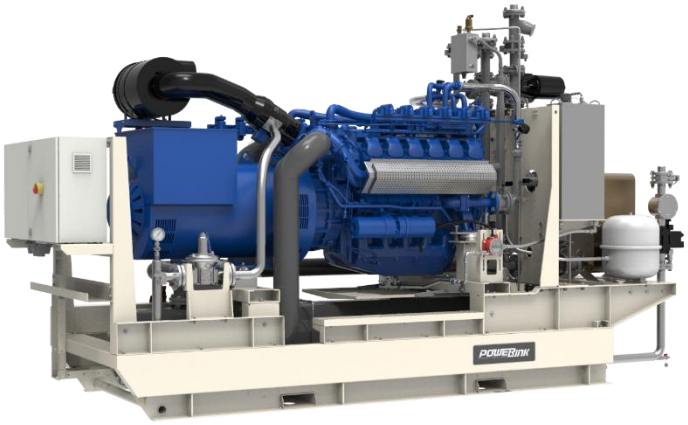
CG400-NG

Natural Gas CHP Unit

POWERINK Power Systems
We Produce Green Energy...

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)	101.6
@7m, dB(A)	89
@10m, dB(A)	83

Dimension and weight

Dimension (LxWxH) , mm	5200X2000X2100
Weight, kg	6400

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	400	Electric efficiency	38.6%
Heat power-kW	460	Heat efficiency	44.4%
Fuel input-kW	1036	Total efficiency	83.0%

Fuel and emission

Fuel type	Natural gas
Methane number	MN > 80
Excess air factor（Lambda）	1.58
Fuel consumption @100% load, m³/h	104
Supply gas pressure range, kPa	10~20
Emission without catalytic converter	
NOx , mg/Nm³	<500mg/Nm³
CO , mg/Nm³	<650mg/Nm³
HCHO (formaldehyde) , mg/Nm³	<60mg/Nm³
NMHC , mg/Nm³	<150mg/Nm³
Emission with catalytic converter (optional)	
NOx , mg/Nm³	≤250

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Standard Basic Module + Acoustic Attenuated Canopy (Optional)

Dimension and Noise Level

Canopy Size	5400*2050*2500mm
Noise Level@ 1m，dB(A)	87.4
@ 7m，dB(A)	76
@ 10m，dB(A)	71

- ☐ Modular designed and manufactured for plug and play
- ☐ Small indoor space required for installation
- □ Environmental friendly low emission
- □ 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 service available）	☐ 6058*2438*2591 ☐ 12192*2438*2896 ☐ 12192*3000*2896 ☐ 13500*3000*2896 ☐ 15000*3200*3000
Noise Level@ 1m，dB(A)	85
@ 7m，dB(A)	74
@ 10m，dB(A)	69

☐ 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	CG400-NG
Electric output power (kW)	400
Heat output power (kW)	460
CHP unit electric efficiency	38.6%
CHP unit heat efficiency	44.4%
CHP unit total efficiency	83.0%
Hot water production @inlet 70℃/outlet 90℃[t/h]	18.728
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)	400	300	200
Heat power (kW)	460	361	262
Energy input (kW)	1036	790	560
Electric efficiency	38.6%	38.0%	35.7%
Heat efficiency	44.4%	45.7%	46.8%
Total efficiency	83.0%	83.7%	82.5%

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 alternator performance data

Alternator brand	Leroy-Somer
Alternator model	LSA47.2M8
Rated output power (kW)	440
Power factor	0.8
Rated current @ 400V and 100% load (A)	794
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(℃)	40
Rated stator temperature rise(℃)	125

Voltage	Power
380V	440 kW
400V	440 kW
415V	440kW

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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	128×142
Displacement	L	21.93
Compression ratio		12 : 1
Rated speed	rpm	1500
Rated output power	kW	420
Excess air factor		1.58
Rotation direction		Anti-clockwise viewed on flywheel
Ignition timing	°BTDC	16

Cooling system

Coolant refilling capacity	L	23
Max. jacket water operating pressure	kPa	300
Min. jacket water circulation flow	L/min	628
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	70
Min. circulation flow HT	L/min	293
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	2097
Combustion air flow	kg/h	2022
Exhaust temperature	°C	433
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	90
Min. refilling capacity	L	40
Max. consumption	kg/h	0.2
Lubrication oil pump		Gear driven

Energy balance and gas flow

Load	100%	75%	50%
Mechanical power, kW	420	315	210
Coolant heat, kW	197	168	135
Mixture heat HT, kW	48	22	3
Mixture heat LT, kW	12	10	5
Exhaust heat up to 120°C, kW	215	171	124
Max. radiation heat, kW	35	23	15
Energy input, kW	1036	790	560
Combustion air flow, kg/h	2022	1511	1037
Fuel consumption, m^3/h	104	79	56
Exhaust gas flow, kg/h	2097	1568	1078
Exhaust gas temperature, ℃	433	451	467

Ignition system

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

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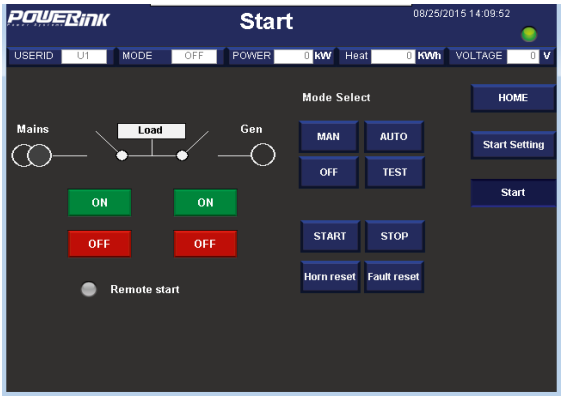
PCC-300 control system

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 - 2xReverse power - 2xOverload - 4xOvercurrent - 1xOvervoltage - 1xUndervoltage - 1xOver/under frequency 1xUnbalanced current	**Power control** - 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 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

POWERINK Power Systems
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