Technical data TWD710G

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	6.73 liters / 411 in^3
Firing order	1-5-3-6-2-4
Bore	104.77 mm / 4.12 in
Stroke	130 mm / 5.12 in
Compression ratio	14.5:1

TWD710G	Speed, rpm	1500	1800
Performance	Test number		
Prime Power			
without fan	kW / hp	160 / 218	169 / 230
with fan	kW / hp	158 / 215	166 / 225
Continuous Standby Power			
without fan	kW / hp	165 / 224	182 / 248
with fan	kW / hp	163 / 222	179 / 243
Standby Power			
without fan	kW / hp	181 / 246	199 / 271
with fan	kW / hp	179 / 243	196 / 266
Torque at			
Prime Power	Nm / lbft	1019 / 755	896 / 641
Standby Power	Nm / lbft	1150 / 848	1060 / 782
Mean piston speed	m/s / ft/sec	6.5 / 21.3	7.8 / 25.6
Effective mean pressure at Prime Power	MPa / psi	1.9 / 275	1.7 / 247
Max combustion pressure at Prime Power	MPa / psi	12.9 / 1875	12.5 / 1810
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	1.63 / 38.7	
Degree of irregularity at Prime Power		1:54	1:102
Residual speed droop at load increase from 0 to 100%	%	≤ 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)	–	–
Prime Power	dB(A)	107.4	109.0
Standby Power	dB(A)	107.9	109.4
Calculated sound pressure Lp at 1 m			
No load	dB(A)	–	–
Prime Power	dB(A)	95.4	97.0
Standby Power	dB(A)	95.9	97.4
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	110	114
Standby power	dB(A)	111	115

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	2.0	2.8	1.1	2.0	20–100				
0–40	6.2	8.1	1.1	2.4	40–100				
0–50		10.0		2.6	50–100				
0–60	10.0		2.6		60–100	3.4		1.2	
100–0	10.0	16.0	1.8	1.8					

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	1.4	1.6	0.5	0.8	20–100				
0–40	2.8	3.8	0.5	0.8	40–100				
0–60	4.5	4.7	0.5	0.8	60–100				
0–70		10.0		1.7	70–100		3.9		1.4
0–83	10.0		1.7		85–100				
100–0	7.3	9.0	0.8	0.9					

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

TWD710G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	4	4
0°C ambient temperature*	s	31	31
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	5	7
0°C ambient temperature*	s	33	35

* 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

TWD710G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	liter/h / US gal/h	0.17 / 0.045	0.19 / 0.050
Standby Power	liter/h / US gal/h	0.20 / 0.053	0.22 / 0.058
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	17 / 4.5	
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	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	240 / 0.389	251 / 0.407
50% of Prime Power	g/kWh / lb/hph	217 / 0.352	218 / 0.353
75% of Prime Power	g/kWh / lb/hph	209 / 0.339	209 / 0.339
100% of Prime Power	g/kWh / lb/hph	209 / 0.339	208 / 0.337
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	234 / 0.379	242 / 0.392
50% of Standby Power	g/kWh / lb/hph	213 / 0.345	214 / 0.347
75% of Standby Power	g/kWh / lb/hph	207 / 0.336	208 / 0.337
100% of Standby Power	g/kWh / lb/hph	206 / 0.333	210 / 0.340
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		Mechanical RSV/Bosch	
Injection pump type/make		P3000/Bosch	
Injection timing std	° B.T.D.C.	17	
Injection timing TA-luft setting	° B.T.D.C.	10	
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	10.0 / 353	12.9 / 456
Standby Power, (at 27°C)	m^3/min / cfm	11.5 / 406	14.3 / 505
Air intake restriction, clean filter	kPa / In wc	1.5 / 150	
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	115 / 6540	131 / 7450
Standby Power	kW / BTU/min	134 / 7620	152 / 8640
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	565 / 1050	495 / 923
Standby Power	°C / °F	590 / 1100	525 / 975
Max allowable back pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	28.2 / 996	33.2 / 1172
Standby Power	m^3/min / cfm	32.6 / 1153	37.6 / 1330

TWD710G	Speed, rpm	1500	1800
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	12 / 682	12 / 682
Standby Power	kW / BTU/min	14 / 796	13 / 739
Heat rejection to coolant at			
Prime Power	kW / BTU/min	95 / 5402	105 / 5971
Standby Power	kW / BTU/min	112 / 6370	131 / 7450
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	0.90	
Radiator core thickness (std size)	mm	73	
Fan diameter	mm	620	
Fan power consumption	kW / hp	2 /3	3 / 4
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			
start 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	

