

Technical data TAD1631GE Prime & Standby Power

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 in ³	16,12 983,9
Firing order		1-5-3-6-2-4
Bore	mm in	144 5,67
Stroke	mm in	165 6,50
Compression ratio		15,0:1

Performance		r/min	1500	1800
Prime Power:	without fan	kW hp	442 601	505 687
	with fan	kW hp	435 592	493 670
Continuous Standby Power:	without fan	kW hp		
	with fan	kW hp		
Standby Power:	without fan	kW hp	485 660	565 768
	with fan	kW hp	478 650	553 752
Torque at:	Prime Power	Nm lbft	2814 2075	2679 1976
	Standby Power	Nm lbft	3088 2277	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	2,20 319	2,10 305
Max combustion pressure at Prime Power		MPa psi	14,4 2089	15,2 2205
Total mass moment of inertia, J (mR ²)		kgm ² lbft ²	4,22 100,1	
Degree of irregularity at Prime Power			1:52	1:108
Residual speed droop at load increase from 0 to 100%		%	<=5	
Friction Power		kW hp	40 54,4	54 73,44

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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 L _w	No load	dB(A)	-	-
	Prime Power	dB(A)	113,9	116,1
	Standby Power	dB(A)	114,5	116,5
Calculated sound pressure L _p at 1 m	No load	dB(A)	-	-
	Prime Power	dB(A)	101,9	104,1
	Standby Power	dB(A)	102,5	104,5

Unsilenced exhaust noise

Data calculated as sound pressure L_p.

Assumed microphone distance 1 m

		r/min	1500	1800
Prime Power		dB(A)	115	119
Standby Power		dB(A)	116	120

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

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	Standby	Prime	Standby		Prime	Standby	Prime	Standby
0-20	3,3	4,0	0,5	2,0	20-100	63,0		6,5	
0-40	6,1	7,6	1,0	3,0	40-100	16,8	18,6	3,5	6,0
0-52		10,0		1,3	52-100		15,0		1,7
0-60	10,0	14,7	2,5	4,5	60-100	9,3	9,3	1,5	1,5
100-0	12,0	13,3	1,0	2,0	80-100	4,1	4,0	1,0	3,0

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	3,3	3,3	1,0	2,0	20-100	18,7	28,5	4,0	6,0
0-40	5,6	6,3	1,2	2,0	40-100	10,9	11,9	2,0	5,3
0-60		10,0		4,0	60-100		7,0		2,0
0-75	10,0		2,0		75-100	6,4		1,0	
100-0	9,4	9,0	1,0	1,5	80-100	3,4	4,0	1,0	2,5

Cold start performance

		r/min	1500	1800	
Time from start to no load speed at ambient temperature:	°C	20	s	2,2	3,0
		5	s	5,0	7,0
			s		
Time from start to stay within 0.8% of no load speed at ambient temperature:	°C	20	s	2,2	3,0
		5	s	5,0	7,0
			s		

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

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Derating

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:

	r/min	1500	1800
Altitude derating factor < 3000 m	% / m	4 / 500	
Altitude derating factor > 3000 m	% / m	6 / 500	
Ambient temperature derating factor	% / °C	1,5 / 5°C	
Humidity	%	No derating	

Lubrication system

		r/min	1500	1800
Lubricating oil consumption	Prime Power	liter/h	0,12	0,16
		US gal/h	0,032	0,042
	Standby Power	liter/h	0,13	0,18
		US gal/h	0,035	0,048
Oil system capacity including filters		liter	64	
		US gal	16,9	
Oil sump capacity:	max	liter	57	
		US gal	15,1	
	min	liter	40	
		US gal	10,6	
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	degrees	15	
	front down	°	15	
	side tilt	°	10	
Oil pressure at rated speed		kPa	300-500	
Oil pressure shut down switch setting		kPa	70	
Lubrication oil temperature:	normal	°C	105	
		°F	221	
	max	°C	120	
		°F	248	
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
Prime Power. Specific fuel consumption at:	25%	g/kWh lb/hph	230 0,373	240 0,389
	50%	g/kWh lb/hph	210 0,340	214 0,347
	75%	g/kWh lb/hph	205 0,332	208 0,337
	100%	g/kWh lb/hph	209 0,339	212 0,344
Standby Power. Specific fuel consumption at:	25%	g/kWh lb/hph	227 0,368	236 0,383
	50%	g/kWh lb/hph	208 0,337	212 0,344
	75%	g/kWh lb/hph	205 0,332	208 0,337
	100%	g/kWh lb/hph	213 0,345	217 0,352
Recommended fuel to conform to		ASTM-D975-No1 and 2-D JIS KK 2204, EN 590		
Total fuel flow		liter/h US gal/h	205 54	215 57
Feed pump pressure		kPa	200	
Feed pump max suction head		m	3	
Fuel filter micron size		mm	0,008	
Prefilter / Water separator		mm		
Governor type/make, standard		Electronic/GAC		
Injection pump type/make		R1500/Bosch		
Injection timing std.		°B.T.D.C	17	21
Injection timing		°B.T.D.C		

