

Technical data TAD731GE

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 and cooling package	kg lb	760 1676
	SAE3	kg lb	-36 -79
Wet weight	Engine and cooling package	kg lb	804 1773
	SAE3	kg lb	-36 -79

Performance

		r/min	1500	1800
Standby Power	without fan	kW	153	163
		hp	208	222
	with fan high temp	kW	148	154
		hp	201	210
Prime Power	without fan	kW	138	147
		hp	187	200
	with fan high temp	kW	133	138
		hp	180	188
Torque at:	Standby Power	Nm	974	865
		lbft	718	638
	Prime Power	Nm	877	778
		lbft	647	574
Mean piston speed		m/s ft/sec	6,5 21,4	7,8 25,7
Effective mean pressure at:	Standby Power	MPa psi	1,7 249	1,5 222
	Prime Power	MPa psi	1,5 223	1,4 199
Max combustion pressure at:	Prime Power	MPa psi	13,5 1958	13 1885
Total mass moment of inertia, J (mR ²)		kgm ² lbft ²	3,09 73,3	
Residual speed droop at load increase from 0 to 100%		%	≤ 5	
Friction Power		kW hp	8,5 11,56	12,3 16,728

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Cold start performance)²

1500/1800

Cold start limit temperature	°C	-15
		-30*

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

Derating, mechanical governor

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating. For operation at higher altitudes and temperatures 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

Derating, electronic governor

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, see mechanical governor.

Lubrication system

		r/min	1500	1800
Lubricating oil consumption	Standby Power	liter/h	0,10	0,10
		US gal/h	0,026	0,026
Oil system capacity including filters		liter	20	
		US gal	5,3	
Oil sump capacity:	max	liter	17	
		US gal	4,5	
	min	liter	14	
		US gal	3,7	
Oil change intervals/specifications:				
VDS-2. ACEA: E3, E5. API: CG-4, CH-4*		h	500	
Engine angularity limits:	front up	°	30	
	front down	°	30	
	side tilt	°	30	
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	0,040	

* See also general section in the sales guide

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Fuel system		r/min	1500	1800
Standby Power Specific fuel consumption at:	25%	g/kWh lb/hph	244 0,40	259 0,42
	50%	g/kWh lb/hph	219 0,36	224 0,36
	75%	g/kWh lb/hph	215 0,35	218 0,35
	100%	g/kWh lb/hph	215 0,35	217 0,35
Prime Power Specific fuel consumption at:	25%	g/kWh lb/hph	259 0,42	279 0,45
	50%	g/kWh lb/hph	224 0,36	231 0,37
	75%	g/kWh lb/hph	216 0,35	220 0,36
	100%	g/kWh lb/hph	215 0,35	217 0,35

Fuel system		r/min	1500	1800
Recommended fuel to conform to	ASTM-D975-No1 and 2-D JIS KK 2204, EN 590			
Total fuel flow	liter/h		360	450
	US gal/h		95	119
Feed pump pressure	kPa		480 - 550	
	psi		70 - 80	
Feed pump max suction head	m		1,5	
	foot		4,9	
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.	°B.T.D.C	2	2

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Intake and exhaust system		r/min	1500	1800	
Air consumption at:	Standby Power	27°C 81°F	m ³ /min cfm	10,65 376	13,33 471
	Prime Power	27°C 81°F	m ³ /min cfm	9,86 348	12,26 433
Air intake restriction, clean filter(s)			kPa in wc	1 4,0	1 4,0
Max allowable air intake restriction			kPa in wc	3,5 14,1	3,5 14,1
Air filter type			Single stage paper cartridge		
Air filter cleaning efficiency			%	99,85	
Heat rejection to exhaust at:	Standby Power		kW BTU/min	131 7450	135 7677
	Prime Power		kW BTU/min	117 6654	121 6881
Exhaust gas temperature after turbine at:	Standby Power		°C °F	540 1004	480 896
	Prime Power		°C °F	520 968	471 879
Max allowable back pressure in exhaust line			kPa In wc	5 20,1	7 28,1
Exhaust gas flow at:	Standby Power		m ³ /min cfm	30,2 1065	34,2 1208
	Prime Power		m ³ /min cfm	27,5 971	31,3 1105
Heat rejection to CAC	Standby Power		kW BTU/min	24 1365	33,7 1916
	Prime Power		kW BTU/min	21,6 1228	30,3 1723

