

TECHNICAL SUBMISSION

Varion C Power 50 High Temperature Combined Heat and Power Unit

General Description:

The Varion C Power 50 CHP High Temperature unit introduces a new era of heat and electrical power generation, with class leading efficiencies, A++ and low CO2 emissions

There are host of standard features in a supremely compact design. The unit is perfectly matched for commercial applications and is compatible with the Elco range of wall and floor mounted boilers.

The compact design assists with transport, handling and installation and the CHP engine.

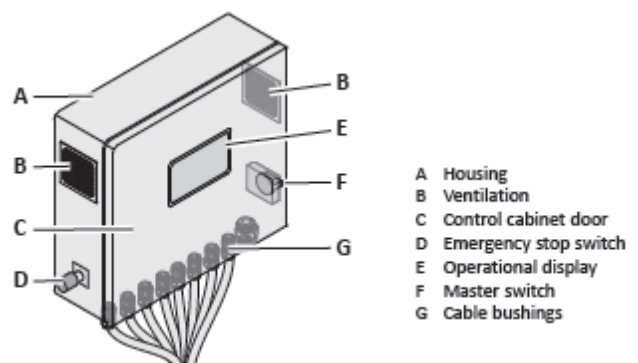
An incredibly low engine speed, combined with an acoustic reduction system, significantly reduces noise emissions. This allows the Varion C Power 50 Standard High Temperature engine to be installed in a variety of locations, without the need for additional attenuation.

The units have modulation control and can operate in parallel with a grid connection. Modulation allows the units output to match the changing demands of the installation.

The unit includes an integral touch-screen colour display for easy adjustment of settings. The operational characteristics of the units can be displayed graphically, in a real time display.

All Varion CHP units are equipped with a modem for remote monitoring, management and analysis of the unit via a smartphone or tablet. As standard, a 24 month mobile data allowance is supplied, which can be extended on request (with full service included). Data is stored on a secure server via live tracking for evaluation and support.

An integrated condensing unit offers overall net efficiencies up-to 90.9%.



Technical Data:

CHP Model	Varion C Power 50 High Temperature	
Technical Data		
Rated electrical output (1)	50.0	kW _e
Rated thermal output (2)	80.0	kW _{th}
Electrical power modulation range	25.0 – 50.0	kW _e
Thermal power modulation range	49.5 – 80.0	kW _{th}
Energy input at rated power	143.0	kW _{hi}
Consumption of Natural Gas (G20)	13.12	m ³ /h
Consumption of LPG (G31)	N/A	kg/h
CHP coefficient	0.63	
Primary energy factor f _{pe} (7)	0.216	
PES	27.2	%
ERP energy label (6)	N/A	
Noise level @ 1m (open field) (3)	65	dB(A)
Sound power level L _w	83	dB°C
Maintenance interval	3,000	hours
Efficiencies		
Electrical efficiency η _{el}	35.0	%
Thermal efficiency η _{th}	55.9	%
Overall efficiency η _{ges}	90.9	%
Operating Conditions		
Primary flow temp ±5°C	93	°C
Standard Thermal Spread ΔT ±5°C	83	°C
Ambient temp min - max	5 – 30	°C
Maximum water pressure	6	bar
Electrical Data		
Nominal voltage	400	V
Frequency	50	Hz
Nominal effective power P _{nG}	50.0	kW
Apparent power S _E max	62.5	kVA
Operating Voltage UnG	400	V
Line frequency	50	Hz
Power factor without compensation (Cos φ)	Synchronous	Cos φ
Compensation of reactive power	Synchronous	kVar
Steps of compensation	Synchronous	
Resonant frequency	Synchronous	
Cos φ acc to VDE-AR-N 4105 quadrants 11.111 (8)	0.8 – 1.0	Cos φ
Rated current I _r	90.2	A
Rated current I _r Cos φ	72.2	A
Rated apparent power S _{rE}	62.5	kVA
Short-circuit alternating current alternator I _k	1170.0	A
Grid short circuit power with UnG SK''	1.060	kVA
Startl current I _k	No starting current: Battery starting system	
Engine		
Manufacturer of engine	MAN	
Number of cylinders	4	
Displacement	4.6	l
Air ratio	1.0	λ
Type of engine oil	Elco/engine oil	
Engine oil volume	180	litres
Electric Generator		
Manufacturer of Generator	MARELLI	
Generator type	Synchronous	
Motor start-up	Not provided	
Rotational speed	1500	Rpm

