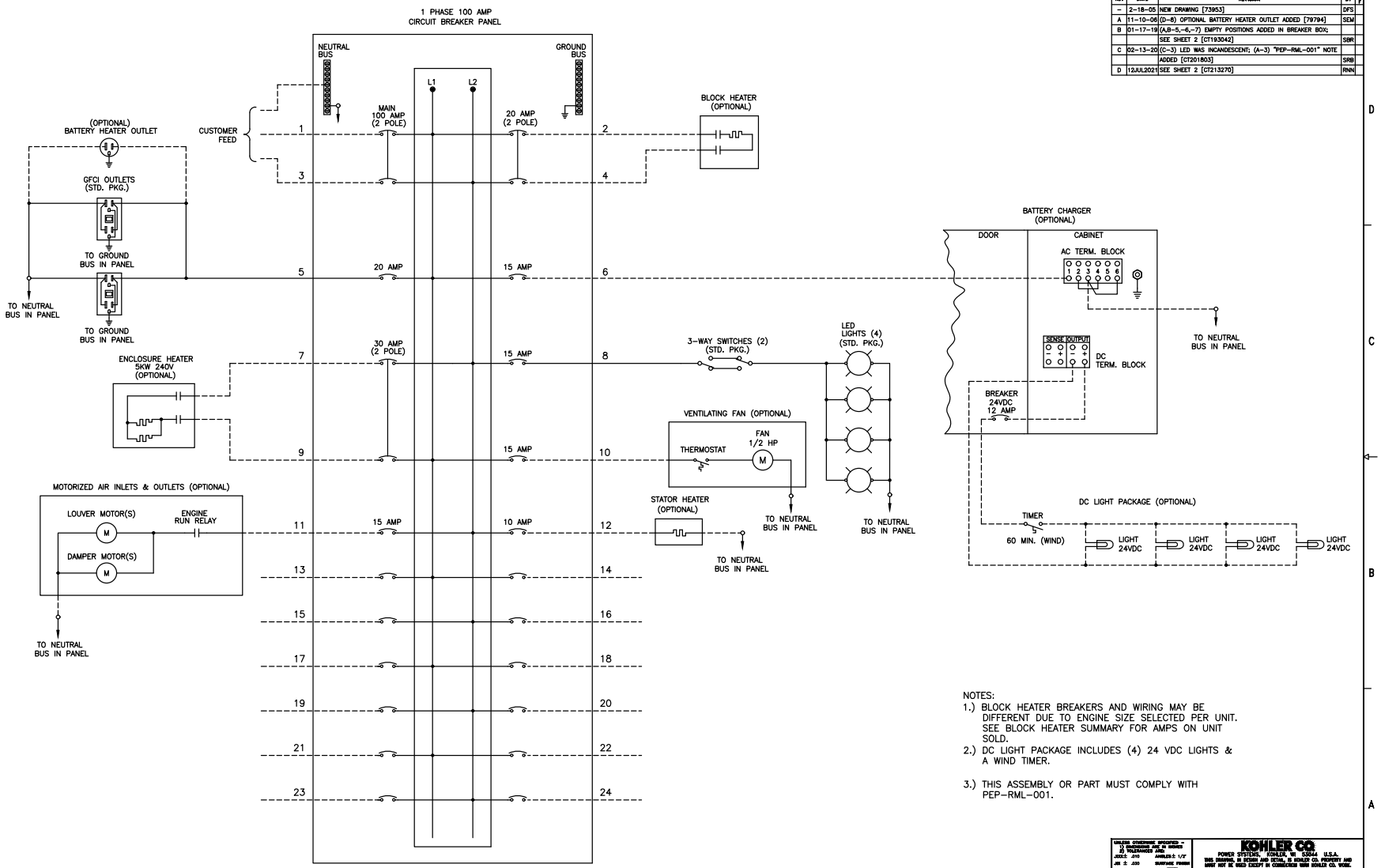
APM402 / DEC 3000 ACCESSORIES

APPROVALS		DATE
DRAWN	DFS	9-18-15
CHECKED	CRS	9-18-15
APPROVED	DFS	9-18-15

KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
THIS DRAWING IS 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: DIAGRAM, DEC3000/APM402 ACCY INTERCONNECTION
SCALE: /// DWG NO. SHEET 2-2
PLOTTED: DWG. NO. GM78246 D

REV	DATE	REVISION	BY
–	2-18-05	NEW DRAWING [73953]	DFS
A	11-10-06	(D-8) OPTIONAL BATTERY HEATER OUTLET ADDED [78794]	SEM
B	01-17-19	(A,B-5,-6,-7) EMPTY POSITIONS ADDED IN BREAKER BOX; SEE SHEET 2 [CT193042]	SBR
C	02-13-20	(C-3) LED WAS INCANDESCENT; (A-3) "PEP-RML-001" NOTE ADDED [CT201803]	SRB
D	12JUL2021	SEE SHEET 2 [CT213270]	RNN



NOTES:
1.) BLOCK HEATER BREAKERS AND WIRING MAY BE DIFFERENT DUE TO ENGINE SIZE SELECTED PER UNIT. SEE BLOCK HEATER SUMMARY FOR AMPS ON UNIT SOLD.
2.) DC LIGHT PACKAGE INCLUDES (4) 24 VDC LIGHTS & A WIND TIMER.

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

TPIK HOUSING
ELECTRICAL ACCESSORIES
1 PHASE

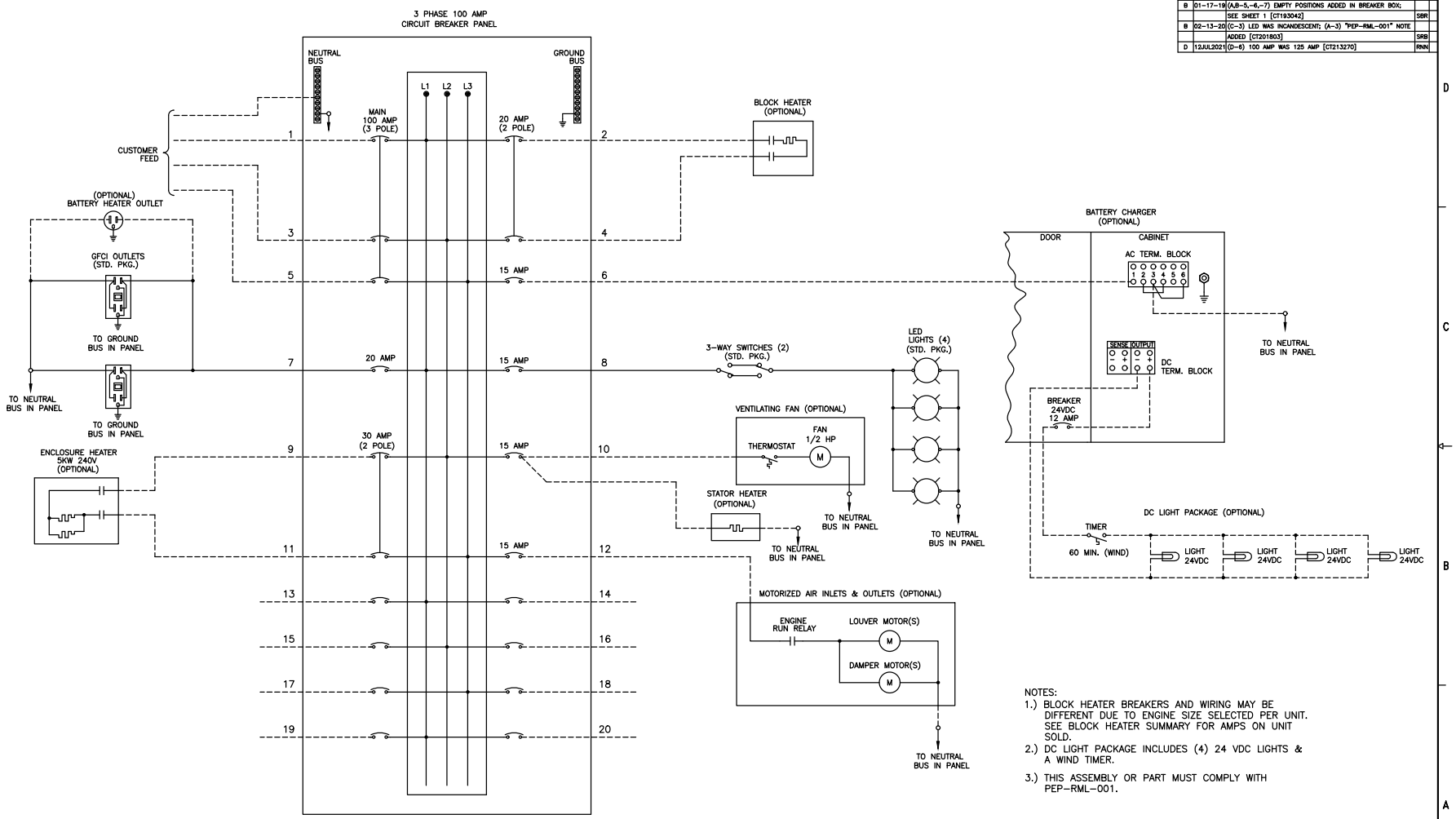
APPROVALS		DATE
DRAWN	DFS	2-18-05
CHECKED	TLK	2-21-05
APPROVED	EB	2-21-05

KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DIAGRAM, SCHEMATIC
TPIK ELECTRICAL PANEL

SCALE: / / / | DWG NO. ADV7035A.DWG | SHEET 1-2
PLOTTED | DWG NO. ADV-7035 | D

REV	DATE	REVISION	BY	N F
–	2-18-05	NEW DRAWING [73953]	DFS	
A	11-10-06	(C-8) OPTIONAL BATTERY HEATER OUTLET ADDED [79794]	SEM	
B	01-17-19	(A,B-5,-6,-7) EMPTY POSITIONS ADDED IN BREAKER BOX;		
		SEE SHEET 1 [CT193042]	SBR	
B	02-13-20	(C-3) LED WAS INCANDESCENT; (A-3) "PEP-RML-001" NOTE		
		ADDED [CT201803]	SRB	
D	12JUL2021	(D-6) 100 AMP WAS 125 AMP [CT213270]	RNN	



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

APPROVALS		DATE
DRAWN	DFS	2-18-05
CHECKED	TLK	2-21-05
ENGINEER	EB	2-21-05

KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

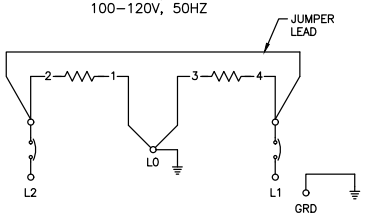
TITLE: DIAGRAM, SCHEMATIC
TPIK ELECTRICAL PANEL

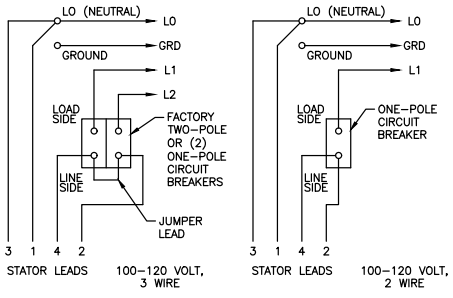
SCALE: /// DWG NO. ADV7035B.DWG SHEET 2-2
PLOTTED: DWG. NO. ADV-7035 D6

TPIK HOUSING
ELECTRICAL ACCESSORIES
3 PHASE

REV	DATE	REVISION	BY
AB	10-4-19	SEE SHEET 4 [CT199071]	DS
AC	02-25-20	SEE SHEET 5 [CT202143]	SBR

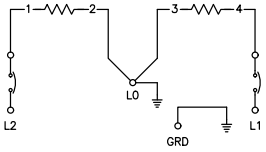
100–120V, 60HZ
100–120V, 50HZ

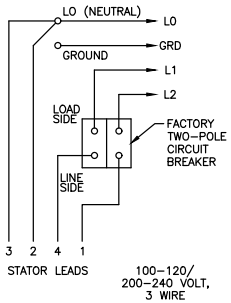




PB3, PB5 OR ADC2100 REGULATORS

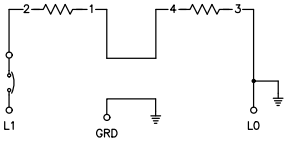
100–120/200–240V, 60HZ
100–120/200–240V, 50HZ

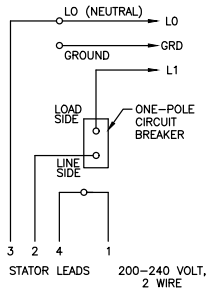




PB3, PB5, ADC2100, PERMANENT MAGNET (PM) AND WOUND FIELD (WF) REGULATORS

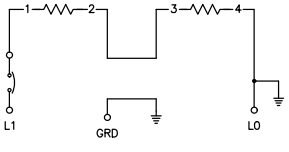
220–240V, 50HZ

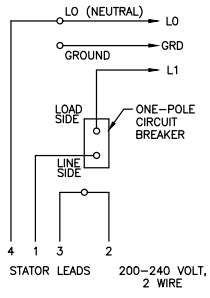




NON–ADC2100 REGULATORS

220–240V, 50HZ





NOTE:
FOR 230 VAC, 1PH, 50 HZ CONNECT LEADS #2 AND #3 PER GM38314 DRAWING

ADC2100 REGULATORS
ADC2/ADC2D REGULATORS
RDC2 REGULATORS

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

APPROVALS	DATE
DRAWN CRS	9-25-06
CHECKED TLK	9-25-06
APPROVED TLK	9-25-06

KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DIAGRAM, ALTERNATOR CONNECTIONS

SCALE: NONE | SHEET: 1–5

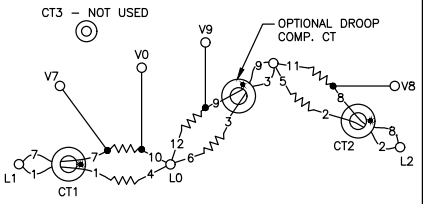
DRAWING NO. ADV–5875 | D

REV	DATE	REVISION	BY	M F
AB	10-4-19	SEE SHEET 4 [CT199071]	DS	
AC	02-25-20	SEE SHEET 5 [CT202143]	SBR	

12 LEAD ALTERNATOR, 3 WIRE, SINGLE PHASE

60 HZ: 100/200V
60 HZ: 120/240V
50 HZ: 100/200V
50 HZ: 110/220V

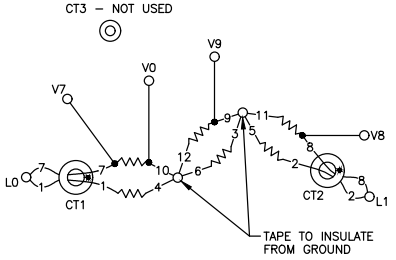
SOME SETS NOT RATED FOR SINGLE PHASE – SEE MANUALS



TB3 UP V7 LO METER SCALE LAMP JUMPER

12 LEAD ALTERNATOR, 3 WIRE, SINGLE PHASE

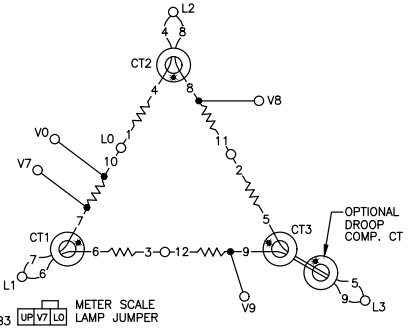
60 HZ: 240V
50 HZ: 220V
(MARINE ONLY)



