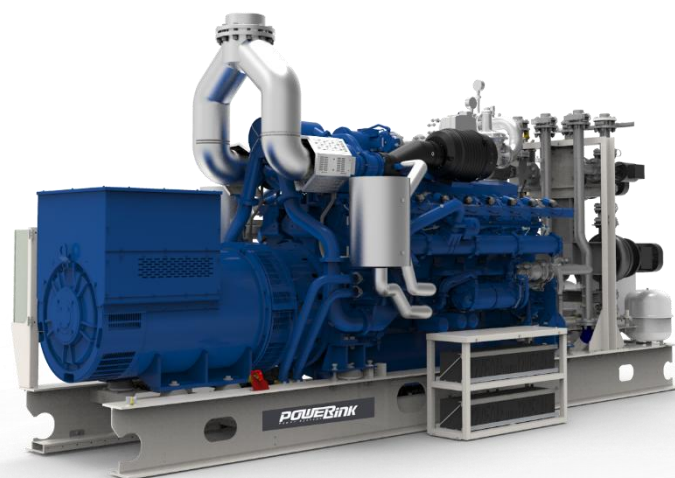


CG450-NG

Natural Gas CHP Unit

Standard Basic Module - Open Type

- Highly efficient gas engine and AC synchronous alternator
- Gas safety train
- Exhaust and jacket water heat exchanger
- Heating water and jacket water circulation system
- Advanced engine control system, including: ignition system, detonation control system ,speed control system , air/fuel ratio control system
- Strict shop test for all CHP unit
- 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
- Monitoring battery voltage and charging automatically
- Auto refilling oil system
- Bus interface for connecting to higher level control unit



Structure and control cabinet

Structure type	Open type
Canopy painting	High-class powder coating
Electrical control cabinet	Integrated ,IP54
Noise level @1m, dB(A)	101.3
@7m, dB(A)	88.8
@10m, dB(A)	83.8

Dimension and weight

Dimension (LxWxH) , mm	5300x2000X2100
Weight, kg	6900

Special statement :

- 1、The technical data are based on natural gas with a lower calorific value of 36MJ/Nm³.The technical data indicated is based on standard conditions according to ISO8528/1, ISO3046/1 and BS5514/1.
- 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、Technical data 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 and efficiency @50Hz

Electric power -kW	450	Electric efficiency	42.1%
Heat power-kW	527	Heat efficiency	49.3%
Fuel input-kW	1069	Total efficiency	91.4%

Fuel and emission

Fuel type	Natural gas
Methane number	MN>80
Excess air factor (Lambda)	1.46
Fuel consumption @100% load, m ³ /h	107
Supply gas pressure range, kPa	10~20
Emission without catalytic converter	
NOx , mg/Nm ³	<500mg/Nm ³
CO , mg/Nm ³	<650mg/Nm ³
HCHO (formaldehyde) , mg/Nm ³	<60mg/Nm ³
NMHC , mg/Nm ³	<150mg/Nm ³
Emission with catalytic converter (optional)	
NOx , mg/Nm ³	≤250

CG450-NG

Natural Gas CHP Unit

POWERink
Power Systems
We Produce Green Energy...

Standard Basic Module + Acoustic Attenuated Canopy (Optional)



Dimension and Noise Level

Canopy Size	5500*2180*2620mm
Noise Level@ 1m , dB(A)	87.3
@ 7m , dB(A)	78.6
@ 10m , dB(A)	74.1

- ☐ 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



Standard Basic Module + Acoustic Attenuated Container (Optional)



Dimension and Noise Level	
Optional container (mm) (customized container modeling service available)	<input type="checkbox"/> 6058*2438*2591
	<input type="checkbox"/> 12192*2438*2896
	<input type="checkbox"/> 12192*3000*2896
	<input type="checkbox"/> 13500*3000*2896
	<input type="checkbox"/> 15000*3200*3000
Noise Level@ 1m , dB(A)	85
@ 7m , dB(A)	76
@ 10m , dB(A)	72

- ☐ 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



CHP Unit performance data and manufacturing technology

CHP unit model	CG450-NG	Power and efficiency			
Electric output power (kW)	450	Load	100%	75%	50%
Heat output power (kW)	527	Electric power (kW)	450	338	225
CHP unit electric efficiency	42.1%	Heat power (kW)	527	395	264
CHP unit heat efficiency	49.3%	Energy input (kW)	1069	795	550
CHP unit total efficiency	91.4%	Electric efficiency	42.1%	42.5%	40.9%
Hot water production @inlet 70°C/outlet 90°C[t/h]	21.9	Heat efficiency	49.3%	49.7%	48.0%
Overload runtime at 1.1xSe(hour)	1	Total efficiency	91.4%	92.2%	88.9%
Steady-state voltage deviation	≤±1%	Manufacturing technology <ul style="list-style-type: none"> ● Special welded base frame, inner vibration isolators and design for whole lifting ● With high-class paint, enduring brightness as well resistance against abrasion and defacing ● Installation manual, operation and maintenance manual wiring program Standards and certificate <ul style="list-style-type: none"> ● ISO3046 , ISO8528 , GB2820 ● BS5000PT99 , AS1359 , IEC34 ● ISO9001:2008 quality system certification 			
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				

AC alternator performance data

Alternator brand	Leroy-Somer	Voltage	Power
Alternator model	LSA49.3S4A	380V	500kW
Rated output power (kW)	500	400V	500kW
Power factor	0.8	415V	500kW
Rated current @ 400V and 100% load (A)	902		
Excitation system	Brushless		
THF (BS EN60034- 1)	<2%		
Bearing number	2		
Winding material	100% copper		
Wiring connection	Series 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(°C)	40		
Rated stator temperature rise(°C)	125		

Efficient gas engine

General data

NO. of cylinders	12
Engine type	4-stroke, turbo charged and air to water cooled, lean burn
Cylinder arrangement	V-form
Bore x stroke	mm 128x142
Displacement	L 24.78
Compression ratio	12: 1
Rated speed	rpm 1500
Rated output power	kW 500
Excess air factor	1.46
Rotation direction	Anti-clockwise viewed on flywheel
Ignition timing	°BTDC 16

Cooling system

Coolant refilling capacity	L	30
Max. jacket water operating pressure	kPa	300
Min. jacket water circulation flow	L/min	650
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	130
Min. circulation flow HT	L/min	350
Coolant type	Mixture of 40% antifreeze and 60% clean fresh water. Lower ambient temperature, higher content of antifreeze.	

