VOLVO PENTA GENSET ENGINE

TAD1641GE

473kW (643 hp) at 1500 rpm, 546 kW (743 hp) at 1800 rpm, acc. to ISO 3046

The TAD1641GE is a powerful, reliable and economical Generating Set Diesel Engine built on the dependable in-line six design.

Durability & low noise

Designed for easiest, fastest and most economical installation. Well-balanced to produce smooth and vibration-free operation with low noise level.

To maintain a controlled working temperature in cylinders and combustion chambers, the engine is equipped with piston cooling. The engine is also fitted with replaceable cylinder liners and valve seats/guides to ensure maximum durability and service life of the engine.

Low exhaust emission

The state of the art, high-tech injection and charging system with low internal losses contributes to excellent combustion and low fuel consumption.

The TAD1641GE complies with EU Stage 2 exhaust emission regulations.

Easy service & maintenance

Easily accessible service and maintenance points contribute to the ease of service of the engine.

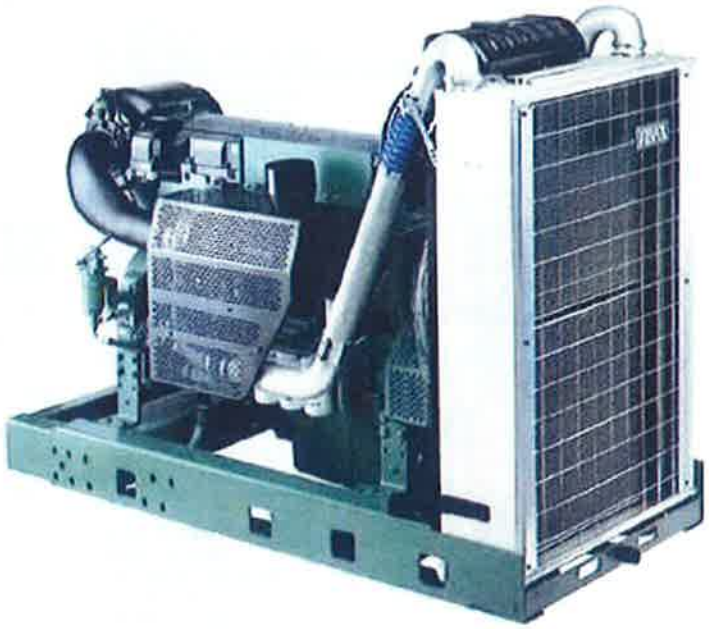
Technical description

Engine and block

- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessary heavy.
- Wet, replaceable cylinder liners
- Piston cooling for low thermal load on pistons and reduced ring temperature
- Tapered connecting rods to reduce risk of piston cracking
- Crankshaft induction hardened bearing surfaces and fillets with seven main bearings for moderate load on main and big end bearings
- Nitrocarburized transmission gears for heavy duty operation
- Keystone top compression rings for long service life
- Viscous type crankshaft vibration damper
- Replaceable valve guides and valve seats
- Over head camshaft and four valves per cylinder equipped with camshaft damper to reduce noise and vibrations.

Lubrication system

- Full flow oil cooler
- Full flow disposable spin-on oil filters, for extra high filtration
- The lubricating oil level can be measured during operation (Standard dipstick only)
- Gear type lubricating oil pump, gear driven by the transmission



Features

- Maintained performance, air temp 40°C
- Cooling system (55°C)
- Fully electronic with Volvo Penta EMS 2
- Dual frequency switch (between 1500 rpm and 1800 rpm)
- High power density
- Emission compliant
- Low noise levels
- Gen Pac configuration

Fuel system

- Self de-aerating system. When replacing filters all fuel stays in the engine.
- Non-return fuel valve
- Electronic unit injectors
- Fuel prefilter with water separator and water-in-fuel indicator / alarm
- Gear driven low pressure fuel pump
- Fine fuel filter with manual feed pump and fuel pressure switch
- Fuel shut-off valve, electrically operated

Cooling system

- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop
- Belt driven, maintenance-free coolant pump with high degree of efficiency
- Coolant filter as standard

