

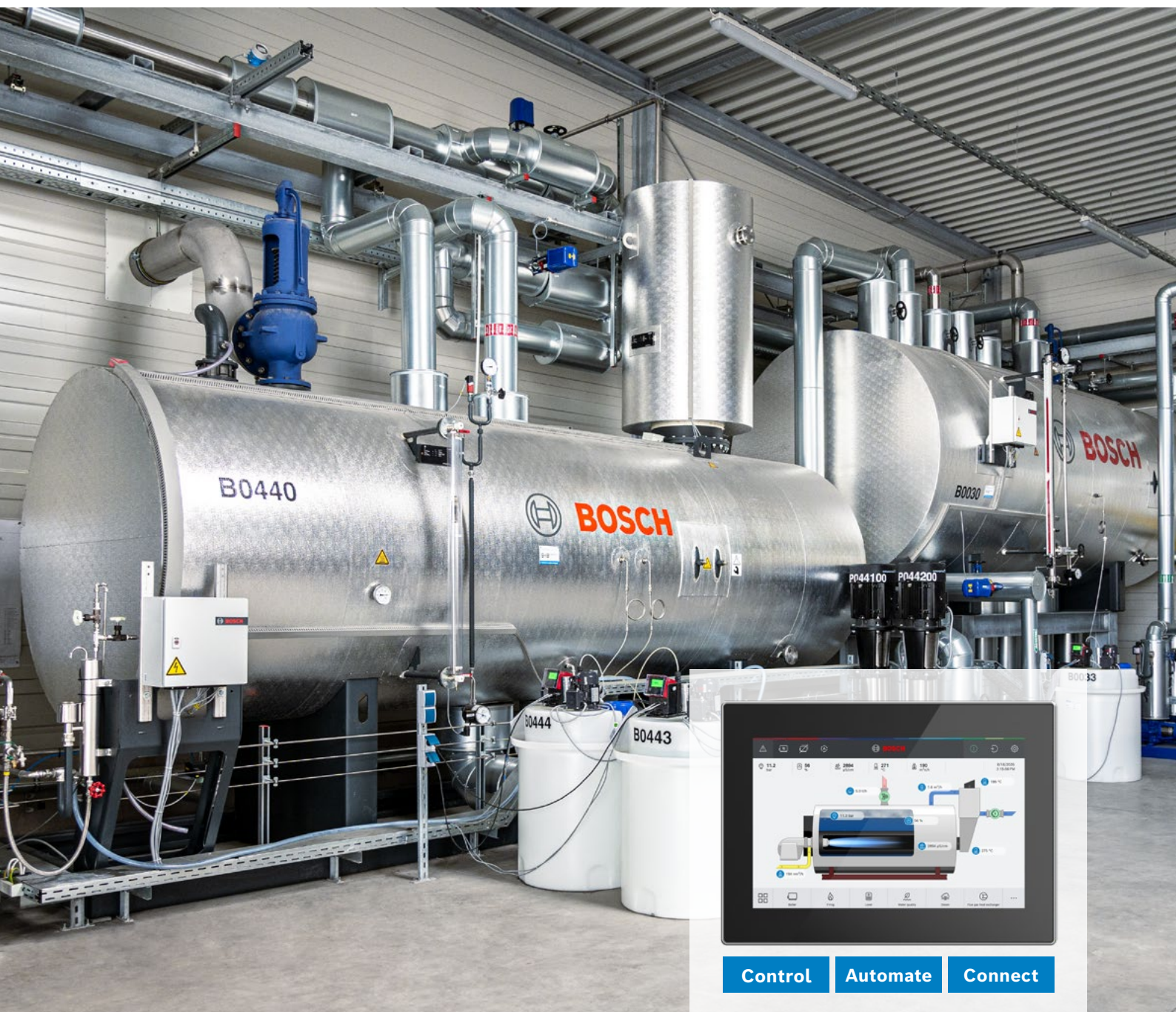
Invented for life



# Boiler components and controls

## For high efficiency, reliability and automation

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Hot water boilers  
Heating boilers

|                     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                     |  |  |  |  |  |
|                     | <b>ELHB</b>                                                                       | <b>UT-L</b>                                                                       | <b>UT-M</b>                                                                       | <b>UT-H</b>                                                                         | <b>UT-HZ</b>                                                                        |
| Output MW           | 0.25–5.5                                                                          | 0.65–25                                                                           | 0.75–19.2                                                                         | 0.82–18.3                                                                           | 13–38                                                                               |
| Temperature max. °C | 190                                                                               | 110                                                                               | 190                                                                               | 225                                                                                 | 225                                                                                 |
| Pressure max. bar   | 16                                                                                | 16                                                                                | 16                                                                                | 30                                                                                  | 30                                                                                  |
|                     | 100 % electric                                                                    | H <sub>2</sub> / Biofuels                                                         | H <sub>2</sub> / Biofuels                                                         | H <sub>2</sub> / Biofuels                                                           | H <sub>2</sub> / Biofuels                                                           |

Steam boilers

|                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|---------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                     |  |  |  |  |  |
|                     | <b>ELSB</b>                                                                         | <b>U-MB</b>                                                                         | <b>CSB</b>                                                                          | <b>UL-S(X)</b>                                                                        | <b>ZFR(X)</b>                                                                         |
| Output t/h          | 0.35–8.3                                                                            | 0.2–2                                                                               | 0.3–23.6                                                                            | 1.25–28                                                                               | 18–55                                                                                 |
| Temperature max. °C | 224                                                                                 | 204                                                                                 | 204                                                                                 | 300                                                                                   | 300                                                                                   |
| Pressure max. bar   | 24                                                                                  | 16                                                                                  | 16                                                                                  | 30                                                                                    | 30                                                                                    |
|                     | 100 % electric                                                                      | H <sub>2</sub> / Biofuels                                                           | H <sub>2</sub> < 20 % / Biofuels                                                    | H <sub>2</sub> / Biofuels / Hybrid                                                    | H <sub>2</sub> / Biofuels                                                             |

Efficiency

|                                                                                     |                                                                                     |                                                                                      |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |
| <b>Heat recovery boiler HRSB</b>                                                    | <b>4-pass boiler with burner</b>                                                    | <b>3-pass boiler without burner</b>                                                  | <b>Recovery and use</b>                                                               |
| Heat recovery steam boiler                                                          | Heat recovery boiler steam/hot water                                                |                                                                                      | Waste heat                                                                            |
|                                                                                     | H <sub>2</sub> / Biofuels                                                           |                                                                                      |                                                                                       |

Components

|                                                                                     |                                                                                     |                                                                                      |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |
| <b>Boiler and system controls</b>                                                   | <b>Water</b>                                                                        | <b>Steam and condensate</b>                                                          | <b>Fuel supply</b>                                                                    |
| Control cabinet                                                                     | Modules                                                                             | Modules                                                                              | Burner systems                                                                        |

Quality through 150 years of experience

Bosch Industrial Boilers is renowned worldwide as a specialist supplier of boiler systems in all sizes and output categories. For over 150 years we have been providing innovation in industrial boiler construction.



