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anywhere, anytime.

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**Controls
and connectivity**

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Working towards one goal – efficient use of energy

The efficient use of energy has become a key competitive factor. Bosch is the right partner for innovative technology and tailor-made solutions – our broad portfolio covers virtually all industries. With our team of experienced professionals, we can offer you competent consultation and service in every phase of your project. Bosch quality stands for exceptional reliability and excellence that you can feel. Products and services perfectly matched to the customer's requirements, combined with comprehensive consultation, guarantee that Bosch is always the best choice.

Our experience, your individual solution

Project-specific requirements for energy and air-conditioning technology are always unique. Bosch develops market-specific solutions that fit perfectly, using our experience from countless successful projects and decades of expert knowledge.

Innovative technology for joint success

The innovative strength of Bosch is reflected in the customer-specific solutions. A long tradition of successful development is the basis for our leading energy and air-conditioning technology with forward-thinking efficiency and sustainability. The operating safety and durability of the solutions have been setting standards for years.

Taking responsibility – economically and environmentally

At Bosch, our benchmark is not just the legal requirements – we place the utmost importance on creating the optimum solution with regards to heating, cooling, ventilation, power, compressed air and energy and heating use. Because, in the end, economical use of resources is a deciding factor in achieving maximum sustainability.

Worldwide service

No matter when, no matter where – we are there to ensure the success of every project. From planning support to 24/7 field and spareparts service: A Bosch company or official service partner is available at all times to support you with a comprehensive service.



Control technology

Boiler, CHP unit and system installations

Automation system connection
Compatible with all standard automation system protocols

MEC Remote – access anywhere, anytime

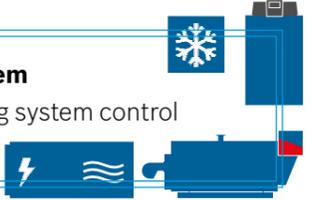
All systems across your locations at a glance



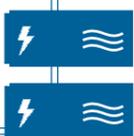
System solutions
Energy centre



MEC System
Overarching system control



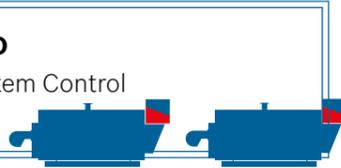
Multi-module control
Premium buffer storage
CHP unit cascade control



Control 8000
Heating system controller



SCO
System Control



Controls
Product level



CSC*
Compact Steam Boiler Control



BCO
Boiler Control



Control 8000
Heating boiler control



Power supply company control unit
CHP control according to power supply company specifications



MEC Optimize
Boiler system optimisation

Boiler Control BCO



The intuitive, PLC-based boiler control BCO offers a very high level of operating data transparency for optimum boiler operation.

At a glance

- ▶ Intuitive operation through the use of graphic symbols on touchscreen displays
- ▶ Integrated monitoring and protective functions ensure a high level of supply and operating reliability
- ▶ Easy connection to higher-level visualisation and automation systems
- ▶ Optional remote access using MEC Remote
- ▶ Condition Monitoring for consistently high system efficiency and availability of steam, hot water and heating boiler systems
- ▶ Fully automatic high-pressure steam boiler operation with the start-up, standby and shutdown control SUC

The boiler control BCO provides all necessary functions for operating steam and hot water boilers according to specialised requirements. Extensive information regarding operating states, operating data and measured values can be viewed on its touchscreen display.

Various system data are analysed, evaluated and transparently displayed via a traffic-light model using the integrated Condition Monitoring software. Operating characteristics that could lead to a drop in efficiency, increased wear or unplanned stoppages can be determined at an early stage and, in many cases, avoided. This ensures the boiler system operates at a consistently high level of efficiency and availability. The diagnostics function, which is included as standard, supports the boiler operating company or the service technician in quickly localising and rectifying irregularities in operation. This results in a further increase in transparency and operating safety.

The automatic start-up, standby and shutdown control SUC for high-pressure steam boilers is available as an additional function of the boiler control BCO. When

SUC is used, start-up and shutdown processes are performed fully automatically, at the press of a button or in response to an external request signal. Integrated automatic functions protect the system against unnecessary stress during cold starts, in heat maintenance mode and in normal operation.

Features

- ▶ Touchscreen display in 9, 12, 15 or 19 inches
- ▶ Performance and water level control
- ▶ Low-load control
- ▶ Condition and efficiency monitoring
- ▶ Operating hours counter for boilers, pumps and burners
- ▶ Diagnostics function and message history
- ▶ Register of the number of burner starts
- ▶ Plain text display of operating and fault messages
- ▶ Display and intermediate storage of all measured values and states relevant to operation
- ▶ For steam boiler systems: desalting control and automatic blow-down

In addition to the basic functions, further options and functions can be added to the BCO control.



BCO for hot water and heating boiler systems



BCO for steam boiler systems



Connection to MEC Remote – monitor all boiler systems, no matter where.



System Control SCO

Intelligent control of multi-boiler systems using an integrated automation system.



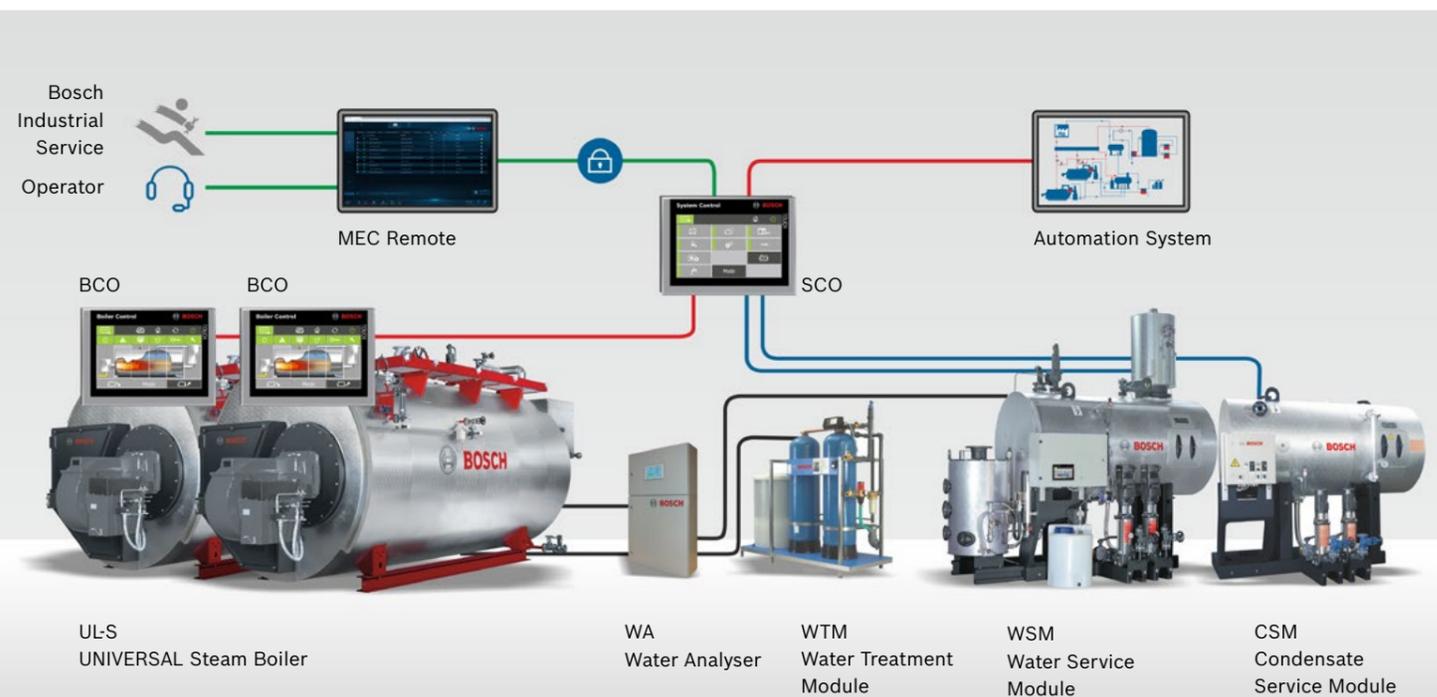
The SCO is our powerful programmable system control with a touch-sensitive TFT colour display. It combines the controls for steam boilers and/or hot water boilers plus individual module controls into one universal management system, opening up a multitude of new possibilities. Communication with higher-level visualisation and automation systems can take place via different automation system protocols, such as Profibus, Modbus TCP/IP and BACnet. The optional remote access via MEC Remote allows you to monitor the system no matter where you are.

