Submittal Package

We are pleased to offer the following submittal for your consideration.

TAW POWER SYSTEMS

Table of Contents

BOM

TAW POWER SYSTEMS, INC.
6312 78th street
Riverview, Florida 33578
www.tawinc.com

ITEM & DESCRIPTION

KOHLER Model KD1000 , EPA Certified Diesel Generator Set

1000kW, @ 0.8 PF, 60 Hz, 3 Phase, 277/480 Volt, UL2200

APM603 / Controller meets NFPA 110
Open Skid with Flexible Connection, Hospital Grade Silencer, Heat Blankets for Silencer, & Wall Thimble
Unit Mounted Radiator
Block Heater 240 Volt, 6000 Watt
Flexible Fuel Lines
Fuel Water Separator
Line Circuit Breakers, 3 Pole, 100% Rated,
- 1000 Amp LSIG w/ Aux Contacts, Shunt Trip & Shunt Trip Wiring (Position 1)
- 800 Amp LSIG w/ Aux Contacts, Shunt Trip & Shunt Trip Wiring (Position 2)

Ground Fault Relay Indication
Generator Heater
Battery Rack and Cables
Starting Battery, AGM
Battery Charger: 20 Amp
Remote Emergency Stop, Lockable
Remote Annunciator
Certified Factory Test @ 0.8 P.F.
4 Engine, Generator Parts, Maintenance Manuals & 1 Electronic Manual
Vibration Isolators: Internal

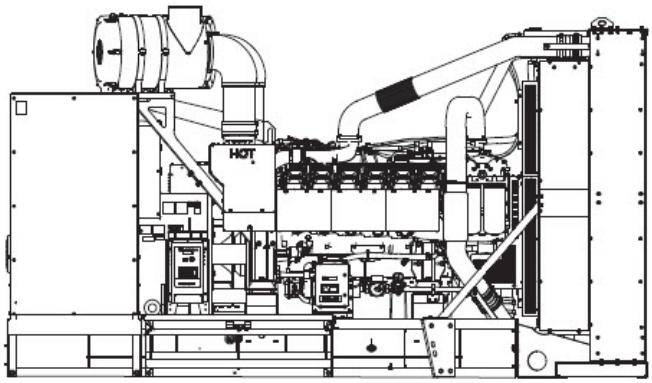
Warranty:
5 Year Comprehensive Warranty

KOHLER®

Spec Sheets

KOHLER®

KD1000
Diesel



Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A standard three-year or 1000-hour limited warranty for standby applications. Five-yare basic, five-year comprehensive, and ten-year extended limited warranties are also available.
- A standard two-year or 8700-hour limited warranty for prime power applications.
- Tier 2 EPA-certified for Stationary Emergency Applications
- Battery Rack and Cables
- Closed Crankcase Ventilation (CCV) Filters
- Customer Connection
- Integral Vibration Isolation

Alternator Features

- Local Emergency Stop Switch
- Oil Drain and Coolant Drain Extension
- Operation and Installation Literature
- The pilot-excited, permanent magnet (PM) alternator provides superior short-circuit capability.
- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.

Other Features

- Self-ventilated and dripproof construction.
- Superior voltage waveform from two-thirds pitch windings and skewed stator.Brushless alternator with brushless pilot exciter for excellent load response.
- Kohler designed controllers for one-source system integration and remote communication.
- The low coolant level shutdown prevents overheating (standard on radiator models only).

Generator Set Ratings

					Standby 130C Rise Ratings	
Alternator	Voltage	Ph	Hz	Peak kVA	kW/kVA	Amps
KH04830TO4D	277/480	3	60	4193	1000 / 1250	1504

RATINGS: All three-phase units are rated at 0.8 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.
Obtain technical information bulletin (TIB-101) for ratings guidelines, complete ratings definitions, and site condition derates.
The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

Model: KD1000, continued

Alternator Specifications

Specifications	Alternator
Alternator manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Permanent-Magnet Pilot Exciter
Voltage regulator	Solid State, Volts/Hz
Insulation	NEMA MG1, UL 1446, Vacuum Pressure Impregnated (VPI)
Insulation: Material	Class H, Synthetic, Nonhygroscopic
Insulation: Temperature Rise	130°C, 150°C Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible disc
Amortisseur windings	Full
Rotor balancing (60Hz)	125%
Alternator winding type	Random Wound
Voltage regulation, no-load to full-load RMS	+/-0.25%
Unbalanced load capability	100% of Rated Standby Current

- The pilot-excited, permanent magnet (PM) alternator provides superior short-circuit capability.
- All models are brushless, rotating-field alternators.
- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Superior voltage waveform from two-thirds pitch windings and skewed stator.
- Brushless alternator with brushless pilot exciter for excellent load response.

Engine

Engine Specification

Engine Manufacturer	Kohler Diesel
Engine Model	KD27V12
Engine: type	4-Cycle, Turbocharged
Cylinder arrangement	12-V
Displacement, L (cu. in.)	27 (1648)
Bore and stroke, mm (in.)	135 x 157 (5.31 x 6.18)
Compression ratio	15.0:1
Piston speed, m/min. (ft./min.)	565 (1854)
Main bearings: quantity, type	7, Precision Half-Shell
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	1114 (1494)
Cylinder head material	Cast Iron
Crankshaft material	Steel
Valve (exhaust) material	Steel
Governor: type, make/model	KODEC Electronic Control
Frequency regulation, no-load to-full load	Isochronous
Frequency regulation, steady state	±0.25%
Frequency	Fixed
Air cleaner type, all models	Dry

Model: KD1000, continued

Exhaust

Exhaust System

Exhaust flow at rated kW,m3/min. (cfm)	201.6 (7119)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	530 (986)
Maximum allowable back pressure, kPa (in. Hg)	8.5 (2.5)
Exh. outlet size at eng. hookup, mm (in.)	See ADV Drawing

Fuel

Fuel System

Fuel type	Diesel
Fuel supply line, min. ID, mm (in.)	14 (0.55)
Fuel return line, min. ID, mm (in.)	14 (0.55)
Max. fuel flow, Lph (gph)	380 (100)
Min./max. fuel pressure at engine supply connection, kPa (in. Hg)	-30/30 (-8.8/8.8)
Maximum diesel fuel lift, m (ft.)	3.7 (12)
Max. return line restriction, kPa (in. Hg)	20 (5.9)
Fuel Filter Primary	1
Fuel Filter Water Separator	1
Recommended fuel	#2 Diesel ULSD

Lubrication

Lubrication System

Type	Full Pressure
Oil pan capacity dipstick mark max., L (qt.)	79 (83.5)
Oil pan capacity, initial filling, L (qt.)	101 (106.7)
Oil filter: quantity, type	2, Cartridge
Oil cooler	Water-Cooled

Cooling

Radiator System

Ambient temperature, °C (°F)	40 (104) 50 (122)
Engine jacket water flow, Lpm (gpm)	1015 (268)
Engine jacket water capacity, L (gal.)	55 (14.4)
Radiator system capacity, including engine, L (gal.)	113.5 (30) 123 (32.4)
Charge cooler air inlet temperature, °C (°F)	219 (426)
Heat rejected to cooling water at rated kW, (Btu/min.)	404 (22996)
Heat rejected to charge air cooler at rated load, kW (Btu/min.)	260 (14799)
Water pump type	Vane Wheel
Fan diameter, including blades, mm (in.)	1350 (53.1)
Fan, kWm (HP)	48 (64.3)
Max. restriction of cooling air, intake and discharge side of radiator, kPA (in. H20)	0.125 (0.5)

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

Model: KD1000, continued

Remote Radiator System

Exhaust manifold type	Dry
Water inlet/outlet, mm (in.)	85 (3.35)
Charge air cooler inlet/outlet (pipe dia. of flange), mm (in.)	127 (5)
Static head allowable above engine, kPa (ft. H2O)	70 (23.5)
Note:	Contact your local distributor for cooling system options and specifications based on your specific requirements.

Operation Requirements

Air Requirements

Radiator-cooled cooling air, m3/min. (scfm) *	1212 (42801)
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)	653.9 (23092)
Combustion air, m3/min. (cfm)	72.7 (2566)
Heat rejected to ambient air: Engine, kW (Btu/min.)	136 (7741)
Heat rejected to ambient air: Alternator, kW (Btu/min.)	48 (2732)

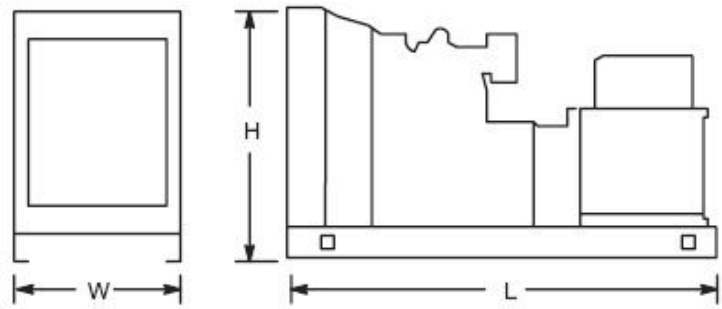
*Air density = 1.20 kg/m3 (0.075 lbm/ft3)

Fuel Consumption

Diesel, Lph (gph), at % load	Rating
Standby Fuel Consumption at 100% load	269 Lph (70.9 gph)
Standby Fuel Consumption at 75% load	209 Lph (55.3 gph)
Standby Fuel Consumption at 50% load	146 Lph (38.6 gph)
Standby Fuel Consumption at 25% load	84 Lph (22.2 gph)
Prime Fuel Consumption at 100% load	247 Lph (65.3 gph)
Prime Fuel Consumption at 75% load	191 Lph (50.4 gph)
Prime Fuel Consumption at 50% load	135 Lph (35.6 gph)
Prime Fuel Consumption at 25% load	79 Lph (20.8 gph)

Dimensions and Weights

Dim Weight Spec	Dim Weight Value
Fuel	Diesel
Engine Manufacturer	Kohler
Overall Size, L x W x H, mm (in.):	4181 x 1958 x 2200 (165.0 x 77.1 x 86.6)
Weight (radiator model), wet, kg (lb.):	8083 (17821)

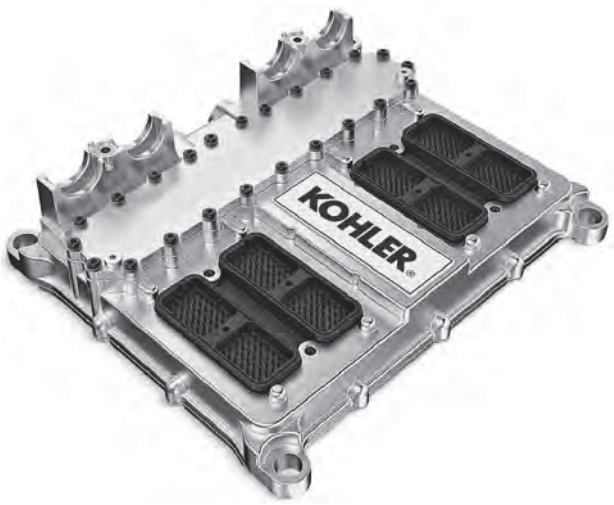


NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

KOHLER. Power Systems

800–3250 kW Industrial Generator Set Engine Control Unit (ECU)

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED



Applicable to the following:

KD800 to KD3250
KD800-YF to KD3250-YF

The ECU2-HD, rated I6K9K, can be used under harsh conditions with connected or disconnected cable harness. The control is suitable for diesel engines with up to 12 cylinders.

In a cascaded configuration, it controls up to 20 cylinders. The ECU is compatible with the common rail system found on the KD Series Kohler engine. The control unit also fulfills functional safety requirements of international safety standards. Due to the integrated diagnostics, the ECU can do self-checks, facilitating maintenance. Integrated fuel cooling ensures safe and reliable operation of the ECU.

Features

- Combined control of engine and exhaust gas treatment.
- Twelve power outputs for injector evaluation.
- Control of up to 20 cylinders in a cascaded configuration.
- Suitable for direct mounting on the engine.
- High performance, self-diagnostics for safe operation.
- Standardized communication interfaces J1939, UDS.
- Functional safety features according to EN ISO 13849.
- Temperature range from –40°C to 125°C (–40°F to 257°F).
- Reliable operation in harsh conditions.
- Platform for EU Stage IV/V, Euro V/VI, and EPA Tier 4f.

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

Kohler Power Systems
Asia Pacific Headquarters
7 Jurong Pier Road
Singapore 619159
Phone (65) 6264-6422, Fax (65) 6264-6455

Specifications and Features

Specification/Feature	
Generator Set Availability	KD800–3250
Microcontroller	Freescale SPC56xx Family
Frequency	256 MHz
Housing	Diecast aluminum
Dimensions	334 X 296 X 85.9 mm (13.1 x 11.7 x 3.4 in.) without strain relief clamp
Weight	5.4 kg (11.9 lbs.)
Rated voltage	+24 VDC
Operating temperature	–40°C to +80°C (–40°F to 176°F) with air cooling, –40°C to max +125°C (–40°F to max. 257°F) with fuel cooling
Flammability	UL 94 V–0
IP rating	IP6K9K with and without connected cable harness
Memory	4 MB Flash, 256 kB RAM internal, 4 MB RAM external (optional), 128 kB EEPROM external
Digital inputs	10 x configurable logic levels
Analog inputs	2 x configurable 0–5 V/0–25 mA, 17 x 0–5 V, 14 x 0–33 V
Resistance inputs	19 x resistance 0–50 kOhms
Frequency inputs	2 x Hall speed sensor, 8 x universal frequency measurement range 0.5 Hz to 10 kHz
Constant voltage outputs	12 x 5 V, 2 x 12 V, 11 x UBATT
Pulse Width Modulation (PWM) outputs	10 x half-bridge configuration with current measurement
Digital outputs	12 x high-side, 8 x low-side
Controlled analog outputs	1
Communication interfaces	4 x CAN according to ISO 11898-2, thereof one galvanically isolated
Power outputs for injectors	12 x split into four stages
Plug	Deutsch DRC 280 Pins (4 x 70)

DISTRIBUTED BY:

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Generator Set Controller

The APM603 generator set controller provides advanced control, system monitoring, and system diagnostics for a single generator set or paralleling multiple generator sets. The APM603 interfaces the generator set to other power system equipment and network management systems using standard industry network communications. It uses a patented digital voltage regulator and unique software logic to manage alternator thermal overload protection as well as serves as an overcurrent protective relay, features normally requiring additional hardware. The APM603 controller meets NFPA 110, Level 1.

Display, Interface, and Accessibility

- A 7-inch color TFT touchscreen for easy local access to data.
  - Home screen can be customized to show critical data at a glance.
  - Create a custom favorites list for quick access to important data
- Measurements are selectable in metric or English units.
- Supports Modbus® protocol through serial bus and Ethernet networks, and supports SNMP and BACnet® through Ethernet networks.

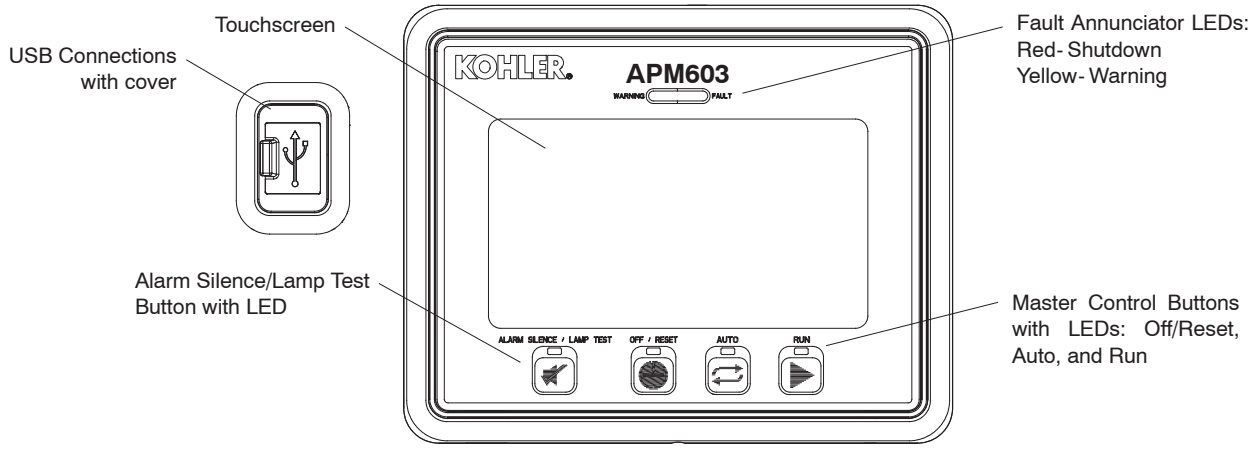
Global Support

- Sales, installation, and service support from more than 800 Kohler and SDMO service providers around the world.

On- board Diagnostics

- Immediate visibility of warnings and faults with text description and code display.
  - 15 seconds of critical data are captured around each warning and fault
  - Critical data can be viewed on the display and downloaded
- Store up to 10,000 events locally along with historical data logging of successful starts.
  - Accurate time stamp from real-time clock
  - Event log can be downloaded
- Data logging of customized parameter list for report generation and advanced troubleshooting.
  - Store to external USB drive for easy transfer to another device

Modbus® is a registered trademark of Schneider Electric.
BACnet® is a registered trademark of ASHRAE.



Controller Features

AC Output Voltage Regulator Adjustment	Maximum of ±10% of the system voltage
Alarm Silence	For NFPA-110 application or user convenience
Alternator Protection	Generator set overload and short circuit protection
Cyclic Cranking	Provides automatic restart after a failed start attempt with programmable on/off time and number of attempts
ECU Diagnostics	Displays engine ECU fault codes and descriptions for engine troubleshooting
Engine Start Aid	Control for an optional engine starting aid
Environmentally Sealed Membrane Keypad	Three master control buttons with LEDs: Off/Reset, Auto, and Run
Patented High-Speed RMS Digital Voltage Regulator	±0.25% no-load to full-load regulation with three-phase true RMS sensing
Lamp Test	Verifies functionality of the indicator LEDs
Real-time Clock	Includes battery back-up to retain date and time through controller power cycle
Remote Reset	Allows remote fault resets and restarting of the generator set
Remote Monitoring Panel	Compatible with the Kohler® Remote Serial Annunciator
Run Time Hourmeter	Displays generator set run time
Run Relay	Indicates that the generator set is running
Time Delay Engine Cooldown (TDEC)	Time delay before the generator set shuts down
Time Delay Engine Start (TDES)	Time delay before the generator set starts

Communication

USB Port	(1) Mini-USB port for PC connection (1) USB port for storage device
Serial (RS-485) Port	(1) Non-isolated for RSA III (1) Isolated for Modbus devices (1) Isolated for paralleling communication
Ethernet Port	(1) RJ45 for Modbus TCP, SNMP, and BACnet

Controller Specifications

Nominal voltage	12 or 24 VDC protected against reverse battery connection
Power	800 mAmps at 12 VDC 400 mAmps at 24 VDC
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% to 95% non-condensing
Display Size, W x H	154 x 86 mm (6.0 x 3.4 inches)
Protection Index	IP65 Front

Paralleling Features

- Isochronous control with real and reactive load sharing with other APM603 controller equipped generator sets
  - Supports paralleling up to 8 generators
- Random first-on logic to prevent two or more generator sets from closing to a dead bus and provides the fastest response for a single generator online
- Automatic synchronizer with dead bus closing
- Soft loading and unloading for generator management
- Protective relay functions:
  - Synch check (25C)
  - Over current (51)
  - Over frequency (81O)
  - Over power (32O)
  - Over voltage (59)
  - Reverse power (32R)
  - Reverse reactive power (32RQ)
  - Under frequency (81U)
  - Under voltage (27)
- Generator management to allow the start and stop of generators based on load demand or state of other generators
  - Fuel level
  - Run time
  - Manual order
  - Time of day
  - Efficiency
- Simplified paralleling system view from any generator controller in the system

Overcurrent Protective Device

- Provides protection against line-to-line and line-to-neutral faults
- Uses thermal and instantaneous current limit settings for alternator protection
- Includes a maintenance mode for arc flash reduction per NEC 240.87

Load Management Features

- Programmable outputs included to command the connect and disconnect of loads based on generator or paralleling system state
  - Loads connected based on available capacity
  - Loads disconnected at system startup
  - Loads disconnected based on a maximum kW setting or underfrequency setting
- Supports up to 16 prioritized load steps per system
  - Can be used on a single generator system
  - Can be combined in a paralleling system for a total system load control capability
- Simplified load management system view from any generator controller in the system
- Requires input/output module option

Advanced Programmable I/O

- Configurable inputs and outputs can be programmed for customer specific use
- PLC-like capability for applying logic to customize generator system behavior

Troubleshooting Features

- 15 seconds of key data automatically captured around each warning and shutdown
  - Data can be exported for detailed analysis
  - Data can be viewed on controller for convenient on-site troubleshooting support
- Configurable data logger will allow you to select parameters to monitor
  - Data stored to USB device for flexibility on amount of data stored and ability to export for detailed analysis
  - Data capture controlled by user to allow capturing specific data required

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 Engine Data.

Standards

The generator set controller has been tested and verified for compliance with the following standards.

- NFPA 99
- NFPA 110, Level 1
- CSA 282-09
- UL 6200
- ASTM B117 (salt spray test)

Controller Functions

The controller displays warning, shutdown, and status messages. **All functions are available as relay outputs.**
Warning causes the yellow fault LED to show and sounds the alarm horn, signaling an impending problem.
Shutdown causes the red fault LED to show, sounds the alarm horn, and stops the generator set.

The controller communicates with the engine ECU and supports a large number of warning and shutdown events that are not listed here. This table highlights the items required for NFPA 110.

Event	Warning	Shutdown
Alternator Thermal Protection †		●
Battery Charger Fault *	▲	
CAN Option Board1 Comm Loss	▲	
Critically Low Fuel Level (diesel) *	▲	
ECU Diagnostic Event	▲	
ECU Mismatch Shutdown †		●
Fuel Leak Alarm (diesel) *	▲	
High Battery Voltage Warning	▲	
High Coolant Temperature Shutdown †		●
High Coolant Temperature Warning	▲	
High Fuel Level Warning (diesel) *	▲	
High Oil Temperature Shutdown †		●
High Oil Temperature Warning	▲	
Local Emergency Stop Shutdown †		●
Loss ECU Comms Shutdown †		●
Loss of Signal Low Coolant Level Voltage	▲	
Low Battery Voltage Warning	▲	
Low Coolant Level Shutdown †		●
Low Coolant Temperature Warning	▲	
Low Fuel Level Shutdown (diesel) * †		●
Low Fuel Level Warning (diesel) *	▲	
Low Fuel Pressure Warning (gas) *	▲	
Low Oil Pressure Shutdown †		●
Low Oil Pressure Warning	▲	
Low RTC (clock) Battery Voltage	▲	
Maintenance Reminder1	▲	
Maintenance Reminder2	▲	
Maintenance Reminder3	▲	
Maximum Power Shutdown †		●
Maximum Power Warning	▲	
Not In Auto Alarm	▲	
Over Crank Shutdown †		●
Over Current Shutdown (L1, L2, L3) †		●
Over Current Warning (L1, L2, L3)	▲	
Over Frequency Shutdown †		●
Over Frequency Warning	▲	
Over Power Shutdown †		●
Over Power Warning	▲	
Over Speed Shutdown †		●
Over Voltage Shutdown (L-L, L-N, each phase) †		●
Over Voltage Warning (L-L, L-N, each phase)	▲	

Event	Warning	Shutdown
Remote Emergency Stop Shutdown †		●
Reverse Power Shutdown †		●
Reverse VAR Shutdown †		●
Under Frequency Shutdown †		●
Under Frequency Warning	▲	
Under Voltage Shutdown (L-L, L-N, each phase) †		●
Under Voltage Warning (L-L, L-N, each phase)	▲	
Weak Cranking Battery	▲	
Status Messages		
Auto Button Pressed		
EPS Supplying Load		
Generator Running		
Generator Started		
Generator Stopped		
GFCI Warning *		
Load Shed Overload		
Load Shed Under Frequency		
Off Button Pressed		
RSA Event Programmable Digital Inputs, 1-8		
Run Button Pressed		

* Function requires optional input sensors or kits
† Items included with common fault shutdown 10

John Deere Engine-Powered Models
Inputs and Outputs

Standard Dedicated User Inputs	Input Type
Auxiliary Fault (Shutdown)	Digital Input
Auxiliary Warning	
Battery Charger Fault	
Breaker Closed *	
Breaker Open *	
Excitation Over Voltage (350 kW and up)	
Fuel Leak Alarm	
Low Fuel Level Switch	
Remote Emergency Stop	
Remote Engine Start	Two-wire input
Speed Bias	Analog Voltage Input, Scalable up to +/- 10 VDC
Voltage Bias	

Standard Dedicated User Outputs	Output Type
Close Breaker *	Relay Driver Output
Common Failure	
Run	
Trip Breaker / Shunt Trip *	
* Only with remote- mounted electrically operated circuit breakers.	

Optional Configurable User Inputs and Outputs	
User Configurable Inputs	2 Analog, 0- 5 VDC 4 Dry Contact Digital
User Configurable Relay Outputs	14 NO/NC Relays 1 Common Fault Relay
Note: Programmable I/O is configurable by a Kohler-authorized technician	

JD Engine Data

The following John Deere engine data is displayed on the APM603 controller.

Parameter
Engine Model Number
Engine Serial Number
ECU Serial Number
Coolant Temperature
Engine Speed
Fuel Pressure
Fuel Consumption Rate
Oil Pressure
Run Time Hours

Kohler KD Engine-Powered Models
Inputs and Outputs

Standard Dedicated User Inputs	Input Type
Auxiliary Fault (Shutdown)	Digital Input
Auxiliary Warning	
Battery Charger Fault	
Breaker Closed *	
Breaker Tripped/Open *	
Fuel Leak Alarm	
Fuel Level	
Idle Switch	
Key Switch Enable	
Low Fuel Level Switch	
Low Oil Level	
Remote Emergency Stop	
Remote Reset	
Remote Engine Start	Two-wire input
Speed Bias	Analog Voltage Input, Scalable up to +/- 10 VDC
Voltage Bias	

Standard Dedicated User Outputs	Output Type
Close Breaker *	Relay Driver Output
Common Failure	
Common Warning	
EPS Supplying Load	
Generator Running	
Horn	
Low Coolant Temperature	
Not in Auto	
System Ready	
Trip Breaker / Shunt Trip *	
* Only with remote- mounted electrically operated circuit breakers.	

Optional Configurable User Inputs and Outputs	
User Configurable Inputs	16 Dry Contact Digital
User Configurable Relay Outputs	8 NO/NC Relays
Note: Programmable I/O is configurable by a Kohler-authorized technician.	

KD Engine Data

The following Kohler Diesel engine data is displayed on the APM603 controller.

Parameter
Engine Model Number
Engine Serial Number
Ambient Temperature
Charge Air Pressure
Charge Air Temperature
Common Rail Fuel Pressure
Coolant Level
Coolant Temperature
Crankcase Pressure
Engine Speed
Fuel Consumption Rate
Fuel Pressure
Fuel Temperature
Intercooler Coolant Temperature (K175 engines only)
Oil Temperature
Oil Pressure
Run Time Hours

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

APM603 Available Options

- ❑ **Common Failure Relay** provides a relay output to signal a generator set fault.
- ❑ **Battery Charger** available with 6 amp, 10 amp, and 20 amp output for 12 and 24V DC voltage output. (Availability is generator model dependent.) The 10 amp and 20 amp models provide NFPA 110 charging and alarming capability.
- ❑ **Electrically Operated Circuit Breakers**
  - For paralleling systems
  - Available generator-mounted or remote-mounted
  - 24VDC
- ❑ **Ground Fault Relay** provides a relay output to signal a ground fault is detected.
- ❑ **Input/Output Module** for Kohler Diesel (KD) models provides:
  - 16 digital input connections with connection to ground
  - 8 relay output connections (Form C, rated 8A, 240 VAC or rated 0.5 A, 48 VDC)
- ❑ **Input/Output Module** for models other than KD provides:
  - 2 analog inputs (0- 5 VDC)
  - 4 digital input connections with connection to ground
  - 14 relay output connections (Form C, rated 10A, 120V)
  - 1 common fault relay output (NO, rated 2A, 24VDC)
- ❑ **Key Switch** to allow selection of RUN, OFF and AUTO modes. Lockable in the AUTO position by removing the key.
- ❑ **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.
- ❑ **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.

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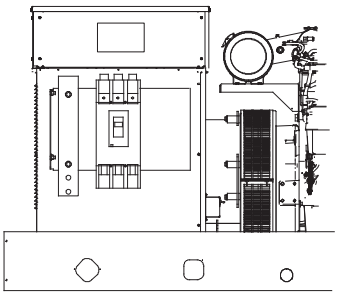
KOHLER POWER SYSTEMS

CIRCUIT BREAKER(S)

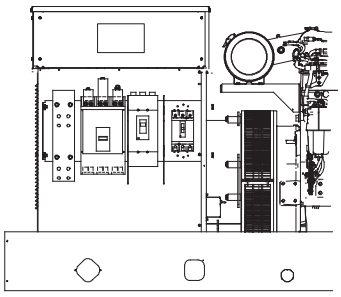
KOHLER.

Industrial Generator Set Accessories

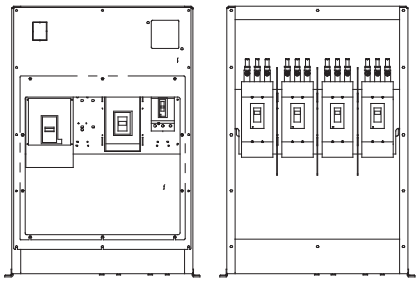
Line Circuit Breakers 15- 3250 kW



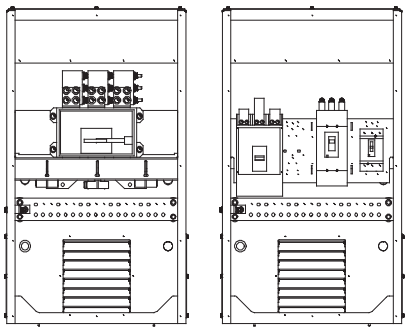
Single Circuit Breaker Kit with Neutral Bus Bar
15- 300 kW Model Shown



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.

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.

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	
	700- 800	Thermal Magnetic	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	
	3000	Electronic LSI	NW
		Electronic LSIG	

Load Bus Rating

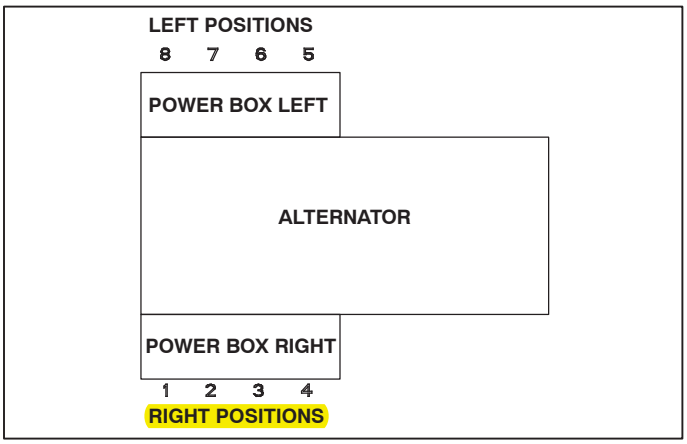
Gen. Set Model	Alt. Model	Rating, Amperes	Type
KD800- KD2500	KH	2000 3000 4000 4500	Load Bus

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

800- 2500 kW KD Model Line Circuit Breaker Specifications

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.

Circuit Breaker Lugs Per Phase (Al/Cu)

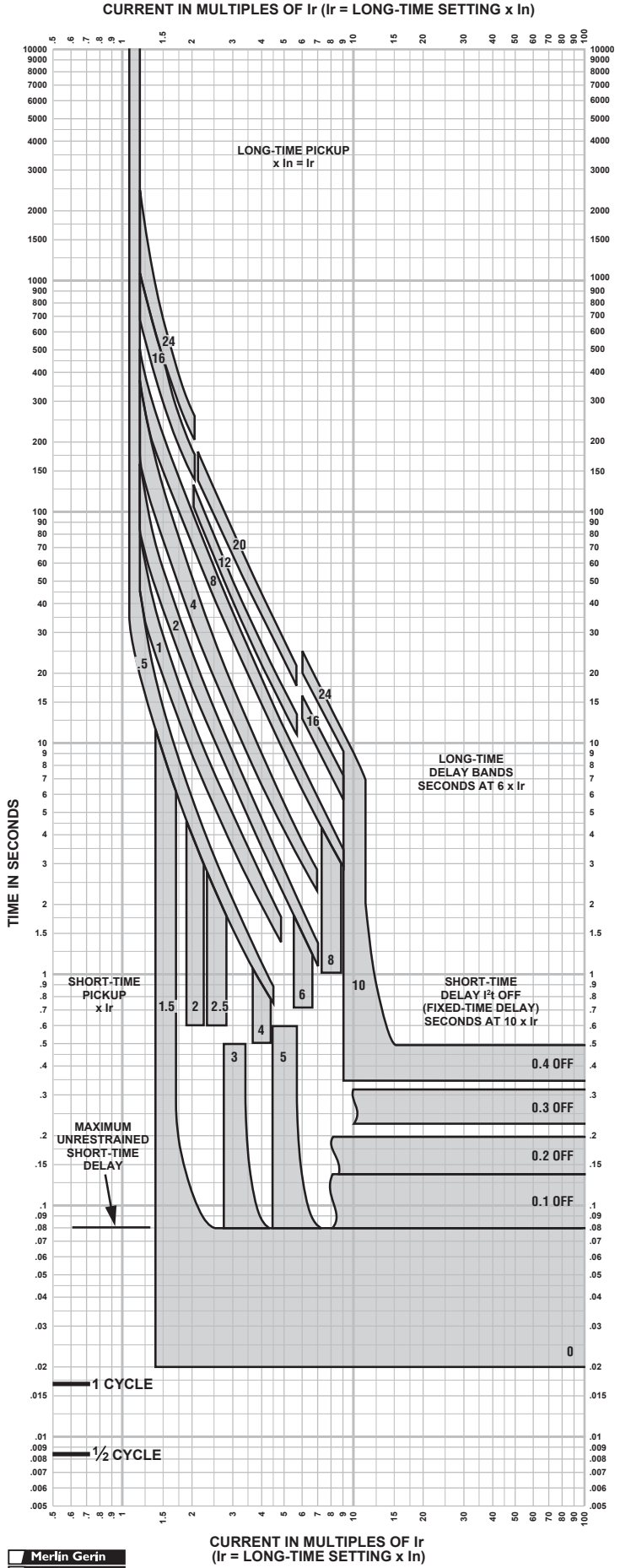
Frame Size	Ampere Range	Wire Range
H	15- 150	One #14 to 3/0
J	175	One 1/0 to 4/0
	200- 250	One 3/0 to 350 kcmil
LG	400- 600	Two 2/0 to 500 kcmil
M	700-800	Three 3/0 to 500 kcmil
P	600-800	Three 3/0 to 500 kcmil
	1000-1200	Four 3/0 to 500 kcmil
R	1600- 2500	(8) 1/0 to 750 kcmil or (16) 1/0 to 300 kcmil
NW	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

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.



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

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

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

The most compact and innovative molded case circuit breakers

P-Frame 1200 A

R-Frame

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

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

Full-Featured Performance

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

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

Onboard Intelligence

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

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

MICROLOGIC® Trip Units

Choose the Model that Meets Your Needs

MICROLOGIC 3.0 and 5.0

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

MICROLOGIC 3.0A, 5.0A and 6.0A

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

MICROLOGIC 5.0P and 6.0P

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

MICROLOGIC 5.0H and 6.0H

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

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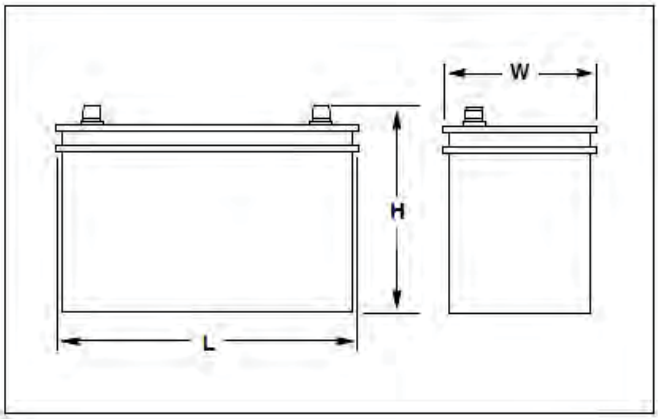
SQUARE D
Schneider Electric

KOHLER®

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

Typical Overall Dimensions

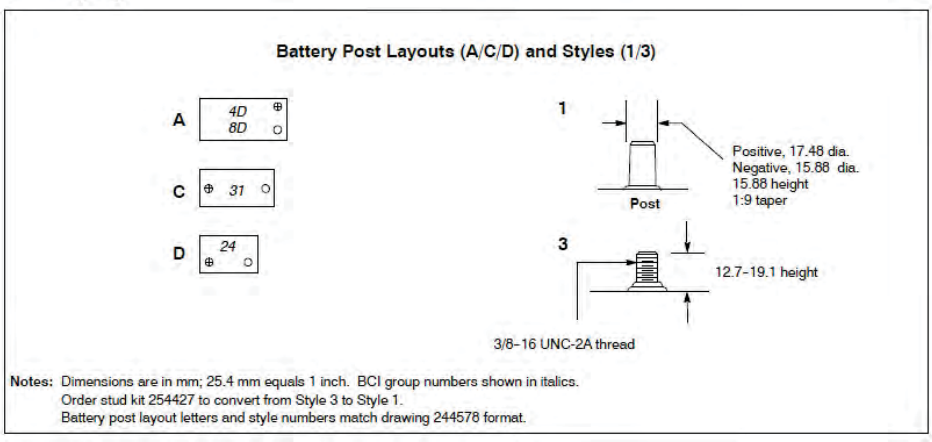


Standard Features

- 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.
- Batteries are rated according to SAE standard J-537. All batteries are 12-volt and have lead-calcium or lead-antimony plates with sulfuric acid electrolyte.
- Most generator set battery kits offer dry-charged or wet-charged batteries.
- Tough polypropylene cases protect against life-shortening vibration and impact damage.
- 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 18ºC (0ºF) Min.	Reserve Capacity Minutes at 27º (80ºF) Min.	Battery Post Layout and Style
				L	W	H			
AGM	10702001800	2	4D	527.1 (20.8)	216.0 (8.5)	258.0 (10.2)	1110	380	A/1

Battery Specifications



KOHLER. Power Systems

24V, 20A Battery Charger

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

Applicable to the following:
KD Model Generator Sets

Standard Features

- Microprocessor Controlled High Frequency Charging Technology
- Single Phase AC Input 105–264VAC, 45–65Hz
- LCD Display
- Charger Failure Alarm with LED Indicator and Form “C” Dry Type Relay Contact
- Adjustable Float Voltage
- AC to DC Isolation
- Filtering Suitable for VRLA Batteries
- Internal Temperature Compensation with Disable Option
- Input and Output Fuses
- Adjustable Current Limiting
- Meets NFPA 110 and C62.41A
- UL/cUL 1236 Listed

The batttery charger uses High Frequency charging technology. The battery charger incorporates Power Factor Correction Circuitry to achieve high efficiency and a wide input range.

This filtered output unit is designed and built to charge VRLA (Gel–Cell, AGM), Flooded Lead Acid, and Nickel Cadmium batteries.

The battery charger is equipped with an LCD display showing DC Volts, DC Amps, and three status LEDs. Integrated Battery Charge Divider / Isolator provides connections for charging up to three independent batteries simultaneously.

Front Panel Display

DC Output		AC Input			Shipping Weight	
Volts (Nominal)	Amps	Volts (Nominal)	Amps	Overall Dimensions W x D x H	kgs	lbs
24	20	105/264	5.0/2.45	243 x 116.1 x 403 mm 9.6 x 4.6 x 15.9 in	5.1	11.3

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

Kohler Power Systems
Asia Pacific Headquarters
7 Jurong Pier Road
Singapore 619159
Phone (65) 6264-6422, Fax (65) 6264-6455

Specifications

AC Input	105–264 VAC, 45–65 HZ, Single Phase
Nominal DC Output	20A @ 24 V
Regulation - Power Stage Only	
Line:	± 10%
Load:	<± 0.5%
Protection	
Input:	Fuse with surge and transient protection
Output:	Fuse with surge protection
Thermal:	Shuts down when overheated
Short Circuit	
AC Over Voltage	
Output Current Limit	Factory set at 100% Adjustable from 50–105%
Metering	LCD DC Output Digital Voltmeter and Ammeter (1%)
Adjustable Voltage Range (Per Cell)	2.15–2.35 volts/cell (Lead) 1.39–1.49 volts/cell (NiCad)
Alarm Contacts	Charger Failure (Form “C” Contact for Charger Failure)
Monitoring	
LCD Display:	Volts Amps
LED Indications:	Current Limit (Red) AC On (Green) Charger Fail (Red)
Environmental	
Operating:	–40°C to 50°C (–40°F to 122°F) (Derated up to 70°F)
Storage:	–40°C to 85°C (–40°F to 185°F)
Relative Humidity:	0% to 95% non condensing
Enclosure	
Structural Design:	Wall Mounting / Powder coat finish
Cable Entry:	Bottom
Standards	USCG requirements ANSI C62–41 cUL NFPA 110

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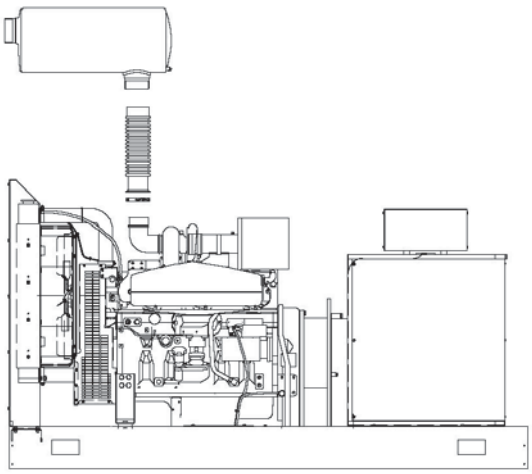
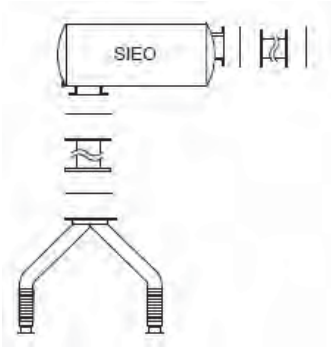




Use the illustrations on the following pages to select the available silencer type and exhaust system configuration best suited for your application. Refer to your authorized distributor/dealer for silencer and component kit numbers and for silencer dimensions.

