SOLID POWER

BlueGen BG-15
Product Specification

Model C-B-D-C-B-B

BlueGen BG-15
Product Specification

Product description

BlueGen BG-15 is a fuel cell system based on the latest SOFC technology and designed to provide a secure, reliable and highly efficient power supply. BlueGen BG-15 operates on natural gas, bio methane and synthetic methane from the mains gas supply and water from the mains water supply. Through an electrochemical reaction, BlueGen BG-15 provides both electricity for export to the grid and heat that can be used for heating water.

BlueGen BG-15 shipment includes the appliance with the Fuel Cell Module (delivered in two packages), special parts to install the BlueGen BG-15, product manuals and access to the mobile- and web-application. The basic parts to connect to the gas, water, electric and internet supply and to the heating circuit are not included.

Operation

BlueGen BG-15 is designed to operate continuously. The start-up and shut-down takes approximately 24 hours. Therefore BlueGen BG-15 can not be used for frequent start and stop operation. To realize a high utilization of fuel energy, the heat should be used to provide heat for hot water and room heating. The initial power output level is set to 1.3 kW_{el}. The electrical power can be modulated and adapted to the needs of the operator in a range between 0.5 kW_{el} and 1.5 kW_{el} (max power at begin of life). For this, the operator will get a personal access to the mobile and web-application BlueGen-*net*. BlueGen-*net* provides the possibility to set up daily and weekly power profile(s) by the operator. Once activated, the BlueGen BG-15 will follow this profile automatically.

Function and data available on BlueGen-*net*:

- Data available on dashboard: status, electrical efficiency, generated electricity, CO2 savings, CO2 emissions
- Data will be displayed as current, daily, weekly, monthly yearly and total overview
- Data available as csv download: operating hours, status, generated electricity, output energy, fuel flow, input energy, electrical efficiency, CO2 emissions, CO2 savings, total CO2 savings
- Power control: Power profile can be set in 15 minutes increment between 0.5 kW_{el} and max. power.

Operation Modes

Start-up Mode

BlueGen BG-15 is heating up to operating temperature by using gas in the start-up burner. Start-up is fully automatic and requires electrical grid power for auxiliaries (grid independent start-up is not possible) and mains water. After reaching the necessary operation conditions, the system automatically moves into the standard power mode (1.3 kW_{el}).

Power Mode

The default power at the initial setup of the system is 1.3 kW_{el} at max. electrical efficiency. The operation mode of the BlueGen BG-15 foresees a reduction of the power output over lifetime. The power output can be modulated between 0.5 kW_{el} and the max. power.

Stand-by Mode

In case of a grid loss the system is producing sufficient electricity for operation (no electrical power is exported). This mode avoids an unplanned shutdown in case of a grid loss.

Shut-down Mode

All BlueGen BG-15 units are monitored online 24/7. In case of unstable operation conditions, the unit will create an alarm to be processed by a service team. Only in exceptional cases, the unit will automatically shut down. If a planned shut down is required (due to e. g. vacation), the operator has to contact SOLIDpower and / or its service partner. The maximum number of requested shut downs is limited to two times per year.

Operation requirements

To ensure continuous and reliable operation the following conditions are required:

- Continuous uninterrupted gas supply with defined gas quality according technical data sheet (natural gas, bio methane, LNG).
- Continuous mains water supply or equivalent with defined water quality according technical data sheet.
- Connection to the electrical grid or equivalent (electrical power needed for start-up mode).
- Reliable internet connection.
- BlueGen BG-15 must be installed indoor.

The installation, commissioning and operation of the BlueGen BG-15 has to be strictly in accordance with the installation and operational manual.

Monitoring & Support

All BlueGen BG-15 are connected via the internet to BlueGen-*net* to allow SOLIDpower and its service partners to respond to service requirements in a timely manner.

BlueGen BG-15
Product Specification

Technical data sheet

Efficiency & Performance

Electrical efficiency**	Up to 57%	At 1.3 kW_{el} output
Overall efficiency**	Up to 88%	At 30°C return temperature and 1.3 kW_{el} output.
Seasonal space heating energy efficiency class	A^{+++}	ERP according EU 811/2013
Seasonal space heating energy efficiency	490%	ERP according EN 50465

Output

Electrical power	Between 0.5 kW_{el} and 1.5 kW_{el}	Default operation: constant at highest el. efficiency, 1.3 kW_{el}
Voltage/frequency	230 V AC ± 10 % 50Hz Single Phase	Parallel grid connected, automatically synchronised with grid.
Ramp rate electrical power	30 W/min (Up & Down)	Depending on system conditions.
Thermal power*	Up to 0.85 kW Up to 0.75 kW	At 30°C return temperature and 1.5 kW_{el} At 30°C return temperature and 1.3 kW_{el}

Emission

NOx class	6	According EN 50465
Maximum exhaust temperature	120 °C	
Sound power level	47 dB(A)	According EN 15036-1