Features

- ▶ Follow-up control of multi-boiler systems
- ▶ Integration of water analysis, degassing systems, dosing pumps and oil supply facilities
- ▶ Integration of condensate systems with foreign matter monitoring systems
- ▶ Broad range of pressure and temperature controls
- ▶ Reserve pump control with automatic boiler sequence control (for steam)

Advanced features

- ▶ Integrated air conditioning for tropical regions
- ▶ Stainless steel control cabinet
- ▶ External actuation using automation system



At a glance

- ▶ Easy connection to higher-level visualisation and automation systems
- ▶ Integrated monitoring and functions to protect against improper operation
- ▶ Extensive storage of operating parameters and operating signals
- ▶ Optional remote access using MEC Remote: visualisation of the user interface
- ▶ Intuitive operation through the use of graphic symbols on touchscreen displays

Compact Steam Boiler Control CSC

The affordable control for smaller steam output ranges convinces with easy handling and comes preloaded with all essential functions for semi-automated boiler operation.



The programmable compact control CSC is the ideal solution for steam boilers with capacities up to 4,000 kg/h steam. It has all the necessary functions for convenient control and operation. While the boiler control BCO is tailored for more complex systems, the CSC is an affordable alternative for small capacity single steam boilers.

The CSC is certified in Europe according to EN 12953 (with conductivity control), and according to TRD 604/24h (without conductivity control) outside of Europe.

Features

- ▶ Limits for low and high water levels
- ▶ Pressure limiter for maximum gauge pressure
- ▶ 2-stage or continuous water level control
- ▶ Dry running protection for feed water pump
- ▶ 2-stage or continuous output regulation
- ▶ Alarm and fault messages with message memory

Advanced features

- ▶ External high-water function
- ▶ Standby pump control
- ▶ Conductivity control and limitation
- ▶ Automatic blow-down and desalting
- ▶ Heat maintenance system via burner
- ▶ Performance regulation with two fuel types

At a glance

- ▶ Attractive price-performance ratio for steam boilers up to 4,000 kg/h steam
- ▶ Colour touchscreen display for simple operation and clear visualisation of operating conditions
- ▶ Flexible installation and minimal space requirement: installed on the boiler in the factory or supplied as a wired and tested wall-mounted switchgear cabinet
- ▶ Power electronics for fuel supply, feed water pump, blow-down and desalting included
- ▶ Ideal water conditions through fully automated, conductivity-controlled desalting and blow-down



The intuitive visualisation of the CSC on the **overview screen** delivers the status of the burner, boiler and feed water pump components, as well as further information about the system status, fuel and operating mode – all at a single glance. A traffic-light model (green/yellow/orange) is used to signal the different states.



The **burner dialog** offers setting options for burner operation, fuel choice and output regulation. Using the display of the current boiler pressure and the actuating signal for the burner, the working gauge pressure can be set. The output regulation can be operated either manually or automatically.



Conductivity control and limits, as well as blow-down, can all be selected to maintain good **water quality** in the boiler. Blow-down can be performed either manually or time-controlled at set intervals.





MEC Optimize – the digital efficiency assistant

MEC Optimize – the digital efficiency assistant

MEC Optimize is Bosch's intelligent system for monitoring and optimising industrial boiler systems. MEC Optimize captures and analyses all data from the boiler system and linked system components and stores these over many years. Using a clear and precise form, the efficiency assistant indicates any increased in energy consumption and evaluates the boiler's operating mode. Forecasts of component wear are also issued based on the individual operating mode, which enables improved maintenance planning and in turn increases system availability.

Handling the **system documentation** is made simple: all the important documents for the boiler system, such as operating manuals, are preloaded in digital form on the MEC Optimize.

In addition, it also includes a **digital boiler logbook**. Boiler attendants can enter the recorded measurement values at every test interval, and use the export function to print these for signing or archiving, as required.

The intelligent boiler logbook also checks all the entered data, then compares this with the manufacturer's specifications and gives action recommendations, in case there are any discrepancies.

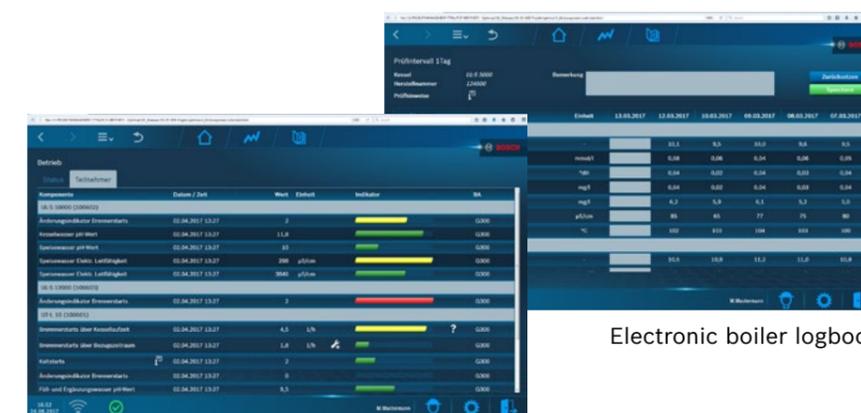
Visualisation and remote access

The MEC Optimize user interface can be visualised using any standard desktop PC or tablet. This means that the persons in charge can keep tabs on energy consumption and system availability.

As an option, MEC Optimize can also transfer the current system status to MEC Remote as well as reporting important information via SMS or e-mail to the operator. For deeper analysis of system data, the operator interface can be easily visualised remotely via MEC Remote, accessed through multiple security levels.