TB3 UP V7 LO METER SCALE LAMP JUMPER

12 LEAD ALTERNATOR, 4 WIRE, DELTA

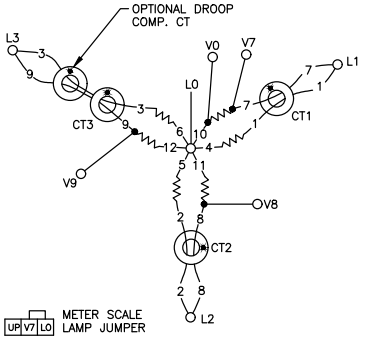
60 HZ: 120/240V
50 HZ: 110/220V



TB3 UP V7 LO METER SCALE LAMP JUMPER

12 LEAD ALTERNATOR, 4 WIRE, LOW WYE

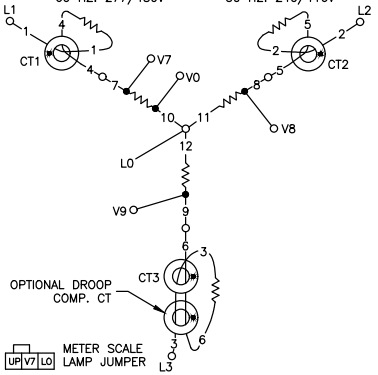
60 HZ: 120/208V
60 HZ: 127/220V
60 HZ: 139/240V
50 HZ: 110/190V
50 HZ: 115/200V
50 HZ: 120/208V



TB3 UP V7 LO METER SCALE LAMP JUMPER

12 LEAD ALTERNATOR, 4 WIRE, HI WYE

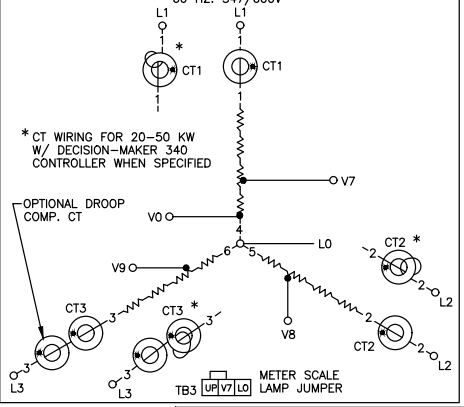
60 HZ: 220/380V
60 HZ: 240/416V
60 HZ: 277/480V
50 HZ: 220/380V
50 HZ: 230/400V
50 HZ: 240/416V



TB3 UP V7 LO METER SCALE LAMP JUMPER

6 LEAD ALTERNATOR, 4 WIRE, WYE

60 HZ: 347/600V



TB3 UP V7 LO METER SCALE LAMP JUMPER

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

3 PHASE
FRII ALTERNATORS,
20–60KW WOUND EXCITER FIELD ALTERNATORS,
AND 10–20KW SMALL STANDBY

UNLESS OTHERWISE SPECIFIED – 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XXX± .010 ANGLES± 1/2° .XX ± .030 SURFACE FINISH .X ± .060 MAX. FRACTIONS ±

APPROVALS		DATE
DRAWN	DFS	7-28-92
CHECKED	TLK	6-23-99
APPROVED	JMH	6-23-99

KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DIAGRAM, ALTERNATOR CONNECTIONS

SCALE: NONE | CAD NO. | SHEET 2-8

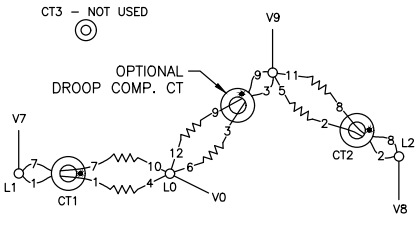
PLOTTED | DWG. NO. ADV-5875 | C

REV	DATE	REVISION	BY	M
AB	10-4-19	SEE SHEET 4 [CT199071]	DS	
AC	02-25-20	SEE SHEET 5 [CT202143]	SBR	

12 LEAD ALTERNATOR, 3 WIRE, SINGLE PHASE

60 HZ: 100/200V
60 HZ: 120/240V
50 HZ: 100/200V
50 HZ: 110/220V

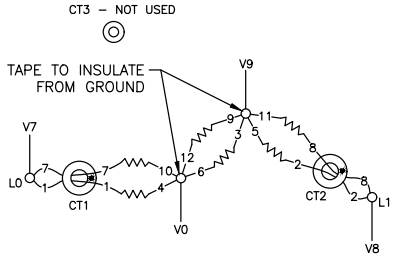
SOME SETS NOT RATED FOR SINGLE PHASE – SEE MANUALS



TB3 UP V7 LO METER SCALE LAMP JUMPER

12 LEAD ALTERNATOR, 3 WIRE, SINGLE PHASE

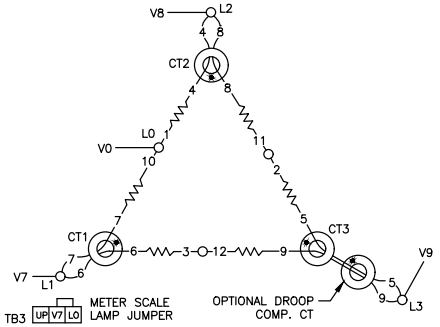
60 HZ: 240V
50 HZ: 220V
(MARINE ONLY)



TB3 UP V7 LO METER SCALE LAMP JUMPER

12 LEAD ALTERNATOR, 4 WIRE, DELTA

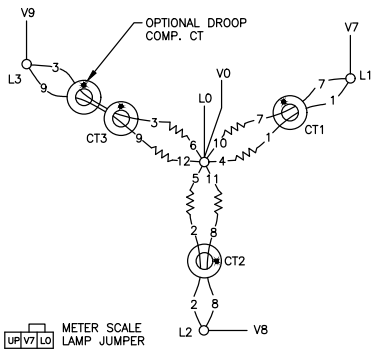
60 HZ: 120/240V
50 HZ: 110/220V



TB3 UP V7 LO METER SCALE LAMP JUMPER

12 LEAD ALTERNATOR, 4 WIRE, LOW WYE

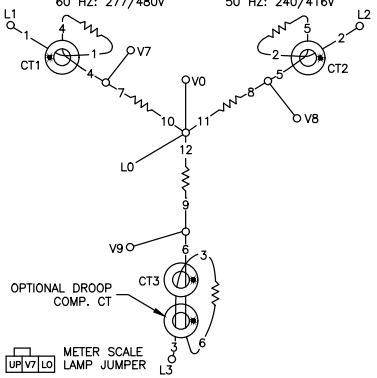
60 HZ: 120/208V
60 HZ: 127/220V
60 HZ: 139/240V
50 HZ: 110/190V
50 HZ: 115/200V
50 HZ: 120/208V



TB3 UP V7 LO METER SCALE LAMP JUMPER

12 LEAD ALTERNATOR, 4 WIRE, HI WYE

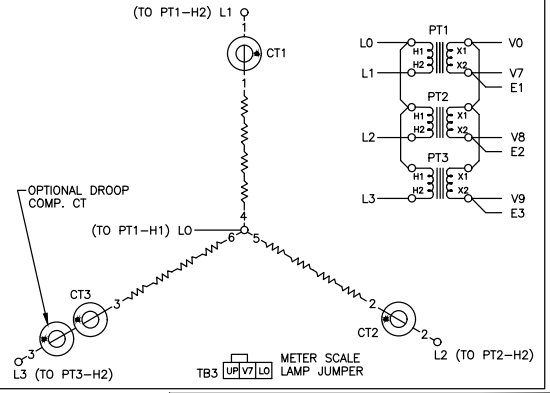
60 HZ: 220/380V
60 HZ: 240/416V
60 HZ: 277/480V
50 HZ: 220/380V
50 HZ: 230/400V
50 HZ: 240/416V



TB3 UP V7 LO METER SCALE LAMP JUMPER

6 LEAD ALTERNATOR, 4 WIRE, WYE

60 HZ: 347/600V



TB3 UP V7 LO METER SCALE LAMP JUMPER

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

3 PHASE
60 (I.M.S.)–300 KW WOUND EXCITER FIELD
600V FRII
ALTERNATORS

UNLESS OTHERWISE SPECIFIED – 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XXX ± .010 ANGLES ± 1/2° .XX ± .030 SURFACE FINISH .X ± .060 MAX. FRACTIONS ±

APPROVALS	DATE
DRAWN LDS	8-25-98
CHECKED TLK	6-23-99
APPROVED JMH	6-23-99

TITLE: DIAGRAM, ALTERNATOR CONNECTIONS

SCALE NONE | CAD NO. | SHEET 3-8

PLOTTED | DWG NO. ADV-5875 | C

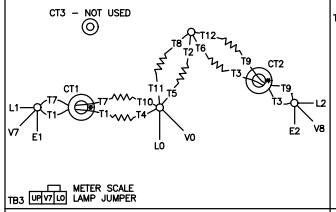
REV	DATE	REVISION	BY	CHK
AB	10-4-19	(D-6,7,8) 12 LEAD ALTERNATOR: 3 WIRE, SINGLE PHASE & 4 WIRE, DELTA RECONNECTION DIAGRAM UPDATED [CT199071]	DS	
AC	02-25-20	SEE SHEET 5 [CT202143]	SBR	

3 PHASE GENERATOR CONNECTIONS

12 LEAD ALTERNATOR, 3 WIRE, SINGLE PHASE

60 HZ: 100/200V
60 HZ: 120/240V
50 HZ: 100/200V
50 HZ: 110/220V

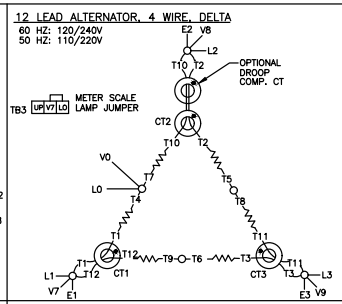
SOME SETS NOT RATED FOR SINGLE PHASE – SEE MANUALS



TB3 UP V7 LO METER SCALE LAMP JUMPER

12 LEAD ALTERNATOR, 4 WIRE, DELTA

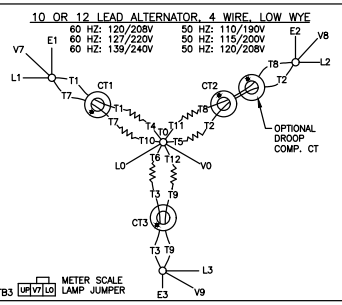
60 HZ: 120/240V
50 HZ: 110/220V



TB3 UP V7 LO METER SCALE LAMP JUMPER

10 OR 12 LEAD ALTERNATOR, 4 WIRE, LOW WYE

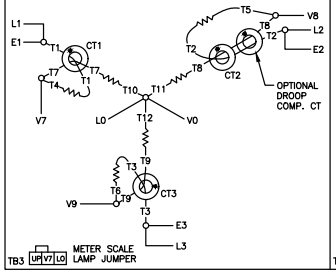
60 HZ: 120/208V 50 HZ: 110/190V
60 HZ: 127/220V 50 HZ: 115/200V
60 HZ: 139/240V 50 HZ: 120/208V



TB3 UP V7 LO METER SCALE LAMP JUMPER

10 OR 12 LEAD ALTERNATOR, 4 WIRE, HI WYE

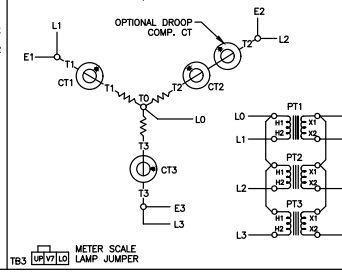
60 HZ: 220/380V 50 HZ: 220/380V
60 HZ: 240/416V 50 HZ: 230/400V
60 HZ: 277/480V 50 HZ: 240/416V



TB3 UP V7 LO METER SCALE LAMP JUMPER

4 LEAD ALTERNATOR, 4 WIRE, WYE

60 HZ: 220/380V 50 HZ: 220/380V
60 HZ: 240/416V 50 HZ: 230/400V
60 HZ: 277/480V 50 HZ: 240/416V
60 HZ: 347/600V



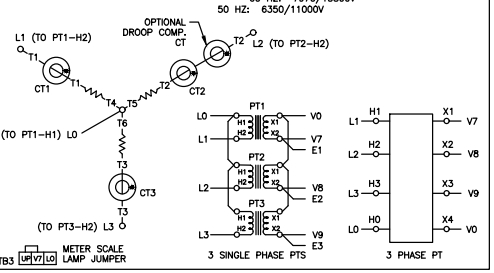
TB3 UP V7 LO METER SCALE LAMP JUMPER

6 LEAD ALTERNATOR, 4 WIRE, WYE (MARATHON)

60 HZ: 2400/4160V
50 HZ: 1905/3300V
50 HZ: 3810/6600V

6 LEAD ALTERNATOR, 4 WIRE, WYE (BAYLOR)

60 HZ: 4160/7200V
60 HZ: 7200/12470V
60 HZ: 7620/13200V
60 HZ: 7970/13800V
50 HZ: 6350/11000V



TB3 UP V7 LO METER SCALE LAMP JUMPER

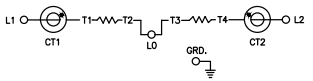
PHASE ROTATION

A	B	C
L1	L2	L3

SINGLE PHASE GENERATOR CONNECTIONS

4 LEAD ALTERNATOR, 3 WIRE, DEDICATED SINGLE PHASE

60 HZ: 120/240V
50 HZ: 110/220V



TB3 UP V7 LO METER SCALE LAMP JUMPER

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.

MARATHON ALTERNATORS

UNLESS OTHERWISE SPECIFIED – DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ±
DECIMALS .XX ±
.XXX ±
ANGLES ±
SURFACE FINISH

APPROVALS		DATE
DRAWN	DFS	5-27-04
CHECKED	JS	5-27-04
APPROVED	JS	5-27-04

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POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
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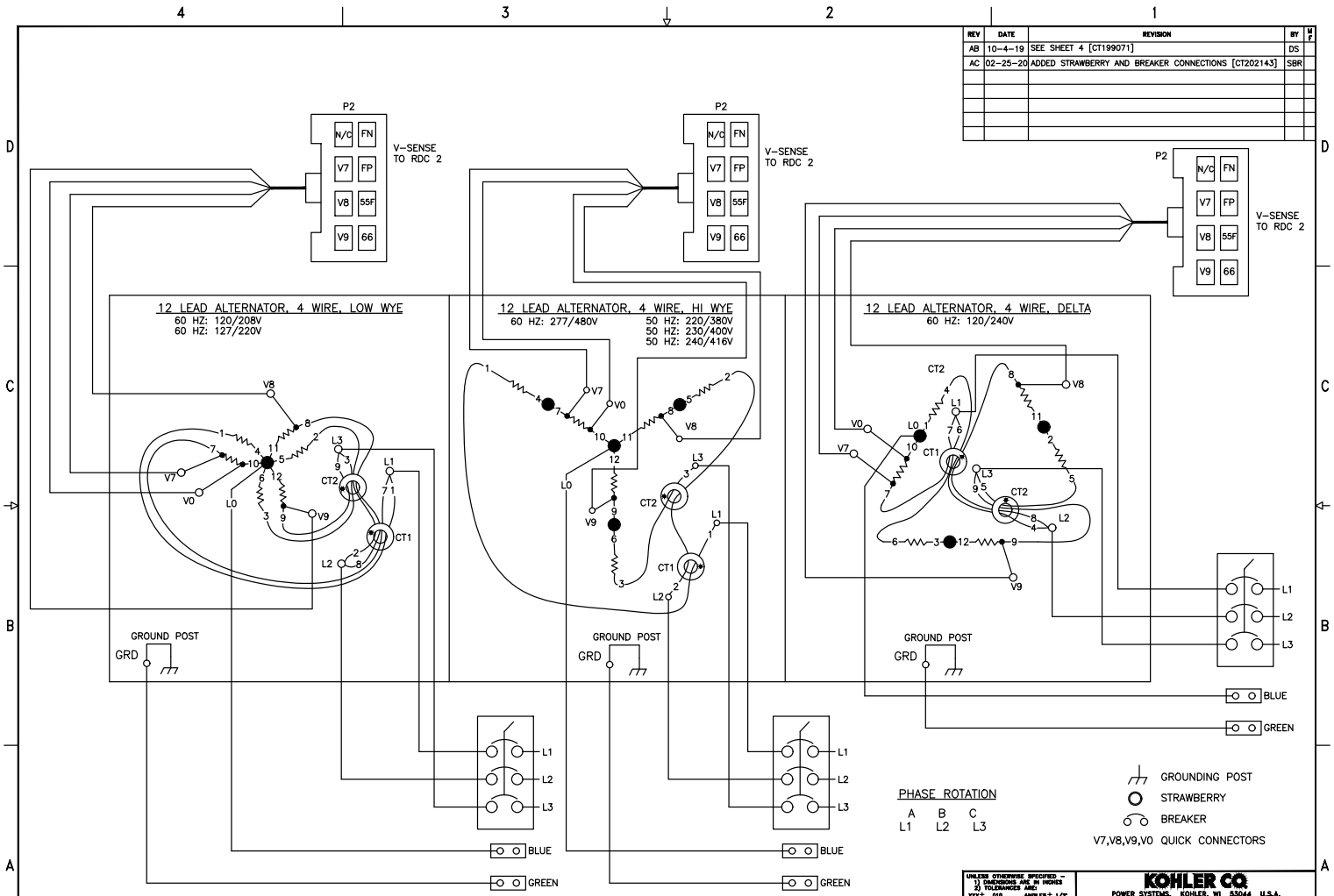
TITLE: DIAGRAM, ALTERNATOR CONNECTIONS

SCALE: NONE | SHEET: 4–8

DRAWING NO.: ADV-5875 | D



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

NOTES:

CURRENT TRANSFORMER DOT OR "H1" TOWARD GENERATOR.
SOME STATORS HAVE DUAL LEADS. ALWAYS CONNECT LEADS OF THE SAME LABEL TOGETHER.

