Technical data TWD740GE

General

In-line four stroke diesel engine with direct injection
Turbo charged and water to air intercooled
Rotation direction, anti-clockwise viewed towards flywheel

Dry weight	Engine*) only 795 kg / 1753 lb GenPac 1095 kg / 2414 lb
Wet weight	Engine*) only 835 kg / 1841 lb GenPac 1158 kg / 2553 lb

*) Incl. intercooler

Number of cylinders	6
Displacement, total	7.28 liter / 445 in^3
Firing order	1-5-3-6-2-4
Bore	107 mm / 4.21 in
Stroke	135 mm / 5.31 in
Compression ratio	17.2:1

TWD740GE	**Speed, rpm**	**1500**	**1800**
Performance	Test no.	24001179	24001169
Prime Power			
without fan	kW / hp	186 / 253	215 / 292
with fan	kW / hp	181 / 246	207 / 281
Standby Power			
without fan	kW / hp	204 / 277	236 / 321
with fan	kW / hp	199 / 270	228 / 310
Torque at			
Prime Power	Nm / lbft	1184 / 874	1140 / 841
Standby Power	Nm / lbft	1299 / 958	1252 / 924
Mean piston speed	m/s / ft/sec	6.5 / 21.3	7.8 / 25.6
Effective mean pressure at Prime Power	MPa / psi	2.0 / 290	2.0 / 290
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	1.7 / 40.3	
Max combustion pressure at			
Prime Power	MPa / psi	14.3 / 2084	14.2 / 2069
Residual speed droop at load increase from 0 to 100%	%	≤ 5	≤ 5
Friction Power	kW	17	24

Engine noise emission

Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

Measured sound power Lw			
No load	dB(A)	99.3	101.3
Prime Power	dB(A)	108.3	110.0
Standby Power	dB(A)	108.3	110.3
Calculated sound pressure Lp at 1 m			
No load	dB(A)	92.4	94.3
Prime Power	dB(A)	100.8	102.5
Standby Power	dB(A)	100.8	102.8

Unsilenced exhaust noise

Data calculated as sound pressure Lp
Assumed microphone distance 1m

Prime power	dB(A)	112	116
Standby power	dB(A)	112	116

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

Single step load performance at 1500 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0-20	2.4	2.7	0.6	0.7	20-100	> 15	> 15	2.0	2.3
0-40	5.0	5.5	0.7	0.8	40-100	12.2	13.5	1.1	1.2
0-58		10.0		1.2					
0-60	9.7	12.7	0.9	1.3	60-100	6.4	7.5	1.0	1.1
0-64	10.0		1.1						
0-80	> 15	> 15	2.0	2.2	80-100	2.7	3.0	1.0	1.1
100-0	10.7	11.5	0.5	0.5					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0-20	2.1	2.4	0.3	0.4	20-100	11.0	12.5	0.8	0.9
0-40	3.9	4.1	0.4	0.5	40-100	6.1	6.7	0.7	0.8
0-60	6.0	6.9	0.7	0.9	60-100	2.1	3.6	0.7	0.8
0-70		10.0		1.0					
0-77	10.0		1.0						
0-80	10.5	14.7	1.1	1.1	80-100	1.7	2.2	0.8	0.9
100-0	6.9	8.0	0.6	0.7					

Prime = based on Prime Power rating. St-by = based on Standby Power rating.

TWD740GE	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	4.7	4.8
+5°C ambient temperature	s	6.8	7.0
-15°C ambient temperature*	s	9.8	13.2
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	4.7	4.8
+5°C ambient temperature	s	6.8	7.0
-15°C ambient temperature*	s	9.8	13.2

* With manifold heater engaged, lubricating oil 15 W/40

Derating	
The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating. For operation at higher altitudes and temperatures the power should be derated according to the following factors:	
Altitude derating factor <3000 m	4% / 500 m
Altitude derating factor >3000 m	6% / 500 m
Ambient temperature derating factor	1.5% / 5°C
Humidity	No derating

