Tolerance values given in the specification is subject to internal regulation TEDOM: 61-0-0284.

Description:

Engine type	**TG 210 G5V TW 86 (Dwg. No. 7000 850/xx)**	
Fuel	natural gas (according to TEDOM: 61-0-0282.1 regulation)	
Engine design	stationary	
Engine working cycle	four-stroke, spark ignited	
Design	in-line, vertical	
Number of cylinder	6	
Valve train	OHV	
Number of valves per cylinder	2	
Turbocharging	yes	
Intercooler	yes	
Mixture	lean	
Cooling	liquid	
Operation (looking at flywheel)	anticlockwise	
Displacement	11,946	[dm^3]
Bore	130	[mm]
Stroke	150	[mm]
Compression ratio	12:1	[-]
Firing order	1-5-3-6-2-4	[-]

Rated parameters at reference conditions:

COOLING CIRCUIT	**PRIMARY**	**SECONDARY**	
Rated speed	1500	1500	[rpm]
Rated power output (continuous)	212,7	210,6	[kW]
Peak torque	1354	1341	[Nm]

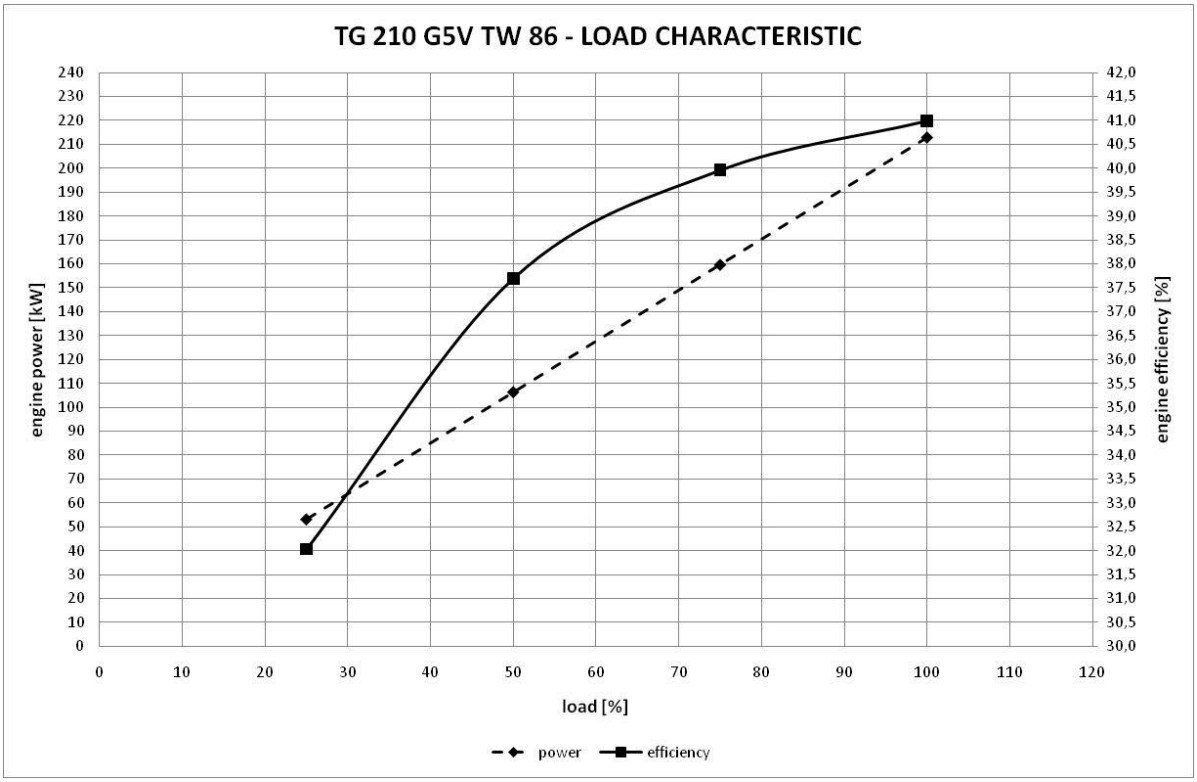
Engine heat output:

COOLING CIRCUIT	**PRIMARY**	**SECONDARY**	
Coolant heat output (with 1st section intercooler)	98,5	122,2	[kW]
Exhaust gas heat output (cooled to 120 °C)	142,3	152,5	[kW]
Intercooler heat output (2nd section)	16,3	6,4	[kW]
Radiation heat power	16,0	16,5	[kW]

Parameters under load:

COOLING CIRCUIT	**PRIMARY**	**SECONDARY**	**COOLING**			
Load	100	100	75	50	25	[%]
Fuel input power	518,9	540,9	400,2	282,1	166,0	[kW]
Efficiency	41,0	38,9	39,9	37,7	32,0	[%]
Fuel consumption	54,9	57,3	42,4	29,9	17,6	[$m^3.h^{-1}$]

Load Characteristics:



Engine parameters and settings:

COOLING CIRCUIT	PRIMARY	SECONDARY	
Ignition advance	29	25	[°]
Coefficient of excess air λ	1,63	1,54	[-]
Exhaust gas temperature at the inlet to the turbocharger	624	620	[°C]
Exhaust gas temperature at the outlet from the turbocharger	529	564	[°C]
Combustion air flow	1102	1085	[kg.h^{-1}]
Exhaust gas flow	1160	1145	[kg.h^{-1}]
Max, exhaust back pressure for rated parameters (at output of the turbocharger)	4,9	4,9	[kPa]
Recommended exhaust gas temperature for warning signal (before turbocharger)	645	640	[°C]
Recommended exhaust gas temperature for stop signal (before turbocharger)	665	660	[°C]
Max. mixture temperature downstream intercooler for the nominal parameters	45	75	[°C]

Technical and build-up parameters:

REGIME OF THE ENGINE REVOLUTION		
Overrun speed max. - gas cut-off	2100	[rpm]
Overrun speed max. - ignition deactivation	2100	[rpm]
ENGINE LUBRICATION		
Lubricating oil - total	56	[dm^3]
Lubricating oil - oil sump - max. mark	51	[dm^3]
Lubricating oil - between max. and min.	8	[dm^3]
Oil consumption	0,3-0,5	[$g.kW^{-1}.h^{-1}$]
Min. operating oil pressure - rated speed (see Instruction handbook)	360	[kPag]
ENGINE COOLING		
Volume of coolant in engine, including 1st section intercooler	30,5	[dm^3]
Coolant temperature at the outlet from the engine	85-95	[°C]
Max. coolant temperature short time (1 hour)	100	[°C]
Min. coolant temperature for 100 % load	60	[°C]
Maximum load for the coolant temperature below 60 °C	25	[%]
Minimum coolant temperature for start	10	[°C]
Recommended power cooler	200	[kW]
Required engine coolant flow	300-400	[$dm^3.min^{-1}$]
Maximum cooling circuit pressure	260	[kPaa]
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	80	[°C]
Allowed crankcase pressure range	-2/+1	[kPa]
Maximum coolant pressure in the low temperature stage intercooler	600	[kPag]
Recommended flow of coolant in the low temperature stage intercooler	75-120	[$dm^3.min^{-1}$]
Maximum temperature of the mixture entering the engine	80	[°C]
OPERATING CLEARANCE		
Cold valve clearance - intake valve	0,30	[mm]
Cold valve clearance - exhaust valve	0,55	[mm]

