



Appendix M

Generator Specifications

Industrial Diesel Generator Set – KD1250-E

50 Hz - Emission Optimized – EPA Tier 2 Compliant



| RATINGS 400V - 50 Hz | | |
|----------------------|-----|------|
| Standby | kVA | 1250 |
| | KWe | 1000 |
| Prime | kVA | 1136 |
| | KWe | 909 |

Benefits & features

KOHLER SDMO premium quality

- KOHLER SDMO provides **one source responsibility** for the generating system and accessories
- The generator set, its components and a wide range of options have been **fully developed, prototype tested, factory built**, and production-tested
- The generator sets are designed in accordance to ISO8528-5 performance **class G3** and accepts rated load in one step

KOHLER SDMO premium performances

Engines

- Low fuel consumption thanks to a high technology common rail injection engine
- A smaller footprint thanks to a high power density
- Low temperature starting capability
- Long maintenance interval

Alternator

- Provide industry leading motor starting capability
- Excitation system to permit sustained overcurrent > 300% In, during 10 sec
- Built with a class H insulation and IP23

Cooling

- A compact and complete solution using a mechanically driven radiator fan
- High temperature and altitude product capacity, running without power derating

Control Panel

The KOHLER SDMO wide controller range provide the reliability and performances you expect from your equipment. You can program, manage and diagnose it easily and in an efficient way

KOHLER SDMO worldwide support

- A standard three-year or 1000-hour limited warranty for standby applications.
- A standard two-year or 8700-hour limited warranty for prime power applications.
- A worldwide product support

GENERAL SPECIFICATIONS

| | | |
|--------------------------------|------------------------|------------|
| Engine brand | KOHLER | |
| Alternator commercial brand | KOHLER | |
| Voltage (V) | 400/230 | |
| Performance class | G3 | |
| Standard Control Panel | M80-D, APM403, APM802, | |
| Genset Fuel consumption | PRP | ESP |
| Consumption @ 100% load (L/h) | 237 | 258,10 |
| Engine optimisation | E | |
| Type of Cooling | Radiator | |

GENERATOR SETS RATINGS

| | Voltage | PH | Hz | Standby Rating | | | Prime Rating | |
|----------|---------|----|----|----------------|------|------|--------------|------|
| | | | | kWe | kVA | Amps | kWe | kVA |
| KD1250-E | 415/240 | 3 | 50 | 912 | 1140 | 1586 | 829 | 1036 |
| | 400/230 | 3 | 50 | 1000 | 1250 | 1804 | 909 | 1136 |
| | 380/220 | 3 | 50 | 1000 | 1250 | 1899 | 909 | 1136 |

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. Average load factor is <85%. 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. Average load factor is <75%. Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time, continuous or other ratings, consult your contact and obtain technical information 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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KOHLER DIESEL ENGINE

| General | |
|------------------------------------------|--------------|
| Engine brand | KOHLER |
| Engine ref. | KD36V16-5AES |
| Distribution | 4T |
| Air inlet system | Turbo |
| Fuel | GO |
| Engine optimisation | E |
| Cylinders configuration | V |
| Number of cylinders | 16 |
| Displacement (L) | 35,96 |
| Bore (mm) * Stroke (mm) | 135 * 157 |
| Compression ratio | 15 : 1 |
| Speed (RPM) | 1500 |
| Maximum stand-by power at rated RPM (kW) | 1108 |
| Cylinder Head Material | Cast Iron |
| Crankshaft Material | Steel |
| Intake and Exhaust Valve Material | Steel |
| Piston type & material | Steel |
| Charge Air coolant | Air/Air DC |
| Frequency regulation, steady state (%) | +/- 0.25% |
| Injection Type | Direct |
| Governor type | Electronic |
| ECU type | KODEC |
| Air cleaner type, models | Dry |

| Fuel system | | |
|---------------------------------------------|--------|--------|
| Maximum fuel pump flow (L/h) | 263 | |
| Max. restriction at fuel pump (m) | 3,50 | |
| Max head on fuel return line (m) | 2,30 | |
| Maximum allowed inlet fuel temperature (°C) | 60 | |
| Consumption with cooling system | PRP | ESP |
| Consumption @ 100% load (L/h) | 237 | 258,10 |
| Consumption @ 75% load (L/h) | 184,90 | 203,40 |
| Consumption @ 50% load (L/h) | 128 | 140,10 |
| Consumption @ 25% load (L/h) | 68,10 | 74,30 |

| Lubrication System | |
|-------------------------------------------|-----------------|
| Oil system capacity including filters (L) | 152 |
| Min. oil pressure (bar) | 3,30 |
| Max. oil pressure (bar) | |
| Oil sump capacity (L) | 135 |
| Oil cooler | Plate Exchanger |
| Oil consumption 100% ESP (L/h) | 0,13 |

