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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 energy and heating. 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 and system installations

### Automation system connectivity

Our Bosch controls have pre-configured data points of common protocols (e.g. Modbus, Profibus, BACnet) for easy connection to central control technology or energy management systems by the customer.

### System solutions

#### Energy centre

**Digital efficiency assistant MEC Optimize**

MEC Optimize monitors and optimises industrial boiler systems. On the basis of the system operation, it predicts the service life of individual components, suggests measures to increase efficiency, and instructs the user in implementing them. The system comfortably provides operation manuals and facility data. Further, the digital boiler log book evaluates the entered data intelligently.



**System control SCO**

The SCO system control brings together the controls for steam boilers and/or hot water boilers plus individual module controls in a single management system, opening up a multitude of new possibilities. Boiler cascades can be controlled intelligently and a more reliable energy supply can be ensured.



**Remote monitoring MEC Remote**

MEC Remote allows operators a comprehensive system overview as well as comfortable and cost-efficient monitoring from afar by visualising current operating data. Further, MEC Remote enables a broad range of remote support by our Bosch service experts.



### Controls

#### Product level

**Compact steam boiler control CSC**

Compact control for single steam boilers with an output of up to 4 t/h. It comes with all significant functions for comfortable control and handling. Optionally mounted on the boiler as a “plug and play” solution.



**Boiler control BCO**

Complex boiler systems can be simply controlled with the project-specific boiler control BCO for all Bosch hot water and steam boilers. All relevant functions are available and provide highest transparency of operation data for perfect boiler operation.



**Compact hot water boiler control CWC**

Compact hot water boiler control CWC for all Bosch single flame tube boilers for warm and hot water. It is characterised by intuitive handling, comprehensive functionality and easy installation due to a “plug and play” solution.



**Control 8000 for heating boilers**

The Control 8000 allows an efficient, comfortable and easy control of medium-sized and large heating systems from Bosch. Project-specific requirements can be perfectly configured due to modular structured technology – also when using several heating boilers and different energy sources.





**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. 24

- ▶ 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
- ▶ 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. The secure remote access allows the operator to visualise the surface of the control system and retrieve all relevant boiler data. As an option, MEC Remote can send alarm notifications via SMS or e-mail in combination with MEC Optimize or when using the hot water boiler control CWC. This significantly reduces the monitoring required for systems with high reliability requirements, such as those in constant operation.

### Effective service support

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 and parts. This optimises service costs and increases system availability.

### Secure remote access

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
- ▶ Alarm management in the expanded scope

### 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
- ▶ If required, remote support from Bosch Industrial Service
- ▶ Optional alarm notifications via SMS or e-mail in combination with MEC Optimize or when using the hot water boiler control CWC

### 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



### Convenient operation on site



### Push notifications via SMS or e-mail



### On-call at home



## 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 display
- ▶ 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.

Furthermore, the BCO takes on various control tasks, such as controlling the desludging and desalting fully automated or controlling the feed water regulation. 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

Optionally, further customer-specific functions can be added to the BCO control for individual requirements.



BCO for hot water and heating boiler systems



BCO for steam boiler systems



No matter, if in the office, from home or on the go. MEC Remote and the integrated interface to control technology offer a secure remote access to your system.



# System Control SCO

The SCO brings together controls of Bosch boilers and additional modules to a superior management system, opening up a multitude of new possibilities.



The SCO (System Control) is our powerful programmable system control for multi-boiler systems with additional boiler house components. The intelligent control allows cascade connection for a higher longevity, more reliable supply and more efficient operation of the system. It switches the boilers on and off dynamically, depending on the current demand of the consumers. 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.

