Important

This Technical Data Sheet and the corresponding Installation Instructions provide important information to ensure the installed engine will operate according to the design specification in the Volvo Penta application for certification.

Requirements marked with ⚠ are considered as critical for exhaust emissions compliance according to the design specification in the Volvo Penta application for certification.

Failing to follow and meet these instructions and requirements when installing a certified engine in a piece of nonroad equipment for use in the United States violates U.S. federal law (40 CFR 1068.105(b)), subject to fines or other penalities as described in the Clean Air Act.

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	16,12 983,9
Firing order			1-5-3-6-2-4
Bore		mm in	144 5,67
Stroke		mm in	165 6,50
Compression ratio			16,8:1
Wet weight (Not including after treatment system)	Engine only	kg lb	1810 3990
	Engine incl. cooling system and air filtration system	kg lb	2217 4888
	Frame	kg lb	550 1213
	Compensator and Mixer pipe	kg lb	25 55
	EATS Muffler	kg lb	188 414

Performance			**rpm**	**1500**	**1800**
Prime Power		without fan	kW	NA	625
			hp	NA	850
		with fan	kW	NA	595
			hp	NA	809
Standby Power		without fan	kW	NA	685
			hp	NA	932
		with fan	kW	NA	655
			hp	NA	891
Torque at:	Prime Power		Nm	NA	3316
			lbft	NA	2445
	Standby Power		Nm	NA	3634
			lbft	NA	2680
Mean piston speed			m/s	NA	9,9
			ft/sec	NA	32,6
Effective mean pressure at:	Prime Power		MPa	NA	2,6
			psi	NA	375
Effective mean pressure at:	Standby Power		MPa	NA	2,8
			psi	NA	411
Max combustion pressure at:	Prime Power		MPa	NA	22
			psi	NA	3191
Max combustion pressure at:	Standby Power		MPa	NA	22,5
			psi	NA	3263
Total mass moment of inertia, J (mR^2) with flywheel			kgm^2	2,50	
			$lbft^2$	59,3	
Total mass moment of inertia, J (mR^2) without flywheel			kgm^2	1,92	
			$lbft^2$	45,6	
Friction Power			kW	NA	51
			hp	NA	69,4

Derating due to altitude - see Technical Diagrams

Engine noise emission

Test Standards: ISO 3744-1981 (E) sound power

Tolerance ± 0.75 dB(A)		**rpm**	**1500**	**1800**
Measured sound power Lw	No load	dB(A)	NA	118,1
	Prime Power	dB(A)	NA	119,1
	Standby Power	dB(A)	NA	118,9
Calculated sound pressure Lp at 1 m	No load	dB(A)	NA	101,1
	Prime Power	dB(A)	NA	102,1
	Standby Power	dB(A)	NA	101,9

Test conditions for load acceptance data

Warm engine.	**Generator**			**Model**		**Type of AVR**	
	Stamford			HCM534F1		MX341	
AVR Settings	UFRO (Hz):		57	DIP (%)*:	50	DWELL (%)*:	N/A
	Stability (%)*:	According to Stamford instructions		Voltage (V):	400	Load factor:	1.0

Applies to Stamford nomenclature,
(%)* : % of max potentiometer setting range
Load acceptance performance can vary due to actual alternator inertia, voltage regulator, type of load and local ambient conditions.

Abbreviation:	**Full name:**	**Descriptions**
AVR	Automatic Voltage Regulator	Generator performance and safty control unit
UFRO	Under Frequency Roll Off	Overheating protection at under frequency
DIP		Controls the slope of voltage drop when the UFRO is active
DWELL		Controls the slope of voltage recovery when the UFRO is active.

Single step load performance at 1800 rpm - PRIME (Resistiv load)

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20	2,6	1,5	0,5	0,0	20-100	8,8	2,9	17,6	1,6
0-40	4,8	2,1	5,3	1,2	40-100	5,9	2,5	9,8	1,5
0-52	7 (G3)	2,3	10,6	1,2	58-100	4,5	2,2	4,0	1,1
0-60	7,4	2,3	11,6	1,2	60-100	4,5	2,1	3,5	1,1
0-68	10 (G2)	2,7	17,1	1,2	71-100	3,5	1,8	2,0	0,8
0-80	12,3	3,1	22,4	1,4	80-100	2,6	1,4	1,5	0,4
0-100	17,4	3,4	31,7	2,1					
100-0	5,6	1,9	8,3	1,7					

Single step load performance at 1800 rpm - STAND BY (Resistiv load)

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20	2,9	1,5	0,8	0,6	20-100	10,8	3,2	21,6	1,7
0-40	5,1	2,1	5,8	1,1	40-100	6,9	2,8	12,3	1,6
0-54	7 (G3)	2,3	10,8	1,2	54-100	5,3	2,4	6,0	1,4
0-60	8,4	2,7	14,6	1,2	60-100	4,7	2,2	4,0	1,4
0-67	10 (G2)	2,9	16,8	1,2	67-100	4,3	2,1	3,3	1,2
0-80	13,3	3,2	24,1	1,7	80-100	3,1	1,6	2,3	0,8
0-100	19,8	3,8	35,4	1,8					
100-0	4,3	1,0	9,8	2,4					