Backpressure Considerations

Consult the generator set spec sheet to determine the maximum allowable exhaust backpressure. Add the backpressure produced by the silencer and exhaust piping together to determine the total exhaust system backpressure. Contact an authorized distributor/dealer to calculate backpressure in exhaust piping. Do not exceed the maximum allowable backpressure.

Legend

Use the information below for identifying the exhaust system components shown in the illustrations on the following pages.

Side Inlet End Outlet (SIEO)

End Inlet End Outlet (EIEO)

Flex Exhaust

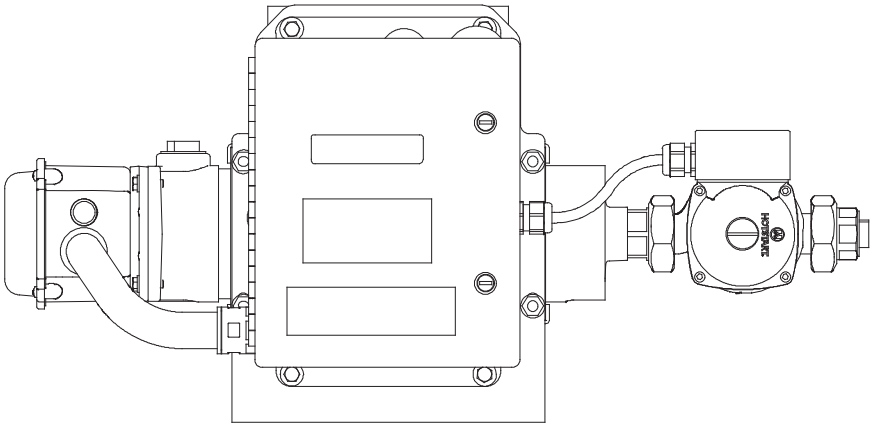
Flex Exhaust (wye)

Exhaust System Kits	Qty. in Kit	Size, In/Out	Note
Flex Exhaust (wye)	2	12 in.	Kit includes (1) flex wye tube and the mounting hardware. Exhaust elbow gaskets are supplied on the engine.

KOHLER

Industrial Generator Set Accessories

Engine Block Heater Kits



Block Heater Kit, Typical

Applicable Models

- KD800- KD1750
- KD2000- KD3250
- KD3500- KD4000

Standard Features

- UL- C/US listed (60 Hz Models) - E250789CE
- 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 has a thermostat, pump, and temperature control system. The pump circulates warm coolant into the engine and supplies constant heating to the engine. The engine block heater kit helps to extend element life and gives a significant reduction in electrical consumption.

The engine block heater has a fixed setting thermostat that turns ON when the engine coolant temperature reaches 49°C (120°F) and turns OFF when the engine coolant temperature reaches 60°C (140°F).

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

The engine block heater kits are available in 208 V, 240 V, 380 V, and 480 V versions.

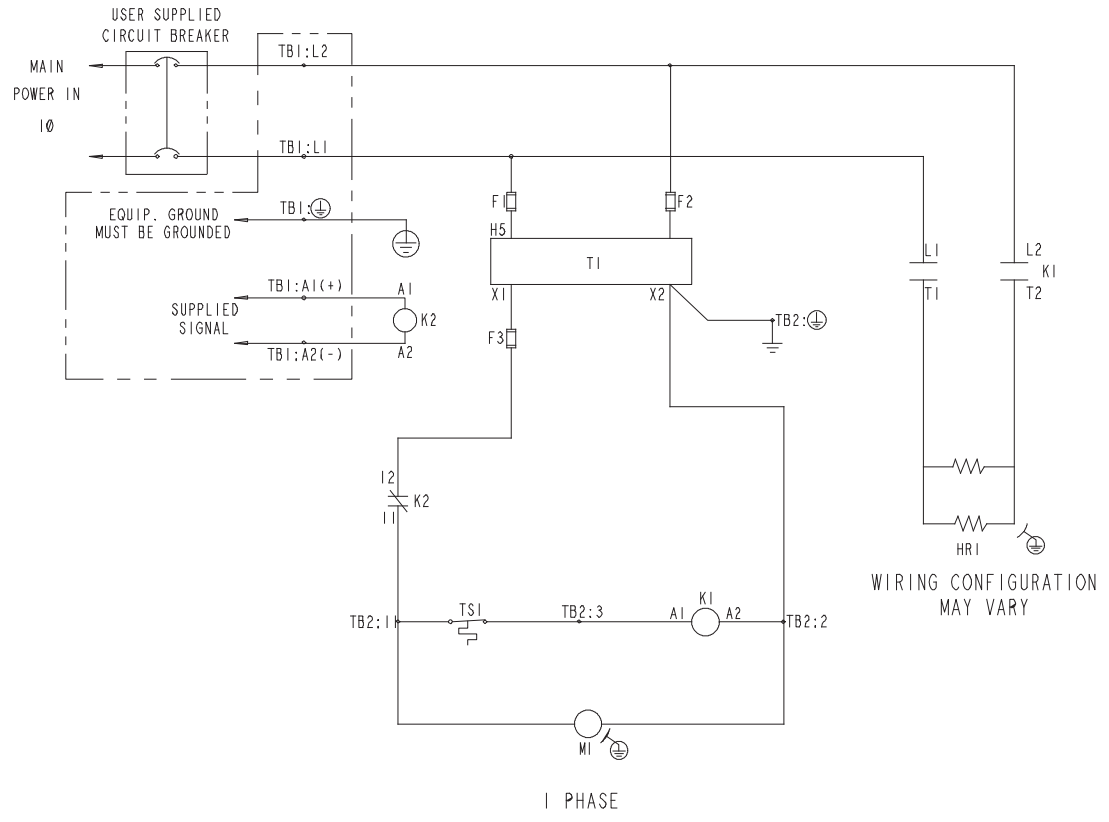
Block Heater Specifications

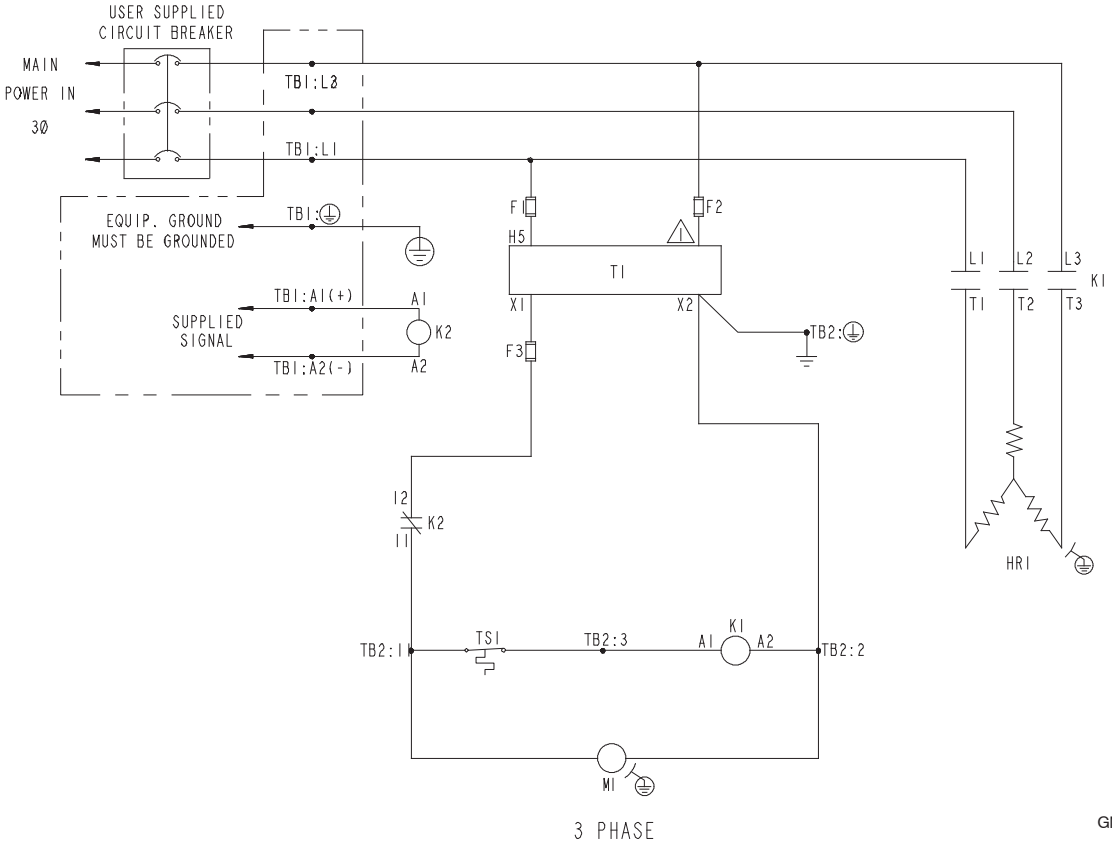
Heating Fluid	Engine Coolant (50% Glycol/50% Water)
Fixed Thermostat	49°- 60°C (120°- 140°F)
Flow	10 GPM (2.2m^3/hr) @ 10 ft head (3 mWc)
Pump Power	70W (50 Hz), 97W (60 Hz)
Max. Pressure	125 psi (860 kPa)
Pressure Loss	0.2 psi (1.5 kPa)
Inlet Plumbing	1.0 in NPT
Outlet Plumbing	1.0 in NPT
Main Control Box Ingress Protection	NEMA 4 (IP66)
Motor Ingress Protection	IP44 (50 Hz), NEMA 2 (60 Hz)

Specifications

Block Heater Kit Number	Component	Watts	Voltage	Phase
10305000145- KA1	10305000200	6000	480	3
10305000145- KA2	10305000300	6000	240	1
10305000145- KA3	10305000400	6000	480	1
10305000145- KA4	10305000500	6000	240	3
10305000145- KA5	10305000600	6000	380	3
10305000145- KA6	10305000700	6000	208	1
10305000145- KA7	10305003100	6000	208	3
10305001400- KA1	10305001500	9000	480	3
10305001400- KA2	10305001600	9000	240	1
10305001400- KA3	10305001700	9000	480	1
10305001400- KA4	10305001800	9000	240	3
10305001400- KA5	10305001900	9000	380	3
10305001400- KA6	10305002000	9000	208	1
10305001400- KA7	10305003300	9000	208	3
10305002800- KA1	10305001800	9000	240	3
10305002800- KA2	10305001500	9000	480	3
10305002800- KA3	10305001600	9000	240	1
10305002800- KA4	10305001700	9000	480	1
10305002800- KA5	10305001900	9000	380	3
10305002800- KA6	10305002000	9000	208	1
10305002800- KA7	10305003300	9000	208	3
10305003501- KA1	10305001500	9000	480	3
10305003501- KA2	10305001600	9000	240	1
10305003501- KA3	10305001700	9000	480	1
10305003501- KA4	10305001800	9000	240	3
10305003501- KA5	10305001900	9000	380	3
10305003501- KA6	10305002000	9000	208	1
10305003501- KA7	10305003300	9000	208	3
10305003601- KA1	10305003804	12000	240	3
10305003601- KA2	10305003807	12000	480	3
10305003601- KA3	10305003803	12000	240	1
10305003601- KA4	10305003806	12000	480	1
10305003601- KA5	10305003805	12000	380	3
10305003601- KA6	10305003801	10500	208	1
10305003601- KA7	10305003802	12000	208	3
10305004001- KA1	10305003804	12000	240	3
10305004001- KA2	10305003807	12000	480	3
10305004001- KA3	10305003803	12000	240	1
10305004001- KA4	10305003806	12000	480	1
10305004001- KA5	10305003801	10500	208	1
10305004001- KA6	10305003802	12000	208	3

Wiring Diagram





GM62498V-4

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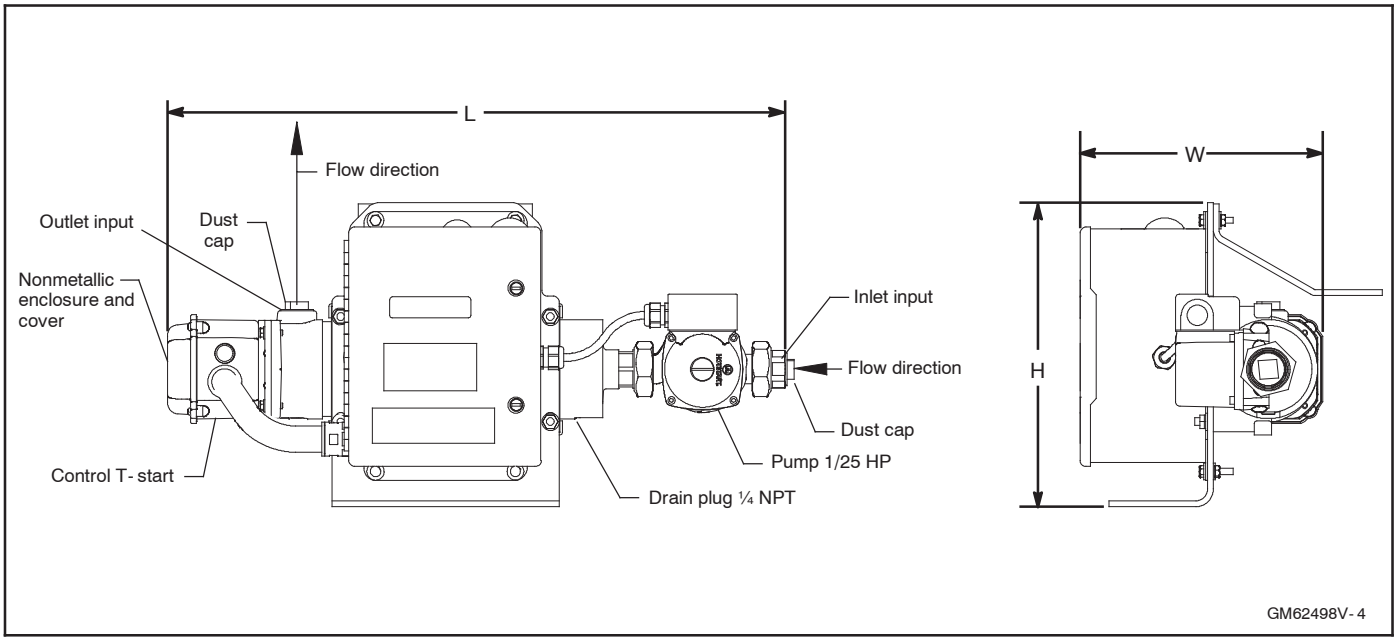
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the US and Canada, phone 1-800-544-2444
KOHLERPower.com

Dimensions and Weights

Overall Size, L x W x H, mm (in):	674 x 264 x 330 (26.53 x 10.4 x 12.9)
Weight, wet, kg (lb):	16.8 (37)



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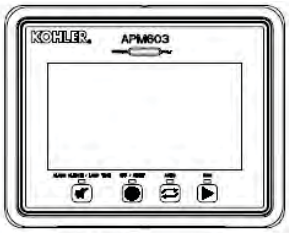
Integral Voltage Regulator with Kohler® APM603 Controllers and Menu-Driven Selections (80-3250 kW Generator Set Models)



APM603 Controller with Integral Voltage Regulator

The voltage regulator is integral to the controller and uses patented high speed digital voltage regulator design providing ±0.25% no-load to full-load regulation using root-mean-square (RMS) voltage sensing.

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 APM603

Calibration	Range Settings	Default Selection
Voltage Adjustment	±10% of System Voltage	System Voltage
Controller Gain	40 to 70 Hz	P: 1.3 I: 1.0 D: 0.25
Underfrequency Unload or Frequency Setpoint	40 to 70 Hz	0.5 Hz Below System Frequency (ECM)
Underfrequency Unload Scope	0-10% of Rated Voltage (Volts per Cycle)	15 Volts per Cycle at 480 Volts (3.1%)
Reactive Dropp	0-10% of System Voltage	4% of System Voltage
VAR Control	-50% to 110%	0 kVAR
PF Adjust Control	-0.50 to 1.0 to 0.50	0.8 Lagging
VAR/PF Gain Adjustment	P: 0.3 to 3.00 I: 0.3 to 3.00 D: 0.3 to 3.00	P: 1.0 I: 1.0 D: 0.25

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Specification/Feature	Integral with APM603
Generator Set Availability	80-500 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	100-600 Volts (L-L), 50-60 Hz
Sensing Mode	RMS, Single- or 3-Phase
Input Requirements	8-36 VDC
Continuous Output	5.0 ADC with GM88453 Activator Board
Maximum Output	7.8 ADC with GM88453 Activator Board
Transition Frequency	50-70 Hz
Exciter Field Resistance	4-30 Ohms with GM88453 Activator Board
No-Load to Full-Load Voltage Regulation	±0.25%
Thermal Drift	<0.5% (-40°C to 70°C) [-40°F to 158°F] Range
Response Time	3-phase: 1 mS 1-phase: 5 mS
System Voltage Adjust.	±10%
Voltage Adjustment	Controller Display
Remote Voltage Adjustment	Analog 0-5 VDC (±10%) Input Optional
Paralleling Capability	Full Load Share and Control plus Reactive Droop
VAR/PF Control Input	VAR Control Mode, PF Control Mode, System VAR Control, System PF Control

Integral Voltage Regulator with APM603 Controller

- A 7.5-inch color TFT touchscreen provides access to data.
- The controller provides an interface between the generator set and switchgear for paralleling applications incorporating multiple generator set and/or utility feeds.
- The controller can control Fast Response™ II, Fast Responset™X, and PMG alternators using the GM88453 activator board.

Voltage Regulator Settings, APM603 Controller

- Voltage Regulator Configuration
  - Under Frequency Unload Settings
  - Single and Three Phase Sensing
  - Voltage Target
  - Voltage Regulator Gains

Paralleling Settings, APM603

- Synchronizing parameters setup
  - Voltage matching
  - Frequency matching
  - Phase matching
  - Time delay

- Load sharing
  - kW sharing
  - kVAR sharing
  - Baseload settings
  - Droop

Paralleling Metering, APM603

- Paralleling State
  - Paralleling Mode
  - System Voltage
  - System Frequency
  - Connected Generators
  - Sync Status
  - Engine Speed

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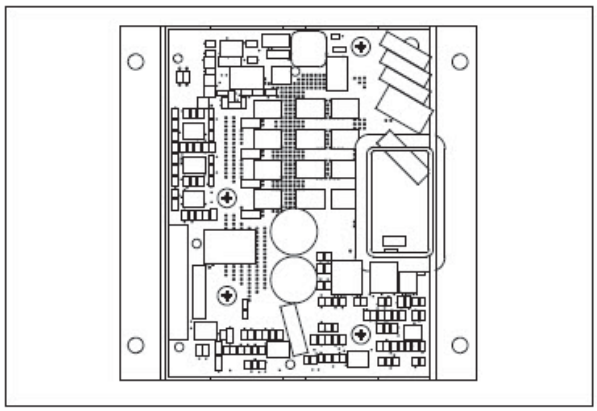
Activator Board GM88453



- 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.

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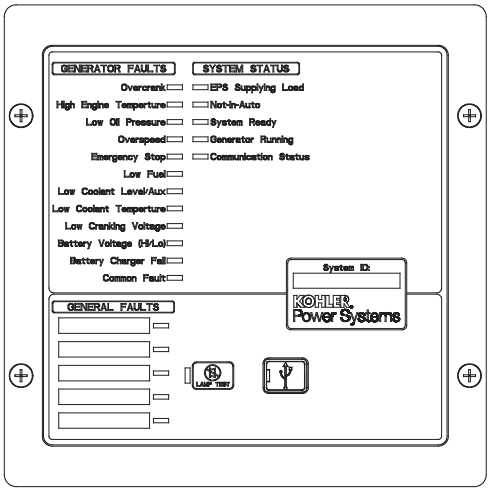
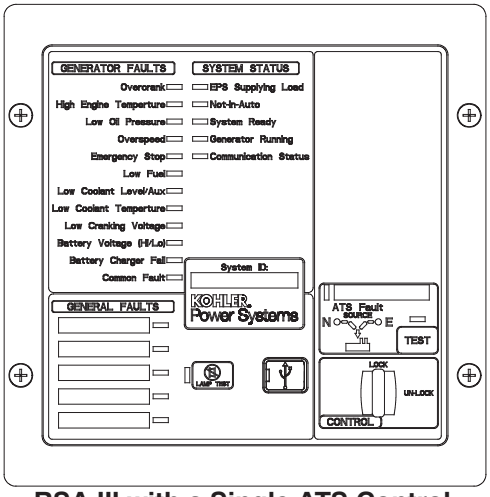
KOHLER POWER SYSTEMS

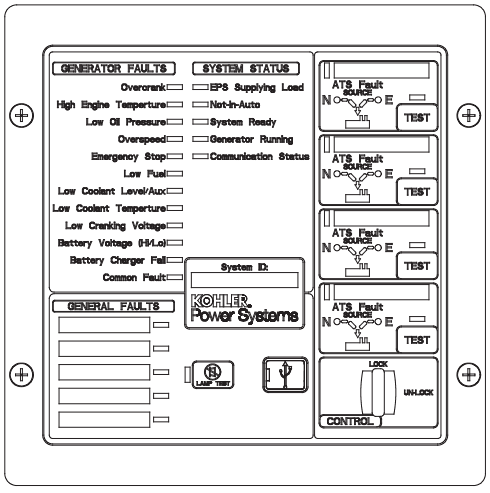
ANNUNCIATOR



RSA III



RSA III with a Single ATS Control



RSA III with Four ATS Controls

Remote Serial Annunciator III (RSA III) for Kohler® Controllers

- Monitors the generator set equipped with one of the following controllers:

APM402	Decision-Maker® 3000
APM603	Decision-Maker® 3500
APM802	Decision-Maker® 6000
Decision-Maker® 3+	Decision-Maker® 8000
Decision-Maker® 550	KPC 1000

- Allows monitoring of the common alarm, remote testing of the automatic transfer switch, and monitoring of the normal/emergency source for up to four ATS with any of the following controllers:

  Decision-Maker® MPAC® 750, 1200, and 1500

  MPAC® 1000 and 1500
- Configuration via a personal computer (PC) software.
- Writable surfaces (white boxes in illustrations) for user-defined selections.
- Uses Modbus® RTU protocol.
- Controller connections:

  RS-485 for serial bus network

  USB port. Connect a personal computer and use Kohler® SiteTech™ software to view events and adjust settings. *

  12-/24-volt DC power supply

  120/208 VAC power supply (available accessory)
- Meets the National Fire Protection Association Standard NFPA 110, Level 1.

