

Natural Gas CHP Range Guide 2017 UK & Ireland – Micro Scale ($\leq 25\text{kW}_e$)

Product Reference	Electrical Output kW_e	Engine Manufacturer	Engine Type	Aspiration Type	Total Heat Output kW_{th}	Fuel Input (LHV) kW	Fuel Input (HHV) kW	Max Return Operating Temp $^{\circ}\text{C}$	Overall Unit Efficiency (LHV)%
ENER-G E11R	11	Toyota	YH-ECP4	Natural	24	38	42	70	92
ENER-G E16R	16	Toyota	YH-ECP4	Natural	30	49	54	70	94
ENER-G E20R	20	Toyota	YH-ECP4	Natural	40	62.5	69	70	96
ENER-G E25R	25	Yanmar	46P98S-C	Natural	50	78	86	70	96

NB: Output figures are based on operation at ISO 3046 conditions with the exception of exhaust output, which is quoted to 95°C , figures are stated from manufacturer's declared performance figures subject to the manufacturer's tolerances and subject to change without notice. Output figures may vary under different operating regimes and site-specific characteristics. As such figures are shown for guidance only. Units built for 400V, 50Hz, 3 Phase operation. Overall unit efficiencies are based on the net fuel input (LHV) and generator efficiency at 1.0 power factor. Values for de-rated units are estimates only. Please refer to ENER-G for performance at other return operating temperatures.

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Natural Gas CHP Range Guide 2017 UK & Ireland – Small Scale ($\leq 530\text{kW}_e$)

Product Reference	Electrical Output kW_e	Engine Manufacturer	Engine Type	Aspiration Type	Output Break kW_b	Output Jacket Water kW_{th}	Output Exhaust Gas kW_{th}	Total Heat Output kW_{th}	Fuel Input (LHV) kW	Fuel Input (HHV) kW	Max Return Operating Temp°C	Overall Unit Efficiency (LHV)%
ENER-G 35M	35	MAN	E 0834 E 302	Natural	38	40	22	62	113	125	80	85.9
ENER-G 35M (Low NOx)	35	MAN	E 0834 E 302	Natural	38	40	22	62	113	125	80	85.9
ENER-G 50M	50	MAN	E 0834 E 302	Natural	54	46	33	79	148	164	80	87.5
ENER-G 50M (Low NOx)	50	MAN	E 0834 E 302	Natural	54	46	33	79	148	164	80	87.5
ENER-G 70M	71	MAN	E 0836 E 302	Natural	75	63	46	109	204	226	80	88.2
ENER-G 70M (Low NOx)	71	MAN	E 0836 E 302	Natural	75	63	46	109	204	226	80	88.2
ENER-G 90	90	ENER-G	EGE-06L	Natural	95	109	54	163	280	309	80	90.4
ENER-G 90 (Low NOx)	90	ENER-G	EGE-06L	Natural	95	109	54	163	280	309	80	90.4
ENER-G 100	100	ENER-G	EGE-06L	Natural	105	116	59	175	304	336	80	90.3
ENER-G 100 (Low NOx)	100	ENER-G	EGE-06L	Natural	105	116	59	175	304	336	80	90.3
ENER-G 110	110	ENER-G	EGE-06L	Natural	116	123	63	186	328	363	80	90.1
ENER-G 110 (Low NOx)	110	ENER-G	EGE-06L	Natural	116	123	63	186	328	363	80	90.1
ENER-G 125	123	ENER-G	EGE-06L	Natural	129	130	69	199	359	397	80	89.8
ENER-G 125 (Low NOx)	123	ENER-G	EGE-06L	Natural	129	130	69	199	359	397	80	89.8
ENER-G 135	135	ENER-G	EGE-08V	Natural	143	147	72	218	395	437	80	89.4
ENER-G 135 (Low NOx)	135	ENER-G	EGE-08V	Natural	143	147	72	218	395	437	80	89.4
ENER-G 150	151	ENER-G	EGE-08V	Natural	159	155	79	235	429	475	80	89.8
ENER-G 150 (Low NOx)	151	ENER-G	EGE-08V	Natural	159	155	79	235	429	475	80	89.8
ENER-G 165	165	ENER-G	EGE-12V	Natural	173	196	89	284	504	558	80	89.2
ENER-G 165 (Low NOx)	165	ENER-G	EGE-12V	Natural	173	196	89	284	504	558	80	89.2
ENER-G 185	185	ENER-G	EGE-12V	Natural	194	210	98	309	550	608	80	89.8
ENER-G 185 (Low NOx)	185	ENER-G	EGE-12V	Natural	194	210	98	309	550	608	80	89.8
ENER-G 210	210	ENER-G	EGE-12V	Natural	220	226	111	337	606	671	80	90.3
ENER-G 210 (Low NOx)	210	ENER-G	EGE-12V	Natural	220	226	111	337	606	671	80	90.3
ENER-G 230	229	ENER-G	EGE-12V	Natural	239	237	121	337	648	716	80	90.6
ENER-G 230 (Low NOx)	229	ENER-G	EGE-12V	Natural	239	237	121	357	648	716	80	90.6
ENER-G 250M	255	MAN	E 2848 LE 322	Turbocharged	265	150	145	321	680	752	80	84.7
ENER-G 310	310	Perkins	4006-23 TRS1	Turbocharged	322	152	205	357	820	907	80	81.4
ENER-G 310 250NOx	310	Perkins	4006-23 TRS1	Turbocharged	322	150	212	362	861	952	80	78.1
ENER-G 375	376	Perkins	4006-23 TRS2	Turbocharged	390	162	237	399	971	1,074	80	79.8
ENER-G 375 250NOx	376	Perkins	4006-23 TRS2	Turbocharged	390	165	253	418	1,026	1,135	80	77.4

