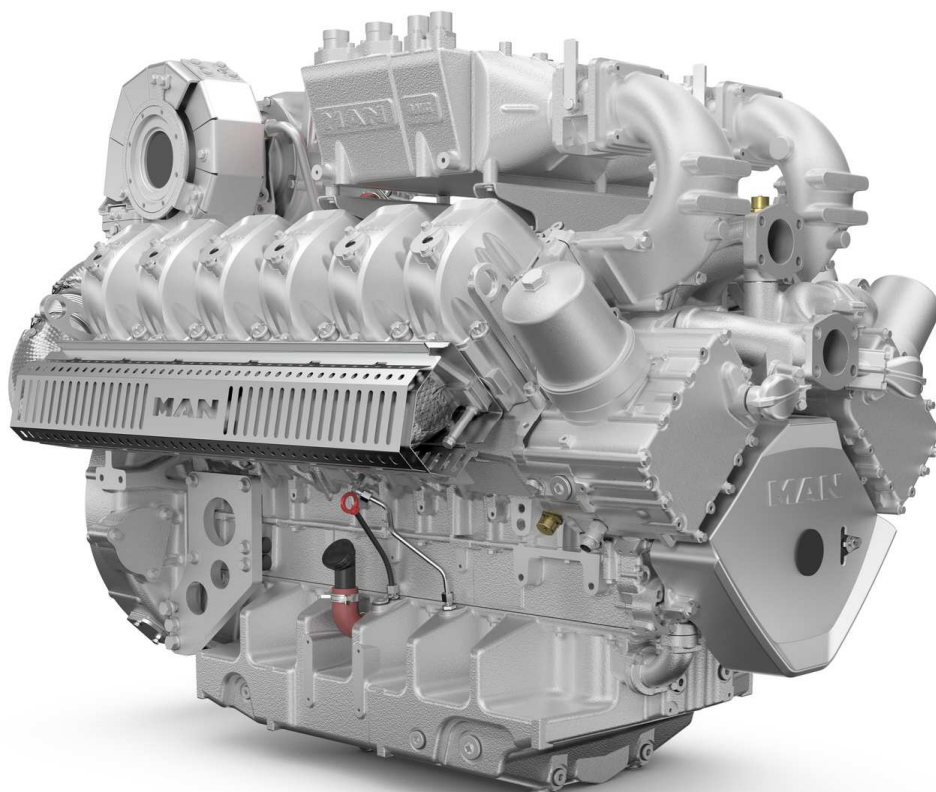


Technical Datasheet E3872 LE201 / LE202



Since our products are in continuous development, we reserve the right to make technical modifications.

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
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Technical Data - Variants of Operation Mode

E3872LE201:

Gastype	Speed	NOx - Level (with 5 % O ₂ correction)		
Natural Gas	1500 rpm (50 Hz)	0,25 g/Nm ³	Page	16
Natural Gas	1500 rpm (50 Hz)	0,50 g/Nm ³	Page	21
Special Gas	1500 rpm (50 Hz)	0,50 g/Nm ³	Page	26

E3872LE202:

Gastype	Speed	NOx - Level (with 5 % O ₂ correction)		
Natural Gas	1800 rpm (60 Hz)	0,25 g/Nm ³	Page	31
Natural Gas	1800 rpm (60 Hz)	0,50 g/Nm ³	Page	36
Special Gas	1800 rpm (60 Hz)	0,50 g/Nm ³	Page	41

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Engine Specification

4-Stroke Otto-Gas-Engine (lean operation)

Specification	metric		standard	
No. of cylinders / type of construction		12	12	V - type (90°)
Bore	mm	138	in	5,43
Stroke	mm	165	in	6,50
Displacement	l	29,62	cu in	1807
No. of valves per cylinder		4		4
Direction of rotation looking on		left		left
Flywheel housing		SAE 0		SAE 0
Ring gear with number of teeth	Z	174	Z	174
Compression ratio	ε	13,3:1	ε	13,3:1

Equipment

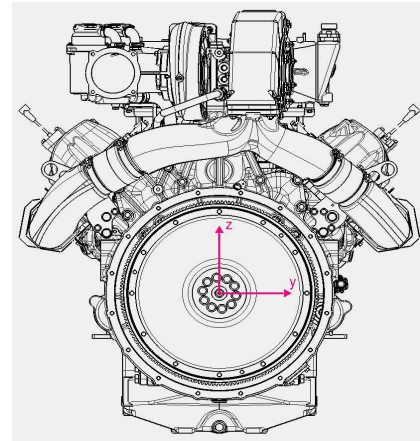
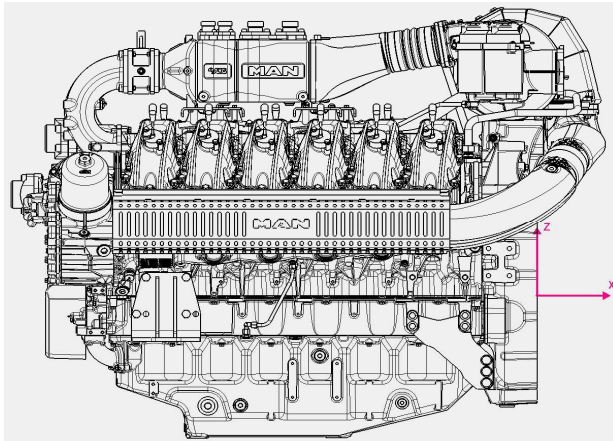
Piston:	Steel piston with compression ratio 13,3:1	
Cylinder liners:	Wet cylinder liners	
Camshaft:	Induction - hardened camshaft	
Crankshaft:	Forged crankshaft with balancing weights	
Exhaust pipes:	Dry exhaust pipes	
Turbocharging:	Pressure oil lubricated turbocharger with water cooled bearing block	
Mixture cooling / engine cooling:	Double-stage mixture cooler without cooling water pump or engine water pump; for LT-coolant circuit and for HT- and engine coolant circuit each necessary a cooling water pump with mixture temperature regulation for 50 °C (122 °F)	
Lubrication:	Forced oil lubrication with two oil pumps; two exchangeable lubrication filters in the main circuit and lubrication cooler in engine coolant circuit	
Oil pan / Oil capacity:	Oil pan with capacity 90 l (24 Imp. gal.)	
Spark plugs:	M18 x 1,5 MAN Pre-Chamber spark plug for industrial engines	
Starter:	Electric starter 24 V - 7 kW	
Required capacity of starter battery:	140 / 225 Ah (min./max.) / 24 V	
Engine monitoring acc. to scope of delivery:	Gas mixture temperature Gas mixture pressure Cooling water temperature inlet Cooling water temperature outlet Oiltemperature Oilpressure Exhaust temperature (side A, side B, single temperatures for each cylinder) Knock sensors	
Documentation:	Installation instructions Repair Manual Operating instructions Maintenance instructions Assembly drawing	51.99496-8316 51.99598-8496 51.99587-6188 51.99597-6090 51.00512-7181

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Geometric Data

		metric		standard	
Dimensions					
Engine width	mm	1243		in	48,9
Engine length	mm	1805		in	71,1
Engine height	mm	1407		in	55,4
Weight					
Engine weight, dry	kg	2159		lb	4760
Gravity data					
Center of gravity, longitudinal axis	mm	-673		in	-26,5
Reference: Flywheel housing, rear edge					
Center of gravity, transversal axis	mm	6		in	0,24
Reference: Crankshaft axis in direction of flywheel housing					
Center of gravity, vertical axis	mm	259		in	10,2
Reference: Crankshaft axis in direction of flywheel housing					
Mass moments of inertia					
Mass moment of inertia, longitudinal axis	kgm²	168		lbin²	574084
Mass moment of inertia, transversal axis	kgm²	396		lbin²	1353198
Mass moment of inertia, vertical axis	kgm²	281		lbin²	960224

Origin of the coordinate system in the crankshaft / flywheel - housing - rear edge



Torsional Mass Elastic System

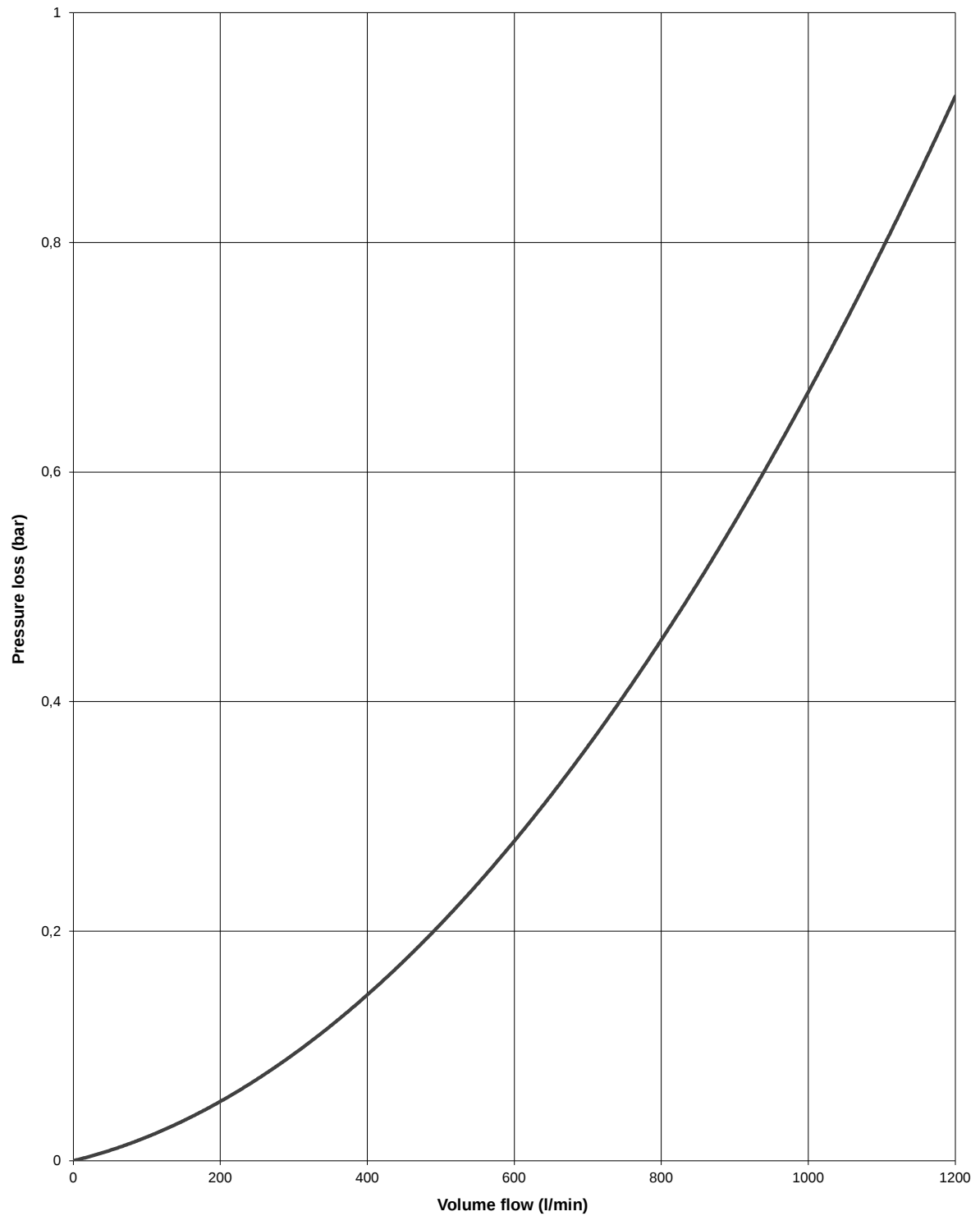
see data sheet 51.99431-8957

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Resistance Level Engine Coolant Circuit

