# Temperature controller ERZ



- Auto-tuning
- Simple adjustment
- Manual control of output in connection with service or starting
- LED step indication
- LED indication of sensor error
- Frost thermostat input
- Optional connection of limit sensor
- Two-step regulator 0-10V DC
- Setback of temperature on external timer
- Parallel displacement of room temperature
- DIN rail mounting
- 24V AC/DC regulator series

## Application

ERZ comprises a series of compact and easily set regulators for the regulation of small and medium-sized heating and ventilation systems, e.g. heating and cooling surfaces, and floor heating.

## Product range

| Type | Product | EAN-nr. |
|---|---|---|
| ERZ-3951 | Temperature regulator, range +5/+40°C.<br>*Two heating steps (0-10V DC). Potentiometer for min. temperature limitation.* | 5703502540863 |
| ERZ-3952 | Temperature regulator, range +35/+105°C.<br>*Two heating steps (0-10V DC). Potentiometer for min. temperature limitation.* | 5703502540870 |
| ERZ-3953 | Temperature regulator, range +5/+40°C.<br>*Two heating steps (0-10V DC). Potentiometer for max. temperature limitation.* | 5703502540887 |
| ERZ-3954 | Temperature regulator, range –10/+35°C.<br>*Two cooling steps (0-10V DC). Potentiometer for min. temperature limitation.* | 5703502540894 |
| ERZ-3955 | Temperature regulator, range –10/+35°C.<br>*One heating step and one cooling step (0-10V DC) with adjustable neutral zone between the steps. Potentiometer for min. temperature limitation.* | 5703502540900 |
| | *Setback of temperature by external timer (all types ERZ)*<br>**Accessories** | |
| ERZF-95 | Room sensor for wall mounting with built-in potentiometer for parallel displacement of setpoint ±5°C | 5703502540962 |
| ETF-995 | Room sensor for wall mounting | 5703866102110 |
| ETF-1195 | Duct sensor | 5703866100413 |
| ETF-195 | Floor sensor | 5703866100817 |
| ERZP-10 | Potentiometer for parallel displacement of setpoint ±5°C (for panel door mounting) | 5703502540931 |
| ERZS-10 | Scale for ERZP-10 | |

*ERZF-95*

*ETF-995*

*ETF-1195*

*ERZP-10*

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## Function

ERZ is a proportional regulator with built-in auto-tuning which automatically eliminates deviations in the P-band and adjusts the regulator to the load. The auto-tuning function saves the traditional time-consuming adjustment of the system when using conventional control relays. ERZ ensures a very constant regulation of small and medium-sized systems.
The ERZ series is equipped with a number of important functions:
*0-10V DC output signals for sequential control:* Two heating steps, two cooling steps, or one heating step and one cooling step.
*Temperature limitation:* Sensor connection for max. or min. limitation. The temperature can be set on the regulator.
*Setback of temperature:* The series has a built-in temperature setback function which is activated by an external timer. The setback temperature can be set on the regulator.
*Frost protection:* Connection for mechanical frost thermostat.

## Technical data

Power supply . . . . . 24V AC/DC
Power consumption . . . . . 3 VA
Temperature settings. . . . . see table
DC-output . . . . . 2 × 0-10V DC (max. 5 mA)
Regulation mode . . . . . Auto-tuning
Ambient temperature . . . . . –10/+40°C
Housing . . . . . IP 20
Dimensions (mm) . . . . . L/86 W/52.5 D/58 mm

## Temperature limitation

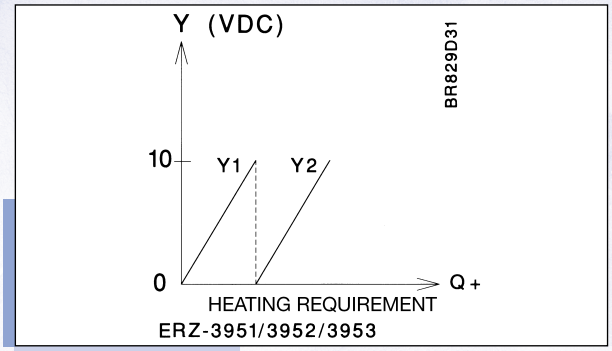
When a sensor (limit sensor) is connected to terminals 10 and 11, a max. and min. temperature can be set on the front panel of the regulator.