Turbo charger

- Efficient and reliable turbo charger
- Extra oil filter for the turbo charger

Electrical system

- Engine Management System 2 (EMS 2), an electronically controlled processing system which optimizes engine performance. It also includes advanced facilities for diagnostics and fault tracing
- The instruments and controls connect to the engine via the CAN SAE J1939 interface, either through the Control Interface Unit (CIU) or the Digital Control Unit (DCU). The CIU converts the digital CAN bus signal to an analog signal, making it possible to connect a variety of instruments. The DCU is a control panel with display, engine control, monitoring, alarm, parameter setting and diagnostic functions. The DCU also presents error codes in clear text.
- Sensors for oil pressure, oil temp, boost pressure, boost temp, coolant temp, fuel temp, water in fuel, fuel pressure and two speed sensors. Crank case pressure, piston cooling pressure, oil level and air filter pressure drop sensors.
- Alternator 24V / 80A

VOLVO PENTA

TAD1641GE

Technical Data

General

Engine designation	TAD1641GE
No. of cylinders and configuration	in-line 6
Method of operation	4-stroke
Bore, mm (in.)	144 (5.67)
Stroke, mm (in.)	165 (6.50)
Displacement, l (in³)	16.12 (983.7)
Compression ratio	16.5:1
Dry weight, kg (lb)	1480 (3263)
Dry weight with Gen Pac, kg (lb)	1910 (4211)
Wet weight, kg (lb)	1550 (3417)
Wet weight with Gen Pac, kg (lb)	2020 (4453)

Performance	**1500 rpm**	**1800 rpm**
with fan, kW (hp) at:		
Prime Power	430 (585)	485 (660)
Max Standby Power	473 (643)	546 (743)

Lubrication system	**1500 rpm**	**1800 rpm**
Oil consumption, liter/h (US gal/h) at:		
Prime Power	0.10 (0.026)	0.11 (0.029)
Max Standby Power	0.10 (0.026)	0.12 (0.032)
Oil system capacity incl filters, liter		42

Fuel system	**1500 rpm**	**1800 rpm**
Specific fuel consumption at:		
Prime Power, g/kWh (lb/hph)		
25 %	216 (0.350)	228 (0.369)
50 %	199 (0.322)	204 (0.331)
75 %	196 (0.318)	202 (0.328)
100 %	199 (0.322)	206 (0.334)
Max Standby Power, g/kWh (lb/hph)		
25 %	217 (0.351)	233 (0.370)
50 %	197 (0.320)	205 (0.332)
75 %	196 (0.318)	203 (0.330)
100 %	200 (0.324)	210 (0.340)

Intake and exhaust system	**1500 rpm**	**1800 rpm**
Air consumption, m³/min (cfm) at:		
Prime Power	35.5 (1254)	44.0 (1554)
Max Standby Power	38.0 (1342)	45.8 (1617)
Max allowable air intake restriction, kPa (in wc)	5 (20.1)	5 (20.1)
Heat rejection to exhaust, kW (BTU/min) at:		
Prime Power	326 (18539)	373 (21212)
Max Standby Power	356 (20245)	442 (25136)
Exhaust gas temperature after turbine, °C (°F) at:		
Prime Power	443 (829)	436 (817)
Max Standby Power	455 (851)	479 (893)
Max allowable back-pressure in exhaust line, kPa (in wc)	10 (40.2)	10 (40.2)
Exhaust gas flow, m³/min (cfm) at:		
Prime power	85.0 (3002)	100.6 (3553)
Max Standby Power	92.0 (3249)	110.4 (3899)

Cooling system	**1500 rpm**	**1800 rpm**
Heat rejection radiation from engine, kW (BTU/min) at:		
Prime Power	18 (1024)	22 (1251)
Max Standby Power	20 (1137)	24 (1365)
Heat rejection to coolant kW (BTU/min) at:		
Prime Power	170 (9668)	212 (12056)
Max Standby Power	184 (10464)	231 (13137)
Fan power consumption, kW (hp)	11 (15)	19 (26)

