

DC Generator Sets

LR13.5DC

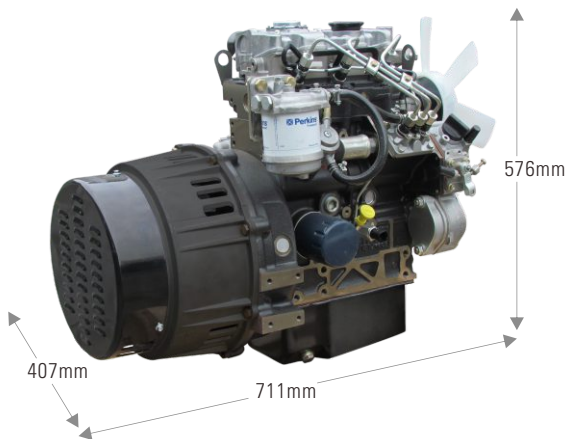


Output Ratings

Voltage	Prime	Standby
48Vdc	12 kW	13.5kW

Ratings and Performance Data

Output DC Voltage: (Vdc)	42-58
Output Max DC Current: (A)	250
Engine Manufacturer:	Perkins
Engine Model:	403D-11
Engine Speed: (rpm)	1200-2800
Alternator Model:	Power 1503 M
Starting System: (Vdc)	12
Communications:	RS 485
Acoustic Noise: (dBA)	75
Fuel consumption $\frac{\%}{\text{hr}}$: (l/hr)	3.05
Fuel Tank Capacity: (Litre)	35
Base Frame:	Heavy Duty Fabricated Steel



Applications

- Telecommunications
- Aircraft
- Military
- Railway
- Uninterruptible Power Supplies
- Solar/Wind Hybrid Power
- Rapid Electric Vehicle Charging

Features

- Microprocessor Controlled
- Variable Speed Design
- Rare Earth, Permanent Magnet Generator
- Direct Connection to Battery Bus (No Transfer Switch)
- Temperature compensated battery charging
- Automatic three step charging circuit consisting of bulk rate, overcharge (equalize), and float
- Alternator exceeds 92% efficiency
- Generator smart startup according to the battery voltage, battery capacity, remote start signal and electric supply fault condition
- Ensure to make engine longer lifetime, it will switch to the battery for power supply when generator's load is over low.
- Smart management for battery's load
- Free maintenance for non-bearings Alternator lifelong
- Regularly switch the operation between two generators in turns easily without adding any other spare parts
- Achieve multi-generators to parallel synchronous operation without adding any other spare parts easily

Advantages of DC genset over AC genset

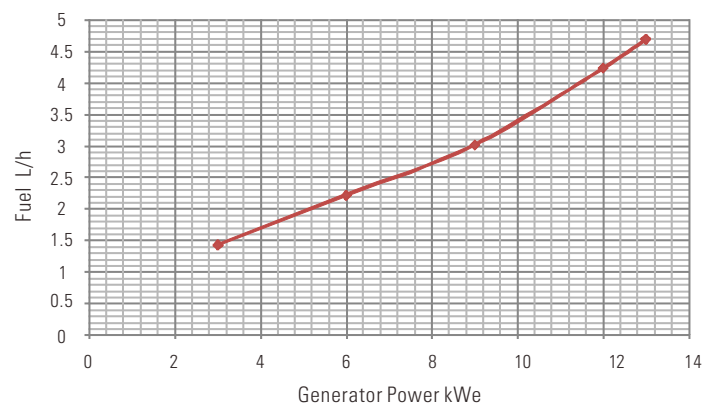
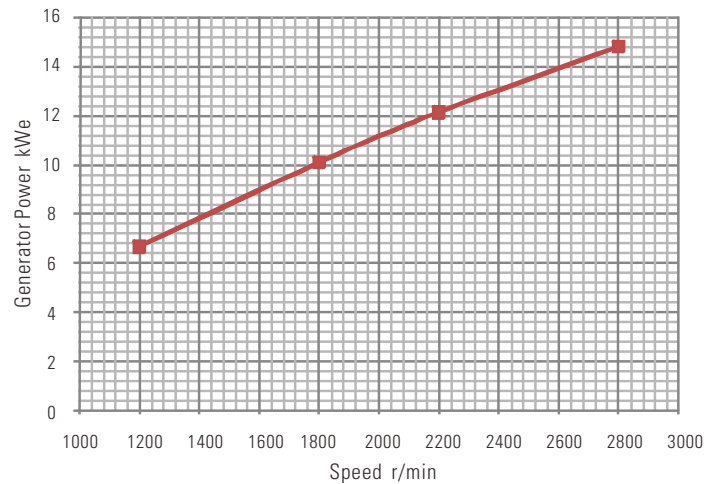
- **Low Fuel Consumption:** NdFeB Magnets Alternator for high efficiency. Under low load, the voltage regulator can vary the engine speed resulting in fuel savings of up to 30%.
- **Expansion capacity:** DC generators can be connected in parallel for load sharing (whereas AC generators cannot) which allows for capacity expansion.
- **Compatibility:** Some AC generators and switch mode power supplies are not compatible. Because of the current pulsing load of switch mode power supplies, some AC genset voltage regulators may not be able to regulate the voltage. DC gensets will have no such problem.
- **Low EMI emissions:** Alternator has no bearings, couplings, brushes, slip rings, or rotating fields. There are no alternator parts to wear.
- **Low Noise Level:** Improving alternator efficiency reduces the demand on the engine and hence the engine noise. Noise is further reduced by eliminating the brushes, slip rings and the alternator fan.
- **Intelligent management of battery charging:** Automatic three-step charging circuit consists of bulk rate, overcharge, and float. Battery life is extended.
- **Automatic Temperature Compensation:** The genset output can be temperature compensated for superior battery charging. A temperature sensor is placed on the battery and the regulator responds by adjusting the output voltage.
- **Comprehensive system protection:** The system is protected from over voltage, battery reverse connection, short circuit and low engine oil. Avoiding faults leads to stable performance.
- **Dynamic LCD display:** Parameters are dynamically displayed for the charge condition and charge process. Touch button operation for convenient use.