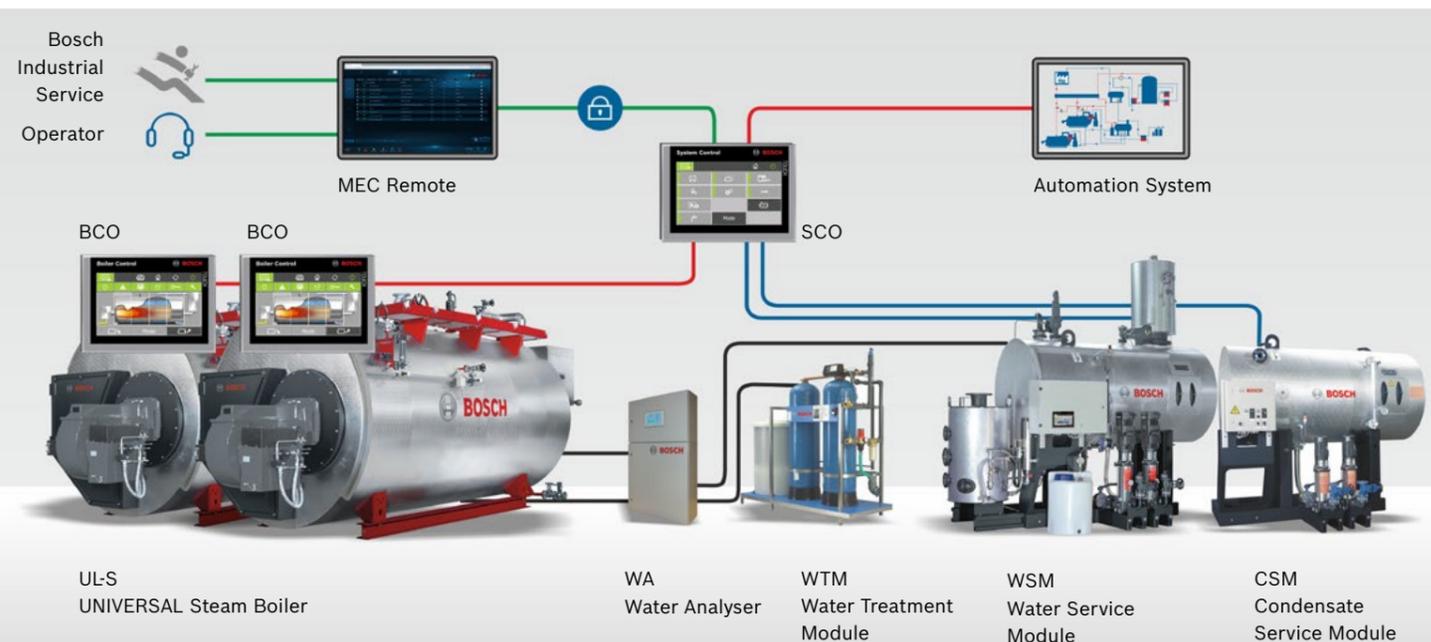
### Features

- ▶ 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)

### Examples for customer-specific equipment

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

Further project-specific features are available optionally.



### At a glance

- ▶ System control for multi-boiler systems and their associated boiler house components
- ▶ 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 compact 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. Customer-specific adaptations as well as connection to control technology, remote support MEC Remote and MEC Optimize are possible with the boiler control BCO.

The CSC is certified in Europe according to EN12953 with conductivity control. Outside of Europe it can be delivered without conductivity control according to TRD 604/24h.

### 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.



## Compact hot water boiler control CWC – The compact solution for your heating system

The compact hot water boiler control CWC is available for all Bosch single-flame-tube boilers for hot and warm water. It is characterised by intuitive handling, comprehensive functions and simple installation due to a plug and play solution.

The new, compact control CWC for hot water and heating boilers combines comprehensive functionality, connectivity and easy installation. Next to the control of the single boiler, a cascade control for up to four boilers is possible. Further, integrated power supply parts for all actuators and sensors, e.g. burners, pumps, ensure simple handling and compact design.

Pre-wired interfaces simplify installation considerably. Connection to the in-house control technology is possible any time due to pre-configured, common protocols. Together with the optional remote support MEC Remote this allows intelligent control on industry 4.0 level.

