

Perkins based INDUSTRIAL GAS ENGINES

Technical Data

Gas Engine

Basic technical data

Number of cylinders	6
Cylinder arrangement	Vertical, In line
Cycle	4 stroke, spark ignition
Induction system	Naturally aspirated
Compression ratio	13.0:1
Nominal bore	105 mm
Stroke	135 mm
Cubic capacity	7,0 litres
Direction of rotation	Anti-clockwise viewed on flywheel
Firing order	1, 5, 3, 6, 2, 4
Cylinder 1	Furthest from flywheel
Total weight of electro unit (engine only)	
- estimated total weight (dry)	788 kg
- estimated total weight (wet)	822 kg

Overall dimensions

- height	1142 mm
- length	1763 mm
- width	756 mm

Moment of inertia (GD²)

- Flywheel	0.27 kgm ²
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Ratings

This is defined in ISO3046 / 1 (BS5514 / 1 - 2002)
The tolerance for the specific fuel consumption is +5% at rated output. The tolerance for the usable heat is 7% at rated output. Ratings are based on maximum engine load.

Operating point

Engine speed	1500 rev/min
Ignition timing	22° BTDC

Fuel data

Lower calorific value	>30,000 kJ/Sm ³
Methane number	> 80
Density	0,833 kg/Sm ³

Test conditions

-air temperature	25 °C (77 °F)
-barometric pressure	100 kPa (29.5 in hg)
-relative humidity	30%
-natural gas LCV	31,65 MJ/Nm ³

Emissions at 100% load (Correlation 5 % O₂)

-NO _x	mg/Nm ³ < 8000
-CO	mg/Nm ³ < 6500
-Engine surface noise	dB (A) 98
-Exhaust sound power level	dB (A) 120

CHP NG KVT-E70SI QECCM

Energy balance $\lambda = 1$

KVT-E70SI - Cogeneration unit

Rating @ 1500 rev/min	Units	Metric		
		100%	75%	50%
Ignition timing	°BTDC	22	24	26
Energy in fuel	kW	209	164	124
Energy in power output (Net)	kW	75	56	38
Energy in exhaust back to 120°C	kW	42	33	24
Energy to coolant	kW	75	59	46
Energy to radiation	kW	17	16	16

Efficiency

KVT-E70SI - Cogeneration unit

Rating @ 1500 rev/min	Units	Metric		
		100%	75%	50%
Mechanical efficiency	%	35,9	34,1	30,6
Thermal efficiency	%	56,0	56,1	56,5
Total efficiency	%	91,9	90,2	87,1

Mass flows

All data is based on measured values. The tolerance for specific fuel consumption is +5% at rated output

KVT-E70SI - Cogeneration unit

Rating @ 1500 rev/min	Units	Metric		
		100%	75%	50%
Combustion air	Kg/h	260	204	155
Fuel	Kg/h	19,8	15,5	11,8
Exhaust gas mass flow rate wet	Kg/h	279,8	219,5	166,8
Exhaust gas temperature	°C	650	640	630

Note: All data based on a grid coupled CHP set

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Cooling system

Recommended coolant: 50% inhibited ethylene glycol or 50% inhibited propylene glycol and 50% clean fresh water. For combined heat and power systems and where there is no likelihood of ambient temperature below 10 °C, then clean 'soft' water may be used, treated with 1% by volume of Perkins inhibitor in the cooling system. The inhibitor is available in 1 litre bottles from Perkins.

Total coolant capacity (engine only) ... 21 litres
Maximum jacket water pressure in crankcase ... 1.5 bar

Jacket cooling water data	Units	1500 rev/min
Coolant flow	l/m	142
Coolant exit temperature (max)	°C	96
Coolant entry temperature (max)	°C	84

Shutdown switch setting... 105 °C
Recommended operating range... 84 / 90 °C

Lubrication system

Recommended lubricating oil: Lubricating oil requirements vary with fuel used. Full specifications including oil sampling and recommendations and condemnation limits appear on the fuel, coolant and lubricating oil recommendation sheet for the 1104 Series Gas Engines.

Lubricating oil capacity

Sump option ... G0002
Lubricating oil capacity total system ... 15,5 litres
Maximum sump capacity ... 14.9 litres
Minimum sump capacity ... 12.4 litres
Maximum engine operating angles
-front up, front down, right side or left side ... 25°
Lube oil consumption... 0.03 kg/h

Lubricating oil temperature

Maximum oil temperature ... 125 °C
Oil pump ... Gear driven
Shutdown switch setting... oil 0,90 bar falling

Exhaust system

Maximum permitted back pressure of the complete exhaust system is 4.0 kPa (40 mBar).

Fuel system

Recommended fuel: Natural Gas LHV at 31.6 MJ/m³. Other fuels may be used, for example landfill or digester gas. Ratings will vary from those shown.

Where fuels other than Natural Gas are being considered it is imperative that a full gas analysis (including details of any solid or liquid components) be obtained. Reference should be made to Koninklijke Van Twist Gas B.V. to determine suitability. Gas supplies must be filtered to the same standard as the engine intake air (i.e. Maximum particle size not to exceed 50 microns).

Gas supply pressure ... 1,5 kPa to 5 kPa at full rated flow
Carburetor type ... Woodward Venturi Mixer

Installation of gas supply and shut off valves to be in accordance with local regulations.

Ignition system

Primary system ... Woodward
Primary voltage ... 12 volts
Polarity ... Negative earth
Spark plug gap ... 0,3 mm
Ignition timing ... 22° BTDC

Electrical system

Type ... Insulated return
Starter motor ... 12 volts
Starter motor power ... 4.2 kW
Number of teeth on flywheel... 126
Number of teeth on starter motor ... 10
Minimum cranking speed ... 120 rev/min

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Version: May 2020

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