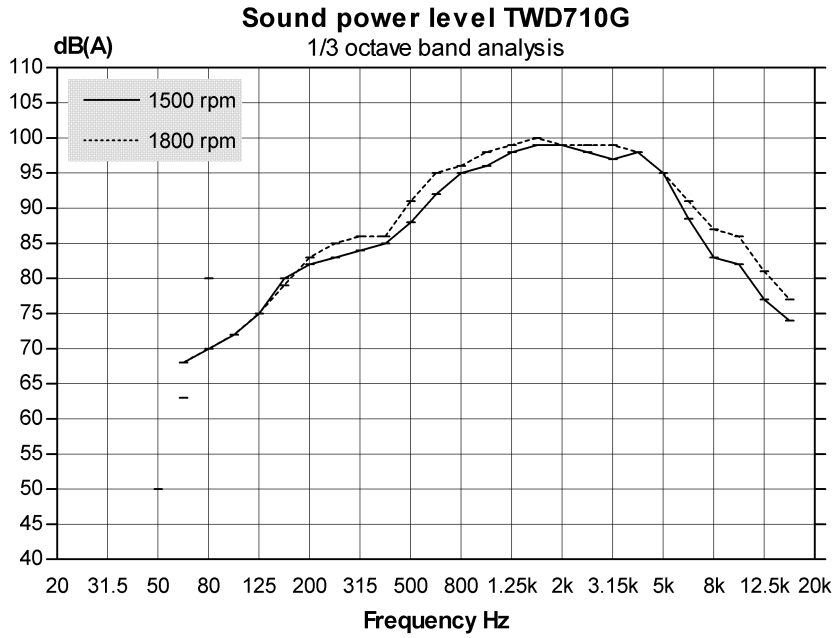
Cooling performance

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 103°C TTT and 50% antifreeze (radiator and cooling fan, see optional equipment).

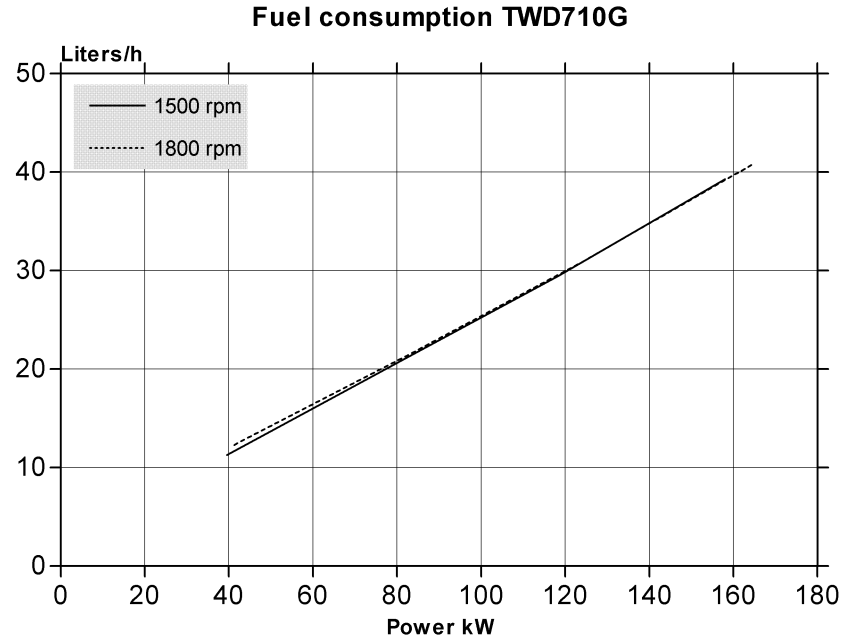
Engine speed rpm	Air on temp °C	110% OF PRIME POWER Air flow m^3/s	Max additional external restriction Pa	STANDBY POWER Air flow m^3/s	Max additional external restriction Pa
1500	30	1.9	350	2.0	350
	40	2.3	300	2.4	300
	50	3.0	175	3.2	150
	55	3.5	50	3.7	0
	57	3.8	0	–	–
1800	30	2.2	560	2.4	550
	40	2.7	500	3.0	450
	50	3.5	300	4.0	175
	54	4.0	120	4.5	0
	58	4.7	0	–	–