3 PHASE
RDC2 CONTROLLER
w/2 CURRENT TRANSFORMERS

UNLESS OTHERWISE SPECIFIED – 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XXX± .010 ANGLES± 1/2° .XX ± .030 SURFACE FINISH .X ± .060 MAX. FRACTIONS ±

APPROVALS	DATE
DRAWN CRS	5-21-12
CHECKED PH	5-21-12
APPROVED PH	5-21-12

TITLE: DIAGRAM, ALTERNATOR CONNECTIONS

SCALE: NONE | CAD NO. | SHEET 5-8

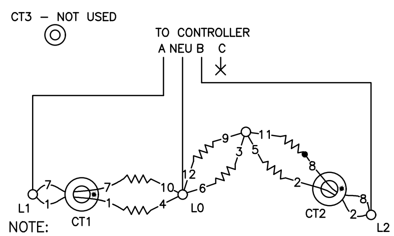
PLOTTED | DWG. NO. ADV-5875 | C

REV	DATE	REVISION	BY	MF
AB	10-4-19	SEE SHEET 4 [CT199071]	DS	
AC	02-25-20	SEE SHEET 5 [CT202143]	SBR	

12 LEAD ALTERNATOR, 3 WIRE, SINGLE PHASE

60 HZ: 100/200V
60 HZ: 120/240V
50 HZ: 100/200V
50 HZ: 110/220V

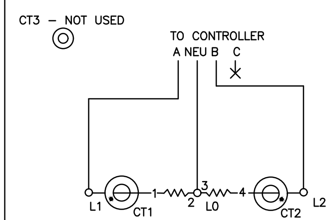
SOME SETS NOT RATED FOR
SINGLE PHASE – SEE MANUALS



NOTE:
NEU MUST BE CONNECTED TO L0, EVEN IF
L0 IS NOT CONNECTED TO THE LOAD.

4 LEAD ALTERNATOR, 3 WIRE, SINGLE PHASE

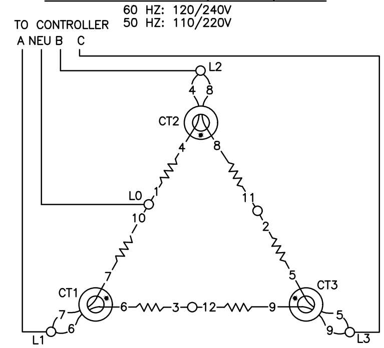
60 HZ: 100–120/200–240V
50 HZ: 100–120/200–240V



NOTE:
NEU MUST BE CONNECTED TO L0, EVEN IF
L0 IS NOT CONNECTED TO THE LOAD.

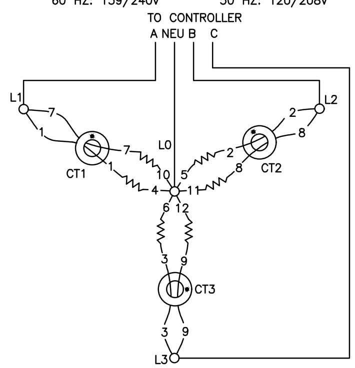
12 LEAD ALTERNATOR, 4 WIRE, DELTA

60 HZ: 120/240V
50 HZ: 110/220V



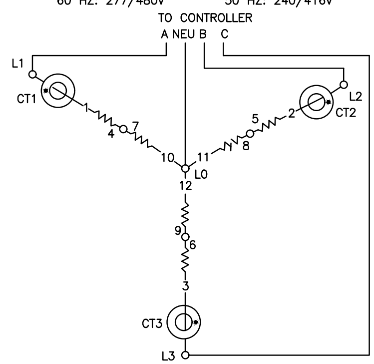
12 LEAD ALTERNATOR, 4 WIRE, LOW WYE

60 HZ: 120/208V 50 HZ: 110/190V
60 HZ: 127/220V 50 HZ: 115/200V
60 HZ: 139/240V 50 HZ: 120/208V



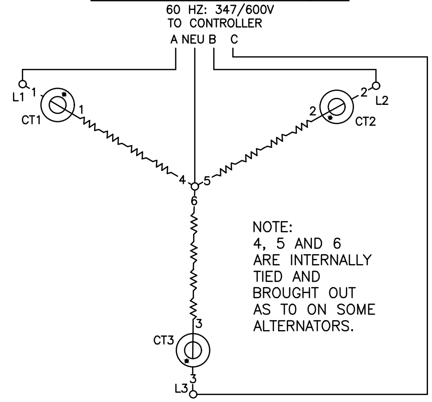
12 LEAD ALTERNATOR, 4 WIRE, HI WYE

60 HZ: 220/380V 50 HZ: 220/380V
60 HZ: 240/416V 50 HZ: 230/400V
60 HZ: 277/480V 50 HZ: 240/416V



6 LEAD ALTERNATOR, 4 WIRE, WYE

60 HZ: 347/600V



NOTE:
4, 5 AND 6
ARE INTERNALLY
TIED AND
BROUGHT OUT
AS TO ON SOME
ALTERNATORS.

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

APM603 CONTROLLER
DEC3500 CONTROLLER

UNLESS OTHERWISE SPECIFIED –
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES ARE:
.XXX ± .010 ANGLES ± 1/2°
.XX ± .030 SURFACE FINISH
.X ± .060 MAX.
FRACTIONS ±

APPROVALS		DATE
DRAWN	PRH	5-27-04
CHECKED	IF	5-27-04
APPROVED	IF	5-27-04

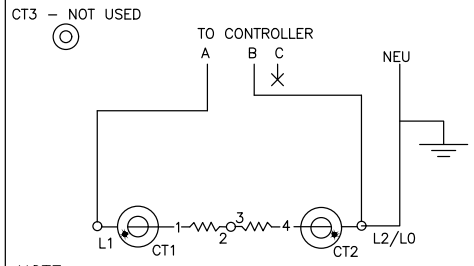
KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DIAGRAM, ALTERNATOR CONNECTIONS
SCALE: NONE CAD NO. SHEET: 6-8
PLOTTED DWG. NO.: ADV-5875 D

REV	DATE	REVISION	BY
AB	10-4-19	SEE SHEET 4 [CT199071]	DS
AC	02-25-20	SEE SHEET 5 [CT202143]	SBR

4 LEAD ALTERNATOR, 2 WIRE, SINGLE PHASE

60 HZ: 200–240V
50 HZ: 200–240V



NOTE:
NEU MUST BE CONNECTED TO L2/L0, EVEN IF LO IS NOT CONNECTED TO THE LOAD.

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

APM603 CONTROLLER
DEC3500 CONTROLLER

APPROVALS	DATE
PRH	5-27-04
IF	5-27-04
IF	5-27-04

KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

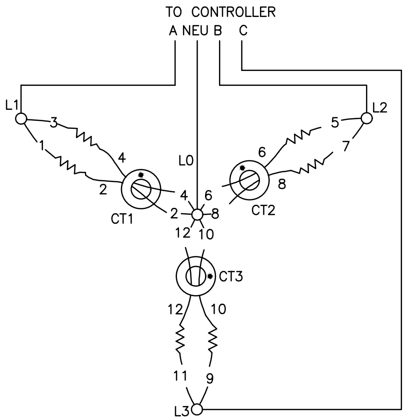
TITLE: DIAGRAM, ALTERNATOR CONNECTIONS

SCALE: NONE | DWG NO. ADV-5875 | SHEET 7-8 | REV D

REV	DATE	REVISION	BY	MF
AB	10-4-19	SEE SHEET 4 [CT199071]	DS	
AC	02-25-20	SEE SHEET 5 [CT202143]	SBR	

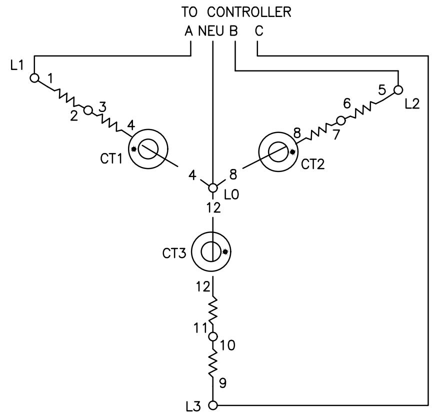
12 LEAD ALTERNATOR, 4 WIRE, LOW WYE, PARALLEL STAR

60 HZ: 120/208V — 50 HZ: 110/190V
60 HZ: 127/220V — 50 HZ: 115/200V
60 HZ: 139/240V — 50 HZ: 120/208V



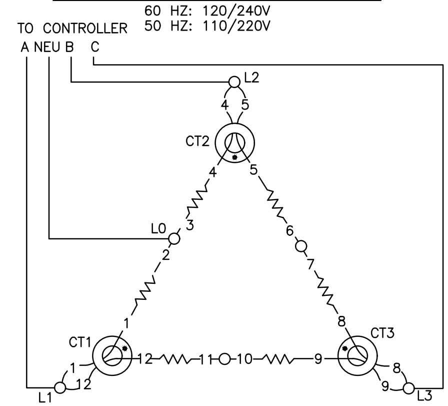
12 LEAD ALTERNATOR, 4 WIRE, HI WYE, SERIES STAR

60 HZ: 220/380V — 50 HZ: 220/380V
60 HZ: 240/416V — 50 HZ: 230/400V
60 HZ: 277/480V — 50 HZ: 240/416V



12 LEAD ALTERNATOR, 4 WIRE, DELTA

60 HZ: 120/240V
50 HZ: 110/220V



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.

APM802 CONTROLLER
DEC3500 CONTROLLER
MECC ALTE ALTERNATOR

UNLESS OTHERWISE SPECIFIED –
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES ARE:
.XXX ± .010 ANGLES ± 1/2°
.XX ± .030 SURFACE FINISH
.X ± .060 √ MAX.
FRACTIONS ±

APPROVALS		DATE
DRAWN	PRH	5-27-04
CHECKED	IF	5-27-04
APPROVED	IF	5-27-04

KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DIAGRAM, ALTERNATOR CONNECTIONS

SCALE: NONE — CAD NO.: — SHEET: 8-8
PLOTTED: — DWG. NO.: ADV-5875 — D

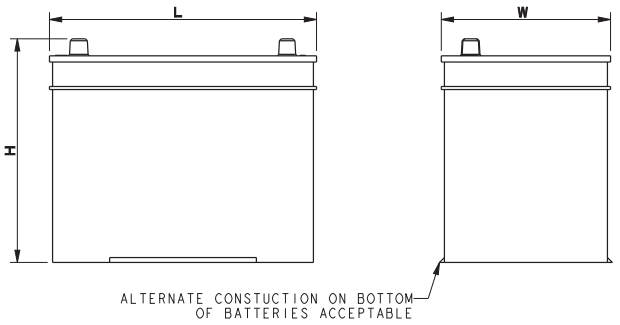
KOHLER®

Miscellaneous

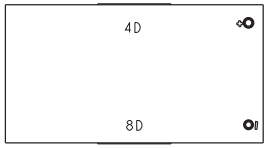
PART NO.	REV		SAE DIMENSION L	SAE DIMENSION W	SAE DIMENSION H	VOLTAGE	COLD CRANKING AMPS AT 0°F MINIMUM	RESERVE CAP MINUTES AT 80°F MINIMUM	POST LAYOUT /STYLE	CHARGE TYPE	BATTERY CONSTRUCTION	BCI GROUP	INTERNAL RESISTANCE (MΩ)
~~244578~~	~~AF~~		~~333.5 [13.13]~~	~~181.1 [7.13]~~	~~238.5 [9.39]~~	~~6~~	~~700~~	~~275~~	~~B/1~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~244750~~	~~AD~~		~~342.9 [13.50]~~	~~173.2 [6.82]~~	~~238.3 [9.38]~~	~~12~~	~~600~~	~~165~~	~~D/1~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~239102~~	~~AK~~		~~198.1 [7.80]~~	~~133.4 [5.25]~~	~~187.5 [7.38]~~	~~12~~	~~200~~	~~32~~	~~D/2~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~289515~~	~~AC~~		~~539.8 [21.25]~~	~~282.7 [11.13]~~	~~276.4 [10.88]~~	~~12~~	~~1150~~	~~450~~	~~A/1~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~291918~~	~~AC~~		~~333.2 [13.12]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~700~~	~~150~~	~~C/3~~	~~WET~~	~~SEE NOTE 1~~	~~~~	-
~~299981~~	~~AD~~		~~333.2 [13.12]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~700~~	~~150~~	~~C/3~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~254425~~	~~AD~~		~~333.2 [13.12]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~1000~~	~~200~~	~~C/3~~	~~WET~~	~~SEE NOTE 1~~	~~~~	-
~~299982~~	~~AC~~		~~333.2 [13.12]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~950~~	~~200~~	~~C/3~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~324367~~	~~BM~~		~~208.0 [8.19]~~	~~179.4 [7.06]~~	~~196.9 [7.75]~~	~~12~~	~~675~~	~~90~~	~~C/1~~	~~WET~~	~~SEE NOTE 1~~	~~~~	-
~~324368~~	~~AC~~		~~206.5 [8.13]~~	~~166.9 [6.57]~~	~~205.2 [8.08]~~	~~12~~	~~675~~	~~90~~	~~C/1~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~324586~~	~~BU~~	☐	~~330.2 [13.00]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~950~~	~~185~~	~~C/3~~	~~WET~~	~~SEE NOTE 2~~	~~31~~	-
324587	BT		330.2 [13.00]	173.0 [6.81]	239.8 [9.44]	12	950	200	C/3	DRY	SEE NOTE 2	31	-
~~256984~~	~~BT~~	☐	~~273.0 [10.75]~~	~~173.0 [6.81]~~	~~228.6 [9.00]~~	~~12~~	~~650~~	~~120~~	~~D/1~~	~~WET~~	~~SEE NOTE 1~~	~~24~~	-
225289	BR		273.0 [10.75]	173.0 [6.81]	228.6 [9.00]	12	650	130	D/1	DRY	SEE NOTE 1	24	-
~~345197~~	~~BS~~		~~273.0 [10.75]~~	~~173.0 [6.81]~~	~~228.6 [9.00]~~	~~12~~	~~510~~	~~80~~	~~E/1~~	~~WET~~	~~SEE NOTE 2~~	~~24F~~	-
354147	BT		330.2 [13.00]	173.0 [6.81]	239.8 [9.44]	12	700	170	C/3	WET	SEE NOTE 2	31	-
~~354148~~	~~BU~~		~~330.2 [13.00]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~700~~	~~150~~	~~C/3~~	~~DRY~~	~~SEE NOTE 2~~	~~31~~	-
345309	BR		219.2 [8.63]	153.9 [6.06]	212.9 [8.38]	12	525	-	E/1	WET	SEE NOTE 1	55	-
~~GM22348~~	~~AC~~		~~525.3 [20.68]~~	~~220.5 [8.68]~~	~~251.0 [9.88]~~	~~12~~	~~1000~~	~~320~~	~~A/1~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
GM22349	BR		527.1 [20.75]	282.4 [11.12]	276.4 [10.88]	12	1150	400	A/1	DRY	SEE NOTE 1	8D	-
~~GM34399~~	~~BT~~	☐	~~527.1 [20.75]~~	~~282.4 [11.12]~~	~~276.4 [10.88]~~	~~12~~	~~1400~~	~~430~~	~~A/1~~	~~WET~~	~~SEE NOTE 1~~	~~8D~~	-
~~GM48784~~	~~BT~~	☐	~~208.0 [8.19]~~	~~173.0 [6.81]~~	~~196.9 [7.75]~~	~~12~~	~~525~~	~~70~~	~~D/1~~	~~WET~~		~~26~~	-
~~GM75512~~	~~BT~~	☐	~~238.0 [9.38]~~	~~129.0 [5.06]~~	~~223.0 [8.81]~~	~~12~~	~~500~~	~~85~~	~~D/1~~	~~WET~~	-	~~51~~	-
10702000701	A		527.1 [20.75]	216.0 [8.50]	258.0 [10.16]	12	1050	290	A/1	WET	-	4D	-
10702001800	A		527.1 [20.75]	216.0 [8.50]	254.0 [10.0]	12	1110	380	A/1	AGM	SEE NOTE 3	4D	-
GM106681	-	☐	260.0 [10.25]	171.0 [6.75]	208.0 [8.19]	12	690	105	D/1	WET	-	34	4.29
GM106375	-	☐	330.2 [13.00]	171.0 [6.75]	239.8 [9.44]	12	925	180	C/3	WET	SEE NOTE 2	31	3.31
GM106373	-	☐	260.0 [10.25]	171.0 [6.75]	229.0 [9.00]	12	650	95	D/1	WET	SEE NOTE 1	24	4.71
GM106377	-	☐	527.1 [20.75]	279.0 [11.0]	254.0 [10.00]	12	1400	380	A/1	WET	SEE NOTE 1	80	2.53
GM106369	-	☐	208.0 [8.19]	172.0 [6.77]	200.0 [7.87]	12	500	95	D/1	WET	-	26	5.85
GM106374	-	☐	237.0 [9.32]	125.0 [4.94]	220.0 [8.66]	12	500	70	D/1	WET	-	51	5.00

