

## MTC-100 - Four Channel Temperature Controller

### Operation Notes

#### **1. Software.**

The following operation notes apply for software 35054.

#### **2. Safety.**

The MTC-100 contains high voltages. Always completely isolate the MTC-100 before removing the rear cover or before changing any connections.

#### **3. Normal Display Operation.**

During normal operation the measured temperature for each thermocouple is displayed in degrees centigrade. The left hand digit flashes on and off and indicates which thermocouple channel is being displayed (1 to 4). The "STEP" push-button is used to move from one channel to the next.

The right hand LED indicator (just above the "PROG" push-button) is illuminated when the channel output relay is energised. During normal operation this is periodically switched on and off with a changing mark/space ratio to vary the amount of power applied to the heater.

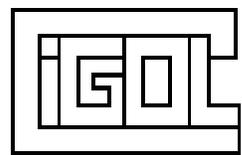
#### **4. Set Point Programming.**

Pressing the "PROG" button causes the left hand LED indicator to start flashing, and the 'Program' mode to be entered.

The display now indicates the control set point for the selected channel. The "STEP" button is used to change from one channel to the next. The "UP" and "DOWN" buttons may be used to change the value of the set point.

Programming a set point value of zero disables the channel. This causes the output relay to be turned off and the thermocouple open circuit monitoring to be disabled. A disabled channel displays three single horizontal dashes in the normal display mode.

Any changes made to the set point value are immediately active, but the actual values are only stored in the non-volatile internal memory when the operator returns to the normal display mode. This is achieved by a second press of the "PROG" button.



The MTC-100 automatically reverts back to displaying the measured temperature (updating the set point stores with the last programmed values) if no button is pressed for a period of two minutes. This prevents the operator accidentally leaving the MTC-100 in the 'program' mode.

## **5. Open Circuit Thermocouple Detection.**

If a thermocouple is detected as going open circuit the open circuit channel is automatically selected and the display is changed to a series of three rows of horizontal bars.

When an open circuit thermocouple is detected the output relay is turned off, and the fault relay is energised.

## **6. Over Temperature Detection.**

The MTC-100 has built in over temperature detection. This is only active when in the display is showing measured temperatures (ie it is disabled in the 'program' mode). If the measured temperature rises above a pre-set threshold (normally factory set at 20°C above the current set point value) then the displayed temperature starts to flash rapidly, the fault relay is energised and all four heater control relays are de-energised. The temperature display for the offending thermocouple channel continues to flash even when the measured temperature falls below the over temperature threshold.

The over temperature condition is reset by entering the 'program' mode.

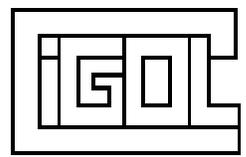
For convenience of operation, under the following conditions the MTC-100 automatically prevents an over temperature trip from latching.

- 6.1 On first application of power, if the measured temperature is found to be above the over temperature threshold.
- 6.2 On leaving the 'program' mode, if the measured temperature is found to be above the over temperature threshold.

Under these conditions the display still flashes rapidly whilst the measured temperature is above the over temperature threshold but the MTC-100 heater relay outputs operate as normal and the fault relay output is not energised. The MTC-100 will automatically re-enable the over temperature monitoring once the measured temperature falls below a reset temperature threshold (normally factory set at 10°C above the current set point value).

## **7. External Connections.**

Connections to the MTC-100 are made using two sets of connectors mounted on the main electronic printed circuit board, which is accessible with the rear cover removed.



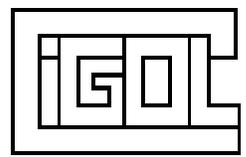
**CAUTION: ISOLATE THE MTC-100 BEFORE REMOVING THE REAR COVER!**

The left hand connectors (Grey "lever locking") are numbered 1 to 8, and are used for the connection of "Type J" thermocouples, as follows:

EC	Label	Connection
1	1-	Negative lead - thermocouple channel 1
2	1+	Positive lead - thermocouple channel 1
3	2-	Negative lead - thermocouple channel 2
4	2+	Positive lead - thermocouple channel 2
5	3-	Negative lead - thermocouple channel 3
6	3+	Positive lead - thermocouple channel 3
7	4-	Negative lead - thermocouple channel 4
8	4+	Positive lead - thermocouple channel 4

The right hand connectors (Orange "pluggable") are numbered 9 to 20, and are used for the 240Vac power connection, and control relay connections. All five relays are fitted with internal 0.022  $\mu$ F/100R contact suppresser circuits. Edge connector assignments are as follows:

EC	Description
9	Output relay signal for channel 1. (Max. rating 1A 240Vac)
10	Output relay signal for channel 2. (Max. rating 1A 240Vac)
11	Output relay signal for channel 3. (Max. rating 1A 240Vac)
12 & 13	Output relay common - this line is connected to the common side of all four output relays.
14	Output relay signal for channel 4. (Max. rating 1A 240Vac)
15	Isolated signal to one side of the 'fault' relay contact. (Max. rating 1A 240Vac)
16	Isolated signal to the other side of the 'fault' relay contact.
17 & 18	Electrical earth. For correct operation this must be connected to a good electrical earth.
19	Neutral - incoming power supply.
20	Live - 240Vac incoming power supply.



## **8. Fusing Arrangements.**

The MTC-100 power supply is fitted with an incoming mains fuse. This is a 3.15A(T) HBC 20mm fuse fitted on the lower board. For continued protection always replace with a fuse of the same value.

The relay contacts are not internally protected. It is the operators responsibility to ensure that the maximum current that can flow is limited to 1A at 240Vac, even in the event of a fault condition arising.

## **9. Mechanical Information.**

The MTC-100 is a panel mounting unit (DIN 43700), of approximate dimensions 145mm X 100mm X 150mm. The recommended panel cut out is 138mm X 92mm.