Description:

Engine type	**MB 50 G5V NX 88**	
Fuel	Biogas (according to TEDOM: 61-0-0282.1 regulation)	
Engine design	stationary	
Engine working cycle	four-stroke, spark ignited	
Design	in-line, vertical	
Number of cylinders	4	
Valve train	OHV	
Number of valves per cylinder	2	
Turbocharging	No	
Intercooler	No	
Mixture	stoichiometric	
Cooling	liquid	
Operation (looking at flywheel)	anticlockwise	
Displacement	4,58	[dm^3]
Bore	108	[mm]
Stroke	125	[mm]
Compression ratio	13:1	[-]
Firing order	1-3-4-2	[-]

Rated parameters at reference conditions:

Rated speed	1500	[min^{-1}]
Rated power output (measured)	48,7	[kW]
Rated power output (corrected acc. ISO 3046-1)	50,1	[kW]
Peak torque	310	[Nm]

Engine heat output:

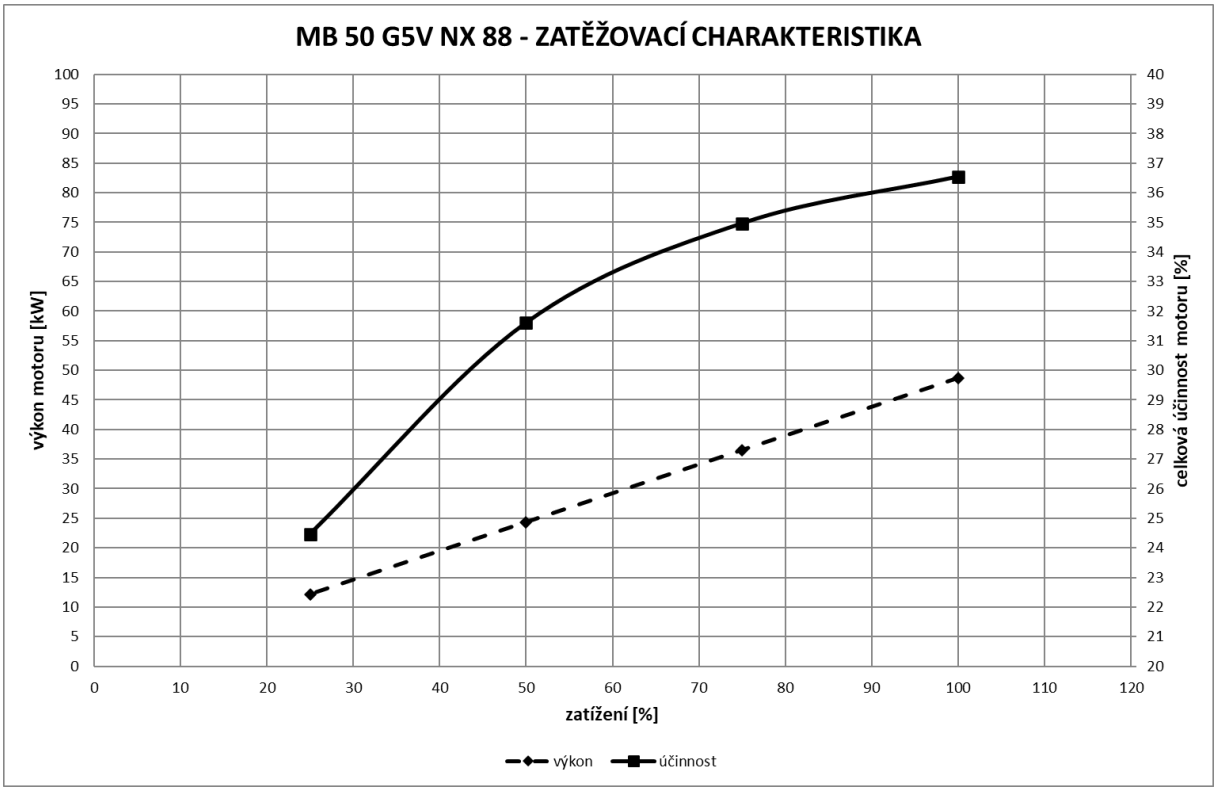
Load	100	75	50	25	[%]
Coolant heat output	40,5	33,1	25,9	18,3	[kW]
Exhaust gas heat output (cooled to 150 °C)	22,3	15,8	10,0	5,0	[kW]
Radiation heat power	13,0	12,5	12,0	11,5	[kW]

Parameters under load:

Load	100	75	50	25	[%]
Fuel input power	133,3	104,5	77,0	49,8	[kW]
Total engine efficiency	34,8	33,3	30,1	23,3	[%]
Total engine efficiency – corrected acc. ISP 3046-1	36,5	35,0	31,6	24,5	[%]
Fuel consumption	20,6	16,1	11,9	7,7	[$m^3.h^{-1}$]

Tolerances of values given in this specification are subject to internal regulation TEDOM: 61-0-0284.