NB: Output figures are based on operation at ISO 3046 conditions with the exception of exhaust output, which is quoted to 120°C, figures are stated from manufacturer's declared performance figures subject to the manufacturer's tolerances and subject to change without notice. Output figures may vary under different operating regimes and site-specific characteristics. As such figures are shown for guidance only. Units built for 400V, 50Hz, 3 Phase operation. Overall unit efficiencies are based on the net fuel input (LHV) and generator efficiency at 1.0 power factor. Values for de-rated units are estimates only. Generator efficiencies are taken from the manufacturer's graph at 0.95 power factor, electrical outputs are based on these efficiencies. Please refer to ENER-G for performance at other return operating temperatures. Datasheet Issue Date 02/09/2016

Natural Gas CHP Range Guide 2017 UK & Ireland – Small Scale ($\leq 530\text{kW}_e$)

Product Reference	Electrical Output kW_e	Engine Manufacturer	Engine Type	Aspiration Type	Output Break kW_b	Output Jacket Water kW_{th}	Output Exhaust Gas kW_{th}	Total Heat Output kW_{th}	Fuel Input (LHV) kW	Fuel Input (HHV) kW	Max Return Operating Temp°C	Overall Unit Efficiency (LHV)%
ENER-G 400M	405	MAN	E 2842 LE 322	Turbocharged	420	236	222	513	1,045	1,156	80	87.9
ENER-G 425	426	Perkins	4008-30 TRS1	Turbocharged	442	188	277	465	1,107	1,224	80	80.5
ENER-G 425 25ONOx	426	Perkins	4008-30 TRS1	Turbocharged	442	200	296	496	1,159	1,282	80	79.6
ENER-G 500	502	Perkins	4008-30 TRS2	Turbocharged	521	210	314	524	1,286	1,422	80	79.8
ENER-G 500 25ONOx	507	Perkins	4008-30 TRS2	Turbocharged	521	218	336	554	1,336	1,478	78	79.4
ENER-G 530M	532	MAN	E 3262 LE 202	Turbocharged	550	257	312	648	1,341	1,483	80	88.0
ENER-G 530 25ONOx	520	MAN	E 3262 LE 202	Turbocharged	539	270	329	688	1,368	1,514	78	88.2

NB: Output figures are based on operation at ISO 3046 conditions with the exception of exhaust output, which is quoted to 120°C, figures are stated from manufacturer's declared performance figures subject to the manufacturer's tolerances and subject to change without notice. Output figures may vary under different operating regimes and site-specific characteristics. As such figures are shown for guidance only. Units built for 400V, 50Hz, 3 Phase operation. Overall unit efficiencies are based on the net fuel input (LHV) and generator efficiency at 1.0 power factor. Values for de-rated units are estimates only. Generator efficiencies are taken from the manufacturer's graph at 0.95 power factor, electrical outputs are based on these efficiencies. Please refer to ENER-G for performance at other return operating temperatures. Datasheet Issue Date 02/09/2016

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Natural Gas CHP Range Guide 2017 UK & Ireland – Large Scale (>600kW_e)