The company, which began in 1865 as a small boiler maker under the Loos family name, has developed in recent decades into a leading global system supplier for industrial boilers. More than 120,000 boiler

systems supplied to over 140 countries worldwide confirm the renowned quality, reliability and efficiency of our industrial boilers, which are manufactured in Gunzenhausen (Germany) and Bischofshofen (Austria).

Efficient systems

Our modular boiler systems can significantly reduce operating costs compared to conventional boilers. In addition to minimising fuel consumption, our boiler systems also reduce the consumption of water, chemicals and electric power as well as the work involved in operation and supervision.

Perfectly controlled

Thanks to the intelligent Bosch control systems, the availability and also the efficiency of the boiler plants increase. Smart control features, such as for example for cold starts or for multi-boiler systems, significantly extend the service life of the boiler systems.



Competence in every phase

Whether it is 3D data, technical drawings or documents for tendering and approval, the experts from Bosch offer specialist support at every phase of the project – from conception through to commissioning.

Trust and openness between partners ensure that mutual success is achieved. Thanks to the customised dimensioning and equipping of the boiler systems, individual solutions can be created and modules retro-fitted easily.



Precision due to welding in ideal position

Thanks to horizontal welding with highly modern welding processes, a more homogeneous structure, a deeper root penetration and notch-free welding surfaces are achieved.

Use of welding robots

Semi-automatic and fully automatic welding robots are used for consistently high quality on highly-stressed welding seams.



Low-stress materials

Modern plasma and laser cutting systems ensure smooth metal processing and cutting. This means that our boilers have higher stress reserves during operation.

In-house manufacture of flame tubes

All smooth and corrugated flame tubes are manufactured in-house and are subject to the most stringent quality requirements.



Health and safety at work and promotion of young talent

Only happy and focused employees will deliver top quality. The very latest safety concepts and equipment and materials for the work to be carried out are part of our overall manufacturing concept, just like the training and further education of our staff.

Experts with certified knowledge

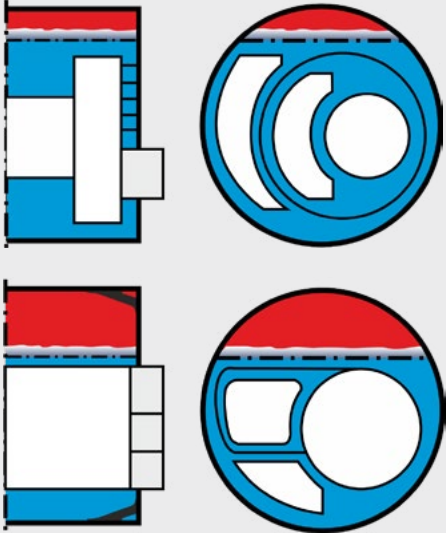
Our nearly 200 boiler welders have more than 1,000 welding exam qualifications. This means that welding of the highest level in accordance with internationally recognised standards is achieved.

Optimum design

Thanks to an ideal ratio between water content and steam chamber, Bosch boilers are optimised in their design for rapid heating and a high level of steam quality. Ideal temperature distribution and release of vapour bubbles enables the boilers to be operated very efficiently even during periods of dynamic loads. Compared to other boiler designs, the Bosch design with its high steam chamber minimises high-water shutdowns and water entrainment. Our intelligent three-component control, combined with pilot signals from large consumers and less frequent pre-ventilation (burner starts), also enables the boiler to react particularly quickly and reliably to load peaks.

High level of durability

The boiler design traditionally used in old steam locomotives has been continuously developed. The design with its fully inserted flame tube and without stud bolts offers the maximum level of robustness and an increased resistance to cold starts.



Old boiler construction with stud bolts (upper drawing). Boiler construction from Bosch (bottom drawing): With optimised steam chamber and optimised power transmission between flame tube and boiler body for long service life.



Certified quality

We manufacture our products in line with current standards and in accordance with the relevant applicable specifications for over 140 countries. The quality management systems in our factories are certified in accordance with strict guidelines. At the customer's request, we also carry out additional checks.



Maximum quality monitoring

We consider quality to be a top priority. Plant inspectors certified by TÜV and TÜV employees monitor and document our quality during manufacture and through to acceptance.

Precision and analysis

An in-house laboratory for welded seam inspections and material analysis provides maximum transparency. Up to 100% of the welding seams of the pressure vessel are X-ray inspected. In total, more than 25,000 X-ray images are analysed in our three X-ray chambers every year.

## Modules for steam boilers

Our modules for steam boilers allow you to equip your system according to your requirements. They ensure maximum operating safety as well as long service life and a high level of efficiency under the specific operating conditions.

### Water service module WSM

The water service module supplies steam boilers with degassed and chemically conditioned feed water and disposes of the desalting and waste water.

- ▶ Feed in and storage of condensate and make-up water
- ▶ Thermal partial deaeration of the feed water with WSM-T
- ▶ Thermal full deaeration of the feed water with WSM-V
- ▶ Chemical conditioning of the feed water
- ▶ Expansion and cooling of the desalting and waste water
- ▶ Cooling of the water samples
- ▶ PLC control and visualisation of
  - water level in the tank
  - feed water temperature for the WSM-T
  - tank pressure for the WSM-V
  - blow-down temperature
- ▶ Control for chemical dosing
- ▶ Dry running protection feed pump module
- ▶ Overflow protection

#### Construction

All components are piped, thermally insulated and electrically wired into a multi-functional assembly unit. Complex scaffold constructions are not necessary: The compact module is mounted on a stable support device and designed for installing at ground level. The PLC-based control with touch display controls all relevant functions automatically.



Water service module WSM-V for full deaeration for all steam boiler systems with outputs ranging from 2,000 to approx. 100,000 kg/h.



Water service module WSM-T for partial deaeration for all steam boiler systems with outputs of up to 8,000 kg/h.

#### Equipment level

The module consists of the steam heated feed water tank, the chemical dosing device, the blow-down and expansion tank, a water sample cooler and the associated fittings as well as the control cabinet. Optionally, there are additional components such as a heat recovery facility for desalting water, a second chemical dosing device or feed pump modules available. For the WSM-V is a spray or trickle deaerator mounted on the feed water tank.

