

## 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	496	551
		hp	675	749
	with fan	kW	485	532
		hp	660	724
Standby Power	without fan	kW	547	604
		hp	744	821
	with fan	kW	536	585
		hp	729	796
Torque at:	Prime Power	Nm	3158	2923
		lbft	2329	2156
	Standby Power	Nm	3482	3204
		lbft	2568	2363
Mean piston speed		m/s	8,3	9,9
		ft/sec	27,1	32,6
Effective mean pressure at:	Prime Power	MPa	2,5	2,3
		psi	357	331
Effective mean pressure at:	Standby Power	MPa	2,7	2,5
		psi	394	362
Max combustion pressure at:	Prime Power	MPa	17,5	18
		psi	2538	2611
Max combustion pressure at:	Standby Power	MPa	18,6	18,9
		psi	2698	2741
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		1:42	1:78
Friction Power		kW	36	53
		hp	48,96	72,08

## Technical data TAD1642GE

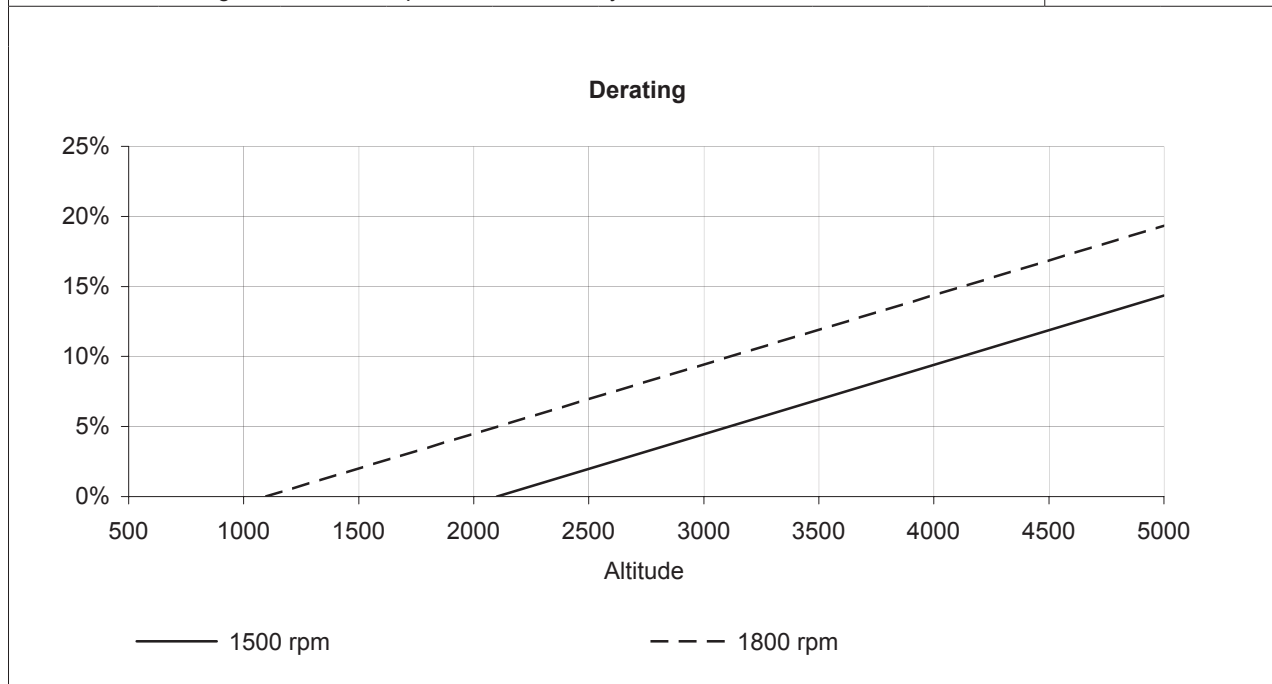
### Derating

The engine may be operated up to 2130 m altitude without derating at 1500rpm.