Cold start performance			rpm	1500	1800
Time from start to stay within 0.5% of no load speed at ambient temperature:	°C	20	s	NA	4,3
		5	s	NA	5,3
		-15 *	s	NA	5,3
		-30 **	s	NA	5,7
		Min start temp*	°C	-31,0	

* With manifold heater 4 kW engaged, lubrication oil 15W/40 and block heater.
** With manifold heater 4 kW engaged, lubrication oil 5W/30 and block heater, Fuel MK-1.

Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
Volvo part No: 22454340 P01	Calix	1.5 kW	10h ambient temp-30 C	-2°C 28°F

Lubrication system			rpm	1500	1800
Lubricating oil consumption	Prime Power		litre/h US gal/h	NA	0,10 0,026
	Standby Power		litre/h US gal/h	NA	0,11 0,029
Oil system capacity including filters			litre US gal	48 12,7	
Oil sump capacity:		max	litre US gal	42 11,1	
		min	litre US gal	32 8,5	
Oil change intervals/specifications:	VDS-3*		h	500	
Engine angularity limits:		front up	°	30	
		front down	°	30	
		side tilt	°	30	
Oil pressure at rated speed			kPa psi	NA NA	399 58
Lubrication oil temperature in oil sump:		max	°C °F	130 266	
Oil filter micron size			µ	40	

* See also general section in the sales guide

Fuel system			rpm	1500	1800
Prime Power	25%	g/kWh		NA	227
Specific **fuel** consumption at:		lb/hph		NA	0,368
	50%	g/kWh		NA	202
		lb/hph		NA	0,327
	75%	g/kWh		NA	195
		lb/hph		NA	0,316
	100%	g/kWh		NA	195
		lb/hph		NA	0,316
% adBlue consumption at:	25%	%		NA	6,4
(Compare to Fuel consumption by Volyme)	50%	%		NA	6,7
	75%	%		NA	7,2
	100%	%		NA	6,4

Standby Power	25%	g/kWh		NA	223
Specific **fuel** consumption at:		lb/hph		NA	0,361
	50%	g/kWh		NA	201
		lb/hph		NA	0,326
	75%	g/kWh		NA	195
		lb/hph		NA	0,316
	100%	g/kWh		NA	197
		lb/hph		NA	0,319
% adBlue consumption at:	25%	%		NA	6,6
(Compare to Fuel consumption by Volyme)	50%	%		NA	6,7
	75%	%		NA	7,2
	100%	%		NA	6,1

Fuel system		rpm	1500	1800
See front page for important information ⚠	ASTM D975 (2D)			
Fuel to conform to				
System supply flow at:		litre/h	NA	210,0
		US gal/h	NA	55,5
Fuel supply line max restriction		kPa	NA	30,0
(Measured at fuel inlet connection)		psi	NA	4,4
Fuel supply line max pressure, engine stopped		kPa	NA	16,5
		psi	NA	2,4
System return flow		litre/h	NA	25,0
		US gal/h	NA	6,6
Fuel return line max restriction		kPa	NA	20,0
(Measured at fuel return connection)		psi	NA	2,9
Maximum allowable inlet fuel temp		°C	NA	60
(Measured at fuel inlet connection)		°F	NA	140
Prefilter / Water separator micron size		µ	10	
Fuel filter micron size		µ	5	
Governor type/make, standard		Volvo/EMS 2.3		
Injection pump type/make		Unit injector hybrid		

Intake and exhaust system		rpm	1500	1800
Air consumption at: (+25°C and 100kPa)	Prime Power	m^3/min	NA	48,1
		cfm	NA	1699
	Standby Power	m^3/min	NA	51,1
		cfm	NA	1805
See front page for important information ⚠ Max allowed air intake restriction including piping		kPa	NA	5
		psi	NA	0,7
Air filter restriction clean Volvo Penta filter		kPa	NA	1,4
		psi	NA	0,2
Heat rejection to exhaust at:	Prime Power	kW	NA	458
		BTU/min	NA	26072
	Standby Power	kW	NA	521
		BTU/min	NA	29623
Exhaust gas temperature after turbine at:	Prime Power	°C	NA	455
		°F	NA	851
	Standby Power	°C	NA	484
		°F	NA	903
See front page for important information ⚠ Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: mm	Prime Power	kPa	NA	19
		psi	NA	2,7
	Standby Power	kPa	NA	20
		psi	NA	2,9
See front page for important information Max allowable temperature drop between turbine and SCR muffler inlet. ⚠	Prime Power	Δ°C	NA	10
		Δ°F	NA	18
	Standby Power	Δ°C	NA	10
		Δ°F	NA	18
SCR muffler pressure drop (at exhaust gas flow and exhaust temp given)	Prime Power	kPa	NA	9
		psi	NA	1,3
	Standby Power	kPa	NA	10
		psi	NA	1,5
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	Prime Power	m^3/min	NA	126,6
		cfm	NA	4471
	Standby Power	m^3/min	NA	137,8
		cfm	NA	4866

