



D3  
53mm  
DIN rail mount



P44  
48mmx48mm  
panel mount



P49  
48mmx96mm  
panel mount

## TEMPERATURE CONTROLLER

### PT100 Probe

incl 4-20mA or 0-10V re-transmit (-T)

**D3-HTC 0/1/2-T**

**P44-HTC 0/1/2-T**

**P49-HTC 0/1/2-T**

EXAMPLE: D3-HTC 0-T= 0 RELAY

Operating instructions and Guarantee Certificate  
[www.iconelectronics.co.za](http://www.iconelectronics.co.za)

### **ReTransmit devices (-T)**

The temperature is converted to a 4 - 20mA signal. This signal may be programmed to represent the full scale, or part thereof. By default a temperature of 0°C will generate an output of 4mA, and a temperature of 440°C will give 20mA.

For 0-10V re-transmit option, the default output is 0V = 0°C, & 10V=440°C

### **Description:**

This device interfaces directly with a 3-wire PT100 temperature probe. (0.1 °C resolution).

It offers up to 2 set points (xx-HTC2) with individual hysteresis parameters. The relays may be independently configured for heating, cooling, heating alarm or cooling alarm functionality.

Configuring relay 1 to "Climate Control" sets R1 to energise when the temperature is below the pre-set level, and R2 to energise when the temperature is above the pre-set level.

The parameter settings may be locked and code protected to avoid changes from being made by unauthorized personnel.

The menu may be reduced to allow changes to only the most commonly adjusted parameters. This reduces the risk that one of the mode advanced parameters are accidentally changed.

The adjustable range of the temperature set points may be limited to avoid temperatures from being entered that may cause damage to the overall system.

### **Available models:**

#### **0 RELAY**

These devices do NOT incorporate any relays and are used to display the temperature read from the probe.

#### **1 RELAY**

These devices incorporate 1 relay. It may be used as either a control or alarm relay for either heating or cooling applications. (please see "relay operation modes" for further details).

The relay is controlled by the Set point and hysteresis parameters.

#### **2 RELAY**

These devices incorporate 2 relays. Each relay may be used as either a control or alarm relay for either heating or cooling applications. (please see "relay operation modes" for further details).

The relays are configured independently. (one may be set for control while the other is used as an alarm relay).

## **Relay Operation modes:**

### **Heating mode:**

The relay is energised while the temperature rises to the set point value.

When the set-point is reached, the relay de-energizes until the temperature drops below the set-point by the hysteresis amount of degrees.

### **Heating alarm mode:**

Similar to heating mode except that the relay is de-energised until the set point is reached.

Once energised, the temperature must drop below the set-point by the hysteresis amount before it will de-energise.

The latch facility may be used to keep the relay energised until the latch is removed (even if the temperature has dropped sufficiently)

### **Cooling mode:**

The relay is energised while the temperature drops to the set point value.

When the set-point is reached, the relay de-energizes until the temperature rises above the set-point by the hysteresis amount of degrees.

### **Cooling alarm mode:**

Similar to cooling mode except that the relay is de-energised until the set point is reached. Once energised, the temperature must rise above the set-point by the hysteresis amount before it will de-energise. The latch facility may be used to keep the relay energised until the latch is removed (even if the temperature has increased sufficiently)

### **Climate control mode:**

Both relays are controlled via 1 set point & hysteresis parameter. Relay 1 works in heating mode while relay 2 works in cooling mode.

## **Notes:**

- If the temperature being read is outside the device's temperature range, the message "t Lo" or "t Hi" is displayed.
- Make all adjustments and reset device before connecting relay.
- Probe lead resistance could affect the accuracy as much as 0.3 °C / ohm
- If the probe is faulty, or not connected, "P.Err" is displayed.
- If the input voltage is below the minimum operating voltage, the relay may not energize. Even though the device's display is on.
- The temperature is re-transmitted based on the re-transmit offset and span parameters. The output may be set to correspond to the entire temperature range or any part thereof. eg. A range of 0-100°C may be re-stransmitted as (4mA=0 °C, 20mA=100°C re-tx offset=0.0, span=100.0), or 50 - 70 °C may be re-stransmitted as (4mA=50 °C, 20mA=70 °C. re-tx offset=50.0, span=20.0).

