



4

2020

# D11 SERIES ENGINE

TECHNICAL DATA SHEET

## D11 (V6) SERIES DIESEL ENGINE



### RATINGS DEFINITION

The power ratings of Emergency Standby and Prime are in accordance with the standard of ISO8528. Fuel Stop power in accordance with the standard of ISO3046. Electric power (kW) should be estimated by considering generator efficiency, cooling fan power loss and power derating due to altitude and temperature.

**STANDBY POWER RATING** is applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. A standby rated engine should be sized for a maximum of a 70% average load factor and 200 hours of operation per year, this includes less than 25 hours per year at the Standby Power rating.

**PRIME POWER RATING** is available for an unlimited of hours per year in variable load application. Variable load should not exceed a 70% average the Prime Power rating during any operating period hours., The Total operating time at 100% Prime Power shall not exceed 500 hours per year.

10% overload capability is available for a period of 1 hour within a 12 hours period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year,

**CONTINUOUS POWER RATING** is the power that the engine can continue to use under the prescribed speed and the specific environment condition in the normal maintenance period stipulated in the manufacturing plant. And continuous power applicable for supplying utility power at a constant 100% for an unlimited number of hours per year. No overload capability is available for this rating.

Ratings (kW/PS)	1500rpm / 50Hz				1800rpm / 60Hz		
	D11	D11A	D11A1	D11A2	D11B	D11B1	D11B2
Prime	320/435	285/388	265/360	240/326	342/465	318/432	288/392
Standby	360/490	314//427	292/397	264/359	390/530	340/462	317/431
Continuous	249/338	217/295	201/273	182/247	260/353	242/329	219/297

### GENERAL ENGINE DATA

Engine Model	D11	D11A	D11A1	D11A2	D11B	D11B1	D11B2
Engine Type	4-Cycle, V-type, 6-Cylinder, Turbo charged & inter-cooled (air to air)						
Speed	1500 rpm			1800 rpm			
Bore x stroke	128 x 142 mm						
Displacement	10.964 L						
Compression ratio	14.6 : 1	15.5 : 1			14.6 : 1	15.5 : 1	
Rotation {Looking at flywheel}	Counter clockwise {CCW}						
Firing order	1-4-2-5-3-6						
Injection timing	18° ±1° BTDC @ 1500 rpm			20° ±1° BTDC @ 1800			
Dry weight {W/O cooling system}	904 kg						
Dimension {L x W x H}	1251*1389*1288 mm						
Flywheel housing	SAE 1						
Flywheel	14{PCD:438.15mm/17.25inch}						
Number of teeth on flywheel	160						
Piston speed	200 m/s			240 m/s			
<b>ENGINE MOUNTING</b>							
Max.Bending Moment at Rear Face to Block	1325 N.m						

### INTAKE & EXHAUST SYSTEM

Engine Model	D11	D11A	D11A1	D11A2	D11B	D11B1	D11B2
Max.Intake Restriction (kPa)	5						
Max.Exhaust Back Pressure (kPa)	<10						
Combustion Air Consumption (m <sup>3</sup> /h)	2119	1820	1675	1507	2365	2042	1857
Max.Exhaust Temp.(After Turbo°C)	475	460	445	435	535	510	480
Exhaust Gas Flow (m <sup>3</sup> /h)	4885	4112	3707	3288	5890	5476	4960
Cooling fan air flow (m <sup>3</sup> /min)	675	675	675	675	810	810	810

**AIR INDUCTION SYSTEM**

Engine Model	D11	D11A	D11A1	D11A2	D11B	D11B1	D11B2
Maximum Intake Air Restriction							
- With Clean Filter Element (m <sup>3</sup> /h)	2119	1820	1675	1507	2365	2042	1857
- With Dirty Filter Element (m <sup>3</sup> /h)	6103	5242	4824	4340	6811	5881	5348
Max.static pressure after radiator (Pa)	955 Pa						

**COOLING SYSTEM****Water circulation by centrifugal pump on engine**

Cooling method	Fresh water forced circulation						
Coolant capacity	19 L						
Coolant flow rate	320 liters / min @1800 rpm, 390 liters / min @1500 rpm						
Pressure Cap	49 kPa						
Max.Permissible Temperature	90 °C						
Max.Coolant warning Temperature	95 °C						
Max.Coolant Shutdown Temperature	105 °C						
Thermostat Open Temperature	71 °C						
Max.external coolant system restriction	Not available						

Two radiator options are provided, based on allowable maximum Air temperature On radiator inlet ( Air On 40 °C) Air On 50 °C  
 - ATB (Ambient Temperature before Boiling ) of generator set varies depending on the engine room ventilation design, even if the same radiator applied. Adequate selection of radiator options by means of the cooling test is highly recommended, and generator set makers are responsible for the selection.

