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mephisto
CHP units

Product range **Biogas | Digester gas**

Bio GAS

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Product range biogas CHP

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Overview of Mephisto condensing combined heat and power units

All combined heat and power units in the Mephisto product line are equipped with condensing technology as standard. The ready-to-connect compact models are operated with biogas or digester gas and are suitable for grid-connected operation. You will find Mephisto CHP units operated with natural gas/biomethane or liquefied gas in a separate product range.

High overall efficiency	➢ Thermodynamically optimised, corrosion-resistant cast aluminium-silicon condensing heat exchanger ➢ Water-cooled generator ➢ Fully enclosed design (no complex vent systems are required)
Low emissions of pollutants	➢ Regulated three-way catalytic converter and lambda control
Low noise emissions	➢ Optimum sound insulation for flue gas and intake air thanks to combination between resonator mufflers and sound absorbers ➢ Enclosed/vibration-isolated design
User-friendly and easy to integrate into higher-level control technology and any existing hydraulic system	➢ Extensive control functions thanks to self-developed control technology hardware and software ➢ Communication with all common bus systems ➢ Complete remote control of modules in real time
Quick, uncomplicated evaluation of operating data	➢ Webgate and Webcontrol: manufacturer's own browser-based tools for viewing and evaluating current and historical technical and operation-relevant data

The following technical information applies to these boundary conditions: **Return temperature t_R**: 35 °C; **air temperature t_A**: 25 °C; **absolute air pressure p_A**: 1,013 mbar; **calorific value (gas) H_i**: 6.0 kWh/m³ i.N.; **methane number MN**: > 120; **fuel gas composition:** 60% CH_4, 40% CO_2

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Mephisto G22 Asynchronous I Biogas

Model

Mephisto G22 A BG

with regulated three-way catalytic converter

Manufacturer

Kraftwerk

Kraft-Wärme-Kopplung GmbH
Am Lindener Hafen 30,
30453 Hannover, Germany

Net output (adjustable)

Electric, net	8 to 20 kW
Thermal	30,3 to 47,3 kW
Gas	42,1 to 64,1 kW_{Hi}

Net efficiency

Electric, effective	31,2 %
Electric, ISO 3046	32,8 %
Thermal, effective	73,8 % ($t_{Returnf}$ = 35 °C)
Overall, effective	105 % (t_{Return} = 35 °C)

Fuel

Biogas or digester gas

Gas connection

- Gas connection rating: 64,1 kW_{Hi} = 71,1 kW_{Hs}
- Gas connection pressure: 20 - 100 mbar
- Gas flow pressure: ≥ 10 mbar
- Mating dimension: DN 20 (3/4" male thread)

Heating connection

- Heating circuit minimum pressure: 1.2 bar
- Permitted operating pressure: max. 4.0 bar (pressures up to 6 bar on request)
- Flow temperature: max. 90 °C
- Return temperature: max. 70 °C
- Mating dimension: 1 1/4" male thread
- Design flow rate: 2.07 m^3/h
- Residual head for net output: 1.0 mWS
- With 40 K spread:
  Design flow rate: 1.04 m^3/h
  Residual head for net output: 4.6 mWS

Electrical connection

- Pre-fuse NH00 50 A gL (gG) or SLS E-50 A
- Supply line H07RN-F 5 x 16 mm^2, up to 50 m in length for installation types B to G

Plate heat exchanger

Soldered stainless steel compact heat exchanger for separating the heating system from the CHP engine water circuit

Pollutant emissions

Mephisto G22 A BG: mg/m3 i.N.

