General / HE

In-line four stroke diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel. Turbocharged

Number of cylinders			6
Displacement, total		litre	12,78
		in^3	779,7
Firing order			1-5-3-6-2-4
Bore		mm	131
		in	5,16
Stroke		mm	158
		in	6,22
Compression ratio			18.5
Dry weight	Engine only, excluding cooling system,	kg	1520
		lb	3351
	Genset, see dimension drawing	kg	
		lb	

Performance		**rpm**			**1500**		
		load	**25%**	**50%**	**75%**	**100%**	**110%**
Power setting 300 kW		kW	75	150	225	300	330
		hp	102	204	306	408	449
Torque at:	Power setting 300 kW	Nm	477	955	1432	1910	2101
		lbft	352	704	1056	1409	1549
Mean piston speed		m/s			7,9		
		ft/sec			26,0		
Effective mean pressure at:	Power setting 300 kW	MPa	0,5	0,9	1,4	1,9	2,1
		psi	68	136	204	272	300
Max combustion pressure at:	Power setting 300 kW	MPa	7	9,7	13,8	15,4	16,1
		psi	1015	1407	2002	2234	2335
Total mass moment of inertia, J (mR^2)		kgm^2			3,43		
Engine only		$lbft^2$			81,4		
Degree of irregularity at:	Power setting 300 kW						
Friction Power		kW	32	32	32	32	32
		hp	44	44	44	44	44
If applicable Derating are described in Technical Diagrams							

Performance		**rpm**			**1800**		
		load	**25%**	**50%**	**75%**	**100%**	**110%**
Power setting 360 kW		kW	90	180	270	360	396
		hp	122	245	367	490	539
Torque at:	Power setting 360 kW	Nm	477	955	1432	1910	2101
		lbft	352	704	1056	1409	1549
Mean piston speed		m/s			9,5		
		ft/sec			31,2		
Effective mean pressure at:	Power setting 360 kW	MPa	0,5	0,9	1,4	1,9	2,1
		psi	68	136	204	272	300
Max combustion pressure at:	Power setting 360 kW	MPa	7,9	11,4	14,6	17,2	17,9
		psi	1146	1653	2118	2495	2596
Total mass moment of inertia, J (mR^2)		kgm^2			3,43		
Engine only		$lbft^2$			81,4		
Degree of irregularity at:	Power setting 360 kW						
Friction Power		kW	46	46	46	46	46
		hp	62,56	62,56	62,56	62,56	62,56
If applicable Derating are described in Technical Diagrams							

VOLVO PENTA 1500rpm/1800 rpm	Document No **21720674**	Issue Index **09**

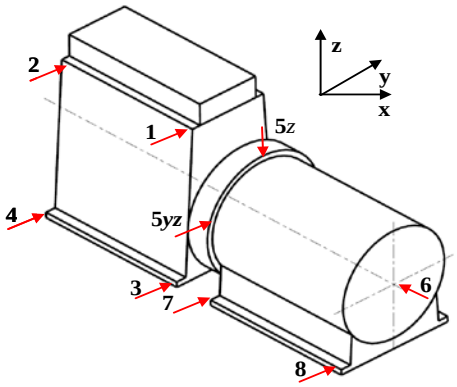
Engine noise emission

Test Standards: ISO 3744-1981 (E) sound power (with intake and without exhaust noise)
Tolerans ± 0.75 dB(A)

		rpm			**1500**		
		load	**25%**	**50%**	**75%**	**100%**	**110%**
Measured sound power Lw	No load	dB(A)	107,5	107,5	107,5	107,5	107,5
	Power setting 300 kW	dB(A)	110,4	111,7	111,2	111,7	112
		rpm			**1800**		
Measured sound power Lw	No load	dB(A)	109,1	109,1	109,1	109,1	109,1
	Power setting 360 kW	dB(A)	112,2	112,9	113,1	113,4	114,2

Vibrations (vibration velocity)

Declared vibration levels according to ISO 8528-9



rpm	**1500**	
RMS Velocity (10 - 1000Hz) Measurement direction		
Measuring position	Axial [x] mm/s	Transverse [y] mm/s	Vertical [z] mm/s
1	11,4	13,7	16,9
2	10,9	15,2	14,4
3	9,9	12,6	10,5
4	10,4	18,5	16,2
5	10,1	6,2	14,2
6	13,6	14,8	21,4
7	10,2	12,4	18,3
8	10,2	15	18,5
rpm	**1800**	
1	10,8	16,0	18,0
2	11,5	32,7	20,5
3	10,8	21,4	28,0
4	10,3	20,7	28,3
5	9,7	9,8	17,5
6	15,4	20,0	16,5
7	9,7	18,4	24,9
8	9,9	21,3	24,2