Dimensions

- Dimensions—W x H x D, mm (in.).

  Surface Mounted:
  203 x 203 x 83 (8.0 x 8.0 x 3.3)

  Flush Mounted (Inside Wall):
  203 x 203 x 76 (8.0 x 8.0 x 3.0)
  Flush mounting plate W1: 254 (10.0)

* SiteTech™ software is available to Kohler authorized distributors and dealers.

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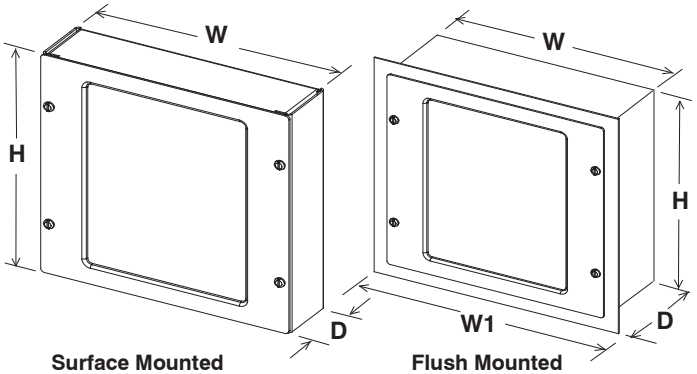

Surface Mounted Flush Mounted

Fault and Status Conditions	Fault LEDs	Fault Horn	System Ready LED	Generator Running LED	Communication Status LED
Overcrank Shutdown	Red	On	Red	Off	Green
High Engine Temperature Warning *	Yellow	On	Red	Green	Green
High Engine Temperature Shutdown	Red	On	Red	Off	Green
Low Oil Pressure Warning *	Yellow	On	Red	Green	Green
Low Oil Pressure Shutdown	Red	On	Red	Off	Green
Overspeed Shutdown	Red	On	Red	Off	Green
Emergency Stop *	Red	On	Red	Off	Green
Low Coolant Level/Aux. Shutdown	Red	On	Red	Off	Green
Low Coolant Temperature *	Yellow	On	Red	Off	Green
Low Cranking Voltage	Yellow	On	Red	Off	Green
Low Fuel—Level or Pressure *	Yellow	On	Red	Green or Off	Green
Not-In-Auto	Red	On	Red	Green or Off	Green
Common Fault	Red	On	Green	Green or Off	Green
Battery Charger Fault (1) *	Yellow	On	Red	Green or Off	Green
Battery Charger Fault (2) *	Yellow	On	Green	Green or Off	Green
High Battery Voltage *	Yellow	Off	Green	Green or Off	Green
Low Battery Voltage *	Yellow	Off	Green	Green or Off	Green
User Input #1 (Warning)	Yellow	Off	Green	Green or Off	Green
User Input #1 (Shutdown)	Red	On	Green	Off	Green
User Input #2 (Warning)	Yellow	Off	Green	Green or Off	Green
User Input #2 (Shutdown)	Red	On	Green	Off	Green
User Input #3 (Warning) (1) †	Yellow	Off	Green	Green or Off	Green
User Input #3 (Shutdown) (1) †	Red	On	Green	Off	Green
User Input #4 (Warning) (1)	Yellow	Off	Green	Green or Off	Green
User Input #4 (Shutdown) (1)	Red	On	Green	Off	Green
User Input #5 (Warning) (1)	Yellow	Off	Green	Green or Off	Green
User Input #5 (Shutdown) (1)	Red	On	Green	Off	Green
EPS Supplying Load	Yellow	Off	Green	Green	Green
Communications Status (Fault mode)	—	Off	Green or Red	Green or Off	Red
ATS Fault (RSA III with ATS Controls only)	Red	On	Red or Yellow	Green or Off	Green

Green LEDs appear as steady on when activated.
Yellow LEDs slow flash when activated except steady on with EPS supplying load and high battery voltage.
Red LEDs slow flash when activated except fast flash with loss of communication and not-in-auto.

Specifications

- LED indicating lights for status, warning, and/or shutdown.
- Power source with circuit protection: 12- or 24-volt DC
- Power source with120/208 VAC, 50/60 Hz adapter (option)
- Power draw: 200 mA
- Humidity range: 0% to 95% noncondensing
- Operating temperature range: - 20°C to +70°C (- 4°F to +158°F)
- Storage temperature range: - 40°C to +85°C (- 40°F to +185°F)
- Standards:
  - NFPA 110, level 1
  - UL 508 recognized
  - CE directive
  - NFPA 99
  - ENS 61000- 4- 4
  - EN6II-4-4 fast transient immunity
- RS-485 Modbus® isolated port @ 9.6/19.2/38.4/57.6 kbps (default is 19.2 kbps)
- USB device port
- NEMA 1 enclosure

(1) All generator set controllers except Decision-Maker® 3+ controller.
(2) Decision-Maker® 3+ controller only.
* May require optional kit or user-provided device to enable function and LED indication.
† Digital input #3 is factory-set for high battery voltage on the Decision-Maker® 3+ controller.
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ATS Controls (RSA III with ATS controls only)

- ATS position LED (normal or emergency)
- Power source indicator LED (normal or emergency)
- ATS fault LED
- Key-operated lock/unlock switch for Test feature
- Test pushbutton

NFPA Requirements

- NFPA 110 compliant
- Engine functions:
  - High battery voltage warning *
  - High engine temperature shutdown
  - High engine temperature warning *
  - Low battery voltage warning *
  - Low coolant level/aux. shutdown
  - Low coolant temperature warning *
  - Low cranking voltage
  - Low fuel warning (level or pressure) *
  - Low oil pressure shutdown
  - Low oil pressure warning *
  - Overcrank shutdown
  - Overspeed shutdown
- General functions:
  - Audible alarm silence
  - Battery charger fault *
  - Lamp test
  - Master switch not-in-auto

Fault and Status LEDs and Lamp Test Switch

Alarm Horn. Horn sounds giving a minimum 90 dB at 0.1 m (0.3 ft.) audible alarm when a warning or shutdown fault condition exists except on high/low battery voltage or EPS supplying load.

Alarm Silenced. Red LED on lamp test switch lights when alarm horn is deactivated by alarm silence switch.

Alarm Silence Switch. Lamp test switch quiets the alarm during servicing. The horn will reactivate upon additional faults.

ATS Fault. Red LED lights when ATS fails to transfer.

Battery Charger Fail. LED lights if battery charger malfunctions. Requires battery charger with alarm contact.

Battery Voltage Hi/Lo. LED flashes if battery or charging voltage drops below preset level. LED lights steady if battery voltage exceeds preset level.

Common Fault. LED lights when a single or multiple common faults occur.

Communication Status. Green LED lights indicating annunciator communications functional. Red LED indicates communication fault.

EPS Supplying Load. LED lights when the Emergency Power System (EPS) generator set is supplying the load (APM402, APM603, APM802, and Decision-Maker® 550, 3000, 3500, 6000, and 8000 controllers) or when transfer switch is in the emergency position (Decision-Maker® 3+ controller).

Emergency Stop. LED lights and engine stops when emergency stop is made. May require a local emergency stop switch on some Decision-Maker® 3+ controllers.

Generator Running. LED lights when generator set is in operation.

High Engine Temperature. Red LED lights if engine has shut down because of high engine coolant temperature. Yellow LED lights if engine coolant temperature approaches shutdown range. Requires warning sender on some models.

Lamp Test (Switch). Switch tests all the annunciator indicator LEDs and horn.

Low Coolant Level/Aux. LED lights when engine coolant level is below acceptable range on radiator-mounted generator sets only. When used with a Decision-Maker® 3+ controller, the LED indicates low coolant level or an auxiliary fault shutdown. Requires user-supplied low coolant level switch on remote radiator models.

Low Coolant Temperature. LED lights if optional engine block heater malfunctions and/or engine coolant temperature is too low. Requires prealarm sender on some models.

Low Cranking Voltage. LED lights if battery voltage drops below preset level during engine cranking.

Low Fuel (Level or Pressure). LED lights if fuel level in tank approaches empty with diesel models or fuel pressure is low on gas models. Requires customer-supplied switch.

Low Oil Pressure. Red LED lights if generator set shuts down because of insufficient oil pressure. Yellow LED lights if engine oil pressure approaches shutdown range. Requires warning sender on some models.

Not In Auto. LED lights when the generator set controller is not set to automatic mode.

Overcrank. LED lights and cranking stops if engine does not start in either continuous cranking or cyclic cranking modes.

Overspeed. LED lights if generator set shuts down because of overspeed condition.

System Ready. Green LED lights when generator set master switch is in AUTO position and the system senses no faults. Red LED indicates system fault.

User-Defined Digital Inputs #1-#5. Monitors five digital auxiliary inputs (can be configured as warnings or shutdowns). User-defined digital inputs are selected via the RSA III master for local or remote (generator set or ATS). The user-defined digital input can be assigned via PC using SiteTech™ setup software.

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Accessories

- ❑ Power source adapter kit 120/208 VAC, 50/60 Hz.
- ❑ Modbus®/Ethernet converter GM41143-KP2 for serial to Ethernet communication.
- ❑ Communication module GM32644-KA1 or GM32644-KP1 is required with Decision-Maker® 3+ controllers.

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Alternator Data

DATASHEET ALTERNATOR

Alternator ref. KH04830T
Alternator type KH04830TO4D

-GENERAL CHARACTERISTICS-

Tension denomination (V)	480/277	**Altitude (m)**	0-1000
Number of Phase	Three phase	**AVR Regulation**	Yes
Number of pole	4	**Indication of protection**	IP23

Capacity for maintaining short circuit at 3 In for 10 s Yes
Winding type Standard

Efficiency & Power

Frequency (Hz)	60 Hz	**Nominal voltage (V)**	480

	Class H				Class F
	125°C/ 40°C continuous	**130°C/ 25°C standby**	**150°C/ 40°C standby**	**163°C/ 27°C standby**	**105°C/ 40°C continuous**
Nominal Rating(Kva)	1560	1590	1630	1700	1440
Nominal Rating(KW)	1248	1272	1304	1360	1152
Efficiency 100%	96,40	96,30	96,30	96,20	96,50

-ELECTRICAL CHARACTERISTICS-

Voltage regulation at established rating (+/- %)	0,50
Insulation class	H
T° class (H/125°), continuous 40°C	H / 125°K
T° class, standby 27°C	H / 163°K
Wave form : NEMA=TIF	<40
Unbalanced load acceptance ratio (%)	100
Winding type	12
Total Harmonic Distortion in no-load DHT (%)	2,4
Wave form : CEI=FHT	<2
Total Harmonic Distortion, on load DHT (%)	1,5
Technology	Without collar or brush
L-L Harmonic Maximum - Single (%)	<3
Deviation Factor (%)	6
Shaft Current	<80
Main Stator Capacitance to ground (mdf)	0,05

Reactances

Direct axis synchro reactance unsaturated (Xd) (%)	391
Direct axis transcient reactance saturated (X'd) (%)	15,40
Direct axis subtranscient reactance saturated (X''d) (%)	7,20
Quadra axis synchro reactance unsaturated (Xq) (%)	181
Quadra axis subtranscient reactance saturated (X"q) (%)	16,50
Zero sequence reactance unsaturated (Xo) (%)	4,06
Negative sequence reactance saturated (X2) (%)	11,80

DATASHEET ALTERNATOR

Alternator ref. KH04830T
Alternator type KH04830TO4D

Short circuit ratio

Short circuit ratio (Kcc)	0,38
Subtranscient time constant (T"d) (ms)	18
Short circuit transcient time constant (T'd) (ms)	271
Open circuit time constant (T'do) (ms)	8900
Subtranscient time constant (T"q) (ms)	0
Leakage stator reactance (Xa)(%)	4,10
Stator Resistance (Ra)(%)	0,0790
Armature time constant (Ta) (ms)	26
No load excitation current (io) (A)	0,70
Full load excitation current (ic) (A)	3,30
Full load excitation voltage (uc) (V)	35,10
Heat rejection (W)	46606
No load losses (W)	18955
Stator resistance (for 20°C ambient) (Ω)	0,0058
Rotor resistance (for 20°C ambient) (Ω)	2,80
Exciter resistance - stator/inductor (for 20° ambient) (Ω)	10,63
Exciter resistance - rotor/armature (for 20° ambient) (Ω)	0,13
Recovery time (Delta U = 20% transcient) (ms)	200
Engine start (Delta U = 20% perm. or 50% trans.) (kVA)	4920
Transcient dip (4/4 load) - PF : 0,8 AR (%)	14

Additional electrical characteristics-

Winding X1, X2 auxiliary resistance (for 20° ambient) (Ω)	0,6770
Auxiliary winding X1, X2 excitation voltage at no load (V)	220
Auxiliary winding X1, X2 excitation voltage on load (V)	234

-MECHANICAL CHARACTERISTICS-

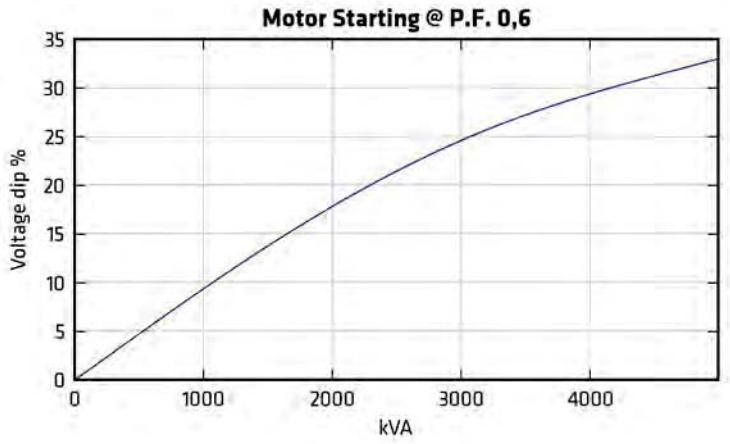
Number of bearing	1
Overspeed (rpm)	2250
Coupling	Direct

DATASHEET ALTERNATOR

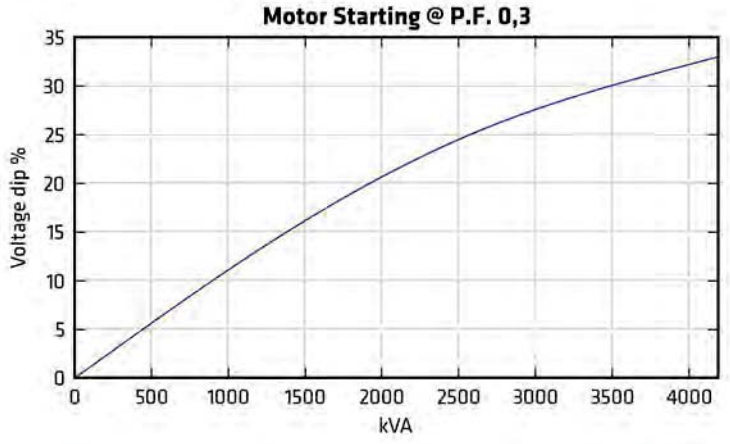
Alternator ref. KH04830T
Alternator type KH04830TO4D

-TECHNICAL CURVES-

Motor starting curve locked rotor (0,6PF)



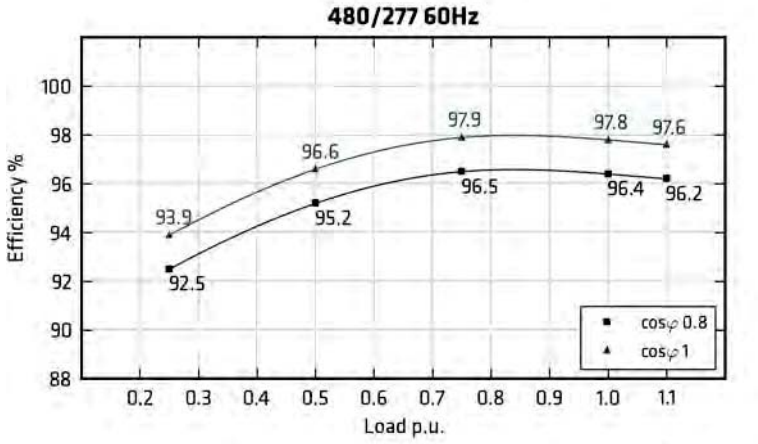
Motor starting curve locked rotor (0,3PF)



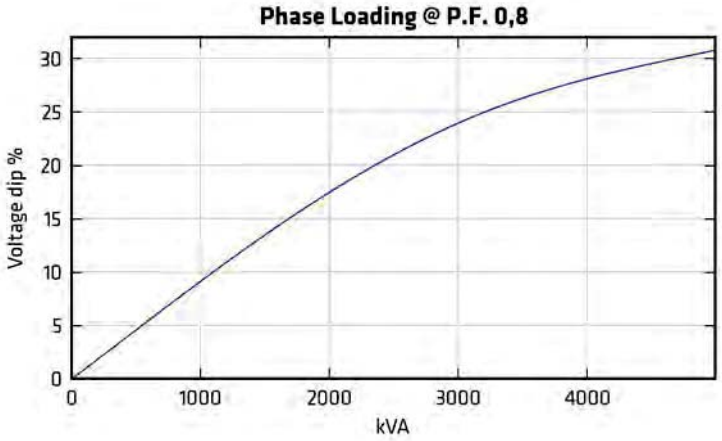
DATASHEET ALTERNATOR

Alternator ref. KH04830T
Alternator type KH04830TO4D

Efficiencies curve (by excitation system)



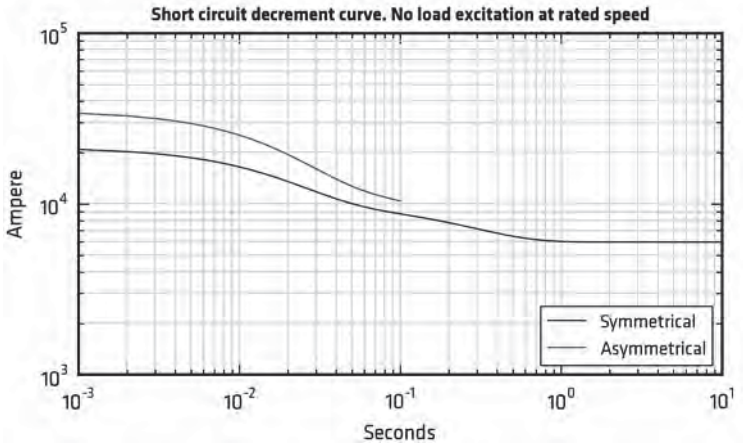
Loading curve (by excitation system)



DATASHEET ALTERNATOR

Alternator ref. KH04830T
Alternator type KH04830TO4D

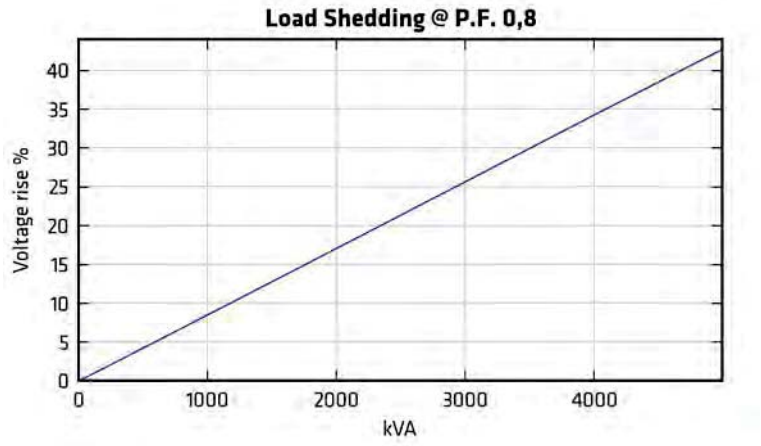
Short circuit curve at no load and rated speed



