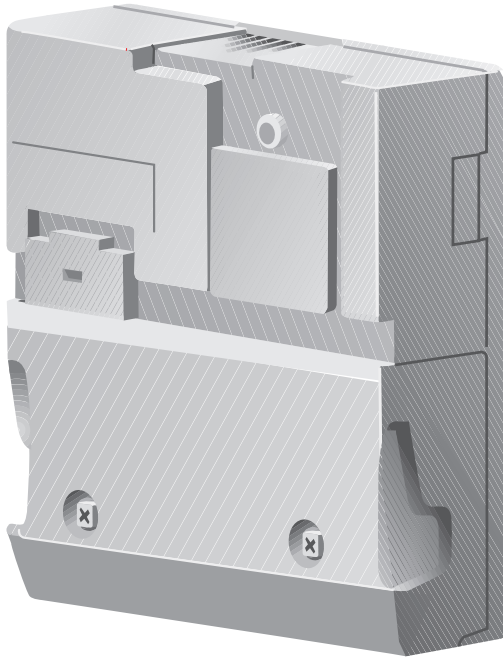


Service instructions

**Modulating boiler controller/
External Error Detection
EM10 for UBA 3 boilers**



Buderus

Foreword

This installation and user manual applies to the EM10 modulating boiler controller.

The EM10 modulating boiler controller for UBA 3 devices was developed and manufactured taking into consideration the latest technological developments and the latest technical safety instructions and it complies with the relevant USA/Canadian standard (UR). This ensures many years of troublefree operation of the EM10 modulating boiler controller. Special attention was paid to the ease of use.



Important general instructions for use

In order to guarantee the safe, efficient and environmentally compliant use of the modulating EM10 boiler controller, you are advised to observe the specifications given in this manual.

All installation and repair work must be carried out by an approved installer.

Only use this device in combination with the accessories referred to in these installation and user instructions. Only use other accessories if they are explicitly intended for the intended application and if they do not negatively affect system performance and safety.

Subject to technical modifications!

The supplier continually strives to deliver improvements for its products. For this reason, there may be variations with respect to illustrations, text and technical specifications.

Range of application

- The module EM10 requires boilers equipped with a UBA 3.

Function of the EM10

- The EM10 module can be used to control the boiler using a 10 VDC (rectified voltage) signal, e.g. from a building management system. The supply water temperature or the boiler output power level can be controlled.
- The module EM10 relays a signal when a blocking malfunction occurs in the boiler. System faults and service announcements are not reported.
- The EM10 does not react to malfunctions of any external controllers which may be installed.

0 – 10V external control signal

The EM 10 can be used as the interface between the boiler and a building management system for example.

A 0-10 VDC signal can be used to enable system supply temperature-based control or Power-based control (fig. 2).

System supply temperature-based control

The EM 10 transfers the 0-10V signal from the building management system to a flow temperature set point.

This is a linear ratio (table 1).

Input voltage [V]	Flow temperature set point (boiler) [°C]	Boiler condition
0 V	0	off
0.5 V	0	off
0.6 V	± 15°C	on
5.0 V	± 50°C	on
10.0 V	± 90°C	on / maximum

Table 1 Flow temperature-based control

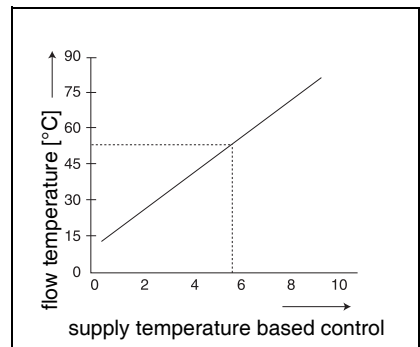


Fig. 1 0 - 10V Diagram

Control based on boiler output



To activate the power regulation the EM10 connectors must be bridged. See the "EM 10 connection diagram" on page 8, pin 1 and 3.

The EM 10 transfers the signal from the building management system to a power set point.

This is a linear ratio (table 2).

Input voltage [V]	Power set point (boiler) [%]	Boiler condition
0 V	0	off
0.5 V	0	off
0.6 V	± 6	low load *)
5.0 V	± 50	partial load
10.0 V	± 100	full load

Table 2 Power-based control

*) The low-load power depends on the type of appliance. For example, if the low load of the appliance is 20% and the control signal 1 volt (= 10%), the target power is lower than the low load. In this case the appliance delivers 10% using an on/off cycle with low load operation. In this example the boiler assembly starts heating continuously from a set point of 2 volts.

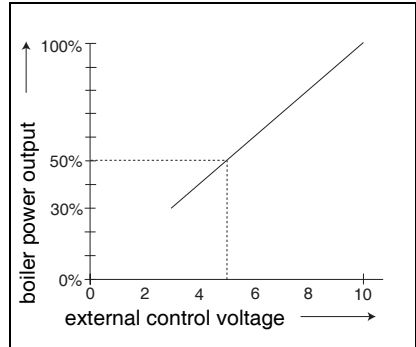


Fig. 2 Control based on power output

Malfunction signal

The generated malfunction signal is given in two ways:

a) AS 24V connection (fig. 1, pos. 1)

The AS 24V connection is a volt-free connection for low voltage malfunction signals of up to 24V, which can be evaluated by an automated building control system.

AS24V connection	no malfunction	malfunction
1 and 2	interrupted	closed
2 and 3	closed	interrupted

See also the "Wiring Diagram" on page 8.

b) AS 115V connection (fig. 1, pos. 2)

The AS 115V connection is a 115V connection which can be used to pass on an external malfunction signal to a siren or warning light. At times of a malfunction, there will be 115V on connections 2 and 4. The malfunction signal is active when:

- the UBA 3 has a locking fault code, or
- the system pressure is too low, or
- there has been no communication with the boiler for at least 5 minutes.

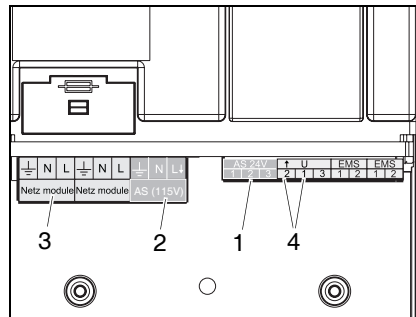


Fig. 3 Connections

Connecting the module



DANGER!

Electrical components may be live.

- Disconnect the boiler from the power supply.
- Remove the outer jacket boiler.
- Click the module in place (fig. 4).

- Connect the mains cable (3-PIN) and the UBA3-Bus cable (2-PIN) (part of the cable harness inside the boiler) to the module (fig. 5, pos.1 and 2).

- Then place the cover of the module (fig. 6, pos. 1) and tighten the screws (fig. 6, pos. 2) using a phillips screwdriver.
- Refit the outer casing of the boiler.
- Connect the boiler to the power supply.

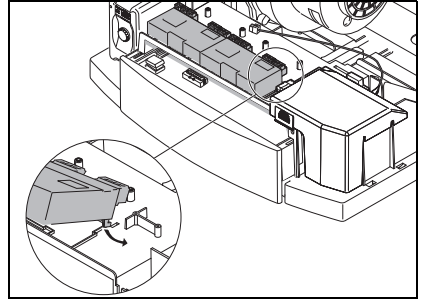


Fig. 4 Click the module in place

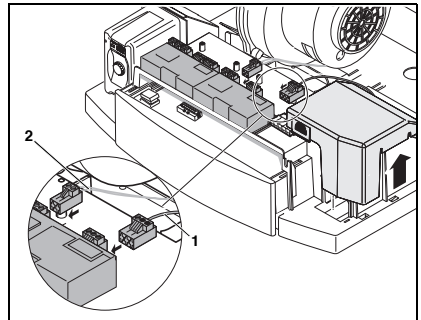


Fig. 5 Connect mains cable

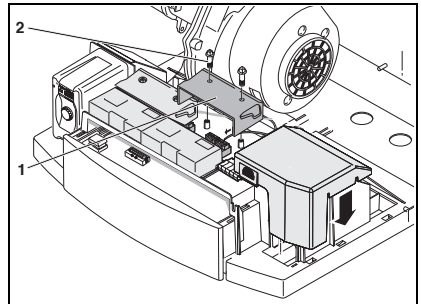


Fig. 6 Place cover of the module

LED-reports of the module EM10

There is one LED which can light up red or green.

The LED flashes red for a short time, when the mains power is turned on.

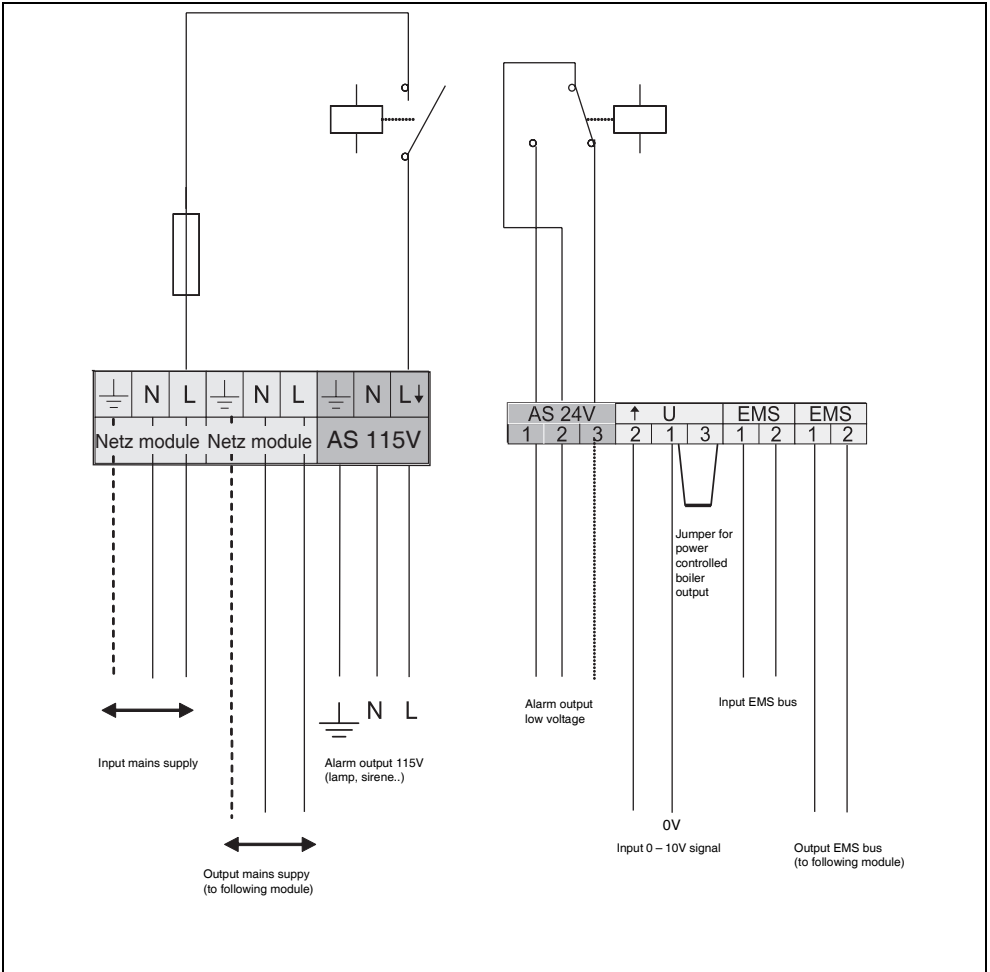
LED status	Meaning	
green (permanent)	Everything is connected properly.	
green (flashing)	No communication with the boiler for at least 5 minutes.	Reset the boiler. If the reset doesn't work contact your installer. See also the instructions for the boiler.
red (permanent)	EM10 is defect.	Contact your installer. See also the instructions for the boiler.

Technical specifications

Description	Unit	Data
Dimensions: Casing (l x b x h)	[in]	8 x 6.4 x 2 (206 x 162 x 52.5 mm)
EM10 voltage supply		115 VAC \pm 10 %, 60 Hz
EM10 power consumption standby / in operation	[VA]	0.3 / 3
EM10 power consumption (max. incl. external error device)	[VA]	150
Internal fuse		1.6 AT, 250V, voltage transformer with a short-circuit protection
Voltage supply for error contact (high voltage) AS(115)		115 VAC, maximum 150 W, fused, 1.6 AT
Voltage supply for error contact (low voltage) AS(24)		maximum 48 V, 5 A, no fuse
Protection rating		II in accordance with EN60730
EMC suppression degree Electrical safety		60730-2-9 60730-1
Protection class		IP 40
Max. EMS bus cable length	[ft.]	30 (100 m)
Ambient temperature: Operation Storage	[°F] [°F]	14 – 140 (= -10 to 60 °C) 14 – 158 (= -10 to 70 °C)
Relative humidity: Operation Storage	[%] [%]	max. 90 (non-condensing) max. 90 (non-condensing)
Cable diameter: error contact high voltage AS(115) External error contact low voltage AS(24) EMS bus 0 - 10 Volt input	AWG AWG AWG AWG	max. 13 max. 13 min. 19 - max. 15 min. 19 - max. 15

Subject to changes due to technical improvements!

Wiring Diagram



Subject to changes due to technical improvements!

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