Test conditions for load acceptance data

Warm engine. UFRO according to stamford recommendation (Start at -3Hz) Minimum dip setting	**Generator**	**Modell**	**Type of AVR**
	Stamford	HCI534D1	MX341

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)	
	Nominal	110% power	Nominal	110% power	(%)	Nomi-nal	110% power	Nomi-nal	110% power
0-20	1,8	1,8	1,1	1,0	20-100	12,1	14,5	2,5	12,7
0-40	2,4	3,1	1,3	3,1	40-100	5,6	6,1	2,3	10,2
0-60	5,3	8,5	1,4	2,0	60-100	2,6	3,9	1,2	7,6
0-80	11,3	17,7	2,5	3,2	80-100	1,4	1,3	0,8	1,9
0-100	20,5	28,4	3,5	11,6					
0-74.6	**10,2**		2,5		74.6-100	1,5		0,9	
0-67.8		**10,2**		2,3	67.8-100		2,7		5,4
0-65.3	**7,3**		1,8		65.3-100	4,6		7,9	
0-59.4		**7,3**		1,8	59.4-100		4,6		7,9
100-0	-3,8	-4,1	1,2	1,2					

Single step load performance at 1800 rpm

Load (%)	Speed diff %		Recovery time (s)		Remaining load	Speed diff (%)		Recovery time (s)	
	Nominal	110% power	Nominal	110% power	(%)	Nomi-nal	110% power	Nomi-nal	110% power
0-20	1,1	1,2	0,6	0,6	20-100	6,7	7,7	1,6	5,2
0-40	1,8	2,1	0,8	0,7	40-100	3,4	4,4	1,4	4,2
0-60	3,7	4,8	1,2	1,3	60-100	1,8	2,4	0,6	2,2
0-80	7,7	9,1	1,5	1,8	80-100	0,8	1,0	0,5	0,6
0-100	13,2	17,0	2,2	8,6					
0-92	**10,2**		1,9		92-100	0,4		0,1	
0-83.6		**10,1**		1,9	83.6-100		0,9		0,5
0-76.8	**6,9**		1,1		76.8-100				
0-69.8		**6,6**		1,2	69.8-100		1,6		1,6
100-0									

Cold start performance		**rpm**	**1500**	**1800**
Time from start to stay within 0.5% of no load speed at ambient temperature:	20°C	s	4,8	4,6
	5 °C	s	5,7	5,2

Lubrication system			**rpm load**	**1500 25%**	**50%**	**75%**	**100%**	**110%**
Lubricating oil consumption	Power setting 300 kW		liter/h	0,005	0,010	0,015	0,020	0,023
			US gal/h	0,001	0,003	0,004	0,005	0,006
			rpm			**1800**		
	Power setting 360 kW		liter/h	0,006	0,012	0,018	0,025	0,027
			US gal/h	0,002	0,003	0,005	0,006	0,007
Oil system capacity including filters			liter	49				
			US gal	12,9				
Oil sump capacity:		max	liter	44				
			US gal	11,6				
		min	liter	35				
			US gal	9,2				
Oil change intervals/ specifications: (Fuel quality dependant)	VDS-3		h	600				
	VDS-2		h	400				
			h					
			h					
Engine angularity limits, static (ref. classification rules, roll and pitch simultaneously)		front up	°	36				
		front down	°	36				
		side tilt	°	36				

Lubrication system		**rpm**	**1500**	**1800**
Oil pressure at rated speed		kPa	360	- 450
		psi	52	- 65
Lubrication oil temperature in oil sump:	max	°C	110	
		°F	230	
Oil filter micron size		µ	40	