(at 5 % by volume reference oxygen) CO 300, NO_x 250

Combustion intake air

Space-air-dependent operating mode

Flue gas connection

- Flue gas conduit D80, fire resistance class B1 plastic pipe made of PP, permitted as a flue gas conduit for condensing heat generators with flue gas temperature up to 120 °C
- Flue gas temperature limited max. 90 °C on thermostat
- Safety thermal cut-out set to 100 °C
- Recommended flue gas counter-pressure: 500 Pa; maximum flue gas counter pressure 800 Pa
- Flue gas flow rate: 69 m_3/h in normal state is equivalent to 89 m_3/h at $T_{Flue\ Gas}$ = 80 °C
- Maximum condensate quantity: 9.7 l/h

Flue gas heat exchanger

- Thermodynamically optimised cast aluminium-silicon heat exchanger
- Integrated catalytic converter

Utilisation of calorific value

- The flue gas temperature is a maximum of 15 K above the corresponding return temperature
- Calorific value used at a return temperature of about 55 °C and above

Engine

- Ford industrial gas engine
- Model: MSG 425
- 4-cylinder Otto engine, water-cooled
- Displacement: 2,489 cm^3

Coupling

Maintenance-free, plug-in, flexible metal/plastic coupling to compensate for radial, axial and angular misalignment

Generator

- Four-pole asynchronous machine for parallel operation on the public grid
- Manufacturer: Weier GmbH
- Model: DASGM 160/L 4, water-cooled
- 3 × 400 V, 50 Hz
- Start-up current: about 60 A
- Rated current: 41.2 A
- cos φ: 0.77 (inductive)
- Rated power: 20 kW
- Rated speed: 1,538min^{-1}

Low voltage certification

Low voltage certification with unit certificate as per application guide VDE-AR-N 4105:2018.

Compensation

Due to the requirements in German code of practice VDE-AR-N 4105:2018-11, operating own generating systems without reactive power compensation is only permitted in exceptional cases. A cos φ of 0.95 is achieved with the standard fixed compensation.

Feed-in management

(as per Section 14 German Renewable Energy Law (EEG) 2021)

Reduction in feed-in power (0-10 V) possible by preselecting target value via analogue input, bus interface (optional) and digital inputs (to connect relay contacts on a ripple control receiver provided by customer).

Controller

- Industrial computer with powerful MPC555 microcontroller, 32-bit power PC with FPU
- Fully automatic operating control
- Remote monitoring/operation via LAN or optional mobile data connection
- Interfaces to higher-level DDC controls: digital and analogue inputs and outputs; optional CAN bus, RK512, Modbus, LON bus, Profibus DP, BACnet/IP, IEC 104, Profinet

Housing

- Sturdy, easily removable, frameless full thermo-acoustic enclosure
- Machine unit on four Asonator steel springs
- Optional base on two vibration dampers to isolate noise

Noise emissions

- Mean sound pressure level at 1 m distance ≤ 53,1 dB(A) as per DIN 45635-11
- Mean sound pressure level (standard equipment) at 1 m distance (10°) to chimney outlet ≤ 41,1 dB(A) as per DIN 45635-11

Third octave band spectra isolation can be provided on request

Dimensions

L × W × H in mm: 1.450 × 1.020 × 1.010
Without electrical enclosure.
Height with electrical enclosure: 1.660 mm

Required space

L × W × H in mm: 3.240 × 2.020 × 1.850

Installation and base plans will be provided on request

Operating weight

810 kg

Delivery

- Machine unit, self-supporting:
  1.300 mm × 800 mm, 485 kg
- Panelling with accessories on pallet:
  1.600 mm × 1.200 mm, 315 kg

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Mephisto G34 Asynchronous I Biogas

Model

Mephisto G34 A BG

with regulated three-way catalytic converter

Manufacturer

Kraftwerk

Kraft-Wärme-Kopplung GmbH
Am Lindener Hafen 30,
30453 Hannover, Germany

Net output (adjustable)

Electric, net	14 to 34 kW
Thermal	50,1 to 75,7 kW
Gas	62,5 to 104,9 kW_{Hi}

Net efficiency

Electric, effective	32,4 %
Electric, ISO 3046	34,0 %
Thermal, effective	72,1 % ($t_{Returnf}$ = 35 °C)
Overall, effective	104,5 % (t_{Return} = 35 °C)

Fuel

Biogas or digester gas

Gas connection

- Gas connection rating: 104,9 kW_{Hi} = 116,3 kW_{Hs}
- Gas connection pressure: 20 - 100 mbar
- Gas flow pressure: ≥ 10 mbar
- Mating dimension: DN 25 (1" male thread)

