Industrial Generator Set - KD1650-E
Emission Optimized – EPA Tier 2 Compliant

Ratings Range

400/230 V - 50 Hz

Standby	**kW**	1320
	kVA	1650
Prime	**kW**	1200
	kVA	1500

Benefits and features

Rehlko premium quality
- Rehlko provides **one source responsibility** for the generating set and accessories
- The generator set, its components and a wide range of options have been **fully developed, prototype tested, factory built,** and production tested.
- Generators sets are designed in accordance with ISO8528-5, performance class G3.
- Generators sets accept the rated load in one step outside the ISO8528-5 operating limit values
- Approved for use with HVO (Hydrotreated Vegetable Oil) according to EN15940.

Rehlko 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 available

Control panel
- The Rehlko 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

Rehlko 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

Manufacturer	Rehlko
Engine ref.	KD45V20-5DES
Alternator choices	KH03850T KH04590T
Performance class	G3
One step load acceptance (out of ISO criteria)	100%
Voltage (V)	400/230 380/220 415/240
Controllers	M80-D APM403 APM802
Emission level	Emission optimization - EPA Tier 2 Compliant
Data Center / Mission Critical Rating	Same as the Standby Rating below
Type of Cooling	Radiator
Factory installed enclosures	ISO20 ISO20SSI

"* Volumetric Fuel consumption is up to 4% higher when using HVO than Diesel Fuel"

Conscious Care$_{TM}$ Qualified

Reduce operating costs, fuel consumption, and greenhouse gas emissions with Conscious CareTM maintenance program.

Generator sets ratings

		Standby rating			Prime rating	
	Hz	kWe	kVA	Amps	kWe	kVA
400/230	50	1320	1650	2382	1200	1500
380/220	50	1320	1650	2507	1200	1500
415/240	50	1320	1650	2296	1200	1500

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Engine Specifications	
Engine brand	KD Series
Engine ref.	KD45V20-5DES*
Air inlet system	Turbo
Cylinder configuration	20 - V
Displacement (l)	44,95
Bore (mm) x Stroke (mm)	135 x 157
Compression ratio	15 : 1
Speed 50Hz (RPM)	1500
Maximum stand-by power at rated RPM (kW)	1463
Governor type	Electronic
Frequency regulation, no-load to full-load	Isochronous
Frequency regulation, steady state (%)	+/- 0.25%

Lubrication System	
Oil Filter Quantity and type****	Spin On / 4
Charge Air coolant	Air/Air

*****Rehlko recommends the use of genuine oil and filters.*

Fuel System	
Maximum fuel pump flow (l/h)	470
Max head on fuel return line (m fuel)	3,1
Fuel Filter Quantity and type	
Fuel	Diesel Fuel/HVO

* Engine reference may be partially modified depending on genset application, options selected by the customer and lead time required.

Consumption with cooling system		
At % load of Engine power rating	**g/kWh**	**L/h****
100%	195	335,6
75%	209,6	270,6
50%	221,5	190,6
25%	243,6	104,8

***Assumed volumetric fuel consumption with diesel fuel having an LHV of 42.7kJ/kg and weighting 0.85kg/L.*

Cooling system	
Ambient temperature design (°C)	40
Radiator & Engine capacity (l)	286
Fan power 50Hz (kW)	37,6
Fan air flow w/o restriction (m3/s)	26
Available restriction on air flow (mm H2O)	30
Type of coolant	Gencool
Radiated heat to ambiant (kW)	102
Heat rejection to coolant HT (kW)	535
Coolant capacity HT, engine only (l)	143
Outlet coolant temperature (°C)	100
Max coolant temperature, Shutdown (°C)	105
Max. pressure at inlet of HT water pump (mbar)	1000
Thermostat begin of opening HT (°C)	82
Thermostat end of opening HT (°C)	92

Exhaust system	
Heat rejection to exhaust (kW)	1077
Exhaust gas temperature @ ESP (°C)	519
Exhaust gas flow @ ESP (l/s)	4218
Electrical system	
Battery voltage (V)	24
Air Intake system	
Combustion air flow (l/s)	1501,41
Radiated heat to ambiant (kW)	102

Alternator Specifications	
Number of pole	4
Technology	Brushless
AVR Regulation	Yes
Insulation class	H
Indication of protection	IP23
Number of bearing	1
Number of wires	12
Coupling	Direct
Overspeed (rpm)	2250
Voltage regulation at established rating (+/- %)	0,5
Unbalanced load acceptance ratio (%)	8

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.

M80-D controller
The M80-D can be used as a basic terminal block for connecting a control unit 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 controller
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 controller
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

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 Directive2014/30/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

Power ratings definition according to ISO8528-1 (2018-02 edition) and ISO-3046-1

Emergency Standby Power (ESP): 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 per 24 hours of operation is <85%.
Prime Power (PRP): At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour within 12 hour of operation. Average load factor per 24 hours of operation is <75%.
Data Center Mission Critical (DCP): Data Center Mission Critical power is defined as being the maximum power which a generating set is capable of delivering while supplying a variable or continuous electrical load and during unlimited run hours. Depending on the sites to supply and the availability of reliable utility, the generating set manufacturer is responsible to define what power level is able to supply to fulfil that requirement including hardware or software or maintenance plan adaptation.

Warranty informations

Standard warranty period:

- for Products in "back-up" service
  - 30 months from the date the Product leaves the plant, extended to 42 months for KD series
  - 24 months from the Product's commissioning date, extended to 36 months for KD series
  - 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),
  - 18 months from the date the Product leaves the plant, extended to 30 months for KD series
  - 12 months from the Product's commissioning date, extended to 24 months for KD series
  - 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".

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-D control panel
- User's manual (1 copy)
- Packing under plastic film
- Delivered with oil

- Modbus protocol
- Making it easy to extend the installation
- -Complies with the international standard IEC 61131-3
- Delivered with antifreeze liquid

Dimensions and Weights

Compact version	
Overall Size, max., L x W x H, (mm)	5090 x 2122 x 2481
Dry weight (kg)	10100
Tank capacity (L)	500

Container dimensions ISO20 soundproofed version	
Overall Size, max., L x W x H, (mm)	6058 x 2438 x 2896
Tank capacity (L)	465
Dry weight (kg)	15900
Sound power level guaranteed (Lwa) 50Hz (75% PRP)	118
Acoustic pressure level @1m in dB(A) 50Hz (75% PRP)	97
Acoustic pressure level @7m in dB(A) 50Hz (75% PRP)	88

Container dimensions ISO20 super soundproofed version	
Overall Size, max., L x W x H, (mm)	9140 x 2438 x 2896
Tank capacity (L)	465
Dry weight (kg)	16500
Sound power level guaranteed (Lwa) 50Hz (75% PRP)	103
Acoustic pressure level @1m in dB(A) 50Hz (75% PRP)	80
Acoustic pressure level @7m in dB(A) 50Hz (75% PRP)	72

** dimensions and weight without options*

Reference Conditions: 25°C Air Inlet Temperature, 40°C Fuel Inlet Temperature, 100 kPa Barometric Pressure; 10.7 g/kg of dry air Humidity. Intake Restriction set to maximum allowable limit for clean filter; Exhaust Back pressure set to maximum allowable limit; Fuel density at 0.85 kg/L.
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. Test conducted with alternate test methods, instrumentation, fuel or reference conditions can yield different results. Data and specifications subject to change without notice.