

## FM458 Strategy module

For heating contractors

Read carefully prior to  
commissioning and  
service work.

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# 1 Safety

## 1.1 About this manual

This section contains general safety instructions that you must observe when servicing the FM458 function module.

The other sections of the service instructions contain additional safety instructions that must also be observed. Read the safety instructions carefully before carrying out the activities described below.

If the safety instructions are not observed, serious or even fatal personal injury and damage to property and the environment may be caused.

## 1.2 Designated use

You can install the FM458 function module in the Logamatic 4321, 4322 and 4323 control panels of the Logamatic 4000 control system.

For the system to operate correctly, you need software version 8.xx or higher of the control panel and the MEC2 user interface.

## 1.3 Standards and guidelines



This product has been tested and certified and meets applicable standards for the US and Canadian markets.

## 1.4 Key to symbols

Two levels of danger are identified and signified by the following terms:



**WARNING!**

### **RISK OF LIFE**

Identifies possible dangers emanating from a product, which might cause serious injury or death if appropriate care is not taken.



**CAUTION!**

### **RISK OF INJURY/ SYSTEM DAMAGE**

Indicates a potentially dangerous situation that could cause minor or moderately serious injuries or damage to property.



### **USER NOTE**

Tip for optimum use of equipment and adjustment as well as useful information.

## 1.5 Please observe these notes

The FM458 function module has been designed and built in accordance with currently-recognized standards and safety requirements.

However, damage resulting from improper service work cannot be completely prevented.

Before starting service work on the FM458 function module read the service instructions carefully.



**WARNING!**

### **RISK OF LIFE**

due to electric shock!

- The installation, electrical wiring, commissioning, electrical connection, as well as maintenance and repairs must only be carried out by a trained contractor who adheres to all current technical regulations and requirements.
- The local regulations must be observed.



**WARNING!**

### **RISK OF LIFE**

due to electric shock!

- Ensure that all electrical work is carried out by a licensed contractor.
- Before opening the control panel: isolate all poles of the power supply and secure against unintentional reconnection.



**WARNING!**

### **RISK OF LIFE**

due to electric shock!

The risk of voltage transfers between the line voltage and the low voltage wiring through unintentional loosening of the cores at the terminals must be prevented.

- Therefore secure individual cables together in bundles (e.g. with cable ties) or strip off only a minimum of the outer insulation.

**CAUTION!****RISK OF INJURY/  
SYSTEM DAMAGE**

due to operator error!

Operator errors can cause injury and damage to property.

- Ensure that children never operate the appliance unsupervised or play with it.
- Ensure that only personnel instructed to operate the appliance correctly have access to it.

**CAUTION!****DEVICE DAMAGE**

through electrostatic discharge (ESD).

- Before unpacking the module, touch a radiator or a grounded metal water pipe to discharge any electrostatic charge in your body.

**USER NOTE**

Ensure that a regulation isolator is available to disconnect all poles from the mains power supply. If there is no circuit breaker, you will need to install one.

**USER NOTE**

Only use original Buderus spare parts. Damage caused by the use of parts not supplied by Buderus is excluded from the Buderus warranty.

## 1.6 Disposal

- Electronic components do not belong in household waste. Dispose of defunct modules correctly through an authorized disposal site.

## 2 Product and function description



### USER NOTE

This module can only be installed in the master with address 0 or 1.

The FM458 function module has been designed exclusively for use with the Logamatic 4000 modular control system.

You can install one or two of the FM458 function modules in Logamatic 4000 control panels.

The main function of the FM458 function module is the operation of a multi-boiler system following a chosen strategy.

Installing the FM458 function module makes the following functions or connection options available:

- Module for installation in the Logamatic 4321 or Logamatic 4323 control panel
- Combination of boilers with single-stage, 2-stage and modulating burners and Logamatic 4000 and/or Logamatic EMS control system
- Maximum 8 boilers, since two modules can be installed per controls.
- Operation in parallel or series to take system-specific standard efficiencies into account
- Load limit either by outdoor temperature or external contact
- Lead lag/rotation for boilers either daily, by outdoor temperature, hours of operation or external contact
- Central fault message function via relay with dry contact
- Programmable 0 – 10 V input for external temperature set point control or burner output control
- Programmable 0 – 10 V output for external set temperature demand
- DHW heating via EMS of boiler 1

- Heat meter input
- Internal communication via data bus
- Encoded and color-coded connection plugs
- Continued operation in case of faults

## 2.1 Front panel

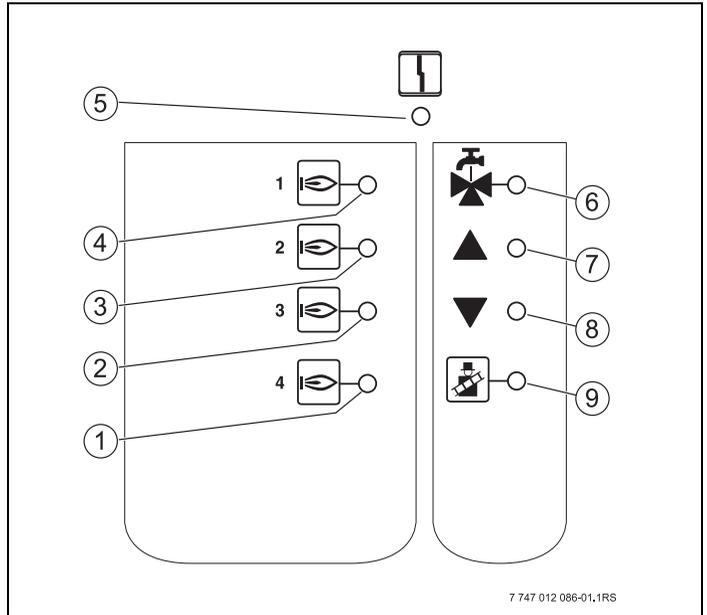


Fig. 1 Front panel of FM458 function module

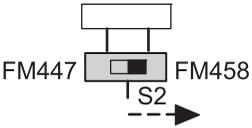
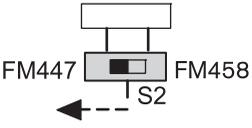
- 1 LED boiler 4 enabled
- 2 LED boiler 3 enabled
- 3 LED boiler 2 enabled
- 4 LED boiler 1 enabled
- 5 LED "Module fault" (red) – general module fault
- 6 LED DHW active via EMS boiler 1
- 7 LED flow too cold, therefore increasing output
- 8 LED flow too hot, therefore lowering output
- 9 LED flue gas test active

## 2.2 Switch on the module PCB

### 2.2.1 Module recognition switch

When used as a spare part, this switch enables the FM458 function module to be reconfigured as a FM447 function module.

This is required in older systems with software versions below 8.xx, to which the FM458 is unknown.

DIP switch Position	Function
	The module logs on as FM458.
	The module logs on as FM447.



#### USER NOTE

The functions described in this document will not be available if the switch is set to FM447.

For programming information, see the service instructions for the Logamatic 4321/4322 control panel.

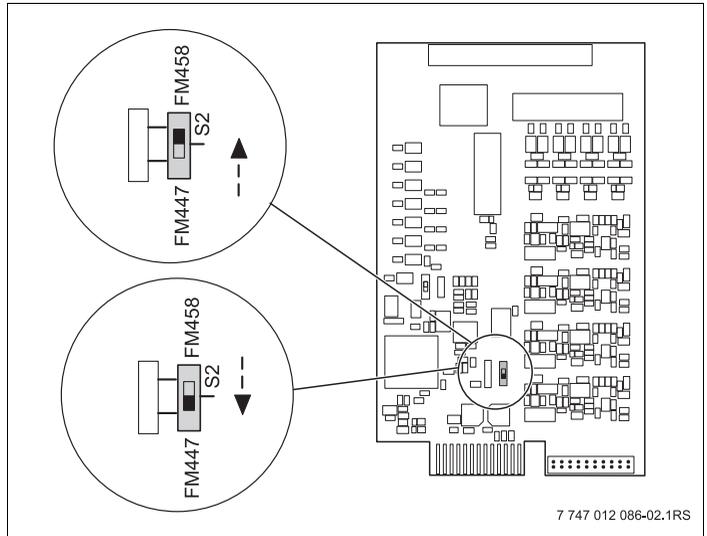


Fig. 2 Position module recognition dip switch

### 2.2.2 Voltage/current output

With the dip switch (voltage/current output), you can configure the output for the temperature demand (terminal  $U_{3,4}$ ).

Dip switch set to U: The temperature demand is issued as a voltage from 0 V to 10 V.

Dip switch set to I: The temperature demand is issued as a current from 0 mA to 20 mA.

You can freely assign voltage or current (see Chapter 6.1 "0 – 10 V input", page 55).

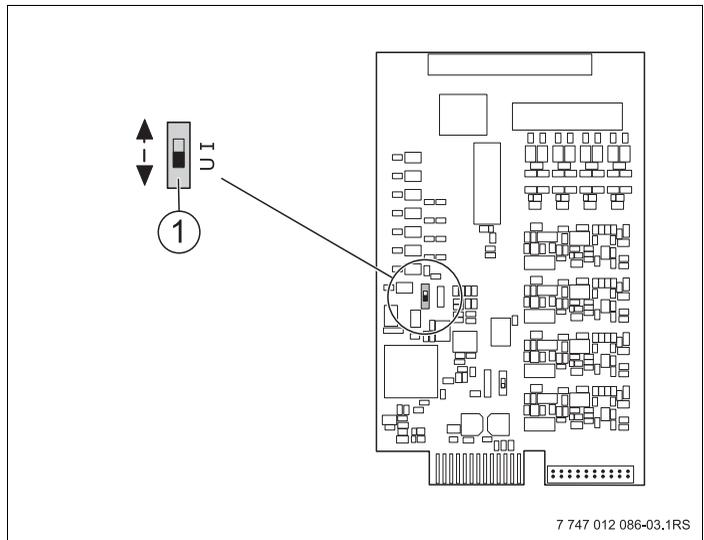


Fig. 3 Dip switch voltage/current output FM458

- 1 Dip switch (factory setting 0 – 10 V)

## 2.3 Terminology key

### 2.3.1 EMS boiler

EMS boilers are boilers equipped with the Energy Management System, i.e. wall-mounted boilers with UBA 3.x or floorstanding boilers with MC10 and SAFe. For a more detailed overview of these boilers, see chapter "Approved boiler types" on page 51.

### 2.3.2 Boilers series 4000

Boilers are called series 4000 boilers that are connected via the standardized 7-pole burner plug for stage 1 or via the 4-pole burner plug for stage 2 or the modulation to the Logamatic 4321/4322 control panel.

### 2.3.3 Mixed cascade

A mixed cascade is a multi-boiler system with up to 8 boilers in which various boiler types are combined with one another, e.g.:

- a) floorstanding boilers series 4000 with EMS wall-mounted boilers
- b) floorstanding EMS boilers with EMS wall-mounted boilers
- c) floorstanding boilers series 4000 with floorstanding EMS boilers

or

- d) floorstanding boilers series 4000 with floorstanding EMS boilers with EMS wall-mounted boilers

### 2.3.4 Serial operating mode

In operation in series, the next boiler in the sequence will only be enabled if the previous boiler has reached 100 % of its output.

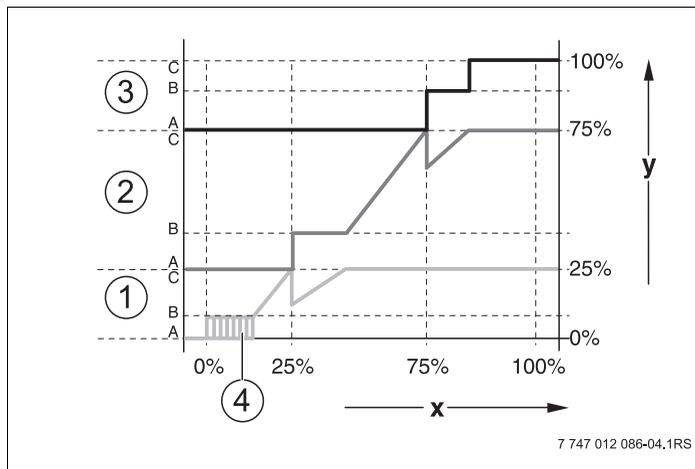


Fig. 4 Diagram "Operation in series"

- 1 Boiler 1 (modulating burner)
- 2 Boiler 2 (modulating burner)
- 3 Boiler 3 (2-stage burner)
- 4 On/Off mode
- x Total heating system output
- y Heating system heat input

### 2.3.5 Parallel operating mode

In parallel mode, the boilers are jointly matched to the demand. With this operation, the strategy function first enables the base stage of boiler 1, then the base stage for boiler 2, etc. When all boilers operate at their base stage, all boilers are modulated in parallel.

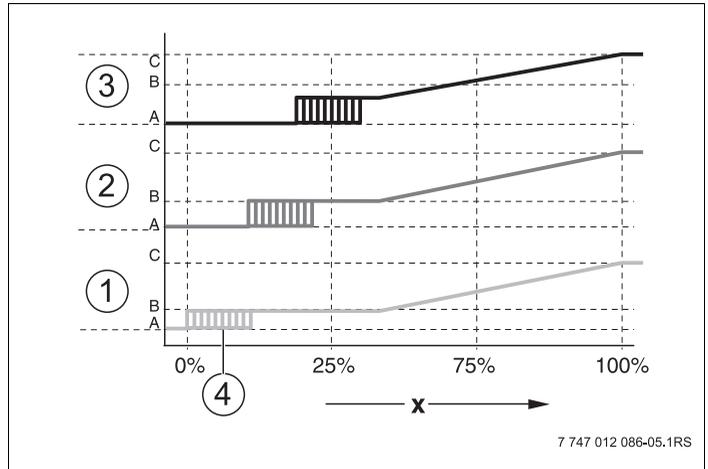


Fig. 5 Diagram "parallel operation"

- 1 Boiler 1
- 2 Boiler 2
- 3 Boiler 3
- 4 On/Off mode
- x Total heating system output

### 2.3.6 Boiler sequence

The FM458 function module not only enables and controls the individual output stages, it also manages the boiler control sequence. It decides which boiler starts as lead boiler and whether or under which circumstances a sequence is changed. The sequence of the various boiler controls can be defined automatically (by the FM458) or manually.

Five setting options are available for lead lag/rotation:

#### **"No lead lag/rotat" (manual boiler sequence selection)**

The system operator specifies a set boiler sequence that is always observed. Select "No lead lag/rotat" at the service level of the MEC2 user interface.

#### **Daily lead lag/rotation**

The strategy function switches to a different boiler sequence cyclically at 12:00 am (00:00) every day.

### Boiler lead lag/rotat after hours of operation

The boiler sequence is selected in accordance with the hours of operation. This means that the strategy function switches to a different boiler sequence cyclically at 12:00 am (00:00) if the relevant lead boiler has exceeded a set number of hours of operation.

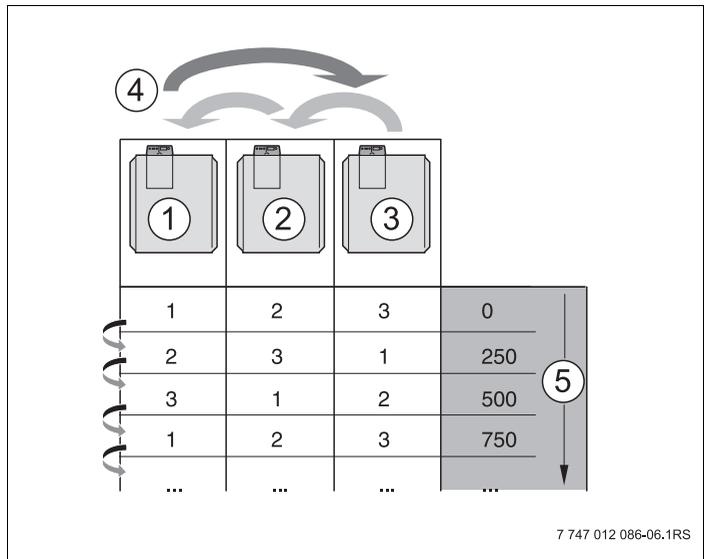


Fig. 6 Boiler lead lag/rotat after hours of operation

- 1 Boiler 1
- 2 Boiler 2
- 3 Boiler 3
- 4 Lead boiler change-over
- 5 Hours of operation of the heating system

### Lead lag/rotat subject to outdoor temperature

The boiler sequences A, B, C and D are selected subject to the outdoor temperature. The temperature changeover thresholds are freely-adjustable (settings see Chapter 7.5 "Lead lag/rotation", page 69).

The following table shows an example of the various boiler sequences (in automatic mode by the FM458).

Number of boilers	Zone 4 Sequence D	Zone 3 Sequence C	Zone 2 Sequence B	Zone 1 Sequence A
2	1-2			2-1
3	1-2-3		3-2-1	3-1-2
4	1-2-3-4	2-3-4-1	3-4-1-2	4-1-2-3
Temperature changeover thresholds	41 °F (5 °C)	50 °F (10 °C)	59 °F (15 °C)	

Tab. 1 Factory-set boiler sequences (automatic)

### 2.3.7 Load limit

The load limit (for settings, see Chapter 7.6 "Load limit", page 77) prevents the starting of lag boilers that are not needed if high heat demands are strictly peak loads.

The load limit function enables matching the number of boilers to lower system loads, e.g. during spring and fall. Boilers that are not needed are disabled.

However, the load limit will be lifted if inadequate heat is provided due to faults in an individual boiler.

The following dependencies can be taken into consideration for blocking the lag boiler using the load limit function.

### Load limit by outdoor temperature

This function blocks the lag boilers automatically subject to an adjustable outdoor temperature (setting range 32 °F to 86 °F (0 °C to 30 °C)).