Heating connection

- Heating circuit minimum pressure: 1.2 bar
- Permitted operating pressure max. 4.0 bar (pressures up to 6 bar on request)
- Flow temperature max. 90 °C
- Return temperature max. 70 °C
- Mating dimension: 1 1/4" male thread
- Design flow rate: 3.32 m^3/h
- Residual head for net output: 5.4 mWS
- With 40 K spread:
  Design flow rate: 1.66 m^3/h
  Residual head for net output: 9.0 mWS

Electrical connection

- Pre-fuse NH00 80 A gL (gG) or SLS E-80 A
- Supply line H07RN-F 5 x 25 mm^2, up to 50 m in length for installation types B to G

Plate heat exchanger

Soldered stainless steel compact heat exchanger for separating the heating system from the CHP engine water circuit

Pollutant emissions

Mephisto G34 A BG: mg/m3 i.N.

(at 5 % by volume reference oxygen) CO 300, NO_x 250

Combustion intake air

Space-air-dependent operating mode

Flue gas connection

- Flue gas conduit D110, fire resistance class B1 plastic pipe made of PP, permitted as a flue gas conduit for condensing heat generators with flue gas temperature up to 120 °C
- Flue gas temperature limited max. 90 °C on thermostat
- Safety thermal cut-out set to 100 °C
- Recommended flue gas counter-pressure: 500 Pa; maximum flue gas counter pressure 800 Pa
- Flue gas flow rate 117 m^3/h in normal state is equivalent to 151 m^3/h at $T_{Flue\ Gas}$ = 80 °C
- Maximum condensate quantity: 15 l/h

Flue gas heat exchanger

- Thermodynamically optimised cast aluminium-silicon heat exchanger
- Integrated catalytic converter

Utilisation of calorific value

- The flue gas temperature is a maximum of 15 K above the corresponding return temperature
- Calorific value used at a return temperature of about 55 °C and above

Engine

- Perkins industrial gas engine
- Model: 1004 Si
- 4-cylinder Otto engine, water-cooled
- Displacement: 4,000 cm³

Coupling

- Maintenance-free, plug-in, flexible metal/plastic coupling to compensate for radial, axial and angular misalignment

Generator

- Four-pole asynchronous machine for parallel operation on the public grid
- Manufacturer: Weier GmbH
- Model: DASGM 200/4 L, water-cooled
- 3 x 400 V, 50 Hz
- Start-up current: 224 A
- Rated current: 57.7 A
- cos φ: 0.85 (inductive)
- Rated power: 30 kW
- Rated speed: 1,538min^{-1}

Low voltage certification

- Low voltage certification with unit certificate as per application guide VDE-AR-N 4105:2018.

Compensation

Due to the requirements in German code of practice VDE-AR-N 4105:2018-11, operating own generating systems without reactive power compensation is only permitted in exceptional cases. A cos φ of 0.95 is achieved with the standard fixed compensation.

Feed-in management

(as per Section 14 German Renewable Energy Law (EEG) 2021)

Reduction in feed-in power (0-10 V) possible by preselecting target value via analogue input, bus interface (optional) and digital inputs (to connect relay contacts on a ripple control receiver provided by customer).

Controller

- Industrial computer with powerful MPC555 microcontroller, 32-bit power PC with FPU
- Fully automatic operating control
- Remote monitoring/operation via LAN or optional mobile data connection
- Interfaces to higher-level DDC controls: digital and analogue inputs and outputs; optional CAN bus, RK512, Modbus, LON bus, Profibus DP, BACnet/IP, IEC 104, Profinet

Housing

- Sturdy, easily removable, frameless full thermo-acoustic enclosure
- Machine unit on four Asonator steel springs
- Optional base on two vibration dampers to isolate noise

Noise emissions

- Mean sound pressure level at 1 m distance ≤ 62.2 dB(A) as per DIN 45635-11
- Mean sound pressure level (standard equipment) at 1 m distance (45°) to chimney outlet ≤ 48.3 dB(A) as per DIN 45635-11