Minimise production downtime, maximise efficiency: MEC Optimize application on p. 34

- ▶ The structured overview enables intuitive operation and clear visualisation of system data
- ▶ Special indicators give a quick overview of the boiler system condition
- ▶ The intelligent boiler logbook evaluates entered data, indicates any deviations from the ideal condition and gives individualised recommendations for action



Clear visualisation of data

Electronic boiler logbook

Improved energy efficiency – keep an eye on all energy flows

Durable boiler system – boiler operation in the ideal state

Increased system availability – maintenance only as required

Improved operating safety – simplified system testing



At a glance

- ▶ Improved energy efficiency – identification of increased energy losses through intelligent data analysis and by rectifying these through the associated recommendations for action in the operating manuals
- ▶ Durable boiler system – automatic monitoring of the operating behaviour supports the operator to achieve particularly boiler-friendly operation
- ▶ Increased system availability – wear prognoses allow for optimum maintenance planning
- ▶ Higher operating safety – intelligent boiler logbook with automatic evaluation of the test data
- ▶ Historical operating data – continuous data acquisition makes system optimisation and troubleshooting easier
- ▶ Digital document storage – all important system documents are saved locally and can be retrieved at any time
- ▶ Optional remote connection via MEC Remote – sends current system status and reports important events via SMS or e-mail to the operator
- ▶ Easy integration of the system into the automation system (BACnet IP, Modbus TCP, OPC UA) or visualisation on a PC/tablet

Remote access using MEC Remote for boiler systems

Using MEC Remote, operators can now gain remote access to their hot water and steam boiler systems conveniently and securely. This means the entire boiler and system control can be visualised using standard Internet-enabled devices.

MEC Remote is the ideal solution for all companies:

- ▶ in which the supervising personnel cannot be on-site constantly
- ▶ operating multi-boiler systems requiring supervision
- ▶ with on-call service, e.g. at the weekends

Using the overview map, multiple systems around the world can all be monitored at once. As an option, MEC Remote can send the operator reports of any abnormalities or faults via SMS or e-mail. This significantly reduces the monitoring required for systems with high reliability requirements, such as those in constant operation.

At your request the Bosch experts can also use remote access to perform expanded parameter setting, programming (SPS) and fault analysis directly on your system. If components fail, the service experts can utilise remote analysis to narrow down the cause and ensure they arrive with the appropriate equipment. This optimises service costs and increases system availability.

One of the most important requirements of a remote connection is maximum security. We provide a sophisticated role concept that controls both access authorisation and approved visualisation levels. The remote access function itself has a multi-level security concept. The external data connection can be turned on or off on the hardware at any time in the boiler house using a key. In addition to logging in with user name and password via encrypted data transfer (https), there is also a mobileTAN procedure to be followed. The operating data from the industrial boilers are only saved locally on the system, not in a cloud. The company ESCRYPT GmbH developed the security concepts for MEC Remote, and the company Cirosec GmbH undertakes regular security audits.

Connection options

- ▶ DSL router
- ▶ Operator's own network
- ▶ Mobile phone network



Features

- ▶ Visualisation of the local user interface
- ▶ Navigation through the control system
- ▶ Parameter setting and programming by Bosch Service using service access

Advanced features

(only in conjunction with MEC Optimize)

- ▶ Transfer system status to the portal
- ▶ Alarm management via e-mail or SMS

At a glance

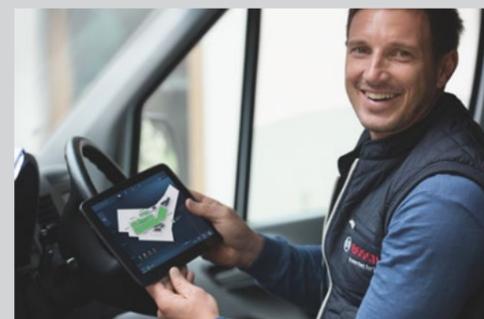
- ▶ Access to operating data, any time, anywhere
- ▶ Boiler systems at all locations on one overview screen
- ▶ Quick, convenient and cost-effective monitoring of system data
- ▶ Secure transmission thanks to a multi-level security concept
- ▶ Optional remote support from Bosch Industrial Service
- ▶ Notifications via SMS or e-mail for defined events, if required

MEC Remote + MEC Optimize

Efficiently networked. Optimally monitored.

Combining MEC Remote and MEC Optimize means you can access system data at any time, from any location.

Live support from service experts



Push notifications via SMS or e-mail



Convenient operation on site



On-call at home



CHP module control – an integrated solution with convenient operation

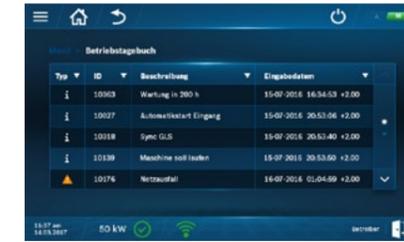
Bosch combined heat and power (CHP) units offer innovative and reliable technology for generating electricity and heat – while still being compact and using space efficiently. These units are the future-proof answer for the demands of both today and tomorrow, thanks to the optimal combination of components, perfect hydraulic balancing and intelligent control technology.

More than just a CHP unit: the control technology developed by Bosch, with an integrated industrial PC, monitors and controls operation, starting and stopping of the engine and synchronisation with the mains power network – completely automatically. It also monitors auxiliary drives.

A convenient touchscreen serves as the display and operating interface, which can be used to directly and intuitively adjust settings to your needs. The central control provides a comprehensive range of functions, with complete visual representation of the CHP control and other peripheral control units.



The intuitive touch control, designed as a tile menu, allows for quick access to all relevant CHP module functions and the associated submenus, organised in **function areas**.



The **operator's log** organises the system history, including all relevant notifications, warnings and faults, into a clear overview. All notifications and descriptions are assigned with an individual ID for simplified identification, which enables precise fault and error detection.



The **statistics display** can be configured as needed, and contains all recorded data points. Individual data can be shown or hidden as required, for additional clarity. Time intervals used in the display can be freely selected.

Features

- ▶ Diagram views for displaying CHP unit functions and system parameters
- ▶ Configuration of operating parameters, target values and methods of control
- ▶ Comprehensive logbook with analysis/error assistant and long-term storage of all information, warning and fault notifications
- ▶ Generator, power supply and system protection via a separate processor unit integrated in the CHP control, for automatic monitoring of mains parameters and synchronisation with the mains network
- ▶ Integrated data interfaces and input/output contacts for connection to the building management system or other higher-level automation system
- ▶ Central control of peripheral components, such as ventilators, pumps, 3-way valves, recirculation air dampers, emergency and mixture coolers, etc.
- ▶ Extensive security concept with security software integrated at the factory (recognition and triggering of gas/smoke alarms, closing gas supply lines, leakage sensors)
- ▶ Intuitive operation on touchscreens with 5.7 or 7.6 inches

At a glance

- ▶ Highly flexible and cost-effective, thanks to individual configuration of operating parameters
- ▶ Evaluation and optimisation of the system and diagnosis of the system state made easier by continuous data logging over the entire service life of the system
- ▶ Conformity with mains supply requirements by certification according to all relevant directives for low- and medium-voltage networks
- ▶ Automatic monitoring for maximum service life and optimal operation
- ▶ Extensive security concept – integrated security software provides early recognition of hazards
- ▶ Information available at all times regarding required maintenance tasks, making service planning easier

CHP control units: ideal complements

The CHP module control can be supplemented with different components and options, tailored to your specific needs. One control unit can be used for multiple Bosch CHP modules and can be monitored using remote access. At the same time, the modules offer great flexibility when connecting to different grid operators.

Multi-module control (MMS)

Using the higher-level multi-module (MMS) control for up to six CHP modules can avoid the need for an on-site higher-level automation system. Operational status, configuration and a system overview are shown and controlled separately for each CHP unit. An operating parameter comparison is undertaken for all of the connected CHP modules, through which the control strategy ensures even loading to achieve maximum service life. Start and stop points are pre-configured at the factory but can also be set individually.

