



TECHNOLOGY BROCHURE

CHP units for heat and power

VITOBLOC

**Combined heat and
power generation:**

Investing in greater
efficiency also means
investing in the future.



Investing in greater efficiency also means investing in the future.

Nowadays, decentralised energy production using cogeneration technology is one of the most economical options for obtaining power and heat in a way that protects natural resources. Its clear advantage over conventional separate generation is the significantly improved utilisation of primary energy. With virtually no loss of waste heat or transfer losses during export to power grids, combined heat and power (CHP) units offer a sustainable alternative when it comes to reducing CO₂ emissions and conserving valuable resources.

Moreover, the ecological effect is not the only benefit. Electricity and heating costs are significantly reduced, which brings a considerable economic advantage. The self-generated power is much cheaper than power drawn from the grid.

Viessmann CHP units are equipped as standard with starter batteries and a synchronous generator with digital voltage regulator, which allows continuous, stable, electrical island operation without the need for further measures.

The compact systems developed by Viessmann are designed for commercial and municipal use. Correspondingly, they have a high performance and are matched to the operational processes for a secure supply of electricity, heating/cooling and domestic hot water. So that your investment in greater efficiency is also an investment in the future. And vice versa. More information about these application areas can be found in this brochure.

CHP: decentralised generation of heat and power

Primary energy is mostly only used once, for example in order to generate power or heat. Combined heat and power generation allows dual usage of the energy, as CHP units supply power and heat at the same time.

CHP systems meet the requirements of the energy transition in a way that is virtually ideal. They are efficient and therefore cost effective, and can be used on practically any scale. Their efficiency is also significantly higher than that of other technologies.

Proven technology for an innovative energy supply

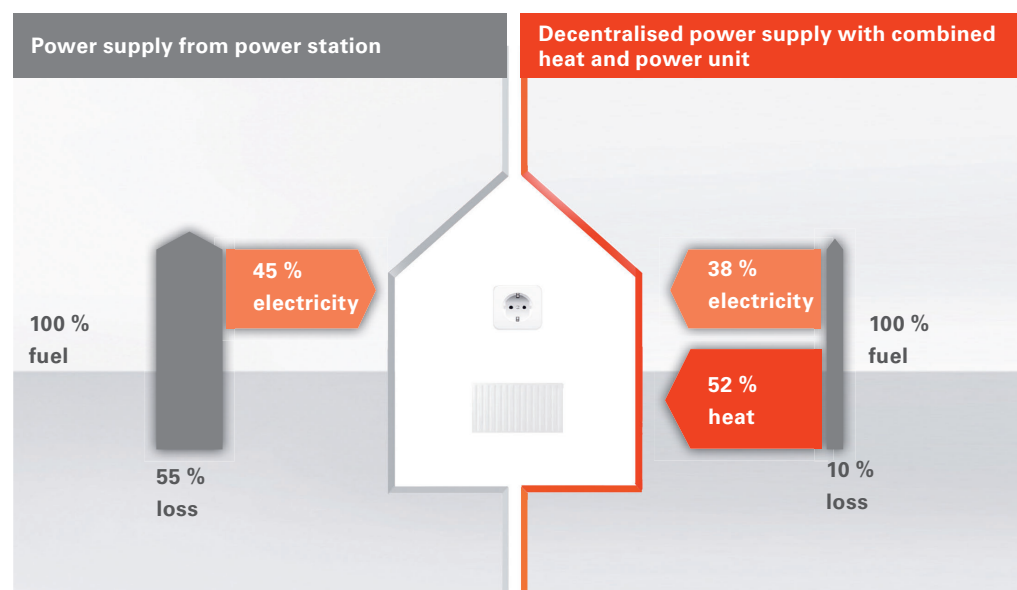
CHP units generate electrical energy and heat simultaneously according to the principle of cogeneration. A special piston engine designed for heavy duty cycles drives the generator to produce electricity.

Power: for self-consumption or exporting to the grid

Electricity for use on site is generated in units tailored to the respective requirement. Any power not required is exported to the public grid and the power supply utility provides remuneration accordingly.

Heat: efficient and with almost no losses

The heat generated in a combined heat and power unit is not lost, unlike with central power stations. It is fed into the heating network. Together with another heat generator, such as a heat pump, the building is supplied with power, heat and DHW with almost no losses. Also, the cooling demand can be completely or partially covered by coupling with an absorption refrigeration unit.



Central power stations usually only produce electricity. The accumulating heat is lost. In contrast, combined heat and power uses up to 34 percent less primary energy – which means a significant reduction in energy costs.