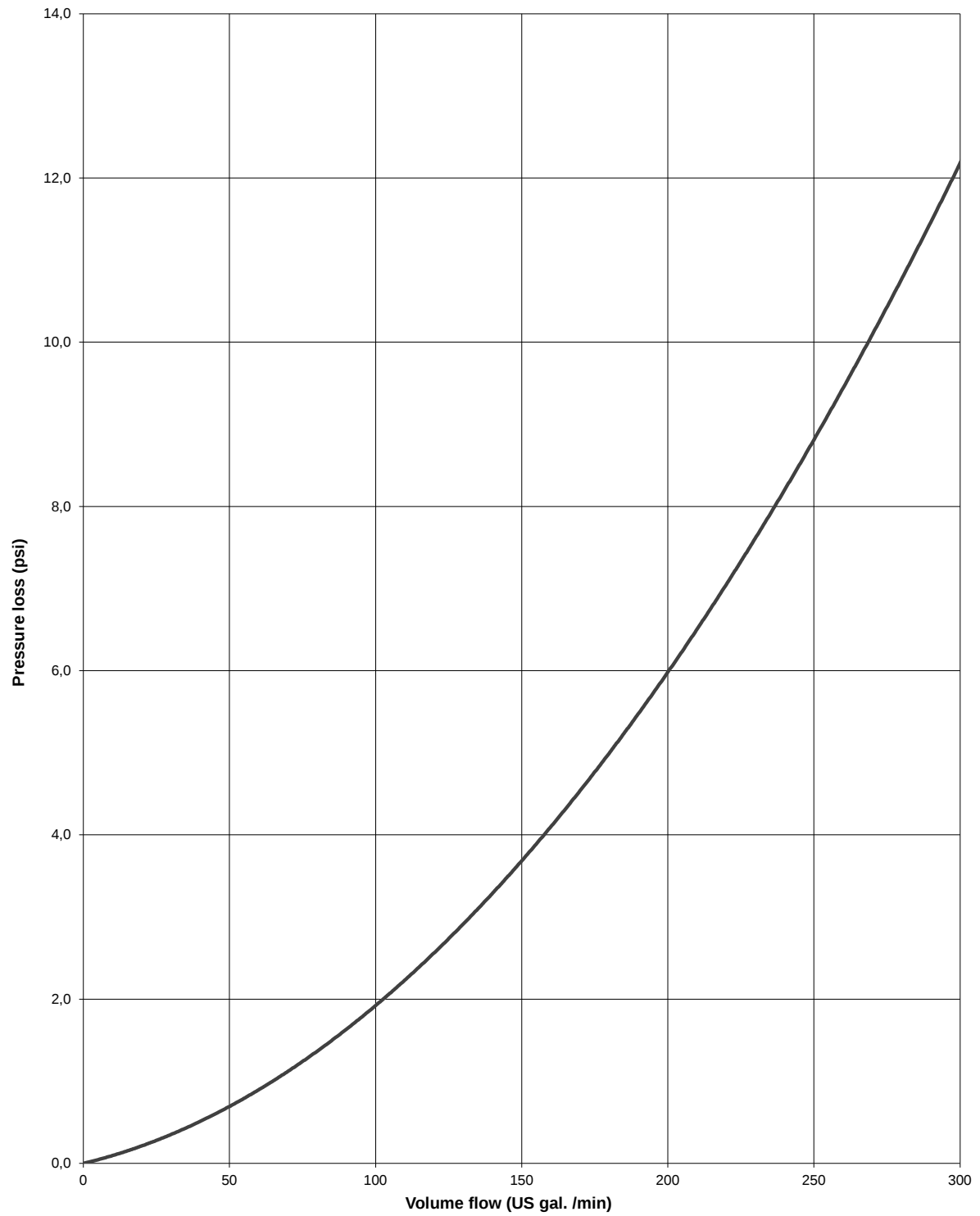
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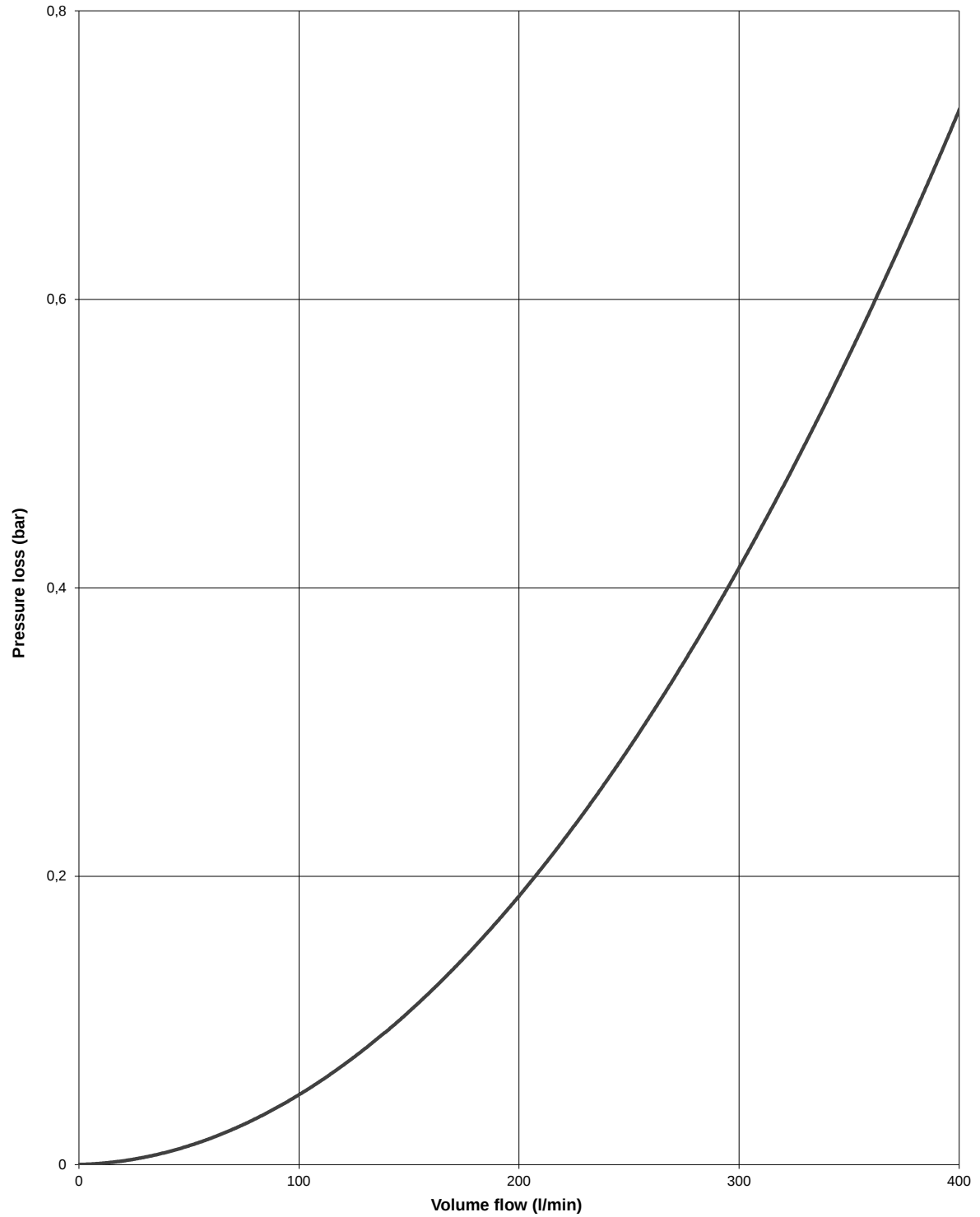
Resistance Level Engine Coolant Circuit standard



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Resistance Level of Intercooler Circuit HT

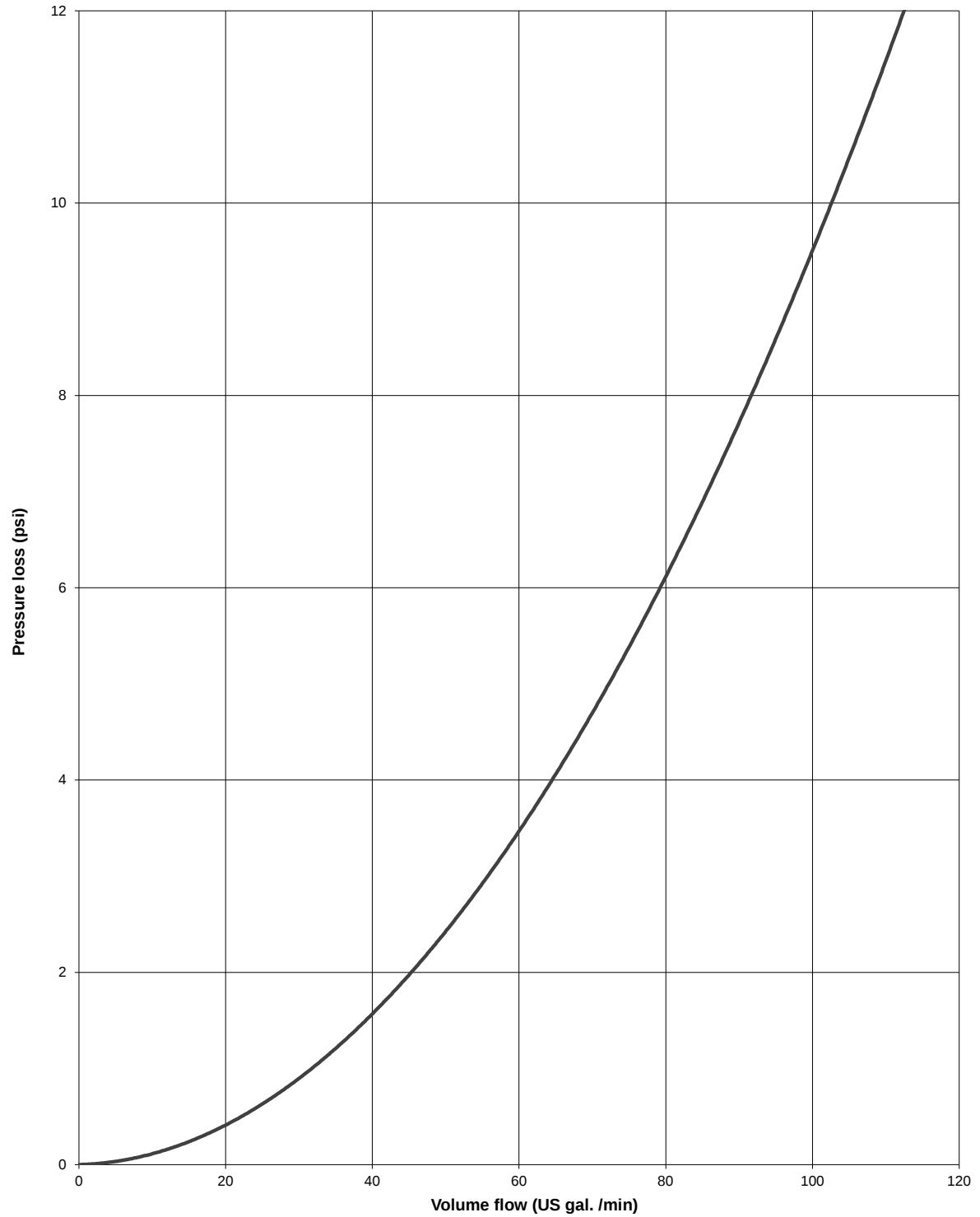
metric



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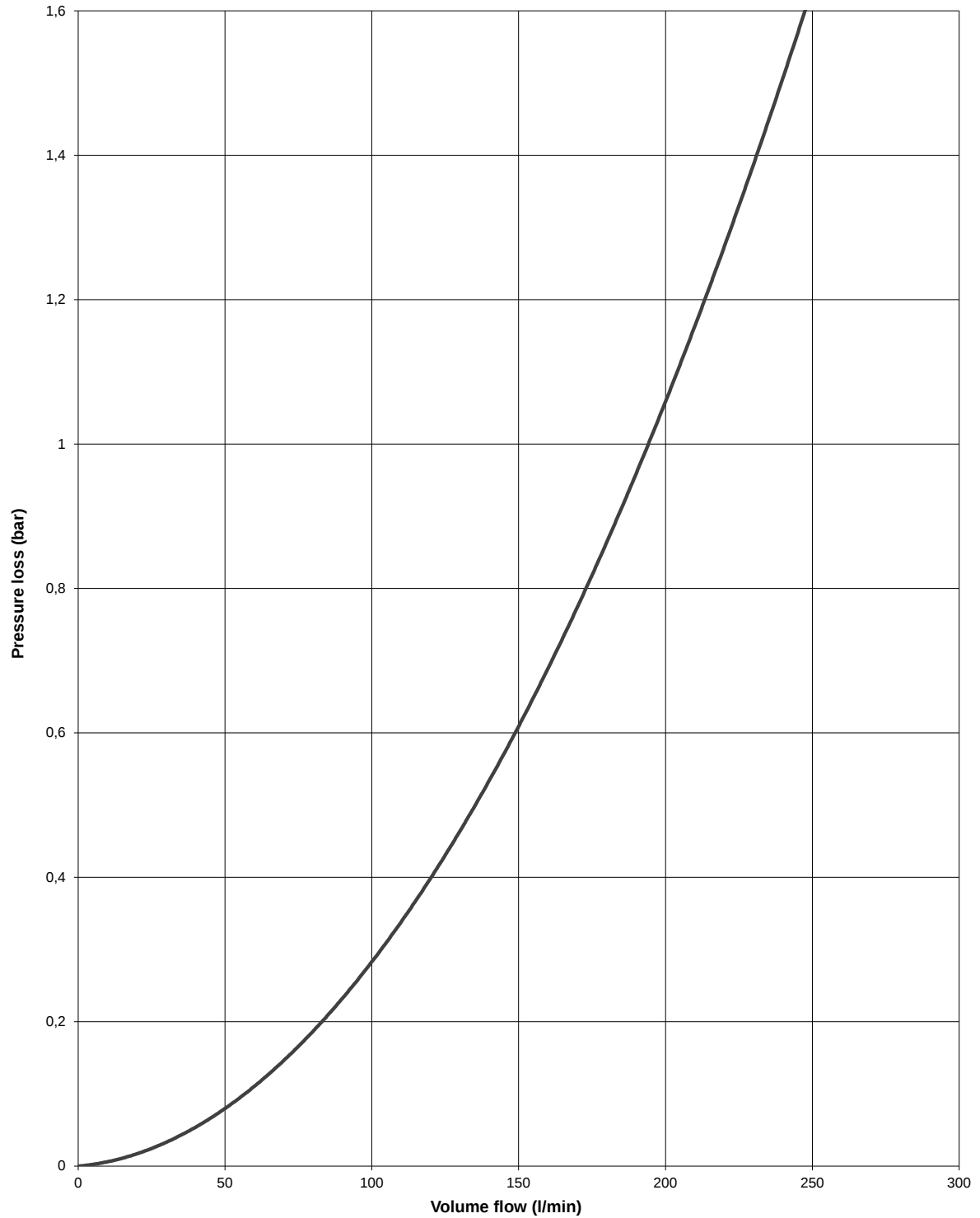
Resistance Level of Intercooler Circuit HT standard



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Resistance Level of Intercooler Circuit LT

