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	TAD1345GE-B	23572235

Important

This Technical Data Sheet and the corresponding Installation Instructions provide important information to ensure the installed engine will operate according to the design specification in the Volvo Penta application for certification.

Requirements marked with  are considered as critical for exhaust emissions compliance according to the design specification in the Volvo Penta application for certification.

Failing to follow and meet these instructions and requirements when installing a certified engine in a piece of nonroad equipment for use in the United States violates U.S. federal law (40 CFR 1068.105(b)), subject to fines or other penalties as described in the Clean Air Act.

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		12,78
	in ³		779,7
Firing order			1-5-3-6-2-4
Bore	mm		131
	in		5,16
Stroke	mm		158
	in		6,22
Compression ratio			18,1:1
Wet weight (Not including after treatment system)	Engine only	kg	1325
		lb	2921
	Engine incl. cooling system and air filtration system	kg	
		lb	
	Engine incl. cooling system, air filtration system, and frame	kg	1790
		lb	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
Power tolerance		%	+4 / -0		
Mean piston speed		m/s		7,9	9,5
		ft/sec		26,0	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		3,43	
		lbft ²		81,4	
Friction Power		kW		30	40
		hp		40,8	54,4
Derating due to altitude - see Technical Diagrams					

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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)	112,9	116,2
	Prime Power	dB(A)	115,2	117,7
	Standby Power	dB(A)	115,7	117,9
Calculated sound pressure Lp at 1 m	No load	dB(A)	100,9	104,2
	Prime Power	dB(A)	103,2	105,7
	Standby Power	dB(A)	103,7	105,9

Test conditions for load acceptance data

Warm engine.	Generator	Model	Type of AVR
	Stamford	HCI 444 F1	MX341 ²
AVR Settings	UFRO (Hz):	47/57	DIP (%)*: 65%
	Stability (%)*:	std	DWELL (%)*: std
		Voltage (V): 400V	Load factor: 1.0

Applies to Stamford nomenclature,

(%)* : % of max potentiometer setting range

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

Abbreviation:	Full name:	Descriptions
AVR	Automatic Voltage Regulator	Generator performance and safety control unit
UFRO	Under Frequency Roll Off	Overheating protection at under frequency
DIP		Controls the slope of voltage drop when the UFRO is active
DWELL		Controls the slope of voltage recovery when the UFRO is active.

Single step load performance at 1500 rpm - PRIME (Resistiv load)

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20	2,1	0,7			20-100	17,3	4,1		
0-40	4,3	0,9			40-100	10,7	2,5		
0-50					50-100				
0-60	9,4	2,3			60-100	5,1	1,8		
0-58	7 (G3)	2,1			58-100	7,2	1,4		
0-71	10 (G2)	2,3			71-100	3,9	1,5		
0-80	16,7	4,0			80-100	1,9	0,7		
0-100	24,1	5,6							
100-0	6,7	1,2							

Single step load performance at 1500 rpm - STAND BY (Resistiv load)

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20	2,3	0,8			20-100	19,2	7,8		
0-40	5,6	1,8			40-100	12,1	6,6		
0-50					50-100				
0-60	11,9	2,9			60-100	6,8	4,2		
0-52	7 (G3)	2,1			52-100	8,7	5,8		
0-65	10 (G2)	2,2			65-100	7,5	5,9		
0-80	19,6	4,1			80-100	2,5	2,4		
0-100	28,7	9,8							
100-0	8,0	1,3							

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Single step load performance at 1800 rpm - PRIME (Resistiv load)

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20	1,6	0,6			20-100	8,0	1,5		
0-40	3,2	0,9			40-100	5,6	1,0		
0-50					50-100				
0-60	4,8	0,9			60-100	3,2	0,8		
0-79	7 (G3)	1,7			79-100	2,1	1,7		
0-100	10 (G2)	1,6			x-100				
0-80	7,4	1,6			80-100	1,5	0,5		
0-100	11,5	2,6							
100-0	5,4	1,1							

Single step load performance at 1800 rpm - STAND BY (Resistiv load)

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20	1,8	0,7			20-100	9,3	1,9		
0-40	3,5	1,0			40-100	6,6	2,5		
0-50					50-100				
0-60	6,3	1,4			60-100	3,5	1,0		
0-73	7 (G3)	1,4			73-100	2,8	1,0		
0-99	10 (G2)	1,6			99-100	0,9	0,0		
0-80	9,2	1,5			80-100	1,5	0,6		
0-100	13,2	2,7							
100-0	5,7	1,1							

Cold start performance

		rpm	1500	1800
Time from start to stay within 0.5% of no load speed at ambient temperature:	°C			
	-15 *	s	6,6	6,0
	-25 *	s	10,8	
	-25 **	s	5,2	
Min start temp*		°C		

* With manifold heater 4 kW engaged, lubrication oil 10W/30.