[Engines]

Technical Data	
Engine Model:	403D-11
Number of cylinders:	3
Cylinder arrangement:	Vertical in-line
Cycle:	4 stroke
Induction system:	Naturally aspirated
Combustion system:	Indirect injection
Bore x Stroke: (mm)	77x81
Compression ratio:	23.0 : 1
Cubic capacity: (L)	1.131
Firing order:	1.2.3
Governing at rated rev/min:	8% ± 2
Rotation:	Clockwise, viewed from front
Basic thread form:	Metric
Cooling system:	Liquid, 50/50 anti freeze
Standard starter motor cold start limit: (°C)	-20

Capacity of oil sump and filter	
Maximum: (L)	4.4
Minimum: (L)	3.4

Dimensions & Weight	
LxWxH, mm	491x407x576
Dry, kg	111.2



[Alternator]

Technical Data	
Ratings voltage: (Vac)	130-395
Ratings Frequency: (Hz)	240-560
Prime rating: (kW)	12
Standby rating: (kW)	14
Efficiency @ full load, %:	91%
Type:	24-Pole, Rotating-Field
Phase number:	3

Technical Data	
Exciter type:	PMG
Standard protection	IP23
Insulation class:	Class H
Overspeed: rpm	3300
Bearing quantity type:	0 Sealed
Cooling Type:	Air Cooling
Altitude: (m)	≤1000

[Rectifier]

Technical Data	
Type:	HFSMR*
Output Power: (kW)	14
Output Current: (A)	292
Output Voltage Adjustment Range: (Vdc)	42-58
Efficiency:	>90%

Technical Data	
Altitude: (m)	≤2000
Cooling Type:	Air Cooling
Power Factor:	0.99
Psophometric Noise (System): (mV)	≤2
Ripple (mV p-p):	≤200

*HFSMR: High frequency switch-mode rectifier

Control System

The autostart generating set control panel offers a large number of monitoring and protection features within an extremely compact and user friendly package.

Engine and Alternator Metering:

- Generator phase voltage **Vdc**
- Generator current **Adc**
- Engine speed **RPM**
- Generator power **kW**
- Battery voltage **Vdc**
- Engine running hours counter **h**
- Engine temperature °C (°F)
- Oil pressure **BAR (PSI)**
- Fuel level %
- Battery bank capacity **AH**
- Battery bank voltage **Vdc**
- Battery bank temperature °C (°F)
- Battery bank current **Adc**

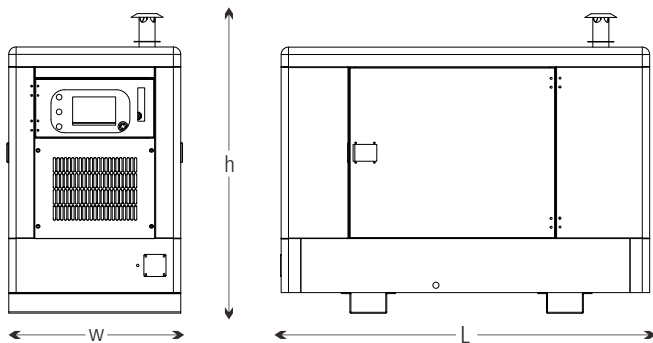
Warning and Shutdown Alarms:

- Low oil pressure
- High engine temperature
- Low/High fuel Level
- High Rectifier temperature
- Over/under Load
- Over / under speed
- High / low gen voltage
- Start failure
- Emergency stop
- High / low battery voltage
- Over current
- High / low battery bank voltage
- Low battery bank capacity
- High battery bank temperature

Optional Function (on ordering):

- Operating Temperature - 40 to 70 °C
- Automatic temperature compensation
- Many sets of synchronous generator
- DC/DC start battery changer
- Double generator rotation operation
- Mains detection

Dimensions and Weights



Length (L)	Width (W)	Height (H)	Dry
mm	mm	mm	kg
1480	750	1005	415
Dry = With Lube Oil			

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

Definitions

Standby Rating

These ratings are applicable for supplying continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted on these ratings. The alternator on this model is peak continuous rated (as defined in ISO 8528-3).