Induction/exhaust system

Exhaust flow	kg/h	2772
Combustion air flow	kg/h	2675
Exhaust temperature	°C	450
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	95
Min. refilling capacity	L	40
Max. consumption	kg/h	0.2
Lubrication oil pump	Gear driven	

Ignition system

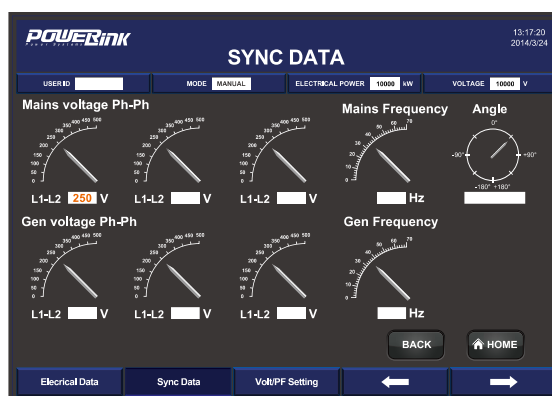
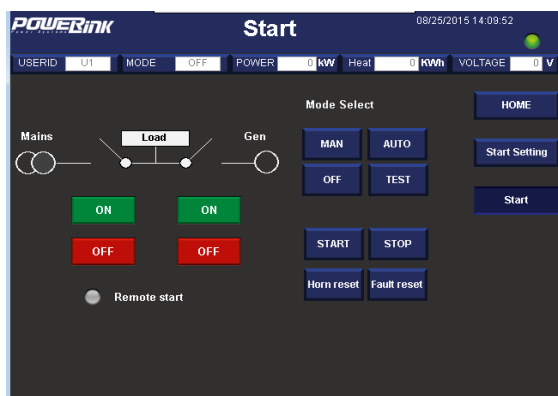
Ignition type	Electronic ignition system	
Polarity	Negative earth	
Spark plug	Separate for every cylinder	

Energy balance and gas flow

Load	100%	75%	50%
Mechanical power, kW	500	375	250
Coolant heat, kW	220	170	134
Mixture heat HT, kW	38	24	2
Mixture heat LT, kW	20	25	15
Exhaust heat up to 120°C, kW	269	210	140
Max. radiation heat, kW	50	/	/
Energy input, kW	1069	795	550
Combustion air flow, kg/h	2675	1895	1300
Fuel consumption, m³/h	107	80	55
Exhaust gas flow, kg/h	2772	1990	1378

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	Standard control functions	
Alternator protection <ul style="list-style-type: none">- 2xReverse power- 2xOverload- 4xOvercurrent- 1xOvervoltage- 1xUndervoltage- 1xOver/under frequency1xUnbalanced current	Power control <ul style="list-style-type: none">- RPM control(synchronization)- Power control(grid connection)- Load share(island)	Voltage control <ul style="list-style-type: none">- Voltage tracking (synchronization)- Voltage control(island)- PF control(grid connection)- Reactive power share (island)
	Lubrication control <ul style="list-style-type: none">- Auto refilling- Warning and monitoring	Pump control <ul style="list-style-type: none">- Cooling system- Emergency radiator
Busbar/mains protection <ul style="list-style-type: none">- 1xOvervoltage- 1xUndervoltage- 1xOver/under frequency- 1xPhase sequence- 1xROCOF alarm	Fan control <ul style="list-style-type: none">- Ventilation for engine room- Radiator fan- Emergency radiator fan	Valve control <ul style="list-style-type: none">- Cooling system- Heating system- Emergency radiator
	Engine protection <ul style="list-style-type: none">- Various routine and customized protection functions- Monitoring	

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 Coupling	AREP AC alternator H class insulation IP23 protection AVR voltage regulator PF control	Steel monocoque base frame Engine bracket Vibration isolators Alternator base	Air circuit breaker Paralleling control system 10-inch touch screen Communication interfaces Electrical switch cabinet
Gas supply system	Lubrication system	Standard voltage	Induction/ exhaust system
Gas safety train Air/fuel mixer	Oil filter Daily auxiliary oil tank Auto refilling oil system New and used oil tank (Only applicable to container , two inch with the daily oil tank)	380/220V 400/230V 415/240V 440/254V	Air filter Exhaust silencer Exhaust bellows Gas flowmeter Gas leakage protection(Only applicable to canopy and container)
Heat exchange system	Service and documents		
Exhaust heat exchanger Jacket water circulation pump Jacket water heat exchanger Mixture circulation pump Intercooler radiator Expansion tank, Shut-off valve Three-way auto proportional valve	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	Service and documents	Lubrication system	Exhaust system
Heavy duty air filter Backfire safety control valve Jacket water heater	Space heater Treatments against humidity and corrosion	Service tools Maintenance and service parts	Oil consumption gauge	Guard shield from touch Residential silencer Three-way catalytic converter
Canopy and base	Gas supply system	Heat exchange system	Electrical system	Voltage
SECC base frame	Gas flow gauge	Jacket water radiator		200V 220V 230V 240V