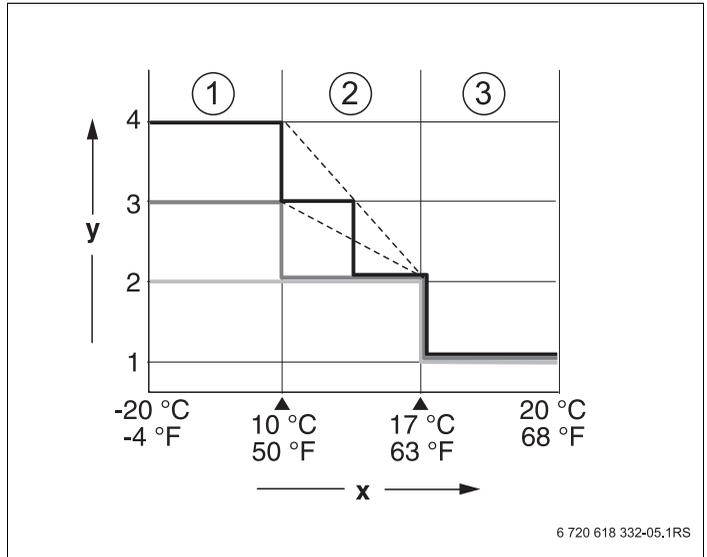


Fig. 7 Diagram "Load limit at outdoor temperature"

- 1 Zone 3
- 2 Zone 2
- 3 Zone 1
- x Temperature thresholds
- y Number of boilers

Subject to the number of boilers, up to 2 temperature thresholds can be defined. The outdoor temperature range is thus divided into three zones. Zone 1 is the high outdoor temperature range. For this zone, the number of enabled boilers can be adjusted. As the outdoor temperature falls, additional boilers are enabled. All boilers can be enabled in zone 3. In heating systems with more than 3 boilers, boilers are variably enabled in zone 2 as the outdoor temperature drops (setting see Chapter 7.6 "Load limit", page 77).

**Load limit via external contact**

An adjustable number of boilers can be blocked via the external dry contact (on-site connection to terminal EL in the FM458 function module). All boilers can be blocked. This enables all boilers to be shut down, for example if external heat sources are available.

## 3 Installation

### 3.1 Scope of delivery

- Check that all package contents are present.

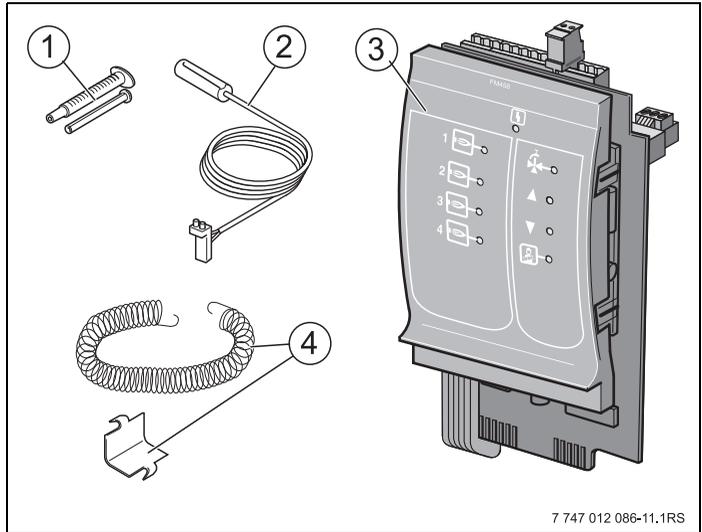


Fig. 8 Minimum delivery – FM458 function module <sup>1)</sup>

- 1 Heat conducting paste
- 2 0.35 inch (9 mm) sensor as contact sensor <sup>2)</sup>
- 3 FM458 function module
- 4 Fasteners for 0.35 inch (9 mm) sensor

1) May include additional components

2) Subject to the installation situation, the sensors can be used for the sensor connections listed in Tab. 3, page 26. The curves are identical.

Not shown: Operating instructions, service instructions, wiring diagram

## 3.2 Checking the software versions

The software versions of the CM431 controller module and the MEC2 user interface must be version 8.xx or higher.

- Before installing the FM458 function module, check the software versions of the CM431 controller module and the MEC2 user interface at the service level (version 8.xx or higher).

For more information contact Buderus.

## 3.3 Installation in the Logamatic 4000 control panel

Generally, you can install the FM458 function module into any vacant slot in the Logamatic 432x of the Logamatic series 4000 (e.g. slot 1 – 4 in the Logamatic 43xx).



### USER NOTE

Recommendation: install the FM458 function module as **far to the right as possible**. This ensures that the heating zones are in a logical order. The heating zone modules should be installed in the control starting from the left side (slot 1).

Exception: certain function modules must be installed in designated slots.

This module can only be installed in the master control panel with the ECOCAN-BUS address 0 or 1.

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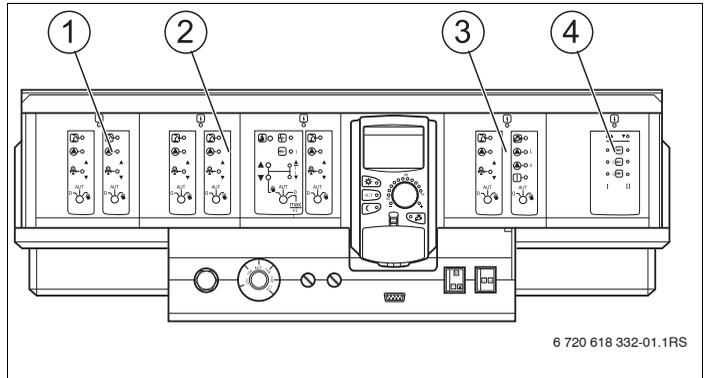


Fig. 9 Assignment of slots 1 – 4 (example: Logamatic 43xx)

- 1 Slot 1: e.g. FM442 (heating zone 1, heating zone 2)
- 2 Slot 2: e.g. FM442 (heating zone 3, heating zone 4)
- 3 Slot 3: e.g. FM441 (heating zone 5, DHW/recirculation pump)
- 4 Slot 4: e.g. FM458 (strategy, for multi-boiler systems)

### 3.4 Connecting inputs and outputs

The low-voltage terminals and the 120 V outputs are on the rear top of the FM458 function module. Colored labels with inscriptions matching the appropriate plugs are attached to the strips. Plugs are color-coded.

- Connect inputs and outputs correctly.  
For additional information, see see Chapter 3.8  
"Recommended hydraulic schemes", page 32 to page 46.

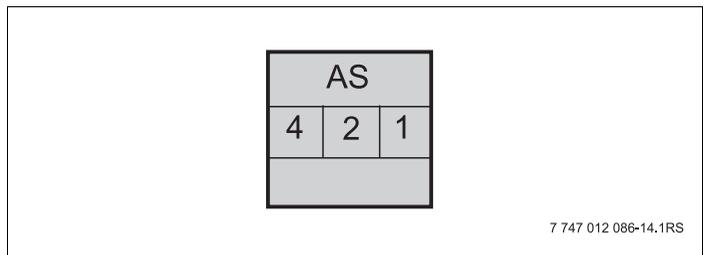


Fig. 10

Designation	Description
AS	Output central fault message, dry contact min. switching capacity 12 V/20 mA max. switching capacity 120 V/5 A

Tab. 2 Inputs and outputs (terminal designation)

### 3.5 Connecting sensors

The sensor connections are located at the rear top of the FM458 function module. Colored labels with inscriptions matching the appropriate plugs are attached to the strips. Plugs are color-coded.

Sensor designation key

	Designation	Function
<b>FVS</b>	<b>Fühler Vorlauf Strategie</b> [Strategy supply temperature sensor]	This sensor is used to regulate a multi-boiler system. It is located at the heat transfer point from the boiler to the system (system supply).
<b>FRS</b>	<b>Fühler Rücklauf Strategie</b> [Strategy return temperature sensor]	This sensor is used to regulate the operating conditions of a multi-boiler system. It is located at the system return.
<b>ZW</b>	<b>Zählereingang Wärmemengenzähler</b> [Input – heat meter]	An external heat meter can be connected via a dry contact to this terminal and used for statistics purposes. Optional: Input for external boiler lead lag/rotation.
<b>EL</b>	<b>Eingang Lastbegrenzung</b> [Load limit input]	
<b>U in</b> 1 / 2	<b>Voltage input</b> <b>0 – 10 volt</b>	This input allows running the system with external input, dependent either on supply temperature or output; the system supply sensor acts as a reference point.
<b>U out</b> 3 / 4	<b>Output</b> <b>0 – 10 volt</b>	This output informs the external control system about the current set system supply temperature.

Tab. 3 Sensor connections

**USER NOTE**

Ensure that you connect the sensors correctly and mount them in the correct positions. For additional information, see Chapter 3.8 "Recommended hydraulic schemes", page 32 and following.

**USER NOTE**

When using two FM458 modules, connect the temperature sensors, the heat meter sensor, the external lead lag/rotation and the external load limit to the module that is connected to boiler 1. If the voltage inputs are connected to each module as the default set temperature, the highest temperature will be used as the set value for the strategy. The voltage and fault message outputs are identical for both modules.

### 3.6 Connecting EMS boilers

The connections for connecting EMS boilers are at the rear top of the FM458 function module. Colored labels with inscriptions matching the appropriate plugs are attached to the strips.

EMS 1		EMS 2		EMS 3		EMS 4	
2	1	2	1	2	1	2	1

EMS 1 interface to EMS boiler 1

... ..

EMS 4 interface to EMS boiler 4

If a second FM458 is installed, terminal EMS 1 on the r.h. (2nd) FM458 is assigned to boiler 5, terminal EMS 2 to boiler 6, terminal EMS 3 to boiler 7 and terminal EMS 4 to boiler 8.

### 3.7 Assigning the boiler number

The boilers are numbered consecutively starting from boiler 1.

Boiler numbers are assigned as follows:

- for boilers series 4000, by setting the CAN-BUS address (address DIP switches),
- for EMS boilers, via connection to terminal EMS 1, EMS 2, EMS 3 or EMS 4 on the FM458 module.

**Important:** the assignment of the boiler numbers must be unambiguous. Each boiler number may only be assigned once!



#### USER NOTE

The boiler sequence uses the boiler number and is freely programmable via parameters.

---

### Application 1:

If only series 4000 boilers are installed, then the first series 4000 boiler will be equipped with the Logamatic 4321 control panel with installed FM458 module; this control panel is set to CAN address 1. The lag boilers will then be equipped with the Logamatic 4322 control panel. These will be numbered via CAN address from 2, 3 etc. upwards.

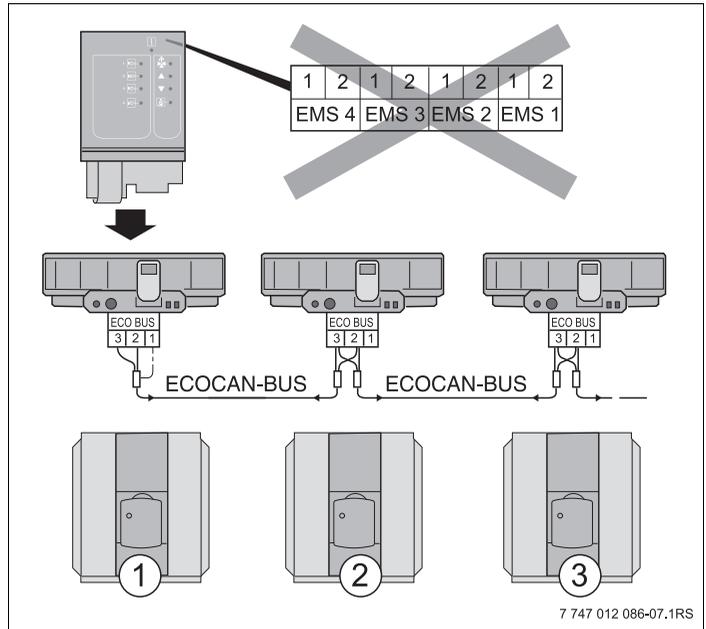


Fig. 11 Multi-boiler system with Logamatic 4000 control unit

- 1 Series 4000 boiler 1 (control panel with ECO CAN-BUS address 1)
- 2 Series 4000 boiler 2 (control panel with ECO CAN-BUS address 2)
- 3 Series 4000 boiler 3 (control panel with ECO CAN-BUS address 3)

### Application 2:

If only EMS boilers are installed, use the Logamatic 4323 control panel. This will be equipped with the FM458 module and set to CAN address 0/1. Boiler numbers are permanently assigned to the relevant boiler via terminals EMS 1, EMS 2, EMS 3 or EMS 4 on the FM458 module. The boilers are consecutively numbered upwards.

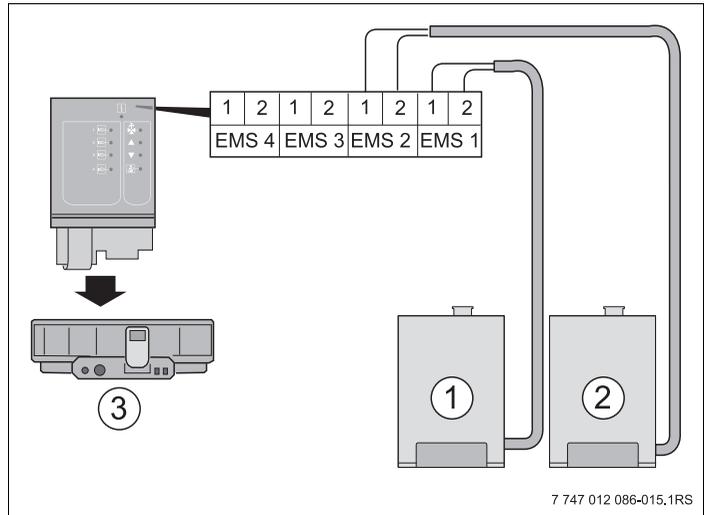


Fig. 12 Multi-boiler system with EMS control unit

- 1 EMS boiler 1 (on terminal EMS 1)
- 2 EMS boiler 2 (on terminal EMS 2)
- 3 Control panel 4323 (control panel with ECOCAN-BUS address 0/1)

### Application 3:

If one or several boiler(s) series 4000 and one or several EMS boiler(s) are installed, then the first series 4000 boiler will be equipped with the Logamatic 4321 control panel with installed FM458 module; this control panel is set to CAN address 1. The lag boilers will then be numbered upwards from 2, 3 etc.

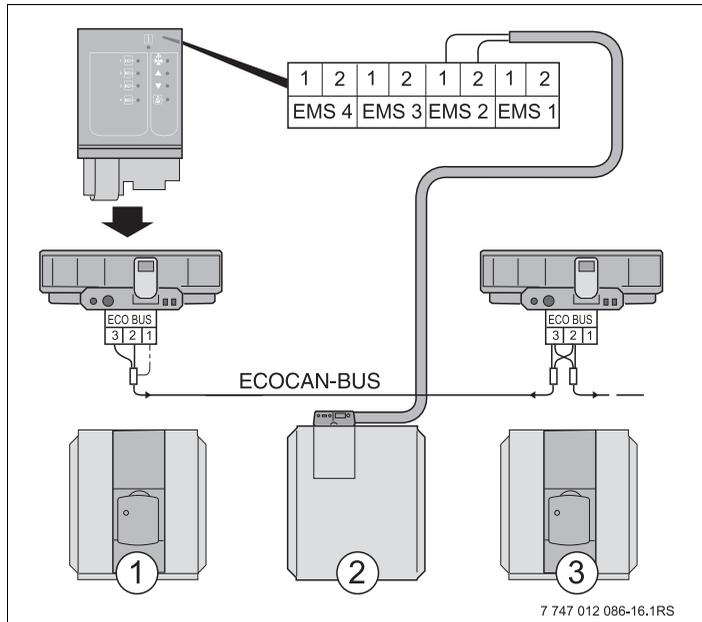


Fig. 13 Multi-boiler system with Logamatic 4000 and EMS control unit

- 1 Series 4000 boiler 1 (control panel with ECOCAN-BUS address 1)
- 2 EMS boiler 2 (on terminal EMS 2)
- 3 Series 4000 boiler 3 (control panel with ECOCAN-BUS address 3)

## 3.8 Recommended hydraulic schemes

The recommended and displayed hydraulic schemes are tailored to the type of heat source, and show a selection of the schemes that are made possible by the FM458 function module.

A differentiation is made between EMS and series 4000 boilers. EMS boilers are factory-fitted with the Logamatic EMS control system. Floorstanding EMS boilers are equipped with the Logamatic MC10 control panel with BC10 user interface; wall-mounted boilers are equipped with the BC10 user interface. Series 4000 boilers must each be equipped with a Logamatic 4321/22 control panel.

Corresponding parameters are listed for each hydraulic scheme.



**CAUTION!**

### SYSTEM DAMAGE

The hydraulic schemes listed in this chapter are only illustrations of relative positions of the sensors, pumps and actuators that may be required.

For the sake of clarity, some hydraulic components that may be required, such as relief valves, expansion vessels etc., are not shown.

It is the responsibility of the installer to ensure compliance with all applicable laws and regulations.

- Install the hydraulic components in accordance with current technology.

	Designation		Designation
DV	Motorized ring butterfly valve	PS	Tank primary pump
EMS	Energy Management System	PZ	Recirculation pump
FA	Outdoor temperature sensor	RK	Boiler return
FB	Drinking water sensor	RV	Flow setter valve
FK	Boiler water temperature sensor	RWT	Heat exchanger return
FV	Heating zone supply temperature sensor	SH	Heating zone actuator
FVS	Strategy supply temperature sensor	SR	Return actuator
HK	Heating zone	TWH	Temperature switch – radiant floor heating zone
HT	High temperature heating zone	VK	Boiler supply
NT	Low temperature heating zone	VWT	Heat exchanger flow
PH	Heating zone pump		
PK	Boiler circulator		

Tab. 4 Abbreviations used in the hydraulic schemes

### 3.8.1 Series 4000 boiler via low loss header

4-boiler system; boilers connected via low loss header (hydraulic separator), heating zones and DHW heating via tank primary pump (BW boiler = condensing boiler, LT boiler = low temperature boiler).

