

VOLVO PENTA TAD1345GE	Document No	Issue Index
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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	12,78 779,7
Firing order			1-5-3-6-2-4
Bore		mm in	131 5,16
Stroke		mm in	158 6,22
Compression ratio			18,1:1
Wet weight	Engine only	kg lb	1325 2921
	Engine incl. cooling system, air filtration system, and frame	kg lb	1790 3946

Performance

			rpm	1500	1800
Prime Power	without fan	kW		398	410
		hp		541	558
	with fan	kW		388	392
		hp		528	533
Standby Power	without fan	kW		441	449
		hp		600	611
	with fan	kW		431	431
		hp		586	586
Torque at:	Prime Power	Nm		2534	2175
		lbft		1869	1604
	Standby Power	Nm		2807	2382
		lbft		2071	1757
Mean piston speed		m/s ft/sec		7,9 26,0	9,5 31,2
Effective mean pressure at:	Prime Power	MPa		2,5	2,1
		psi		361	310
Effective mean pressure at:	Standby Power	MPa		2,8	2,3
		psi		400	340
Max combustion pressure at:	Prime Power	MPa		17,8	17,2
		psi		2582	2495
Max combustion pressure at:	Standby Power	MPa		19,3	18,1
		psi		2799	2625
Total mass moment of inertia, J (mR ²)		kgm ² lbft ²		3,43 81,4	
Friction Power		kW		30	44
		hp		40,8	59,84

Derating see Technical Diagrams

Engine noise emission

Test Standards: ISO 3744-1981 (E) sound power

Tolerance ± 0.75 dB(A)

		rpm	1500	1800
Measured sound power Lw	No load	dB(A)	114,8	117,8
	Prime Power	dB(A)	116,9	119,6
	Standby Power	dB(A)	117,2	119,8
Calculated sound pressure Lp at 1 m	No load	dB(A)	97,8	100,8
	Prime Power	dB(A)	99,9	102,5
	Standby Power	dB(A)	100,2	102,8

Unsilenced exhaust noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m

	rpm	1500	1800
Prime Power	dB(A)	115	118
Standby Power	dB(A)	115	119

Test conditions for load acceptance data

Warm engine.	Generator	Model	Type of AVR
	Stamford	HCI544C	SX440

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
0-20	1,7	1,5	1,3	1,7	20-100	24,5	30,8	4,0	4,5
0-40	3,3	3,6	1,7	1,6	40-100	7,3	9,3	2,0	2,8
0-60	9,9	14,7	1,8	2,8	60-100	2,5	2,6	1,7	1,9
0-80	24,3	30,4	3,6	3,6	80-100	1,1	1,1	1,9	1,9
0-98	36,1	47,9	3,9	4,6					
0-55	7,0		2,7		55-100	3,1		1,7	
0-60	10,0		2,2		59-100	2,6		1,7	
0-50		7,0		2,8	50-100		4,2		1,9
0-54		10,0		2,2	54-100		3,5		1,9
100-0	5,5	6,5	2,1	2,1					

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
0-20	1,0	1,1	1,7	1,8	20-100	6,5	8,4	1,9	3,4
0-40	2,2	2,4	2,2	2,0	40-100	3,0	3,7	2,0	1,7
0-60	4,1	4,2	2,2	1,6	60-100	1,9	2,2	2,5	2,3
0-80	8,7	9,3	3,2	2,6	80-100	0,9	0,9	1,9	2,0
0-78	6,5		2,1		78-100	0,9		2,2	
0-88	10,0		2,9		88-100	0,7		1,3	
0-71		6,4		1,4	71-100		1,5		2,1
0-80		10,0		3,0	80-100		1,0		1,8
100-0	3,7	4,0	2,1	2,1					

Cold start performance

		°C	rpm	1500	1800
Time from start to stay within 0.5% of no load speed at ambient temperature:	20	s	4,8	4,6	
	5	s	5,7	5,2	
	-15*	s	6,6	6,0	

* With manifold heater 4 kW engaged, lubrication oil 15W/40 and block heater.

Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
	Volvo	2	12	10°C 50°F

Lubrication system

		rpm	1500	1800
Lubricating oil consumption	Prime Power	litre/h US gal/h	0,04 0,011	0,05 0,013
	Standby Power	litre/h US gal/h	0,04 0,011	0,05 0,013
Oil system capacity including filters		litre US gal	36 9,5	
Oil sump capacity:	max	litre US gal	30 7,9	
	min	litre US gal	19 5,0	
Oil change intervals/specifications:	VSD3	h	600	
	VSD2	h	400	
		h	200	
Engine angularity limits:	front up	°	11	
	front down	°	11	
	side tilt	°	11	
Oil pressure at rated speed		kPa psi	370 - 520 54 - 75	
Lubrication oil temperature in oil sump:	max	°C	130	
		°F	266	
Oil filter micron size		µ	40	

* See also general section in the sales guide

Fuel system

		rpm	1500	1800
Prime Power Specific fuel consumption at:	25%	g/kWh lb/hph	217 0,352	229 0,371
	50%	g/kWh lb/hph	199 0,323	205 0,332
	75%	g/kWh lb/hph	197 0,319	200 0,324
	100%	g/kWh lb/hph	196 0,318	201 0,326
Standby Power Specific fuel consumption at:	25%	g/kWh lb/hph	211 0,342	225 0,365
	50%	g/kWh lb/hph	198 0,321	204 0,331
	75%	g/kWh lb/hph	197 0,319	201 0,326
	100%	g/kWh lb/hph	196 0,318	202 0,327

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Fuel system	rpm 1500 1800		
Fuel to conform to	ASTM-D975-No1 and 2D JIS KK 2204, EN 590		
System supply flow at:	litre/h US gal/h	125,0 33,0	127,0 33,6
Fuel supply line max restriction (Measured at fuel inlet connection)	kPa psi	30,0 4,4	30,0 4,4
Fuel supply line max pressure, engine stopped	kPa psi	20,0 2,9	20,0 2,9
System return flow	litre/h US gal/h	18,0 4,8	18,0 4,8
Fuel return line max restriction (Measured at fuel return connection)	kPa psi	20,0 2,9	20,0 2,9
Maximum allowable inlet fuel temp (Measured at fuel inlet connection)	°C °F	50 122	50 122
Prefilter / Water separator micron size	µ	10	
Fuel filter micron size	µ	5	
Governor type/make, standard	Volvo / EMS 2.2		
Injection pump type/make	Delphi E3		

Intake and exhaust system		rpm 1500 1800		
Air consumption at: (+25°C and 100kPa)	Prime Power	m ³ /min cfm	26,8 946	33 1165
	Standby Power	m ³ /min cfm	27,6 975	33 1165
Max allowable air intake restriction including piping		kPa psi	5 0,7	5 0,7
Air filter restriction clean Volvo Penta filter		kPa psi		
Heat rejection to exhaust at:	Prime Power	kW BTU/min	268 15241	280 15923
	Standby Power	kW BTU/min	303 17231	324 18426
Exhaust gas temperature after turbine at:	Prime Power	°C °F	475 887	440 824
	Standby Power	°C °F	570 1058	490 914
Max allowable back pressure in exhaust line	Prime Power	kPa psi	9 1,3	9 1,3
	Standby Power	kPa psi	10 1,5	10 1,5
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	Prime Power	m ³ /min cfm	56,8 2006	77,0 2719
	Standby Power	m ³ /min cfm	58,3 2059	82,0 2896

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			rpm	1500	1800
Heat rejection radiation from engine at:	Prime Power	kW	15	22	
		BTU/min	853	1251	
	Standby Power	kW	17	23	
		BTU/min	967	1308	
Heat rejection to coolant at:	Prime Power	kW	145	165	
		BTU/min	8246	9383	
	Standby Power	kW	160	180	
		BTU/min	9099	10236	
Coolant	Volvo Penta coolant "ready mix" or Volvo Penta coolant mixed with clean fresh water 40 / 60				
Radiator cooling system type	Closed circuit				
Standard radiator core area		m ²	0,8		
		foot ²	8,61		
Fan diameter		mm	890		
		in	35,04		
Fan power consumption - LOW fan ratio		kW	6	11	
		hp	8	15	
Fan power consumption - STD fan ratio		kW	10	18	
		hp	14	24	
Fan drive ratio - LOW			0,84 : 1		
Fan drive ratio - STD			0,99 : 1		
Coolant capacity,	engine	litre	20		
		US gal	5,28		
	std radiator and hoses	litre	24		
		US gal	6,34		
Coolant pump		drive/ratio	Belt / 1,43 :1		
Coolant flow with standard system		l/s	5	5,5	
		US gal/s	1,32	1,45	
Minimum coolant flow		l/s	5,0	5,5	
		US gal/s	1,32	1,45	
Maximum outer circuit restriction, including piping		kPa	39	47	
		psi	5,7	6,8	
Thermostat	start to open	°C	82		
		°F	180		
	fully open	°C	92		
		°F	198		
Maximum static pressure head (expansion tank height + pressure cap setting)		kPa	100		
		psi	14,5		
Minimum static pressure head (expansion tank height + pressure cap setting)		kPa	70		
		psi	10,2		
Standard pressure cap setting		kPa	70		
		psi	10,2		
Maximum top tank temperature		°C	107		
		°F	225		
Draw down capacity. The difference between min coolant level in the expansion tank and the lowest level where the engine's coolant system still are functioning		litre	1,8		
		US gal	0,48		

