

Technical data TAD940GE

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	9,36 571,4
Firing order			1-5-3-6-2-4
Bore		mm in	120 4,72
Stroke		mm in	138 5,43
Compression ratio			20,2
Dry weight	Engine only, excluding cooling system	kg lb	1015 2238
	GenPac	kg lb	1354 2985
Wet weight	Engine only, excluding cooling system	kg lb	1065 2348
	GenPac	kg lb	1404 3095

Performance		r/min	1500	1800
Standby Power	without fan	kW hp	277 377	294 400
	with fan	kW hp	267 363	276 375
Prime Power	without fan	kW hp	252 343	267 363
	with fan	kW hp	242 329	249 339
Torque at:	Standby Power	Nm lbft	1763 1301	1560 1150
	Prime Power	Nm lbft	1604 1183	1416 1045
Mean piston speed		m/s ft/sec	6,9 22,7	8,3 27,2
Effective mean pressure at:	Standby Power	MPa psi	2,4 343	2,1 304
Effective mean pressure at:	Prime Power	MPa psi	2,2 312	1,9 276
Max combustion pressure at:	Standby Power	MPa psi	18 2611	19,8 2872
Max combustion pressure at:	Prime Power	MPa psi		
Total mass moment of inertia, J (mR2)		kgm ² lbft ²	2,60 61,7	
Degree of irregularity at:	Standby Power		1:40	1:69
Friction Power		kW hp	28 38,08	38 51,68

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 Lw	No load	dB(A)	108,2	109,6
	Standby Power	dB(A)	110,3	112,1
		dB(A)	110,1	111,9

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Unsilenced exhaust noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m

	r/min	1500	1800
Standby Power	dB(A)	113	117
Prime Power	dB(A)	113	116

Test conditions for load acceptance data

Warm engine.	Generator	Modell	Type of AVR
	Stamford	HCI444F	SX440 AVR

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	NA	1,5	NA	0,8	20-100	NA	15,7	NA	7,4
0-40	NA	3,1	NA	1,5	40-100	NA	8,1	NA	5,9
0-55	NA	6,8	NA	1,9	55-100	NA	5,5	NA	5,1
0-60	NA	9,1	NA	3,1	60-100	NA	4,3	NA	4,9
0-x	10,0		NA		x-100	NA		NA	
0-x		10,0	NA		x-100	NA		NA	
100-0		3,4	NA	1,3		NA		NA	

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	NA	1,8	NA	1,7	20-100	NA	5,6	NA	5,0
0-40	NA	2,7	NA	1,5	40-100	NA	3,9	NA	4,2
0-60	NA	4,2	NA	1,8	60-100	NA	2,4	NA	3,2
0-75	NA	6,7	NA	6,8	75-100	NA	1,9	NA	2,1
0-83	NA	10,0	NA	9,4	83-100	NA	1,2	NA	1,7
0-x	10,0		NA		x-100	NA		NA	
0-x		10,0	NA		x-100	NA		NA	
100-0			NA			NA		NA	

Cold start performance

		r/min	1500	1800	
Time from start to no load speed at ambient temperature:	°C	15	s	4,5	5,1
		0	s	6,0	6,8
		-20*	s	12,5	14,3
Time from start to stay within 0.5% of no load speed at ambient temperature:	°C	15	s	4,5	5,1
		0	s	6,0	6,8
		-20*	s	12,5	14,3

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

Usage of manifold heater:	Time preheating	Time postheating		
	25 sec	100 sec		
Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
Block mounted	Calix	1,5 kW		

Derating

The engine may be operated up to 1500m altitude without derating. For operations at higher altitudes the power will be derated according to graph in the diagram section. There is no derating for ambient temperature or humidity.

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Lubrication system

		r/min	1500	1800
Lubricating oil consumption	Standby Power	liter/h US gal/h	0,03 0,009	0,04 0,009
	Prime Power	liter/h US gal/h	0,03 0,008	0,03 0,008
Oil system capacity including filters		liter US gal	40 10,6	
Oil sump capacity:	max	liter US gal	35 9,2	
	min	liter US gal	28 7,4	
Oil change intervals/specifications:	VDS-2*	h	600	
	VDS, ACEA, E3*	h	400	
	ACEA E2, API CD, CF, CF-4, CG-4*	h	250	
Engine angularity limits:	front up	°	30	
	front down	°	30	
	side tilt	°	30	
Oil pressure at rated speed		kPa psi	350 - 600 51 - 87	
Lubrication oil temperature in oil sump:	max	°C	125	
		°F	257	
Oil filter micron size		mm	0,040	