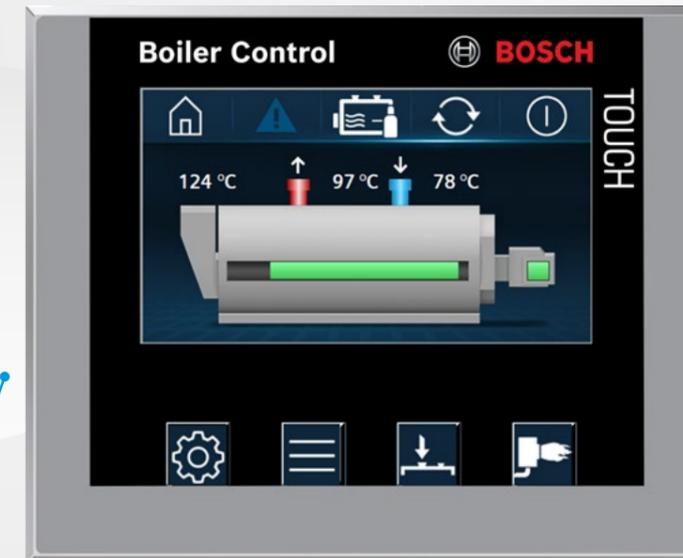


### Comprehensive functionality

- ▶ Control of a complete boiler system including components with only one control unit
- ▶ Numerous features included, such as e.g. combustion, return flow temperature protection, speed control, heat maintenance system and control of the boiler circuit pump

### Remote maintenance and control technology connection

- ▶ Visualisation of the CWC user interface from afar via secure VPN connection with MEC Remote upon request
- ▶ Optional alarm notification via e-mail or SMS and remote support from the Bosch service
- ▶ Compatible with common control technology protocols, such as Modbus TCP, Profibus DP, Profinet IO



### Quick commissioning and simple installation

- ▶ Pre-wired control cabinet as plug and play solution
- ▶ Control cabinet can be mounted on the boiler up to approx. 9 MW boiler output
- ▶ Only one control cabinet necessary: Power supply parts for all actuators and sensors included in the control cabinet

### Compact overall solution

- ▶ Integrated boiler sequence control for up to four boilers
- ▶ Power supply for all actuators and sensors included in the CWC, e.g. for burners and pumps
- ▶ Attractive price-performance ratio

### Intuitive operation

- ▶ Modern colour touch display for simple operation and clear visualisation of operating conditions
- ▶ Four additional function keys allow quick access to frequently used menu items

### At a glance

- ▶ Modular complete solution with cost advantage, for all single-flame-tube hot water and heating boilers
- ▶ Integrated sequence control for up to four boilers
- ▶ Intuitive operation via colour touch display and function keys for quick access
- ▶ Pre-configured and completely wired for quick commissioning
- ▶ Integrated power supply parts in the compact control cabinet, e.g. for pumps, valves and burner
- ▶ Compatible with all common control technology protocols
- ▶ Optional remote access via MEC Remote for maximum availability and alarming function in case of any incident via SMS or e-mail on request

# 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, 0–10V feedback, potential-free collective fault messaging and external locking.

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 all your requirements. The device can easily integrate up to four modules.

### Function module FM-SI – Safety equipment

With the FM-SI function module, you can simply integrate up to five external safety devices into the Control 8000. For quick fault analysis and reliable heating operation.

- ▶ Integration of safety devices into the Control 8000 for high heating system availability
- ▶ Quick fault analysis via the control unit or remote access
- ▶ Simple, individual naming for each safety component via the user interface

### Function module FM-AM – Integration of alternative heat sources

The FM-AM function module connects regenerative heating sources to the Control 8000 and ensures efficient interaction of all heating system components.

- ▶ Individual system combinations made up of alternative and conventional heating sources in the Control 8000
- ▶ Simple request of alternative heating sources via potential-free contact or Modbus RTU interface
- ▶ Convenient operation and visualisation of your heating system via intuitive control display

### Function module FM-CM – Integration of conventional heat sources

The FM-CM function module enables you to combine up to 16 heating sources in any way – whether they are floor standing or wall mounted. Smart control functions allow for an efficient and flexible operation of your multi-boiler system.

- ▶ Integration of up to 16 heating sources in the Control 8000
- ▶ Individual system combination and consideration of specific seasonal efficiencies of heating sources
- ▶ Integration and smart control of a central buffer cylinder
- ▶ Full flexibility and smart control of multi-boiler systems

### Function module FM-MW – Integration of heating circuit and DHW functions

With the FM-MW function module, you can expand the Control 8000 with a heating circuit and a domestic hot water function. These can be controlled separately, offering full flexibility and an excellent DHW convenience.

