

Illustration: may differ from specified module

Compact CHP ready for connection, mainly consisting of

- serially manufactured Industrial-Gas-Otto-engine
- air-cooled synchronous generator
- waste-gas heat exchanger integrated in primary cooling circuit
- oil reservoir with automatic oil feeding
- control cabinet with programmable controller and operating unit
- gas train

Integrated heat exchanger basket, mainly consisting of

- expansion tank in motor circuit and mixture circuit
- relief valve in motor circuit, mixture circuit and heater circuit
- filling valves, cleanout valves and exhaust valves
- plate heat exchanger
- pumps for motor circuit, mixture circuit and heater circuit
- 3-way mixing valve for return temperature increase

Water and gas connections are executed with compensators.

Motor and generator are connected through a pluggable elastic metal plastics coupler to compensate radial offset, axial offset or angular offset. It is mounted on a framework vibration-cushionedly. Furthermore the framework is uncoupled through oscillation decoupling elements.

The control cabinet is executed as a separate unit. All regulation and control functions as well as control elements are part of the control cabinet. Assisted by a menu-navigated display performance data and state data could be read and adjusted easily.

The drive of the CHP is caused by a water-cooled, supercharged Otto-Gas-Engine. It is stationary engine designed for permanent operation. A microprocessor-controlled ignition ensures an optimal adaption of the ignition point and the ignition energy to the gas quality (methane number).

Lambda regulation is carried out without a lambda sensor using a calculation program which sets the optimal lambda value for each operating mode using the actual output, charging pressure and mixture temperature values.

Besides an exceedingly high electrical efficiency, a double-staged mixture cooling, including a low temperature circuit and a high temperature circuit, leads to an ideal usage of thermal power from the mixture heat.

Technical specification



Kraft-Wärme-Kopplung

avus1000b

Biogas 60% CH₄, 40% CO₂

Engine data			Engine utilities		
	Hz	400			
Mixture cooling to RPM	°C	60	Lubricate consumption	kg/h	0,37
ISO standard power (mech.)	1/min	1.500	Filling capacity lubricant min./max.	l	360
Arrangement of cylinders	kW	1.222	Filling capacity cooling water	l	-
Number of cylinders		V 70°	Operating pressure (max.)	bar	2,5
Bore	mm	16	Cooling water recirculated quantity (min. / max.)	m ³ /h	56,1
Stroke	mm	145	Cooling water temperature (inflow)	°C	80,8
Swept volume	l	185	Cooling water temperature (exit)	°C	86,7
		48,88	Balance (inflow/exit, max.)	K	5,9
direction of rotation (look on balance wheel)		links	Mixture inflow temperature after damper (max.)	°C	60
compression ratio	ε	12,5	Mixture cooling water, inflow temperature low	°C	55
average effective pressure	bar	20,0	temperature circuit (max.)		
average piston speed	m/s	9,25	Mixture cooling water recirculated quantity low	m ³ /h	20
			temperature circuit (max.)		
Power data			Efficiencies		
	Hz	50			
Load	%	100		%	100 75 50
Ignition timing	grad	variabel	Electrical	%	42,1 41,0 38,7
ISO standard power (mech.)	kW	1.222	Mechanical	%	43,3 42,1 40,0
Electrical power	kW el	1.189	Thermal	%	41,3 42,7 44,1
			Total (el. + th.)	%	83,4 83,7 82,8
Cooling water heat	kW	341	Power number		1,02 0,96 0,88
Low temperature mixture heat	kW	55			
High temperature mixture heat	kW	215			
Waste gas heat up to 180°C	kW	484			
useable thermal power at 180°C	kW	1.166			
radiant heat of module (max.)	kW	166			
nominal power	kW	2.821			
Fuel consumption (mech.)	kWh/kWh	2,31			
Fuel consumption (el.)	kWh/kWh el	2,37			
Temperatures and pressures			Mass flows and volume flows		
Waste gas temperature after turbine	°C	424	Combustion air mass flow	kg/h	5.846
exhaus back pressure (max.)	mbar	60	Combustion air volume flow	Nm ³ /h	4.522
			Supply air volume flow	m ³ /h	46.137
Heating water return temperature (max.)	°C	75	Combustible mass flow	kg/h	623
Heating water flow temperature (max.)	°C	95	Combustible volume flow	m ³ /h	470
Pressure decrease heating circuit (max.)	mbar	200	Waste gas mass flow, wet	kg/h	6.350
			Waste gas mass flow, dry	kg/h	5.894
maximum backpressure at the air intake	mbar	10	Waste gas volume flow, wet	m ³ /h	4.937
			Waste gas volume flow, dry	m ³ /h	4.390
			Heating water volume flow (max.)	m ³ /h	66,788
Emission value at 5% residual oxygen			Technical basic conditions		
NOx	mg/Nm ³	< 500	Power conditions acc. to DIN-ISO-3046		
CO	mg/Nm ³	< 1.000	Norm conditions: air pressure: 1000mbar,		
			air temperature: 25°C or 295 K, rel. humidity: 30%		
			Gasquality according "TA 1000-0300"		
			All data are related to full load engine running at denoted		
			media temperatures and are subject to technical advancements.		
			Equipment as well as installation systems have to meet all		
			Jenbacher technical instructions.		
			When installed > 500 m and/or with intake air temperatures > 30 °C,		
			the power reduction must be determined on a project-specific basis.		