Configuration of the specific operating modes allows for great flexibility:

- ▶ Heat-controlled, based on the supply flow temperature
- ▶ Heat-controlled, based on the buffer storage temperatures
- ▶ Power-controlled, based on the power drawn from the mains
- ▶ Power-controlled, island mode

The multi-module control has a wide range of on-site interfaces, such as digital inputs for releasing the CHP modules, external emergency stop and potential-free contacts for warning/fault feedback signals or starting a peak-load boiler. Modifications can be made depending on the application required, thanks to the reserve contacts in a separate multi-module control cabinet that can be freely configured.

At a glance

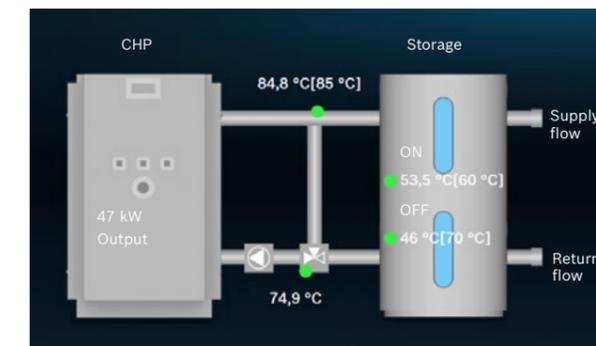
- ▶ Stand-alone control of multiple CHP units via a central, separate control cabinet saves on building management system (data points)
- ▶ An integrated display allows for both a system overview and configuration using just one control device
- ▶ Greater flexibility through configuring the control logic
- ▶ A range of external interfaces, meaning further heat sources, can be added to the control
- ▶ Avoid downtime through automatic request and release of CHP units as well as optimal maintenance planning



Multi-module control as a higher-level automation system for up to six CHP modules

Premium buffer storage control

Buffer cylinders increase CHP module operating time: when heat is not being transferred, the CHP units heat the storage cylinders in order to guarantee continuous operation. The premium buffer storage control allows for regulation of up to two CHP modules based on buffer cylinder temperatures. Operating hours are compared to ensure an even load across the CHP units. The display visualises the CHP module and buffer storage system for easy handling and parameter setting.



As with the multi-module control, all maintenance work can be undertaken at the same time – meaning shorter downtimes. Particularly high on-site power generation is made possible by combining the buffer cylinders with a power-controlled operation of the CHP modules, supported by the mains draw control, for example.

At a glance

- ▶ Control up to two CHP units without using the on-site building management system
- ▶ Optimised heat supply in combination with buffer cylinders
- ▶ System visualisation included
- ▶ Start/stop/performance control can be configured freely
- ▶ Even load distribution reduce overall maintenance costs for the CHP module cascade
- ▶ Easily combined with power-controlled operation

Control unit for power supply companies (EVU)

Ensuring maximum power grid stability through providing access for the power supply companies to the CHP control unit is regulated by law. This leads to significant extra work for the operators when setting up the connection conditions. Especially challenging are the different requirements with complex control algorithms, or regional grid operators reading out certain measurement variables from generating units.

Almost all power supply company requirements can be displayed using Bosch's power supply company control unit. The separate switch box is supplied with a number of input/output contacts to enable flexible configuration. Intervention from the grid operator is visualised on the CHP control display and shows the reason for the current CHP unit operation, allowing the operator to see instantly why a CHP module is operating at a reduced output, for example.

Request signals from power supply companies are, for example, unrestricted performance reduction, active power specification or disconnection from the mains. At the same time, feedback signals are sent regarding different operating parameters, e.g. operating mode, active power notification or power/voltage notification.

At a glance

- ▶ High level of flexibility through the comprehensively configurable control parameters
- ▶ Modification of CHP unit parameters through an external input signal from the grid operator/power supply company
- ▶ Expansion of infeed management and fulfillment of grid operator specifications as a contribution to power network stability
- ▶ Visualisation of power supply company specifications for greater operating mode transparency for the CHP module operator

MEC Remote for remote access to the CHP unit

Remotely accessing the CHP module using MEC Remote allows visualisation of the CHP control on any Internet-capable device. Data security is guaranteed at all times through the use of a secure VPN tunnel. Remote monitoring and diagnostics increase system availability and help avoiding downtimes through continual evaluations, system checks as well as component failure forecasts, in accordance with the customer's requirements.

Online support for optimal on-site assistance

MEC Remote for CHP modules offers online support, direct from the manufacturer. Upon your wish, our customer service engineers and our central control room can access the system controls, if needed. MEC Remote can also independently check relevant system data easily and quickly. The interface can be used on either a PC desktop or a mobile device. The system ensures a detailed overview of the system operating state – in text form or as a graphic. The messaging service automatically sends the operator or local service technician all important notifications, such as maintenance information or faults, via SMS or e-mail. As an option, the events or a history of all measurement data can be displayed. Smart functions enable the evaluation of data with regards to energy efficiency and economy.

Warranty extension and “95% availability guarantee” for compact CHP modules from 12 to 240kWel

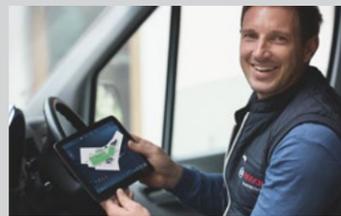
A maintenance contract includes use of the basic MEC Remote package, free of charge. This also extends the CHP unit warranty by twelve months through MEC Remote system monitoring and the resulting guarantee of service quality. When signing a “premium” maintenance contract, reliable CHP module operation is guaranteed by our service department for the length of the contract. The “95% availability guarantee” is also offered with this contract in conjunction with MEC Remote. This means the internal CHP unit software monitors and documents the compact CHP module availability; our service department then evaluates this data remotely. This ensures the economic efficiency of the CHP unit.



Quick overview via the **status indicators** with intuitive navigation.

Schematic diagram with the most important technical data at a glance. Switch between different diagrams and detail levels.

Status display can be configured using all the recorded variables, plus the time frame can be freely chosen and all display configurations saved.



Live support from service experts



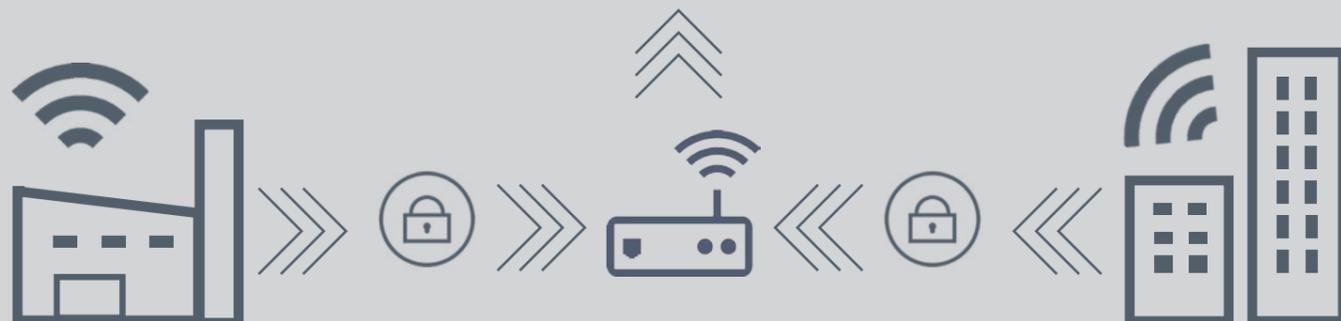
Convenient operation on site



Push notifications via SMS or e-mail



On-call at home



Features

- ▶ Overview graphics and tables containing current operating data, e.g. electrical performance, speed, and flow and return temperatures
- ▶ Constant display of all important data in the status bar, e.g. connection status and system name
- ▶ Notifications about operating signals, such as maintenance or faults
- ▶ Bosch Service contact information at a glance
- ▶ Data export as a table of values for further analysis, e.g. in Excel or CSV formats

