General

In-line four stroke diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel.
Turbocharged

Number of cylinders			6
Displacement, total		litre in^3	7,15 436,0
Firing order			1-5-3-6-2-4
Bore		mm in	108 4,25
Stroke		mm in	130 5,12
Compression ratio			18:1
Dry weight	Engine only	kg lb	710 1565
	Engine and cooling package	kg lb	900 1984
Wet weight	Engine only	kg lb	751 1656
	Engine and cooling package	kg lb	968 2134

Performance			**r/min**	**1500**	**1800**	
Standby Power		without fan	kW hp	183 249	204 277	
		with fan	kW hp	176 239	192 261	
Prime Power		without fan	kW hp	166 226	186 252	
		with fan	kW hp	159 217	173 235	
Torque at:	Standby Power		Nm lbft	1165 859	1082 798	
	Prime Power		Nm lbft	1059 781	984 726	
Mean piston speed			m/s ft/sec	6,5 21,4	7,8 25,7	
Effective mean pressure at:	Standby Power		MPa psi	2,0 297	1,9 276	
	Prime Power		MPa psi	1,9 270	1,7 251	
Max combustion pressure at:	Standby Power		MPa psi	14,9 2161	19,1 2770	
	Prime Power		MPa psi	14 2031	15,1 2190	
Total mass moment of inertia, J (mR2) (with flywheel 2,612)			kgm^2 $lbft^2$	3,09 73,3		
Degree of irregularity at:	Standby Power			1:37	1:48	
	Prime Power			1:41	1:52	
Residual speed droop at load increase from 0 to 100%			%	adjustable		
Friction Power			kW hp	8,5 11,6	12,3 16,7	

Engine noise emission

Test Standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerans ± 0.75 dB(A)

		r/min	1500	1800	
Measured sound power Lw	No load	dB(A)	103	104	
	Standby Power	dB(A)	106	109	
	Prime Power	dB(A)	106	108	
Calculated sound pressure Lp at 1 m	No load	dB(A)	90	91	
	Standby Power	dB(A)	93	95	
	Prime Power	dB(A)	92	95	

Unsilenced exhaust noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m	r/min	1500	1800	
Standby Power	dB(A)	117	118	
Prime Power	dB(A)	116	117	

Load acceptance

Test condition: Warm engine. Load acceptance performance can vary due to actual alternator inertia, voltage regulator, type of load and local ambient conditions.

Single step load performance at 1500 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load	Speed diff (%)		Recovery time (s)	
	Prime	Standby	Prime	Standby	(%)	Prime	Standby	Prime	Standby
0-40	6,0	6,3	1,8	2,0	40-100	11,2	13,1	4,5	9,9
0-50	7,2	8,2	2,1	2,9	50-100	8,5	9,6	3,8	7,8
0-60	8,7	10,2	3,0	4,3	60-100	6,8	7,8	3,5	5,0
0-75	13,7	17,5	3,8	4,5	75-100	4,0	4,6	3,2	3,6
0-51	7,0		2,8		0-46		7,0		2,8
0-100									
100-0									

Single step load performance at 1800 rpm

Load (%)	Speed diff %		Recovery time (s)		Remaining load	Speed diff (%)		Recovery time (s)	
	Prime	Standby	Prime	Standby	(%)	Prime	Standby	Prime	Standby
0-40	3,8	4,1	1,2	1,4	40-100	5,4	6,7	2,1	7,0
0-50	4,5	5,1	1,6	1,7	50-100	4,8	5,8	1,9	6,8
0-60	5,6	6,2	1,8	2,2	60-100	3,6	4,4	1,8	4,1
0-75	7,3	7,5	2,1	2,5	75-100	2,4	3,5	1,7	3,6
0-73	7,0		1,9		0-66		7,0		1,9
0-100	14,3	18,3	3,5	9,1					
100-0	5,8	5,8	2,0	2,0					

Cold start performance	r/min	1500/1800
Cold start limit temperature	°C	-15
		-30*

* With manifold heater engaged, lubrication oil 15W/40

Derating

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating. For applications above 1000 m an ECU with automatic derating must be used. For operations with air ambient temperature over 40°C, the power should be derated according to the following factors:

Altitude derating factor < 3000 m	% / m	4 / 500
Altitude derating factor > 3000 m	% / m	6 / 500
Ambient temperature derating factor	% / °C	2 / 5°C
Humidity	%	No derating

Lubrication system			**r/min**	**1500**	**1800**	
Lubricating oil consumption	Standby Power		liter/h	0,09	0,11	
			US gal/h	0,024	0,029	
	Prime Power		liter/h	0,08	0,09	
			US gal/h	0,021	0,024	
Oil system capacity including filters			liter	34		
			US gal	9,0		
Oil sump capacity:		max	liter	31		
			US gal	8,2		
		min	liter	24		
			US gal	6,3		
Oil change intervals/specifications:						
Closed crankcase ventilation	ACEA: E4. API: CH-4, CI-4* full synthetic		h	500		
Open crankcase ventilation	VDS-2. ACEA: E3, E5. API: CG-4, CH-4*		h	500		
Open crankcase ventilation	VDS. ACEA: E2. API: CF, CF-4*		h	250		
Engine angularity limits:		front up	°	10		
		front down	°	10		
		side tilt	°	10		
Oil pressure at rated speed			kPa	480	520	
			psi	70	75	
Oil pressure shut down switch setting			kPa	200		
			psi	29		
Lubrication oil temperature:		normal	°C	110		
			°F	230		
		max	°C	125		
			°F	257		
Oil filter micron size			mm	0,012		

* See also general section in the sales guide

Fuel system		r/min	1500	1800	
Standby Power Specific fuel consumption at:	25%	g/kWh lb/hph	234 0,38	244 0,40	
	50%	g/kWh lb/hph	215 0,35	220 0,36	
	75%	g/kWh lb/hph	212 0,34	216 0,35	
	100%	g/kWh lb/hph	214 0,35	220 0,36	
Prime Power Specific fuel consumption at:	25%	g/kWh lb/hph	270 0,44	260 0,42	
	50%	g/kWh lb/hph	219 0,35	225 0,36	
	75%	g/kWh lb/hph	213 0,35	217 0,35	
	100%	g/kWh lb/hph	213 0,35	218 0,35	
Recommended fuel to conform to		ASTM-D975-No1 and 2-D JIS KK 2204, EN 590			
Total fuel flow		liter/h US gal/h	360 95	450 119	
Max allowed inlet fuel temperature	continuous	°C °F	70 158		
	temporarily	°C °F	90 194		
Feed pump pressure		kPa psi	500 73		
Fuel supply line max. restriction (before fuel feed pump)		kPa psi	35 5,1		
Fuel supply line max. restriction (before fuel prefilter and manuel feed pump)		kPa psi	15 2,2		
Fuel supply line max. pressure, (before fuel feed pump)		kPa psi	20 2,9		
Fuel filter micron size		mm	0,005		
Prefilter / Water separator		mm	0,063		
Governor type/make, standard		Heinzman / EDC4			
Injection pump type/make		PFM 1 P100 S 2005 / Bosch			
Injection timing std.		ºB.T.D.C	2,5		

Intake and exhaust system			r/min	1500	1800	
Air consumption at:	Standby Power	27°C 81°F	m^3/min cfm	12,4 439	14,4 509	
	Prime Power	27°C 81°F	m^3/min cfm	11,4 403	14,4 509	
Air intake restriction, clean filter(s)			kPa psi	1,5 0,2		
Max allowable air intake restriction			kPa psi	3,5 0,5		
Air filter type				Two stage paper cartridge		
Air filter cleaning efficiency			%	99,9		
Heat rejection to exhaust at:	Standby Power		kW BTU/min	144 8189	167 9497	
	Prime Power		kW BTU/min	127 7222	146 8303	
Exhaust gas temperature after turbine at:	Standby Power		°C °F	542 1008	515 959	
	Prime Power		°C °F	529 984	495 923	
Max allowable back pressure in exhaust line	Standby Power		kPa psi	3 12,0	5 0,7	
	Prime Power		kPa psi	5 0,7	7 1,0	
Exhaust gas flow at:	Standby Power		m^3/min cfm	35,1 1240	41,8 1476	
	Prime Power		m^3/min cfm	31,9 1127	38,3 1353	
Heat rejection to CAC	Standby Power		kW BTU/min	36 2042	47 2661	
	Prime Power		kW BTU/min	32 1837	42 2394	

