CG350-BG

Biogas CHP Unit

POWERLINK Power Systems

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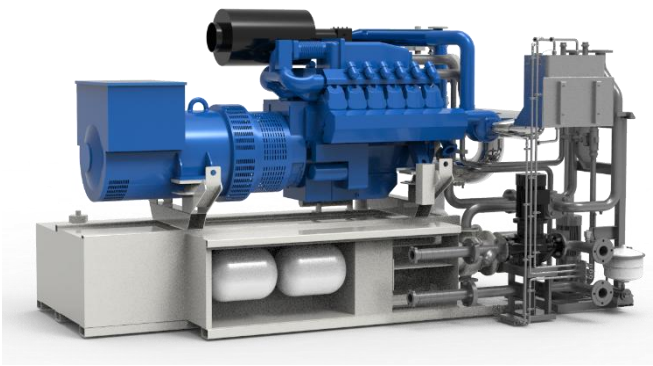
Standard Basic Module -Open Type

-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)	101
@7m, dB(A)	89.4
@10m, dB(A)	83.4

Dimension and weight

Dimension (LxWxH) , mm	4700x1600x2100
Weight,kg	5700

Power andefficiency @50Hz

Electric power -kW	350	Electric efficiency	39.3%
Heat power-kW	450	Heat efficiency	50.5%
Fuel input-kW	891	Total efficiency	89.8%

Fuel and emission

Fuel type	Biogas
Fuel composition	60%-CH_4/40%-CO_2
Methane number	MN > 100
Excess air factor（Lambda）	1.52
Fuel consumption @100% load, m^3/h	149
Supply gas pressure range, kPa	10~20
Emission without catalytic converter	
NOx , mg/Nm^3	<500mg/Nm^3
CO , mg/Nm^3	<850mg/Nm^3
HCHO (formaldehyde) , mg/Nm^3	<60mg/Nm^3
NMHC , mg/Nm^3	<50mg/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°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.

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Standard Basic Module + Acoustic Attenuated Canopy (Optional)

Dimension and Noise Level	
Canopy Size	5100*1700*2500mm
Noise Level@ 1m , dB(A)	87
@ 7m , dB(A)	75.2
@ 10m , dB(A)	70.2

- ☐ 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）	☐ 6058*2438*2591 ☐ 12192*2438*2896 ☐ 12192*3000*2896 ☐ 13500*3000*2896 ☐ 15000*3200*3000
Noise Level@ 1m，dB(A)	85
@ 7m，dB(A)	73
@ 10m，dB(A)	68

☐ 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	CG350-BG
Electricoutput power (kW)	350
Heat output power (kW)	450
CHP unit electric efficiency	39.3%
CHP unit heat efficiency	50.5%
CHP unit total efficiency	89.8%
Hot water production @inlet 70℃/outlet 90℃[t/h]	18.8
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)	350	263	175
Heat power (kW)	450	338	225
Energy input (kW)	891	662	459
Electric efficiency	39.3%	39.7%	38.1%
Heat efficiency	50.5%	51.0%	49.0%
Total efficiency	89.8%	90.7%	87.1%

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	LSA47.2M7
Rated output power (kW)	400
Power factor	0.8
Rated current @ 400V and 100% load (A)	722
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	400 kW
400V	400 kW
415V	400 kW

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Efficient gas engine

General data

NO. of cylinders		8
Engine type	4-stroke, turbo charged and air to water cooled, lean burn	
Cylinder arrangement		V-form
Bore x stroke	mm	132×157
Displacement	L	17.2
Compression ratio		13.6：1
Rated speed	rpm	1500
Rated output power	kW	370
Excess air factor		1.52
Rotation direction	Anti-clockwise viewed on flywheel	
Ignition timing	°BTDC	17°

Cooling system

Coolant refilling capacity	L	20
Max. jacket water operating pressure	kPa	300
Min. jacket water circulation flow	L/min	476
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	80
Min. circulation flow HT	L/min	150
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	1800
Combustion air flow	kg/h	1600
Exhaust temperature	°C	500
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	38
Max. consumption	kg/h	0.15
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	400	300	200
Coolant heat, kW	194	172	142
Mixture heat HT, kW	44	39	17
Mixture heat LT, kW	20	14	10
Exhaust heat up to 120°C, kW	212	173	131
Max. radiation heat, kW	38.5-	/	/
Energy input, kW	891	662	459
Combustion air flow, kg/h	1600	1300	890
Fuel consumption, m³/h	149	110	77
Exhaust gas flow,kg/h	1800	1400	990

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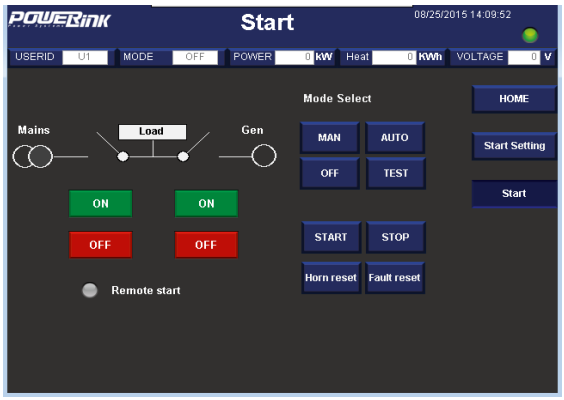
PCC-300 control system

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
- Grid 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 solution
- 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/ Grid 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 circuitbreaker PCC300 control system 10.4-inch touch screen Communication interfaces Breaker cabinet Mains floating charger Paralleling protection
Gas supply system	**Lubrication system**	**Standard voltage**	**Intake/ 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 Intercoolerradiator Emergencyradiator	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

POWERLINK 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