Load Characteristics:



Engine parameters and settings:

Load	100	80	60	40	[%]
Ignition advance	32				
Coefficient of excess air λ	1				
Exhaust gas temperature at outlet of water-cooled exh. manifold	466	436	397	342	[°C]
Combustion air flow	194	152	112	72	[$kg.h^{-1}$]
Exhaust gas flow	218	171	126	81	[$kg.h^{-1}$]

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 volume - total	9/13	[dm^3]
Lubricating oil volume - between max. and min.	4	[dm^3]
Oil consumption – maximum permissible	0,075	[$kg.h^{-1}$]
Minimum operating lubrication pressure – rated engine speed (overpressure)	600	[kPa]
ENGINE BLOCK COOLING		
Coolant volume	12	[dm^3]
Maximum coolant temperature at engine outlet	88	[°C]
Minimum coolant temperature at engine outlet	80	[°C]
Maximum possible temperature difference of the coolant between the inlet and outlet of the engine	6	[°C]
Minimum coolant temperature for start	25	[°C]
Minimum required coolant flow rate	137	[$dm^3.min^{-1}$]
Maximum pressure in the cooling circuit	200	[kPa]
Coolant concentration min/max	33/50	[%]
OPERATING LIMITATIONS		
Minimum intake air temperature for start	-10	[°C]
Intake air (mixture) temperature for the nominal parameters	25	[°C]
Maximum temperature of the engine compartment during operation	50	[°C]
Maximum intake under-pressure for nominal parameters (at the entrance to the mixer)	X	[kPa]
Maximum allowable intake under-pressure (at the entrance to the mixer)	3	[kPa]
Maximum exhaust backpressure for nominal parameters (on engine output)	4	[kPa]
Maximum allowable exhaust backpressure (on engine output)	5	[kPa]
OPERATING CLEARANCE		
Cold valve clearance - intake valve	0,5	[mm]
Cold valve clearance - exhaust valve	0,5	[mm]
Electrode distance of spark plugs	0,25	[mm]

*… preliminary recommended value (2,5 bar stated in the manufacturer´s documentation)

Emissions production behind catalytic converter*:

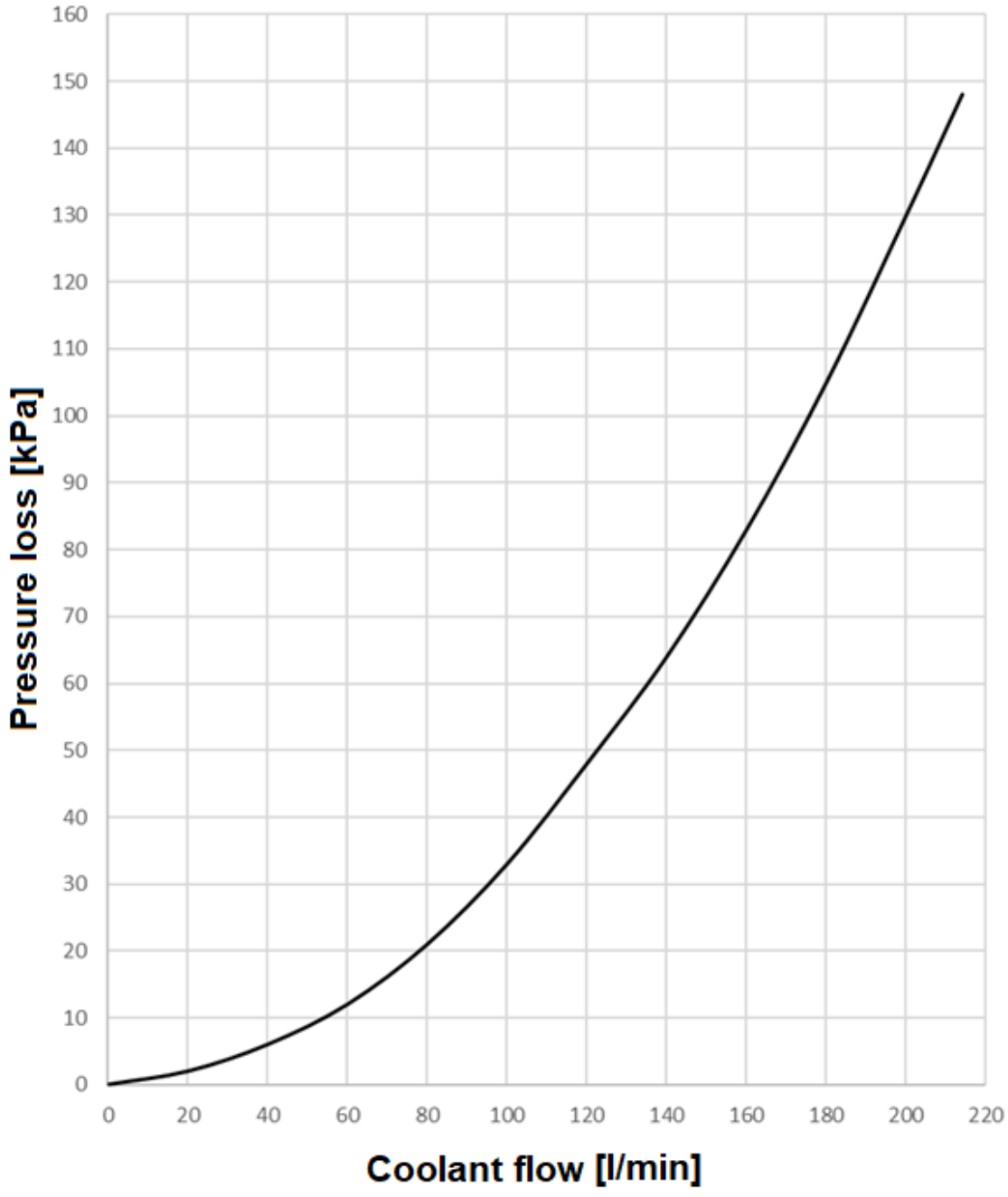
Nitrogen oxides - NO_x	< 100	[$mg.m_n^{-3}$]
Carbon monoxide – CO	< 250	[$mg.m_n^{-3}$]
Total hydrocarbons – THC	< 400	[$mg.m_n^{-3}$]
Methane – CH_4	< 350	[$mg.m_n^{-3}$]
Formaldehyde – HCHO	< 20	[$mg.m_n^{-3}$]