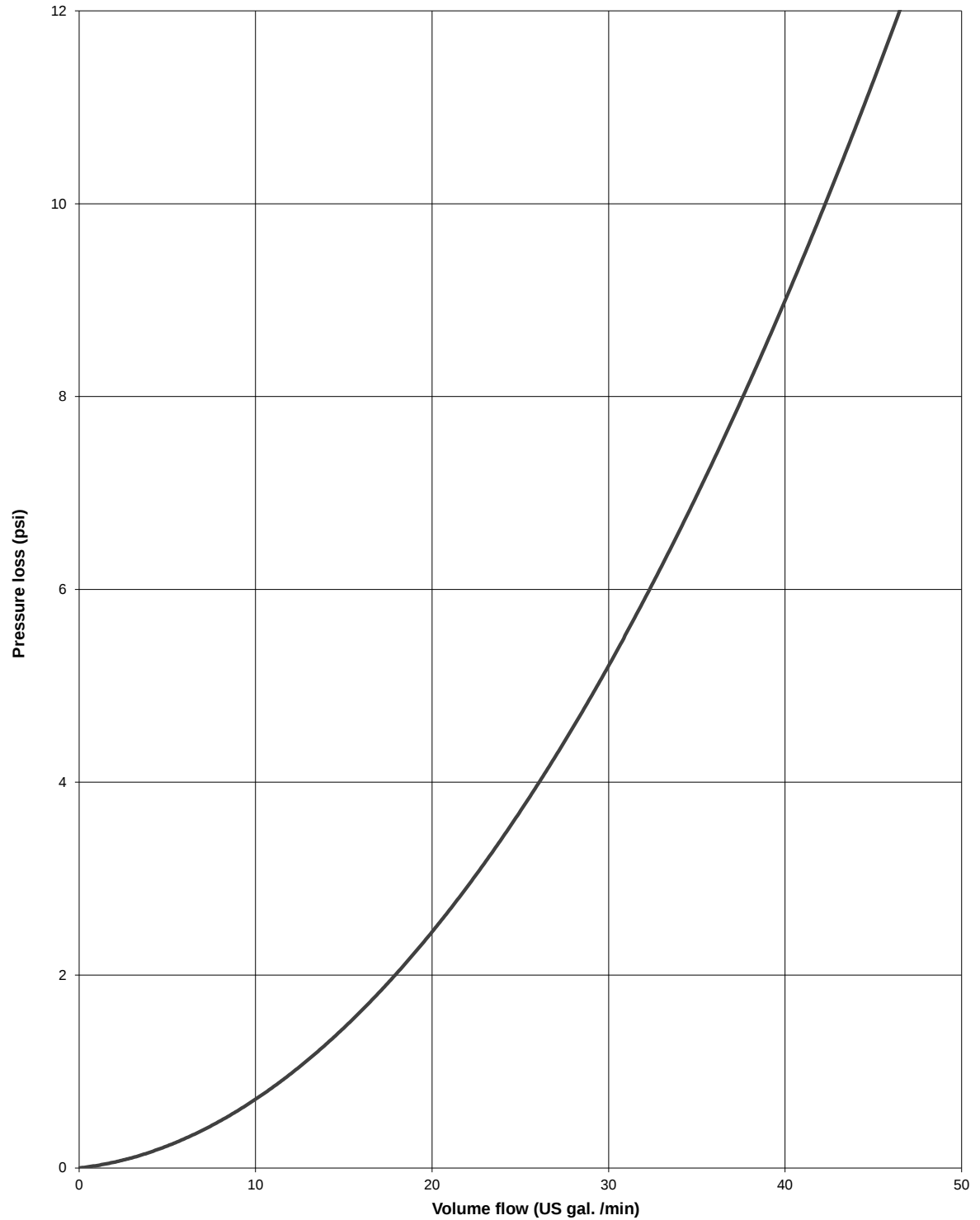
metric



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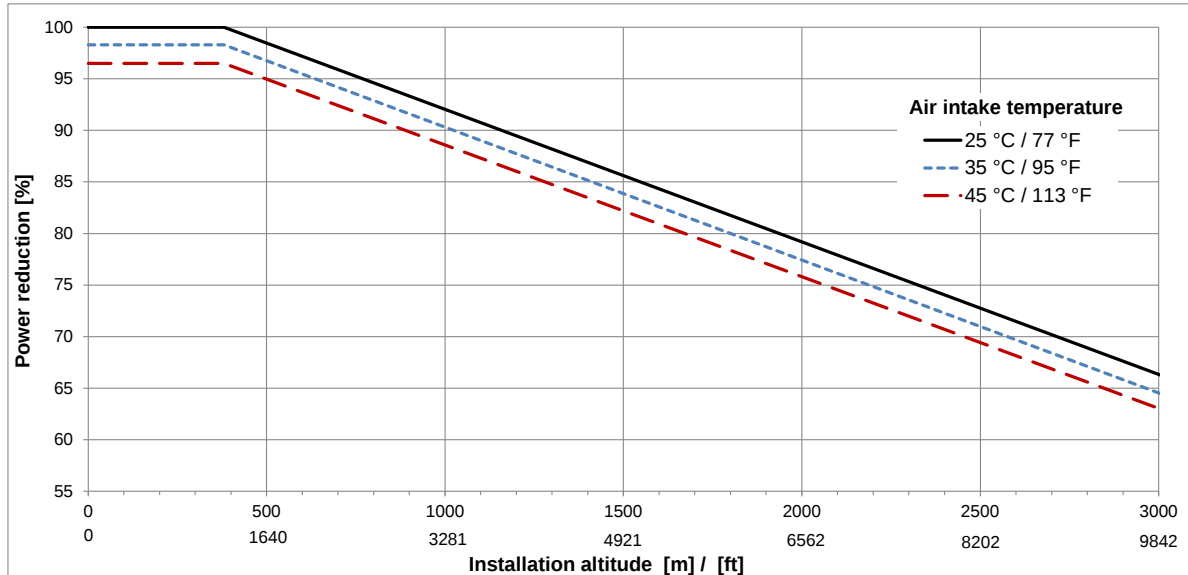
Resistance Level of Intercooler Circuit LT standard



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Power Reduction

Power reduction depending on installation altitude



Power reduction depending on installation altitude has to be implemented permanently in the system control.

Power reduction depending on mixture temperature

Mixture temp. after mixture cooler	Power reduction
°C °F	%
≥ 55 131	5
≥ 60 140	10
≥ 65 149	Operation not permitted / Engine stop

Power reduction depending on exhaust gas temperature

Exhaust gas temp. before turbocharger	Power reduction
°C °F	%
≥ 640 1184	Exhaust temperatur warning
≥ 650 1202	10
≥ 660 1220	Operation not permitted / Engine stop

Power reduction depending on spread between the individual cylinder exhaust gas temperatures

Exhaust gas temp. spread cylinders	Power reduction
°C °F	%
≥ 50 122	Exhaust gas temp. spread warning
≥ 55 131	10
≥ 60 140	Operation not permitted / Engine stop

Operation with methane numbers < 80 or H₂ - content > 2 Vol-%

Operation with natural gas with methane numbers < 80 or H₂ content > 2 Vol-% requires mandatorily the use of one of the following knock control systems:

- DetCon20, company Motortech (1500 rpm and 1800 rpm)
- Ariadne KC01, company Heinzmann (only 1500 rpm)
- DET-1600 MAN, company Altronic (1500 rpm and 1800 rpm)

The power reduction depending on mixture and exhaust gas temperature has to be implemented in addition to the power reduction depending on installation altitude.

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Acoustic Data - E3872LE201

Engine surface noise according to DIN 45635 - 11 - CL2

Natural Gas - 1500 rpm (50 Hz) - eff. Power 735 kW - NO_x 0,5 g/Nm³ (5 % O₂)

Sound pressure level of single measuring points (¹/₃ Octaves)

A - weighted measuring surface - sound pressure level

LpA (re 20 µPa)

dB(A)

98,4

A - weighted sound power level

LWA (re 1 pW)

dB(A)

115,0

Surface dimension

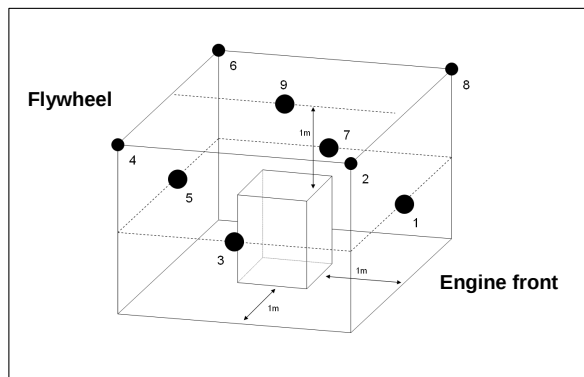
LS

dB

16,9

Frequency [Hz]	MP 1	MP 2	MP 3	MP 4	MP 5	MP 6	MP 7	MP 8	MP 9
	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]
25	18,0	15,0	19,3	13,6	26,2	19,3	14,0	12,1	18,4
31,5	14,5	9,1	13,9	9,8	29,0	10,4	17,2	9,5	13,4
40	28,5	21,6	27,3	20,9	40,1	20,4	36,0	24,4	22,6
50	26,9	36,8	51,8	43,7	44,7	42,9	50,6	36,8	40,5
63	47,3	47,3	54,4	46,7	47,1	41,9	50,1	35,7	52,3
80	51,4	51,8	55,7	56,1	49,3	55,2	60,4	53,3	57,9
100	49,2	48,9	55,9	48,0	59,2	51,6	53,0	44,6	50,4
125	58,1	54,0	58,4	57,0	64,4	53,9	65,9	50,6	59,7
160	58,4	57,3	64,1	61,6	68,2	59,9	65,4	55,9	64,2
200	69,2	63,7	69,7	68,5	71,2	63,6	68,1	64,3	69,5
250	74,8	69,8	76,1	73,3	78,6	67,3	74,9	71,0	72,8
315	84,5	74,2	77,6	80,0	84,0	76,7	78,3	75,9	79,3
400	87,0	80,4	81,3	76,3	81,4	75,8	83,2	78,7	79,4
500	85,8	79,2	85,0	77,5	83,0	78,7	81,8	77,9	78,8
630	93,9	84,2	85,6	82,3	87,0	80,8	83,8	84,4	82,2
800	93,2	90,3	90,9	83,1	85,0	82,4	87,3	87,2	85,5
1000	93,5	88,0	88,4	82,7	88,2	84,0	87,1	90,2	86,4
1250	93,1	85,4	88,7	79,2	84,0	80,4	85,8	87,2	82,1
1600	90,1	81,2	86,0	77,6	81,4	79,4	84,0	83,5	80,9
2000	89,4	79,7	87,2	77,4	87,7	79,0	80,8	82,0	78,7
2500	91,7	81,3	85,9	79,2	90,0	82,2	86,3	83,8	79,2
3150	91,0	82,7	86,9	79,7	88,8	82,0	86,2	85,5	79,8
4000	93,8	82,1	84,6	79,6	88,6	81,4	85,0	85,5	80,6
5000	88,8	78,8	82,9	78,4	85,2	78,3	81,8	81,2	79,1
6300	84,3	82,4	91,0	82,5	85,5	78,0	80,3	77,4	86,8
8000	81,0	83,7	97,3	84,0	88,0	80,4	82,5	80,1	91,6
10000	78,2	79,7	89,5	79,7	88,7	80,5	81,6	78,6	81,8
12500	77,4	82,0	91,4	81,9	87,6	79,1	80,2	77,6	83,1
16000	72,4	77,3	84,5	73,4	77,2	67,5	68,2	66,0	80,6
20000	61,1	67,7	77,0	65,3	73,6	63,0	65,2	60,5	68,8
Sum	102,6	96,1	101,8	93,1	99,2	92,8	96,4	96,4	96,4

Placement of measuring points of engine noise surface



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Acoustic Data - E3872LE201

Exhaust outlet noise according to DIN 45635 - 11 - CL2

Natural Gas - 1500 rpm (50 Hz) - eff. Power 735 kW - NO_x 0,5 g/Nm³ (5 % O₂)

Sound pressure level of single measuring points (¹/₃ Octaves)

A - weighted measuring surface - sound pressure level

L_{DA} (re 20 µPa)

dB(A) 106,5

A - weighted sound power level

L_{WA} (re 1 pW)

dB(A) 119,0

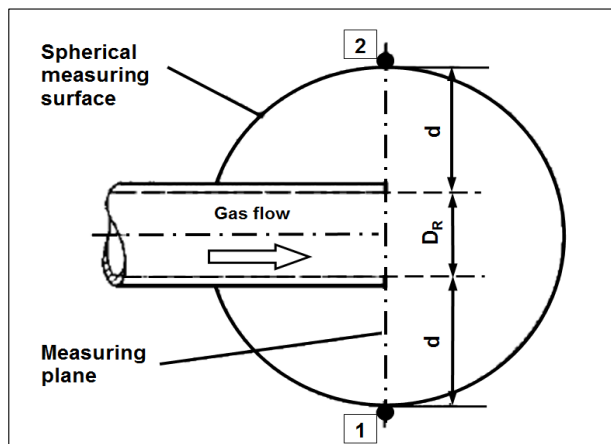
Surface dimension

L_S

dB 12,2

Frequency [Hz]	MP 1 [dB(A)]	MP 2 [dB(A)]
25	35,9	36,5
31,5	36,3	37,0
40	49,1	50,2
50	48,9	49,2
63	73,0	74,0
80	91,9	92,7
100	79,1	79,3
125	96,3	98,5
160	99,2	101,2
200	87,0	88,2
250	92,7	98,2
315	95,5	95,2
400	99,4	98,0
500	94,9	95,2
630	90,1	90,4
800	90,1	89,8
1000	90,6	91,1
1250	86,4	86,5
1600	85,8	86,2
2000	86,5	86,9
2500	88,1	88,6
3150	88,7	88,4
4000	87,1	88,3
5000	82,5	83,6
6300	80,0	79,8
8000	74,4	75,5
10000	66,8	66,6
12500	57,9	58,6
16000	46,2	46,7
20000	31,8	31,8
Sum	105,9	107,0

