

General Engine Data			
Type		V-Type, 4 cycle, water cooled, 12 Cylinder	
Aspiration		Turbocharged & Intercooled	
Cylinder Type		Replaceable dry liner	
Bore x Stroke	mm (inch)	128 x 142 (5.04 x 5.59)	
Displacement	liter (inch <sup>3</sup> )	21.927 (1338)	
Compression Ratio		15 : 1	
Valves per Cylinder	- Intake	1	
	- Exhaust	1	
Valves lashes at cold	- Intake mm (inch)	0.3 (0.0118)	
	- Exhaust mm (inch)	0.4 (0.0157)	
Valve Timing	- Intake	Opening: 24° BTDC	Close: 36° ABDC
	- Exhaust	Opening: 63° BBDC	Close: 27° ATDC
Combustion Type		Direct Injection	
Firing Order		1-12-5-8-3-10-6-7-2-11-4-9	
Injection Timing		18° BTDC	
Rotation		Counter Clockwise, viewed from flywheel	
Dimension (L x W x H)	mm	1,910 x 1,279 x 1,822 (L= Built Length)	
Dry Weight	Approx. kg (lb)	1.775 (3.913)	

Engine Ratings	1,470 rpm	1,760 rpm	2,100 rpm
DF12TiH-N Output <i>kW (hp)</i>	540 (724)	637 (854)	621 (833)

\*To determine the maximum allowable pump load, a deduction of 10% must be made.

Fuel System	
Injection Pump	Bosch in-line "P" type
Governor	RSV type (all speed control)
Feed Pump	Mechanical type
Injection Nozzle	Multi hole type
Opening Pressure <i>kPa (psi)</i>	27,949 (4,053.7)
Fuel Filter	Full flow, cartridge type
Used Fuel	Diesel fuel type 2-D Only
Fuel consumption	See table no. 03.100.06FCEN.03
Minimum Supply line Size <i>mm (inch)</i>	12 (0.47)
Minimum Return line Size <i>mm (inch)</i>	12 (0.47)

Electrical System		24 Volts (Nominal)
Starter motor <i>kW</i>	1 x 7	
Recommended Battery Capacity <i>Ah</i>	200	
Quantity per battery bank	2	
Cold Cranking Amperes <i>@ -18°C (0°F)</i>	1000	
Charging Alternator Output <i>Amps</i>	45	

Air Induction System	
Air Cleaner Type	Drip proof, Replaceable
Engine Air Flow <i>m<sup>3</sup>/min.</i>	47 @ 2,100 rpm
Air Inlet Restriction Dirty <i>kPa (mmH<sub>2</sub>O)</i>	6.2 (635)
Air Inlet Restriction Clean <i>kPa (mmH<sub>2</sub>O)</i>	2.2 (220)

Cooling system	
Heat Exchanger Minimum Raw Water Flow	1 litre / Minute per kW installed
Engine Water Pump	Centrifugal type driven by belt
Water Pump Capacity <i>liter/min. (gal./min.)</i>	454 (120) @ 2100 rpm
Heat Exchanger Maximum Cooling H <sub>2</sub> O	
Inlet Pressure <i>kPa (psi)</i>	1,000 (145.1)
Flow <i>liter/min. (gal./min.)</i>	621 (136.6)
Maximum Temperature <i>°C (°F)</i>	37.8 (100)
Thermostat, Start to Open <i>°C (°F)</i>	71 (160)
Fully Opened <i>°C (°F)</i>	85 (185)
Coolant Capacity <i>liter (gal.)</i>	35 (9.4)
Coolant Pressure Cap <i>kPa (psi)</i>	95 (13.8)
Maximum Raw Water Supply pipe	
Connection to Heat Exchanger <i>inch</i>	2½" BSP
Maximum Raw Water Discharge pipe	
Connection from Heat Exchanger <i>inch</i>	3" BSP
Max. Engine Coolant Temperature <i>°C (°F)</i>	96 (204.8)
Pressure loss Engine Cooling circuit <i>kPa (psi)</i>	80 (116)

Lubrication System	
Lubrication Method	Fully Forced pressure feed type
Oil Pump	Gear type driven by crankshaft
Oil Filter	Full Flow, Cartridge type
Oil pressure Range, normal <i>kPa (psi)</i>	100 (14.5) at idle 300-600 (43.5-87.0) at maximum speed
Max. Oil Sump Temperature <i>°C (°F)</i>	108 (226)
Oil Sump Capacity High <i>litre (gal.)</i>	40 (10.6)
Low <i>litre (gal.)</i>	33 (8.7)
Total Engine Oil Capacity <i>litre (gal.)</i>	40 (10.6)
Minimum Oil Pressure <i>kPa (psi)</i>	75 (10.9)

Exhaust System	
Exhaust Gas Flow <i>m<sup>3</sup>/min.</i>	132 @ 2100 rpm
Exhaust Gas Temperature <i>°C (°F)</i>	600 (1112) @ 2100 rpm
Max. Allowable Back Pressure <i>kPa (mmH<sub>2</sub>O)</i>	6.2 (635)
Minimum Exhaust Pipe Diameter <i>mm (inch)*</i>	138.4 (5")

\* Based on Nominal System. Flow analysis must be done to assure adherence to system limitations!

(Minimum exhaust pipe diameter is based on 15 feet of pipe, one elbow, and a silencer. Pressure drop no greater than one half the max. allowable back pressure)

Heater System	
Wattage (Nominal) <i>W</i>	3,000
Voltage – AC <i>V</i>	230

Engine Performance Data	
All data is based on the engine operating with fuel system, lubricating oil pump, air cleaner, and alternator; not included are compressor, fan, optional equipment, and driven components. Data is based on operation at SAE standard J1394 conditions of 300ft (91.4m) altitude, 29.61 in.(752mm) Hg dry barometer, and 77°F (25°C) intake air temperature, using No.2 diesel or a fuel corresponding to ASTM-D2.	
Altitude above which output should be Limited <i>m (ft.)</i>	91.4 (300)
Correction Factor per 305m.(1000ft.) above Altitude Limit	3%
Temperature above which output should be Limited <i>°C (°F)</i>	25 (77)
Correction Factor per 11°C (10°F) above Temperature Limit	2% (1%)