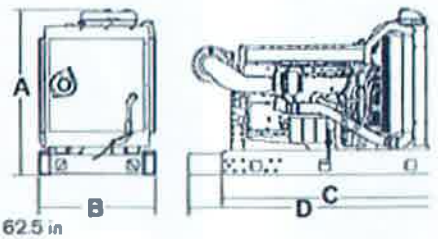
Standard equipment

	Engine	Gen Pac
Engine		
Automatic belt tensioner	•	•
Lift eyelets	•	•
Flywheel		
Flywheel housing with conn. acc. to SAE 1	•	•
Flywheel for 14" flex. plate and flexible coupling	•	•
Vibration dampers	•	•
Engine suspension		
Fixed front suspension	-	•
Lubrication system		
Oil dipstick	•	•
Full-flow oil filter of spin-on type	•	•
By-pass oil filter of spin-on type	•	•
Oil cooler, side mounted	•	•
Low noise oil sump	•	•
Fuel system		
Fuel filters of disposable type	•	•
Electronic unit injectors	•	•
Pre-filter with water separator	•	•
Intake and exhaust system		
Air filter with replaceable paper insert	•	•
Air restriction indicator	•	•
Air cooled exhaust manifold	•	•
Connecting flange for exhaust pipe	•	•
Exhaust flange with v-clamp	•	•
Turbo charger, low right side	•	•
Cooling system		
Radiator incl intercooler	-1)	•
Belt driven coolant pump	•	•
Fan hub	•	•
Thrust fan	-1)	•
Fan guard	-	•
Belt guard	-	•
Control system		
Engine Management System (EMS) with CAN-bus interface SAE J1939	•	•
CIU, Control Interface Unit	-	-
Alternator		
Alternator 80A / 24V	•	•
Starting system		
Starter motor, 7.0kW, 24V	•	•
Connection facility for extra starter motor	•	•
Instruments and senders		
Temp.- and oil pressure for automatic stop/alarm 103°C	•	•
Other equipment		
Expandable base frame	-	•
Engine Packing		
Plastic wrapping	•	•

1) must be ordered, se order specification
- optional equipment or not applicable
• included in standard specification

Dimensions TAD1641GE

Not for installation



A* = 1587 mm / 62.5 in
B* = 1120 mm / 44.1 in
C* = 1976 mm / 77.8 in
D = 2296 mm / 90.5 in (During transport)
D = Max 3311 mm / 130.5 in
* Including radiator and intercooler

Note! Not all models, standard equipment and accessories are available in all countries.
All specifications are subject to change without notice.
The engine illustrated may not be entirely identical to production standard engines.

Power Standards

The engine performance corresponds to ISO 3046, BS 5514 and DIN 6271. The technical data applies to an engine without cooling fan and operating on a fuel with calorific value of 42.7 MJ/kg (18360 BTU/lb) and a density of 0.84 kg/liter (7.01 lb/US gal), also where this involves a deviation from the standards. Power output guaranteed within 0 to +2% at rated ambient conditions at delivery. Ratings are based on ISO 8528. Engine speed governing in accordance with ISO 3046/IV, class A1 and ISO 8528-5 class G1.

Exhaust emissions

The engine complies with EU stage 2 emission legislation according to the Non Road Directive EU 97/68/EEC. The engine also complies with TA-luft -50% exhaust emission regulations.

Rating Guidelines

PRIME POWER rating corresponds to ISO Standard Power for continuous operation. It is applicable for supplying electrical power at variable load for an unlimited number of hours instead of commercially purchased power. A 10 % overload capability for governing purpose is available for this rating.
MAXIMUM STANDBY POWER rating corresponds to ISO Standard Fuel Stop Power. It is applicable for supplying standby electrical power at variable load in areas with not established electrical networks. In the event of normal utility power failure. No overload capability is available for this rating.
1 hp = 1 kW x 1.36

Information

For more technical data and information, please look in the Generating Set Engines Sales Guide.

VOLVO PENTA

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Technical data TAD1641GE

Engine noise emission

Test Standards: ISO 3744-1981 (E) sound power (with fan & radiator, without intake and exhaust noise)

Tolerans ± 0.75 dB(A)		r/min	1500	1800
Measured sound power Lw	No load	dB(A)	113,1	116,9
	Prime Power	dB(A)	116,9	119
	Standby Power	dB(A)	116,9	119,4
Calculated sound pressure Lp at 1 m	No load	dB(A)	101,1	104,9
	Prime Power	dB(A)	104,9	107
	Standby Power	dB(A)	104,9	107,4

Unsilenced exhaust noise

Data calculated as sound pressure Lp. (Without fan & radiator)

Assumed microphone distance 1 m	r/min	1500	1800
Prime Power	dB(A)	115	119
Standby Power	dB(A)	116	120

Test conditions for load acceptance data

Warm engine.	Generator	Modell	Type of AVR
	Stamford	HCI 544 E1	SX 440

Load acceptance performance can vary due to actual alternator inertia, voltage regulator, type of load and local ambient conditions. UFRO: STD-setting 47 / 57 Hz.

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	2,4	2,6	1,3	1,2	20-100	24,1	28,9	4,7	7,8
0-40	4,0	4,1	1,3	1,3	40-100	12,6	14,2	3,4	4,5
0-54		10,0		2,5	54-100		8,3		3,0
0-59	10,0		2,5		59-100	7,5		2,8	
0-60	11,0	15,3	2,6	3,0	60-100	6,0	6,4	1,7	2,0
0-80	19,3	28,7	3,2	4,6	80-100	2,3	2,2	1,3	2,0
0-100	36,6	42,8	5,3	7,3					
100-0	9,3	10,3	2,5	2,5					

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	1,5	1,7	1,3	1,4	20-100	11,3	10,9	3,5	3,5
0-40	2,8	3,1	1,7	1,6	40-100	4,7	6,0	1,9	3,0
0-60	5,7	7,2	2,3	2,2	60-100	2,7	2,9	1,8	3,0
0-67		10,0		2,9	67-100		7,7		2,9
0-76	10,0		2,9		76-100	2,0		1,5	
0-80	11,0	15,3	2,9	3,7	80-100	1,6	1,7	1,3	1,4
0-100	19,7	23,7	4,0	4,0					
100-0	5,5	6,6	1,0	1,3					

Cold start performance			r/min	1500	1800
Time from start to stay within 0.5% of no load speed at ambient temperature:	°C	20	s	6,5	8,4
		5	s	6,7	8,7
		-15*	s	7,3	9,8
Time from start to stay within 0.8% of no load speed at ambient temperature:	°C	20	s	5,6	7,5
		5	s	6,2	8,2
		-15*	s	6,7	9,2

* With manifold heater kW engaged, lubrication oil 10W/30, block heater and MK1 fuel.

Usage of manifold heater:	Time preheating, minutes	Time postheating, minutes		
	0,5	1,7		
Ambient temp. °C	Block heater type and Make	Power kW	Engaged hours	Cooling water temp engine block, °C
-15	External Volvo	2	12	17

Technical data TAD1641GE

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 in³	16,12 983,7
Firing order			1-5-3-6-2-4
Bore		mm in	144 5,67
Stroke		mm in	165 6,50
Compression ratio			16,5:1
Dry weight	Engine only, excluding cooling system	kg lb	1480 3263
	GenPac	kg lb	1910 4211
Wet weight	Engine only, excluding cooling system	kg lb	1550 3417
	GenPac	kg lb	2020 4453

Performance		r/min	1500	1800
Prime Power	without fan	kW hp	441 600	504 685
	with fan	kW hp	430 585	485 660
Standby Power	without fan	kW hp	484 658	565 768
	with fan	kW hp	473 643	546 743
Torque at:	Prime Power	Nm lbft	2807 2071	2674 1972
	Standby Power	Nm lbft	3081 2272	2997 2211
Mean piston speed		m/s ft/sec	8,3 27,1	9,9 32,6
Effective mean pressure at:	Prime Power	MPa psi	2,2 317	2,1 302
Effective mean pressure at:	Standby Power	MPa psi	2,4 348	2,3 339
Max combustion pressure at:	Prime Power	MPa psi	16,4 2379	17,1 2480
Max combustion pressure at:	Standby Power	MPa psi	17,5 2538	18,2 2640
Total mass moment of inertia, J (mR2)		kgm² lbft²	4,20 99,7	
Degree of irregularity at:	Prime Power		1:50	1:88
Friction Power		kW hp	36 48,96	53 72,08

Derating

The engine may be operated up to 1500 m altitude without derating .
For operation at higher altitudes the power will be derated according to the graph in technical diagrams.
There is no derating for ambient temperature or humidity.

Technical data TAD1641GE

Lubrication system			r/min	1500	1800
Lubricating oil consumption	Prime Power		liter/h	0,10	0,11
			US gal/h	0,026	0,029
	Standby Power		liter/h	0,10	0,12
			US gal/h	0,026	0,032
Oil system capacity including filters			liter	48	
			US gal	12,7	
Oil sump capacity:		max	liter	42	
			US gal	11,1	
		min	liter	32	
			US gal	8,5	
Oil change intervals/specifications:	VDS-2*		h	600	
	VDS, ACEA, E3*		h	400	
	ACEA E2, API CD, CF, CF-4, CG-4*		h	200	
Engine angularity limits:		front up	°	30	
		front down	°	30	
		side tilt	°	30	
Oil pressure at rated speed			kPa	300 - 650	
			psi	44 - 94	
Lubrication oil temperature in oil sump:		max	°C	130	
			°F	266	
Oil filter micron size			mm	0,040	

* See also general section in the sales guide

Fuel system		r/min	1500	1800
Prime Power	25%	g/kWh	216	228
Specific fuel consumption at:		lb/hph	0,350	0,369
	50%	g/kWh	199	204
		lb/hph	0,322	0,331
	75%	g/kWh	196	202
		lb/hph	0,318	0,328
	100%	g/kWh	199	206
		lb/hph	0,322	0,334
Standby Power	25%	g/kWh	217	233
Specific fuel consumption at:		lb/hph	0,351	0,377
	50%	g/kWh	197	205
		lb/hph	0,320	0,332
	75%	g/kWh	196	203
		lb/hph	0,318	0,330
	100%	g/kWh	200	210
		lb/hph	0,324	0,340

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Fuel system			r/min	1500	1800
Fuel to conform to				ASTM-D975-No1 and 2-D JIS KK 2204, EN 590	
System return flow			liter/h US gal/h	25 6,6	
System supply flow at rated speed			liter/h US gal/h	170 45	190 50
Fuel supply line max restriction			kPa psi	10 1	
Fuel supply line max pressure, engine stopped			kPa psi	0,0 0,0	
Fuel return line max restriction			kPa psi	20,0 2,9	
Maximum allowable inlet fuel temp			°C °F	60 140	
Prefilter / Water separator			mm	0,010	
Governor type/make, standard				Volvo / EMS 2	
Injection pump type/make				Delphi / E1	

Intake and exhaust system			r/min	1500	1800
Air consumption at:	Prime Power	25°C 77°F	m^3/min cfm	35,5 1254	44 1554
	Standby Power	25°C 77°F	m^3/min cfm	38 1342	45,8 1617
Air intake restriction, clean filter(s)			kPa in wc	1,2 4,8	2 8,0
Max allowable air intake restriction			kPa in wc	5 20,1	5 20,1
Air filter type				Single stage paper cartridge	
Air filter cleaning efficiency			%	99,85	
Heat rejection to exhaust at:	Prime Power		kW BTU/min	326 18539	373 21212
	Standby Power		kW BTU/min	356 20245	442 25136
Exhaust gas temperature after turbine at:	Prime Power		°C °F	443 829	436 817
	Standby Power		°C °F	455 851	479 893
Max allowable back pressure in exhaust line			kPa In wc	10 40,2	10 40,2
Exhaust gas flow at:	Prime Power		m^3/min cfm	85,0 3002	100,6 3553
	Standby Power		m^3/min cfm	92,0 3249	110,4 3899