Third octave band spectra isolation can be provided on request

Dimensions

L x W x H in mm: 1.800 x 1.040 x 1.300
Without electrical enclosure.
Height with electrical enclosure: 1.910 mm

Required space

L × W × H in mm: 3.800 × 2.100 × 2.280

Installation and base plans will be provided on request

Operating weight

1.350 kg

Delivery

- Machine unit, self-supporting:
  1.600 mm × 800 mm. 930 kg
- Panelling with accessories on pallet:
  2.000 mm × 1.200 mm. 400 kg

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Mephisto G50 Asynchronous I Biogas

Model

Mephisto G50 A BG

with regulated three-way catalytic converter

Manufacturer

Kraftwerk

Kraft-Wärme-Kopplung GmbH
Am Lindener Hafen 30,
30453 Hannover, Germany

Net output (adjustable)

Electric, net	20 to 50 kW
Thermal	65 to 101,0 kW
Gas	82,1 to 144,5 kW_{Hi}

Net efficiency

Electric, effective	34,6 %
Electric, ISO 3046	36,3 %
Thermal, effective	69,9 % (t_{Return} = 35 °C)
Overall, effective	104,5 % (t_{Return} = 35 °C)

Fuel

Biogas or digester gas

Gas connection

- Gas connection rating: 144,5 kW_{Hi} = 160,3 kW_{Hs}
- Gas connection pressure: 20 - 100 mbar
- Gas flow pressure: ≥ 10 mbar
- Mating dimension: DN 32 (1 ¼" male thread)

Heating connection

- Heating circuit minimum pressure: 1.5 bar
- Permitted operating pressure: max. 6.0 bar
- Flow temperature: max. 90 °C
- Return temperature: max. 70 °C
- Mating dimension: 1½" male thread
- Design flow rate: 4.43 m^3/h
- Residual head for net output: 6.0 mWS
- With 40 K spread:
  Design flow rate: 2.21 m^3/h
  Residual head for net output: 10.3 mWS

Electrical connection

- Pre-fuse NH00 100 A gL (gG) or SLS E-100 A
- Supply line H07RN-F 5 x 35 mm^2, up to 50 m in length for installation types B to G; 35 mm^2 for all installation types

Plate heat exchanger

Soldered stainless steel compact heat exchanger for separating the heating system from the CHP engine water circuit

Pollutant emissions

Mephisto G50 A BG: mg/m3 i.N.

(at 5 % by volume reference oxygen) CO 300, NO_x 250

Combustion intake air

Space-air-dependent operating mode

Flue gas connection

- Flue gas conduit D110, fire resistance class B1 plastic pipe made of PP, permitted as a flue gas conduit for condensing heat generators with flue gas duct up to 120 °C
- Flue gas temperature limited max. 100°C on thermostat
- Safety thermal cut-out set to 120 °C
- Recommended flue gas counter-pressure: up to 500 Pa; maximum flue gas counter pressure 800 Pa
- Flue gas flow rate: 161 m3/h in normal state is equivalent to 208 m3/h at $T_{Flue\ Gas}$ = 80 °C
- Maximum condensate quantity: 22 l/h

Flue gas heat exchanger

- Thermodynamically optimised cast aluminium-silicon heat exchanger
- Integrated catalytic converter

Utilisation of calorific value

- The flue gas temperature is a maximum of 15 K above the corresponding return temperature
- Calorific value used at a return temperature of about 55 °C and above

Engine

- Industrial gas engine
- Model: MAG 49.4 S 315
- 4-cylinder Otto engine, water-cooled
- Displacement: 4,900 cm^3

Coupling

- Maintenance-free, plug-in, flexible metal/plastic coupling to compensate for radial, axial and angular misalignment

Generator

- Four-pole asynchronous machine for parallel operation on the public grid
- Manufacturer: Weier GmbH
- Model: DASGM 250/4 L, water-cooled
- 3 x 400 V, 50 Hz
- Start-up current: 52 A (frequency inverter fitted as standard)
- Rated current: 94 A
- cos φ: 0.86 (inductive)
- Rated power: 56 kW
- Rated speed: 1,514 min^{-1}

Low voltage certification

Low voltage certification with unit certificate as per application guide VDE-AR-N 4105:2018.

Compensation

Due to the requirements in German code of practice VDE-AR-N 4105:2018-11, operating own generating systems without reactive power compensation is only permitted in exceptional cases. A cos φ of 0.95 is achieved with the standard fixed compensation.

Feed-in management

(as per Section 14 German Renewable Energy Law (EEG) 2021)

Reduction in feed-in power (0-10 V) possible by preselecting target value via analogue input, bus interface (optional) and digital inputs (to connect relay contacts on a ripple control receiver provided by customer).

Controller

- Industrial computer with powerful MPC555 microcontroller, 32-bit power PC with FPU
- Fully automatic operating control
- Remote monitoring/operation via LAN or optional mobile data connection
- Interfaces to higher-level DDC controls: digital and analogue inputs and outputs; optional CAN bus, RK512, Modbus, LON bus, Profibus DP, BACnet/IP, IEC 104, Profinet

Housing

- Sturdy, easily removable, frameless full thermo-acoustic enclosure
- Machine unit on four Asonator steel springs
- Optional base on two vibration dampers to isolate noise

Noise emissions

- Mean sound pressure level at 1 m distance ≤ 60,0 dB(A) as per DIN 45635-11
- Mean sound pressure level (standard equipment) at 1 m distance (10°) to chimney outlet ≤ 51,2 dB(A) as per DIN 45635-11

Third octave band spectra isolation can be provided on request

Dimensions

L × W × H in mm: 2.235 × 1.020 × 1.930
with electrical enclosure:

Required space

L × W × H in mm: 4.500 × 2.000 × 2.100

Installation and base plans will be provided on request

Operating weight

1.850 kg

Delivery

- Machine unit, self-supporting:
  1.640 mm × 785 mm, 1.240 kg
- Panelling with accessories on pallet:
  2.000 mm × 1.200 mm, 590 kg

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Mephisto G50 Synchronous I Biogas

Model

Mephisto G50 S BG

with regulated three-way catalytic converter

Manufacturer

Kraftwerk

Kraft-Wärme-Kopplung GmbH
Am Lindener Hafen 30,
30453 Hannover, Germany

Net output (adjustable)

Electric, net	20 to 50 kW
Thermal	65 to 101,0 kW
Gas	82,1 to 144,5 kW_{Hi}

Net efficiency

Electric, effective	34,6 %
Electric, ISO 3046	36,3 %
Thermal, effective	69,9 % (t_{Return} = 35 °C)
Overall, effective	104,5 % (t_{Return} = 35 °C)

Fuel

Biogas or digester gas

Gas connection

- Gas connection rating: 144,5 kW_{Hi} = 160,3 kW_{Hs}
- Gas connection pressure: 20 - 100 mbar
- Gas flow pressure: ≥ 10 mbar
- Mating dimension: DN 32 (1 ¼" male thread)

Heating connection

- Heating circuit minimum pressure: 1.5 bar
- Permitted operating pressure: max. 6.0 bar
- Flow temperature: max. 90 °C
- Return temperature: max. 70 °C
- Mating dimension: 1½" male thread
- Design flow rate: 4.43 m^3/h
- Residual head for net output: 6.2 mWS
- With 40 K spread:
  Design flow rate: 2.21 m^3/h
  Residual head for net output: 10.3 mWS

Electrical connection

- Pre-fuse NH00 100 A gL (gG) or SLS E-100 A
- Supply line H07RN-F-J 5 x 35 mm^2, up to 50 m in length for installation types B to G; 35 mm^2 for all installation types

Plate heat exchanger

Soldered stainless steel compact heat exchanger for separating the heating system from the CHP engine water circuit

Pollutant emissions

Mephisto G50 S BG: mg/m3 i.N.

(at 5 % by volume reference oxygen) CO 300, NO_x 250

Combustion intake air

Space-air-dependent operating mode

Flue gas connection

- Flue gas conduit D110, fire resistance class B1 plastic pipe made of PP, permitted as a flue gas conduit for condensing heat generators with flue gas duct up to 120 °C
- Flue gas temperature limited max. 100°C on thermostat
- Safety thermal cut-out set to 120 °C
- Recommended flue gas counter-pressure: up to 500 Pa; maximum flue gas counter pressure 800 Pa
- Flue gas flow rate: on request
- Maximum condensate quantity: on request

Flue gas heat exchanger

- Thermodynamically optimised cast aluminium-silicon heat exchanger
- Integrated catalytic converter

Utilisation of calorific value

- The flue gas temperature is a maximum of 15 K above the corresponding return temperature
- Calorific value used at a return temperature of about 55 °C and above

Engine

- Industrial gas engine
- Model: MAG 49.4 S 315
- 4-cylinder Otto engine, water-cooled
- Displacement: 4,900 cm^3

Coupling

- Maintenance-free, plug-in, flexible metal/plastic coupling to compensate for radial, axial and angular misalignment

Generator

- four-pole synchronous machine for parallel operation on the public grid or emergency power supply
- Manufacturer: Weier GmbH
- Model: DGS-F-250L4, water-cooled
- 3 x 400 V, 50 Hz
- Start-up current: 55 A (frequency inverter fitted as standard)
- Rated current: 72 A / 80 A
- cos φ: 1...0,9 (inductive/capacitive)
- Rated power: 62,5 kW
- Rated speed: 1,500 min^{-1}

Low voltage certification

Low voltage certification with unit certificate as per application guide VDE-AR-N 4105:2018.

Reactive power control

Control of reactive power according to Q(U) characteristic curve, cos φ (P)-characteristic curve or fixed cos φ: 1... 0.9 (inductive/capacitive).

Feed-in management

(as per Section 14 German Renewable Energy Law (EEG) 2021)

Reduction in feed-in power (0-10 V) possible by preselecting target value via analogue input, bus interface (optional) and digital inputs (to connect relay contacts on a ripple control receiver provided by customer).

Controller

- Industrial computer with powerful MPC555 microcontroller, 32-bit power PC with FPU
- Fully automatic operating control
- Remote monitoring/operation via LAN or optional mobile data connection
- Interfaces to higher-level DDC controls: digital and analogue inputs and outputs; optional CAN bus, RK512, Modbus, LON bus, Profibus DP, BACnet/IP, IEC 104, Profinet

Housing

- Sturdy, easily removable, frameless full thermo-acoustic enclosure
- Machine unit on four Asonator steel springs
- Optional base on two vibration dampers to isolate noise

Noise emissions

- Mean sound pressure level at 1 m distance ≤ 60,0 dB(A) as per DIN 45635-11
- Mean sound pressure level (standard equipment) at 1 m distance (10°) to chimney outlet ≤ 51,2 dB(A) as per DIN 45635-11

Third octave band spectra isolation can be provided on request

Dimensions

L × W × H in mm: 2.235 × 1.020 × 1.930
with electrical enclosure:

Required space

L × W × H in mm: 4.500 × 2.000 × 2.100

Installation and base plans will be provided on request

Operating weight

1.960 kg

Delivery

- Machine unit, self-supporting:
  1.640 mm × 785 mm, 1.350 kg
- Panelling with accessories on pallet:
  2.000 mm × 1.200 mm, 590 kg

