


## 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 turbocharged diesel engine with direct injection.

Rotation direction, anti-clockwise viewed towards flywheel.

Number of cylinders			6
Displacement, total		litre	7,70
		in <sup>3</sup>	469,9
Firing order			1-4-2-6-3-5
Bore		mm	110
		in	4,33
Stroke		mm	135
		in	5,31
Compression ratio			17.5:1
Wet weight w/o EATS	Engine only	kg	707
		lb	1559
	Engine incl. cooling system and air filtration system	kg	917
		lb	2022
Engine incl. cooling system, air filtration system, and frame	kg	N/A	
	lb	N/A	

## Performance

			rpm	1500	1800
Standby Power	without fan	kW		320	321
		hp		435	437
	with fan	kW		308	301
		hp		419	409
Prime Power	without fan	kW		292	294
		hp		397	400
	with fan	kW		280	274
		hp		381	373
COP Power	without fan	kW		219	221
		hp		298	300
	with fan	kW		207	201
		hp		282	273
Torque at:	Standby Power	Nm		2037	1703
		lbft		1502	1256
	Maximum within fine speed range	Nm		2167	1793
		lbft		1598	1322
Total mass moment of inertia, J (mR <sup>2</sup> )		kgm <sup>2</sup>		0,420	
			lbft <sup>2</sup>		10,0
<b>Derating due to altitude - see Technical Diagrams</b>					

### Engine noise emission

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

 Tolerance  $\pm 0.75$  dB(A)

			<b>rpm</b>	<b>1500</b>	<b>1800</b>
Measured sound power Lw	Standby Power	dB(A)		111,8	115,3
	Prime Power	dB(A)		111,2	115,3
	No load	dB(A)		111,5	100,3
Calculated sound pressure Lp at 1 m	Standby Power	dB(A)		99,8	103,3
	Prime Power	dB(A)		99,2	103,3
	No load	dB(A)		99,5	88,3

### Tailpipe noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m?

			<b>rpm</b>	<b>1500</b>	<b>1800</b>
Standby Power	dB(A)		N/A	N/A	
Prime Power	dB(A)		N/A	N/A	
COP	dB(A)		N/A	N/A	

### Test conditions for load acceptance data

Engine at working temperature, fuel that is used..... Nominal operating conditions

Generator	Brand	Model	Type of AVR
AVR Settings	UFRO (Hz):	DIP:	DWELL:
	Stability (%)*:	Voltage (V):	Power factor:

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

### Nomenclature

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.

### Load Acceptance at 1500 rpm

Genset Classification

This engine fulfills G1, G2 and G3 classes, according to ISO8528-5. For other class, please, see the table below.

Load (%)	Speed diff (%)	Speed Recovery time (s)	
G4			
0-39	7 (G3)	2,0	G3 boundary conditions
0-48	10 (G2)	3,0	G2 boundary conditions

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	3,0	1,2	1,1	0,2	20-100	25,7	5,8	54,6	4,8
0-40	7,6	2,4	3,1	1,8	40-100	10,1	2,4	7,2	1,5
0-60	22,1	3,0	31,0	2,5	60-100	3,2	1,2	3,7	0,4
0-80	50,3	6,5	56,6	5,6	80-100	1,1	1,0	0,8	0,1
0-100	N/A	N/A	N/A	N/A					
0-110	N/A	N/A	N/A	N/A					
100-0	13,8	1,9	12,8	1,3					

**Load Acceptance at 1800 rpm**
**Genset Classification**

This engine fulfills G1, G2 and G3 classes, according to ISO8528-5. For other class, please, see the table below.