* See also general section in the sales guide

rpm **1500**

VOLVO PENTA	Document No	Issue Index
1500rpm/1800 rpm	**21720674**	**09**

Fuel system		**load**	**25%**	**50%**	**75%**	**100%**	**110%**
Specific fuel consumption: US EPA Tier 3	Power setting 300 kW	g/kWh	239	209	204	203	203
		lb/hph	0,387	0,339	0,330	0,329	0,330
Specific fuel consumption IMO Tier II	Power setting IMO Tier II	g/kWh	235	203	193	194	195
		lb/hph	0,381	0,329	0,313	0,314	0,316
		rpm			**1800**		
Specific fuel consumption: US EPA Tier 3	Power setting 360 kW	g/kWh	250	214	212	216	214
		lb/hph	0,405	0,347	0,344	0,349	0,346
Specific fuel consumption IMO Tier II	Power setting IMO Tier II	g/kWh	244	207	200	200	203
		lb/hph	0,396	0,336	0,324	0,325	0,329
Fuel to conform to		ASTM-D975-No. 1 and 2-D, JIS KK 2204, EN 590 DMX and MDO-DMA (ISO8271)					
		rpm			**1500**		
System return flow	Power setting 300 kW	liter/h	53	52	52	52	51
		US gal/h	13,9	13,8	13,6	13,6	13,5
		rpm			**1800**		
	Power setting 360 kW	liter/h	56	56	55	55	55
		US gal/h	14,9	14,7	14,6	14,5	14,4
		rpm			**1500**		
System supply flow	Power setting 300 kW	liter/h	74	90	106	125	131
		US gal/h	19,6	23,7	28,1	32,9	34,7
		rpm			**1800**		
	Power setting 360 kW	liter/h	83	102	124	148	156
		US gal/h	22,0	26,9	32,7	39,0	41,2
		rpm			**1500**		
Normal fuel pressure (after filter)	Power setting 300 kW	kPa	529	519	508	495	490
		psi	76,7	75,3	73,7	71,8	71,1
		rpm			**1800**		
	Power setting 360 kW	kPa	576	561	548	532	527
		psi	83,5	81,4	79,5	77,2	76,4

Fuel system

Fuel supply line max restriction	kPa	30
	psi	4,4
Fuel supply max pressure head (day tank, from CL)	m	2,3
	feet	7,4
Fuel supply line max suction head (from CL)	m	3,6
	feet	11,7
Fuel return line max restriction	kPa	20
	psi	2,9
Maximum allowable inlet fuel temp	°C	60
	°F	140
Prefilter / Water separator micron size	µ	
Fuel filter micron size	µ	2

		rpm			**1500**		
Intake system		**load**	**25%**	**50%**	**75%**	**100%**	**110%**
Air consumption at: (+25°C and 100kPa)	Power setting 300 kW	m^3/min	11	16	20	24	26
		cfm	401	551	709	865	929
		rpm			**1800**		
	Power setting 360 kW	m^3/min	15	22	27	30	30
		cfm	544	761	947	1051	1074
Max allowable air intake restriction including piping		kPa	3				
		psi	0,4				
Air filter type		Paper cartridge					
Air filter cleaning efficiency		%					

Exhaust system		rpm / rpm	25%	50%	1500 / 75%	100%	110%
Heat rejection to exhaust at:	Power setting 300 kW	kW	60	103	146	191	211
		BTU/min	3418	5875	8297	10862	11999
		rpm			1800		
	Power setting 360 kW	kW	75	125	179	242	266
		BTU/min	4277	7126	10151	13762	15127

Exhaust system		rpm / load	25%	50%	1500 / 75%	100%	110%
Exhaust gas temperature after turbine at:	Power setting 300 kW	°C	278	335	362	384	393
		°F	532	635	684	723	739
		rpm			1800		
	Power setting 360 kW	°C	260	301	337	399	423
		°F	500	574	639	750	793
Max allowable back pressure in exhaust line		kPa	10				
		psi	1,5				
		rpm			1500		
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	Power setting 300 kW	m^3/min	22	33	43	52	57
		cfm	765	1149	1510	1853	2020
		rpm			1800		
	Power setting 360 kW	m^3/min	28	42	54	65	69
		cfm	995	1473	1906	2298	2446

Cooling system		rpm / load	25%	50%	1500 / 75%	100%	110%
Heat rejection radiation from engine to surrounding at:	Power setting 300 kW	kW	3,0	3,5	4,0	4,5	4,7
		BTU/min	171	199	227	256	267
		rpm			1800		
	Power setting 360 kW	kW	3,5	4,0	4,5	5,0	5,2
		BTU/min	199	227	256	284	296
		rpm			1500		
Heat rejection to raw water system at:	Power setting 300 kW	kW	42	68	117	175	242
		BTU/min	2388	3867	6654	9952	13762
		rpm			1800		
	Power setting 360 kW	kW	59	92	154	227	317
		BTU/min	3355	5232	8758	12909	18027