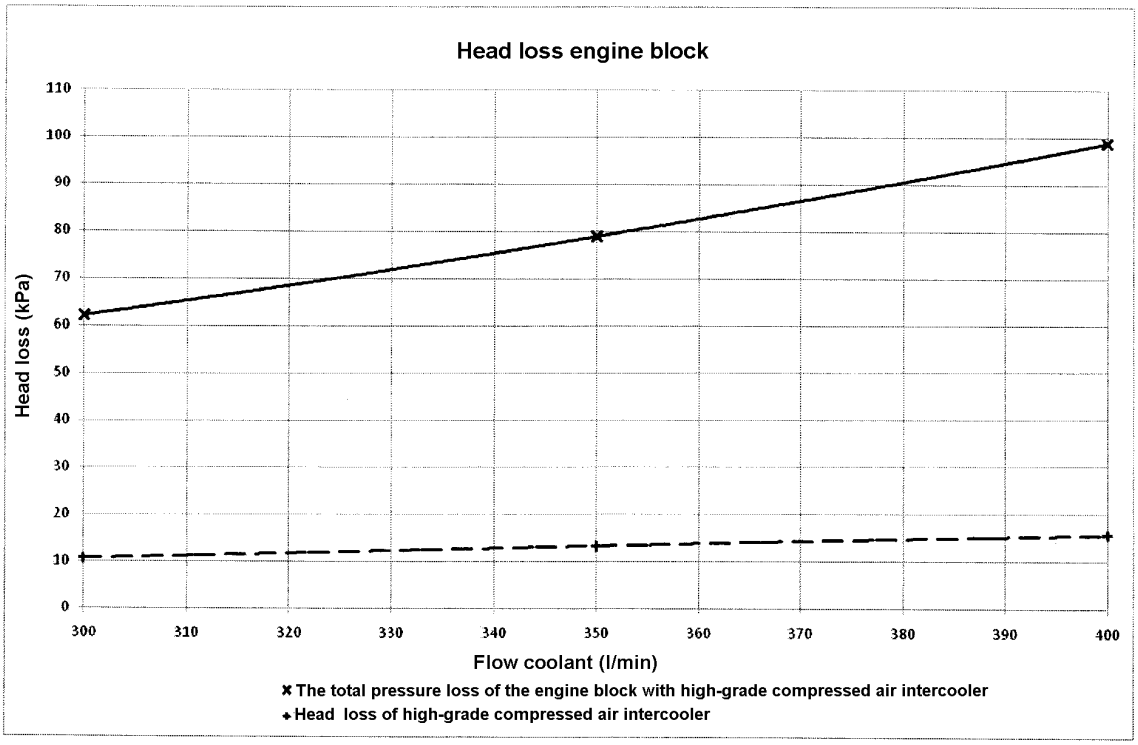
Emissions:

Nitrogen oxides - NO_x	< 500	[$mg.m_n^{-3}$]
Carbon monoxide - CO	< 650	[$mg.m_n^{-3}$]
Total hydrocarbons - HC	-	[$mg.m_n^{-3}$]
Particulate - PM[b]	-	[$mg.m_n^{-3}$]
Formaldehyde - HCHO with catalyst KTD 8024-3	< 60 < 20	[$mg.m_n^{-3}$] [$mg.m_n^{-3}$]

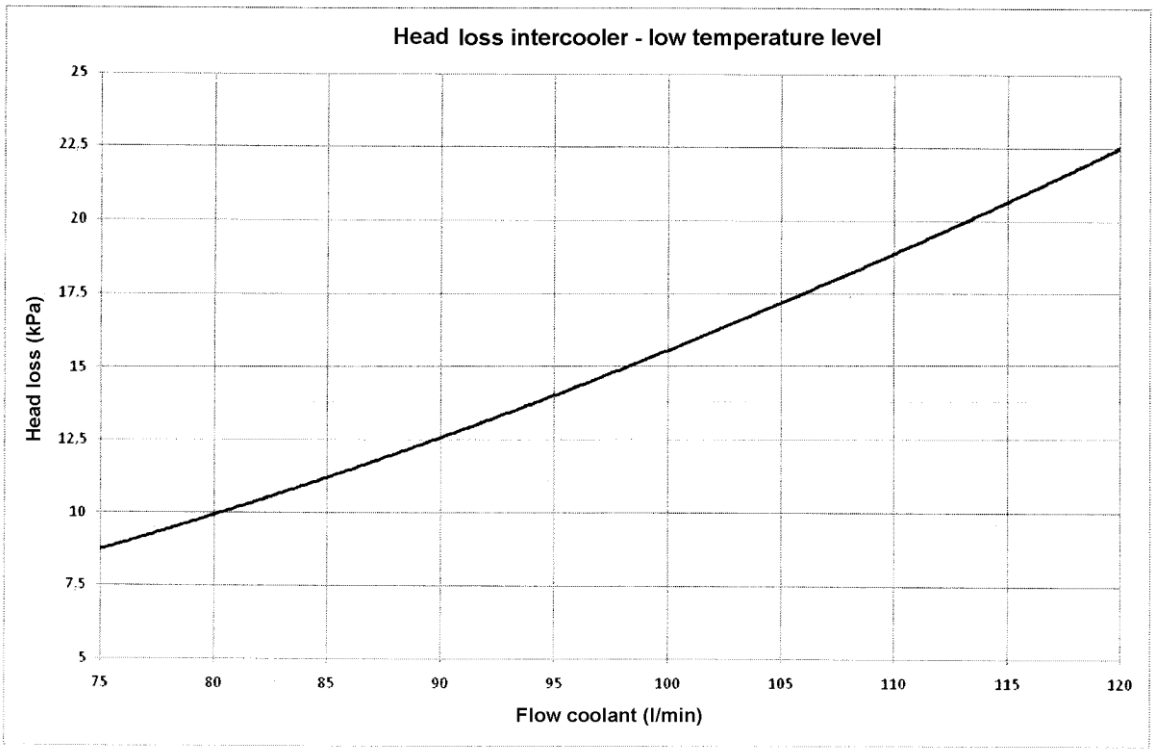
Engine noise - 100% load:

Sound power level of the engine at a distance of 1 m	94,2	[dB(A)]
Sound power level of the exhaust line noise at a distance of 1 m	116	[dB(A)]

Head loss engine block:



Head loss intercooler compressed air:



Reference ambient conditions:

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

Fuel characteristic:

Fuel pressure - reference	101,325	[kPa]
Fuel temperature - reference	15	[°C]
Fuel relative humidity	0	[%]
LHV	34	[$MJ.m^{-3}$]
CH_4 concentration (biogas engines)	-	[%]
CO_2 concentration (biogas engines)	-	[%]

Allowed fuel characteristic:

Fuel efficiency (biogas engines)	-	[$MJ.m_n^{-3}$]
Minimum CH_4 concentration	80	[%]
Minimum methane number fuel	80	[-]

Correction of power depending on the altitude:

Altitude	500	750	1000	1250	1500	[m a.s.l.]
Correction factor	1	0,96	0,93	0,89	0,85	[-]

Correction of power depending on the temperature of the fuel mixture sucked:

Mixture temperature	45	55	65	75	80	[°C]
Correction factor	1,00	0,92	0,83	0,74	0,70	[-]

Time limits for low load operation:

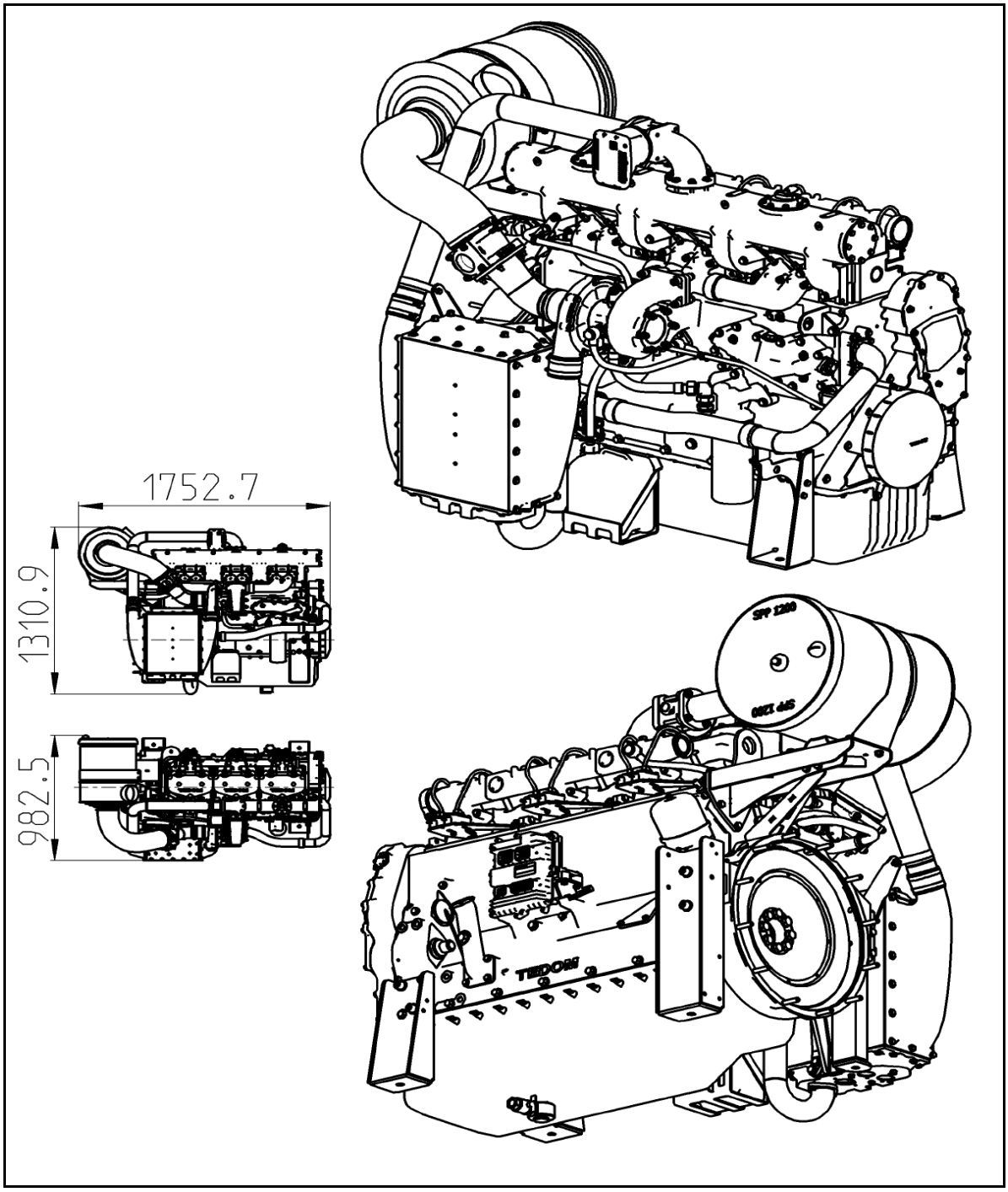
Engine power [%]	Runtime [min]
0 – 30	30*
31 - 50	120*
51 - 100	Continuous

* *After allowed running time under 51 % of nominal power must follow min. 2 hours recovery run above 70 % of nominal engine power.*

