

# Technical data TAD1353GE

## 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>	12,78 779,7
Firing order			1-5-3-6-2-4
Bore		mm in	131 5,16
Stroke		mm in	158 6,22
Compression ratio			18,1:1
Dry weight	Engine only, excluding cooling system	kg lb	1295 2855
	GenPac	kg lb	1715 3781
Wet weight	Engine only, excluding cooling system	kg lb	1325 2921
	GenPac	kg lb	1790 3946

Performance		r/min	1500	1800
Standby Power	without fan	kW hp	-	449 611
	with fan	kW hp	-	430 585
Prime Power	without fan	kW hp	-	410 558
	with fan	kW hp	-	391 532
Torque at:	Standby Power	Nm lbft	-	2382 1757
	Prime Power	Nm lbft	-	2175 1604
Mean piston speed		m/s ft/sec	-	9,5 31,2
Effective mean pressure at:	Standby Power	MPa psi	-	2,3 340
Effective mean pressure at:	Prime Power	MPa psi	-	2,1 310
Max combustion pressure at:	Standby Power	MPa psi	-	17,6 2553
Max combustion pressure at:	Prime Power	MPa psi	-	16,2 2350
Total mass moment of inertia, J (mR <sup>2</sup> )		kgm <sup>2</sup> lbft <sup>2</sup>		3,43 81,5
Degree of irregularity at:	Standby Power		-	
Friction Power		kW hp	-	44 59,432

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## Engine noise emission

Test Standards: ISO 3744-1981 (E) sound power (with radiator and fan, no intake and exhaust noise)

Tolerance  $\pm 0.75$  dB(A)

		r/min	1500	1800
Measured sound power Lw Fan ratio 0,84	No load	dB(A)	-	115,3
	Standby Power	dB(A)	-	117,4
	Prime Power	dB(A)	-	116,7
Calculated sound pressure Lp at 1 m	No load	dB(A)	-	
	Standby Power	dB(A)	-	
	Prime Power	dB(A)	-	
Measured sound power Lw Fan ratio 0,99	No load	dB(A)	-	117,4
	Standby Power	dB(A)	-	118,6
	Prime Power	dB(A)	-	118,2
Calculated sound pressure Lp at 1 m	No load	dB(A)	-	
	Standby Power	dB(A)	-	
	Prime Power	dB(A)	-	

## Unsilenced exhaust noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m

	r/min	1500	1800
Standby Power	dB(A)	-	119
Prime Power	dB(A)	-	118

## Test conditions for load acceptance data

Warm engine.	Generator	Model	Type of AVR
	Stamford	HCI 444 F1	SX 440

Load acceptance performance can vary due to actual alternator inertia, voltage regulator, type of load and local ambient conditions.

**UFRO : Std-setting 57 Hz / 400 V**

## 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	1,1	1,4	1,6	1,8	20-100	18,6	22,2	4,0	3,7
0-40	2,9	3,3	2,1	1,7	40-100	6,8	9,8	1,9	2,8
0-55	-	7,0	-	2,8	55-100	-	6,2	-	2,5
0-60	6,3	9,2	2,6	3,2	60-100	3,5	5,2	1,5	2,4
0-62	7,0	10,0	3,2	3,6	62-100	3,2	4,8	1,5	2,4
0-69	10,0	-	3,3	-	69-100	2,3	-	1,4	-
0-80	15,2	18,9	3,4	4,4	80-100	1,0	1,3	1,2	1,9
0-100	25,1	30,6	4,1	3,6					
100-0	3,5	4,9	2,9	2,9					

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## Cold start performance

		r/min	1500	1800
Time from start to no load speed at ambient temperature:	°C	20	s	-
		5	s	-
		-15*	s	-
Time from start to stay within 0.5% of no load speed at ambient temperature:	°C	20	s	4,6
		5	s	5,2
		-15*	s	6,0

\* With manifold heater 4 kW engaged, lubrication oil 15W/40 and block heater.

Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
	Volvo	2	12	10°C 50°F

## Lubrication system

		r/min	1500	1800
Lubricating oil consumption	Standby Power	litre/h US gal/h	-	0,05 0,013
	Prime Power	litre/h US gal/h	-	0,04 0,011
Oil system capacity including filters		litre US gal	36 9,5	
Oil sump capacity:	max	litre US gal	30 7,9	
	min	litre US gal	19 5,0	
Oil change intervals/specifications:	VDS3	h	600	
	VDS2	h	400	
		h	200	
Engine angularity limits:	front up	°	11	
	front down	°	11	
	side tilt	°	11	
Oil pressure at rated speed		kPa psi	370 - 520 54 - 75	
Oil pressure shut down switch setting		kPa psi	190-300 28-44	
Lubrication oil temperature in oil sump:	max	°C	130	
		°F	266	
Oil filter micron size		µ	40	

\* See also general section in the sales guide

## Fuel system

		r/min	1500	1800
<b>Standby Power</b> Specific fuel consumption at:	25%	g/kWh lb/hph	-	247 0,400
	50%	g/kWh lb/hph	-	215 0,349
	75%	g/kWh lb/hph	-	209 0,339
	100%	g/kWh lb/hph	-	200 0,324
<b>Prime Power</b> Specific fuel consumption at:	25%	g/kWh lb/hph	-	250 0,405
	50%	g/kWh lb/hph	-	219 0,355
	75%	g/kWh lb/hph	-	210 0,340
	100%	g/kWh lb/hph	-	201 0,326

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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 2D JIS KK 2204, EN 590		
System supply flow at:	litre/h	-	126,0
	US gal/h		33,3
Fuel supply line max restriction	kPa	-	10,0
	psi		1,5
Fuel supply line max pressure, engine stopped	kPa	-	0,0
	psi		
System return flow	litre/h	-	18,0
	US gal/h		4,8
Fuel return line max restriction	kPa	-	20,0
	psi		2,9
Maximum allowable inlet fuel temp	°C	-	60
	°F		140
Prefilter / Water separator micron size	μ	10	
Fuel filter micron size	μ	5	
Governor type/make, standard	Volvo / EMS 2.2		
Injection pump type/make	Delphi E3		

<b>Intake and exhaust system</b>		<b>r/min</b>	<b>1500</b>	<b>1800</b>
Air consumption at: (+25°C and 100kPa)	Standby Power	m <sup>3</sup> /min cfm	-	31,2 1102
	Prime Power	m <sup>3</sup> /min cfm	-	29,4 1038
Max allowable air intake restriction including piping		kPa psi	-	5 0,7
Air filter type		Single stage paper cartridge		
Air filter cleaning efficiency		%	99,85	
Heat rejection to exhaust at:	Standby Power	kW BTU/min	-	338 19222
	Prime Power	kW BTU/min	-	306 17402
Exhaust gas temperature after turbine at:	Standby Power	°C °F	-	495 923
	Prime Power	°C °F	-	485 905
Max allowable back pressure in exhaust line		kPa psi	-	10 1,5
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	Standby Power	m <sup>3</sup> /min cfm	-	79,0 2790
	Prime Power	m <sup>3</sup> /min cfm	-	74,0 2613

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Cooling system		r/min	1500	1800
Heat rejection radiation from engine at:	Standby Power	kW BTU/min	-	11 626
	Prime Power	kW BTU/min	-	10 569
Heat rejection to coolant at:	Standby Power	kW BTU/min	-	178 10123
	Prime Power	kW BTU/min	-	165 9383
Coolant	Volvo Penta coolant "ready mix" or Volvo Penta coolant mixed with fresh clean water 40 / 60			
Radiator cooling system type	Closed circuit			
Standard radiator core area	m <sup>2</sup> foot <sup>2</sup>		0,8 8,61	
Fan diameter	mm in		890 35,04	
Fan power consumption AOT 55 *	kW hp		-	12 16
	Fan power consumption AOT 60 * Standard		kW hp	
				19 26
Fan drive ratio AOT 55 *		0,84 : 1		
Fan drive ratio AOT 60 * - Standard		0,99 : 1		
Coolant capacity,	engine	litre US gal	20 5,28	
	std radiator with hoses	litre US gal	24 6,34	
Coolant pump		drive/ratio	Belt / 1,43:1	
Coolant flow with standard system, outer circuit.		l/s US gal/s	-	5,5 1,45
Minimum coolant flow, outer circuit.		l/s US gal/s	-	5,0 1,32
Maximum outer circuit restriction, including piping		kPa psi	-	40 5,8
Thermostat	start to open	°C	82	
		°F	180	
	fully open	°C	92	
		°F	198	
Maximum static pressure head (expansion tank height + pressure cap setting)		kPa psi	100 14,5	
Minimum static pressure head (expansion tank height + pressure cap setting)		kPa psi	70 10,2	
Standard pressure cap setting		kPa psi	70 10,2	
Maximum top tank temperature		°C °F	107 225	
Draw down capacity	4% of cooling system capacity			