Cooling system. Fresh water coolant circuit

Coolant volume engine, including heat exchanger, charge air cooler and std. expansion tank		liter US gal	53 14,00
Max. additional coolant for cabin heater etc. with std. expansion tank		liter US gal	16 4,23
Max. coolant flow to cabin heater etc.		l/s US gal/s	0,7 0,18
Coolant pump	drive/ratio		1/1.5

		rpm	**1500**	**1800**
Coolant flow with fully open thermostat		l/s US gal/s	4,6 1,22	5,5 1,45
Nominal coolant pressure with standard system		kPa psi	145-170	196-224
Thermostat	start to open	°C °F	82 180	
	fully open	°C °F	92 198	
Maximum static pressure head (expansion tank height + pressure cap setting)		kPa psi	100 14,5	
Standard pressure cap setting		kPa psi	75 10,9	

Coolant (40% coolant / 60% water)	See Operators Manual

Cooling system. Engine mounted raw water pump

Raw water pump	drive/ratio		1/1.5	
		rpm	**1500**	**1800**
Nominal raw water design flow		l/s US gal/s	6,4 1,7	7,4 1,9
Nominal raw water pump pressure head at design flow (measured before and after pump)		kPa psi	79 11,4	103 14,9
Maximum raw water pump suction head		kPa psi	-10 -1,5	-14 -2,0
Maximum additional pressure drop (after heat exchanger)		kPa psi	78 11,3	105 15,2
Maximum raw water temperature entering heat exchanger		°C °F	32 90	

Cooling system. Raw water circuit central cooling	**rpm**	**1500**	**1800**
Maximum raw water flow	l/s US gal/s	7,0 1,8	
Minimum raw water flow	l/s US gal/s	4,9 1,3	5,8 1,5
Pressure drop engine raw water circuit at maximum flow	kPa psi		
Pressure drop engine raw water circuit at minimum flow	kPa psi		
Maximum allowed raw water circuit pressure before heat exchanger (external pump system)	kPa psi	150 21,8	
Maximum raw water temperature entering heat exchanger	°C °F	38 100	

Charge air cooler system		rpm / load	1500 25%	50%	75%	100%	110%
Cooling power	Power setting 300 kW	kW	10	23	45	77	104
		BTU/min	569	1308	2559	4379	5914
		rpm			1800		
	Power setting 360 kW	kW	18	35	64	95	124
		BTU/min	1024	1990	3640	5403	7052
		rpm			1500		
Charge air mass flow	Power setting 300 kW	kg/s	0,186	0,221	0,318	0,415	0,505
		rpm			1800		
	Power setting 360 kW	kg/s	0,237	0,302	0,426	0,524	0,581

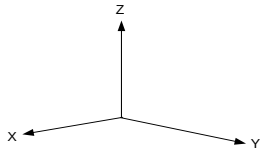
Charge air cooler system		rpm / load	1500 25%	50%	75%	100%	110%
Charge air inlet temp. (Charge air temp after turbo compressor)	Power setting 300 kW	°C	49,6	68,7	113,2	153	189,4
		°F	121	156	236	307	373
		rpm			1800		
	Power setting 360 kW	°C	61	89	137	178	218
		°F	142	193	278	352	424