ENER-G Large CHP Range Guide (400V 3ph & 500NOx/Nm³(1,2))

Product Reference	Electrical Output kW _e (400V) ^(3,6)	Generation Voltage (3-ph) V	NOx Emissions mg/Nm ³ (5% O ₂)	Methane Number MN ⁽⁴⁾	Output Break kW _e	Output Jacket Water kW _{th} ^(7,8)	Output Exhaust Gas kW _{th} ^(8,9)	Total Heat Output kW _{th}	Fuel Input (LHV) kW ⁽¹¹⁾	Fuel Input (HHV) kW ⁽¹²⁾	Steam Output kg/h ^(8,9,10)	Electrical Unit Efficiency (LHV) % ⁽¹³⁾	Thermal Unit Efficiency (LHV) % ⁽¹³⁾	Overall Unit Efficiency (LHV) % ⁽¹³⁾
ENER-G 770 500NOx	776	400	≤500	≥70 ⁽⁵⁾	800	401	422	823	1,832	2,026	534	42.4	44.9	87.3
ENER-G 850 500NOx	854	400	≤500	≥80	880	443	448	891	1,993	2,204	564	42.8	44.7	87.6
ENER-G 1010 500NOx	1,013	400	≤500	≥80	1,040	495	492	987	2,331	2,578	575	43.5	42.3	85.8
ENER-G 1165 500NOx	1,169	400	≤500	≥70 ⁽⁵⁾	1,200	600	628	1,228	2,731	3,020	795	42.8	45.0	87.8
ENER-G 1280 500NOx	1,286	400	≤500	≥80	1,320	664	659	1,323	2,974	3,289	852	43.2	44.5	87.7
ENER-G 1520 500NOx	1,523	400	≤500	≥80	1,560	712	691	1,403	3,438	3,802	852	44.3	40.8	85.1
ENER-G 1560 500NOx	1,560	400	≤500	≥70 ⁽⁵⁾	1,600	885	777	1,662	3,649	4,036	976	42.8	45.5	88.3
ENER-G 1710 500NOx	1,718	400	≤500	≥80	1,760	974	821	1,795	3,991	4,414	1,023	43.0	45.0	88.0
ENER-G 1950 500NOx	1,948	400	≤500	≥70 ⁽⁵⁾	2,000	1,048	1,016	2,064	4,555	5,038	1,285	42.8	45.3	88.1
ENER-G 2020 500NOx	2,028	400	≤500	≥80	2,080	965	936	1,901	4,573	5,058	1,159	44.3	41.6	85.9
ENER-G 2150 500NOx	2,145	400	≤500	≥80	2,200	1,161	1,078	2,239	4,990	5,519	1,356	43.0	44.9	87.9
ENER-G 2535 500NOx	2,535	400	≤500	≥80	2,600	1,186	1,212	2,398	5,751	6,361	1,426	44.1	41.7	85.8

ENER-G Large CHP Range Guide (400V 3ph & 250NOx/Nm³(1,2))

Product Reference	Electrical Output kW _e (400V) ^(3,6)	Generation Voltage (3-ph) V	NOx Emissions mg/Nm ³ (5% O ₂)	Methane Number MN ⁽⁴⁾	Output Break kW _e	Output Jacket Water kW _{th} ^(7,8)	Output Exhaust Gas kW _{th} ^(8,9)	Total Heat Output kW _{th}	Fuel Input (LHV) kW ⁽¹¹⁾	Fuel Input (HHV) kW ⁽¹²⁾	Steam Output kg/h ^(8,9,10)	Electrical Unit Efficiency (LHV) % ⁽¹³⁾	Thermal Unit Efficiency (LHV) % ⁽¹³⁾	Overall Unit Efficiency (LHV) % ⁽¹³⁾
ENER-G 770 250NOx	776	400	≤250	≥70 ⁽⁵⁾	800	416	443	859	1,883	2,083	562	41.2	45.6	86.8
ENER-G 850 250NOx	854	400	≤250	≥80	880	462	469	931	2,053	2,271	591	41.6	45.3	86.8
ENER-G 1010 250NOx	1,013	400	≤250	≥80	1,040	512	507	1,019	2,413	2,669	631	42.0	42.2	84.2
ENER-G 1165 250NOx	1,169	400	≤250	≥70 ⁽⁵⁾	1,200	622	652	1,274	2,795	3,091	826	41.8	45.6	87.4
ENER-G 1280 250NOx	1,286	400	≤250	≥80	1,320	690	687	1,377	3,054	3,378	863	42.1	45.1	87.2
ENER-G 1520 250NOx	1,523	400	≤250	≥80	1,560	743	713	1,456	3,551	3,927	878	42.9	41.0	83.9
ENER-G 1560 250NOx	1,560	400	≤250	≥70 ⁽⁵⁾	1,600	884	844	1,728	3,722	4,117	1,063	41.9	46.4	88.3
ENER-G 1710 250NOx	1,718	400	≤250	≥80	1,760	1,014	863	1,877	4,100	4,535	1,077	41.9	45.8	87.7
ENER-G 1950 250NOx								TBC						
ENER-G 2020 250NOx	2,028	400	≤250	≥80	2,080	1,010	969	1,979	4,748	5,251	1,196	42.7	41.7	84.4
ENER-G 2150 250NOx	2,145	400	≤250	≥80	2,200	1,215	1,123	2,338	5,126	5,669	1,415	41.8	45.6	87.5
ENER-G 2535 250NOx	2,535	400	≤250	≥80	2,600	1,245	1,183	2,428	5,933	6,562	1,455	42.7	40.9	83.7