Scope of delivery

Condensing CHP unit	Mephisto CHP modules consist of a machine set, sound insulation housing, gas line and electrical enclosure for module control and buffer tank management. All Mephisto CHP units are equipped with a condensing flue gas heat exchanger as standard.
Gas connection set	Consisting of 1 m stainless steel flexible hose, stainless steel ball valve and stainless TAS valve in the required dimensions.
Heating connection set	Consisting of 2 stainless steel flexible hoses (1 m each), flat-sealing with union nut in the required dimensions.
Reactive power compensation	Reactive power compensation to increase the power factor (cos φ). Consisting of automatic circuit breakers, capacitor contactors and power capacitor. The cos φ can be adjusted to network requirements ex works if necessary. Fully mounted in the CHP electrical enclosure or in a separate housing on the CHP electrical enclosure.
Silencer	Intake silencer for fitting outside the sound proofing, flue gas reflection silencer in the module housing and flue gas resonator silencer and flue gas silencer for fitting outside the sound proofing.
Tools for evaluating the operating data + remote control of the CHP unit	Webgate Webgate displays the CHP unit's operation-relevant data, such as the operating hours or the electrical energy generated, over its entire service life. Historical data and the availability specified in full maintenance contracts in particular can thus be evaluated easily. Webcontrol The Webcontrol visualisation interface not only allows the user to fully control the CHP unit remotely in real time, but also view and evaluate current and historical technical measurement data (temperatures, currents, outputs, etc.). This provides a tool for project monitoring and system optimisation.
Mephisto Basic Control	Software module within the CHP unit controller system with the following functions: - CHP unit output and flow temperature control - Buffer tank loading determined by two temperature sensors - Communication with a DDC via a digital input for the CHP request and order - Analogue input for target output/temperature specification - Analogue output for current output reading - Three potential-free changeover contacts for operating signal, ready signal and fault signal Integrated in CHP unit controller. Five analogue inputs in the CHP unit for Pt1000 temperature sensors for control or evaluation purposes included.

Accessories

Safety component assemblies and filling device	On the heating side as specified in DIN EN 12828:2014-07; consisting of Pneumatex pressurised expansion tank, safety valve, pressure gauge, automatic bleeding device and boiler, filling and drain ball valve for filling and draining, fitted ready for operation on the CHP module rear wall.
Pump assembly G22, G34	Consisting of Grundfos MAGNA3 high-efficiency wet running pump, electronically controlled, energy efficiency index (EEI) = 0.19, GENIbus module (controlled by CHP unit module control), Three shut-off valves, (one with backflow preventer function and forced positioning), two thermometers, sludge separator in the heating water return flow and flow sensor for displaying the volume flow in the CHP unit controls, fitted ready for operation on module connection plate.
Pump assembly G50	Consisting of Grundfos MAGNA3 high-efficiency wet running pump, electronically controlled, energy efficiency index (EEI) = 0.19, GENIbus module (controlled by CHP unit module control), An electronically controlled shut-off valve for software-based heating circuit backflow protection, a shut-off valve, including thermometer and flow sensor for displaying the volume flow in the CHP unit controls, fitted ready for operation on module connection plate.
Mephisto remote monitoring module	OpenVPN gateway for remote monitoring and control of all CHP modules at a location via Ethernet LAN. A network connection with the necessary port releases as specified in the >Mephisto CHP Network Configuration< document must be provided by the customer. Remote monitoring can also be performed via a mobile data connection using LTE/HSPA+/GPRS (4G/3G/2G) as an option. Fitted ready for operation in the CHP control cabinet. Including access to the manufacturer's Webgate tool.
Communication interface Mephisto API	Standardized programming interface for directly retrieving the data points processed by the CHP control system using customer-side HTTP requests. The documentation of the Mephisto API follows the "OpenAPI" description standard and is made available via the Swagger UI. The API calls are protected by authentication.
Operating time schedule	Software module within the CHP control system for automated limitation of the CHP utilisation hours per year. Function selection: CHP unit interlock with notification or notification only. After interlocking, the CHP unit is displayed as not ready for operation in communication with a DDC.
Pressure monitoring on the heating side	Heating system pressure sensor with connection cable for monitoring the pressure in the heating system. Ready to connect to the CHP unit in the pump assembly return line and connected to the controller via an analogue input. The current status and the pressure evolution over time can be displayed in self-developed Webcontrol in combination with the remote monitoring module.