Viessmann CHP units achieve an overall efficiency of up to 107 percent (based on the net calorific value). Together with the simultaneous generation of heat and power, CHP units are therefore extremely efficient.

Use self-generated power yourself or export it to the grid?

Users achieve higher efficiency with CHP units if they use as close as possible to 100 percent of the power generated by the CHP unit themselves. In this case, the cost of the self-generated power is offset against the cost of electricity from the power supply utility. This leads to significant savings.

Meets the connection requirements of power supply utilities

The units meet the stringent current and future technical connection requirements of power supply utilities. Thanks to intelligent control, the power supply phase (cos phi) can be shifted via the software. This eliminates the need for additional hardware modifications. The certified CHP units are equipped with integral grid and system protection as standard and are designed for electrical island mode.

The figures say it all

The clear advantage of combined heat and power over conventional separate heat and power generation is the significantly better utilisation of primary energy. The overall efficiency of Viessmann CHP units is up to 107 percent (based on the net calorific value). With the Vitobloc 300 NG 20 (NG = natural gas), for example, the thermal efficiency of up to 75 percent is added to the electrical efficiency of over 32 percent.

A proven principle as the basis for many different applications

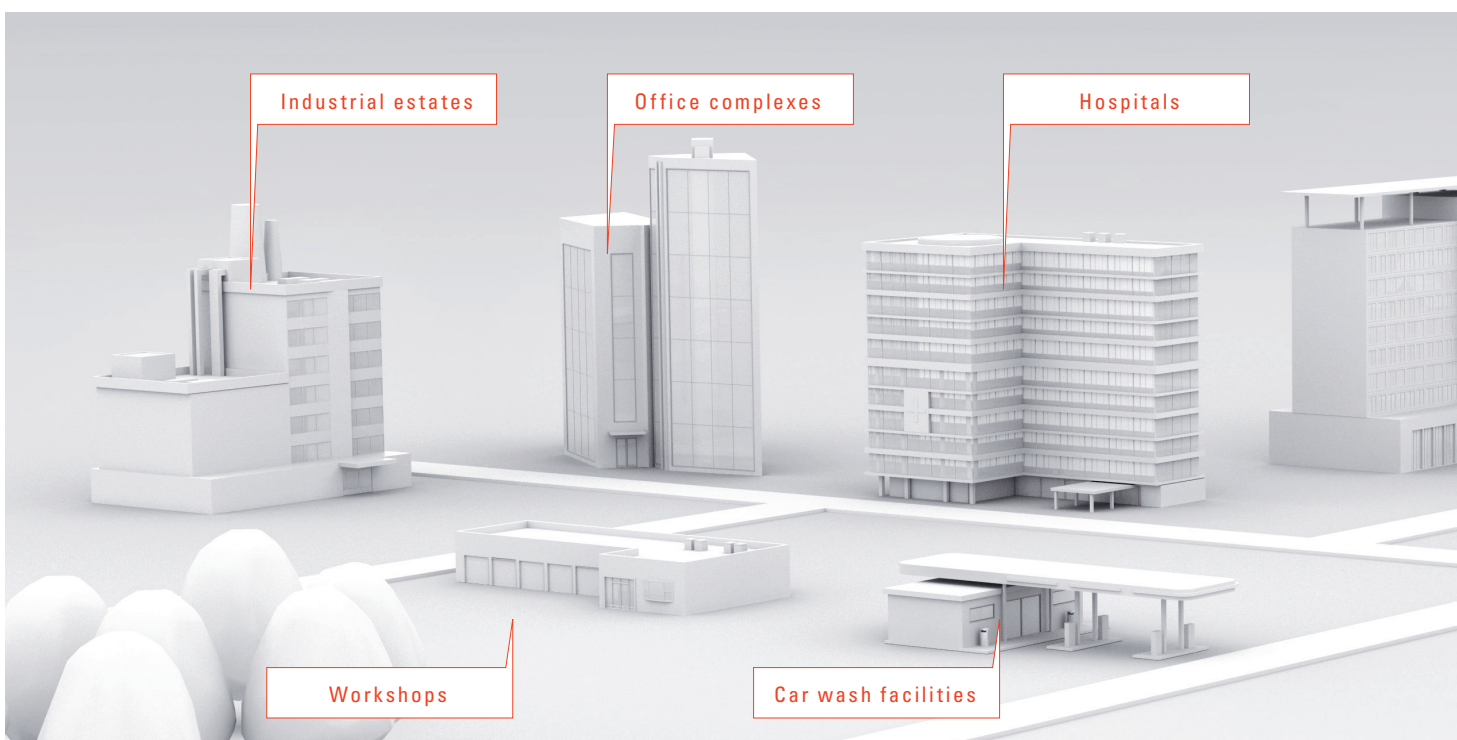
The Viessmann CHP units specially designed for commercial use really come into their own in applications where power and heat are required continually. The Vitobloc CHP units can also be run profitably in a flexible mode.