Placement of measuring points of exhaust outlet noise



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Acoustic Data - E3872LE202

Engine surface noise according to DIN 45635 - 11 - CL2

Natural Gas - 1800 rpm (60 Hz) - eff. Power 840 kW - NO_x 0,5 g/Nm³ (5 % O₂)

Sound pressure level of single measuring points ($\frac{1}{3}$ Octaves)

A - weighted measuring surface - sound pressure level

LpA (re 20 µPa)

dB(A)

100,2

A - weighted sound power level

LWA (re 1 pW)

dB(A)

117,0

Surface dimension

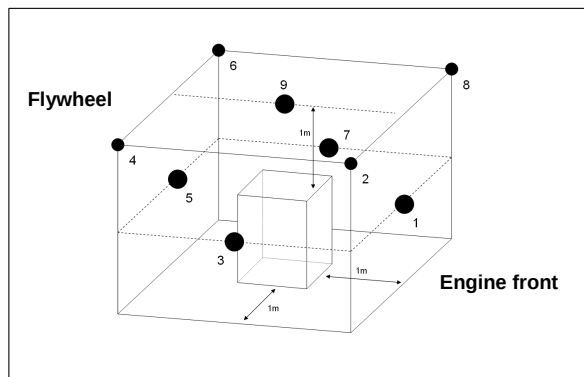
LS

dB

16,9

Frequency [Hz]	MP 1	MP 2	MP 3	MP 4	MP 5	MP 6	MP 7	MP 8	MP 9
	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]
25	10,0	9,7	6,5	8,4	18,3	7,5	5,8	9,6	6,0
31,5	26,7	17,5	27,3	21,9	37,1	14,3	19,7	13,9	27,3
40	30,4	11,5	32,4	24,0	31,6	24,6	35,9	23,1	19,4
50	40,4	21,6	42,7	33,9	36,5	34,6	46,2	33,2	28,5
63	33,5	40,7	50,3	42,3	39,2	41,9	51,2	40,5	44,4
80	49,2	54,8	56,6	57,7	58,6	53,6	51,4	49,4	58,6
100	58,2	56,7	61,8	60,8	68,5	56,2	60,0	59,6	59,2
125	59,1	51,9	61,9	56,6	57,8	57,4	63,7	58,0	62,6
160	56,8	54,7	62,4	61,7	72,3	56,1	65,8	56,9	62,0
200	72,1	68,7	72,1	66,3	78,0	67,0	71,0	69,8	77,5
250	82,8	71,9	82,3	77,2	76,6	74,5	79,5	77,4	79,6
315	85,1	75,2	80,5	75,8	83,0	76,8	81,9	77,8	77,2
400	82,7	79,2	84,7	79,3	80,5	79,2	83,2	75,7	77,8
500	88,6	81,7	88,2	79,7	83,8	80,3	83,6	81,9	81,4
630	97,9	87,5	85,3	82,5	86,8	84,5	85,5	86,5	82,6
800	97,3	94,1	89,3	87,3	83,8	83,0	90,8	88,6	89,3
1000	95,1	88,8	88,9	83,4	91,0	83,2	88,1	90,8	85,7
1250	98,5	90,9	93,3	81,1	88,6	82,5	90,2	90,4	85,0
1600	94,0	84,6	87,8	79,1	83,6	82,7	89,9	87,8	83,4
2000	91,5	84,3	91,5	79,6	89,9	82,1	86,2	85,3	81,6
2500	93,1	83,7	87,3	80,0	90,3	82,7	87,7	85,6	81,2
3150	91,6	83,8	87,6	80,1	89,0	81,7	86,8	86,6	81,5
4000	94,4	83,6	86,0	80,5	87,9	81,1	85,7	85,8	81,6
5000	90,1	79,8	83,2	80,1	87,3	79,3	82,6	82,0	80,2
6300	85,9	80,8	88,3	81,4	85,2	77,4	80,2	77,5	86,7
8000	84,8	86,7	96,8	88,6	92,0	82,0	84,1	81,3	94,8
10000	82,1	74,6	83,9	80,3	86,4	76,4	77,6	74,9	81,5
12500	79,2	80,9	89,7	81,0	88,3	79,4	80,8	78,4	83,4
16000	75,5	81,9	88,4	78,8	81,3	72,0	71,8	70,9	83,2
20000	65,2	68,2	78,1	65,5	71,6	62,0	63,9	60,0	69,7
Sum	105,5	98,9	102,2	94,9	100,3	93,8	98,8	98,1	98,5

Placement of measuring points of engine noise surface



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Released	16.12.2024	GK/PW		

Acoustic Data - E3872LE202

Exhaust outlet noise according to DIN 45635 - 11 - CL2

Natural Gas - 1800 rpm (60 Hz) - eff. Power 840 kW - NO_x 0,5 g/Nm³ (5 % O₂)

Sound pressure level of single measuring points (¹/₃ Octaves)

A - weighted measuring surface - sound pressure level

L_{DA} (re 20 µPa)

dB(A) 108,8

A - weighted sound power level

L_{WA} (re 1 pW)

dB(A) 121,0

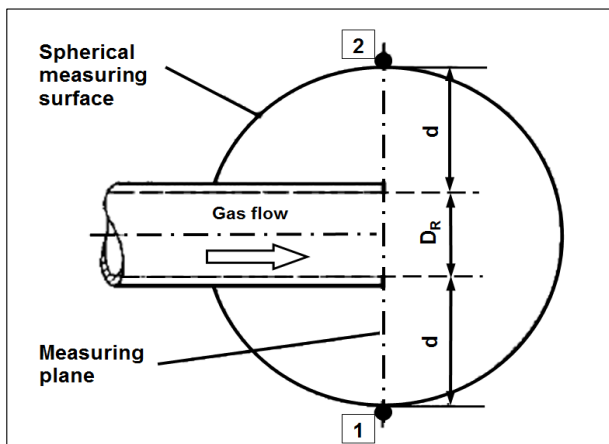
Surface dimension

L_S

dB 12,2

Frequency [Hz]	MP 1 [dB(A)]	MP 2 [dB(A)]
25	29,7	29,6
31,5	40,7	40,5
40	46,7	46,3
50	51,4	51,4
63	62,6	61,1
80	89,6	87,3
100	98,5	96,1
125	92,9	92,7
160	99,8	102,2
200	96,9	96,7
250	93,9	96,3
315	98,2	98,2
400	98,5	99,1
500	100,4	100,6
630	96,0	95,2
800	92,0	92,3
1000	95,9	95,8
1250	90,9	91,1
1600	92,5	92,3
2000	91,7	92,0
2500	93,1	93,8
3150	93,4	93,7
4000	91,8	92,3
5000	87,5	88,0
6300	84,4	84,3
8000	78,3	78,7
10000	71,5	71,2
12500	59,1	59,7
16000	49,0	50,0
20000	38,0	38,8
Sum	108,6	109,0

Placement of measuring points of exhaust outlet noise



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Mode of Operation

Natural Gas - E3872LE201

1500 rpm (50 Hz) - NO_x Level 0,25 g/Nm³ (5 % O₂)

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Natural Gas - E3872LE201 **1500 rpm (50 Hz) - NO_x Level 0,25 g/Nm³ (5 % O₂)**

Basic Data

	metric				standard		
Engine Data							
Rated speed	min ⁻¹	1500			rpm	1500	
Effective rated power	kW	735			bhp	986	
Max. engine torque at rated speed	Nm	4680			Nm	4680	
Mean effective pressure	bar	19,9			psi	287,9	
Mean piston speed	m/s	8,25			m/s	8,25	
Oil circuit							
Mean oil consumption	g/h	40			lb/hr	0,088	
Max. permissible lubricating oil consumption	g/h	100			lb/hr	0,220	
Lubricating oil filling quantity min. / max.	l	70	90		Imp.gal.	18	24
Cooling circuit							
Engine cooling water filling quantity	l	55			Imp.gal.	14,5	
- therefrom mixture cooler HT	l	5			Imp.gal.	1,3	
Mixture cooling water filling quantity LT	l	3			Imp.gal.	0,8	
Engine cooling water operating pressure max. (on engine inlet side)	bar _{rel.}	3,0			psi	44	
Engine cooling water volume flow rate min.	l/min	695			ft³/min	24,5	
Engine cooling water temperature min.	°C	80			°F	176	
Engine cooling water temperature max.	°C	90			°F	194	
Difference inlet - outlet max.	K	6			K	6	
Mixture temperature before mixture cooler max.	°C	220			°F	428	
Mixture temperature after mixture cooler max.	°C	50			°F	122	
Mixture cooling water inlet temperature HT max.	°C	83			°F	181,4	
Mixture cooling water volume flow rate HT	l/min	301			ft³/min	10,6	
Difference inlet - outlet max. HT max.	K	8			K	8	
Mixture cooling water inlet temperature LT max.	°C	44			°F	111,2	
Mixture cooling water volume flow rate LT	l/min	157			ft³/min	5,5	
Difference inlet - outlet LT max.	K	7			K	7	
Coolant concentration min. / max.	%	40	50		%	40	50
Pressure conditions							
Intake depression after air filter max. (measured in new condition)	mbar	15			psi	0,22	
Gas flow pressure before zero pressure regulator min. / max.	mbar	30	100		psi	0,44	1,45
Pressure loss gas mixer max.	mbar	75			psi	1,09	
Pressure loss gas mixture intercooler max.	mbar	25			psi	0,36	
Exhaust back pressure	mbar	60	(± 20)		psi	0,87	(± 0,29)
Emissions* metric (with 5 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	g/Nm³	0,25	0,25	0,25			
CO	g/Nm³	0,71	0,64	0,62			
THC	g/Nm³	1,52	1,84	1,78			
TOC (emission without O ₂ correction acc. to VDI 3481-4)	g/Nm³	0,89	1,04	1,08			
HCHO	mg/Nm³	77	78	78			
Emissions* standard (with 15 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	ppmvd	45	45	46			
CO	ppmvd	211	192	183			
THC	ppmvd	907	1044	1068			
HCHO	ppmvd	22	22	22			

* For dimensioning of exhaust after treatment systems tolerances and aging effects must be included in calculations.

Lube oil to MAN works standard M 3271-5 (steel piston) and coolant to MAN works standard MAN 324 Si-OAT
Gas quality according to installation guideline (corresponds to gas quality "with MAN Exhaust Aftertreatment System")

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE201 **1500 rpm (50 Hz) - NO_x Level 0,25 g/Nm³ (5 % O₂)**

Flow and Heat Balance

IT 28 °CA / 735 kW
metric

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	28	28	28
Effective rated power ¹	kW	736	552	366
Engine Cooling water heat output ²	kW	253	224	182
Mixture cooling water heat output HT ²	kW	146,7	77,0	14,0
Mixture cooling water heat output LT ²	kW	65,8	38,4	28,7
Exhaust heat output (cooled down to 120 °C)	kW	313,7	268,7	203,9
Residual heat output incl. radiation heat	kW	59,0	41,4	40,5
Rated thermal input	kW	1685	1289	896
Specific fuel consumption	MJ/kWh	8,25	8,43	8,81
Air-fuel ratio	-	1,74	1,79	1,75

Efficiency Data

Effective mechanical ¹	%	43,7	42,8	40,9
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(46,4)	(45,4)	(43,4)
Thermal ⁵	%	42,4	44,2	44,7
Total	%	86,0	87,0	85,6

Mass and Volume Flow Rates

Combustion air mass flow rate	kg/h	3681	2846	1907
Fuel mass flow rate	kg/h	127,3	99,2	68,9
Exhaust gas mass flow rate, wet	kg/h	3808	2944	1975
Exhaust gas volume flow rate, dry ⁶	Nm ³ /h	2600	2014	1346
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	kg/h	42509	34447	27997
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	kg/h	18423	12371	3781
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	kg/h	9867	5140	3670

Temperatures

Measured temperature inlet turbine	°C	575	564	551
Measured temperature outlet turbine	°C	375	404	438

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/9,0
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on Antifreeze proportion % 45
Spec. effective heat capacity c_p kJ/kg K 3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	kPa	100
	Air temperature	°C	25
	Relative air humidity	%	30

Conditions during the measurement	Atmospheric pressure abs.	kPa	97,0	99,0	99,1
	Inlet air temperature	°C	29,8	36,1	35,3
	Relative air humidity	%	49,8	64,8	65,3

Fuel gas conditions	Calorific value	MJ/kg	47,6	46,8	46,8
	Methane number		81,5	82,0	82,0
	Hydrogen content fuel gas	Vol.-%	0,0	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft Air temperature °C 0
Atmospheric pressure abs. kPa 100

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output	%	±7
Tolerance for specific fuel consumption at rated output	%	+5

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE201 **1500 rpm (50 Hz) - NO_x Level 0,25 g/Nm³ (5 % O₂)**

Flow and Heat Balance

IT 28 °CA / 735 kW
standard

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	28	28	28
Effective rated power ¹	bhp	987	740	491
Engine cooling water heat output ²	bhp	340	300	244
Mixture cooling water heat output HT ²	bhp	196,7	103,3	18,8
Mixture cooling water heat output LT ²	bhp	88,3	51,5	38,5
Exhaust heat output (cooled down to 120 °C)	bhp	421	360	273
Residual heat output incl. radiation heat	bhp	79,1	55,5	54,3
Rated thermal input	bhp	2260	1729	1201
Specific fuel consumption	BTU/ bhp-hr	5829	5955	6228
Air-fuel ratio	-	1,74	1,79	1,75

