POWERED BY KW ENERGIE

Michael Schmid

Basics smartblock®

PRESENTATION AGENDA

Construction smartblock®

Definition Combined Heat Power Plant

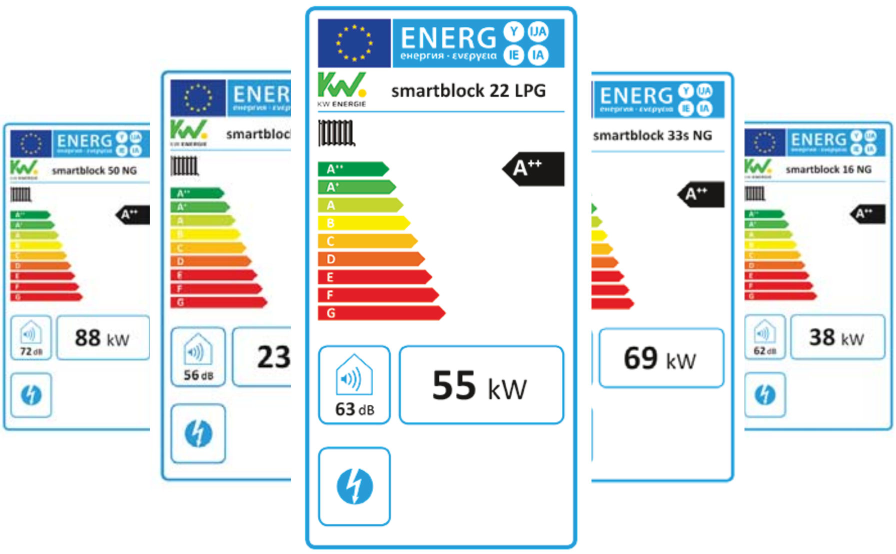
- A combined heat power plant (abbr. CHP) is a system for generating heat and electricity in modular construction.
- For this purpose, a force-heat coupling is used.
- The electricity generators are driven by combustion engines.
- The increased total efficiency as compared with conventional combinations of local heating and central power plant results from the fact that the waste heat generated by the electricity generator is used directly on site.
- The efficiency of the electricity generator is between 25% and 34% (relative to the heating value).
- The total efficiency is between 90% and 96%; with heat exchanger technology efficiency ratings of beyond 100% are possible.
- Conventional CHP modules have a power performance range between 1 kW and several tens of MW.
- Systems under 50 kW are called mini-force-heat coupling CHPs, under 15 kW micro-CHPs, and under 2.5 kW nano-CHPs.

smartblock® Product Presentation

- 2012 Introduction of the smartblock series
- Registered trademark and logo for the entire EU

smartblock® Produktvorstellung

Implementation of the Eco-design guideline (2009/125/EG)



smartblock® Product Presentation

DVGW construction sample test according to EC gas device guideline (2009/142/EG) for the entire smartblock series from 7.5 to 50 kW approved and certified by DVGW.

smartblock® Product Presentation

The heart of our smartblock

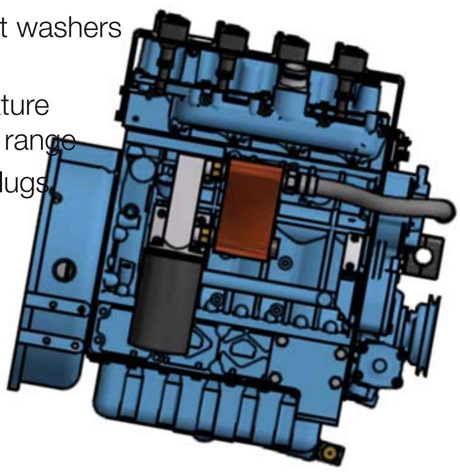
The heart of our smartblock are the smartblock motors. Sturdy, robust, highly efficient and service-friendly.
The heartbeat of the smartblock motors is determined by the newly developed GSC technology (gas stream combustion). With this innovative combustion method a complete flaming within the combustion chamber, which has been reduced in size to an absolute minimum, is achieved.
The uniformity of the combustion and the thermodynamic efficiency set peak standards and are unequalled.

Our gas motors K18, K24 and K36

These smartblock motors are used for the smartblocks 16, 22 and 33. The newly developed GSC technology combustion method (patent pending with the German Patenting and Trademark Agency) is being used.

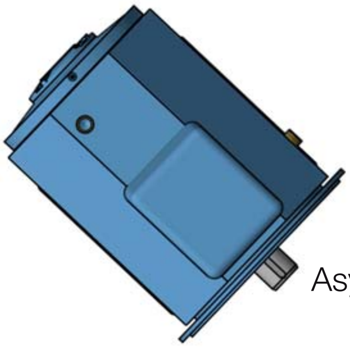
The advantages against conventional Otto engines:

- High thermodynamic efficiency with excellent knock resistance
- Designed for permanent operation at low speeds
- No failure-prone hydraulic tappets
- Valve clearance setting most simple using adjustment screws on rocker levers
- Modified cylinder head fitted with special gas valve seat washers and high temperature resistant exhaust valves
- Map-controlled singe spark ignition for igniting the mixture
  → almost constant efficiency over a wide performance range
- Very high spark plug MLBF by using industrial spark plugs

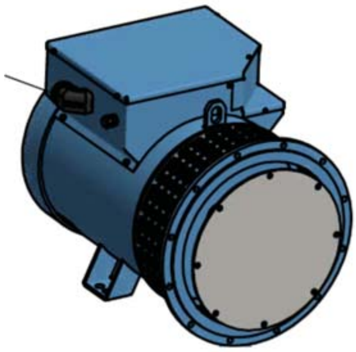


Generating electricity

Depending on the CHP version either synchronous or asynchronous generators are used.
All smartblocks are available as grid substitute or insular systems.
The types marked “s” are fitted with air-cooled synchronous generators.



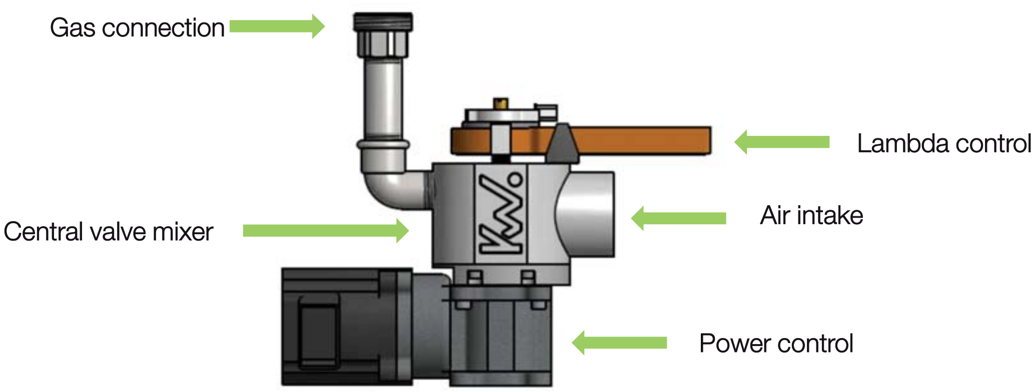
Asynchronous



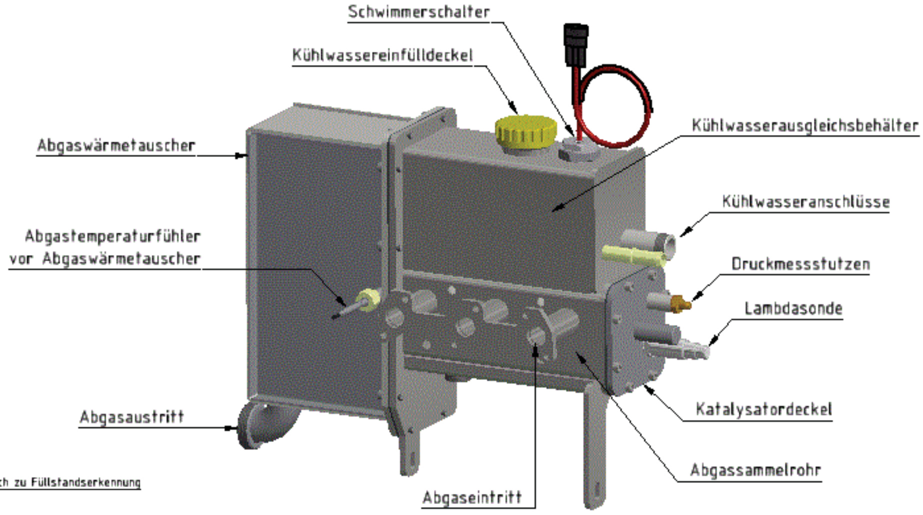
Synchronous

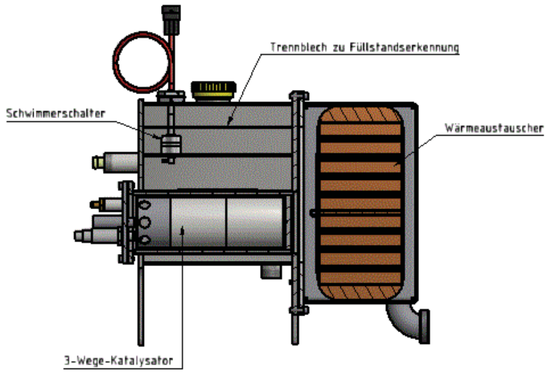
Getting the mixture right is vital

The **central valve mixer** designed especially for our smartblocks is distinguished by its rugged construction, simplest settings and excellent mixture characteristics. And it provides an almost perfectly constant total mixture across the entire performance range.



Exhaust gas heat exchanger module

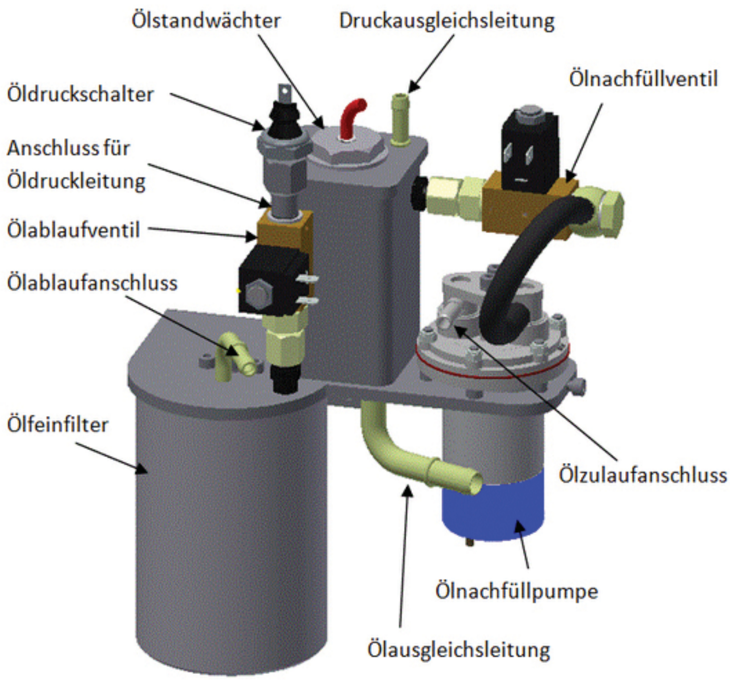




A further milestone in the construction of the smartblocks is the exhaust gas heat exchanger module (patent pending).
A large number of assemblies and components otherwise installed all over and individually in the CHP are grouped together in a single, revolutionary and compact module.

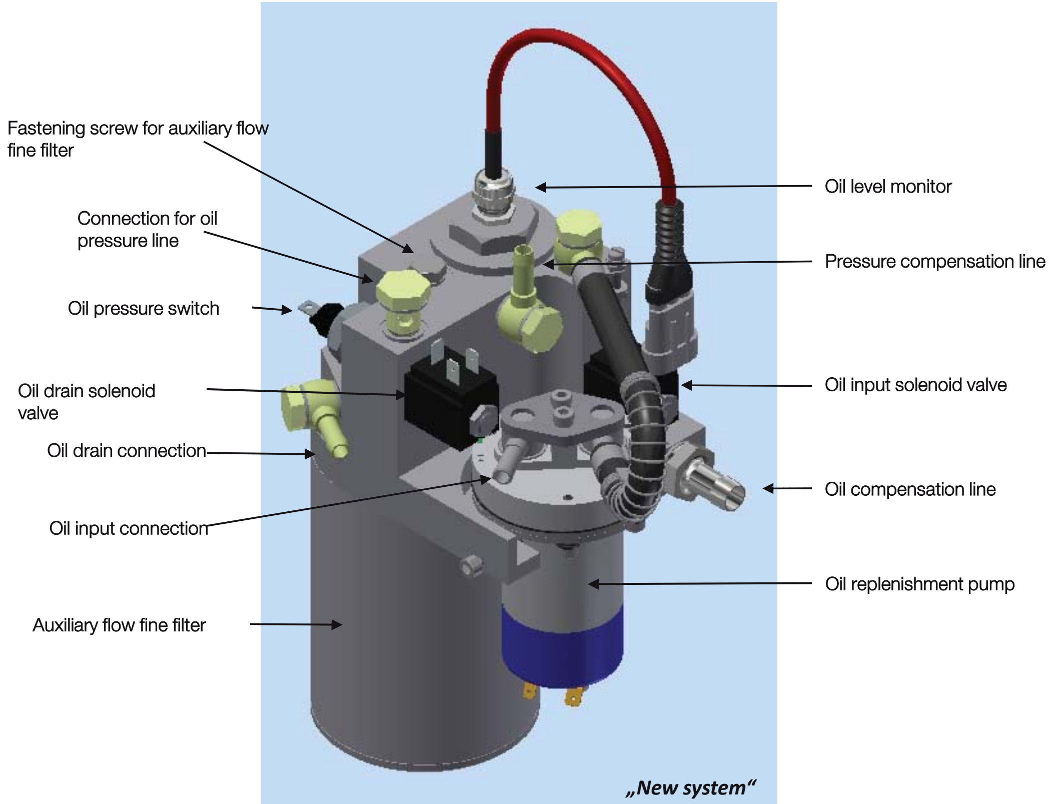
Oil system module

The motor oil circulation system increases the lubricant volume considerable without any changes whatsoever to the engine or motor. In addition, the module also serves as a conventional automatic motor oil replenishing system.
This will increase the interval (operating hours) between two oil changes substantially.
The automatic lubricant level monitor replaces a regular manual checking and replenishing the motor oil.



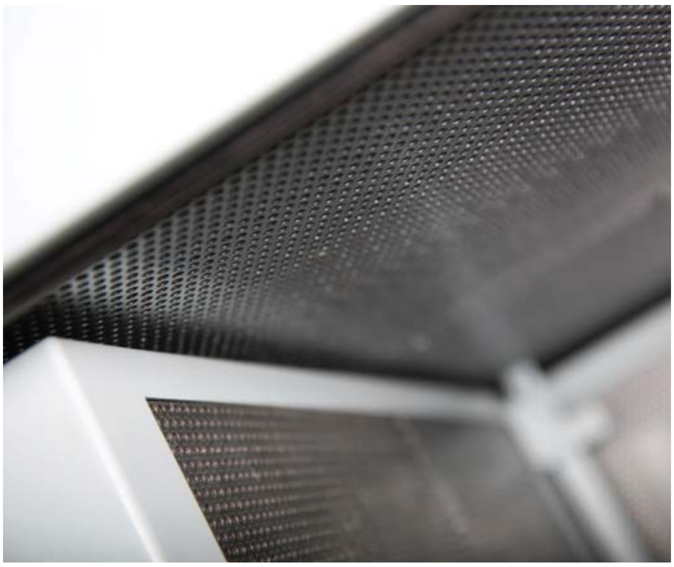
"Old system"

Ölsystemmodul

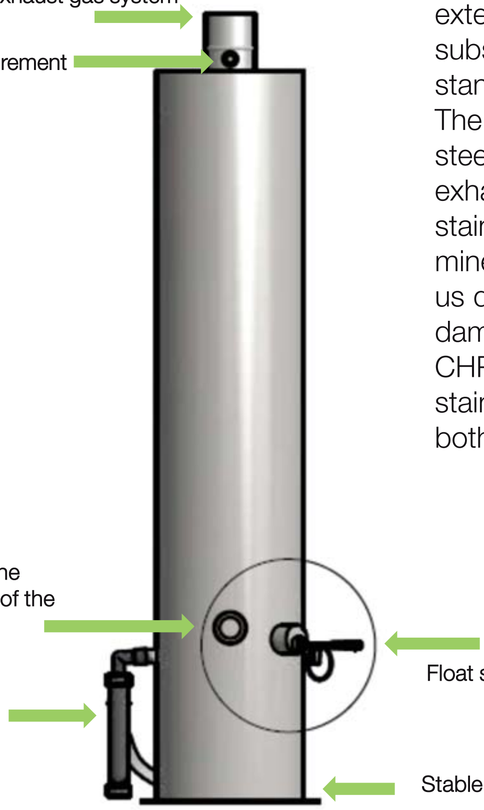


Quiet by nature

All smartblocks are enclosed in a highly effective noise dampening hood, which is, despite its rugged construction, easy to open, so that access to the CHP is available at all times.

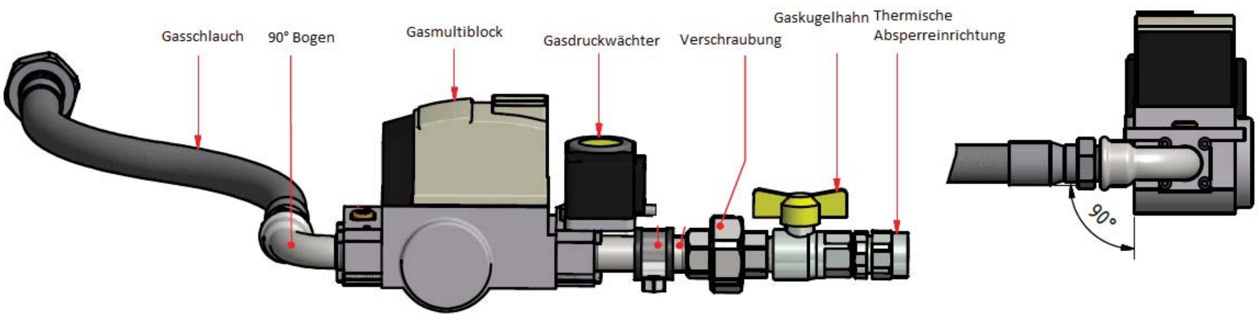


Combination exhaust gas muffler



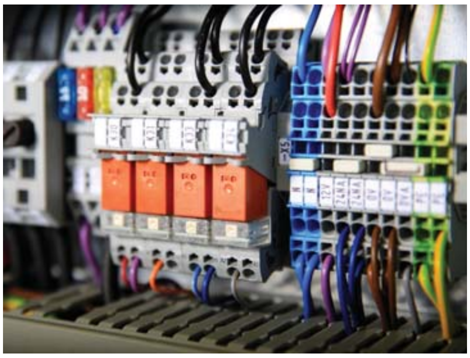
The exhaust gas muffler module (ASM is an external assembly mounted directly subsequent to the CHP and is part of the standard delivery scope.
The ASM is made completely of V4A stainless steel. Even the dampening filler wool in the exhaust gas noise muffler consists of V4A stainless steel. Compared to the normally used mineral wool the stainless steel wool used by us does not quickly deteriorate in its dampening properties. The connection to the CHP is by means of a vibration-absorbing stainless steel compensator with union nuts on both ends.

Gas control system



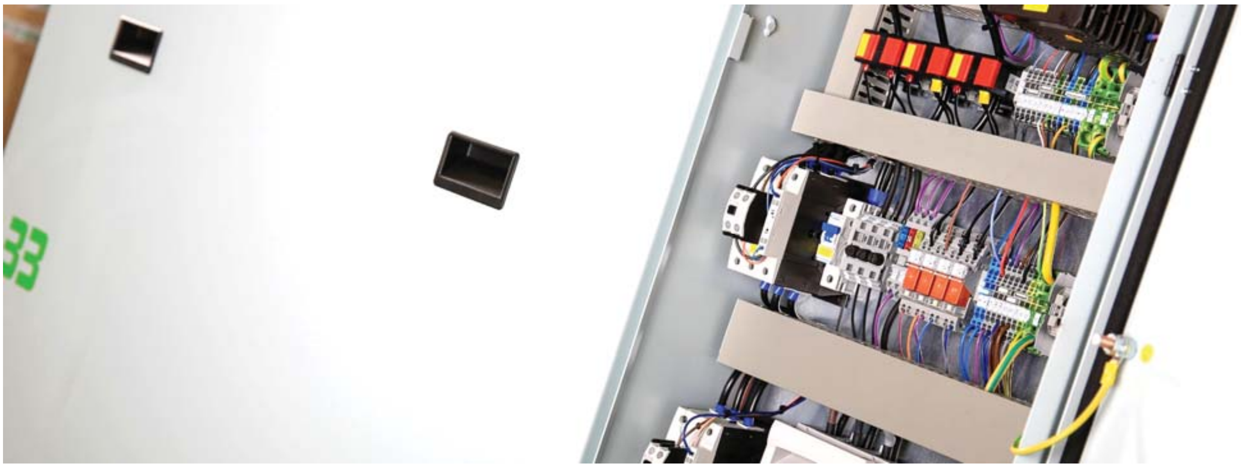
The gas control assembly consists of DVGW-approved and certified assemblies (GasMultiBloc with integrated gas filter and pressure controller, attached gas pressure monitor, as well as a gas valve and flashback protection) and the gas mixer module.
The oxygen required for the combustion is taken directly from the ambient atmosphere; it is cleaned of dirt particles in the air filter at the intake.
During maintenance work on the system the air filter cartridge must be exchanged!

IMPORTANT!!! The system is DVGW approved and certified and must not be modified in any way.



The central nervous system: The power switching cabinet

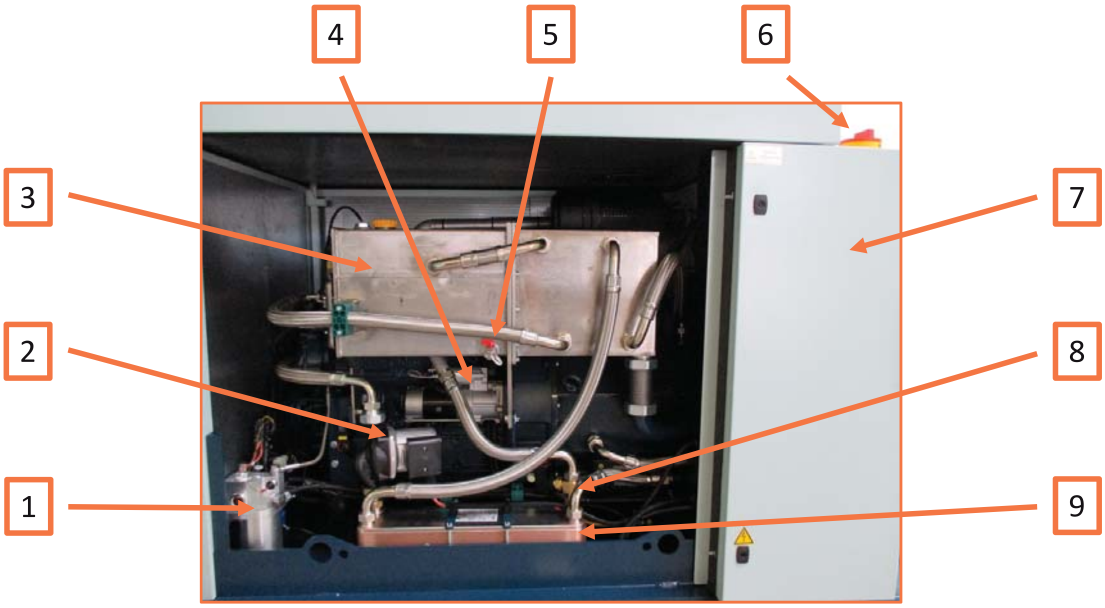
The core of the CHP is the internal power switching cabinet, where the generator power is switched, controlled and protected.
It also houses the plug-and-play and pre-configured cable harnesses for the gas valve, the gas pressure monitor, the condensate switch and the charging pup, as well as additional sockets for the connection of other, external sensors.



The central nervous system: The controller

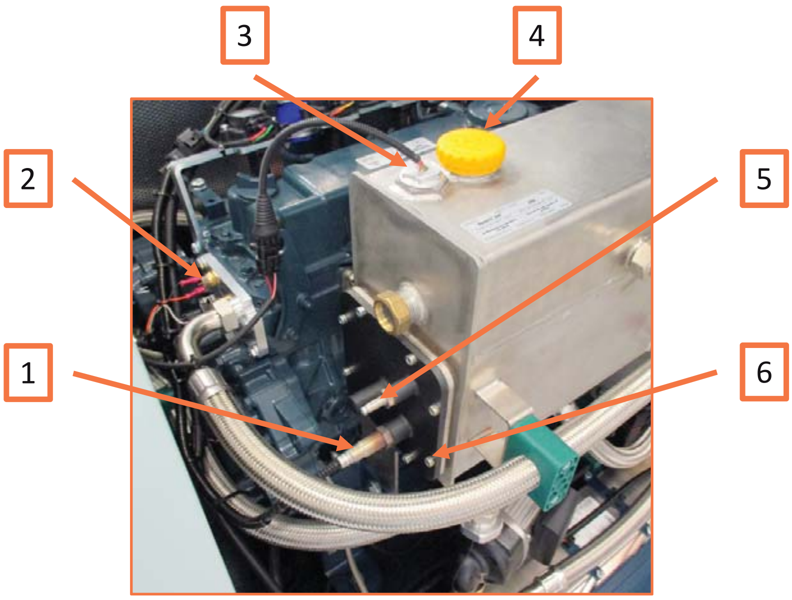
An economical and ecologically efficient CHP operation requires an intelligent controlling system with a continuous monitoring of the CHP and all its functions.
The high-performance CHP control system BR06 is the brains behind all smartblocks, and it fulfils the requirements in an ideal manner. The basis of the control system is the professional and industrial control system with full graphic display and an easily navigable key pad field. During many years of further development the software behind our BR06 control system has been augmented by an enormous variety of protection mechanisms as well as operational and controlling features.

View right side



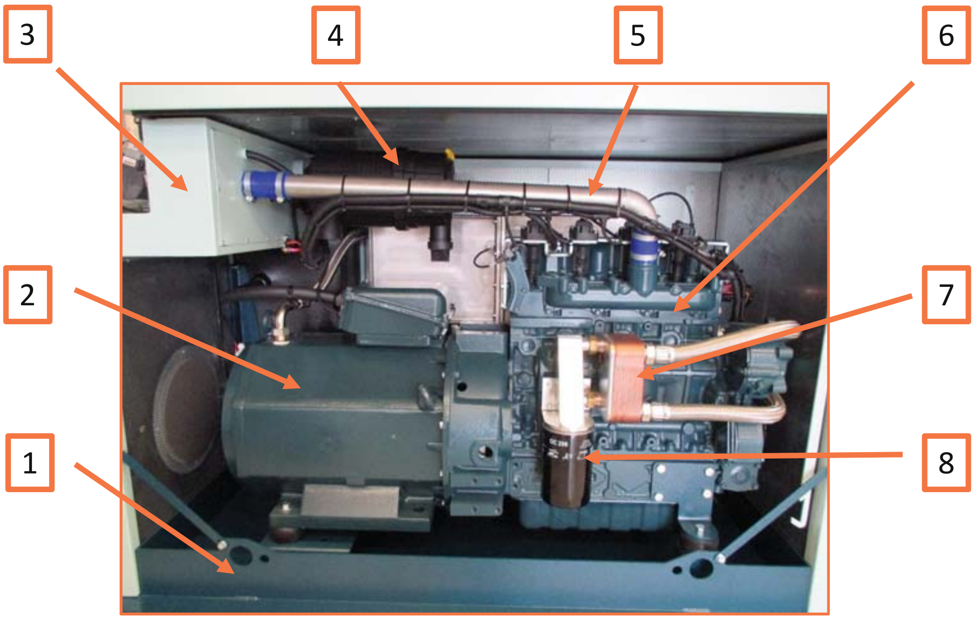
1. Oil system module
2. Coolant pump
3. Exhaust gas heat exchanger module
4. Starter
5. Drain valve
6. Main switch
7. Power switching cabinet
8. Flow monitor
9. Plate heat exchanger

View "oblique to exhaust gas manifold"



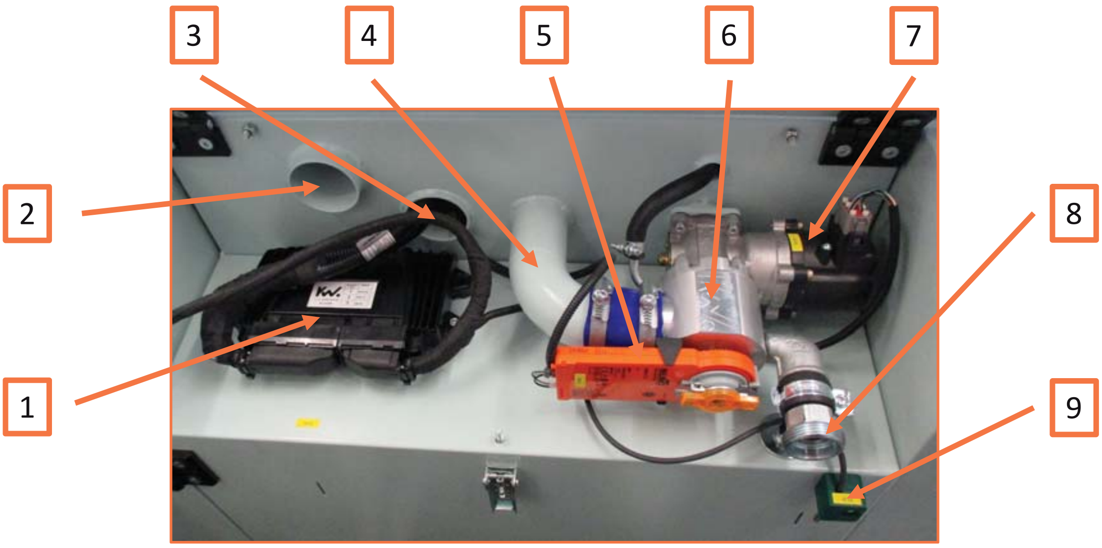
1. Lambda probe
2. Safety temperature limiter
3. Coolant level monitor
4. Coolant cover lid
5. Measurement fitting – Exhaust gas counter-pressure
6. Cover plate 3-eay catalytic converter

View left side



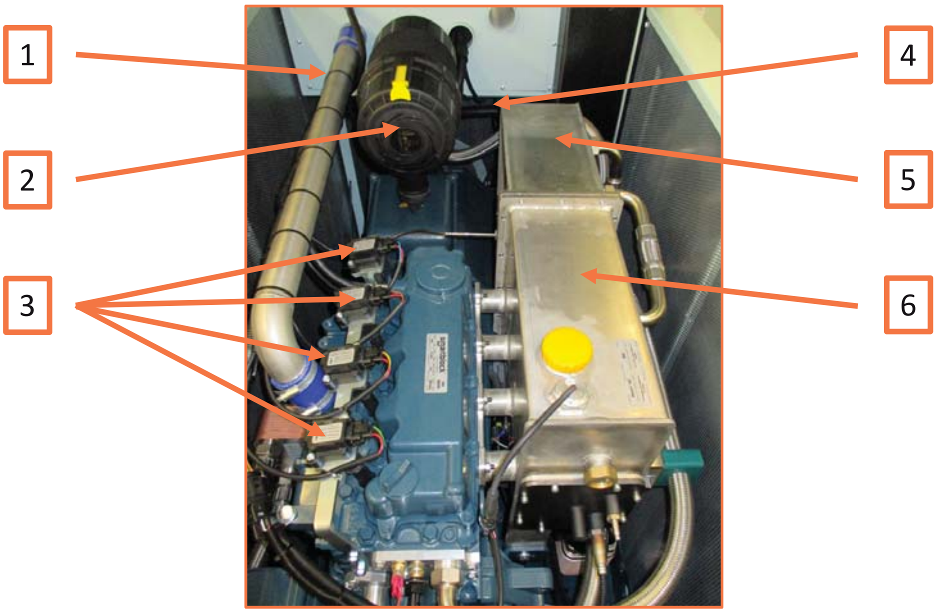
1. Base frame
2. Generator
3. Noise protection hood
4. Air filter
5. Mixture line
6. Motor
7. Oil cooler
8. Motor oil filter

View “under cover” gas control casing



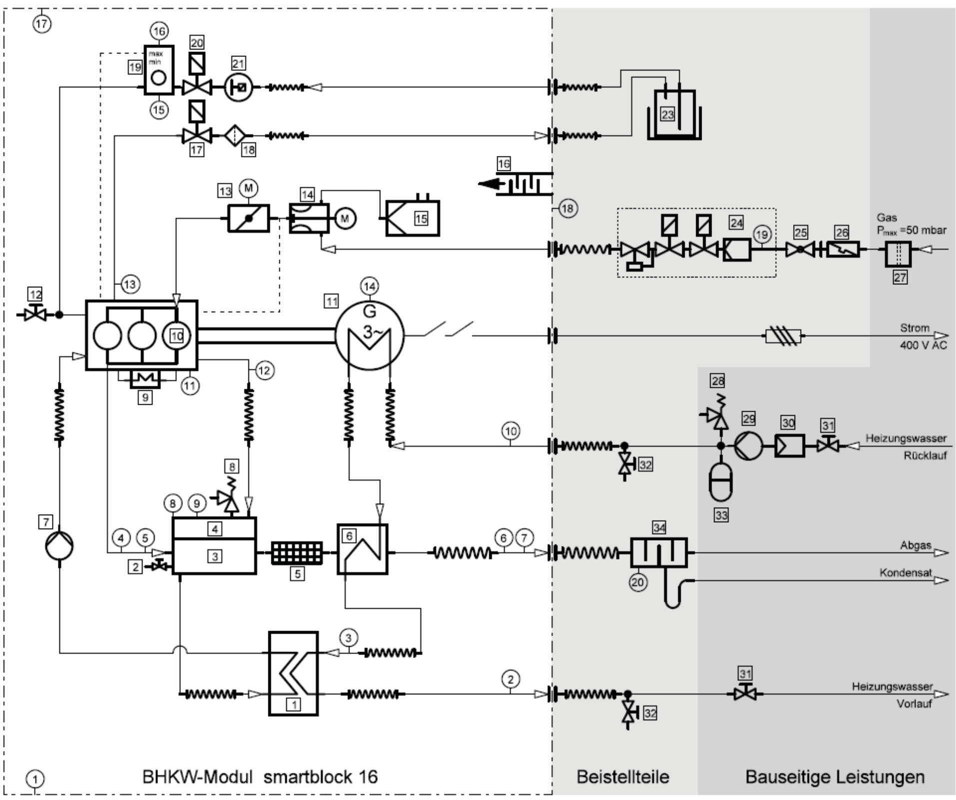
1. Motor controller
2. Air intake opening
3. Cable through-feed
4. Air intake (air filter)
5. Setting motor gas mixer
6. Central valve mixer
7. Throttle flap, actuator
8. Fuel gas connection
9. Ambient temperature sensor

View from top



1. Mixture line
2. Air filter
3. Four single ignition solenoid
4. STB Hood
5. Exhaust gas heat exchanger
6. Exhaust gas manifold

Overview



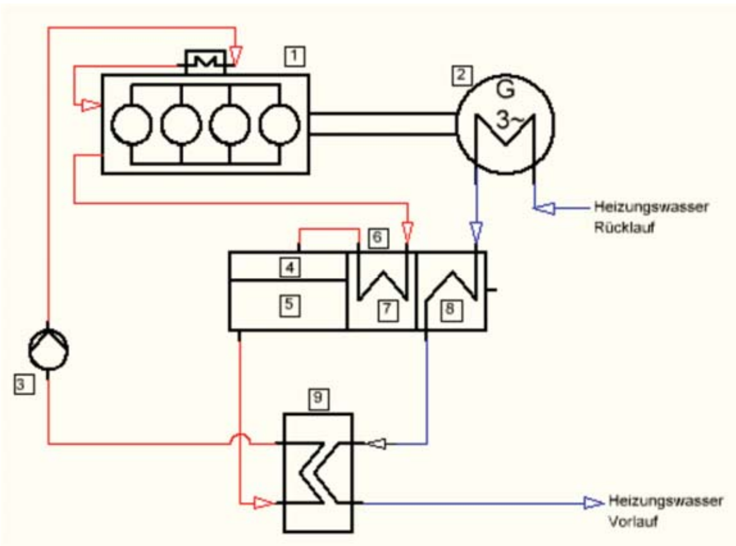
Aggregate cooling

Dual circuit cooling system with a coolant pump, pressure compensation vessel integrated in the exhaust gas heat exchanger. Excess and low pressure valves and drainage tap. Heat transfer from the aggregate cooling circuit to the heating system by means of stainless steel plate heat exchanger.

During the combustion in the motor and the generation of electricity in the asynchronous generator heat is generated, which is used to heat the water in the heating circuit. The heat is absorbed through the internal cooling circuit on the heated components and released through the plate heat exchanger / cooler to the external heating circuit.
The internal cooling circuit absorbs heat inside the systems at the following plaves:

- Generator cooling (not with smartblock s)
- Motor cooling
- Exhaust gas cooling (exhaust gas heat exchanger module)

Cooling circuit schematic smartblock



1 Motor
2 Generator
3 Kühlwasserpumpe
4 Kühlwasserausgleichsbehälter
5 Abgassammelrohr
6 Abgaswärmetauschermodul
7 Abgaswärmetauscher 1
8 Abgaswärmetauscher 2
9 Kühlwasserwärmetauscher

For smartblock "s" without generator

Red Line = Primary circuit (motor cooling circuit)
Blue Line = Secondary circuit (heating cooling circuit)

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Installation & Operating Conditions

Installation and Operating Conditions


smartblock
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Aufstellungs- und Betriebsbedingungen

Requirements on the installation space of the CHP

General requirements

The installation space may not be used for other purposes, except for the storage of heating fuels. There must be no other openings to other rooms, except for air-tight and self-closing doors. The room must be ventilated. Exceptions are possible, if the prior usage of the rooms makes this indispensable and the system can be operated safely or of the room is within a free-standing building, which is used only either for operating the system or the storage of heating fuels.

The CHP may not be installed in staircases, hallways, corridors, garages or rooms with increased explosion or fire hazards

The floors at the installation space must be horizontal, even and of sufficient load capacity.
A floating screed is not suitable. The floor should not have a porous structure, so that cleaning is easier. If there is no floor tiling, an oil-resistant floor coating should have been applied. In case there is floor drain please observe the regulations of the German water management ordinance (WHG).

General requirements

The operating space must be kept dry and clean at all times. In order to prevent an excessive dust content in the intake air, the operating space should be kept as dust-free as possible. The maximum permissible ambient temperature in the operating room is 35°C. The operating room must be frost-free at all times. A CHP currently not in use must at all times be located in a frost-free environment.

Space requirements

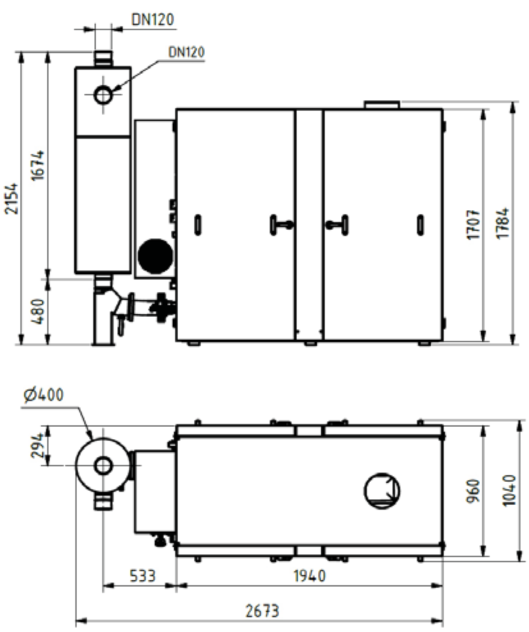
At the installation space a maintenance and service space must be freely accessible at all times measuring no less than 60cm (smartblock 7,5, 16) resp. 80 cm (smartblock 22, 33, 50) around the CHP; at least 1 metre is recommended in all cases. Depending on the CHP type, the minimum required room height for the installation of the CHP 2.0 m (smartblock 7,5 bis 33) and 2.5 m (smartblock 50) respectively.

Spatial requirements

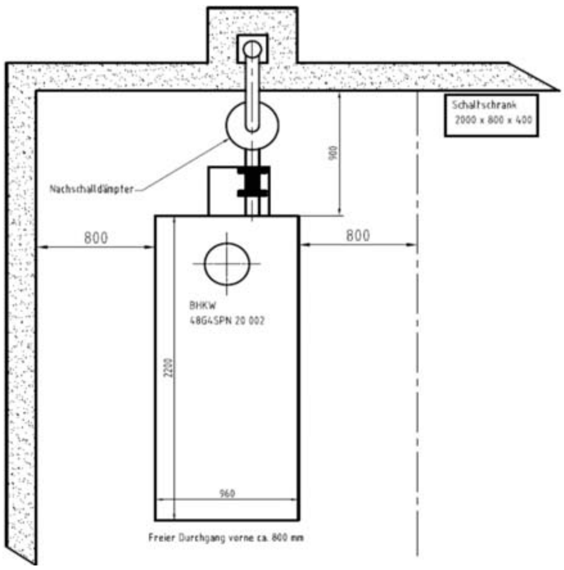
The room heights must be available throughout the designated maintenance area and may not be reduced by lines, pipes or similar fittings. So that maintenance work is possible without restrictions, the free space and wall distances must be ensured. A good access to the CHP including switching cabinet and all ancillary aggregates must be possible at all times and without restrictions,, with all areas needed for maintenance free of obstructions of any kind; otherwise this will result in access difficulties and extra costs for maintenance, service and repair work.

➢ In case the minimum distances and spaces are not ensured this will result in extra costs due to obstructions during service and repair work under difficult working conditions.

Dimensions



Dimensions CHP



Dimensions installation & spacing

Combustion air supply and ventilation

The combustion air supply as well as the ventilation for the hood (in all smartblocks “s” and smartblocks 33 and 50) must be pulled in from the installation room! Direct fresh air intake from the outside through a fitted channel is prohibited, because at very low outside temperatures there is acute freezing hazard.

The combustion air supply is considered as established if the CHP is set up in room which is fitted with one (or two) opening to the outside according to the firing ordinance. The “FeuVO Bayern” [Fire Ordinance Bavaria], for example, prescribes for a firing heat power of 50 kW a clear cross of at least 150 cm^2 or two openings of 75 cm^2 each or shafts into the open with an equivalent flow rating. For each additional kW additional two cm^2 clearance must be made available. According to the FeuVO the ventilation opening for the CHP smartblock 50 must be no smaller than 350 cm^2. The cross section of the opening of 150 cm^2 corresponds with a circular opening to a diameter of 13.8 cm (350 cm^2 equal a diameter of 21.2 cm). In case weather vanes or bird protection grids are fitted the cross-sections are reduced due to the additional air resistance and must be increased appropriately. Grid mesh widths below 2 mm must be avoided.

Combustion air supply and ventilation

Ventilation openings for combustion system must never be closed or obstructed, unless other safety systems ensure that the CHP can only be operated with an open air supply. The required cross-section must not be reduced by grids or covers of any sort. Ventilation openings for any boiler systems located in the same room must be taken into account.

It must be ensured that intake combustion air is free of combustible or explosive gases or fumes. In addition, the intake air must be free of dust and not contaminated with halogens or other solvent fumes. In particular, in public swimming pools chlorine and other salts from the water preparation are an issue.

- ATTENTION: Corrosion hazard, deposits in the exhaust system, motor damages

Combustion air supply and ventilation

In order to ensure a satisfactory CHP operation and to prevent secondary damages the room temperature and the temperature of the intake air must be between +5°C and +35°C.
The warm exhaust air must (with all smartblocks “s” as well as smartblocks 33 and 50) be removed from the room, to prevent excessive heating f the room.

- ❖ For the ventilation we recommend a temperature-controlled extractor fan as well as a separate air intake opening. This is the only way to ensure that the room is not overheated or too cold.

Alternatively, the customer may opt for a direct exhaust channel to the outside. But this requires a self-closing return flap so that no cold air can reach the CHP in still-stand mode (frost hazard). The exhaust fan integrated in the module as part of the CHP can be expected in the exhaust line supported by a customer-provide accessory fan in the exhaust line exceeding a length of 4 m.

Heating water

The high temperatures in the heating system in conjunction with limey heating water may lead to lime deposits on the exchanger plates of the plate heat exchanger. Consequently, the transfer performance of the plate heat exchanger will deteriorate over time, resulting in a decrease of the forward temperature, increase of the motor temperature and finally a failure of the CHP.

Basically we strongly recommend that only drinking water must be full softened and desalinated before filling into the heating system according to the guidelines of VDI 2035. This way a calcium hydrogen carbonate content of 0.02 mol/m³ can be reached (0.11 °dH). With appropriate conditioning finally a pH value of 8.2 to no more than 9.5 must be set. If aluminum components are installed in the heating system, the pH value may not exceed 8.5. Information on appropriate devices (rental units) or a filling with conditioned heating water according to VDI 2035 may be retrieved from various water conditioning and preparation companies (e.g. Grünbeck).

Heating water

- An insufficient water quality and the resulting pollution of the plate heat exchanger will inevitably lead to an increase in the exhaust temperature water quality and a decrease in the difference between the forward temperature and the motor temperature!
- Use exclusively conditioned heating water according to VDI 2035!
- To prevent sludge in the cooling system the installation of a sludge separator is urgently recommended.
- The use of Glysantin or other similar admixtures to the heating water is prohibited.

Gas supply

The gas supply system, starting from the main gas connection to the connection to the CHP module must be installed on site by the end user. GasMultiBloc, gas main tap, thermal block and flexible gas connection hose are part of the delivery scope from KW Energie, as is the gas control system integrated in the CHP. All technical regulations and guidelines must be strictly observed (e.g. TRGI)! The following connection specifications must be observed.

- The gas line must be connected to the CHP with a rigid line! The flexible gas connection hose between the CHP and GasMultiBloc must be used (part of the delivery scope)!
- The installation of an additional gas filter on site by the customer is strongly recommended!

BHKW Typ	Gas-Anschlussdruck	Gas-Fließdruck	Gas-Wärmeleistung
smartblock 7,5 / 7,5s	18-25 mbar	≥ 18 mbar	2,9 Nm³/h (effektiv)
smartblock 16 / 16s	18-25 mbar	≥ 18 mbar	5,2 / 5,4 Nm³/h (effektiv)
smartblock 22 / 22s	18-25 mbar	≥ 18 mbar	6,9 Nm³/h (effektiv)
smartblock 33 / 33s	18-25 mbar	≥ 18 mbar	10,2 Nm³/h (effektiv)
smartblock 50	18-50 mbar	≥ 18 mbar	15,1 Nm³/h (effektiv)

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Water Conditioning AFS Solutions GmbH

AGUASAVE & AGUACLEAN Long term protection & savings

- A solution concept for all water circuits (heating / cooling circuits)
- Quality monitored and secure initial filling and replenishing of heating and cooling circuits and other ancillary systems
- No complicated designs or calculations by the workers or planners required
- Simple and automatic recording of water levels and system contents
- Automatic documentation of all important parameters at filling (boiler records) of the systems
- Simple and self-regulatory replenishment with shut down when supplies are used or excessive replenishment volumes or frequencies or durations without additional staff requirements or intervention in the system
- Fully automatic and controlled water exchange of non-compliant (VDI) circuit water against optimized and conditioned and fully protected filling and replenishment water without detrimental effects on the user or operator

AGUASAVE & AGUACLEAN Long term protection & savings

- Gentle cleaning (corrosion / deposits / sludge), also in existing systems. Protection of new energy generating installations and the assemblies and components installed in the system
- Ensuring the planned savings in conjunction with the investment in innovative heating and cooling technology products
- Prevention of damages due to corrosion, deposits and sludge in all heating and cooling system, also when using different materials and various raw water qualities
- Immediate and sustainable quality optimization of the water used in all water-run circuit systems
- Sustainable energy efficiency optimization of the entire heating and cooling system
- Reduction of energy, maintenance and repair costs in all water-using systems

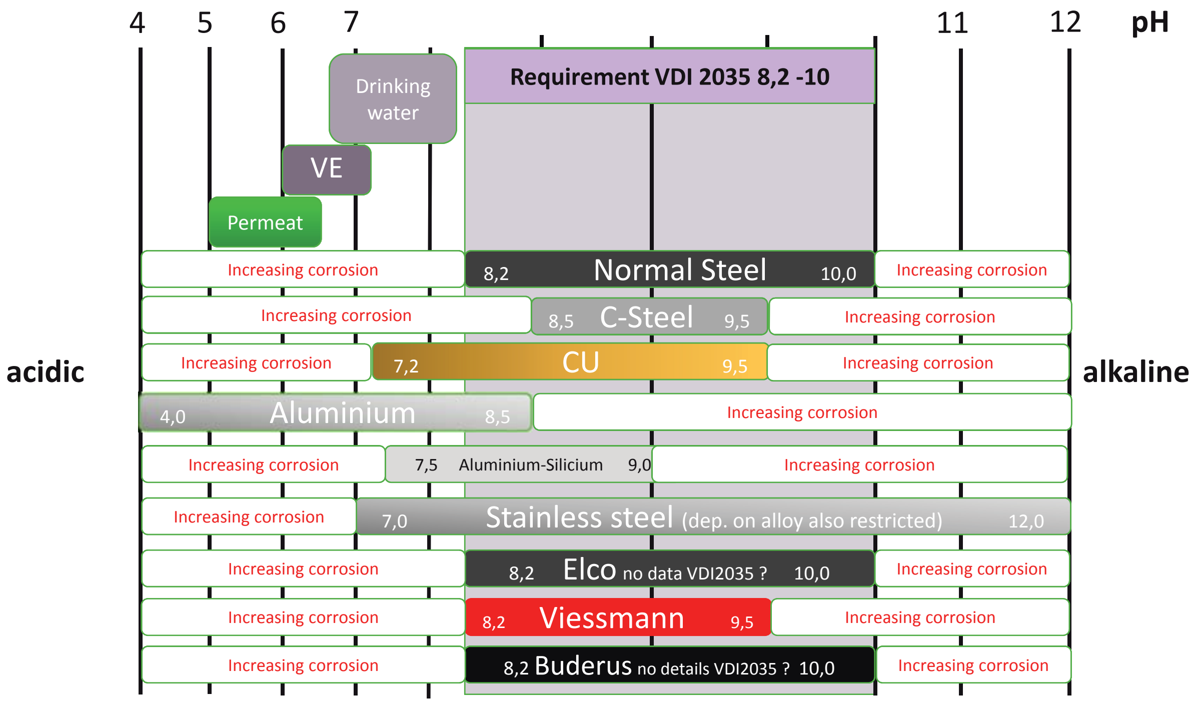
AGUASAVE & AGUACLEAN Long term protection & savings

- Meeting all requirements of VDI 2035 sheet 1 & 2 as well as the specifications of the CHP / boiler and component manufacturers for securing all warranty and guarantee claims
- With the water quality produced and the fully protected product the pH value in the circuit becomes irrelevant and does not present an issue in the range between 7 and 10. This is unproblematic in practice.
- If all deposits and sludge are removed from the system, the power consumption of the pumps and the whole system is reduced.
- The measures extend the MTBF of boilers and all installed circuit pumps, fittings and control valves.
- The modern high efficiency pumps are susceptible to magnetite (permanent magnets). Through the implementation of the AFS concept and the simultaneous gentle cleaning is an effective protection against magnetite in the running operation.

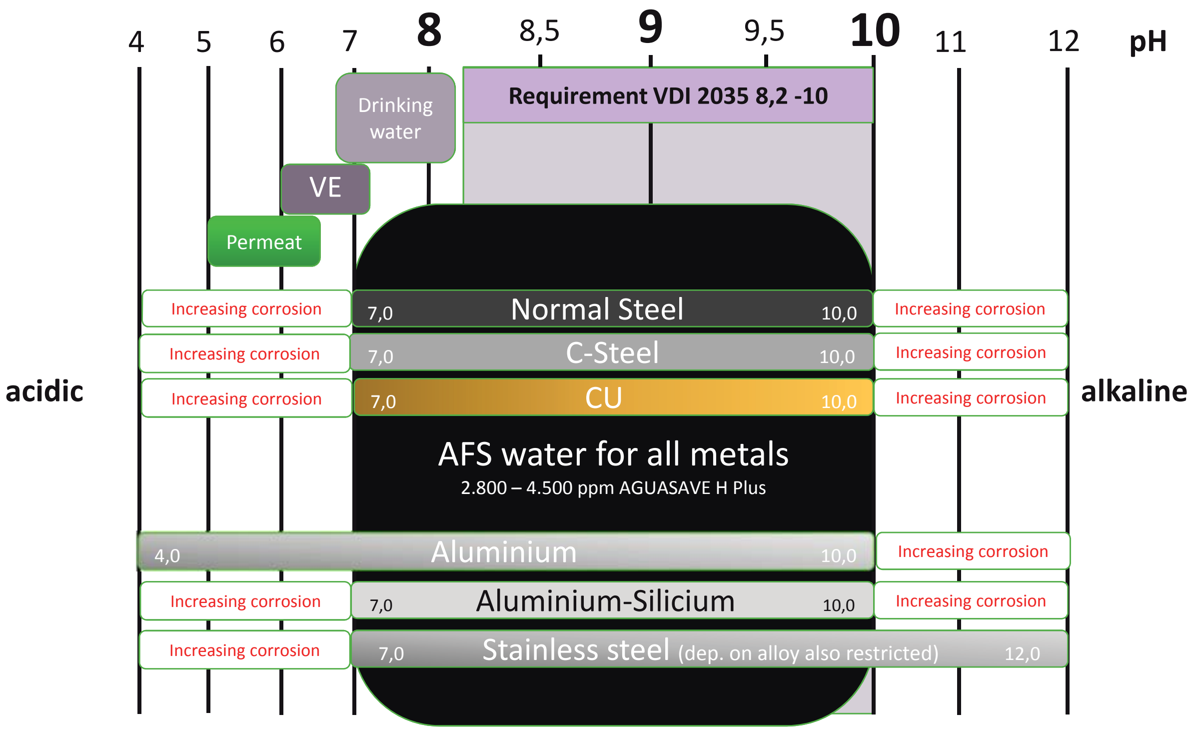
Recommended water values in AS, after AS and in the circuit

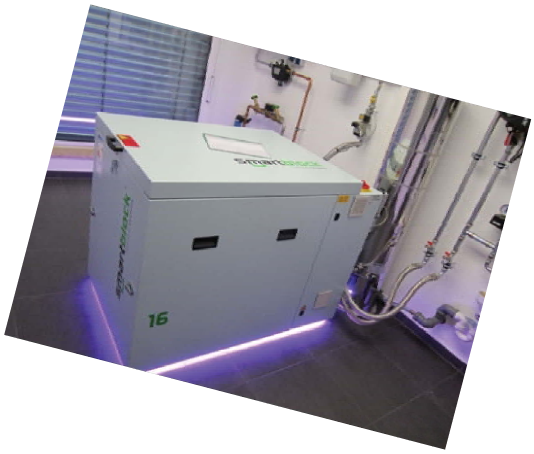
Wasserseitige Vorgaben für eine optimale Fahrweise von BHKW- und Heizungskreisläufen				
Parameter	Einheit	Füll- und Ergänzungswasser ohne AGUASAVE H Plus	Füll- und Ergänzungswasser mit AGUASAVE H Plus	Kreislaufwasser
Leitfähigkeit	µS/cm	100 - 200	300 - 450	350 - 550
pH-Wert		5,5 - 7,0	6,0 - 8,5	7,0 - 10,0
Gesamthärte	°dH	0,1 - 4,0	0,1 - 4,0	0,1 - 4,0
Karbonathärte	°dH	0,1 - 4,0	0,1 - 4,0	0,1 - 4,0
Chloride	mg/l	< 20,0	< 20,0	< 20,0
Sulfate	mg/l	< 20,0	< 20,0	< 20,0
Nitrate	mg/l	< 5,0	< 5,0	< 5,0
AGUASAVE H Plus	mg/l	0	3.000 - 4.500	2.800 - 4.500

Corrosion activity vs. pH value



Corrosion activity vs. pH-value





Practical exercise in training room

Delivery & Installation

TRANSPORT ON SITE

The complete packaging unit can ideally be moved to the installation site means of a fork lift or lift truck.
The lateral impact bumper can be dismantled with a screwdriver into single boards. The accessories are packed on top of a top board protecting the CHP lid.

SET-UP

After the CHP has been moved to the installation site, the transport pallet must be removed.
Ideally the CHP is lifted using a portal crane, the pallet is pulled out and the CHP set down on the prepared position. For this, remove the side walls of the sound proofing hood and use suitable lifting devices (four round slings with safety hooks and automatic locks) to lift the CHP and set it down in the final position.

If a portal crane is not available the CHP can also be lifted and moved using a machine lift and base blocks when removing the transport pallet.

Installation of dismantled units

The CHP is delivered to the site completely, and on site it is dismantled and re-assembled on the final installation position:

- o Hood components
- o Motor
- o Generator
- o Base frame

In complex installation situations or sb 50 an external company (e.g. piano movers) is commissioned in many cases.

Hint! To make things easy and cost-efficient it is advantageous to provide an absolutely even installation position in advance!

Tools required for dismantled installation

- Conventional tools (screwdriver, wrench, etc.)
- Lift truck
- Electric caterpillar
- Electric truck
- Portal crane
- Tackle/block, pulley, straps, chains, etc.

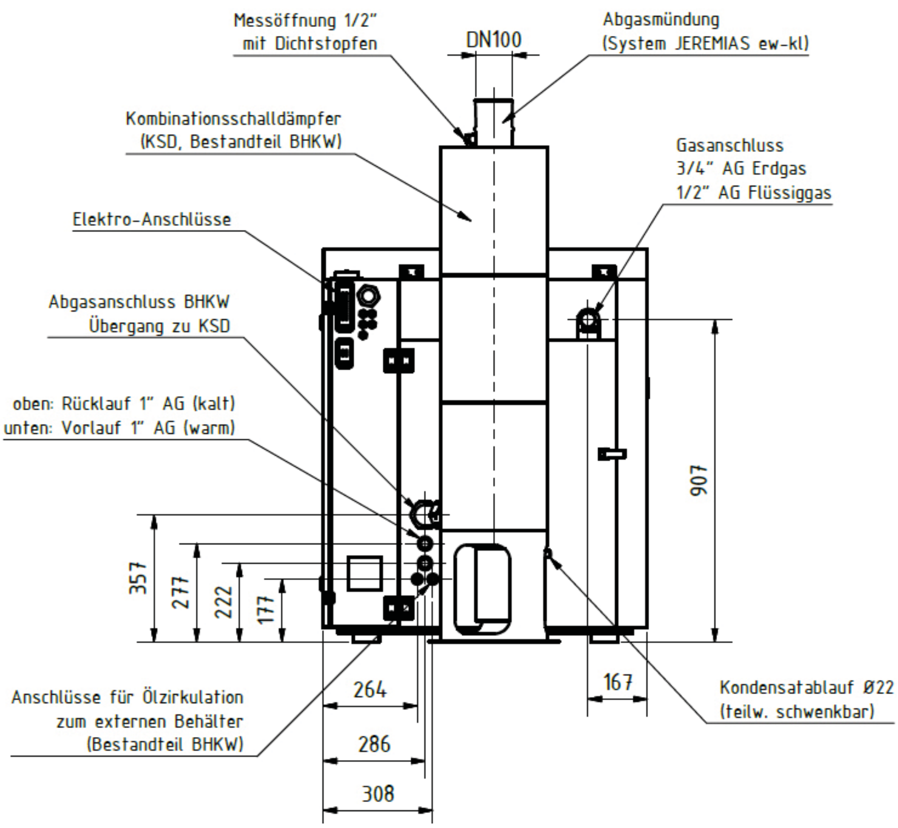
Placing the acoustic buffer mat

1. Place the CHP in the installation room.
2. Remove the side panels and lift the CHP by5 to 6 cm (machine lift or portal crane).
3. Secure the CHP against unintentional lowering.
4. The push the mat halfway under the CHP and align recesses with rubber feet.
5. Then carefully lower the CHP back down and
6. Repeat the process for the other side.

smartblock®
POWERED BY KW ENERGIE

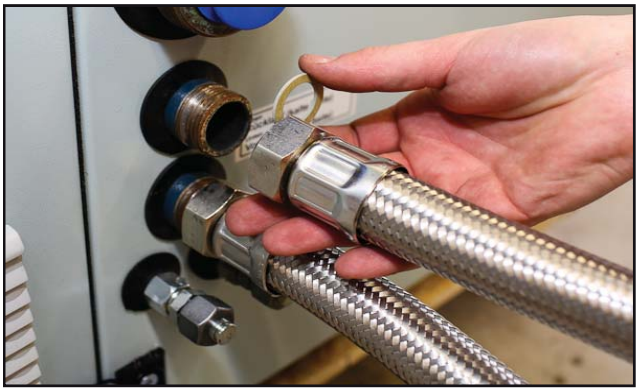
Hydraulic and Electrical Integration

CHP Connections



CHP mechanical and electrical connections

Forward and return flow (heating connection)
Part of the delivery are two reinforced hoses including seals. Both hoses are mounted directly to the CHP at the connections (forward, warm side, and return, cold side) together with the seal washers.
On the heating end two shut-off valves must be mounted for forward and return flow.



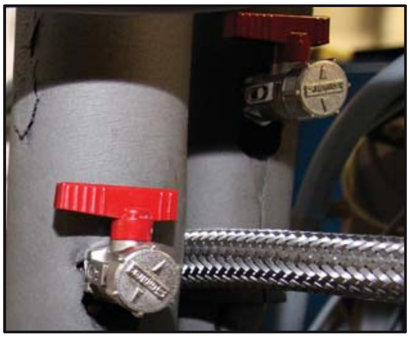
Shut-off valves and buffer charger pump

An externally controllable high efficiency pump is prescribed as a buffer charger pump. It must additionally be fitted with 0-10 V controllable voltage signal. In the Grundfos Magna 3 this signal a standard feature. Before start-up this pump is also to be programmed according to the KW Energie instructions!

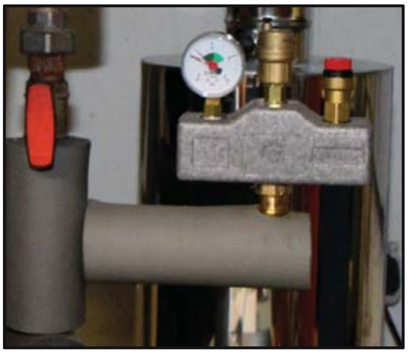
To facilitate a later exchange of the pump stop valves should be installed before and after the pump, respectively.

Fill / drain valves and safety cocks

At the ends of the reinforced hoses to the heating two T junctions with fill / drain valves must be fitted. They serve for purging and draining the heating system and are useful when at a later time the plate heat exchanger and exhaust gas heat exchanger need to be exchanged!



Between the CHP and the first shut-off valve installed to separate the CHP from the heating system a safety valve (excess pressure) must be installed; response pressure 3 to no more than 6 bar.



Sludge filter, fill and replenish valves

The sludge prevents clogging of the heat exchanger with sludge from the heating system. It must be installed in the return flow lines of the CHP!

Not installing the replenishing valve required by the drinking water ordinance any replenishment of the heating water would inevitably constitute a breach of valid regulations and laws.

Exhaust gas connection (CHP)

The supplied combination muffler (KSD) must be set up directly behind the CHP. The union nuts of the stainless steel compensator must be screwed onto the exhaust gas connections of the CHP and the KSD, with seal washers inserted. The free-standing KSD can be fixed in the final installation position onto the floor f the installation room by means of noise protection plugs (not supplied). The floor ring of the KSD has appropriate bore holes.

Exhaust gas connection (chimney / flue link)

The flue or chimney pipe can be directly mounted on the exhaust gas pipe from the combination muffler KSD.

We recommend the CHP exhaust gas system available from the company JEREMIAS (System ew-kl, dw-kl), a metal, conically sealing stainless steel flue system. The exhaust gas reverse pressure after the KSD must not exceed 5 mbar.

At the transition connector there is an opening for connecting the exhaust gas reverse pressure and emissions measurement devices.

Condensate drain

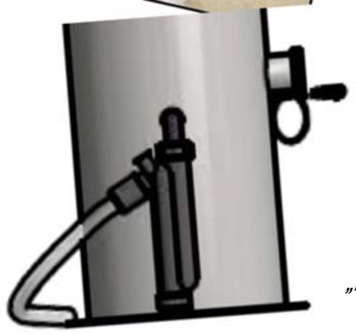
Any condensate collected in the CHP itself, from the noise muffler and the subsequent exhaust gas line is drained through this single condensate drain; other drains are not necessary.

The central condensate drain is located at the bottom of the combination exhaust gas muffler (KSD) . For older models a flexible acid-resistant hose (ø20 mm) is connected to the stainless steel syphon, which can be swiveled in all directions.

The new KSD has a condensate syphon screwed directly onto the KSD. This may be located on the left or the right side. The opposite side can be closed with stop plug. Fitted onto the syphon is a transparent, flexible, acid-resistant hose (ø19x3 mm) with a length of 20 cm. This may be exchanged with a longer hose as required.

Before the first start-up the syphon must be filled with water in order to prevent exhaust gas exiting through the syphon!

„old version"



„new version"

Oil circulation system

The external oil storage vessel is set up outside the CHP, and depending on the CHP type the following vessels are supplied:
The barrel respectively the canister is placed in an oil catchment basin to the left or the right of the combination exhaust gas muffler. The oil connection fitting on the barrel resp. canister is connected to the fittings on the CHP by means of two hoses (supplied) with the screw connectors D10 and D12. For this purpose the plugs on the CHP must be removed so the union nuts on the hoses can be screwed on. (incl. container)

Condensate drain

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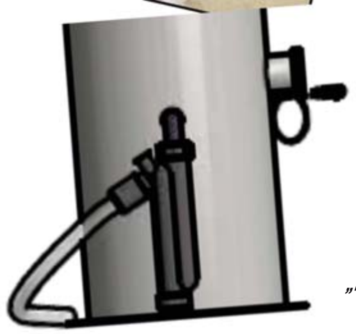

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Gas filter

The gas filter prevents contamination from reaching the safety filter in the GasMultiBloc. A contaminated gas filter is detected by the gas pressure monitor of the CHP. A contaminated safety filter in the CHP is not detected because the pressure monitor is installed before the safety filter in the gas line.

Gas supply / Gas supply module

It is recommend to fasten the gas supply module on a console using pipe clamps (not included). Simply fastening the GasMultiBloc on the gas line is not sufficient. Please observe the attached installation instructions for the GasMultiBloc (Dungs).

The gas supply between the GasMultiBloc and the CHP is established by means of a flexible gas hose. On the CHP end the hose is connected with a union nut. The hose has a standard length of 50 cm. The GasMultiBloc must be mounted in a position so that the gas hose is sufficient; any extension using two hoses in line is not permissible!

Combustion and cooling air supply for sb 50 and smartblock "s"

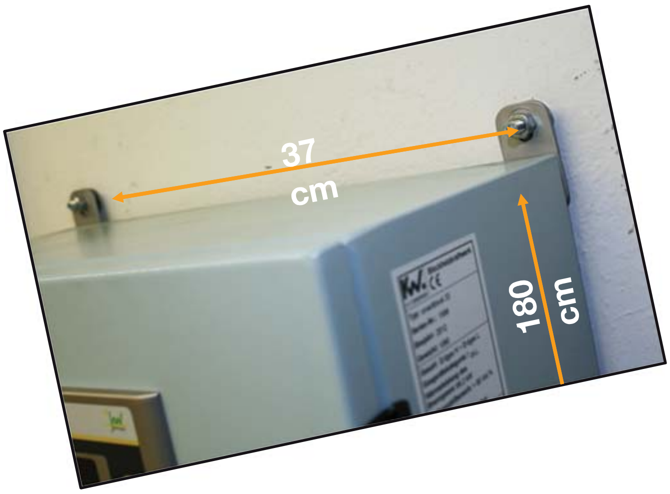
For smartblocks with extractor fans (all smartblocks "s" and smartblock 50) an temperature-controlled exhaust fan should be mounted in the installation room. An exhaust channel can also be connected directly on the CHP. IN this case a self-shutting return flap must be integrated in the line. In case the exhaust line is longer than 4 meters an additional fan to support the CHP extractor fan must be installed.

Support fan

CHP electrical connections

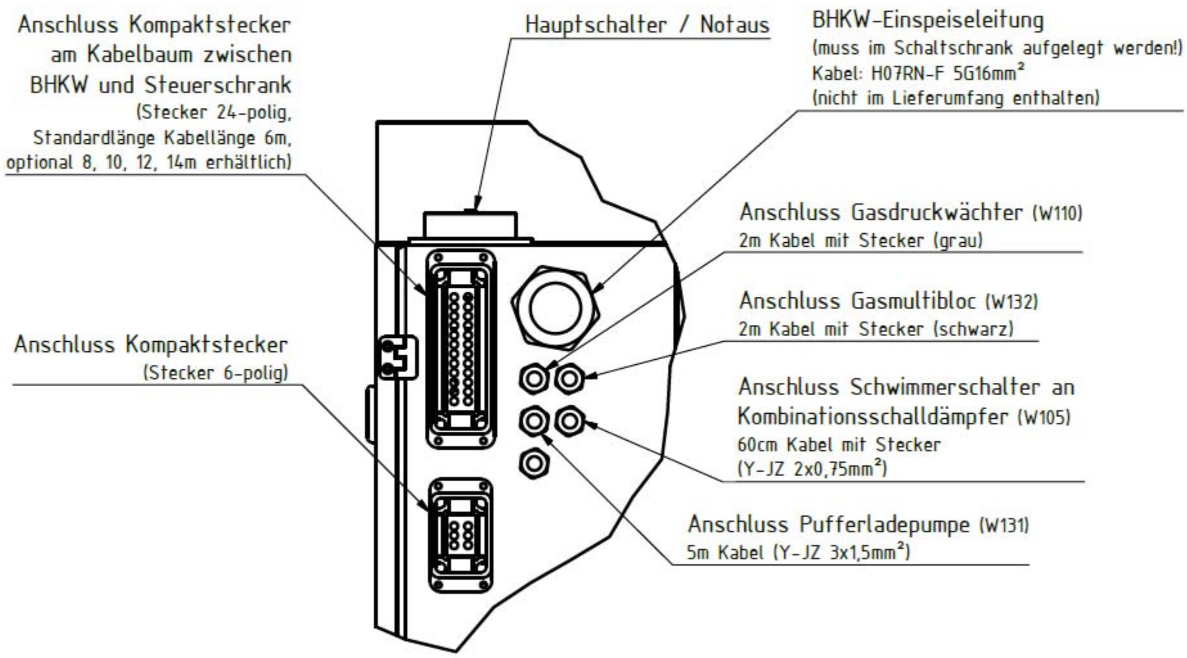
Control cabinet (mounting)

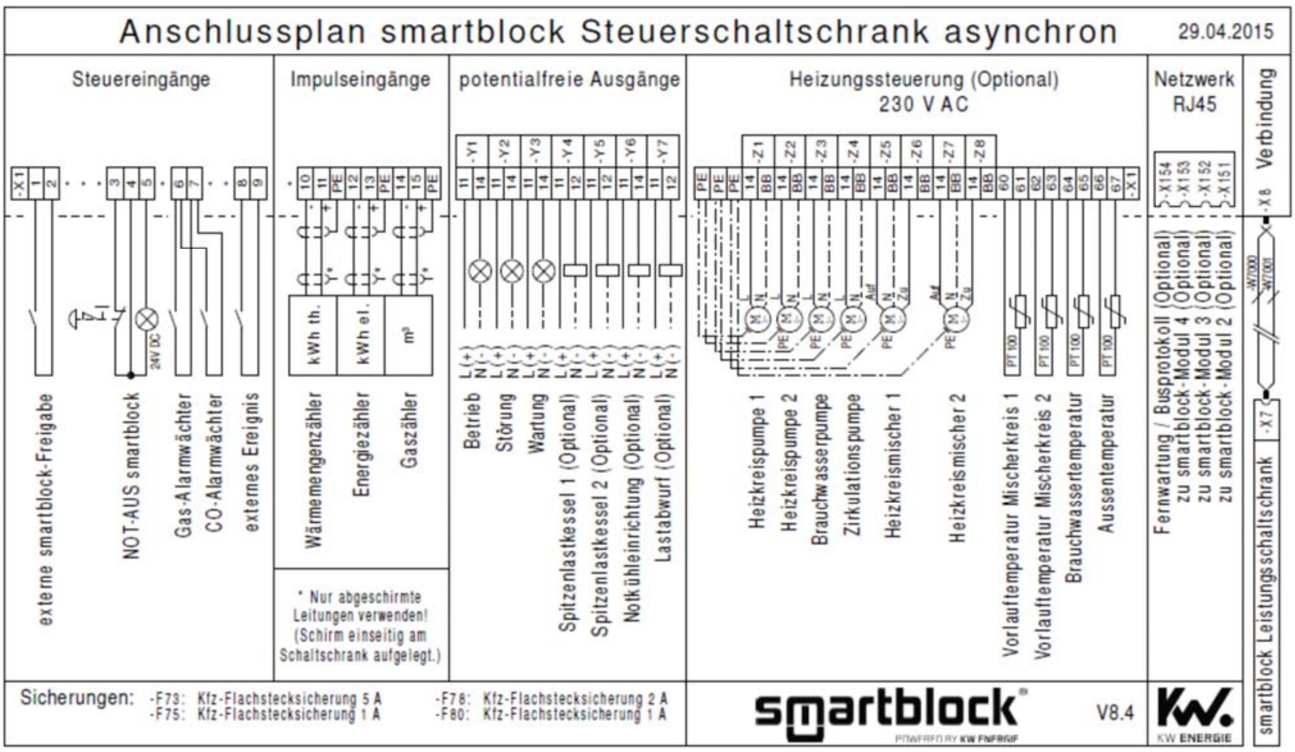
The separate control cabinet with the CHP control system BR06 is normally mounted on a wall. Ensure that there is free access to the cabinet, that the door can be opened by at least 90° and that the display is on eye level (approx. 1,6 m).

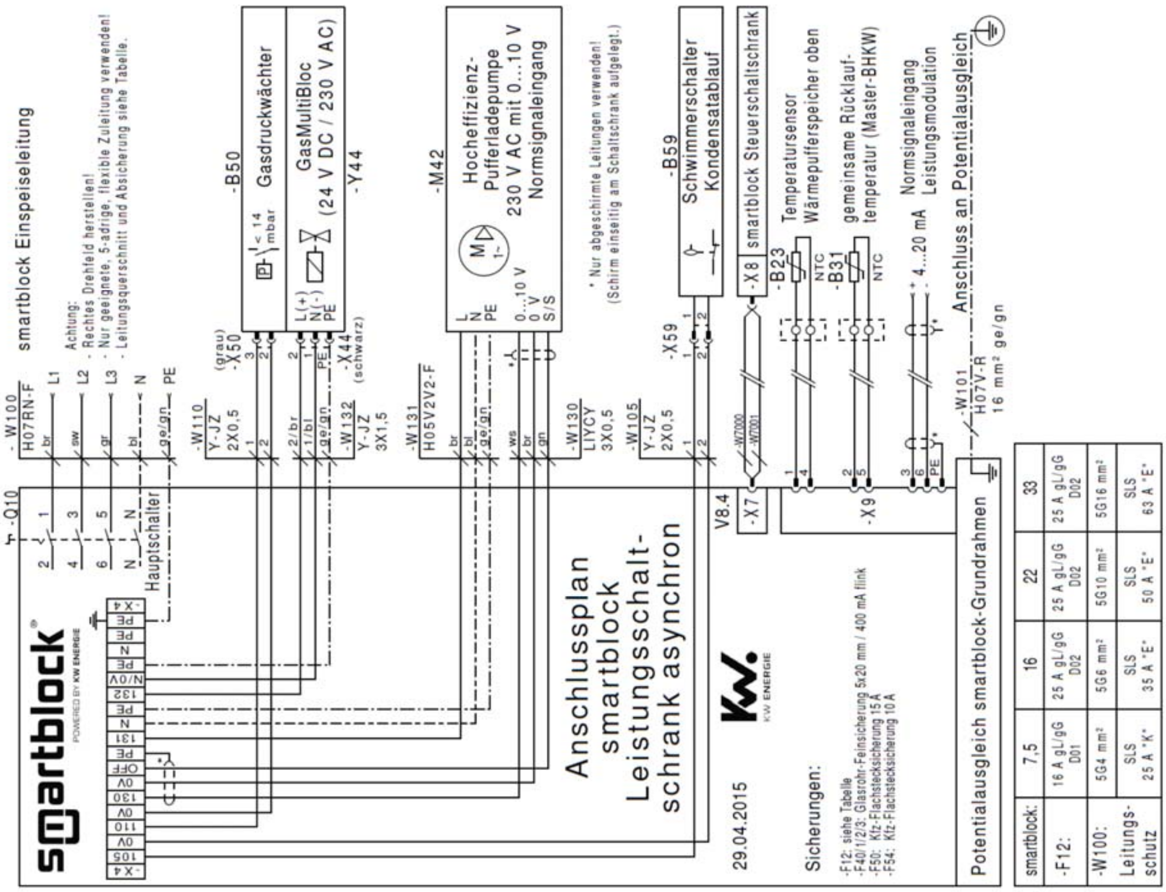


For the wall mounting normally two plugs 10x60 are set at a horizontal distance of 37 cm and a height above the floor of 1.8 meters (stone or concrete walls). Use two threaded rods 8x80, hang the control cabinet on the protruding ends and secure the cabinet with a washer D8.4 and nut M8 on the rods.

Smartblock Electrical connections







Connection to the building grid

For line protection purposes circuit breakers / fuses need to be installed (not included in the delivery). It is imperative to check the fuse triggering characteristics!

CHP type	Line cross section (wire gauge)	Line protection
smartblock 7,5	5G4 mm²	25 A, Typ K, SLS (Circuit breaker)
smartblock 7,5s	5G4 mm²	25 A, Typ E, SLS (Circuit breaker)
smartblock 22	5G10 mm²	50 A, Typ K, SLS (Circuit breaker)
smartblock 22s	5G10 mm²	50 A, Typ E, SLS (Circuit breaker)
smartblock 33	5G16 mm²	63 A, Typ K, SLS (Circuit breaker)
smartblock 33s	5G16 mm²	63 A, Typ E, SLS (Circuit breaker)
smartblock 50	5G35 mm²	100 A gL/gG (NH-Fuse)

The power cable must be connected to the building grid via the bus bar. Also, any additional components must be installed in the distribution (e.g. grid-drain depending power modulation or in grid substitution mode). All details are provided in the circuit diagram and the technical documentation (see annex).

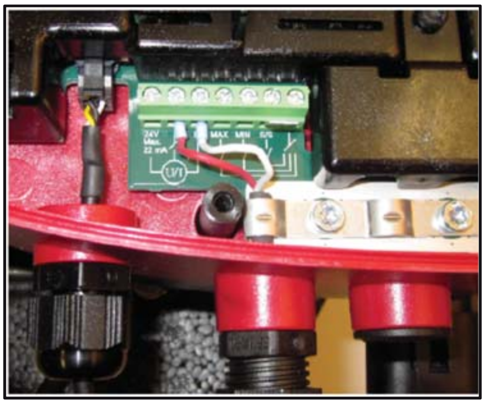
Connection to the building grid

Use only suitable 5 lead flexible cables as a power cable, which must comply with the lead cross section and wire gauge specifications in the table.
The cable must be connected to the CHP through the power switching cabinet.
Pull the cable through the screw grommet on the back of the CHP and connect the individual leads to the main switch (L1, L2, L3, N; see connection and circuit diagram, appendix). In the smartblock 7.5 it may be convenient to dismantle the main switch before making the connections.

Electrical connection high efficiency buffer charger pump

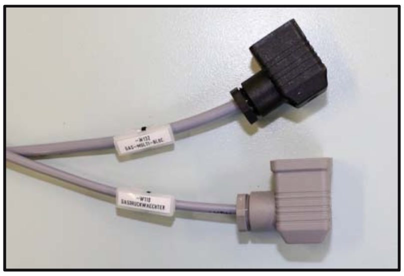
The buffer charger pump is connected by means of two wires. These are pulled out of the power switching cabinet and confectioned. The wire labelled W130 is for controlling the 0-10 V signal, and the wire W131 is for the 230 V AC supply voltage to the pump.

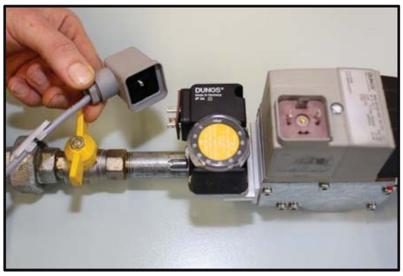
We recommend the following charger pumps: Grundfos Magna 3 (0-10V module included) and Wilo Stratos pumps (0-10V module must be purchased as an optional accessory).
For both pumps we have the respective parameter settings lists available!



Connecting peripherals

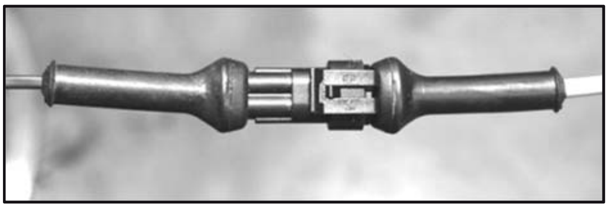
All connection cables to peripherals are pre-confectioned and labelled as standard equipment of the control cabinet.
The connection to the gas supply module is by means of two cables with plugs (see illustration). The plugs must be plugged onto the GasMultiBloc and secured by screws.





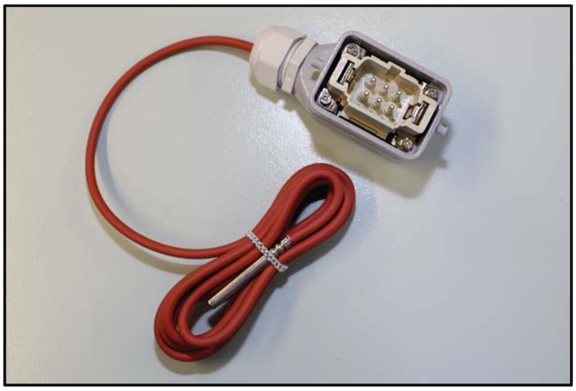
Connecting peripherals

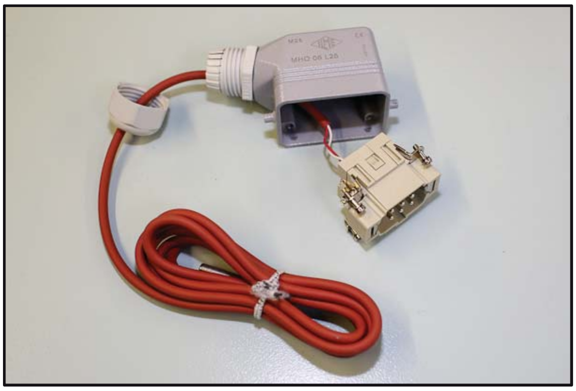
The safety switch on the combination exhaust muffler (KSD) is connected by means of a male and a female plug from the CHP and the KSB respectively. Ensure that the cable does not come into contact with the hot exhaust gas compensator between the CHP and the KSD during operation!



Connecting peripherals

In the 6-pole plug (rear CHP) the NTC buffer temperature sensor is connected on top as default on delivery. Normally, the length of the cable needs to be adapted to the spatial circumstances on site. For this purpose pull out the plug, loosen the cable clamp and open the plug (unscrew 4 screws). Then both wires can be disconnected and extended. In addition two other signals can be applied. Common return for multi-module systems and one standard signal input (4...20mA) for the options external target value setting and grid supply control.





Plug connections power switching cabinet to CHP

The connection between the control cabinet and the CHP is established by means of a cable with a plug on either end, with the plug on the CHP going to the left rear, and on the switching cabinet from underneath the base panel. He pug connections are secured in place by safety catch clips on the plug casings. The cable has a standard length of 6 meters. When ordering one extension cable can be ordered in lengths of 2, 4, 6 or 8 meters. The maximum length including extension may not exceed 14 meters!

Earthing the CHP base frame

On the CHP base frame, directly underneath the water connection fittings, there is an earth connector. From the an appropriately flexible earth cable must be laid directly to the equipotential bus bar. For the wire and cable gauge refer to the electrical circuit diagram. The connection is made with a ring lug (M8).

Optional connections CO & gas alarm

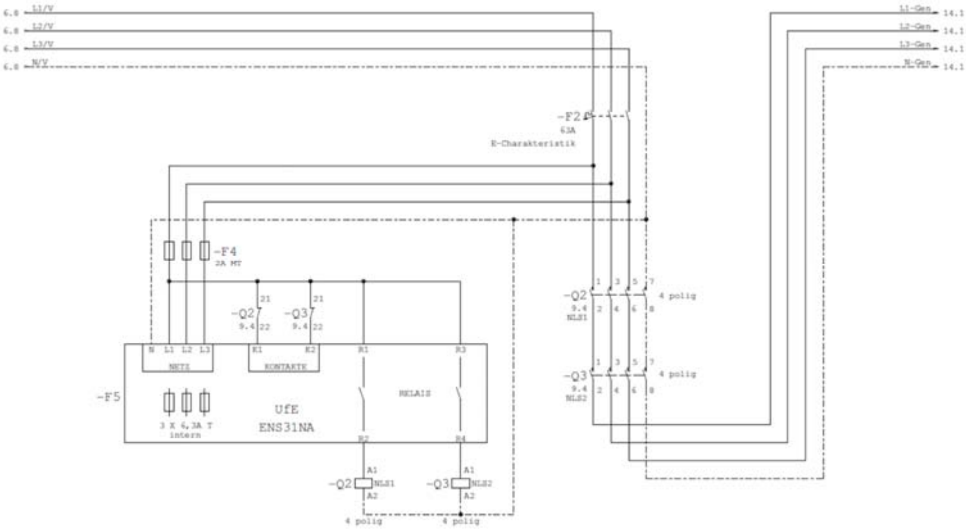
The CO and gas alarm are connected to an external 230 VAC socket. Through available opening contacts a control line is connected to the CHP. This way the CHP will shut down in case of a fault. An appropriate zero potential contact is provided in the control cabinet (control inputs 6/7 in series).

The devices are normally intended for wall mounting. Observe the following criteria when mounting the units:

- CO alarm in the CHP room → mount 15 cm below the ceiling
- Gas alarm for LPG → mount 15 to 30 cm above floor
- Gas alarm for natural gas →mount 15 to 30 cm below ceiling

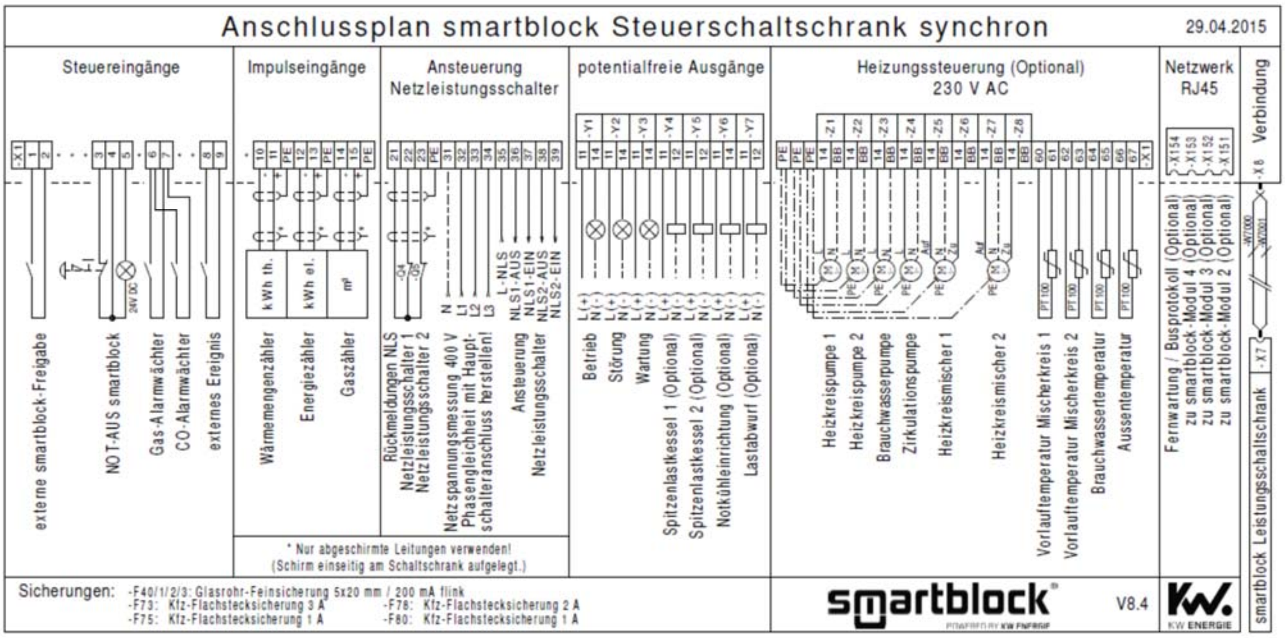
Central grid & system protection or freely accessible switches

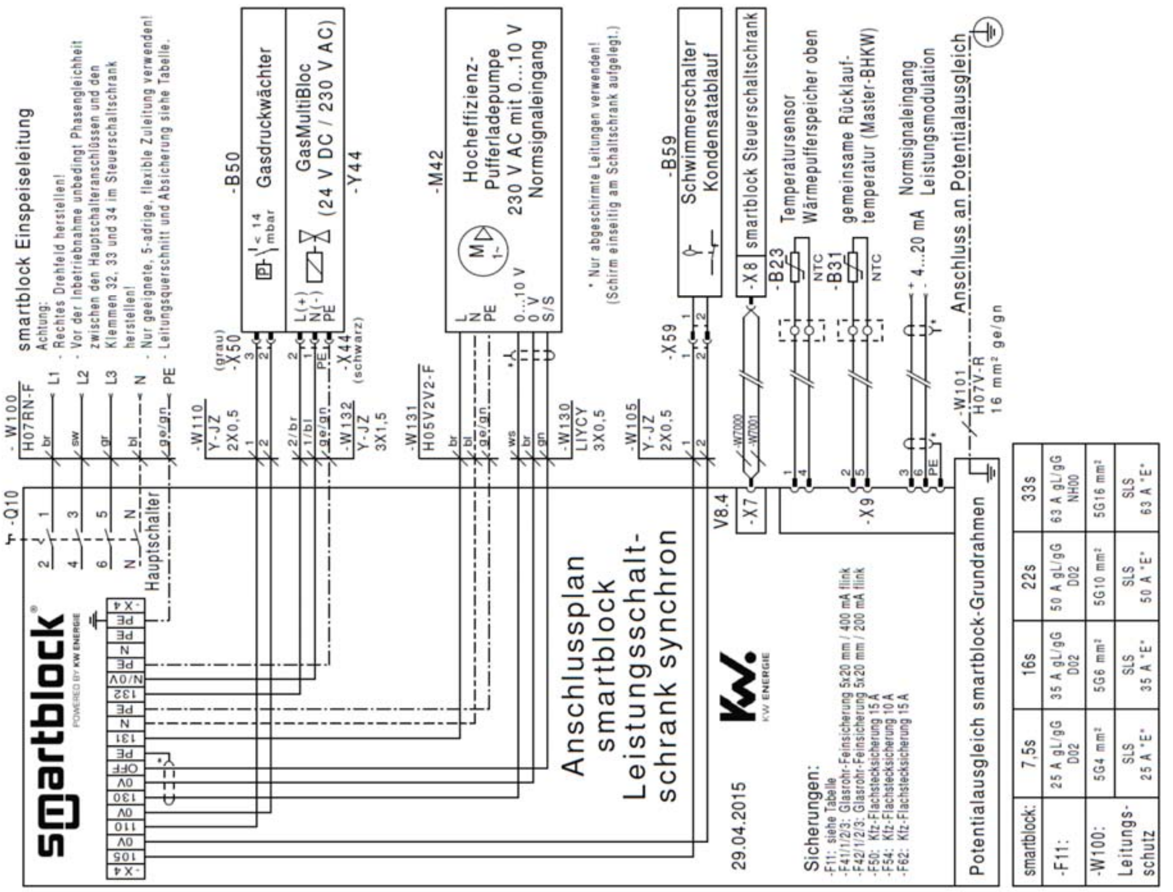
With a cumulative power of 30 kVA or more of all connected and planned generating units in the system there must either be a switching point accessible to the energy producer at all times, or a central grid and system protection using circuit breakers must be integrated into the electrical distribution system.
Both options have been taken into consideration on the first pages of the electrical circuit diagram!



Optional connections – during emergency power operation

- Main grid power switch 1
- Main grid power switch 2
- Control main grid power switches 1 & 2
- Return signal main grid power switches 1 & 2
- Grid voltage monitor
- Combustion and cooling air supply with return flap
- Emergency cooling
- Load drop





smartblock:	7,5s	16s	22s	33s
-F11:	25 A gL/gG D02	35 A gL/gG D02	50 A gL/gG D02	63 A gL/gG NH00
-W100:	5G4 mm²	5G6 mm²	5G10 mm²	5G16 mm²
Leitungsschutz	SLS 25 A "E"	SLS 35 A "E"	SLS 50 A "E"	SLS 63 A "E"

Grid power switch emergency power operation

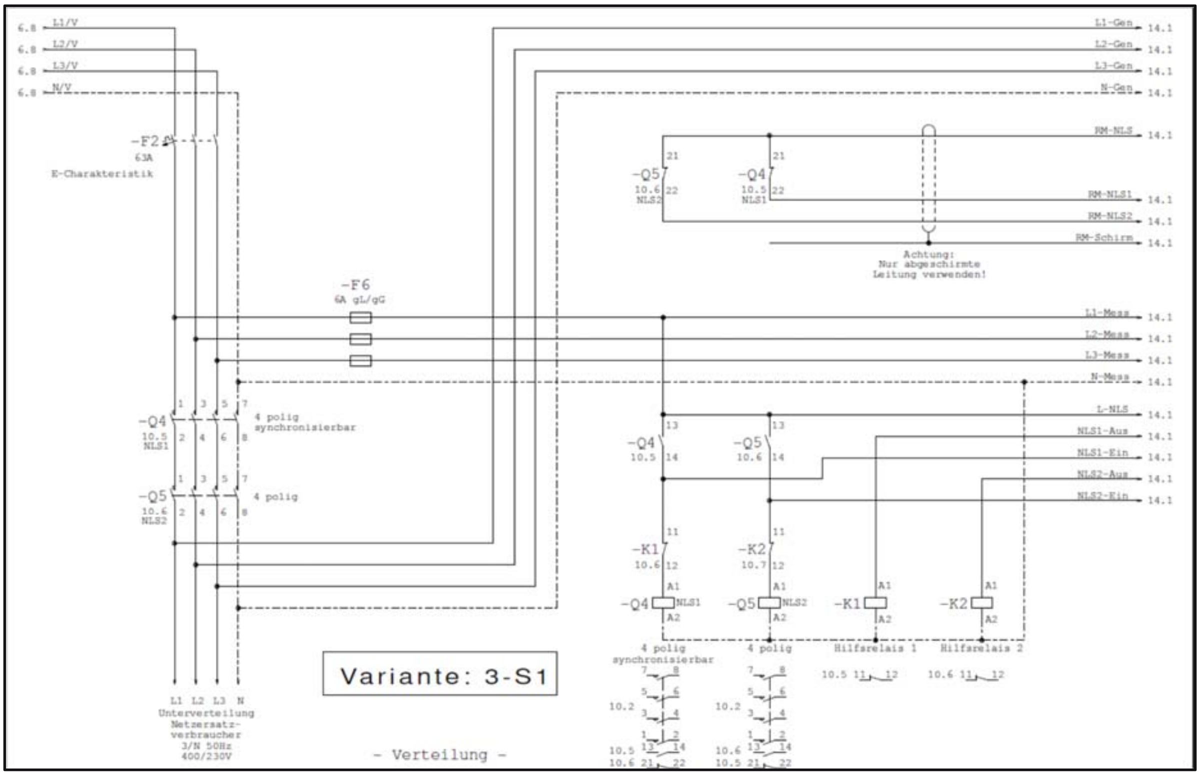
In smartblock “s” a control for emergency power operation is included. The additionally required components (auxiliary relays, switches etc.) for the emergency power switching are not included in the CHP delivery scope. These must be additionally installed in the main distribution and wired; the different options are included in the electrical circuit diagram.

Variant 3 – S1: two grid power switches

Variant 3 – S2: two grid power switches with external main switch

Variant 3 – S3: one grid power switch with central grid and system protection

Grid power switch emergency power operation



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Options & Accessories (Connections & Functions)

Electrical options smartblock

Eight additional options can be ordered with our smartblock series. The options ordered are indicated in the electrical circuit diagram with an X in the box with the option ordered and supplied. The right column indicates on which page and path the option is connected!

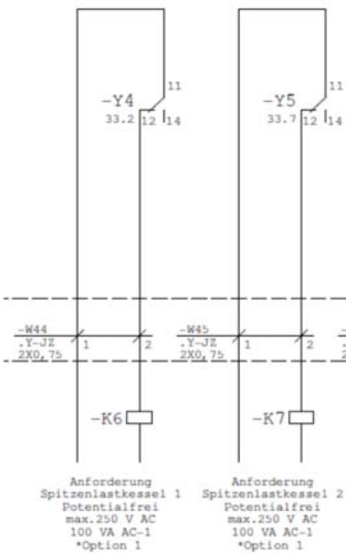
Elektrische Optionen

	Enthaltene Option:	Schaltplanseite(n):
☐	1 Ansteuerung Spitzenlastkessel 1 und 2 [a)]	27.5, 27.6, 33.2, 33.7
☐	2 Heizungssteuerung [b)] inkl. Anst. Spitzenlastkessel [a)]	15, 27.5, 27.6, 33.2, 33.7, 34, 35
☐	3 Mehrmodulanlage [c)]	26.6, 28
☐	4 Integrierter Stromzähler [d)]	10.3, 12.1
☐	6 Ansteuerung Notkühleinrichtung [a)]	27.7, 33.6
☐	7 Ansteuerung Lastabwurfeinrichtung [a)]	27.8, 33.7
X	8 Netzübergaberegelung / Leistungsmodulation [f)]	26.7
X	12 Netzwerkanbindung RJ45-Anschluss (LAN / UDP)	28.2

Option 1 “Control peak load boiler 1 & 2”

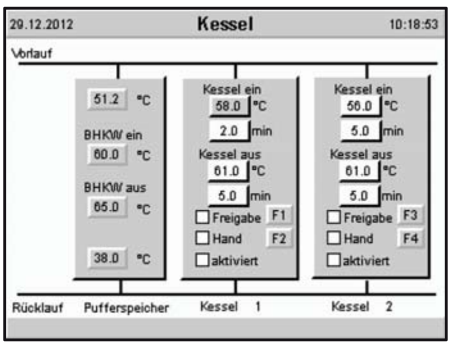
With the option request peak load boiler two boilers can switched on and off depending on temperature. For each of the two boilers separate switching on and off trigger temperatures and the respective delay times can be programmed.
The boilers are controlled by means of zero potential opening contacts. In case of a BR06 control system failure the relay contacts drop and switch on the boilers. This way the heating supply is ensured despite a CHP failure.

Attention: external voltage



Control switching cabinet

Option 1 “Controlling peak load boilers 1 & 2”

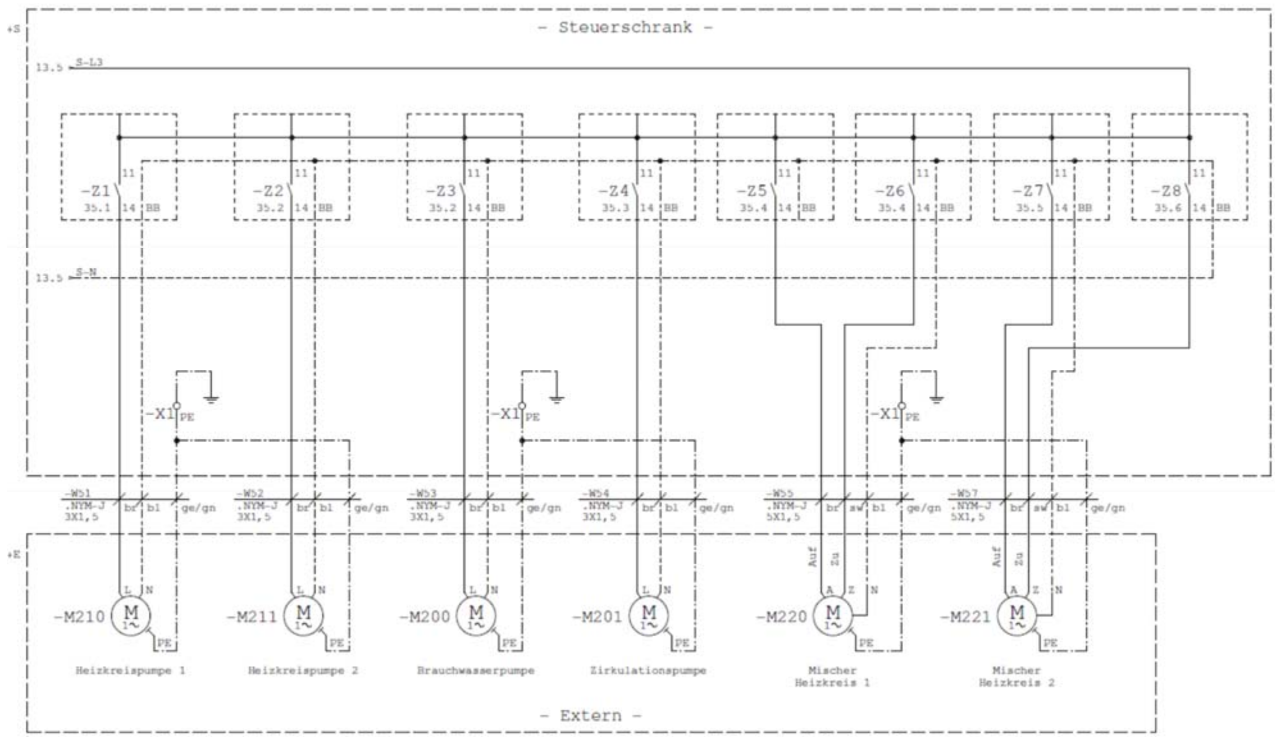


Overview-> F3 Boiler

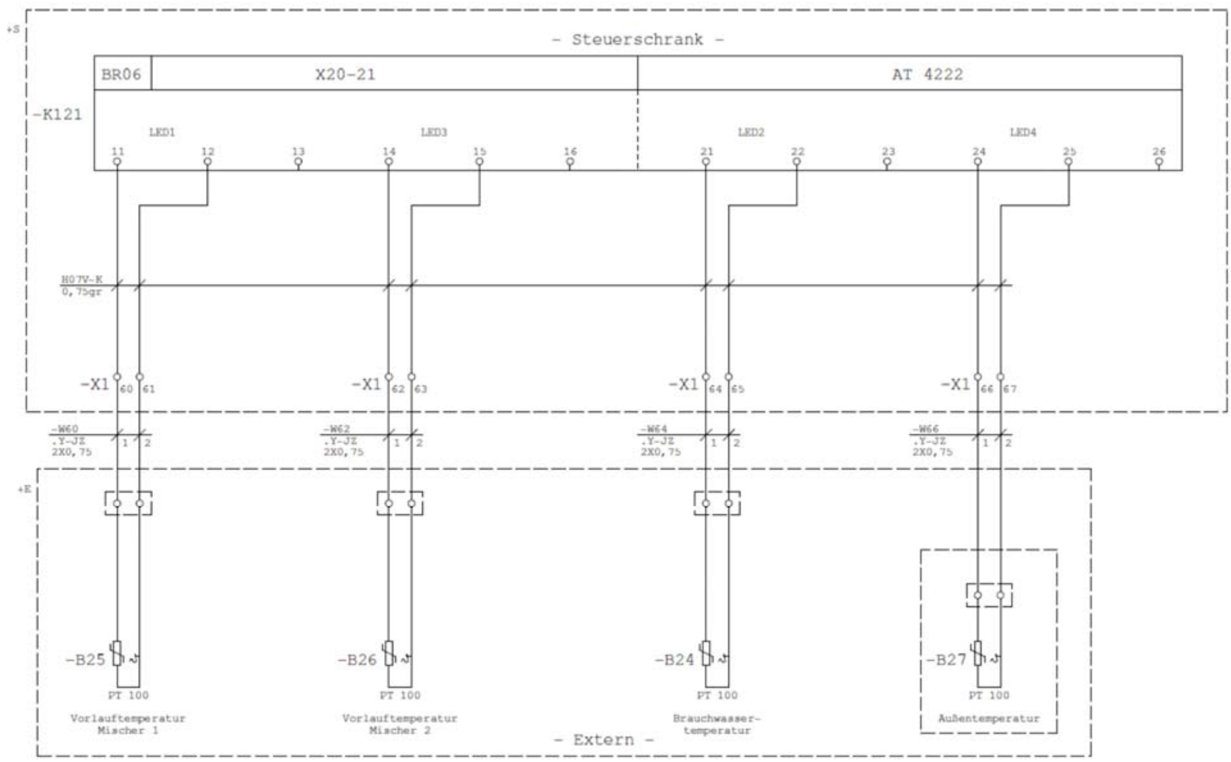
<u>In the left field we see the buffer storage.</u>
On the top the current top buffer temperature is shown. Below that the set switching on and off temperatures of the CHP.
Below that the return temperature to the CHP is shown, which in a running CHP equals the lower buffer temperature.

<u>The two fields on the right represent boilers 1 and 2</u>.
Under *“Boiler on”* and *“Boiler off”* user-defined temperatures and delays can be programmed.
The boiler will switch on as soon as the temperature falls below the set temperature and stays low for the set delay time.
The boiler will be switched off when the boiler exceeds the set temperature and stays high for the set delay time.
Use keys F1 & F3 to release the boilers!
Use keyss F2 & F6 to manually control and switch the boilers!

Option 2 “Heating control incl. switching peak load boiler”

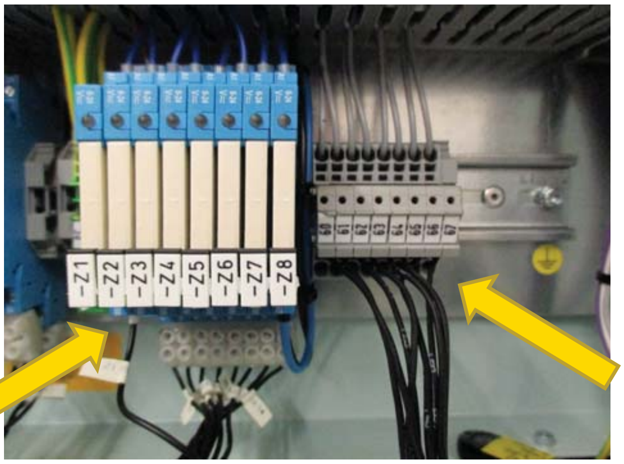


Option 2 “Heating control incl. switching peak load boiler”



Option 2 “Heating control incl. switching peak load boiler”

In the control switching cabinet relay and catch terminals for heating control on the bottom bus bar are provided for the heating control! The required pumps ae directly connected to the relay contacts, and the sensors are connected to the terminals 60 – 67!



Temperature sensors

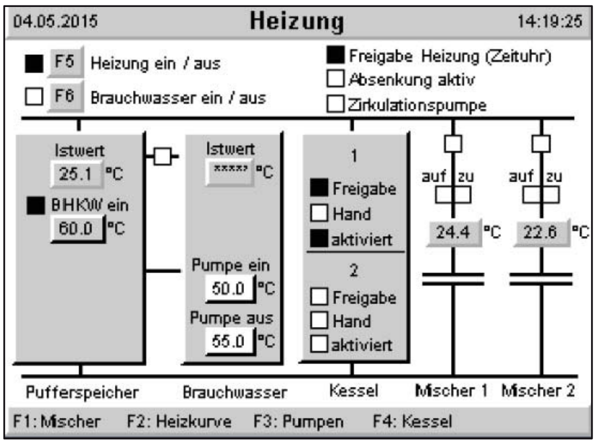
Pumps

Control switching cabinet

Option 2 “Heating control incl. switching peak load boiler”

Here heating, service water pump, boiler and two mixers can be controlled by temperature, time or manually. The heating system always automatically comprises the option “Peak load boiler”.

- Motor switching temperature: If the buffer storage temperature drops below the set trigger value, the motor will start and reheat the buffer storage.
- Switching on and off temperature of the charger pump for the service water storage: The charger pump is requested when the temperature drops below the trigger temperature “on” and the buffer storage also provides this temperature level. The request is cancelled when the sensor reports a temperature higher than the trigger value “off”.

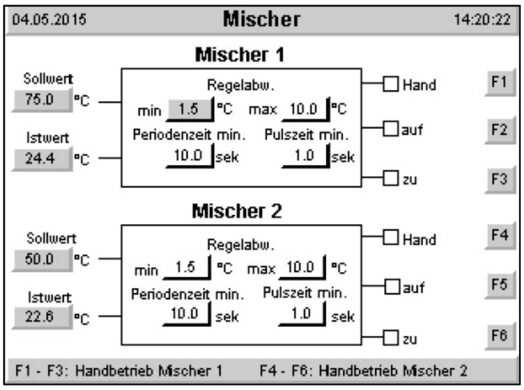


Heating system

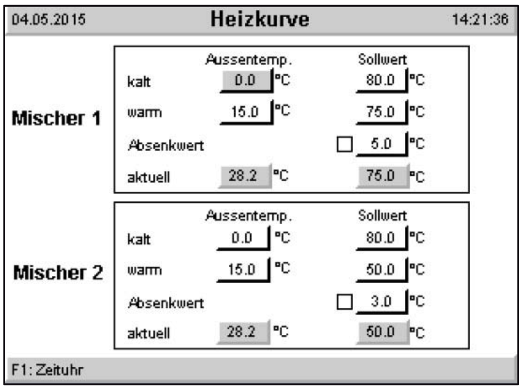
Option 2 “Heating control incl. switching peak load boiler”

In this menu the controlling behavior of the two heating mixers is set. The minimum and maximum temperature deviations within a specified time can be set!

On the submenu screen Heating curve the curves for the two heating mixers are set. Possible changes: outside temperature (cold, warm), target value (cold, warm) and reduction value!

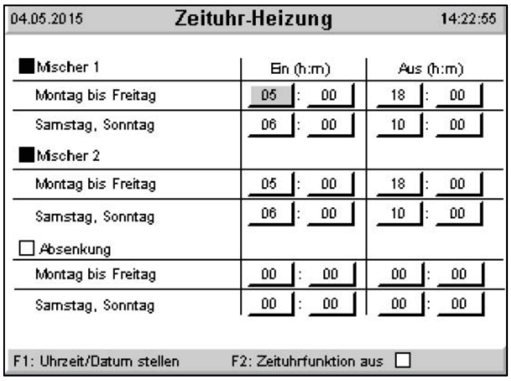


Heating system-> F1 Mixer



Heating system-> F2 Heating curve

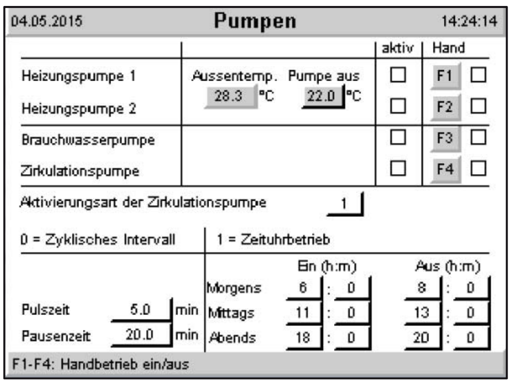
Option 2 “Heating control incl. switching peak load boiler”



Heating system -> F2 Heating curve -> F1 Timer function

The sub menu screen *Timer - Heating* is accessed with the function key F1 on the submenu screen *Heating curve*. The target value can be lowered by a previously set value. The heating can be released at specific times or blocked and the lowering can be initiated. There are different settings for weekdays (Mo – Fr) and holidays (Sa – Su); the switching points are updated every minute.

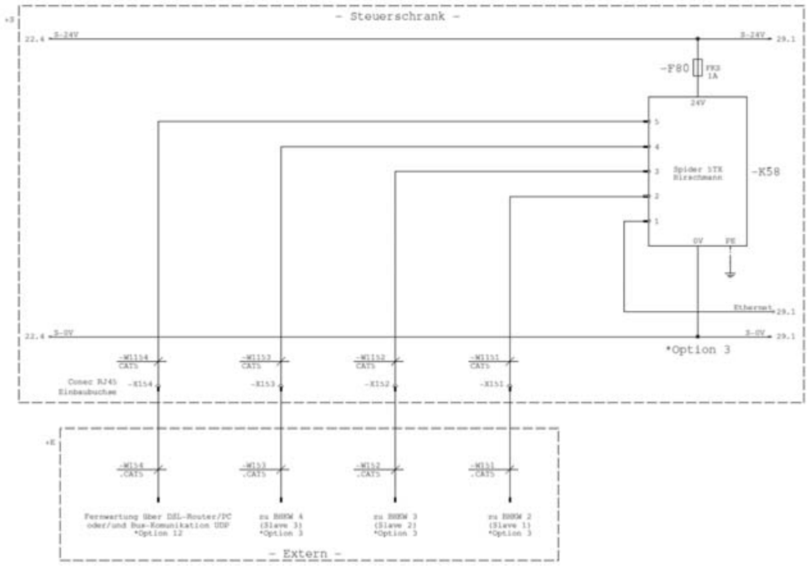
Here all pumps can be manually switched on and off. In the lower part of the screen the behavior of the service water circulation pump can be programmed. The service water circulation is important to keep the service water pipes warm, so that when a warm water tap is opened the service water is available immediately at the required temperature.



Heating system -> F3 Pumps

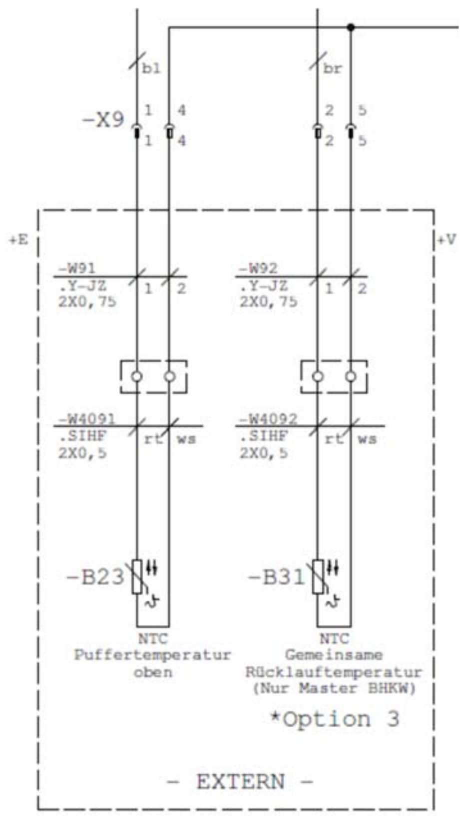
Option 3 “Multi-module system”

Due to the master-slave function of our BR06 control system up to five CHP modules can be networked, with communication running through Ethernet-UDP. One CHP is configured as master and is assigned the leader tasks. All other CHPs are configured as slaves. The master CHP requests the slave CHPs as per demand and priority and defines the required power to be supplied.



Option 3 “Multi-module system”

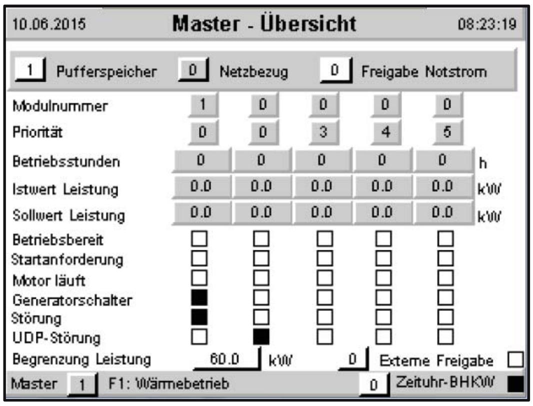
In master-slave operating mode an additional joint return flow sensor is required. This is inserted at the front end of the return line and serves as the switching off impulse trigger for all installed systems. The sensor is connected to terminals 2 & 5 of the 6-pole Hirschmann plug!



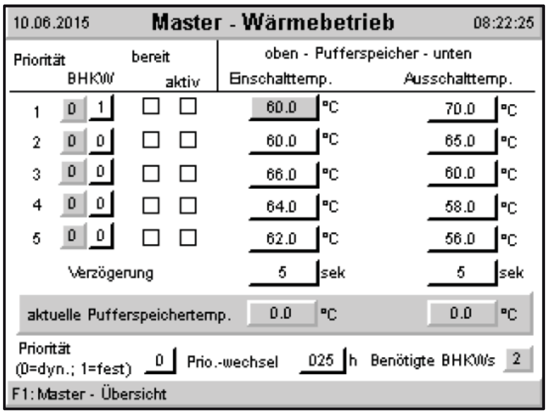
Option 3 “Multi-module system”

On this menu screen the operating mode is set. There is a difference between heating mode and grid operation. In addition the release of emergency power can be set and the CHP timer programmed.

Then the switching on and off conditions for the heating mode are set here, Up to five CHPs can be controlled in master-slave operating mode.



Overview -> F1 Operating mode



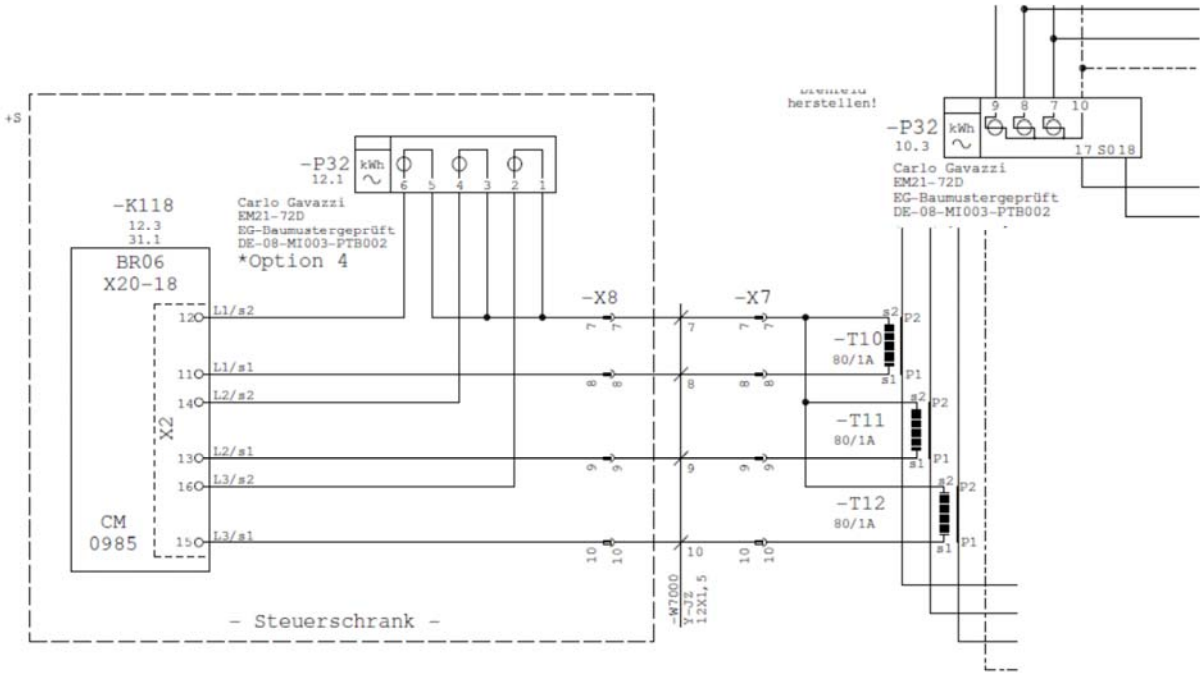
Overview -> F1 Operating mode -> F1 Heating mode

Option 4 “Integrated electricity meter”

As a standard, the CHP is not fitted with an integrated and calibrated electricity meter. This must be ordered in advance when the order is placed, subject to the prior grid energy provider’s approval of this unit!

Control switching cabinet

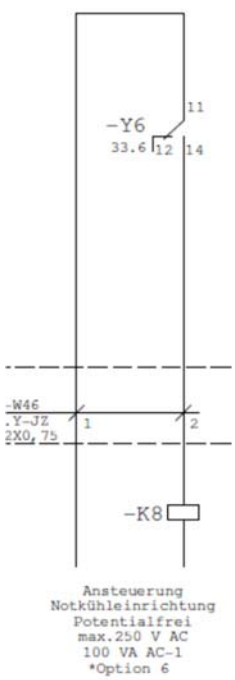
Option 4 “Integrated electricity meter”

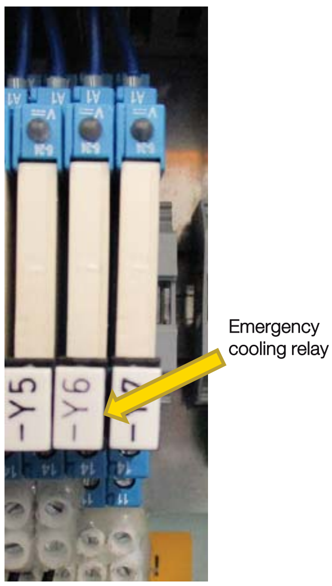


Option 6 “Control emergency cooling system”

With the option of an emergency cooling system an emergency cooler is triggered by a zero potential relay contact when a specified limit value is reached (return or motor temperature). This will ensure a corresponding heat reduction in the CHP, ensuring continued operation of the CHP. This option is often ordered for the grid substitution operation mode!

Attention: External voltage



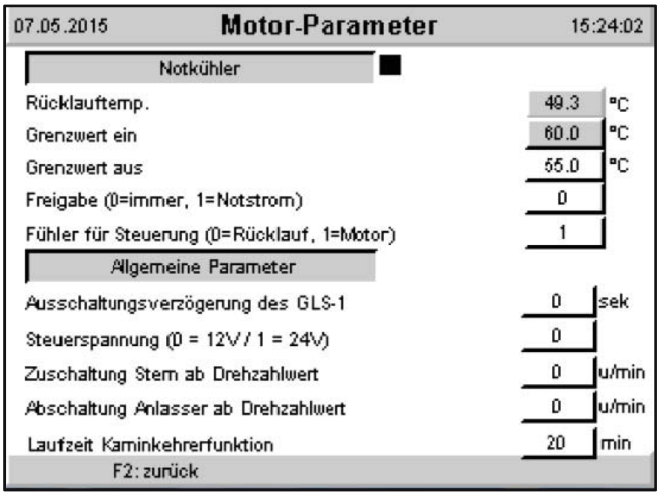


Control switching cabinet

Option 6 “Control emergency cooling system”

The emergency cooler is normally triggered by the return temperature. On the screen “Motor Parameters” there is also the possibility to select the motor temperature as the trigger temperature.

- Trigger value ON: Temperature at which the emergency cooler is switched on, default 70°C to 75°C.
- Trigger value OFF: Temperature at which the emergency cooler is switched off, default 3°C to 5°Cbelow the trigger value ON.

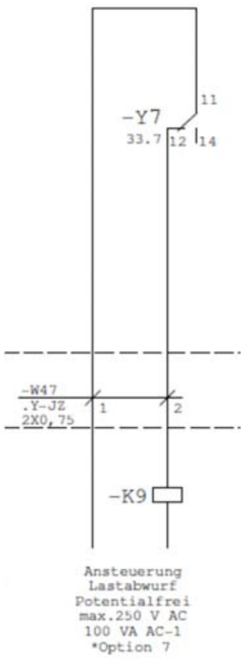


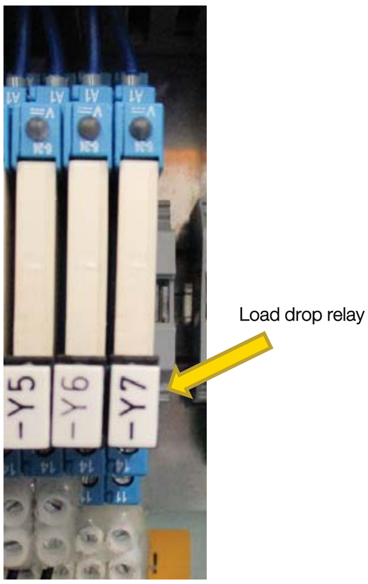
Motor -> F6 Parameters -> F1 continue -> F1 continue -> F1 continue

Option 7 “Control load drop system”

With the option Load drop less important consumers can be dropped when a power trigger value is exceeded. This keeps the full CHP power available for the important consumers.

Attention: external voltage

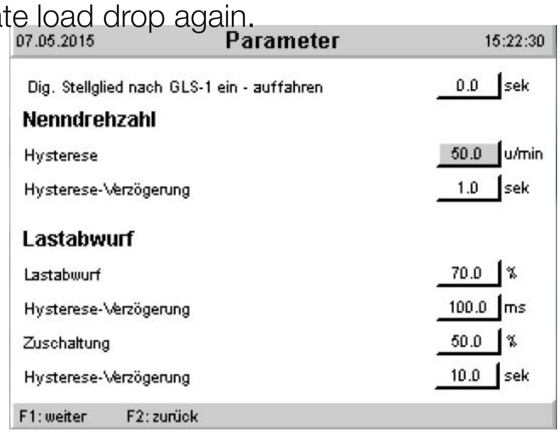




Control switching cabinet

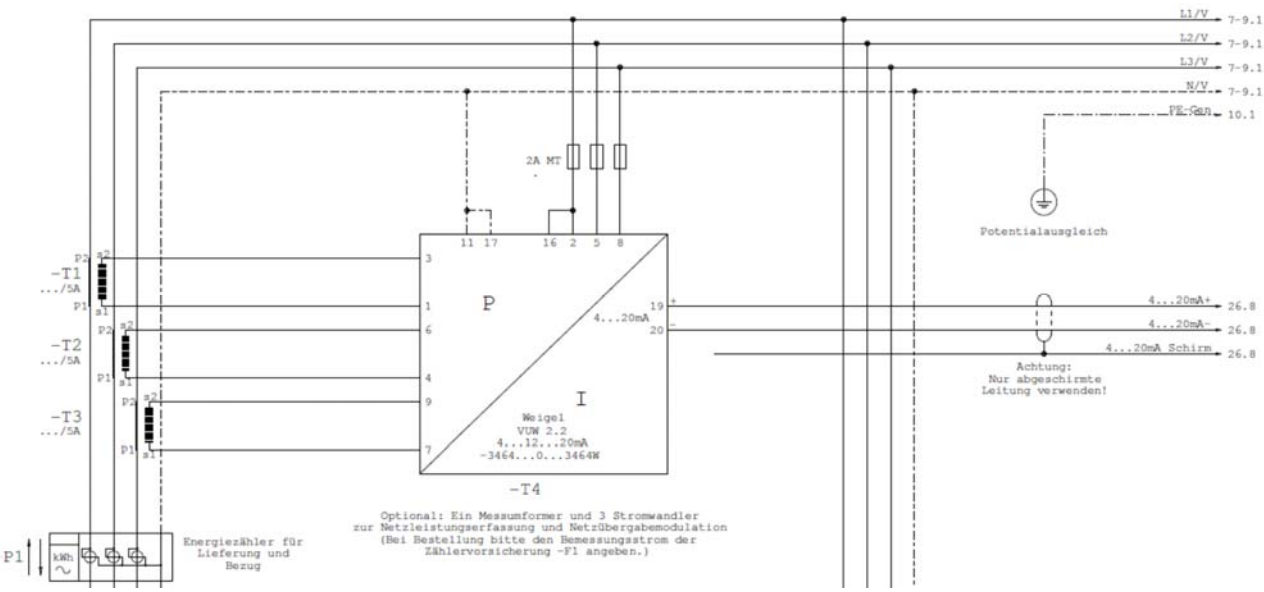
Option 7 “Control load drop system”

- Load drop: CHP power, at which less important consumers are switched off.
  Default: 80% to 90%.
- Delay: Time over which the load drop trigger must be exceeded until the load is dropped; this time is set to relatively short, so that the CHP does not switch off due to overload when the power is increased.
  Default: 10 ms.
- Reconnect: CHP power, at which less important consumers are witched on again. This value must be set low enough so that the reconnection of the less important consumers does not trigger an immediate load drop again.
- Delay: Time over which the power must be below the reconnection power before the reconnection is triggered.
  Default: 10 s.



Speed (rpm) / Power -> F6 Parameters -> F1 continue

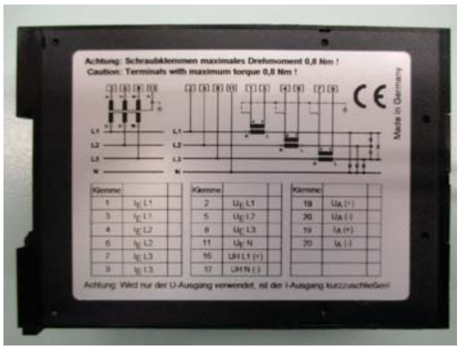
Option 8 “Grid transfer control / power modulation”



Option 8 “Grid transfer control / power modulation”

When setting up the grid transfer control some important points must be observed:

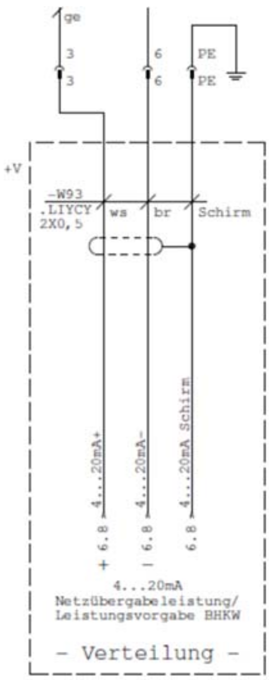
- ✓ The measurement transformer must issue a 4-20 mA control signal and the zero point must be at 12 mA.
- ✓ When connecting three current transformers the flow direction (k&l) must be observed!
- ✓ The phases at the measurement transformer must be connected correctly to the current transformer (Transformer T1 => Phase L1).
- ✓ The measurement transformer requires a voltage supply in addition to the three measurement phases.
- ✓ For the 4-20 mA control signal a dual pole screened cable must be used; the screen is connected to the cable at one side of the cable!
- ✓ The current transformers and the measurement transformer must have the same reference value from the secondary current, e.g. N/5A
- ✓ If despite observing all points addressed there is an interference signal, a separating amplifier may help. Harmonic distortion can also be a problem in the system, in creased by the large pumps in the heating system. For these cases there are special measurement transformers!



Connection plan measurement transformer (e.g. Type Weigel VU

Option 8 “Grid transfer control / power modulation”

The grid transfer control adjust the motor power variably to the required grid transfer power. This way it is possible to achieve any state at the grid transfer point (draw power from the grid, feed power into the grid, or adjust to zero load). The measured value is evaluated as follows: positive signal → power drawn from grid; negative signal → power fed from generator to grid. Special feature: “Return temperature limit”: A limit may also be set in this control.



Option 8 “Grid transfer control / power modulation”

Type label / Transformer (e.g. Type Weigel VUW 2.3)

Calculation of the measurement range for the BR06 control sys

Current transformer ratio (SWV) * Power range (LB) = Measurement range (MB) (negative/positi

Example:
3 x Current transformer 100/5 A
MU (see ill.) Power range -3464 W … +3464W; current N/5; zero point medium (12mA)

Current transformer ratio
Primary current 100A / Secondary current 5A = current transformer ratio 20

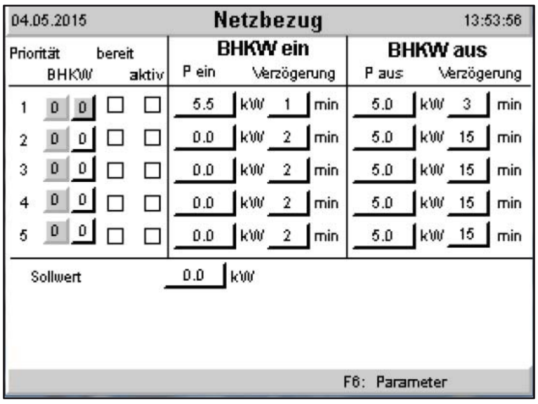
SWV 20 * LB -/+ 3.464 kW = MB -/+ 69.28 KW

The calculated measurement range must then be entered in the BR06 control system!

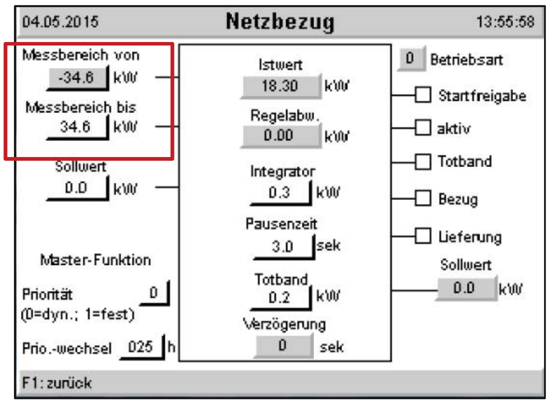
Option 8 “Grid transfer control / power modulation”

On this menu screen the switching on and off conditions for the grid transfer are programmed. Up to a maximum of five CHPs can be controlled in master-slave mode.

Here the calculated measurement range must be entered, first the negative range and then the positive range.



Speed / Power-> F4 Grid transfer



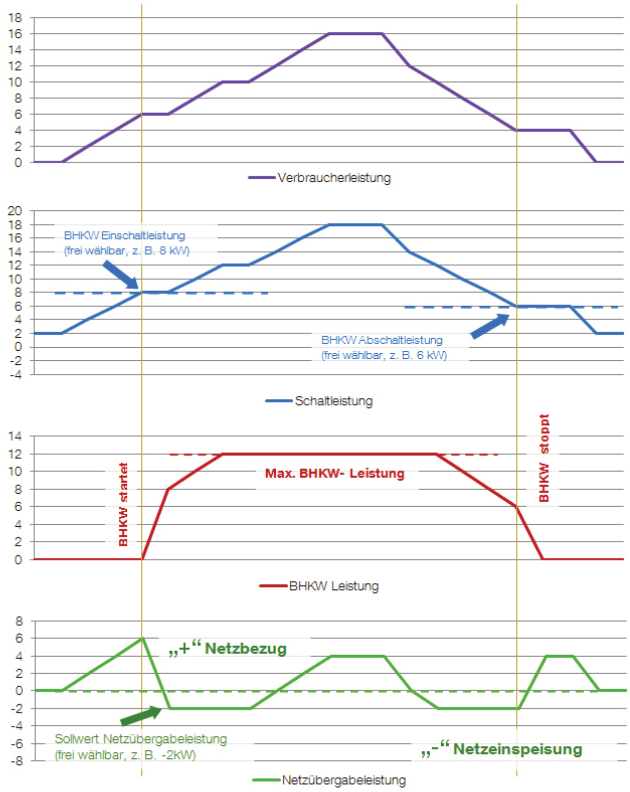
Speed / Power -> F4 Grid transfer -> F6 Parameters

Option 8 “Grid transfer control / power modulation”

Grid transfer control
Example control behavior

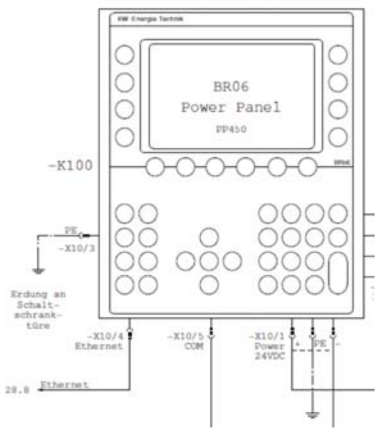
CHP Type: KWE 12G-4 AP
P max = 12.0 kW (100%)
P min = 6.0 kW (50%)

Target value
Grid transfer power: -2.0 kW
P on = 8.0 kW,
P off = 6.0 kW



Option 12 “Networking (LAN/DSL)”

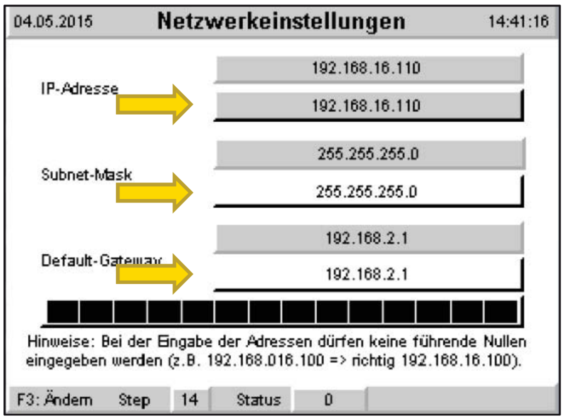
Connecting the Br06 control system to a network can either be made with a cross-over cable directly to a PC (LAN) or to a DSL network by means of a 1:1 patch cable. Feed the cable through the bottom section of the control cabinet to the RJ45 adapter socket inside the control cabinet!



Control switching cabinet

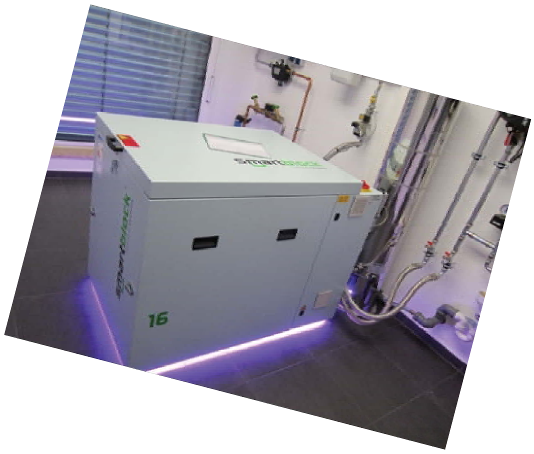
Option 12 “Networking (LAN / DSL / VPN Router)”

On this screen the network configuration can be changed. For this the IP address, subnet mask and default gateway must be entered. Attention: When entering network addresses omit leading zeros. The press and hold the F3 key → setting of parameters is begun. This is shown in the step counter and the text message. This process requires some time to complete.



Accessories smartblock (sb7.5 to sb50)

- Cable harness extension for smartblock (plus 2, 4, 6, or maximum 8m)
- Gas warning device natural and liquid petroleum gas
- Gas warning device carbon monoxide (CO)
- Mobile transmission – data telecommunications
- Current transformers and measurement transformer for grid transfer control
- External grid system protection
- Emergency power switching
- Oil vessel catchment basin for sb33 & sb50
- Condensation heat exchanger sb50
- Tool set for start-up sb7.5 – sb50
- Tool set for maintenance sb7.5 – sb50



smartblock®
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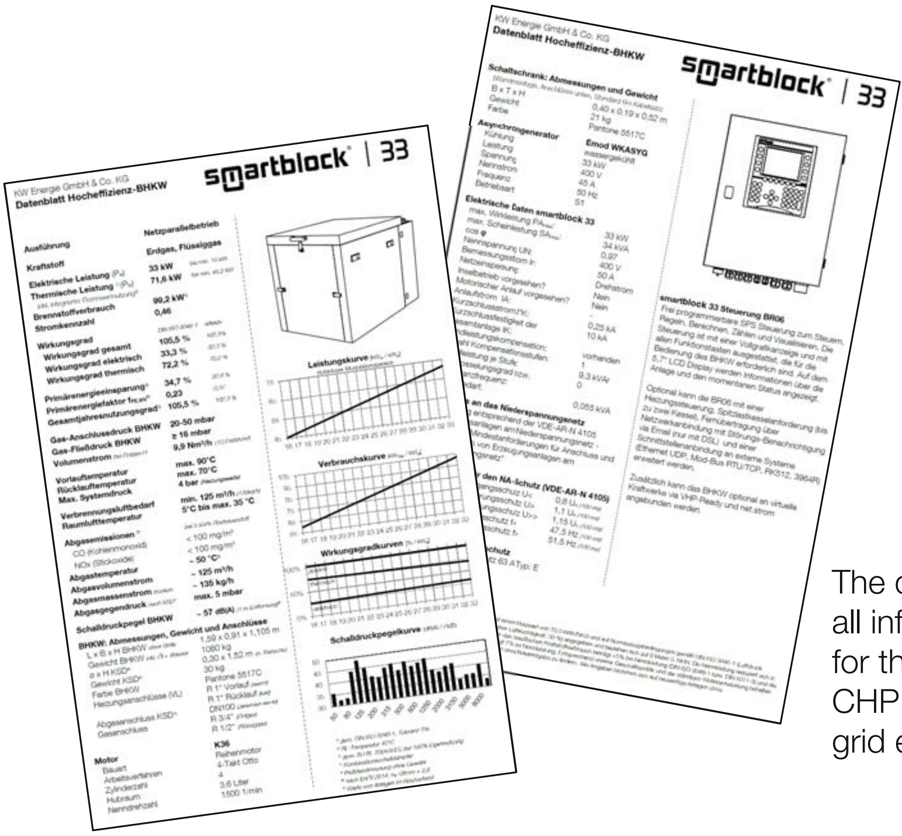
Practical Exercises in the Training Room

smartblock®
POWERED BY KW ENERGIE

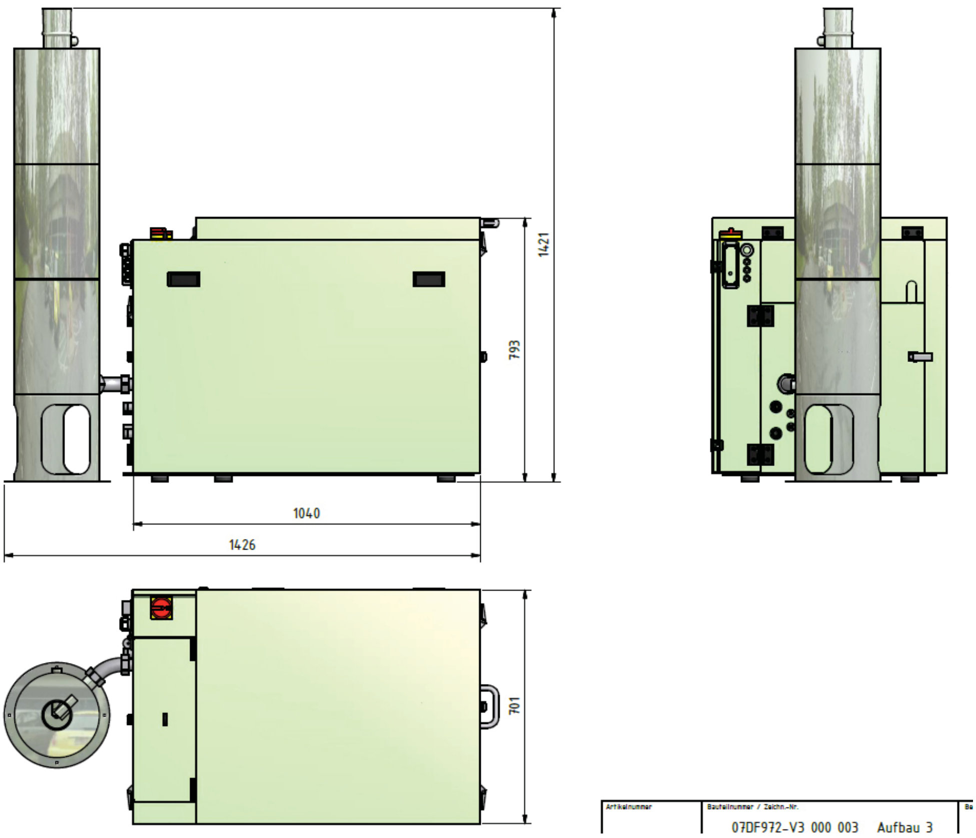
Specifications, Data Sheets & Conformity Declarations

Data Sheet High Efficiency CHP



The data sheet contains all information required for the registration of the CHP at the BAFA and the grid energy provider!

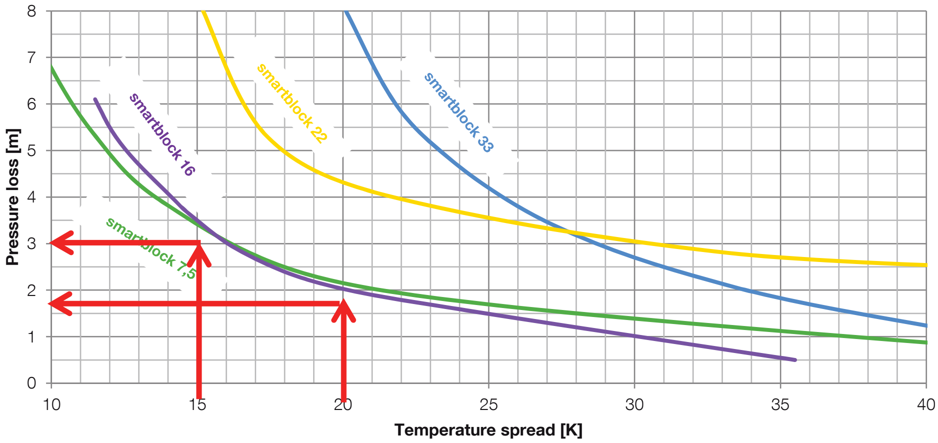
Dimensions



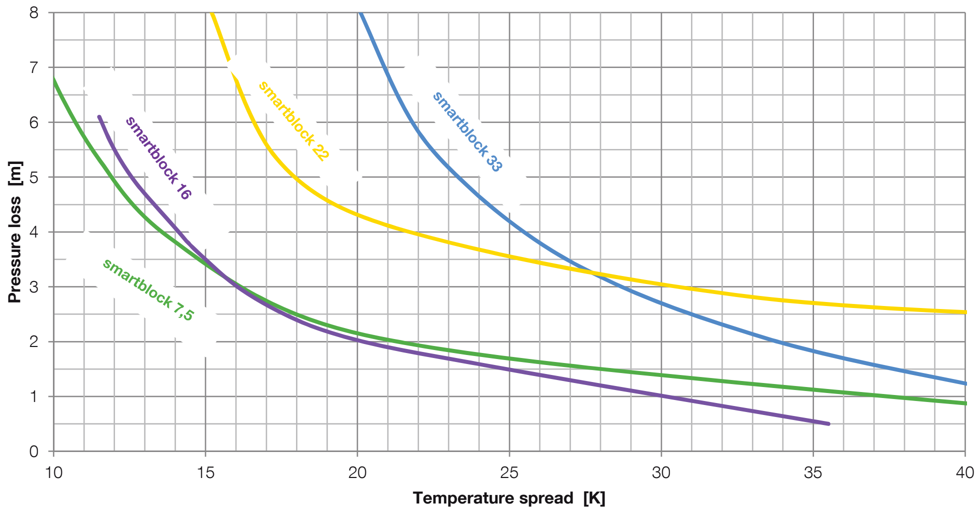
Pump design - Dimensioning

As with any other pump system design the pressure losses of the individual components must be cumulated:

- CHP (see pressure loss chart in Installation and Operating Conditions)
- Pipes / Formed pieces / Fittings (see techn. data sheets / tables)
- Sludge separator (see techn. data sheets / tables)
- Calorific counter (see techn. data sheets / tables)



Pump design - Dimensioning



When designing the pump system, ensure that the charger pump is not too large, as this may cause the charger pump to circulate so much cooling water at only 10% of the power that with a relatively cold return flow the operating temperature is not reached. A special message to alert to such a situation has been introduced: Alert message 134: „Motor temperature too low".

Conformity Declarations

Certification of electrical properties
The compliance with the requirements of VDE-AR-N4105 is certified by our Conformity Declaration (G.2 for Generating Units and G.3 for Grid and Line Protection), supplied with every CHP. A preliminary version is attached to the order confirmation.
Test reports (F.3 for Generating Units and F.4 for Grid and Line Protection) can be requested from KW Energie as required.

The commissioning protocol (F.1) and the Specifications / Data sheet for Generating Units (F.2) is normally made available by the grid operator and can be filled in at commissioning / start-up.

Conformity Declarations G.2

KONFORMITÄTSNACHWEIS ERZEUGUNGSEINHEIT (G.2)

KONFORMITÄTSNACHWEIS EZE

Hersteller: KW Energie GmbH & Co. KG, Neumarkter Str. 157, 92342 Freystadt

KW ENERGIE

Nummer: 2015 – xxxx

Typ Erzeugungseinheit: smartblock 7,5

Bemessungswerte: siehe Tabelle Anhang A

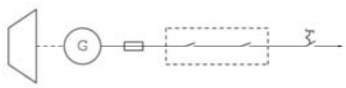
Netzanschlussregel: **VDE-AR-N 4105 „Erzeugungsanlagen am Niederspannungsnetz"**
Technische Mindestanforderungen für Anschluss und Parallelbetrieb von Erzeugungsanlagen am Niederspannungsnetz

Die oben bezeichnete Erzeugungseinheit erfüllt die Anforderungen der VDE-AR-N-4105.

Technische Daten: siehe technisches Datenblatt Erzeugungseinheit (BHKW)

Softwareversion: ab Version V07x

Schematischer Aufbau der Erzeugunseinheit:



Zusammengefasste Angaben zu den Eigenschaften der Erzeugungseinheit:

Das Blockheizkraftwerk (BHKW) besteht im wesentlichen aus einem Verbrennungsmotor, der einen Generator antreibt. Der dadurch erzeugte Drehstrom wird parallel zur Netzspannung in das Hausnetz oder das öffentliche Stromnetz eingespeist. Die gleichzeitig gewonnene Wärme (Motor-, Abgas- und ggf. Generatorkühlung) wird an das Heizungssystem übergeben.

Der Betrieb des BHKW erfolgt vollautomatisch. Bei vorhandener Startfreigabe (durch Wärme- oder Strombedarf oder externe Freigabe) startet das BHKW und erzeugt Strom und Wärme. Entsprechend der gewählten Leistungsvorgabe wird das BHKW bei Nennleistung bzw. modulierend betrieben. Sobald die Startfreigabe nicht mehr ansteht stoppt das BHKW.

Bei einem Netzausfall (passive Inselnetzerkennung) oder einer Netzstörung (unzulässige Spannungs- und Frequenzwerte) wird das Hausnetz automatisch (einfehlersicher) vom öffentlichen Stromnetz getrennt. Im Netzersatzbetrieb (**smartblock s** / KWE SPN) erzeugt das BHKW die benötigte Leistung der Verbraucher und überwacht und regelt die Spannung und Frequenz im Inselnetz. Bei Netzwiederkehr wird das Inselnetz mit dem öffentlichen Stromnetz synchronisiert und verbunden.

VORABVERSION

Freystadt, 22.04.2014

Ort, Datum — *Unterschrift: Konrad Weigel, Geschäftsführer*

Dieser Konformitätsnachweis darf nicht in Ausschnitten verwendet werden.

ANHANG A

Konformitätsnachweis Erzeugungseinheit (G.2)

Technische Daten Kuppelschalter

KONFORMITÄTSNACHWEIS EZE

Erzeugungseinheit Typ	*max. Wirk-leistung P_{Emax}*	*max. Schein-leistung S_{Emax}*	*Bemessungs-spannung U_n*
smartblock 7,5	7,5 kW	8,3 kVA	400 V
smartblock 7,5s	7,5 kW	8,3 kVA	400 V
smartblock 16	16 kW	16,6 kVA	400 V
smartblock 16s	16 kW	16,6 kVA	400 V
smartblock 22	22 kW	24,4 kVA	400 V
smartblock 22s	22 kW	24,4 kVA	400 V
smartblock 33	33 kW	36,7 kVA	400 V
smartblock 33s	33 kW	36,7 kVA	400 V
smartblock 50	50 kW	55,6 kVA	400 V

Erzeugungseinheit Typ	*max. Wirk-leistung P_{Emax}*	*max. Schein-leistung S_{Emax}*	*Bemessungs-spannung U_n*
KWE 12G-4 AP	12 kW	13,3 kVA	400 V
KWE 12G-4 SPN	12 kW	13,3 kVA	400 V
KWE 48G-4 AP	48 kW	53,3 kVA	400 V

Conformity Declarations G.3

KONFORMITÄTSNACHWEIS NA-Schutz (G.3)

Hersteller: KW Energie GmbH & Co. KG
Neumarkter Str. 157
92342 Freystadt

KW ENERGIE

Nummer: 2015 – xxxx

Typ NA-Schutz: integrierter NA-Schutz zu

Typ Erzeugungseinheit: smartblock 7,5

Netzanschlussregel: **VDE-AR-N 4105 „Erzeugungsanlagen am Niederspannungsnetz"**
Technische Mindestanforderungen für Anschluss und Parallelbetrieb von Erzeugungsanlagen am Niederspannungsnetz

Der oben bezeichnete Netz- und Anlagenschutz erfüllt die Anforderungen der VDE-AR-N-4105:

- Einstellwerte und Abschaltzeiten (s.u.)
- technische Anforderungen der Schalteinrichtung
- passive Inselnetzerkennung
- Einfehlersicherheit

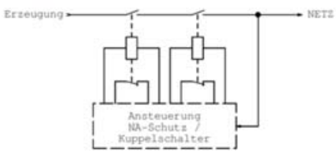
Einstellwerte und Abschaltzeiten:

Schutzfunktion	*Einstellwert*	*Auslösewert*	*Abschaltzeit**
Spannungsrückgangsschutz U<	0,8 U_n	< 0,8 U_n	< 200 ms
Spannungssteigerungsschutz U>	1,1 U_n	> 1,1 U_n	< 200 ms
Spannungssteigerungsschutz U>>	1,15 U_n	> 1,15 U_n	< 200 ms
Frequenzrückgangsschutz f<	47,5 Hz	< 47,5 Hz	< 200 ms
Frequenzsteigerungsschutz f>	51,5 Hz	> 51,5 Hz	< 200 ms

* Summe der Eigenzeiten NA-Schutz und Kuppelschalter

Technische Daten Kuppelschalter: siehe Tabelle Anhang A

Schematischer Aufbau der Wirkungskette „NA-Schutz-Kuppelschalter":



Softwareversion: ab Version V07a

Freystadt, xx.xx.xxxx — **VORABVERSION**

Ort, Datum — *Unterschrift: Konrad Weigel, Geschäftsführer*

Dieser Konformitätsnachweis darf nicht in Ausschnitten verwendet werden.

KONFORMITÄTSNACHWEIS NA-Schutz

ANHANG A

Konformitätsnachweis NA-Schutz (G.3)

Technische Daten Kuppelschalter

Erzeugungseinheit Typ	*Hersteller*	*Typ Kuppelschalter*	*Schaltzeit*
smartblock 7,5	ABB EATON	AF16-30-01-11 DS7-340SX016N0-N	11…95 ms
smartblock 7,5s	ABB	AF16-40-00-11 (2 Stück)	11…95 ms
smartblock 16	EATON	DILMC50(RDC24)	24 ms
smartblock 16s	EATON	DILMP45-10(RDC24)	30 ms
smartblock 22	EATON	DILMC50(RDC24) (2 Stück)	24 ms
smartblock 22s	EATON	DILMP45-10(RDC24) (2 Stück)	30 ms
smartblock 33	EATON	DILMC65(RDC24) (2 Stück)	24 ms
smartblock 33s	EATON	DILMP63(RDC24) (2 Stück)	24 ms
smartblock 50	EATON	DILMC115(RAC240) (2 Stück)	35…41 ms

Erzeugungseinheit Typ	*Hersteller*	*Typ Kuppelschalter*	*Schaltzeit*
KWE 12G-4 AP	EATON	DILM25(230V50HZ) (2 Stück)	8…14 ms
KWE 12G-4 SPN	EATON	DILMP63(230V50HZ, 240V60HZ) (2 Stück)	8…13 ms
KWE 48G-4 AP	EATON	DILMP125(RAC240) (2 Stück)	35…41 ms

KONFORMITÄTSNACHWEIS NA-Schutz

EC - Conformity Declarations

EG – KONFORMITÄTSERKLÄRUNG

Im Sinne der EG - Maschinenrichtlinie 2006/42/EG, Anhang II A

Hiermit wird erklärt, dass die nachfolgend bezeichnete Maschine in ihrer Konzeption und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der EG-Richtlinie 2006/42/EG entspricht. Bei einer nicht mit uns abgestimmten Änderung der Maschine verliert diese Erklärung ihre Gültigkeit. Die Amtssprache der Originalbetriebsanleitung ist entsprechend dem Herstellerland deutsch.

Hersteller: KW Energie GmbH & Co. KG
Neumarkter Str. 157
92342 Freystadt

KW ENERGIE

Beschreibung der Maschine:

- Bezeichnung: Blockheizkraftwerk
- Typ: **smartblock xxx od. KWE XXXX**
- Seriennummer: 1902
- Baujahr: 2015

Es wird die Übereinstimmung mit den für das Produkt geltenden Richtlinien erklärt:

- EG-Maschinenrichtlinie 2006/42/EG
- EG-Niederspannungsrichtlinie 2006/95/EG
- EG-Richtlinie Elektromagnetische Verträglichkeit EN 61000-6-2 : 2005

Angewendete harmonisierte Normen:

- EN ISO 12100: 2010
  Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung
- EN 12601: 2001
  Stromerzeugungsaggregate mit Hubkolben-Verbrennungsmotoren
- EN 1679-1: 1998
  Hubkolben-Verbrennungsmotoren – Sicherheit Teil 1
- EN 60204-1: 2006
  Sicherheit von Maschinen – Elektrisches Ausrüsten von Maschinen
- EN ISO 13850: 2008
  Sicherheit von Maschinen- Not-Halt Gestaltungsleitsätze
- EN ISO 13849-1: 2008
  Sicherheit von Maschinen – Sicherheitsbezogene Teile von Steuerungen - Teil 1: Allgemeine Gestaltungsleitsätze
- DIN EN 62079: 2001
  Erstellen von Anleitungen, Gliederungen, Inhalt und Darstellung
- DIN EN 61000-6-4: 2007
  Elektromagnetische Verträglichkeit – Teil 6-4: Fachgrundnormen – Störaussendung für Industriebereiche

Bevollmächtigter für die Zusammenstellung der Technischen Unterlagen:
Andreas Weigel, Geschäftsführer
KW Energie GmbH & Co. KG, Neumarkter Str. 157, 92342 Freystadt

Herstellerunterschrift:

VORABVERSION

Freystadt, 15.11.2013

Ort, Datum — *Unterschrift: Konrad Weigel, Geschäftsführer*

EG-KONFORMITÄTSERKLÄRUNG

Herstellererklärung Betriebsanleitung

Im Sinne der EG - Maschinenrichtlinie 2006/42/EG, Anhang I, Abs. 1.7.4.1

Hiermit wird erklärt, dass für die nachfolgend bezeichneten Maschinen die aufgelisteten Landessprachen verfügbar sind. Die Amtssprache der Originalbetriebsanleitung ist entsprechend dem Herstellerland deutsch!
Jeder Maschine, die ins europäische Ausland geliefert wird, liegt die Betriebsanleitung in Landessprache in Papierform sowie die deutsche Originalbetriebsanleitung in digitaler Form bei.

Bei einer nicht mit uns abgestimmten Änderung der Maschine verliert diese Erklärung ihre Gültigkeit.

Hersteller: KW Energie GmbH & Co. KG
Neumarkter Str. 157
92342 Freystadt

KW ENERGIE

Beschreibung der Maschine:

- Bezeichnung: Blockheizkraftwerk
- Typen: **smartblock 7,5 / 7,5s**
  smartblock 16 / 16s
  smartblock 22 / 22s
  smartblock 33 / 33s

Betriebsanleitungen, verfügbare Landessprachen:

- Deutschland, Österreich, Schweiz - Sprache Deutsch
- Italien, Südtirol - Sprache Deutsch
- Großbritannien, Irland - Sprache Englisch
- Spanien - Sprache Spanisch
- Slowenien - Sprache Slowenisch

Software, verfügbare Landessprachen:

- Deutschland, Österreich, Schweiz - Sprache Deutsch
- Großbritannien, Irland - Sprache Englisch
- Spanien - Sprache Spanisch
- Slowenien - Sprache Slowenisch
- Italien - Sprache Italienisch
- Frankreich - Sprache Französich

Bevollmächtigter für die Zusammenstellung der Technischen Unterlagen:
Andreas Weigel, Geschäftsführer
KW Energie GmbH & Co. KG, Neumarkter Str. 157, 92342 Freystadt

Herstellerunterschrift:

Freystadt, 15.11.2013

Ort, Datum — *Unterschrift: Konrad Weigel, Geschäftsführer*

HERSTELLERERKLÄRUNG MRL - BA