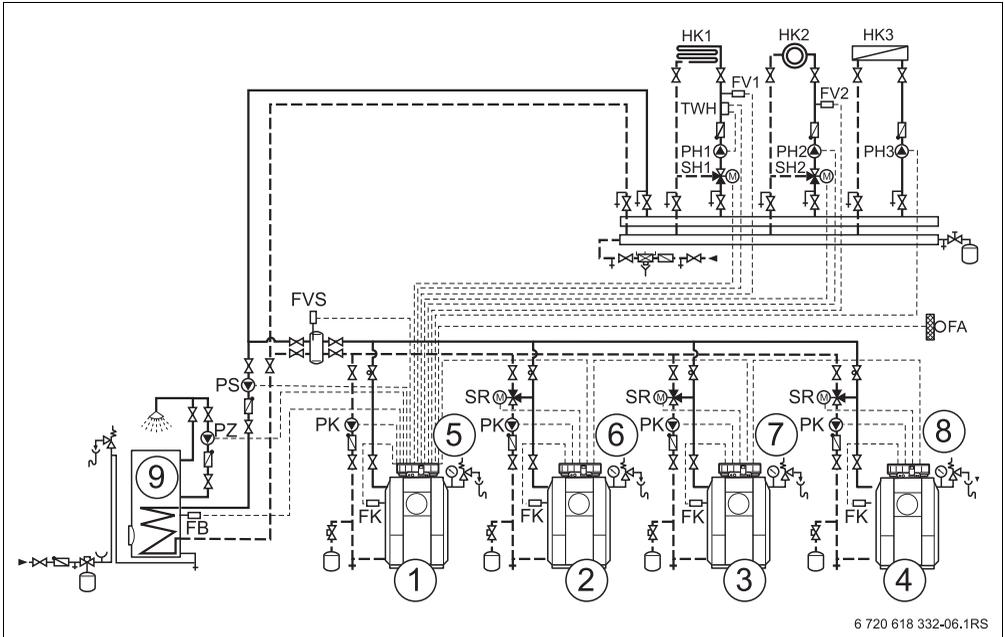


Fig. 14 Hydraulic scheme 1

- 1 Series 4000 boiler 1: e.g. condensing boiler Logano plus \_\_
- 2 Series 4000 boiler 2: e.g. condensing boiler Logano plus \_\_
- 3 Series 4000 boiler 3: e.g. condensing boiler Logano plus \_\_
- 4 Series 4000 boiler 4: e.g. condensing boiler Logano plus \_\_
- 5 Logomatic 4321 with FM441, FM442 and FM458
- 6 Logomatic 4322
- 7 Logomatic 4322
- 8 Logomatic 4322
- 9 DHW storage tank

No.	Parameter	Selection	Description
1.	Number of boilers	4	
2.	Maximum system temperature	167 °F (75 °C)	system-specific
3.	Hydraulic decoupling (low loss header)	yes	
4.	Lead lag/rotation (Chapter 7.5, page 69)	no default	system-specific
5.	Load limit (Chapter 7.6, page 77)	no default	system-specific
6.	Operating mode	no default	system-specific
7.	Lead boiler post purge (pump)	60 min	
8.	Lag boiler post purge	5 min	

**Notes:**

- The operating conditions are met and the lag boilers are hydraulically blocked via the boiler circuit pump and check valve.
- Water heating via FM441 function module.

### 3.8.2 EMS boiler (floorstanding) via low loss header

4-boiler system with floorstanding condensing boilers; boilers connected via low loss header (hydraulic separator), heating zones and DHW heating via tank primary pump (BW boiler = condensing boiler).

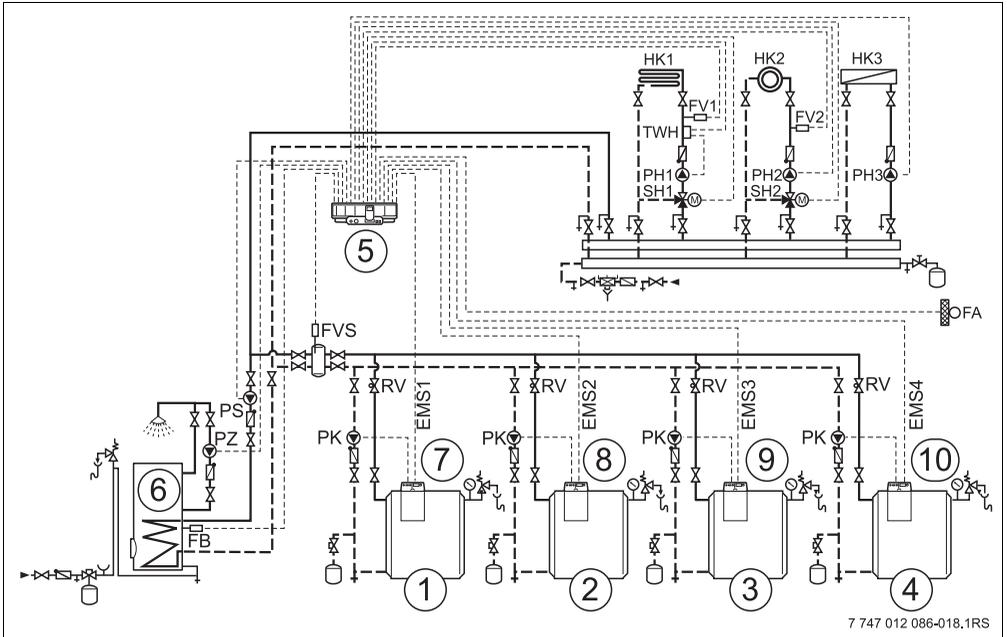


Fig. 15 Hydraulic scheme 2

- 1 EMS boiler 1: e.g. condensing boiler Logano plus GB312
- 2 EMS boiler 2: e.g. condensing boiler Logano plus GB312
- 3 EMS boiler 3: e.g. condensing boiler Logano plus GB312
- 4 EMS boiler 4: e.g. condensing boiler Logano plus GB312
- 5 Logamatic 4323 with FM441, FM442 and FM458
- 6 DHW storage tank
- 7 Logamatic MC10
- 8 Logamatic MC10
- 9 Logamatic MC10
- 10 Logamatic MC10

No.	Parameter	Selection	Description
1.	Number of boilers	4	
2.	Maximum system temperature	167 °F (75 °C)	system-specific
3.	Hydraulic decoupling (low loss header)	yes	
4.	Lead lag/rotation (Chapter 7.5, page 69)	no default	system-specific
5.	Load limit (Chapter 7.6, page 77)	no default	system-specific
6.	Operating mode	no default	system-specific
7.	Lead boiler post purge (pump)	60 min	
8.	Lag boiler post purge	5 min	

**Notes:**

- The operating conditions are met and the lag boilers are hydraulically blocked via the boiler circuit pump and check valve.
- Water heating via FM441 function module.

### 3.8.3 EMS boiler (wall-mounted) with DHW

4-boiler system with wall-mounted condensing boilers; boilers connected via low loss header (hydraulic separator).

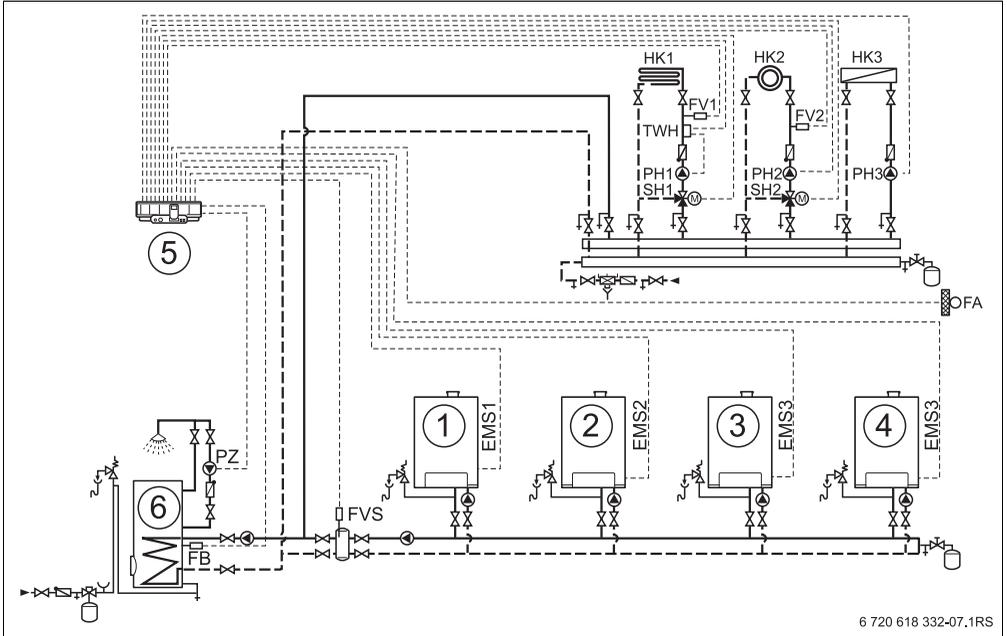


Fig. 16 Hydraulic scheme 3

- 1 EMS boiler 1: e.g. condensing boiler Logano plus GB\_\_
- 2 EMS boiler 2: e.g. condensing boiler Logano plus GB\_\_
- 3 EMS boiler 3: e.g. condensing boiler Logano plus GB\_\_
- 4 EMS boiler 4: e.g. condensing boiler Logano plus GB\_\_
- 5 Logomatic 4323 with FM442 and FM458
- 6 DHW storage tank

No.	Parameter	Selection	Description
1.	Number of boilers	4	
2.	Maximum system temperature	167 °F (75 °C)	system-specific
3.	Hydraulic decoupling (low loss header)	yes	
4.	Lead lag/rotation (Chapter 7.5, page 69)	no default	system-specific
5.	Load limit (Chapter 7.6, page 77)	no default	system-specific
6.	Operating mode	no default	boiler-specific
7.	Lead boiler post purge (pump)	60 min	
8.	Lag boiler post purge	5 min	

**Notes:**

- Water heating via pump control.
- Hydraulic blocking of the lag boiler via boiler circuit pump and check valve.



No.	Parameter	Selection	Description
1.	Number of boilers	2	
2.	Maximum system temperature	167 °F (75 °C)	system-specific
3.	Hydraulic decoupling (low loss header)	no	
4.	Lead lag/rotation (Chapter 7.5, page 69)	none	
5.	Load limit (Chapter 7.6, page 77)	no default	system-specific
6.	Operating mode	no default	system-specific
7.	Lead boiler post purge (pump)	60 min	
8.	Lag boiler post purge	5 min	

**Notes:**

- High efficiency through fixed boiler sequence with condensing boiler as lead boiler.
- The operating conditions are met and the lag boilers are hydraulically blocked via the boiler circuit pump and check valve.
- Water heating via FM441 function module.

### 3.8.5 Boilers series 4000 in "reverse return"

2-boiler system; boilers connected according to "reverse return"; heating zones and DHW heating via tank primary pump (LT boiler = low temperature boiler).

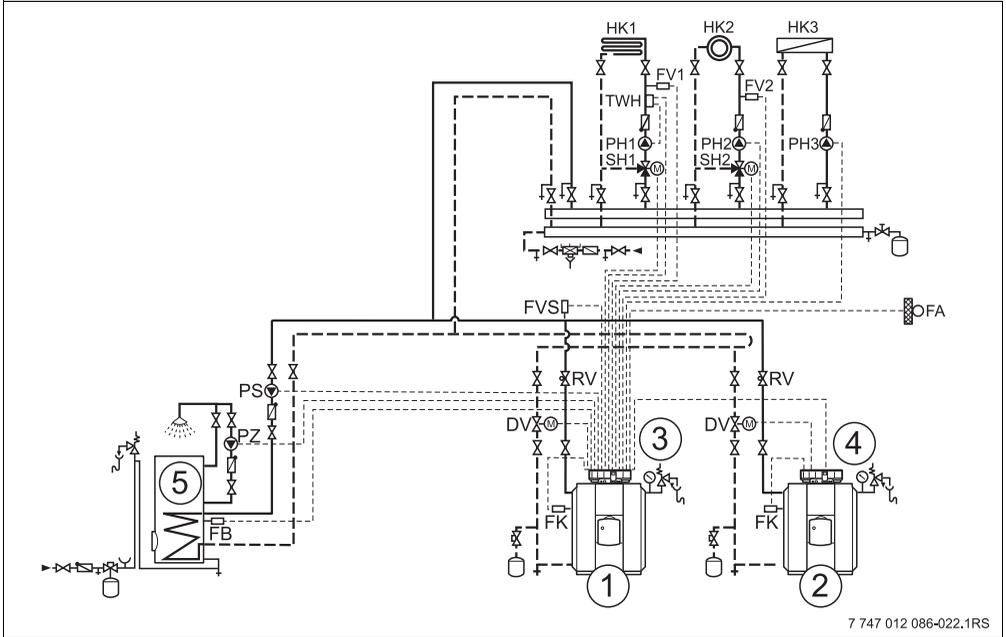


Fig. 18 Hydraulic scheme 6

7 747 012 086-022.1RS

- 1 Series 4000 boiler 1: e.g. low temperature boiler Logano\_\_
- 2 Series 4000 boiler 2: e.g. low temperature boiler Logano\_\_
- 3 Logamatic 4321 with FM441, FM442 and FM458
- 4 Logamatic 4322
- 5 DHW storage tank

No.	Parameter	Selection	Description
1.	Number of boilers	2	
2.	Maximum system temperature	167 °F (75 °C)	system-specific
3.	Hydraulic decoupling (low loss header)	no	
4.	Lead lag/rotation (Chapter 7.5, page 69)	no default	system-specific
5.	Load limit (Chapter 7.6, page 77)	no default	system-specific
6.	Operating mode	serial	boiler-specific
7.	Lead boiler post purge (pump)	60 min	
8.	Lag boiler post purge	5 min	

**Notes:**

- Only install boilers of the same type (same hydraulic pressure drop).
- Separate boiler circuit actuators (motorized butterfly valves) for maintaining the operating temperatures plus for hydraulic blocking of lag boilers.
- Load split of boilers: 50/50 %.
- Externally-controlled heating zones are not recommended.
- Water heating via FM441 function module.



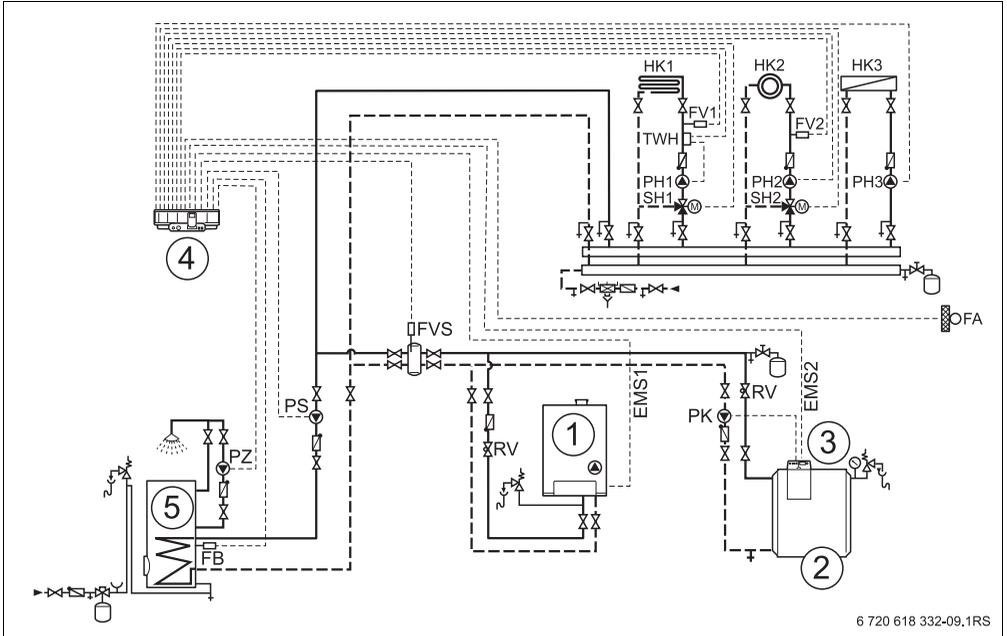
No.	Parameter	Selection	Description
1.	Number of boilers	2	
2.	Maximum system temperature	167 °F (75 °C)	system-specific
3.	Hydraulic decoupling (low loss header)	yes	
4.	Lead lag/rotation (Chapter 7.5, page 69)	no default	system-specific
5.	Load limit (Chapter 7.6, page 77)	no default	system-specific
6.	Operating mode	no default	system-specific
7.	Lead boiler post purge (pump)	60 min	
8.	Lag boiler post purge	5 min	

**Notes:**

- The operating conditions are met and the lag boilers are hydraulically blocked via the boiler circuit (either via boiler circuit pump and 3-way boiler circuit actuator (only series 4000 boilers) or via boiler circuit pump and check valve (EMS and series 4000 boilers).
- Water heating via FM441 function module.

### 3.8.7 System with different EMS boilers

2-boiler system with floorstanding and wall-mounted boilers; boilers connected via low loss header (hydraulic separator), heating zones and DHW heating via tank primary pump (BW boiler = condensing boiler).



6 720 618 332-09,1RS

Fig. 20 Hydraulic scheme 9

- 1 EMS boiler 1: e.g. condensing boiler Logano plus GB\_\_
- 2 EMS boiler 2: e.g. condensing boiler Logano plus GB312
- 3 Logamatic MC10
- 4 Logamatic 4323 with FM441, FM442 and FM458
- 5 DHW storage tank

No.	Parameter	Selection	Description
1.	Number of boilers	2	
2.	Maximum system temperature	167 °F (75 °C)	system-specific
3.	Hydraulic decoupling (low loss header)	yes	
4.	Lead lag/rotation (Chapter 7.5, page 69)	no default	system-specific
5.	Load limit (Chapter 7.6, page 77)	no default	system-specific
6.	Operating mode	no default	system-specific
7.	Lead boiler post purge (pump)	60 min	
8.	Lag boiler post purge	5 min	

**Notes:**

- The operating conditions are met and the lag boilers are hydraulically blocked via the boiler circuit pump and check valve.
- Water heating via FM441 function module.