### Steam accumulator module SAM

The module is used for storing a defined energy content that is available as expansion steam during pressure reduction. The application area is the covering of peak loads e.g. if the capacity of a steam generator is exceeded briefly. The greater the water content of the accumulator, the greater the re-evaporation heat is.

The steam accumulator is filled 50 % with water and is heated up with steam to the boost pressure. The accumulator is discharged by opening the shut-off devices on the consumer side. Always the exact same steam quantity that was removed previously is fed into the accumulator. As a result, it is generally not necessary to feed additional feed water into the steam accumulator during operation. A float condensate trap is provided to prevent an increasing water level.

#### Construction

The steam accumulator consists of a horizontal cylindrical tank with a built-in steam nozzle pipe.

#### Equipment level

The module is thermally insulated and delivered with assembled equipment ready for operation. The module is fitted with a venting, drain shut-off, filling shut-off, steam inlet and outlet valves, an overflow and overpressure protection, a direct temperature display as well as a water level indicator.

#### Benefits

- ▶ Fast and easing planning, installation and acceptance
- ▶ No need for positive suction head, ground level installation
- ▶ Ready for operation with just a few connections
- ▶ Easy commissioning, maintenance and operation
- ▶ Complete warranty unit
- ▶ Reliable spare parts supply
- ▶ Easy transportation and relocation
- ▶ High degassing efficiency with WSM-T
- ▶ Highest degassing efficiency with WSM-V
- ▶ Reduced consumption of chemicals with WSM-V
- ▶ Trouble-free and reliable boiler and system operation

#### Benefits

- ▶ Balance of brief peak loads
- ▶ Reduction of water entrainment and its negative effects
- ▶ Reduction of switching frequency of the steam generators
- ▶ Reduction of the energy consumption and wear



## Condensate service module CSM Condensate high-pressure plant CHP

Condensate from steam consumers is channeled, collected and temporarily stored in the condensate service module. A condensate pump pumps the condensate back into the feed water deaeration plant if the corresponding need for water arises. Unpressurised condensate service modules are usually installed near the consumer.

With the condensate high-pressure plant the condensate is kept at pressure and temperature so that expansion steam losses are prevented or significantly reduced. The condensate is fed directly to the steam boiler via the condensate pump when required. Deaeration once again of the high-pressure condensate is not necessary. Condensate high-pressure plants should always be used if the discharge into the feed water tank or into unpressurized condensate service modules would be accompanied by high expansion steam losses due to the condensate parameters.



The unpressurised condensate service module collects the condensate streams and channels them back into the water/steam circuit via the deaeration system.

### Construction

All components are piped, thermally insulated and electrically wired into a multi-functional assembly unit. The unpressurised condensate service module is mounted on a stable support device and designed for installing at ground level. The condensate high-pressure plant is prepared for open installation and needs a positive suction head of at least 1.5 meters. The intelligent control with touch display controls all relevant functions automatically.

### Equipment level

The system consists of the components condensate tank, condensate pump module, control cabinet and equipment accessories. The system's piping and thermal insulation is pre-installed ex works.

### Benefits

- ▶ Decrease in energy and water consumption by reducing make-up water quantities
- ▶ Minimisation of expansion steam losses, desalting and blow-down quantities, less chemical consumption and reduced corrosion potential in the steam-condensate-system when using condensate high-pressure plants



The amount of fuel, make-up water requirement and use of chemical dosing agents for the water treatment can be reduced drastically by a condensate high-pressure plant.

## Blow-down, expansion and cooling module BEM

The purpose of the blow-down, expansion and cooling module BEM is the intake of all hot waste water of a steam boiler system. This waste water is collected, expanded and cooled down to the permitted, set discharge temperature. The module is designed for multi-boiler systems with a max. of three steam boilers.

### Construction

A closed, upright container mounted on a supporting structure, with various feed and drain connections. The lower half of the module is filled with water during operation, the upper half is expansion space. The prevailing media temperature is recorded and converted to an electrical signal with the temperature measuring transducer in the lower part of the module. Mixed cooling is achieved by the supply of cold, softened make-up water and the waste water is safely drained off when the permitted discharge temperature is reached. The discharge temperature can be controlled by the control system of the water service module.

### Equipment level

The module comprises a vertical cylinder sealed with plates at both ends and a protection against contact. It is offered thermally insulated and fully assembled ex works with all necessary fittings.

### Benefits

- ▶ Quick and easy assembly, ready for immediate operation with few connections
- ▶ Exact compliance with official guidelines thanks to automatic operating mode



## Expansion and heat recovery module EHM

The module recovers a substantial amount of the heat quantity contained within the hot water (desalting water/condensate) of a boiler system. In the expansion tank the water that is under pressure is expanded. The expansion steam produced thereby supports the heating of the feed water tank. In the downstream heat exchanger the make-up water of the boiler system is preheated and the desalting water/condensate is cooled to a temperature of approx. 35°C.

### Construction

The module comprises an expansion tank, an integrated heat exchanger for heat recovery, the supporting structure and the necessary equipment.

### Equipment level

The module is offered thermally insulated and fully assembled ex works with all necessary fittings.

### Benefits

- ▶ Quick and easy assembly, ready for immediate operation with few connections
- ▶ Increase in efficiency of the system
- ▶ Reduction of the fuel, cooling water and waste water costs



## Expansion, heat recovery and blow-down module EHB

The module comprises the combination of the expansion and heat recovery module EHM with the blow-down, expansion and cooling module BEM. Its purpose is therefore the recovery of the energy contained within the hot water (desalting water/condensate) and the discharge of waste water taking into account the permitted discharge temperature.

### Construction

The module consists of an expansion tank as well as a waste water and cooling tank. A heat exchanger with associated fittings is integrated for heat recovery.

### Equipment level

Two cylinders one above the other sealed with plates at both ends, a collecting station, all necessary fittings, the internal piping and thermal insulation are included in the scope of delivery and are offered ex works fully assembled.

### Benefits

- ▶ Quick and easy assembly, ready for immediate operation with few connections
- ▶ Exact compliance with official guidelines thanks to automatic operating mode
- ▶ Increase in efficiency of the system
- ▶ Reduced fuel, cooling water and waste water costs



## Vapour cooler VC

In thermal full deaeration systems, exhaust vapour accumulates inherently. Without a vapour cooler, exhaust vapour would be dissipated into the open air. In the vapour cooler, however, the exhaust vapour condenses by means of a heat exchanger. The released thermal energy generated during the cooling of the exhaust vapour is used to heat up the make-up water.

