

# Technical data TAD1642GE

## 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 <sup>3</sup>	16,12 983,7
Firing order			1-5-3-6-2-4
Bore		mm in	144 5,67
Stroke		mm in	165 6,50
Compression ratio			16,5:1
Dry weight	Engine only, excluding cooling system	kg lb	1480 3263
	GenPac	kg lb	1910 4211
Wet weight	Engine only, excluding cooling system	kg lb	1550 3417
	GenPac	kg lb	2020 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 lbft	3158 2329	2923 2156
	Standby Power	Nm lbft	3482 2568	3204 2363
Mean piston speed		m/s ft/sec	8,3 27,1	9,9 32,6
Effective mean pressure at:	Prime Power	MPa psi	2,5 357	2,3 331
Effective mean pressure at:	Standby Power	MPa psi	2,7 394	2,5 362
Max combustion pressure at:	Prime Power	MPa psi	17,5 2538	18 2611
Max combustion pressure at:	Standby Power	MPa psi	18,6 2698	18,9 2741
Total mass moment of inertia, J (mR <sup>2</sup> )		kgm <sup>2</sup> lbft <sup>2</sup>	4,20 99,7	
Degree of irregularity at:	Prime Power		1:42	1:78
Friction Power		kW hp	36 48,96	53 72,08

## Derating

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

For operation at higher altitudes the power will be derated according to the graph in technical diagrams

There is no derating for ambient temperature or humidity.

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## 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

## 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					

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### 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 manifold heater kW engaged, 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

### Lubrication system

		r/min	1500	1800
Lubricating oil consumption	Prime Power	liter/h	0,10	0,11
		US gal/h	0,026	0,029
	Standby Power	liter/h	0,11	0,12
		US gal/h	0,029	0,032
Oil system capacity including filters		liter	48	
		US gal	12,7	
Oil sump capacity:	max	liter	42	
		US gal	11,1	
	min	liter	32	
		US gal	8,5	
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	°	30	
	front down	°	30	
	side tilt	°	30	
Oil pressure at rated speed		kPa	300 - 650	
		psi	44 - 94	
Lubrication oil temperature in oil sump:	max	°C	130	
		°F	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	213	227	
		lb/hph	0,345	0,367	
		50%	g/kWh	198	204
			lb/hph	0,321	0,330
	75%	g/kWh	197	202	
		lb/hph	0,320	0,328	
	100%	g/kWh	201	209	
		lb/hph	0,326	0,339	
<b>Standby Power</b> Specific fuel consumption at:	25%	g/kWh	208	220	
		lb/hph	0,337	0,357	
	50%	g/kWh	197	203	
		lb/hph	0,320	0,329	
	75%	g/kWh	200	204	
		lb/hph	0,323	0,330	
	100%	g/kWh	204	212	
		lb/hph	0,330	0,343	

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<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 BTU/min	18 1024	20 1137
	Standby Power	kW BTU/min	20 1137	24 1365
Heat rejection to coolant at:	Prime Power	kW BTU/min	187 10635	218 12397
	Standby Power	kW BTU/min	218 12397	248 14104
Coolant	Volvo coolant or Volvo anticorrosion additive together with clean fresh water			
Radiator cooling system type	Closed circuit			
Standard radiator core area		m <sup>2</sup> foot <sup>2</sup>	1,32 14,21	
Standard radiator core thickness		mm in	52 2,05	
Fan diameter		mm in	890 35,04	
Fan power consumption		kW hp	11 15	19 26
Fan drive ratio			1,04 : 1	
Coolant capacity,	Engine	liter US gal	33 8,72	
	Engine + std radiator with hoses	liter US gal	60 15,85	
Coolant pump		drive/ratio	Belt / 1,85:1	
Coolant flow with standard system		l/s US gal/s	6,4 1,69	7,7 2,04
		l/s US gal/s	6,4 1,69	7,7 2,03
Minimum coolant flow		l/s US gal/s	6,4 1,69	7,7 2,03
		kPa in wc	40 161	60 241
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 in wc	100 402	
		kPa in wc	70 281	
Minimum static pressure head (expansion tank height + pressure cap setting)		kPa in wc	75 301	
		kPa in wc	75 301	
Standard pressure cap setting		kPa in wc	75 301	
Maximum top tank temperature		°C	103	
		°F	217	
Draw down capacity	4% of total cooling system capacity			

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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	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
Governor characteristic		
Gain		
Stability		

Engine protection	Alarm		Engine protection	
Parameter	Selectable span	Default setting	Protection at	Protective action
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	-	-	>1500	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	120% / off *	Alarm level	Shut down / on
Low voltage V	-	25,5	-	-

\*Off means no shutdown , alarm only.

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Electrical system		r/min	1500	1800
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	

Power take off		r/min	1500	1800
Front end in line with crank shaft max:		Nm lbft	-	
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW hp	-	-
	max down	kW hp	-	-
	max right	kW hp	-	-
Timing gear at compressor PTO max:		Nm lbft	160 118	
Speed ratio direction of rotation viewed from flywheel side			1,31:1 / anti-clockwise	
Timing gear at servo pump PTO max:		Nm lbft	100 74	
Max allowed bending moment in flywheel housing		Nm lbft	15000 11063	
Max. rear main bearing load		N lbf	5000 1124,0	