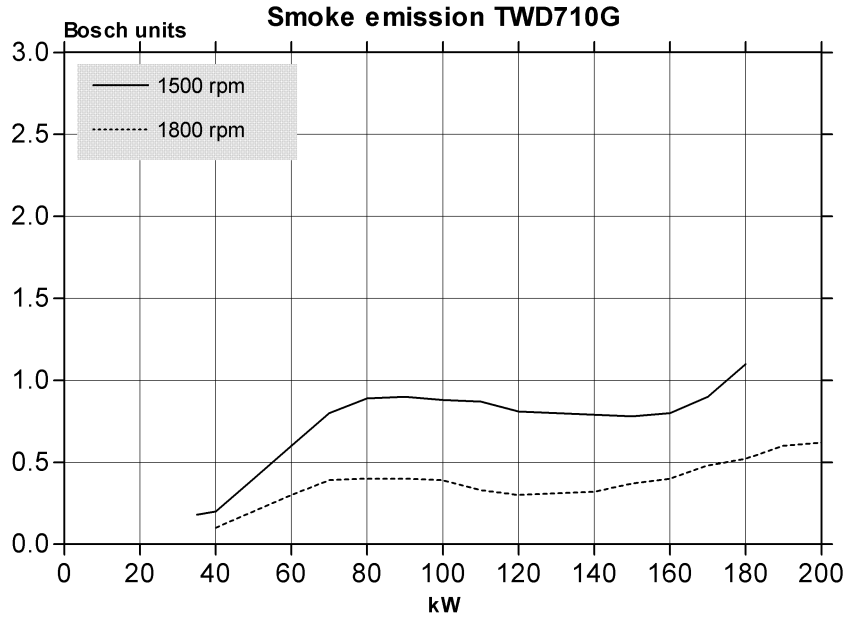
TWD710G	Speed, rpm	1500	1800
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3.37:1	
Starter motor	make/type/kW	Bosch/KB/5.4	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		140	
Number of teeth on starter motor		9	
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	35	
hold current	Amp	0.4	
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	

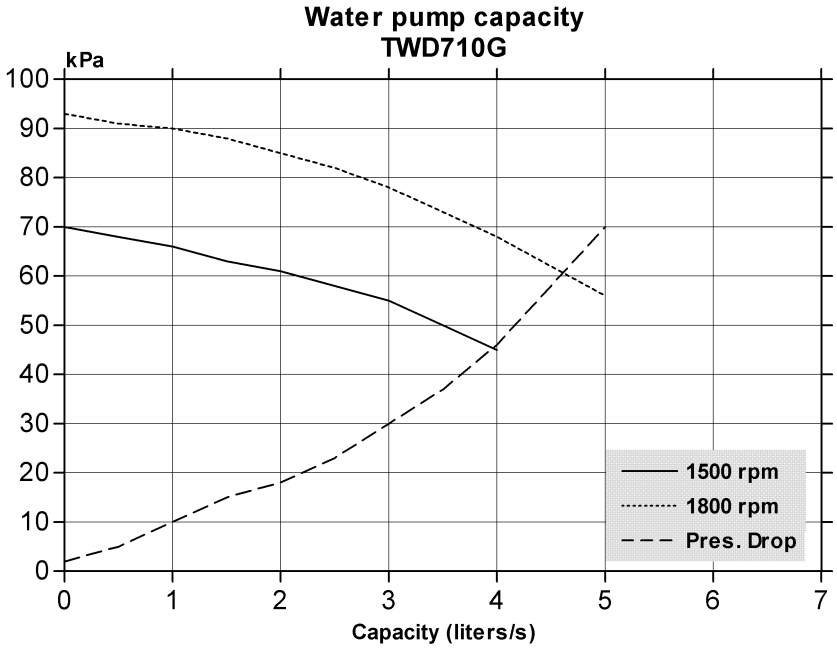
Test standards: ISO 3744-1981 (E) sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)



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 TWD710G
Bosch units
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1500 rpm
1800 rpm
0
20
40
60
80
100
120
140
160
180
200
kW


Water pump capacity
TWD710G
kPa
100
90
80
70
60
50
40
30
20
10
0
1500 rpm
1800 rpm
Pres. Drop
0
1
2
3
4
5
6
7
Capacity (liters/s)