TWD740GE	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	liter/h / US gal/h	0.03 / 0.008	0.05 / 0.013
Standby Power	liter/h / US gal/h	0.04 / 0.011	0.06 / 0.016
Recommended lubricating oil, see general section in this sales guide			
Oil system capacity including filters	liter / US gal	29 / 7.7	
Oil sump capacity			
max	liter / US gal	24 / 6.3	
min	liter / US gal	16 / 4.2	
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	degrees	16	
front down	degrees	40	
side tilt	degrees	40	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	110	
max	°C	120	
Oil filter micron size	mm	0.040	

* See also general section in this sales guide

Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	237 / 0.384	247 / 0.400
50% of Prime Power	g/kWh / lb/hph	211 / 0.342	218 / 0.353
75% of Prime Power	g/kWh / lb/hph	205 / 0.332	207 / 0.335
100% of Prime Power	g/kWh / lb/hph	203 / 0.329	207 / 0.335
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	234 / 0.379	246 / 0.399
50% of Standby Power	g/kWh / lb/hph	210 / 0.340	213 / 0.345
75% of Standby Power	g/kWh / lb/hph	203 / 0.329	207 / 0.335
100% of Standby Power	g/kWh / lb/hph	203 / 0.329	208 / 0.337
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	liter/h / US gal/h	115 / 30.4	130 / 34.3
Feed pump pressure	kPa	100-150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Electronic / GAC	
Injection pump type/make		P 3000 / Bosch	
Injection timing	° B.T.D.C.	10	
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	11.6 / 410	16.1 / 569
Standby Power, (at 27°C)	m^3/min / cfm	12.5 / 441	17.2 / 607
Air intake restriction, clean filter(s)	kPa / In wc	0.8 / 3.2	1.2 / 4.8
Max allowable air intake restriction	kPa / In wc	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	141 / 7995	169 / 9582
Standby Power	kW / BTU/min	156 / 8845	190 / 10773
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	525 / 977	528 / 982
Standby Power	°C / °F	540 / 1004	555 / 1031
Max allowable back-pressure in exhaust line	kPa / In wc	10 / 40	
Exhaust gas flow at			
Prime Power	m^3/min / cfm	31.0 / 1095	39.3 / 1388
Standby Power	m^3/min / cfm	33.5 / 1183	42.8 / 1511

TWD740GE	Speed, rpm	1500	1800
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	11 / 624	13 / 737
Standby Power	kW / BTU/min	12 / 680	14 / 794
Heat rejection to coolant at			
Prime Power	kW / BTU/min	107 / 6085	123 / 6995
Standby Power	kW / BTU/min	118 / 6711	134 / 7621
Recommended coolant		Volvo coolant or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	0.80	
Radiator core thickness (std size)	mm	73	
Fan diameter	mm	750	
Fan power consumption	kW / hp	5 / 7	8 / 11
Fan drive ratio		1.01:1	
Coolant capacity			
engine	liter	15.9	
std radiator with hoses	liter	26	
Coolant pump	drive/ratio	gear / 1.30:1	
Coolant flow with standard system	l/s	3.4	4.1
Minimum coolant flow	l/s	2.8	3.1
Maximum external coolant system restriction	kPa	32	45
Thermostat			
starts to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