Advanced features

- ▶ Visualisation of historical operating data in clear history graphs, with the option to show or hide individual data sets
- ▶ Display of scale adjustable by defining the time frame

At a glance

- ▶ Quick, convenient and cost-effective monitoring of system data
- ▶ Secure VPN-protected access in real time, including status and operating data
- ▶ Access via a web portal, independent of the platform
- ▶ Overview of all CHP systems
- ▶ Data export into standard file formats, for efficiency and economy analyses
- ▶ Remote monitoring and parameter setting for the system by Bosch Industrial Service
- ▶ Stay up-to-date – through notifications by SMS or e-mail
- ▶ Warranty period extension of twelve months in combination with a maintenance contract

Everything under control – Control 8000 heating boiler control

Powerful basic equipment

The Control 8000 has control functions for a boiler circuit and a domestic water heating system as standard. In case the boiler circuit is not needed, a mixed heating circuit can be used instead.

Additional interfaces

The SD card slot enables effortless data recording. The USB port offers not only a quick and easy way to install firmware updates, it can also be used for service access, with the appropriate adapter.

Integrated cable ducting

All cables are securely and efficiently connected, thanks to the integrated cable ducting. Assembly is made simple with module-specific labels for a clear overview.

Quick, easy assembly

You can choose where to attach the control to the boiler – on top, on the side or on the wall. Installation is quick and saves precious time.

Touch screen

The 7-inch touchscreen offers the industrial standard of 800 x 480 pixels for an optimum overview. Operating the device is intuitive.

Status indicators with LED lighting strips

An LED lighting strip shows the operating status according to colour, meaning the status is visible from a distance.

Uncomplicated system expansion

The Control 8000 can be easily expanded with different modules, making it ideal for all requirements. The modular technology offers slots for up to four modules.

Top hat rail (optional)

Thanks to the top hat rail, small additional components can be easily added to the device, such as relays for potential-free signal conversion.

Basic functions

Located below the touchscreen are three separate function keys: these are used for the flue gas inspector, unlocking and emergency operation of the system or control device.



Easy remote access

Remote access enables simple and convenient control of a heating circuit.



The digital Control 8000 makes it easy to control medium and large Bosch heating systems efficiently and conveniently. The technology has been built in a modular structure, meaning project-specific requirements can be easily taken into consideration – even when using multiple boilers and different fuels.

Self-explanatory operation

Can a heating system really be as easy to operate as a smartphone? The Control 8000 makes it possible. It provides a graphical display of all heating circuits and system components. Using a keyboard, all the heating circuits can be individually named. Heating circuits and sources can be displayed in detail at different levels, and the device also offers different views of hydraulic diagrams. There are manual control options for all system components. A simple tap of the screen switches it to retro mode.

Easy networking with other products

Connecting to the building management system using the standard integrated Modbus interface is simple: simply connect using the network connector. The standard range of functions includes: on/off contact, 0–10V input, 0–10 V feedback, potential-free collective fault messaging and external locking.

A Bosch CHP module can also be networked with the control via the Modbus interface. The Control 8000 screen offers an amazing overview of the connected building management system – plus a detailed visualisation of individual system components, all at the touch of a button.



Basic view



Target room temperature



Monitoring/manual control of the heating circuit

Control 8000 – easily expandable with function modules

The Control 8000 architecture is modular and extremely flexible. The functions of the control device can be expanded with different modules, thereby fulfilling to all your requirements. The device can easily integrate up to four modules.

SI – Safety equipment

For connecting up to five external safety devices – e.g. to fulfill DIN EN 12828:

- ▶ Minimum and maximum pressure limiter can be connected
- ▶ General 4-pole input (can be named individually)
- ▶ Four 2-pole programmable inputs (can be named individually)
- ▶ Fault analysis and detection of the triggered safety device can be undertaken on the control device or via remote access

MM – Heating circuit integration

For integrating two heating circuits, with or without actuator:

- ▶ Option of connecting a remote control
- ▶ Alternatively, an external day/night switchover with optional time limit can be connected
- ▶ Heating circuit can be programmed as a pre-control circuit via external request
- ▶ Potential-free input – e.g. for overriding a pump fault
- ▶ Automatic modification of low-output temperature in accordance with DIN EN 12831
- ▶ Holiday mode with a freely selectable lowering function
- ▶ Manual operation of heating circuit via touchscreen

CM – Integration of conventional heat sources

For integrating up to four conventional heat sources:

- ▶ Various combinations of heating boilers
- ▶ Parallel/serial operating mode to take into account the specific degree of use
- ▶ Integration of a strategic buffer cylinder for alternative system construction with start/stop sensors
- ▶ Load limit either according to outside temperature or external contact
- ▶ Sequence reversal for boilers either daily, according to outside temperature, based on operating hours or external contact
- ▶ Maximum of four function modules per system (equal to 16 heat sources)

- ▶ Communication of Control 8000 with heating boilers via an Ethernet interface
- ▶ Communication with energy management system (EMS) heat sources via EMS BUS

MW – Integration of heating circuit and DHW functions

For integrating heating circuit and DHW functions. When controlling a heating circuit with or without actuator and heating circuit pump, the scope of functions is the same as the MM function module. When controlling a DHW circuit with a cylinder primary pump and DHW circulation pump, the scope of functions includes:

- ▶ DHW heating with own timing channel or time-linked to the heating circuits
- ▶ Choice of DHW priority operation or simultaneous with heating circuits
- ▶ Control of a DHW circulation pump with interval switching or continuous operation and individual timing channel
- ▶ Optimised DHW heating using residual heat from the heating boiler
- ▶ External fault signal input, e.g. pump
- ▶ External input for one-time DHW heating outside of the set times or for activating thermal disinfection
- ▶ Daily thermal disinfection possible

AM – Integration of an alternative heat source

For integrating an alternative heat source, e.g. a CHP unit, gas-fired heat pump, solid fuel burner or a buffer storage:

- ▶ Integration of renewable heat sources, such as a CHP module or heat pump, into the overall system
- ▶ Integration of buffer cylinders into the overall system using different types of circuits
- ▶ Request an “automatic” alternative heat source via potential-free contact to cover base-load demand using selectable strategies and/or a time program
- ▶ Control the heat circuit of the alternative heat source



Connecting a Bosch CHP module via the Modbus RTU interface

- ▶ Simple, quick and secure integration into the control concept
- ▶ Request and release CHP unit via Modbus
- ▶ Display CHP module operating messages, warnings or fault messages
- ▶ Automatic adjustment of individual parameters

MEC Remote for the Control 8000

The Control 8000 control and functions can be accessed at any time using an Internet-capable PC or mobile device. The connection is set up via the integrated Internet interface on the Control 8000, using a router. A 1:1 representation of the control display is then transmitted to the device via the Internet. This means the system can be monitored and easily programmed regardless of location. With the help of the Bosch portal and an optional gateway, even complex tasks, such as control centre software functions or data transfer, can be undertaken via the Internet.