## 4 Integrating EMS boilers

### 4.1 BC10 basic controller

The BC10 base controller enables the standard operation of boilers with EMS/UBA 3.x or EMS/SAFe. For information about the operation of the BC10, see the service instructions for the EMS boiler.



#### USER NOTE

Extended functions are set via the MEC2 user interface.

Both dials of the BC10 base controller must be set to "Aut" (otherwise a fault message will be issued).

---

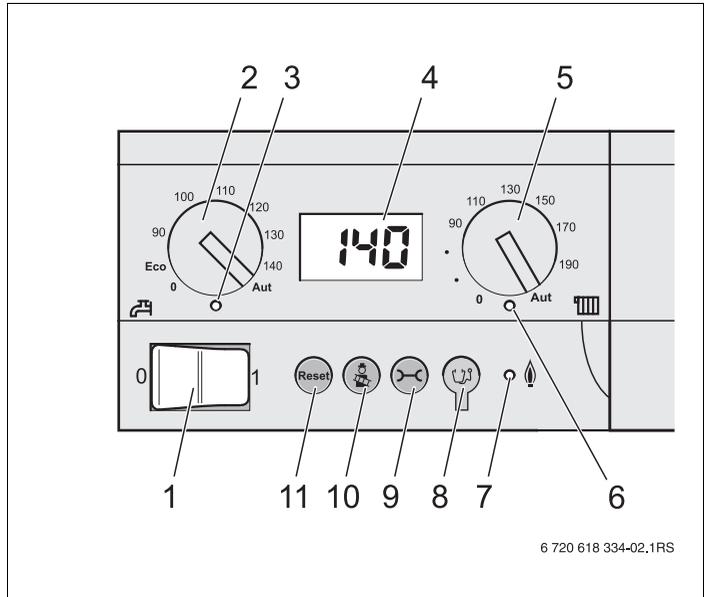


Fig. 21 BC10 controls

- 1 On/Off switch
- 2 Dial for DHW set point
- 3 LED "DHW status"
- 4 Status display screen
- 5 Dial for maximum boiler temperature in heating mode
- 6 "Heat demand" LED
- 7 "Burner" LED (On/Off)
- 8 Diagnostic plug
- 9 "Status display" button
- 10 "Flue gas test" button
- 11 "Reset" button

### Setting the output restriction

The boiler output can be restricted to 37.5 kBTU/h (11 kW) (or 170.6 kBTU/h (50 kW)) with higher boiler output) using a jumper on the back of the base controller.

- Removing the base controller.
- Remove jumper (→ Fig. 22 [1]) if the boiler output should be restricted.

Jumper	State	Explanation
	Not inserted	Output restricted to 37.5 kBTU/h (11 kW) (170.6 kBTU/h (50 kW)) (only for boilers with UBA 3)
	Inserted	Output not restricted (state of device when delivered)

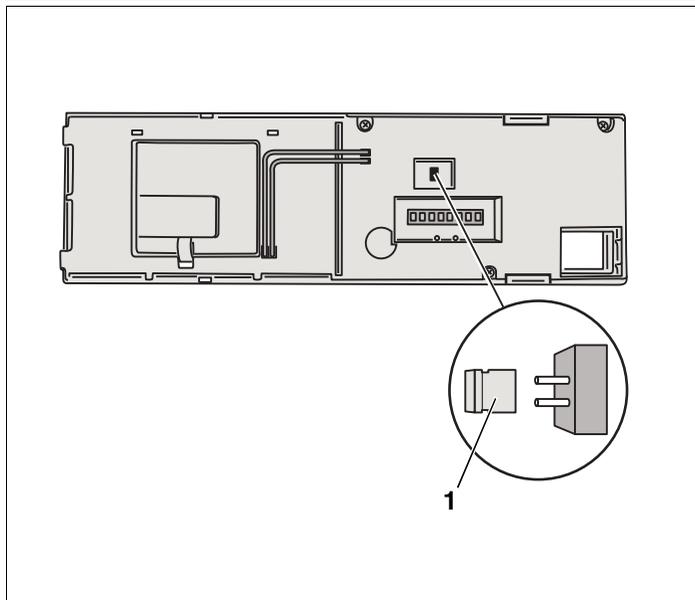


Fig. 22 Back of the BC10 base controller

- 1 Jumper for restricting output

## 4.2 Approved boiler types

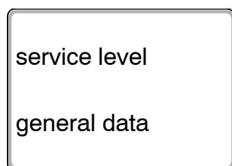
EMS	BCM	Boiler type
<b>UBA 3</b>	1000	Logamax plus GB142-30
	1002	Logamax plus GB142-24
	1015	Logamax plus GB142-45
	1016	Logamax plus GB142-60
	1026	Logamax plus GB162-100
	1027	Logamax plus GB162-80
<b>SAFe 40</b>	6031	Logano plus GB312-80
	6032	Logano plus GB312-120
	6033	Logano plus GB312-160
	6034	Logano plus GB312-200
	6035	Logano plus GB312-240
	6036	Logano plus GB312-280
	6037	Logano plus GB312-90

Tab. 5 Approved boiler types

## 5 The functions of the FM458

The following sections explain how to use and set the various functions via the MEC2 user interface.

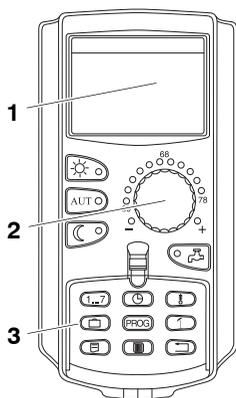
### 5.1 Operation with MEC2



#### Calling up the service level

The service instructions for your Logamatic 4xxx control panel explain in detail how to operate the MEC2 remote control. The following provides a brief overview of the MEC2 operation.

The MEC2 user interface offers two operating levels (level 1 with closed flap and level 2 with open flap) plus one service level (accessible via password). The service level has various main menus and submenus for set up of the controls.



- 1 Display
- 2 Dial
- 3 Function keys



To enter the service level press this key combination (key code) until "service level – general data" is displayed.

## 5.2 Integrating the FM458 function module in the control

### 5.2.1 Integration of FM458 function module at the MEC2 level

After you have installed the FM458 function module (→ see installation instructions "Modules for 43xxx control panels"), your control panel will detect it automatically when switched on.



#### USER NOTE

If the FM458 function module is not recognized automatically, you will need to install it manually once via the MEC2 user interface.

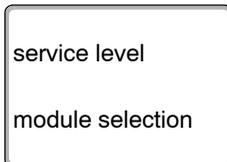
### 5.2.2 Manual integration of FM458 function module at the MEC2 level



Call up the service level.



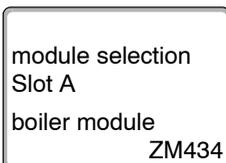
Turn the dial until "service level – module selection" appears in the display.



The display shows the main menu.



Press "Display" to select the main menu "module selection".

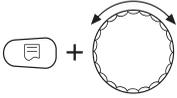


"module selection – Slot A" is shown on the display.



Turn the dial to the position (slot) where the FM458 function module is to be installed.

For example, the FM458 function module is to be installed in slot 2.

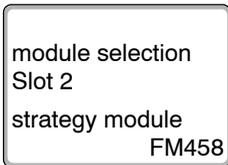


Hold "Display" down (the text on the bottom line begins to flash), and turn the dial until the FM458 function module appears on the display.

Release the "Display" button.



Press "Back".



The FM458 function module ("strategy module") is installed in slot 2.



Press "Back" three times or close the operating flap to reach operating level 1.

## 6 General data

### 6.1 0 – 10 V input

As soon as a module with 0 – 10 V input has been installed in the control panel, the following screens appear as listed in the table below:

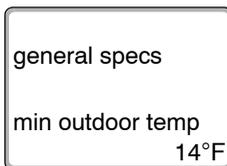
Module	Name	Temperature control	Power control
FM447	Strategy module	X	
FM448	Fault module	X	
FM456	KSE 2 (EMS)	X	X (CM431 V6.xx or higher)
FM457	KSE 4 (EMS)	X	X (CM431 V6.xx or higher)
FM458	Strategy module	X	X (CM431 V8.xx or higher)
ZM433	Sub station	X	



Call up the service level. "general specs" appears as the first main menu.



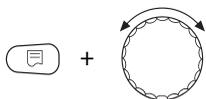
Press "Display" to call up a submenu (here: "min outdoor temp").



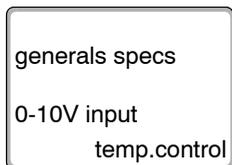
The display shows the selected submenu.



Turn the dial until the submenu "0-10V input" appears.



Hold down "Display" and turn the dial until the desired set value appears (here: "temp.control").



The display shows the set value.

Release "Display" to save your input.

	<b>Input range</b>	<b>Factory setting</b>
<b>0 – 10 V input</b>	OFF temp.control power control	temp.control

## 6.2 Temperature control 0 – 10 V input

If you have selected "temp.control" for a 0 – 10 V input, you can select the start and stop point, if necessary, for the external 0 – 10 V input.

You can set the following:

- The set value in °F (°C) for 0 V ("temp.control 0V corresp. to")
- The set value in °F (°C) for 10 V ("temp.control 10V corresp. to")

The following linear curve is calculated from these values:

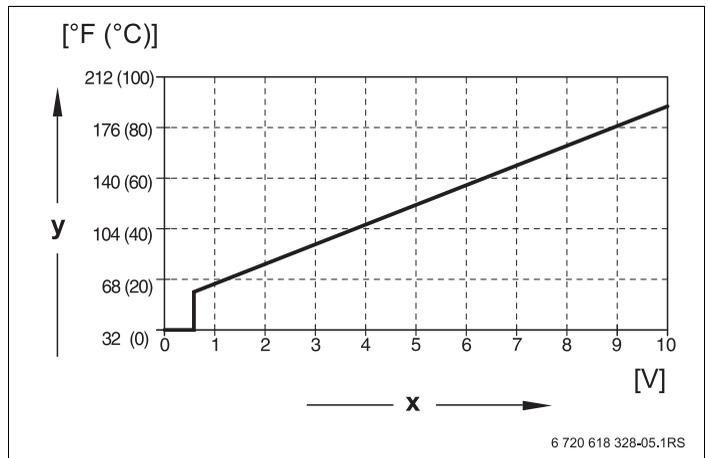


Fig. 23 Input 0 – 10 V

- x** Input voltage in V (factory setting)
- y** Setpoint boiler temperature in °F (°C)

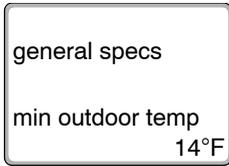
The start value (start point) of the curve is set to 0.6 V for a positive curve, Fig. 23 shows the factory setting.



Call up the service level. "general specs" appears as the first main menu.



Press "Display" to call up a submenu (here: "min outdoor temp").



The display shows the selected submenu.



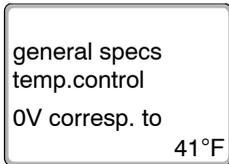
Turn the dial until submenu "temp.control 0V corresp. to" or "temp.control 10V corresp. to" appears.



+



Hold down "Display" and turn the dial until the desired set value appears (here: "41°F" (5°C)).



The display shows the set value.

Release "Display" to save your input.



Press "Back" to return to the next level up.



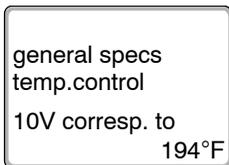
Turn the dial until submenu "temp.control 10V corresp. to" appears.



+



Hold down "Display" and turn the dial until the desired set value appears (here: "194°F" (90°C)).



The display shows the set value.

Release "Display" to save your input.

	Input range	Factory setting
temp. control 0 V	41 °F – 210 °F (5 °C – 99 °C)	41 °F (5 °C)
temp. control 10 V	41 °F – 210 °F (5 °C – 99 °C)	194 °F (90 °C)



#### USER NOTE

If a curve with a negative incline is programmed, e.g. 0 volt = 194 °F (90 °C), ensure that all 0 – 10 V inputs of a control panel are used. An open input corresponds to 0 V and thus a to heat demand for, e.g. 194 °F (90 °C).

The demand should be set parallel at all 0 – 10 V inputs of a control panel, if applicable.

### 6.3 Power control for 0 – 10 V input

The 0 – 10 V input can also be used for power control.

If you have selected power control for the 0 – 10 V input, you can, if necessary, match the curve for external power control.

You can set the following:

- The set output value for 0 V ("power control 0V corresp. to")
- The set output value for 10 V ("power control 10V corresp. to")

The following linear curve is calculated from these values:

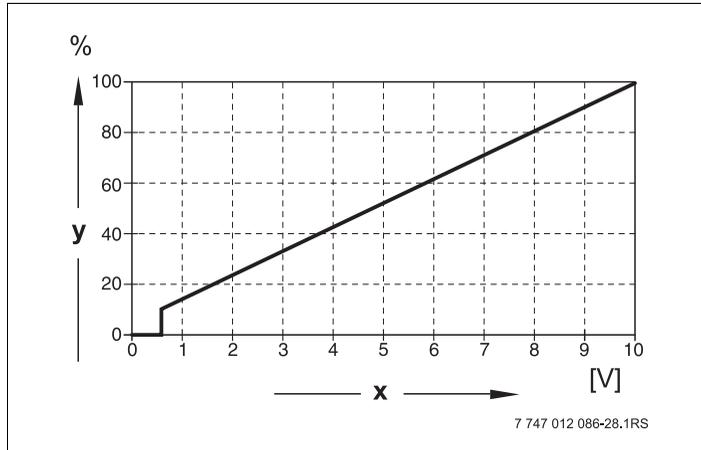


Fig. 24 0 – 10 V input

**x** Input voltage in V (factory setting)

**y** Output demand in %

The start value (switch-on point) of the curve is set to 0.6 V with a positive curve.



#### USER NOTE

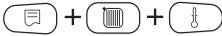
In case of external power control, the control panels can no longer take internal heat demands, e.g. from heating zones or DHW function, into consideration.



#### USER NOTE

If a curve with a negative incline is programmed, e.g. 0 volt = 100 % output, ensure that all 0 – 10 V inputs of this control panel are used. An open input corresponds to 0 V and thus to an output demand of 100 %.

The demand should be set parallel at all 0 – 10 V inputs of a control panel, if applicable.



Call up the service level. "general specs" appears as the first main menu.



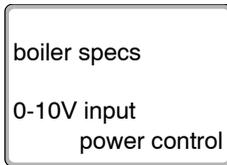
Turn the dial until the main menu "boiler specs" appears.



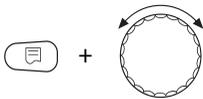
Press "Display" to call up a submenu (here: "No of boilers").



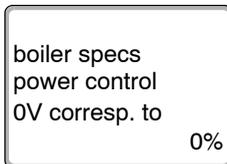
Turn the dial until submenu "power control" appears.



The display shows the selected submenu.



Hold down "Display" and turn the dial until the desired value appears (here: "0V corresp. to 0%").

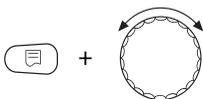


Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save your input.



Turn the dial until the submenu "10V corresp. to ...%" appears.



Hold down "Display" and turn the dial until the desired value appears (here: "10V corresp. to 100%").

boiler specs  
power control  
10V corresp. to  
100%

Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save your input.



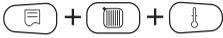
Press "Back" to return to the next level up.



	<b>Input range</b>	<b>Factory setting</b>
<b>power control 0 V</b>	0 % – 100 %	0 %
<b>power control 10 V</b>	0 % – 100 %	100 %

## 7 Strategy data

### 7.1 Number of boilers



You select the number of boilers in this menu.

Call up the service level. "general specs" appears as the first main menu



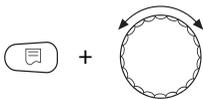
Turn the dial until the main menu "service level – strategy" appears.



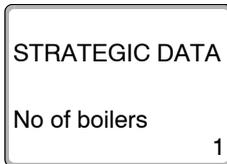
Press "Display" to call up a submenu (here: "STRATEGIC DATA").



Turn the dial until the submenu "No of boilers" appears.



Hold down "Display" and turn the dial until the desired value appears (here: "1").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
No of boilers	0 – 4 with 1 FM458 0 – 8 with 2 FM458	1



#### USER NOTE

If you set the integration to "0", then the module assumes that the control unit should not take any heat source into consideration. All boilers are shut down. No further adjustments can be made.

## 7.2 Maximum system temperature

You select the maximum system temperature in this menu.



Call up the service level. "general specs" appears as the first main menu



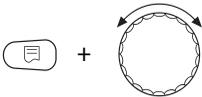
Turn the dial until the main menu "service level – strategy" appears.



Press "Display" to call up a submenu (here: "STRATEGIC DATA").



Turn the dial until the submenu "max system temperature" appears.



Hold down "Display" and turn the dial until the desired value appears (here: "167°F" (75°C)).



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.



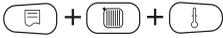
### USER NOTE

Never set the maximum system temperature higher than the lowest maximum shutdown temperature of any individual boiler in the system.

	Control range	Factory setting
max system temperature	122 F – 194 °F (50 °C – 90 °C)	167 °F (75 °C)

### 7.3 Hydraulic decoupling (low loss header)

In this menu you define whether a hydraulic low loss header is installed in the system.



Call up the service level. "general specs" appears as the first main menu



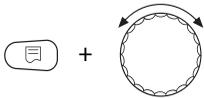
Turn the dial until the main menu "service level – strategy" appears.



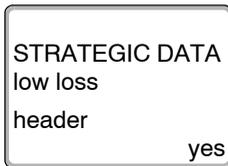
Press "Display" to call up a submenu (here: "STRATEGIC DATA").



Turn the dial until the submenu "low loss header" appears.



Hold down "Display" and turn the dial until the desired value appears (here: "yes").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
low loss header	yes no	yes

### 7.4 Boiler sequences

	1 x FM458				2 x FM458										
	2	3	4		5	6	7	8							
1	1 2	1 2 3	1 2 3 4		1 2 3 4 5	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8							
2	2 1	2 1 3	2 1 3 4		2 1 3 4 5	2 1 3 4 5 6	2 1 3 4 5 6 7	2 1 3 4 5 6 7 8							
3	2 1 3	2 1 3 1	3 2 1 4		3 2 1 4 5	3 2 1 4 5 6	3 2 1 4 5 6 7	3 2 1 4 5 6 7 8							
4	1 2	1 3 2	1 3 2 4		1 3 2 4 5	1 3 2 4 5 6	1 3 2 4 5 6 7	1 3 2 4 5 6 7 8							
5	2 1	2 3 1	2 3 1 4		2 3 1 4 5	2 3 1 4 5 6	2 3 1 4 5 6 7	2 3 1 4 5 6 7 8							
6	1 2	3 1 2	3 1 2 4		3 1 2 4 5	3 1 2 4 5 6	3 1 2 4 5 6 7	3 1 2 4 5 6 7 8							
7	1 2	1 2 3	4 1 2 3		4 1 2 3 5	4 1 2 3 5 6	4 1 2 3 5 6 7	4 1 2 3 5 6 7 8							
8	2 1	2 1 3	4 2 1 3		4 2 1 3 5	4 2 1 3 5 6	4 2 1 3 5 6 7	4 2 1 3 5 6 7 8							
9	2 1	3 2 1	4 3 2 1		4 3 2 1 5	4 3 2 1 5 6	4 3 2 1 5 6 7	4 3 2 1 5 6 7 8							
10	1 2	1 3 2	4 1 3 2		4 1 3 2 5	4 1 3 2 5 6	4 1 3 2 5 6 7	4 1 3 2 5 6 7 8							
11	2 1	2 3 1	4 2 3 1		4 2 3 1 5	4 2 3 1 5 6	4 2 3 1 5 6 7	4 2 3 1 5 6 7 8							
12	1 2	3 1 2	4 3 1 2		4 3 1 2 5	4 3 1 2 5 6	4 3 1 2 5 6 7	4 3 1 2 5 6 7 8							
13	1 2	1 2 3	1 4 2 3		1 4 2 3 5	1 4 2 3 5 6	1 4 2 3 5 6 7	1 4 2 3 5 6 7 8							
14	2 1	2 1 3	2 4 1 3		2 4 1 3 5	2 4 1 3 5 6	2 4 1 3 5 6 7	2 4 1 3 5 6 7 8							
15	2 1	3 2 1	3 4 2 1		3 4 2 1 5	3 4 2 1 5 6	3 4 2 1 5 6 7	3 4 2 1 5 6 7 8							
16	1 2	1 3 2	1 4 3 2		1 4 3 2 5	1 4 3 2 5 6	1 4 3 2 5 6 7	1 4 3 2 5 6 7 8							
17	2 1	2 3 1	2 4 3 1		2 4 3 1 5	2 4 3 1 5 6	2 4 3 1 5 6 7	2 4 3 1 5 6 7 8							
18	1 2	3 1 2	3 4 1 2		3 4 1 2 5	3 4 1 2 5 6	3 4 1 2 5 6 7	3 4 1 2 5 6 7 8							
19	1 2	1 2 3	1 2 4 3		1 2 4 3 5	1 2 4 3 5 6	1 2 4 3 5 6 7	1 2 4 3 5 6 7 8							
20	2 1	2 1 3	2 1 4 3		2 1 4 3 5	2 1 4 3 5 6	2 1 4 3 5 6 7	2 1 4 3 5 6 7 8							
21	2 1	3 2 1	3 2 4 1		3 2 4 1 5	3 2 4 1 5 6	3 2 4 1 5 6 7	3 2 4 1 5 6 7 8							
22	1 2	1 3 2	1 3 4 2		1 3 4 2 5	1 3 4 2 5 6	1 3 4 2 5 6 7	1 3 4 2 5 6 7 8							
23	2 1	2 3 1	2 3 4 1		2 3 4 1 5	2 3 4 1 5 6	2 3 4 1 5 6 7	2 3 4 1 5 6 7 8							
24	1 2	3 1 2	3 1 4 2		3 1 4 2 5	3 1 4 2 5 6	3 1 4 2 5 6 7	3 1 4 2 5 6 7 8							
25	1 2	1 2 3	1 2 3 4		1 2 3 4 5	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8							
26	2 1	2 3 1	2 3 4 1		2 3 4 5 1	2 3 4 5 6 1	2 3 4 5 6 7 1	2 3 4 5 6 7 8 1							
27	1 2	3 1 2	3 4 1 2		3 4 5 1 2	3 4 5 6 1 2	3 4 5 6 7 1 2	3 4 5 6 7 8 1 2							
28	1 2	1 2 3	4 1 2 3		4 5 1 2 3	4 5 6 1 2 3	4 5 6 7 1 2 3	4 5 6 7 8 1 2 3							
29	1 2	1 2 3	1 2 3 4		5 1 2 3 4	5 6 1 2 3 4	5 6 7 1 2 3 4	5 6 7 8 1 2 3 4							
30	1 2	1 2 3	1 2 3 4		1 2 3 4 5	6 1 2 3 4 5	6 7 1 2 3 4 5	6 7 8 1 2 3 4 5							
31	1 2	1 2 3	1 2 3 4		1 2 3 4 5	1 2 3 4 5 6	7 1 2 3 4 5 6	7 8 1 2 3 4 5 6							
32	1 2	1 2 3	1 2 3 4		1 2 3 4 5	1 2 3 4 5 6	1 2 3 4 5 6 7	8 1 2 3 4 5 6 7							
33	2 1	2 3 1	2 3 4 1		2 3 4 5 1	2 3 4 5 6 1	2 3 4 5 6 7 1	2 3 4 5 6 7 8 1							
34	2 1	3 2 1	3 4 2 1		3 4 5 2 1	3 4 5 6 2 1	3 4 5 6 7 2 1	3 4 5 6 7 8 2 1							
35	2 1	2 3 1	4 2 3 1		4 5 2 3 1	4 5 6 2 3 1	4 5 6 7 2 3 1	4 5 6 7 8 2 3 1							
36	2 1	2 3 1	2 3 4 1		5 2 3 4 1	5 6 2 3 4 1	5 6 7 2 3 4 1	5 6 7 8 2 3 4 1							
37	2 1	2 3 1	2 3 4 1		2 3 4 5 1	6 2 3 4 5 1	6 7 2 3 4 5 1	6 7 8 2 3 4 5 1							
38	2 1	2 3 1	2 3 4 1		2 3 4 5 1	2 3 4 5 6 1	7 2 3 4 5 6 1	7 8 2 3 4 5 6 1							
39	2 1	2 3 1	2 3 4 1		2 3 4 5 1	2 3 4 5 6 1	2 3 4 5 6 7 1	8 2 3 4 5 6 7 1							

7 747 012 086-09.1RS

Fig. 25 Possible boiler sequences

Boiler sequences are split into three categories:

The boiler sequences 1 – 24 comprise all possible boiler sequences for a 4 boiler system. In a system with 5 to 8 boilers, boilers 5 to 8 always occupy the same position at the end of the sequence. Boiler sequences 25 – 32 comprise a constant rotation of all boilers. In the boiler sequences 33 – 39, boiler 1 will always be positioned last. These sequences are intended for hydraulic systems in which boiler 1 takes over the water heating directly (hot water via EMS 3 control valve or EMS flow).

With the "automatic" setting (factory setting), the FM458 determines the boiler sequence by itself, subject to the number of boilers, the selected lead lag/rotation and whether boiler 1 heats water directly.

Depending on the selected lead lag/rotation, up to 4 boiler sequences can be assigned (sequence A – D; every sequence is assigned a boiler sequence from Fig. 25, page 66 "Possible boiler sequences").

### **How is a boiler sequence adjusted?**

The sequence to be adjusted (sequence A – D) appears in the 2nd line of the MEC2 display plus, if necessary, the condition to be met (e.g. "AT > 59 °F (15 °C); see Chapter 7.5 "Lead lag/rotation", page 69).

On line 3 of the MEC2 display, the boiler sequence appears that is listed in this sequence (the displayed number of boilers corresponds to that entered under "Strategic data – No of boilers"). "automatic" means that the FM458 determines the boiler sequence (see above).

Line 4 of the MEC2 display shows the number of the boiler sequence (the corresponding boiler sequence is displayed on line 3); you will find an overview of the possible boiler sequences in Fig. 25, page 66 "Possible boiler sequences".

Example of a boiler sequence entry:

- System with 3 boilers
- No set lead lag/rotation

>> Only one sequence (A) can be selected.



Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – strategy" appears.



Press "Display" to call up a submenu (here: "STRATEGIC DATA").



Turn the dial until the submenu "seq.A" appears.



The display shows the submenu.



Hold down "Display" and turn the dial until the desired value appears (here: "2-3-1") of boiler sequence 5.



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.

## 7.5 Lead lag/rotation

With this parameter you determine whether there should be a change between the boiler sequences.

Setting options:

- **none**  
The same sequence will be used (no change).
- **hrs of run time**  
The sequences are changed subject to hours of operation of the lead boiler.
- **outdoor temp**  
The sequences are changed subject to the outdoor temperature.
- **daily**  
Sequences are changed daily (at 12:00 am (00:00)).
- **external contact**  
The system changes between two sequences subject to the switching state (open/closed) of the "ZW" contact.



### USER NOTE

A heat meter can no longer be connected if the lead lag/rotation is activated via the external contact.



Call up the service level. "general specs" appears as the first main menu



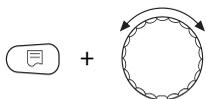
Turn the dial until the main menu "service level – strategy" appears.



Press "Display" to call up a submenu (here: "STRATEGIC DATA").



Turn the dial until the submenu "lead lag/rotat".



Hold down "Display" and turn the dial until the desired value appears (here: "none").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.



### USER NOTE

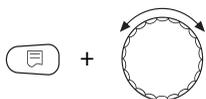
After selecting the lead lag/rotation, additional parameters can be selected by turning the dial clockwise.

	Control range	Factory setting
lead lag/rotat	none hrs of run time outdoor temp daily external contact	none

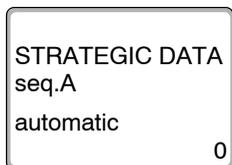
#### 7.5.1 "Lead lag/rotat none"

Only sequence A can be selected if "lead lag/rotat none" has been selected.

#### Selection of sequence A



Hold down "Display" and turn the dial until the desired value appears (here: "0").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.

**USER NOTE**

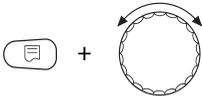
The following boiler sequence is implemented when "automatic" is selected:

Sequence no. 25 or sequence no. 33

	Control range	Factory setting
seq.A	0 – 39	0 (= automatic)

**7.5.2 Rotation after hrs of run time**

When "lead lag/rotat hrs of run time" has been selected, turning the dial clockwise will display the menu for the hours after which the sequence should be reversed. The boiler sequence is changed over when the lead boiler reaches the number of hours selected here.



Hold down "Display" and turn the dial until the desired value appears (here: "250 hours").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.

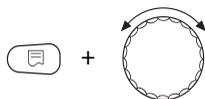


Press "Back" to return to the next level up.

**USER NOTE**

After turning the dial clockwise, the sequences A – D can be selected.

	Control range	Factory setting
rotation after	10 h – 1000 h	250 h



### Setting the boiler sequences for sequences A – D

Hold down "Display" and turn the dial until the desired value appears (here: "0").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.



### USER NOTE

The "automatic" setting will only be accepted if "automatic" was selected for all sequences (A – D).

The "automatic" setting will be ignored, if for at least one sequence "automatic" was not selected, and the change will only include the factory-set boiler sequences.

With the "automatic" setting, the following boiler sequences are implemented for all sequences:

2-boiler system: No. 25 and 26 or No. 33  
(no lead lag/rotation possible)

3-boiler system: No. 25 to 27 or No. 33 and 34

4-boiler system: No. 25 to 28 or No. 33 to 35

5-boiler system: No. 25 to 29 or No. 33 to 36

6-boiler system: No. 25 to 30 or No. 33 to 37

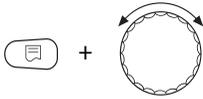
7-boiler system: No. 25 to 31 or No. 33 to 38

8-boiler system: No. 25 to 32 or No. 33 to 39

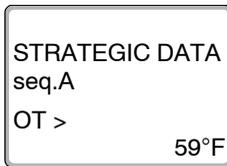
	Control range	Factory setting
seq.A	0 – 39	0 (= automatic)
seq.B	0 – 39	0 (= automatic)
seq.C	0 – 39	0 (= automatic)
seq.D	0 – 39	0 (= automatic)

### 7.5.3 Lead lag/rotation by outdoor temperature

If "lead lag/rotat outdoor temp" has been selected, turning the dial clockwise will display the menus for changeover thresholds for sequences A- C. The changeover threshold for sequence D cannot be adjusted; it is the result of the changeover threshold for C and applies to all temperatures set lower than in sequence C.



Hold down "Display" and turn the dial until the desired value appears (here: "59°F" (15°C)).



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.

The additional sequences B – C are selected by simply turning the dial (no need to push "Display").



Press "Back" to return to the next level up.

	Control range	Factory setting
Changeover threshold seq.A	-4 °F to 86 °F (-20 °C to 30 °C)	59 °F (15 °C)
Changeover threshold seq.B	-20 °F (-29 °C) to changeover threshold sequence A – 1 K	50 °F (10 °C)
Changeover threshold seq.C	-20 °F (-29 °C) to changeover threshold sequence B – 1 K	41 °F (5 °C)
Changeover threshold seq.D	not adjustable	none



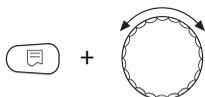
#### USER NOTE

If -22 °F (-30 °C) is selected for the changeover threshold for sequence B, the temperature display will be hidden; sequences C and D will no longer be adjustable and will not be implemented.

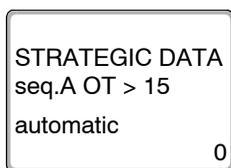
If -22 °F (-30 °C) is selected for the changeover threshold for sequence C, the temperature display will be hidden; sequence D will no longer be adjustable and will not be implemented.

### Determining the sequences for outdoor temperature thresholds for sequences A – D

Once the outdoor temperature thresholds have been set, turning the dial further clockwise will display the menus for setting the boiler sequences for sequences A – D.



Hold down "Display" and turn the dial until the desired value appears (here: "0").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.



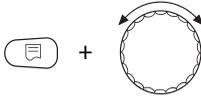
#### USER NOTE

For the sequences implemented in "automatic", see page 20.

	Control range	Factory setting
seq.A	0 – 39	0 (= automatic)
seq.B	0 – 39	0 (= automatic)
seq.C	0 – 39	0 (= automatic)
seq.D	0 – 39	0 (= automatic)

### 7.5.4 "Lead lag/rotat daily"

If "lead lag/rotat daily" was selected, turning the dial further clockwise will display the menus for the boiler sequences of sequences A – D.



Hold down "Display" and turn the dial until the desired value appears (here: "0").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.



#### USER NOTE

The "automatic" setting will only be accepted if "automatic" was selected for all sequences (A – D).

The "automatic" setting will be ignored, if for at least one sequence "automatic" was not selected, and the change will only include the factory-set boiler sequences. With the "automatic" setting for all sequences, the following boiler sequences will be executed:

2-boiler system: No. 25 and 26 or No. 33  
(no lead lag/rotation possible)

3-boiler system: No. 25 to 27 or No. 33 and 34

4-boiler system: No. 25 to 28 or No. 33 to 35

5-boiler system: No. 25 to 29 or No. 33 to 36

6-boiler system: No. 25 to 30 or No. 33 to 37

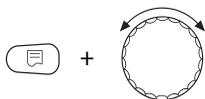
7-boiler system: No. 25 to 31 or No. 33 to 38

8-boiler system: No. 25 to 32 or No. 33 to 39

	Control range	Factory setting
seq.A	0 – 39	0 (= automatic)
seq.B	0 – 39	0 (= automatic)
seq.C	0 – 39	0 (= automatic)
seq.D	0 – 39	0 (= automatic)

### 7.5.5 "Lead lag/rotat external contact"

If "lead lag/rotat external contact" has been selected, turning the dial twice clockwise will display the menus for sequence A (ZW open) and B (ZW closed).



Hold down "Display" and turn the dial until the desired value appears (here: "0").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.



#### USER NOTE

Boiler sequence 25 or 33 will be operated if, for sequence A, "ZW open automatic" was selected. Boiler sequence 26 or 34 will be operated if, for sequence B, "ZW closed automatic" was selected.

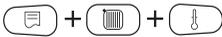
	Control range	Factory setting
seq.A ZW open	0 – 39	0 (= automatic)
seq.B ZW closed	0 – 39	0 (= automatic)

## 7.6 Load limit

With this parameter you determine whether there should be a load limit.

Setting options:

- **none**  
Strategy can always enable all boilers.
- **outdoor temp.**  
A different number of boilers can be enabled, subject to the outdoor temperature.
- **external contact**  
Only a specific number of boilers can be enabled subject to the switching state (open/closed) of the "EL" contact.



Call up the service level. "general specs" appears as the first main menu



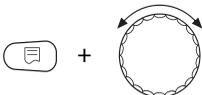
Turn the dial until the main menu "service level – strategy" appears.



Press "Display" to call up a submenu (here: "STRATEGIC DATA").



Turn the dial until submenu "load limit" appears.



Hold down "Display" and turn the dial until the desired value appears (here: "none").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.

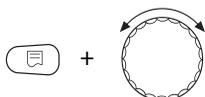


Press "Back" to return to the next level up.

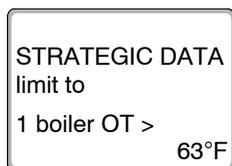
	Control range	Factory setting
load limit	none outdoor temp. external contact	none

### 7.6.1 Load limit by outdoor temperature

If "load limit outdoor temp." was selected, turning the dial clockwise will display the menu for entering load limit temperature threshold 1.



Hold down "Display" and turn the dial until the desired value appears (here: "63°F" (17°C)).



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.



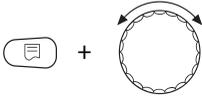
#### USER NOTE

It is possible to set the number of boilers (see page 80).

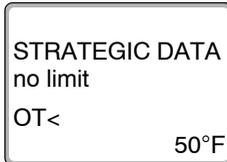
	Control range	Factory setting
Temperature threshold	-24 °F to 86 °F (-31 °C to 30 °C)	63 °F (17 °C)

### Enabling all boilers

Turning the dial further clockwise will display the menu for entering load limit temperature threshold 2.



Hold down "Display" and turn the dial until the desired value appears (here: "50°F" (10°C)).



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.

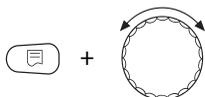


Press "Back" to return to the next level up.

	Control range	Factory setting
Temperature threshold	-24 °F (-31 °C) up to temperature threshold 1	50 °F (10 °C)

**Number of boilers at outdoor temperatures above threshold 1**

Turning the dial further clockwise will enable you to select how many boilers can be enabled above temperature threshold 1.



Hold down "Display" and turn the dial until the desired value appears (here: "1").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.

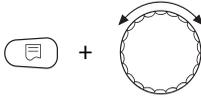


Press "Back" to return to the next level up.

	<b>Control range</b>	<b>Factory setting</b>
No. of boilers	0 to no. of boilers – 1	1

### 7.6.2 Load limit via external contact

If "load limit via external contact" was selected, turning the dial clockwise will display the menu for entering the boilers to be enabled when the external contact is closed.



Hold down "Display" and turn the dial until the desired value appears (here: "1").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.



#### USER NOTE

All boilers will be enabled with the contact open.

	Control range	Factory setting
No. of boilers	0 to no. of boilers – 1	1

### 7.6.3 Operating mode serial/parallel

In this menu you can determine whether the boilers are to be enabled in series or in parallel.

For a definition of the serial or parallel operating mode, see Chapter 2.3.4 "Serial operating mode", page 16 or Chapter 2.3.5 "Parallel operating mode", page 17.



Call up the service level. "general specs" appears as the first main menu



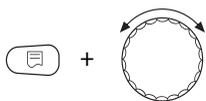
Turn the dial until the main menu "service level – strategy" appears.



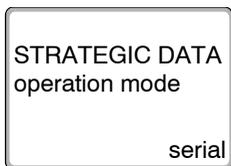
Press "Display" to call up a submenu (here: "STRATEGIC DATA").



Turn the dial until submenu "operation mode" appears.



Hold down "Display" and turn the dial until the desired value appears (here: "serial").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.

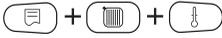


Press "Back" to return to the next level up.

	Control range	Factory setting
operation mode	serial parallel	serial

### 7.6.4 Leading boiler post purge (pump/actuator)

This menu enables you to set the post purge for the pump or actuator of the lead boiler.



Call up the service level. "general specs" appears as the first main menu



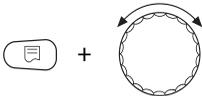
Turn the dial until the main menu "service level – strategy" appears.



Press "Display" to call up a submenu (here: "STRATEGIC DATA").



Turn the dial until the submenu "leading boiler" appears.



Hold down "Display" and turn the dial until the desired value appears (here: "60min.>").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
post purge	0 min. – 60 min. constant oper.	60 min.

### 7.6.5 Slave boiler post purge (pump/actuator)

This menu enables you to set the post purge for the pump or actuator of the lag boiler.



Call up the service level. "general specs" appears as the first main menu



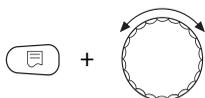
Turn the dial until the main menu "service level – strategy" appears.



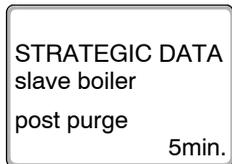
Press "Display" to call up a submenu (here: "STRATEGIC DATA").



Turn the dial until the submenu "slave boiler" appears.



Hold down "Display" and turn the dial until the desired value appears (here: "5min.").



Press "Back" to return to the next level up. The selected value flashes on the display.

Release "Display" to save that value.



Press "Back" to return to the next level up.



#### USER NOTE

Select the post purge of the lag boiler so that you can be sure that the boiler flow temperature has reached the same level as that of the return.

The pump post purge selected for the EMS boiler must not exceed the post purge selected in this menu.

	Control range	Factory setting
post purge	0 min. – 60 min. constant oper.	5 min.

## 8 DHW data

The FM458 strategy module supports water heating via the EMS boiler 1 (**only in control panel 4323**). Water heating is achieved with the help of a tank primary pump or a 3-way valve.



### USER NOTE

Water will be heated exclusively via the Logamatic 4000 – DHW module (e.g. FM441) if one is installed. In this case, the DHW settings described in this chapter will not apply. For applicable settings see the documentation of the corresponding module/control panel.

### 8.1 Selecting the DHW storage tank

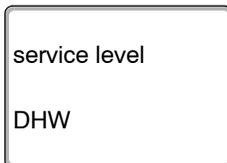
Here, you can enable and disable the DHW storage tank. If a cascade module is installed, you can select the type of water connections for the DHW storage tank.



Call up the service level. "general specs" appears as the first main menu



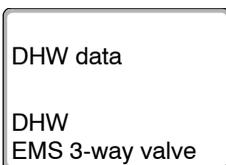
Turn the dial until the main menu "service level – DHW" appears.



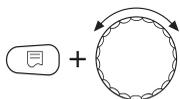
The display shows the main menu.



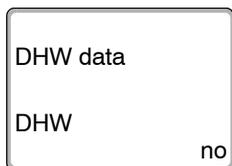
Press "Display" to call up a submenu (here: "DHW").



The automatically-recognized DHW storage tank will be preset on the display.



Hold down "Display" and turn the dial until the desired value appears (here: "no").



The display shows the set value.

Release "Display" to save that value.



Press "Back" to return to the next level up.



### USER NOTE

The selection EMS tank primary pump is only possible in 1-boiler systems.

	Control range	Factory setting
DHW	no EMS 3-way valve EMS circulator EMS tankless htr	automatically-recognized factory default in online mode

Parameter	EMS 3-way valve	EMS circulator	EMS tankless htr
Set temperature range	X	X	X
Selecting switching optimization	X	X	
Selecting residual heat use	X	X	
Setting differential	X	X	
Thermal disinfection*	X	X	
Daily heating*	X	X	X
Recirculation pump*	X	X	X

Tab. 6 Possible parameters, subject to hydraulic connection

\* with subsequent settings

## 8.2 Set temperature range

With this function you can set the upper limit for the required DHW temperature.



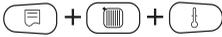
### WARNING!

### RISK OF SCALDING

from DHW.

Hot water temperatures above 122 °F (50 °C) can cause scalding almost immediately.

- Do not draw off DHW unmixed.
- Ensure that a thermostatic mixing valve is installed as protection against scalding.



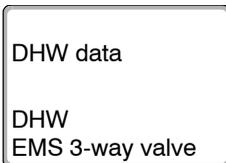
Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – DHW" appears.



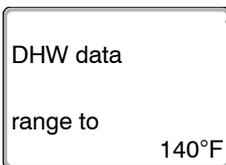
Press "Display" to call up a submenu (here: "DHW").



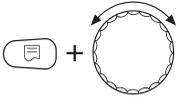
The display shows submenu "DHW".



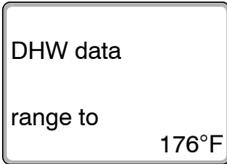
Turn the dial until the submenu "range to" appears.



The display shows the submenu "range to".



Hold down "Display" and turn the dial until the desired value appears (here: "176°F" (80°C)).



The display shows the set value.

Release "Display" to save that value.

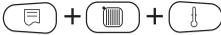


Press "Back" to return to the next level up.

	Control range	Factory setting
range to	140 ° – 176 °F (60 °C – 80 °C)	140 °F (60 °C)

### 8.3 Selecting switching optimization

If you select the "optimization" function, DHW heating will begin prior to the actual start point. The control unit calculates the timing of the start-up, taking into consideration the residual heat of the storage tank and the beginning of the heating for the heating zones, so that the DHW temperature is reached in good time.



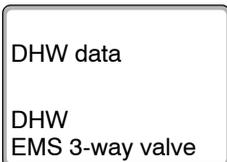
Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – DHW" appears.



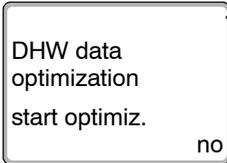
Press "Display" to call up a submenu (here: "DHW").



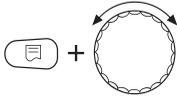
The display shows submenu "DHW".



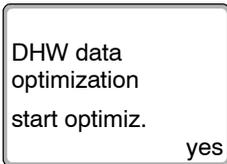
Turn the dial until the submenu "optimization start optimiz." appears.



The display shows the submenu "optimization start optimiz.".



Hold down "Display" and turn the dial until the desired value appears (here: "yes").



The display shows the set value.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
optimization	yes no	no

## 8.4 Selecting residual heat use

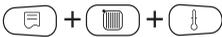
If you select the "utlz.leftovr.ht" function, you can use the residual boiler heat for storage tank heating.

### "Residual heat use yes"

If you select "utlz.leftovr.ht yes", the control unit calculates the shutdown temperature of the burner and the runtime of the primary pump via the residual boiler heat, until the storage tank is fully heated. The burner is switched off before the set DHW temperature is reached. The tank heating pump continues to operate. The control panel calculates the runtime of the primary pump (between 3 and 30 minutes) to heat the storage tank.

### "Residual heat use no"

If you select "utlz.leftovr.ht no", you will only use a small amount of residual heat. The burner runs until the required DHW temperature has been reached. The storage tank primary pump runs on for 3 minutes after the burner has been switched off.



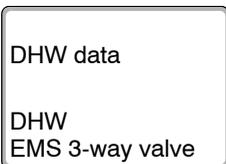
Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – DHW" appears.



Press "Display" to call up a submenu (here: "DHW").



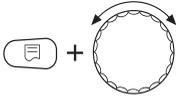
The display shows submenu "DHW".



Turn the dial until the submenu "utlz.leftovr.ht" appears.



The display shows the submenu "utlz.leftovr.ht".



Hold down "Display" and turn the dial until the desired value appears (here: "no").



The display shows the set value.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
utlz.leftovr.ht	yes no	yes

## 8.5 Setting differential

With "differential" you can determine, at how many Fahrenheit (°F) (Kelvin (K)) below the set DHW temperature the reloading of the storage tank begins.



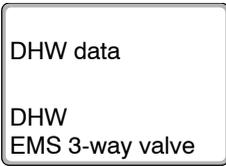
Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – DHW" appears.



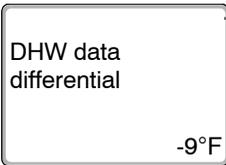
Press "Display" to call up a submenu (here: "DHW").



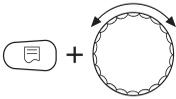
The display shows submenu "DHW".



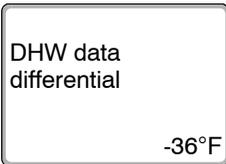
Turn the dial until the submenu "differential" appears.



The display shows the submenu "differential".



Hold down "Display" and turn the dial until the desired value appears (here: "-36°F" (-20K)).



The display shows the set value.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
differential	-36°F – 4 °F (-20 °C – 2 °C)	-9 °F (-5 °C)

## 8.6 Selecting and setting thermal disinfection

If you select the "thermal disinfection" function, the DHW is brought to a temperature (158 °F (70 °C)) once or several times a week. This is high enough to kill off germs (e.g. legionella bacteria).

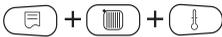
The tank primary pump and DHW circulation pump run constantly during the thermal disinfection process.

If you have selected "thermal disinfection yes", thermal disinfection starts according to factory settings or your own preferences.

You can adjust the factory settings for thermal disinfection via additional menus.

The system tries to reach the set disinfection temperature for three hours. If this fails, the error message "thermal disinfection failed" appears.

You may also set up thermal disinfection via your own individual program.



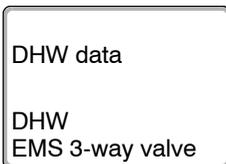
Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – DHW" appears.



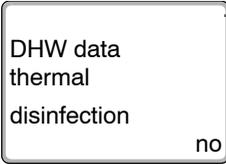
Press "Display" to call up a submenu (here: "DHW").



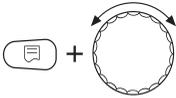
The display shows submenu "DHW".



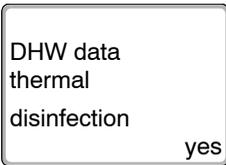
Turn the dial until the submenu "thermal disinfection" appears.



The display shows the submenu "thermal disinfection".



Hold down "Display" and turn the dial until the desired value appears (here: "yes").



The display shows the set value.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
thermal disinfection	no yes	no

## 8.7 Setting disinfection temperature

The disinfection temperature can be set with the "temperature disinfection" function.



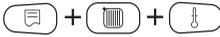
### WARNING!

### RISK OF SCALDING

from DHW.

Hot water temperatures above 122 °F (50 °C) can cause scalding almost immediately.

- If thermal disinfection is activated, ensure that a thermostatic mixing valve is installed as protection against scalding.



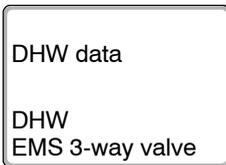
Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – DHW" appears.



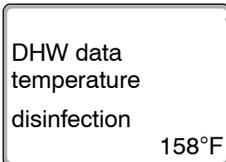
Press "Display" to call up a submenu (here: "DHW").



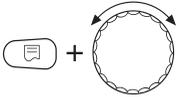
The display shows submenu "DHW".



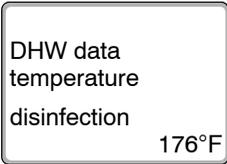
Turn the dial until the submenu "temperature disinfection" appears.



The display shows the submenu "temperature disinfection".



Hold down "Display" and turn the dial until the desired value appears (here: "167°F" (75°C)).



The display shows the set value.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
temperature disinfection	149 °F – 167 °F (65 °C – 75 °C)	158 °F (70 °C)

### 8.8 Setting day of week for disinfection

The day of the week for disinfection can be set with the "day of week disinfection" function.



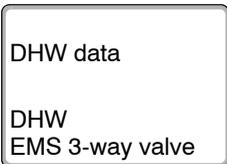
Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – DHW" appears.



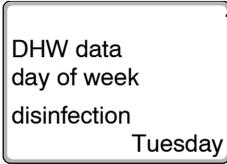
Press "Display" to call up a submenu (here: "DHW").



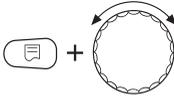
The display shows submenu "DHW".



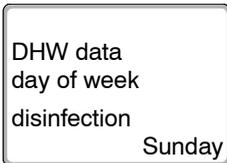
Turn the dial until the submenu "day of week disinfection" appears.



The display shows the submenu "day of week disinfection".



Hold down "Display" and turn the dial until the desired value appears (here: "Sunday").



The display shows the set value.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
day of week disinfection	Monday – Sunday daily	Tuesday

## 8.9 Setting time of day for disinfection

The time of day for disinfection can be set with the "disinfection time" function.



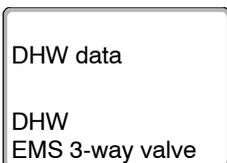
Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – DHW" appears.



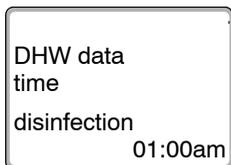
Press "Display" to call up a submenu (here: "DHW").



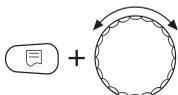
The display shows submenu "DHW".



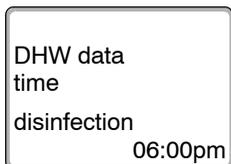
Turn the dial until the submenu "time disinfection" appears.



The display shows the submenu "time disinfection".



Hold down "Display" and turn the dial until the desired value appears (here: "06:00pm" (18:00)).



The display shows the set value.

Release "Display" to save that value.



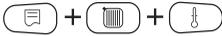
Press "Back" to return to the next level up.

	<b>Control range</b>	<b>Factory setting</b>
time disinfection	12:00 am – 11:00 pm (00:00 – 23:00)	01:00 am (01:00)

## 8.10 Daily heating

When daily heat-up is set, the DHW (which may include a solar storage tank, if installed) is heated to 140 °F (60 °C) once a day to prevent legionella bacteria from multiplying in the DHW.

The time when the storage tank is heated can be adjusted.



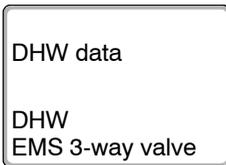
Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – DHW" appears.



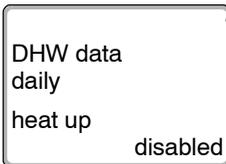
Press "Display" to call up a submenu (here: "DHW").



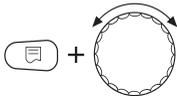
The display shows submenu "DHW".



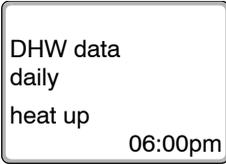
Turn the dial until the submenu "daily heat up" appears.



The display shows the submenu "daily heat up".



Hold down "Display" and turn the dial until the desired value appears (here: "06:00pm" (18:00)).



The display shows the set value.  
Release "Display" to save that value.



Press "Back" to return to the next level up.



**USER NOTE**

If the DHW was heated to 140 °F (60 °C) within the last 12 hours, it is not heated at the specified time.

	Control range	Factory setting
time disinfection	disabled 12:00 am – 11:00 pm (00:00 – 23:00)	disabled

**8.11 Selecting the recirculation pump**

You can set DHW to be immediately available at the tap via the "recirculation" function.



