

VOLVO PENTA TAD731GE	Document No	Issue Index
	21370069	03

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		7,15
	in ³		436,0
Firing order			1-5-3-6-2-4
Bore	mm		108
	in		4,25
Stroke	mm		130
	in		5,12
Compression ratio			18:1
Dry weight	Engine and cooling package	kg	760
		lb	1676
Wet weight	Engine and cooling package	kg	804
		lb	1773
	SAE3	kg	-36
		lb	-79

Performance		r/min	1500	1800	2000
Standby Power	without fan	kW	153	163	163
		hp	208	222	222
	with fan	kW	148	153	159
	high temp cooling	hp	201	209	216
Prime Power	without fan	kW	139	148	147
		hp	189	202	200
	with fan	kW	134	139	143
	high temp cooling	hp	182	188	194
Torque at:	Standby Power	Nm	974	865	778
		lbft	718	638	574
	Prime Power	Nm	886	786	702
		lbft	653	580	518
Mean piston speed		m/s	6,5	7,8	8,7
		ft/sec	21,4	25,7	28,5
Effective mean pressure at:	Standby Power	MPa	1,7	1,5	1,4
		psi	248	221	199
	Prime Power	MPa	1,6	1,4	1,2
		psi	226	201	179
Max combustion pressure at:	Standby Power	MPa	-	-	13
		psi	-	-	1885
	Prime Power	MPa	13,5	13	11,9
		psi	1958	1885	1726
Total mass moment of inertia, J (mR ²)		kgm ²	3,09		
		lbft ²	73,3		
Residual speed droop at load increase from 0 to 100%		%	≤ 5		
Friction Power		kW	8,5	12,3	-
		hp	11,56	16,728	-

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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	2000
Measured sound power Lw	No load	dB(A)	100,5	102,5	-
	Standby Power	dB(A)	103,5	106	-
	Prime Power	dB(A)	102,5	105,5	-
Calculated sound pressure Lp at 1 m	No load	dB(A)	87,5	89,5	-
	Standby Power	dB(A)	90,5	93	-
	Prime Power	dB(A)	89,5	92,5	-

Unsilenced exhaust noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m

		r/min	1500	1800	2000
Standby Power		dB(A)	112	113	-
Prime Power		dB(A)	111	112	-

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 - EDC4

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	Standby	Prime	Standby		Prime	Standby	Prime	Standby
0-40	4,7	5,3	2,2	2,1	40-100	7,1	8,4		8,3
0-50	6,0	6,7	2,1	2,0	50-100	5,8	7,3	3,0	>15
0-60	7,0	7,8	2,3	2,3	60-100	4,5	5,1	3,7	5,5
100-0	9,0	6,4	2,0	1,7					

Single step load performance at 1800 rpm - EDC4

Load (%)	Speed diff %		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	Standby	Prime	Standby		Prime	Standby	Prime	Standby
0-40	3,1	3,5	1,2	1,2	40-100	3,9	4,0	1,2	3,3
0-60	4,4	4,8	1,1	0,9	60-100	2,5	2,5	1,1	2,5
100-0	5,0	4,3	0,9	1,3					

Single step load performance at 1500 rpm - mech

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	Standby	Prime	Standby		Prime	Standby	Prime	Standby
0-75	6,2		0,5						
100-0	6,9		1,3						

Single step load performance at 1800 rpm - mech

Load (%)	Speed diff %		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	Standby	Prime	Standby		Prime	Standby	Prime	Standby
0-75	5,0								
0-100	7,3		1,1						
100-0	5,2								

Cold start performance

1500/1800/2000

Cold start limit temperature	°C	-15
		-30*

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

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Derating, mechanical governer

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 governer

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	2000
Lubricating oil consumption	Standby Power	liter/h	0,10		
		US gal/h	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	420	450	550
		psi	61	65	80
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	2000
Standby Power Specific fuel consumption at:	25%	g/kWh lb/hph	244 0,40	259 0,42	266 0,43
	50%	g/kWh lb/hph	219 0,36	224 0,36	229 0,37
	75%	g/kWh lb/hph	215 0,35	218 0,35	222 0,36
	100%	g/kWh lb/hph	215 0,35	217 0,35	223 0,36
Prime Power Specific fuel consumption at:	25%	g/kWh lb/hph	259 0,42	279 0,45	280 0,45
	50%	g/kWh lb/hph	224 0,36	231 0,37	236 0,38
	75%	g/kWh lb/hph	216 0,35	220 0,36	224 0,36
	100%	g/kWh lb/hph	215 0,35	217 0,35	223 0,36

Fuel system		r/min	1500	1800	2000
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	480 127
Max allowed inlet fuel temperature	continuous	°C	70		
		°F	158		
	temporarily	°C	90		
		°F	194		
Feed pump pressure		kPa psi	480 70	550 80	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.	°B.T.D.C		2	2	2