Other operating restrictions:

- Up to 4 Start per day are possible
- Minimum runtime 1 hour per Start
- Due to wear 1 start is equal 0,5 operating hours

Outline dimensions of the engine:



Total engine weight:

Total engine weight	1050	[kg]

Fitting dimensions of the engine:

Flywheel housing	SAE 1 (alternator)
Engine block/ flywheel housing	SAE 1 (with rear brackets)
Engine block	4 x M16 (for front brackets)
Flywheel	SAE 11½ (or SAE 14)

Publication specification:

Date of specification:	Specification version:	Elaborated by:	Note:
11.10.2011	1st. edition	T. Hampl	
23.2.2012	REVISION A	T. Hampl	pT2 = CHP
16.4.2012	REVISION B	T. Hampl	
25.5.2012	REVISION C	T. Hampl	3 at 5
4.12.2012	REVISION D	T. Hampl	Data for operation on secondary circuit
10.1.2013	REVISION E	V. Gulova	Emissions (Formaldehyde) engine with catalyst
18.9.2013	REVISION F	V. Gulova	Changing the ignition advance from 24° to 29°
5.12.2014	REVISION G	V. Gulova	Revision No. 558/14
9.2.2015	REVISION H	T. Hampl	Engine noise
1.11.2016	REVISION I	V. Gulova	Allowed crankcase pressure range Maximum coolant pressure in the low temperature stage intercooler
28.3.2019	REVISION J	V. Gulova	Revision No. 520/19
29.4.2020	REVISION K	V. Gulova	Revision No. 534/20