* See also general section in the sales guide

Fuel system

		r/min	1500	1800
Standby Power Specific fuel consumption at:	25%	g/kWh lb/hph	227 0,368	239 0,388
	50%	g/kWh lb/hph	203 0,329	210 0,341
	75%	g/kWh lb/hph	197 0,319	202 0,328
	100%	g/kWh lb/hph	204 0,330	204 0,330
Prime Power Specific fuel consumption at:	25%	g/kWh lb/hph	230 0,373	242 0,392
	50%	g/kWh lb/hph	206 0,334	214 0,347
	75%	g/kWh lb/hph	197 0,319	203 0,329
	100%	g/kWh lb/hph	201 0,326	205 0,332

Fuel system

		r/min	1500	1800
Fuel to conform to		ASTM-D975-No1 and 2-D JIS KK 2204, EN 590		
System return flow	liter/h	36		
	US gal/h	9,5		
System supply flow at rated speed	liter/h	108,0		
	US gal/h	28,5		
Fuel supply line max restriction	kPa	10,0		
	psi	1,5		
Fuel supply line max pressure, engine stopped	kPa	0,0		
	psi			
Fuel return line max restriction	kPa	20,0		
	psi	2,9		
Maximum allowable inlet fuel temp	°C	50		
	°F	122		
Prefilter / Water separator		mm	0,005	
Governor type/make, standard		EMS2		
Injection pump type/make		Unit injector / Delphi		

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Intake and exhaust system		r/min	1500	1800
Air consumption at:	Standby Power	m ³ /min cfm	20,0 705	23,2 820
	Prime Power	m ³ /min cfm	18,1 638	21,7 765
Air intake restriction, clean filter(s)		kPa in wc	2 8,0	2 8,0
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:	Standby Power	kW BTU/min	216 12284	223 12682
	Prime Power	kW BTU/min	NA NA	NA NA
Exhaust gas temperature after turbine at:	Standby Power	°C °F	488 910	429 804
	Prime Power	°C °F	NA NA	NA NA
Max allowable back pressure in exhaust line		kPa In wc	10 40,2	10 40,2
Exhaust gas flow at:	Standby Power	m ³ /min cfm	49,6 1750	52,7 1862
	Prime Power	m ³ /min cfm	NA NA	NA NA

Cooling system		r/min	1500	1800
Heat rejection radiation from engine at:	Standby Power	kW BTU/min	NA	NA
	Prime Power	kW BTU/min	NA	NA
Heat rejection to coolant at:	Standby Power	kW BTU/min	120 6824	124 7052
	Prime Power	kW BTU/min	113 6426	116 6597
Coolant	Volvo coolant or Volvo anticorrosion additive together with clean fresh water			
Radiator cooling system type		Closed circuit		
Standard radiator core area		m ² foot ²	0,8 8,61	
Standard radiator core thickness		mm in	52 2,05	
Fan diameter		mm in	890 35,04	
Fan power consumption		kW hp	10 14	18 24
Fan drive ratio		1:1,01		
Coolant capacity,	engine	liter US gal	17 4,49	
	std radiator with hoses	liter US gal	24 6,34	
Coolant pump		drive/ratio	belt/1,50:1	
Coolant flow with standard system		l/s US gal/s	5,5 1,45	6,5 1,72
Minimum coolant flow		l/s US gal/s	5,3 1,40	6,2 1,64
Maximum external coolant system restriction, including piping		kPa in wc	50 201	55 221
Thermostat	start to open	°C	82	

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		°F	180
	fully open	°C	92
		°F	198
Maximum static pressure head (expansion tank height + pressure cap setting)		kPa	100
		in wc	402
Minimum static pressure head (expansion tank height + pressure cap setting)		kPa	70
		in wc	281
Standard pressure cap setting		kPa	70
		in wc	281
Maximum top tank temperature		°C	103
		°F	217
Minimum temperature entering engine		°C	68
		°F	154
Draw down capacity	10% of total cooling system capacity		

Intercooler system		r/min	1500	1800
Cooling power	Standby Power	kW	52	66
		BTU/min	2957	3753
	Prime Power	kW	44	58
		BTU/min	2502	3298
Combustion air mass flow	Standby Power	kg/s	0,39	0,47
	Prime Power	kg/s	0,36	0,44
Combustion air inlet temp.	Standby Power	°C	204	193
		°F	399	379
	Prime Power	°C	180	190
		°F	356	374
Combustion air outlet temp.	Standby Power	°C	55	58
		°F	132	136
	Prime Power	°C	54	56
		°F	128	132
Maximum pressure droop over intercooler, incl. piping		kPa	5	
		psi	0,73	
Boost pressure		kPa	230	
		psi	33,36	
Standard intercooler core area		m ²	0,89	
		foot ²	9,58	
Standard intercooler core thickness		mm	68	
		in	2,68	

Cooling performance Fan ratio 1:1,01

Cooling air flow and 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	PRIME POWER		STANDBY POWER	
		Air flow kg/s	External restriction Pa	Air flow kg/s	External restriction Pa
1500	30	3,4	1280	3,6	1240
	40	3,9	1150	4,1	1090
	50	4,6	930	4,9	850
	55	5,0	760	5,4	650
	60	5,7	530	6,1	380
	65	-	-	7,0	0
1800	67	7,0	0		
	30	3,9	1930	4,3	1860
	40	4,4	1760	4,8	1680
	50	5,2	1490	5,6	1370
	55	5,7	1280	6,2	1120
	60	6,4	1010	7,0	780
	67	-	-	8,6	0
70	8,6	0			

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Cooling performance Fan ratio 1:0,9

Cooling air flow and 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	PRIME POWER		STANDBY POWER	
		Air flow kg/s	External restriction Pa	Air flow kg/s	External restriction Pa
1500	30	3,4	950	3,5	910
	40	3,8	830	4,0	770
	50	4,5	620	4,8	540
	55	5,0	460	5,3	350
	60	5,6	230	6,0	90
	61	-	-	6,2	0
	64	6,2	0		
1800	30	3,9	1450	4,2	1380
	40	4,4	1290	4,7	1210
	50	5,1	1030	5,5	910
	55	5,6	830	6,1	680
	60	6,3	560	6,9	350
	64	-	-	7,7	0
	67	7,7	0		

Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronous/droop Switchable during operation	Isochronous
Governor droop	0 - 8%	0 % (4 % when switched)
Governor response	NA	NA
Dual speed	1500 / 1800 rpm	According to customer
Idle speed	600 - 1200 rpm	900 rpm
Fine speed adjustment	NA	±120 rpm
Stop function	Energized to run / stop	Energized to stop
Preheating function	On ignition / Preheat on request	Preheat on request
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 +3	Shut down.	ON/OFF
Oil pressure	Low idle	kPa	NA	130	Shut down.	ON/OFF
	1500 rpm	kPa	NA	220	Shut down.	ON/OFF
	1800 rpm	kPa	NA	300	Shut down.	ON/OFF
Oil level		NA	Low level	NA	NA	NA
Piston cooling pressure >1000 rpm	kPa	NA	NA	NA	NA	NA
Coolant temp	°C	95 - 103	98	Setting +5	Shut down.	ON/OFF
Coolant level		NA	Low level	Low level	Shut down.	ON/OFF
Fuel feed pressure	Low idle	kPa	NA	150	NA	NA
	>1400 rpm		NA	300	NA	NA
Water in fuel		NA	Water in fuel	NA	NA	NA
Crank case pressure	kPa	NA	Increased pressure	Increased pressure	Shut down.	ON/OFF
Air filter pressure droop	kPa	NA	NA	NA	NA	NA
Altitude, above sea	m	NA		>1500	Automatic derating,	see section derating
Charge air temp	°C	NA	87	+5	Shut down.	ON/OFF
Charge air pressure	kPa	NA	380	380	Shut down.	ON/OFF
Engine speed	rpm	100 - 120% of rated speed	120% of rated speed	Alarm level	Shut down.	OFF/ON

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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		4,5	
Starter motor	make		Melco	
	type		90P55	
	kW		5,5	
Starter motor solenoid,	pull current	Amp	N/A	
	hold current	Amp	2	
Number of teeth on:	flywheel		153	
	starter motor		11	
Inrush current at +20°C		Amp	1000	
Cranking current at +20°C		Amp	428	
Crank engine speed at 20°C		rpm	140	
Starter motor battery capacity:	max	Ah	2x225 700A DIN	
	min at +5°C	Ah	2x170 600A DIN	
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	TVC necessary	
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW	53	54
		hp	72	73
	max down	kW	248	300
		hp	337	408
	max right	kW	43	69
		hp	58	94
Timing gear at compressor PTO max:		Nm lbft	150 111	
Speed ratio direction of rotation viewed from flywheel side		1,29:1/clockwise		
Speed ratio direction of rotation viewed from flywheel side		1,58:1/clockwise		
Speed ratio direction of rotation viewed from flywheel side				
Max allowed bending torque in flywheel housing		Nm lbft	7000 5163	
Max. rear main bearing load		N lbf	3000 674,4	