### Construction

Plate-type heat exchanger with threaded connections, wetted parts are made of stainless steel.

### Equipment level

The module comprises a heat exchanger with associated fittings.

### Benefits

- ▶ Heat recovery and thus efficiency improvement
- ▶ Useable energy for additional heating or for transfer to separate water circuit
- ▶ Reduced fuel consumption



## Pump module PM

The module is used for pumping the feed water from the feed water tank into the steam boiler or for pumping the condensate from the condensate tank into the deaeration plant. The pump module is optionally equipped with a motor with frequency converter for infinitely variable, demand-related water quantity control.

### Construction

The supplied pumps are vertical multi-stage high-pressure centrifugal pumps with a fully enclosed, fan-cooled motor. They are designed especially for use in shell boilers.

### Equipment level

The pump module is delivered fully assembled ex works on a console with pressure indicator, shut-off, filter and non-return valves.

### Benefits

- ▶ Pre-assembled for quick installation
- ▶ Speed-controlled version for increasing the efficiency of the flue gas heat exchanger
- ▶ Reduction in power consumption and increase in operating convenience



## Feed water regulation module RM

If no speed-controlled feed pump is available, continuous regulation with the feed water regulation module RM is recommended as an alternative for all boilers fitted with modulating burners and flue gas heat exchangers. The module ensures longer flow-through times of the flue gas heat exchanger and thus optimum heat recovery from the boiler flue gases. At the same time, the minimum quantity required for the feed pump cooling is ensured via the feed water regulation module.

The prefabricated module is used at a suitable location in the feed water pressure line. It is switched as supply flow control.

### Equipment level

The feed water regulation module for infinitely variable control consists of a feed water control valve, discharge device, dirt trap device and two shut-off valves as well as a bypass device.

### Benefits

- ▶ Increase in efficiency of the flue gas heat exchanger
- ▶ Reduction of the pump switches
- ▶ Constant boiler water level
- ▶ Reliable minimum flow rate for cooling the feed pump



Flue gas heat exchanger ECO stand-alone

A flue gas heat exchanger, also called an economiser, is part of the standard equipment for energy-optimised and environmentally friendly boiler operation.

Flue gases contain significant heat potential at high temperature. Economizer modules with their highly-efficient heat recovery surfaces utilise this heat potential and thus increase the boiler efficiency of new or existing steam boiler systems significantly. The flue gas heat exchanger is installed downstream of the boiler and is used for “dry” operation for heating up feed water. To use the condensing heat, the flue gas condensation can take place in an additional downstream flue gas heat exchanger module and make-up water can be heated up.

Construction

In the lower part, the flue gases are collected and flow through the integrated heat exchanger in the upper part for heat recovery.

Equipment level

Servo drive, piping of the connections, flue gas control and drain shut-off valves are fully assembled and included in the scope of delivery as well as the thermal insulation ex works.

Benefits

- ▶ Effective waste heat recovery increases boiler efficiency
- ▶ High fuel savings and reduced CO<sub>2</sub> emissions
- ▶ Integrated into the boiler or as a stand-alone version for easy retrofitting



Steam distributor SD

In the distributor, the generated steam mass flow is distributed to the consumer and residual moisture is separated and drained.

Construction

A collecting pipe with an order-related number of pipe outlets is fully assembled with flange connections and all necessary fittings into a module unit.

Equipment level

The distributors are fitted with pressure indicators, shut-off, non-return and condensate drain valves and will be delivered thermally insulated.



Benefits

- ▶ Reduction of network losses by centralised distribution for systems with complex consumer structures
- ▶ Savings thanks to centralised operation and maintenance

Air preheating system APH

By means of this system the combustion air is preheated and the flue gas temperature is reduced. The efficiency is increased.

When installing a new steam boiler system with economizer, air preheating is the ideal solution for increasing efficiency, particularly in cases where the integration of a flue gas condenser is impractical for process reasons. The Bosch air preheating system is available for single-flame or double-flame tube boilers with duoblock burners. The system is economically viable from a boiler capacity of around five tonnes of steam per hour. The fan can be installed on the top of the boiler, this means that the compact system requires little space for installation. Return-on-investment (ROI) is generally achieved after 1.5 to 2 years.

Construction

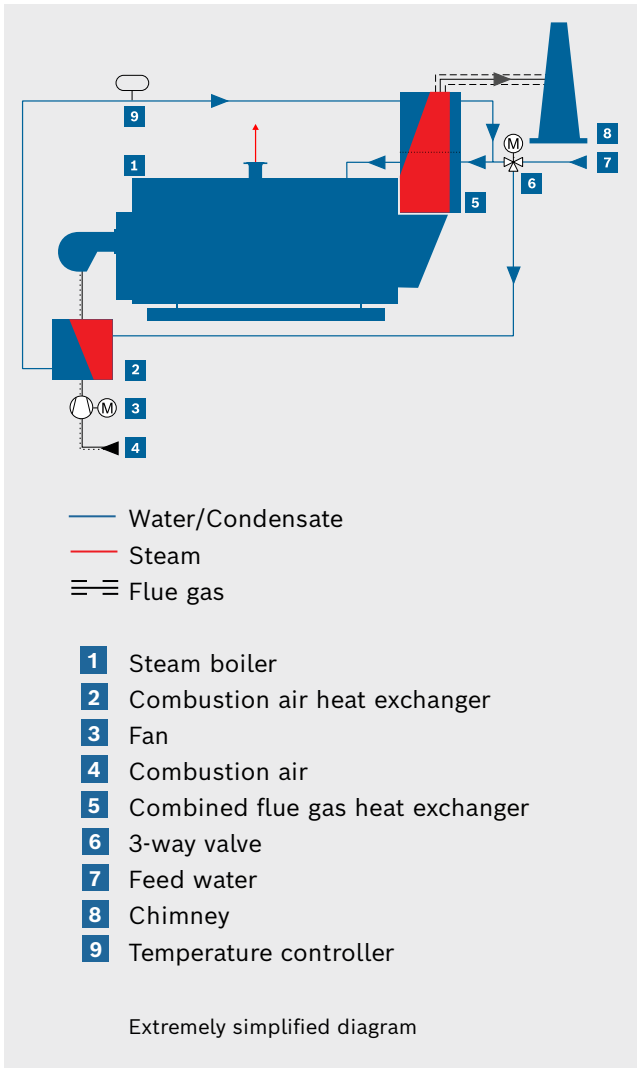
In the Bosch system, a part of the heated feed water flow is utilised for increasing the temperature of the combustion air. The hereby cooled feed water increases efficiency by further reducing the flue gas temperature in the downstream, combined economizer.

