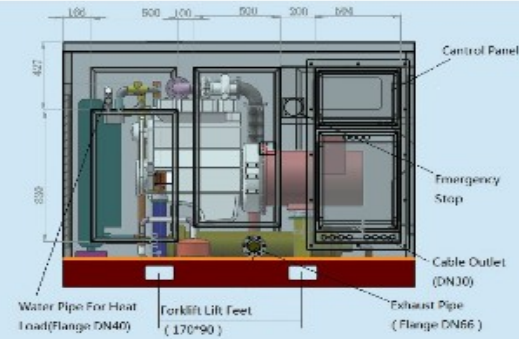




# Biogas Combined Heat & Power Systems

Phone: 0114 360 8355  
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## UFL Micro Biogas CHPs

The UFL Micro Biogas CHPs are based on the highly durable Petter industrial diesel engine. Low cost replacement parts are available worldwide.

This range of micro biogas CHPs has been designed to maximise reliability and durability to ultimately minimise operational expenditure and cost of ownership. Through clever design the need for several typically present components has been removed eliminating unnecessary failure opportunities and reducing cost. The design has also focussed on reducing overall system cost by eliminating the need for a booster pump and in some cases the need for gas storage systems also.

The electrical efficiency of this range of micro biogas CHPs has reached a level only previously possible on much larger machines. This has been achieved using proprietary technology which maximises the expansion stroke whilst maintaining a strong spark event. Other more traditional optimisations also contribute to the efficiency.

Three models are currently in production (others can be supplied on request):-

- The 3.8 kWe single phase biogas CHP (classed as a G83 device)
- The 5.7 kWe single or 3-phase biogas CHP (single phase model classed as a G59 device)
- The 11.4 kWe 3-phase biogas CHP (classed as a G83 device)

**Features supplied as standard:-**

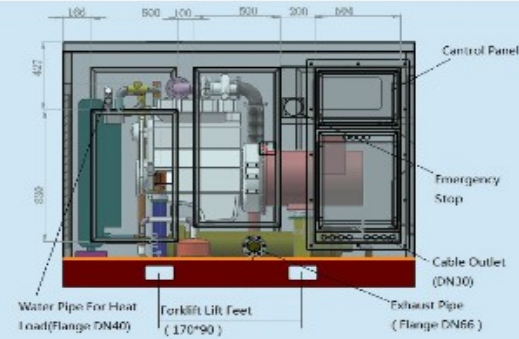
- Full heat recovery from both coolant and exhaust systems
- Built-in full-load dump radiator.
- Asynchronous induction generator head - simplifying the grid synchronisation process, making the connection significantly more reliable, and capable of tolerating poor quality grid supply/connection.
- Simple variable power output (gas consumption) control to accommodate a zero storage, gas consumption regime - lowering AD plant costs. The CHPs can also be configured to provide gas fuel suction, eliminating the need for booster pumps.
- A sophisticated UK designed and built, long dwell time, high energy, solid-state, inductive ignition system - designed to provide optimised combustion, maximum start and run reliability, and extended spark plug life (a major OPEX).
- High H<sub>2</sub>S tolerance and longer service intervals due to high capacity oil reservoir with oil level maintainer valve and innovative sump breather system.
- Stainless steel gas train with dual redundant low power solenoid safety valves.
- Stainless steel exhaust gas heat exchanger and secondary water circuit heat exchanger.





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- Zero airlock, pressure-tested coolant (primary) system with low power circulation pump, in-line strainer, pressure gauge, pressure relief valve, industrial expansion tank, and flexible drain pipe with ball valve for easy coolant replacement.
- Exhaust system with two (perpendicular) sections of flexible stainless steel braided pipe providing 3 dimensions of motion flexibility, low resistance wide radius elbow joints for maximum volumetric efficiency, and a lambda sensor port.
- Innovative reliable air/fuel ratio control system with power output ceiling limiting and variable power output based on fuel gas availability (as fuel availability decreases, so does the power output).
- Stainless steel flexible oil pipe system with screw-on cartridge oil filter and flexible drain pipe.
- Weather-proof, noise attenuating, single side servicing access enclosure with forklift access base, banded bottom with drain port and top mounted lifting eye fittings. The CHPs have been designed (730mm wide) to allow passage through standard door ways. The service side doors are removable when open.
- Water-tight control panel with safety/overload breakers, individually wired component breakers/fuses, fully compliant G59/3 mains protection relay configurable for any country's grid regulations, emergency stop switch, heavy duty motorised mains contactor and sophisticated CPU-based generator controller.

## Optional features:-

- Alternative voltages and frequencies to accommodate any country's grid requirements.
- Centrifugal oil filter instead of the screw-on cartridge filter.
- Coolant level sensor.
- Coolant flow rate sensor to allow measurement of thermal output.
- Compact, solid-state, low power dehumidifier.
- Stainless steel H<sub>2</sub>S removal system.
- SMS and/or internet monitoring and control.
- Additional sound proofing.
- Island mode (grid disconnected power generation).
- Scada data interface.
- Siloxane scrubber for landfill gas applications.
- Water-cooled generator head for increased heat recovery.
- Over-sized exhaust gas heat exchanger for increased heat recovery.
- Lockable enclosure doors.
- Unlimited choice of enclosure colour.