The costs of power and heat generation are now a significant factor for many commercial operations, production plants, municipal and cultural facilities, and residential complexes. CHP units offer huge savings potential in these sectors: with their highly efficient fuel usage and no transport losses, together with a considerable tax saving, they ensure low running costs and rapid amortisation of investments. In terms

of their output, they are specially designed for commercial facilities and residential complexes in which there is a permanent demand for heat and power.

Efficient energy generation is subsidised

There are numerous public subsidy programmes for investment in combined heat and power which make this technology particularly attractive.



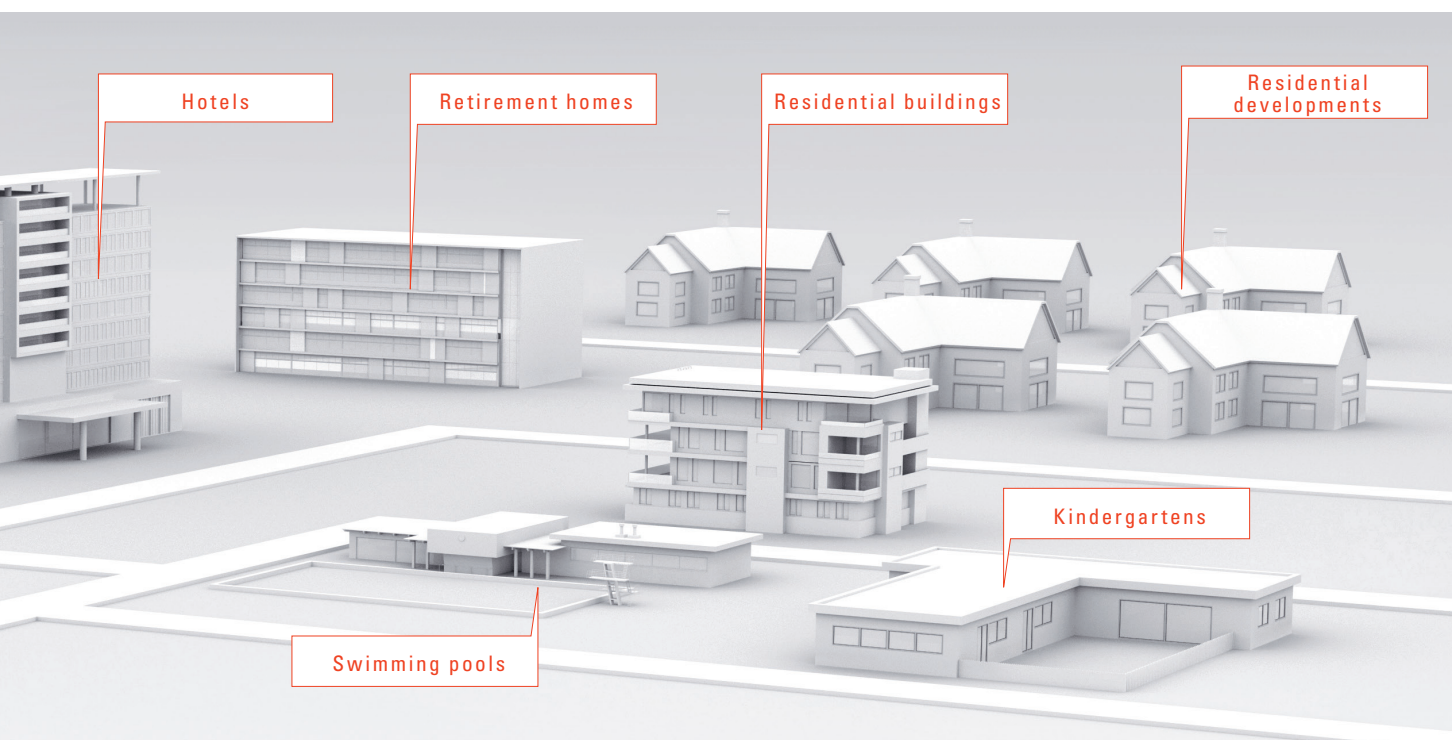
With more than 35 years' experience in this product area, Viessmann offers efficient systems for combined heat and power generation.

