Description:

Engine type	**SB 365 G5V TW 86 (č.v. 1-079-372)**	
Fuel	Biogas (according to TEDOM: 61-0-0282.1 regulation)	
Engine design	stationary	
Engine working cycle	four-stroke, spark ignited	
Design	V, vertical	
Number of cylinder	8	
Valve train	OHV	
Number of valves per cylinder	4	
Turbocharging	yes	
Intercooler	yes	
Mixture	lean	
Cooling	liquid	
Operation (looking at flywheel)	anticlockwise	
Displacement	16,4	[dm^3]
Bore	130	[mm]
Stroke	160	[mm]
Compression ratio	14,2:1	[-]
Firing order	1-5-4-2-6-3-7-8	[-]
Number of flywheel teeth	158	[-]

Rated parameters at reference conditions:

Rated speed	1500	[min^{-1}]
Rated power output (continuous)	362,7	[kW]
Rated power output according ISO 3046-1	X	[kW]
Peak torque	2309	[Nm]

Engine heat output:

Load	100	80	60	40	[%]
Coolant heat output	157,2	147,1	126,7	108,5	[kW]
Exhaust gas heat output (cooled to 150 °C)	175,6	144,0	110,3	86,1	[kW]
Intercooler heat output	84,3	55,3	25,0	11,4	[kW]
Radiation heat	29,0	21,5	15,0	12,0	[kW]

(1)… expected distribution of intercooler heat output: HT 61,7kW, LT 22,6kW

Parameters under load:

Load	100	80	60	40	[%]
Fuel input power	878,1	715,9	517,6	396,0	[kW]
Fuel consumption	170,2	138,8	100,3	76,8	[$m^3.h^{-1}$]
Engine efficiency measured	41,3	40,5	38,5	36,6	[%]
Engine efficiency according to (2)	43,4	42,6	40,5	38,5	[%]

(2)…Efficiency computed according to regulation 61-0-0284 with full use of tolerance according to ISO 3046-1
Tolerances of values in the specification are specified in regulation 61-0-0284

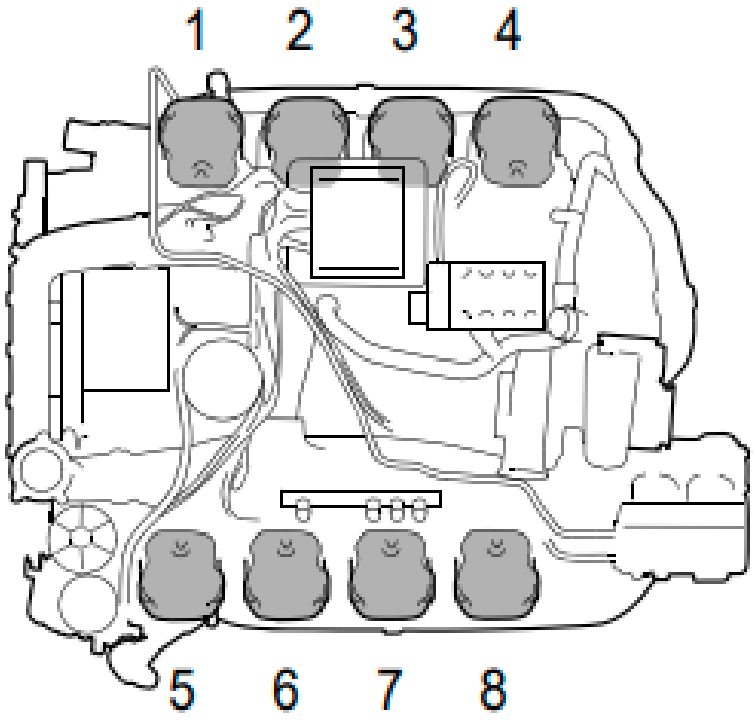
Engine parameters and settings:

Zatížení	100	80	60	40	[%]
Coefficient of excess air λ	1,558	1,574	1,505	1,468	[-]
Exhaust gas temperature at the outlet from the cylinder heads	620	597	599	593	[°C]
Exhaust gas temperature at the outlet from the turbocharger	467	466	498	513	[°C]
Combustion air flow	1626	1339	926	691	[kg.h^{-1}]
Exhaust gas flow	1846	1519	1056	790	[kg.h^{-1}]
Mixture temperature at the outlet from the turbocharger	185,0	156,5	116,7	88,5	[°C]
Maximum temperature of the mixture after the intercooler for nominal parameters	45				[°C]

Ignition advance:

Load	100	80	60	40	[%]
Cylinder no.1[(3)]	21	26	27	27	[°BTDC]
Cylinder no.2[(3)]	21	26	27	27	[°BTDC]
Cylinder no.3[(3)]	21	26	27	27	[°BTDC]
Cylinder no.4[(3)]	21	26	27	27	[°BTDC]
Cylinder no.5[(3)]	21	26	27	27	[°BTDC]
Cylinder no.6[(3)]	21	26	27	27	[°BTDC]
Cylinder no.7[(3)]	21	26	27	27	[°BTDC]
Cylinder no.8[(3)]	21	26	27	27	[°BTDC]

(3)... Cylinders marked from engine pulley



Technical and build-up parameters:

REGIME OF THE ENGINE REVOLUTION		
Overrun speed max. - gas cut-off	2100	[min^{-1}]
Overrun speed max. - ignition deactivation	2100	[min^{-1}]
ENGINE LUBRICATION		
Lubricating oil - total	48-54	[dm^3]
Lubricating oil - between max. and min.	6	[dm^3]
Oil consumption	< 0,2	[$g.kW^{-1}.h^{-1}$]
Operating lubrication pressure – rated speed	3-6	[bar]
Min. operating oil pressure - rated speed	0,7	[bar]
ENGINE COOLING		
Volume of coolant in engine and intercooler	26+10	[dm^3]
Coolant temperature at the outlet from the engine	90	[°C]
Max. coolant temperature short time (1 hour)	95	[°C]
Min. coolant temperature for 100 % load	70	[°C]
Maximum load for the coolant temperature below 70 °C	25	[%]
Minimum coolant temperature for start	10	[°C]
Recommended radiator (jacket water cooler) capacity	250	[kW]
Required engine coolant flow	500 - 600	[$dm^3.min^{-1}$]
Maximum cooling circuit pressure	250	[kPa]
OPERATING LIMITATIONS		
Min. intake air temperature for start	10	[°C]
Intake air (mixture) temperature input before turbocharger for the nominal parameters	25	[°C]
Maximum temperature of the engine compartment during operation	50	[°C]
Allowed crankcase pressure range	-1/0	[kPa]
Maximum exhaust back pressure for rated parameters (at the output of the engine)	7,2	[kPa]
Maximum permissible exhaust back pressure (at the output of the engine)	8,0	[kPa]
Maximum suction vacuum for nominal parameters (at the entrance to the mixer)	-	[kPa]
Maximum permissible suction vacuum (at the entrance to the mixer)	-	[kPa]
Recommended exhaust gas temperature upstream turbo for warning signal	640	[°C]
Recommended exhaust gas temperature upstream turbo for stop signal	660	[°C]
OPERATING CLEARANCE		
Cold valve clearance - exhaust valve	0,7	[mm]
Cold valve clearance - intake valve	0,45	[mm]

Reading in the lower window	Valve transition on cylinder	Adjust intake valve on cylinder	Adjust exhaust valve on cylinder	Adjust injector on cylinder	Reading in the upper window
DOWN TDC (0°)	6	7 and 8	4 and 5	4 and 5	UP TDC (180°)
UP TDC (180°)	7	1 and 5	2 and 6	2 and 6	DOWN TDC (0°)
DOWN TDC (360°)	1	2 and 4	3 and 7	3 and 7	UP TDC (540°)
UP TDC (540°)	4	3 and 6	1 and 8	1 and 8	DOWN TDC (360°)

Emissions:

Nitrogen oxides - NO_x	< 500	[$mg.m_n^{-3}$]
Carbon monoxide - CO	< 500	[$mg.m_n^{-3}$]
Total hydrocarbons - HC	< 1300	[$mg.m_n^{-3}$]
Methan - CH4	< 1100	[$mg.m_n^{-3}$]
Formaldehyde - HCHO	<65	[$mg.m_n^{-3}$]

Engine noise (4):

Sound power pressure of the engine	107	[dB(A)]
Sound power pressure of the exhaust line noise	120	[dB(A)]

(4)… estimated values

Reference ambient conditions for engine performance data:

Barometric pressure	100	[kPa]
Ambient temperature	25	[°C]
Relative air humidity	30	[%]

Fuel reference conditions:

Fuel pressure - reference	101,325	[kPa]
Fuel temperature - reference	0	[°C]
Fuel relative humidity	0	[%]
LHV	18,6	[$MJ.m^{-3}$]
Concentration CH_4 (biogas engines)	52	[%]
Concentration CO_2 (biogas engines)	48	[%]