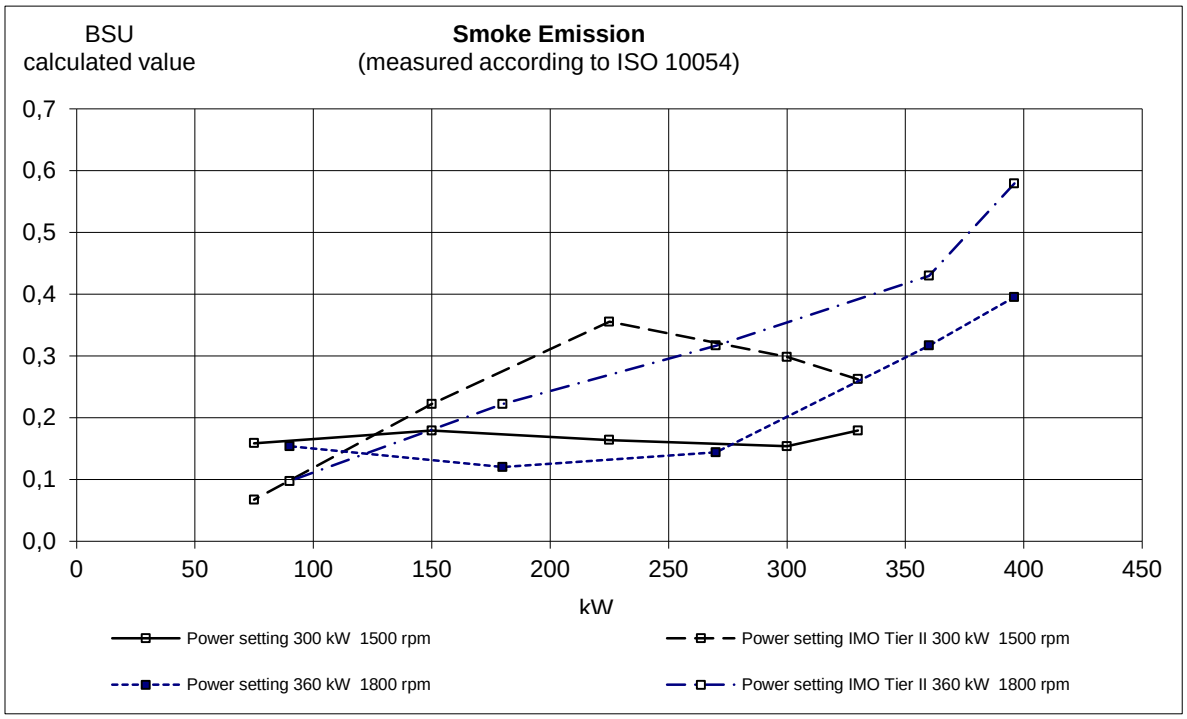
Charge air cooler system		rpm / load	1500 25%	50%	75%	100%	110%
Charge air outlet temp. (Charge air temp after charge air cooler)	Power setting 300 kW	°C	34	35	38	41	46
		°F	93	95	100	106	114
		rpm			1800		
	Power setting 360 kW	°C	35	37	41	45	49
		°F	94	98	105	113	121
Maximum pressure drop over charge air cooler, incl. piping		kPa	1,3				
		psi	0,19				
		rpm	1500				
Charge air pressure	Power setting 300 kW	kPa	243				
		psi	35,24				
		rpm	1800				
	Power setting 360 kW	kPa	246				
		psi	35,68				