Viessmann offers various CHP unit output sizes as standard: from 15 to 530 kW_{el}. Thanks to this extensive gradation of output levels and the compactness of the units, the product range features the right system for any requirements.

CHP UNITS FOR HEAT AND POWER – WORTHWHILE IN THESE APPLICATIONS

- Feed-in to local and district heating networks
- Urban energy solutions
- Schools and educational institutions
- Kindergartens and nurseries
- Swimming pools, gyms and sports arenas
- Event venues
- Hospitals, clinics and large medical practices
- Industrial and commercial buildings
- Office and administration buildings
- Garages and service facilities
- Retirement homes and care homes
- Large residential buildings
- Complex residential developments
- Large agricultural operations
- Hotels and restaurants

CHP is worthwhile wherever there is a parallel demand for power and heat.



Tailor-made energy concepts for applications requiring a medium output

With Viessmann, you can rely on over 35 years of experience in the design, production and installation of efficient CHP systems.

Viessmann is one of the leading international manufacturers of heating, industrial and refrigeration systems. When it comes to CHP units too, the company offers customised solutions with efficient systems and a broad range of outputs – for every need and application. CHP units from Viessmann impress with their high quality and good system integration. This means that users can always be sure that their investment will pay off.

Complete supplier: simply more efficient by design

CHP units are at the heart of an efficient power and heat supply. However, their efficiency is only fully realised in a well thought-out system. So it's good to know that, as a complete supplier, Viessmann offers the full range of system technology.

Supply systems from Viessmann range from CHP units, heat pumps, photovoltaics, battery systems and biomass boilers to higher-level building management systems. An unbeatable combination!



Vitobloc 300 CHP units (type NG 15 and NG 20): completely ready-to-connect and factory-tested compact units save time and costs for design, installation and commissioning.



| H₂ READY · 20%

Vitobloc CHP units for generating power and heat

Vitobloc 300 NG 15 and NG 20 can now be operated with up to 20 % hydrogen in the natural gas.

High levels of efficiency included

CHP units from Viessmann have an impressive level of efficiency. The Vitobloc 300 and Vitobloc 200 allow particularly easy maintenance with intervals of up to 8000 hours without an oil refill. Some have integrated condensing technology and achieve overall efficiency of up to 107 percent. They are up to 50 percent electrically modulated and can be run with both heat-led and power-led operation.

Other plus points for the Vitobloc 300 and Vitobloc 200 CHP units are the extensive technical equipment with flexible connections for gas, exhaust gas, extract air and heating water, as well as the standard silencer hood for significantly reduced operating noise.

TAKE ADVANTAGE OF THESE BENEFITS

- + Experience: more than 6000 installed systems with over 350 MW electrical output
- + Low incidental costs: the systems are designed for minimal complexity in planning and installation
- + Modulation ability: Vitobloc CHP units allow both power-led and heat-led operation
- + Safety: integral hydraulic system separation
- + Island mode for power: prepared as standard
- + Public power grid: grid operators' connection conditions for access are met as standard
- + High availability: long maintenance intervals and large oil volume
- + Tested quality: every unit undergoes a thorough factory test run
- + Operational reliability: proven remote monitoring and automation concepts
- + Service quality: extensive customised or standardised service concepts



VITOBLOC 300

Unit NG 15

Outputs: 15 kW_{el}, 38.3 kW_{th}
Overall efficiency for operation
with natural gas: 106.6 % (H₂) [net cv]

Unit NG 20

Outputs: 20 kW_{el}, 46.5 kW_{th}
Overall efficiency for operation
with natural gas: 107.3 % (H₂) [net cv]

Fuel: natural gas, LPG,
blends of 20 % hydrogen in natural gas
4-cylinder 4-stroke gas engine with
3-way catalytic converter
Water-cooled three-phase synchronous
generator
Energy efficiency class: A+++



VITOBLOC 200

Unit EM-50/81

Outputs: 50 kW_{el}, 83 kW_{th}
Overall efficiency: 90.3 % (H₂) [net cv]
4-cylinder 4-stroke gas engine with
3-way catalytic converter

Unit EM-70/115

Outputs: 70 kW_{el}, 117 kW_{th}
Overall efficiency: 90.7 % (H₂) [net cv]
6-cylinder 4-stroke gas engine with
3-way catalytic converter