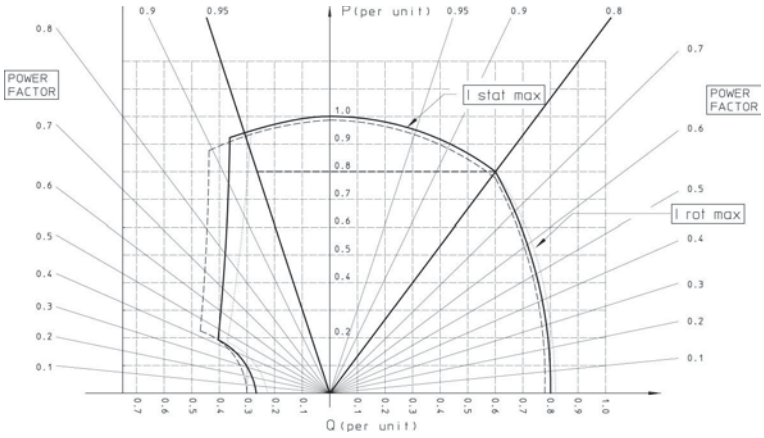
DATASHEET ALTERNATOR

Alternator ref. KH04830T
Alternator type KH04830TO4D

Rejection curve (by excitation system)



Capability curve (PQ diagram)

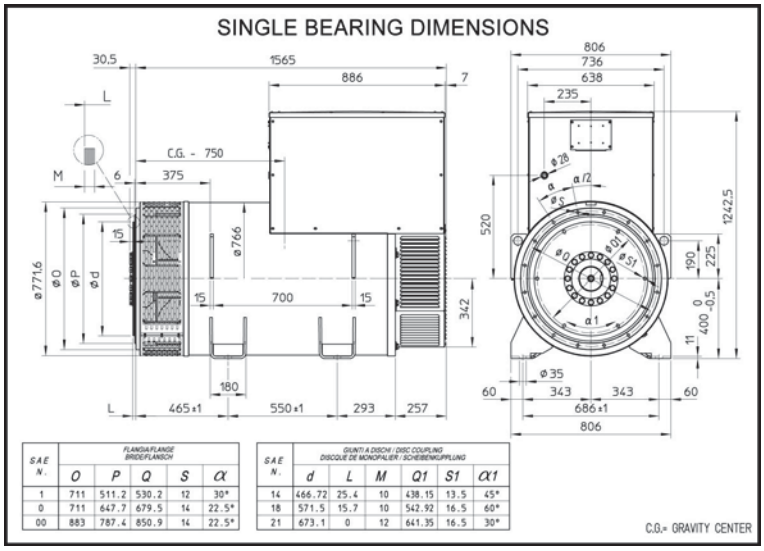


DATASHEET ALTERNATOR

Alternator ref. KH04830T
Alternator type KH04830TO4D

DIMENSIONS-

Overall dimension drawing (Single bearing)



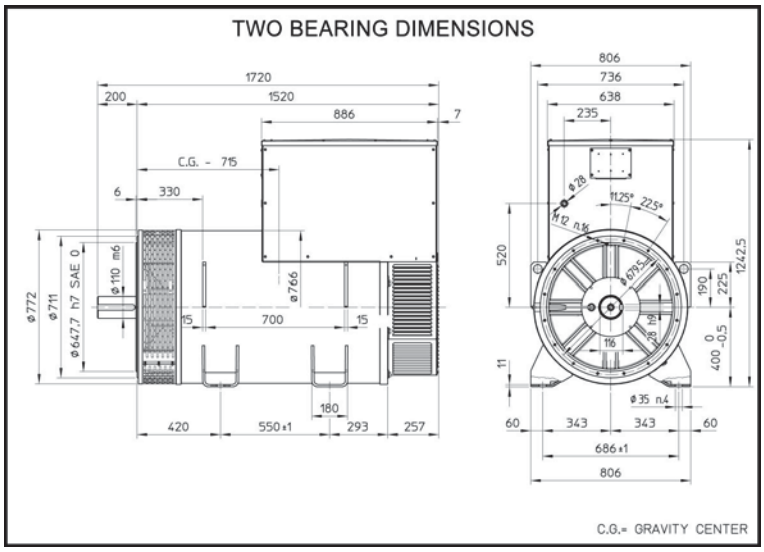
SAE N.	FLANGIA/FLANGE BRIDE/FLANSCH				
	O	P	Q	S	α
1	711	511.2	530.2	12	30°
0	711	647.7	679.5	14	22.5°
00	883	787.4	850.9	14	22.5°

SAE N.	GIUNTI A DISCHI / DISC COUPLING DISQUE DE MONOPALIER / SCHEIBENKUPPLUNG					
	d	L	M	Q1	S1	α1
14	466.72	25.4	10	438.15	13.5	45°
18	571.5	15.7	10	542.92	16.5	60°
21	673.1	0	12	641.35	16.5	30°

DATASHEET ALTERNATOR

Alternator ref. KH04830T
Alternator type KH04830TO4D

Overall dimension drawing (Two bearings)

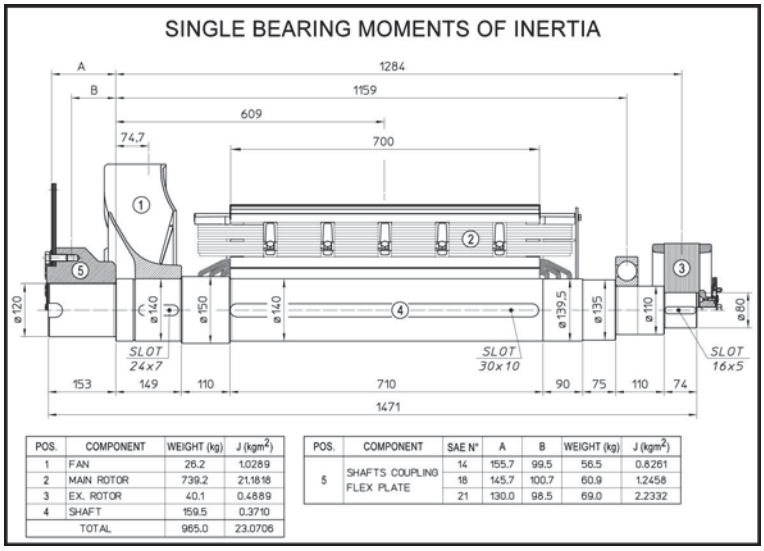


DATASHEET ALTERNATOR

Alternator ref. KH04830T
Alternator type KH04830TO4D

-TORSIONAL ANALYSIS DATA-

Rotation part drawing for torsional vibration calculation (Single bearing)



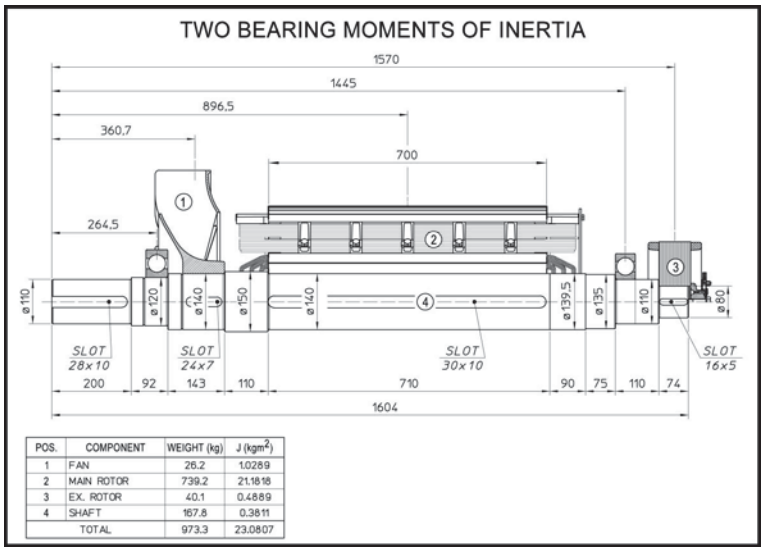
POS.	COMPONENT	WEIGHT (kg)	J (kgm^2)
1	FAN	26.2	1.0289
2	MAIN ROTOR	739.2	21.1818
3	EX. ROTOR	40.1	0.4889
4	SHAFT	159.5	0.3710
TOTAL		965.0	23.0706

POS.	COMPONENT	SAE N°	A	B	WEIGHT (kg)	J (kgm^2)
5	SHAFTS COUPLING FLEX PLATE	14	155.7	99.5	56.5	0.8261
		18	145.7	100.7	60.9	1.2458
		21	130.0	98.5	69.0	2.2332

DATASHEET ALTERNATOR

Alternator ref. KH04830T
Alternator type KH04830TO4D

Rotation part drawing for torsional vibration calculation (Two bearings)



POS.	COMPONENT	WEIGHT (kg)	J (kgm^2)
1	FAN	26.2	1.0289
2	MAIN ROTOR	739.2	21.1818
3	EX. ROTOR	40.1	0.4889
4	SHAFT	167.8	0.3811
	TOTAL	973.3	23.0807

KOHLER®

Cooling Data

TECHNICAL INFORMATION BULLETIN

Generator Set Cooling System Data Sheet

	50°C Ambient Temperature Cooling System								
KD1000 60Hz (Standby Duty)	**Total external restriction on open unit**	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)	51.5 (125)	50 (122)	49 (120)	48 (118)	46 (115)	NA (NA)	45 (113)
	Cooling system airflow	m^3/min (ft^3/min)	1350 (47700)	1289 (45500)	1261 (44500)	1221 (43100)	1170 (41300)	NA (NA)	NA (NA)

	40°C Ambient Temperature Cooling System								
KD1000 60Hz (Standby Duty)	**Total external restriction on open unit**	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)	45.5 (114)	44 (111)	43 (109)	42 (108)	40 (104)	NA (NA)	39 (102)
	Cooling system airflow	m^3/min (ft^3/min)	1212 (42800)	1165 (41100)	1134 (40000)	1102 (38900)	1060 (37400)	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.). 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.
6. Performance is based on a 50/50 water and ethylene glycol mixture.

KOHLER®

Sound Data

TEC NICAL INFORMATION BULLETIN

Generator Set Sound Data Sheet

			Sound Pressure Data in dB(A)			
Generator Set Model		**Load**	**Raw E haust**	**Open Unit, Isolated E haust**	**Level Sound Enclosure**	**Level 2 Sound Enclosure**
KD 000	60	100% Load	124.4	96.2	91.8	75.7
		No Load	111.3	92.8	88.6	72.1

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.

KD 000	**0**

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
100% Load	7 (23)	Level 2 Sound	3:00	61.3	67.9	68.3	71.3	68.3	64.1	58.5	55.6	75.8
			1:30	58.4	60.3	70.9	70.2	67.8	64.0	58.7	52.7	75.3
			12:00 - Engine	57.4	64.4	70.5	70.4	68.9	63.9	57.1	49.2	75.6
			10:30	55.1	60.4	76.2	72.2	70.0	67.5	61.3	55.3	78.9
			9:00	60.8	65.6	69.4	70.7	68.5	65.0	58.3	55.5	75.6
			7:30	61.7	67.2	68.5	69.2	66.5	63.1	56.2	55.9	74.7
			6:00 - Alternator	56.4	64.3	59.1	63.4	57.9	58.2	53.5	59.9	69.4
			4:30	62.9	69.7	71.6	67.0	62.0	62.9	57.1	57.1	75.4
			8-pos. log avg.	60.0	66.0	71.1	69.9	67.4	64.2	58.1	56.0	75.7

				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	63.5	72.9	76.2	81.0	78.1	75.0	71.8	63.9	84.8
			1:30	64.4	76.0	86.6	88.4	91.0	88.7	86.4	79.1	95.7
			12:00 - Engine	68.6	78.8	81.4	89.3	91.5	83.1	78.2	70.8	94.4
			10:30	61.8	77.8	86.6	88.4	91.9	90.2	87.8	78.5	96.5
			9:00	61.8	73.8	74.9	81.6	78.3	74.9	71.4	63.7	85.0
			7:30	56.2	70.3	76.8	74.2	79.3	75.3	67.2	60.4	83.2
			6:00 - Alternator	51.5	64.4	76.4	73.7	69.8	67.1	61.6	53.9	79.4
			4:30	59.7	69.7	76.0	76.3	76.6	75.9	69.7	65.5	82.8
			8-pos. log avg.	63.2	74.8	82.0	85.1	87.5	84.3	81.6	73.4	91.8

				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	59.9	73.6	90.4	87.0	89.7	91.2	88.2	86.2	96.9
			1:30	53.9	70.3	92.3	90.8	91.4	92.1	88.6	85.7	98.5
			12:00 - Engine	55.6	72.5	78.2	87.6	87.7	87.4	82.9	77.7	93.1
			10:30	57.1	72.9	86.1	87.9	89.6	90.0	87.4	82.8	95.7
			9:00	57.7	74.5	85.9	87.7	89.1	90.9	88.2	86.0	96.2
			7:30	58.5	76.6	86.3	87.2	89.8	91.2	88.1	85.1	96.3
			6:00 - Alternator	57.7	72.6	85.1	82.6	85.1	87.4	84.6	81.6	92.7
			4:30	59.5	75.2	91.1	88.6	89.4	90.7	88.7	86.8	97.3
			8-pos. log avg.	57.8	73.9	88.5	87.9	89.3	90.4	87.5	84.7	96.2

The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. © 2017 by Kohler Co. All rights reserved.

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)	98.8	105.0	111.6	117.6	116.7	119.1	117.1	113.1	124.4

KD 000	60 Hz

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 2 Sound	3:00	55.6	61.7	65.7	64.5	62.7	59.3	54.7	47.1	70.6
			1:30	53.4	60.8	68.5	64.4	63.3	56.9	50.4	44.1	71.5
			12:00 - Engine	54.4	60.7	67.9	63.7	65.7	57.5	50.9	45.6	71.6
			10:30	53.7	61.0	72.8	66.9	64.3	59.1	52.9	47.1	74.6
			9:00	53.7	61.4	65.8	66.8	63.3	56.5	51.7	45.0	71.1
			7:30	51.8	59.7	69.5	66.0	62.4	57.8	51.0	44.3	72.2
			6:00 - Alternator	52.7	57.6	67.9	62.7	59.2	54.1	49.1	42.9	70.0
			4:30	53.8	62.9	70.1	67.8	63.1	59.6	53.7	45.8	73.3
			8-pos. log avg.	53.8	60.9	69.1	65.7	63.3	57.9	52.1	45.5	72.1

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	61.0	68.2	72.3	73.9	74.7	69.4	61.5	55.6	79.5
			1:30	60.1	68.0	83.5	88.4	85.1	83.0	76.7	71.9	91.8
			12:00 - Engine	63.7	71.2	80.9	82.4	92.3	83.8	76.5	70.6	93.6
			10:30	59.7	67.1	83.4	84.7	88.1	84.3	76.8	70.8	91.7
			9:00	61.2	68.2	72.3	75.7	75.6	70.5	61.8	56.0	80.5
			7:30	54.3	63.1	75.9	71.8	77.9	73.4	63.9	54.8	81.5
			6:00 - Alternator	52.1	60.9	75.9	72.6	67.3	65.6	55.7	48.3	78.3
			4:30	56.3	64.6	73.4	72.9	76.3	74.9	66.2	58.9	80.9
			8-pos. log avg.	59.9	67.4	79.4	82.0	85.5	79.9	72.7	67.1	88.6

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)	3:00	58.0	75.7	86.4	84.9	87.4	86.9	84.4	76.8	93.3
		1:30	54.9	71.8	86.6	89.0	86.8	86.8	83.8	76.9	94.0
		12:00 - Engine	55.4	74.0	81.2	86.8	84.4	82.8	79.1	72.7	90.8
		10:30	53.3	71.5	82.7	85.3	86.7	86.9	82.9	74.5	92.4
		9:00	55.9	74.2	86.3	85.2	87.1	87.2	85.0	77.8	93.4
		7:30	55.8	75.2	85.2	84.7	87.5	87.3	84.4	77.7	93.2
		6:00 - Alternator	54.1	73.5	84.4	82.2	82.6	82.1	78.9	70.6	89.5
		4:30	57.4	75.9	89.0	85.2	87.0	86.4	84.3	77.9	93.9
		8-pos. log avg.	55.8	74.2	85.8	85.8	86.4	86.2	83.3	76.2	92.8

Open Unit, Isolated Exhaust

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)	86.9	94.6	108.2	102.0	104.9	100.9	95.6	91.9	111.3

KOHLER®

Emissions Data

KOHLER®

KD1000

60 Hz. Diesel Generator Set
Tier 2 EPA Certified for Stationary Emergency Applications
EMISSION OPTIMIZED DATA SHEET

ENGINE INFORMATION

Model:	KD27V12	Bore:	135 mm (5.31 in.)
Nameplate kW @ 1800 RPM:	1114	Stroke:	157 mm (6.18 in.)
Type:	4-Cycle, 12-V Cylinder	Displacement:	27 L (1648 cu. in.)
Aspiration:	Turbocharged, Charge Air Cooled	EPA Family:	MLHAL45.0ESP
Compression ratio:	15:0:1	EPA Certificate:	MLHAL45.0ESP-002
Emission Control Device:	Direct Diesel Injection, Engine Control Module, Turbocharger, Charge Air Cooler		

EXHAUST EMISSION DATA:		**EPA D2 Cycle 5-mode weighted**
HC		0.06 g/kWh
NO_x	(Oxides of Nitrogen as NO_2)	5.59 g/kWh
CO	(Carbon Monoxide)	0.53 g/kWh
PM	(Particulate Matter)	0.06 g/kWh

TEST METHODS AND CONDITIONS

Test Methods:
Steady-State emissions recorded per EPA CFR 40 Part 89, and ISO8178-1 during operation at rated engine speed (+/-2%) and stated constant load (+/-2%) with engine temperatures, pressures and emission rates stabilized.

Fuel Specification:
40-48 Cetane Number, 0.05 Wt. % max. Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.

Reference Conditions:
25 °C (77 °F) Air Inlet Temperature, 40 °C (104 °F) Fuel Inlet Temperature, 100 kPa (29.53 in Hg) Barometric Pressure; 10.7 g/kg (75 grains H2O/lb.) of dry air Humidity (required for NOx correction); Intake Restriction set to maximum allowable limit for clean filter; Exhaust Back pressure set to maximum allowable limit.

Data was taken from a single engine test according to the test methods, fuel specification and reference conditions stated above and is subjected to instrumentation and engine-to-engine variability. Tests conducted with alternate test methods, instrumentation, fuel or reference conditions can yield different results.

Data and specifications subject to change without notice.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2021 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Liebherr Machines Bulle SA**
(U.S. Manufacturer or Importer)

Certificate Number: **MLHAL45.0ESP-002**

Effective Date: 11/05/2020

Expiration Date: 12/31/2021

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 11/05/2020

Revision Date: N/A

Model Year: 2021
Manufacturer Type: Original Engine Manufacturer
Engine Family: MLHAL45.0ESP

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 560<kW<=2237
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Electronic Control

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.