- ▶ Simple expansion of the Control 8000 with a heating circuit and a domestic hot water circuit
- ▶ Convenient operation of the heating circuit and domestic hot water circuit with individual weekly schedule or manual control
- ▶ Excellent DHW convenience function thanks to separate weekly schedule for circulation circuit
- ▶ Save energy while on holiday thanks to automatic adaptation to heat and DHW demand
- ▶ Function for thermal disinfection to comply with hygiene requirements
- ▶ Activation of one-time cylinder charging and thermal disinfection via external switchover

### Function module FM-MM – Heating circuit integration

With the FM-MM function module, the Control 8000 offers full flexibility for the integration of up to two heating circuits. Thanks to intuitive menus and automatic functions, you can conveniently configure each heating circuit and save energy at the same time.

- ▶ Flexible expansion of the Control 8000 with up to two heating circuits
- ▶ Convenient operation of the heating circuits with individual weekly schedule or manual control
- ▶ Individual switching between heating and setback mode and simple fault analysis
- ▶ Save energy while on holiday thanks to automatic heat demand matching
- ▶ Optimised heating comfort thanks to room-compensated temperature control with BFU remote control

## 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.

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.

### 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

### 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



## Application examples – the perfect combination

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

#### Requirements

- ▶ Conventional heating for the building
- ▶ Process heat for production
- ▶ No connection to system technology



#### Implementation

- ▶ Heating boiler with compact hot water boiler control CWC
- ▶ Steam boiler with compact steam boiler control CSC

A switch of processes from steam to hot water as well as the age of the existing plant require a replacement of the boilers. The increased use of hot water in processes with temperatures below 110°C, e.g. CIP, a smaller steam boiler below 4 t/h is sufficient. This steam boiler is controlled with the compact steam boiler control CSC. Hot water for the processes and conventional heat for the buildings is supplied by a hot water boiler, which is controlled by the compact hot water boiler control CWC.

### 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

The secure connection of the Bosch heating boilers with the Control 8000 via a Modbus interface allows a cascading control. One boiler reliably delivers the required base load, increased heat demand 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.

#### Implementation

- ▶ Efficient covering of base and peak loads with condensing heating boilers Bosch Condens 7000
- ▶ Optimal operation through centralised control via Control 8000
- ▶ Remote connection using MEC Remote via UMTS, without any additional wired network interfaces



### 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

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.

#### 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



## 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. Due to increasing demands on capacity at Bechtel, the existing steam supply system was no longer sufficient to meet the requirements. The two Loos steam boilers, which were installed in 1994, had a total output of 16 t/h and were already running at full load in continuous operation. Bechtel, however, needed twice as much steam and now has not only more steam thanks to the system output of some 30 t/h, but it also has an advanced boiler system as regards energy efficiency, operating safety and flexibility. 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.

### Data analysis at its finest

As far back as 2012, Bechtel had already introduced an energy management system. The aim was to continually monitor energy consumption in the dairy, and thereby to save costs and prevent negative environmental impact. In perfect harmony with this, Bosch's MEC Optimize system tool captures and analyses all the data from the steam boilers and from

all the associated system components. Using a clear and precise form, the system indicates any increased energy consumption and evaluates the boiler's operating mode. Forecasts of component wear are also issued based on the individual operating mode, and this increases the system availability. At Bechtel the whole process is visualised on standard desktop laptops or tablets. This means that the particular persons in charge always have the energy consumption and system availability in view. The staff at the dairy also have access via MEC Optimize to a digital document storage with operating instructions and service reports as well as an electronic boiler logbook.

### High operational reliability: automation and remote service

The integrated Bosch control systems are also of crucial importance in meeting the high demands of milk processing in regards to reliability. They deliver the relevant operating data to MEC Optimize and automate the boiler and system operation, as well as providing intelligent control features such as automatic start-up and multi-boiler control. Integrated safety logic protects the boiler system against maloperation. The linking of the control units to

Bosch's MEC Remote service tool offers Bechtel additional security. Whether outside or inside the company premises: the functional performance of the system and all the relevant system data can be checked in real time, which means that boiler operators can react quickly to any adverse changes. The data visualisation is via internet-enabled user terminals such as tablets, smartphones or desktop PC, and a sophisticated security concept protects against unauthorised access. A further benefit is the optional remote support by the Bosch service experts. At the request of the customer, they can access the system and perform software updates or parameterisation for example, as well of course as quickly eliminating causes of problems. This not only increases system availability but also saves time and cost.