Extension module fault message	Additional terminals for five external fault messages (e.g. boiler fault, pump fault) with potential-free NO contact or NC contact, ready fitted in the CHP unit control cabinet. Software module for parametrizing, displaying and evaluating the fault statuses on the CHP unit controller touch display and in Webcontrol/Webgate. Forwarding of fault message emails in Kraftwerk Webgate freely configurable. In addition to external fault messages, the software module can also monitor the controller's analogue inputs (e.g. CHP unit return, boiler flow, cat on) and generate fault messages if adjustable limit values are exceeded or not reached. A total of up to eight analogue and/or digital signals can be processed.
M-Bus data logger	Software module within the CHP unit controller for data acquisition and storage for one or more meters (electricity, gas, heat and water meters) by M-bus. Graph display of the current and historical values (max. two years) on the CHP unit controller's touch display. Retrieval/download of recorded data via Webcontrol or API interface (optional). Setpoint query possible for current-controlled operation of the CHP unit. Data transfer rate: 2400 baud. Supports 5 bus devices. Increased to up to 50 meters on request. Connection option for star-shaped wiring in the CHP control cabinet: max. two meters. If there are more than two meters, wiring is installed outside the CHP unit electrical enclosure on site. Installation and configuration on site.
Extension island grid operation	Enables the CHP plant to operate on an existing island network. The island network operation is activated via a digital input on the CHP plant.
Set for black start capability	Enables the module to start without drawing power from the grid. Intended for operation of the CHP plant on an island grid. Consists of starter battery, charger, starter and connection cable. Control system integrated in the CHP plant.
Extension emergency power supply for CHP with synchronous generator	Software module within the CHP control system for the independent provision of an island network by the CHP after the customer system has been disconnected from the public grid. A switch box for automatically disconnecting the customer system from the public grid in the event of a power failure can be offered on request. Can only be used in combination with the set for black start capability.

Control technology accessories

Extension module for electricity-based operation	Software module for electricity-based mode of operation for CHP. A heat-based mode of operation, dependent on electricity demand, is also possible as an option. Integrated in CHP unit controller. A power meter, available separately, is required for the target power output (Possible interfaces: 0-10 V, 0(4)-20 mA or M-Bus).
Communication module CAN	To communicate with higher-level heating control via CAN. Fitted ready for operation in the CHP control cabinet.
Communication module RK512	To communicate with higher-level heating via RK512. Fitted ready for operation in the CHP control cabinet.
Communication module Modbus	To communicate with higher-level heating control via Modbus TCP or Modbus RTU. Fitted ready for operation in the CHP control cabinet.
Communication module LON-Bus	To communicate with higher-level heating control via LON bus. Fitted ready for operation in the CHP control cabinet.
Communication module Profibus-DP	To communicate with higher-level heating control via Profibus-DP. Fitted ready for operation in the CHP control cabinet.
Communication module BACnet/IP	To communicate with higher-level heating control BACnet/IP. Fitted ready for operation in the CHP control cabinet.
Communication module IEC 104	To communicate with higher-level heating control via IEC 104. Fitted ready for operation in the CHP control cabinet.
Communication module Profinet	To communicate with higher-level heating control via Profinet. Fitted ready for operation in the CHP control cabinet.

Delivery, installation, services

Here are some of the services offered by us or our licensed local partners:

Packaging and delivery	Packaging and delivery of one or more combined heat and power generation unit as per shipping requirements.
On-site delivery, positioning and installation of the CHP unit	Transport of the CHP unit from the unloading point to the installation location, positioning and installation at the installation location.
Flue gas system inside the boiler room	Consisting of a PPS D80 or D110 flue gas pipe; type B, 120 °C with type approval, including all moulded parts and assembly materials for everything from the CHP module to the chimney entry. Including flue gas measurement connection and condensate trap.
Control integration	Supply, installation and connection of electrical control cables.
Commissioning	Of a CHP module, setting of all machine parameters, adjustment of the gas line, control of all functions required for operation, emission measurement, test of safety systems (in particular of the grid and plant protection and shut-off devices), instruction of the operator, compilation of the commissioning protocol and handover of the operating and maintenance manual.
Module maintenance	Maintenance and repair by own servicing team or licensed partners.

Contact

You will find more accessories in our product range for natural gas, biomethane and liquefied gas CHP units. You are also welcome to contact us directly.

We will provide you with extensive consultation on all technical and financial matters related to our entire product portfolio.

We will be happy to provide you with a project-specific quote. You can contact us by phone +49 511 262 9970 or by email **mail@kwk.info**. You will find other options to contact us on our website **www.kwk.info/en/contact**.

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