| Air Intake system | |
|----------------------------------|------|
| Max. intake restriction (mm H2O) | 500 |
| Intake air flow (L/s) | 1084 |

| Exhaust system | |
|-------------------------------------|-------------------------|
| Heat rejection to exhaust (kW) | 811 |
| | PRP ESP |
| Exhaust gas temperature (°C) | 540 535 |
| Exhaust gas flow (L/s) | 2928 3117 |
| Max. exhaust back pressure (mm H2O) | 850 |

| Radiator Charge Air Cooling System | |
|--------------------------------------------|-------|
| Ambiant temperature design (°C) | 40 |
| Radiated heat to ambient (kW) | 78 |
| CAC Heat Rejection (kW) | 214 |
| Heat rejection to coolant HT (kW) | 410 |
| Radiator & Engine capacity (L) | |
| Coolant capacity HT, engine only (L) | 124 |
| Flow on the HT circuit (L/min) | 1723 |
| Maximum Coolant temp without derating (°C) | 105 |
| Outlet coolant temperature (°C) | 100 |
| Type of coolant | |
| Compressor Discharge Temp at 25°C (°C) | 201 |
| Thermostat begin of opening HT (°C) | 82 |
| Thermostat end of opening HT (°C) | 92 |
| Fan power (kW) | 40 |
| Fan air flow w/o restriction (m3/s) | 20,50 |

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Alternator Specifications

| | |
|---------------------------------------------------------|----------------|
| Alternator commercial brand | KOHLER |
| Alternator ref. | KH04070T |
| Number of pole | 4 |
| Number of bearing | Single Bearing |
| Technology | Brushless |
| Indication of protection | IP23 |
| Insulation class | H |
| Number of wires | 12 |
| Capacity for maintaining short circuit at 3 In for 10 s | Yes |
| AVR Regulation | Yes |
| Coupling | Direct |

Application data

| | |
|---------------------------------------------------|------|
| Overspeed (rpm) | 2250 |
| Power factor (Cos Phi) | 0,80 |
| Voltage regulation at established rating (+/- %) | 0,50 |
| Wave form : NEMA=TIF | <40 |
| Wave form : CEI=FHT | <2 |
| Total Harmonic Distortion in no-load DHT (%) | 2,1 |
| Total Harmonic Distortion, on linear load DHT (%) | 1,5 |
| Recovery time (Delta U = 20% transient) (ms) | 200 |

Performance datas

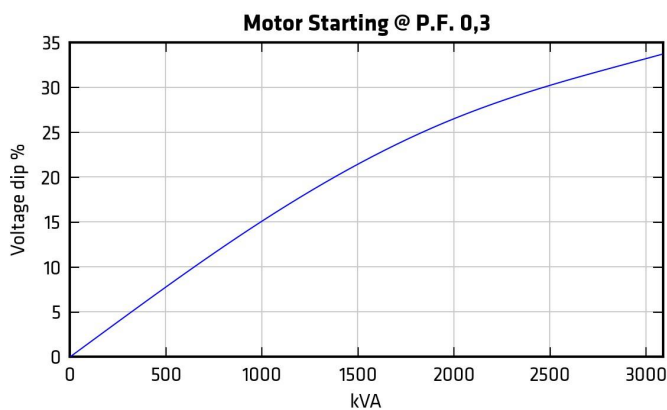
| | |
|--------------------------------------|------|
| Continuous Nominal Rating 40°C (kVA) | 1150 |
| Unbalanced load acceptance ratio (%) | 100 |

Peak motor starting (kVA) based on x% voltage dip power factor at 0.3

Alternator Standard Features

- All models are brushless, rotating-field alternators
- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- The AVR voltage regulator provides superior short circuit capability
- Self-ventilated and dip proof construction
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds
- Superior voltage waveform

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



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Dimensions compact version

| | |
|----------------------------------------|-------------------|
| Length (mm) * Width (mm) * Height (mm) | 4665* 1900 * 2380 |
| Dry weight (kg) | 8300 |
| Tank capacity (L) | 432 |



* Sounds level in dB(A) are given at 75% Prime Power

Contener dimensions ISO20 version

| ISO20 Si | |
|----------------------------------------|-------------------|
| Length (mm) * Width (mm) * Height (mm) | 6058* 2438 * 2896 |
| Dry weight (kg) | 15800 |
| Tank capacity (L) | 500 |
| Acoustic pressure level @1m in dB(A) | 91 |
| Measured acoustic power level (Lwa) | 112 |
| Acoustic pressure level @7m in dB(A) | 82 |