Cooling system			rpm	1500	1800
Heat rejection radiation from engine at:		Prime Power	kW	NA	26
			BTU/min	NA	1479
		Standby Power	kW	NA	29
			BTU/min	NA	1649
Coolant		Volvo Penta coolant "ready mix or Volvo Penta coolant mixed with fresh water 40/60			
Radiator cooling system type			Closed circuit		
Standard radiator core area			m²	NA	1,68
			foot²	NA	18,08
Fan diameter			mm	NA	965
			in	NA	37,99
Fan power consumption			kW	NA	30
			hp	NA	41
Fan drive ratio					1.04:1
Coolant capacity,	Engine only		litre	NA	33
			US gal	NA	8,72
	CACs (Charge Air Coolers)		litre	NA	10
			US gal	NA	2,64
	Coolant radiators incl piping, Engine circuit		litre	NA	48
			US gal	NA	12,68
	Coolant radiators incl piping, CAC- circuit		litre	NA	48
			US gal	NA	12,68
	Expansion tank, Engine circuit		litre	NA	20
			US gal	NA	5,28
	Expansion tank, CAC circuit		litre	NA	7
			US gal	NA	1,85
Coolant pump			drive/ratio	Belt / 1,85:1	
Coolant pump , CAC circuit			drive/ratio	Belt / 2,29:1	
Thermostat, Engine circuit	Start to open		°C	NA	82
			°F	NA	180
	Fully open		°C	NA	92
			°F	NA	198
Thermostat, CAC circuit	Start to open		°C	NA	40
			°F	NA	104
	Fully open		°C	NA	52
			°F	NA	126
Maximum static pressure head (expansion tank height + pressure cap setting)			kPa	NA	100
			psi	NA	14,5
Minimum static pressure head (expansion tank height + pressure cap setting)			kPa	NA	70
			psi	NA	10,2
Standard pressure cap setting			kPa	NA	75
			psi	NA	10,9
Maximum top tank temperature			°C	NA	107
			°F	NA	225
Charge air pressure (after charge air coolers)			kPa	NA	360
			psi	NA	52,2
See front page for important information Max allowed Charge air outlet temp. At air inlet temp. 25°C ⚠	Prime Power		°C	NA	50
			°F	NA	122
	Standby Power		°C	NA	50
			°F	NA	122

OEM cooling system design:

- move of standard radiatorts		**rpm**	**1500**	**1800**
Maximum additional coolant, Engine circuit with standard expansion tank		litre	NA	15
		US gal	NA	3,96
Maximum additional coolant, CAC circuit with standard expansion tank		litre	NA	5
		US gal	NA	1,32
Maximum distans in vertikal direction with standard pressure cap (75 kPa)		m	NA	2,5
		ft	NA	8,20
Maximum additional pressure drop due to move		KPa	NA	10
		psi	NA	1,5
- replacement of standard radiators				
Heat rejection to coolant **engine radiator** at:	Prime Power	kW	NA	223
		BTU/min	NA	12682
	Standby Power	kW	NA	245
		BTU/min	NA	13933
Heat rejection to coolant **CAC radiator** at:	Prime Power	kW	NA	208
		BTU/min	NA	11829
	Standby Power	kW	NA	216
		BTU/min	NA	12284
Minimum coolant flow **engine radiator** (at fully open thermostat)		litre/s	NA	6
		US gal/s	NA	1,59
Minimum coolant flow **CAC radiator** (at fully open thermostat)		litre/s	NA	2,5
		US gal/s	NA	0,66
Maximum coolant pressure drop over **engine radiator** incl. Piping (at coolant flow above)		kPa	NA	70
		psi	NA	10,2
Coolant pressure drop over complete engine circuit cooling system (at coolant flow above)		kPa	NA	160
		psi	NA	23,2
Coolant pressure drop over complete CAC circuit cooling system (at coolant flow above)		kPa	NA	135
		psi	NA	19,6
Nominal coolant pressure before engine circuit coolant pump		kPa	NA	30
		psi	NA	4,4
Nominal coolant pressure before CAC circuit coolant pump		kPa	NA	30
		psi	NA	4,4

Cooling performance

Standard fan: Fan ratio: 1 : 1.04 Fan type: FIX

Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% antifreeze.
Valid at 1 atm. (radiator and cooling fan, see optional equipment)

Engine speed rpm	Air on temp °C	PRIME POWER		STANDBY POWER	
		Air flow m^3/s	External restriction Pa	Air flow m^3/s	External restriction Pa
1800	63	15,2	0		
	62	14,5	100	15,2	0
	61	14,1	200		
	60	13,6	300		
	59			14,5	100
	58			13,9	200
	57			13,6	300

