

# CG1000S-BG

## Special Gas CHP Unit

### Main configuration and features:

- Highly efficient gas engine
- AC synchronous alternator
- Gas safety train and gas protection device against leakage
- Exhaust and jacket water heat exchanger
- Heating water and jacket water circulation system
- Expansion tank and water jacket heater
- Advanced engine control system, including: ignition system, detonation control system ,speed control system , air/fuel ratio control system and cylinder temp. protection system
- Strict shop test for all CHP unit
- Able to be used directly outdoors with enduring and firm characteristics and design against rain and dust
- Ventilation fan, electric inlet and outlet shutter
- Industrial silencer with silencing ability of 12-20dB(A)
- Unattached switch cabinet and electric control cabinet
- Multi-functional control system with simple operation
- Data communication interfaces integrated into control system
- Lighting and smoke alarm system
- Monitoring battery voltage and charging automatically
- Auto refilling oil system
- Bus interface for connecting to higher level control unit



### Power and efficiency @50Hz

Electric power -kW	1000	Electric efficiency	38.7%
Heat power-kW	1091	Heat efficiency	42.2%
Input power -kW	2584	Total efficiency	80.9%

### Soundproof canopy and control cabinet

Structure type	40 feet high-cube
Container painting	High-class paint
Electrical control cabinet	Integrated into canopy,IP54
Noise level@7m, dB(A)	84

### Dimension and weight

Dimension ( LxWxH ) , mm	12192X2438X2896
Weight, kg	24000

### Special statement :

- 1、 The technical data are based on a gas mixture of 60% methane and 40% carbon dioxide with a calorific value of 6,0 kWh/Nm<sup>3</sup> and a methane no. > 100.
- 2、 The technical data is measured in standard conditions:  
Absolute atmospheric pressure: 100kPa  
Ambient temperature : 25°C  
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、 Dimension and weight above 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.

### Fuel and emission

Fuel type	Special gas
Fuel component	60%-CH <sub>4</sub> /40%-CO <sub>2</sub>
Methane number	MN > 100
Excess air factor ( Lambda )	1.7
NO <sub>x</sub> , mg/Nm <sup>3</sup>	≤480
CO , mg/Nm <sup>3</sup>	≤870
HCHO ( formaldehyde ) , mg/Nm <sup>3</sup>	≤60
NMHC , mg/Nm <sup>3</sup>	≤150
Fuel consumption @100% load, m <sup>3</sup> /h	431
Supply gas pressure range, kPa	20~25

### CHP Unit performance data and manufacturing technology

CHP unit model	CG1000S-BG	Telephone interference factor(TIF)	≤50
Electric output power ( kW )	1000	Telephone harmonious factor(THF)	≤2% , as per BS4999
Heat output power ( kW )	1091	<p><b>Manufacturing technology</b></p> <ul style="list-style-type: none"> <li>● Special welded base frame, inner vibration isolators and design for whole lifting</li> <li>● With high-class paint, enduring brightness as well resistance against abrasion and defacing</li> <li>● Installation manual, operation and maintenance manual wiring program</li> </ul> <p><b>Standards and certificate</b></p> <ul style="list-style-type: none"> <li>● ISO3046 , ISO8528 , GB2820</li> <li>● BS5000PT99 , AS1359 , IEC34</li> <li>● ISO9001:2008 quality system certification</li> </ul>	
CHP unit electric efficiency	40.3%		
CHP unit heat efficiency	42.2%		
CHP unit total efficiency	80.9%		
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		

### AC alternator performance data

Alternator brand	LEROY SOMER	Voltage	Power
Alternator model	LSA50.2M6	380V	1000 kW
Rated output power (kW)	1000	400V	1000 kW
Power factor	0.8	415V	1000 kW
Rated current @ 380V and 100% load (A)	1899	440V	952 kW
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	PMG		
Rated ambient temperature(°C)	40		
Rated stator temperature rise(°C)	125		

### Efficient gas engine

#### General data

NO. of		16
Engine type		4-stroke, turbo charged and air to water cooled, lean burn
Cylinder arrangement		V-form , 60°
Bore x stroke	mm	160×190
Displacement	L	61.123
Compression ratio		12 : 1
Rated speed	rpm	1500
Rated output power	kW	1042
Excess air factor		1.7
Rotation direction		Anti-clockwise viewed on flywheel
Ignition timing	°BTDC	26

#### Cooling system

Total coolant capacity	L	95
Jacket water pressure in crankcase	kPa	≤100
Total coolant flow	L/min	950
Max. coolant exit temperature	°C	96
Max. coolant entry temperature	°C	81
Charge coolant flow	L/min	600
Charge coolant exit temperature	°C	40
Charge coolant entry temperature	°C	36
Coolant type	Mixture of 50% Inhibited ethylene glycol or propylene glycol and 50% clean fresh water. Lower ambient temp, higher content of antifreeze.	

