

VOLVO PENTA GENSET ENGINE

TAD531GE

1500 rpm, 102 kW (139 hp) – 1800 rpm 111 kW (151 hp)

The TAD531GE is a powerful, reliable and economical Generating Set Diesel Engine.

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 TAD531GE is certified for EU Stage 2 exhaust emission regulations.

Easy service & maintenance

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

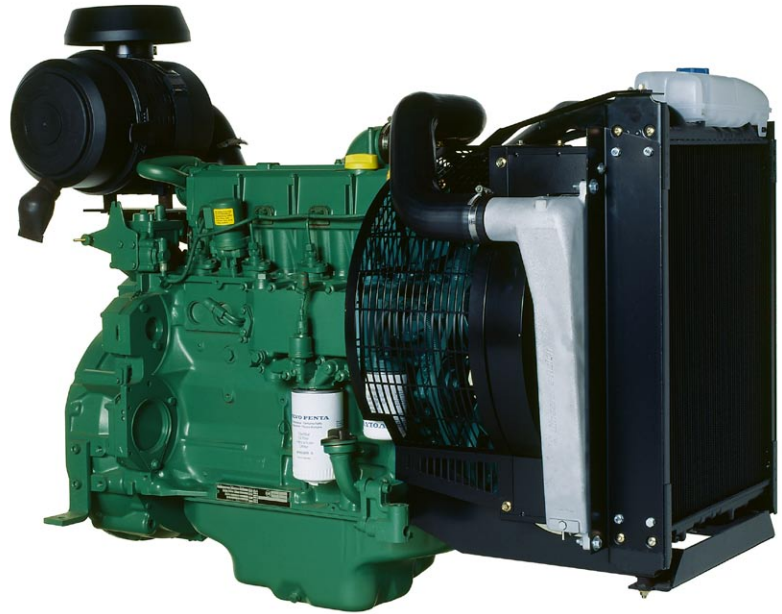
Technical description

Engine and block

- Optimized cast iron cylinder block with optimum distribution of forces
- Piston cooling for low piston temperature and reduced ring temperature
- Drop forged steel connecting rods
- Crankshaft hardened bearing surfaces and fillets for moderate load on main and big-end bearings
- Keystone top compression rings for long service life
- Replaceable valve guides and valve seats
- Three PTO positions at flywheel end
- Lift eyelets
- Flywheel housing with connection acc. to SAE 3
- Flywheel for flexible coupling and friction clutch
- Transport brackets

Lubrication system

- Full flow disposable spin-on oil filter, for extra high filtration
- Rotary displacement oil pump driven by the crankshaft
- Deep centre oil sump, 30° inclination
- Oil filler on top
- Oil dipstick, short in front
- Integrated full flow oil cooler, side-mounted



Features

- Mechanical or electronic governor with CAN-bus communication
- Compact design
- High power to weight ratio
- Emission compliant
- Noise optimized engine design
- A wide selection of optional equipment and power settings

Fuel system

- Six hole fuel injection nozzles
- Electronic governor with smoke limiter function
- Washable fuel prefilter with water separator
- Rotary low-pressure fuel pump
- Fine fuel filter of disposable type

Intake and exhaust system

- Connection flange for exhaust line
- Turbo charger, centre low with exhaust flange
- Closed crankcase ventilation
- Heater flange in charge air inlet (without power relay)

Cooling system

- Belt driven, maintenance-free coolant pump with high degree of efficiency

- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block
- Reliable thermostat with minimum pressure drop
- Cooling water pipe, inlet and outlet
- Fan hub
- Fan on separate bracket 292mm above crankshaft

Electrical system

- 12 V electrical system
- Alternator 1x55A / 12V, low left
- Starter motor, 3.1 kW / 12 V, single pole
- ECU (without high altitude sensor) control and monitoring of oil pressure, coolant temperature, coolant level, charge air pressure, engine rpm and fuel temperature compensation
- Engine wiring

**VOLVO
PENTA**

TAD531GE

Technical Data

General

Engine designation	TAD531 GE	
No. of cylinders and configuration.....	in-line 4	
Method of operation	4-stroke	
Bore, mm (in.).....	108 (4.25)	
Stroke, mm (in.).....	130 (5.12)	
Displacement, l (in ³).....	4.76 (290)	
Compression ratio.....	18:1	
Dry weight, kg (lb).....	575 (1268)	
Wet weight, kg (lb).....	606 (1336)	

Performance	1500 rpm	1800 rpm
with fan, kW (hp) at:		
Prime Power	88 (119)	93 (126)
Standby Power	98 (133)	104 (141)

Lubrication system	1500 rpm	1800 rpm
Oil consumption, liter/h (US gal/h) at:		
Prime Power	0.08 (0.021)	0.08 (0.021)
Standby Power	0.08 (0.021)	0.08 (0.021)
Oil system capacity incl filters, liter	13	

Fuel system	1500 rpm	1800 rpm
Specific fuel consumption at:		
Prime Power, g/kWh (lb/hph)		
25 %	259 (0.419)	277 (0.449)
50 %	225 (0.365)	232 (0.376)
75 %	218 (0.353)	221 (0.358)
100 %	218 (0.353)	218 (0.353)
Standby Power, g/kWh (lb/hph)		
25 %	244 (0.396)	259 (0.420)
50 %	221 (0.358)	226 (0.366)
75 %	217 (0.351)	219 (0.355)
100 %	219 (0.355)	218 (0.353)

Intake and exhaust system	1500 rpm	1800 rpm
Air consumption at 27°C, m ³ /min (cfm):		
Prime Power	5.7 (201)	7.24 (256)
Standby Power	6.09 (215)	7.75 (274)
Max allowable air intake restriction, kPa (In wc)	3.5 (14.1)	3.5 (14.1)
Heat rejection to exhaust, kW (BTU/min) at:		
Prime Power	78 (4436)	83 (4720)
Standby Power	88 (5004)	92 (5232)
Exhaust gas temperature after turbine, °C (°F) at:		
Prime Power	544 (1011)	518 (964)
Standby Power	557 (1035)	516 (961)
Max allowable back-pressure in exhaust line, kPa (In wc)	5 (20.1)	7 (28.1)
Exhaust gas flow, m ³ /min (cfm) at:		
Prime power	16.7 (589)	19.9 (704)
Standby Power	18.4 (650)	22.1 (781)

Cooling system	1500 rpm	1800 rpm
Heat rejection radiation from engine, kW (BTU/min)		
Prime Power	9 (522)	10 (568)
Standby Power	10 (580)	11 (631)
Heat rejection to coolant kW (BTU/min)		
Prime Power	47.4 (2696)	48.0 (2730)
Standby Power	52.5 (2986)	53.3 (3031)
Fan power consumption, kW (hp)	5.9 (8)	10.2 (14)

Standard equipment

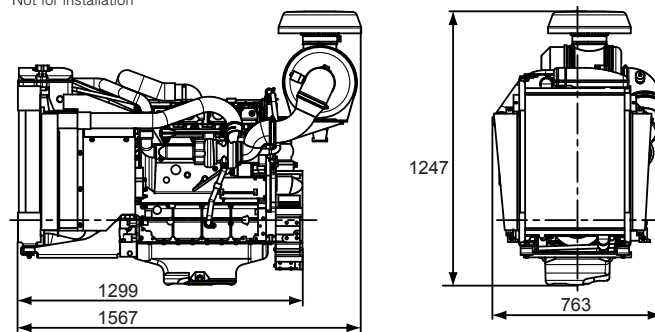
Engine

- Automatic belt tensioner •
- Lift eyelets •
- Flywheel**
- Flywheel housing SAE 3 •
- Flywheel 11.5" disc •
- 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 •
- 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 •
- Crankcase ventilation •
- Cooling system**
- Tropical radiator incl intercooler –¹⁾
- Gear driven coolant pump •
- Fan hub •
- Pusher fan –¹⁾
- Fan guard –¹⁾
- Belt guard –¹⁾
- Control system**
- Engine Diesel Control 4 (EDC4) with CAN-bus interface SAE J1939 and stand alone interface –
- Alternator**
- Alternator 55 A / 12 V •
- Starting system**
- Starter motor, 3.1kW, 12 V •
- Instruments and senders**
- Temp.- and oil pressure for automatic stop/alarm 103°C •
- Engine Packing**
- Plastic wrapping •

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

Dimensions TAD531GE

Not for installation



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 G3

Exhaust emissions

The engine complies with Tier 2 and TA-luft 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. A10 % 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 well 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

