



**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
- Oxikat integrated in waste-gas heat exchanger (optional)
- 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. All water-side connections are directed upwards above the heat exchanger basket.

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 touch-screen performance data and state data could be readed and adjusted easily.

The drive of the CHP is caused by a water-cooled, supercharged Otto-Gas-Engine. It is a 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).

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.

The oil level control is carried out by a sight glass with oil level deficit indication, which is connected with the oilpan.

<b>Engine data</b>		<b>Hz</b>	<b>50</b>	<b>Engine utilities</b>	
Mixture cooling to RPM	°C	50	Lubricate consumption	g/kWh	1,6
ISO standard power (mech.)	1/min	1500	Filling capacity lubricant min./max.	l	9/13
Air ration (Lambda)	kW	68	Filling capacity cooling water	l	13
Arrangement of cylinders	λ	1,42	Operating pressure (max.)	bar	2
Number of Cylinders		row	Cooling water recirculated quantity	l/min	169
Bore		4	Cooling water temperature min.	°C	80
Stroke	mm	108	Cooling water temperature max.	°C	88
Swept volume	mm	125	Balance (inflow/exit, max.)	K	6
	l	4,58			
Direction of rotation (look on balance wheel)		left	Mixture inflow temperature after damper max.	°C	50
body of balance wheel		SAE 2	Mixture cooling water, inflow temperature	°C	45
tooth rim with number of teeth	Z	143	low temperature circuit (max.)		
compression ratio	ε	11 : 1	Mixture cooling water recirculated quantity	l/min	19
average effective pressure	bar	11,9	low temperature circuit (max.)		
average piston speed	m/s	6,3	Mixture cooling water inflow temperature	°C	85
			high temperature circuit (max.)		
			Mixture cooling water recirculated quantity	l/min	39
			high temperature circuit (max.)		
<b>Power data</b>		<b>Hz</b>	<b>50</b>	<b>Efficiencies</b>	
Load	%	100	Electrical	%	36,1
Ignition timing	degree	22	Mechanical	%	38,3
ISO standard power (mech.)	kW	68	Thermal	%	48,0
Electrical Power	kW	64	Total (el. + th.)	%	84,1
Cooling water heat	kW	52	Power number		0,75
Mixture heat (high temperature circuit)	kW	6			
Mixture heat (low temperature circuit)	kW	3			
Waste gas heat up to 180 °C	kW	28			
useable thermal power at 180 °C	kW	85			
radiant heat of module (max.)	kW	15			
nominal power	kW	177			
Fuel consumption (mech.)	kWh/kWh	2,60			
Fuel consumption (el.)	kWh/kWh	2,77			
<b>Temperatures and pressures</b>				<b>Mass flows and volume flows</b>	
Waste gas temperatur after turbine	°C	430	Combustion air mass flow	kg/h	312
exhaust back pressure	mbar	40	Combustion air volume flow	m³/h	264
			Supply air volume flow	m³/h	2.504
Heating water return temperature (max)	°C	70	Combustible mass flow	kg/h	36
Heating water flow temperature (max)	°C	90	Combustible volume flow	m³/h	30
Pressure decrease heating circuit (max)	mbar	150	Waste gas mass flow, wet	kg/h	349
			Waste gas mass flow, dry	kg/h	323
maximum backpressure at the air intake	mbar	40	Waste gas volume flow, wet	m³/h	269
			Waste gas v olume flow, dry	m³/h	235
			Heating water volume flow (max.)	m³/h	5
<b>Emission value at 5% residual oxygen</b>				<b>Technical basic conditions</b>	
NOx	mg/Nm³	< 500	Power conditions acc. To DIN-ISO-3046		
CO (without catalyst)	mg/Nm³	< 1000	Norm conditions: air pressure: 1000 mbar		
CO (with catalyst)	mg/Nm³	< 300	Air temperature: 25 °C or 295 K, rel. Humidity: 30%		
HCHO (formaldehyde without catalyst)	mg/Nm³	< 60	Gasquality accorcng "2G TA 04 Gas"		
HCHO (formaldehyde with catalyst)	mg/Nm³	< 40	All data are related to full load engine running at denoted media temperatures and are subject to technical advancements.		
NMHC	mg/Nm³	< 150	Equipment as well as installation systems have to meet all technical instructions of 2G.		