Note! External restrictions are calculated for values >0 Pa

Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronous	Isochronous
Governor droop	N/A	N/A
Governor response	Adjustable PID-constants (VODIA)	
Dual speed	Single speed 1800rpm, 60Hz	1800,0
Idle speed	600-1200rpm	900,0
Fine speed adjustment	+- 90 rpm	0,0
Preheating function	On / Off	Off

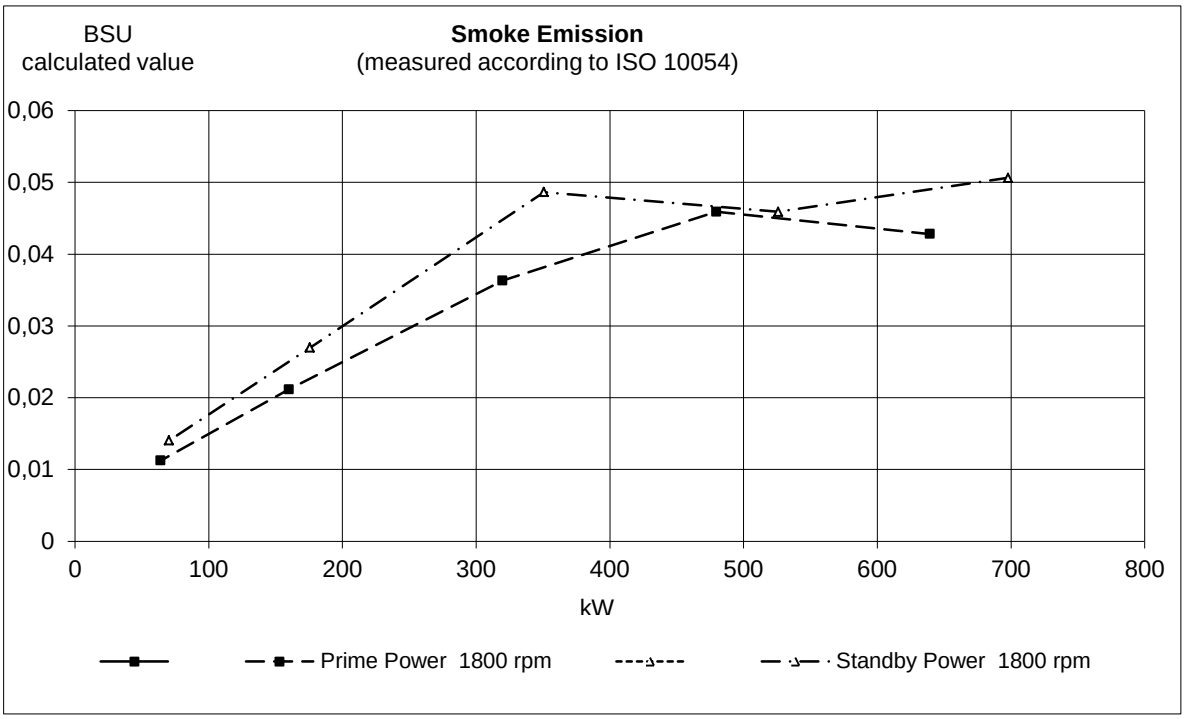
Engine sensor and switch settings

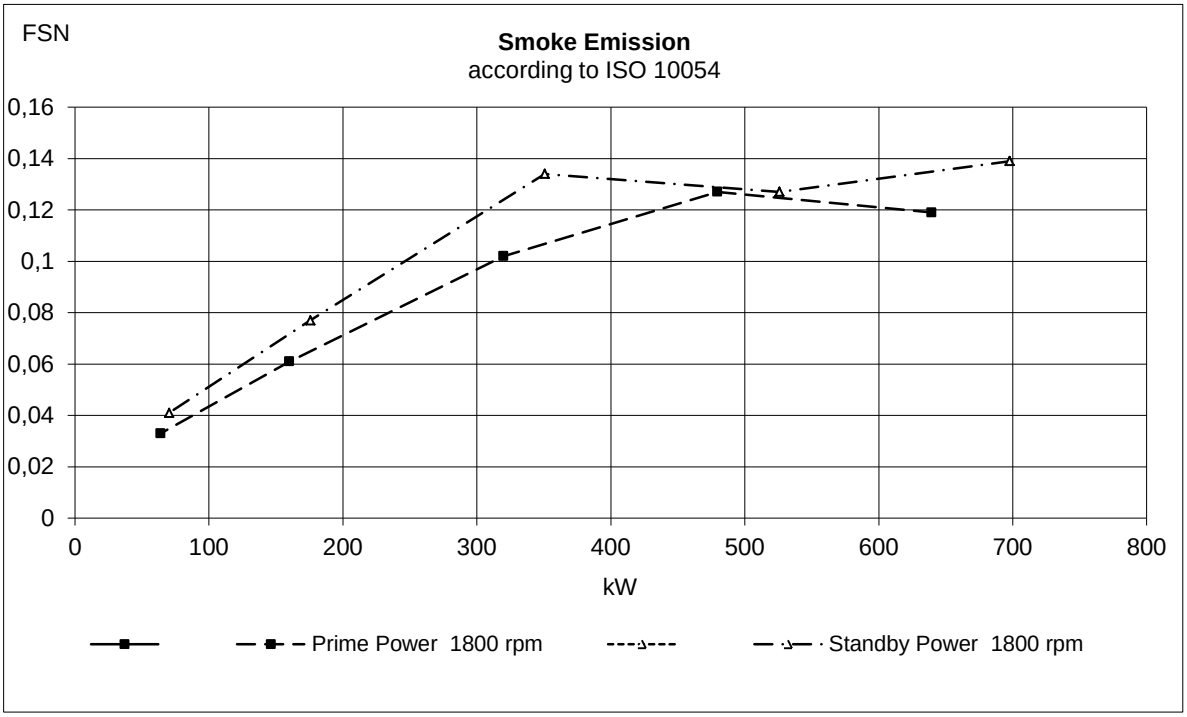
			Alarm level		Engine protection	
Parameter		Unit	Setting range	Default setting	Level	Action. Default/Alternative
Oil temp		°C	120 - 130	125	Setting +2.5	Shutdown after 10s
Oil pressure	Low idle 900rpm	kPa	NA	170	145	Shutdown
	1800 rpm	kPa	NA	300	275	Shutdown
Oil level			NA	Min level		
DEF dosing injector failure			NA	On	Low level	Shutdown after 10s
Coolant temp		°C	95 - 101	103	Setting +4	Shutdown after 10s
Coolant level			See cooling system	On	Low level	Shutdown after 10s
Fuel feed pressure	Low idle	kPa	NA	100		
	>1400 rpm	kPa	NA	300		
Water in fuel			NA	Max level		
Crank case pressure		kPa	NA	Rapid increase	Rapid increase	Shutdown
Air filter pressure drop		kPa	NA	5		
Altitude, above sea		m				Automatic derating, see section Smoke, Fuel & Derating
Charge air temp		°C	NA	80	82,5	Shutdown after 10s
Charge air pressure		kPa	NA	25 above demand	35 above demand	Shutdown after 1s
Engine speed		rpm	100 - 120% of rated speed	115% of rated speed	Alarm level	Shutdown
Exhaust Temperature (before SCR volume)		°C	NA	530	550,0	Shutdown after 10s
Engine protection can be disabled. For consequences please see VP International Limited Warranty Policy						