**LUBRICATION SYSTEM****Force-feed lubrication by gear pump, lubricating oil cooling water circuit of engine**

Lub.Method	Fully forced pressure feed type						
Oil filter	Full flow, cartridge type						
Lube oil specification	CF-4						
Lube oil pressure	Idle Speed : Min 160 kPa Governed Speed: Min 200 kPa						
Maximum oil temperature	110 °C						
Max.Permissible Oil Temperature	90 °C						
Oil Consumption (as % of fuel consumption)	≤0.5						
Oil capacity	25 L						

**FUEL SYSTEM****In-line pump with integrated, electromagnetic actuator**

Engine Model	D11	D11A	D11A1	D11A2	D11B	D11B1	D11B2
Governor	Electric type (Original GAC from USA)						
Speed drop	G2 Class (ISO 8528)						
Feed pump	Mechanical type in pump						
Injection nozzle	Multi hole type						
Opening pressure	28 MPa						
Fuel filter	Full flow, Cartridge type with water drain valve						
Maximum fuel inlet restriction	30 kPa						
Maximum fuel return restriction	60 kPa						
Fuel feed pump Capacity	630 liters / hr						
Fuel	Diesel fuel						
Fuel Consumption of generator set							
Standby power- 100% load (l/h)	89	77	70	63	101	85	79
Prime Power - 100% load (l/h)	78	68	63	57	87	79	71
- 75% load (l/h)	58	51	47	42	64	59	51
- 50% load (l/h)	39	34	33	30	44	40	36
- 25% load (l/h)	24	21	19	18	25	23	21
Continuous power - 100% load (l/h)	59	52	41	43	66	60	54
Lowest Fuel Consumption Ratio(g/kW.h)	198	195	193	192	204	202	197

## ELECTRICAL SYSTEM

Charging Alternator Voltage	28V
Charging Alternator Capacity	45A
Voltage regulator	Built-in type IC regulator
Starting motor	7kW
Battery Voltage	24V
Battery Capacity	2 *200 Ah ( recommended )
Starting aid (Option)	Block heater ( Min. Temperature for Unaided Cold Start -10°C )

## VALVE SYSTEM

Type	Overhead valve type	
Number of valve	Intake 1, exhaust 1 per cylinder	
Valve lashes at cold	Intake 0.3 mm, Exhaust 0.4 mm	
Valve timing	Opening	Close
- Intake valve	24 deg.BTDC	36 deg.ABDC
- Exhaust valve	63 deg.BBDC	27 deg.ATDC

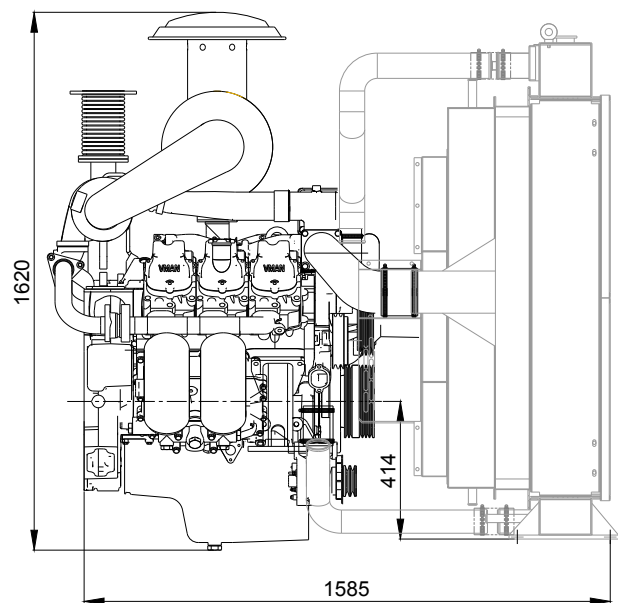
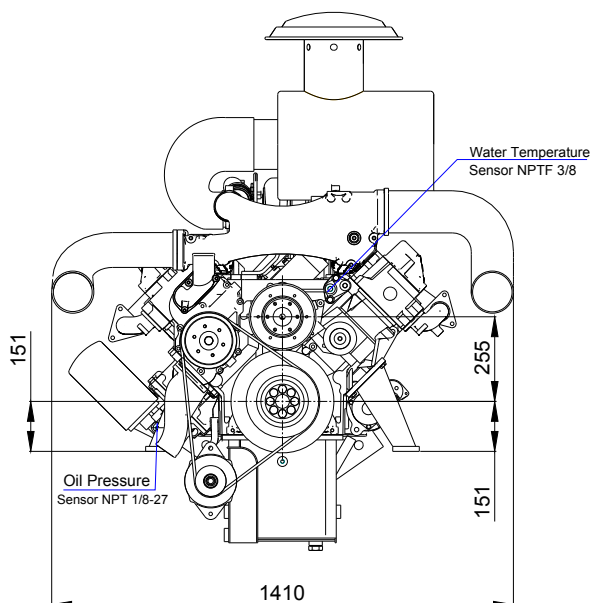
## Engine Data with Dry Exhaust Manifold (Standby Power)

Engine Model	D11	D11A	D11A1	D11A2	D11B	D11B1	D11B2
Cooling Water Circulation	320 L/min (1500 rpm)				390L/min (1800 rpm)		
Heat Rejection to Exhaust (kW)	278	242	219	197	314	266	246
Heat Rejection to Coolant (kW)	121	106	95	86	137	116	107
Heat Rejection to Intercooler (kW)	81	70	64	57	91	77	71
Radiated Heat to Ambient (kW)	37	32	21	18	60	41	35

## Engine Data with Dry Exhaust Manifold (Prime Power)

Engine Model	D11	D11A	D11A1	D11A2	D11B	D11B1	D11B2
Cooling Water Circulation	320 L/min (1500 rpm)				390L/min (1800 rpm)		
Heat Rejection to Exhaust (kW)	252	220	199	179	276	249	223
Heat Rejection to Coolant (kW)	110	96	87	78	120	109	97
Heat Rejection to Intercooler (kW)	73	64	58	52	80	72	65
Radiated Heat to Ambient (kW)	34	29	19	17	52	38	32

## D11 (V6) Series diesel engine drawing



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