Fuel: natural gas
Three-phase synchronous generator

CHP UNIT WITH INTEGRAL CONDENSING TECHNOLOGY

Vitobloc 300 (type)		NG 15		NG 20	
Return temperature	°C	30 to 85		30 to 85	
Length	mm	2068		2068	
Width	mm	760		760	
Height	mm	1550		1550	
Weight	kg	880		880	
Gas type		Natural gas	LPG	Natural gas	LPG
Electrical output	kW _{el}	15.0	15.0	20.0	20.0
Thermal output	kW _{th}	38.3	37.0	46.5	45.0
Fuel use	kW _{fuel}	50.0	50.7	62.0	63.4
Electrical efficiency	%	30.0	29.6	32.3	31.7
Thermal efficiency	%	76.6	72.9	75.0	71.4
Overall efficiency	%	106.6	102.5	107.3	103.1
Power index		0.384	0.398	0.424	0.438
Primary energy factor fPE		0.360	0.394	0.279	0.323
Primary energy saving PEE	%	32.3	29.9	33.7	31.0
Number/arrangement of cylinders		4/inline		4/inline	
Process		Lambda = 1		Lambda = 1	
Vitobloc 200 (type)		EM-50		EM-70	
Length	mm	2800		2800	
Width	mm	860		860	
Height	mm	1700		1700	
Weight	kg	2000		2100	
Electrical output	kW _{el}	50		70	
Thermal output	kW _{th}	83		117	
Fuel use	kW _{fuel}	145		204	
Electrical efficiency	%	34.5		34.3	
Thermal efficiency	%	57.2		57.4	
Overall efficiency	%	91.7		91.7	
Power index		0.593		0.590	
Primary energy factor fPE		0.262		0.267	
Primary energy saving PEE	%	26.58		26.45	
Flow temperature max.	°C	93		92	
Return temperature max.	°C	75		75	
Number/arrangement of cylinders		4/inline		6/inline	
Process		Lambda = 1		Lambda = 1	



VITOBLOC 200

Unit EM-100/173

Outputs: 99 kW_{el}, 173 kW_{th}
Overall efficiency: 93.8 % (H₂) [net cv]

Unit EM-134/202

Outputs: 134 kW_{el}, 202 kW_{th}
Overall efficiency: 90.6 % (H₂) [net cv]

Unit EM-140/207

Outputs: 140 kW_{el}, 209 kW_{th}
Overall efficiency: 90.9 % (H₂) [net cv]

Fuel: natural gas
6-cylinder 4-stroke gas engine with
3-way catalytic converter
Three-phase synchronous generator



VITOBLOC 200

Unit NG 260

Outputs: 263 kW_{el}, 416 kW_{th}
Overall efficiency: 94.2 % (H₂) [net cv]

Fuel: natural gas
12-cylinder 4-stroke gas engine with
3-way catalytic converter
Three-phase synchronous generator

Version ST

Standard version

Version HT

High temperature version

Version MT

Version without exhaust gas heat exchanger



VITOBLOC 200

Unit EM-430/580

Outputs: 435 kW_{el}, 581 + 33 kW_{th}
Overall efficiency: 89.7 % (H₂) [net cv]

Unit EM-530/660

Outputs: 530 kW_{el}, 643 + 45 kW_{th}
Overall efficiency: 90.3 % (H₂) [net cv]

Fuel: natural gas
12-cylinder 4-stroke gas engine
with oxidation catalytic converter
Three-phase synchronous generator
Units also available as SCR and
SCR-ready versions.

CHP UNIT WITH NATURALLY ASPIRATED ENGINE FOR NATURAL GAS

Vitobloc 200 (type)		EM-100	EM-134	EM-140	NG 260
Length	mm	3400	3400	3400	3583
Width	mm	900	900	900	1600
Height	mm	1700	1700	1700	2000
Weight	kg	3420	3420	3420	5600
Electrical output	kW _{el}	99	134	140	263
Thermal output	kW _{th}	173	202	209	416
Fuel use	kW _{fuel}	291	371	384	721
Electrical efficiency	%	34.4	36.1	36.5	36.5
Thermal efficiency	%	59.4	54.5	54.4	57.7
Overall efficiency	%	93.8	90.6	90.9	94.2
Power index		0.578	0.66	0.661	0.618
Primary energy factor fPE		0.292	0.189	0.171	0.176
Primary energy saving PEE	%	28.13	26.84	27.21	29.08
Flow temperature max.	°C	93	93	94	92
Return temperature max.	°C	75	75	75	75
Number/arrangement of cylinders		6/inline	6/inline	6/inline	12/V
Process		Lambda = 1	Lambda = 1	Lambda = 1	Lambda = 1

CHP UNIT WITH TURBO ENGINE FOR NATURAL GAS

Vitobloc 200 Type		EM-430	EM-430 SCR	EM-430 SCR-ready	EM-530	EM-530 SCR	EM-530 SCR-ready
Length	mm	3982	3982	3982	3982	3982	3982
Width	mm	1600	1600	1600	1600	1600	1600
Height	mm	2000	2000	2000	2000	2000	2000
Weight	kg	7300	7100	7100	7300	7100	7100
Electrical output	kW _{el}	435	435	435	530	505	515
Thermal output	kW _{th}	581 + 33	281 + 32	308 + 33	643 + 45	321 + 40	339 + 44
Fuel use	kW _{fuel}	1169	1090	1169	1348	1258	1316
Electrical efficiency	%	37.2	39.3	37.2	39.3	40.1	39.1
Thermal efficiency	%	49.7	25.8	26.3	47.7	25.5	25.8
Overall efficiency	%	89.7	65.7	63.5	90.3	65.7	64.9
Power index		0.749	1.513	1.378	0.810	1.545	1.492
Primary energy factor fPE		0.158	0.030	0.310	0.038	-0.014	0.092
Primary energy saving PEE	%	25.30	12.01	7.82	26.58	12.18	10.69
Flow temperature max.	°C	90	85	85	90	85	85
Return temperature max.	°C	70	75	75	70	75	75
Number/arrangement of cylinders		12/V Lean turbo with mixture cooling	12/V Lean turbo with mixture cooling	12/V Lean turbo with mixture cooling	12/V Lean turbo with mixture cooling	12/V Lean turbo with mixture cooling	12/V Lean turbo with mixture cooling
Process							

A comprehensive offering for every system – from design through to full service

CHP units from Viessmann are team players. They achieve their highest efficiency in a system that is individually matched to the respective requirements. This starts with system technology, e.g. with control cabinets for higher-level control functions, and extends to customised maintenance contracts.

Customised efficiency: tailor-made control cabinets, proven software

The technology required in the control cabinet is different for practically every CHP unit. Viessmann offers made-to-measure control cabinets and the appropriate software for every application: programmable logic control (PLC), automation, grid connection, auxiliary drives, control or power units.

Our in-depth experience pays off for users: every system is precisely tailored to the conditions of the specific application, which guarantees optimum efficiency and reliability. This applies especially to modernisation of existing combined heat and power systems, but also to smaller boiler house control systems with remote monitoring.

Commissioning: efficient from the outset

Many parameters need to be taken into account when commissioning a CHP unit. The process begins with ensuring the right site for the system and includes everything from informing the grid operator to performing the required installations and connection to the existing infrastructure. The experts at Viessmann are there for you at every stage of the commissioning process – from tailoring to your individual requirements to fine parameterisation. Thanks to this, you can count on high availability of your system right from the outset. In addition, all Viessmann systems are network compatible. This means that both you and Viessmann engineers can view the status of your CHP unit at any time and intervene at an early stage if necessary.

Before delivery, every CHP unit must demonstrate proven performance in test runs that reflect real operating conditions. The specified output values are documented for each individual unit.



**Customer oriented:
optional services to suit your
exact needs**

From commissioning and training to full operational management – Viessmann offers you a complete portfolio of services. Users can assemble their own individual service package from the options available, according to their particular demands and requirements.

**Training:
rely on the expertise of your
contractor**

Viessmann offers a seminar on planning CHP units for design engineers and heating contractors.

A specialist CHP design engineer supports users with economic viability and sizing calculations.

**Project planning:
full support from the start**

The specialists at Viessmann are on hand at all times to assist your trade partner with design and project planning. They help with all questions regarding sizing based on energy consumption data, viability analyses or applications for state subsidies.



Viessmann service technicians have extensive knowledge and lots of experience – so that everything goes smoothly on site.

**Comprehensive service:
maintaining value over the
long term**

Regular inspection and maintenance ensures that your CHP unit system retains its value. Viessmann has drawn up various maintenance contracts which can be tailored to individual requirements with regard to interval and scope. You can opt for classic maintenance, a service package with maintenance, or the complete package with repairs – a comprehensive all-round service with a good price-performance ratio.

Connectivity: the best connection to achieve high economic efficiency

Constant service access is essential for ensuring optimum operation and availability. Ideally, the CHP unit should have a digital communication link. This creates transparency for customers and service partners.

Whether for a software update, a new requirement from the grid operator or optimisation of the system – digital interfaces allow quick, easy and cost saving communication directly with the CHP unit. This is done by linking the CHP unit to the internet.

Vitobloc CHP units have been continually developed for efficient, secure and reliable operation, ensuring maximum benefits for customers.

