

**TEF PI-Controller and Positioner**

**Features**

- Floating point temperature controller and positioner
- On/Off thermostat for 4-pipe systems or 2-pipe systems with fan function.
- Temperature control depending on room or return air temperature
- Integrated room temperature sensor
- Programmable user and control parameters
- Minimum, maximum set point limitation
- Enable or Disable change of set points and heating/cooling changeover
- Temperature display in Celsius or Fahrenheit
- 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-Trn10-20 as Duct sensor, SRA-Trn10 as Room sensor and SPA-Trn10-10 as immersion sensor.

Floating Actuators: Any actuators with less than 24 VAC, 1A or 24VDC, 1A are acceptable. (AC or DC is according to power supply of TEF). Actuators with constant running time are preferred for optimum functionality.

Binary auxiliary devices: E.g. pumps, fans, on/off valves, humidifiers, etc. Do not directly connect devices that exceed 24 VAC, 1A.

**Temperature input configuration**

In order to use the external temperature sensor option, the internal sensor needs to be removed. The internal sensor is located in the lower middle section of the PCB. It is marked with **RT**.

**Power Failure**

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

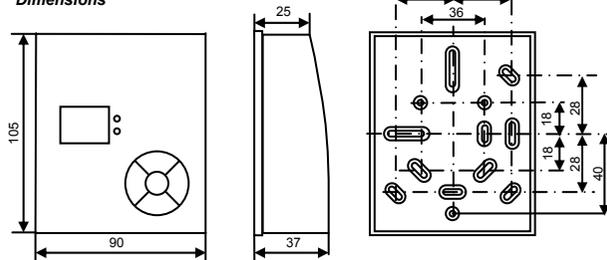
**Mounting location**

- 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

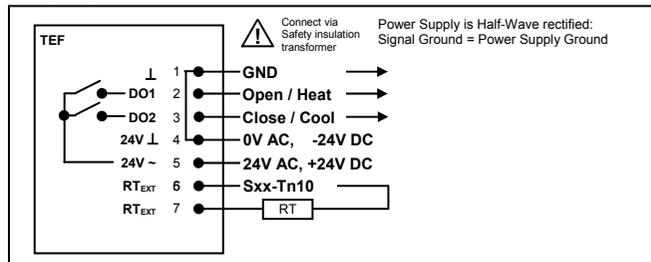
**Dimensions**



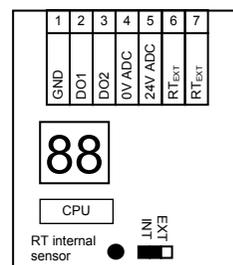
**Technical Specification**

Power	Power Supply	21.5 - 26.5 V AC 50/60 Hz	
	Power Consumption	Max 2 VA	
	Electrical Connection	Terminal Connectors	
Signal Inputs	Temperature Inputs	RT Internal, External (Sxx-Trn10 sensor)	
	Range	10 to 35 °C (50...95 °F)	
	Resolution	0.5 K	
Signal Outputs	Accuracy	1 K	
	Digital Switching Outputs	DO1 to DO2	
	AC Voltage	0...24V AC 1 A max., each output	
Display (LED)	Insulation resistance	AC3750 V acc. to EN 60 730-1	
	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	
	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.	
Mechanical Conditions	class 2M2		
Standards	Ambient Humidity	0 to 95% rH Non Condensing	
	CE	conform according to EMC Standard	89/336/EEC
		EMEI Standard	73/23/EEC
		Product standards	EN 60 730 - 1
	Automatic electrical controls for household and similar use	EN60 730 - 2 - 9	
	Special requirement on temperature dependent controls		
	Electromagnetic compatibility		
	Emissions	EN 50 081-1	
	Immunity	EN 50 082-1	
	Pollution Class	Normal	
Degree of Protection	IP30 to EN 60 529		
General	Safety Class	III to EN 60 730	
	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 (= 4)
  - 2: DO1: 24V AC or DC (= 5)  
Floating Output Open,  
Binary Heat 4 pipe system  
Heat or Cool 2 pipe system
  - 3: DO2: 24V AC or DC (= 5)  
Floating Output Close  
Binary Cool 4 pipe system  
Fan 2 pipe system
  - 4: Power Supply Ground
  - 5: Power supply 24 V AC/DC
  - 6: External temperature Sensor
  - 7: External temperature Sensor

**Configuration parameters for firmware version 1.3**

The TEF 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 = Positioner only, 3 = Both modes are enabled	1,2,3	3
P3	Choose if the end user is allowed to change set points 0 = Disabled, 1 = Enable set point access for temperature loop, 2 = Enable set point access for positioner 3 = Enable set point access for both loops	0, 1, 2, 3	3
P4	Heat/Cool change Enable, 0 = Disabled, 1 Enabled	0,1	1
P5	Dead zone span. Difference between heating & cooling setpoint	0...10 K	1 K
P6	Minimum set point limit	10...33/50...97	10C, 50F
P7	Maximum set point limit	11...34/51...98	34C, 98F
P8	Frost protection enable/disable	no, FP	FP
P9	Calibration value of temperature	-3...3	~
PA	Display in analog mode, 0 = 0-10, 1 = 0-100	0,1	0

**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	Actuator running time Opening, 10...990 seconds	01 - 99	10
E1	Actuator running time Closing, 10...990 seconds	01 - 99	10
E2	Control mode 0 = PI control, 1 = On/Off control	0, 1	0
E3	P - Band / Hysteresis Temperature loop. Select the accuracy of the temperature loop in degrees Kelvin.	0.5...8.0	2.0
E4	Maximum of 1 part of Analog Loop, Limits the influence of the integral part on the output signal, 0 disables the 1 part	0.0...A0 (100)	0.0
E5	Tn, Reset time of Analog loop integral, 0.5 - 30 min	0.5...30	05
E6	For on/off control only: 2 pipe or 4 pipe system 0 = 2 pipe system, 1 = 4 pipe system	0, 1	0
E7	For 2-pipe systems only: Enable Fan Control 0 = No Fan control, 1 = Fan Control	0, 1	0
E8	Reversing Difference in percentage of actuator position	00...A0 (100)	15
E9	Switching Difference in percentage of actuator position	00...A0 (100)	10