## **Adjustable parameters:**

*Please note: Depending on the model of the device purchased, some of the parameters listed below may not be available*

- Pre-set temperature for relay 1 (R1) "°C.r1"(default value: 25.0)

When the probe temperature reaches this value, relay 1 changes state.

- Hysteresis for relay 1 "HY.r1" (default value: 1.0, range 1-100.0 °C)

Once the pre-set temperature is reached, it must change (in the opposite direction) by this amount before the relay resumes it's original state.

- Relay 1 mode (function) "Fn.r1" (default: Heating)

The device may be configured for :

- Heating "HEAt"

The relay is energised while the probe temperature is BELOW the pre-set temperature. Temp must DROP to re-energize relay.

- Cooling "COOL"

The relay is energised while the probe temperature is ABOVE the pre-set temperature. Temp must RISE to re-energize relay.

- Heating Alarm "H. AL"

The relay is de - energised while the probe

- Cooling Alarm "C. AL"

The relay is de - energised while the probe temperature is ABOVE the pre-set temperature.

- Climate control "C.cnt"

R1 is energised while the temperature is BELOW the pre-set temperature, and R2 is energised while the temperature is ABOVE the pre - set temperature. Only one temperature and one hysteresis setting is used in this mode. When set to this mode, Relay 2 setpoint, hysteresis and function if automatically configured, and are therefore not available for adjustment

- Pre-set temperature for relay 2 (R2) “°C .2” (default value: 25.0)  
When the probe temperature reaches this value, relay 2 changes state.
- Hysteresis for relay 2 “HYS.2” (default value: 1.0, range 1-100.0 °C)  
Once the pre-set temperature is reached, it must change (in the opposite direction) by this amount before the relay resumes it's original state.
- Relay 2 mode (function) “Fn.r2” (default: Heating)  
Please see above (Relay 1 modes. Note that Relay 2 cannot be set to Climate control.)
- Maximum value for set-point “HI” user setting (default value: 440.0)  
This is the maximum value obtainable via the set-point parameters (“°C.r1” / “°C.r2”).
- Minimum value for set-point “LO” user setting (default value: -50.0)  
This is the minimum value obtainable via the set-point parameters (“°C.1” / “°C.2”).
- Offset “OFSt” (default value: 0, range -10.0 to +10.0 °C)  
This value is added (or subtracted if negative) to the current temperature.
- Re - transmit output Offset “rt.OS” (default : 0.0, range -50.0 to +450.0 °C)  
When the temperature equals this value, 4mA is transmitted.
- Re - transmit output Span “rt.SP” (default : 440.0, range -50.0 to +450.0 °C)  
When the temperature equals this value PLUS the offset (rt.OS) value (“rt.SP”+“rt.OS”), 20mA is transmitted. (see notes)
- Reset “rESt”  
Press “▲” and “▼” or “+” and “-” buttons simultaneously to reset the device to the factory defaults.

**DUAL DISPLAY DEVICE Programming example: Set setpoint 1 to 30.0°C:**

Press “ $\text{O}$ ” to display “°C .r1”

Use “▲” and “▼” to change the value to “30.0”.

Press “ $\text{O}$ ” for 3 seconds to exit the menu.

**SINGLE DISPLAY DEVICE Programming example: Set the setpoint to 30.0°C:**

Press “MENU” to display “°C.r1”. Press “SELECT” to view the current value.

Use the “+” and “-” buttons to change the value to 30.0.

Press “ENTER” to return to the menu.

Press “BACK” to exit the menu.

**Climate control Example:**

If the temperature is set to 25 °C, and the hysteresis is set to 2, and the temperature being read is rising from 10 °C, the heating relay (R1) will be energised until the temperature reaches 25°C.