Efficiency Data

Effective mechanical ¹	%	43,7	42,8	40,9
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(46,4)	(45,4)	(43,4)
Thermal ⁵	%	42,4	44,2	44,7
Total	%	86,0	87,0	85,6

Mass and Volume Flow Rates

Combustion air mass flow rate	lb/hr	8115	6275	4204
Fuel mass flow rate	lb/hr	281	219	152
Exhaust gas mass flow rate, wet	lb/hr	8396	6491	4355
Exhaust gas volume flow rate, dry ³	Nm ³ /h	2600	2014	1346
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	lb/hr	93717	75944	61723
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	lb/hr	40615	27273	8336
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	lb/hr	21753	11332	8091

Temperatures

Measured temperature inlet turbine	°F	1067	1048	1024
Measured temperature outlet turbine	°F	707	759	820

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/9,0
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on Antifreeze proportion % 45
Spec. effective heat capacity c_p kJ/kg K 3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	psi	14,5		
	Air temperature	°F	77		
	Relative air humidity	%	30		
Conditions during the measurement	Atmospheric pressure abs.	psi	14,1	14,4	14,4
	Inlet air temperature	°F	85,6	97,0	95,5
	Relative air humidity	%	49,8	64,8	65,3
Fuel gas conditions	Calorific value	MJ/kg	47,6	46,8	46,8
	Methane number		81,5	82,0	82,0
	Hydrogen content fuel gas	Vol.-%	0,0	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft Air temperature °F 32
Atmospheric pressure abs. psi 14,5

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output	%	±7
Tolerance for specific fuel consumption at rated output	%	+5

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE201

1500 rpm (50 Hz) - NO_x Level 0,25 g/Nm³ (5 % O₂)

Values / limits for 100 % load*

Performance Data

Ignition timing (±2 °CA)	Hz	50	Hz	50
Effective rated power	°CA	28	°CA	28
O ₂ - content in exhaust gas min.	kW	736	bhp	987
NO _x - content in exhaust gas max. (with 5 % O ₂ correction)	Vol-%	10,1		
	g/Nm ³	0,25		

Operating parameters

Cooling water operating pressure max. (pump installed pressing)	bar _{rel.}	3,0	psi	44
Intake depression after air filter max. (measured in new condition)	mbar	15	psi	0,22
Gas flow pressure before zero pressure regulator min. / max.	mbar	30 100	psi	0,44 1,45
Pressure loss over gas mixer max.	mbar	75	psi	1,09
Pressure loss gas mixture intercooler max.	mbar	25	psi	0,36
Exhaust back pressure	mbar	60 (± 20)	psi	0,87 (± 0,29)

Comments:

- The data sheet values were determined at a full-load exhaust gas back pressure = 60 mbar. Higher exhaust gas back pressures are permissible, but lead to different values, especially regarding the full load rated power. An application recommendation for higher full-load exhaust gas back pressures can be requested from MAN.

- Depending on the engine control unit used, it may be necessary to change the ignition timing in the partial load range in order to avoid power fluctuations. Details can be found in the installation guidelines in chapter 12.1 Ignition system.

History:

- Base datasheet status 05.11.2024
- Knock control system DET-1600 MAN, company Altronic (1500 rpm and 1800 rpm) added on 16.12.2024

* The values and limits are valid with standard conditions acc. to ISO 3046-1 at 100 m / 328 ft above sea level

Standard conditions:		metric		standard	
	Atmospheric pressure abs.	kPa	100	psi	14,5
	Air temperature	°C	25	°F	77
	Relative air humidity	%	30	%	30

For alternative operating parameters please see chapter "Power reduction".

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Mode of Operation

Natural Gas - E3872LE201

1500 rpm (50 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE201 **1500 rpm (50 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)**

Basic Data

		metric			standard		
Engine Data							
Rated speed	min ⁻¹	1500			rpm	1500	
Effective rated power	kW	735			bhp	986	
Max. engine torque at rated speed	Nm	4680			Nm	4680	
Mean effective pressure	bar	19,9			psi	287,9	
Mean piston speed	m/s	8,25			m/s	8,25	
Oil circuit							
Mean oil consumption	g/h	40			lb/hr	0,088	
Max. permissible lubricating oil consumption	g/h	100			lb/hr	0,220	
Lubricating oil filling quantity min. / max.	l	70	90		Imp.gal.	18	24
Cooling circuit							
Engine cooling water filling quantity	l	55			Imp.gal.	14,5	
- therefrom mixture cooler HT	l	5			Imp.gal.	1,3	
Mixture cooling water filling quantity LT	l	3			Imp.gal.	0,8	
Engine cooling water operating pressure max. (on engine inlet side)	bar _{rel.}	3,0			psi	44	
Engine cooling water volume flow rate min.	l/min	696			ft³/min	24,6	
Engine cooling water temperature min.	°C	80			°F	176	
Engine cooling water temperature max.	°C	90			°F	194	
Difference inlet - outlet max.	K	6			K	6	
Mixture temperature before mixture cooler max.	°C	215			°F	419	
Mixture temperature after mixture cooler max.	°C	50			°F	122	
Mixture cooling water inlet temperature HT max.	°C	83			°F	181,4	
Mixture cooling water volume flow rate HT	l/min	275			ft³/min	9,7	
Difference inlet - outlet max. HT max.	K	8			K	8	
Mixture cooling water inlet temperature LT max.	°C	44			°F	111,2	
Mixture cooling water volume flow rate LT	l/min	148			ft³/min	5,2	
Difference inlet - outlet LT max.	K	7			K	7	
Coolant concentration min. / max.	%	40	50		%	40	50
Pressure conditions							
Intake depression after air filter max. (measured in new condition)	mbar	15			psi	0,22	
Gas flow pressure before zero pressure regulator min. / max.	mbar	30	100		psi	0,44	1,45
Pressure loss gas mixer max.	mbar	70			psi	1,02	
Pressure loss gas mixture intercooler max.	mbar	35			psi	0,51	
Exhaust back pressure	mbar	60	(± 20)		psi	0,87	(± 0,29)
Emissions* metric (with 5 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	g/Nm³	0,50	0,50	0,50			
CO	g/Nm³	0,62	0,60	0,61			
THC	g/Nm³	1,38	1,67	1,77			
TOC (emission without O ₂ correction acc. to VDI 3481-4)	g/Nm³	0,81	1,01	1,08			
HCHO	mg/Nm³	79	77	81			
Emissions* standard (with 15 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	ppmvd	86	91	91			
CO	ppmvd	185	178	181			
THC	ppmvd	828	1000	1058			
HCHO	ppmvd	22	22	23			

* For dimensioning of exhaust after treatment systems tolerances and aging effects must be included in calculations.

Lube oil to MAN works standard M 3271-5 (steel piston) and coolant to MAN works standard MAN 324 Si-OAT
Gas quality according to installation guideline (corresponds to gas quality "with MAN Exhaust Aftertreatment System")

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE201 **1500 rpm (50 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)**

Flow and Heat Balance

IT 30 °CA / 735 kW
metric

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	30	30	30
Effective rated power ¹	kW	737	551	368
Engine Cooling water heat output ²	kW	254	226	182
Mixture cooling water heat output HT ²	kW	133,9	62,0	9,8
Mixture cooling water heat output LT ²	kW	62,1	37,5	28,0
Exhaust heat output (cooled down to 120 °C)	kW	301,6	255,4	196,6
Residual heat output incl. radiation heat	kW	79,1	45,5	38,6
Rated thermal input	kW	1677	1265	883
Specific fuel consumption	MJ/kWh	8,19	8,28	8,64
Air-fuel ratio ³	-	1,74	1,78	1,74

Efficiency Data

Effective mechanical ¹	%	44,0	43,5	41,7
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(46,7)	(46,1)	(44,2)
Thermal ⁵	%	41,1	43,0	44,0
Total	%	85,1	86,5	85,7

Mass and Volume Flow Rates

Combustion air mass flow rate	kg/h	3596	2772	1875
Fuel mass flow rate	kg/h	125,8	97,4	68,0
Exhaust gas mass flow rate, wet	kg/h	3722	2869	1942
Exhaust gas volume flow rate, dry ⁶	Nm ³ /h	2555	1964	1325
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	kg/h	42579	34550	28714
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	kg/h	16823	10362	3094
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	kg/h	9302	5021	3563

Temperatures

Measured temperature inlet turbine	°C	563	552	538
Measured temperature outlet turbine	°C	372	397	432

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/9,0
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on Antifreeze proportion % 45
Spec. effective heat capacity c_p kJ/kg K 3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	kPa	100		
	Air temperature	°C	25		
	Relative air humidity	%	30		
Conditions during the measurement	Atmospheric pressure abs.	kPa	97,3	99,1	99,1
	Inlet air temperature	°C	28,9	30,8	34,8
	Relative air humidity	%	46,0	65,4	66,8
Fuel gas conditions	Calorific value	MJ/kg	48,0	46,8	46,8
	Methane number		81,5	82,0	82,0
	Hydrogen content fuel gas	Vol.-%	0,0	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft Air temperature °C 0
Atmospheric pressure abs. kPa 100

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output	%	±7
Tolerance for specific fuel consumption at rated output	%	+5

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE201 1500 rpm (50 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

Flow and Heat Balance

IT 30 °CA / 735 kW
standard

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	30	30	30
Effective rated power ¹	bhp	988	739	494
Engine cooling water heat output ²	bhp	340	303	244
Mixture cooling water heat output HT ²	bhp	179,6	83,1	13,1
Mixture cooling water heat output LT ²	bhp	83,2	50,3	37,5
Exhaust heat output (cooled down to 120 °C)	bhp	404	342	264
Residual heat output incl. radiation heat	bhp	106,1	61,0	51,8
Rated thermal input	bhp	2249	1697	1184
Specific fuel consumption	BTU/ bhp-hr	5789	5854	6108
Air-fuel ratio ³	-	1,74	1,78	1,74

Efficiency Data

Effective mechanical ¹	%	44,0	43,5	41,7
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(46,7)	(46,1)	(44,2)
Thermal ⁵	%	41,1	43,0	44,0
Total	%	85,1	86,5	85,7

Mass and Volume Flow Rates

Combustion air mass flow rate	lb/hr	7928	6111	4134
Fuel mass flow rate	lb/hr	277	215	150
Exhaust gas mass flow rate, wet	lb/hr	8206	6326	4282
Exhaust gas volume flow rate, dry ⁶	Nm ³ /h	2555	1964	1325
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	lb/hr	93871	76170	63304
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	lb/hr	37088	22844	6820
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	lb/hr	20509	11068	7856

Temperatures

Measured temperature inlet turbine	°F	1045	1026	1000
Measured temperature outlet turbine	°F	701	747	810

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/9,0
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on Antifreeze proportion % 45
Spec. effective heat capacity c_p kJ/kg K 3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	psi	14,5		
	Air temperature	°F	77		
	Relative air humidity	%	30		
Conditions during the measurement	Atmospheric pressure abs.	psi	14,1	14,4	14,4
	Inlet air temperature	°F	84,1	87,4	94,6
	Relative air humidity	%	46,0	65,4	66,8
Fuel gas conditions	Calorific value	MJ/kg	48,0	46,8	46,8
	Methane number		81,5	82,0	82,0
	Hydrogen content fuel gas	Vol.-%	0,0	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft Air temperature °F 32
Atmospheric pressure abs. psi 14,5

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output	%	±7
Tolerance for specific fuel consumption at rated output	%	+5

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE201

1500 rpm (50 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

Values / limits for 100 % load*

Performance Data

Ignition timing (±2 °CA)	Hz	50	Hz	50
Effective rated power	°CA	30	°CA	30
O ₂ - content in exhaust gas min.	kW	737	bhp	988
NO _x - content in exhaust gas max. (with 5 % O ₂ correction)	Vol-%	10,1		
	g/Nm ³	0,50		

Operating parameters

Cooling water operating pressure max. (pump installed pressing)	bar _{rel.}	3,0	psi	44
Intake depression after air filter max. (measured in new condition)	mbar	15	psi	0,22
Gas flow pressure before zero pressure regulator min. / max.	mbar	30 100	psi	0,44 1,45
Pressure loss over gas mixer max.	mbar	70	psi	1,02
Pressure loss gas mixture intercooler max.	mbar	35	psi	0,51
Exhaust back pressure	mbar	60 (± 20)	psi	0,87 (± 0,29)

Comments:

- The data sheet values were determined at a full-load exhaust gas back pressure = 60 mbar. Higher exhaust gas back pressures are permissible, but lead to different values, especially regarding the full load rated power. An application recommendation for higher full-load exhaust gas back pressures can be requested from MAN.

- Depending on the engine control unit used, it may be necessary to change the ignition timing in the partial load range in order to avoid power fluctuations. Details can be found in the installation guidelines in chapter 12.1 Ignition system.

History:

- Base datasheet status 05.11.2024
- Knock control system DET-1600 MAN, company Altronic (1500 rpm and 1800 rpm) added on 16.12.2024

* The values and limits are valid with standard conditions acc. to ISO 3046-1 at 100 m / 328 ft above sea level

Standard conditions:		metric		standard	
	Atmospheric pressure abs.	kPa	100	psi	14,5
	Air temperature	°C	25	°F	77
	Relative air humidity	%	30	%	30

For alternative operating parameters please see chapter "Power reduction".