NOTE: DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

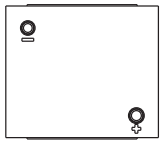
☐ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION



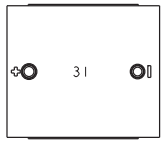
LAYOUT A



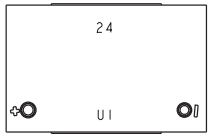
LAYOUT B



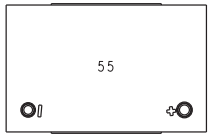
LAYOUT C



LAYOUT D



LAYOUT E



REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
BY	5-6-16	(C-6) 10702001800: COLD CRANKING AMPS 1110	
		WAS 1100 [CTI46053]	BGW
CA	4-15-19	(C-8) GM106681, GM106375, GM106373,	
		GM106377, GM106369 & GM106374 ADDED; (D-3)	
		INTERNAL RESISTANCE (MΩ) COLUMN ADDED;	
		(D-8) 324586 & 256984 VOIDED; (C-8)	
		GM34399, GM48784, GM75512	
		VOIDED;(A,B-8,7,6,5,4) VIEWS & NOTES MOVED	
		TO SHEET 2, SHEET 2 ADDED [CTI94425]	DS

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0°30' SURFACE FINISH 63 MAX. THIRD ANGLE PROJECTION

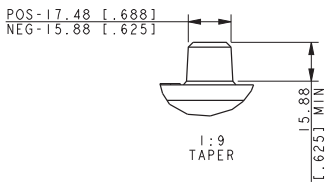
APPROVALS		DATE
DRAWN	SLR	4-15-19
CHECKED	EB	4-15-19
APPROVED	RAD	4-15-19

TITLE: DWG, BATTERY, DRY CHARGED

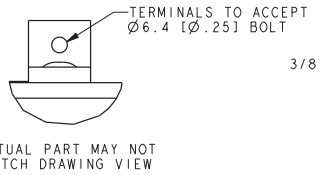
SCALE 0.30 | CAD NO. | SHEET 1 of 2

DWG NO. 244578-CMP | D

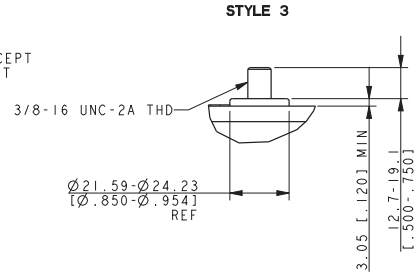
STYLE 1



STYLE 2



STYLE 3



NOTES:
1) STYLE 3 CAN BE CONVERTED TO STYLE 1 BY INSTALLATION OF 254427 STUD CONVERTION KIT.
2) BATTERIES USING ``STYLE 3'' STUDS MUST HAVE EITHER THE ``POS'' OR ``NEG'' STUD CLEARLY IDENTIFIED.
3) STYLE 3 TERMINAL TORQUE 10 Nm [15 FT LBS].
4) "POS" & "NEG" IDENTIFICATION MUST BE MARKED AS SHOWN ON THE PART LAYOUT AND WITHIN 5mm OF THE STUD.

NOTES: (APPLIES TO ALL BATTERIES)
SAE J537 DIMENSIONS ARE MAX ALLOWABLE DIMENSIONS.
COLD CRANKING AMPS ARE MINIMUM ACCEPTABLE VALUES.
HOLD DOWN DESIGN IN COMPLIANCE WITH SAE STANDARDS.
BATTERY WARNING LABEL TO BE LOCATED ON TAP OF BATTERY. (BETWEEN TERMINALS ON LAYOUT D)
MANUFACTURER MUST PROVIDE A CERTIFICATE CONTAINING MFGRS. NAME, MFGRS. PART NUMBER,
AND KOHLER PART NUMBER CERTIFYING THAT THE BATTERY WAS BUIT TO INDUSTRY STANDARDS.
SEE N.F.P.A.-110 FOR SPECIFIC DETAILS. CERTIFICATE REQUIRED ONLY ONCE PER BATTERY PART NUMBER.
MAY NOT BE CALCIUM-CALCIUTYPE.

NOTES: (CHARGE TYPE)
ALL DRY CHARGED BATTERIES MUST BE SUPPLIED WITH ACTIVATION INSTRUCTIONS ADHERED TO BATTERY
AND LOOSE. BATTERY MUST ALSO BE IDENTIFED ON TOP AS: ``DRY CHARGED, MUST ADD BATTERY GRADE
ELECTROLYTE, SEE ACTIVATION INSTRUCTIONS''.
BATTERIES SHOULD BE RECEIVED APPROPRIATELY MARKED AS DRYCHARGED OR WET STORAGE.
ONE OF THE BATTERY POSTS MUST BE SHIELDED WHEN BATTERIES ARE WET CHARGED.
BATTERIES WHEN SHIPPED DRY - DO NOT REQUIRE POST PROTECTORS.

NOTES: (BATTERY CONSTRUCTION)
1) MUST BE LEAD-CALCIUM HYBRID OR LEAD-ANTIMONY TYPE.
2) LEAD-CALCIUM GRID.
3) ABSORBED GLASS MAT. (AGM)

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
CA	4-15-19	NEW DRAWING; SEE SHEET 1 [CT194425]	DS

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES:
X.XX ± 0.25
X.X ± 1.0
X ± 1.3
ANGLES ± 0°30'
SURFACE FINISH 63 MAX.
THIRD-ANGLE PROJECTION

APPROVALS		DATE
DRAWN	DS	4-15-19
CHECKED	GFR	4-15-19
APPROVED	AMM	4-15-19

TITLE
DWG, BATTERY, DRY CHARGED

SCALE 0.30 | CAD NO. | SHEET 2 of 2
DWG NO. **244578-CMP** | **D**

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 SJTOOW -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 INPACTS. 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 TEMPERATUARE COMPENSATION SUBSYSTEM WHEN INSTALLED
- VOLTAGE OUTPUT: INDICATES THE STATE OF THE BATTERY AND CERTAIN FAULT CONDITIONS.

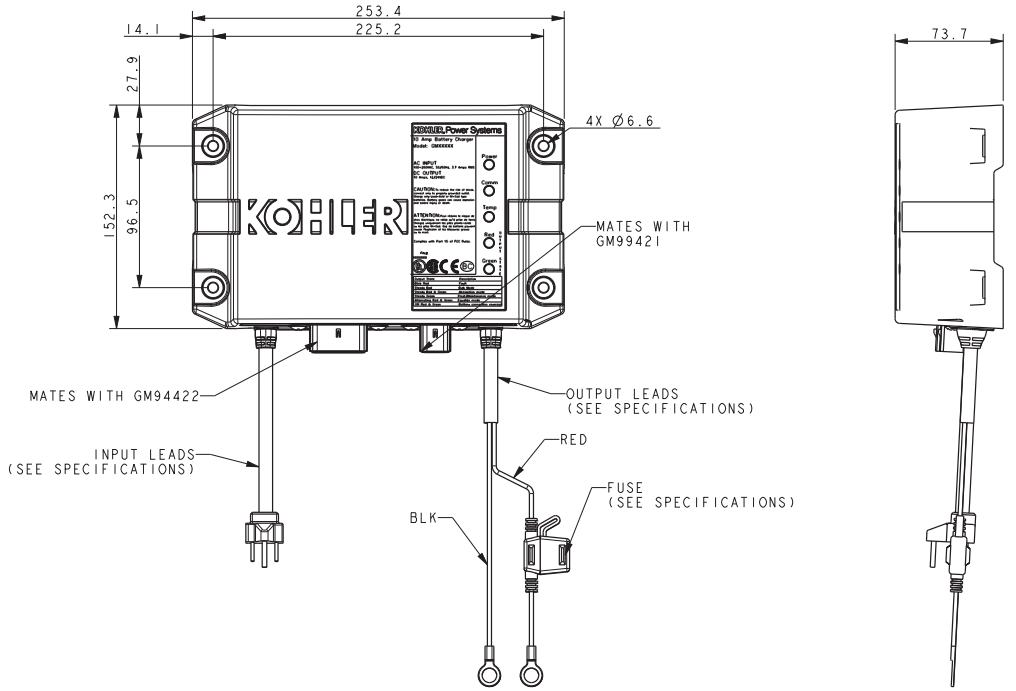
DOCUMENTATION:
THERE SHALL BE AN INSTALLATION / OPERATIONAL MANUAL SUPPLIED WITH EACH CHARGER. PER KOHLER SUPPLIED ARTWORK.

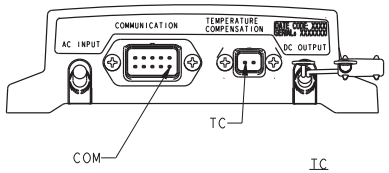
CERTIFICATIONS (US AND CANADA):
- UL1236
- CSA - C22.2 NO 107.2-01
- FCC- TITLE 47, PART 15 CLASS A
- CE
- EN 61000-6-2
- CEC AND DOE
- NFPA-110 LEVEL1 (WHEN SUPPORTED WITH APPLICABLE KOHLER CONTROLLER)
- IBC

PRODUCT LABELING:
THE LABEL ATTACHED TO THE CHARGER SHALL HAVE THE FOLLOWING INFORMATION:
- UL LISTING
- KOHLER PART NUMBER
- DESCRIPTION OF ALL INDICATOR
- OUTPUT CURRENT AND VOLTAGE
- INPUT VOLTAGE AND FREQUENCY

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

WARRANTY:
2 YEAR FROM DATE OF PURCHASE FROM MANUFACTURE.





COM
PIN 1 N/C
2 ID SEL 1
3 ID SEL 2
4 N/C
5 CAN-H
6 N/C
7 ID SEL 1 RTN
8 ID SEL 2 RTN
9 CAN-GND
10 CAN-L

TC
PIN 1 TC SENSOR W1
2 TC SENSOR W2

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	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

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X .XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30'
SURFACE FINISH ✓ MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	SAM	9-22-14
CHECKED	SAM	9-22-14
APPROVED	AGT	9-22-14

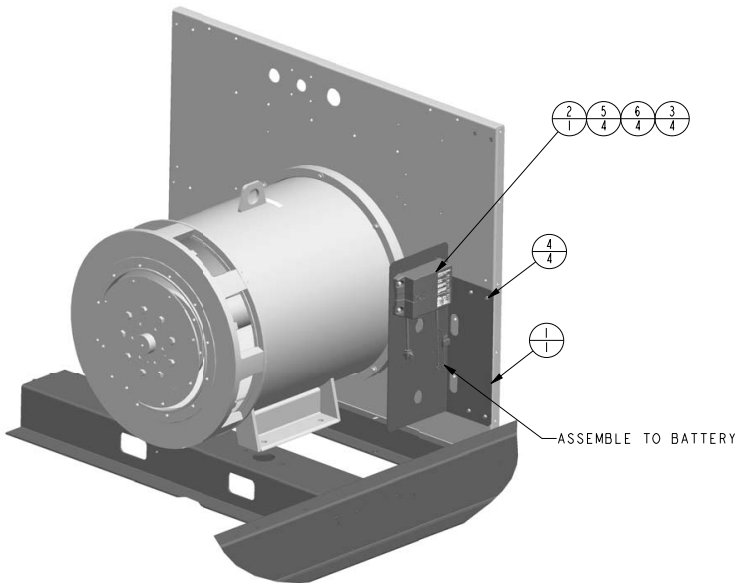
KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

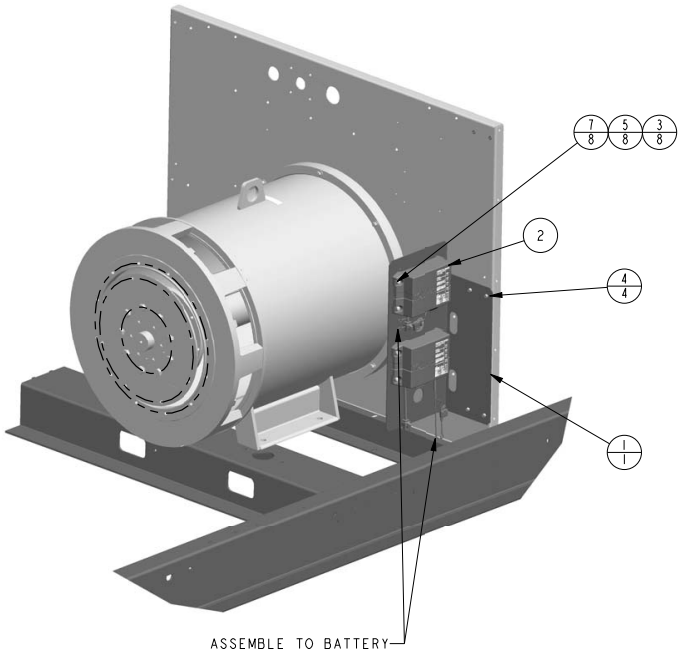
TITLE
CHARGER, BATTERY 10 AMP

SCALE 0.50 | CAD NO. | SHEET 1 of 1
DWG NO. GM87448 | D

KIT NO.	ITEM	PART NO	QTY	DESCRIPTION
GM94922-KA1				ASSY BATTERY CHARGER 12/24V-10A
	1	GM78810	1	BRACKET, BATTERY CHARGER
	2	GM87448	1	CHARGER, BATTERY
	3	M125A-06-80	4	WASHER, PLAIN 6.4 ID X 12.0 OD
	4	M6921-06016-60	4	SCREW, HEX FLNGE M6X16MM FLLY THRD JS500
	5	M6923-06-80	4	NUT, HEX 6MM
	6	M933-06030-60	4	SCREW, HEX CAP
GM94922-KA2				BATTERY CHARGER, FLOAT, 12/24V-10A
	1	GM78810	1	BRACKET, BATTERY CHARGER
	2	GM87448	2	CHARGER, BATTERY
	3	M125A-06-80	8	WASHER, PLAIN 6.4 ID X 12.0 OD
	4	M6921-06016-60	4	SCREW, HEX FLNGE M6X16MM FLLY THRD JS500
	5	M6923-06-80	8	NUT, HEX 6MM
	7	M933-06030-60	8	SCREW, HEX CAP
	8	GM95050	1	HARNESS, Y

THIS IS AN AUTOMATED TABLE. ALL UPDATES MUST BE MADE IN THE ASSEMBLY.