- NOx number at 5% O₂. Lower levels than 250mgNOx/Nm³ requires additional ancillaries;
- Normal cubic meter is 1013.25mbar and 273.15K;
- Based on standard reference conditions according to ISO 3046-1: P_{atm} = 1000mbar, T_{atm} = 25°C & RH_{atm} = 30%;
- If the minimum methane number (MN) can't be attained, power de-rates will apply;
- Variant is available for high ambient temperatures with the second stage aftercooler at 53°C. This variant requires MN≥240 for same mechanical and electrical power output;
- Gross power as measured at the generator terminals at nominal voltage and frequency & PF = 1.00;

- Inclusive of recovered heat from engine block, lube oil and first stage aftercooler only (ie second stage aftercooler at 42°C omitted);
- Subject to ISO 3046 tolerances (+/- 8%);
- Exhaust heat recovered to 120°C;
- Estimated values based on 7bar_g dry saturated steam (T_{sat} = 170.43°C), boiler feedwater at 85°C & no economiser on boiler. The exact available steam needs to be calculated based on site conditions;
- Subject to ISO 3046 tolerances (+ 5%) using natural gas;
- Derived from LHV figure with additional 10.6% to allow for latent heat of vaporisation - this figure to be used for economic calculations;
- Calculation based off LHV gas figure.

Natural Gas CHP Range Guide 2017 UK & Ireland – Large Scale (>600kW_e)

ENER-G Large CHP Range Guide (11kV 3ph & 500NOx/Nm³(1,2))

Product Reference	Electrical Output kW _e (400V) ^(3,4)	Generation Voltage (3-ph) V ⁽⁵⁾	NOx Emissions mg/Nm ³ (5% O ₂)	Methane Number MN ⁽⁶⁾	Output Break kW _b	Output Jacket Water kW _{th} ^(8,9)	Output Exhaust Gas kW _{th} ^(9,10)	Total Heat Output kW _{th}	Fuel Input (LHV) kW ⁽¹²⁾	Fuel Input (HHV) kW ⁽¹³⁾	Steam Output kg/h ^(9,10,11)	Electrical Unit Efficiency (LHV) % ⁽¹⁴⁾	Thermal Unit Efficiency (LHV) % ⁽¹⁴⁾	Overall Unit Efficiency (LHV) % ⁽¹⁴⁾
ENER-G 1165 500NOx 11kV	1,165	11,000	≤500	≥70 ⁽⁷⁾	1,200	600	628	1,228	2,731	3,020	795	42.7	45.0	87.6
ENER-G 1280 500NOx 11kV	1,282	11,000	≤500	≥80	1,320	664	659	1,323	2,974	3,289	828	43.1	44.5	87.6
ENER-G 1520 500NOx 11kV	1,516	11,000	≤500	≥80	1,560	712	691	1,403	3,438	3,802	852	44.1	40.8	84.9
ENER-G 1560 500NOx 11kV	1,555	11,000	≤500	≥70 ⁽⁷⁾	1,600	885	777	1,662	3,649	4,036	976	42.6	45.5	88.2
ENER-G 1710 500NOx 11kV	1,711	11,000	≤500	≥80	1,760	974	821	1,795	3,991	4,414	1,023	42.9	45.0	87.8
ENER-G 1950 500NOx 11kV	1,948	11,000	≤500	≥70 ⁽⁷⁾	2,000	1,048	1,016	2,064	4,555	5,038	1,285	42.8	45.3	88.1
ENER-G 2025 500NOx 11kV	2,026	11,000	≤500	≥80	2,080	965	936	1,901	4,573	5,058	1,159	44.3	41.6	85.9
ENER-G 2150 500NOx 11kV	2,143	11,000	≤500	≥80	2,200	1,161	1,078	2,239	4,990	5,519	1,356	42.9	44.9	87.8
ENER-G 2535 500NOx 11kV	2,535	11,000	≤500	≥80	2,600	1,186	1,212	2,398	5,751	6,361	1,426	44.1	41.7	85.8