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Mode of Operation

Special Gas - E3872LE201

1500 rpm (50 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Special Gas - E3872LE201

1500 rpm (50 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

Basic Data

		metric			standard		
Engine Data							
Rated speed	min ⁻¹	1500			rpm	1500	
Effective rated power	kW	735			bhp	986	
Max. engine torque at rated speed	Nm	4680			Nm	4680	
Mean effective pressure	bar	19,9			psi	287,9	
Mean piston speed	m/s	8,25			m/s	8,25	
Oil circuit							
Mean oil consumption	g/h	40			lb/hr	0,088	
Max. permissible lubricating oil consumption	g/h	100			lb/hr	0,220	
Lubricating oil filling quantity min. / max.	l	70	90		Imp.gal.	18	24
Cooling circuit							
Engine cooling water filling quantity	l	55			Imp.gal.	14,5	
- therefrom mixture cooler HT	l	5			Imp.gal.	1,3	
Mixture cooling water filling quantity LT	l	3			Imp.gal.	0,8	
Engine cooling water operating pressure max. (on engine inlet side)	bar _{rel.}	3,0			psi	44	
Engine cooling water volume flow rate min.	l/min	695			ft³/min	24,6	
Engine cooling water temperature min.	°C	80			°F	176	
Engine cooling water temperature max.	°C	90			°F	194	
Difference inlet - outlet max.	K	6			K	6	
Mixture temperature before mixture cooler max.	°C	225			°F	437	
Mixture temperature after mixture cooler max.	°C	50			°F	122	
Mixture cooling water inlet temperature HT max.	°C	83			°F	181,4	
Mixture cooling water volume flow rate HT	l/min	264			ft³/min	9,3	
Difference inlet - outlet max. HT max.	K	8			K	8	
Mixture cooling water inlet temperature LT max.	°C	44			°F	111,2	
Mixture cooling water volume flow rate LT	l/min	123			ft³/min	4,4	
Difference inlet - outlet LT max.	K	7			K	7	
Coolant concentration min. / max.	%	40	50		%	40	50
Pressure conditions							
Intake depression after air filter max. (measured in new condition)	mbar	15			psi	0,22	
Gas flow pressure before zero pressure regulator min. / max.	mbar	30	100		psi	0,44	1,45
Pressure loss gas mixer max.	mbar	60			psi	0,87	
Pressure loss gas mixture intercooler max.	mbar	35			psi	0,51	
Exhaust back pressure	mbar	60	(± 20)		psi	0,87	(± 0,29)
Emissions* metric (with 5 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	g/Nm³	0,50	0,50	0,50			
CO	g/Nm³	0,58	0,61	0,60			
THC	g/Nm³	1,29	1,44	1,52			
TOC (emission without O ₂ correction acc. to VDI 3481-4)	g/Nm³	0,85	0,98	1,06			
HCHO	mg/Nm³	90	78	81			
Emissions* standard (with 15 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	ppmvd	87	95	92			
CO	ppmvd	174	182	180			
THC	ppmvd	774	858	911			
HCHO	ppmvd	26	22	23			

* For dimensioning of exhaust after treatment systems tolerances and aging effects must be included in calculations.

Lube oil to MAN works standard M 3271-5 (steel piston) and coolant to MAN works standard MAN 324 Si-OAT
Gas quality according to installation guideline (corresponds to gas quality "with MAN Exhaust Aftertreatment System")

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Special Gas - E3872LE201 1500 rpm (50 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

Flow and Heat Balance

IT 30 °CA / 735 kW
metric

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	30	30	30
Effective rated power ¹	kW	741	552	369
Engine Cooling water heat output ²	kW	255	230	189
Mixture cooling water heat output HT ²	kW	129,1	69,7	14,0
Mixture cooling water heat output LT ²	kW	51,7	34,5	28,1
Exhaust heat output (cooled down to 120 °C)	kW	347,4	278,4	213,3
Residual heat output incl. radiation heat	kW	34,7	41,1	39,8
Rated thermal input	kW	1682	1293	911
Specific fuel consumption	MJ/kWh	8,18	8,61	9,08
Air-fuel ratio ³	-	1,58	1,58	1,54

Efficiency Data

Effective mechanical ¹	%	44,0	42,7	40,5
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(46,7)	(45,3)	(43,0)
Thermal ⁵	%	43,5	44,7	45,7
Total	%	87,5	87,4	86,3

Mass and Volume Flow Rates

Combustion air mass flow rate	kg/h	3532	2568	1752
Fuel mass flow rate	kg/h	329,2	261,2	184,3
Exhaust gas mass flow rate, wet	kg/h	3861	2829	1936
Exhaust gas volume flow rate, dry ⁶	Nm ³ /h	2061	1872	1277
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	kg/h	42550	36439	29857
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	kg/h	16162	10943	4109
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	kg/h	7776	4910	3659

Temperatures

Measured temperature inlet turbine	°C	580	578	563
Measured temperature outlet turbine	°C	398	422	455

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/14,9
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on Antifreeze proportion % 45
Spec. effective heat capacity c_p kJ/kg K 3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	kPa	100	
	Air temperature	°C	25	
	Relative air humidity	%	30	
Conditions during the measurement	Atmospheric pressure abs.	kPa	96,3	98,8
	Inlet air temperature	°C	20,9	34,4
	Relative air humidity	%	60,0	69,0
Fuel gas conditions	Calorific value	MJ/kg	18,4	18,2
	Methane number		117,5	120,3
	Hydrogen content fuel gas	Vol.-%	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft Air temperature °C 0
Atmospheric pressure abs. kPa 100

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output % ±7
Tolerance for specific fuel consumption at rated output % +5

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Special Gas - E3872LE201 1500 rpm (50 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

Flow and Heat Balance

IT 30 °CA / 735 kW
standard

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	30	30	30
Effective rated power ¹	bhp	993	741	495
Engine cooling water heat output ²	bhp	341	308	254
Mixture cooling water heat output HT ²	bhp	173,1	93,5	18,8
Mixture cooling water heat output LT ²	bhp	69,3	46,3	37,7
Exhaust heat output (cooled down to 120 °C)	bhp	466	373	286
Residual heat output incl. radiation heat	bhp	46,5	55,1	53,4
Rated thermal input	bhp	2256	1734	1222
Specific fuel consumption	BTU/ bhp-hr	5781	6083	6418
Air-fuel ratio ³	-	1,58	1,58	1,54

Efficiency Data

Effective mechanical ¹	%	44,0	42,7	40,5
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(46,7)	(45,3)	(43,0)
Thermal ⁵	%	43,5	44,7	45,7
Total	%	87,5	87,4	86,3

Mass and Volume Flow Rates

Combustion air mass flow rate	lb/hr	7786	5662	3863
Fuel mass flow rate	lb/hr	726	576	406
Exhaust gas mass flow rate, wet	lb/hr	8511	6237	4269
Exhaust gas volume flow rate, dry ⁶	Nm ³ /h	2061	1872	1277
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	lb/hr	93808	80335	65824
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	lb/hr	35631	24125	9059
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	lb/hr	17143	10824	8067

Temperatures

Measured temperature inlet turbine	°F	1076	1072	1045
Measured temperature outlet turbine	°F	748	792	851

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/14,9
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on Antifreeze proportion % 45
Spec. effective heat capacity c_p kJ/kg K 3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	psi	14,5		
	Air temperature	°F	77		
	Relative air humidity	%	30		
Conditions during the measurement	Atmospheric pressure abs.	psi	14,0	14,3	14,3
	Inlet air temperature	°F	69,5	93,9	98,2
	Relative air humidity	%	60,0	69,0	48,4
Fuel gas conditions	Calorific value	MJ/kg	18,4	18,2	18,2
	Methane number		117,5	120,3	120,3
	Hydrogen content fuel gas	Vol.-%	0,0	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft Air temperature °F 32
Atmospheric pressure abs. psi 14,5

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output	%	±7
Tolerance for specific fuel consumption at rated output	%	+5

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Special Gas - E3872LE201

1500 rpm (50 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

Values / limits for 100 % load*

Performance Data

Ignition timing (±2 °CA)	Hz	50	Hz	50
Effective rated power	°CA	30	°CA	30
O ₂ - content in exhaust gas min.	kW	741	bhp	993
NO _x - content in exhaust gas max. (with 5 % O ₂ correction)	Vol-%	8,8		
	g/Nm ³	0,50		

Operating parameters

Cooling water operating pressure max. (pump installed pressing)	bar _{rel.}	3,0	psi	44
Intake depression after air filter max. (measured in new condition)	mbar	15	psi	0,22
Gas flow pressure before zero pressure regulator min. / max.	mbar	30 100	psi	0,44 1,45
Pressure loss over gas mixer max.	mbar	60	psi	0,87
Pressure loss gas mixture intercooler max.	mbar	35	psi	0,51
Exhaust back pressure	mbar	60 (± 20)	psi	0,87 (± 0,29)

Comments:

- The data sheet values were determined at a full-load exhaust gas back pressure = 60 mbar. Higher exhaust gas back pressures are permissible, but lead to different values, especially regarding the full load rated power. An application recommendation for higher full-load exhaust gas back pressures can be requested from MAN.

- Depending on the engine control unit used, it may be necessary to change the ignition timing in the partial load range in order to avoid power fluctuations. Details can be found in the installation guidelines in chapter 12.1 Ignition system.

History:

- Base datasheet status 05.11.2024
- Knock control system DET-1600 MAN, company Altronic (1500 rpm and 1800 rpm) added on 16.12.2024

* The values and limits are valid with standard conditions acc. to ISO 3046-1 at 100 m / 328 ft above sea level

Standard conditions:		metric		standard	
	Atmospheric pressure abs.	kPa	100	psi	14,5
	Air temperature	°C	25	°F	77
	Relative air humidity	%	30	%	30

For alternative operating parameters please see chapter "Power reduction".

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Mode of Operation

Natural Gas - E3872LE202

1800 rpm (60 Hz) - NO_x Level 0,25 g/Nm³ (5 % O₂)

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE202 **1800 rpm (60 Hz) - NO_x Level 0,25 g/Nm³ (5 % O₂)**

Basic Data

		metric			standard		
Engine Data							
Rated speed	min ⁻¹	1800			rpm	1800	
Effective rated power	kW	800			bhp	1073	
Max. engine torque at rated speed	Nm	4244			Nm	4244	
Mean effective pressure	bar	18,0			psi	261,1	
Mean piston speed	m/s	9,90			m/s	9,90	
Oil circuit							
Mean oil consumption	g/h	50			lb/hr	0,110	
Max. permissible lubricating oil consumption	g/h	110			lb/hr	0,243	
Lubricating oil filling quantity min. / max.	l	70	90		Imp.gal.	18	24
Cooling circuit							
Engine cooling water filling quantity	l	55			Imp.gal.	14,5	
- therefrom mixture cooler HT	l	5			Imp.gal.	1,3	
Mixture cooling water filling quantity LT	l	3			Imp.gal.	0,8	
Engine cooling water operating pressure max. (on engine inlet side)	bar _{rel.}	3,0			psi	44	
Engine cooling water volume flow rate min.	l/min	799			ft³/min	28,2	
Engine cooling water temperature min.	°C	80			°F	176	
Engine cooling water temperature max.	°C	90			°F	194	
Difference inlet - outlet max.	K	6			K	6	
Mixture temperature before mixture cooler max.	°C	235			°F	455	
Mixture temperature after mixture cooler max.	°C	50			°F	122	
Mixture cooling water inlet temperature HT max.	°C	83			°F	181,4	
Mixture cooling water volume flow rate HT	l/min	342			ft³/min	12,1	
Difference inlet - outlet max. HT max.	K	8			K	8	
Mixture cooling water inlet temperature LT max.	°C	44			°F	111,2	
Mixture cooling water volume flow rate LT	l/min	184			ft³/min	6,5	
Difference inlet - outlet LT max.	K	7			K	7	
Coolant concentration min. / max.	%	40	50		%	40	50
Pressure conditions							
Intake depression after air filter max. (measured in new condition)	mbar	15			psi	0,22	
Gas flow pressure before zero pressure regulator min. / max.	mbar	30	100		psi	0,44	1,45
Pressure loss gas mixer max.	mbar	90			psi	1,31	
Pressure loss gas mixture intercooler max.	mbar	25			psi	0,36	
Exhaust back pressure	mbar	60	(± 20)		psi	0,87	(± 0,29)
Emissions* metric (with 5 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	g/Nm³	0,25	0,25	0,25			
CO	g/Nm³	0,81	0,64	0,67			
THC	g/Nm³	1,63	1,45	1,68			
TOC (emission without O ₂ correction acc. to VDI 3481-4)	g/Nm³	0,96	0,88	1,04			
HCHO	mg/Nm³	93	80	85			
Emissions* standard (with 15 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	ppmvd	39	46	45			
CO	ppmvd	242	191	200			
THC	ppmvd	976	869	1006			
HCHO	ppmvd	26	22	24			

* For dimensioning of exhaust after treatment systems tolerances and aging effects must be included in calculations.

