Technical data TAD1640GE

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	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			17,5:1
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 hp	401 545	445 605
	with fan	kW hp	392 533	430 585
Standby Power	without fan	kW hp	440 598	494 672
	with fan	kW hp	431 586	479 651
Torque at:	Prime Power	Nm lbft	2553 1883	2361 1741
	Standby Power	Nm lbft	2801 2066	2621 1933
Mean piston speed		m/s ft/sec	8,3 27,1	9,9 32,6
Effective mean pressure at:	Prime Power	MPa psi	2,0 289	1,8 267
Effective mean pressure at:	Standby Power	MPa psi	2,2 317	2,0 296
Max combustion pressure at:	Prime Power	MPa psi	15 2176	16,2 2350
Max combustion pressure at:	Standby Power	MPa psi	16,1 2335	17,2 2495
Total mass moment of inertia, J (mR2)		kgm^2 $lbft^2$	4,20 99,7	
Degree of irregularity at:	Prime Power		1:52	1:97
Friction Power		kW hp	38 51,68	55 74,8

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.

Technical data TAD1640GE

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)	110,3	112
	Prime Power	dB(A)	114,4	115,8
	Standby Power	dB(A)	115	116,7
Calculated sound pressure Lp at 1 m	No load	dB(A)	98,3	100
	Prime Power	dB(A)	102,4	103,8
	Standby Power	dB(A)	103	104,7

Unsilenced exhaust noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m	**r/min**	**1500**	**1800**
Prime Power	dB(A)	115	119
Standby Power	dB(A)	115	119

Test conditions for load acceptance data

Warm engine.	Generator	Modell	Type of AVR
	Stamford	HCI 544 C14	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	2,3	2,5	1,6	1,7	20-100	15,4		3,7	
0-40	4,4	5,3	1,8	1,8	20-100		18,8		23,2
0-60	7,5	9,1	2,4	2,5	40-100	9,3	12,7	3,2	8,6
0-63		9,5		3,0	60-100	4,1	8,4	2,2	3,9
0-70	9,8		3,0		63-100		7,5		3,6
0-80	14,2	18,1	3,2	3,3	70-100	3,3		2,0	
0-100		29,5		7,1	80-100	2,1	2,5	1,8	1,8
0-100	24,7		4,6						
100-0	8,4	9,2	1,6	2,0					

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	1,6	1,8	1,6	1,7	20-100	7,0	9,1	2,9	5,4
0-40	2,9	3,6	2,0	2,1	40-100	5,8	6,8	2,5	3,7
0-60	5,1	5,8	2,0	2,1	60-100	3,1	3,9	2,2	2,3
0-80	6,9	7,8	2,3	2,4	80-100	1,5	1,7	1,8	2,9
0-90		9,5		3,2	90-100		1,2		3,0
0-100	9,2	12,6	3,1	4,9					
100-0	5,8	7,0	1,8	1,9					

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	6,3	8,2
		5	s	6,1	8,3
		-15*	s	7,0	9,5
Time from start to stay within 0.8% of no load speed at ambient temperature:	°C	20	s	5,1	7,0
		5	s	5,6	7,6
		-15*	s	6,5	9,0

* 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	1,6

Ambient temp °C	Block heater type and Make	Power kW	Engaged hours	Cooling water temp engine block, °C.
-15	External Volvo	2	12	17

Technical data TAD1640GE

Lubrication system			**r/min**	**1500**	**1800**
Lubricating oil consumption	Prime Power		liter/h	0,10	0,10
			US gal/h	0,026	0,026
	Standby Power		liter/h	0,10	0,11
			US gal/h	0,026	0,029
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**
Prime Power	25%	g/kWh	227	245
Specific fuel consumption at:		lb/hph	0,368	0,397
	50%	g/kWh	203	210
		lb/hph	0,329	0,340
	75%	g/kWh	198	202
		lb/hph	0,320	0,327
	100%	g/kWh	200	202
		lb/hph	0,323	0,328
Standby Power	25%	g/kWh	221	234
Specific fuel consumption at:		lb/hph	0,359	0,379
	50%	g/kWh	201	206
		lb/hph	0,325	0,334
	75%	g/kWh	197	201
		lb/hph	0,319	0,326
	100%	g/kWh	202	206
		lb/hph	0,327	0,334