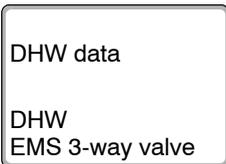
Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – DHW" appears.



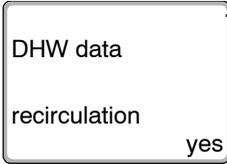
Press "Display" to call up a submenu (here: "DHW").



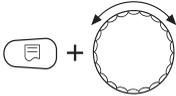
The display shows submenu "DHW".



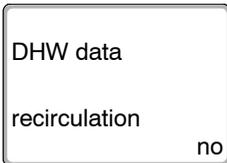
Turn the dial until the submenu "recirculation" appears.



The display shows the submenu "recirculation".



Hold down "Display" and turn the dial until the desired value appears (here: "no").



The display shows the set value.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
recirculation	yes no	yes

## 8.12 Setting the recirculation pump intervals

Interval operation reduces the operating costs of the recirculation pump.

You can determine that DHW is immediately available at the taps via the "recirculation per hour" function.

The set interval applies during the period when the time program enables the recirculation pump. This may be:

- The factory-set recirculation pump program
- Your own recirculation pump program
- a connection to the heating zone switching times

In constant mode the recirculation pump operates continuously when in day mode, and is switched off in night mode.

Example:

Your own time program was created to start the recirculation pump between 05:30 am – 10:00 pm (05:30 – 22:00) with setting "recirculation per hour 2 cycles".

The circulation pump is run

- at 05:30 am (05:30) for 3 minutes,
- at 06:00 am (06:00) for 3 minutes,
- at 06:30 am (06:30) for 3 minutes,
- etc. until 10:00 pm (22:00).



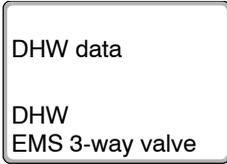
Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – DHW" appears.



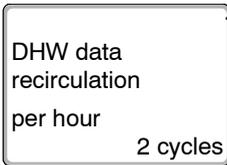
Press "Display" to call up a submenu (here: "DHW").



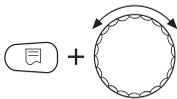
The display shows submenu "DHW".



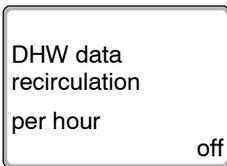
Turn the dial until the submenu "recirculation per hour" appears.



The display shows the submenu "recirculation per hour".



Hold down "Display" and turn the dial until the desired value appears (here: "off"). The recirculation pump will now only operate during heating once.



The display shows the set value.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
recirculation per hour	off 1 cycles 2 cycles 3 cycles 4 cycles 5 cycles 6 cycles constant oper.	2 cycles

## 9 Recording heat consumption

In its basic version, the Logamatic 4xxx control panel software enables you to calculate the heat demand of a heating system via the setting of the burner output (for additional information see the service instructions of the relevant control panel).



### USER NOTE

If the FM458 module has been installed and the heat volume is recorded via the heat meter (WMZ), you cannot calculate the heat demand via the burner setting, as one function cancels out the other. This display is not visible in the MEC2 user interface. Selection of one function cancels the other function.

### 9.1 Adjusting heat consumption recording "by impulses"

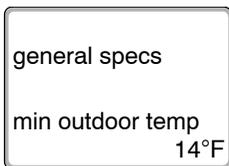
Display the heat demand via the input provided on the MEC2 user interface, if a heat meter (WMZ) is integrated into the heating system. The FM458 function module has a pulse counter input, which must be enabled with the MEC2 user interface.



Call up the service level. "general specs" appears as the first main menu



Press "Display" to call up a submenu (here: "min outdoor temp").



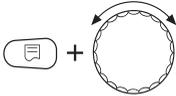
The display shows the submenu "min outdoor temp".



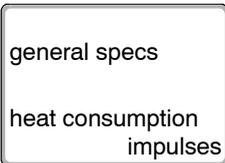
Turn the dial until the submenu "heat consumption – no display" appears.



The display shows the submenu "heat consumption – no display".



Hold down "Display" and turn the dial until the desired value appears (here: "impulses").



The display shows the set value.

Release "Display" to save that value.



Press "Back" to return to the next level up.

	Control range	Factory setting
heat consumption	no display impulses per burner* solar*	no display

\* This option only appears if the relevant module was installed and the corresponding function was selected.

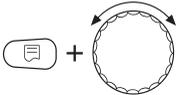
## 9.2 Compensating impulse value

Now match the impulse value of the heat meter to the optional settings of the MEC2 user interface.

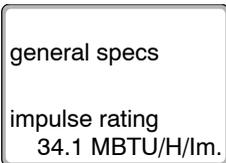
Turn the dial until the submenu "impulse rating" appears.



The display shows the submenu "impulse rating".



Hold down "Display" and turn the dial until the desired value appears (here: "34.1 MBTU/H/Im." (10 kW/Im.)).



The display shows the set value.

Release "Display" to save that value.



Press "Back" to return to the next level up.



### USER NOTE

The impulse setting in the control must always match the impulse setting of the heat meter. Where that is not the case, errors will occur during counting.

	Control range	Factory setting
impulse rating	3.41 MBTU/H/Im. (1 kW/impulse) 34.1 MBTU/H/Im. (10 kW/impulse) 341 MBTU/H/Im. (100 kW/impulse) 3412 MBTU/H/Im. (1000 kW/impulse)	3.41 MBTU/H/Im. (1 kW/impulse)

### 9.3 Checking heat consumption

Open the cover of the MEC2 user interface.



Rotate the dial until the display shows the various heat consumption values.

fuel consmpt/day  
current  
1706 MBTU/h

weekly consumpt  
current  
8292 MBTU/h

Yearly consumpt  
current  
120754 MBTU/h

You can check the daily, weekly and annual heat consumption.

Display of heat consumption data		
Daily consumption	Weekly consumption	Annual consumption
current	current	current
yesterday	1 week ago	1 year ago
2 days ago	2 weeks ago	2 years ago
Metering period		
from 12:00 am to 12:00 pm (00:00 to 00:00)	from Monday to Sunday	from 1/1/XX to 12/31/XX (01.01.XX to 31.12.XX)

Tab. 7 Possible heat consumption displays



#### USER NOTE

Changes to the date and time falsify the correct display of the consumption values and may result in loss of data.

## 9.4 Restarting the heat consumption count

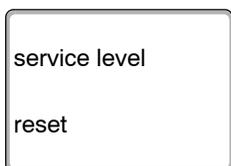
If you want to restart the heat consumption metering, a reset is required.



Call up the service level. "general specs" appears as the first main menu



Turn the dial until the main menu "service level – reset" appears.



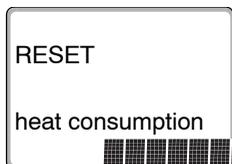
The display shows the main menu.



Press "Display" to select the main menu "RESET".



Turn the dial until the submenu "heat consumption" appears.



The display shows the submenu "heat consumption".



Hold down "Display" until "service level – reset" appears on the display.

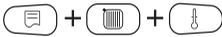
The blocks in the last line disappear one after another. The reset occurs when all blocks have disappeared. If the button is released while a block is still visible, the reset is canceled. After the reset, the display automatically returns to the next higher level.

The heat consumption metering is restarted.



Press "Back" to return to the next higher level.

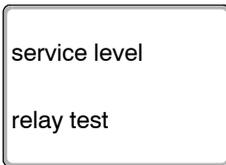
## 10 Relay test



Call up the service level. "general specs" appears as the first main menu.



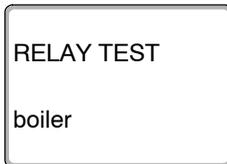
Turn the dial until main menu "relay test" appears.



The display shows the main menu "service level – relay test".



Press "Display" to open the main "RELAY TEST" menu.



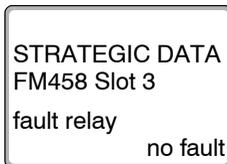
The display shows the submenu "boiler".



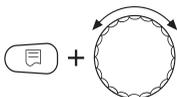
Turn the dial until the submenu "relay test – strategy FM458" appears.



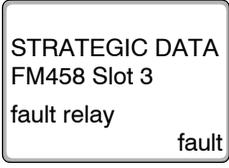
Press "Display" to select the submenu "relay test – strategy FM458".



The display shows the selected submenu.



Hold down "Display" and turn the dial until the desired value appears (here: "fault").



The display shows the set value.

Release "Display" to save that value.



Press "Back" twice to return to the next higher level.



---

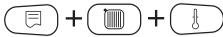
**USER NOTE**

At the end of the "relay test", all adjustments are cancelled.

---

## 11 Fault log

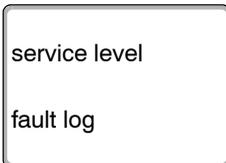
Using the "fault log" menu you can display the last four fault messages for the heating system. The MEC2 can only display the fault messages of the control panel it is connected to.



Call up the service level. "general specs" appears as the first main menu.



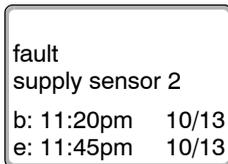
Turn the dial until the main menu "service level – fault log" appears.



The display shows the main menu.



Press "Display".



The fault message is displayed.

Fault messages recorded by the control panel will be displayed together with the beginning and end times of the fault.

The display will show "no fault" if the connected control panel has not recorded any faults.



Turn dial and scroll through the recent fault messages.



Press "Back" to return to the next level up.

## 12 Fault messages



### USER NOTE

All the faults that can arise during interaction between the FM458 function module and the connected heat sources are listed in the "Fault" column.

Fault messages relating to the series 4000 boilers are described in the service instructions of the Logamatic 4321/4322 control panel.

The terms in the "Fault" column show the messages as they appear in the MEC2 user interface display.

Fault	Effect on control characteristics	Possible causes of the fault	Remedy
boiler x boiler #	– Will no longer be considered as part of the strategy.	– Incorrect boiler number; boiler connected incorrectly.	– Check boiler assignment or wiring.
boiler x no connection	– Will no longer be considered as part of the strategy.	– Communication with the boiler interrupted incorrect number of boilers.	– Check configuration or wiring.
strategy supply sensor	– Emergency operation The strategy expects an actual flow temperature of 41 °F (5 °C).	– Sensor defective, sensor lead broken, strategy module defective.	– Check sensor and sensor lead, check module.
strategy return sensor	– Emergency operation Operation without condensate protection.	– Sensor defective, sensor lead broken, strategy module defective.	– Check sensor and sensor lead, check module.
strategy configuration supply control	– Operation according to boiler 1. Mixing valves are opened fully if boiler 1 has no flow temperature control via heating zone mixing valves.	– "Flow temperature control via heating zone actuators" has been selected for at least for one but not for all boilers.	– Check configuration.

Tab. 8 Fault messages

Fault	Effect on control characteristics	Possible causes of the fault	Remedy
strategy configuration contrl of return	<ul style="list-style-type: none"> <li>- Return control continues, therefore enabling a boiler flow rate reduction for condensing boilers.</li> </ul>	<ul style="list-style-type: none"> <li>- "Return temperature control via heating zone actuators" has been selected for at least for one but not for all boilers.</li> </ul>	<ul style="list-style-type: none"> <li>- Check configuration.</li> </ul>
strategy configuration no heat	<ul style="list-style-type: none"> <li>- Default output for all boilers 100 %.</li> </ul>	<ul style="list-style-type: none"> <li>- No output has been set for one boiler when output control was selected.</li> </ul>	<ul style="list-style-type: none"> <li>- Check configuration.</li> </ul>
boiler x Status y/z burner	<ul style="list-style-type: none"> <li>- Boiler protection (freezing protection) is not guaranteed.</li> <li>- No DHW.</li> <li>- No heating.</li> </ul>	<ul style="list-style-type: none"> <li>- The EMS boiler reports a lockout fault with display code (y) and service code (z).</li> </ul>	<ul style="list-style-type: none"> <li>- Check the boiler documentation for a detailed description of this fault and take the measures specified there.</li> <li>- Press "Reset" on the BC10.</li> </ul>
boiler x EMS	<ul style="list-style-type: none"> <li>- The combustion is not at an optimum level (high emissions).</li> </ul>	<ul style="list-style-type: none"> <li>- The EMS boiler reports a fault.</li> </ul>	<ul style="list-style-type: none"> <li>- Check the display and service code on the BC10.</li> <li>- Check the detailed description of this fault in Chapter 14.2 "Supplementary fault messages with EMS" and take the measures specified there.</li> </ul>
boiler x service Hyy	<ul style="list-style-type: none"> <li>- No effect.</li> <li>- Service message; no system error.</li> </ul>	<ul style="list-style-type: none"> <li>- Example: maintenance interval has expired.</li> </ul>	<ul style="list-style-type: none"> <li>- Check the detailed description of this maintenance message in Chapter 14.3 "Maintenance messages for boilers with EMS" and take the measures specified there.</li> </ul>

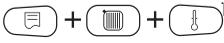
Tab. 8 Fault messages

<b>Fault</b>	<b>Effect on control characteristics</b>	<b>Possible causes of the fault</b>	<b>Remedy</b>
boiler x manual mode	<ul style="list-style-type: none"> <li>- It may get cold.</li> </ul>	<ul style="list-style-type: none"> <li>- This is not a fault; at least one of the dials on the BC10 base controller is not set to "Aut".</li> </ul>	<ul style="list-style-type: none"> <li>- If manual mode is no longer required, set both dials on the BC10 base controller to "Aut".</li> </ul>
DHW EMS	<ul style="list-style-type: none"> <li>- No DHW.</li> </ul>	<ul style="list-style-type: none"> <li>- The EMS boiler reports a fault with the DHW function.</li> </ul>	<ul style="list-style-type: none"> <li>- Check the display and service code on the BC10.</li> <li>- Check the detailed description of this fault in Chapter 14.2 "Supplementary fault messages with EMS" and take the measures specified there.</li> </ul>
address unknown module slot x	<ul style="list-style-type: none"> <li>- The module switches all outputs off and the fault LED on.</li> </ul>	<ul style="list-style-type: none"> <li>- The control panel software is too old to use this module.</li> <li>- The replacement FM458 was not reconfigured as FM447.</li> <li>- The module or control is defective.</li> </ul>	<ul style="list-style-type: none"> <li>- Slide module recognition switch on the FM458 into position FM447 (see Chapter 2.2.1 "Module recognition switch").</li> <li>- Replacement of the module/control panel.</li> </ul>
address conflict slot x	<ul style="list-style-type: none"> <li>- The module switches all outputs off and the fault LED on.</li> </ul>	<ul style="list-style-type: none"> <li>- Module in the wrong slot/in the wrong control panel. Some modules can only be operated at specified CAN addresses. Install the strategy module only into the control panel with ECOCAN-BUS address 0 or 1.</li> </ul>	<ul style="list-style-type: none"> <li>- Check module arrangement or match ECOCAN-BUS address.</li> </ul>

Tab. 8   *Fault messages*

## 13 Strategy monitor data

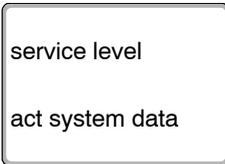
You can scan current values (monitor data) for the strategy via the "act system data" menu.



Call up the service level. "general specs" appears as the first main menu.



Turn the dial until the main menu "service level – act system data" appears.



The display shows the main menu.



Press "Display" to select the main menu "DISPLAY".



The display shows the submenu "boiler 1".



Turn the dial until the submenu "strategy" appears.



The display shows the submenu "strategy".



The individual monitor data of the boiler can be called up using the dial.

Strategy monitor data

System data:

Display	Function	Unit	
supply X/Y	Supply temperature set value/actual value	°F (°C)	
return X/Y	Return temperature set value/actual value	°F (°C)	
external demand	External temperature demand External output demand	°F (°C) %	
1-2-3-4-5	Current boiler sequence		
boiler ON	Number of boilers currently enabled.		
boiler maximum	Number of boilers that can be enabled.		
Operating mode*	OFF	There is no heat demand, therefore all boilers are off.	
	freeze	Boiler on for frost protection.	
	output	Boiler enabled via output control (0 – 10 V input).	
	start-up	The set flow temperature of the low loss header was increased suddenly by an application. The enabled output stages are incremented in a special mode.	
	setback	The set flow temperature of the low loss header was increased suddenly by an application. The enabled output stages are incremented in a special mode.	
	modulation	Burner modulating to maintain the set system value.	
	burner ON	Set temperature higher than the actual system temperature. Integral runs to start the burner.	
	stage 2 ON	Set temperature higher than the actual system temperature. Integral runs to start a stage 2.	
	maximum	Set temperature higher than the actual system temperature. All boilers operate at maximum output.	
	burner OFF	Set temperature lower than the actual system temperature. Integral runs to stop the burner.	
	stage 2 OFF	Set temperature higher than the actual system temperature. Integral runs to stop a stage 2.	
	too warm	Set temperature higher than the actual system temperature. All boilers are off.	
compensation	Set and actual system temperatures are identical. Boiler enable will be unchanged.		
	1000/6600	Current/maximum control deviation integral.	K <sup>2</sup> s
	X system Y%	X = ▲ system too cold, X = ▼ system too hot, y =system use	

Fig. 26 System data:

\* Depending on the operating mode, only one parameter may be displayed.

In addition, the strategy monitor data includes a display of the most important monitor data for all system boilers (one MEC2 mask per boiler).

Display		Function	Unit
boiler xy		x = boiler number, y = EMS or 4000	
Operating mode*	single stage:	This boiler has a 1-stage burner.	
	two stage:	This boiler has a 2-stage burner.	
	modulating	This boiler is equipped with a modulating burner.	
	flue gas test	Boiler in flue gas test.	
	DHW	Boiler heats DHW.	
	no comm.	Communication cannot be established with this boiler.	
	boiler #	Either more than one boiler responds to this boiler number or the number of this boiler is greater than the set number of boilers.	
	fault	The boiler is not ready for use (e.g. locked out).	
supply		Current boiler supply temperature.	°F (°C)
output xy		Set/actual boiler output.	