Features

- ▶ Monitoring of operating parameters on the user interface
- ▶ Error messages for current faults and indications of any faulty components
- ▶ Parameter settings available on the user interface

The user interface at the customer level enables the heat source to be selected and offers a system overview. The control device offers different views of and in hydraulic diagrams – revolutionary, yet also self-explanatory. Settings in the switching program or in the calendar, as well as on the manual control panels, can also be made intuitively.

With additional secure access, you can connect to the service user interface. This menu offers a clear selection of all system components that can be changed, such as boiler data, heating circuit data, DHW data and other relevant function blocks for intuitive and effective commissioning of the heating system.

Advanced features

- ▶ Monitoring of operating parameters on the service user interface
- ▶ Parameter settings also available on the service user interface
- ▶ Alarms via SMS or e-mail
- ▶ Comprehensive system status – display of the current system operating status

Master Energy Control – MEC System

Controlling multi-faceted systems made easy

The overarching MEC System for large-scale plants allows you to combine various system parts, such as boiler, combined heat and power units and storage cylinders, to form an efficient energy system that can be controlled via one operator interface. The MEC System combines intelligent self-diagnosis and optimisation functions with reliable remote technology.

Integrated energy monitoring functions continually monitor the energy flows and costs. The powerful industrial PC creates transparency through a range of logged data and meaningful forecasts for optimum energy use during operation.

Secure and intuitive

- ▶ Browser-based access via IP-capable devices
- ▶ Monitor the energy control centre from anywhere, at any time

Modular design

- ▶ Individual solutions tailored to each system
- ▶ Integration of existing heat sources
- ▶ Links to the building management system, energy management and virtual power plant systems
- ▶ Compatible with standard automation system protocols
- ▶ Complete system solution from a single source, including software, hardware and control system

Decrease energy costs, reduce emissions

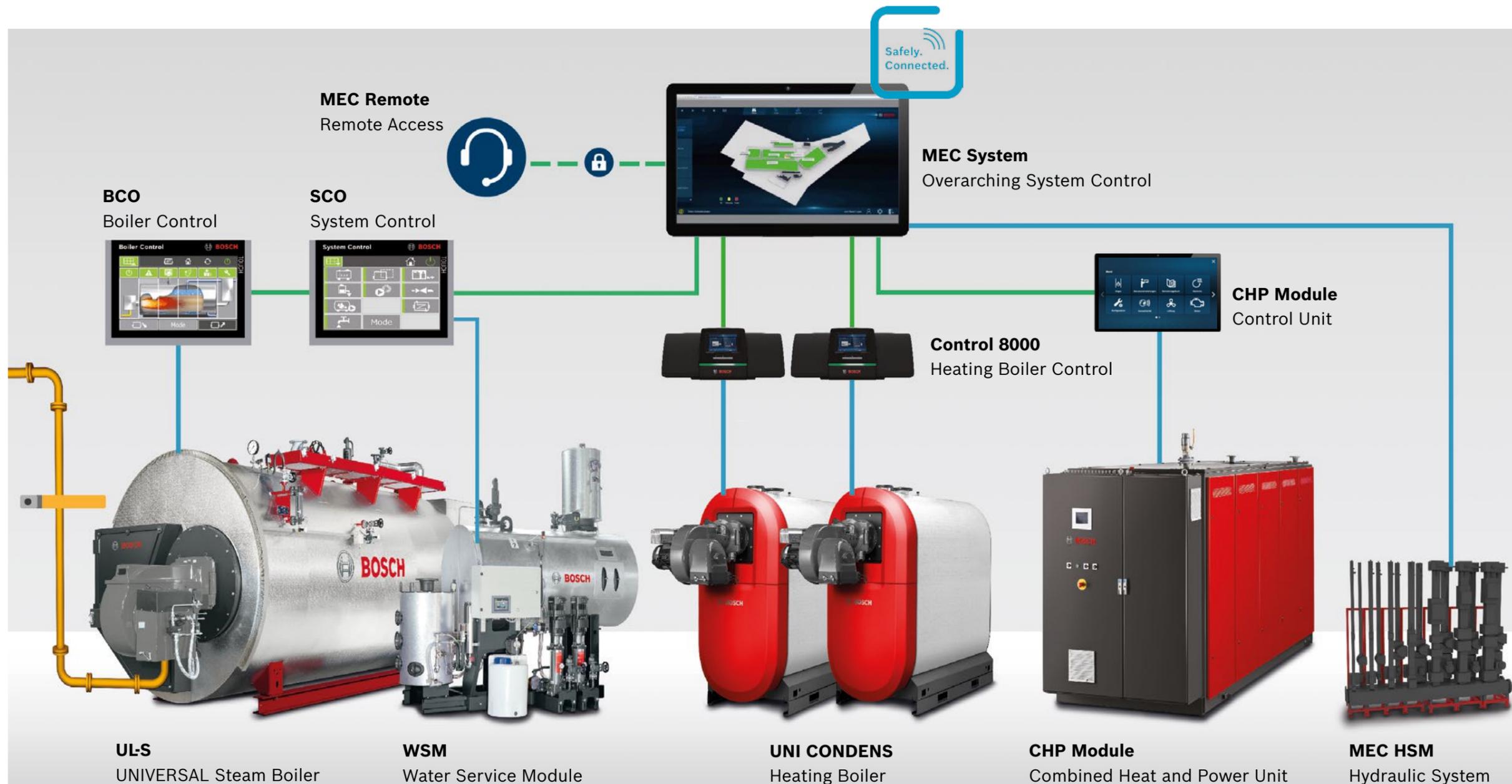
- ▶ Energy efficiency monitoring to EN 50001
- ▶ Approved tool as part of an energy management system (BAFA, dena)
- ▶ Load-limiting and monitoring functions
- ▶ CHP module runtime forecast for compliance with subsidy requirements
- ▶ Operation and condition monitoring

Thanks to the Master Energy Control system, it is possible to control steam and heating boilers, CHP units, hot water storage and heat distribution systems. Customised functions can be extended on an individual project basis to other thermal components of large-scale plants.

Controlling multi-faceted systems

Control systems

Products



ULS
UNIVERSAL Steam Boiler

WSM
Water Service Module

UNI CONDENS
Heating Boiler

CHP Module
Combined Heat and Power Unit

MEC HSM
Hydraulic System

Master Energy Control – MEC System



Full transparency and operability at every level



Status
Transparent system status visible at every level



Setting
Available at every system level, depending on the user level



Monitoring
Keep an eye on important data at every level

Features

Individual and customer-specific solutions created by combining standardised control functions

- ▶ System strategy for the interaction between boilers, CHP units, storage cylinders, hydraulic circuits, sensors and actuators
- ▶ Cascade functions for CHP modules and/or boilers
- ▶ Energy distribution, heat requirement calculation, heating circuit control and DHW treatment
- ▶ User management

- ▶ Clear, coloured visualisation of locations and operating states, temperatures and performance of all systems
- ▶ Alarm and report management
- ▶ Parameter setting via the system control panel (HMI)
- ▶ Energy and data monitoring, dashboard, search function
- ▶ Error minimisation through proven and pre-tested software modules

Bosch customer service engineer Torsten Fischborn

“I think it's great, how well the system has proved itself in operation. Some days after the commissioning I found out through small differences in the amount of energy that the setting of one of the older valves in the automatic desalination system could be optimised. This would not have been noticed so quickly with a conventional system.”