#### Induction/exhaust system

Exhaust flow	kg/h	5652
Max. exhaust temp. before turbo	°C	600
Max. exhaust temp. after turbo	°C	468
Max. exhaust back pressure	mmH <sub>2</sub> O	400
Max. suction restriction	mmH <sub>2</sub> O	380
Exhaust outlet flange size	mm	2×152

#### 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

Total capacity	L	286
Sump maximum	L	257
Sump minimum	L	147
Oil temperature	°C	88
Oil pressure at rated speed	kPa	470
Oil flow - 1500rpm	L/min	402
Max. consumption	g/kWhr	0.25
Oil type		Single grade
Oil pump		Gear driven

#### Energy balance

Load		100%
Mechanical power	kW	1042
Coolant and oil heat	kW	445
Charge coolant heat	kW	180
Exhaust heat up to 120°C	kW	646
Max. radiation heat	kW	132
Energy input	kW	2584

#### Ignition system

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

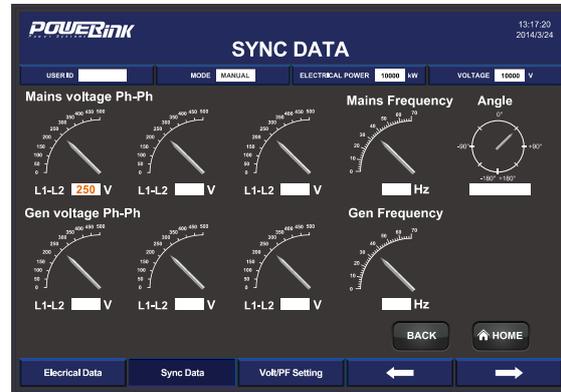
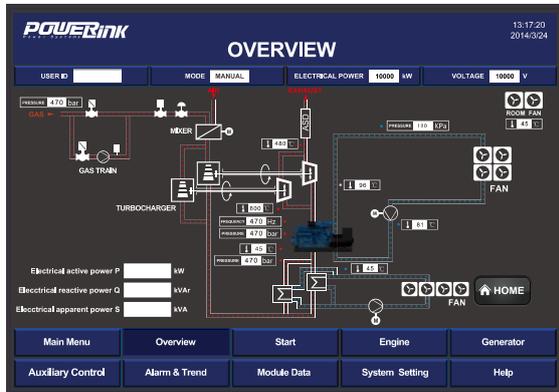
#### Fuel consumption

100% load	m <sup>3</sup> /h	431
75% load	m <sup>3</sup> /h	210
50% load	m <sup>3</sup> /h	144

Fuel: Special Gas - LHV = 21.6 MJ/m<sup>3</sup>

### PCC-300 control system

Open control system is adopted with touch screen display , and various functions, including: engine protection and control, paralleling between gensets or gensets and mains, and CHP control functions, as well as 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
- Mains data: U, I, Hz, kW, kVAr, PF
- Modbus communication protocol 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 project
- Convenient remote monitor and service
- Simplified engine start/stop control
- Enhanced stability and safety

#### Standard protection functions

- Alternator protection**
- 2xReverse power
  - 2xOverload
  - 4xOvercurrent
  - 1xOvervoltage
  - 1xUndervoltage
  - 1xOver/under frequency
  - 1xUnbalanced current
- Busbar/mains protection**
- 1xOvervoltage
  - 1xUndervoltage
  - 1xOver/under frequency
  - 1xPhase sequence
  - 1xROCOF alarm

#### Standard control functions

- Power control**
- RPM control(synchronization)
  - Power control(grid connection)
  - Load share(island )
- Lubrication control**
- Auto refilling
  - Warning and monitoring
- Fan control**
- Ventilation for engine room
  - Radiator fan
  - Emergency radiator fan
- Engine protection**
- Various routine and customized protection functions
  - Monitoring
- Voltage control**
- Voltage tracking (synchronization)
  - Voltage control(island)
  - PF control(grid connection)
  - Reactive power share (island)
- Pump control**
- Cooling system
  - Emergency radiator
- Valve control**
- Cooling system
  - Heating system
  - Emergency radiator

### Standard configuration

Engine	Alternator	Canopy and base	Electrical cabinet
Gas engine Ignition system Lambda controller Electronic governor actuator Electrical start motor Battery system Auto charging system Detonation control system Cylinder temp. protection system Coupling	PMG AC alternator H class insulation IP23 protection AVR voltage regulator PF control	Steel monocoque base frame Engine bracket Vibration isolators Alternator base Soundproof canopy	Air circuit breaker Paralleling control system 10-inch touch screen Communication interfaces Electrical switch cabinet Lighting system Smoke alarm system Lightning protection
Gas supply system	Lubrication system	Standard voltage	Induction/ exhaust system
Gas safety train Gas leakage protection Air/fuel mixer	Oil filter Daily auxiliary oil tank Auto refilling oil system	380/220V 400/230V 415/240V 440/254V	Air filter Exhaust silencer Exhaust bellows Ventilation fan Electric inlet and outlet shutter
Heat exchange system	Service and documents		
Exhaust heat exchanger Jacket water circulation pump Jacket water heat exchanger Mixture circulation pump Mixture radiator Jacket water heater Expansion tank, Shut-off valve Three-way auto proportional valve Emergency radiator	Tools package Installation and operation manual Maintenance manual Software manual Parts manual	Engine operation and maintenance manual Gas quality specification Control system manual After service guide Standard package	

### Optional configuration

Engine	Alternator	Exhaust system
Heavy duty air filter Backfire safety control valve	Space heater AVR Treatments against humidity and corrosion	Guard shield from touch Resident silencer Three-way catalytic converter
Canopy and base	Lubrication system	Service and documents
SECC base frame	Oil consumption gauge New and used oil tank	Service tools Maintenance and service parts
Gas supply system		Voltage
Gas flow gauge Refrigerated gas drier Gas compressor	Emergency relief flare Free water separator Gas purification plant	220V 230V 240V