

# Compressed-air-and-heat system

## CHP CA 570 NA

### COMPRESSED-AIR PRODUCTION WITHOUT ELECTRICITY

In most companies, the supplies of compressed air, heating energy and process heat represent a large cost factor. Production halls must be heated, and products dried or heated for manufacture. Compressed air is utilised in many ways in modern industries, and accounts for around 10 % of total energy costs. This causes high operational costs, which depend on energy and gas prices as well as political conditions. Conventional systems are thus becoming increasingly uneconomical.

### A COST- AND ENERGY-EFFICIENT SOLUTION

Bosch KWK Systeme has developed the innovative CHP CA 570 NA compressed-air-and-heat system to save on operational costs. It combines an oil-injected screw compressor with a gas engine. To use the energy as efficiently as possible, almost all of the heat produced is transferred to the heating circuit.

### EXPERIENCE

Our first compressed-air-and-heat system was installed in an industrial company in 2015. At 90 per cent annual utilisation in the year, a savings of over €50,000 was calculated, the carbon footprint was halved, and after less than 3 years, the investment has paid for itself.

### CONCLUSION

The compressed-air-and-heat system is worthwhile in many ways:

- Energy costs are reduced
- Overall efficiency increases
- Carbon footprint shrinks
- Independence on political

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### VERSATILE APPLICATION POSSIBILITIES

Our combined heat, power and compressed air system meets a variety of requirements:

- The compressor output is continuously variable (above 60 %) via engine speed
- Maximum output pressure 8.5 bar
- Feed temperature to heating system: constant 90° C



Image: Combined heat, power and compressed air system at the power station of the Bosch Thermotechnik GmbH in Lollar

## TECHNICAL DATA

### Compact module (8.5 bar positive pressure and 1800 rpm)

Volume flow rate pursuant to ISO 1217	570 m <sup>3</sup> /h
Thermal rating (± 8 %)	135 kW
Design	Compact module
Fuel	Natural gas
Energy input (± 8 %)	164 kW
Electrical input rating	3,0 kW
Hot water (return / feed)	70 / 90 °C
Exhaust temperature after heat exchanger	110 °C
Exhaust back pressure after engine (max.)	30 mbar
Exhaust-gas mass flow (wet)	244 kg/h
Dimensions: Length approx.	3 290 mm
Width approx.	960 mm
Height approx.	1 830 mm
Weight approx.	2 400 kg

### Compressor (speed regulated)

Operational overpressure	6,0 - 8,5 bar
Heat recovery compressed air	48 kW*
Intake power (1 800 / 2 700 rpm) pursuant to ISO 1217	390 / 570 m <sup>3</sup> /h

### Gas engine

Engine manufacturer	MAN
Engine type	E 0834
Gas input pressure	> 20 / < 100 mbar
Specific brake horsepower at 8.5 bar positive operating pressure	0,105 kWh/m <sup>3</sup>
Thermal efficiency	82,0 %
Engine heat output	48 kW
Speed range	1 200 - 1 800 rpm
Exhaust heat with heat exchanger	39 kW
CO (at 5 % O <sub>2</sub> in dry exhaust)	≤ 300 mg/m <sup>3</sup> <sub>stp**</sub>
NOx (at 5 % O <sub>2</sub> in dry exhaust)	≤ 250 mg/m <sup>3</sup> <sub>stp**</sub>
NMHC (at 5 % O <sub>2</sub> in dry exhaust)	≤ 150 mg/m <sup>3</sup> <sub>stp**</sub>

Installation conditions (Values in accordance with standard reference requirements and \*at max. positive operating pressure of 8.5 bar):

- Gas engine:  
absolute air pressure 1013 mbar; air temperature 25° C; relative humidity 30 %;  
installation altitude 100 m about sea level; methane number ≥ 80
- Compressor unit:  
absolute intake pressure 1 bar; intake temperature 20° C; humidity 0 % (dry) installation

Site requirements: Three-phase connection; 16 A, 400 V and 50 Hz

\*\* stp = standard temperature and pressure

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