Charge air cooler system

		rpm		1500	1800
Heat rejection to charge air cooler	Prime Power	kW	78	94	
		BTU/min	4436	5346	
	Standby Power	kW	82	92	
		BTU/min	4663	5232	
Charge air mass flow	Prime Power	kg/s	0,53	0,62	
	Standby Power	kg/s	0,53	0,63	
Charge air inlet temp. (Charge air temp after turbo compressor)	Prime Power	°C	195	199	
		°F	383	390	
	Standby Power	°C	204	199	
		°F	399	390	
Charge air outlet temp. (Charge air temp after intercooler)	Prime Power	°C	44	44	
		°F	111	111	
	Standby Power	°C	45	45	
		°F	113	113	
Maximum pressure drop over charge air cooler incl. piping		kPa	8		
		psi	1,16		
Charge air pressure (After charge air cooler)		kPa	225		
		psi	32,63		
Standard charge air cooler core area		m ²	0,89		
		foot ²	9,58		

Cooling performance

Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% coolant. Valid at 1 atm. (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 (STD 0,99)	50			5,8	261
	52			6,1	180
	54	5,7	290	6,4	82
	56	6,1	180	6,7	0
	58	6,4	82		
	60	6,7	0		
1800 (STD 0,99)	55			7,0	455
	58			7,6	215
	60	7,3	340	8,2	0
	61	7,6	225		
	63	8,2	0		

Note! External restrictions are calculated for values >0 Pa

Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronus / Droop	Isochronus
Governor droop	0-8 %	0,0
Governor response	Adjustable PID-constants (VODIA)	Standard
Dual speed	YES	1500 or 1800
Idle speed	600-1200	900
Fine speed adjustment	± 120	0
Stop function	Energized to Run / Stop	Energized to Stop
Preheating function	On / Off	On
Lamp test	On / Off	On

Engine sensor and switch settings

Parameter	Unit	Alarm level		Engine protection		
		Setting range	Default setting	Level	Action. Default/Alternative	
Oil temp	°C	120 - 130	125	Setting +5	Shut down.	
Oil pressure	Low idle	kPa	-	190,0	-30,0	Shut down.
	1500 rpm	kPa	-	250,0	-30,0	Shut down.
	1800 rpm	kPa	-	300,0	-30,0	Shut down.
Oil level		-	Min level	-	-	
Piston cooling pressure >1000 rpm	kPa	-	150	150,0	Shut down.	
Coolant temp	°C	95 - 103	102	Setting +5	Shut down.	
Coolant level		See cooling system	On	Low level		
Fuel feed pressure	Low idle	kPa	-	100	-	-
	>1400 rpm		-	200	-	-
Water in fuel		-	High level	-	-	
Crank case pressure	kPa	-	Increased pressure	Increased pressure	Shut down.	
Air filter pressure droop	kPa	-	5	-	-	
	0,0		Alarm level		Engine protection	
Altitude, above sea	m	-	-	-	Automatic derating, see section derating	
Charge air temp	°C	-	80	85	Shut down.	
Charge air pressure *	1500 rpm	kPa	-	360	370	Shut down.
	1800 rpm	kPa	-	350	360	Shut down.
Engine speed	rpm	100 - 120% of rated speed	120% of rated speed	Alarm level	Shut down.	
* P abs at sea level						

Engine protection can be disabled. For consequences please see VP International Limited Warranty Policy

Electrical system

Voltage and type	24V / insulated from earth		
Alternator:	make/output	A	Bosch 80 A
	tacho output	Hz/alt. Rev	6
	drive ratio		5,3:1
Starter motor	make		Melco
	type		105P70
	kW		7,0
Number of teeth on:	flywheel		153
	starter motor		12
Max wiring resistance main circuit		mΩ	2

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Cranking current at +20°C	A	180	
Crank engine speed at 20°C	rpm	155	
Starter motor battery capacity:	max	Ah/A	2x225
	min at +5°C	Ah/A	-
Inlet manifold heater (at 20 V)	kW	4,0	
Power relay for the manifold heater	A	1	

Power take off

in 5 0

Front end in line with crank shaft max:	Nm lbft	-		
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW hp	-	-
	max down	kW hp	-	-
	max right	kW hp	-	-
Timing gear at compressor PTO max:	Nm lbft	160 118		
Speed ratio direction of rotation viewed from flywheel side	0,91:1/clockwise			
Timing gear at servo pump PTO max:	Nm lbft	100 74		
Speed ratio direction of rotation viewed from flywheel side				
Max allowed bending moment in flywheel housing	Nm	15000		
	lbft	11063		
Max. rear main bearing load	N	4000		
	lbf	899,2		