### An overview of the system components

The high level of boiler efficiency of over 97% is very impressive. In addition to integrated economizers, both boilers have an air preheating system: part of the boiler feed water flow is directed by the system into a heat exchanger on the air side, which raises the combustion air temperature from 25°C to 80°C. The cooled feed water then flows through a heat exchanger bundle on the flue gas side and reduces the temperature of the hot boiler flue gases before it is being fed back into the main feed water flow. Up to 2% fuel saving can be achieved in this way.

The modern dual-fuel burners also enhance the energy balance. The number of burner starts and therefore the accompanying energy losses are reduced significantly thanks to the large control range of 1:14 in gas operation. The total burner heat output of around 20 MW can be reduced to 1.4 MW, without causing a shutdown of the burners. The installed O<sub>2</sub> controls work positively on the modulating burner operation. Speed controls are also installed, which further optimise the operating mode.

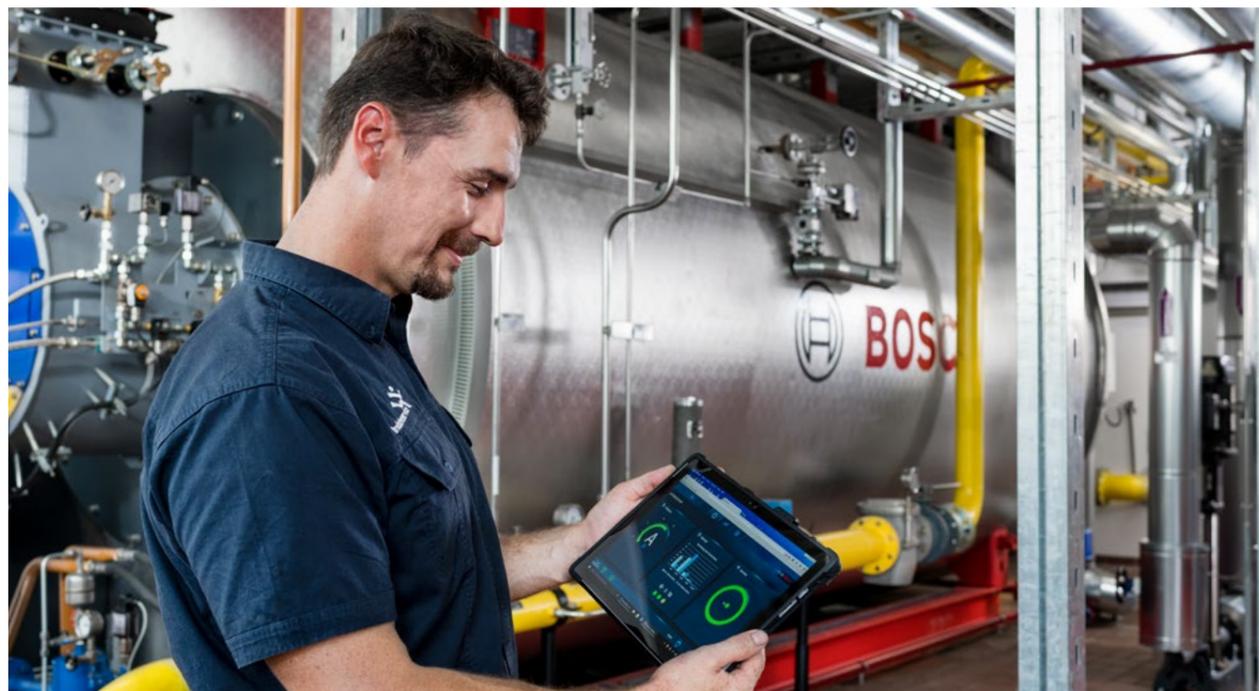
Other system components, such as feed water deaeration, are also part of the Bosch scope of delivery. The deaeration process is an important part of achieving the optimum water quality, and it protects the boiler and its components against corrosion. By heating the make-up water to 103°C, the corrosive component parts such as carbon dioxide and oxygen are released and escape with a

small quantity of exhaust vapour via the roof. This exhaust vapour contains usable heat, which is recovered by a downstream vapour cooler with an output of 80 kW. The system equipment also includes continuous conductivity measurement as well as automatic desalting and blow-down devices. The modulating feed water controls ensure that there is a constant water level in the boilers.