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
-	10-1-14	NEW DRAWING [CT95303]	SAM

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30' SURFACE FINISH MAX.

THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	SAM	10-1-14
CHECKED	SAM	10-1-14
APPROVED	AGT	10-1-14

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE
DWG, ASSY BATTERY CHARGER

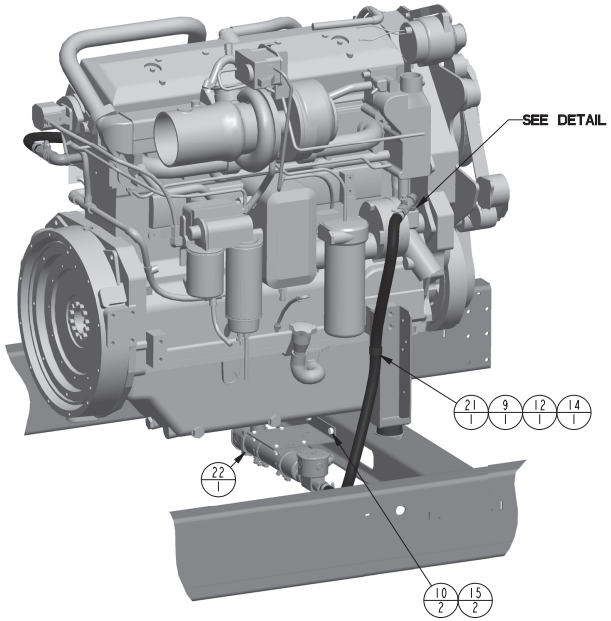
SCALE 0.12 | CAD NO. | SHEET 1 of 1

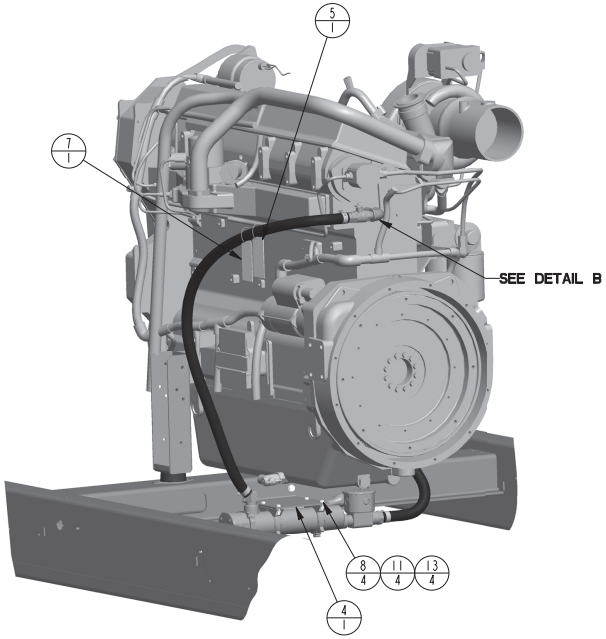
DWG NO. GM94922 | D

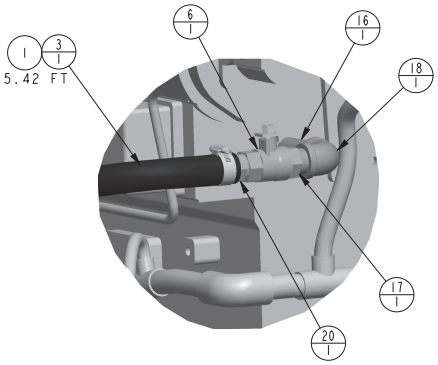
BATTERY CHARGER KIT

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

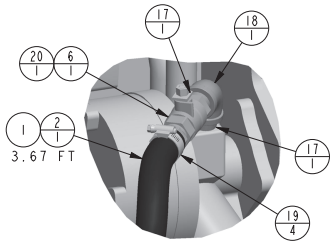
THIS IS AN AUTOMATED TABLE. ALL UPDATES MUST BE MADE IN THE ASSEMBLY. ITEMS 1-3 & 26 ARE FIXED. ITEM 1 IS A MANUAL BALLOONS.







DETAIL B
SCALE 0.40



DETAIL A
SCALE 0.40

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

BLOCK HEATER KITS
350-500 MODELS
JOHN DEERE

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	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]	DJV

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30' SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

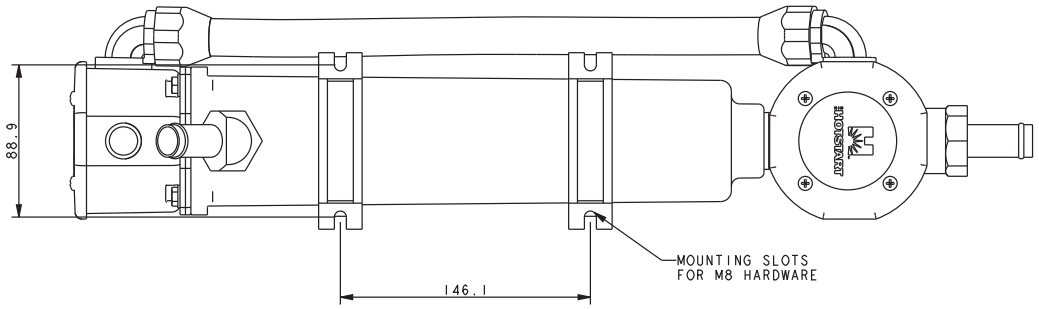
APPROVALS		DATE
DRAWN	DJV	8-10-10
CHECKED	CWF	8-10-10
APPROVED	JDZ	8-10-10

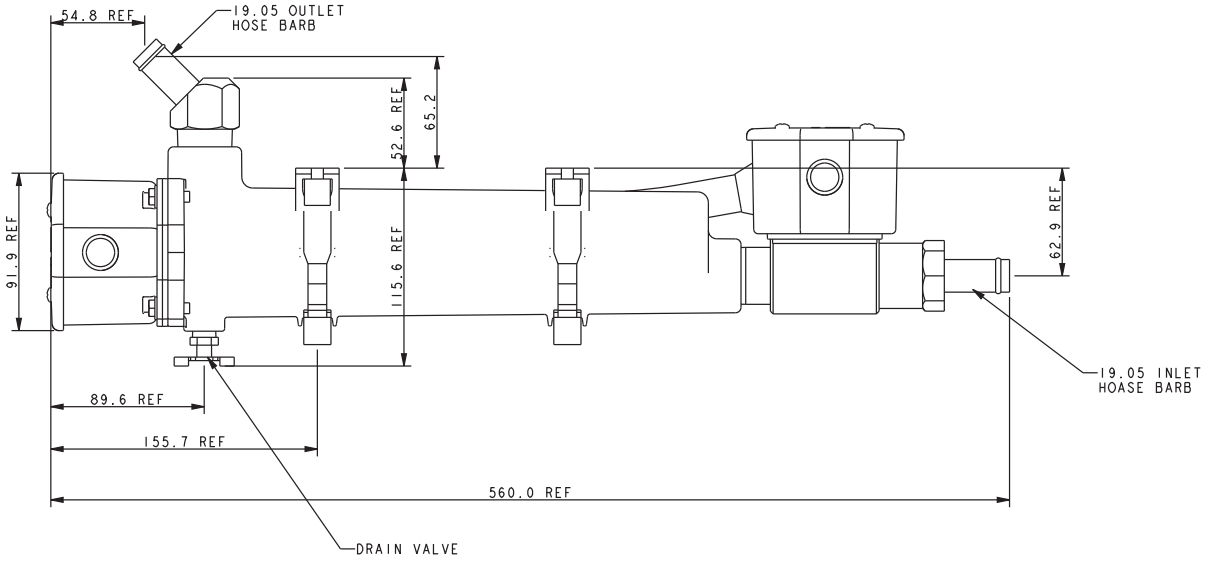
TITLE
DWG, ASSY BLOCK HEATER

SCALE 0.14 | CAD NO. | SHEET 1 of 1

DWG NO. **GM75809** | **D**

PART NO	REV	WATTS	VOLTS	AMPS	TEMP RANGE	REPLACEMENT ELEMENT
GM76113	A	2500	90/120	15.6/20.8	27/38° C [80/100° F]	GM29477
GM76114	A		190/208	11.0/12.0		GM29478
GM76115	A		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
-	6-9-10	NEW DRAWING [89933-1]	SAM
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

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30'
SURFACE FINISH 3.2 MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	SAM	6-9-10
CHECKED	JMS	6-9-10
APPROVED	WRD	6-9-10

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

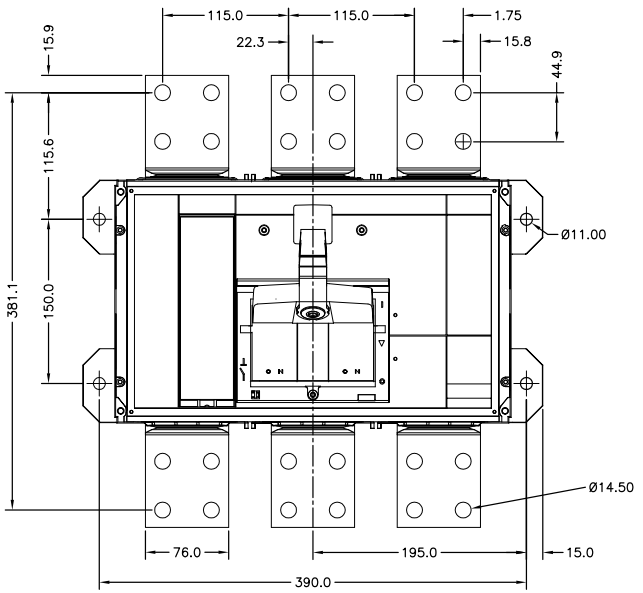
TITLE
HEATER, BLOCK

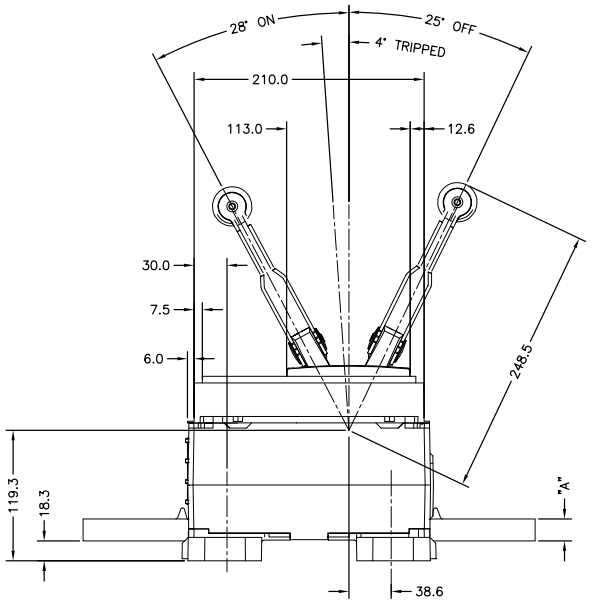
SCALE 0.70 | CAD NO. | SHEET 1 of 1
DWG NO. GM76113 | D

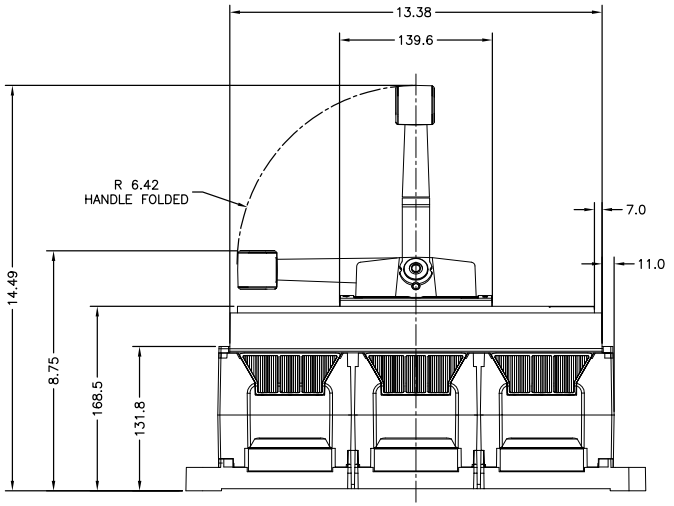
MICROLOGIC CIRCUIT BREAKERS						
PART NO.	REV	DIM "A"	AMPS	% RATING	GFI	VENDOR NO.
GM48156-1	A	12.7	1600	80	NO	RJF36160U33A
GM48156-2	A				YES	RJF36160U44A
GM48156-3	A			100	NO	RJF36160CU33A
GM48156-4	A				YES	RJF36160CU44A
GM48156-5	A	16.0	2000	80	NO	RJF36200U33A
GM48156-6	A				YES	RJF36200U44A
GM48156-7	A			100	NO	RJF36200CU33A
GM48156-8	A				YES	RJF36200CU44A
GM48156-9	A	20.0	2500	80	NO	RJF36250U33A
GM48156-10	A				YES	RJF36250U44A
GM48156-11	A			100	NO	RJF36250CU33A
GM48156-12	A				YES	RJF36250CU44A
GM48156-13	A	12.7	1200	80	YES	RJF36120U44A
GM48156-14	B				NO	RJF36120U33A
GM48156-15	B			100	NO	RJF36120CU33A
GM48156-16	B				YES	RJF36120CU44A

REV	DATE	REVISION	BY
–	1-31-06	NEW DRAWING [77272]	RAC
A	2-23-07	(A-1) NOTE ADDED [78285]	GFR
B	8-1-07	(D-8) GM48156-14, -15 & -16 ADDED; [79677]	BTW

REVISION BLOCK INDICATES REVISION LEVEL OF DRAWING NOT PART REVISION. SEE PART REVISION LEVEL BEHIND PART NUMBER FOR CURRENT PART REVISION LEVEL.







NOTE:
KOHLER PART # TO BE CLEARLY VISIBLE ON CIRCUIT BREAKER AND ON INDIVIDUAL PACKAGING.