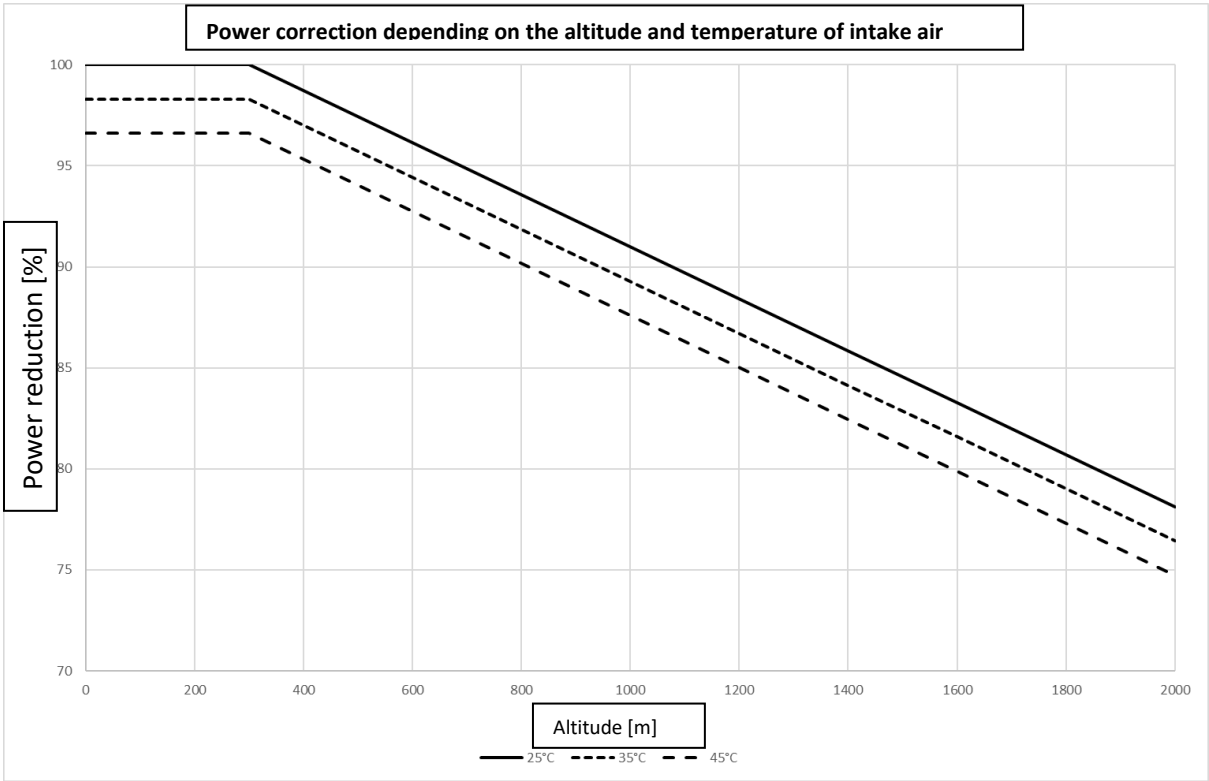
Allowed fuel parameters:

Minimum fuel methane number for a standard engine tune (5)	> 129	[-]
Minimum fuel methane number for a standard engine tune (6)	> 123	[-]
The maximum rate of change of the methane number of the fuel MN	10/30	[-/s]

(5)… Minimum methane number for fuels with a methane content between 48 and 55% vol. (without detonation detection)

(6)… Minimum methane number for fuels with methane content between 55 and 65% vol. (necessary detonation detection!)

Power correction depending on the altitude and temperature of intake air:



Time limits for low load operation:

The minimum power for continuous operation is 60 % of the rated value.

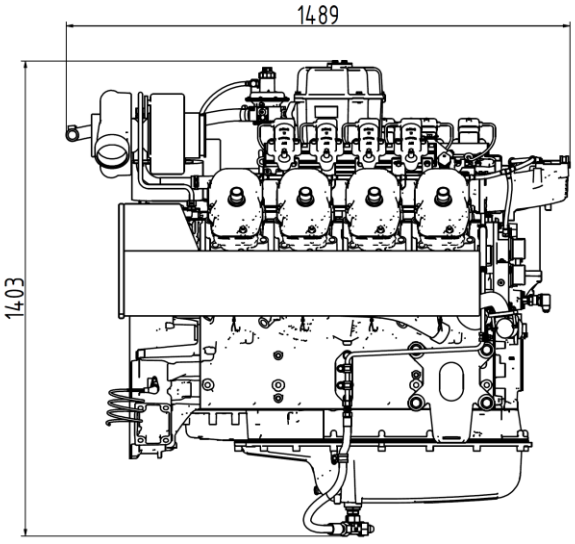
Engine power [%]	Runtime [min]
60 ÷ 100	continuous [8,9]
30 ÷ 60	max. 500 h / year; max. 5 h continuous [7,8,9]
0 ÷ 30	5 min [8,9]