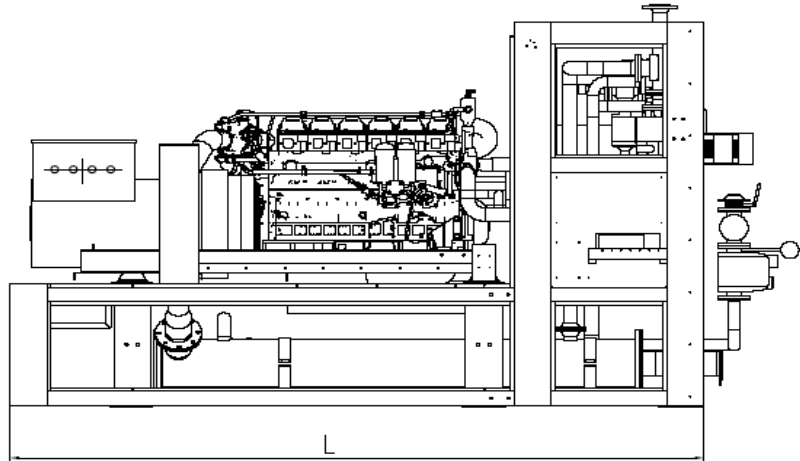
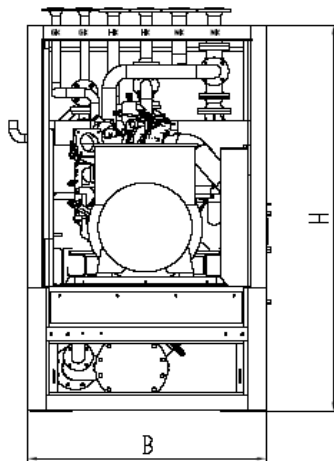
**Generator data**

Manufacturer		Leroy Somer
Type		LSA 44.2 VS3
Power at Cos φ = 0,8	kVA	80
Voltage	V	400
Frequency	Hz	50
Rated speed	1/min	1500
Nominal current at Cos φ = 0,8	A	115
Cos φ		0,8 - 1
Efficiency (full load) at Cos φ = 1	%	94,30
Efficiency (full load) at Cos φ = 0,8	%	92,10
Reactance X"d	%	10,70
Reactance Xi = X2	%	12,00
Mass moment of inertia	kg m <sup>2</sup>	0,83
Stator circuit		star
Ambient air temperature	°C	40
Protection class		IP23
Cos φ has to be between 0,8 and 1,0 within the complete range of capacity.		

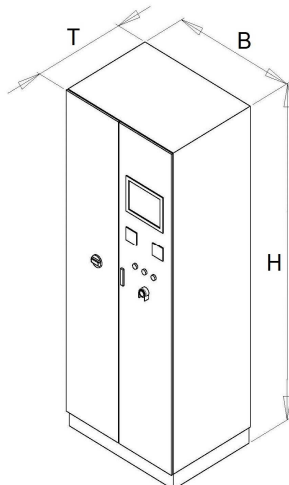
**Main dimensions and weights**

<b>Module:</b>			
Length (L):	mm	2.870	
Height (H):	mm	1.810	
Width (B):	mm	1.150	
Weight (approx.)	kg	3.000	
<b>Control cabinet</b>			
Height (H)	mm	2.000	
Width (B)	mm	800	
Depth (T)	mm	600	
Weight (approx.)	kg	200	
<b>Power switch cabinet</b>			
Height (H)	mm	2.000	
Width (B)	mm	600	
Depth (T)	mm	500	
Weight (approx.)	kg	150	

**Modul:**



**Control cabinet:**



**Power cabinet:**