Equipment level

The air preheating system consists of a three-way valve, a combined flue gas heat exchanger and an air-side heat exchanger. In comparison with conventional two-circuit systems, it is now possible to omit the circulation pump, the expansion vessel and various electronic safety and control systems. This reduces not only investment costs, but also the recurrent costs for maintenance and replacement parts.

Benfits

- ▶ Increased system efficiency
- ▶ Reduced fuel consumption
- ▶ Reduced emissions
- ▶ Lower investment costs in comparison with conventional solutions
- ▶ Lower maintenance and servicing costs
- ▶ Shorter period of amortisation
- ▶ Superior quality standardised system from Bosch



Feed water cooling module FWM

The flue gas temperature is an important criterion for assessing the efficiency of a steam boiler system. Older and smaller systems have often relatively high flue gas temperatures, which is accompanied by unnecessary high fuel costs. For systems with medium to high operating hours technical solutions for reducing the flue gas losses such as condensing heat exchangers or air preheating systems pays off quickly. However, the feed water cooling module is the most cost-effective alternative for systems with lower operating hours. It is easy to retrofit and particularly suitable for:

- ▶ Boilers with low to medium condensate recirculation
- ▶ Systems without modules for fresh water preheating
- ▶ In the case of continual hot water demand, e.g. for office buildings or industrial processes
- ▶ Boiler systems with economizers but without downstream condensing heat exchangers
- ▶ Boilers with low operating hours, e.g. production with single-shift operation
- ▶ Boilers with an output < 10 t/h

Construction

Cold make-up water is heated up in the feed water cooling module by using the warm feed water in a heat exchanger. As a result of the feed water cooling down, there is a larger temperature difference between the water and flue gas in the economizer. The flue gas outlet temperature decreases due to the better heat transfer in the economizer. The firing efficiency is thus enhanced by up to 1.8%. The control of the module ensures that the temperatures and flow rates are always within the permitted range.



It thereby prevents:

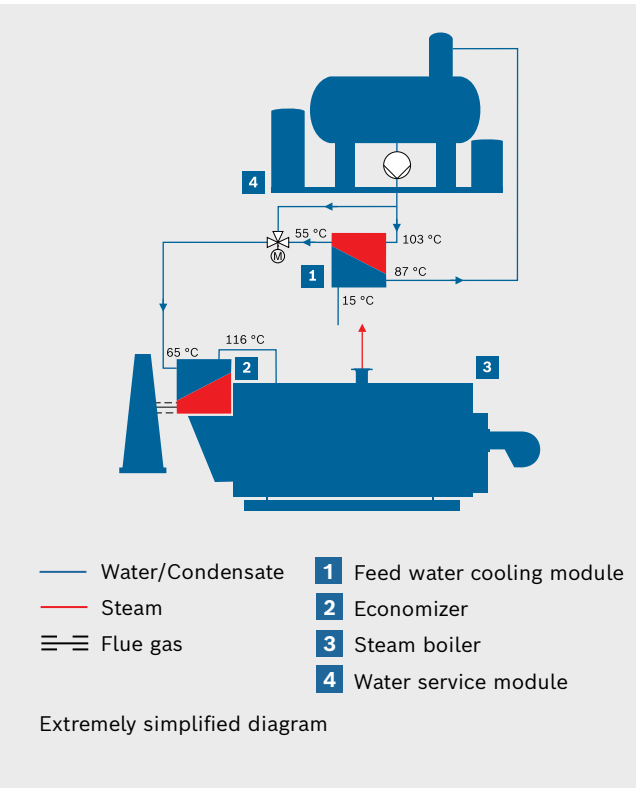
- ▶ Thermal stresses caused by too cold feed water flowing into the boiler
- ▶ Corrosion caused by unwanted condensation of the flue gas when it is cooled down too much

Equipment level

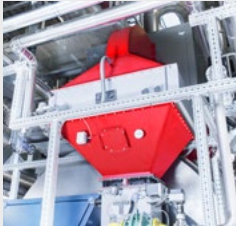
The feed water cooling module consists of an insulated plate-type heat exchanger, valves, pipe connection pieces and temperature sensors. It is delivered installation-ready on a base frame. The dimensioning of the module and the parameterisation of the control are made specifically to order – based on the system’s mode of operation.

Benefits

- ▶ Reduced fuel costs
- ▶ Easy retrofitting to older systems thanks to a small space requirement and simple piping
- ▶ Matched control for safe operation of the boiler and components
- ▶ Quick amortisation, even on systems with few operating hours
- ▶ Ready for operation with just a few connections
- ▶ Simple commissioning, operation and maintenance



Reduce fuel consumption and CO<sub>2</sub> emissions

|                                                                                                                                                         |                                                                                                                                                    |                                                                                                                                                |                                                                                                                                                   |                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flue gas heat exchanger<br><br>up to 7% less fuel                    | Condensing heat exchanger<br><br>up to 7% less fuel             | Condensate high-pressure plant<br><br>up to 12% less fuel   | Air preheating system<br><br>up to 2.5% less fuel              | Feed water cooling module<br><br>up to 1.8% less fuel                 |
| Heat recovery module desalting/condensate<br><br>up to 2% less fuel | TDS control and low salt operation<br><br>up to 3.4% less fuel | Vapour cooler (deaerator heat)<br><br>up to 0.5% less fuel | O <sub>2</sub> and/or CO controls<br><br>up to 0.5% less fuel | Speed control (combustion air fan)<br><br>up to 75% less electricity |

The savings potential is plant-specific and depends on the operating mode. Many of the measures can be combined.

Increase automation, reliability and longevity

|                                                                                                                                                         |                                                                                                                                    |                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Water service module, water treatment module, blow-down module<br> | Boiler and system controls incl. software<br> | Feed water regulation and pump modules<br> |
| Steam accumulator module<br>                                       | Steam distributor<br>                         | Fuel supply modules<br>                    |

# Modules for hot water boilers

Our modules for hot water boilers facilitate installation and ensure safe operation of your system. They are pre-assembled ready to be installed and optimally suitable for retrofitting.

## Supply flow adapter piece SP

A flange adapter including safety equipment for closed systems.

**Construction**

A tube with flange connections for the supply line with mounting of the safety equipment.

**Equipment level**

The supply flow adapter piece is fitted with a built-on level limiter, maximum pressure limiter, pressure indicator, manostat tube with shut-off valve, shut-off valves (emptying, test function) and shut-off valve with test connection.