Intake and exhaust system		r/min	1500	1800	
Air consumption:	Prime Power at:	25°C	m ³ /min	31,8	39,3
		77°F	cfm	1123	1388
	Standby Power at:	25°C	m ³ /min	34,3	41,8
		77°F	cfm	1211	1476
Air intake restriction, clean filter(s)		kPa in wc	1,5 6,0	2,2 8,8	
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	369	415	
		BTU/min	20985	23601	
	Standby Power	kW	416	482	
		BTU/min	23658	27411	
Exhaust gas temperature after turbine at:	Prime Power	°C	550	520	
		°F	1022	968	
	Standby Power	°C	565	560	
		°F	1049	1040	
Max allowable back pressure in exhaust line		kPa In wc	5 20,1	7 28,1	
Exhaust gas flow at:	Prime Power	m ³ /min	90,3	105,0	
		cfm	3189	3708	
	Standby Power	m ³ /min	99,0	116,6	
		cfm	3496	4118	

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Cooling system		r/min	1500	1800
Heat rejection radiation from engine at:	Prime Power	kW	26	30
		BTU/min	1479	1706
	Standby Power	kW	29	33
		BTU/min	1649	1877
Heat rejection to coolant at:	Prime Power	kW	180	211
		BTU/min	10236	11999
	Standby Power	kW	195	235
		BTU/min	11089	13364
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		1,25	
	foot ²		13,45	
Radiator core thickness (std. size)	mm		73	
	in		2,87	
Intercooler core area (std. Size)	m ²		1,06	
	foot ²		11,41	
Intercooler core thickness (std. Size)	mm		68	
	in		2,68	
Fan diameter	mm		890	
	in		35,04	
Fan power consumption	kW		7	12
	hp		10	16
Fan drive ratio	0,86:1			
Coolant capacity,	engine	liter		35
		US gal		9,25
	std radiator with hoses	liter		29
		US gal		7,66
Coolant pump	drive/ratio	gear/1,48:1		
Coolant flow with standard system	l/s		8,7	10,5
	US gal/s		2,30	2,77
Minimum coolant flow	l/s		8,3	10,0
	US gal/s		2,19	2,64
Maximum external coolant system restriction	kPa		30	50
	in wc		121	201
Thermostat,	start to open	°C		86
		°F		187
	fully open	°C		96
		°F		205
Maximum static pressure head	kPa		50	
	in wc		201	
Pressure cap setting on standard radiator	kPa		70	
	in wc		281	
Maximum top tank temperature	°C		103	
	°F		217	
Minimum temperature entering engine	°C		68	
	°F		154	
Shutdown switch setting	°C		103	
	°F		217	
Recommended draw down capacity	10% of total cooling system capacity			

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Cooling performance Fan Ratio 0,86:1

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 103°C TTT and 50% antifreeze (radiator and cooling fan, see optional equipment)

Engine speed rpm	Air on temp °C	110% OF PRIME POWER		STANDBY POWER	
		Air flow m ³ /s	Max additional external restriction Pa	Air flow m ³ /s	Max additional ext. restriction Pa
1500	30	4,20	600	4,20	600
	40	5,20	425	5,20	425
	50	6,90	125	6,90	125
	57	7,30	0	7,30	0
1800	30	5,50	800	5,50	800
	40	6,80	600	6,80	600
	55	8,90	0	8,90	0

Cooling performance Fan Ratio 1,0:1

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 103°C TTT and 50% antifreeze (radiator and cooling fan, see optional equipment)

