CG220-BG

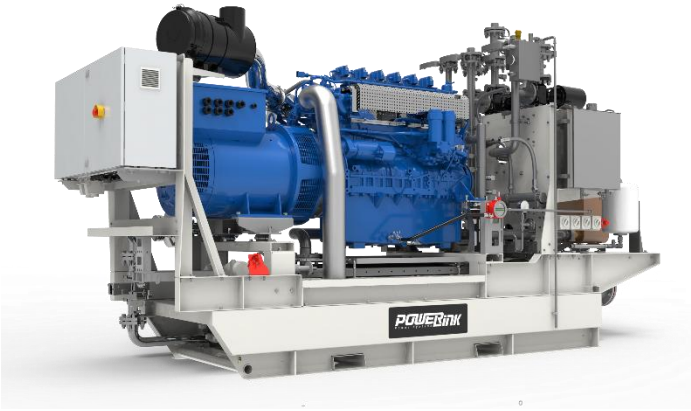
Biogas CHP Unit

POWERLINK Power Systems

We Produce Green Energy...

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)	100.1
@7m, dB(A)	91.4
@10m, dB(A)	87.2

Dimension and weight

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

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/Nm³ 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、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.

Power andefficiency @50Hz

Electric power -kW	220	Electric efficiency	40.2%
Heat power-kW	269	Heat efficiency	49.1%
Fuelinput-kW	547	Total efficiency	89.3%

Fuel and emission

Fuel type	Biogas
Fuel composition	60%-CH4/40%-CO2
Methane number	MN＞100
Excess air factor（Lambda）	1.57
Fuel consumption @100% load, m³/h	91
Supply gas pressure range, kPa	10~20
Emission without catalytic converter	
NOx , mg/Nm^3	<500mg/Nm³
CO , mg/Nm^3	<1000mg/Nm³
HCHO (formaldehyde) , mg/Nm³	<60mg/Nm³
NMHC , mg/Nm³	<150mg/Nm³
Emission with catalytic converter(optional)	
NOx , mg/Nm^3	≤250

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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)	79.3
@ 7m , dB(A)	72.4
@ 10m , dB(A)	68.3

- ☐ 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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Biogas CHP Unit

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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 ☐ 6058*2438*2591 ☐ 12192*2438*2896 ☐ 12192*3000*2896 ☐ 13500*3000*2896 ☐ 15000*3200*3000
Noise Level@ 1m，dB(A)	77
@ 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

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CHP Unit performance data and manufacturing technology

CHP unit model	CG220-BG
Rated electric output power (kW)	220
Rated heat output power (kW)	269
Ratedelectric efficiency	40.2%
Ratedheat efficiency	49.1%
Rated total efficiency	89.3%
Hot water production @inlet 70℃/outlet 90℃[t/h]	11.8
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)	220	165	110
Heat power (kW)	269	202	135
Energy input (kW)	547	406	282
Electric efficiency	40.2%	40.6%	39.0%
Heat efficiency	49.1%	49.8%	47.9%
Total efficiency	89.3%	90.4%	86.9%

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	LSA46.3L10
Rated output power (kW)	252
Power factor	0.8
Rated current @ 400V and 100% load (A)	455
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	252 kW
400V	252 kW
415V	252 kW
440V	252 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	13.82
Compression ratio		11：1
Rated speed	rpm	1500
Rated output power	kW	252
Excess air factor		1.57
Rotation direction	Anti-clockwise viewed on flywheel	
Ignition timing	°BTDC	20

Cooling system

Coolant refilling capacity	L	16
Max. jacket water operating pressure	kPa	250
Min. jacket water circulation flow	L/min	350
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	84
Min. circulation flow HT	L/min	100
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	1221
Combustion air flow	kg/h	1050
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	53
Min. refilling capacity	L	30
Max. consumption	kg/h	0.16
Lubrication oil pump	Gear driven	

Ignition system

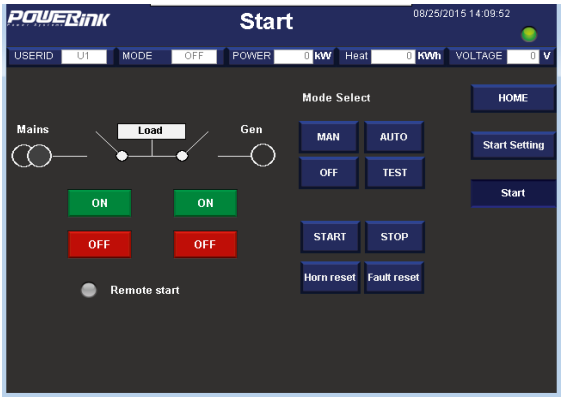
Ignition type	Electronic ignition system
Polarity	Negative earth
Spark plug	Separate for every cylinder

Energy balance and gas flow

Load	100%	75%	50%
Mechanical power, kW	252	189	126
Coolant heat, kW	117	104	89
Mixture heat HT, kW	13	4	0
Mixture heat LT, kW	16	13	8
Exhaust heat up to 120°C, kW	139	106	74
Max. radiation heat, kW	24	/	/
Energy input, kW	547	406	282
Combustion air flow, kg/h	1050	780	550
Fuel consumption, m^3/h	91	68	47
Exhaust gas flow,kg/h	1221	899	640

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 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
- Mains data：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 project
- Convenient remote monitor and service
- Simplified engine start/stop control
- Enhanced stability and safety

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

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Standard configuration

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

Optional configuration

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

Web: www.powerlinkworld.com

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