Load (%)	Speed diff (%)	Speed Recovery time (s)	
0-55	7 (G3)	1,5	G3 boundary conditions
0-59	10 (G2)	1,8	G2 boundary conditions

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	1,5	0,6	0,7	0,2	20-100	13,3	2,2	16,9	2,0
0-40	3,6	0,8	1,7	1,1	40-100	6,1	1,2	6,1	1,2
0-60	8,7	1,8	4,3	1,9	60-100	3,8	0,9	4,3	0,8
0-80	18,1	2,5	25,4	2,4	80-100	1,6	0,5	2,2	0,4
0-100	N/A	N/A	N/A	N/A					
0-110	N/A	N/A	N/A	N/A					
100-0	6,8	1,3	6,1	0,4					

Cold start performance	Ambient Temp. [°C]	Manifold Heater	Block heater	RPM	
				1500	1800
Time to Set Speed from start	20	-	-	4,8	5,5
	5	-	-	4,3	5,5
	-15*	Yes	-	6,4	7,1
	-25*	Yes	-	8,6	-
	-30 **	Yes	Yes	5,3	7,9

Min start temp w/o Block Heater*	-25	°C
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\* With manifold heater kW engaged, lubrication oil SAE 10W/30.

\*\* With manifold heater kW engaged, lubrication oil SAE 10W/30 and block heater, Fuel MK-1.

Block heater type	Power kW	Engaged hours	Cooling water temp engine block
M9T701	1,5	16	28°C

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<b>Lubrication system</b>		<b>rpm</b>		
		<b>1500</b>	<b>1800</b>	
Lubricating oil consumption	Standby Power	litre/h	0,02	0,02
		US gal/h	0,005	0,005
	Prime Power	litre/h	0,02	0,02
		US gal/h	0,005	0,005
	COP	litre/h	N/A	N/A
		US gal/h		
Oil system capacity including filters		litre	27	
		US gal	7,1	
Oil sump capacity:	max	litre	25	
		US gal	6,6	
	min	litre	16	
		US gal	4,2	
Oil change intervals/specifications:		h	500	
Engine angularity limits:	front up	°	10	
	front down	°	10	
	side tilt	°	10	
Oil pressure at nominal set speed		kPa	330 - 430	
		psi	48 - 62	
Lubrication oil temperature in oil sump:	max	°C	125	
		°F	257	
Oil filter micron size		μ	5,000	

\* See also general section in the sales guide

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Fuel system		rpm	1500	1800
<b>Standby Power</b> Specific fuel consumption at:	25%	g/kWh lb/hph	219 0,355	229 0,371
	50%	g/kWh lb/hph	206 0,334	211 0,342
	75%	g/kWh lb/hph	198 0,321	203 0,329
	100%	g/kWh lb/hph	197 0,319	198 0,321
% DEF consumption at: (Compare to Fuel consumption by Volyme)	25%	%	N/A	N/A
	50%	%	N/A	N/A
	75%	%	N/A	N/A
	100%	%	N/A	N/A

<b>Prime Power</b> Specific fuel consumption at:	25%	g/kWh lb/hph	219 0,355	230 0,373
	50%	g/kWh lb/hph	208 0,337	214 0,347
	75%	g/kWh lb/hph	200 0,324	204 0,331
	100%	g/kWh lb/hph	198 0,321	204 0,331
% DEF consumption at: (Compare to Fuel consumption by Volume)	25%	%	N/A	N/A
	50%	%	N/A	N/A
	75%	%	N/A	N/A
	100%	%	N/A	N/A

CO2 emission declaration	rpm	1500	1800
Carbon dioxide (CO <sub>2</sub> ) emissions determined during the EU type approval process, NRSC-D2.	g/kWh	682	692

Fuel system		rpm	1500	1800
Fuel to conform to	ASTM-D975-No1-D and 2-D EN 590 / JIS KK2204 / HVO100% B30(Sulphur levels up to 3000ppm)			
System supply flow at:	litre/h US gal/h		139,0 36,7	142,0 37,5
Fuel supply line max restriction (Measured at fuel inlet connection)	kPa psi		-55,0 -8,0	-55,0 -8,0
Fuel supply line max pressure, engine stopped & running	kPa psi		20,0 2,9	20,0 2,9
System return flow at:	litre/h US gal/h		64,0 16,9	65,0 17,2
Fuel return line max restriction (Measured at fuel return connection)	kPa psi		15,0 2,2	15,0 2,2
Maximum allowable inlet fuel temp (Measured at fuel inlet connection)	°C °F		80 176	80 176
Prefilter / Water separator micron size	μ		30	
Fuel filter micron size	μ		5	
Governor type/make, standard	Volvo / EMS 2.4			
Injection pump type/make	Denso HP4			

