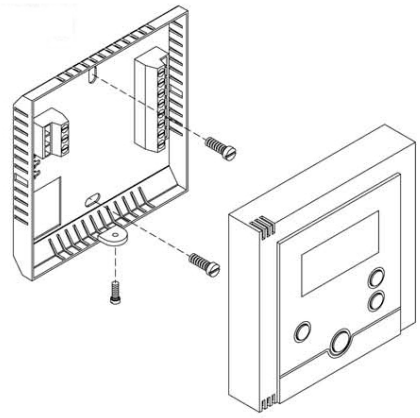
Modulating Temperature Controllers with Digital Display
Installation and Operation Instructions

Mounting Details



Mounting

The temperature controller can be surface mounted or secured to a standard European 75 x 75 x 35 mm electrical box. See Figure1: Mounting Details. Two mounting screws are included.

Display Control Unit

Display Control Unit

1 Temperature Sensor
2 Cooling Mode
3 Heating Mode
4 Temperature Indication
5 ºC or ºF Display
6 Auto Cooling/Heating Mode
7 Temperature Set Point Increase Key
8 Temperature Set Point Decrease Key
9 Enter Key
10 Function Key

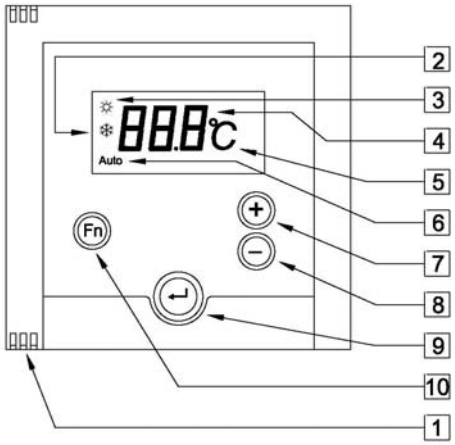
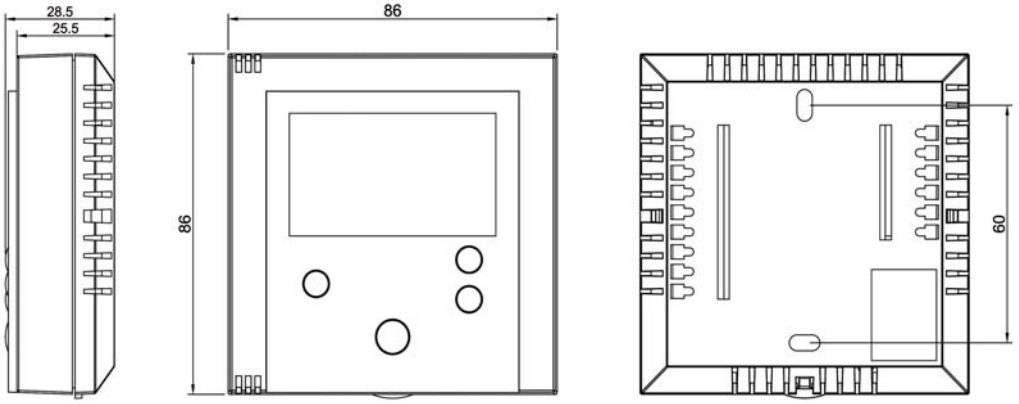


Figure 5: Dimensions in mm



LED Indicators

Four LED indicators showing control output status are provided for 3-wire on-off/floating controllers and located at the backside of the front cover. A cable extender kit Cable-1 is required when checking and testing the output status signals.

T1	LED1	OPEN signal at terminal 3
	LED2	CLOSE signal at terminal 4
T2	LED1	OPEN signal at terminal 3
	LED2	CLOSE signal at terminal 4
	LED3	OPEN signal at terminal 6
	LED4	CLOSE signal at terminal 7

Note: LED indicators are available in 3-wire on-off/floating models only.