METRIC CAD FILE

SQUARE D R-FRAME CIRCUIT BREAKER
3 POLE ELECTRONIC TRIP

UNLESS OTHERWISE SPECIFIED –
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ± 0.25
X.X ± 1.0
X ± 1.0
ANGLES ± 0°30'
SURFACE FINISH MAX.
THIRD ANGLE PROJECTION

APPROVALS	DATE
DRAWN RAC	1-31-06
CHECKED WSD	2-1-06
APPROVED AJH	2-1-06

TITLE: DWG, CIRCUIT BREAKER

SCALE .5 | DRG NO. GM48156.DWG | SHEET 1-1

DWG. NO. GM48156 | D0

PLOTTED DATE

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 [25 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]
.34 MPa [50 PSI] UP TO & INCLUDING 3/8" ID HOSE AND
MAX. OPERATING PRESSURE: .24 MPa [25 PSI] OVER 3/8" HOSE
1.7 MPa [250 PSI]UP TO & INCLUDING 3/8" ID HOSE &
MIN. BURST PRESSURE: 1.2 MPa [175 PSI] OVER 3/8 ID HOSE

TYPE 6 SAE 100R14 TYPE A BRAIDED HOSE FOR HOT OIL & FLUID AND GREASY ENVIROMENTS, 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: UP TO 125°C [257°F]
.34 MPa [50 PSI] UP TO & INCLUDING 3/8" ID HOSE AND
MAX. OPERATING PRESSURE: .24 MPa [25 PSI] OVER 3/8" HOSE
1.7 MPa [250 PSI]UP TO & INCLUDING 3/8" ID HOSE &
MIN. BURST PRESSURE: 1.2 MPa [175 PSI] OVER 3/8 ID HOSE
MIN. OPERATING 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

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 [.25]	±12.7 [.50]	±19.1 [.75]	±1%

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
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]	PAR
JC	2-25-19	SEE SHEET 3 & 8 [CT193537]	SUD
JD	10-23-19	(A-3) "... PEP-RML-001" ADDED & SEE SHEET	
		2 & 5 [CT210155]	PAS

UNLESS OTHERWISE SPECIFIED: (1) DIMENSIONS ARE IN MILLIMETERS (2) TOLERANCES ARE: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0° 30' — SURFACE FINISH √ MAX. — THIRD ANGLE PROJECTION

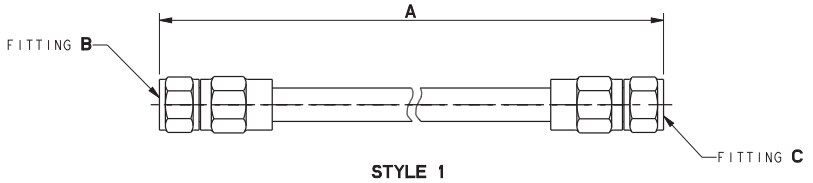
APPROVALS		DATE
DRAWN	JJC	2-5-97
CHECKED	EB	2-5-97
APPROVED	RGH	2-5-97

KOHLER CO. METRIC | PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: **DWG, FUEL LINE, FLEXIBLE**

SCALE | CAD NO. | SHEET 1 of 9
DWG NO. **273614-CMP** | **D**

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]	1	5
~~ES-71131~~	~~ER~~		~~1270 [50.0]~~	~~[1/4-18] NPT FEMALE~~	~~[5/8-18] THD FEMALE 45° FLARE SWIVEL~~	~~6.4 [.25]~~	~~1~~	~~6~~
GM38483	EJ		1270 [50.0]	[1/4-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	5
GM75369	FW		1524 [60.0]	[1/4] NPSM FEMALE SWIVEL-GLX	[1/4] NPSM FEMALE SWIVEL-GLX	6.4 [.25]	1	2
GM75758	FP		1650 [65.0]	[1/4-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	10.4 [.41]	1	6
GM38482	EJ		1650 [65.0]	[1/4-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	5
GM28340	EJ		584 [23.0]	[3/8-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	5
GM23505	EJ		1650 [65.0]	[3/8-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	5
GM75759	FP		1956 [77.0]	[3/8-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	10.4 [.41]	1	6
GM59340	EZ		1956 [77.0]	[3/8-18] NPT FEMALE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	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]	1	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]	1	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]	1	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]	1	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]	1	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]	1	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]	1	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]	1	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]~~	~~1~~	~~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]	1	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]~~	~~1~~	~~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]~~	~~1~~	~~3~~
GM93651	-		1270 [50.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	[5/8-18] THD FEMALE 45° FLARE SWIVEL	9.5 [.38]	1	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]	1	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]	1	5



STYLE 1

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
HR	11-15-16	SEE SHEET 5 OF 9 [CT165574]	BGP
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGW
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	(C-8) REVISION FOR PART 273614 UPDATED TO "FW" & SEE SHEET 1 & 5 [CT210155]	PAS

UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X .XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0° 30' SURFACE FINISH 125 MAX. THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	JJC	2-5-97
CHECKED	EB	2-5-97
APPROVED	RGH	2-5-97

KOHLER CO. METRIC PRO-E

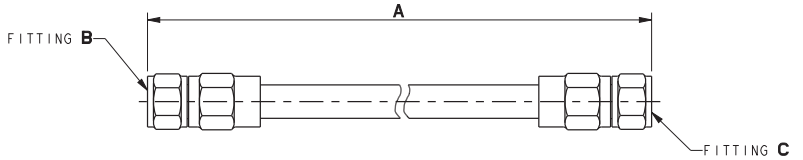
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DWG, FUEL LINE, FLEXIBLE

SCALE | CAD NO. | SHEET 2 of 9

DWG NO. 273614-CMP D

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]	1	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]	1	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]	1	1	-
274733	EL		584 [23.0]	[1/2-20] THD FEMALE INVERTED FLARE	[1/2-20] THD FEMALE 45° FLARE SWIVEL	6.4 [.25]	1	1	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]	1	1	-
GM16960	EJ		813 [32.0]	[1/2-20] THD FEMALE 45° FLARE SWIVEL	[1/2-20] THD FEMALE 45° FLARE SWIVEL	7.9 [.31]	1	3	-
GM10887	EJ		914 [36.0]	[1/2-14] NPT FEMALE	[3/4-16] THD FEMALE JIC 37° FLARE SWIVEL	12.7 [.50]	1	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]	1	1	-
336863	EJ		1219 [48.0]	[9/16-18] THD FEMALE 37° FLARE SWIVEL	[7/8-14] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	5	-
GM89284	-		450 [17.7]	[5/8-18] THD FEMALE 45° FLARE SWIVEL	[3/4-16] THD FEMALE 45° FLARE SWIVEL	7.9 [.31]	1	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]	1	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]	1	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]	1	5	-
274738	CT		1600 [63.0]	[5/8-18] THD FEMALE INVERTED FLARE	[5/8-18] THD FEMALE 45° FLARE SWIVEL	7.9 [.31]	1	1	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]	1	1	-
354591	EJ		2159 [85.0]	[5/8-18] THD FEMALE 45° FLARE SWIVEL	[5/8-18] THD FEMALE 45° FLARE SWIVEL	10.4 [.41]	1	1	-
GM105629	-		2050 [80.7]	[5/8-18] THD FEMALE 45° FLARE SWIVEL	[1/2-24] THD FEMALE 45° FLARE SWIVEL	7.9 [.31]	1	1	-
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]	1	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]	1	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]~~	~~1~~	~~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]~~	~~1~~	~~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]	1	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]	1	5	-
GM39501	EJ		1400 [55.0]	[3/4-16] THD FEMALE 45° FLARE SWIVEL	[11/16-16] ORFS SAE J1453 (FEMALE)	9.5 [.38]	1	5	-



STYLE 1

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
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGW
HW	2-20-17	SEE SHEET 6 [CT170738]	CEK
HY	5-24-17	SEE SHEETS 5 AND 7 [CT171684]	SAM
JA	5-8-18	(B-8)GM105629 ADDED, GM91721 HOSE ID 7.9 [.31]	
		WAS 9.5 [.38], SEE SHEET 1 [CT186807]	RMJ
JB	10-29-18	SEE SHEET 1 [CT189809]	PAR
JC	2-25-19	(B-8) 274738 REINSTATED; (D-8) 274733	
		REINSTATED; SEE SHEET 8 [CT193537]	SUD
JD	10-23-19	SEE SHEET 1,2 & 5 [CT210155]	PAS

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X .XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30'
SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

APPROVALS	DATE
DRAWN SAM	6-8-99
CHECKED KW	7-20-99
APPROVED KW	7-20-99

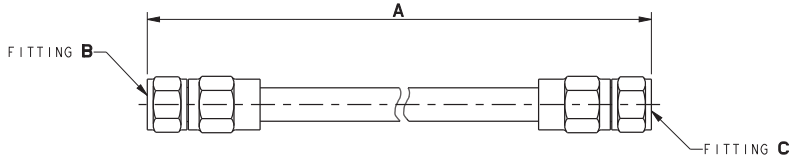
KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DWG, FUEL LINE, FLEXIBLE

SCALE | CAD NO. | SHEET 3 of 9

DWG NO. 273614-CMP D

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 [.38]	1	6
343604	EJ		1778 [70.0]	[3/4-16] THD FEMALE 45° FLARE SWIVEL	[3/4-16] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	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 [.41]	1	6
ES-72845	EY		3175 [125.0]	[3/4-16] THD FEMALE 45° FLARE SWIVEL	[11/16-16] ORFS SAE J1453 (FEMALE)	9.5 [.38]	1	5
274503	EJ		432 [17.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL	[7/8-14] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	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 [.62]	1	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 [.50]	1	7
ES-80186	-		813 [32.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL	[7/8-14] THD FEMALE 45° FLARE SWIVEL	9.5 [.38]	1	5
274502	EJ		889 [35.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL	[7/8-14] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	1
274632	EJ		1143 [45.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL	[7/8-14] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	1
361547	EJ		1219 [48.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL	[7/8-14] THD FEMALE 45° FLARE SWIVEL	15.8 [.62]	1	1
274633	EJ		1245 [49.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL	[7/8-14] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	1
274634	EJ		1499 [59.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL	[7/8-14] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	1
274228	EJ		1600 [63.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL	[7/8-14] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	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 [.50]	1	6
354570	EJ		1600 [63.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL	[7/8-14] THD FEMALE 45° FLARE SWIVEL	15.8 [.62]	1	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 [.62]	1	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 [.62]	1	5
274736	EJ		2159 [85.0]	[7/8-14] THD FEMALE 45° FLARE SWIVEL	[7/8-14] THD FEMALE 45° FLARE SWIVEL	12.7 [.50]	1	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 [.50]~~	~~1~~	~~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 [.50]~~	~~1~~	~~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 [.62]	1	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 [.75]~~	~~1~~	~~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 [.62]	1	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 [.75]	1	5



STYLE 1

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
HP	9-29-16	SEE SHEETS 2, 3 AND 6 [CT143502]	SAM
HR	11-15-16	SEE SHEET 5 OF 9 [CT165574]	BGP
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGW
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

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X .XX ± 0.25
X .X ± 1.0
X ± 1.5
ANGLES ± 0° 30'
SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

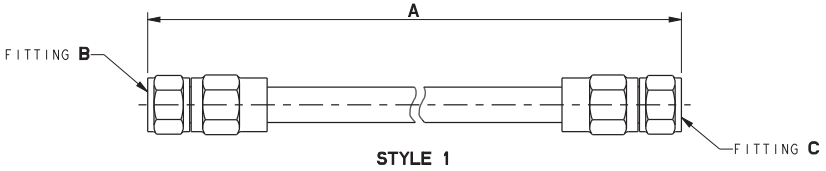
APPROVALS		DATE
DRAWN	GFR	10-31-08
CHECKED	JMS	10-31-08
APPROVED	WRD	10-31-08

TITLE: DWG, FUEL LINE, FLEXIBLE

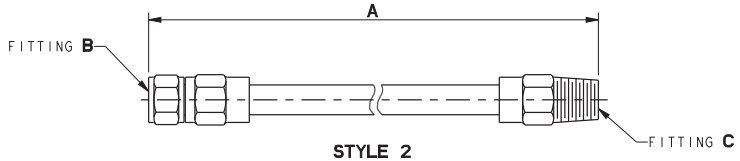
SCALE | CAD NO. | SHEET 4 of 9

DWG NO. 273614-CMP D

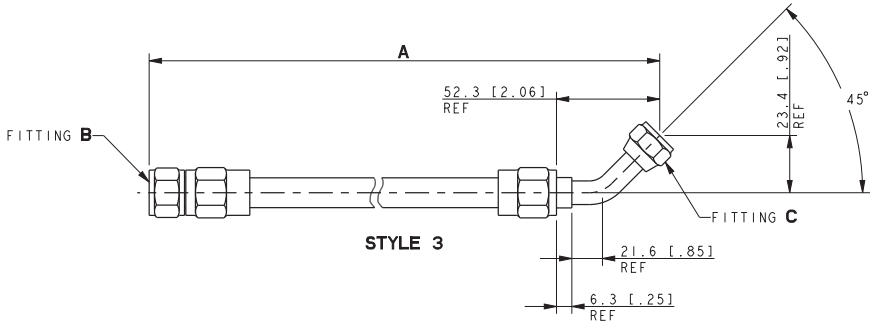
PART NO	REV		A	FITTING B	FITTING C	HOSE ID	STYLE	MATL TYPE
347494	CF		1575 [62.0]	[1 1/16-14] THD FEMALE 45° FLARE SWIVEL	[1 1/16-14] THD FEMALE 45° FLARE SWIVEL	19.0 [.75]	1	5
347495	CF		1829 [72.0]	[1 1/16-14] THD FEMALE 45° FLARE SWIVEL	[1 1/16-14] THD FEMALE 45° FLARE SWIVEL	19.0 [.75]	1	5
~~ES-70739~~	~~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	[11/16-16] 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



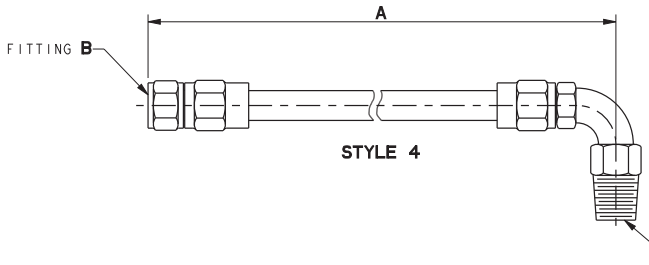
STYLE 1



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
HW	2-20-17	SEE SHEET 6 [CT170738]	CEK
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

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30'
SURFACE FINISH MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	GFR	10-31-08
CHECKED	JMS	10-31-08
APPROVED	WRD	10-31-08

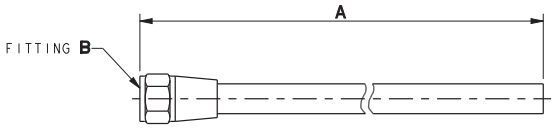
KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DWG, FUEL LINE, FLEXIBLE

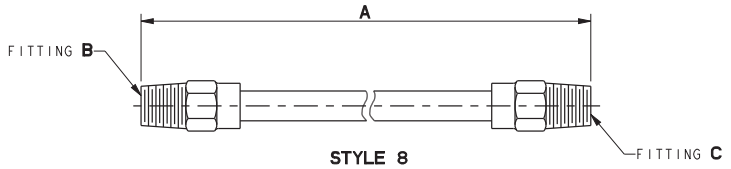
SCALE | CAD NO. | SHEET 5 of 9

DWG NO. 273614-CMP D

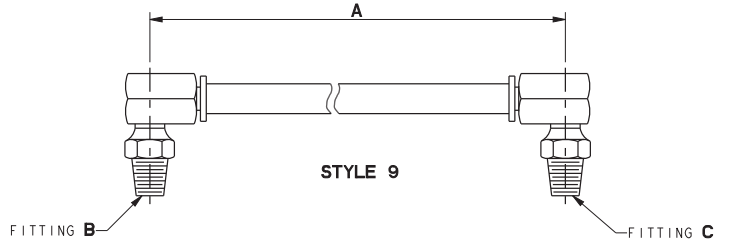
PART NO	REV		A	FITTING B	FITTING C	HOSE ID	STYLE	MATL TYPE
225676	EJ		635 [25.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	NOT REQUIRED	4.8 [.19]	5	1
ES-32511	EJ		813 [32.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	NOT REQUIRED	4.8 [.19]	5	1
344210	EJ		940 [37.0]	[7/16-20] THD FEMALE 45° FLARE SWIVEL	NOT REQUIRED	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	1
ES-33534	EJ		381 [15.0]	[1/2-20] THD FEMALE 45° FLARE SWIVEL	NOT REQUIRED	7.9 [.31]	5	1
276283	EJ		737 [29.0]	[1/2-20] THD FEMALE 45° FLARE SWIVEL	NOT REQUIRED	7.9 [.31]	5	1
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	1
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
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGW
HU	1-24-17	(A-8) ADDED ES-83774 [CT169865]	IMM
HV	1-30-17	(A-8) ES-83774 LENGTH WAS 1073 [CT170133]	IMM
HW	2-21-17	(B-8) GM102407 & GM102408 ADDED [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 [CT2101155]	PAS

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30'
SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	DRA	4-10-14
CHECKED	GFR	4-10-14
APPROVED	JJR	4-10-14

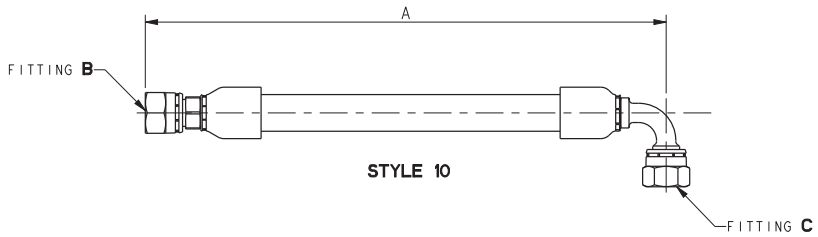
KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DWG, FUEL LINE, FLEXIBLE

SCALE | CAD NO. | SHEET 6 of 9

DWG NO. 273614-CMP D

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
~~365282~~	~~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
HP	9-29-16	SEE SHEETS 2, 3 AND 6 [CT143502]	SAM
HR	11-15-16	SEE SHEET 5 OF 9 [CT165574]	BGP
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGW
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 [CT2101155]	PAS

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X .XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30'
SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

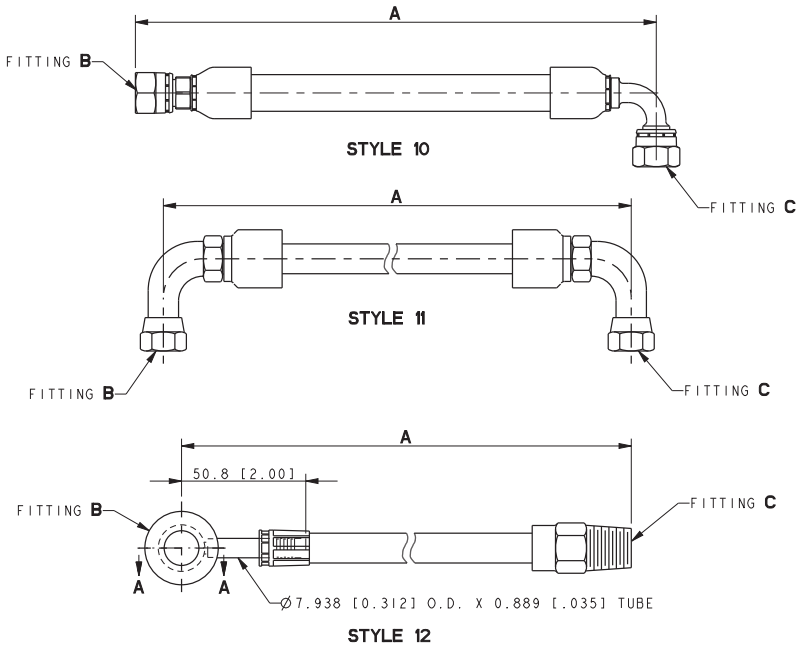
APPROVALS		DATE
DRAWN	DRA	4-10-14
CHECKED	GFR	4-10-14
APPROVED	JJR	4-10-14

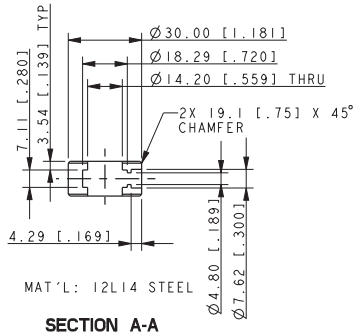
TITLE: **DWG, FUEL LINE, FLEXIBLE**

SCALE | CAD NO. | SHEET 7 of 9

DWG NO. **273614-CMP** **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	1
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	1
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	1
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	1
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	1
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	1
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
HP	9-29-16	SEE SHEETS 2, 3 AND 6 [CT143502]	SAM
HR	11-15-16	SEE SHEET 5 OF 9 [CT165574]	BGP
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGW
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

UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0° 30' — SURFACE FINISH 63 MAX. — THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	DRA	4-10-14
CHECKED	GFR	4-10-14
APPROVED	JJR	4-10-14

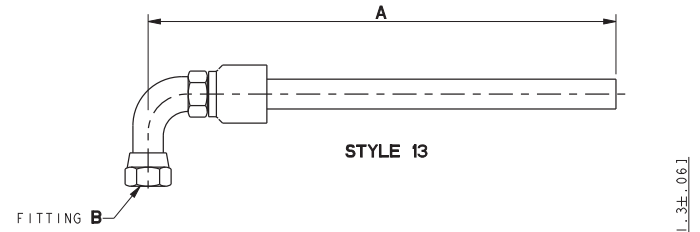
KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

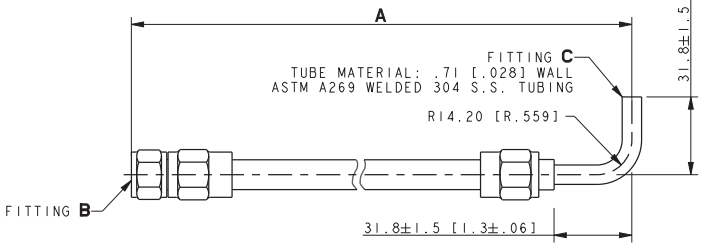
TITLE: DWG, FUEL LINE, FLEXIBLE

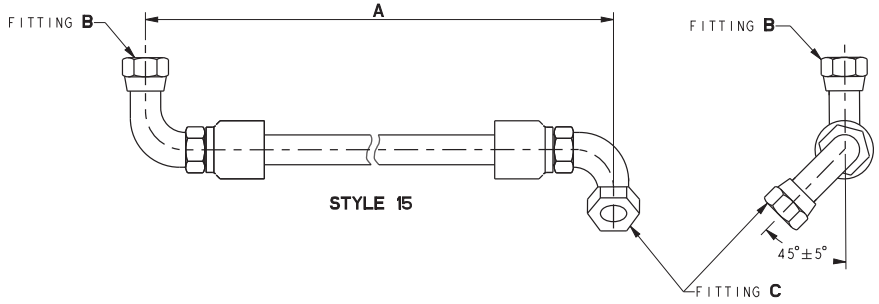
SCALE | CAD NO. | SHEET 8 of 9

DWG NO. 273614-CMP | 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
HP	9-29-16	SEE SHEETS 2, 3 AND 6 [CT143502]	SAM
HR	11-15-16	SEE SHEET 5 OF 9 [CT165574]	BGP
HT	12-8-16	SEE SHEET 1 AND 5 OF 9 [CT167075]	BGW
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

UNLESS OTHERWISE SPECIFIED: (1) DIMENSIONS ARE IN MILLIMETERS (2) TOLERANCES ARE: X .XX ± 0.25, X .X ± 1.0, X ± 1.5, ANGLES ± 0° 30' MAX. SURFACE FINISH ✓ THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	DRA	4-10-14
CHECKED	GFR	4-10-14
APPROVED	JJR	4-10-14

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DWG, FUEL LINE, FLEXIBLE

SCALE | CAD NO. | SHEET 9 of 9

DWG NO. 273614-CMP D

KOHLER®

Warranty

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

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

Kohler Product	**Warranty Coverage**
Stationary Standby 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.
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	**Warranty Coverage**
Stationary Standby Generator Set & Accessories	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

KOHLER®

Certification

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Kohler Power Systems
N7650 Lakeshore Road
Sheboygan
Wisconsin
53083
USA

Holds Certificate No: **FM 727336**

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

Design, manufacture, and distributor support for electrical generators, alternators, fuel tanks, automatic transfer switches and switchgear.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 1995-02-28
Effective Date: 2021-11-07
Latest Revision Date: 2021-10-29
Expiry Date: 2024-11-06

...making excellence a habit.™

Certificate No: **FM 727336**

Location	Registered Activities
Kohler Power Systems - GK 900 Highland Drive Bldg 604 Kohler Wisconsin 53004 USA	Manufacture of leads and harness, automatic transfer switches and switchgear. Distribution of generator sets.
Kohler Power Systems N7650 Lakeshore Road Sheboygan Wisconsin 53083 USA	Design, manufacture, and distributor support for electrical generators, automatic transfer switches and switchgear.
Kohler Power Systems 300 N Dekora Woods Blvd Saukville Wisconsin 53080 USA	Manufacture of fuel tanks, skids, fabricated components and generators.
Kohler Power Systems Muth Warehouse 2821 Muth Court Sheboygan Wisconsin 53083 USA	The distribution of generator sets.
Kohler Power Systems KWIP Warehouse 4327 County EE Sheboygan Wisconsin 53081 USA	Receiving, sequencing and warehousing of generator components.

Original Registration Date: 1995-02-28

Latest Revision Date: 2021-10-29

Effective Date: 2021-11-07

Expiry Date: 2024-11-06

ENGINEERING EXPRESS®
160 SW 12TH AVE SUITE 106, DEERFIELD BEACH, FL 33442
(954) 354-0660 | ENGINEERINGEXPRESS.COM

Technical Evaluation Report

DIVISION: 48 10 00–ELECTRICAL POWER GENERATION EQUIPMENT

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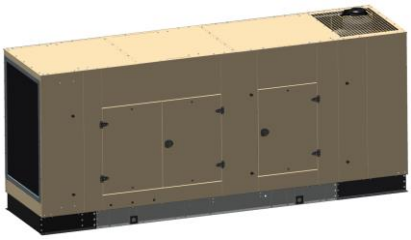
(Subject to Renew March 1, 2022 or next code cycle)

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

Florida Building Code Sixth & Seventh Editions (2017 & 2020)
International Building Code (2012, 2015 & 2018)



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

SCOPE OF EVALUATION (compliance with the following codes):

THIS IS A STRUCTURAL (WIND) PERFORMANCE EVALUATION ONLY. NO ELECTRICAL OR TEMPERATURE PERFORMANCE RATINGS OR CERTIFICATIONS ARE OFFERED OR IMPLIED HEREIN.

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.

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.

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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

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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.**

The FBC 6th & 7th Editions (2017 & 2020) define APPROVED SOURCE (Section 202) as: "An independent person, firm or corporation, approved by the building official, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses." Engineering Express® professionals meet the competency requirements as defined in the FBC and can seal their work. Engineering Express® is regularly engaged in conducting and providing engineering evaluations of single-element and full-scale building systems tests.

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.

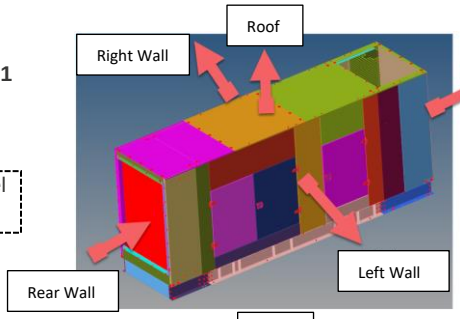
Structural Engineering Calculations

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:

Load Case 1

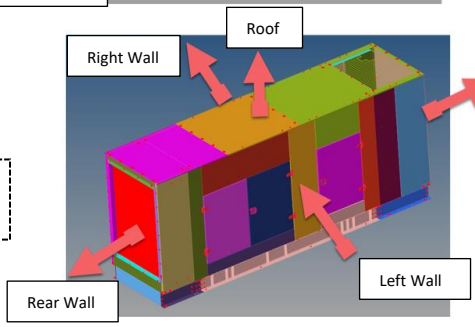
(Wind parallel to long side)



		Pressure, psf (x 10^{-3} MPa)				
Load Case	Wind Direction	Rear Wall	Front Wall	Left Wall	Right Wall	Roof
1		61.26 (2.933)	-48.85 (-2.339)	-48.85 (-2.339)	-47.30 (-2.265)	-96.92 (-4.641)

Load Case 2

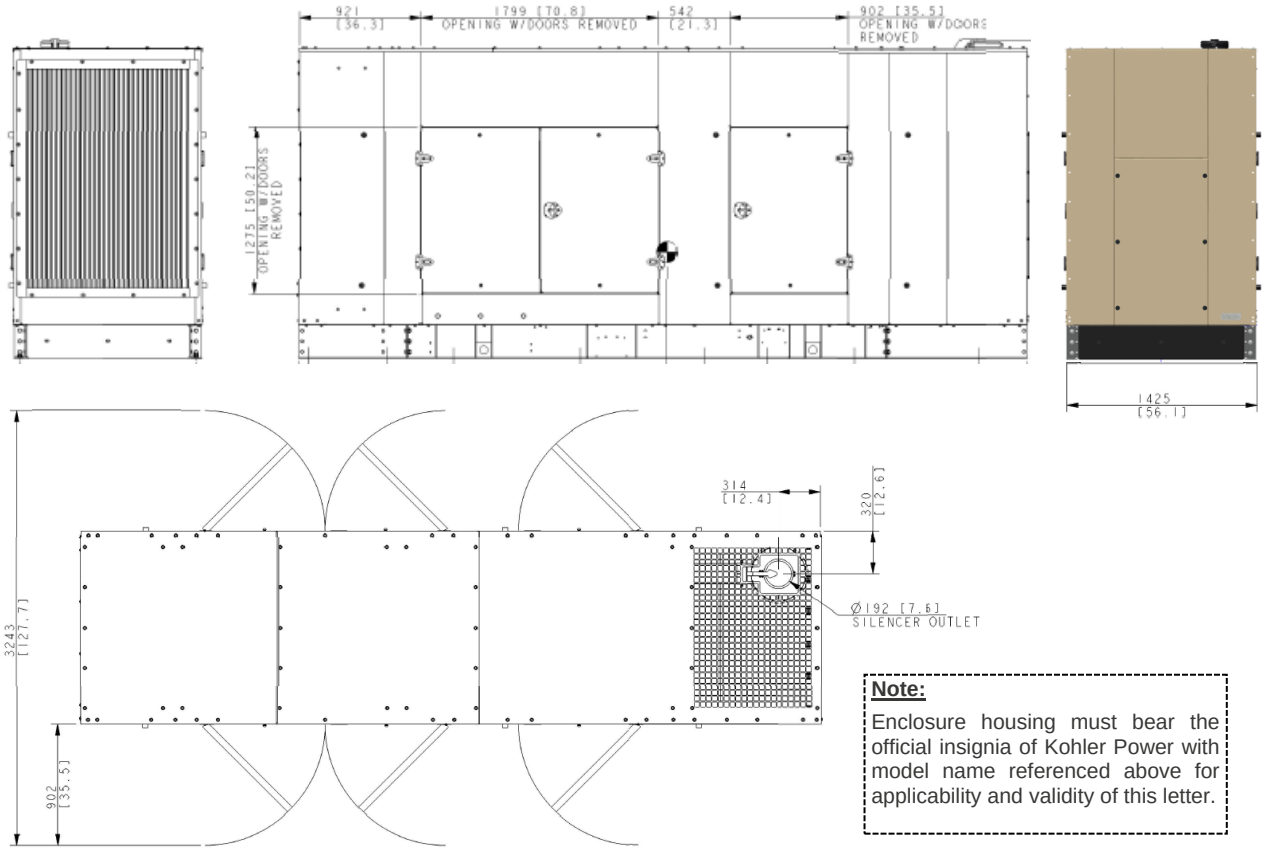
(Wind perpendicular to long side)



		Pressure, psf (x 10^{-3} MPa)				
Load Case	Wind Direction	Rear Wall	Front Wall	Left Wall	Right Wall	Roof
2		-48.85 (-2.339)	-48.85 (-2.339)	61.26 (2.933)	-47.30 (-2.265)	-96.92 (-4.641)

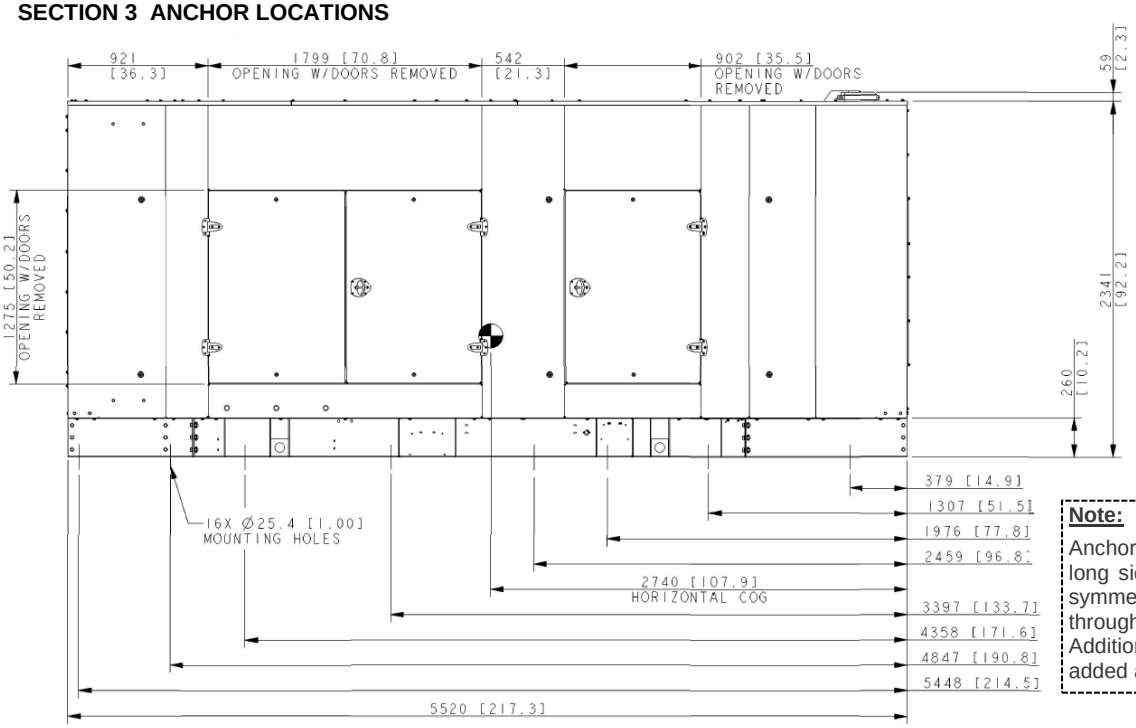
2. Supplemental FEA has been performed to evaluate the front and left walls of the enclosure to +/- 65 psf. Upon thorough review of the results, it is the opinion of this engineer that the results, coupled with the FEA above, satisfactorily indicate the enclosure and skid stresses remain below ultimate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

SECTION 2 DIMENSIONS & ELEVATIONS



Note:
Enclosure housing must bear the official insignia of Kohler Power with model name referenced above for applicability and validity of this letter.