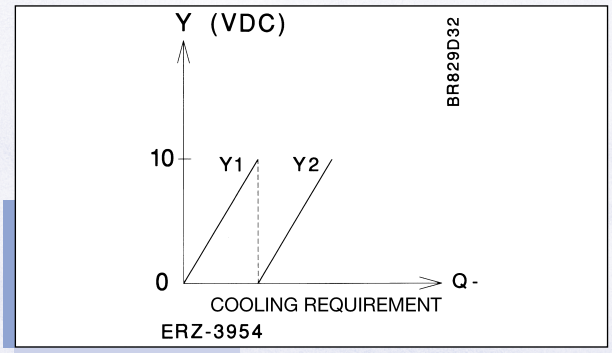
*Min. adjustable limitation (excl. ERZ-3953)*
The setting is made on the front panel. This function is only active if a limit sensor is connected. The set value is the minimum temperature which must be maintained where the limit sensor is located. However, this possibility is not valid for ERZ 3954, but this type has a built-in fixed min. setting of 10°C.
*Max. adjustable limitation*
Only valid for ERZ-3953. The setting is made on the front panel.
The other ERZ types have a fixed max. value, *(see temperature settings).*

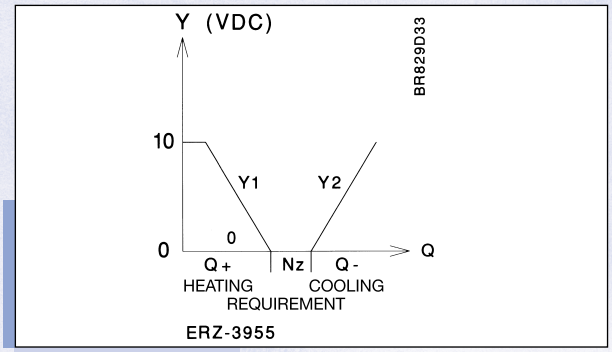
## Temperature settings

| ERZ | Temp. Set | Max. Limit | Min. Limit | Setback Range | Dead Band | Reg. |
|---|---|---|---|---|---|---|
| 3951 | +5/+40°C | +55°C | 0/+30°C | 0/+20°C | None | H/H |
| 3952 | +35/+105°C | +105°C | +25/+55°C | +30/+70°C | None | H/H |
| 3953 | +5/+40°C | +25/+65°C | +10°C | 0/+20°C | None | H/H |
| 3954 | –10/+35°C | None | –5/+20°C | –5/+20°C | None | C/C |
| 3955 | –10/+35°C | +55°C | 0/+30°C | –6°C | +0.1/+5°C | C/H |

## Function diagrams



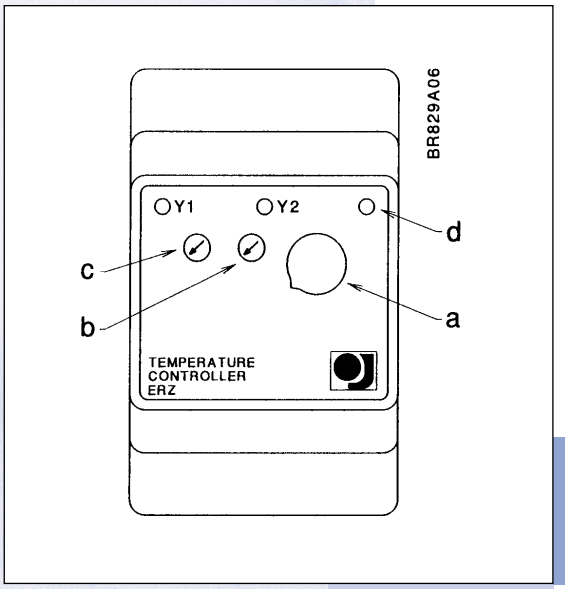



## Setback temperature

The setting is made on the front panel. The set value is the reduced temperature setpoint which is obtained when terminals 13 and 14 are short-circuited via an external switch/control. On the ERZ-3955, this setting is not adjustable. On this type the normal setpoint temperature is reduced by 6°C when terminals 13 and 14 are short-circuited.

## Frost protection

Frost protection of the heating surface can be provided by removing the jumper between terminals 12 and 13 and connecting a mechanical frost thermostat with a contact action which breaks on detection of a frost condition (or via relay/switches). *The heat outputs are then increased to 10V whilst the frost condition exists.*




## Manual overload of output

The signal outputs $Y_1$ and $Y_2$ can be manually adjusted to provide 10V or 0V by turning the temperature setpoint knob to the highest or lowest value. This may be applicable at start up of the system or during maintenance, as the position/movement of valve and damper can be ascertained and checked.