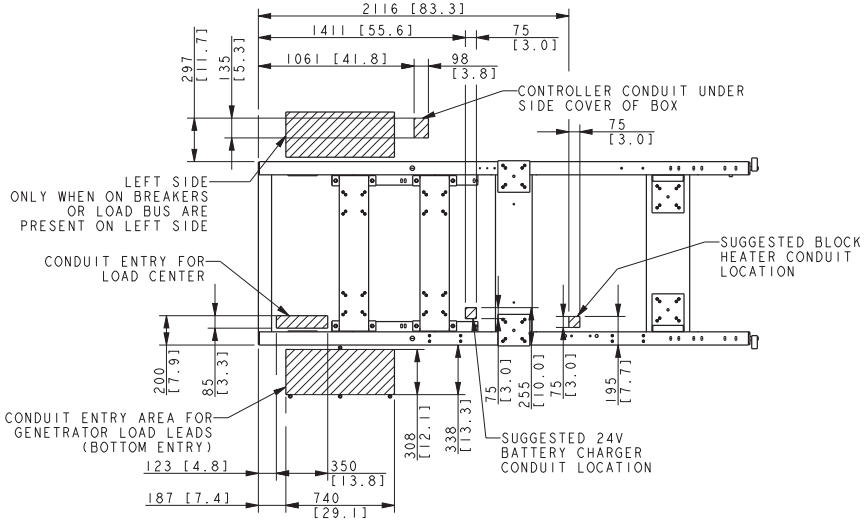
This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate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

KOHLER®

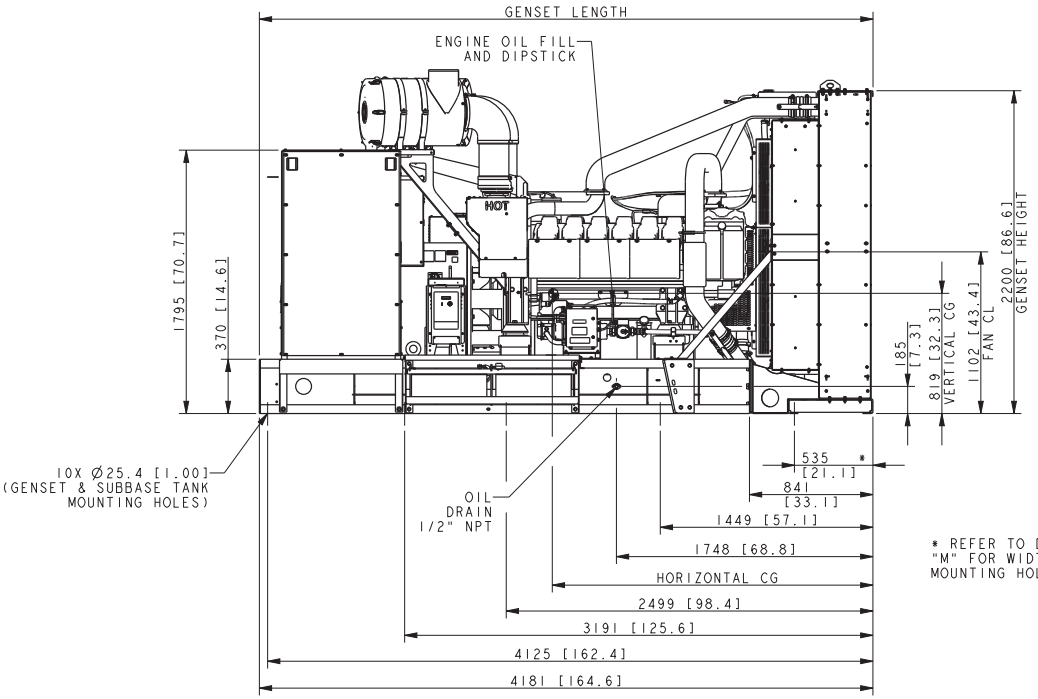
Dimensional Drawings

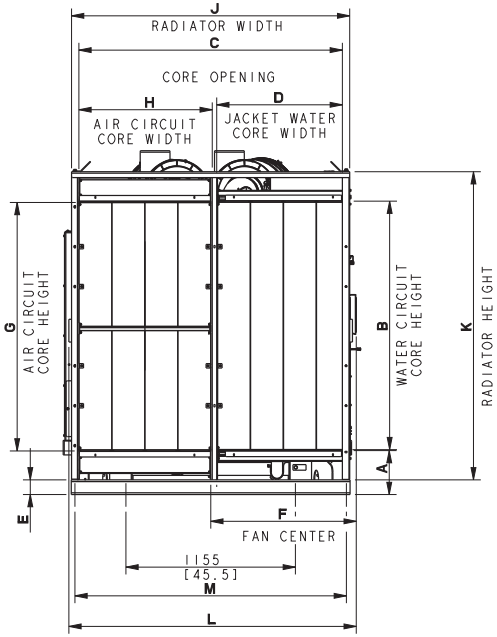


MODEL	ALT.	GENSET MAXIMUM WEIGHT (WET)	(HORIZONTAL CG) (WET)	GENSET LENGTH
KD800	KH02970TO4D	6916 Kg [15248 LBS]	2185 [86]	4181 [164.6]
KD800/900	KH03450TO4D	7155 Kg [15773 LBS]	2225 [87.6]	4181 [164.6]
KD800/900/1000	KH04070TO4D	7457 Kg [16440 LBS]	2277 [89.6]	4181 [164.6]
KD900/1000	KH04830TO4D	7770 Kg [17131 LBS]	2340 [92.1]	4181 [164.6]
KD1000	KH05520TO4D	8083 Kg [17821 LBS]	2391 [94.1]	4224 [166.3]*

* KH05520TO4D ALTERNATOR EXTENDS PAST SKID

MODEL	A	B	C	D	E	F	G	H	J	K	L	M
KD800 50Hz FUEL OPT	400 [15.7]	1587 [62.5]	1394 [54.8]	674 [26.5]	194 [7.6]	747 [29.4]	1487 [58.5]	674 [26.5]	1494 [58.8]	2030 [79.9]	1924 [75.7]	1688 [66.4]
KD900/1000 50Hz FUEL OPT	305 [12.0]	1687 [66.4]	1618 [63.7]	899 [35.4]	100 [3.9]	859 [33.8]	1587 [62.5]	674 [26.5]	1718 [67.6]	2099 [82.6]	1941 [76.4]	1850 [72.8]
KD800 60 Hz	400 [15.7]	1587 [62.5]	1618 [63.7]	674 [26.5]	100 [3.9]	859 [33.8]	1487 [58.5]	899 [35.4]	1718 [67.6]	2125 [83.6]	1924 [75.7]	1850 [72.8]
KD900/1000 60 Hz	306 [12.0]	1687 [66.4]	1844 [72.6]	899 [35.4]	100 [3.9]	948 [37.3]	1687 [66.4]	899 [35.4]	1896 [74.6]	2100 [82.6]	1986 [78.2]	1850 [72.8]





* REFER TO DIMENSION "M" FOR WIDTH OF THIS MOUNTING HOLE

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

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

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

4) IF SUBBASE FUEL TANK AND/OR ENCLOSURE IS USED. REFER TO SUBBASE FUEL TANK/ENCLOSURE ADV TO DETERMINE MOUNTING LOCATION.

KD800, KD900, KD1000
KD27V12

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
A	11-3-16	(C-4) RADIATOR DIMENSIONS TABLE UPDATED [CT164327]	CEM
B	6-7-17	(B-8) 10X Ø25.4 [1.00] (GENSET & SUBBASE TANK	
		MOUNTING HOLES) WAS 16X; SEE SHEET 2 [CT175358]	RRT
C	10-10-17	(D-1) COLUMN M ADDED; (D-2) "RADIATOR	
		DIMENSIONS" TITLE REMOVED; (A-4) NOTE FOR	
		DIMENSION "M" ADDED [CT180111]	RRT
D	10-8-18	IMPERIAL DIMENSIONS ADDED TO ALL DIMENSIONS;	
		SEE SHEET 2, 3, 4 & 5 [CT191046]	ADP
E	2-19-20	SEE SHEET 4 [CT202039]	DS

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ±
X.X ±
ANGLES ±
SURFACE FINISH MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	SSS	9-8-16
CHECKED	DJV	9-8-16
APPROVED	BMK	9-8-16

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POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
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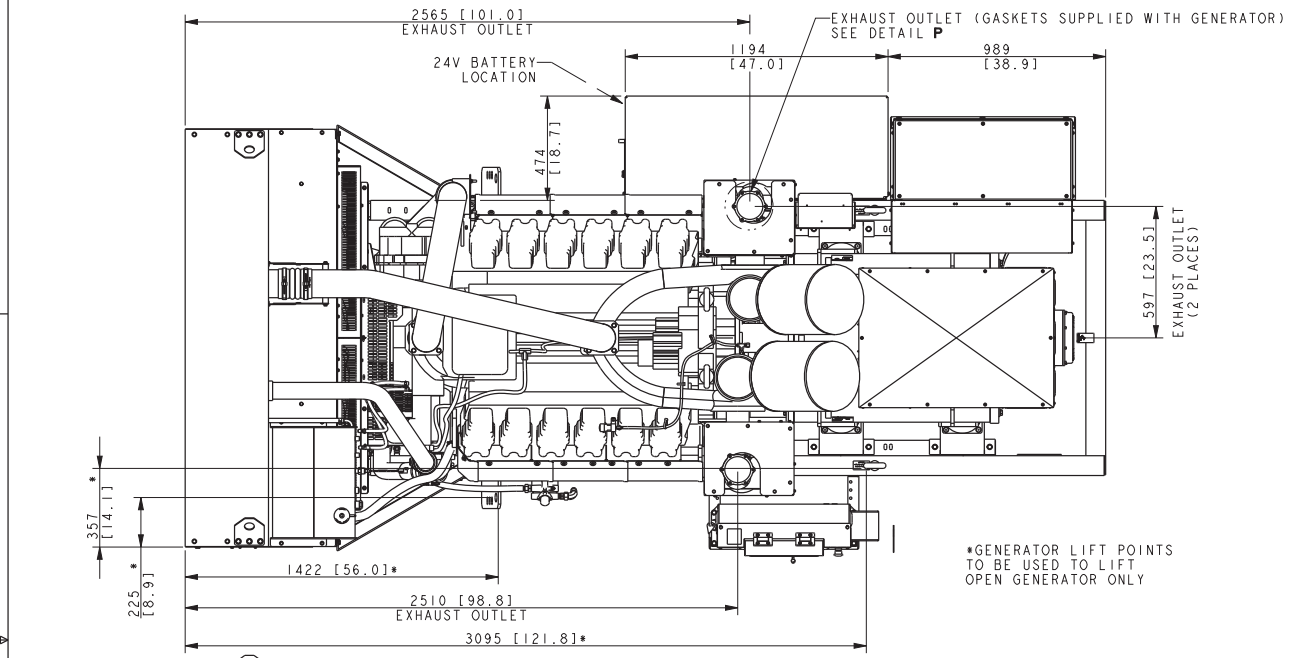
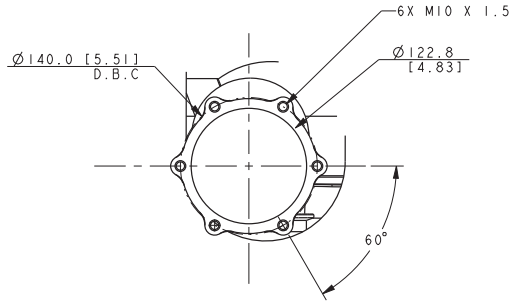
TITLE: DIMENSION PRINT, KD800-1000

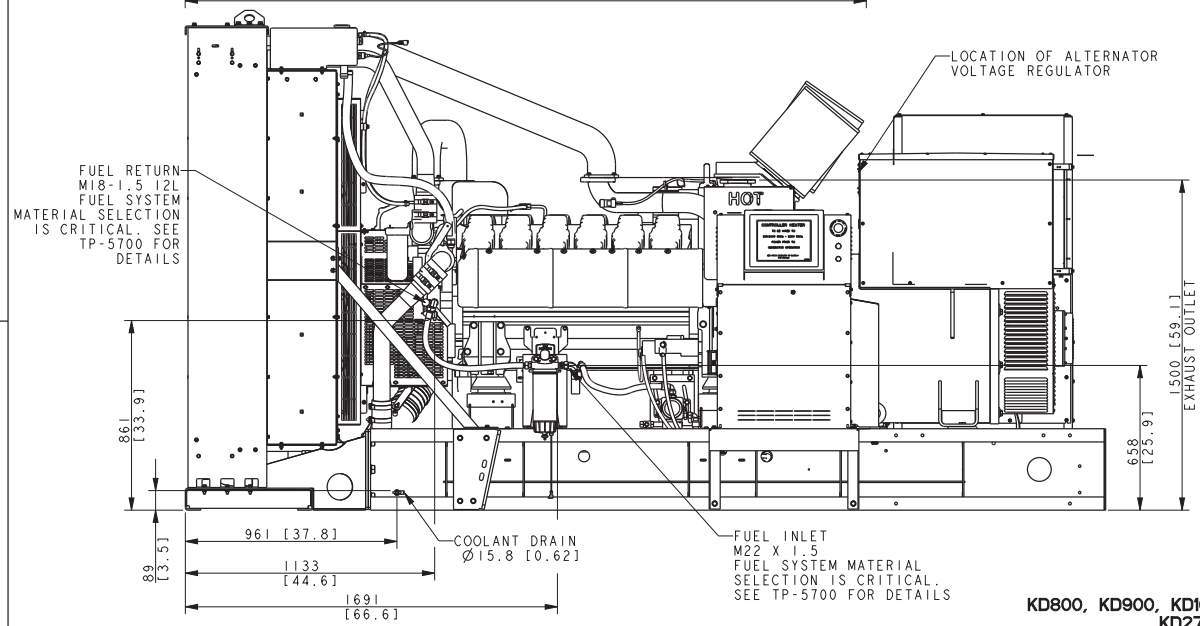
SCALE 0.06 | CAD NO. | SHEET 1 of 5

DWG NO. ADV-8868 | D





DETAIL P
SCALE 0.400



KD800, KD900, KD1000
KD27V12

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
A	11-3-16	SEE SHEET 1 [CT164327]	CEM
B	6-7-17	(A-5), (B-8) FUEL SYSTEM NOTE UPDATED; SEE	
		SHEET 1 [CT175358]	RRT
C	10-10-17	SEE SHEET 1 [CT180111]	RRT
D	10-8-18	IMPERIAL DIMENSIONS ADDED TO ALL DIMENSIONS;	
		(D-5,6) 474 WAS 476, 989 WAS 995; (A-4,7)	
		658 WAS 644; (A-7) 1691 WAS 1730; SEE SHEET	
		1, 3, 4 & 5 [CT191046]	ADP
E	2-19-20	SEE SHEET 4 [CT202039]	DS

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ±
X.X ±
X ±
ANGLES ±
SURFACE FINISH
MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	SSS	9-8-16
CHECKED	DJV	9-8-16
APPROVED	BMK	9-8-16

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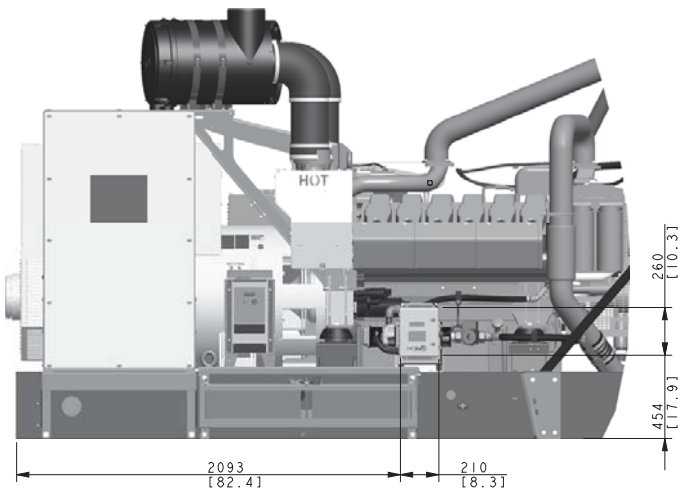
TITLE
DIMENSION PRINT, KD800-1000

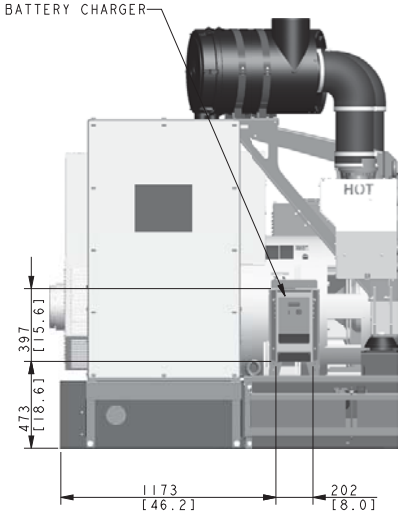
SCALE 0.09 | CAD NO. | SHEET 2 of 5

DWG NO. **ADV-8868** **D**



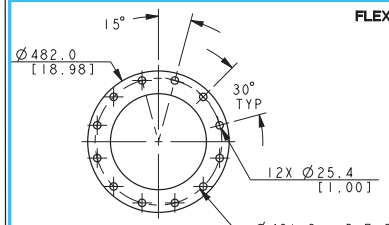
BLOCK HEATER LOCATION

BLOCK HEATER
(RIGHT SIDE GENSET)

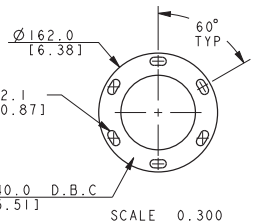


BATTERY CHARGER
(RIGHT SIDE GENSET)

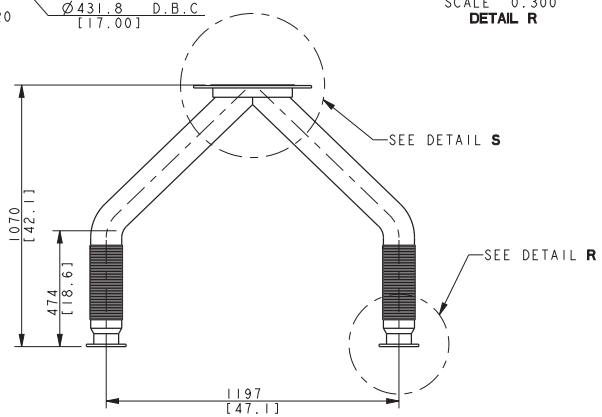
FLEXIBLE Y EXHAUST



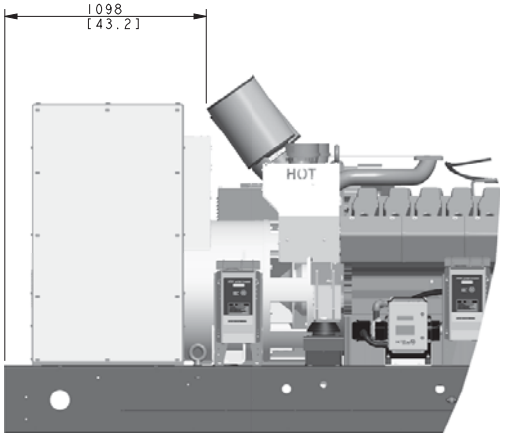
SCALE 0.120
DETAIL S



SCALE 0.300
DETAIL R

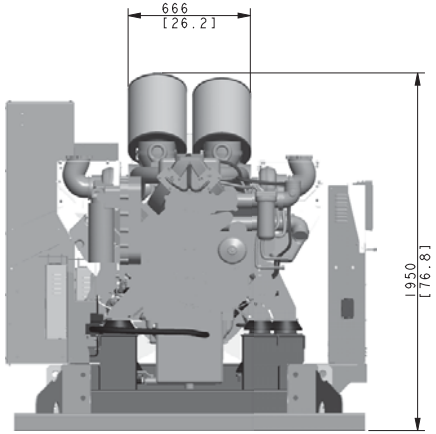


SCALE 0.100

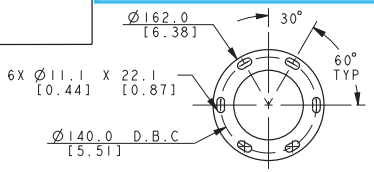


RIGHT SIDE

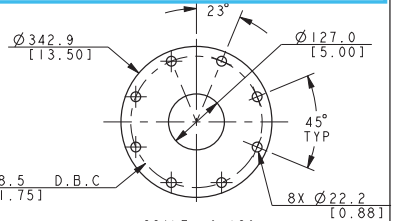
STANDARD DUTY AIR CLEANER
(RIGHT SIDE GENSET)



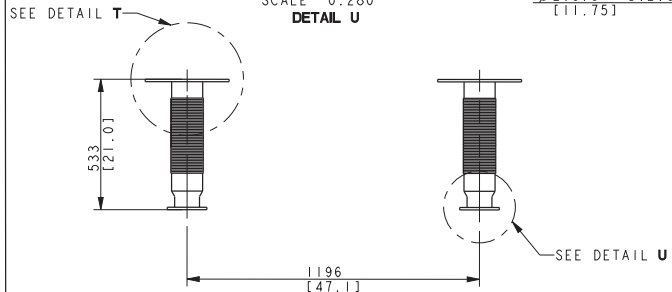
SCALE 0.075



SCALE 0.280
DETAIL U



SCALE 0.180
DETAIL T



NOTE:
FLEXIBLE EXHAUST TO BE FULLY SUPPORTED BY EXTERNAL STRUCTURE (ALLOWED BENDING MOMENT AT EXHAUST FLANGE INTERFACE LESS THAN 19 Nm)

KD800, KD900, KD1000
KD27V12

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	9-8-16	NEW DRAWING [CT160432]	SSS
A	11-3-16	SEE SHEET 1 [CT164327]	CEK
B	6-7-17	SEE SHEET 1 & 2 [CT175358]	RRT
C	10-10-17	SEE SHEET 1 [CT180111]	RRT
D	10-8-18	IMPERIAL DIMENSIONS ADDED TO ALL DIMENSIONS;	
		SEE SHEET 1, 2, 4 & 5 [CT191046]	ADP
E	2-19-20	SEE SHEET 4 [CT202039]	DS

UNLESS OTHERWISE SPECIFIED:
[] DIMENSIONS ARE IN MILLIMETERS
[] TOLERANCES ARE:
X.XX ±
X.X ±
X ±
ANGLES ±
SURFACE FINISH MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	SSS	9-8-16
CHECKED	DJV	9-8-16
APPROVED	BMK	9-8-16

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

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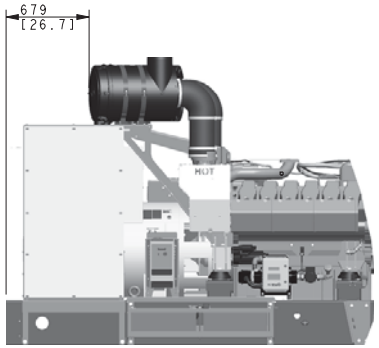
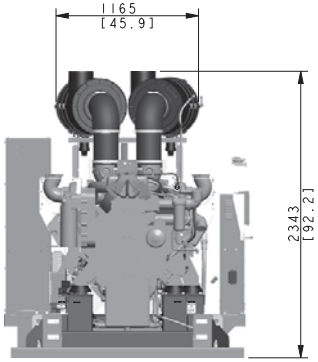
TITLE
DIMENSION PRINT, KD800-1000

SCALE 0.15 | CAD NO. | SHEET 3 of 5

DWG NO. **ADV-8868** | **D**

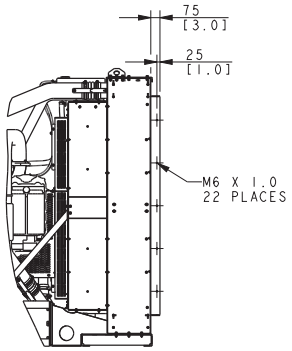


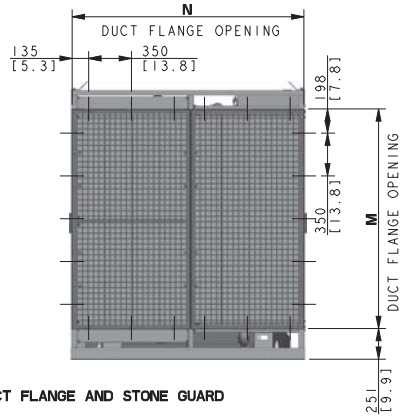
(RIGHT SIDE GENSET)



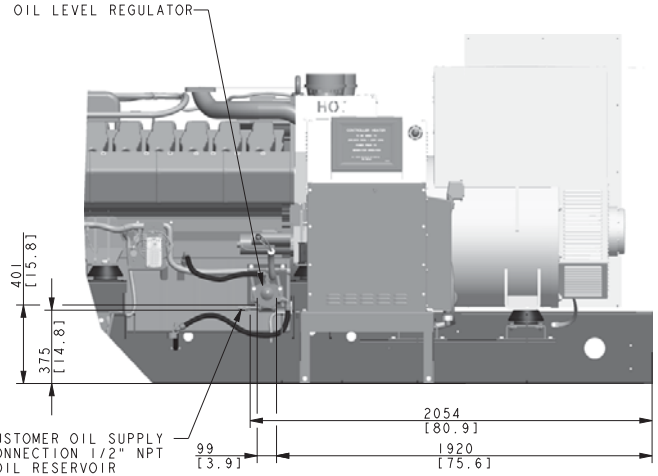
HEAVY DUTY AIR CLEANER

DUCT FLANGE DIMENSIONS		
MODEL	M	N
KD800 50Hz FUEL OPT	1685 [66.3]	1492 [58.7]
KD900/1000 50Hz FUEL OPT	1796 [70.7]	1718 [67.6]
KD800/900 60 Hz	1685 [66.3]	1716 [67.5]
KD1000 60 Hz	1796 [70.7]	1895 [74.6]





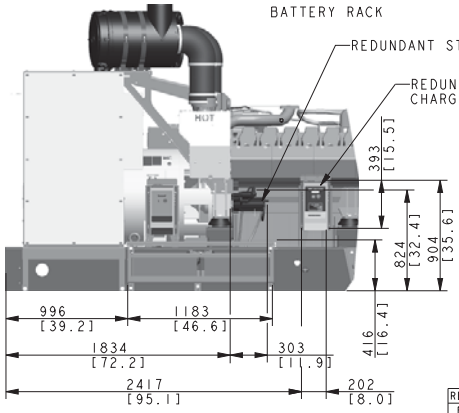
DUCT FLANGE AND STONE GUARD

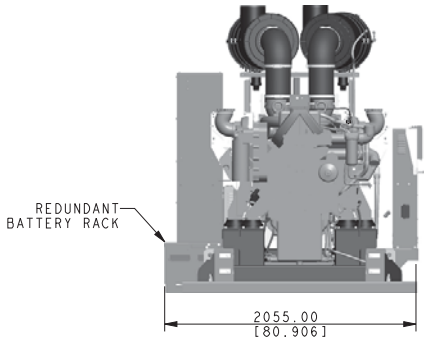


NOTE:
LEFT SIDE SKID MEMBER HIDDEN TO SHOW
CONNECTION FROM OIL LEVEL REGULATOR TO OIL SUMP.