Application Notes

- The 3-wire floating controller output is a pulse/pause type signal which the on/off ratio of the pulse/pause cycle is directly proportional to. The pulse/pause duration is typically 10 seconds.
- On a single-output cool only or heat only unit, i.e. a unit with only main output being available, connecting a shunting wire between terminals SR2 and GND forces the unit to go into heating mode.
- On a single-output cool only or heat only unit, connecting a TE10-1 changeover sensor between terminals SR2 and GND will automatically switch the unit between cooling and heating mode. When the sensor temperature exceeds 30ºC, the controller enters into heating mode.
- On a dual-output unit, the main output is always associated with the cooling controlled device and the secondary output with the heating controlled device.
- Remove jumper JP1 if external sensor is wired to SR1 and GND.
- Insert jumper JP2 if 2-10 VDC proportional output is required.
- The changeover sensor should be wrapped around the supply water pipe when associated with a water system.
- 22 or 24 AWG twisted shielded pair double-insulated cable is recommended as remote sensor wiring and its length must not exceed 25 m.
- Do not bundle and run power wiring and remote sensor wiring in the same conduit.
- Unoccupied contact closure activates unoccupied mode.
- When using either or both of the external temperature and changeover sensors, run the wires away from any electric motors or power wiring. Failure to do so may result in poor thermostat performance due to electrical noise.
- It is highly recommended that the 24 VAC power supply is interlocked to the air-conditioning system so that the controller is shut down when the air-conditioning system is turned off.

Operation Notes

- The controller is always turned on and in active operating mode as long as power supply is connected.
- LCD displays ambient temperature constantly. When either “+” or “–” adjustment key is pressed, the LCD reading changes to show the current temperature set point value. Increase or decrease set point value by pressing “+” key and “–” key respectively. Will return to ambient temperature display when all keys are passive for 10 seconds.
- Press the “Fn” key momentarily to enter the desired operating mode: Nothing Changed or Cool-Heat or Cool-Heat-Auto.
- Unoccupied mode can be activated in the following manner when the unoccupied contact closes:

  For “T1” and “A1” models, the unoccupied cooling or heating mode is determined by the status of the SR2 seasonal changeover sensor and the valve output is controlled according to the measured temperature.

  For “T1M” and “A1M” models, the unoccupied cooling or heating status is determined by the last status of the occupied mode and the valve output is controlled according to the measured temperature.

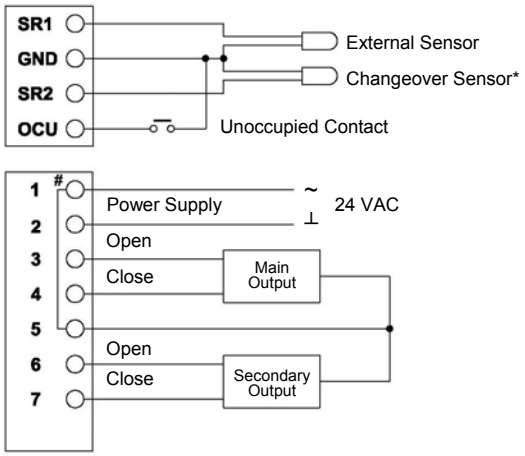
  For “T2”, “A2” and “AH” models, while the unoccupied cooling or heating status is always determined by the measured temperature, the valve output is also controlled according to the measured temperature.

  When unoccupied mode is activated, all keys are locked out and no settings can be entered.
- The controller allows authorized service agent to change the following system functions and operating parameters in the field:

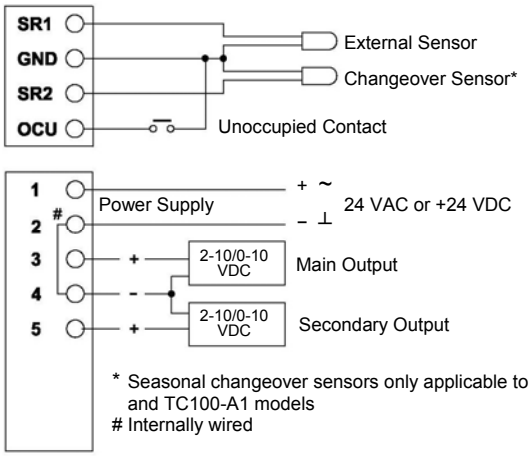
Menu		Function	Description
Main	Sub		
S-F System Function Selection	S	MCU firmware (software) revision level	Appears only after entering the setup menu
	t	Temperature engineering unit selection	To select display of ºC or ºF, factory setting ºC. Appears only after entering the setup menu
	uA	Activation selection in unoccupied mode	Since the controller is always in active operating mode when power is connected, there is no standby mode. Therefore, the controller can be set in either uA1 or uA2 setting value. uA1 = unoccupied mode can only be activated when thermostat is in operating mode (factory setting) uA2 = unoccupied mode can be activated when thermostat is in either standby mode or operating mode
	c	Selection of constant display of ambient temperature or temperature set point value	cAt = constant display of ambient temperature (factory setting) cSP = constant display of set point value
	rF	Restoration of factory settings	rFC = Retain current settings (factory setting) rFS = Restore factory settings
S-P System Operating Parameter Setting	P	Proportional band for PI control	For 2-10/0-10 VDC output models: To set proportional band from 1 to 10 K (1-20 R) in 1 degree increments, factory setting 5 K (10 R). For 3-wire floating control models: To set proportional band from 0 to 10 K (0-20 R) in 1 degree increments, factory setting 5 K (10 R); setting = 0 means output = on-off control mode.
	I	Integral time for PI control	To set integral time from 0 to 30 (300 s) in numeric 1 (10 s) increments, factory setting 6 (60 s). Setting = 0 means integral time being turned off.
	U	Upper occupied set point limit setting	To set upper occupied set point limit, adjustable between current lower set point limit value and 35°C, factory setting 35°C. The program is set such that there is always a minimum separation of 4 degrees maintained between the upper occupied set point limit value and the lower set point limit value.
	L	Lower occupied set point limit setting	To set lower occupied set point limit, adjustable between current upper set point limit value and 0°C, factory setting 0°C. The program is set such that there is always a minimum separation of 4 degrees maintained between the upper occupied set point limit value and the lower set point limit value.
	C	Unoccupied cooling set point setting	To set unoccupied cooling set point, adjustable between current unoccupied heating set point value and 35°C (factory setting 26°C). The program is set such that there is always a minimum separation of 4 degrees maintained between the unoccupied cooling set point value and the unoccupied heating set point value. Unoccupied cooling set point setting is not applicable to Model “1M”.
	H	Unoccupied heating set point setting	To set unoccupied heating set point, adjustable between current unoccupied cooling set point value and 5°C (factory setting 16°C). The program is set such that there is always a minimum separation of 4 degrees maintained between the unoccupied cooling set point value and the unoccupied heating set point value. Unoccupied heating set point setting is not applicable to Model “1M”.
	n	Offset adjustment of temperature indication (field recalibration of measured temperature)	n 2 = temperature indication plus 2 degrees n 1 = temperature indication plus 1 degree n 0 = no offset, factory setting n-1 = temperature indication minus 1 degree n-2 = temperature indication minus 2 degrees
	d	Deadband adjustment for dual-output models only	To set auto cool/heat changeover deadband value from 1 to 5 K (2 to 10 R). Factory setting 1.5 K (± 1.5 K of set point value): when ambient temperature is 1.5 K above set point value, controller will go into cooling mode or when ambient temperature is1.5 K below set point value, controller will go into heating mode.

Wiring Diagrams

On-Off/Floating Controller



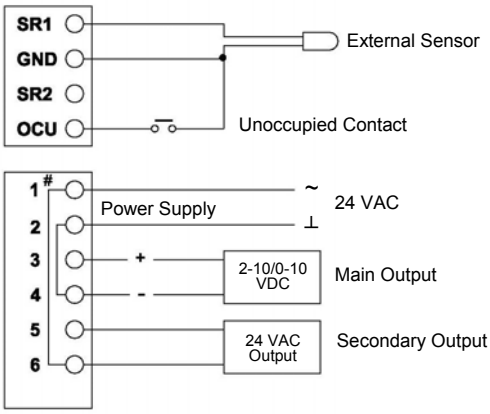
2-10/0-10 VDC Proportional Controller



* Seasonal changeover sensors only applicable to TC100-T1 and TC100-A1 models

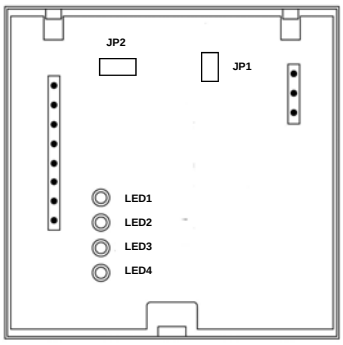
\# Internally wired

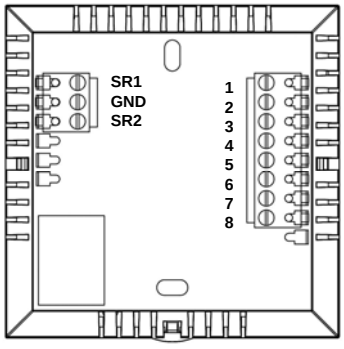
2-10/0-10 VDC Proportional + 24 VAC On-Off Controller



\# Internally wired

Wiring Terminals and Jumper Settings





JUMPER SETTINGS		
	JUMPER IN OPEN POSITION	JUMPER IN CLOSED POSITION
JP1	With External Sensor	With Built-in Sensor
JP2	For 0-10 VDC Output	For 2-10 VDC Output
Note: JP2 is available in 0-10 VDC/2-10 VDC output models only.		

Note: Short-circuit protection PTC is available on all models.