Intercooler system	r/min	1500	1800	
Boost pressure	kPa psi	175 25	195 28	
Charge air temp after turbo compressor	°C °F	185 365	188 370	
Max allowable comb. air temp after CAC	°C °F	50 122		
Max pressure droop over intercooler, incl. Piping	kPa psi	15 2		

Cooling system			r/min	1500	1800	
Heat rejection radiation from engine at:	Standby Power		kW	18	20	
			BTU/min	1024	1137	
	Prime Power		kW	17	19	
			BTU/min	967	1081	
Heat rejection to coolant at:	Standby Power		kW	85	96	
			BTU/min	4834	5459	
	Prime Power		kW	77	87	
			BTU/min	4379	4948	
Recommended coolant	Volvo coolant or Volvo anticorrosion additive together with clean fresh water					
Radiator cooling system type				Closed circuit		
Radiator core area			m^2	0,65		
			$foot^2$	7,00		
Radiator core thickness			mm	55		
			in	2,17		
Intercooler core area			m^2	0,41		
			$foot^2$	4,46		
Intercooler core thickness			mm	50		
			in	1,97		
Fan diameter			mm	870		
			in	34,25		
Fan power consumption			kW	7,2	12,4	
			hp	10	17	
Fan drive ratio				1:0,8		
Coolant capacity,	engine		liter	9,8		
			US gal	2,59		
	engine with radiator and hoses		liter	32		
			US gal	8,45		
Coolant pump			drive/ratio	1,73:1		
Coolant flow with standard cooling system			l/s	3,0	3,6	
			US gal/s	0,79	0,95	
Maximum external coolant system restriction			kPa	25	35	
			psi	4	5	
Thermostat,	start to open		°C	87		
			°F	189		
	fully open		°C	102		
			°F	216		
Maximum static pressure head			kPa	100		
			psi	15		
Pressure cap setting on standard cooling system			kPa	100		
			psi	15		
Maximum top tank temperature			°C	105		
			°F	221		
Max. permissible cooling down of engine coolant by radiator			°C	8		
			°F	46		
Shutdown switch setting			°C	113		
			°F	235		
Recommended draw down capacity	10% of total cooling system capacity					

Cooling performance

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 105°C TTT and 50% antifreeze (radiator and cooling fan, see optional equipment)

Engine speed rpm	Air on temp °C	PRIME POWER		STANDBY POWER	
		Air flow m^3/s	External restriction Pa	Air flow m^3/s	External restriction Pa
1500	66	3,9	0		
	61	3,3	150		
	59	3,1	200		
	54	2,7	300		
	48	2,4	400		
	69			3,9	0
	64			3,3	150
	63			3,1	200
	58			2,7	300
	52			2,4	400
1800	68	4,9	0		
	64	4,3	150		
	63	4,1	200		
	60	3,7	300		
	57	3,4	400		
	71			4,9	0
	68			4,3	150
	66			4,1	200
	64			3,7	300
	61			3,4	400

Electrical system		**r/min**	**1500**	**1800**
Voltage and type			24V / 1 pole system	
Alternator:	make/output	Amp	Iskra/35	
	tacho output	Hz/alt. Rev	6	
	drive ratio		4,07:1	
Starter motor		make	Melco	
		type	M008T62471	
		kW	5,0	
Starter motor solenoid,	pull current	Amp	2	
	hold current	Amp	2	
Number of teeth on:	flywheel		129	
	cam wheel		96	
	starter motor		10	
Inrush current at +20°C		Amp	1200	
Cranking current at +20°C		Amp	400	
Crank engine speed at 20°C		rpm	200	
Starter motor battery capacity:	max	Ah	135	
	min at +5°C	Ah	110	
Inlet manifold heater (at 12V/24V)		kW	2 / 3,6	
Power relay for the manifold heater (at 12V/24V)		Amp	150 / 120	