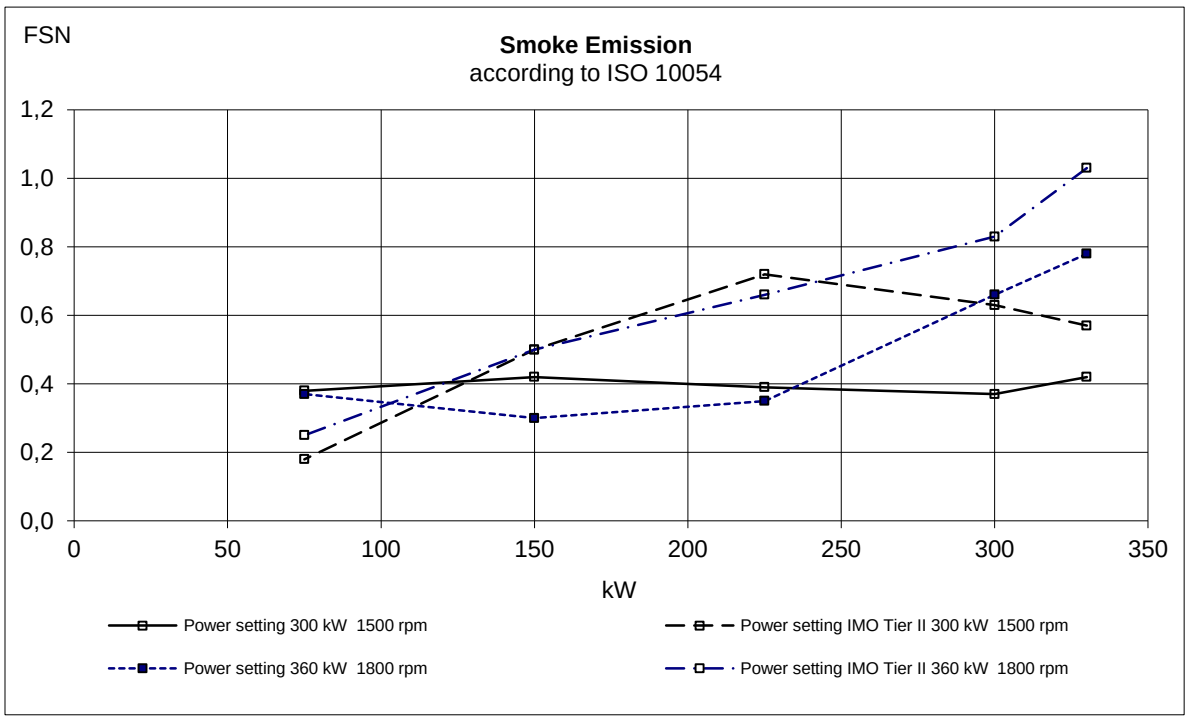
Engine management system

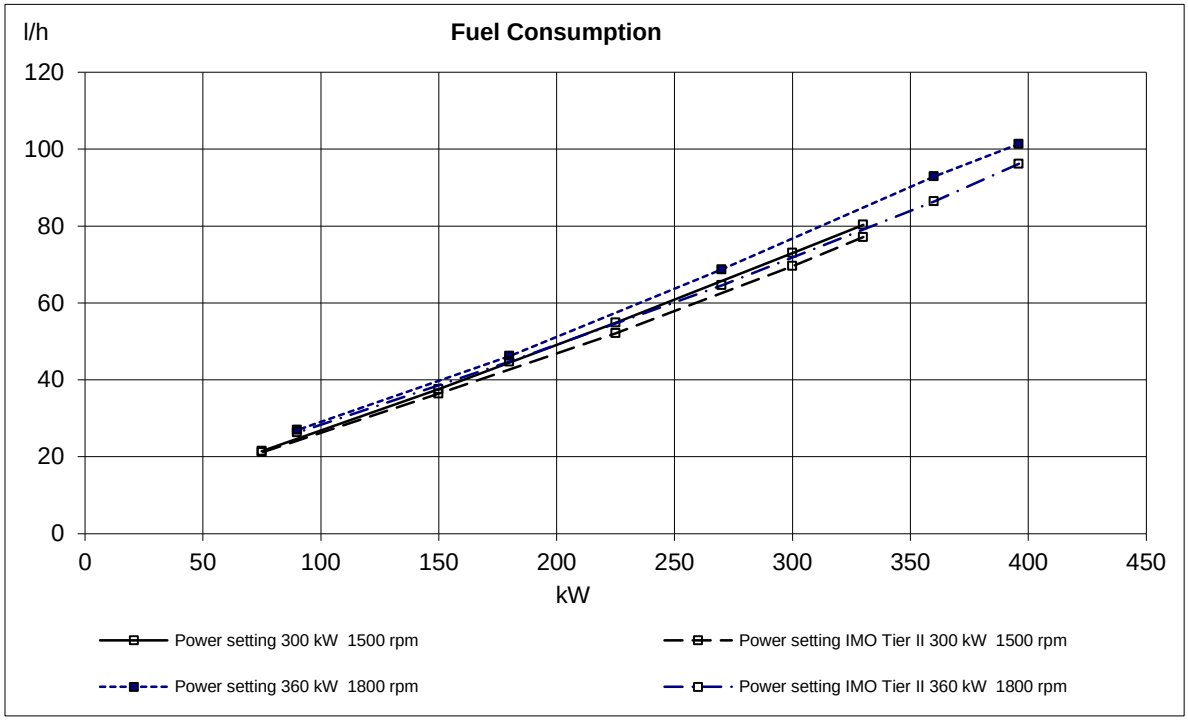
Functionality	Alternatives	Default setting
Governor mode	Isochronus / Droop	Droop
Governor droop	0 / 0.1-5%	4%
Governor response	Adjustable PID (service tool)	0/0/0
Dual speed	YES	1500 or 1800 rpm
Idle speed	600-1200	900
Fine speed adjustment	± 90	0
Stop function	Normaly Closed / Normaly Opend	Depends on order