Lube oil to MAN works standard M 3271-5 (steel piston) and coolant to MAN works standard MAN 324 Si-OAT
Gas quality according to installation guideline (corresponds to gas quality "with MAN Exhaust Aftertreatment System")

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE202 **1800 rpm (60 Hz) - NO_x Level 0,25 g/Nm³ (5 % O₂)**

Flow and Heat Balance

IT 24 °CA / 800 kW
metric

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	24	24	24
Effective rated power ¹	kW	807	600	400
Engine Cooling water heat output ²	kW	293	259	211
Mixture cooling water heat output HT ²	kW	167,4	115,3	39,0
Mixture cooling water heat output LT ²	kW	77,2	39,3	27,8
Exhaust heat output (cooled down to 120 °C)	kW	419,8	322,2	249,0
Residual heat output incl. radiation heat	kW	96,9	50,7	49,3
Rated thermal input	kW	1991	1488	1047
Specific fuel consumption	MJ/kWh	8,88	8,94	9,42
Air-fuel ratio	-	1,75	1,77	1,74

Efficiency Data

Effective mechanical ¹	%	40,5	40,3	38,2
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(43,0)	(42,7)	(40,5)
Thermal ⁵	%	44,2	46,8	47,6
Total	%	84,7	87,1	85,9

Mass and Volume Flow Rates

Combustion air mass flow rate	kg/h	4264	3178	2185
Fuel mass flow rate	kg/h	152,1	111,2	78,2
Exhaust gas mass flow rate, wet	kg/h	4416	3289	2263
Exhaust gas volume flow rate, dry ⁶	Nm ³ /h	2980	2264	1555
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	kg/h	48904	42326	34448
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	kg/h	20914	14135	4786
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	kg/h	11622	5664	4002

Temperatures

Measured temperature inlet turbine	°C	621	599	586
Measured temperature outlet turbine	°C	411	432	457

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/9,0
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on

Antifreeze proportion	%	45
Spec. effective heat capacity c _p	kJ/kg K	3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	kPa	100		
	Air temperature	°C	25		
	Relative air humidity	%	30		
Conditions during the measurement	Atmospheric pressure abs.	kPa	97,0	100,4	100,4
	Inlet air temperature	°C	25,0	30,8	32,4
	Relative air humidity	%	60,0	56,1	57,1
Fuel gas conditions	Calorific value	MJ/kg	47,1	48,3	48,3
	Methane number		80,9	80,2	80,2
	Hydrogen content fuel gas	Vol.-%	0,0	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft

Air temperature	°C	0
Atmospheric pressure abs.	kPa	100

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output	%	±7
Tolerance for specific fuel consumption at rated output	%	+5

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE202 **1800 rpm (60 Hz) - NO_x Level 0,25 g/Nm³ (5 % O₂)**

Flow and Heat Balance

IT 24 °CA / 800 kW
standard

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	24	24	24
Effective rated power ¹	bhp	1082	805	537
Engine cooling water heat output ²	bhp	393	347	282
Mixture cooling water heat output HT ²	bhp	224,5	154,6	52,3
Mixture cooling water heat output LT ²	bhp	103,6	52,7	37,3
Exhaust heat output (cooled down to 120 °C)	bhp	563	432	334
Residual heat output incl. radiation heat	bhp	129,9	68,0	66,1
Rated thermal input	bhp	2671	1996	1403
Specific fuel consumption	BTU/ bhp-hr	6279	6315	6660
Air-fuel ratio	-	1,75	1,77	1,74

Efficiency Data

Effective mechanical ¹	%	40,5	40,3	38,2
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(43,0)	(42,7)	(40,5)
Thermal ⁵	%	44,2	46,8	47,6
Total	%	84,7	87,1	85,9

Mass and Volume Flow Rates

Combustion air mass flow rate	lb/hr	9400	7006	4817
Fuel mass flow rate	lb/hr	335	245	172
Exhaust gas mass flow rate, wet	lb/hr	9736	7251	4990
Exhaust gas volume flow rate, dry ³	Nm ³ /h	2980	2264	1555
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	lb/hr	107816	93314	75944
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	lb/hr	46107	31162	10550
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	lb/hr	25623	12488	8823

Temperatures

Measured temperature inlet turbine	°F	1149	1110	1087
Measured temperature outlet turbine	°F	771	810	855

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/9,0
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on Antifreeze proportion % 45
Spec. effective heat capacity c_p kJ/kg K 3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	psi	14,5		
	Air temperature	°F	77		
	Relative air humidity	%	30		
Conditions during the measurement	Atmospheric pressure abs.	psi	14,1	14,6	14,6
	Inlet air temperature	°F	77,0	87,4	90,3
	Relative air humidity	%	60,0	56,1	57,1
Fuel gas conditions	Calorific value	MJ/kg	47,1	48,3	48,3
	Methane number		80,9	80,2	80,2
	Hydrogen content fuel gas	Vol.-%	0,0	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft Air temperature °F 32
Atmospheric pressure abs. psi 14,5

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output	%	±7
Tolerance for specific fuel consumption at rated output	%	+5

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE202

1800 rpm (60 Hz) - NO_x Level 0,25 g/Nm³ (5 % O₂)

Values / limits for 100 % load*

Performance Data

Ignition timing (±2 °CA)	Hz	60	Hz	60
Effective rated power	°CA	24	°CA	24
O ₂ - content in exhaust gas min.	kW	807	bhp	1082
NO _x - content in exhaust gas max. (with 5 % O ₂ correction)	Vol-%	10,0		
	g/Nm ³	0,25		

Operating parameters

Cooling water operating pressure max. (pump installed pressing)	bar _{rel.}	3,0	psi	44
Intake depression after air filter max. (measured in new condition)	mbar	15	psi	0,22
Gas flow pressure before zero pressure regulator min. / max.	mbar	30 100	psi	0,44 1,45
Pressure loss over gas mixer max.	mbar	90	psi	1,31
Pressure loss gas mixture intercooler max.	mbar	25	psi	0,36
Exhaust back pressure	mbar	60 (± 20)	psi	0,87 (± 0,29)

Comments:

- The data sheet values were determined at a full-load exhaust gas back pressure = 60 mbar. Higher exhaust gas back pressures are permissible, but lead to different values, especially regarding the full load rated power. An application recommendation for higher full-load exhaust gas back pressures can be requested from MAN.

- Depending on the engine control unit used, it may be necessary to change the ignition timing in the partial load range in order to avoid power fluctuations. Details can be found in the installation guidelines in chapter 12.1 Ignition system.

History:

- Base datasheet status 05.11.2024
- Knock control system DET-1600 MAN, company Altronic (1500 rpm and 1800 rpm) added on 16.12.2024

* The values and limits are valid with standard conditions acc. to ISO 3046-1 at 100 m / 328 ft above sea level

Standard conditions:		metric		standard	
	Atmospheric pressure abs.	kPa	100	psi	14,5
	Air temperature	°C	25	°F	77
	Relative air humidity	%	30	%	30

For alternative operating parameters please see chapter "Power reduction".

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Mode of Operation

Natural Gas - E3872LE202

1800 rpm (60 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE202 **1800 rpm (60 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)**

Basic Data

		metric			standard		
Engine Data							
Rated speed	min ⁻¹	1800			rpm	1800	
Effective rated power	kW	840			bhp	1126	
Max. engine torque at rated speed	Nm	4457			Nm	4457	
Mean effective pressure	bar	18,9			psi	274,2	
Mean piston speed	m/s	9,90			m/s	9,90	
Oil circuit							
Mean oil consumption	g/h	60			lb/hr	0,132	
Max. permissible lubricating oil consumption	g/h	120			lb/hr	0,265	
Lubricating oil filling quantity min. / max.	l	70	90		Imp.gal.	18	24
Cooling circuit							
Engine cooling water filling quantity	l	55			Imp.gal.	14,5	
- therefrom mixture cooler HT	l	5			Imp.gal.	1,3	
Mixture cooling water filling quantity LT	l	3			Imp.gal.	0,8	
Engine cooling water operating pressure max. (on engine inlet side)	bar _{rel.}	3,0			psi	44	
Engine cooling water volume flow rate min.	l/min	821			ft³/min	29,0	
Engine cooling water temperature min.	°C	80			°F	176	
Engine cooling water temperature max.	°C	90			°F	194	
Difference inlet - outlet max.	K	6			K	6	
Mixture temperature before mixture cooler max.	°C	235			°F	455	
Mixture temperature after mixture cooler max.	°C	50			°F	122	
Mixture cooling water inlet temperature HT max.	°C	83			°F	181,4	
Mixture cooling water volume flow rate HT	l/min	344			ft³/min	12,1	
Difference inlet - outlet max. HT max.	K	8			K	8	
Mixture cooling water inlet temperature LT max.	°C	44			°F	111,2	
Mixture cooling water volume flow rate LT	l/min	188			ft³/min	6,6	
Difference inlet - outlet LT max.	K	7			K	7	
Coolant concentration min. / max.	%	40	50		%	40	50
Pressure conditions							
Intake depression after air filter max. (measured in new condition)	mbar	15			psi	0,22	
Gas flow pressure before zero pressure regulator min. / max.	mbar	30	100		psi	0,44	1,45
Pressure loss gas mixer max.	mbar	85			psi	1,23	
Pressure loss gas mixture intercooler max.	mbar	35			psi	0,51	
Exhaust back pressure	mbar	60	(± 20)		psi	0,87	(± 0,29)
Emissions* metric (with 5 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	g/Nm³	0,50	0,50	0,50			
CO	g/Nm³	0,61	0,60	0,60			
THC	g/Nm³	1,24	1,34	1,50			
TOC (emission without O ₂ correction acc. to VDI 3481-4)	g/Nm³	0,75	0,82	0,93			
HCHO	mg/Nm³	77	81	84			
Emissions* standard (with 15 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	ppmvd	88	92	92			
CO	ppmvd	181	179	178			
THC	ppmvd	739	801	897			
HCHO	ppmvd	22	23	24			

* For dimensioning of exhaust after treatment systems tolerances and aging effects must be included in calculations.

Lube oil to MAN works standard M 3271-5 (steel piston) and coolant to MAN works standard MAN 324 Si-OAT
Gas quality according to installation guideline (corresponds to gas quality "with MAN Exhaust Aftertreatment System")

	Date	Signature	No. of data sheet	Index
Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE202 **1800 rpm (60 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)**

Flow and Heat Balance

IT 24 °CA / 840 kW
metric

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	24	24	24
Effective rated power ¹	kW	833	630	420
Engine Cooling water heat output ²	kW	301	258	214
Mixture cooling water heat output HT ²	kW	168,4	113,8	41,6
Mixture cooling water heat output LT ²	kW	78,6	38,0	26,7
Exhaust heat output (cooled down to 120 °C)	kW	448,7	317,5	240,5
Residual heat output incl. radiation heat	kW	31,7	65,8	57,6
Rated thermal input	kW	2003	1525	1070
Specific fuel consumption	MJ/kWh	8,66	8,72	9,17
Air-fuel ratio ³	-	1,73	1,75	1,71

Efficiency Data

Effective mechanical ¹	%	41,6	41,3	39,3
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(44,1)	(43,8)	(41,6)
Thermal ⁵	%	45,8	45,2	46,4
Total	%	87,4	86,5	85,7

Mass and Volume Flow Rates

Combustion air mass flow rate	kg/h	4619	3186	2155
Fuel mass flow rate	kg/h	153,1	113,9	79,9
Exhaust gas mass flow rate, wet	kg/h	4777	3300	2235
Exhaust gas volume flow rate, dry ⁶	Nm ³ /h	3232	2267	1529
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	kg/h	50243	43679	34940
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	kg/h	21044	14809	5340
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	kg/h	11834	5609	3846

Temperatures

Measured temperature inlet turbine	°C	610	593	579
Measured temperature outlet turbine	°C	407	418	450

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/9,0
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on

Antifreeze proportion	%	45
Spec. effective heat capacity c _p	kJ/kg K	3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	kPa	100		
	Air temperature	°C	25		
	Relative air humidity	%	30		
Conditions during the measurement	Atmospheric pressure abs.	kPa	98,0	100,2	100,2
	Inlet air temperature	°C	25,0	32,8	30,9
	Relative air humidity	%	70,0	52,8	51,5
Fuel gas conditions	Calorific value	MJ/kg	47,1	48,3	48,3
	Methane number		80,9	80,2	80,2
	Hydrogen content fuel gas	Vol.-%	0,0	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft

Air temperature	°C	0
Atmospheric pressure abs.	kPa	100

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output	%	±7
Tolerance for specific fuel consumption at rated output	%	+5

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Created	16.12.2024	FM	51.99494-7094	D
Released	16.12.2024	GK/PW		

Natural Gas - E3872LE202 **1800 rpm (60 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)**

Flow and Heat Balance

IT 24 °CA / 840 kW
standard

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	24	24	24
Effective rated power ¹	bhp	1117	845	564
Engine cooling water heat output ²	bhp	404	346	287
Mixture cooling water heat output HT ²	bhp	225,9	152,6	55,8
Mixture cooling water heat output LT ²	bhp	105,5	51,0	35,8
Exhaust heat output (cooled down to 120 °C)	bhp	602	426	323
Residual heat output incl. radiation heat	bhp	42,5	88,2	77,2
Rated thermal input	bhp	2687	2045	1434
Specific fuel consumption	BTU/ bhp-hr	6121	6166	6482
Air-fuel ratio ³	-	1,73	1,75	1,71

Efficiency Data

Effective mechanical ¹	%	41,6	41,3	39,3
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(44,1)	(43,8)	(41,6)
Thermal ⁵	%	45,8	45,2	46,4
Total	%	87,4	86,5	85,7

Mass and Volume Flow Rates

Combustion air mass flow rate	lb/hr	10182	7024	4751
Fuel mass flow rate	lb/hr	337	251	176
Exhaust gas mass flow rate, wet	lb/hr	10533	7275	4927
Exhaust gas volume flow rate, dry ³	Nm ³ /h	3232	2267	1529
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	lb/hr	110767	96296	77031
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	lb/hr	46395	32649	11773
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	lb/hr	26089	12367	8479

Temperatures

Measured temperature inlet turbine	°F	1129	1100	1074
Measured temperature outlet turbine	°F	765	785	842

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/9,0
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on Antifreeze proportion % 45
Spec. effective heat capacity c_p kJ/kg K 3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	psi	14,5		
	Air temperature	°F	77		
	Relative air humidity	%	30		
Conditions during the measurement	Atmospheric pressure abs.	psi	14,2	14,5	14,5
	Inlet air temperature	°F	77,0	91,0	87,6
	Relative air humidity	%	70,0	52,8	51,5
Fuel gas conditions	Calorific value	MJ/kg	47,1	48,3	48,3
	Methane number		80,9	80,2	80,2
	Hydrogen content fuel gas	Vol.-%	0,0	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft Air temperature °F 32
Atmospheric pressure abs. psi 14,5

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output	%	±7
Tolerance for specific fuel consumption at rated output	%	+5

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Released	16.12.2024	GK/PW		

Natural Gas - E3872LE202

1800 rpm (60 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

Values / limits for 100 % load*

Performance Data

Ignition timing (±2 °CA)	Hz	60	Hz	60
Effective rated power	°CA	24	°CA	24
O ₂ - content in exhaust gas min.	kW	833	bhp	1117
NO _x - content in exhaust gas max. (with 5 % O ₂ correction)	Vol-%	9,7		
	g/Nm ³	0,50		

Operating parameters

Cooling water operating pressure max. (pump installed pressing)	bar _{rel.}	3,0	psi	44
Intake depression after air filter max. (measured in new condition)	mbar	15	psi	0,22
Gas flow pressure before zero pressure regulator min. / max.	mbar	30 100	psi	0,44 1,45
Pressure loss over gas mixer max.	mbar	85	psi	1,23
Pressure loss gas mixture intercooler max.	mbar	35	psi	0,51
Exhaust back pressure	mbar	60 (± 20)	psi	0,87 (± 0,29)

Comments:

- The data sheet values were determined at a full-load exhaust gas back pressure = 60 mbar. Higher exhaust gas back pressures are permissible, but lead to different values, especially regarding the full load rated power. An application recommendation for higher full-load exhaust gas back pressures can be requested from MAN.