Inputs

Annual fuel consumption***	22.000 kWh per year	At 1.3 kW_{el}
Fuel types	Natural gas according EN 437 Bio methane LNG	Appliance type: I2L / I2H / I2N / I2E / I2E+ / I2EL
Fuel inlet pressure	Max pressure: 25 mbar Min pressure: 15 mbar	
Fuel in	Max: 3.6 kW*** Nominal: 3 kW*** Min: 1.2 kW***	Max. fuel in only to be considered for the design of the gas installation. Not required in normal operation.
Water consumption	up to 32 l/day	at 1.3 kW_{el}
Maximal water consumption	36 l/day	at 1.5 kW_{el}
Mains water inlet pressure	Max: 10 bar Min: 1 bar	
Water quality	< 12 °dH / 21 °fH	If the water hardness is above the specification, please contact the SOLIDpower partner.
Waste heat recovery circuit pressure	Max: 3 bar Min: 1 bar	
Waste heat recovery circuit temperature	Max: 80 °C Min: 5 °C	80 °C is the maximum recommended temperature. The WHR circuit components need to be rated to higher temperatures.
Electrical power supply	Max: 0.2 kW	In operation modes BlueGen BG-15 does not produce electrical power (e. g. Start-up mode, Shut-down mode), external power supply is required

BlueGen BG-15
Product Specification

Connections & Dimensions

Flue	DN60 / 100	Balanced flue
Ethernet connection	RJ45	Included in delivery
AC electrical connection	Wieland connector	Included in delivery
Natural gas	½" BSPP female	
Water inlet	1/4" quick connect fitting	Hose and adaptor included in delivery
Waste drain flue	1/4" quick connect fitting	Hose and adaptor included in delivery
Waste drain process water	1/4" quick connect fitting	Hose and adaptor included in delivery
Waste heat recovery	3/4"BSPP female	
Weight	250 kg	Shipped in two packages (175 kg + 75 kg)
Size	1200 x 550 x 800 mm	Height x Width x Depth

Installation environment

Location	Indoor	
Ambient temperature	Min: 5 °C Max: 45 °C	
Mounting conditions	Side to side installation	
IP Code	IP20	

Customer interface

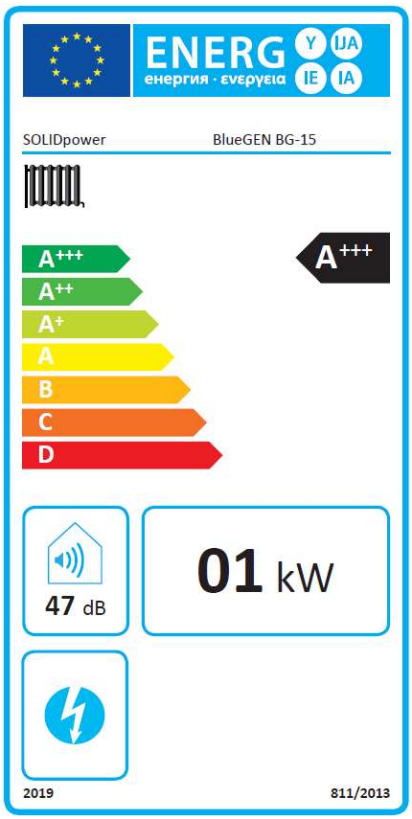
Customer Interface	BlueGen-*net* Status LED	Mobile App, Customer Website Integrated in the front panel
Internet	Min. broadband ADSL2 with 2 mbps	Up to 4MB upload Up to 2MB download

Standards

Gas regulation	EU 2016/426; EN 50465	
Grid regulation	AS4777, VDE0126-1-1, VDE-AR-N-4105, EN50438; CEI 0-21: 07 2016	

* the thermal power/energy varies depending on the electrical efficiency and the return temperature
** based on the lower calorific value of natural gas and start of operation
***based on higher calorific value of natural gas and start of operation

Note regarding technical performance:
The max electrical power output is 1.5 kW_{el} at beginning of life. During the lifetime the max. electrical power output may derate to 1.2 kW_{el}. If the max. power output is below this value on a permanent base SOLIDpower and/or its service partner needs to be contacted. The overall efficiency of the system over lifetime will stay constant, but the ratio between electrical and thermal efficiency can change. In addition, the electrical and thermal efficiency depends on various conditions including environmental conditions (e. g. altitude, temperature), quality of input media (e. g. gas quality, air quality, return temperature heat circuit) and operation conditions (e. g. power set point).



SOLIDpower GmbH
Borsigstraße 80
D-52525, Heinsberg, Germany
Technique: +49 (0)2452 15 3701
Sales: +49 (0)2452 15 3758
Fax: +49 (0)2452 15 3755

E-mail: service@solidpower.com
Enquiries: info@solidpower.com
www.solidpower.com

SOLIDpower SpA
Viale Trento 115/117 mod C/D BIC
Mezzolombardo –TN, Italy
Tel.: +39 0461 175 5068
Fax: +39 0461 175 5050