

ENER-G 150 (Low NOx) Natural Gas CHP Unit

Energy Balance and Load Data at Power Factor 1.0

		Units	100%	75%***	50%***
Electrical Output	(+/-3%)	kW	150	113	75
Electrical Efficiency (Net)	(+/-5%)	%	35.1%	32.8%	29.3%
Heat Output	(+/-10%)	kW	235	192	143
Thermal Efficiency (Net)	(+/-8%)	%	54.7%	55.8%	55.5%
Fuel Input (Net / Gross)*	(+/-5%)	kW	429 / 475	345 / 381	257 / 285
Total Efficiency (Net)	(+/-8%)	%	89.8%	88.6%	84.8%
Heat Output from Jacket Water	(+/-8%)	kW	155	132	100
Heat Output from Exhaust Gas @ 120°C	(+/-8%)	kW	79	61	43
Aftercooler Heat Output	(+/-8%)	kW	N/A	N/A	N/A
Radiated Heat Output	(+/-8%)	kW	17	12	7
Combustion Air Flow (35°C, 100 kPa, 30% RH)**	(+/-5%)	m³/h	459	369	275
Fuel Mass Flow ($\rho = 0.75\text{kg/Nm}^3$)	(+/-5%)	kg/h	32.2	25.9	19.3
Fuel Volume Flow (LHV = 10kWh/Nm³)	(+/-5%)	Nm³/h	42.9	34.5	25.7
Exhaust Mass Flow (Wet)	(+/-5%)	kg/h	564	452	338
Exhaust Volume Flow @ 120°C	(+/-5%)	m³/h	628	504	376

*Natural gas Net and Gross fuel input figures are based on 36MJ/Nm³ and 39.8MJ/Nm³ respectively. The Gross figure is used when establishing UK fuel costs. Net figures are provided for ease of performance comparison with other technologies. Fuel must comply with engine manufacturer's fuel quality guide, supplied separately.

**Engine technical data is based on Standard Conditions according to DIN ISO 3046-1 but engine de-rate applies when Combustion Air Temperature is >25°C.

*** If operating at part load for long periods of time, the unit should be run at full load for at least 5 hours in a given 24 hour period.

Engine Details

Manufacturer	ENER-G
Model	EGE-08V
Fuel Type	Natural Gas
Min. Methane Number	70
Cylinders	8
Aspiration	Natural
Speed	rpm 1500

Hot Water Details

Max. Water In/Out Temp.	°C	80/90
Max. Water Flow Rate*	l/s	5.78
Max. Glycol Content	%	30
Connection Size	mm	65
Flange Type		PN16
Pressure Loss**	kPa	15.8
Max. Working Pressure	Bar	9.75

* Assuming $C_p = 4.2\text{ kJ/kg}\cdot\text{K}$ and $\rho = 968.55\text{ kg/m}^3$

** Pressure loss figures stated are at max. water flow rate. Internal unit only.

Exhaust Details

Connection Size	mm	150
Flange Type		PN16
Outlet Temp***	°C	120
Allowable Backpressure	Pa	2340
Allowable Backpressure with Catalyst	Pa	1230

*** For engines with exhaust bypass, please request exhaust bypass temp. from Centrica Business Solutions.

Ventilation Details

Connection Size	mm	500
Ventilation Rate****	m³/s	1.75
Max. Air Inlet Temp.	°C	30
Max. Air Outlet Temp.	°C	45
Enclosure Pressure Drop	Pa	86

**** Vent rate is stated at max. air outlet temp, 100kPa

Generator Details

Manufacturer	Stamford
Model	UCDI274K-311
Type	Synchronous
Rating	kVA 250
Voltage	V 400
Phase	Ph 3
Frequency	Hz 50
Protection Class	IP23
Rated Power Factor	PF 0.8
Xd Dir. Axis Synchronous	2.55
X'd Dir. Axis Transient	0.119
X''d Dir. Axis Sub-Transient	0.078
T'' Sub-Transient Time Const	0.02
T'do O.C Field Time Const.	1.27
CHP Protection Device	A/Ph 280
Current Per Phase @ 0.80PF	A 268
Current Per Phase @ 0.95PF	A 229
Efficiency @ 0.80PF	% 93.5%
Efficiency @ 0.95PF	% 94.7%
Indicative Main Cable Size ^a †	mm² 120
Indicative Earth Cable Size ^b †	mm² 70

^a 4-Core XLPE/SWA/PVC to BS5467, Max 50 meters.

^b 1-Core 6491B to BS7211, Max 50 meters.

† Sizes and lengths based on IET 17TH Edition BS7671, Installation method 31.

Fuel Details

Connection Size	mm	40
Flange Type		PN16
Min/Max. Supply Pressure	mbar	20/55

Emissions @ 5% O₂

NOx	mg/Nm³	3798
CO	mg/Nm³	2088
NOx (With Catalyst)	mg/Nm³	<50
CO (With Catalyst)	mg/Nm³	<150

Weight Details

Enclosure (Dry)	STD/PREM.	See Sales Drawing
Container (Dry)	STD/PREM.	See Sales Drawing

Noise Data

Enclosure SPL @ 1m	SN/LN	dB(A)	70/63.62
Container SPL @ 1m	SN/LN	dB(A)	75/65

NB: Output figures are based on operation at DIN ISO 3046-1 conditions with the exception of exhaust output, which is quoted to 120°C/180°C for Natural Gas/Biogas respectively, figures are stated from manufacturer's declared performance figures subject to the manufacturer's tolerances and subject to change without notice. Values for de-rated units are estimates only. Energy balance data assumes perfect combustion. All information detailed is for guidance only and is subject to change without notice due to our commitment to continuous improvement - all values should be confirmed with Centrica Business Solutions on a project specific basis.

Noise Levels			
Standard Noise Enclosure dB(A)@1m	70	Standard Noise Container dB(A)@1m	70
Premium Noise Enclosure dB(A)@1m	65	Premium Noise Container dB(A)@1m	65
Note: Measured in free field conditions			
Operating point	Octave mean frequency (Hz)		Sound Pressure Level SPL @ 1m dB(L)
Exhaust Outlet Noise without Silencers	63	61	
	125	67	
	250	83	
	500	88	
	1000	94	
	2000	93	
	4000	86	
	8000	79	
Overall Sound Pressure Level SPL @ 1m dB(A)		97.7	

Note: for silencer insertion losses refer to silencer datasheets.

Ventilation Aperture Noise without Fan or Attenuator	63	50
	125	60
	250	75
	500	74
	1000	80
	2000	81
	4000	76
	8000	70
Overall Sound Pressure Level SPL @ 1m dB(A)		97.7

Note: for overall ventilation noise the ventilation fan noise must be added to the above figures before deducting the attenuator insertion losses.