* Sounds level in dB(A) are given at 75% Prime Power

Contener dimensions ISO20 super soundproofed version

| ISO20 SSi | |
|----------------------------------------|-------------------|
| Length (mm) * Width (mm) * Height (mm) | 9140* 2438 * 2896 |
| Dry weight (kg) | 16700 |
| Tank capacity (L) | 500 |
| Acoustic pressure level @1m in dB(A) | 85 |
| Measured acoustic power level (Lwa) | 107 |
| Acoustic pressure level @7m in dB(A) | 76 |



* Sounds level in dB(A) are given at 75% Prime Power

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M80-D



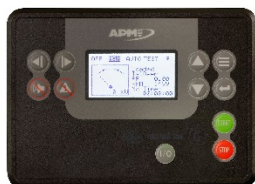
The M80-D can be used as a basic terminal block for connecting an electrical cabinet box and as an instrument panel with a highly intuitive LCD screen giving an overview of your generating set's basic parameters:

- Oil gauge
- coolant temperature
- oil temperature
- engine speed
- battery voltage
- charge air temperature
- fuel consumption
- etc.

The engine main functions can be controlled and events are recorded to facilitate diagnostics:

- starting
- speed adjustment
- stopping
- droop
- etc.

APM403



BASIC GENERATING SET AND POWER PLANT CONTROL

The APM403 is a versatile control unit which allows operation in manual or automatic mode

- Measurements : voltage and current
- kW/kWh/kVA power meters
- Standard specifications: Voltmeter, Frequency meter.
- Optional : Battery ammeter.
- J1939 CAN ECU engine control
- Alarms and faults: Oil pressure, Coolant temperature, Overspeed, Start-up failure, alternator min/max, Emergency stop button.
- Engine parameters: Fuel level, hour counter, battery voltage.
- Optional (standard at 24V): Oil pressure, water temperature.
- Event log/ Management of the last 300 genset events.
- Mains and genset protection
- Clock management
- USB connections, USB Host and PC,
- Communications : RS485 INTERFACE
- ModBUS protocol /SNMP
- Optional : Ethernet, GPRS, remote control, 3G, 4G,
- Websupervisor, SMS, E-mails

APM802



ADVANCED POWER PLANT MANAGEMENT CONTROL

Dedicated to power plant management APM802 provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility

- Graphic display with touchscreen
- User language selectable
- Specially researched ergonomics
- High level of equipment availability
- USB and Ethernet ports
- Modbus protocol
- Making it easy to extend the installation
- Complies with the international standard IEC 61131-3

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STANDARD SCOPE OF SUPPLY

All our KD Series gensets are fitted with:

- Industrial water cooled DIESEL engine
- Radiator with coolant
- Electric starter & charge alternator 24 V D.C
- Electronic governor
- Standard air filter
- Single bearing alternator IP 23 T° rise/ insulation to class H/H
- Welded steel base frame with 80% vibration attenuation mounts
- Flexible fuel lines & lub oil drain pump
- Fuel water separator filter
- Exhaust outlet with flexible and flanges
- M80 control panel
- User's manual (1 copy)
- Packing under plastic film
- Delivered with oil
- Delivered with antifreeze liquid

CODES AND STANDARDS

Engine-generators set is designed and manufactured in facilities certified to standards ISO9001:2015 & ISO14001:2015. The generator sets and its components are prototype-tested, factory built and production tested and are in compliance with the relevant standards:

- Machinery Directive 2006/42/EC of May 17th 2006
- EMC Directive 2014/30/UE
- Safety objectives set out in the Low Voltage Directive 2014/35/UE
- EN ISO 8528-13, EN 60034-1, EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 55011, EN 1679-1 et EN 60204-1

TERMS OF USE

According to the standard, the nominal power assigned by the genset is given for 25°C Air Inlet Temperature, of a barometric pressure of 100 kPA (100 m A.S.L), and 30 % relative humidity. For particular conditions in your installation, refer to the derating table.

WARRANTY INFORMATIONS

Standard Warranty Period:

- for Products in "back-up" service
 - o 30 months from the date the Product leaves the plant, **extended to 42 months for KD series**
 - o 24 months from the Product's commissioning date, **extended to 36 months for KD series**
 - o 1,000 running hours

The warranty expires when one of the above conditions is met.

- for Products in "continuous" service (continuous supply of electricity, either in the absence of any normal electricity grid or to complement the grid),
 - o 18 months from the date the Product leaves the plant, **extended to 30 months for KD series**
 - o 12 months from the Product's commissioning date, **extended to 24 months for KD series**
 - o 2,500 running hours, **extended to 8700 running hours for KD series**

The warranty expires when one of the above conditions is met.

For more details regarding conditions of application and scope of the warranty please refer to our General "terms & conditions of sales".

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