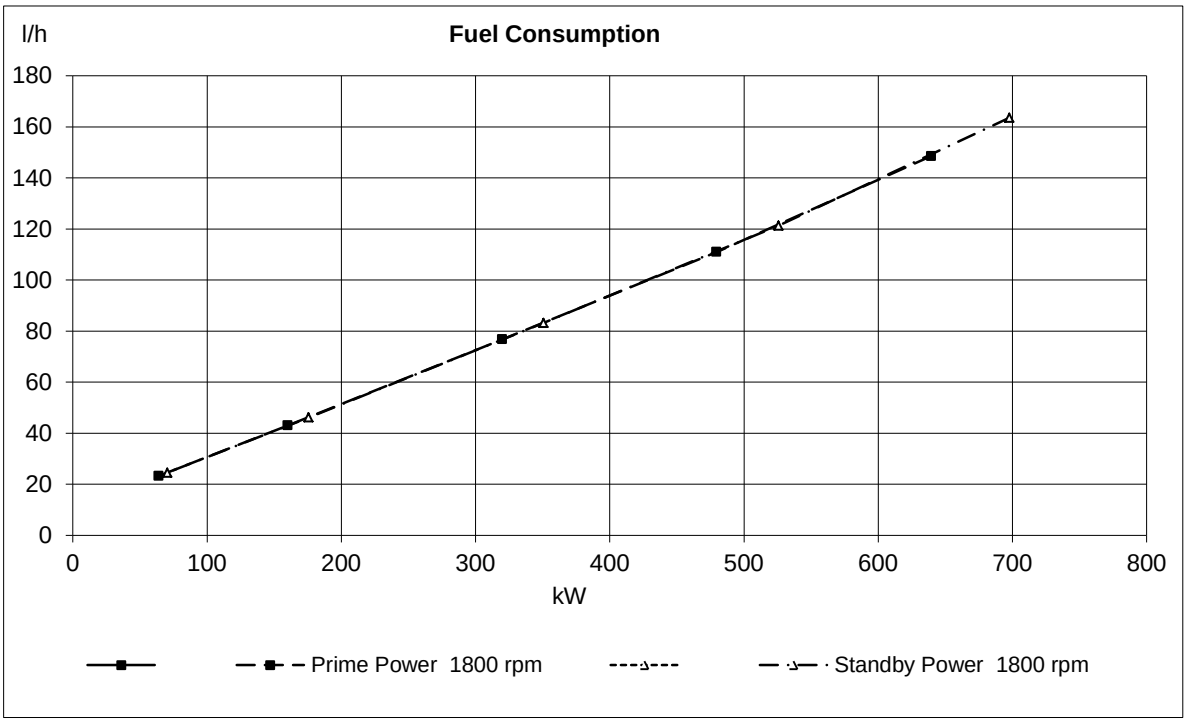
Electrical system

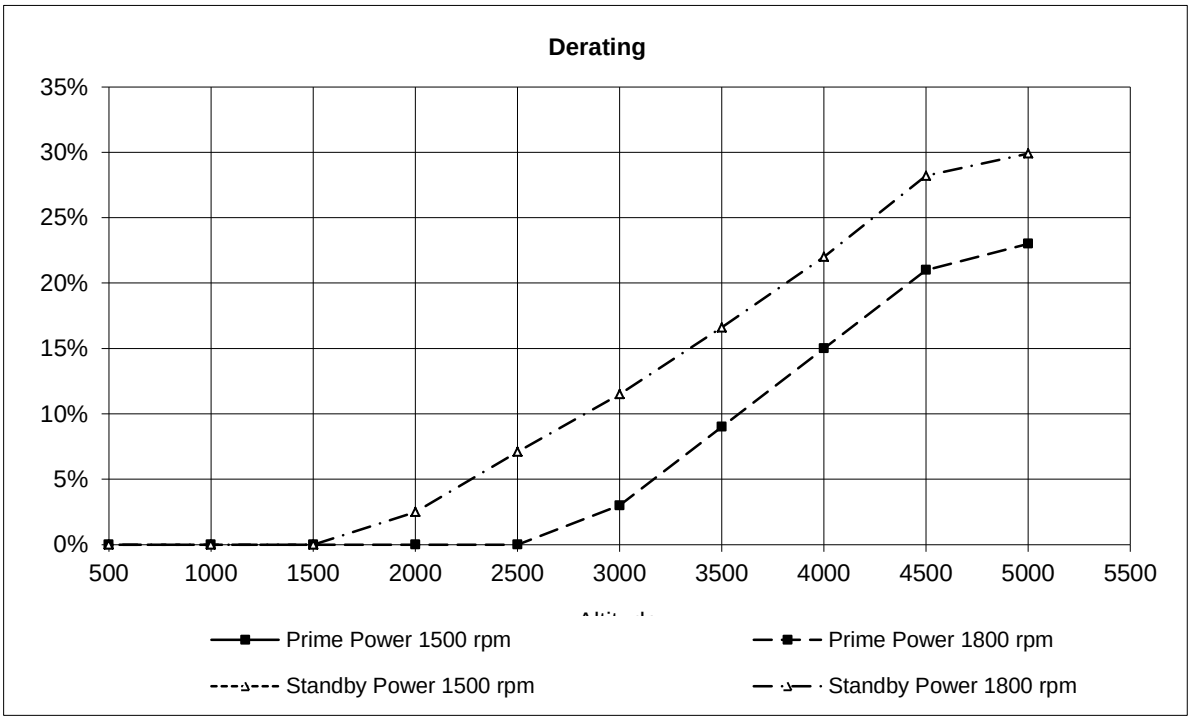
Voltage and type		24V / insulated from earth	
Alternator:	make/output	A	Bosch / 80
	tacho output	Hz/alt. Rev	6
	drive ratio		3,94 : 1
Starter motor		make	Mitsubishi Electric
		type	24V7.0KW12/3.175F
		kW	7,0
Number of teeth on:	flywheel		153
	starter motor		12
Max wiring resistance main circuit		mΩ	
Cranking current at +20°C		A	300
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		A	1