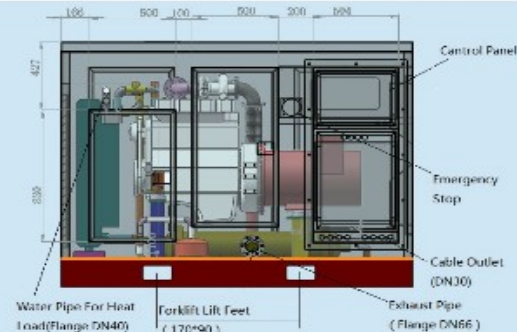




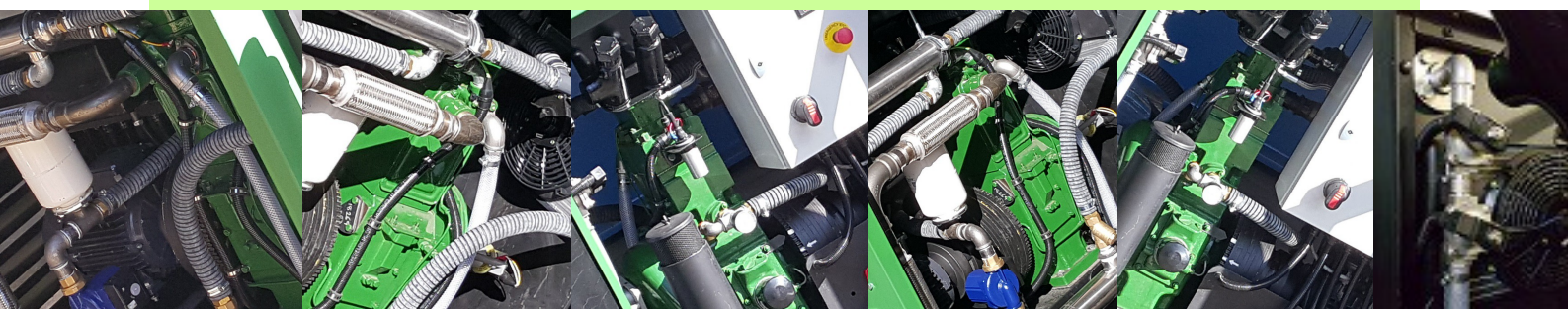


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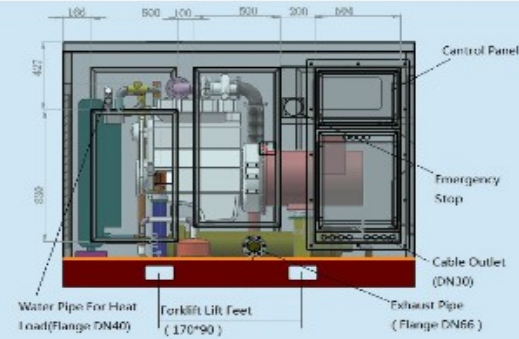
Model	UFLBG35	UFLBG57	UFLBG114
Maximum Power output (kW)	3.8	5.7	11.4
Electrical efficiency (%)	29	30	31
Maximum Heat Output (kW)	7.3	10.5	20.2
Overall Efficiency (%)	85	85	86
Gas (60% methane) consumption at full load (m <sup>3</sup> /hr)	2.2	3.2	6.1
Gas supply pressure (mbar)	-10 to 50		
Bore x Stroke (mm)	95 x 110	114.3 x 110	114.3 x 110
Number of cylinders	1	1	2
Total displacement (cc)	780	1130	2260
Phase	1	1 or 3	3
Voltage (V)	240	240 or 415	415
Current (A)	15.8	23.75 or 9	18
Rated (max) Current (A)	16	24 or 16	24
Frequency (Hz)	50		
Speed (rpm) approx	1514		
Nominal flow temperature (°C)	80		
Nominal return temperature (°C)	60		
Secondary circuit minimum flow rate (L/min)	5.2	7.5	14.5
N.B. Alternative flow and return temperatures can be accommodated by varying the secondary circuit flow rate			
Total oil capacity (L)	7		14
Dimensions LxWxH (mm)	1200x730x1360		1400x730x1360
Weight (kgs)	615	635	683
Noise at 1m (db)	79	82	84





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## Generator Controller

### Overview

The UFL micro biogas CHP controller is a solid-state CPU based sophisticated control system. It provides machine protection, control and monitoring. It incorporates a highly intuitive LCD display interface allowing all parameters (86 in total) to be modified via the front panel. This interface can also be password protected.

The controller has complete control of the CHP subsystems allowing it to control the gas solenoid valves, ignition system, the engine starter system, the CHP temperature management system and the grid connection relays.

The controller is easy to integrate with an AD system main controller providing remote start/stop, health status and error reporting via dedicated signal lines.

Remote monitoring and control via the internet or SMS is also available as an option.

### Engine Protection/Monitoring

The controller continually monitors:- engine coolant temperature, engine oil pressure, engine speed (over speed and under speed protection), oil reservoir tank level sensing, coolant level sensing (option), start attempt counter, running hours and service interval monitoring.

### Generator/Grid Protection/Monitoring

The controller continually monitors:- generator/grid voltage, current, power factor, and frequency. The controller will raise a fault if any of these values goes above or below a configurable predetermined set value.

On three phase models the controller will also monitor each phase individually and guards against phase imbalance.

The controller keeps a running total of kWhrs generated as well as the total active and reactive power.

### Warning/Fault Reporting

Any error situation can be categorised as either a warning or a fault. Faults will cause the controller to shut down the CHP. Warnings will be flagged but the CHP will be allowed to continue running. All faults and warnings are logged within the controller for later diagnosis and will be stored until they are actively deleted. Faults need to be reset before the CHP can be restarted. This can be achieved via the main AD system controller if necessary.







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