

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

**Performance**

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

## Technical data TAD1641GE

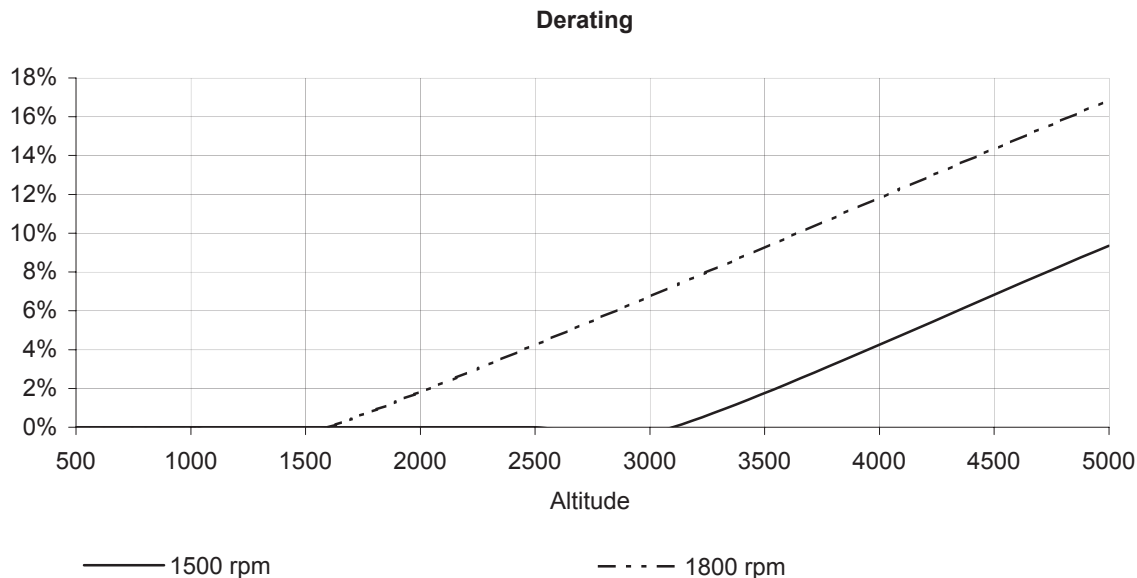
### Derating

The engine may be operated up to 3130 m altitude without derating at 1500rpm.

The engine may be operated up to 1630 m altitude without derating at 1800rpm.

For operation at higher altitudes the power will be derated according to the graph below.

There is no derating for ambient temperature or humidity.



### Engine noise emission

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

Tolerans  $\pm 0.75$  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

### Emission

484kW/1500rpm	TA-luft	mg/Nm <sup>3</sup>		
Load factor	NO <sub>x</sub>	CO	Soot	HC
55%	1720	144	10	32
83%	1731	453	18	19
110% stand by	1742	896	29	12

O<sub>2</sub>-content 5%, without fan. For latest updated values, refer to "Sales Support" on Partner Network.

**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 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
-25	External Volvo	2	12	5

## Technical data TAD1641GE

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

\* See also general section in the sales guide

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

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

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

## 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 together with clean fresh water			
Radiator cooling system type	Closed circuit			
Standard radiator core area	m <sup>2</sup>		1,32	
	foot <sup>2</sup>		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 hoses 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		401	
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			

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	36,6
Standard intercooler core area		m <sup>2</sup>	1,3	
		foot <sup>2</sup>	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 rpm	Air on temp °C	PRIME POWER		STANDBY POWER	
		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

### Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronous/droop Switchable during operation	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

Engine protection Parameter	Alarm		Engine protection	
	Selectable span	Default setting	Protection at	Protective action Default / Alternative
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	-	-	-	Automatic derating, see section derating
Charge air temp after cac	-	80	+5	Shut down
Charge air pressure kPa	-	290	300	Shut down
Overspeed	100 - 120% of rated speed	120% / off *	Alarm level	Shut down / on
Low voltage V	-	25,5	-	-

\*Off means no shutdown , alarm only.



<b>Electrical system</b>		<b>r/min</b>	<b>1500</b>	<b>1800</b>
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	

<b>Power take off</b>		<b>r/min</b>	<b>1500</b>	<b>1800</b>
Timing gear at compressor PTO max:		Nm	160	
		lbft	118	
Speed ratio direction of rotation viewed from flywheel side		1,31:1 / anti-clockwise		
Timing gear at servo pump PTO max:		Nm	100	
		lbft	74	
Max allowed bending moment in flywheel housing		Nm	15000	
		lbft	11063	
Max. rear main bearing load		N	5000	
		lbf	1124,0	