**Benefits**

- ▶ Pre-assembled for quick installation
- ▶ Exact compliance with official guidelines



## Return flow adapter piece RP

Flange adapter for installation at the return flow nozzle.

**Construction**

A T-tube with various flange connections and a connection for the temperature monitoring.

**Equipment level**

On this return flow adapter piece a flange connection for the expansion line as well as a connection for a thermometer or temperature sensor is already provided.

**Benefits**

- ▶ Pre-assembled for quick installation



## Return flow temperature safeguard RTS

The return flow temperature safeguard of a hot water generator can be realised by means of temperature maintaining or temperature boosting.

**Construction**

All individual accessory parts such as supply flow adapter piece with safety equipment, return flow adapter piece, supply and return flow fittings, circulation pump and motor three-way valve are pre-assembled into the ready-to-install RTS module.

**Equipment level**

The return flow temperature maintenance consists of:

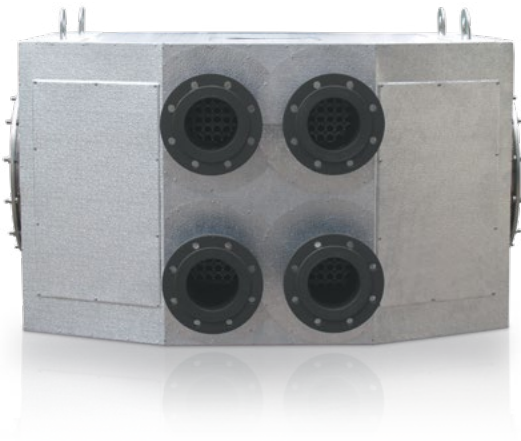
- ▶ Boiler circulation pump
- ▶ Three-way control valve
- ▶ Return temperature control
- ▶ Shut-off valves supply flow/return flow

The return flow temperature boosting consists of:

- ▶ Admixing pump
- ▶ Shut-off valve, suction side
- ▶ Shut-off valve, pressure side
- ▶ Non-return valve, pressure side
- ▶ Motor shut-off valve boiler return flow
- ▶ Shut-off valve boiler supply flow

**Benefits**

- ▶ Short assembly time of just a few hours
- ▶ Problem-free compliance with operating conditions



## Flue gas heat exchanger ECO stand-alone

The flue gas flows at the boiler outlet inherently have heat potential at a high temperature level. A heat exchanger extracts heat from the hot flue gas and, in return, preheats return water. The stand-alone retrofit variants are available without bypass for gas-fired heating boilers as well as with bypass and flue gas control damper for hot water boilers with oil/gas dual-firings.

If a separate water circuit is available, the use of condensing technology by means of a stainless steel flue gas condenser is recommended.

**Construction**

Heat exchanger in welded construction for installation downstream of the boiler, with connecting pieces for water inlet, water outlet and drainage, and including inspection openings on the flue gas side. With the bypass version, the hot flue gases are controlled by means of control dampers.

**Equipment level**

The module is fully assembled. Lifting lugs, feet or transport rails and a flue gas control valve are included in the scope of delivery ex works as well as the thermal insulation.

**Benefits**

- ▶ Improved energy efficiency
- ▶ High fuel savings and CO<sub>2</sub> reduction
- ▶ Integrated into the boiler or as a stand-alone version for easy retrofitting

## Modules for supplies to the boiler and intelligent control systems

You can setup the operation of hot water and steam boilers according to your needs with our ready-to-install modules for supplies to the boiler. Our smart control technology enables maximum automation, energy efficiency and reliability.

### Water treatment module WTM

To avoid boiler scale, it is only permissible to operate boiler systems with softened feed water. In the guidelines on water characteristics, the permitted total hardness for different types of boilers and operational modes is limited. For softening water, raw water is filtered and make-up water is generated by means of the ion exchange process. The hardening components calcium and magnesium ions are replaced by sodium ions.

Fully automatic versions simplify operation, prevent operating errors, enable continuous operation and ensure increased utilisation of capacity when using the same raw water hardness.

#### Construction

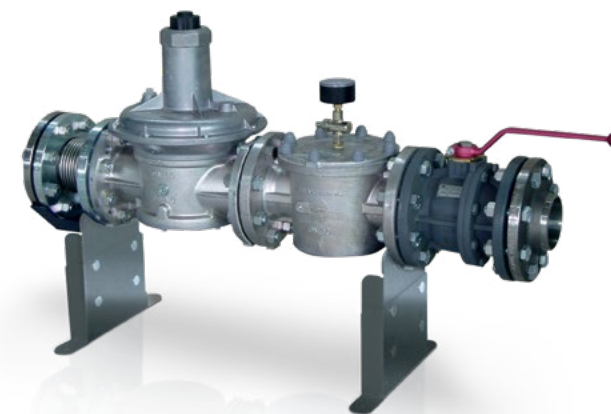
On a support structure, all elements of the water softening plant are clearly and functionally arranged fully assembled. The WTM is suitable for all boiler sizes.

#### Equipment level

The WTM consists of the water softening system and a salt-softening receptacle. A drainage water connection, sampling device, pressure indicator as well as control fittings, shut-off and filter valves complete the module.

#### Benefits

- ▶ Constant softened feed water for preventing calcification of the boiler heating surfaces
- ▶ Good heat transfer, high efficiency and long service life of the boiler
- ▶ High degree of operational reliability
- ▶ Quality-controlled version allows external hardness monitoring to be dispensed with – e.g. for improved utilisation of capacity and without the need for permanent supervision of operation even in the case of varying raw water hardness



### Gas regulation module GRM

The module regulates the constant gas pressure upstream of the burner – irrespective of the level of the input pressure and gas flow rate. Ensures against inadmissible gauge pressure and inadmissible gas flow rate.

#### Construction

All elements included in the scope of delivery are arranged in the necessary order and delivered fully assembled on a support structure.

#### Equipment level

The gas regulation module GRM includes all fittings such as filter, ball valve, shut-off valve etc., which are necessary for the gas-side fuel supply of the burner.

#### Benefits

- ▶ Pre-assembled for quick installation
- ▶ Exact compliance with official guidelines
- ▶ Increase of operating safety



### Oil circulation module OCM

The oil circulation module prepares liquid fuels and records the throughput. As a ready-to-connect extraction module for each burner for easy installation in ring lines with an upstream pressure of at least 1.5 bar. The two-chamber oil collector vessel is designed for light and heavy fuel oil pressure atomising burners with a return nozzle system.

#### Construction

The oil circulation module is combined into a fully assembled compact unit on a carrier plate and is delivered with a protective cover.