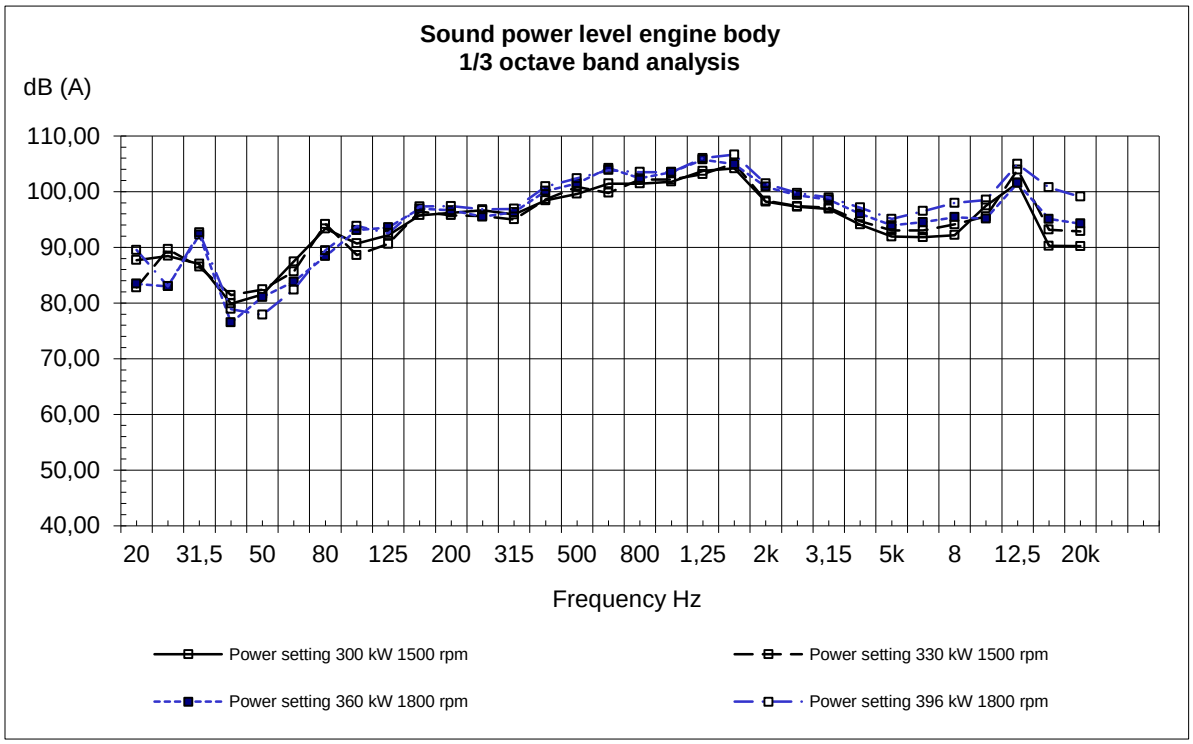
Electrical system		rpm	1500 and 1800
Voltage and type		24V / insulated from earth	
Alternator:	make/output	A	Bosch /110A
	tacho output	Hz/alt. Rev	6
	drive ratio		3,7:1
Starter motor		make	Melco
		type	105P70
		kW	7,0
Starter motor solenoid,	pull current	A	280
	hold current	A	-
Number of teeth on:	flywheel		153
	starter motor		12
Inrush current at +20°C \ +5°C		A	1020 \ 1560
Cranking current at +20°C \ +5°C		A	400 \ 530
Crank engine speed at 20°C \ +5°C		rpm	150 \ 130
Starter motor battery capacity:	max	Ah	2x220
	min at +5°C	Ah	2x180

Max. g-force			
	x	m/s²	2
	y	m/s²	2
	z	m/s²	6


BSU
calculated value
Smoke Emission
(measured according to ISO 10054)
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0,0
0
50
100
150
200
250
300
350
400
450
kW
Power setting 300 kW 1500 rpm
Power setting IMO Tier II 300 kW 1500 rpm
Power setting 360 kW 1800 rpm
Power setting IMO Tier II 360 kW 1800 rpm


FSN
Smoke Emission
according to ISO 10054
1,2
1,0
0,8
0,6
0,4
0,2
0,0
0
50
100
150
200
250
300
350
kW
Power setting 300 kW 1500 rpm
Power setting IMO Tier II 300 kW 1500 rpm
Power setting 360 kW 1800 rpm
Power setting IMO Tier II 360 kW 1800 rpm


l/h
Fuel Consumption
120
100
80
60
40
20
0
0
50
100
150
200
250
300
350
400
450
kW
Power setting 300 kW 1500 rpm
Power setting IMO Tier II 300 kW 1500 rpm
Power setting 360 kW 1800 rpm
Power setting IMO Tier II 360 kW 1800 rpm