**With manifold heater 4 kW engaged, lubrication oil 10W/30 and block heater.

Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
	Volvo	2	12	20°C 68°F

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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		μ	40,000	

* See also general section in the sales guide

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Fuel system		rpm	1500	1800
Prime Power Specific fuel consumption at:	25%	g/kWh lb/hph	218 0,353	235 0,380
	50%	g/kWh lb/hph	197 0,319	202 0,328
	75%	g/kWh lb/hph	194 0,315	198 0,321
	100%	g/kWh lb/hph	193 0,313	198 0,320

Standby Power Specific fuel consumption at:	25%	g/kWh lb/hph	215 0,349	230 0,372
	50%	g/kWh lb/hph	196 0,318	200 0,325
	75%	g/kWh lb/hph	195 0,315	198 0,321
	100%	g/kWh lb/hph	195 0,316	198 0,321

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		
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		μ	10,000	
Fuel filter		μ	5,000	
Governor type/make, standard	Volvo / EMS 2.4			
Injection pump type/make	Delphi E3			

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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
 See front page for important information 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
 See front page for important information Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: mm		Prime Power	kPa psi	9 1,3
		Standby Power	kPa psi	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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Cooling system		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
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		kW	10	18
		hp	14	24
Fan drive ratio		0,99:1		
Coolant capacity,	engine	litre	20	
		US gal	5,28	
	engine with 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	100	
		psi	14,5	
Standard pressure cap setting		kPa	100	
		psi	14,5	
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 is functioning		litre	1,8	
		US gal	0,48	

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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
 See front page for important information Max allowable 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
 See front page for important information Maximum pressure drop over charge air cooler incl. piping		kPa	8	
		psi	1,16	
Charge air pressure (After charge air cooler)		kPa	255	225
		psi	36,98	32,63
Standard charge air cooler core area		m ²	0,89	
		foot ²	9,58	

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Standard fan: STD Fan ratio: 1 : 0,99 Fan type: FIX

Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% antifreeze. 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	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	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

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Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronus / Droop	Isochronus
Governor droop	0-8 %	0,0
Governor response	Adjustable PID-constant (VODIA)	Standard
Dual speed	YES	1500 or 1800
Idle speed	600-1200	900,0
Fine speed adjustment	± 90	0,0
Stop function	Energized to Run / Stop	Energized to Run / 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	-	Shut down.	
Piston cooling pressure >1000 rpm	kPa	-	150	150,0	-	
Coolant temp	°C	95 - 103	102	Setting +5	Shut down.	
Coolant level		See cooling system	On	Low level	Shut down.	
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	85,0	Shut down	
Charge air pressure 1500/	kPa	-	360 / 350	370 / 360	Shut down.	
Engine speed	rpm	100 - 120% of rated speed	120% of rated speed	Alarm level	Shut down.	

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

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Electrical system

Voltage and type			
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
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

	rpm	1500	1800
Max allowed bending moment in flywheel housing	Nm	15000	
	lbft	11063	
Max. rear main bearing load	N	4000	
	lbf	899,2	

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Sensors Alarm	Signal	Range	rpm Map					Condition	Derating
			450 rpm	500 rpm	1000 rpm	1450 rpm	2000 rpm		
<i>Oil pressure</i>	0,5-4,5 V	0-700 kPa	450 rpm	500 rpm	1000 rpm	1450 rpm	2000 rpm		
Warning Level			-50	60	210	310	310		
Alarm Level			-85	25	175	275	275		

Remarks

1) <i>Soft derate Coolant temp</i>	Speed / °C				
Remaining torque in %	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A

Derate map R2			
°C			
%	N/A	N/A	N/A

2) <i>Soft derate Oil temp</i>	Speed / °C				
Remaining torque in %	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A

Derate map R2			
°C			
%	N/A	N/A	N/A