Technical specification



Kraft-Wärme-Kopplung

avus1000b

Biogas 60% CH₄, 40% CO₂

Generator data

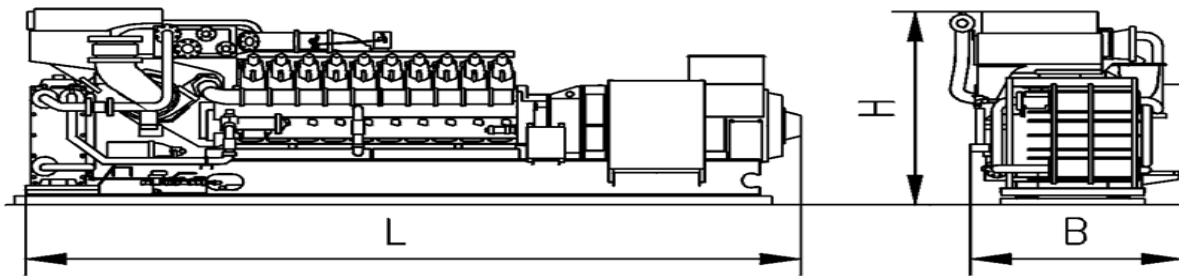
Manufacturer	Leroy Somer	
Type	LSA 52.2 M60	
Power	kVA	1.870
Voltage	V	400
Frequency	Hz	50
Rated Speed	1/min	1500
Nominal current at Cos φ = 0,8	A	2.121
Cos φ		1
Efficiency (full load) at Cos φ = 1	%	97,3
Efficiency (full load) at Cos φ = 0,8	%	96,2
Reactance X _d	p.u.	2,04
Reactance X' _d	p.u.	0,19
Reactance X'' _d	p.u.	0,1
Mass moment of inertia	kgm ²	42,6
Stator circuit	Stern	
Ambient air temperature	°C	40
Protection class	IP 23	

The Cos Phi can be adjusted in between 0,8 inductive (lagging) and 0,95 capacitive (leading). The precise adjustment value however should be decided by the Utility company.

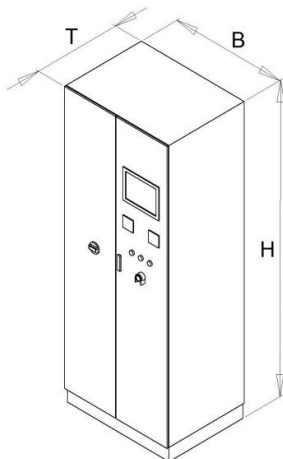
Main dimensions and weights

Module:			
Length (L)	mm	6.700	
Height (H)	mm	2.200	
Width (B)	mm	1.800	
Weight dry (approx.)	kg	14.200	
Control cabinet:			
Height (H)	mm	2.200	
Width (B)	mm	1.000	
Depth (T)	mm	600	
Weight (approx.)	kg	240	
Power switch cabinet:			
Height (H)	mm	2.200	
Width (B)	mm	600	
Depth (T)	mm	600	
Weight (approx.)	kg	120	

Modul:



Control cabinet:



Power switch cabinet:

