KW Energie GmbH & Co. KG

High efficiency-CHPP data sheet

smartblock® | 50 V2

Operational mode	**Mains parallel operation**
Energy efficiency [1]	**A++**
Seasonal heating efficiency [2]	**346.9 %**
Fuel	**Natural gas**
Calorific value	**integrated**

stepless modulation range	*- 100 % -*	*- 50 % -*
Electric output (P_{el})	**50.0 kW**	**25.0 kW**
Thermal output [8] (P_{th})		
Return-temperature 30 °C	103.1 kW	66.1 kW
Return-temperature 40 °C	**100.2 kW**	**66.1 kW**
Return-temperature 60 °C	90.2 kW	57.0 kW
Fuel consumption [1]		
Return-temperature 40 °C	**137.4 kW**	**83.3 kW**
Return-temperature 60 °C	139.2 kW	83.4 kW
CHPP coefficient [3]	**0.50**	0.38

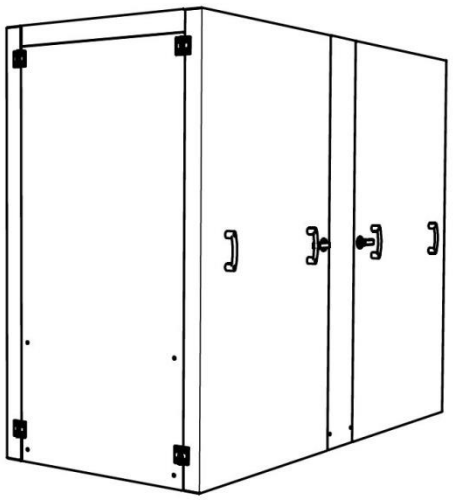
- All following information at rated power (100 %) and 40 °C return -

Efficiency	*- EN 50645 -*	*- actual value -*
Total efficiency	**109.4 %**	*103.9 %*
Electric efficiency	**36.4 %**	*34.6 %*
Thermal efficiency	**73.0 %**	*69.3 %*
Primary energy savings [4]	**37.8 %**	*34.6 %*
Primary energy factor $f_{PE,WV}$ [7]	**0.11**	*0.19*
Total annual use efficiency [4]	**109.4 %**	*103.9 %*

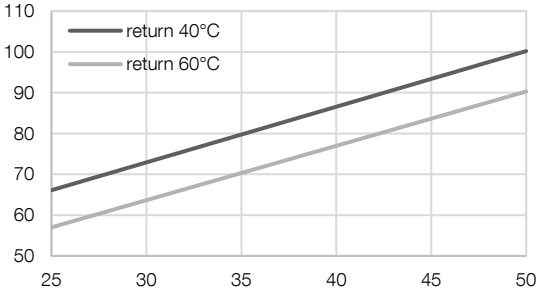
Gas connection pressure	**20-50 mbar**
Gas flow pressure	**≥ 16 mbar**
Flow rate *with natural gas-H*	**14.5 Nm³/h** *(10.0 kWh/m³)*
Flow temperature	**max. 90 °C**
Return temperature	**max. 70 °C**
Max. System pressure	**4 bar** *(heating side)*
Supply air volume flow	**min. 1004 m³/h** *(1185 kg/h)*
Combustion air requirement	**min. 159 m³/h** *(188 kg/h)*
Ambient temperature	**5 °C to max. 35°C**
Exhaust gas emission	*at 5 Vol% remaining oxygen*
CO (carbon monoxide)	< 100 mg/m³
NOx (nitrogen oxide)	< 100 mg/m³
CH_2O (formaldehyde)	< 1 mg/m³
Exhaust gas temperature [3]	**max. 130 °C**
Exhaust gas volume flow	**~ 170 m³/h**
Exhaust gas mass flow *dry*	**~ 187 kg/h**
Exhaust gas back pressure [5]	**max. 5 mbar** *after CS*
Sound pressure level CHPP [6]	**54.7 dB(A)** *(1 m distance)*

CHPP: Dimensions, weights and connections

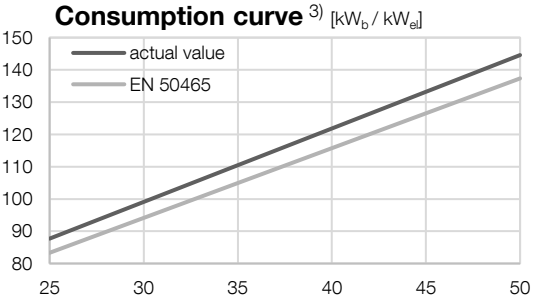
L x W x H CHPP *w/o handles*	2.29 x 0.96 x 1.71 m
Weight CHPP *incl. oil + water*	2020 kg
ø x H CS [5]	0.41 x 1.88 m *(w/o flanges)*
Weight CS [5]	72 kg
Colour CHPP	Pantone 5517C
Heating connections	R 1 1/4“ Flow *(warm)*
	R 1 1/4“ Return *(cold)*
Exhaust gas connection CS [5]	DN120 *(Jeremias ew-kl)*
Gas connection	R 1“



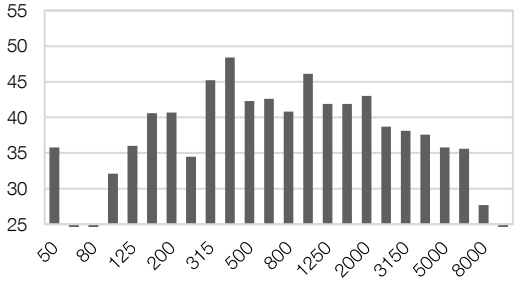
Output curve [kW_{th} / kW_{el}]



Consumption curve [3] [kW_b / kW_{el}]



Sound pressure level [6] [dB(A)/Hz]



[1] *According to EN 50465, tolerance 5 %*
[2] *Seasonal space heating efficiency CHP according to DIN EN 50465:2015, Kap. 7.6.2.2*
[3] *Return-temperature 40 °C*
[4] *According to EU RL 2004/8/EG with 100 % internal use*
[5] *Combination silencer*
[6] *According to DIN EN ISO 3744:2011-2*
[7] *According to EnEV 2014: f_{PE} -power = 2.8*
[8] *System as new values*
[9] *Standard delivery*

Engine	**K49S**
Type	Straight engine (Otto)
Operation	4-stroke
Cylinder	4
Displacement	4.9 litres
Nominal engine speed	1500 1/min

Cabinet: Dimensions and weight

(floor standing cabinat, side connections, standard cable set 6 m)

W x D x H	0.90 x 0.31 x 1.27 m
Weight	105 kg
Colour	Pantone 5517C

Asynchronous generator	**Emod WKASYG**
Cooling	water-cooled
Power	53.0 kW
Rated voltage	400 V
Rated current	88.0 A
Frequency	50 Hz

Electrical data smartblock 50

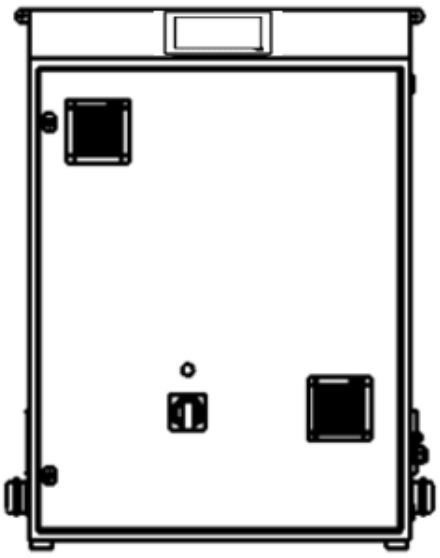
max. effective power $P_{A_{max}}$	50.0 kW	
max. apparent power $S_{A_{max}}$	51.5 kVA	55.5 kVA
cos φ	0.97 ind. [9]	0.90 ind.
Nominal current I_N	74.4 A	80.2 A
Nominal voltage U_N	400 V AC	
Grid feed	three-phase	
Island operation aveilable	no	
Motor start provided	no	
Starting current I_A	0 A	
Short circuit current I''_K	0.91 kA	
Short-circuit resistance of the system I_K	10 kA	
Reactive power compensation	present	
Number of compensation steps	1	
Reactive power per step	23.3 kvar	12.4 kvar
Choke coil factor	0 %	
Own consumption (Stand-by)	0.060 kW	
Enclosure rating (DIN EN 60529)	IP 20	
Line protection at building site	SLP 100 A „C"-Characteristics	

Connection to the low voltage grid

Operational mode according to VDE-AR-N 4105 "Generation units at the low voltage grid - technical minimum requirements for connection and parallel operation of generation units at the low voltage grid"

Settings grid protection (VDE-AR-N 4105)

Voltage drop protection U<	0.8 UN *(100 ms)*
Voltage increase protection U>	1.1 UN *(100 ms)*
Voltage increase protection U>>	1.15 UN *(100 ms)*
Frequency drop protection f<	47.5 Hz *(100 ms)*
Frequency increase protection f>	51.5 Hz *(100 ms)*



smartblock 50 control BR18

The freely programmable PLC system is equipped with analogue resistive touch screen display for controlling, regulating, counting and visualization, which are required for operating the CHP. The 10.1" display shows information from the CHP and the current status of the system.

The BR18 can optionally be expanded by a heating control system, requirement peak load boiler (up to 2 boilers), data transfer via LAN and Internet with an error notification via email (only with DSL) and an interface connection to external systems (Ethernet UDP, Mod-Bus RTU/TCP, RK512, 3964R).

Additionally, the CHPP can be connected to virtual power plants using VHP-Ready and net.strom.

Standard reference conditions according to EN 50465: The technical data are based on natural gas H with a heating value of 10,0 kWh/Nm³ (Total air pressure 100 kPa, air temperature 25 °C, relative humidity 30 %, 0m above sea level). The nominal power can be less, depending on the actual height above sea level. The tolerance of the specific fuel consumption is +5 % at nominal power (EN 50465) and the tolerance of the usable thermal output is 7 % at nominal power. We reserve the right to change data and characteristics without prior notice in accordance with our business policy and the ongoing development process. All details refer to systems as new