#### Equipment level

The module includes a two-chamber collector vessel, a filter valve, the oil quantity indicator, a shut-off valve, pressure safeguard valve, vent shut-off valve and two drain plugs. For heavy fuel oil operation there is also a heater cartridge for the filter and vessel.

#### Benefits

- ▶ Pre-assembled for quick installation
- ▶ Reliable recording of the oil throughput



### Oil supply module OSM

The oil supply module is used for pumping and filtering fossil fuels in ring lines for supplying one or more burners.

#### Construction

It is pre-assembled in an oil collection tray as a single or double station with all fittings for easy installation in the ring line.

#### Equipment level

Double stations enable filter cleaning without interruption of operations and offer 100% reserve. The heavy fuel oil pump module is fitted with electric or combination heating for steam or hot water.

#### Benefits

- ▶ Can be used for all Bosch boiler systems with oil firing and ring line supply
- ▶ Pre-assembled for quick installation



### Stand-alone flue gas heat exchanger with flue gas condensation

Using condensing technology, this flue gas heat exchanger recovers energy from the residual heat of the boiler flue gas.

The operating mode is the same as a normal economizer. The flue gas heat exchanger recovers heat from the hot boiler flue gas, while cool water flows through the heat exchanger tubes and reduces the flue gas temperature. The energy gained through flue gas condensation gives a higher level of boiler efficiency and therefore reduces fuel consumption and flue gas emissions.

#### Construction

Stainless steel heat exchanger in welded construction for installation downstream of the boiler, with connection pieces for water inlet, water outlet and drainage, and including inspection openings on the flue gas side. For the model with bypass, the hot flue gases are controlled by means of control dampers.

#### Equipment level

The module is fully fitted with lifting lugs and feet as well as a flue gas control valve and heat insulation.

#### Benefits

- ▶ Improvement of the efficiency level
- ▶ High fuel savings
- ▶ Easy retrofitting to existing systems
- ▶ Can be used with both steam and hot water systems



### Oil pressure regulation module ORM

Pressure controlling device for maintaining the pressure in the oil ring line.

#### Construction

The oil pressure control module consists of a controller, including connection parts such as manometer, manometer valve and a bypass valve.

#### Benefits

- ▶ Pre-assembled for quick installation
- ▶ Increase of operating safety



### Oil preheater module OPM

The oil preheater module preheats the pumpable heavy fuel oil to the atomizer temperature of the respective burner.

#### Construction

A cylindrical heat exchanger is combined into a compact unit assembled with fittings and delivered on a stable support structure.

#### Equipment level

The heat exchanger with an extendible tube bundle can optionally be fitted with steam or steam/electrical heating. The module, including the heating control, thermal insulation and all fittings, is pre-assembled ready to connect.

#### Benefits

- ▶ Can be used for all Bosch boiler systems with oil firing and ring line supply
- ▶ Increase of operating safety

# Control, automation, connectivity



Boiler control BCO

The BCO represents technological progress in **intelligent boiler control**. The system controls, monitors and optimises fully automated boiler operation.

Designed for all operators who prioritise maximum energy efficiency, safety and reliability.



System control SCO

The SCO is the **central control system for your modern boiler house**. It intelligently connects boilers and system components, and automates the entire plant management process.

Seamless communication for high process reliability and end-to-end data transparency.



Industrial Boiler Assist

Bosch Industrial Boiler Assist is the central platform for the **remote management of boiler systems**. Benefit from efficient remote support, continuous real-time monitoring and proactive alerts.

For ensuring a very high level of operational safety and availability for your steam and heat supply.

## Boiler and system controls: Connectivity and plug & play

### Seamless connection to the customer's automation systems

- ▶ The boiler and system controls (BCO/SCO) offer reliable data exchange via common industrial protocols and platform-independent standards
- ▶ Direct flow of information, centralised monitoring, and high process reliability

### Mobile system monitoring as a system extension

- ▶ Secure remote access to BCO and SCO user interfaces with Industrial Boiler Assist (optional)
- ▶ Location-independent monitoring via the Internet or company network, including alerting
- ▶ System has been developed in accordance with the requirements of the Cyber Resilience Act (CRA)

### Plug & play: Quick commissioning and standard-compliant acceptance

- ▶ Function-tested and ready for connection, housed in a wired control cabinet with preconfigured software
- ▶ Standard-compliant design (incl. DIN EN 50156-1) with system-specific wiring diagrams
- ▶ EU type-approved safety chain generally simplifies regulatory approvals considerably

OPC UA  
BACnet  
Profinet  
Profibus  
Modbus



### Capacitive multi-touch technology: For excellent usability

- Intuitive and smart operation
- Responds to touch without physical pressure
- High-resolution display with brilliant color depth



### User-centric UX design: For practical use

- Developed in cooperation with users and service experts
- Self-explanatory menus and realistic graphic displays
- Country-specific languages available



### Software architecture & scalability: For your tailored project

- PLC programming tailored to the design and hardware
- Modular, scalable software architecture – from central core functions to professional features



### Robust industrial panels: For industrial requirements

- Shock and temperature resistance
- Resistant to dirt and moisture (IP65 protection class)
- 10.1" and 12.1" widescreen TFT displays

Boiler Control BCO: Three key benefits for your operations

High degree of automation and top priority for operational safety

- ▶ Automated processes such as performance regulation, level control and demand-based desalting (steam)
- ▶ Gentle automatic start-up via start-up control SUC as an option (steam)
- ▶ Integrated monitoring and safety logics
- ▶ Coordinated interaction with the system control SCO for multi-boiler systems

Detailed data collection as the basis for well-founded analyses

- ▶ Recording and archiving of, for example, boiler operating hours, burner starts and cold starts
- ▶ Visualisation via informative graphs and summary tables
- ▶ Traceability of system development and seamless documentation of operational processes

Predictive condition monitoring to improve efficiency and availability

- ▶ Intelligent software module continuously analyses relevant measurement and consumption data
- ▶ Enables proactive intervention in the event of deviations (e.g. increased desalting rates)
- ▶ Diagnostic function for targeted troubleshooting



