# CG200-BG

**Biogas CHP Unit**

POWERLINK Power Systems

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## Standard Basic Module -Open Type

- Highly efficientgas engine
- Highly reliable AC synchronous alternator
- Gas train
- Exhaust/water heat exchanger
- Water/water heat exchanger
- Heating circulation system
- Advanced engine control system, including: ignition system, detonation control system ,speed control system , air/fuel ratio control system
- Industrial silencer
- Control cabinet and switch cabinet
- Multi-functional control system with simple operation
- Data communication interfaces integrated into control system
- Battery charger
- Automatic oil refilling system
- Island mode or connecting to the grid mode

### Structure and control cabinet

| | |
|---|---|
| Structure type | Open type |
| Canopy painting | High-class powder coating |
| Electrical control cabinet | Integrated,IP54 |
| Noise level@1m, dB(A) | 100 |
| @7m, dB(A) | 91.1 |
| @10m, dB(A) | 86.9 |

### Dimension and weight

| | |
|---|---|
| Dimension ( LxWxH ) , mm | 4300X1300X2000 |
| Weight, kg | 4400 |

### Power andefficiency @50Hz

| | | | |
|---|---|---|---|
| Electric power -kW | 200 | Electric efficiency | 36.7% |
| Heat power-kW | 255 | Heat efficiency | 46.8% |
| Fuelinput-kW | 545 | Total efficiency | 83.5% |

### Fuel and emission

| | |
|---|---|
| Fuel type | Biogas |
| Fuel composition | 60%-$CH_4$/40%-$CO_2$ |
| Methane number | MN > 100 |
| Excess air factor（Lambda） | 1.4 |
| Fuel consumption @100% load, $m^3/h$ | 91 |
| Supply gas pressure range, kPa | 10~20 |
| **Emission without catalytic converter** | |
| NOx , $mg/Nm^3$ | <500$mg/Nm^3$ |
| CO , $mg/Nm^3$ | <1000$mg/Nm^3$ |
| HCHO ( formaldehyde ) , $mg/Nm^3$ | <60$mg/Nm^3$ |
| NMHC , $mg/Nm^3$ | <150$mg/Nm^3$ |
| **Emission with catalytic converter(optional)** | |
| NOx , $mg/Nm^3$ | ≤250 |

**Special statement :**

1、The technical data are based on a gas mixture of 60% methane and 40% carbondioxid with a calorific value of 6,0 $kWh/Nm^3$ and a methane no. > 100.

2、The technical data is measured in standard conditions:
Absolute atmospheric pressure：100kPa
Ambient temperature : 25℃
Relative air humidity : 30%

3、Rating adaptation at ambient conditions acc to DIN ISO 3046/1. The tolerance for the specific fuel consumption is + 5 % at rated output.

4、Technical dataabove are just for standard product ,and may be subject to change. As this document is used only for presale reference, take the specification supplied by PowerLink before ordering as final.

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## Standard Basic Module + Acoustic Attenuated Canopy (Optional)

| Dimension and Noise Level | |
|---|---|
| Canopy Size | 4570*1410*2440mm |
| Noise Level@ 1m , dB(A) | 80.2 |
| @ 7m , dB(A) | 72.9 |
| @ 10m , dB(A) | 68.9 |

- ☐ Modular designed and manufactured for plug and play□ Environmental friendly low emission
- ☐ Small indoor space required for installation□ Low noise does not affect the surrounding environment

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## Standard Basic Module + Acoustic Attenuated Container (Optional)

### Dimension and Noise Level

| | |
|---|---|
| Optional container（mm）（customized container modeling serviceavailable） | ☐ 7000*2300*2500<br>☐ 6058*2438*2591<br>☐ 12192*2438*2896<br>☐ 12192*3000*2896<br>☐ 13500*3000*2896<br>☐ 15000*3200*3000 |
| Noise Level@ 1m，dB(A) | 78 |
| @ 7m，dB(A) | 70 |
| @ 10m，dB(A) | 66 |

☐ Outdoor application enabled, weatherproof and dustproof, corrosion preventive□ Environmental friendly low emission

☐ Modular designed and manufactured for plug and play□ Low noise does not affect the surrounding environment

# CG200-BG

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## CHP Unit performance data and manufacturing technology

| CHP unit model | CG200-BG |
|---|---|
| Rated electric output power ( kW ) | 200 |
| Rated heat output power ( kW ) | 255 |
| Ratedelectric efficiency | 36.7% |
| Ratedheat efficiency | 46.8% |
| Rated total efficiency | 83.5% |
| Hot water production @inlet 70℃/outlet 90℃[t/h] | 10.708 |
| Overload runtime at 1.1xSe(hour) | 1 |
| Steady-state voltage deviation | ≤±1% |
| Transient-state voltage deviation | -15%~20% |
| Voltage recovery time(s) | ≤4 |
| Voltage unbalance | 1% |
| Steady-state frequency regulation | ±0.5% |
| Transient -state frequency regulation | ±5% |
| Frequency recovery time(s) | ≤3 |
| Steady-state frequency band | 0.5% |
| Recovery time response(s) | 0.5 |
| Telephone interference factor(TIF) | ≤50 |
| Telephone harmonious factor(THF) | ≤2% , as per BS4999 |

