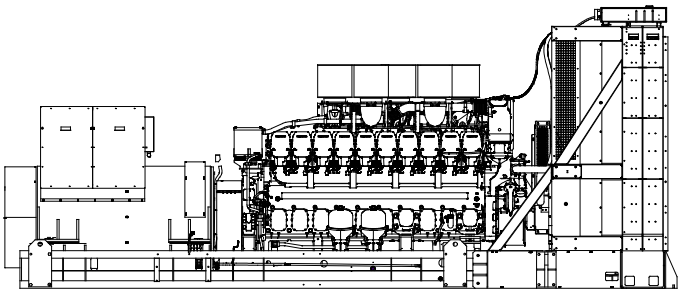
KOHLER®

Industrial Diesel Generator Set - KD4000

Tier 2 EPA-Certified for Stationary Emergency Applications



KDxxxx designates a generator set with a Tier 2 EPA-Certified engine.
KDxxxx-F designates a 60 Hz generator set with a fuel optimized engine.

Ratings Range

		60 Hz
Standby:	**kW**	4000
	kVA	5000
Prime:	**kW**	3640
	kVA	4550

Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- Approved for use with certified renewable Hydrotreated Vegetable Oil (HVO) / Renewable Diesel (RD) fuels compliant with EN15940 / ASTM D975.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a cULus 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-year 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.
- Other features:
  - Kohler designed controllers for one-source system integration and remote communication. See Controllers on page 4.
  - The low coolant level shutdown prevents overheating (standard on radiator models only).

General Specifications

Orderable Generator Model Number	GMKD4000
Manufacturer	Kohler
Engine: model	KD103V20
Alternator Choices	KH09370TO4D KH10171TO4D
Performance Class	Per ISO 8528-5
One Step Load Acceptance	100%
Voltage	4160 V, 6600 V, 12470 V, 13200 V, 13800 V
Controller	APM603, APM802
Fuel Consumption, L/hr (gal./hr) 100% at Standby	1060 (280.0)
Fuel Consumption, L/hr (gal./hr) 100% at Prime Power	959 (253.3)
Emission Level Compliance (KDxxxx)	Tier 2
Open Unit Noise Level @ 7 m dB(A) at Rated Load	99
Data Center Continuous (DCC) Rating (Refer to TIB-101 for definitions)	Same as the Standby Rating below

Generator Set Ratings

				130°C Rise Standby Rating		105°C Rise Prime Rating	
Alternator	**Voltage**	**Ph**	**Hz**	**kW/kVA**	**Amps**	**kW/kVA**	**Amps**
KH09370TO4D	2400/4160	3	60	4000/5000	694	3640/4550	631
	3810/6600	3	60	4000/5000	437	3640/4550	398
	7200/12470	3	60	4000/5000	231	3640/4550	211
	7620/13200	3	60	4000/5000	219	3640/4550	199
	7970/13800	3	60	4000/5000	209	3640/4550	190
KH10171TO4D	2400/4160	3	60	4000/5000	694	3640/4550	631
	3810/6600	3	60	4000/5000	437	3640/4550	398
	7200/12470	3	60	4000/5000	231	3640/4550	211
	7620/13200	3	60	4000/5000	219	3640/4550	199
	7970/13800	3	60	4000/5000	209	3640/4550	190

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.

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Engine Specifications	60 Hz
Manufacturer	Kohler
Engine: model	KD103V20
Engine: type	4-Cycle, Turbocharged, Intercooled
Cylinder arrangement	20-V
Displacement, L (cu. in.)	103 (6304)
Bore and stroke, mm (in.)	175 x 215 (6.89 x 8.46)
Compression ratio	16.0:1
Piston speed, m/min. (ft./min.)	774 (2539)
Main bearings: quantity, type	9, Precision Half Shells
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	4290 (5753)
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

Lubricating System	60 Hz
Type	Full Pressure
Oil pan capacity with filter (initial fill), L (qt.) §	700 (740)
Oil filter: quantity, type §	10, Cartridge

§ Kohler recommends the use of Kohler Genuine oil and filters.