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#### Intake and exhaust system

**rpm 1500 1800**

Air consumption at: (+25°C and 100kPa)	Standby Power	m <sup>3</sup> /min cfm	19 671	21,8 770
	Prime Power	m <sup>3</sup> /min cfm	18,7 660	21,9 773



#### See front page for important information

Max air intake restriction including piping with maintained performance		kPa psi	3 0,4	3,8 0,6
Max <u>allowable</u> air intake restriction including piping		kPa psi	5 0,7	5 0,7
Air filter restriction clean Volvo Penta filter		kPa psi	5,0 0,7	5,0 0,7
Heat rejection to exhaust at:	Standby Power	kW BTU/min		
	Prime Power	kW BTU/min		
Exhaust gas temperature after turbine at:	Standby Power	°C °F	455 851	500 932
	Prime Power	°C °F	500 932	460 860



#### See front page for important information

Max allowable back pressure in exhaust after turbine		kPa psi	10 1,5	10 1,5
 <b>See front page for important information</b> Max allowable temperature drop between turbine and SCR muffler inlet.		Δ°C Δ°F	N/A	N/A
	Heat rejection to exhaust:	kW BTU/min		
Exhaust gas temperature after turbine at maximum power:		°C °F	505 941	459 858
	 <b>See front page for important information</b> Max allowable temperature drop between turbine and muffler 1 inlet at exhaust temperature 480° C and exhaust gas flow 69.8 m <sup>3</sup> /min.		Δ°C Δ°F	N/A N/A
 <b>See front page for important information</b> Max allowable temperature drop between muffler 1 and muffler 2 at exhaust temperature ° C and exhaust gas flow m <sup>3</sup> /min.			Δ°F	N/A
	DPF muffler pressure drop (at exhaust gas flow and exhaust temp specified in this table)		kPa psi	N/A N/A
SCR muffler pressure drop (at exhaust gas flow and exhaust temp specified in this table)		kPa psi	N/A N/A	
Exhaust gas flow at max power: (temp and pressure after turbine)		m <sup>3</sup> /min cfm		
 <b>See front page for important information</b> Engine speed during service regeneration		rpm	N/A	N/A

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 See front page for important information Max allowed load during service regeneration	Nm  lb ft	N/A	N/A
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**TAD843GE****Charge air cooler system**

	<b>rpm</b>	<b>1500</b>	<b>1800</b>
Heat rejection to charge air cooler at standby power	kW	70	81,3
	BTU/min	3981	4623
Charge air mass flow at standby power	kg/s	0,37	0,43
Charge air inlet temp at standby power (Charge air temp after turbo compressor)	°C	230	226
	°F	446	439
 <b>See front page for important information</b>  Max allowable Charge air outlet temp at standby power (Charge air temp after intercooler)	°C	45	45
	°F	113	113
 Maximum pressure drop over charge air cooler incl. Piping	kPa	9	12
	psi	1,31	1,74
Maximum charge air pressure (After charge air cooler)	kPa	2,9	2,7
	psi	0,42	0,39
Standard charge air cooler core area	m <sup>2</sup>	0,217	
	foot <sup>2</sup>	2,34	