Combustion/Ventilation Air		
Combustion air flow	183.0	m ³ /h
Ventilation air flow	1100.00	m ³ /h
Total air flow	1283.00	m ³ /h
Maximum air pressure loss (4)	150	Pa
Min/Max air temperature	5 – 30	°C
Min cross sectional area without resistance		cm ²
Exhaust Gas		
Maximum temperature of exhaust gas (5)	<150	°C
Exhaust gas temperature (nominal)	95	
Exhaust gas volume flow rate (wet)	193	Kg/h
Exhaust gas volume flow rate (dry)	156	Kg/h
Maximum exhaust gas pressure loss	500	Pa
Maximum exhaust gas pressure loss in cascade application	500	Pa
Emissions CO @ 5% O ₂ (TA-Luft DE)	18.0	mg/Nm ³
Emissions NO _x @ 5% O ₂ (EU 813/2013)	13.6	mg/kWh
Emissions NO _x @ 0% O ₂ (BREEAM UK - electrical)	51.1	mg/kWh
Dimensions L x W x H		
Weight	2587 x 822 x 1756	mm
	2250	Kg
Installation location		
	Internal	
Erp Data		
Erp Label (6)	N/A	
Erp energy input (6) (kWhHs)	158.7	%
Erp electrical efficiency (6) (η _{el})	31.5	%
Erp thermal efficiency (6) (η _{ges})	50.4	%
Erp overall efficiency (6) (η _{ges})	81.9	%
Class of room controller (6)	2	
P designh (6)	31.0	kW
QHE (6)	41.165	kWh
P _{SB} electrical power requirement in stand-by	0.07	kW
Electrical power requirement at partial load (6)	0.66	kW
Electrical power requirement at full load P _{el max} (6)	0.96	kW
P _{stby} CHP Thermal standing losses (6)	0.87	kW
Electrical consumption standby (6)	0.07	kW
η _S = η _{son} – Σ (F1-F5) (6)	155.5	kW
Rated electrical power	49.04	kWel

- (1) Data based on ISO 3046/1-2002 tolerance ± 5%
- (2) Data tolerance ± 8%
- (3) Measured at distance of one metre in front of unit
- (4) CHP Cabinet ventilation air does not need to be exhausted above roof level.
- (5) At primary return temperature of 35°C and optimum operating conditions ± 5%
- (6) Based on EU Regulation 811/2013; 813/2013
- (7) Fpe electricity = 2.8 regarding DIN V 18599, DIN V 4701-10, EnEv 2014 effective from 1/01/2016
- (8) Only when using the optional compensation (not required for Varion C Power 50 units)

Cabinet:	<p>Integrated for smooth CHP operation with the necessary control facilities for single, or cascade operation. Heating circuit control is included.</p> <p>Control panel dimensions (800x800x300). The connection cable is 3m in length</p>
Electrical connections:	<p>Supply to the control cabinet 5 No 35mm² max</p> <p>50m (fuse 100A slow)</p> <p>Clamping range 35mm²</p> <p>Temperature sensor cable: min 2-08 JY(ST)Y to 15m length</p> <p>Control cables for pump 3 x 1.5mm²</p> <p>RJ45 Patch cable in CHP connector</p>
Power factor correction:	Synchronous
Gas pressure	20 mBar Nat Gas – 50 mBar LPG – Dynamic Pressure ≥ 18 mBar
Regulations:	Compliance with relevant EU Directives for CE Certification
Connections:	<p>Gas ½" IG</p> <p>Heating flow 2" male thread PN3.0</p> <p>Heating return 2" male thread PN3.0</p> <p>Exhaust DN 80mm Ø DN 100mmØ after silencer</p> <p>Combustion air supply & cooling cabinet exhaust 200mmØ Inlet DN 150mmØ</p> <p>It is important that all connections to the CHP engine incorporate flexible couplings to provide vibration isolation.</p>
Operation:	<p>Mains parallel without emergency, heat leading</p> <p>Current use for the building with facility to feed back to the grid</p> <p>The CHP should charge a suitable sized primary buffer cylinder to prevent excessive switching.</p> <p>Transmission of operational data over internet connection.</p>
Display and counter/tracer:	<p>Operation of the internet control and monitoring programs via a touchscreen control interface. The interface consists of a 10.1 graphic display with visualised plant diagrams to assist with commission. Operational information and sensor readings can be obtained via the control interface. This information can also be reviewed and altered remotely.</p> <p>The control interface include a master switch, emergency stop, electric vehicle (Efz) charging data button and a maintenance button.</p>
Elco Support:	The operational history of the CHP unit can be monitored remotely and preventative maintenance can be completed without the need to visit site. Operational data is logged on daily, monthly and annual reports that can be used for evaluation and reporting
Water quality:	The CHP engine circuit should operate with a 40% glycol, 60% water solution and this must be maintained. The primary heating circuit must be clean and free from debris and contaminants. Reference should be made to the quality requirements of group 2 according to VDI 2035 9esp. Hardness <0.11 dH)