At a glance

- ▶ System solution from a single source, including software, hardware and control system
- ▶ Full data transparency and connectivity, visualisation of both the complete system and the system environment
- ▶ Intuitive operation and user interaction
- ▶ Efficient system operation thanks to optimised system controls
- ▶ Monitor everything from afar using remote access (via MEC Remote)
- ▶ Future-proof and expandable due to the hardware-independent software platform
- ▶ Multi-protocol capability for complete data transparency and for easy integration into automation systems, e.g. BACnet, SCADA, etc.
- ▶ Straightforward integration of new, existing and third-party products, as well as on-site sensors, actuators, etc.



System status portrayed in intuitive colours for **quick fault detection and navigation.**



Coloured representation of energy generation and needs for straightforward **energy data monitoring.**



Data recording, saving and visualisation for complete **data transparency.** Export function into standard file formats.

Application examples – the perfect combination

Application 1: small or medium-sized brewery, 2-shift operation

Requirements

- ▶ Conventional heating for the building
- ▶ Process heating and cooling for production
- ▶ No production automation system
- ▶ Energy data monitoring and evaluation of historical system data

Implementation

- ▶ Heating boiler with control device Control 8000
- ▶ Steam boiler with boiler control BCO
- ▶ Central control using system control MEC System
- ▶ Energy data monitoring and evaluation using MEC System



The MEC System combines existing energy sources and coordinates the needs of the different consumers, removing the need for a costly automation system connection. Thanks to BAFA and dena certification, the brewery energy manager can also use MEC System as energy management software, in accordance with DIN EN 50001.

Application 2: Housing association, multiple properties in one city

Requirements

- ▶ Reliable heat supply for tenants
- ▶ Low operating costs through an effective boiler and local power generation
- ▶ Centralised remote monitoring of all systems
- ▶ Effective route planning for maintenance work
- ▶ Active fault notifications sent to on-call service staff mobile phones

Implementation

- ▶ CHP units to cover base-load demand efficiently
- ▶ Peak load boilers with condensing technology
- ▶ Optimal operation through centralised control via Control 8000
- ▶ Remote connection using MEC Remote via UMTS, without any additional wired network interfaces

The CHP control is securely connected to the Control 8000 over a Modbus interface, allowing centralised control of both components in one system. The CHP module reliably delivers the necessary base load, and any increased demand for heating is automatically supplemented by the peak load boiler. All systems can be monitored remotely using MEC Remote and maintenance work can be planned in advance. On-call service staff are automatically informed via SMS or e-mail if a system is reporting a fault, meaning they will be on-site as quickly as possible.



Application 3: Large industrial operation, 3-shift operation, 7 days per week

Requirements

- ▶ Process heating for production
- ▶ Connection to an existing automation system
- ▶ Maximum energy savings
- ▶ Highest possible system availability to avoid production downtime

Implementation

- ▶ Multi-boiler system with two steam boilers, each 16t/h
- ▶ High-pressure condensate module
- ▶ Boiler controls BCO connected via system control SCO
- ▶ Digital efficiency assistant MEC Optimize

The redundancy of the dual boiler system is a distinct advantage: this means the system is also highly efficient even in partial load operation, and maintenance work can be undertaken on the boiler without interrupting steam supply. Using high-pressure condensate reduces the demand for fresh water and the system's own consumption for water treatment. The SCO enables operation without constant monitoring (72 hours) and ensures especially efficient operation thanks to its boiler sequence control. MEC Optimize provides fully automated analysis and evaluation of the system data to make recommendations for actions to increase operational efficiency. At the same time, MEC Optimize also provides the relevant section of the operating instructions. The boiler logbook is maintained digitally, meaning every step is documented and can be referenced by the operator.



Reference: Fleischwaren Sutter GmbH

In the course of continuous factory optimisation, Sutter decided to introduce an energy management system in its main production facility in Gau-Bickelheim. The resulting tax and cost benefits have been used to partially compensate for the increase in energy costs over recent years, and in addition many tons of CO₂ have been avoided.

The savings potential was analysed and evaluated at the request of Mr Böhme, the Energy Manager at Sutter. The process heat supply with three oil-fired steam boilers was quickly identified as one of the biggest energy consumers in the factory. “Previously we used to be supplied with around 30,000 litres of light fuel oil per week – and every week at a different price. The conversion to natural gas has improved our planning reliability in regard to our energy costs – this is a benefit that we can pass on to our customers in the form of stable prices,” explains Christian Böhme.

In the course of the modernisation, dual-fuel burners were retrofitted and the existing fuel oil supply was maintained as backup. If there are supply shortages in winter, the natural gas supplier can request short-term operation with light fuel oil. In return for this, the natural gas supplier waived the additional building costs for laying the gas pipeline.

In comparison with the previous fuel oil burners with mechanical linkage, the new electronically controlled burners can modulate down to 350 kW, which enables them to be operated significantly more quietly and efficiently at partial load. In addition to this, the losses on the flue gas side were demonstrated to have been reduced from six percent to five percent through the use of combustion control with oxygen probe.

Since the supply of spare parts for the aging burner control based on the Siemens Simatic C7 would probably have become more difficult in the coming years, a state-of-the-art burner control system consisting of BCO and SCO was integrated during the modernisation. In addition to the automated water treatment, the SCO also undertakes, for example, the adaptive changing of the primary boiler, so that stoppage damage to the backup boiler is prevented.

The SCO automatically reports boiler operation abnormalities to the higher-level control technology, and as a precaution it switches to the standby boiler, which has been kept warm.

When a certified energy management system is being introduced, the consumption figures have to be captured on a regular basis in order to enable an analysis to be performed. Sutter opted for the higher-level automation system MEC System from Bosch. Thanks to this system, the Energy Manager and the Technical Managers can view the status of the system at any time from their workplaces and can evaluate the recorded data. Each user can intuitively configure the view, in order to have an overview of the relevant data.

“I think it's great, how well the system has proved itself in operation. For example, some days after the commissioning I found out through small differences in the amount of energy that the setting of one of the older valves in the automatic demineralisation system could be optimised. This would not have been noticed so quickly with a conventional system,” explains the Bosch customer service engineer responsible for the system, Torsten Fischborn, during his first service visit after the modernisation.

The Energy Manager, Mr Böhme, expresses his satisfaction: “Despite the recent lower prices for light fuel oil, we will already have saved over a quarter of a million euros in the first year, and the investment will be amortised after approximately three years – a worthwhile project and a considerable contribution to reducing our CO₂ emissions.”



Sutter's process heat supply works with greater efficiency after the successful modernisation.



The system control from Bosch consists of:

- ▶ The controls for the individual boilers and their safety chains
- ▶ The sequence control and water treatment for the multi-boiler system
- ▶ The higher-level control system for the visualisation, recording and evaluation of operating data
- ▶ An interface for direct messages to the Technical Manager

Reference: MEC Optimize from Bosch provides high transparency

As part of expanding production, the Privatmolkerei Bechtel (dairy company) needed to renew their process heat supply. Their boiler system, with nearly 30 tons of steam capacity per hour, is one of the first in the world with MEC Optimize.

