
**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.

| Engine data | Hz | 50 |
|---|---|---|
| Mixture cooling to | °C | 50 |
| RPM | 1/min | 1500 |
| ISO standard power (mech.) | kW | 466 |
| Air ration (Lambda) | λ | 1,47 |
| Arrangement of cylinders | | V |
| Number of Cylinders | | 12 |
| Bore | mm | 128 |
| Stroke | mm | 142 |
| Swept volume | l | 21,93 |
| Direction of rotation (look on balance wheel) | | left |
| body of balance wheel | | SAE 1 |
| tooth rim with number of teeth | Z | 160 |
| compression ratio | ε | 14,8 : 1 |
| average effective pressure | bar | 17,0 |
| average piston speed | m/s | 7,1 |

| Power data | Hz | 50 |
|---|---|---|
| Load | % | 100 |
| Ignition timing | grad | 22 |
| ISO standard power (mech.) | kW | 466 |
| Electrical Power | kW | 450 |
| Cooling water heat | kW | 216 |
| Mixture heat (high temperature circuit) | kW | 55 |
| Mixture heat (low temperature circuit) | kW | 24 |
| Waste gas heat up to 180 °C | kW | 198 |
| useable thermal power at 180 °C | kW | 469 |
| radiant heat of module (max.) | kW | 69 |
| nominal power | kW | 1108,4 |
| Fuel consumption (mech.) | kWh/kWh | 2,38 |
| Fuel consumption (el.) | kWh/kWh | 2,46 |

| Temperatures and pressures | | |
|---|---|---|
| Waste gas temperatur after turbine | °C | 450 |
| exhaust back pressure | mbar | 30 |
| Heating water return temperature (max) | °C | 70 |
| Heating water flow temperature (max) | °C | 90 |
| Pressure decrease heating circuit (max) | mbar | 150 |
| maximum backpressure at the air intake | mbar | 15 |

| Emission value at 5% residual oxygen | | |
|---|---|---|
| NOx | mg/Nm³ | < 500 |
| CO | mg/Nm³ | < 1.000 |

| Engine utilities | | |
|---|---|---|
| Lubricate consumption | g/kWh | 0,2 |
| Filling capacity lubricant min./max. | l | 60 / 90 |
| Filling capacity cooling water | l | 23 |
| Operating pressure (max.) | bar | 3 |
| Cooling water recirculated quantity | l/min | 599 |
| Cooling water temperature min. | °C | 80 |
| Cooling water temperature max. | °C | 88 |
| Balance (inflow/exit, max.) | K | 6 |
| Mixture inflow temperature after damper max. | °C | 50 |
| Mixture cooling water, inflow temperature low temperature circuit (max.) | °C | 38 |
| Mixture cooling water recirculated quantity low temperature circuit (max.) | l/min | 133 |
| Mixture cooling water inflow termperature high temperature circuit (max.) | °C | 85 |
| Mixture cooling water recirculated quantity high temperature circuit (max.) | l/min | 306 |

| Efficiencies | | |
|---|---|---|
| Electrical | % | 40,6 |
| Mechanical | % | 42,0 |
| Thermal | % | 42,3 |
| Total (el. + th.) | % | 82,9 |
| Power number | | 0,96 |

| Mass flows and volume flows | | |
|---|---|---|
| Combustion air mass flow | kg/h | 2.022 |
| Combustion air volume flow | m³/h | 1.707 |
| Supply air volume flow | m³/h | 17.460 |
| Combustible mass flow | kg/h | 300 |
| Combustible volume flow | m³/h | 222 |
| Waste gas mass flow, wet | kg/h | 2.321 |
| Waste gas mass flow, dry | kg/h | 2.164 |
| Waste gas volume flow, wet | m³/h | 1.772 |
| Waste gas volume flow, dry | m³/h | 1.562 |
| Heating water volume flow (max.) | m³/h | 27 |

**Technical basic conditions**

Power conditions acc. To DIN-ISO-3046
Norm conditions: air pressure: 1000 mbar
Air temperature: 25 °C, rel. Humidity: 30%
Gasquality accorcing "2G TA 04 Gas"
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 technical instructions of 2G.