Technical data TAD1640GE

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 US gal/h	25 6,6	
System supply flow at rated speed	liter/h US gal/h	165 44	180 48
Fuel supply line max restriction	kPa psi	10,0 1,5	
Fuel supply line max pressure, engine stopped	kPa psi	0,0 0,0	
Fuel return line max restriction	kPa psi	20,0 2,9	
Maximum allowable inlet fuel temp	°C °F	60 140	
Prefilter / Water separator	mm	0,010	
Governor type/make, standard	Volvo / EMS2		
Injection pump type/make	Delphi E1		

Intake and exhaust system			**r/min**	**1500**	**1800**
Air consumption at:	Prime Power	25°C 77°F	m^3/min cfm	31,7 1119	39,7 1402
	Standby Power	25°C 77°F	m^3/min cfm	36,2 1278	42,6 1504
Air intake restriction, clean filter(s)			kPa in wc	1,1 4,4	1,7 6,8
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:		Prime Power	kW BTU/min	299 17004	319 18141
		Standby Power	kW BTU/min	335 19051	381 21667
Exhaust gas temperature after turbine at:		Prime Power	°C °F	452 846	408 766
		Standby Power	°C °F	456 853	444 831
Max allowable back pressure in exhaust line			kPa In wc	10 40,2	10 40,2
Exhaust gas flow at:		Prime Power	m^3/min cfm	74,8 2642	86,9 3069
		Standby Power	m^3/min cfm	85,4 3016	98,0 3461

Technical data TAD1640GE

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	22 1251
Heat rejection to coolant at:	Prime Power		kW BTU/min	158 8985	176 10009
	Standby Power		kW BTU/min	166 9440	188 10691
Coolant	Volvo coolant or Volvo anticorrosion additive together with clean fresh water				
Radiator cooling system type			Closed circuit		
Standard radiator core area			m² foot²	1,3 13,99	
Standard radiator core thickness			mm in	68 2,68	
Fan diameter			mm in	890 35,04	
Fan power consumption			kW hp	9 12	15 20
Fan drive ratio				0,97 : 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 2,03
Minimum coolant flow			l/s US gal/s	6,4 1,69	7,7 2,03
Maximum external coolant system restriction, including piping			kPa in wc	50 201	70 281
Thermostat	start to open		°C °F	86 187	
	fully open		°C °F	96 205	
Maximum static pressure head (expansion tank height + pressure cap setting)			kPa in wc	100 402	
Minimum static pressure head (expansion tank height + pressure cap setting)			kPa in wc	70 281	
Standard pressure cap setting			kPa in wc	75 301	
Maximum top tank temperature			°C °F	103 217	
Draw down capacity	4% of total cooling system capacity				

Technical data TAD1640GE

Intercooler system		**r/min**	**1500**	**1800**
Cooling power	Prime Power	kW	81	112
		BTU/min	4606	6369
	Standby Power	kW	99	129
		BTU/min	5630	7336
Combustion air inlet temp. (Charge air temp after turbo compressor)	Prime Power	°C	180	197
		°F	356	387
	Standby Power	°C	198	215
		°F	388	419
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	15
		psi	1,5	2,2
Boost pressure		kPa	232	231
		psi	33,6	33,5
Standard intercooler core area		m²	1,32	
		foot²	14,21	
Standard intercooler core thickness		mm	52	
		in	2,05	

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	Air on	PRIME POWER		STANDBY POWER	
rpm	temp	Air mass flow	External restriction	Air mass flow	External restriction
	°C	kg/s	Pa	kg/s	Pa
1500	40	4,0	751	4,5	612
	45	4,5	626	5,0	467
	50	5,0	471	5,6	291
	55	5,7	280	6,4	107
	58			6,9	0
	60	6,5	79		
	62	6,9	0		
1800	40	4,8	1110	5,5	903
	45	5,4	934	6,1	701
	50	6,1	712	6,8	456
	55	6,9	448	7,8	186
	58			8,6	0
	60	8	150		
	62	8,6	0		

Technical data TAD1640GE

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

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,
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.

Technical data TAD1640GE

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	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	

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	NA	