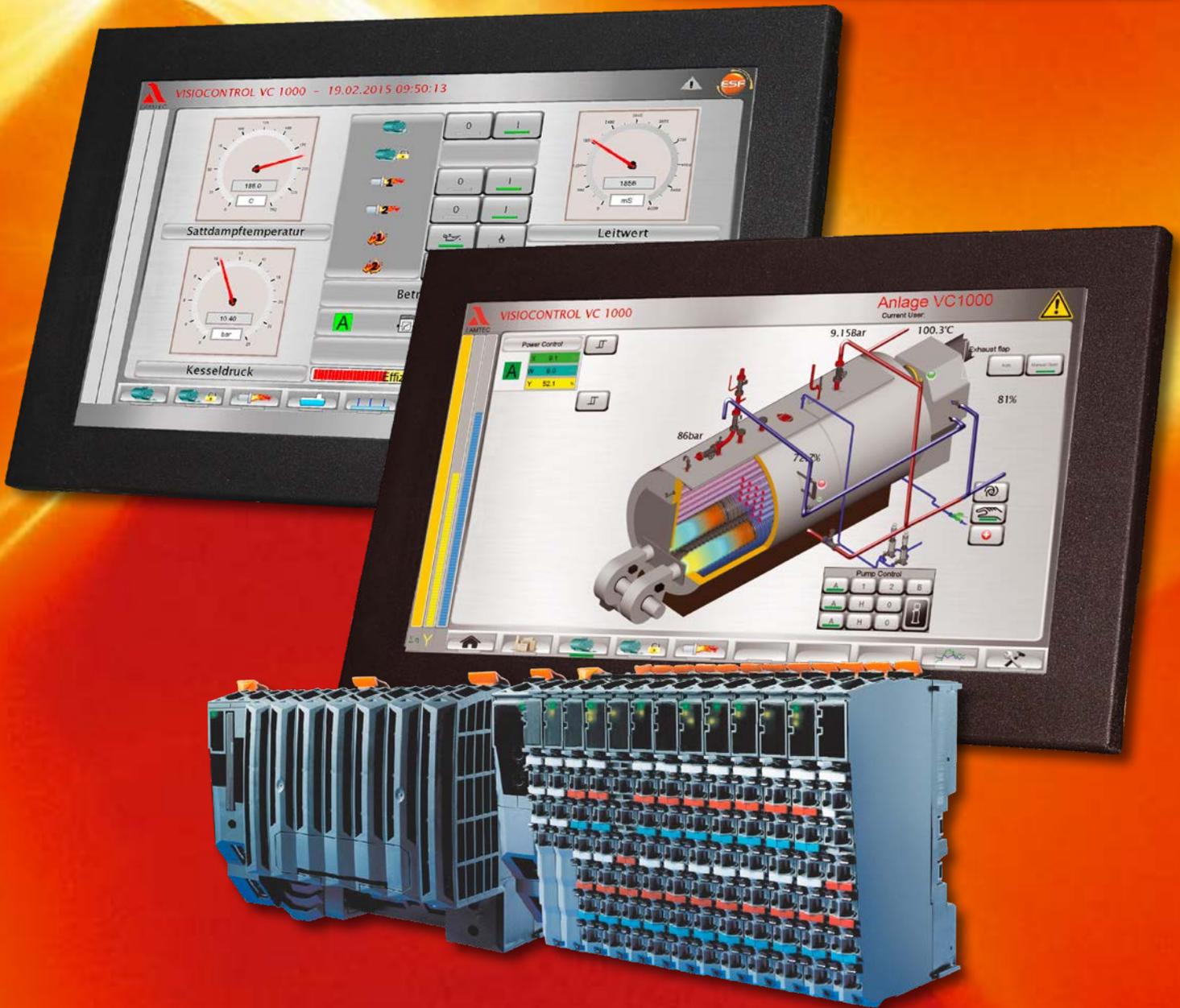


Ready-To-Use Solution
"Plug, configure, operate"



System overview

VC100 / VC1000 Modular Boiler Control System

Control and visualisation of boiler, burner and boiler house



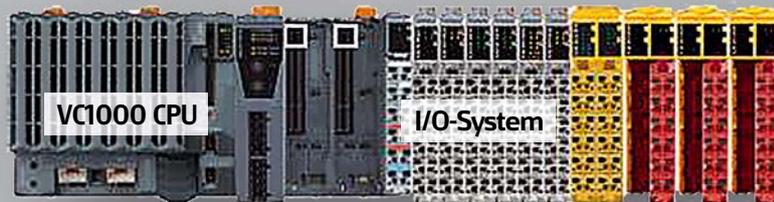
Sensors and systems for fuel technology

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"Plug, configure, operate" - a complete system



VNC



Boiler protection system

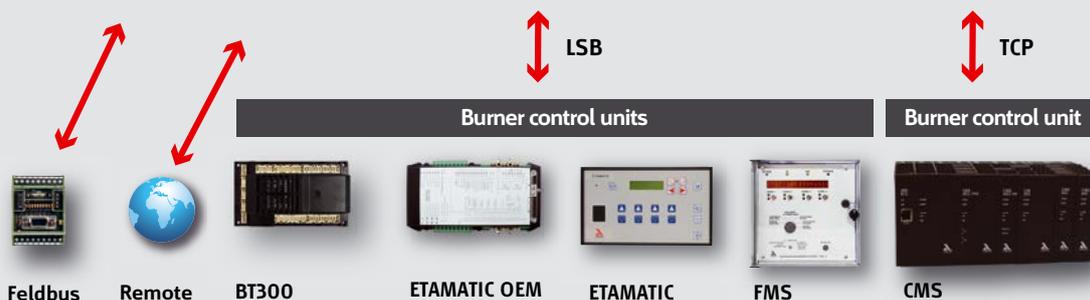
- Water level monitoring
- Water quality monitoring
- Pressure monitoring
- Unattended operation

Boiler control system

- Feedwater control
- Feedwater pump control
- Desalting
- Desludging

Boiler house components

- Feedwater supply
- Steam/hot water distributor
- Combustion air preheating
- Condensate return
- Chemical dosing
- Blowdown cooling
- Boiler sequence control



Feldbus

Remote

BT300

ETAMATIC OEM

ETAMATIC

FMS

CMS

Complete system for burner and boiler control system.

Operate and control boiler plants with one system - LAMTEC VC100 / VC1000 makes this possible.

For the first time, LAMTEC is offering the VC100 / VC1000 as a completely pre-programmed system for the operation and control of boiler plants. The operator can access all relevant data and functions very quickly and clearly via a touch screen. The different modules allow the system designer to tailor the VC100 / VC1000 exactly to the requirements of the plant.

The main components include the following:

- Burner control unit
- Boiler control system
- Boiler protection system
- Additional boiler house components (feedwater preparation, condensate return, etc.)

All modules are networked via the "LAMTEC SYSTEM BUS" (LSB), which simplifies the installation of the complete system.

Problems caused by external fieldbus couplings are prevented. Any LAMTEC burner control unit can be used for the burner control module.

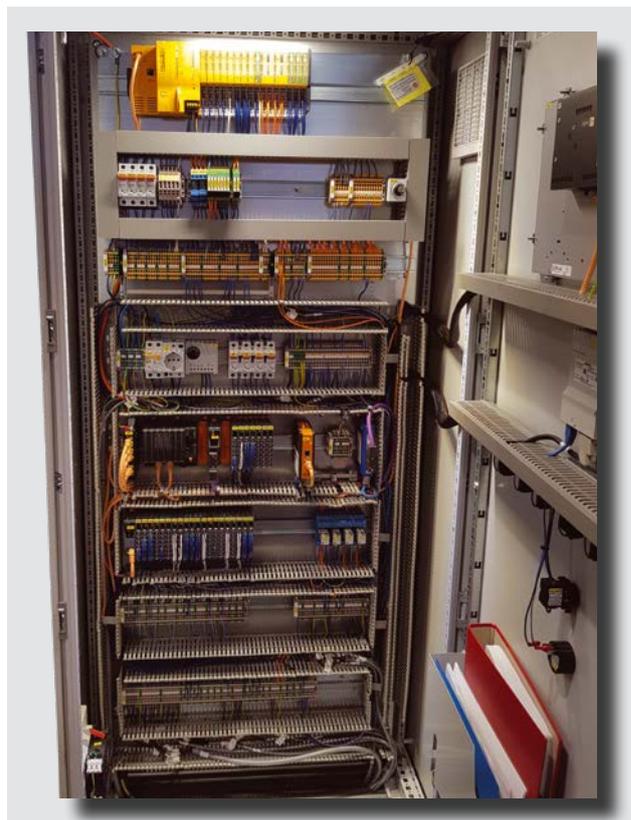
LAMTEC provides the following burner control units for this:

- ETAMATIC / ETAMATIC OEM
- Burner Control FA1
- FMS
- BT300
- CMS

Thanks to the pre-programmed PLC, installation and operation are very easy. All burner-specific data is read from the burner control unit and prepared graphically and textually for the purpose of visualisation for the user.

Advantages

- Plug, configure, operate
- Out-of-the-box solution
- No programming knowledge required
- Modularly expandable
- Configurable
- Extended control functions
- Type-tested solution
- No individual acceptance (modules for unattended operation)
- Fast commissioning
- Boiler and burner control in one
- Easy to use
- Flexible visualisation



The commissioning engineer can assemble the boiler plant including auxiliary equipment with the aid of menu guidance, with no PLC programming knowledge being required for this. Among other things, the portfolio of the VC100 / VC1000 contains pre-programmed controllers, e.g. for the power output and boiler water level, which can be changed easily without the operator needing to switch to the programming level of the system.

In addition to the boiler water level and load control, the system provides freely adjustable controllers for which the operator also requires no PLC programming knowledge. Up to 25 controllers can be used in the maximum configuration. (VC100 → 5 controllers/ VC1000 → 25 controllers).

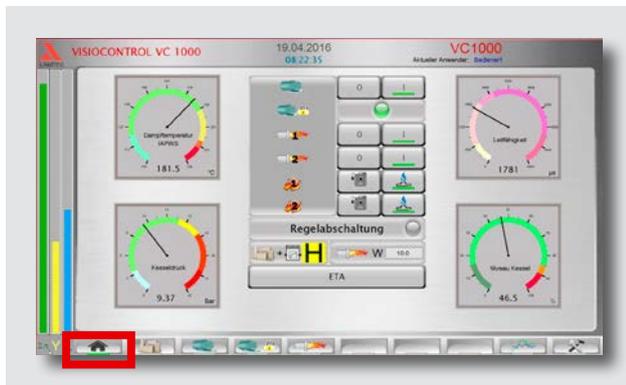
Visualisation system

Various boiler graphics are stored in the system. During setup, the customer can select the appropriate boiler and additional modules with the aid of menu guidance. There is a choice of 3 boiler types:

- Steam boiler (shell boiler)
- Hot water boiler
- Warm water boiler

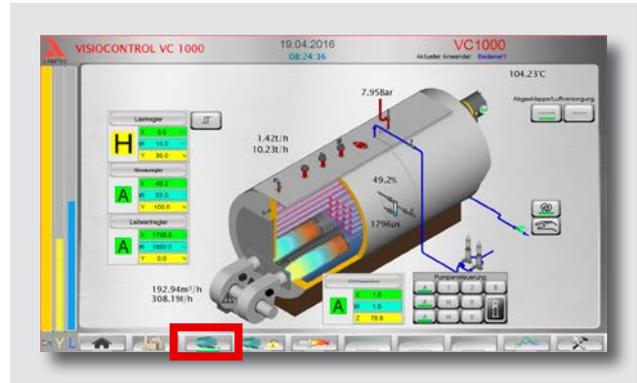
Main screen/start page

In this view the operator can find all the important data and control elements required for a boiler system. Here, a quick glance will tell you whether the system is running optimally. In other words, if the system is running properly, all indicators should be in the green area of the respective displays. From this screen, you can access all other user levels by soft key.



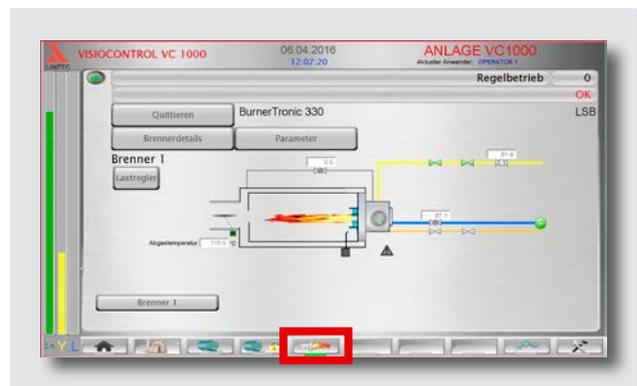
"Boiler" menu item

All boiler-specific data and controllers are shown here. From this screen, you can easily branch into the individual controller modules. Alternatively, it is possible to switch between the 3D and 2D (PID) view.



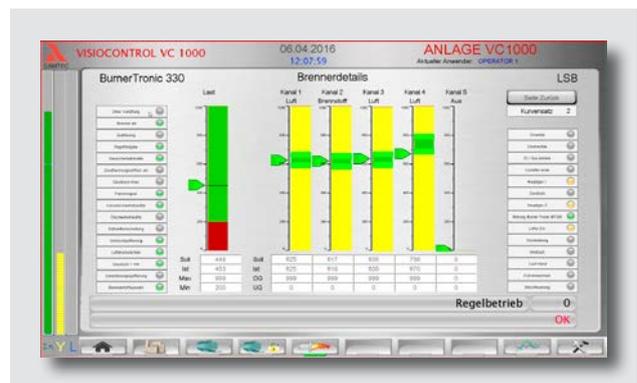
"Firing" menu item

The VC100 / VC1000 can read out all burner-specific details using the parameter settings of the burner control unit via the LAMTEC SYSTEM BUS. After that, the burner screen is generated automatically.



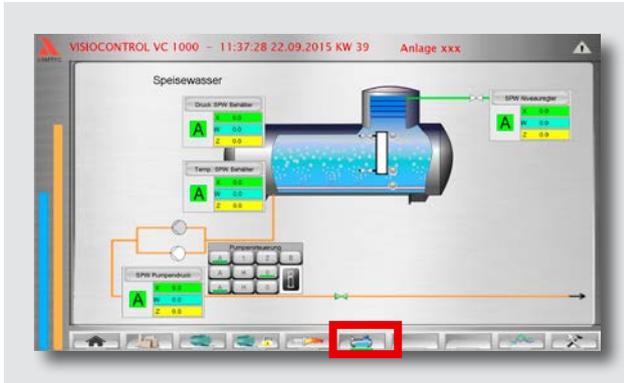
"Burner Details" sub-menu

Via the "Burner x" Button the operator can switch to a second operator level where detailed information for each individual burner about the damper positions, digital inputs and outputs as well as the current load value can be accessed.



"Feed water Control" menu item

An example for a variety of additional modules is feed-water control. This selection comprises a total of 6 different modules. As a result, almost every configuration can be solved by one standard.

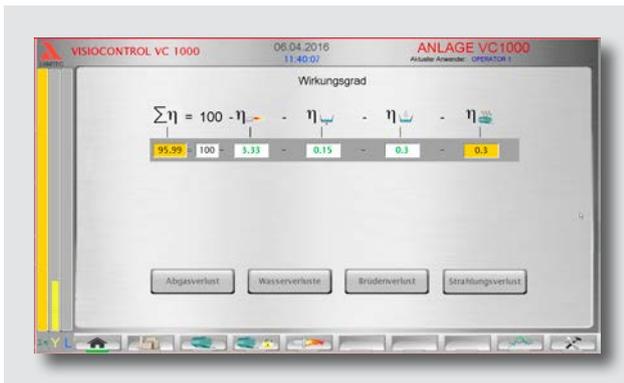


"Efficiency" menu item

The VC100 / VC1000 not only has control functions, but also includes an overview of the plant efficiency. By calculating the current plant efficiency, the operator can constantly obtain information on the plant via the display menu.

The following are taken into consideration:

- Combustion efficiency
- Blowdown losses
- Exhaust vapour losses
- Radiation losses

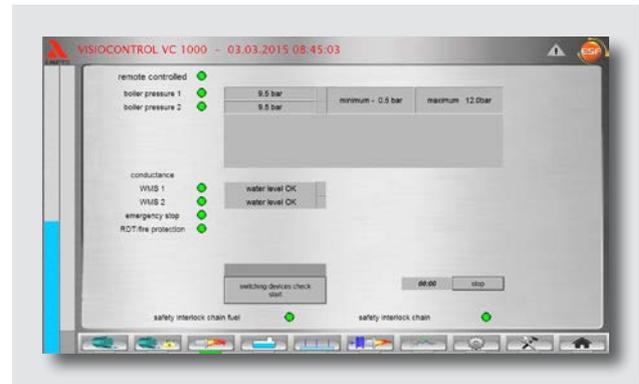


"Boiler Protection" menu item

The structure of the boiler protection corresponds with national standards and regulations.

Main functions:

- Water level monitoring
- Water quality monitoring
- Temperature monitoring unit
- Pressure monitoring
- Unattended operation



Configuration of VC100 / VC1000

This level includes the following:

- User management for the administration of access rights on different operation and configuration levels
- Network settings
- Country-specific language selection
- Messages, diagnostics
- Date storage/backup
- Time and date setting



VC1000 module matrix

The VC1000 is a modular system that can be configured for most applications. Thanks to its flexible structure, the system can be adapted to a large variety of customer requirements. The following table shows an overview of essential modules.

| VC1000 | |
|--------|--|
| ▶ | VC1000 basic module: Visualisation of the boiler and burner with basic firing-rate controller |
| ▶ | Module 2: 3-component firing-rate controller extension module |
| ▶ | Modules 3/4: Additional burner(s) |
| ■ | Module 3: Additional burner via LAMTEC System Bus (max. 4) |
| ■ | Module 4: Additional burner, external brand (no LSB coupling, max. 2) |
| ▶ | Modules 10/11/12: Level control, desalination and blowdown |
| ■ | Module 10: "Digital" |
| ■ | Module 11: "Analogue" |
| ■ | Module 12: "Analogue plus" (with differential pressure control using frequency converter and 3-component controller) |
| ▶ | Module 15: Hot water boiler extension module |
| ▶ | Modules 20/21: Feedwater control |
| ■ | Module 20: "Digital" |
| ■ | Module 21: "Analogue" |
| ▶ | Modules 30/31: Superheater |
| ■ | Module 30: Extension module 1 |
| ■ | Module 31: Extension module 2 |
| ▶ | Modules 40/41: Condensate return, chemical dosing and blowdown cooler |
| ■ | Module 40: "Digital" |
| ■ | Module 41: "Analogue" |
| ▶ | Module 42: Boiler sequence control (max. 4 boilers) |
| ▶ | Module 43: Line controller for hot water |
| ▶ | Module 50: Control of exhaust gas heat exchanger/air preheater |
| ▶ | Module 51: Pressure control of flue gas/combustion air |
| ▶ | Module 80: Field bus module (make a selection) |
| ■ | Modbus TCP (included in Module 1) |
| ■ | Module 80.1: ProfiNet |
| ■ | Module 80.2: Profibus |
| ■ | Module 80.3: INA Powerlink |
| ■ | Module 80.4: Ethernet TCP Client |
| ▶ | Module 81: Remote maintenance / messages extension module |
| ▶ | Module 85: "Customised Application" extension module with 3 additional controllers and hardware with additional I/O |
| ▶ | Module 86: Signal contacts (safety chain activation) extension module |
| ▶ | Module 90: Safety 1 - Three safety chains |
| ▶ | Module 93: Safety 2 - Unattended operation with "PILZ" failsafe PLC (Austrian regulations) |
| ▶ | Module 94: Unattended operation with B+R (EN 12952 / EN 12953) |

VC100 module matrix

The VC100 is a cost-optimised solution with the essential basic functions for the control of a boiler without additional boiler house functionality.

VC100

- ▶ VC100 basic module: Visualisation of the boiler and burner with basic firing-rate controller
- ▶ Module 4: Additional burner(s)
 - Module 4: Additional burner, external brand (no LSB coupling, max. 2)
- ▶ Modules 10/11: Level control, desalination and blowdown
 - Module 10: "Digital"
 - Module 11: "Analogue"
- ▶ Module 15: Hot water boiler extension module
- ▶ Module 80: Field bus module (make a selection)
 - Modbus TCP (included)
- ▶ Module 81: Remote maintenance / messages extension module
- ▶ Module 86: Signal contacts (safety chain activation) extension module
- ▶ Module 90: Safety 1 - Three safety chains
- ▶ Module 93: Safety 2 - Unattended operation with "PILZ" failsafe PLC
- ▶ Module 94: Unattended operation with B+R (EN 12952 / EN 12953)

Module descriptions

Module 1:

Basic control

- Basic control of a boiler with one burner
- Visualisation of a boiler with one burner
- Burner firing-rate control for one burner with one component (actual pressure value or actual temperature value)
- Basic module for all other modules

Module 2:

Visualisation system

- Functions the same as for module 1.
- Output control for one burner with 3 components (actual pressure value or temperature value, quantity of fuel, quantity of steam or heat)

Module 3:

Visualisation system

- Basic control system for additional burners (maximum of 4 burners currently possible)
- Visualisation for additional burners (maximum of 4 burners currently possible)

Module 4:

External burner

- Basic control system for external burners (maximum of 2 burners), 4 to 20mA possible or DPS (synchronous/asynchronous)
- Visualisation for external burners (maximum of 2 burners possible)

Module 10:

Digital steam boiler modules

- 10.1 Boiler level control with one feedwater pump and digital water level recording
- 10.2 Boiler level control with two feedwater pumps with automatic pump change and binary water level recording
- 10.3 Blowdown control

Module 11:

Steam boiler, analogue 1

- The prerequisite is module 10
- All functions of module 10 are available.
- 11.1 Boiler level control with one feedwater pump and analogue water level recording

- 11.2 Boiler level control with two feedwater pumps with automatic pump change and analogue water level recording
- 11.3 Level control via DPS control valve, one feedwater pump and analogue water level recording
- 11.4 Level control via DPS control valve and two feedwater pumps with automatic pump change and analogue water level recording
- 11.5 Conductivity control via DPS control valve
- 11.6 Blowdown control with overfilling protection

Module 12:

Steam boiler, analogue 2

- The prerequisite is modules 10 and 11
- All functions of module 1 are available.
- Instead of the DPS valves, actuation of the valves via 4 - 20 mA is also possible
- 12.1 Differential pressure control of a feedwater pump via frequency converter (level control via the feedwater control valve)
- 12.2 Differential pressure control of two feedwater pumps via frequency converter (level control via the feed water control valve)
- 12.3 Three-component control for boiler level (the prerequisite is modules 2 and 11)

Module 15:

Hot water boiler

- 15.1 RFB bypass (return flow boost)
The return flow boost can be designed as a pump or control valve. Using the controller, the flow quantity through the bypass is changed depending on the boiler control temperature.
- 15.2 Mains pump
Using the controller, the speed of the mains pump is changed depending on the actual value (e.g. differential system pressure or temperature in the hydraulic switch).
- 15.3 Keeping warm function
The heat retention is enabled by the thermostat until the set temperature is reached.

Module 20:

Feedwater 1, digital

- 20.1 Level control of the feedwater tank via digital water level recording
- 20.2 Control of the exhaust vapour valve (large, small)

Module 21: Feedwater 2, analogue

- The prerequisite is module 20
- All functions of module 20 are available.
- *21.1 Level control* of the feedwater tank, continuous
- *21.2 Pressure control* of the feedwater tank, continuous
- *21.3 Temperature control* of the feedwater tank, continuous
- *21.4 Continuous control of the exhaust vapour valve* (via DPS or 4 - 20mA)

Module 30: Superheater 1

- *30.1 Superheater temperature regulation* via exhaust gas lead or water injection
- *30.2 Control of the start-up valve* (via DPS or 4 - 20mA)

Module 31: Superheater 2

- The prerequisite is module 30
- All functions of module 30 are available
- For an additional superheater

Module 40: Boiler house 1

- *40.1 Control of the condensate return* via digital water level recording
- *40.2 Control of the digital chemical dosing*
- *40.3 Control of blowdown cooler* via digital temperature recording

Module 41: Boiler house 2

- The prerequisite is module 40
- All functions of module 40 are available.
- *41.1 Continuous level control* of condensate tank (DPS)
- *41.2 Continuous level control* condensate tank (4 - 20mA)
- *41.3 Continuous control of the chemical dosing* (via 4 - 20mA) depending on the feedwater quantity
- *41.4 Temperature control of the blowdown cooler*, continuous (via DPS or 4 - 20mA)

Module 42: Boiler sequence control

- Boiler sequence control system via system pressure or system temperature for up to four boilers
- If the product of the set system pressure/temperature and time falls short the next follow-up boiler will be activated. Before the next boiler will follow-up a waiting time can be set by parameter. The allocation of the boiler number varies according to the functionality of the boiler sequence. If the product of the set system pressure/temperature and time is exceeded, the boilers will be deactivated in reverse order. Individual boilers in the boiler sequence can be deselected (repair/service).