Scope of supply

Varion C-Power S50.0 HT Natural Gas CHP engine

Flue gas silencer ASD-K2 DN80

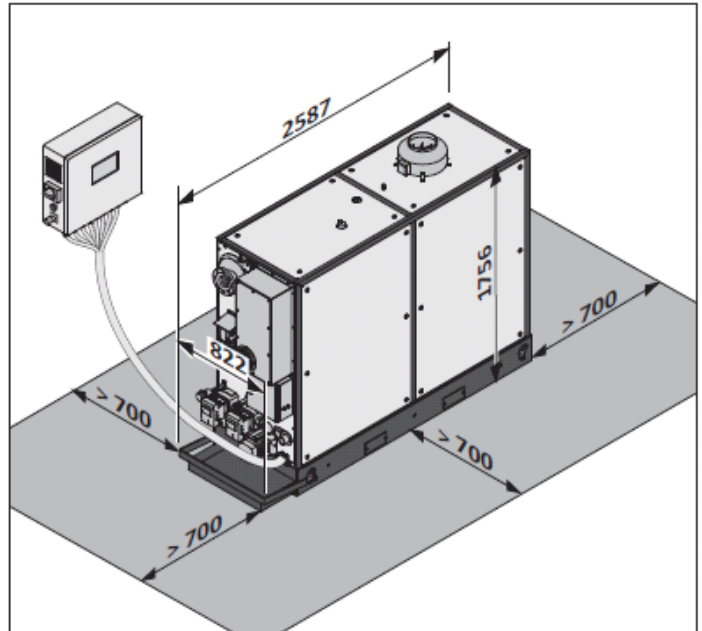
Module for data transfer MODBUS/TCP

Optional Equipment offered as standard

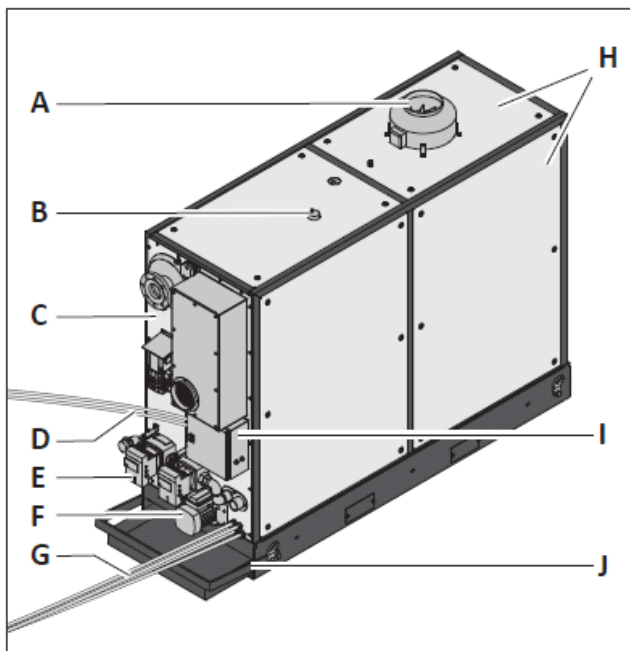
Reactive current compensator

Master/slave control of up-to three units

VARION® C-POWER 50.0 High temperature)



Clearance Requirements



- A "Exhaust air" connection (room-air dependent)
- B Ventilation
- C Type plate
- D Connection cable for calorific value heat exchanger¹
- E Secondary pump
- F Primary pump
- G Control cabinet wiring harness
- H Housing cover
- I Connection cabinet
- J Hoop guard

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¹ only with variant "VARION® C-POWER 50.0 Calorific value"