Technical data TAD1641GE

Intercooler system		r/min	1500	1800
Cooling power	Prime Power	kW	91	127
		BTU/min	5175	7222
	Standby Power	kW	110	147
		BTU/min	6256	8360
Combustion air inlet temp. (Charge air temp after turbo compressor)	Prime Power	°C	184	210
		°F	363	410
	Standby Power	°C	202	230
		°F	396	446
Max allowable Comb. Air temp after CAC at 25 degree ambient. (Charge air temp after intercooler)	Standby Power	°C	45	45
		°F	113	113
Maximum pressure droop over intercooler, incl. piping		kPa	10	18
		psi	1,5	2,6
Boost pressure		kPa	240	252
		psi	34,8	36,5
Standard intercooler core area		m²	1,3	
		foot²	13,99	
Standard intercooler core thickness		mm	68	
		in	2,68	

Cooling performance

Cooling air flow and external restriction at different radiator air temperatures based on 103°C TTT and 40% antifreeze (radiator and cooling fan, see optional equipment)

Engine speed	Air on	PRIME POWER		STANDBY POWER	
rpm	temp °C	Air mass flow kg/s	External restriction Pa	Air mass flow kg/s	External restriction Pa
1500	40	5,1	966	5,6	876
	45	5,7	866	6,2	780
	50	6,4	769	7,0	708
	55	7,3	710	8,0	650
	60	8,5	595	9,4	285
	62			10,1	0
	65	10,1	0		
1800	40	6,0	1473	6,9	1286
	45	6,7	1339	7,7	1156
	50	7,6	1195	8,7	1059
	55	8,7	1085	10,0	918
	60	10,1	928	11,7	203
	61			12,4	0
	65	12,4	0		

Technical data TAD1641GE

Cooling system		r/min	1500	1800
Heat rejection radiation from engine at:	Prime Power	kW	18	22
		BTU/min	1024	1251
	Standby Power	kW	20	24
		BTU/min	1137	1365
Heat rejection to coolant at:	Prime Power	kW	170	212
		BTU/min	9668	12056
	Standby Power	kW	184	231
		BTU/min	10464	13137
Coolant	Volvo coolant or Volvo anticorrosion additive together with clean fresh water			
Radiator cooling system type			Closed circuit	
Standard radiator core area		m²	1,32	
		foot²	14,21	
Standard radiator core thickness		mm	52	
		in	2,05	
Fan diameter		mm	890	
		in	35,04	
Fan power consumption		kW	11	19
		hp	15	26
Fan drive ratio			1,04 : 1	
Coolant capacity,	engine	liter	33	
		US gal	8,72	
	Engine + std radiator with with hoses.	liter	60	
		US gal	15,85	
Coolant pump		drive/ratio	Belt / 1,85:1	
Coolant flow with standard system		l/s	6,4	7,7
		US gal/s	1,69	2,04
Minimum coolant flow		l/s	6,4	7,7
		US gal/s	1,69	2,04
Maximum external coolant system restriction, including piping		kPa	40	60
		in wc	161	241
Thermostat	start to open	°C	86	
		°F	187	
	fully open	°C	96	
		°F	205	
Maximum static pressure head (expansion tank height + pressure cap setting)		kPa	100	
		in wc	402	
Minimum static pressure head (expansion tank height + pressure cap setting)		kPa	70	
		in wc	281	
Standard pressure cap setting		kPa	75	
		in wc	301	
Maximum top tank temperature		°C	103	
		°F	217	
Draw down capacity	4% of total cooling system capacity			

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Engine management system

Functionality		Alternatives	Default setting
Governor mode		Isochronous/droop	Isochronous
Governor droop		0-8%	4%
Dual speed		1500/1800	According to customer
Low idle speed select		600-1200	900
Stop function		Energized to Run / Stop	Energized to stop
Lamp test		On / Off	On
Pre-heat on ignition		On / Off	Off
Governor characteristic			
Gain			
Stability			