SECTION 3 ANCHOR LOCATIONS



Note:
Anchors are located along the long sides of the unit and are symmetric. Refer to Sections 5 through 7 for specifications. Additional holes might be added as needed.

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

SECTION 4 ENCLOSURE MODELS INCLUDED

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

SECTION 5 ANCHOR DIRECTIVE

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

ANCHOR DIRECTIVE NOTES

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

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

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

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

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

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

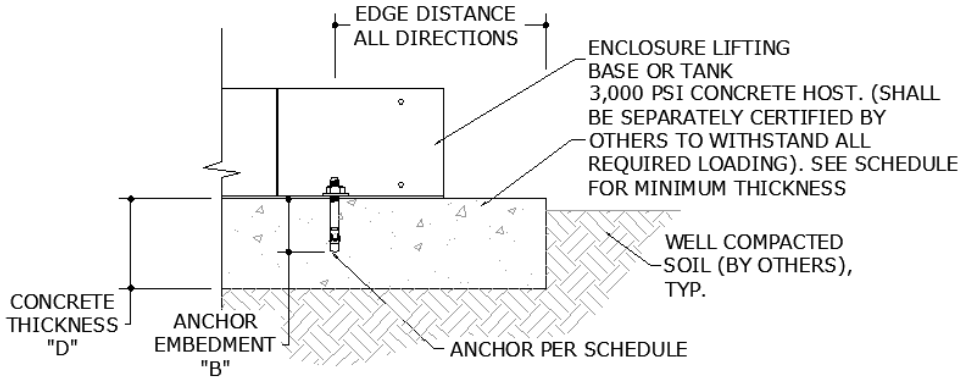
***The unit skid shall mount directly to the tank with the specified number of M20 UNC GR.8.8 thru-bolts with 2" min. OD washers top and bottom, typ. Provide 1.5" min. edge distance from edge of members in contact (skid flange and tank flange). Members in contact shall be 3/16" min. thick Fy = 36 ksi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

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

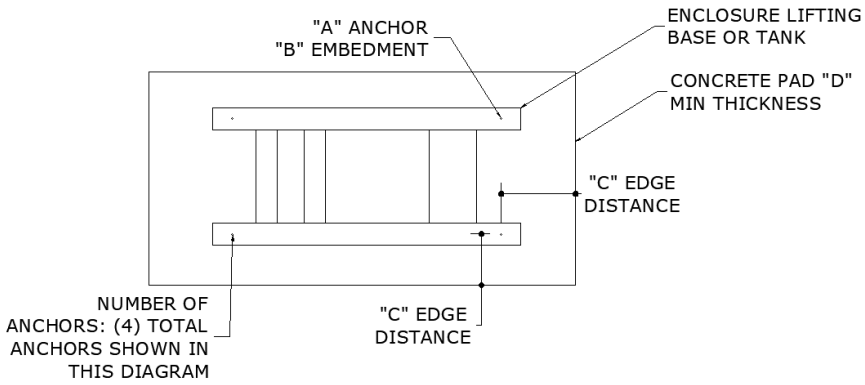
- For each I-beam top connection to skid, employ (2) M20 UNC GR. 8.8 steel thru-bolts with 2" min. OD washers top and bottom, (1) thru-bolt per side, typ. Position thru-bolt no more than 6" away from the end of the I-beam, typ. Provide 1.5" min. edge distance between the thru-bolt and any edge of the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

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

SECTION 6 ANCHOR ILLUSTRATIONS



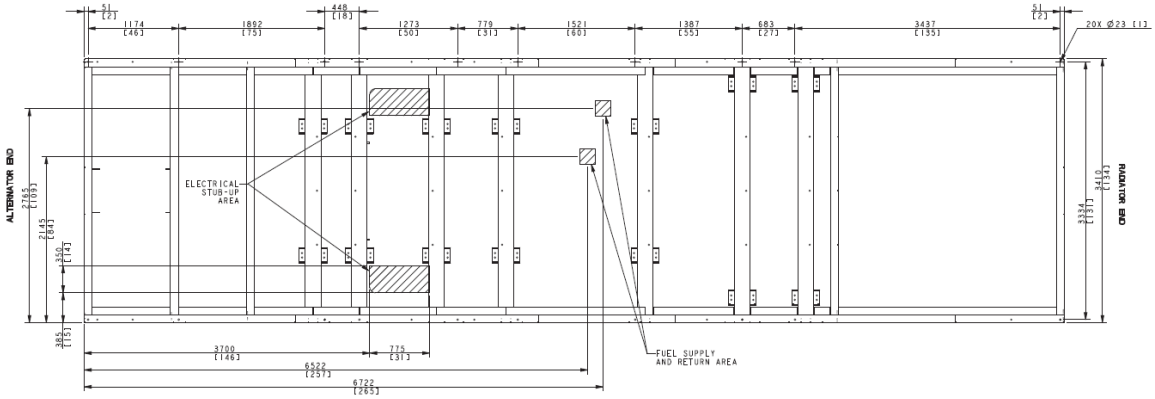
DETAIL A



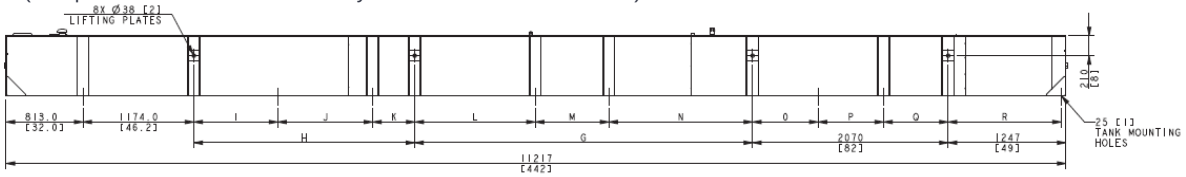
ANCHORAGE PLAN VIEW ILLUSTRATION

Instructions:

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



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



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

SECTION 7: WIND INSTALLATION REQUIREMENTS:

The following are requirements for wind-rated installation:

1. The design of post-installed anchors in concrete used for the component anchorage has been evaluated by this engineer for wind applications in accordance with ASCE 7 as reference herein.
2. Anchors must be installed in minimum 4000 psi compressive strength normal weight concrete. Concrete aggregate must comply with ASTM C33. Installation in structural lightweight concrete is not permitted unless otherwise approved by the structural engineer of record.
3. Anchors must be installed to the torque specification as recommended by the anchor manufacturer to obtain maximum loading.
4. Anchors must be installed in the locations specified in the Kohler ADV-9189 dimension print in correlation with signed and sealed engineering herein. The more stringent requirement from either document shall apply in cases of uncertainty.
5. Anchor plates from Kohler must be installed at each anchor location between anchor head and equipment for tension load distribution.
6. Concrete floor slab and concrete housekeeping pads must be designed, and rebar reinforced for wind applications in accordance with ACI 318 and ASCE 7 as referenced herein
7. All housekeeping pad thicknesses must be designed in accordance with pre-qualification test report or a minimum of 1.5x the anchor embedment depth, whichever is largest.
8. All housekeeping pads must be doweled or cast into the building structural floor slab and designed for wind application per appropriate code requirements for the subject jurisdiction and as approved by the structural engineer of record.
9. Wall mounted equipment must be installed to a rebar reinforced structural concrete wall that is designed for wind applications and approved by the engineer of record to resist the added wind loads from the components being anchored to the wall.
10. Floor mounted equipment (with or without housekeeping pad) must be installed to a rebar reinforced structural concrete floor that is designed for wind applications and approved by the engineer of record to resist the added wind loads from components being anchored to the floor.
11. When installing to a floor, rebar interference must be considered.
12. Attaching equipment to any floor other than those constructed of structural concrete and designed to accept the wind loads from said equipment is not permitted by this specification and beyond the scope of this certification.
13. Attaching equipment to any concrete block walls or cinder block walls is not permitted by this specification and beyond the scope of this certification.
14. Rooftop installations are not permitted by this evaluation and is beyond the scope of this certification.
15. Installation upon rooftop curbs shall be coordinated with the curb manufacturer and the Structural Engineer of Record. Any curb or concrete pad that supports the RTU unit is beyond the scope of this certification.
16. Anchor locations, size, type and load requirements shall be as specified on the certified installation specification. Mounting requirements details such as brand, type, embedment depth, edge spacing, anchor spacing, concrete strength, wall bracing, and special inspection must be outlined and approved by the project Structural Engineer of Record to withstand the wind anchor loads as defined on the certified installation specification. The installing contractor is responsible for the proper installation of all anchors and mounting hardware, observing the mounting requirement details outlined by the Engineer of Record. Contact Kohler if a detailed Wind Installation Calculation Package is required.
17. Electrical wiring, piping, duct and other connections to the equipment is the responsibility of the installing contractor. It is necessary that these remain intact, functional and do not inhibit the functionality of the generator set after a wind event.
18. Concrete pad dimensions are minimum values to satisfy only the anchor bolt requirements. The pad must be designed by the project structural engineer of record.

TERMINOLOGY (CONTINUED):

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

LIMITATIONS & CONDITIONS OF USE (CONTINUED):

Host Structure:

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

Production Drawings:

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

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

Drawing and Change Control:

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

Survivability:

This evaluation report is valid for a newly installed unit and does not include certification of the product beyond a design event if impacted. Inspections shall be implemented during annual equipment maintenance or after a named storm; all fasteners and cabinet components are to be verified, and all damaged, loose, corroded and/or broken fasteners and cabinet components shall be replaced to ensure structural integrity against hurricane wind forces. Contact this office for any reevaluation needs as designated by the Authority Having Jurisdiction.

Durability:

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

Extent of Certification:

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

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

Kohler Standby/Prime Generator Set Test Program

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

Prototype Testing

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

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

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.

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
KohlerPowerSystemscom

G18-56 12/05b

KOHLER®

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

Yes	Does Not Apply		
❑	❑	1.	Is the equipment installed in a fire-resistant room (made of non-combustible material) or in an outdoor weather housing?
❑	❑	2.	Is there adequate clearance between the engine and floor for service maintenance?
❑	❑	3.	Is there emergency lighting available at the equipment room or weather housing?
❑	❑	4.	Is there adequate heating for the equipment room or outdoor weather housing?
❑	❑	5.	Is the equipment room clean with all materials not related to the emergency power supply system removed?
❑	❑	6.	Is the equipment room protected with a fire protection system?

Engine and Mounting

❑	❑	7.	Is the mounting surface(s) properly constructed and leveled?
❑	❑	8.	Is the mounting surface made from non-combustible material?
❑	❑	9.	Was the generator-to-engine alignment performed after attaching the skid to the mounting base? Generator sets with two-bearing generators require alignment.

Lubrication

❑	❑	10.	Is the engine crankcase filled with the specified oil?

Cooling and Ventilation

❑	❑	11.	Is the cooling system filled with the manufacturer's specified coolant/antifreeze and purged of air?
❑	❑	12.	Is there adequate inlet and outlet air flow (electric louvers adjusted and ventilation fan motor(s) connected to the corresponding voltage)?
❑	❑	13.	Is the radiator duct properly sized and connected to the air vent or louver?
❑	❑	14.	Are flexible sections installed in the cooling water lines?

Fuel

❑	❑	15.	Is there an adequate/dedicated fuel supply?
❑	❑	16.	Are the fuel filters installed?
❑	❑	17.	Are the fuel tanks and piping installed in accordance with applicable codes and standards?
❑	❑	18.	Is there adequate fuel transfer tank pump lift capacity and is the pump motor connected to the corresponding voltage?
❑	❑	19.	Is the fuel transfer tank pump connected to the emergency power source?
❑	❑	20.	Are flexible fuel lines installed between the engine fuel inlet and fuel piping?
❑	❑	21.	Is the specified gas pressure available at the fuel regulator inlet?
❑	❑	22.	Does the gas solenoid valve function?
❑	❑	23.	Are the manually operated fuel and cooling water valves installed allowing manual operation or bypass of the solenoid valves?

Exhaust

❑	❑	24.	Is the exhaust line sized per guidelines and does it have flexible connector(s)? Is the flexible connector(s) straight?
❑	❑	25.	Is there an exhaust line condensate trap with a drain installed?
❑	❑	26.	Is the specified silencer installed and are the hanger and mounting hardware tightened?
❑	❑	27.	Is a heat-isolating thimble(s) installed at points where exhaust lines pass through combustible wall(s) or partition(s)?
❑	❑	28.	Is the exhaust line free of excessive bends and restrictions? Is the backpressure within specifications?
❑	❑	29.	Is the exhaust line installed with a downward pitch toward the outside of the building?
❑	❑	30.	Is the exhaust line protected from entry by rain, snow, and animals?
❑	❑	31.	Does the exhaust system outlet location prevent entry of exhaust gases into buildings or structures?
❑	❑	32.	Are individuals protected from exposure to high temperature exhaust parts and are hot parts safety decals present?

AC Electrical System

❑	❑	33.	Does the nameplate voltage/frequency of the generator set and transfer switch match normal/utility source ratings?
❑	❑	34.	Do the generator set load conductors have adequate ampacity and are they correctly connected to the circuit breakers and/or the emergency side of the transfer switch?
❑	❑	35.	Are the load conductors, engine starting cables, battery charger cables, and remote annunciator leads installed in separate conduits?
❑	❑	36.	Is the battery charger AC circuit connected to the corresponding voltage?

Transfer Switch, Remote Control System, Accessories

❑	❑	37.	Is the transfer switch mechanism free of binding? **Note:** Disconnect all AC sources and operate the transfer switch manually.
❑	❑	38.	Are the transfer switch AC conductors correctly connected? Verify lead designations using the appropriate wiring diagrams.
❑	❑	39.	Is all other wiring connected, as required?

Batteries and DC Electrical System

❑	❑	40.	Does the battery(ies) have the specified CCA rating and voltage?
❑	❑	41.	Is the battery(ies) filled with electrolyte and connected to the battery charger?
❑	❑	42.	Are the engine starting cables connected to the battery(ies)?
❑	❑	43.	Do the engine starting cables have adequate length and gauge?
❑	❑	44.	Is the battery(ies) installed with adequate air ventilation?
❑	❑	45.	Are the ends of all spark plug wires properly seated onto the coil/distributor and the spark plug?

Special Requirements

❑	❑	46.	Is the earthquake protection adequate for the equipment and support systems?
❑	❑	47.	Is the equipment protected from lightning damage?

Generator Set/Transfer Switch Startup Checklist

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

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

* 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.