CHP unit control with innovative functions

The electronic platform with the ViNCI hardware and software developed by Viessmann is used to control the CHP unit. The core element of the control unit is a Linux-based industrial computer. This allows connection to innovative remote services and interfaces for communication in multi mode systems and building management systems (BMS). Cloud-based data management meets the highest security standards.

The system naturally allows remote web-based visualisation and operation on professional backend solutions.

Remote access via professional interfaces

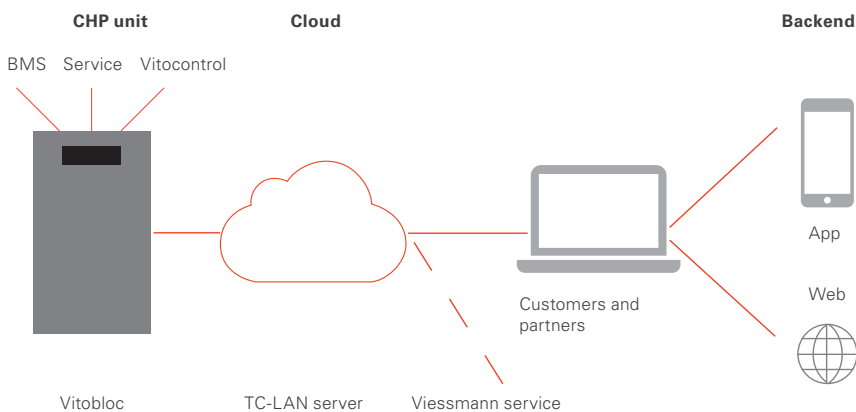
ViNCI control allows monitoring of CHP units. During actual operation, valuable conclusions can be drawn for possible optimisations. This leads to higher efficiency of the unit.

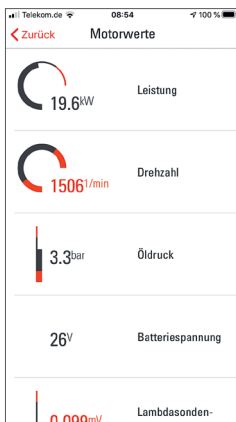
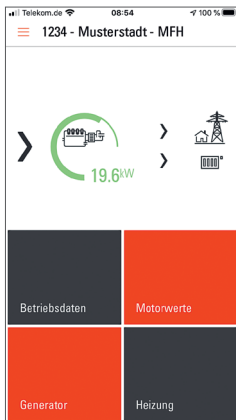
The available data enables better planning of servicing work and faster responses by the CHP service team. With remote access, on-site maintenance is no longer needed, which saves on costs and increases the availability and reliability of the CHP unit.

PLEASE NOTE

To allow remote access, the system must be connected to the internet via the TC-LAN interface.

VITOBLOC ELECTRONIC PLATFORM WITH VINCI CONTROL





Monitoring and visualisation via app



Clearly laid out, straightforward and intuitive – the new ViNCI control

FUNCTIONS AND PROPERTIES

- Monitoring and visualisation by app via web-based access
- Control and monitoring of mains parallel mode and island mode
- Control and monitoring of heat-led or power-led operation
- Remote access (remote setting of parameters and event acknowledgement)
- Flexible parameter setting according to system-specific requirements
- Integral load control, e.g. for self-supply
- Integral, flexibly expandable grid code regulations
- Increased number of sensors, e.g. heating water pressure, generator temperature, electronic high limit safety cut-out for exhaust gas, etc.
- Fast data recording and storage in a matter of milliseconds
- Integral colour touchscreen
- Future extensions possible

INTERFACES

- 1 x LAN for internet connection (TC-LAN)
- 1 x external CAN for further decentralised electronics modules (e.g. buffer management)
- 1 x LAN for Modbus TCP (e.g. for BMS)
- 1 x RS232 for Modbus RTU (e.g. for BMS)
- 1 x RS485 for Modbus RTU (e.g. for BMS)
- 1 x USB for updates and parameter export

BENEFITS

- + Continuous information about the system status
- + If required, evaluations and optimisations based on operating data
- + Convenient operation from anywhere
- + Flexible implementation of project-specific requirements, e.g. integration of additional sensors, implementation of utility-specific connection conditions (TAB)
- + Fast response times of the CHP service team when connecting the CHP unit to the TC-LAN system
- + Early detection and elimination of potential sources of error
- + No need for on-site service calls or the associated costs
- + High availability and reliability

Efficient and reliable in every application

Nowadays, cogeneration technology is one of the most economical options for obtaining power and heat in a way that protects natural resources.