The Bechtel dairy processes more than one million kilograms of milk per day. Complex production structures and energy-intensive processes require comprehensive data analysis. This transparency is the basis of competitive production costs – decisive factors include preventing system failures and minimising energy consumption. Bechtel had already introduced an energy management system as far back as 2012. Since 2017, the company has also been using the digital efficiency assistant MEC Optimize from Bosch.

MEC Optimize is integrated in the boiler control and records all data from the steam boiler, water treatment, heat recovery facilities and other connected plant components. The operating data is stored locally for many years and evaluated via trend analyses. If the fuel consumption increases, for example, due to excessive desalting rates or soiling in the boiler, the efficiency assistant identifies and reports possible causes. At Bechtel, this is done through the company network of connected PCs or via a WiFi hotspot in the boiler house to the tablet of the boiler attendant. For defined cases, there is an option to send notifications directly to the operator's mobile phone via the remote maintenance system MEC Remote.

Another important optimisation aspect is the maximisation of the boiler service life. The most important influences here are the water characteristics and the operating mode – both are often neglected in practice. MEC Optimize not only serves as a digital boiler logbook but interprets the entered values and helps the operator to identify and correct conditions that promote corrosion or are even safety-critical. In addition, the operating mode is analysed for incorrect start-up, inefficient boiler sequence control and too frequent boiler cycles.

MEC Optimize also prevents production losses due to interrupted process heat: the permissible loads and switching cycles are stored for all important components. Based on the operating mode, the efficiency assistant determines the state of the component, predicts the probable residual run time and helps to plan maintenance. The other plant equipment from Bosch for feed water deaeration, heat recovery and automation rounds off the overall system and ensures low energy consumption.

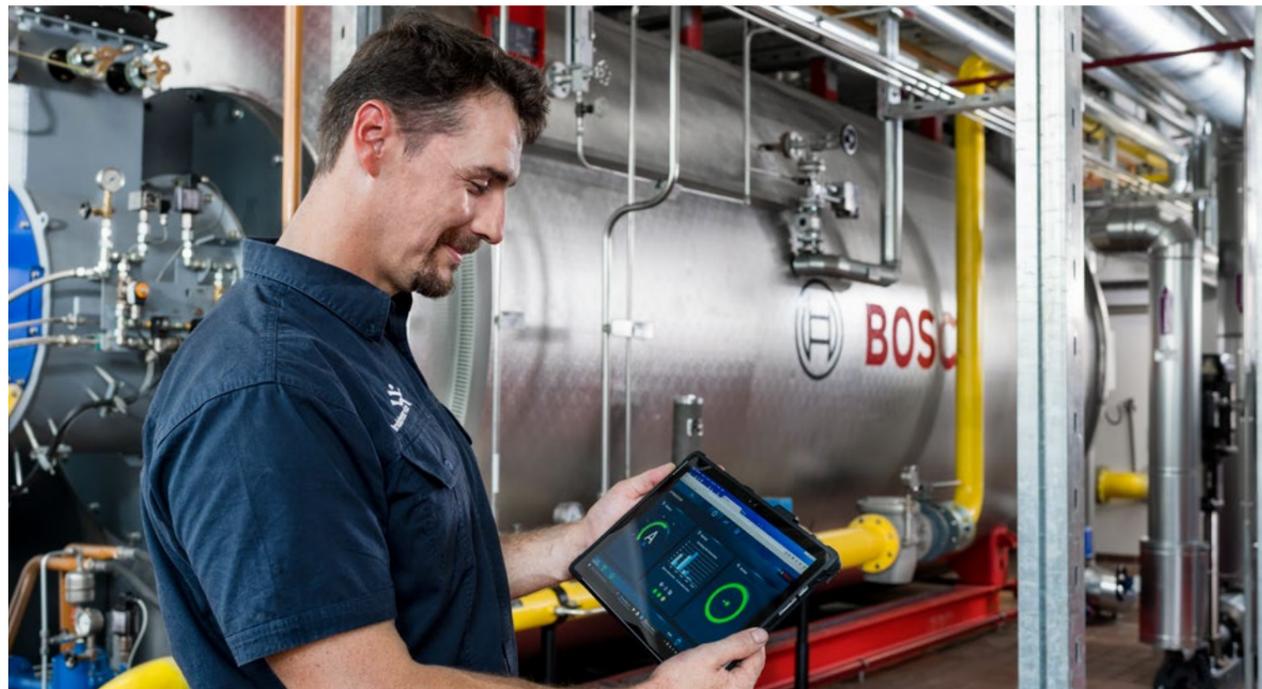
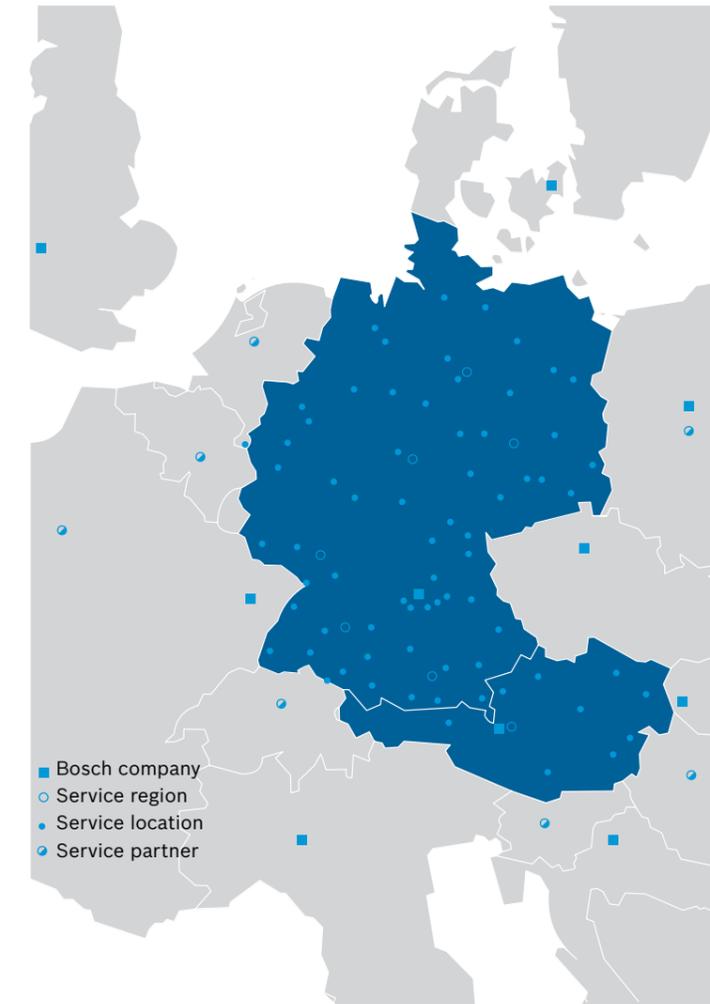
Our service: fast, competent and close to our customers

- ▶ Over 100 boiler service experts in Germany and Austria
- ▶ Boiler service in over 140 countries around the world
- ▶ Over 100 CHP module service experts

Our service team – always available, always on-site

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Spare parts 24-hour hotline	spareparts@bosch-industrial.com Tel: +49 180 5010540*
Your personal on-site service experts	www.bosch-industrial.com/searchcontact experts
Bosch KWK Systeme	
Service and spare parts	service.kwk@de.bosch.com Tel: +49 6406 9103-111

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