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# ecoGEN-10AG

## High efficiency COGENERATION Unit



Fuel	Natural Gas, LPG
Operation mode	Mains parallel operation
Electrical Output	<b>9,9 kW</b> (50% modulation range)
Thermal Output	<b>23,0 kW</b> (if T <sub>return</sub> < 40 °C)
Fuel consumption	36,2 kW (according ISO 3046-1 tol. 5%)
Total efficiency	91% (102,2% with condenser)
Electrical & Thermal efficiency	27,3% & 63,7% (74,9% with cond.)
Voltage	3x 400 VAC
Cos φ	0,98
Exhaust gas emissions (NOx/CO)	125/150 mg/Nm <sup>3</sup> (at 5% remainingO <sub>2</sub> )
Sound pressure level	55 dB/A (at 1m distance)
Exhaust gas temperature	max 85 °C
Return temperature	max 70 °C

ENGINE	
Brand & type	FORD ZSG 416
Cilinders	In line
Number of cilinders	4
Operation	4 stroke
Displacement	1,6 liters
Nominal eng speed	1540 rpm
Nominal power	15 kW

GENERATOR	
Type	Asynchronous
Cooling	Water cooled
Power	15 kW
Voltage	3x400 VAC
Frequency	50 Hz
Nominal current	26 A
Operating mode	Delta

DIMENSIONS, WEIGHT & HYDRAULIC CONNECTIONS			
Length	1340 mm	Flow connection	R ¾ "
Width	780 mm	Return connection	R ¾ "
Height	1218 mm	Exhaust gas connection	R 1 ¼ "
Weight	700 kg	Gas connection	R ½ "

### Construction

Folded steel bottom frame with watertight drip-tray. Engine and generator mounted on a base frame with vibration dampers. Three integrated heat exchangers: cooling circuit, exhaust collector and exhaust gases, and condenser. Separate electric control cabinet.

### Engine start-up

No electrical starter and batteries. The asynchronous generator is coupled as an engine (via electronic soft-start) and is used to start up the CHP-unit.

### Gas supply

Fuelling system including a pressure switch, pressure reducing valve, and 2 solenoid valves.

### Heating circuit

Integrated hot water exit temperature regulation. Taking return temperature readings via a three-way valve is not necessary.

### Acoustic and thermal insulation

The acoustic and thermal insulation is made of a perforated galvanised steel sheet, a sound absorber, and 50 mm of rock wool.

This all reinforced by an external housing of 1.5 mm thick painted steel sheet.

The cover and two face panels are removable for ease of maintenance.

### Load modulation.

The electric output can be modulated from 100% to 50% of the rated output. Partial-load operation is controlled by the return temperature or by an optional module that limits power generation in order to follow the electricity demand curve (ie to prevent grid injection)

### Exhaust system

Stainless steel two-stage exhaust gas exchanger mounted on the engine. Integrated catalytic converter and Lambda regulation. External silencer with standard connection kit.

### Optional Heat recovery condenser.

An optional heat recovery condenser can be ordered. Maximum heat recovery is achieved with return temperatures below 40 °C.



#### Control cabinet

Integrated relay and control box integrated in the module's cowling. External control and monitoring display unit for vertical mounting.

#### Programmable regulation unit

Multifunction programmable unit for displaying data, recording parameters, performing diagnostics, measuring output, and metering electric energy.

#### Functions

- Automatic start/stop function
- Operating safety functions
- Diagnostics
- Room thermostat function
- Programmable timer
- Constant output regulation
- Possibility of additional regulation of two external three-way valves
- Primary circuit temperature regulation by an external sensor
- .....

#### Protective features, engine & alternator:

- Engine overspeed detection
- Engine underspeed detection
- Oil pressure detection
- Engine overheating detection
- Exhaust overheating detection
- Water flow temperature monitoring
- Water return temperature monitoring
- Primary circuit leak detection
- Alternator overheating detection
- .....

#### Grid protection/cos $\Phi$ compensation

- Management of 3-phase mains protection according to SYNERGRID or VDE0126 standard.
- Condensers, cos  $\Phi$  compensation resistances included in the control box.

#### Outputs

- Fault signal
- Operating signal
- Secondary circuit circulation pump
- Gas EV charge control

#### Inputs

- External control (4-20 mA)
- External enable (dry contact)
- Accumulator temperature

#### Control switches

- Main power switch
- Programmable unit's keypad
- On switch

#### Display panel (backlit LCD graphic screen)

- Real-time electric output
- Generated electric energy
- Alternator current
- Operating hours counter
- Maintenance counter
- Engine temperature
- Exhaust gas temperature.
- Water flow temperature
- Water return temperature
- Boilers maximum temperature
- Faults and diagnostics
- .....

#### Options

- Controls for auxiliary boiler, 3-way valves, domestic hot water
- Remote control via Internet
- Self-consumption electricity generation
- .....

Remark: The reference measuring conditions are: Temperature: 20°C, elevation: 100 m.

The tolerances given are  $\pm 5\%$  for the thermal output and  $\pm 1\%$  for the electric output values.

The output values are reduced by 1% for every 100 m above sea level and by 2% for every 5°C above the reference values.

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