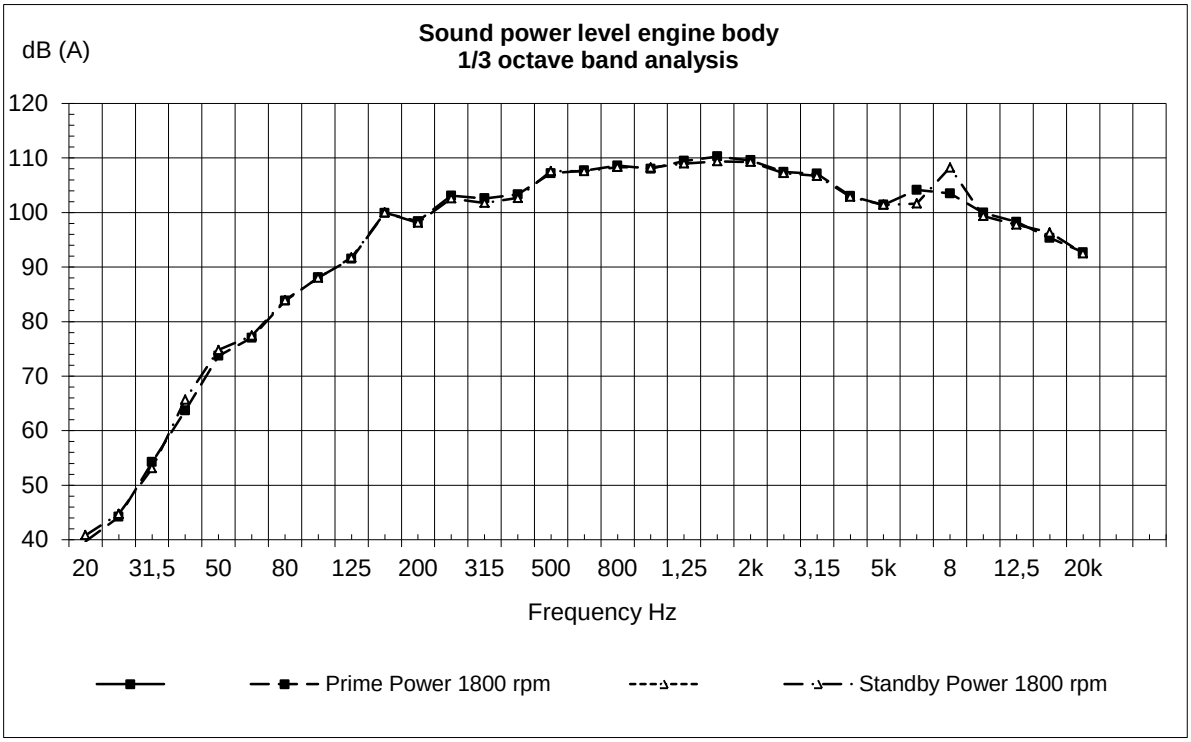
Power take off		**rpm**	**1500**	**1800**
Front end in line with crank shaft max:		Nm	NA	NA
		lbft	NA	NA
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW	NA	NA
		hp	NA	NA
	max down	kW	NA	NA
		hp	NA	NA
	max right	kW	NA	NA
		hp	NA	NA
Timing gear at compressor PTO max:		Nm	NA	NA
		lbft	NA	NA
Speed ratio direction of rotation viewed from flywheel side		0,91:1/clockwise		
Timing gear at servo pump PTO max:		Nm	NA	NA
		lbft	NA	NA
Speed ratio direction of rotation viewed from flywheel side		1,58:1/clockwise		
Timing gear at hydraulic pump PTO max:		Nm	NA	NA
		lbft	NA	NA
Speed ratio direction of rotation viewed from flywheel side				
Max allowed bending moment in flywheel housing		Nm	15000	
		lbft	11063	
Max. rear main bearing load		N	NA	NA
		lbf	NA	NA