| Manual oversteering of output | Lowest temperature scale value | | Highest temperature scala value | |
|---|---|---|---|---|
| | $Y_1$ | $Y_2$ | $Y_1$ | $Y_2$ |
| ERZ -3951<br>-3952<br>-3953<br>-3954 | 0V DC | 0V DC | 10V DC | 10V DC |
| ERZ -3955 | 0V DC | 10V DC | 10V DC | 0V DC |

## Settings/LED indications

- Desired temperature **pos. a**
- Setback temperature **pos. c**
- Dead band (ERZ-3955) **pos. c**
- Min./max. limitation, **pos. b**
- Green LED indicates power ON, **pos. d**
- Flashing green LED indicates sensor failure, **pos. d**
- Red LEDs indicate output signal, **pos. $Y_1$ og $Y_2$**
- Light intensity varies from 0-100% at 0-10V
- Red LED short ON, long OFF indicates setpoint positioned for 0V output
- Red LED long ON, short OFF indicates setpoint positioned for 10V output

## Parallel displacement of SET-point ERZF-95

By connecting the ERZF-95 the set temperature of the regulator can be parallelly displaced ±5°C.
The built-in room sensor can be connected to terminal 8 and 9 on the ERZ, if a separate room sensor is not required.

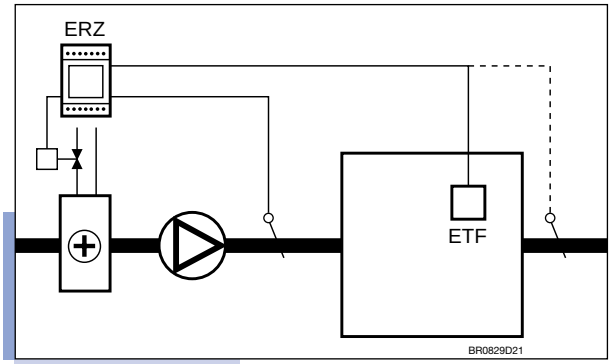
## Sensor connection

The reference sensor (the regulating sensor) is connected to the terminals 8 and 9. By connecting a sensor (limit sensor) to the terminals 10 and 11 a max. or min. temperature can be set on the front of the regulator *(see the section Temperature limitation).*

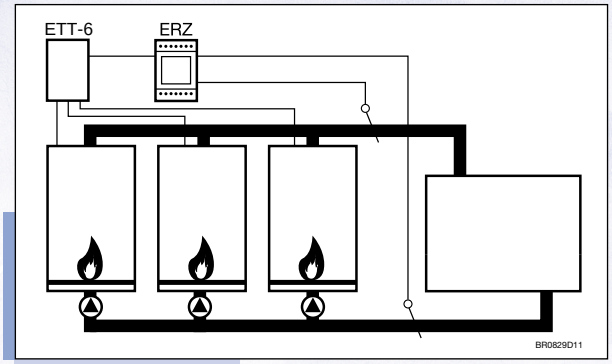
## Installation

The ERZ is mounted on DIN-rail in control cubicle or on the wall.

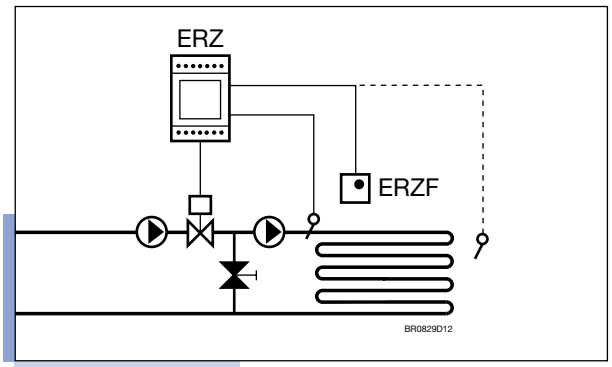
## Application (ERZ-types )



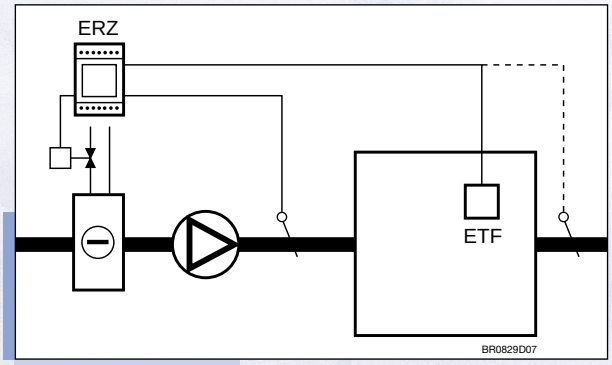

*Constant room temperature control with duct sensor for min. limitation of supply air temperature (ERZ-3951)*