### The result

The new Bosch steam boiler system fully meets the growing capacity requirements and has the potential to cover additional load demands. In addition to this, the potential for energy and cost savings has been systematically tapped thanks to the optimum matching of all the components. This enables the Bechtel private dairy to lead the way with an exemplary system, when it comes to energy efficiency and environmental protection. Alfred Gürster, Head of Production and Technology at Bechtel, summarises as follows: "Implementing the project during running operation was certainly not easy and entailed many risks and difficulties, all of which were overcome. In the final analysis however, it was due to the coordinated cooperation of all those involved in the project, that the new steam boiler system was implemented without any supply interruptions. Our capacity problems are solved and the system is running very well. Thanks to MEC Optimize, we also have a state-of-the-art efficiency monitoring system, and can therefore view the energy consumption and system availability at any time."



## Reference: Hot process water in Amsterdam concrete factory

The Dutch concrete plant Voorbij Prefab needs a lot of hot water for the production of precast concrete elements. Precise temperature control is crucial for the optimum operation of the processes. With the remote control MEC Remote, the plant can be centrally monitored at all times.

The concrete plant Voorbij Prefab, located in the Dutch city Amsterdam, is specialised in the production and supply of pre-cast concrete elements. The state-of-the-art, robot-controlled plant produces high-quality solid elements for residential construction and various concrete products for industry, including conversion stations and counterweights. To replace the existing plant, three vertical Bosch Condens 7000 F condensing boilers were recently installed.

The three Bosch aluminium boilers, each with an output of 300 kW, are connected in cascade and are switched on and off as required by the Control 8000 boiler control system. For the optimal composition of innovative concrete mixes, the rapid provision of large quantities of hot water at exactly the right temperature



is of crucial importance. This is exactly what the optimum combination of boiler and associated control system delivers.

A particular advantage of the Condens 7000 F is its high flow temperature of up to 95°C. The required hydraulics can be easily reproduced on the Control 8000 control system and, for example, the three boilers with the required flow temperature can be easily controlled and monitored. Thanks to the remote access MEC Remote, this is also possible from the central control room on the other side of the production plant.



### Bosch Condens 7000 F

- ▶ 75 to 300 kW
- ▶ Blade flow temperature 95°C
- ▶ Modulation range 1:6
- ▶ Max. operating pressure 6 bar
- ▶ High maximum  $\Delta T$  (50K), no open distributor required
- ▶ Prepared for future gas types
- ▶ Optimum control with innovative Bosch control
- ▶ Can be integrated into building management system
- ▶ Remote monitoring and management possible

## Our service: fast, competent and close to our customers

### Always there for you

We offer our customers a 24/7 service and ensure the shortest response times through a close network of service areas. During normal working hours you can get in touch directly with your responsible service technician. You will find the contact details on the control cabinet of your boiler system. For emergencies and outside business hours, the 24-hour hotline is available:

Service Hotline Germany/International:  
+49 180 5667468\*  
Service Hotline Austria:  
+43 810 810300\*\*



More than 200  
Bosch service  
technicians and  
certified service  
partners  
worldwide

### Commissioning up to remote analysis

Our boiler service covers the entire life cycle of your plant from commissioning to regular maintenance. Service access via MEC Remote provides fast and cost-efficient remote support. Not sure whether your boiler system is still state-of-the-art and working efficiently? Here too, our experts provide support and evaluate potential modernisation measures based on your specific situation.

### Reliable spare parts supply

Several thousand parts are available immediately from the factory. We are happy to support you with professional installation of the spare parts. For highest system availability and shortest reaction times we recommend to use our customised spare parts packages.

Spare parts hotline Germany/International:  
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\* 0.14 euros/min. from the German fixed network; mobile phone maximum price 0.42 Euro/min.

\*\* max. 0.10 euros/min. from the Austrian fixed network  
Costs for calls from mobile networks and international connections may vary.

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