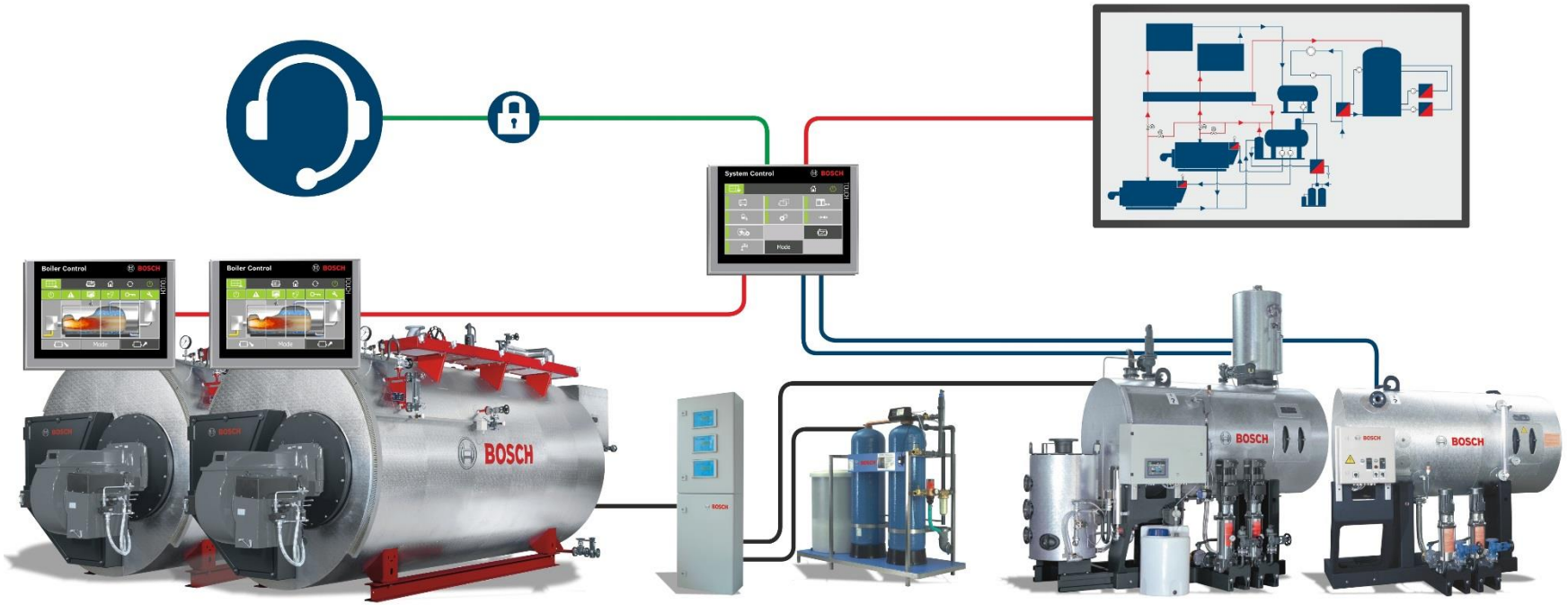

Intelligent control technology

Boiler control BCO / System control SCO

Thermotechnology

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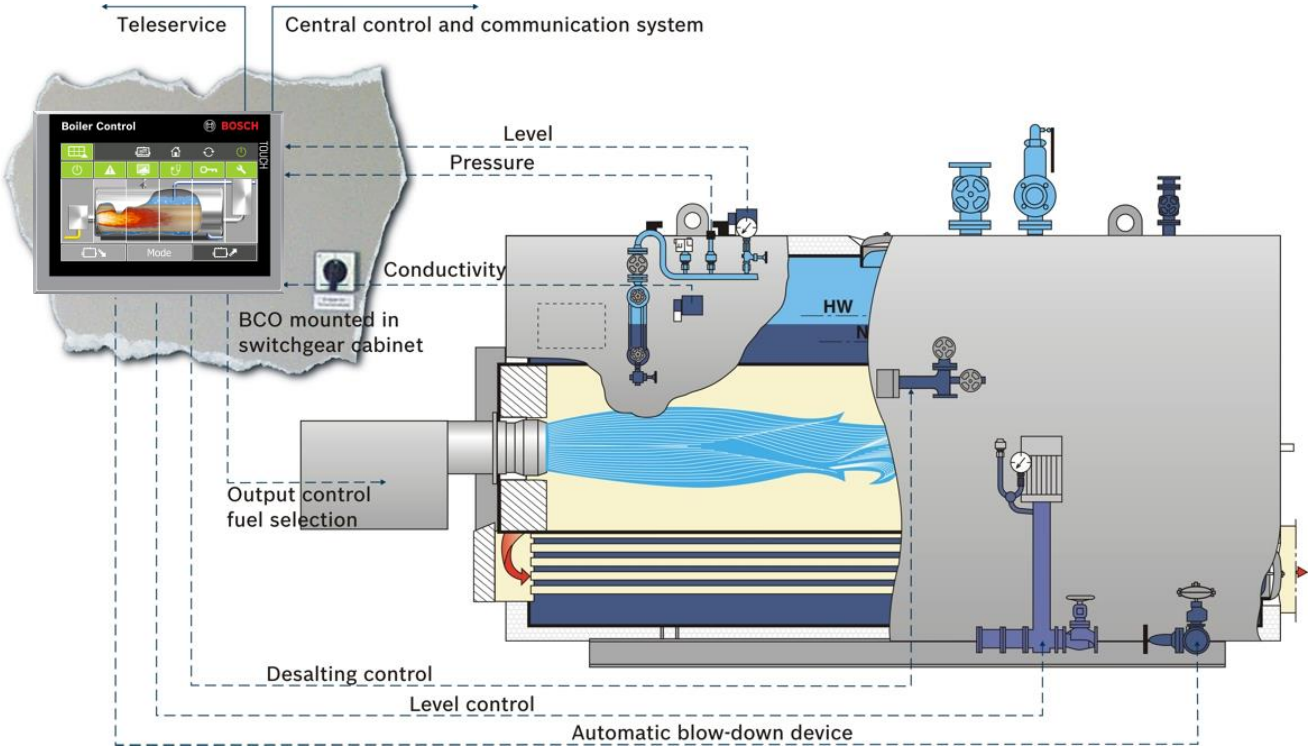
BOSCH

Boiler control BCO



One central automation device, with graphical user interface, ergonomically programmed.

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Boiler control BCO

- Programmable control with TFT colour display and touch-sensitive surface; integrated in the boiler control panel
- Display and setting of all necessary functions for operating steam and hot water boilers according to specialised requirements
- Automatic steam boiler operation with SUC start-up, standby and shutdown control
- Positive effect on consistently high system efficiency and availability of steam, hot water and heating boilers with “Condition Monitoring basic”
- Integrated diagnostics function for systematic elimination of irregularities in boiler operation

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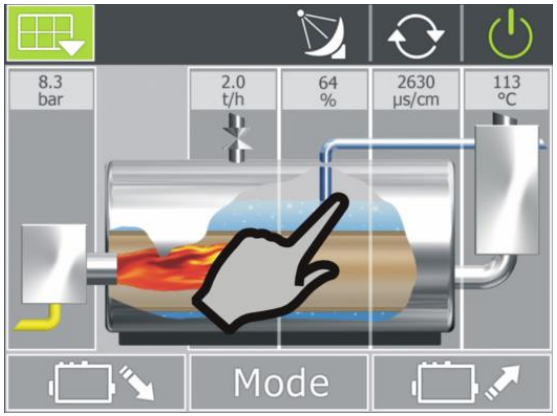
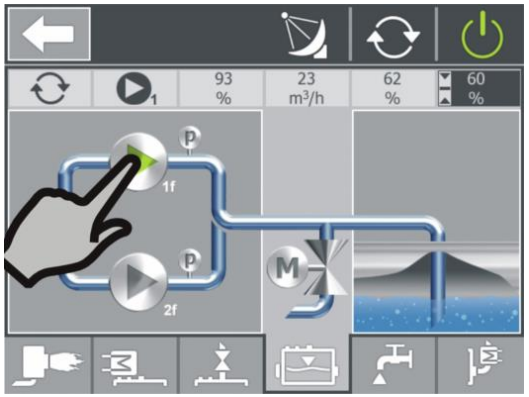
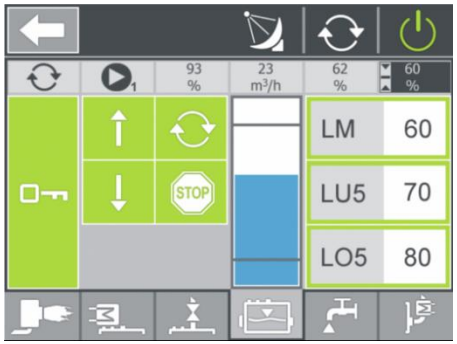
Basic functions BCO

- Performance regulation
- Level control
- Low-load control
- Boiler hours run meter
- Burner hours run meter
- Recording of number of burner starts
- Message history
- Plain text display of operating signals and fault messages
- Intuitive, menu-driven operation via touch-sensitive graphic display
- Display and intermediate storage of all relevant measured values and states
- Condition Monitoring basic
- Diagnostics function







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Benefits BCO

- Intuitive operation with graphical symbols and state-of-the-art touchscreen displays
- Simple optimisation of all measuring and control functions
- Maximum supply and operating reliability thanks to integrated monitoring and protection functions
- Easy connection to higher-level visualisation and control systems
- Ready for use with Teleservice: Operating parameters and messages can be accessed via an optional modem
- SUC start-up, standby and shutdown control allows fully automatic high pressure steam boiler operation
- Positive effect on consistently high system efficiency and availability of steam, hot water and heating boilers with Condition Monitoring basic
- Integrated diagnostics function for highest transparency and operating safety

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SUC automatic start-up, standby and shutdown control

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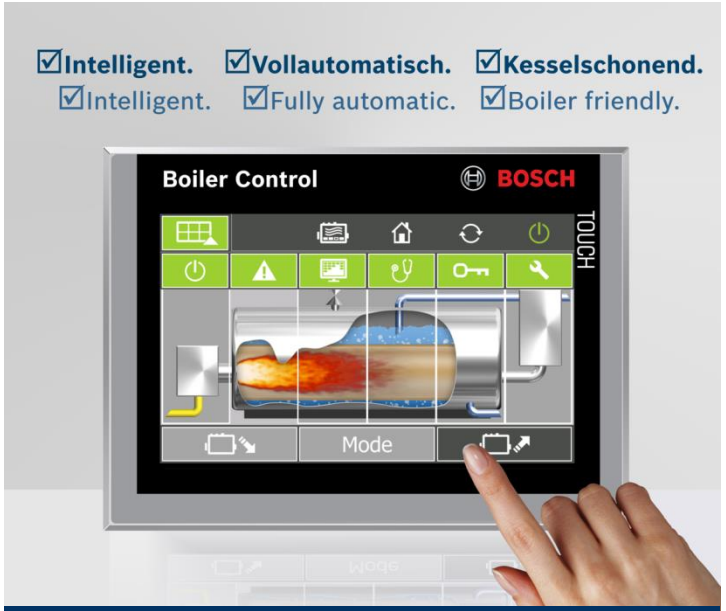
SUC automatic start-up, standby and shutdown control

Control and equipment variant facilitating automatic high pressure steam boiler operation in the operating modes

- normal operation
- heat maintenance
- cold standby
- hot standby

➔ At the push of a button or using an external request signal, the steam boiler can be started up fully automatically and gently when cold, shut down and protected against overload during normal operation.



User interface of the boiler control BCO: boiler starts fully automatically when the “Start-up” icon is pressed or by means of an external signal.

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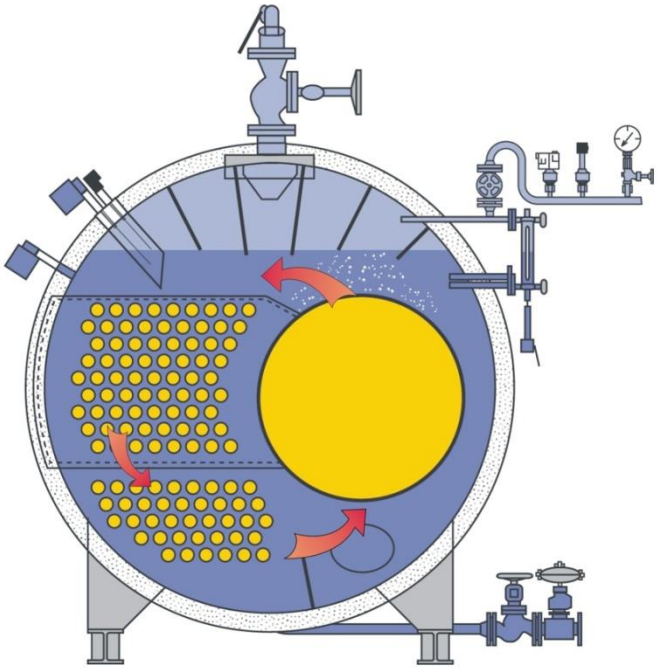
Background: Cold starts

- Due to the high temperature difference between flame tube and boiler shell, cold starts cause a much greater mechanical stress on shell boilers than normal operation.

- This load is increased when no or only a very low steam bubble formation during the start-up procedure takes place which is the case at closed steam extraction valve, for example. The natural circulation (see picture) does not start. This results layers of different temperature in the boiler (cold on top, hot on bottom side) with additional thermal stresses.



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Background: Overload and high load change rates

- If the steam extraction flow exceeds the nominal boiler output, re-evaporation effects in the boiler water arise through a fast dropping of the working gauge pressure. The boiler water foams which can lead to water entrainment in the steam outlet:

  - Humid steam
  - Water impact
  - Corrosion
  - Salt deposits and leaky valves

- Inappropriate flow conditions can also occur at high load change rates, accompanied by strong pressure fluctuations.
- The steam bubble formation required for the heat flow from the heating surfaces can stagnate and cause local overheating.

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Solutions SUC

- **Cold starts:** The boiler is started up gently at the push of a button or using an external signal
  - Starting with low burner load
  - Continuous monitoring / regulation of the water level
  - Motorised start-up shut-off valve opens, a small steam amount can flow off
  - Natural, internal water circulation of the boiler starts - unnecessary thermal stresses will be prevented
  - The steam shut-off valve opens with an adjustable start-up sequence to warm-up the connected steam system slowly

- **Shutdown process:** The automatic shutdown process can also be triggered by the push of a button or using an external signal
  - Steam extraction and start-up shut-off valve (if available) closes
  - Burner load is reduced slowly
  - Burner control interrupts the fuel supply completely

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Solutions SUC

- **Reaction to overload:** The integrated function for overload protection provides constant steam quality, also at sudden load changes
  - Steam extraction is reduced by the motor-driven steam extraction valve
  - Water entrainment and its problems, for example salt deposit and corrosion of connected components, are prevented

- **Heat maintenance mode:** With each sporadic burner start during heat maintenace or standby mode the start-up shut-off valve opens
  - The natural internal water circulation of the boiler is activated
  - Through-mixing of the boiler water
  - Temperature differences and extreme thermal stresses are prevented

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Benefits SUC

- Fully automatic start-up from the cold state
- Avoidance of water entrainment and its follow-up problems
- Avoidance of temperature stratification in heat maintenance mode
- Avoidance of water impact, corrosion and brining
- Boiler-friendly operation
- Fully automatic shutdown of the steam boiler
- Automatic protection functions ensure a long and reliable boiler life
- Relief for the operating staff*

*SUC does not exempt the boiler operator from his obligation to be on site during cold start.

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Condition Monitoring basic

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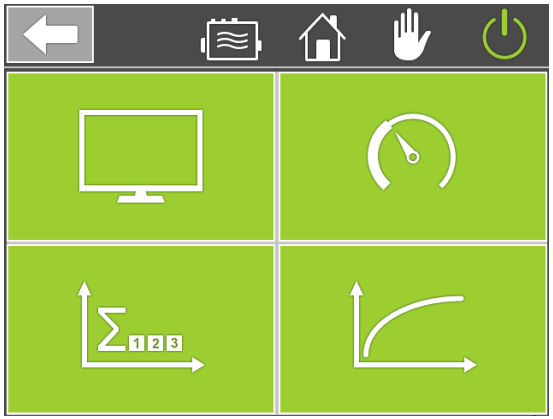
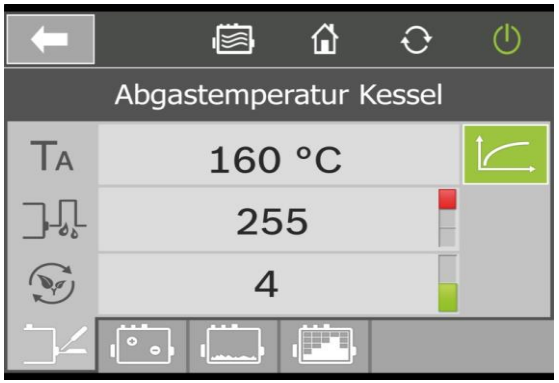
Functions CMbasic

Standard equipment for all steam, hot water and heating boilers with BCO boiler control

- Selection menu with four areas: operation monitor, function values, consumption values and measurement values
- Displays operating hours, starting frequency, number of cold starts over the course of time
- Recognises unfavourable start-up conditions
- Recognises water and waste gas contamination or undesired condensation
- Generates maintenance reports on request
- Displays energy losses incurred in desalination and blowing down*
- Displays fuel and water consumption over the course of time*
- Displays steam volume over the course of time*
- Displays boiler load profile over the course of time*





* Boiler systems can be configured to customer requirements. Depending on the measurement and regulation systems used, some functions may be limited or unavailable.

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Benefits CMbasic

- Transparency in terms of system efficiency
- Enables service measures to be planned according to requirements
- Consistently high level of availability
- Simpler and more targeted diagnostics in case of errors
- Quick support from manufacturer's teleservice
- Saves energy and costs
- Reduces emissions
- Intuitive interface

Act preemptively – reduce costs...

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Diagnostics function

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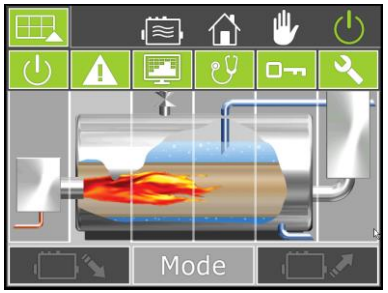
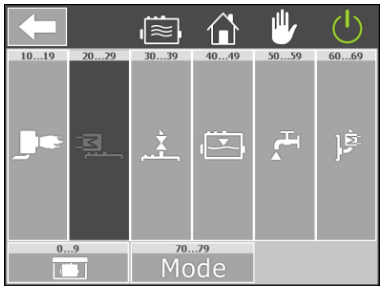
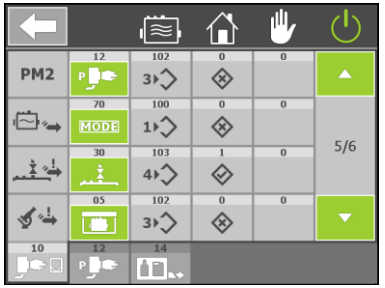
Diagnostics function

The diagnostics information shows all the influencing factors on the most important boiler functions, such as burner control, output control, steam extraction, water supply and flue gas control.







- Quick localisation and elimination of irregularities in boiler operation
- Systematic analysis of the current operating parameters
- Support of the boiler operating company and service technician

Operation and control of the boiler plants are optimally supported

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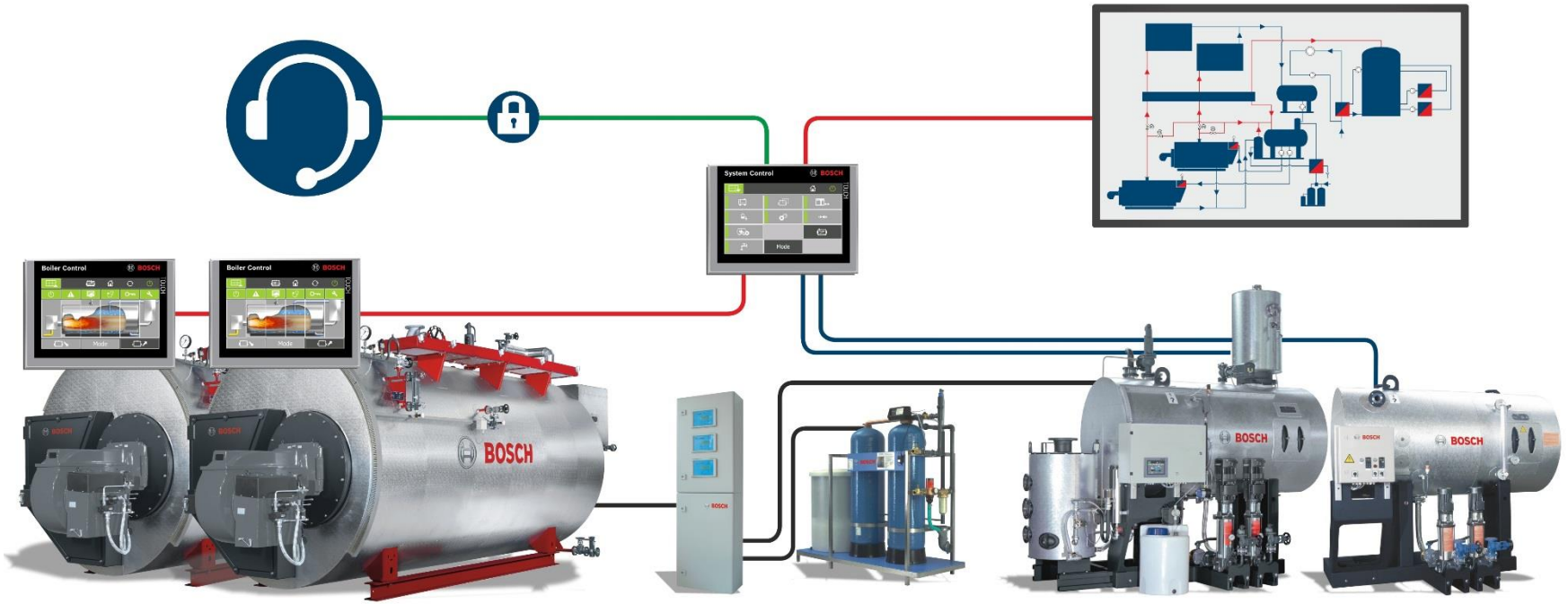
Control technology



One management system for the control of boiler systems.

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System control SCO

- Programmable, powerful control system with touch-sensitive TFT colour display
- The SCO system control brings together the controls for steam boilers or hot water boilers plus individual module controls in a single management system

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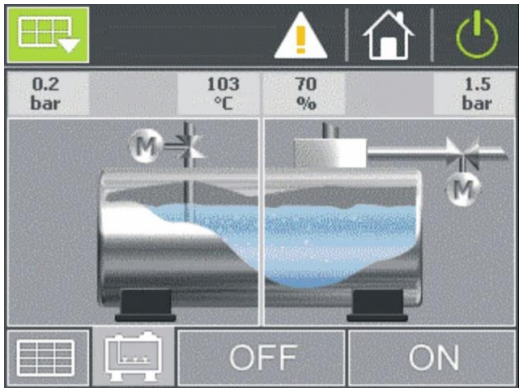
Functions SCO

- Sequence control of multi-boiler systems
- Integration of water analyses
- Integration of deaeration systems
- Integration of condensate systems
- Integration of foreign matter monitoring systems
- Integration of oil supply facilities
- A very wide range of pressure and temperature controls, etc.
- Return flow temperature maintenance (hot water only)
- Weather-based boiler control (hot water only)



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Benefits SCO

- Easy connection to higher-level visualisation and control systems
- Integrated monitoring and protection functions to prevent faulty operation
- Extensive storage of operating parameters and operating signals
- Ready to use with Teleservice: Operating parameters and operating signals can be accessed via an optional modem
- Intuitive operation with graphical symbols and state-of-the-art touchscreen displays

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Control technology

Thank you for your attention

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