At this point, R1 will de-energise.

If the temperature keeps rising, the cooling relay (R2) will energise when the temperature reaches 27°C (25° + 2° hysteresis).

If the temperature then drops to 25 °C, the cooling relay will de-energize, and the heating relay will energise when the temperature drops to 23 °C (25° - 2°hysteresis).

**Specifications:**

Temperature range:	-50.0 °C to + 440.0 °C
Resolution:	0.1°C
Accuracy:	±0.5 °C (@ 25 °C ambient )
Input voltage:	±15% of rated input
Probe:	PT100 (38.5 ohm/ 100 °C)
Re-transmit Accuracy:	±0.3% @ 25°C (% of full scale)

**re-transmit Notes:**

- The output 4-20mA is dependant on the value being displayed, and is set up in a similar manner to the display. The offset parameter determines when 4mA is output, and the span is the amount required for the output to increase by an additional 12mA ie. 20mA is output when the value displayed = re-transmit OFFSET+SPAN
- To set the re-transmission signal to follow the input signal (the output 4-20mA follows the 4-20mA received), set the re-tx offset and span settings to the same value as the display offset and span settings.
- To set the re-transmission signal to invert the input signal (the output = 4mA when the input = 20mA), set the re-tx offset = (display offset+span) and re-tx span = (display span x -1).
- Whenever the input signal is above or below the "CAL.O" or "CAL.S" values by more than 3%. The display indicates "Er.Hi" or "ER.Lo".
- Certain settings are reset to default when the device is re-configured. Re-check all settings to ensure they are correct before commissioning. (use the advanced menu)

**Menu operation (single display):**

All adjustments are made via the three front mounted buttons.

Press the "MENU" button repeatedly until the desired setting is reached, press "SELECT" to display the current value of the selected parameter, or sub menu (if applicable).

The "+" and "-" buttons are used to change the value.

"ENTER" will return the device to the menu.

The "BACK" button will exit the menu.

**Menu operation (dual display):**

Press the menu "U" button repeatedly until the desired setting is reached.

The "▲" and "▼" buttons are used to change the value.

"U" will display the next menu item.

To exit the menu hold "U" button for 3 seconds.

**Menu options:**

Exit the menu before making the following adjustments.

**Lock / unlock parameters:****(default: unlocked)**

Press "BACK" ("▼"), then "ENTER" ("U") and hold the 2 buttons until the desired option is displayed.

The display cycles between "Loc" (no changes allowed) & "u.Loc" (parameters may be adjusted)

**Full / reduced menu (default: Full)**

Press "SELECT" ("▲"), then "ENTER" ("U") and hold the 2 buttons until the desired option is displayed.

The display cycles between "rEdu" (limited menu) & "Full" (all parameters are accessible)

**Access Code: (default: no code)**

Once the above options have been set as required, Press "BACK" and "SELECT" ("▼" and "▲") simultaneously until "CODE" is displayed.

Now use the "+" & "-" ("▲" and "▼") to enter a code.

Once a code is entered, access to the options above is not permitted.

To clear the code, re-enter the same code again.

If the code is forgotten. Press and hold "+" & "-" ("▲" and "▼") until "CODE" is displayed while re-applying power to the device.

**Please Note ( for 1 and 2 relay devices ONLY):**

- As a power saving feature, the display dims if settings are not being made.
- Even though the device seems to operate correctly, the relay(s) will not energise if the input voltage is below the operating voltage.

**12 Month guarantee:**

Our product is guaranteed for a 12 (twelve) month period from date of purchase. This guarantee is valid for defects arising from failure during specified conditions. This guarantee does not cover damage due to abuse, tampering or improper installation. Our company does not accept liability for any consequential damage or loss arising from product malfunction. Should this product prove to be defective, kindly return for inspection or repair.

**Relay specifications:**

Contact rating: 10A 250 VAC 2500VA

Mechanical life: 30 million operations

Electrical life: 250 000 operations (at maximum load)