*valid for catalytic converter delivered by TEDOM

Engine noise:

Exhaust sound pressure level	139,0	[dB(A)]
Engine sound pressure level	98,3	[dB(A)]

Engine block pressure loss:



For the first unit, verify the actual coolant flow through the engine

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	0	[°C]
Fuel relative humidity	0	[%]
LHV	23,323	[$MJ.m^{-3}$]
CH_4 concentration (biogas engines)	65	[%]
CO_2 concentration (biogas engines)	35	[%]

Allowed fuel characteristic:

Minimum methane number fuel for standard engine adjustment	80	[-]

Minimum CH_4 concentration	50	[%]
Minimum Methane Number (MN) for standard setup (2)	134	[-]
Maximum gradient for MN change	10/30	[-/s]

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 of inlet air:

Inlet air temperature	25	30	35	40	45	50
Power correction factor	1,00	0,98	0,96	0,94	0,92	0,90

Correction of power based on fuel composition:

CH_4 concentration	65	60	55	50	[%]
Correction factor (1)	1	0,97	0,94	0,90	[-]

(1)…Minimum power de-rating, based on CH_4/CO_2 ratio. Real de-rating may be affected by other components present in the gas.

Time limits for low load operation:

Engine power [%]	Runtime [min]
50 ÷ 100	no restrictions
30 ÷ 50	- max. 500 h / year; max. 5 h continuous - the oil change interval must be determined based on the oil analysis (according to operating instructions / TUC 13.036)
0 ÷ 30	5 minutes *

Notes:

* **After each part load operation < 50 % the engine have to be run at least 1 hour at full load (100 %).**

Other operating restrictions:

Maximum number of start per day	4	[-/den]
Minimum runtime per start	1	[hod]
One start equal to hrs in terms of wear	0,5	[mth]

Total engine weight:

Total engine weight	430	[kg]

Rozměry motoru:

Width	740	[mm]
Length	825	[mm]
Height	940	[mm]

Fitting dimensions of the engine:

Flywheel flange	SAE 2

Recommended accessories to achieve nominal parameters:

Zero pressure regulator Krom-Schröder GIK 40R02-5
Mixer TEDOM
Fuel actuator Woodward L-series DN30
Air filter MANN-HUMMEL 45 200 92 920
Power flap Woodward L-series DN50
Water cooled exhaust collector MAN
Ignition Motortech MIC4
Ignition coils Motortech
Spark plugs DENSO GK3-5
Ignition coils TESLA K412C

Publication specification:

Date of release:	Version:	Elaborated by:	Note:
28.03.2023	1. vydání	T. Hampl	ZP 2020 001 + reduction of performance and overall efficiency for smaller tear-off of spark plugs (0.25mm) compared to measurement (0.6mm)