Fuel System	60 Hz
Fuel supply line, min. ID, mm (in.)	25 (1.0)
Fuel return line, min. ID, mm (in.)	19 (0.75)
Max. fuel flow , Lph (gph)	1200 (317)
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)	30 (8.9)
Fuel filter: quantity, type	3, Primary Engine Filter 2, Fuel/Water Separator
Recommended fuel	#2 Diesel ULSD / HVO / RD

Fuel Consumption**	60 Hz
Diesel, Lph (gph) at % load	**Standby Rating**
100%	1060 (280.0)
75%	870 (230.0)
50%	580 (153.3)
25%	323 (85.3)
Diesel, Lph (gph) at % load	**Prime Rating**
100%	959 (253.3)
75%	774 (204.5)
50%	530 (140.0)
25%	299 (79.1)

** Volumetric Fuel consumption is up to 4% higher when using HVO/RD than #2 ULSD.

Radiator System	60 Hz EPA Tier 2	60 Hz Low NOx EPA Tier 2
Ambient temperature, °C (°F)	50 (122)	45 (113)
Engine jacket water capacity, L (gal.)	400 (106)	
Radiator system capacity, including engine, L (gal.)	1217 (321)	
Engine jacket water flow, Lpm (gpm)	2420 (640)	
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	1370 (77912)	1450 (82462)
Charge cooler water flow, Lpm (gpm)	830 (220)	
Heat rejected to charge cooling water at rated kW, dry exhaust, kW (Btu/min.)	1170 (66538)	1380 (78481)
Water pump type	Centrifugal	
Fan diameter, including blades, mm (in.)	2438 (96)	
Fan, kWm (HP)	120 (160.9)	
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H_2O)	0.125 (0.5)	

Remote Radiator System†	60 Hz
Exhaust manifold type	Dry
Connection sizes:	Class 150 ANSI Flange
Water inlet/outlet, mm (in.)	216 (8.5) Bolt Circle
Intercooler inlet/outlet, mm (in.)	178 (7.0) Bolt Circle
Static head allowable above engine, kPa (ft. H_2O)	250 (83.6)

† Contact your local distributor for cooling system options and specifications based on your specific requirements.

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Exhaust System	60 Hz EPA Tier II	60 Hz Low Nox EPA Tier II
Exhaust flow at rated kW, m^3/min. (cfm)	853 (30126)	892 (31499)
Exhaust temperature at rated kW at 25°C (77°F) ambient, dry exhaust, °C (°F)	480 (895)	
Maximum allowable back pressure, kPa (in. Hg)	8.5 (2.5)	
Exh. outlet size at eng. hookup, mm (in.)	See ADV drawing	

Electrical System	60 Hz
Battery charging alternator:	
Ground (negative/positive)	Negative
Volts (DC)	24
Ampere rating	140
Starter motor qty. at starter motor power rating, rated voltage (DC)	Standard: 2 @ 9 kW, 24; Redundant (optional); 2 @ 15 kW, 24
Battery, recommended cold cranking amps (CCA):	
Quantity, CCA rating each, type (with standard starters)	4, 1110, AGM
Quantity, CCA rating each, type (with redundant starters)	8, 1110, AGM
Battery voltage (DC)	12

Air Requirements	60 Hz EPA Tier II	60 Hz Low Nox EPA Tier II
Radiator-cooled cooling air, m^3/min. (scfm)‡	3888 (137300)	
Cooling air required for generator set when equipped with city water cooling or remote radiator, based on 14°C (25°F) rise, m^3/min. (scfm)‡	1469 (51868)	
Combustion air, m^3/min. (cfm)	322 (11361)	343 (12120)
Heat rejected to ambient air:		
Engine, kW (Btu/min.)	220 (12511)	
Alternator, kW (Btu/min.)	193.3 (11000)	

‡ Air density = 1.20 kg/m^3 (0.075 lbm/ft^3)

Alternator Specifications		60 Hz
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)
Material		Class H, Synthetic, Nonhygroscopic
Temperature rise		130°C, 150°C Standby
Bearing: quantity, type		2, Sealed
Coupling type		Coupling
Amortisseur windings		Full
Alternator winding type		Form Wound
Rotor balancing		125%
Voltage regulation, no-load to full-load		±0.25%
Unbalanced load capability		100% of Rated Standby Current
Peak motor starting kVA:		(35% dip for voltages below)
12470 V	KH10171TO4D	12179
13800 V	KH09370TO4D	11673

Alternator Standard Features

- 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.

NOTE: See TIB- 102 Alternator Data Sheets for alternator application data and ratings, efficiency curves, voltage dip with motor starting curves, and short circuit decrement curves.

Controllers

APM802 Controller
Provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility.

- 12-inch graphic display with touch screen and menu control provide easy local data access
- Measurements are selectable in metric or English units
- User language is selectable
- Two USB ports allow connection of a flash drive, mouse, or keypad
- Electrical data, mechanical data, and system settings can be saved to a flash drive
- Ethernet port allows connection to a PC type computer or Ethernet switch
- The controller supports Modbus® RTU and TCP protocols
- NFPA 110 Level 1 capability

Refer to G6-152 for additional controller features and accessories.

Modbus® is a registered trademark of Schneider Electric.

APM603 Controller
Provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility.