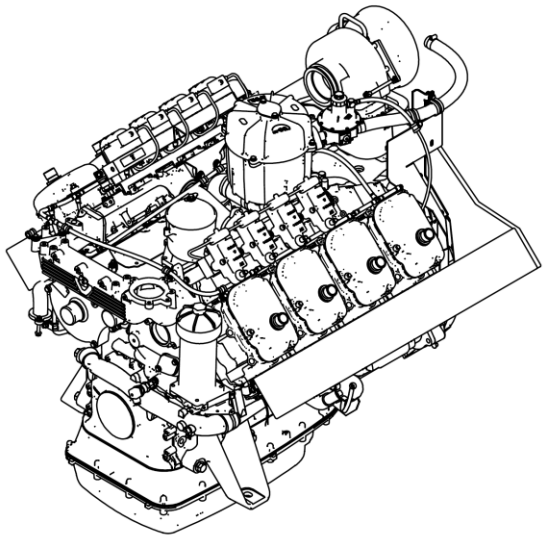
[7]... After each part load operation <60 % the engine have to be run at least 1 hour at full load (100 %).
[8]... the oil change interval must be determined by sampling according to the SCHNELL prescription: 5424_220627_Technische__Anweisung_Schmierstoffe_019_de
[9]... use prescribed Schnell oils (Longlife GE, Protect oil SAE 40, Tectrol methaflexx ZS PLUS)

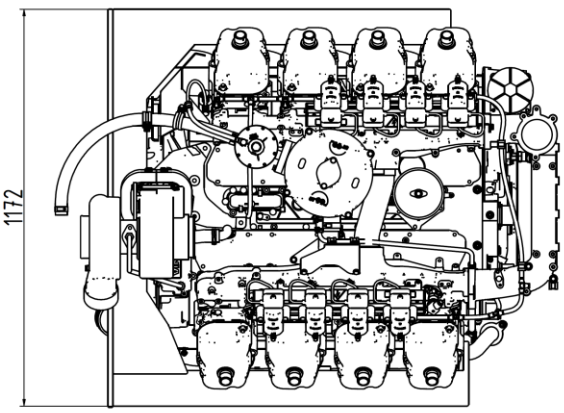
Other operating restrictions:

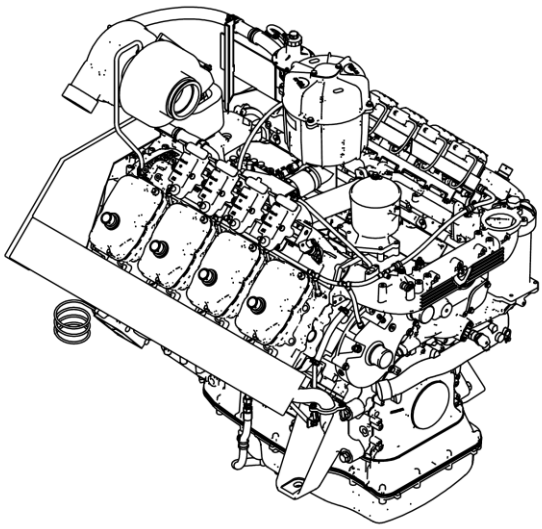
Maximum number of starts per day	4	[-/den]
Minimum running time after start	1	[hod]
In terms of wear, one start is equal	0,5	[mth]

Engine dimensions:









Total engine weight:

Total engine weight	1340	[kg]

Fitting dimensions of the engine:

Flywheel housing	SAE 1
Engine block/ flywheel housing	SAE 14

Scope of supply:

Motortech MIC-5 SE ignition	1-064-369
Ignition coils Motortech 06.50.104	1-030-214
Spark plugs Schnell M14x1	1-064-239
Schnell V20 prechambers	1-070-712
Woodward F-series 68mm electronic throttle	1-066-165
Mixer Honeywell HON 983 200/100 + Zeppelin	1-060-063 + 1-025-454
Woodward 8404-2022 Electronic Fuel Damper	1-067-964
Holset HE500FG Wastegate Turbo (A/R 22 Turbine)	1-067-770

Publication specification:

Date of specification:	Specification version:	Elaborated by:	Note:
14.2.2023	-	Hampl	Data Schnell XXX_SMP_DC16_MS14_Laststufen_V40 - kopie.xlsm