Prime Rating

These ratings are applicable for supplying continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation to the annual hours of operation and this model can supply 10% overload power for 1 hour in 12 hours.

Standard Reference Conditions

Note: Standard reference conditions 25°C (77°F) air inlet temp, 100m (328ft) A.S.L. 30% relative humidity. Fuel consumption data at full load with diesel fuel with specific gravity of 0.85 and conforming to BS2869: 1998, Class A2.

General Data

Documents

A full set of operation and maintenance manuals and circuit wiring diagrams.

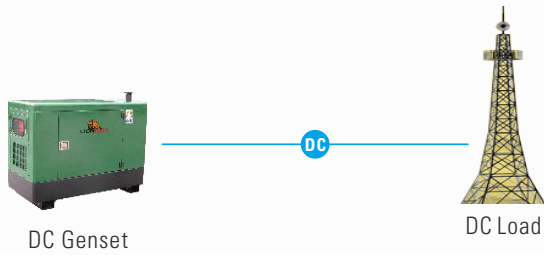
Quality Standards

ISO8528, BSEN60034, BSEN61000, IEC60034.

Warranty

All equipment carries full manufacturer's warranty.

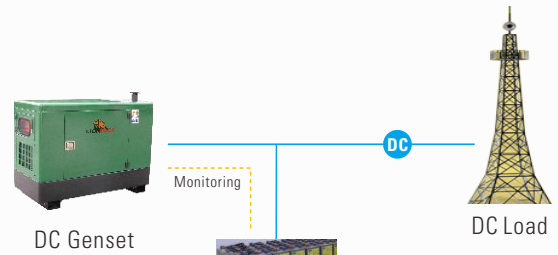
Typical Application



DC Genset

DC Load

Constant voltage power supply mode of DC Genset without battery bank

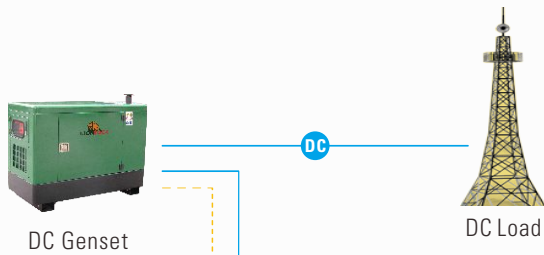


DC Genset

DC Load

Battery Bank

Hybrid power supply mode of DC Genset/battery bank

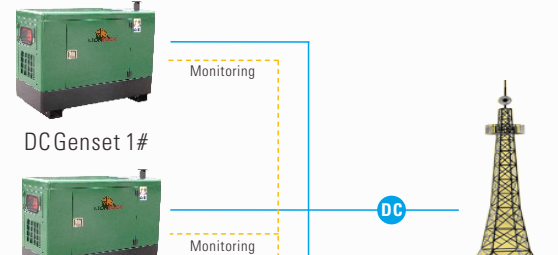


DC Genset

DC Load

Battery Bank

Load management power supply mode of DC Genset and battery bank



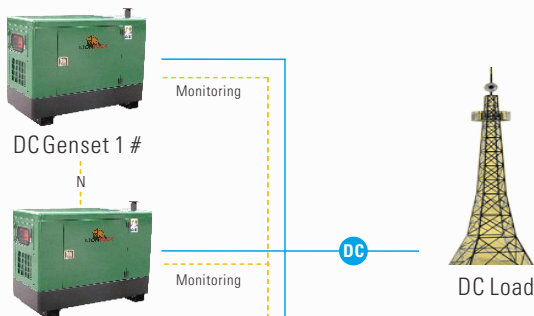
DC Genset 1#

DC Load

DC Genset 2#

Battery Bank

Power supply mode of switching double running genset in turns



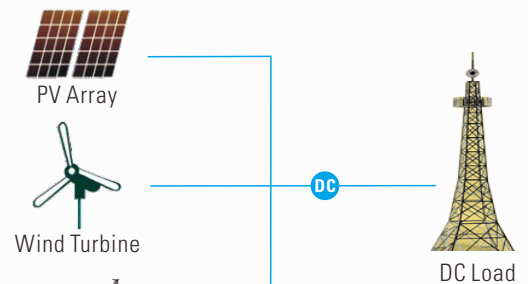
DC Genset 1 #

DC Load

DC Genset 64 #

Battery Bank

Power supply mode of parallel synchronous operation between multi-genset



PV Array

DC Load

Wind Turbine

DC Genset

Battery Bank

Hybrid power supply mode of solar/wind/DC Genset/battery bank