- 7-inch graphic display with touch screen and menu control provides easy local data access
- Measurements are selectable in metric or English units
- Paralleling capability to control up to 8 generators on an isolated bus with first-on logic, synchronizer, kW and kVAR load sharing, and protective relays
  Note: Parallel with other APM603 controllers only
- Generator management to turn paralleled generators off and on as required by load demand
- Load management to connect and disconnect loads as required
- Controller supports Modbus® RTU, Modbus® TCP, SNMP and BACnet®
- Integrated voltage regulator with ±0.25% regulation
- Built-in alternator thermal overload protection
- UL-listed overcurrent protective device
- NFPA 110 Level 1 capability

Refer to G6-162 for additional controller features and accessories.

BACNet® is a registered trademark of ASHRAE.

Codes and Standards

- Engine- generator set is designed and manufactured in facilities certified to ISO 9001.
- Generator set meets NEMA MG1, BS5000, ISO, DIN EN, and IEC standards, NFPA 110.
- Engine generator set is tested to ISO 8528-5 for transient response.
- The generator set and its components are prototype-tested, factory-built, and production-tested.

Third-Party Compliance

- Tier 2 EPA-Certified for Stationary Emergency Applications

Available Approvals and Listings
❑ IBC Seismic Certification
❑ cULus

Warranty Information

- A standard three-year or 1000-hour limited warranty for standby applications. Five-year 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.

Available Warranties for Standby Applications
❑ 5-Year Basic Limited Warranty
❑ 5-Year Comprehensive Limited Warranty
❑ 10-Year Major Components Limited Warranty

Standard Features

- Closed Crankcase Ventilation (CCV) Filters
- Customer Connection
- Local Emergency Stop Switch
- Oil Drain and Coolant Drain Extension
- Operation and Installation Literature
- Fan Bearing Grease Extension
- Fuel/Water Separator
- Spring Isolation Under the Skid

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Available Options

Engine Type

- ❑ KDxxxx Tier 2 EPA-Certified Engine
- ❑ KDxxxx-F Fuel Optimized Engine
- ❑ KDxxxx Tier 2 NOx Optimized EPA-Certified Engine (contact factory)

Approvals and Listings

- ❑ IBC Seismic Certification
- ❑ cULus

Open Unit

- ❑ Exhaust Silencer, Hospital (kit: PA-361626)
- ❑ Exhaust Silencer, Critical (kits: PA-361625 qty. 2)
- ❑ Flexible Exhaust Connector, Stainless Steel

Controller

- ❑ Input/Output, Digital
- ❑ Load Shed (APM802 only)
- ❑ Manual Key Switch
- ❑ Remote Emergency Stop Switch
- ❑ Lockable Emergency Stop Switch
- ❑ Remote Serial Annunciator Panel

Cooling System

- ❑ Block Heater; 10500 W, 208 V, (Select 1 Ph or 3 Ph) *
- ❑ Block Heater; 12000 W, 240 V, (Select 1 Ph or 3 Ph) *

* Required for Ambient Temperatures Below 5°C (41°F).

Electrical System

- ❑ Battery, AGM (kit with qty. 4, loose)
- ❑ Battery Charger (loose)
- ❑ Battery Racks (loose)
- ❑ Battery Cables

Fuel System

- ❑ Flexible Fuel Lines
- ❑ Restriction Gauge (for fuel/water separator)

Literature

- ❑ General Maintenance
- ❑ NFPA 110
- ❑ Overhaul
- ❑ Production

Miscellaneous

- ❑ Air Cleaner, Heavy Duty (loose)
- ❑ Air Cleaner Restriction Indicator
- ❑ Automatic Oil Replenishment System
- ❑ Rated Power Factor Testing

Warranty (Standby Applications only)

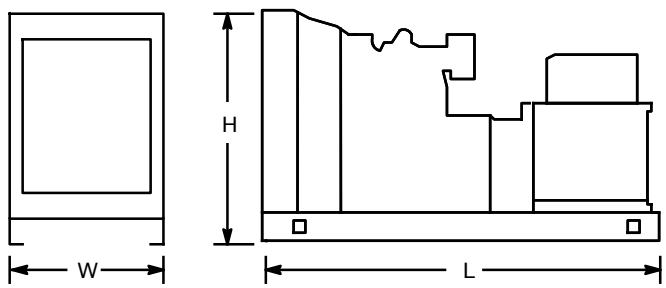
- ❑ 5-Year Basic Limited Warranty
- ❑ 5-Year Comprehensive Limited Warranty
- ❑ 10-Year Major Components Limited Warranty

Other

- ❑
- ❑

Dimensions and Weights

Overall Size, max., L x W x H, mm (in.):	8263 x 3172 x 3451 (325.3 x 124.9 x 135.8)
Weight, radiator model, max. wet, kg (lb.):	35199 (77631)



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

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KOHLERPower.com

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