The compact systems developed by Viessmann are suitable for a wide range of uses in the commercial and municipal sectors, and ensure a safe and efficient supply of power, heat and domestic hot water in many, highly diverse applications.



At its logistics centre in Bodelshausen, fashion brand Marc Cain has opted for its own local heating network with a Viessmann Vitoflex 300-UF biomass boiler and a Vitobloc 200 EM-20/39 CHP unit for power generation.



Two Vitobloc 200 units with output sizes of 238 kW_{el}/363 kW_{th} and 140 kW_{el}/207 kW_{th} are installed in the Leica headquarters in Wetzlar, for power generation for the company's own use in its production and administration facilities. The thermal energy generated covers the heat demand in the buildings as well as operation of an absorption refrigeration unit.



The Rosenstein Quarter in Stuttgart, comprising 500 apartments, boasts an impressive, future-oriented concept for heating, cooling and power with a focus on sector coupling. The heating centre is located in the basement of the modern residential complex. At the heart of this is a Vitobloc EM 50/81 CHP unit.



The energy centre of the Blauhaus in Mönchengladbach is used, among other things, by the nearby university for study purposes – a Vitocal 300-G Pro brine/water heat pump with ice store system is installed here, together with a Vitobloc 200 EM-6/15 CHP unit for the additional heat and power supply.



Two Vitobloc 200 EM-140/207 CHP units, each with an output of 140 kW_{el} and 207 kW_{th}, are used to supply the Hainich Clinic in Thüringen with heat, and also provide 40 percent of its power needs.



Two CHP units contribute to sustainable operation at a timber company in Bavaria, each providing an output of 140 kW_{el} and 207 kW_{th}.

In the energy centre of the German Social Accident Insurance complex, five Vitobloc 200 EM-238/363 CHP units supply heat for the operation of absorption refrigeration units and building heating. These also cover the power demand for the data centre and other electrical loads in the building.



Two Vitobloc 200 EM-140/207 biogas operated CHP units are installed at the cogeneration plant of Güstrow municipal services, where they supply heat and power to 500 households.



With over 6000 installed systems and an electrical output of over 350 MW, Viessmann is a leading developer and manufacturer of CHP units.



Viessmann One Base networks digital services with complete energy systems, including heat pumps, ventilation systems, power storage units and photovoltaic systems.

**VISSMANN
ONE BASE**

Value added services	Wärme Leads	ViShare* Service Plus	Strom Logistik Plus	FörderProfi ...
Digital services	ViCare	ViGuide	ViScada	...
Connectivity & platforms	Connectivity Inside	Energy Management Inside	Vitoconnect @wibutler	Vitocontrol GridBox ...
Products & systems	[Icons representing various energy products and systems]			

Seamless integration of products and systems with digital services and value added services for system users and trade partners

* The operator and contractual partner of the ViShare Energy Community is Energy Market Solutions GmbH (EMS), a subsidiary of the Viessmann Group.

We are Viessmann, a family business. Founded in 1917 as a heating technology manufacturer, today we are the world's leading provider of sustainable climate (heating, cooling and air quality) and renewable energy solutions.

Our integrated range of solutions seamlessly connects products and systems via digital platforms and services, creating an individualised feel-good climate for our users. All our activities are driven by the corporate mission statement: "We create living spaces for generations to come." This is the responsibility that we, the 13,000 members of the Viessmann family, take on every day together with our (trade) partners.



We create living spaces for generations to come.



Number 1 Trade Partner – for the 16th consecutive time

Practical partnership

As part of its comprehensive range, Viessmann also offers a wide selection of value added services. These include an extensive training and further development programme for trade partners at the well equipped training facilities of the Viessmann Academy.

With its new digital services, Viessmann offers innovative solutions such as the operation and monitoring of heating systems by smartphone. Users benefit from greater reassurance and convenience, whilst contractors can keep a constant eye on the systems for which they are responsible.



As a family company in its fourth generation, we take a long term view: we create living spaces for generations to come. This mission statement guides the actions of all employees in the large Viessmann family.

VISSMANN GROUP IN FIGURES

1917

— Viessmann was founded

13 000

— employees

3.4

— Group turnover in billions of euros

54

— export share in percent

22

— manufacturing sites in
12 countries

74

— sales companies in
43 countries

120

— sales offices worldwide



Viessmann Climate Solutions SE
35107 Allendorf (Eder)
Germany
Telephone: +49 6452 70-0
www.viessmann.de

Your trade partner

12/2022 EN

Copyright Viessmann.
Duplication and alternative
use only with prior consent.
Subject to modifications.