AB Volvo Penta
 SE-405 08 Göteborg, Sweden
 www.volvopenta.com

Technical data TAD531GE

General

In-line four stroke diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel. Turbocharged

Number of cylinders			4
Displacement, total		litre in ³	4,76 290,7
Firing order			1-3-4-2
Bore		mm in	108 4,25
Stroke		mm in	130 5,12
Compression ratio			18:1
Dry weight	Engine and cooling package	kg	575
		lb	1268
Wet weight	Engine and cooling package	kg	606
		lb	1336
	SAE2	kg lb	36 79

Performance

		r/min	1500	1800
Standby Power	without fan	kW	102	111
		hp	139	151
	with fan low temp	kW	98	104
		hp	133	141
Prime Power	without fan	kW	92	100
		hp	125	136
	with fan low temp	kW	88	93
		hp	119	126
Torque at:	Standby Power	Nm	649	589
		lbft	479	434
	Prime Power	Nm	586	531
		lbft	432	391
Mean piston speed		m/s ft/sec	6,5 21,4	7,8 25,7
Effective mean pressure at:	Standby Power	MPa	1,7	1,6
		psi	248	225
Max combustion pressure at:	Standby Power	MPa	12,9	12,8
		psi	1871	1856
Total mass moment of inertia, J (mR ²)		kgm ² lbft ²	1,43 33,9	
Residual speed droop at load increase from 0 to 100%		%	≤ 5	
Friction Power		kW hp	6,0 8,16	8,6 11,696

Technical data TAD531GE

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
Measured sound power Lw	No load	dB(A)	99,5	101
	Standby Power	dB(A)	102,5	104
	Prime Power	dB(A)	102,5	104
Calculated sound pressure Lp at 1 m	No load	dB(A)	86,5	88
	Standby Power	dB(A)	89,5	91
	Prime Power	dB(A)	89,5	91

Unsilenced exhaust noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m

		r/min	1500	1800
Standby Power		dB(A)	108	108
Prime Power		dB(A)	107,5	108

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	5,0	5,5	2,0	2,0	40-100	12,0	-	4,5	-
0-50	6,0	7,0	2,0	2,0	50-100	9,0	-	4,0	-
0-60	8,0	8,5	2,5	3,0	60-100	7,0	-	3,0	-
0-75	10,0	13,0	3,0	4,0	75-100	4,0	-	2,5	-
0-100	-	-	-	-					
100-0	7,5	9,0	2,0	2,5					

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	3,0	3,5	1,0	1,0	40-100	5,0	5,0	2,0	5,0
0-50	4,0	4,5	1,0	1,5	50-100	4,0	4,0	2,0	4,0
0-60	4,4	4,8	1,1	0,9	60-100	2,5	2,5	1,1	2,5
0-75	6,0	6,5	2,0	2,0	75-100	2,0	2,0	1,5	2,0
0-100	9,5	11,5	3,0	5,0					
100-0	7,5	8,0	1,5	2,0					

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	6,7		0,7						
0-100	16,7		2,2						
100-0	6,9		2,0						

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	4,9		0,2						
0-100	8,1		1,7						
100-0	4,3		0,3						

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Cold start performance

1500/1800

Cold start limit temperature	°C	-15
		-30*

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

Derating, mechanical governor

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	3 / 5°C
Humidity	%	No derating

Derating, electronic governor

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
Lubricating oil consumption	Standby Power	liter/h	0,08	0,08
		US gal/h	0,021	0,021
Oil system capacity including filters		liter	13	
		US gal	3,4	
Oil sump capacity:	max	liter	11	
		US gal	2,9	
	min	liter	9	
		US gal	2,4	
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	450 - 480	
		psi	65 - 70	
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
Standby Power Specific fuel consumption at:	25%	g/kWh lb/hph	244 0,396	259 0,420
	50%	g/kWh lb/hph	221 0,358	226 0,366
	75%	g/kWh lb/hph	217 0,351	219 0,355
	100%	g/kWh lb/hph	219 0,355	218 0,353
Prime Power Specific fuel consumption at:	25%	g/kWh lb/hph	259 0,419	277 0,449
	50%	g/kWh lb/hph	225 0,365	232 0,376
	75%	g/kWh lb/hph	218 0,353	221 0,358
	100%	g/kWh lb/hph	218 0,353	218 0,354