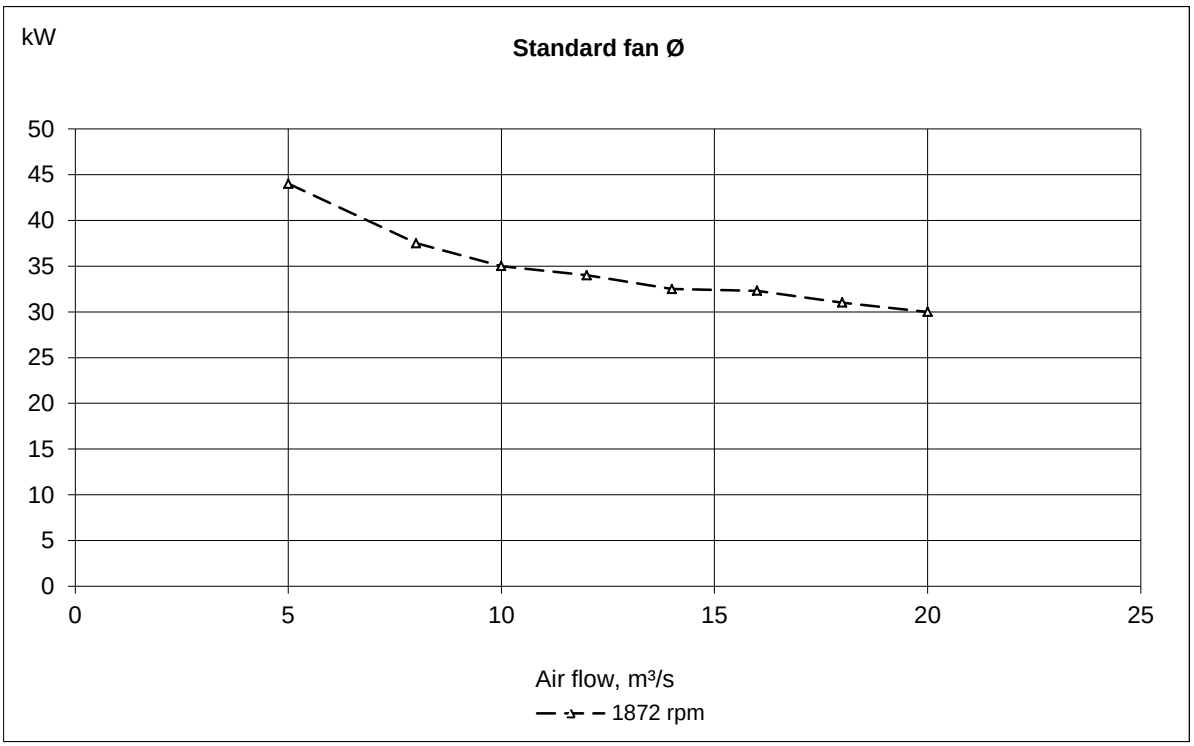

BSU
calculated value
Smoke Emission
(measured according to ISO 10054)
0,06
0,05
0,04
0,03
0,02
0,01
0
0
100
200
300
400
500
600
700
800
kW
Prime Power 1800 rpm
Standby Power 1800 rpm

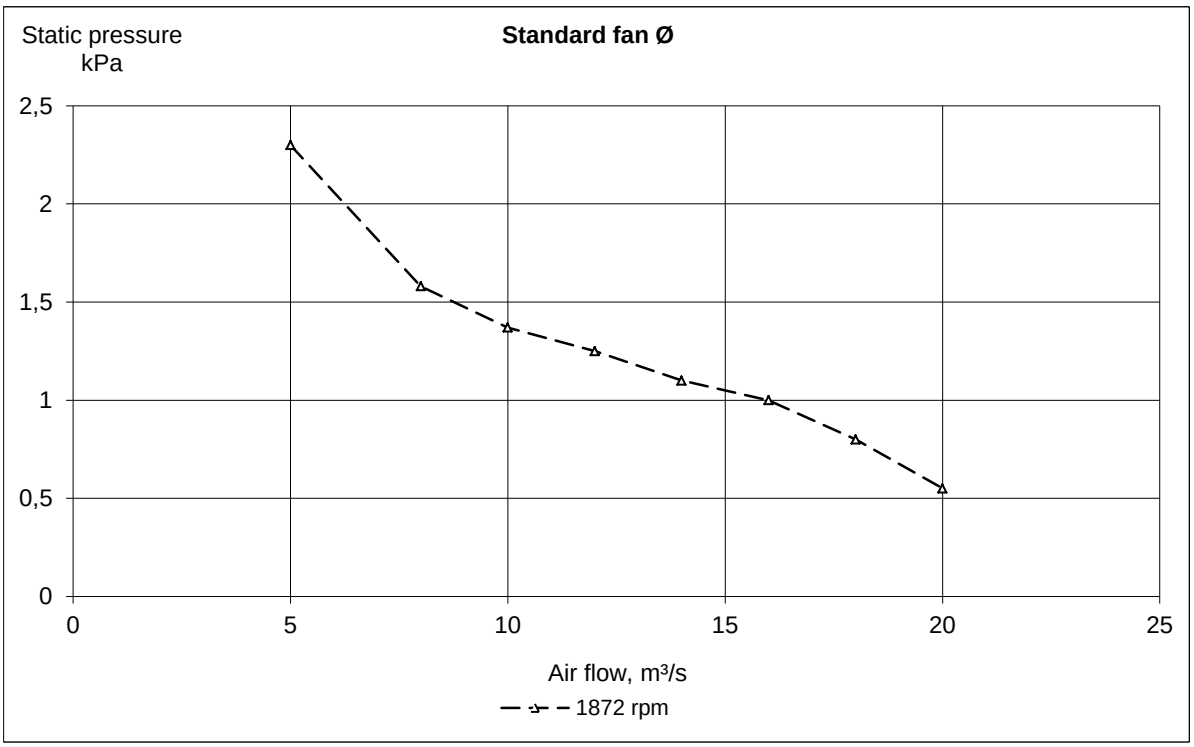

FSN
Smoke Emission
according to ISO 10054
0,16
0,14
0,12
0,1
0,08
0,06
0,04
0,02
0
0
100
200
300
400
500
600
700
800
kW
Prime Power 1800 rpm
Standby Power 1800 rpm


l/h
Fuel Consumption
180
160
140
120
100
80
60
40
20
0
0
100
200
300
400
500
600
700
800
kW
Prime Power 1800 rpm
Standby Power 1800 rpm


Derating
35%
30%
25%
20%
15%
10%
5%
0%
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
Prime Power 1500 rpm
Prime Power 1800 rpm
Standby Power 1500 rpm
Standby Power 1800 rpm


Sound power level engine body
1/3 octave band analysis
dB (A)
120
110
100
90
80
70
60
50
40
20
31,5
50
80
125
200
315
500
800
1,25
2k
3,15
5k
8
12,5
20k
Frequency Hz
Prime Power 1800 rpm
Standby Power 1800 rpm


kW
Standard fan Ø
50
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
Air flow, m³/s
1872 rpm


Static pressure
kPa
Standard fan Ø
2,5
2
1,5
1
0,5
0
0
5
10
15
20
25
Air flow, m³/s
1872 rpm