Sound power level engine body
1/3 octave band analysis
dB (A)
110,00
100,00
90,00
80,00
70,00
60,00
50,00
40,00
20
31,5
50
80
125
200
315
500
800
1,25
2k
3,15
5k
8
12,5
20k
Frequency Hz
Power setting 300 kW 1500 rpm
Power setting 330 kW 1500 rpm
Power setting 360 kW 1800 rpm
Power setting 396 kW 1800 rpm

Performance	Power (kW)	Rpm
Power setting HE	300	1500
Power setting HE	300	1500
Power setting HE	360	1800
Power setting HE	360	1800
Power setting KC	300	1500
Power setting KC	300	1500
Power setting KC	360	1800
Power setting KC	360	1800

Sensors Control and Monitoring System							Switches Engine Shutdown System	
Sensors	**Signal**	**Unit**	**Range**	**Initial Delay / Warning Delay**	**Warning Level**	**Derating Level**	**Shutdown Initial Delay / Shutdown Delay**	**Shutdown Level (Tolerance)**
Coolant level switch	Digital		ON/OFF	7,5 sec from start / 7,5 sec	Low(OFF / Open contact)	NA	NA	NA
Coolant temperature	50-0 kΩ	°C	- 40 - 140 ±1.5°C	30 sec from start / 2 sec	98° C	NA	NA	NA
Coolant temperature (SDU)	Digital	°C	ON/OFF	NA	NA	NA	1 sec. from start / 1 sec	105 (±2°C) SDU Ch. S1 (NA for EME. Valid for AUX and HBR modes)*
Engine speed cam	Frequency	rpm		Instant	Lost signal	NA	NA	NA
Engine speed crank	Frequency	rpm		Instant	Lost signal	NA	NA	NA
Eng. overspeed SDU 1500 rpm+15%	Frequency	rpm / Hz	153 puls./rev.	Instant	Lost signal	NA	Instant	1725 rpm / 4399 Hz (-1 to 0%)
Eng. overspeed SDU 1800 rpm+15%	Frequency	rpm / Hz	153 puls./rev.	Instant	Lost signal	NA	Instant	2070 rpm / 5278 Hz (-1 to 0%)
Exhaust gas temperature	PT200	°C	- 40 - 750 ± 2.5%	30 sec from start / 22 sec	575° C	NA	NA	NA
Crankcase pressure	0,5-4,5 V	kPa	0-15 kPa	20 sec from start / Instant	Rapid Pressure Increase	NA	NA	NA
Oil temperature	50-0 kΩ	°C	-40 - 140°C	30 sec from start / 22 sec	130° C	NA	NA	NA

NA = Not applicable *
Emergency genset modes= EME
Auxiliary genset modes= AUX
Combined genset modes= EME, HBR

Sensors Alarm	Signal	Unit	Range	Initial Delay / Delay	Warning Level / Derating Level / Shutdown Level rpm Map (relative pressure)				Notes
Charge air pressure	0,5-4,5 V	kPa	50 - 600 ± 4 kPa				**1500 rpm**	**1800 rpm**	
Warning Level		kPa		30 sec from start / 2 sec			319	269	
Charge air Temperature	50 - 0 kΩ	°C	-40 - 130°C ±4%				**1500 rpm**	**1800 rpm**	
Warning Level		°C		90 sec from start / 22 sec			80° C	75° C	
Coolant pressure	0,5-4,5 V	kPa	0-300 kPa ±3%				**1500 rpm**	**1800 rpm**	
Warning Level		kPa		30 sec from start / 4 sec			55	81	
Seawater pressure	0,5-4,5 V	kPa	0-300 kPa ±3%				**1500 rpm**	**1800 rpm**	
Warning Level		kPa		30 sec from start / 7.5 sec			40	40	
Fuel pressure	0,5-4,5 V	kPa	0-700 kPa ±1,5%				**1500 rpm**	**1800 rpm**	
Warning Level		kPa		30 sec from start / 30 sec			270	270	
Oil pressure	0,5-4,5 V	kPa	0-700 kPa ±1,5%				**1500 rpm**	**1800 rpm**	
Warning Level		kPa		30 sec from start / 3 sec			265	265	
Shutdown Level (SDU)	Digital	kPa	ON/OFF	11 s ±20% from start / 1 s			120 ±20	120 ±20	Shutdown Unit Activated S2,S3: 510 rpm ±2% 1300 Hz ±2% 153 pulses / revolution (NA for EME. Valid for AUX and HBR modes)*