Engine protection	Alarm		Engine protection	
Parameter	Selectable span	Default setting	Protection at	Protective action
Oil temperature C	120 - 130	125	Setting +5	Shut down / off *
Oil pressure kPa				
Low idle 900rpm	-	190	Default -30	Shut down / off *
1500 rpm	-	250	"	"
1800 rpm	-	300	"	"
Oil level	-	Min level	-	-
Piston cooling pressure kPa				
>1000rpm	-	150	150	Shut down / off *
Coolant temp	95 - 101	98	Setting +5	Shut down / off *
Coolant level	-	On	Low level	Shut down / off *
Fuel feed pressure kPa				
Low idle 900rpm	-	150	-	-
> 1400 rpm	-	300	-	-
Water in fuel	-	High level	-	-
Crank case pressure kPa	-	-	-	Shut down
Air filter diff pressure kPa	-	5,0	-	-
Altitude, above sea m	-	-	>1500	Automatic derating,
Charge air temp after cac	-	80	+5	Shut down
Charge air pressure kPa	-	290	300	Shut down
Overspeed	100 - 120% of rated	120% / off *	Alarm level	Shut down / on
Low voltage V	-	25,5	-	-

*Off means no shutdown , alarm only.

Technical data TAD1641GE

Electrical system		r/min	1500	1800
Voltage and type		24V / insulated from earth		
Alternator:	make/output	Amp	Bosch / 80	
	tacho output	Hz/alt. Rev	6	
	drive ratio		3,9 : 1	
Starter motor		make	Melco	
		type	105P70	
		kW	7,0	
Starter motor solenoid,	pull current	Amp	-	
	hold current	Amp	2,3	
Number of teeth on:	flywheel		153	
	starter motor		12	
Inrush current at +20°C		Amp	700	
Cranking current at +20°C		Amp	280	
Crank engine speed at 20°C		rpm	150	
Starter motor battery capacity:	max	Ah	2 x 225	
	min at +5°C	Ah		
Inlet manifold heater (at 20 V)		kW	4,0	
Power relay for the manifold heater		Amp	1	

Power take off		r/min	1500	1800
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		1,31:1 / anti-clockwise		
Timing gear at servo pump PTO max:		Nm lbft	100 74	
Max allowed bending moment in flywheel housing		Nm lbft	15000 11063	
Max. rear main bearing load		N lbf	5000 1124,0	

VOLVO PENTA

NO: 164010

EXHAUST EMISSION DECLARATION

TECHNICAL SPECIFICATION

Engine type:	TAD1641GE
Specification:	869252 / 869253
Module No:	138052003
Rated crankshaft power *):	484 kW
Rated speed:	1500 rpm

*) Stand-by power without fan acc. to ISO 3046

TEST INFORMATION

Test conditions	40 CFR part 89
Test indentification	27001876
Test date	May 19, 2004
Test cycle	5-mode US constant speed test cycle

EXHAUST EMISSIONS (weighted cycle)

CO (g/kWh)	1,15
HC (g/kWh)	0,12
NOx (g/kWh)	5,34
PM (g/kWh)	0,086

EXHAUST EMISSIONS (per cycle mode)

Mode	#	1	2	3	4	5	6	7	8
Power	(kW)	489,3	368,6	245,8	122,9	49,5			
NOx	(g/h)	2596	1919	1303	661	415			
HC	(g/h)	21	25	28	27	40			
CO	(g/h)	1354	508	110	81	144			
PM	(g/h)	74,8	35,5	17,8	12,7	14,7			
CO_2	(g/h)	326329	241002	161625	87701	45264			
NOx	(ppm)	711	639	587	426	322			
HC	(ppm)	17	24	36	51	92			
CO	(ppm)	570	260	76	80	171			
CO_2	(%)	8,62	7,74	7,02	5,45	3,39			
O_2	(%)	8,85	10,07	11,05	13,2	16,04			

TA-Luft

Test indentification	27002201
Test date	April 6, 2005

Mode	#	1	2	3	4
Power	(kW)	440,8	331,6	221,2	110,8
Nox (O_2)	(mg/Nm^3)	1950	1933	1896	1656
HC (O_2)	(mg/Nm^3)	15	23	43	72
CO (O_2)	(mg/Nm^3)	578	210	114	213
PM (O_2)	(mg/Nm^3)	30	17	19	21

* PM is calculated from multifilter measurements with AVL Smart Sampler.

SMOKE

Opacity (%): Acc: n.a., Lug: n.a., Peak: n.a.

Gothenburg 2005-07-07

AB Volvo Penta
Product Liability
40508 Gothenburg
SWEDEN