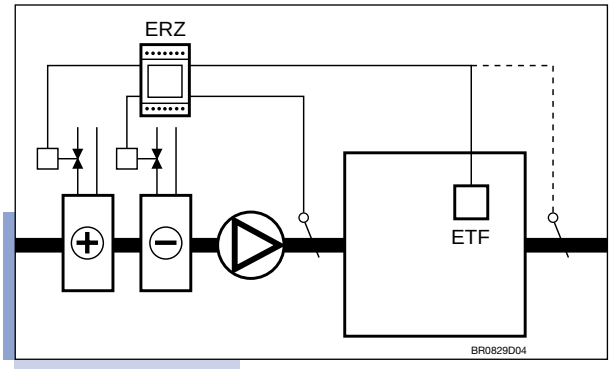

*Constant flow temperature control with step control of gas boilers via ETT-6.*
*Sensor in return for min. limitation of return temperature for boilers (ERZ-3952)*




*Constant flow temperature or control of floor heating with max. limitation of flow temperature (ERZ-3953)*

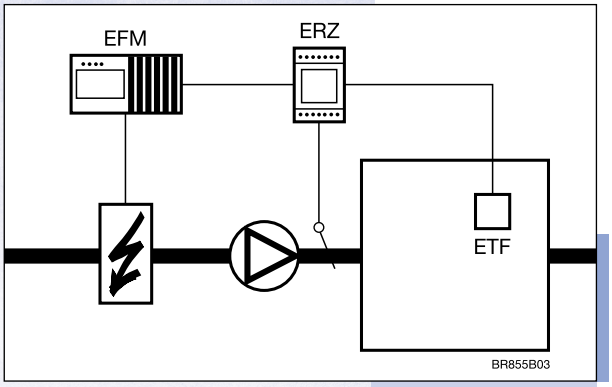



*Constant room temperature control with duct sensor for min. limitation of supply air temperature (ERZ-3954)*

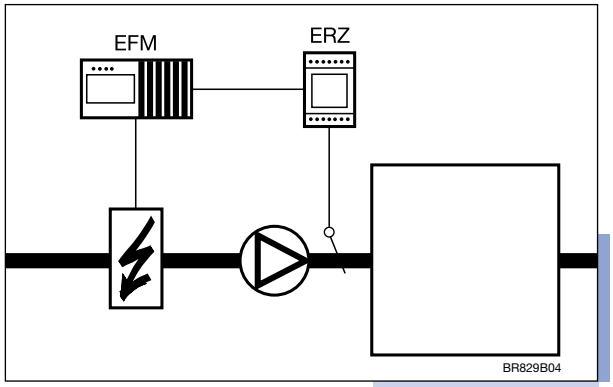



*Constant room temperature control (heating/cooling) with duct sensor for min. limitation of supply air temperature (ERZ-3955)*

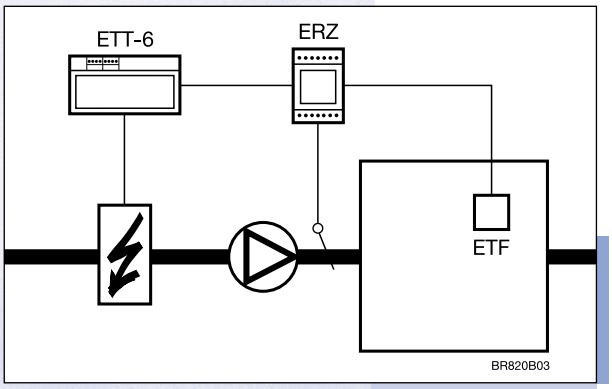
## Application examples



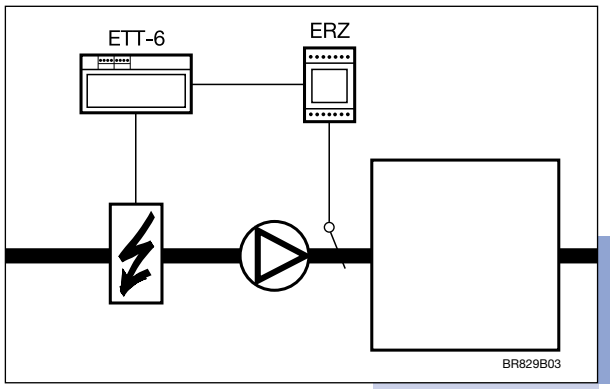

*Constant room temperature control with output controller EFM for modulated adjustment of the electrical output and with duct sensor for max. or min. limitation of supply air temperature.*



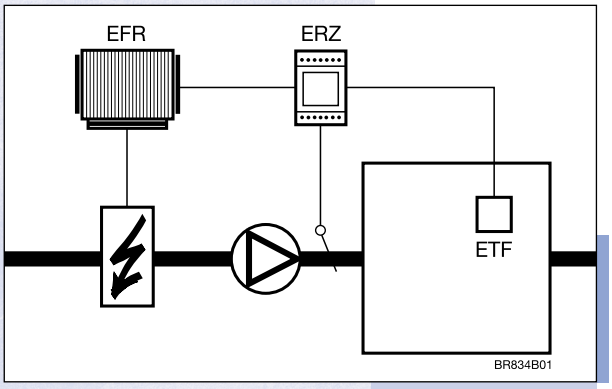

*Control of constant of supply air temperature with output controller EFM for modulated adjustment of the electrical output.*



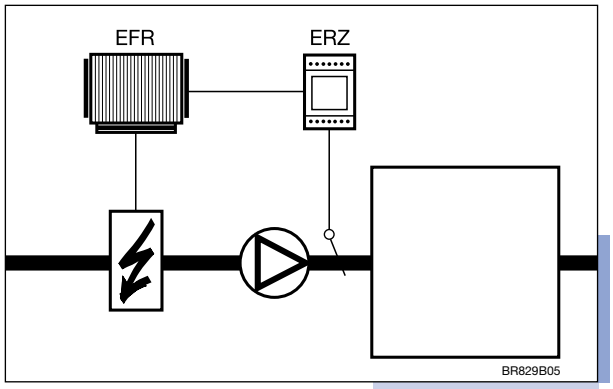

*Constant room temperature control with step controller ETT-6 and with duct sensor for max. or min. limitation of supply air temperature.*




*Constant supply air temperature control with step controller ETT-6.*

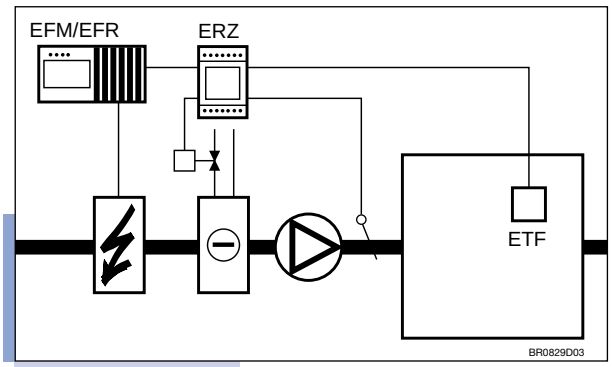



*Constant room temperature control with the output controller EFR for modulated adjustment of the electrical output (3-phase) and with duct sensor for max. or min. limitation of supply air temperature.*

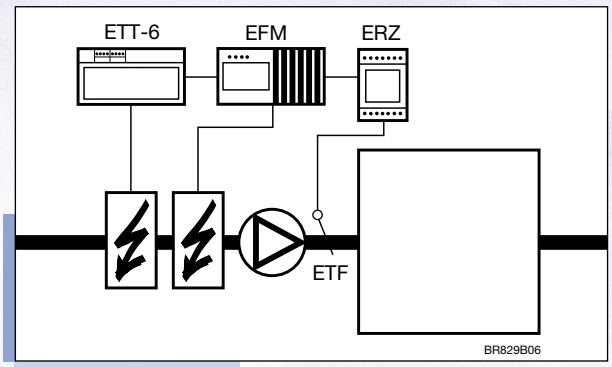



*Constant supply air temperature control with output controller EFR for modulated adjustment of the electrical output (3-phase).*

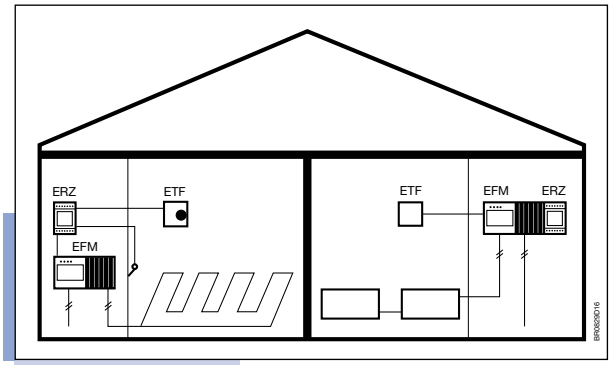
## Application examples



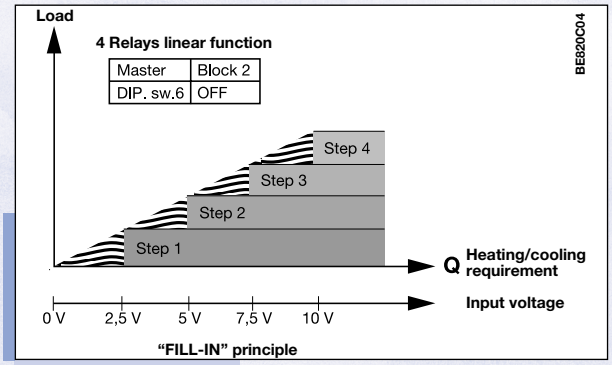

*Constant room temperature control with sequence control of electrical heating surface and cooling surface (water-based cooling) and with duct sensor for min. limitation of supply air temperature.*

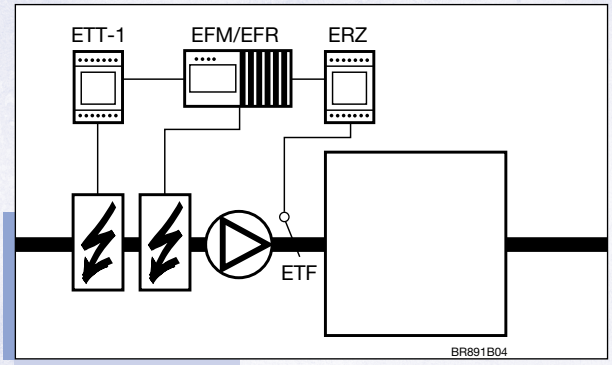



*Step controller type ETT-6 combined with output controller type EFM/EFR for large outputs. The ETT-6 can be used for linear switch-on of output steps. The output controller EFM/EFR is used to fill out the steps after the "FILL IN" principle. The control signal comes from the controller ERZ or another 0-10V regulator.*



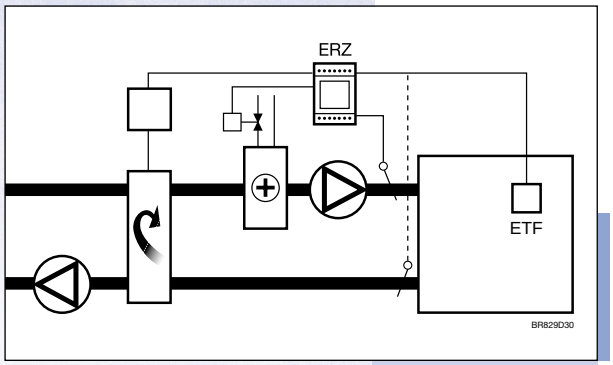

*The output controller type EFM for control of electrical floor heating or radiant heating.*



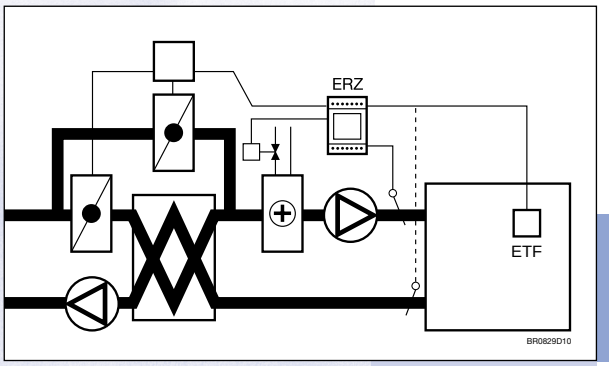




*Constant injection temperature control. Step controller type ETT-1 combined with output controller type EFM/EFR for control of 2 even sized heating elements after the "FILL IN" principle.*

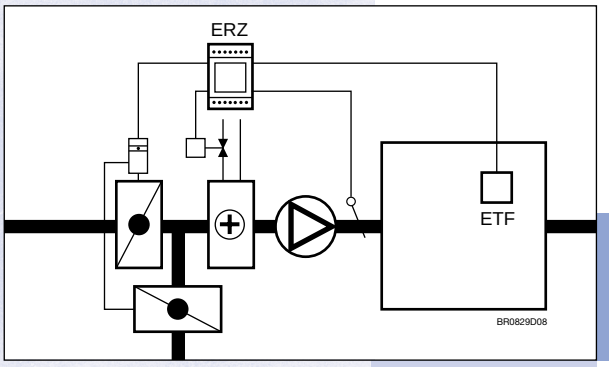
## Application examples




*Constant room temperature control of heat recovery systems with rotating heat exchanger, with duct sensor for min. limitaton of supply air temperature.*
*Note! The ERZ must only be used if the control unit on the rotation wheel can linearize the characteristics for transferred energy.*

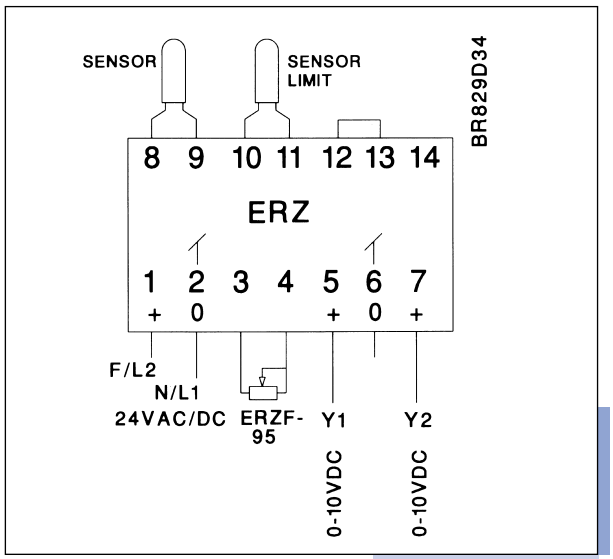



*Constant room temperature control of heat recovery system (air/air) with duct sensor for min. limitation of supply air temperature.*

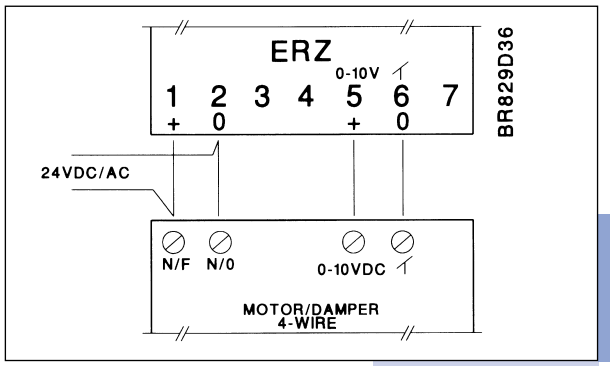



*Constant room temperature control of recirculating systems (valve and heating surface in sequence). Duct sensor for min. limitation of supply air temperature.*