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Intake and exhaust system		r/min	1500	1800	2000	
Air consumption at:	Standby Power	27°C 81°F	m ³ /min cfm	10,65 376	13,33 471	15,4 544
	Prime Power	27°C 81°F	m ³ /min cfm	9,86 348	12,26 433	14 494
Air intake restriction, clean filter(s)			kPa in wc	1,5 6,0		
Max allowable air intake restriction			kPa in wc	3,5 14,1		
Air filter type			Two stage paper cartridge			
Air filter cleaning efficiency			%	99,9		
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	470 878
	Prime Power		°C °F	520 968	471 880	452 846
Max allowable back pressure in exhaust line			kPa In wc	5 20,1	7 28,1	7 28,1
Exhaust gas flow at:	Standby Power		m ³ /min cfm	30,2 1067	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	37,6 2138
	Prime Power		kW BTU/min	21,6 1228	30,3 1723	34,2 1945

Intercooler system		r/min	1500	1800	2000	
Boost pressure			kPa in wc	139 556	157 630	152 610
	Charge air temp after turbo compressor		°C °F	151 304	161 322	164 327
Max allowable comb. air temp after CAC			°C °F	50 122		
Max pressure droop over intercooler, incl. Piping			kPa In wc	15 60		

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Cooling system		r/min	1500	1800	2000
Heat rejection radiation from engine at:	Standby Power	kW	15	16	16
		BTU/min	853	910	910
	Prime Power	kW	14	15	15
		BTU/min	796	853	853
Heat rejection to coolant at:	Standby Power	kW	68	74	77
		BTU/min	3890	4180	4402
	Prime Power	kW	62	66	73
		BTU/min	3509	3770	4151
Recommended coolant	Volvo coolant or Volvo anticorrosion additive together with clean fresh water				
Radiator cooling system type	Closed circuit				
Radiator core area	m ²	0,44			
	foot ²	4,74			
Radiator core thickness	mm	55			
	in	2,17			
Fan diameter - low temp cooling system	mm	546			NA
	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	NA	
	hp	5	9		
Fan power consumption - high temp cooling system & dual speed rating	kW	5,5	9,6	4,1	
	hp	7	13	6	
Fan drive ratio	1,73:1			1,22:1	
Coolant capacity,	engine	liter	9,8		
		US gal	2,59		
	radiator with hoses	liter	14		
		US gal	3,70		
Coolant pump	drive/ratio	1,73:1			1,22:1
Coolant flow	l/s	2,9	3,6	2,8	
	US gal/s	0,77	0,95	0,74	
Maximum external coolant system restriction	kPa	25	35	24	
	in wc	100	141	96	
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	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				

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

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Cooling performance

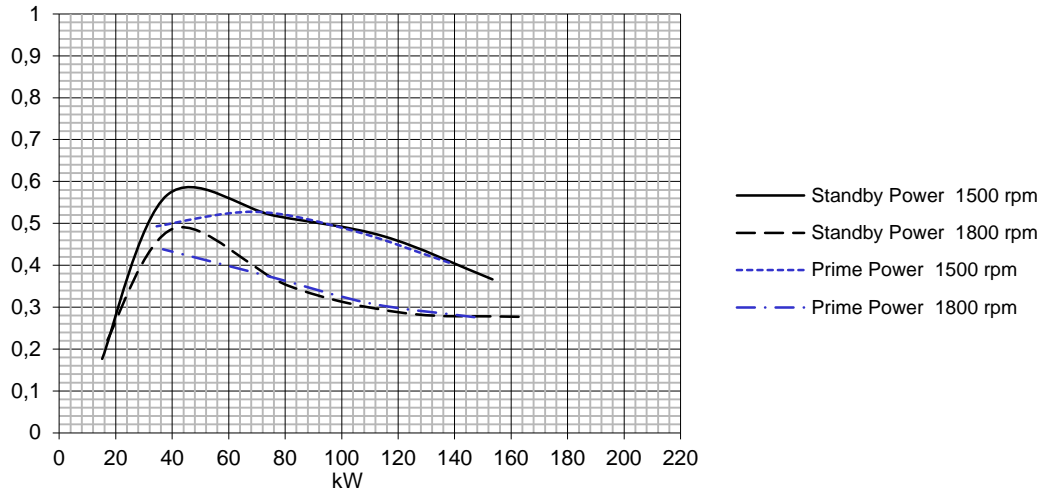
Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 105°C TTT and 50% antifreeze (radiator and cooling fan, see optional equipment)

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
2000 tropical	49	2,7	0		
	42	2,3	150		
	41	2,2	200		
	32	1,8	300		
	15	1,5	400		
tropical	./.			2,7	0
	./.			2,3	150
	./.			2,2	200
	./.			1,8	300
	./.			1,5	400

Electrical system

		r/min	1500	1800	2000
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		3,0		
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		

BSU Smoke Emission



l/h Fuel Consumption