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Cooling system		r/min	1500	1800
Heat rejection radiation from engine at:	Standby Power	kW	15	16
		BTU/min	853	910
	Prime Power	kW	14	15
		BTU/min	796	853
Heat rejection to coolant at:	Standby Power	kW	68	74
		BTU/min	3890	4180
	Prime Power	kW	62	66
		BTU/min	3509	3770
Recommended coolant	Volvo coolant or Volvo anticorrosion additive together with clean fresh water			
Radiator cooling system type	Closed circuit			
Radiator core area (std. size)	m ²	0,52		
	foot ²	5,60		
Radiator core thickness (std. size) - low temp cooling package	mm	60		
	in	2,36		
Fan diameter - low temp cooling system	mm	546		
	in	21,50		
Fan diameter - high temp cooling system & dual speed rating	mm	596		
	in	23,46		
Fan power consumption - low temp cooling system	kW	3,8	6,6	
	hp	5	9	
Fan power consumption - high temp cooling system & dual speed rating	kW	5	8,7	
	hp	7	12	
Fan drive ratio	1,73:1			
Coolant capacity,	engine	liter	9,8	
		US gal	2,59	
	std radiator with hoses	liter	14	
		US gal	3,70	
Coolant pump	drive/ratio	1,73:1		
Coolant flow with low temp system	l/s	2,9	3,6	
	US gal/s	0,77	0,95	
Maximum external coolant system restriction	kPa	25	35	
	in wc	100	141	
Thermostat,	start to open	°C	83	
		°F	181	
	fully open	°C	95	
		°F	203	
Maximum static pressure head	kPa	100		
	in wc	402		
Pressure cap setting on low temp radiator	kPa	60		
	in wc	241		
Maximum top tank temperature	°C	105		
	°F	221		
Shutdown switch setting	°C	113		
	°F	235		
Recommended draw down capacity	10% of total cooling system capacity			

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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 low temp high temp low temp high temp	55	2,5	0		
	49	2,1	150		
	47	2,0	200		
	41	1,7	300		
	33	1,5	400		
	59	2,9	0		
	55	2,5	150		
	54	2,4	200		
	49	2,1	300		
	43	1,8	400		
	52			2,5	0
	45			2,1	150
	43			2,0	200
	37			1,7	300
	28			1,5	400
56			2,9	0	
52			2,5	150	
50			2,4	200	
45			2,1	300	
39			1,8	400	
1800 low temp high temp low temp high temp	57	3,1	0		
	54	2,8	150		
	52	2,6	200		
	49	2,4	300		
	46	2,2	400		
	61	3,6	0		
	59	3,3	150		
	58	3,2	200		
	56	2,9	300		
	53	2,7	400		
	54			3,1	0
	50			2,8	150
	49			2,6	200
	45			2,4	300
	42			2,2	400
58			3,6	0	
55			3,3	150	
54			3,2	200	
52			2,9	300	
49			2,7	400	

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Electrical system		r/min	1500	1800
Voltage and type		12V / 1 pole system		
Alternator:	make/output	Amp	Iskra/55	
	tacho output	Hz/alt. Rev	6	
	drive ratio		3,01:1	
Starter motor	make		Bosch	
	type		EV	
	kW		3,1	
Starter motor solenoid,	pull current	Amp	60	
	hold current	Amp	12	
Number of teeth on:	flywheel		129	
	cam wheel		96	
	starter motor		9	
Inrush current at +20°C		Amp	1200	
Cranking current at +20°C		Amp	400	
Crank engine speed at 20°C		rpm	150	
Starter motor battery capacity:	max	Ah	176	
	min at +5°C	Ah	110	
Stop solenoid,	max	Amp	3	
Inlet manifold heater (at 12V/24V)		kW	2 / 3,6	
Power relay for the manifold heater (at 12V/24V)		Amp	150 / 120	