**Power and efficiency**

| Load | 100% | 75% | 50% |
|---|---|---|---|
| Electric power (kW) | 200 | 150 | 100 |
| Heat power (kW) | 255 | 202 | 162 |
| Energy input (kW) | 545 | 422 | 309 |
| Electric efficiency | 36.7% | 35.5% | 32.4% |
| Heat efficiency | 46.8% | 47.9% | 52.4% |
| Total efficiency | 83.5% | 83.4% | 84.8% |

### Manufacturing technology

- Special welded base frame, inner vibration isolators and design for whole lifting
- With high-class paint, endurable brightness as well resistance against abrasion and defacing
- Installation manual, operation and maintenance manual wiring program

### Standards and certificate

- ISO3046 , ISO8528 , GB2820
- BS5000PT99 , AS1359 , IEC34
- ISO9001:2008 quality system certification

## AC alternatorperformance data

| Alternator brand | Leroy-Somer |
|---|---|
| Alternator model | LSA46.3M7 |
| Rated output power (kW) | 224 |
| Power factor | 0.8 |
| Rated current @ 400V and 100% load (A) | 404 |
| Excitation system | Brushless |
| THF (BS EN60034- 1) | <2% |
| Bearing number | 2 |
| Winding material | 100% copper |
| Wiring connection | Star |
| Rotor insulation class | H |
| Winding pitch | 2/3 |
| A.V.R. model | R450 |
| Voltage fluctuation(no load to full load) | ± 0.5% |
| Housing protection | IP23 |
| TIF (NEMA MG 1-22) | <50 |
| Excitation method | AREP |
| Rated ambient temperature(℃) | 40 |
| Rated stator temperature rise(℃) | 125 |

| Voltage | Power |
|---|---|
| 380V | 224 kW |
| 400V | 224 kW |
| 415V | 224 kW |
| 440V | 224 kW |

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## Efficient gas engine

### General data

| | | |
|---|---|---|
| NO. of cylinders | | 6 |
| Engine type | 4-stroke, turbo charged and air to water cooled, lean burn | |
| Cylinder arrangement | | In line |
| Bore x stroke | mm | 128×166 |
| Displacement | L | 12.82 |
| Compression ratio | | 11：1 |
| Rated speed | rpm | 1500 |
| Rated output power | kW | 200 |
| Excess air factor | | 1.4 |
| Rotation direction | Anti-clockwise viewed on flywheel | |
| Ignition timing | °BTDC | 20 |

### Cooling system

| | | |
|---|---|---|
| Coolant refilling capacity | L | 16 |
| Max. jacket water operating pressure | kPa | 200 |
| Min. jacket water circulation flow | L/min | 318 |
| Min. jacket water temperature | °C | 80 |
| Max. jacket water temperature | °C | 88 |
| Max. jacket water difference(inlet-outlet) | K | 6 |
| Min. circulation flow LT | L/min | 86 |
| Min. circulation flow HT | L/min | 92 |
| Coolant type | Mixture of 40％ antifreeze and 60％ clean fresh water. Lower ambient temperature, higher contentof antifreeze. | |

### Induction/exhaust system

| | | |
|---|---|---|
| Exhaust flow(wet) | kg/h | 1121 |
| Combustion air flow | kg/h | 977 |
| Exhaust temperature | °C | 478 |
| Max. exhaust back pressure | mbar | 40 |
| Max. suction restriction | mbar | 15 |

### Fuel control system

| | |
|---|---|
| Gas train，Including： | ball valves |
| | filters |
| | gas pressure gauge |
| | safety solenoid valves |
| | constant pressure regulator etc |
| | gas pressure relief valve |

### Lubrication system

| | | |
|---|---|---|
| Max. refilling capacity | L | 41 |
| Min. refilling capacity | L | 30 |
| Max. consumption | kg/h | 0.15 |
| Lubrication oil pump | Gear driven | |

### Energy balance and gas flow

| Load | 100% | 75% | 50% |
|---|---|---|---|
| Mechanical power, kW | 220 | 165 | 110 |
| Coolant heat, kW | 103 | 89 | 80 |
| Mixture heat HT, kW | 13 | 4 | 0 |
| Mixture heat LT, kW | 15 | 13 | 6 |
| Exhaust heat up to 120°C, kW | 139 | 109 | 82 |
| Max. radiation heat, kW | 17 | 17 | 14 |
| Energy input, kW | 545 | 422 | 309 |
| Combustion air flow, kg/h | 977 | 727 | 522 |
| Fuel consumption, $m^3/h$ | 91 | 70 | 52 |
| Exhaust gas flow,kg/h | 1121 | 838 | 604 |
| Exhaust gas temperature, ℃ | 478 | 493 | 510 |

### Ignition system

| | |
|---|---|
| Ignition type | Electronic ignition system |
| Polarity | Negative earth |
| Spark plug | Separate for every cylinder |

## PCC-300 control system

Programmable control system is adopted with touch screen display , and various functions, including: engine protection and control, CHP parallel and grid connection, and CHP control functions,as wellas communication functions， etc.

