

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

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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	

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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	