## Generator data

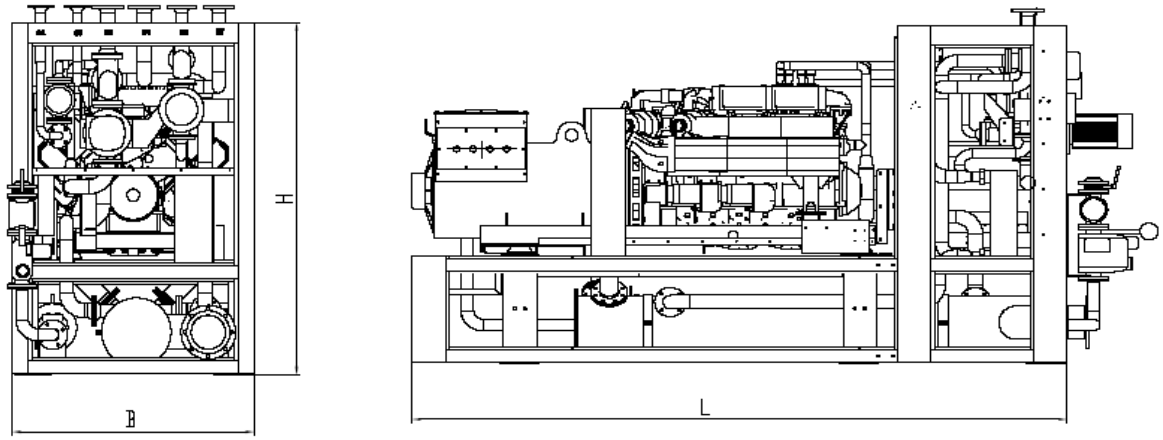
| | | |
|---|---|---|
| Manufacturer | | Leroy Somer |
| Type | | LSA 49.1 M6 |
| Power at Cos φ = 0,8 | kVA | 564 |
| Voltage | V | 400 |
| Frequency | Hz | 50 |
| Rated speed | 1/min | 1500 |
| Nominal current at Cos φ = 0,8 | A | 812 |
| Cos φ | | 0,8 - 1 |
| Efficiency (full load) at Cos φ = 1 | % | 96,60 |
| Efficiency (full load) at Cos φ = 0,8 | % | 95,20 |
| Reactance X"d | % | 11 |
| Reactance Xi = X2 | % | 12 |
| Mass moment of inertia | kg m² | 8,3 |
| Stator circuit | | star |
| Ambient air temperature | °C | 40 |
| Protection class | | IP 23 |

Cos φ has to be between 0,8 and 1,0 within the complete range of capacity.

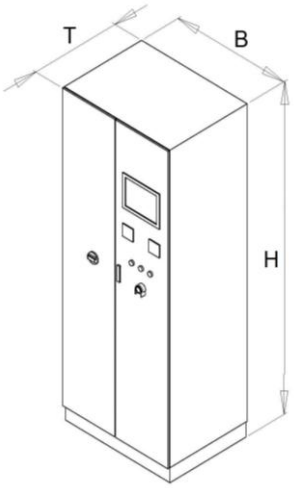
## Main dimensions and weights

| | | |
|---|---|---|
| **Module:** | | |
| Length (L): | mm | 4.150 |
| Height (H): | mm | 2.208 |
| Width (B): | mm | 1.500 |
| Weight (approx.) | kg | 6.000 |
| **Control cabinet** | | |
| Height (H) | mm | 2.000 |
| Width (B) | mm | 800 |
| Depth (T) | mm | 600 |
| Weight (approx.) | kg | 200 |
| **Power switch cabinet** | | |
| Height (H) | mm | 2.000 |
| Width (B) | mm | 600 |
| Depth (T) | mm | 500 |
| Weight (approx.) | kg | 150 |

## Module:




## Control cabinet:




## Power cabinet: