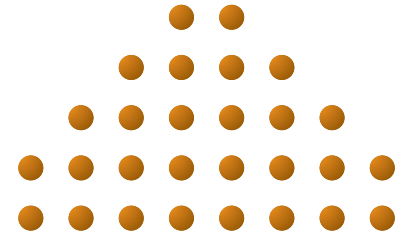
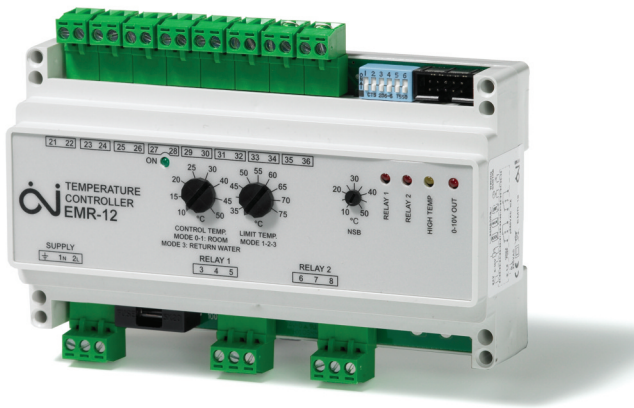


OJ Controller

**EMR**

WATERLINE CONTROLLER FOR UNDERFLOOR HEATING

# Temperature Controller EMR

- Limitation of supply or return temperature
- Relay for pump
- 0-10V output for actuator
- Relay for boiler
- Timed overrun of pump
- LED indication of sensor error
- Night setback
- Frost protection

## FUNCTION

### Flexible

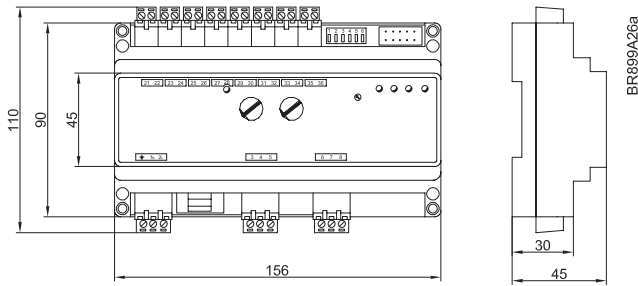
The EMR temperature controller is designed to operate with several different types of control requirement, and these modes are selected on the 6 dip-switches on the top of the unit

### Valve control

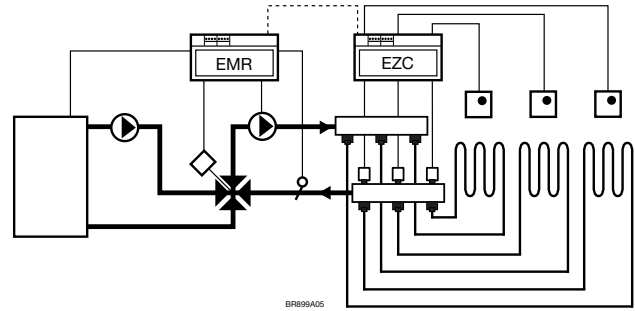
To control the heating temperature, the EMR will operate a 24V powered modulating control valve via a 0-10V DC control signal. The valve can be a two port type that allows water to be injected into the under-floor circuit, or a three or four port valve that allows water to be mixed from the boiler circuit down to the under-floor circuit in the correct proportion. The two port system is primarily for use where the hot water for the under-floor is being taken from a radiator circuit, whereas the three or four port is generally used on larger systems and where the boiler is allowed to produce water within a primary circuit. For under-floor heating applications the two most frequently used modes will be Mode 2 and Mode 3.

**Mode 1** is a system where there is a single area of under-floor heating, and control is required via a room temperature sensor (not a thermostat).

**Mode 2** is a system where there may be multiple areas of under-floor heating, each controlled by a room thermostat, wired via an EZC MICROCENTER, and where the demand signal from the Microcenter is used to start and stop the EMR.



Dimensions (mm)



EMR temperature controller in combination with  
 Microcenter type EZC

**Mode 3** is an advanced system whereby two water temperature sensors are used and where the return water temperature is controlled with the additional benefit of a high limiting action sensed on the flow water temperature.

In each mode the EMR will provide two relay (volt free) outputs to start both a pump and a boiler.

#### BOILER RELAY

##### Applicable in all modes

A dedicated boiler relay is provided to enable the boiler to run if there is a demand for heat. The boiler relay will be ON once the control valve has reached 20% open, and will remain on until the control valve is 90% closed. A built-in delay action creates a 30-sec. pause between off/on actions to prevent short cycling of the boiler.

The boiler relay is a 5-amp switch, and is volt free.

##### Pump relay

A dedicated Pump relay is provided to enable the secondary (under-floor) pump to be started when there is a demand for heat. The Pump relay will be ON once a requirement for heat is present via the output signal to the control valve, and will remain on whilst this signal exists. When the signal is turned off (0V) it will remain running for 2 minutes to circulate any residual heat entering the system. In the event of a high limit condition being detected, the pump will run on for 20 minutes and then stop if the condition has not been removed. It will re start after a further 20 minutes and will then run for 5 minutes. If the high limit condition still exists, it will stop again for 20 minutes and keep repeating this cycle. Once the high limit condition is removed, normal action will start. Whilst in high limit condition the boiler relay will be off and the mixing valve will be closed.

The Pump relay is a 5-amp switch, and is volt free.

#### SENSOR OPTIONS

##### Limit sensor

In modes 1, 2 & 3 the limit sensor should be strapped to the flow pipe immediately after the mixing valve and circulating pump. The mixing valve will be modulated to maintain a

preset temperature of the flow water entering the underfloor manifold. In Mode 3 applications, a second sensor should be strapped to the return pipe immediately after the manifold. This sensor is called the “control” sensor and will enable the EMR to modulate the mixing valve so that a preset temperature is maintained for the water leaving the manifold. Typically, the control sensor setting should be 8-10°C below the design flow temperature, and 15-20°C below the high limit setting.

##### Control valve output

EMR uses a 24V AC powered control valve that is positioned via a 0-10V DC signal. The 24V power is provided from the EMR. The maximum power available from the EMR is 6VA.

##### Night setback

EMR has the facility for automatically reducing the room temperature during a night-time period, or when the heating is not required. The reduced temperature setting should be set on the setback (NSB) knob. A time switch or programmer should be connected.

##### Frost protection

The EMR has automatic frost protection in all modes. If the room temperature as measured by the room sensor in mode 1 falls below 10°C, or if the flow temperature as measured by the limit sensor falls below 10°C in Modes 1, 2, or 3, the EMR will open the control valve and turn on the boiler and pump. If separate protection of the boiler plant is required a frost thermostat mounted in the boiler house should be connected in parallel with the time switch contacts.

#### TECHNICAL DATA

Power supply	230V AC ±10%
Temperature setting:	Room 0/+40°C Limit +35/+65°C
Setback (NSB)	0/+40°C
DC-output	0-10V DC (max. 10 mA)
AC output	24V AC (max. 6VA)
Ambient temperature	-10/+40°C
Output relay S.P.C.O.	max. 250V / 10A res. max. 250V / 5A inductive