- Depending on the engine control unit used, it may be necessary to change the ignition timing in the partial load range in order to avoid power fluctuations. Details can be found in the installation guidelines in chapter 12.1 Ignition system.

History:

- Base datasheet status 05.11.2024
- Knock control system DET-1600 MAN, company Altronic (1500 rpm and 1800 rpm) added on 16.12.2024

* The values and limits are valid with standard conditions acc. to ISO 3046-1 at 100 m / 328 ft above sea level

Standard conditions:		metric		standard	
	Atmospheric pressure abs.	kPa	100	psi	14,5
	Air temperature	°C	25	°F	77
	Relative air humidity	%	30	%	30

For alternative operating parameters please see chapter "Power reduction".

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Released	16.12.2024	GK/PW		

Mode of Operation

Special Gas - E3872LE202

1800 rpm (60 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

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Special Gas - E3872LE202

1800 rpm (60 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

Basic Data

		metric			standard		
Engine Data							
Rated speed	min ⁻¹	1800			rpm	1800	
Effective rated power	kW	840			bhp	1126	
Max. engine torque at rated speed	Nm	4457			Nm	4457	
Mean effective pressure	bar	18,9			psi	274,2	
Mean piston speed	m/s	9,90			m/s	9,90	
Oil circuit							
Mean oil consumption	g/h	60			lb/hr	0,132	
Max. permissible lubricating oil consumption	g/h	120			lb/hr	0,265	
Lubricating oil filling quantity min. / max.	l	70	90		Imp.gal.	18	24
Cooling circuit							
Engine cooling water filling quantity	l	55			Imp.gal.	14,5	
- therefrom mixture cooler HT	l	5			Imp.gal.	1,3	
Mixture cooling water filling quantity LT	l	3			Imp.gal.	0,8	
Engine cooling water operating pressure max. (on engine inlet side)	bar _{rel.}	3,0			psi	44	
Engine cooling water volume flow rate min.	l/min	818			ft³/min	28,9	
Engine cooling water temperature min.	°C	80			°F	176	
Engine cooling water temperature max.	°C	90			°F	194	
Difference inlet - outlet max.	K	6			K	6	
Mixture temperature before mixture cooler max.	°C	245			°F	473	
Mixture temperature after mixture cooler max.	°C	50			°F	122	
Mixture cooling water inlet temperature HT max.	°C	83			°F	181,4	
Mixture cooling water volume flow rate HT	l/min	357			ft³/min	12,6	
Difference inlet - outlet max. HT max.	K	8			K	8	
Mixture cooling water inlet temperature LT max.	°C	44			°F	111,2	
Mixture cooling water volume flow rate LT	l/min	210			ft³/min	7,4	
Difference inlet - outlet LT max.	K	7			K	7	
Coolant concentration min. / max.	%	40	50		%	40	50
Pressure conditions							
Intake depression after air filter max. (measured in new condition)	mbar	15			psi	0,22	
Gas flow pressure before zero pressure regulator min. / max.	mbar	30	100		psi	0,44	1,45
Pressure loss gas mixer max.	mbar	90			psi	1,31	
Pressure loss gas mixture intercooler max.	mbar	35			psi	0,51	
Exhaust back pressure	mbar	60	(± 20)		psi	0,87	(± 0,29)
Emissions* metric (with 5 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	g/Nm³	0,50	0,50	0,50			
CO	g/Nm³	0,61	0,60	0,59			
THC	g/Nm³	1,07	1,20	1,37			
TOC (emission without O ₂ correction acc. to VDI 3481-4)	g/Nm³	0,72	0,83	0,96			
HCHO	mg/Nm³	105	81	86			
Emissions* standard (with 15 % O ₂ correction, dry)							
Load	%	100	75	50			
NO _x	ppmvd	80	92	91			
CO	ppmvd	181	179	176			
THC	ppmvd	640	717	817			
HCHO	ppmvd	29	23	24			

* For dimensioning of exhaust after treatment systems tolerances and aging effects must be included in calculations.

Lube oil to MAN works standard M 3271-5 (steel piston) and coolant to MAN works standard MAN 324 Si-OAT
Gas quality according to installation guideline (corresponds to gas quality "with MAN Exhaust Aftertreatment System")

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Created	16.12.2024	FM	51.99494-7094	D
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Special Gas - E3872LE202 1800 rpm (60 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

Flow and Heat Balance

IT 28 °CA / 840 kW
metric

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	28	28	28
Effective rated power ¹	kW	846	629	421
Engine Cooling water heat output ²	kW	302	271	218
Mixture cooling water heat output HT ²	kW	175,7	109,8	37,9
Mixture cooling water heat output LT ²	kW	88,5	39,3	26,7
Exhaust heat output (cooled down to 120 °C)	kW	451,5	339,2	256,5
Residual heat output incl. radiation heat	kW	42,9	52,5	59,2
Rated thermal input	kW	2046	1544	1088
Specific fuel consumption	MJ/kWh	8,70	8,84	9,33
Air-fuel ratio ³	-	1,56	1,58	1,54

Efficiency Data

Effective mechanical ¹	%	41,4	40,8	38,7
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(43,9)	(43,2)	(41,0)
Thermal ⁵	%	45,4	46,6	47,0
Total	%	86,8	87,4	85,8

Mass and Volume Flow Rates

Combustion air mass flow rate	kg/h	4094	2977	2013
Fuel mass flow rate	kg/h	394,0	303,7	214,6
Exhaust gas mass flow rate, wet	kg/h	4488	3281	2228
Exhaust gas volume flow rate, dry ⁶	Nm ³ /h	2335	2189	1477
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	kg/h	50053	44290	36317
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	kg/h	21863	13820	5003
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	kg/h	13212	5655	3940

Temperatures

Measured temperature inlet turbine	°C	621	611	596
Measured temperature outlet turbine	°C	426	437	469

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/14,9
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on Antifreeze proportion % 45
Spec. effective heat capacity c_p kJ/kg K 3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	kPa	100		
	Air temperature	°C	25		
	Relative air humidity	%	30		
Conditions during the measurement	Atmospheric pressure abs.	kPa	96,8	100,4	100,4
	Inlet air temperature	°C	25,3	35,1	34,0
	Relative air humidity	%	50,0	56,5	50,4
Fuel gas conditions	Calorific value	MJ/kg	18,7	18,3	18,3
	Methane number		116,0	119,6	119,6
	Hydrogen content fuel gas	Vol.-%	0,0	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft Air temperature °C 0
Atmospheric pressure abs. kPa 100

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output	%	±7
Tolerance for specific fuel consumption at rated output	%	+5

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Special Gas - E3872LE202 1800 rpm (60 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

Flow and Heat Balance

IT 28 °CA / 840 kW
standard

Performance Data

Load	%	100	75	50
Ignition timing before TDC	°CA	28	28	28
Effective rated power ¹	bhp	1134	844	565
Engine cooling water heat output ²	bhp	404	363	292
Mixture cooling water heat output HT ²	bhp	235,7	147,2	50,8
Mixture cooling water heat output LT ²	bhp	118,7	52,7	35,8
Exhaust heat output (cooled down to 120 °C)	bhp	605	455	344
Residual heat output incl. radiation heat	bhp	57,5	70,4	79,4
Rated thermal input	bhp	2743	2070	1459
Specific fuel consumption	BTU/ bhp-hr	6152	6249	6593
Air-fuel ratio ³	-	1,56	1,58	1,54

Efficiency Data

Effective mechanical ¹	%	41,4	40,8	38,7
Corrected (ISO 3046-1 incl. 5 % fuel tolerance) mechanical ⁴	%	(43,9)	(43,2)	(41,0)
Thermal ⁵	%	45,4	46,6	47,0
Total	%	86,8	87,4	85,8

Mass and Volume Flow Rates

Combustion air mass flow rate	lb/hr	9025	6563	4438
Fuel mass flow rate	lb/hr	869	670	473
Exhaust gas mass flow rate, wet	lb/hr	9893	7233	4911
Exhaust gas volume flow rate, dry ³	Nm ³ /h	2335	2189	1477
Engine cooling water mass flow rate (@max. ΔT outlet - inlet)	lb/hr	110348	97644	80065
Mixture cooling water mass flow rate HT (@max. ΔT outlet - inlet)	lb/hr	48200	30468	11030
Mixture cooling water mass flow rate LT (@max. ΔT outlet - inlet)	lb/hr	29128	12466	8687

Temperatures

Measured temperature inlet turbine	°F	1150	1131	1105
Measured temperature outlet turbine	°F	799	818	876

Reference setting: Gasmixer Heinzmann VE 200 1251 24 S12 6,5/14,9
Ignition System Motortech MIC 4

¹ For profitability analysis it is recommended to use the effective values. Conditions during the measurement see below.

² Cooling water data based on Antifreeze proportion % 45
Spec. effective heat capacity c_p kJ/kg K 3,67

³ Air-fuel ratio Measured with ETAS LA 4_E. Please see chapter "Values / limits"

⁴ The corrected mechanical efficiency (ISO 3046-1, Section 13) refers to the below-mentioned values, whereby the permissible tolerance for fuel consumption by 5 % is taken into account.

Standard conditions	Atmospheric pressure abs.	psi	14,5		
	Air temperature	°F	77		
	Relative air humidity	%	30		
Conditions during the measurement	Atmospheric pressure abs.	psi	14,0	14,6	14,6
	Inlet air temperature	°F	77,5	95,2	93,2
	Relative air humidity	%	50,0	56,5	50,4
Fuel gas conditions	Calorific value	MJ/kg	18,7	18,3	18,3
	Methane number		116,0	119,6	119,6
	Hydrogen content fuel gas	Vol.-%	0,0	0,0	0,0

⁵ Permissible tolerance for usable thermal output is not taken into account

⁶ Standard conditions acc. to TA-Luft Air temperature °F 32
Atmospheric pressure abs. psi 14,5

Provided permissible tolerances acc. to ISO 3046-1:

Tolerance for usable heat at rated output	%	±7
Tolerance for specific fuel consumption at rated output	%	+5

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Special Gas - E3872LE202

1800 rpm (60 Hz) - NO_x Level 0,50 g/Nm³ (5 % O₂)

Values / limits for 100 % load*

Performance Data

Ignition timing (±2 °CA)	Hz	60	Hz	60
Effective rated power	°CA	28	°CA	28
O ₂ - content in exhaust gas min.	kW	846	bhp	1134
NO _x - content in exhaust gas max. (with 5 % O ₂ correction)	Vol-%	8,5		
	g/Nm ³	0,50		

Operating parameters

Cooling water operating pressure max. (pump installed pressing)	bar _{rel.}	3,0	psi	44
Intake depression after air filter max. (measured in new condition)	mbar	15	psi	0,22
Gas flow pressure before zero pressure regulator min. / max.	mbar	30 100	psi	0,44 1,45
Pressure loss over gas mixer max.	mbar	90	psi	1,31
Pressure loss gas mixture intercooler max.	mbar	35	psi	0,51
Exhaust back pressure	mbar	60 (± 20)	psi	0,87 (± 0,29)

Comments:

- The data sheet values were determined at a full-load exhaust gas back pressure = 60 mbar. Higher exhaust gas back pressures are permissible, but lead to different values, especially regarding the full load rated power. An application recommendation for higher full-load exhaust gas back pressures can be requested from MAN.

- Depending on the engine control unit used, it may be necessary to change the ignition timing in the partial load range in order to avoid power fluctuations. Details can be found in the installation guidelines in chapter 12.1 Ignition system.

History:

- Base datasheet status 05.11.2024
- Knock control system DET-1600 MAN, company Altronic (1500 rpm and 1800 rpm) added on 16.12.2024

* The values and limits are valid with standard conditions acc. to ISO 3046-1 at 100 m / 328 ft above sea level

Standard conditions:		metric		standard	
	Atmospheric pressure abs.	kPa	100	psi	14,5
	Air temperature	°C	25	°F	77
	Relative air humidity	%	30	%	30

For alternative operating parameters please see chapter "Power reduction".

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Released	16.12.2024	GK/PW		