AUTOMATIC OIL REPLENISHMENT SYSTEM
(LEFT SIDE GENSET)

REDUNDANT STARTER, BATTERY RACK & CHARGER
(RIGHT SIDE GENSET)





KD800, KD900, KD1000
KD27V12

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
B	6-7-17	SEE SHEET 1 & 2 [CT175358]	RRT
C	10-10-17	SEE SHEET 1 [CT180111]	RRT
D	10-8-18	IMPERIAL DIMENSIONS ADDED TO ALL DIMENSIONS; (A-4,5) 416 WAS 453, 996 WAS 995, 1183 WAS 1194; SEE SHEET 1, 2, 3 & 5 [CT191046]	ADP
E	2-19-20	(C-4) PROJECTION VIEW ADDED; (D-2) 135, 350, 198 & (C-2) 350 DIMENSION ADDED [CT202039]	DS

UNLESS OTHERWISE SPECIFIED:
[] DIMENSIONS ARE IN MILLIMETERS
[] TOLERANCES ARE:
X.XX ±
X.X ±
X ±
ANGLES ±
SURFACE FINISH MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	SSS	9-8-16
CHECKED	DJV	9-8-16
APPROVED	BMK	9-8-16

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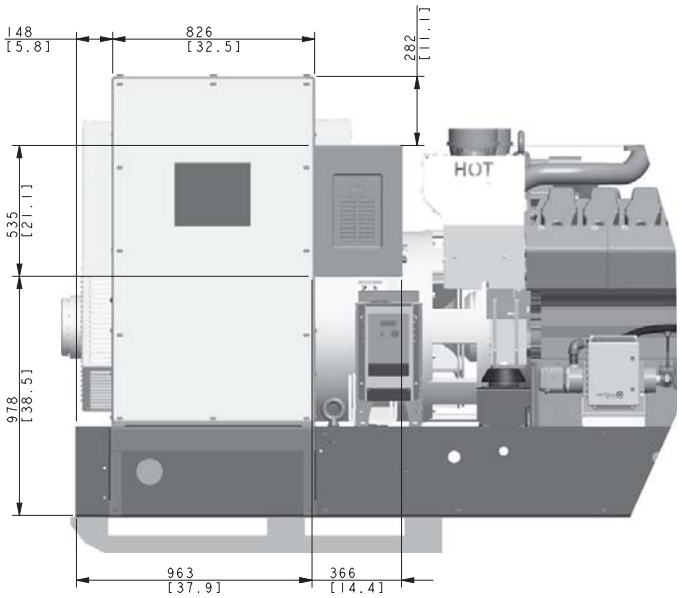
TITLE
DIMENSION PRINT, KD800-1000

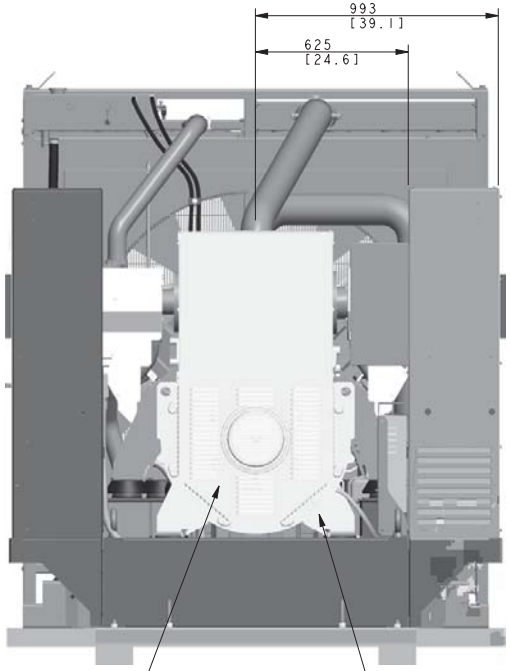
SCALE 0.05 | CAD NO. | SHEET 4 of 5

DWG NO. ADV-8868 D

CIRCUIT BREAKER BOX
(RIGHT AND/OR LEFT SIDE OPTION)



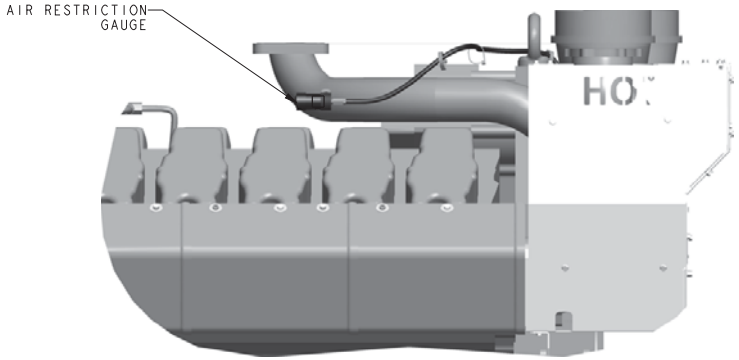
BASIC ELECTRICAL PACKAGE (BEP) LOAD CENTER



ALTERNATOR AIR FILTER INSTALLED
INSIDE OF LOUVERED PANELS
(7% DERATE ON GENERATOR RATING)

ALTERNATOR HEATER THREADS
INTO REAR CASTING OF ALTERNATOR

ALTERNATOR AIR FILTER AND HEATER



AIR FILTER RESTRICTION INDICATOR
(RIGHT SIDE OF GENSET)

KD800, KD900, KD1000
KD27V12

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	9-8-16	NEW DRAWING [CT160432]	SSS
A	11-3-16	SEE SHEET 1 [CT1643271]	CEN
B	6-7-17	SEE SHEET 1 & 2 [CT1753581]	RRT
C	10-10-17	SEE SHEET 1 [CT1801111]	RRT
D	10-8-18	IMPERIAL DIMENSIONS ADDED TO ALL DIMENSIONS;	
		SEE SHEET 1, 2, 3 & 4 [CT191046]	ADP
E	2-19-20	SEE SHEET 4 [CT202039]	DS

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ±
X.X ±
X ±
ANGLES ±
SURFACE FINISH
MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	SSS	9-8-16
CHECKED	DJV	9-8-16
APPROVED	BMK	9-8-16

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POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
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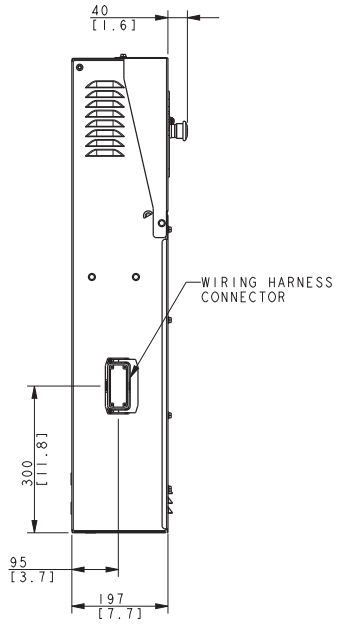
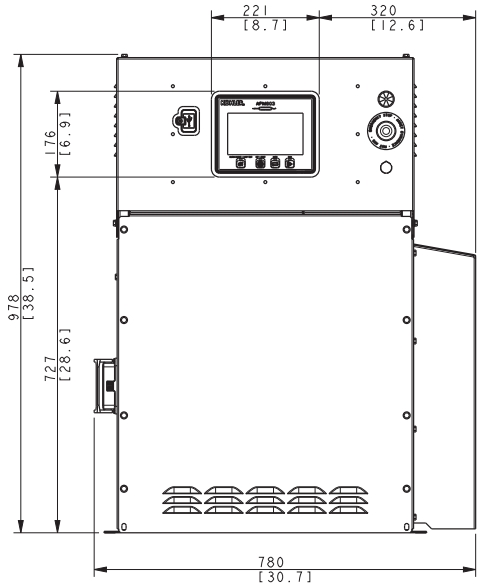
TITLE
DIMENSION PRINT, KD800-1000

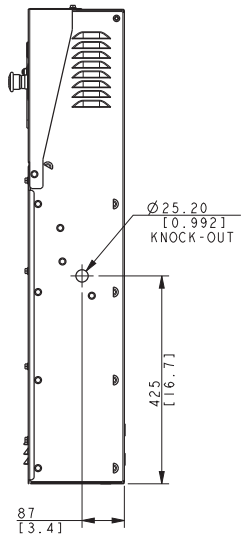
SCALE 0.06 | CAD NO. | SHEET 5 of 5

DWG NO. ADV-8868 | D

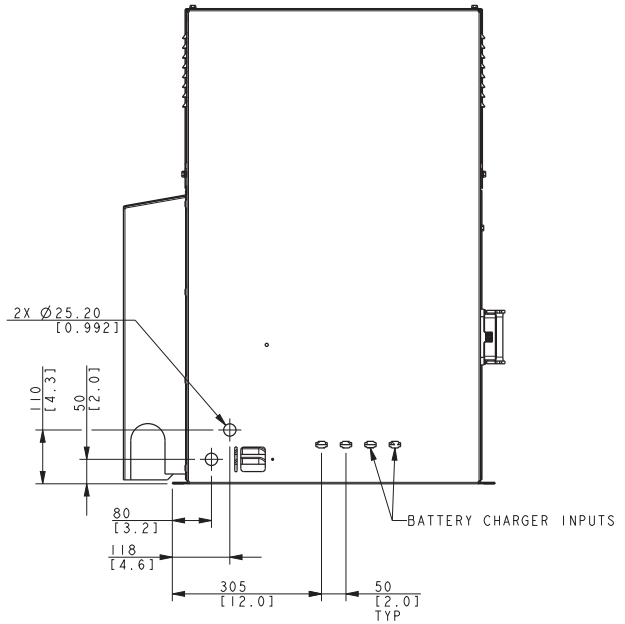
APM603

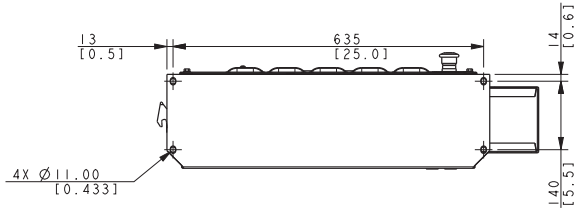






RIGHT SIDE VIEW WITH
WIRING CHUTE REMOVED





NOTE: DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

KDI 800-4000KW
CONTROLLER

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL □ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY
A	4-1-19	VIEWS ADDED FOR APM603 [CT194757]	YBY
B	8-2-19	SEE SHEET 1 [CT197629]	SMH

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 (M-D-Y)
DRAWN	YBY	4-1-19
CHECKED	DJV	4-1-19
APPROVED	LAC	4-1-19

KOHLER CO. SDMO
KOHLER POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
SDMO, CS 92048, 29228 BREST CEDEX 2, FRANCE

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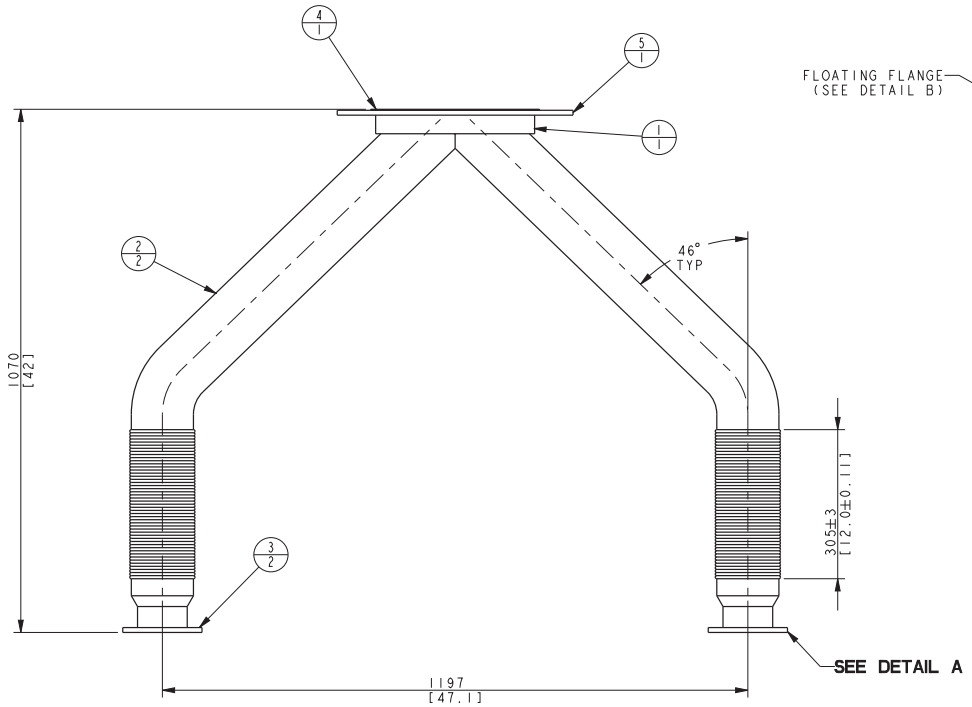
METRIC
PRO-E

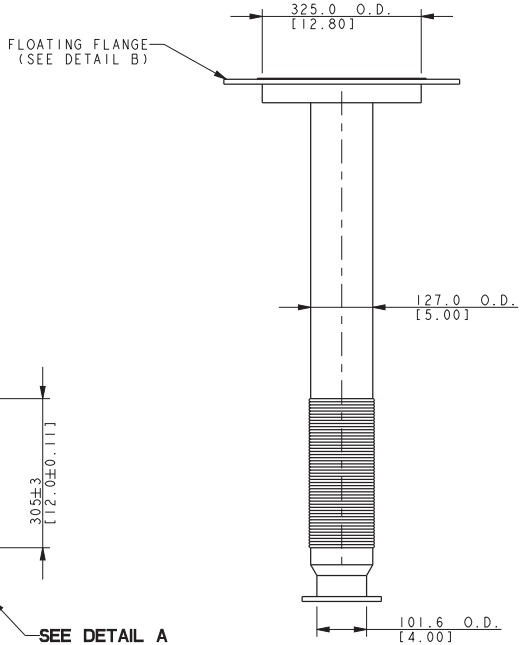
TITLE: DIMENSION PRINT, CONTROLLER

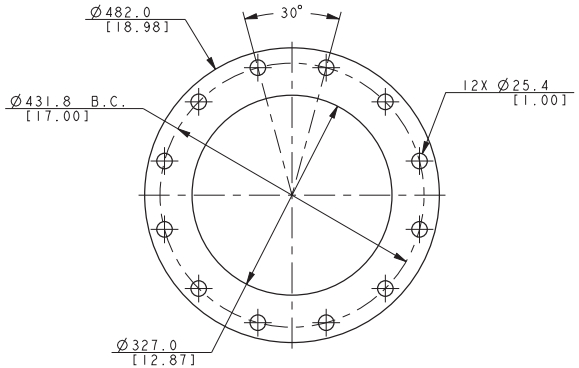
SCALE 0.20 | CAD NO. | SHEET 2 of 2

DWG NO. ADV-8869 | D

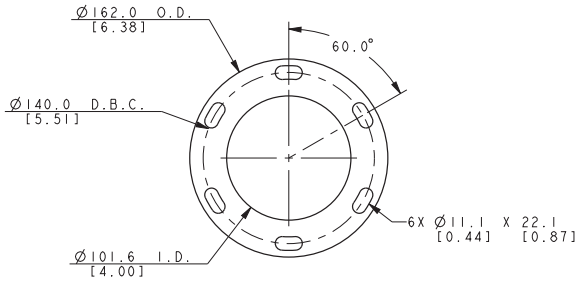
PART NO.	REV.
10901003116	- □



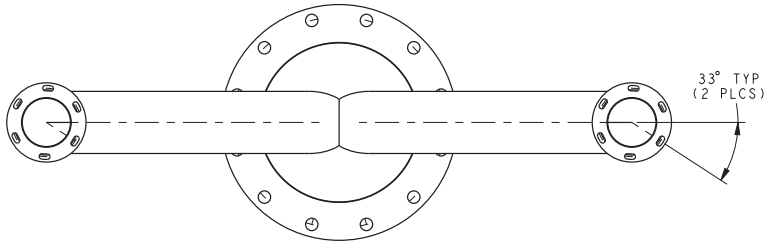




DETAIL B
SCALE 0.25



DETAIL A
SCALE 0.50



NOTES:
DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS
FINISH PAINT HIGH TEMP BLACK

ITEM	MODEL NO (MFG REF ONLY)	QTY	ASTM MATERIAL / DESCRIPTION	EN MATERIAL / DESCRIPTION
5	109010031XX-5	1	STEEL,0.38IN.	10.0mm S355JO
4	109010031XX-4	1	STEEL,16 GA.	1.5mm S235JR
3	109010031XX-3	2	STEEL,0.38IN.	10.0mm S355JO
2	109010031XX-2	2	STEEL,16 GA. CR	1.5mm S235JR, 1.5mm
1	109010031XX-1	1	STEEL,16 GA.	1.5mm S235JR

ASTM MATERIAL DESIGNATION PER G-712.