Module 43: Steam distribution

- Control of up to three lines (TPS or 4...20 mA)
- Using the controller, the control valves are opened depending on the pressure or temperature. Per line, a timer is available for the setpoint selection. Each timer can set up to three setpoints in three time windows on a daily basis.

Module 50: Exhaust gas heat exchanger / air preheater

- *Exhaust gas heat exchanger inlet temperature control with control valve* (via TPS or 4 - 20mA)
The temperature control function comprises a digital controller for controlling the inlet temperature of the exhaust gas heat exchanger (minimum inlet temperature in order to prevent condensation). Using the controller, the control valve is opened or closed depending on the temperature.
- *Continuous heat reduction with frequency converter* (4 - 20mA)
The temperature control function comprises a digital controller for controlling the heat consumption. Using the controller, the speed of the pump is changed depending on the actual value (e.g., air preheating, buffer temperature).

Module 51: Control of flue gas / combustion air damper

- *Control of exhaust gas pressure* (via DPS or 4 - 20mA)
The temperature control function comprises a digital controller for controlling the flue gas pressure. Using the controller, the exhaust gas

valve is opened or closed depending on the exhaust gas pressure. In case of pre or post purging the controller will be modulated up to 100% during the time of venting.

- *Continuous differential pressure control of combustion air with frequency converter (4 - 20mA)*
The differential pressure control function comprises a digital controller for controlling the combustion air differential pressure. Using the controller, the speed of the combustion air fan is changed depending on the differential pressure. In case of pre or post purging the controller will be modulated up to 100% during the time of venting.

Module 80: Communication modules

- *The Modbus TCP communication (without additional board) is included in module 1.*
- It can also be implemented through one of the interfaces
 - PROFINET
 - PROFIBUS DP
 - INA Powerlink
 - Ethernet TCP IP Client
- All hardware inputs and outputs of the control system and the displays of the controller can be picked up by the selected interface.

Module 81:

Remote maintenance / messages

- With the remote maintenance function, the visualisation can be accessed or service work can be performed by a programmer. Messages can be sent using the "Messages" option (e-mail or text message, depending on the kind of integration). The required Internet connection is not included in the module.

Module 85:

Customer-specific process integration

- The additional signals of the hardware extension of the module and the signals of the installed modules are available. With these signals, logical links (AND/OR/NOT) and up to three additional controllers can be configured by the customer.
- Freely programmable
- With up to 3 output controllers
- Logical links with functionalities from the other modules
- Hardware I/O

Module 86:

Signal contacts via digital inputs (Safety chain activation)

- The digital inputs can be freely assigned to four alarm groups. The triggering alarm of each alarm group is displayed. Per alarm group, a digital output is switched when the alarm is emitted in order to actuate an indicator lamp.
- The function must not be used for safety-related shut-downs.

Module 90: Safety 1 - Three safety interlock chains (SIL 3)

- The module contains the operations of three safety chains and the required hardware. Digital inputs are assigned to the safety chains. The safety chains are switched to digital outputs that can be integrated into a corresponding shut-down.

Module 93: Safety 2 - Unattended operation with "PILZ" failsafe PLC

- The module contains a connection to a boiler protection system from manufacturer ENERGY SERVICE Friesenbichler GmbH.

Module 94:

Safety 3 - Unattended operation "light" with B+R (EN12952/EN12953)

- The module contains a boiler protection system (without superheater function) from manufacturer ENERGY SERVICE Friesenbichler GmbH with corresponding hardware.

**LAMTEC Meß- und Regeltechnik
für Feuerungen GmbH & Co. KG**

Wiesenstraße 6
D-69190 Walldorf
Telefon: +49 (0) 6227 6052-0
Telefax: +49 (0) 6227 6052-57

info@lamtec.de

www.lamtec.de