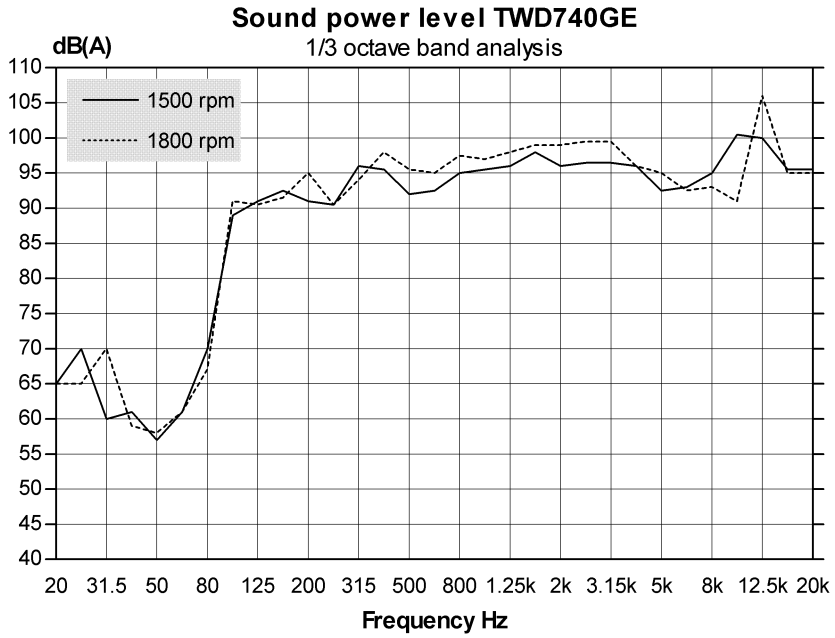
Cooling performance

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 103°C TTT and 50% antifreeze.

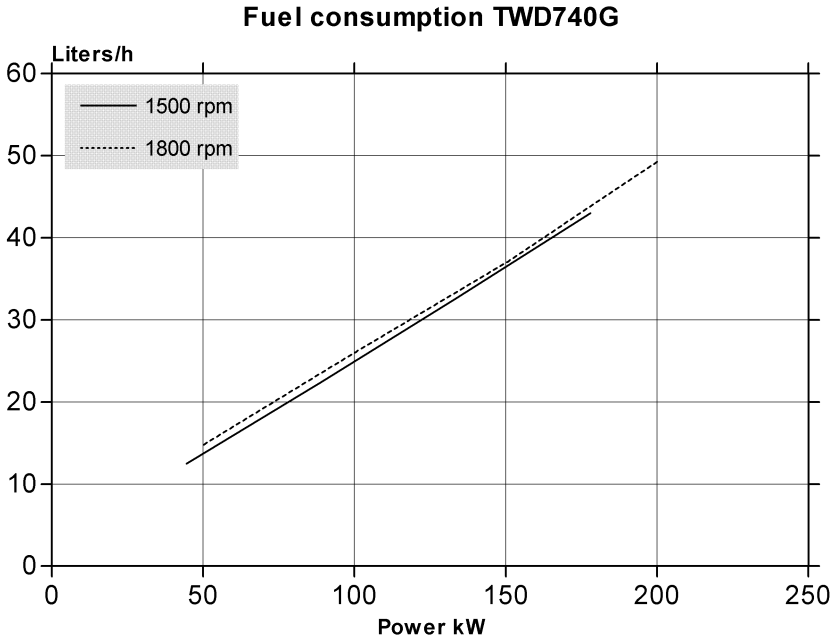
Engine speed rpm	Air on temp °C	110% of PRIME POWER Air flow m^3/s	Max additional external restriction Pa	STANDBY POWER Air flow m^3/s	Max additional external restriction Pa
1500	30	1.8	850		
	40	2.2	700		
	50	2.8	525		
	55	3.3	300		
	62	4.2	0		
1800	30	2.1	1200		
	40	2.6	1050		
	50	3.3	800		
	55	3.8	600		
	64	5.4	0		

