

TEM P-PI-Controller and Positioner

Features

- Temperature controller, positioner, analog PI controller or P-PI-cascade controller.
- 2 Control loops in one, Modulating PI-control analog loop and PI-control temperature loop.
- Output for a DC 0...10V actuator
- Input for a DC 0...10V sensor
- Transformation of display value according to analog sensor range
- Temperature control depending on room or return air temperature
- Integrated room temperature sensor
- Programmable user parameters
- Minimum, maximum set point limitation
- Minimum, maximum limitation of output and input.
- Enable or Disable change of set points and heating/cooling changeover
- Temperature display in Celsius or Fahrenheit
- Programmable control parameters
- Selectable Frost protection
- Operating Voltage 24V

Selection of actuators and sensors

Temperature Sensors: Use only our approved NTC sensors to achieve maximum accuracy. Recommended is SDA-Tn10-20 as Duct sensor, SRA-Tn10 as Room sensor and SPA-Tn10-10 as immersion sensor.

Modulating Actuators: Choose actuators with an input signal type of 0-10V DC or 4-20mA. Minimum and maximum signal limitations may be set in software.

Temperature input configuration

In order to use the external temperature sensor option place Jumper 5 to EXT. See Terminal Connections for location of JP5.

Power Failure

All the parameters and set points are memorized and don't need to be reentered.

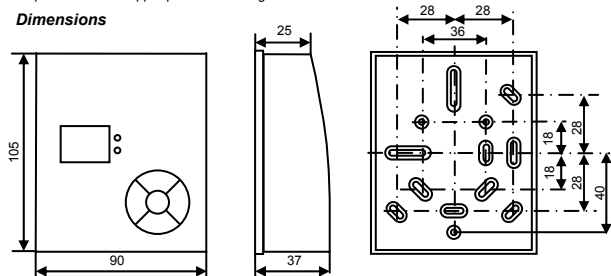
Mounting location

- Install the controller on an easy accessible interior wall, approx. 1.5 m above the floor in an area of average temperature.
- Avoid direct sunlight or other heat sources, e.g. the area above radiators and heat emitting equipment.
- Avoid locations behind doors, outside walls and below or above air discharge grills and diffusers.
- Location of mounting is less critical if external temperature sensors are used.

Installation

1. Install the mounting plate on the wall box. The type of screws required depends on the wall box. For Chinese standard M4x25 screws are most suitable. The mounting plate provides holes for most international standards. Horizontal distance of mounting screws ranges from 35 to 65 mm; vertical distances are 58 to 85 mm.
2. On the upper side of the controller, there are two clips. Press them inside using a small screwdriver.
3. Separate the front plate of the controller with the base by opening it carefully. Unplug the connector from the button.
4. Connect the wirings as shown in the wiring diagram. Pay attention to follow local guidelines regarding insulation and wire sizes.
5. Connect the main body to the mounting plate by holding it in place and inserting the two small screws that are part of the package in the upper left and lower right corner.
6. Reconnect the plug of the button and press the front plate into place. Insert the lower part first and then press down the upper part until hearing a click

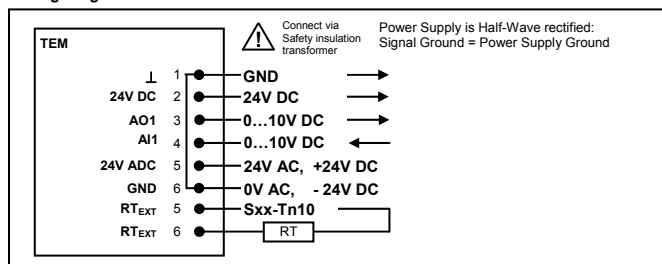
Dimensions



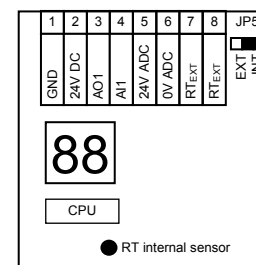
Technical Specification

| | | |
|-------------------------------|-------------------------------------------------------------|--------------------------------------------|
| Power | Power Supply | 21.5 - 26.5 V AC 50/60 Hz |
| | Power Consumption | Max 2 VA |
| Signal Inputs | Electrical Connection | Terminal Connectors |
| | Temperature Inputs | RT Internal, External (Sxx-Tn10 sensor) |
| | Range | 10 to 35 °C (50...95 °F) |
| | Resolution | 0.5 K |
| | Accuracy | 1 K |
| Signal Outputs | Analog Inputs | AI1 |
| | Input Signal | DC 0-10V, DC 0-5V or 0...20mA |
| | Resolution | 39 mV, 0.078 mA |
| | Accuracy | ± 2% |
| | Maximum Load | 20 mA, 500Ω |
| Display (LED) | Actual values and setpoint | 2 digits |
| | Resolution value | 0.5 |
| Environment | Digital Signals | ON, OFF |
| | Ambient Temperature | -10 to 50°C acc IEC 721-3-3 (14 to 122 °F) |
| | Operation | To IEC 721-3-3 |
| | Climatic Conditions | class 3 K5 |
| | Temperature | 0...50°C |
| Standards | Humidity | <95% r.h. |
| | Transport & Storage | To IEC 721-3-2 and IEC 721-3-1 |
| | Climatic Conditions | class 3 K3 and class 1 K3 |
| | Temperature | -25...70°C |
| | Humidity | <95% r.h. |
| General | Mechanical Conditions | class 2M2 |
| | Ambient Humidity | 0 to 95% rH Non Condensing |
| | CE conform according to EMC Standard | 89/336/EEC |
| | Product standards | EN 60 730 – 1 |
| | Automatic electrical controls for household and similar use | EN60 730 – 2 – 9 |
| Electromagnetic compatibility | Emissions | EN 50 081-1 |
| | Immunity | EN 50 082-1 |
| | Pollution Class | Normal |
| | Degree of Protection | IP30 to EN 60 529 |
| | Safety Class | III to EN 60 730 |
| General | Housing | ABS plastic |
| | Servicing | Maintenance Free |
| | Dimensions | 105 x 90 x 37 mm (H x W x D) |
| | Dimensions of package | 160 x 100 x 40 mm (H x W x D) |
| | Weight (including package) | 215 g |

Wiring Diagram



Terminal Connections



Legend

- 1: Signal Ground
- 2: Actuator/Sensor power supply 24V DC. For AC powered actuators/sensors use power from terminals 5/6.
- 3: AO1: 0...10V DC Output
- 4: AI1: 0...10V DC Input
- 5: Power supply 24 V AC/DC
- 6: Power supply Ground (linked to Signal Ground)
- 7: External temperature Sensor
- 8: External temperature Sensor
- J5 Jumper for external or internal temperature sensor

Configuration parameters for firmware version 1.2

The TEM can be adapted to wide variety of applications. The adaptation is done with parameters. The parameters can be changed on the unit without the need of additional equipment.

Identifying the firmware version

The parameters and functionality of controller depend on its firmware revision. It is therefore important to use a matching product version and parameter set. The firmware version is marked on the package box of your product. In order to identify the firmware version of an installed controller, remove the cover and locate the CPU in the center of the PCB. The firmware version is printed on the label of the CPU.

Changing parameters

- The parameters are password protected. There are two levels of parameters: User operation parameters for access control settings and Expert parameters for control functions and unit setup. The passwords for user levels and expert levels are different. Only control experts should be given the control parameter password.
1. Press LEFT and RIGHT button together for three seconds. The display will indicate **PP** and both status LED's are blinking in orange.
 2. Select a password using UP or DOWN buttons. Dial **09** in order to get access to the user parameters. The RIGHT key will work as ENTER key and the LEFT key as ESC key. Press Enter.
 3. Once logged in, **PO** is displayed and the two status LED show a steady orange light. Now you can select the parameters by pressing the up or down key.
 4. Change a parameter by pressing the RIGHT key. The two status LED will now blink alternatively in orange color. Change the parameter using UP or DOWN keys.
 5. After you are done, press RIGHT again in order to return to the parameter selection level. In order to leave the menu press the POWER key once or do not press a key for more than 10 sec.

User Parameters (Password 09)

| Parameter | Description | Range | Standard |
|-----------|-----------------------------------------------------------------------------------------------|----------|----------|
| P0 | Celsius or Fahrenheit | °C, °F | °C |
| P1 | Light intensity of display, 1 = dark, 10 = bright | 1...10 | 10 |
| P2 | Enable control modes: 1 = Temperature only, 2 = Analog only, 3 = Both modes are enabled | 1,2,3 | 3 |
| P3 | Enable change set points: 0 = Disabled, 1 = Enabled | 0,1 | 1 |
| P4 | Enable Heat/Cool change: 0 = Disabled, 1 Enabled | 0,1 | 1 |
| P5 | Minimum set point limitation for temperature loop | 5...35°C | 10°C |
| P6 | Maximum set point limitation for temperature loop | 5...35°C | 40°C |
| P7 | Frost protection enable/disable | no, FP | FP |
| P8 | Calibration value of temperature sensor | -3...3 K | 0 |
| P9 | Calibration value for analog input. In % of the input range. | -9...9% | 0 |
| P10 (PA) | Display in analog mode, 0 = 0-10, 1 = 0-100 | 0,1 | 1 |

Control Parameters (password 14)

Warning! Only experts should change these settings! The parameters are grouped according to control modules. After completing the logging in, a control module must be selected before accessing the parameters.

| Parameter | Description | Range | Standard |
|-----------|----------------------------------------------------------------------------------------------|--------------|-----------|
| E0 | P – Band Temperature loop, 0 disables the P part | 0...10.0 K/F | 2.0 K |
| E1 | P – Band Analog Loop, Selecting 0 disables the P part. | 0...100 % | 10 % |
| E2 | Action of P-Band. 0 = reverse acting, 1 = direct acting | 0,1 | 0 |
| E3 | Maximum of integral, 0 disables the I part | 0.0...100 % | 0.0 % |
| E4 | Tn, Reset time of integral, 0.5 - 30 min | 0.5...30 Min | 2 Min |
| E5 | Function of analog control mode 0 = positioner, 1 = PI-controller, 2 = cascade-controller | 0,1,2 | 0 |
| E6 | Display in Analog Mode, 0 = Input, 1 = Output | 0,1 | 1 |
| E7 | Minimum limitation of output voltage | 0 – max. | 0 V DC |
| E8 | Maximum limitation of output voltage | Min – 10.0 | 10.0 V DC |
| E9 | Minimum limitation of input voltage | 0 – max. | 0 V DC |
| E10 (EA) | Maximum limitation of input voltage | Min – 10.0 | 10.0 V DC |
| E11 (Eb) | Lower display transformation value in analog loop | 0...Max % | 0 % |
| E12 (EC) | Upper display transformation value in analog loop | Min...100 % | 100 % |
| E13 (Ed) | Daily valve exercise | 0,1 | 0 |