Fuel system		r/min	1500	1800
Recommended fuel to conform to		ASTM-D975-No1 and 2-D JIS KK 2204, EN 590		
Total fuel flow	liter/h		360	450
	US gal/h		95	119
Feed pump pressure	kPa	500 - 550		
	psi	73 - 80		
Feed pump max suction head	m	1,5		
	foot	4,9		
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			

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Intake and exhaust system		r/min	1500	1800	
Air consumption at:	Standby Power	27°C 81°F	m ³ /min cfm	6,089 215	7,75 274
	Prime Power	27°C 81°F	m ³ /min cfm	5,7 201	7,24 256
Air intake restriction, clean filter(s)			kPa in wc	1 4,0	1 4,0
Max allowable air intake restriction			kPa in wc	3,5 14,1	3,5 14,1
Air filter type			Single stage paper cartridge		
Air filter cleaning efficiency			%	99,85	
Heat rejection to exhaust at:	Standby Power		kW BTU/min	88 5004	92 5232
	Prime Power		kW BTU/min	78 4436	83 4720
Exhaust gas temperature after turbine at:	Standby Power		°C °F	557 1035	516 961
	Prime Power		°C °F	544 1011	518 964
Max allowable back pressure in exhaust line			kPa In wc	5 20,1	7 28,1
Exhaust gas flow at:	Standby Power		m ³ /min cfm	18,4 650	22,1 781
	Prime Power		m ³ /min cfm	16,7 589	19,9 704
Heat rejection to CAC	Standby Power		kW BTU/min	13,1 745	21 1194
	Prime Power		kW BTU/min	11,8 671	18,9 1075

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Cooling system		r/min	1500	1800
Heat rejection radiation from engine at:	Standby Power	kW BTU/min	10 580	11 631
	Prime Power	kW BTU/min	9 523	10 569
Heat rejection to coolant at:	Standby Power	kW BTU/min	52,5 2986	53,3 3031
	Prime Power	kW BTU/min	47,4 2696	48,0 2730
Recommended coolant	Volvo coolant or Volvo anticorrosion additive together with clean fresh water			
Radiator cooling system type	Closed circuit			
Radiator core area (std. size)	m ²	0,29		
	foot ²	3,12		
Radiator core thickness (std. size) - low temp cooling package	mm	62		
	in	2,44		
Fan diameter - low temp cooling system	mm	516		
	in	20,31		
Fan power consumption - low temp cooling system	kW	4,2	7,1	
	hp	6	10	
Fan power consumption - high temp cooling system	kW	5,9	10,2	
	hp	8	14	
Fan drive ratio	1,73:1			
Coolant capacity,	engine	liter	7,2	
		US gal	1,90	
	std radiator with hoses	liter	12,5	
		US gal	3,30	
Coolant pump	drive/ratio	1,73:1		
Coolant flow with low temp system	l/s	2,71	3,42	
	US gal/s	0,72	0,90	
Maximum external coolant system restriction	kPa	25	35	
	in wc	100	141	
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 on low temp radiator	kPa	90		
	in wc	361		
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			

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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	
1500	53	1,5	0			
	low temp	44	1,2	150		
		37	1,0	200		
	high temp	63	2,0	0		
		57	1,6	150		
		53	1,5	200		
		46	1,2	300		
	low temp	50			1,5	0
		40			1,2	150
		32			1,0	200
	high temp	60			2,0	0
54				1,6	150	
50				1,4	200	
42				1,2	300	
1800	59	1,9	0			
	low temp	51	1,7	150		
		48	1,4	200		
		37	1,1	300		
	high temp	67	2,6	0		
		64	2,2	150		
		62	2,1	200		
		59	1,9	300		
		54	1,6	400		
	low temp	55			1,9	0
		47			1,7	150
		44			1,4	200
		32			1,1	300
	high temp	64			2,6	0
		61			2,2	150
		59			2,1	200
		56			1,9	300
51				1,6	400	

Technical data TAD531GE

Electrical system		r/min	1500	1800
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		3,1	
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	1110	
Cranking current at +20°C		Amp	370	
Crank engine speed at 20°C		rpm	160	
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	