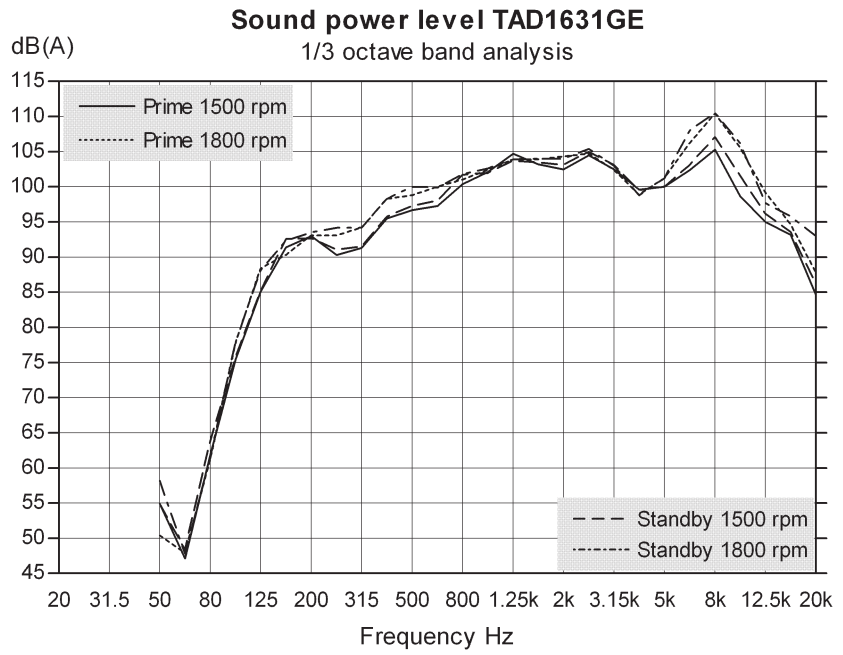
Engine speed rpm	Air on temp °C	110% OF PRIME POWER		STANDBY POWER	
		Air flow m ³ /s	Max additional external restriction Pa	Air flow m ³ /s	Max additional ext. restriction Pa
1500	30	4,40	1160	4,80	1160
	40	5,30	850	5,80	850
	50	7,00	610	7,40	610
	55	7,80	160	8,70	160
	62	8,30	0	9,00	0
1800	30	5,50	1520	6,20	1520
	40	7,00	1090	7,60	1090
	50	8,10	710	9,80	710
	60	9,70	0	11,00	0

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Electrical system		r/min	1500	1800
Voltage and type		24V / insulated from earth		
Alternator:	make/output	Amp	Valeo/60	
	tacho output	Hz/alt. Rev	6	
	drive ratio		4,06:1	
Starter motor	make		Bosch	
	type		KE	
	kW		7,5	
Starter motor solenoid,	pull current	Amp	51	
	hold current	Amp	7	
Number of teeth on:	flywheel		153	
	starter motor		12	
Inrush current at +20°C		Amp	950	
Cranking current at +20°C		Amp	400	
Crank engine speed at 20°C		rpm	200	
Starter motor battery capacity:	max	Ah	2x176	
	min at +5°C	Ah	2x110	
Stop solenoid,	pull current	Amp	35	
	hold current	Amp	0,4	
Inlet manifold heater (at 20 V)		kW	4	
Power relay for the manifold heater		Amp	1	

Power take off		r/min	102	104
Front end in line with crank shaft max:		Nm	-	
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW	-	-
	max down	kW	-	-
	max right	kW	-	-
Timing gear at compressor PTO max:		Nm	130	
Speed ratio direction of rotation viewed from flywheel side			1,12:1/anti clockwise	
Timing gear at servo pump PTO max:		Nm	55	
Speed ratio direction of rotation viewed from flywheel side			1,68:1/anti clockwise	
Timing gear at hydraulic pump PTO max:		Nm		
Speed ratio direction of rotation viewed from flywheel side				

Test standards: ISO 3744-1981 (E)
 sound power (without fan, intake and
 exhaust noise)
 Tolerance ± 0.75 dB(A)



Fuel consumption data is based on a
 diesel fuel with a calorific value of 42.7
 MJ/kg (18360 BTU/pound) and a density
 of 0.84 kg/liter (7.01 lb/US gal.)