**Tailored boiler control for your project:**  
Automated boiler operation, reliable processes

System Control SCO: Three key benefits for your operations

Convenient plant management on high-performance industrial touchscreens

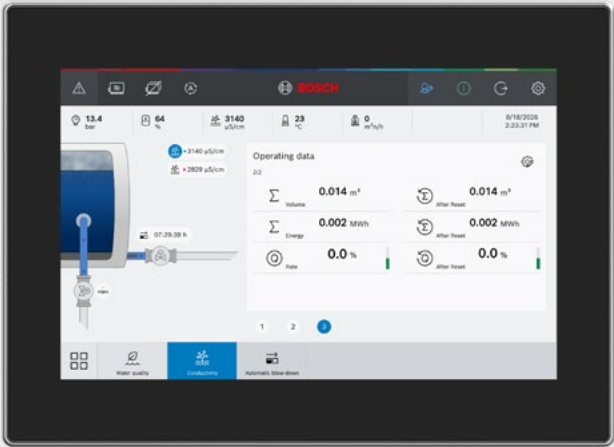
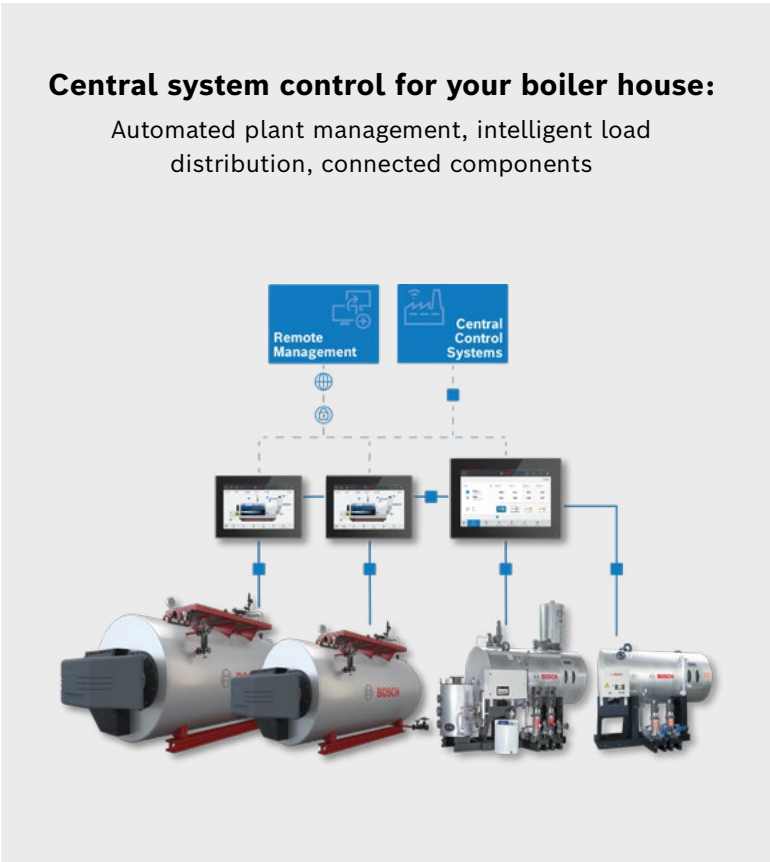
- ▶ Automates the entire operation of the boiler system in conjunction with the boiler control BCO
- ▶ Intelligent monitoring and safety features
- ▶ Transparent operation by storing and visualising all relevant data

Smart multi-boiler control for high energy efficiency and a long service life

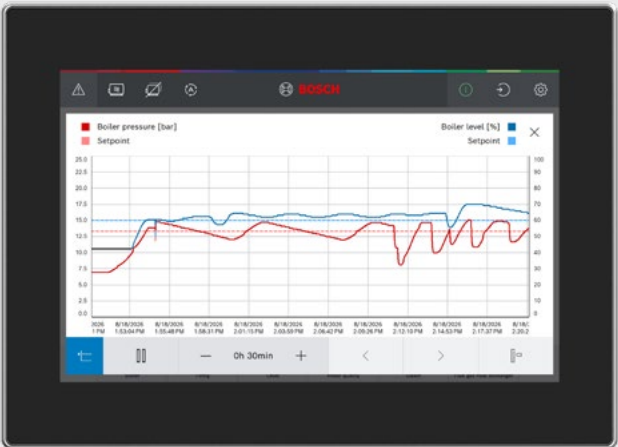
- ▶ Automatic adjustment of steam or heat generation to match actual demand
- ▶ Intelligent load distribution across individual energy generators and proactive heat maintenance mode

Simple integration of peripheral systems around the boiler

- ▶ Direct connection of modules such as deaeration plants, condensate systems and foreign matter monitoring
- ▶ Reliable data communication via industry-standard bus systems
- ▶ Fewer interfaces in the boiler house and a perfectly coordinated interaction



**Condition monitoring, example: desalting**  
Continuous analysis of operational data for high boiler efficiency



**Transparent system history:**  
Clear trend charts for the seamless documentation of all operational processes



## Industrial Boiler Assist: Remote management of boiler systems

### Flexible data access for seamless remote monitoring

- Keep an eye on your boiler system in real time, at all times, wherever you are
- Mirror the user interface of your control systems 1:1, navigate seamlessly through all menus, and securely access your process data
- Monitor multiple systems at different locations simultaneously

### Simple integration with a free choice of network connection

- Fast and efficient integration into both new and existing Bosch control systems (BCO, SCO)
- Minimal effort thanks to preconfigured remote technology
- Easy access via the Internet or company network – flexible use on all standard devices such as PCs and mobile phones

### Fast and cost-effective remote support from Bosch experts

- Enable secure online service access for Bosch experts on demand
- Fault diagnosis, parameterisation, and programming can be carried out quickly and directly online
- On-site service calls can be reduced through digital pre-identification of spare parts

### Very high system availability thanks to proactive alerting

- Immediate notification in the event of irregularities to safeguard your processes
- Receive predefined status updates directly via push notification or e-mail



### Certified cyber security for your remote access



- **Multi-level security:** Reliable protection against unauthorised access through latest encryption, two-factor authentication and regular security audits
- **Certified to strict standards:** for cybersecurity, data protection and cloud computing – ISO/IEC 27001, 27017, 27701 and IEC 62443-4-1, 62443-4-2
- **Future-proof regulatory compliance:** The system has been developed in accordance with the requirements of the Cyber Resilience Act (CRA)

## Bosch Industrial Service

Our industrial service for steam boilers and hot water boilers ensures plant availability even in the most demanding situations. You can rely on us.

### 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\*\*

### Commissioning up to remote analysis

Our boiler service supports you throughout the entire lifecycle of your system – from commissioning to regular maintenance. Fast and cost-effective remote support is ensured by secure service access via the Industrial Boiler Assist. 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:  
+49 180 5010540\*

\* 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.



### More than 200

Bosch service technicians and certified service partners worldwide.



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\* EUR 0.14/min from German landline; maximum mobile phone price: 0.42 Euro/min  
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