Tab. 9 Boiler parameters in strategy

\* Depending on the operating mode, only one parameter may be displayed.



#### USER NOTE

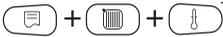
For additional monitor data for boilers with Logamatic 4000, see the documentation of the Logamatic 4321/4322 control panels.

For additional monitor data for boilers with Logamatic EMS, see the details in the following chapter.

# 14 EMS boiler

## 14.1 EMS boiler monitor data

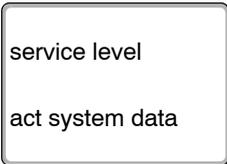
You can scan current boiler values (monitor data) via the "act system data" menu.



Call up the service level. "general specs" appears as the first main menu.



Turn the dial until the main menu "service level – act system data" appears.



The display shows the main menu.



Press "Display" to select the main menu "DISPLAY".



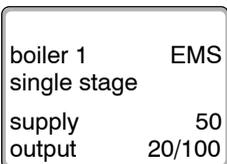
The display shows the submenu "boiler 1".



The individual "boiler" can be called up using the dial.



Press "Display" to call up submenu "actual data boiler 1".



The display shows the first monitor data of boiler 1.



The individual monitor data of the boiler can be called up using the dial.

Display	Function	Unit
EMS boiler x	x = boiler number	
Operating mode*	single stage:	This boiler has a 1-stage burner.
	two stage:	This boiler has a 2-stage burner.
	modulating	This boiler is equipped with a modulating burner.
	flue gas test	Boiler in flue gas test.
	DHW	Boiler heats DHW.
	no comm.	Communication cannot be established with this boiler.
	boiler #	Either more than one boiler responds to this boiler number or the number of this boiler is greater than the set number of boilers.
	fault	The boiler is not ready for use (e.g. locked out).
supply	Current boiler supply temperature	°F (°C)
output x/y	Set/actual boiler output	
outdoor	Current outdoor temperature	°F (°C)
avg temp	Adjusted outdoor temperature	°F (°C)
external demand	External set flow temperature in °F (°C) or set output in %, if the 0 – 10 V input is enabled	°F (°C)/%
supply x/y	x = set flow temperature y = actual flow temperature	°F (°C)
return	Return temperature	°F (°C)
starts	Number of burner starts	
Status	Current operating status	
service code	Service code (only EMS boiler) to differentiate between status messages	
operating	Hours of operation by the burner (only EMS boilers)	
KIM x V y	x = KIM number, y = Version number of the UBA (only UBA boiler)	
UBA 3 V	Software version UBA 3	

Tab. 10 EMS boiler monitor data

\* Depending on the operating mode, only one parameter may be displayed.

Display	Function	Unit
BIM x V y	x = BIM number, y = Software version BIM (only boilers with MC10)	
MC10 V	Software version MC10 (only boilers with MC10)	
SAFe V	Software version SAFe (only boilers with MC10)	
output	Current boiler output	%
Operating	max.output	Maximum enabled boiler output
	DHW-EMS	Boiler heats DHW
circulator	Current pump rate (only UBA boilers)	%
maximum	Maximum boiler output	kBTU/h
min. output	Minimum modulation output or output of stage 1	%
flue gas	Flue gas temperature	°F (°C)
air intake	Air inlet temperature of the burner	°F (°C)
pressure	Boiler water pressure	psi (bar)
ionisation currnt	Ionization current of the burner flame	μA
ignition	Status of the ignition facility	
flame	Flame status	
circulator logic	Boiler operating temperature that must be reached after starting the burner	°F (°C)
valve 1	Status fuel valve 1	
valve 2	Status fuel valve 2	

Tab. 10 EMS boiler monitor data

\* Depending on the operating mode, only one parameter may be displayed.

## 14.2 Supplementary fault messages with EMS

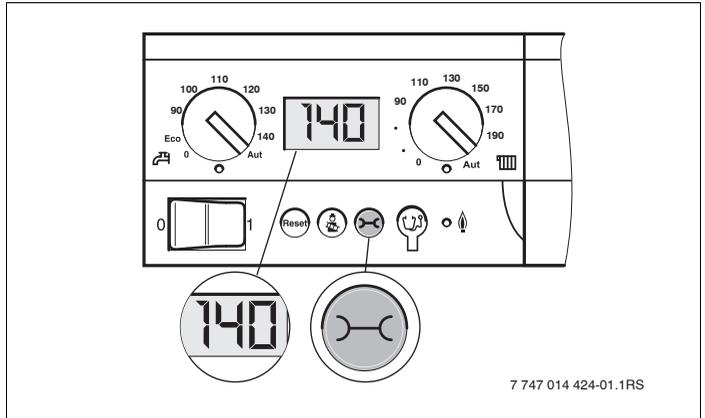


Fig. 27 Call up display and service code  
(e.g. Logamatic MC10 control panel/BC10 base controller)

### Calling up status (display code) and service codes

If a fault occurs, the status is immediately displayed by the control panel. The display flashes when a locking safety shutdown occurs.

- Press "Status display" to check the service code.
- Press "Status display" several times to display further status information until the boiler status is displayed again.

**DHW EMS faults**

**DC:** Display code (status)

**SC:** Service code

DC	SC	Fault	Effect on control characteristics	Possible causes of fault	Remedy
A01	808	DHW sensor defective	<ul style="list-style-type: none"> <li>- DHW is no longer heated.</li> </ul>	<ul style="list-style-type: none"> <li>- Sensor connected incorrectly or defective.</li> <li>- Breakage or short circuit in the sensor lead.</li> <li>- Sensor aged.</li> </ul>	<ul style="list-style-type: none"> <li>● Check connection of the DHW sensor and replace if necessary.</li> </ul>
A01	810	DHW remains cold	<ul style="list-style-type: none"> <li>- There is a constant attempt to heat the DHW storage tank.</li> <li>- Solar heating system does not start.</li> </ul>	<ul style="list-style-type: none"> <li>- Constant drawing or system leak.</li> <li>- Sensor connected incorrectly or defective.</li> <li>- Breakage or short circuit in the sensor lead.</li> <li>- Sensor aged.</li> <li>- Loading pump incorrectly connected or defective.</li> </ul>	<ul style="list-style-type: none"> <li>● Fix any leaks.</li> <li>● Check connection of the DHW sensor and replace if necessary.</li> <li>● Check function of sensor and tank primary pump.</li> <li>● Check sensor attachment on DHW tank.</li> </ul>
A01	811	Thermal disinfection	<ul style="list-style-type: none"> <li>- Thermal disinfection has been interrupted.</li> </ul>	<ul style="list-style-type: none"> <li>- Constant drawing or system leak.</li> <li>- Sensor connected incorrectly or defective.</li> <li>- Breakage or short circuit in the sensor lead.</li> <li>- Sensor aged.</li> <li>- Loading pump incorrectly connected or defective.</li> </ul>	<ul style="list-style-type: none"> <li>● Fix any leaks.</li> <li>● Check connection of the DHW sensor and replace if necessary.</li> <li>● Check function of sensor and tank primary pump.</li> <li>● Check sensor attachment on DHW tank.</li> </ul>

Tab. 11 Possible messages with DHW EMS faults

## EMS faults

DC	SC	Fault	Effect on control characteristics	Possible causes of fault	Remedy
AD 1	817	Air temperature sensor defective	<ul style="list-style-type: none"> <li>– Fan speed cannot be matched optimally.</li> </ul>	<ul style="list-style-type: none"> <li>– This fault message is generated if a temperature is recorded at the air temperature sensor which is too low (&lt; -22 °F (-30 °C)) or too high (&gt; 212 °F (100 °C)).</li> </ul>	<ul style="list-style-type: none"> <li>● Check the air temperature sensor incl. the plug-in connection at the SAFE, and replace if necessary.</li> </ul>
AD 1	818	Boiler remains cold	<ul style="list-style-type: none"> <li>– Inadequate heating system supply.</li> </ul>	<ul style="list-style-type: none"> <li>– This fault message is generated if the boiler remains below the pump logic temperature (117 °F (47 °C)) for a specified period even though the burner is operating.</li> </ul>	<ul style="list-style-type: none"> <li>● Check the system design and the pump parameters, and correct if necessary.</li> <li>● Check the non-return valve function and replace if necessary.</li> <li>● Check whether gravity brakes are in operating position.</li> </ul>
AD 1	819	Constant oil pre-heater signal	<ul style="list-style-type: none"> <li>– Burner attempts to start.</li> </ul>	<ul style="list-style-type: none"> <li>– An enable signal is received from the oil pre-heater, even though it is switched off.</li> </ul>	<ul style="list-style-type: none"> <li>● Check the plug allocation on the SAFE and the oil pre-heater, and correct if necessary.</li> </ul>
AD 1	820	Oil too cold	<ul style="list-style-type: none"> <li>– Burner attempts to start.</li> </ul>	<ul style="list-style-type: none"> <li>– The oil pre-heater does not respond within 6 minutes, indicating that the oil has reached operating temperature.</li> </ul>	<ul style="list-style-type: none"> <li>● Check the electrical connection of the oil pre-heater; if not OK, replace the oil pre-heater.</li> </ul>

Tab. 12 Possible messages with EMS faults

**USER NOTE**

Other faults are described in the technical documentation for the boiler.

### 14.3 Maintenance messages for boilers with EMS

DC: Display code (status)

SC	Service	Possible cause	Remedy	EMS with boiler
H 1	Flue gas temperature too high	As soon as the flue gas temperature has exceeded a certain limit (230 °F (110 °C)), the burner is switched to stage 1, and this maintenance message is generated. The message will only be cleared when the command "Reset maintenance message" is issued.	<ul style="list-style-type: none"> <li>● Cleaning the boiler.</li> <li>● Check the position, equipment level, and state of the plate insert, and correct if necessary.</li> </ul>	SAFe
H 2	The burner fan runs too slowly	The SAFe must create an unusually high PWM signal for the required speed.	<ul style="list-style-type: none"> <li>● Check the burner fan for contamination, and clean or replace if necessary.</li> </ul>	SAFe
H 3	Hours of operation expired	Does not occur in conjunction with this control panel.		SAFe
H 4	Low flame sensor current	<p>The flame signal is only just above the SAFe shutdown threshold.</p> <ul style="list-style-type: none"> <li>– Flame sensor or holding bracket is dirty.</li> <li>– Mixing system incorrectly aligned in relation to sight tube.</li> <li>– Defective flame sensor/SAFe electrical connection.</li> <li>– Flame sensor or SAFe defective.</li> </ul>	<ul style="list-style-type: none"> <li>● Check flame sensor and holding bracket (mirror) for dirt, and clean if necessary.</li> <li>● Check the orientation of the mixing system towards the sight tube and correct if necessary.</li> <li>● Check the mixing system for contamination and clean if necessary.</li> <li>● Check the flame sensor plug-in connection on the SAFe.</li> <li>● Check burner setting and correct if necessary.</li> <li>● Check the flame sensor signal for stages 1 and 2 using the RC35. Replace the flame sensor if this is not OK.</li> </ul>	SAFe

Tab. 13 Service messages

SC	Service	Possible cause	Remedy	EMS with boiler
H 5	High ignition delay	<p>At the last burner start, the flame was established after a long delay:</p> <ul style="list-style-type: none"> <li>- Defective oil supply.</li> <li>- Defective ignition system.</li> <li>- Defective burner adjustment.</li> <li>- Defective burner components.</li> </ul>	<ul style="list-style-type: none"> <li>● Check oil supply.</li> <li>● Check the ignition via a relay test (RC35); check the ignition electrode for contamination or damage (electrode gap) and replace if necessary.</li> <li>● Replace the oil nozzle.</li> <li>● Replace the oil cut-off valve of the oil pre-heater.</li> <li>● Check the mixing system and clean if necessary.</li> <li>● Check burner setting, correct if necessary.</li> </ul>	SAFE

Tab. 13 Service messages

SC	Service	Possible cause	Remedy	EMS with boiler
H 6	Flame blown off frequently	<p>During the last burner starts, the flame blew off frequently.</p> <ul style="list-style-type: none"> <li>- Defective oil supply.</li> <li>- Defective ignition system.</li> <li>- Defective burner adjustment.</li> <li>- Defective burner components.</li> </ul>	<ul style="list-style-type: none"> <li>● Call up the fault memory of blocking faults to check in which operating phase the flame blew off.</li> </ul> <p>If only 6U/511 (no flame established) is present:</p> <ul style="list-style-type: none"> <li>● Check oil supply.</li> <li>● Check the flame sensor current using RC35.</li> <li>● Check the ignition via a relay test (RC35).</li> <li>● Replace the oil nozzle.</li> <li>● Replace the oil cut-off valve of the oil pre-heater.</li> <li>● Check the mixing system and clean if necessary.</li> <li>● Check burner setting, correct if necessary.</li> </ul> <p>If other blocking faults (flame blow-off after the flame was established successfully) are present:</p> <ul style="list-style-type: none"> <li>● Check burner setting and correct if necessary.</li> <li>● Check the oil supply equipment.</li> <li>● Plug assignment 1/2. Check magnetic valve (fault 6L/516).</li> <li>● Check flame sensor current during operation. If signal &lt; 50 <math>\mu</math>A, check holding bracket and clean or replace flame sensor if necessary.</li> </ul>	SAFe
H 7	System pressure	The operating pressure in the heating system has dropped too low.	Top up the heating water until the operating pressure > 1.0 bar.	UBA 3

Tab. 13 Service messages

SC	Service	Possible cause	Remedy	EMS with boiler
H 8	According to date	Does not occur in conjunction with this control panel.		SAFe
H 9	Incorrect pump	The wrong pump type is recognized via the pump interface.	Install correct pump.	UBA 3
H 10	High flame current	Over a longer period, high flame currents have been measured during operation.	Service the heating system. Check connecting lead between SAFe and flame sensor, and remedy fault. Replace flame sensor. Replace SAFe.	SAFe
H 11	SLS sensor fault	Cold water inlet sensor lead break.	Check sensor and replace if required.	UBA 3.5
H 12	SLS sensor fault	Storage tank sensor lead break	Check sensor and replace if required.	UBA 3.5

Tab. 13 Service messages

## 15 Sensor characteristics

Using the diagram you can check whether temperature and resistance correlate.

- Isolate the heating system from the power supply before taking any readings.

### Fault test (without room temperature sensor)

- Remove the sensor terminals.
- Check the resistance at the sensor lead ends using an ohmmeter.
- Check the sensor temperature with a thermometer.



### USER NOTE

For all curves, the sensor tolerance is up to 3 %/77 °F (25 °C).

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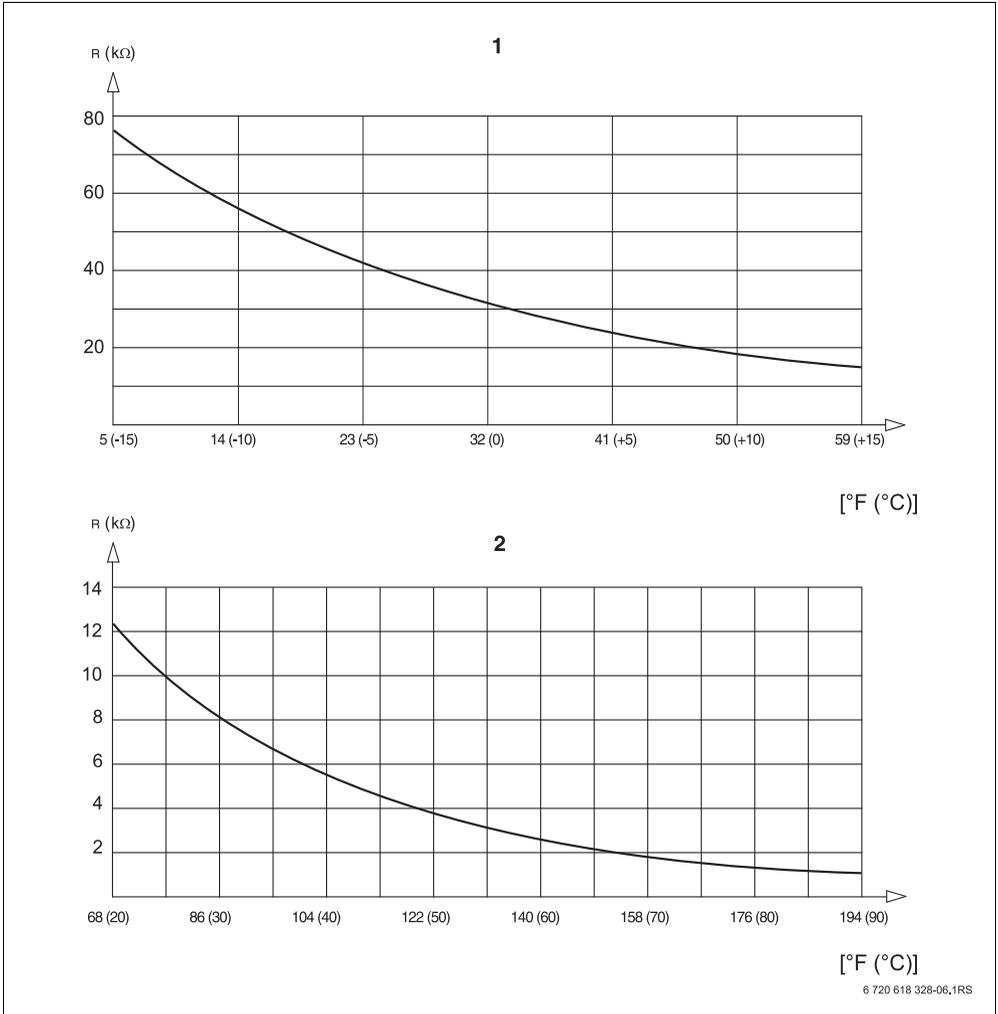


Fig. 28 Outdoor temperature sensor and boiler water, flow, system flow, system return, DHW temperature sensors

- 1 Outdoor temperature sensor curve
- 2 Curve – boiler water, flow, system flow, system return, DHW temperature sensors

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