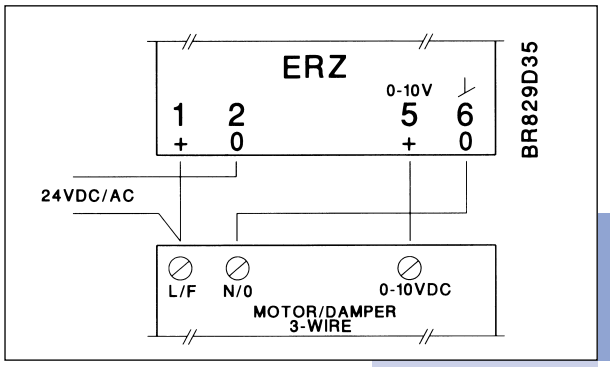
## Connection diagrams




*Connection to EFM, EFR, ETT-6 is shown in the section of the various products.*

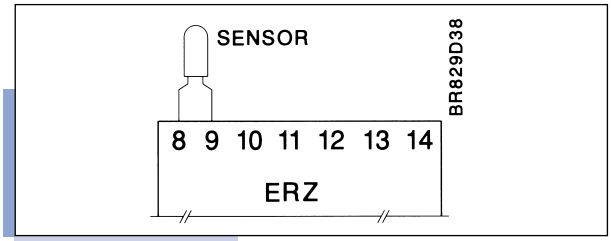



*Motor/damper connection*

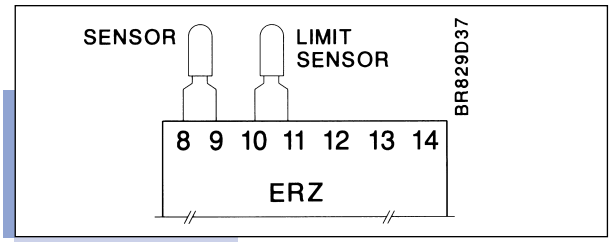



*Motor/damper connection*

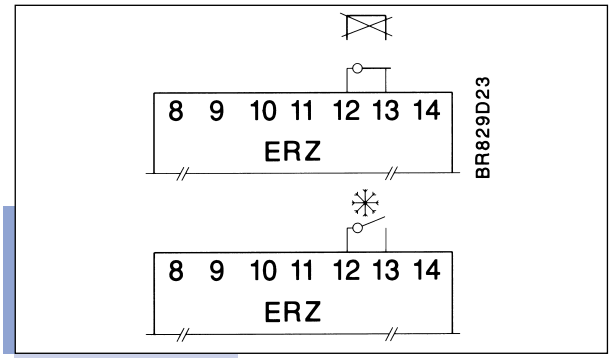
## Connection diagrams



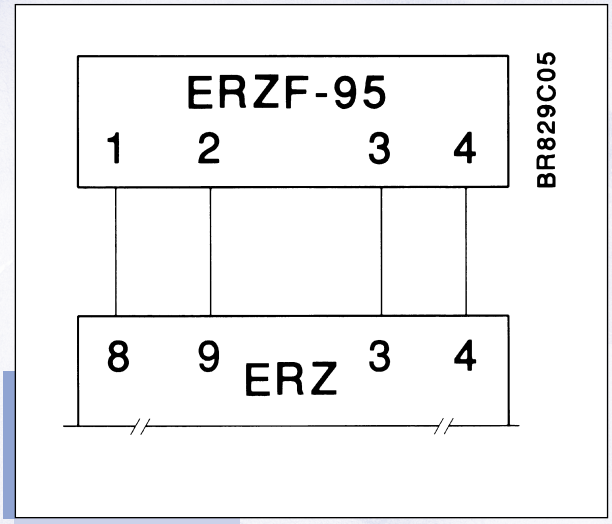

*Sensor connection at constant room temperature, constant supply air temperature and constant flow temperature.*



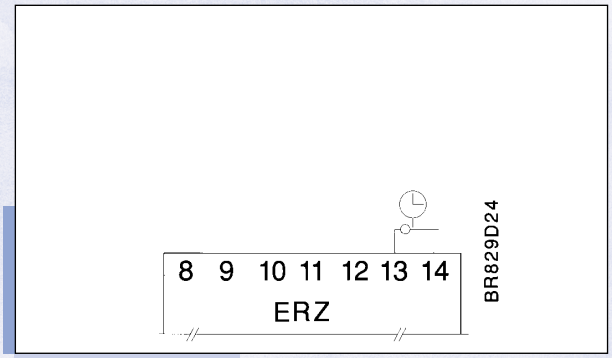

*Sensor connection at constant room temperature with sensor for min. temperature limitation of supply air and for constant flow temperature.*




***Frost protection***
*Factory mounted wiring loop is removed and frost thermostat with breaking function (potential free contact) is connected between the terminals 12 and 13.*

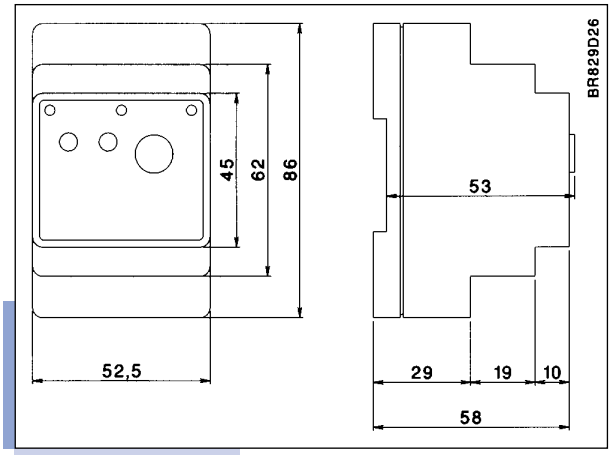



*Connection of room sensor with built-in potentiometer for parallel displacement. If the ERZ is connected to remote sensor the connection to terminal 1 and 2 on the ERZ-95 is left out.*

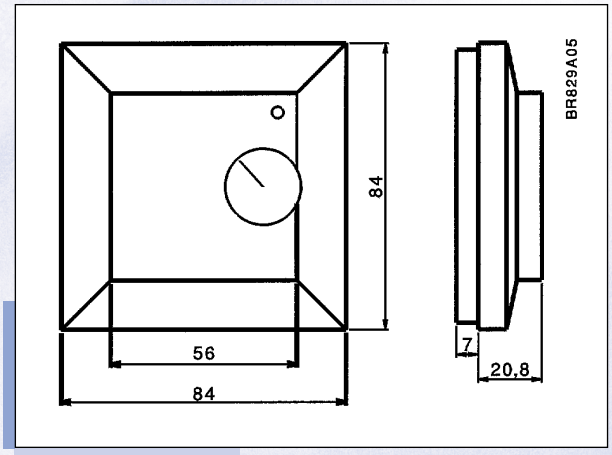



***Setback temperature***
*If terminal 13 and 14 is short-circuited via remote contact/timer controlled contact, the regulator will maintain the adjusted setback temperature.*

## Dimensions




*ERZ*




*ERZF-95*