ENER-G Large CHP Range Guide (11kV 3ph & 250NOx/Nm³(1,2))

Product Reference	Electrical Output kW _e (400V) ^(3,4)	Generation Voltage (3-ph) V ⁽⁵⁾	NOx Emissions mg/Nm ³ (5% O ₂)	Methane Number MN ⁽⁶⁾	Output Break kW _b	Output Jacket Water kW _{th} ^(8,9)	Output Exhaust Gas kW _{th} ^(9,10)	Total Heat Output kW _{th}	Fuel Input (LHV) kW ⁽¹²⁾	Fuel Input (HHV) kW ⁽¹³⁾	Steam Output kg/h ^(9,10,11)	Electrical Unit Efficiency (LHV) % ⁽¹⁴⁾	Thermal Unit Efficiency (LHV) % ⁽¹⁴⁾	Overall Unit Efficiency (LHV) % ⁽¹⁴⁾
ENER-G 1165 250NOx 11kV	1,165	11,000	≤250	≥70 ⁽⁷⁾	1,200	622	652	1,274	2,795	3,091	826	41.7	45.6	87.3
ENER-G 1280 250NOx 11kV	1,282	11,000	≤250	≥80	1,320	690	687	1,377	3,054	3,378	863	42.0	45.1	87.1
ENER-G 1520 250NOx 11kV	1,516	11,000	≤250	≥80	1,560	743	713	1,456	3,551	3,927	878	42.7	41.0	83.7
ENER-G 1560 250NOx 11kV	1,555	11,000	≤250	≥70 ⁽⁷⁾	1,600	884	844	1,728	3,722	4,117	1,063	41.8	46.4	88.2
ENER-G 1710 250NOx 11kV	1,711	11,000	≤250	≥80	1,760	1,014	863	1,877	4,100	4,535	1,077	41.7	45.8	87.5
ENER-G 1950 250NOx 11kV								TBC						
ENER-G 2025 250NOx 11kV	2,026	11,000	≤250	≥80	2,080	1,010	969	1,979	4,748	5,251	1,196	42.7	41.7	84.4
ENER-G 2150 250NOx 11kV	2,143	11,000	≤250	≥80	2,200	1,215	1,123	2,338	5,126	5,669	1,415	41.8	45.6	87.4
ENER-G 2535 250NOx 11kV	2,535	11,000	≤250	≥80	2,600	1,245	1,183	2,428	5,933	6,562	1,455	42.7	40.9	83.7

- NOx number at 5% O₂. Lower levels than 250mgNOx/Nm³ requires additional ancillaries;
- Normal cubic meter is 1013.25mbar and 273.15K;
- Based on standard reference conditions according to ISO 3046-1: P_{atm} = 1000mbar, T_{air} = 25°C & RH_{air} = 30%;
- Gross power as measured at the generator terminals at nominal voltage and frequency & PF = 1.00;
- 6.6kV generation voltage also available.
- If the minimum methane number (MN) can't be attained, power de-rates will apply;
- Variant is available for high ambient temperatures with the second stage aftercooler at 53°C. This variant requires MN≥80 for same mechanical and electrical power output;

- Inclusive of recovered heat from engine block, lube oil and first stage aftercooler only (ie second stage aftercooler at 42°C omitted);
- Subject to ISO 3046 tolerances (+/- 8%);
- Exhaust heat recovered to 120°C;
- Estimated values based on 7bar_g dry saturated steam (T_{sat} = 170.43°C), boiler feedwater at 85°C & no economiser on boiler. The exact available steam needs to be calculated based on site conditions;
- Subject to ISO 3046 tolerances (+ 5%) using natural gas;
- Derived from LHV figure with additional 10.6% to allow for latent heat of vaporisation – this figure to be used for economic calculations;
- Calculation based off LHV gas figure.

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