KD27V12

REV	DATE	□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY
-	8-17-16	NEW DRAWING [CT156211]	CEK

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 (M-D-Y)
DRAWN	CEK	2-10-16
CHECKED	KRM	8-17-16
APPROVED	BMK	8-17-16

KOHLER CO. SDMO — METRIC — PRO-E

KOHLER POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
SDMO, CS 92648, 29228 BREST CEDEX 2, FRANCE

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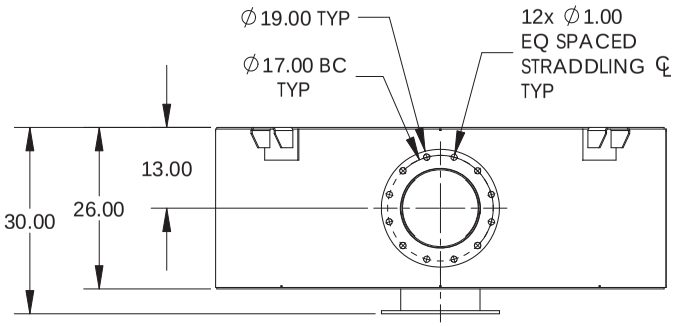
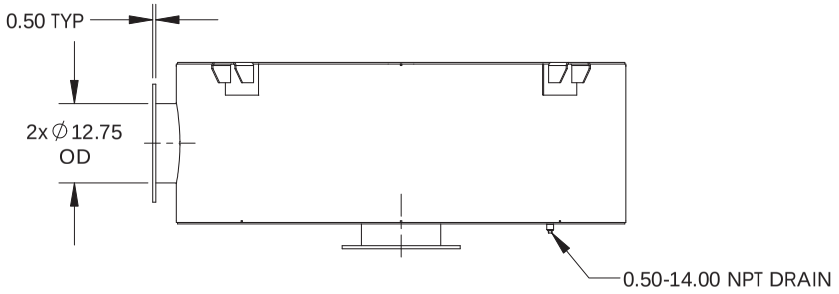
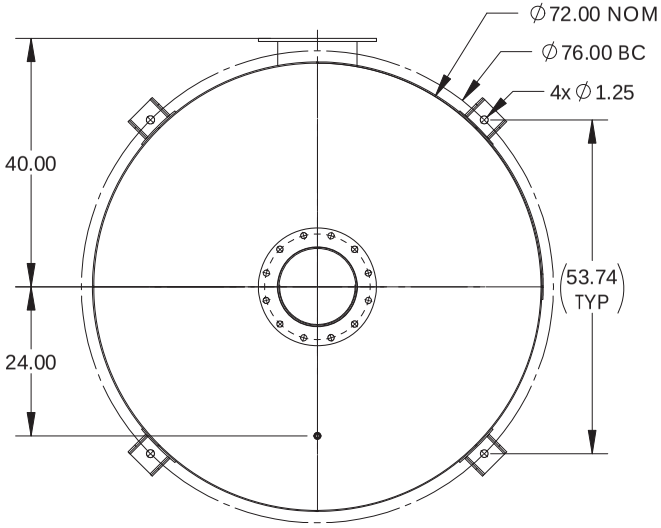
TITLE
DWG, FLEXIBLE Y EXHAUST

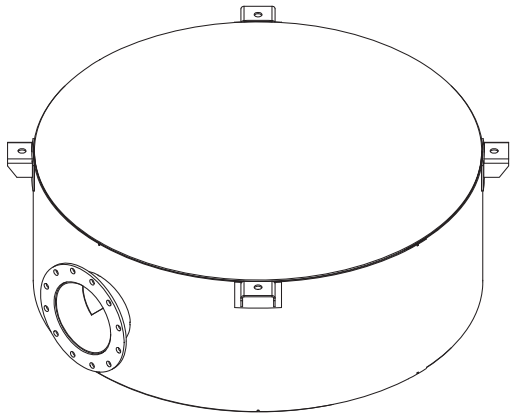
SCALE 0.20 | CAD NO. | SHEET 1 of 1

DWG NO. 109010031XX | D









ENGINE INFORMATION	SILENCER INFORMATION		
ENGINE MAKE: KOHLER	RESONATOR FREQUENCY: ---	DRAWN BY: HKO	DATE: 01/28/2021
ENGINE MODEL: KD27V12	RESONATOR ALPHA: ---	CHECKED BY: HKO	DATE: 01/28/2021
DISPLACEMENT: 1648	SILENCER Km: ---	ENGINEERING: HKO	DATE: 01/28/2021
EXHAUST FLOW: 7119	SILENCER IL: ---	MANUFACTURING: HKO	DATE: 01/28/2021
EXHAUST TEMPERATURE: 986	TOLERANCES DO NOT APPLY TO GAGE THICKNESS OR COMMERCIAL FEATURES	TOLERANCES UNLESS OTHERWISE SPECIFIED: .X = ±0.25 ALL ANGLES ±1°, .XX = ±0.125, .XXX = ±0.0625, .XXXX = ±0.03125	WEIGHT (LBS): 1490
MAX BACK PRESSURE: 34	THIRD ANGLE PROJECTION		SHEET: 3 OF 3
RAW SOUND PRESSURE: ---			

BERGARI SOLUTIONS
member of the mandelgroup

DESCRIPTION: SIL: DISK HOSP CS
E-S 12.75-12.75
Ø72.00 X 30.00 OAH

CONSTRUCTION MATERIAL: CS

FINISH: HIGH TEMP BLACK PAINT

PART NUMBER: 500-014039 REV: 01

SCALE (DO NOT SCALE): 1:20 SHEET SIZE: B

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CUSTOMER	CUSTOMER P/N
---	---

REV.	BY	DATE	DESCRIPTION	ECO
01	HKO	01/28/2021	RELEASE FOR CUSTOMER APPROVAL	---

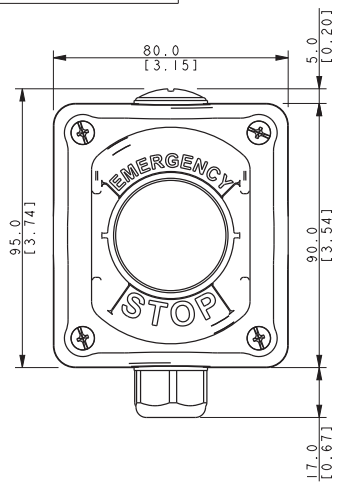
KOHLER®

Miscellaneous

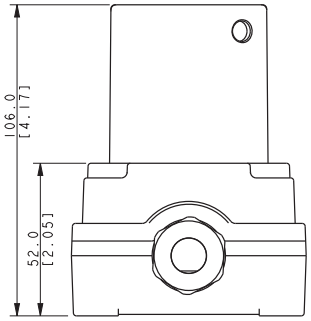
- NEC Remote Lockable E-Stop
- Generator Heater Strip

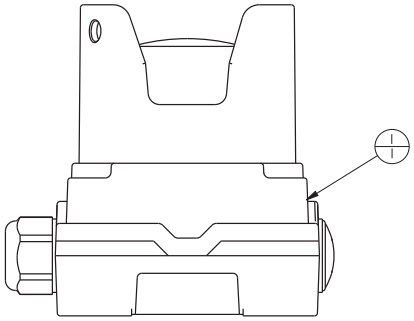
KIT NO.	ITEM	PART NO	QTY	DESCRIPTION
GM103743				E-STOP, NEC REMOTE
	1	GM103743-1	1	E-STOP W/ YELLOW SHROUD, LOTO
	2	GM103743-2	4	#10 X 1.25□ Sheetmetal Screw
	3	GM103743-3	1	TERMINAL, FAST-ON, MALE, 18-22 AWG
	4	GM103743-4	1	TERMINAL, FAST-ON, FEMALE, 18-22 AWG
	5	GM103743-5	2	TERMINAL, SPADE, 22-16 AWG
	6	GM103743-6	1	LITERATURE, TT-1736

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



SCALE 1.50





NOTE:

DIMENSIONS IN [ ] ARE IN INCH EQUIVALENTS.

SCREWS AND TERMINALS ARE TO BE BAGGED AND PLACED IN THE BOX

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	2-12-18	NEW DRAWING [CT176728]	CCL

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	CCL	2-12-18
CHECKED	KJB	2-12-18
APPROVED	KJB	2-12-18

KOHLER CO. METRIC PRO-E

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

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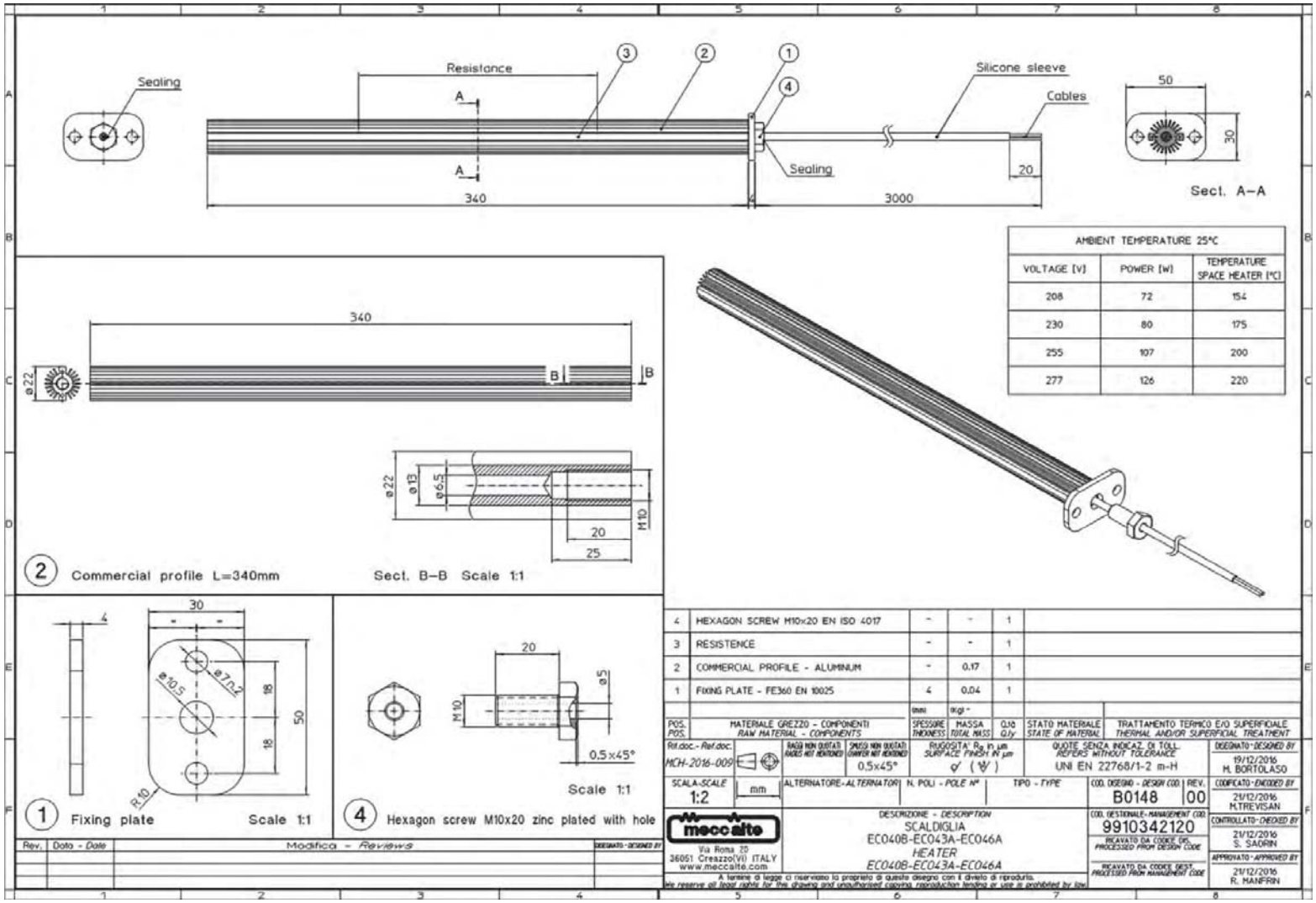
TITLE: E-STOP, NEC REMOTE

SCALE 1.50 | CAD NO. | SHEET 1 of 1

DWG NO. GM103743 D

PART NO.	REV.
10210000301	A



AMBIENT TEMPERATURE 25°C		
VOLTAGE [V]	POWER [W]	TEMPERATURE SPACE HEATER [°C]
208	72	154
230	80	175
255	107	200
277	126	220

POS.	MATERIALE GREZZO - COMPONENTI RAW MATERIAL - COMPONENTS	SPESSORE THICKNESS	MASSA TOTAL MASS	Q.tà Q.ty	STATO MATERIALE STATE OF MATERIAL	TRATTAMENTO TERMICO E/O SUPERFICIALE THERMICAL AND/OR SUPERFICIAL TREATMENT
4	HEXAGON SCREW M10x20 EN ISO 4017	-	-	1		
3	RESISTENCE	-	-	1		
2	COMMERCIAL PROFILE - ALUMINUM	-	0.17	1		
1	FIXING PLATE - FE360 EN 10025	4	0.04	1		
		mm	kg	-		

Ref.doc. - Ref.doc.: MCH-2016-009
RAGGI NON QUOTATI RADII NOT MENTIONED: 0.5x45°
SPIGOLI NON QUOTATI CHAMFER NOT MENTIONED: 0.5x45°
RUGOSITÀ R_a in µm SURFACE FINISH IN µm: ∅ (▽)
QUOTE SENZA INDICAZ. DI TOLL. REFERS WITHOUT TOLERANCE: UNI EN 22768/1-2 m-H

SCALA-SCALE 1:2 mm
ALTERNATORE-ALTERNATOR | N. POLI - POLE Nº | TIPO - TYPE
COD. DISEGNO - DESIGN COD.: B0148 | REV.: 00

DESIGNATO - DESIGNED BY: 19/12/2016 M. BORTOLASO
CODIFICATO - ENCODED BY: 21/12/2016 M.TREVISAN
CONTROLLATO - CHECKED BY: 21/12/2016 S. SAORIN
APPROVATO - APPROVED BY: 21/12/2016 R. MANFRIN

meccalte
Via Roma 20
36051 Creazzo(VI) ITALY
www.meccalte.com

DESCRIZIONE - DESCRIPTION
SCALDIGLIA
EC040B-EC043A-EC046A
HEATER
EC040B-EC043A-EC046A

COD. GESTIONALE-MANAGEMENT COD.: 9910342120
RICAVATO DA CODICE DIS. PROCESSED FROM DESIGN CODE
RICAVATO DA CODICE GEST. PROCESSED FROM MANAGEMENT CODE

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Rev.	Data - Date	Modifica - Revisions	DESIGNATO - DESIGNED BY

NOTES:

MECCALTE PART NUMBER: TBD

OPERATING VOLTAGE: 208 - 277V

HEATER HAS A CONSTANT RESISTANCE OF 661.25Ω

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

K135 KD800 - 1750

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	11-22-16	NEW DRAWING [CTI66455]	BGP
A	5-31-17	NEW VENDER DRAWING REV 00 REPLACES OLD VENDER DRAFT [CTI75076]	BGP
B	11-1-17	(A-6) 208-277V WAS 208-253V [CTI80943]	RRT

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCE: X.XX ± 0.25, X.X ± 0.5, X ± 1.5, ANGLES ± 0°30' | SURFACE FINISH 3.2 MAX. | THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	BGP	11-22-16
CHECKED	CEK	11-22-16
APPROVED	BMK	11-22-16

KOHLER.
KOHLER, WISCONSIN 53044

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TITLE: DWG, HEATER, GENERATOR

SCALE 0.40 | CAD NO. | SHEET 1 of 1

DWG NO. 102100003XX | D

KOHLER®

Warranty

Transfer Switch Extended Five-Year 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**
Transfer switch and factory-supplied transfer switch accessories	Five (5) years from registered startup date.
Transfer switch main contacts	Ten (10) years from the registered startup date.

This warranty is not effective unless a proper extended warranty registration form and warranty fee have been sent to Kohler Co. within one year of registered startup. The extended warranty start date is determined by the standard warranty requirements and runs concurrent with the standard warranty during the first year. To receive extended warranty coverage, the provisions of the standard warranty registration must be met.

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

1. Normal wear, periodic service, and routine adjustments.
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:
   a. Operation above or below rated capacity, voltage, or frequency.
   b. Modifications.
   c. Installation contrary to published specifications and codes.
4. Damage caused by negligent maintenance such as:
   a. Failure to provide a clean, dry environment.
   b. Failure to perform recommended exercising.
   c. Failure to perform scheduled maintenance as prescribed in supplied manuals.
   d. Use of parts and/or procedures other than factory-supplied or -approved replacement parts and/or procedures.
5. Non-Kohler replacement parts. Replacement of a failed Kohler part with a non-Kohler part voids the warranty on that part.
6. Original installation charges and startup costs.
7. Additional expenses for repair after normal business hours, i.e. overtime or holiday labor rates.
8. Rental of equipment during performance of warranty repairs.
9. Removal and replacement of non-Kohler-supplied options and equipment.
10. Non-Kohler-authorized repair shop labor without prior approval from Kohler Co. Warranty Department.
11. Expenses incurred investigating performance complaints unless the problem is caused by defective Kohler materials or workmanship.
12. Maintenance items such as fuses, lamps, and adjustments.
13. Labor and travel charges after the fifth year of the transfer switch main contacts warranty period.
14. 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., Kohler Power Systems 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-6087 4/15d

Stationary Standby Industrial Generator Set Three-Year or One Thousand (1000)-Hour Limited Warranty for KD Model Generator Sets

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	Three (3) years from registered startup or one thousand (1000) hours* (whichever occurs first). In any event, the warranty period will expire not later than fifty-four (54) months from the date of shipment from Kohler Co.'s factory. If the unit is not registered within 18 months from the factory ship date the warranty will start from the date of shipment from Kohler Co.'s factory. * Unlimited hours are allowed for standby applications within the U.S.

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-7048 2/17c

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

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, second, and third 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.
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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-7050 8/16a

KOHLER®

Certification

Certificate of Registration

nqa global assurance

This is to certify that the Quality Management System of:

Kohler Power Systems

N7650 Lakeshore Road
Sheboygan WI 53083
United States of America

Central function listed above. See appendix for additional locations

applicable to:

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

has been assessed and approved by
National Quality Assurance, U.S.A., against the provisions of:

ISO 9001:2015

Certificate Number:	16852
EAC Code:	19, 17
Certified Since:	February 28, 1995
Valid Until:	November 6, 2021
Reissued:	November 7, 2018
Cycle Issued:	November 7, 2018

For and on behalf of NQA, USA

ANAB ACCREDITED ISO/IEC 17021 MANAGEMENT SYSTEMS CERTIFICATION BODY

G15-152 11/18

This approval is subject to the company maintaining its system to the required standard, which will be monitored by NQA, USA, 289 Great Road, Suite 105, Acton, MA 01720, an accredited organization under the ANSI-ASQ National Accreditation Board.

Certificate of Registration

nqa global assurance

Appendix to Certificate Number: 16852

Includes Facilities Located at:

Kohler Power Systems Certificate Number 16852 N7650 Lakeshore Road Sheboygan WI 53083 United States of America	Design, manufacture, and distributor support for electrical generators, automatic transfer switches and switchgear
Kohler Power Systems Certificate Number 16852 300 N Dekora Woods Blvd. Saukville WI 53080 United States of America	Manufacturer of fuel tanks, skids, fabricated components and generators
Muth Warehouse Certificate Number 16852 2821 Muth Court Sheboygan WI 53083 United States of America	The distribution of generator sets
KWIP Warehouse Certificate Number 16852 4327 County EE Sheboygan WI 53081 United States of America	Receiving, sequencing and warehousing of generator components

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PROTOTYPE TEST REPORT

KOHLER

Models Covered: **KD800, KD900, KD1000**
Model Tested: **KD1000**
Cooling System Tested: **50C**
Alternator Tested: **KH04070TO4D**
Engine Tested: **KD27V12**
Voltage Tested: **480V**

GENSET

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

Meets Rated Load

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

± 0.25 % Frequency Band
± 0.25 % Voltage Deviation

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

Full Load Acceptance	Full Load Rejection
37.7 % Voltage Dip	**14.3** % Voltage Overshoot
4.34 Seconds of Recovery Time	**1.80** Seconds of Recovery Time
15.4 % Frequency Dip	**9.30** % Frequency Overshoot
3.41 Seconds of Recovery Time	**2.29** Seconds of Recovery Time

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

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

Complies with NFPA 110 Type 10

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

Complies

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

Complies

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

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

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

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Voltage Tested: **480V**

ALTERNATOR

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

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

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

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

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

Kohler Standby Prime Generator Set Test Program

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

Prototype Testing

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

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

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Kohler Automatic Transfer Switch Test Program
Non-Bypass Models

Testing is an integral part of quality assurance. In keeping with our uncompromising commitment to quality, safety, and reliability, every Kohler Automatic Transfer Switch (ATS) undergoes an extensive series of performance and production testing.

Performance Testing

All Kohler ATSs are UL1008 listed, which includes the following performance tests:

- General – Normal Operation
- Overvoltage
- Undervoltage
- Overload
- Temperature Rise
- Endurance
- Dielectric Voltage – Withstand
- Short Circuit Withstand
- Short Circuit Close- On
- Dielectric Voltage – Withstand (repeated)
- Strength of insulating base and support

EMC/EMI Immunity Verification

Controls and printed circuit board assemblies are evaluated to IEC and IEEE tests, including:

- EN61000- 4- 4 Fast Transient Immunity Severity Level 4
- EN61000- 4- 5 Surge Immunity Class 4 (voltage sensing and programmable inputs only)
- IEC Specifications for EMI/EMC Immunity:
  - CISPR 11, Radiated Emissions
  - IEC 1000- 4- 2, Electrostatic Discharge
  - IEC 1000- 4- 3, Radiated Electromagnetic Fields
  - IEC 1000- 4- 4, Electrical Fast Transients (Bursts)
  - IEC 1000- 4- 5, Surge Voltage
  - IEC 1000- 4- 6, Conducted RF Disturbances
  - IEC 1000- 4- 8, Magnetic Fields
  - IEC 1000- 4- 11, Voltage Dips and Interruptions
- IEEE 472 (ANSI C37.90A) Ring Wave Test

Production Testing

Every Kohler ATS is fully tested prior to leaving the factory. Visual inspections are also performed by the mechanism manufacturer as well as Kohler personnel during assembly and final test. Production testing includes the following:

- Electrical operation testing on all ATSs
- Verification of controller communication
- Verification of controller settings
- Voltage calibration
- Automatic transfer switch operation when Normal source is lost
  - Verify engine start signal
  - Verify transfer to Emergency position when Emergency source is available
- Automatic Transfer switch operation when Normal source returns
  - Verify transfer to Normal position
  - Verify engine start signal is removed

CSA Certification

CSA Certification is also available upon request. CSA certification includes the following additional test:

- Dielectric test at 1000V plus twice the maximum rated voltage

Options Testing

The operation of all installed options is verified. Tested options include:

- Input/Output Modules
- Supervised Transfer Control Switch
- Preferred Source Switch
- Load Shed, Normal and Emergency
- Line-to- Neutral Monitoring
- Digital Meter setup and operation

Kohler offers other testing at the customer's request at an additional charge. These optional tests include customized load testing for specific application, witness testing, and contact resistance testing. A certified test report is also available at an additional charge.

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