The engine may be operated up to 1130 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	117
	Prime Power	dB(A)	117	118
	Standby Power	dB(A)	117	119
Calculated sound pressure Lp at 1 m	No load	dB(A)	101	105
	Prime Power	dB(A)	105	106
	Standby Power	dB(A)	105	107

### 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)	116	120
Standby Power	dB(A)	116	120

### Emission

547kW/1500rpm	TA-luft	mg/Nm <sup>3</sup>		
Load factor	NOx	CO	Soot	HC
55%	1758	156	10	35
83%	1752	575	20	21
110% stand by	1748	713	27	15

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	3,2	3,5	1,8	1,8	20-100	26,8	32,5	6,3	8,4
0-38		7,0		2,4	38-100		13,3		6,4
0-40	6,8	7,8	2,3	2,5	40-100	11,2	11,7	5,0	6,1
0-41	7,0		2,3		41-100	10,7		4,5	
0-48		10,0		3,9	48-100		9,5		4,0
0-53	10,0		3,2		53-100	8,0		4,1	
0-60	13,5	17,3	3,6	4,4	60-100	6,6	7,4	4,0	3,8
0-80	26,7	32,6	5,8	6,8	80-100	3,2	3,2	1,1	3,5
0-100	42,5	52,5	8,3	9,7					
100-0	9,6	10,4	1,6	1,7					

**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	2,2	2,4	1,8	2,0	20-100	9,9	11,4	3,0	3,6
0-40	4,6	5,1	2,0	2,0	40-100	6,3	7,3	2,3	3,0
0-52		7,0		2,0	52-100		6,2		2,7
0-57	7,0		2,0		57-100	4,5		2,1	
0-60	7,7	8,5	2,1	2,2	60-100	4,1	4,8	2,0	2,4
0-67		10,0		2,8	67-100		4,0		2,3
0-73	10		2,6		73-100	2,5		2	
0-80	11,7	15,2	2,8	3,6	80-100	1,9	2,2	1,9	2,0
0-100	19,4	22,9	3,9	5,6					
100-0	6,8	7,4	0,9	1,7					

**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

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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	0,11 0,029	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	213 0,345	227 0,367
	50%	g/kWh lb/hph	198 0,321	204 0,330
	75%	g/kWh lb/hph	197 0,320	202 0,328
	100%	g/kWh lb/hph	201 0,326	209 0,339
<b>Standby Power</b> Specific fuel consumption at:	25%	g/kWh lb/hph	208 0,337	220 0,357
	50%	g/kWh lb/hph	197 0,320	203 0,329
	75%	g/kWh lb/hph	200 0,323	204 0,330
	100%	g/kWh lb/hph	204 0,330	212 0,343

<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	180	200
		US gal/h	48	53
Fuel supply line max restriction		kPa	10,0	
		psi	1,5	
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	38	45,4
		77°F	cfm	1342	1603
	Standby Power	25°C	m <sup>3</sup> /min	40,6	46,6
		77°F	cfm	1434	1646
Air intake restriction, clean filter(s)			kPa	1,5	2
			in wc	6,0	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	375	439
			BTU/min	21326	24965
	Standby Power		kW	426	500
			BTU/min	24226	28435
Exhaust gas temperature after turbine at:		Prime Power	°C	471	468
			°F	880	874
		Standby Power	°C	494	512
			°F	920	954
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	92,6	108,9
			cfm	3270	3846
		Standby Power	m <sup>3</sup> /min	100,7	117,6
			cfm	3556	4153

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Cooling system		r/min	1500	1800
Heat rejection radiation from engine at:	Prime Power	kW	18	20
		BTU/min	1024	1137
	Standby Power	kW	20	24
		BTU/min	1137	1365
Heat rejection to coolant at:	Prime Power	kW	187	218
		BTU/min	10635	12397
	Standby Power	kW	218	248
		BTU/min	12397	14104
Coolant	Volvo coolant 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
	std radiator 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	2,03
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	112	145
		BTU/min	6369	8246
	Standby Power	kW	131	159
		BTU/min	7450	9042
Combustion air inlet temp. (Charge air temp after turbo compressor)	Prime Power	°C	206	228
		°F	403	442
	Standby Power	°C	226	243
		°F	439	469
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	11	19
		psi	1,60	2,76
Boost pressure		kPa	268	262
		psi	38,9	38,0
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	5,9	835	6,5	736
	45	6,5	748	7,2	683
	50	7,4	697	8,2	616
	55	8,4	600	9,4	250
	57			10,0	0
	60	9,9	76		
	63	10,0	0		
1800	40	6,8	1313	7,6	1154
	45	7,6	1182	8,5	1055
	50	8,6	1078	9,7	956
	55	9,8	963	11,1	494
	58			12,3	0
	60	11,5	324		
	61	12,3	0		

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### 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	2x 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	