\* Applies to AOT at standby power and 0 kPa external restriction

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### Charge air cooler system

		r/min	1500	1800
Heat rejection to charge air cooler	Standby Power	kW	-	94
		BTU/min		5346
	Prime Power	kW	-	93
		BTU/min		5289
Charge air mass flow	Standby Power	kg/s	-	0,64
	Prime Power	kg/s	-	0,62
Charge air inlet temp. (Charge air temp after turbo compressor)	Standby Power	°C	-	195
		°F		383
	Prime Power	°C	-	193
		°F		379
Charge air outlet temp. (Charge air temp after cooler)	Standby Power	°C	-	45
		°F		113
Std cooling system 0 kPa ext restriction. Air on Temp 33 °C	Prime Power	°C	-	44
		°F		111
Maximum pressure drop over charge air cooler incl. piping		kPa	8	
		psi	1,16	
Charge air pressure (After charge air cooler)		kPa	248	
		psi	35,97	
Standard charge air cooler core area		m <sup>2</sup>	0,89	
		foot <sup>2</sup>	9,58	

### Cooling performance

Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% antifreeze (radiator and cooling fan with **standard fan ratio 0.99**, see optional equipment)

Engine speed rpm	Air on temp °C	PRIME POWER		STANDBY POWER	
		Air flow kg/s	External restriction Pa	Air flow kg/s	External restriction Pa
1800	40	4,7	1380	5,1	1270
	50	6,3	800	6,5	710
	55	7,1	480	7,4	350
	59	-	-	8,3	0
	60	7.7	120		
	61	8,3	0		

Note! Calculated values >0 Pa

Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% antifreeze (radiator and cooling fan with **optional fan ratio 0,84**, see optional equipment)

Engine speed rpm	Air on temp °C	PRIME POWER		STANDBY POWER	
		Air flow kg/s	External restriction Pa	Air flow kg/s	External restriction Pa
1800	40				
	50				
	54			7,5	0
	56	7,5	0		

Note! Calculated values >0 Pa

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## Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronus / Droop	Isochronus
Governor droop	0-8 %	4%
Governor response	Adjustable PID-constants (VODIA)	Standard
Dual speed	NO	1800
Idle speed	600-1200	900
Fine speed adjustment	± 120	0
Stop function	Energized to Run / Stop	Energized to Stop
Preheating function	On / Off	On
Lamp test	On / Off	On

Engine protection		Alarm level		Engine protection	
Parameter	Unit	Setting range	Default setting	Level	Action. Default/Alternative
Oil temp	°C	120 - 130	125	Setting +5	Shut down. ON/OFF*
Oil pressure	Low idle	kPa	-	120	Shut down. ON/OFF*
	1800 rpm	kPa	-	270	Shut down. ON/OFF*
Oil level		-	Min level	-	-
Piston cooling pressure >1000 rpm	kPa	-	150	150	Shut down. ON/OFF*
Coolant temp	°C	95-103	102	Setting +5	Shut down. ON/OFF*
Coolant level		-	On	Low level	Shut down. ON/OFF*
Fuel feed pressure	Low idle	kPa	-	150	-
	>1400 rpm		-	300	-
Water in fuel		-	High level	-	-
Crank case pressure	kPa	-	Increased pressure	Increased pressure	Shut down. ON/OFF*
Air filter pressure droop	kPa	-	5	-	-
Altitude, above sea	m	-	-	-	Automatic derating, see section derating
Charge air temp	°C	-	80	85	Shut down. ON/OFF*
Charge air pressure	kPa	-	310	320	Shut down. ON/OFF*
Engine speed	rpm	100 - 120% of rated speed	120%	Alarm level	Shut down. ON/OFF*

\* Off means no shut down, alarm only

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<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		5,3 : 1	
Starter motor	make		Melco	
	type		105 P70	
	kW		7,0	
Number of teeth on:	flywheel		153	
	starter motor		12	
Max wiring resistance main circuit		mΩ	2	
Cranking current at +20°C		Amp	280	
Crank engine speed at 20°C		rpm	155	
Starter motor battery capacity:	max	Ah/A	2x225	
	min at +5°C	Ah/A	-	
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>
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		0,91:1/clockwise		
Timing gear at servo pump PTO max:		Nm lbft	100 74	
Speed ratio direction of rotation viewed from flywheel side		1,58:1/clockwise		
Max allowed bending moment in flywheel housing		Nm lbft	15000 11063	
Max. rear main bearing load		N lbf	4000 899,2	