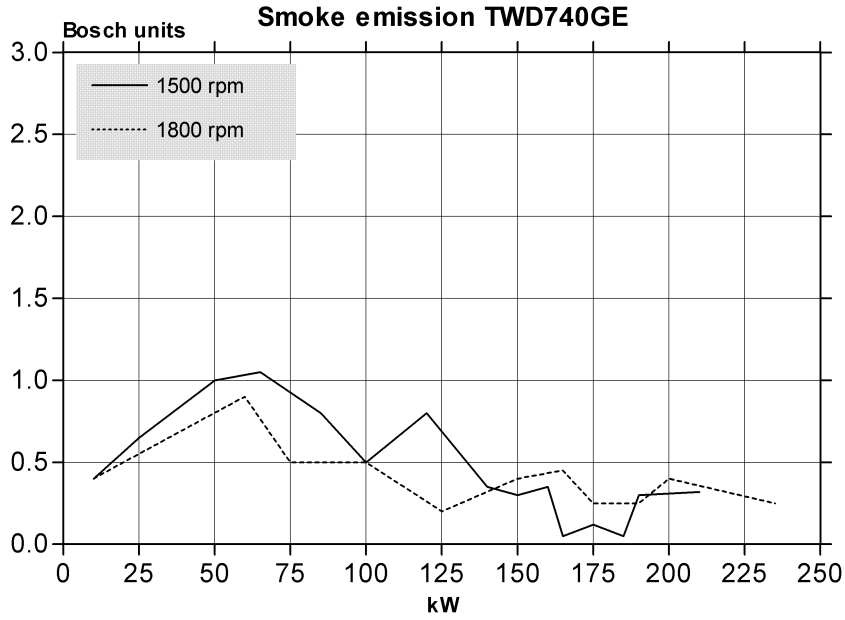
TWD740GE	Speed, rpm	1500	1800
Electrical system			
Voltage and type		24 V / insulated from earth	
Alternator make / output	Amp	Valeo / 60	
tacho output	Hz / alternator rev	6	
drive ratio		3.37:1	
Starter motor	make / type / kW	Bosch / KB / 5.4	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel	SAE 2 / SAE 1	140 / 156	
Number of teeth on starter motor	SAE 2 / SAE 1	9 / 11	
Inrush current at +20°C	Amp	800	
Cranking current at +20°C	Amp	330	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x143	
minimum at > +5°C	Ah	2x70	
Stop solenoid			
pull current	Amp	–	
hold current	Amp	–	
Inlet manifold heater (at 20 V)	kW	3.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 420	
Front end belt pulley load:			
Direction of load viewed from flywheel side:			
left	kW	max 16	max 22
down	kW	max 23	max 24
right	kW	max 12	max 21
Timing gear at compressor PTO	Nm	max 110	
speed ratio direction of rotation viewed from flywheel side		0.91:1 / clockwise	
Timing gear at servo pump PTO	Nm	max 38	
speed ratio direction of rotation viewed from flywheel side		1.58:1 / clockwise	

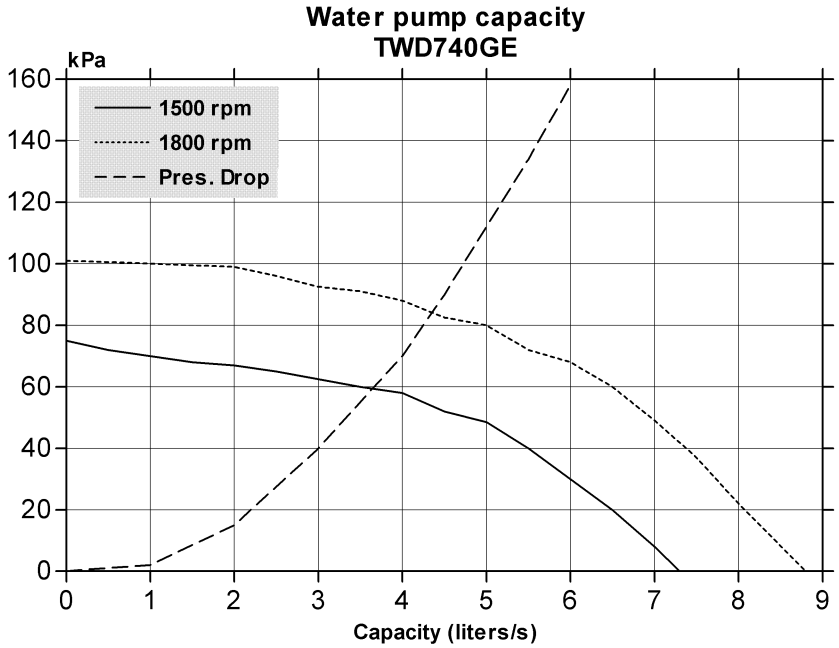
Test standards: ISO 3744-1981 (E) sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)



Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/liter (7.01 lb/US gal.)




Smoke emission TWD740GE
Bosch units
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1500 rpm
1800 rpm
0
25
50
75
100
125
150
175
200
225
250
kW


Water pump capacity
TWD740GE
kPa
160
140
120
100
80
60
40
20
0
1500 rpm
1800 rpm
Pres. Drop
0
1
2
3
4
5
6
7
8
9
Capacity (liters/s)