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#### Cooling system

Coolant type and mixture		VCS 40/60	
Coolant capacity,	engine only	litre	17
		US gal	4,49
	charge air coolers	litre	N/A
		US gal	
coolant radiators incl piping		litre	19
		US gal	5,02
expansion tank		litre	5
		US gal	1,32
		<b>rpm</b>	<b>1500</b> <b>1800</b>
Heat rejection radiation from engine at Standby power:		kW	
		BTU/min	
Heat rejection to coolant at standby power		kW	
		BTU/min	
Standard radiator core area		m <sup>2</sup>	0,485
		foot <sup>2</sup>	5,22
Min coolant flow <b>engine coolant circuit</b> (at fully open thermostat)		litre/s	3,8
		US gal/s	1,00
			4,6
			1,22
Maximum coolant temperature entering engine (25°C amb. Temp.)		°C	-
		F	
Maximum external <b>engine coolant circuit</b> restriction, including piping (25°C amb. Temp.)		kPa	25
		psi	3,6
Nominal coolant pressure		kPa	75
		psi	10,9
			75
			10,9
Nominal coolant flow <b>with standard system</b>		litre/s	3,8
		US gal/s	1,00
			4,6
			1,22
Fan diameter		mm	650
		in	25,59
Fan power consumption		kW	12
		hp	16
			20
			27
Fan drive ratio			1.4:1
Coolant pump		drive/ratio	1.4:1
Thermostat	start to open	°C	85
		°F	185
	fully open	°C	100
		°F	212
Maximum static pressure head (expansion tank height + pressure cap setting)		kPa	110
		psi	16,0
Minimum static pressure head (expansion tank height + pressure cap setting)		kPa	60
		psi	8,7
Standard pressure cap setting		kPa	100
		psi	14,5
Maximum top tank temperature		°C	107
		°F	225
Charge air pressure (after charge air coolers)		kPa	280
		psi	40,6

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## Cooling performance

Standard fan: 650mm Fan ratio: 1 Fan type: Fixed

Cooling air flow and external restriction at different radiator air temperatures based on X°C TTT and X% antifreeze. Valid at 1 atm. (radiator and cooling fan, see optional equipment)

Engine speed rpm	External restriction Pa	Air flow m <sup>3</sup> /s	STANDBY POWER	PRIME POWER
			Air on temp °C	Air on temp °C
1500	0	6,2	58	59,5
	100			
	200			
	300			
1800	0	7,4	61	62
	100			
	200			
	300			

Note! External restrictions are calculated for values &gt;0 Pa

**TAD843GE**
**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 / 1800
Idle speed	600-1200	900,0
Fine speed adjustment	± 90	0
Stop function	Energized to Run / Stop	Energized to Run / Stop
Preheating function	On / Off	On

**Engine protection map**

Parameter	Unit	Warning Level (Yellow)	Engine protection			
			Alarm level (Red)	Default	Optional	
Oil temp	°C	125	130	Shut Down		
Oil pressure	Low idle	kPa	151	101	Shut Down	
	1500 rpm	kPa	233	183	Shut Down	
	1800 rpm	kPa	263	213	Shut Down	
Oil level		N/A	N/A	N/A		
DEF Dosing injector failure		N/A	N/A	N/A		
		N/A	N/A	N/A		
Piston cooling pressure >1000 rpm	kPa	N/A	N/A	N/A		
Coolant temp	°C	105	107,0	Shut Down		
Coolant level		N/A	Low	Shut Down (10 s delay)		
Fuel feed pressure	Low idle	kPa	N/A	N/A	N/A	N/A
	>1400 rpm	kPa	N/A	N/A	N/A	N/A
Water in fuel		On	N/A	N/A		
Crank case pressure	kPa	N/A	N/A	N/A		
Air filter pressure droop	kPa	5,0	N/A	Warning		
Altitude, above sea	m					
Charge air temp	°C	80	85,0	Shut Down		
Charge air pressure	kPa	95-330	200-435	Shut Down		
Engine speed	rpm					
Exhaust Temperature (Before SCR volume)	°C	N/A	N/A	N/A		
		N/A	N/A	N/A		

**TAD843GE****Electrical system**

Voltage and type		24V Dc	
Alternator:	make/output	A	Mitshubishi / 110 A
	tacho output	Hz/alt. Rev	
	drive ratio		1:4
Starter motor	make		SEG
	type		HXF88
	kW		5,6
Number of teeth on:	flywheel		137
	starter motor		10
Max wiring resistance main circuit		mΩ	5
Cranking current at +20°C		A	507
Crank engine speed at 20°C		rpm	230
Starter motor battery capacity:	min	Ah	100 / 680
	CCA at -18°C	Ah/A	140 / 800
Inlet manifold heater (at 24 V)		kW	
Power relay for the manifold heater		A	200