## Main functions

- Engine monitor：coolant, lubrication, exhaust, battery
- Supply gas circuit monitor：pressure,temperature and CH4 content
- Auto paralleling and load share
- Voltage and PF control
- Alternator data：U, I, Hz, kW, kVA, kVAr, PF, kWh, kVAh
- Griddata：U, I, Hz, kW, kVAr, PF
- Modbus communicationprotocol based on RS232 and RS485 interfaces
- SMS message
- Internet connection and USB 2.0 interface
- 10-inch touch screen
- Internet monitor, auto orientation and cloud communication
- 1000 history events log

## Advantages

- Accordant with consumer requirement
- Complete control solution
- Convenient remote monitor and service
- Simplified engine start/stop control
- Enhanced stability and safety

| Standard protection functions | Standard control functions | |
|---|---|---|
| **Alternator protection**<br>- 2xReverse power<br>- 2xOverload<br>- 4xOvercurrent<br>- 1xOvervoltage<br>- 1xUndervoltage<br>- 1xOver/underfrequency<br>1xUnbalanced current | **Powercontrol**<br>- RPM control(synchronization)<br>- Power control(grid connection)<br>- Load share(island ) | **Voltage control**<br>- Voltage tracking (synchronization)<br>- Voltage control(island)<br>- PF control(grid connection)<br>- Reactive power share (island） |
| | **Lubrication control**<br>- Auto refilling<br>- Warning and monitoring | **Pump control**<br>- Cooling system<br>- Emergency radiator |
| **Busbar/ Gridprotection**<br>- 1xOvervoltage<br>- 1xUndervoltage<br>- 1xOver/under frequency<br>- 1xPhase sequence<br>- 1xROCOF alarm | **Fan control**<br>- Ventilation for engine room<br>- Radiator fan<br>- Emergency radiator fan | **Valve control**<br>- Cooling system<br>- Heating system<br>- Emergency radiator |
| | **Engine protection**<br>- Various routine and customized protection functions<br>- Monitoring | |

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## Standard configuration

| Engine | Alternator | Canopy and base | Electrical cabinet |
|---|---|---|---|
| Gas engine<br>Ignition system<br>Lambda controller<br>Speed control system<br>Electrical start motor<br>Battery system<br>Detonation control system<br>Lockable isolator switch<br>Turbocharger & intercooler<br>Jacket water heater | PMG<br>AC alternator<br>H class insulation<br>IP23 protection<br>AVR voltage regulator | Steel monocoque base frame<br>Engine bracket<br>Vibration isolators<br>Alternator base | Air circuit breaker<br>PCC300 control system<br>10.4-inch touch screen<br>Communication interfaces<br>Breaker cabinet<br>Mains floating charger<br>Paralleling protection |
| **Gas supply system** | **Lubrication system** | **Standard voltage** | **Intake/ exhaust system** |
| Gas safety train<br>Air/fuel mixer<br>Throttle valve<br>Flame arrester | Oil filter<br>Daily auxiliary oil tank<br>Auto refilling oil system<br>New and waste oil tank (Only applicable to container) | 380/220V<br>400/230V<br>415/240V<br>440/254V | Air filter<br>Exhaust silencer<br>Exhaust bellows<br>Gas leakage protection(Only applicable to canopy and container) |
| **Heat exchange system** | **Service and documents** | | |
| Exhaust/water heat exchanger<br>Jacket water circulation pump<br>Water/water heat exchanger<br>Mixture circulation pump<br>Expansion tank, Shut-off valve<br>Three-way valve<br>Intercooler radiator<br>Emergency radiator | Tools package<br>Installation and operation manual<br>Maintenance manual<br>Software manual<br>Parts manual | Engine operation and maintenance manual<br>Gas quality declaration<br>Control system manual<br>After service guide | |

## Optional configuration

| Alternator | Electrical system | Gas supply system |
|---|---|---|
| Space heater<br>Treatments against humidity and corrosion | RCD<br>ATS control cabinet<br>Thermal power gauge<br>Electric power gauge | Gas flow gauge<br>Emergency relief flare<br>Water separator<br>Gas compressor<br>Gas purification plant |
| **Voltage** | **Service and documents** | **Exhaust system** |
| 220V 230V 240V | Service tools<br>Maintenance and service parts | Three-way catalytic converter |

POWERLINK Power Systems
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Data is subject to change without prior notice as new products are always developed.
Please contact PowerLink or local agent with any doubts or for more information