

μ TC-15
TEMPERATURE CONTROL MODULE
INSTALLATION, OPERATION & MAINTENANCE MANUAL

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***TEMPERATURE CONTROL
MODULE***

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Please read these instructions thoroughly before using this instrument.



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GENERAL OPERATING INSTRUCTIONS

IMPORTANT! Make sure the control module power switch is 'OFF' and the main frame circuit breaker is 'OFF' before inserting or removing control modules.

NORMAL OPERATION:

When the power switch is turned 'ON' the control module will immediately check the zone temperature. If the zone temperature is below 212 degrees F. the "Soft Start" function will automatically be activated. Upon completion of the soft start cycle the control module will automatically switch to the auto control mode. At this time the module will apply the necessary power to bring the process temperature to the setpoint temperature and maintain it there.

The setpoint temperature is normally preset at 400 degrees F. from the factory. You may change the setpoint temperature at any time by pressing the 'UP' or 'DOWN' keys respectively. When the control module is turned on it will always remember the last entered setpoint temperature and return to that setting.

SOFT START:

The soft start cycle applies a reduced output power to the heater at start up. During soft start the output power is gradually increased, however, the zone temperature is limited to 212 degrees F. The soft start cycle time is adjustable from 1 to 20 minutes and is factory set at 5 minutes. The soft start duration may be changed using option 'P05'. The soft start function will not be operational without thermocouple feedback.

GROUND FAULT:

When the soft start cycle terminates, the control module will check the amount of current leaking to ground in the heater circuit. If the leakage is in excess of the value entered the ground fault detection, the soft start cycle will be reactivated. Upon completion of the second soft start cycle the module will check for leakage to ground again. If the leakage is still in excess of the entered value the control module will alarm and 'gFd' will be displayed in the process temperature window. The ground fault detection sensitivity is adjustable from 60 to 180 milliamps and is factory set at 80mA. The ground fault sensitivity may be adjusted or turned off using option 'P08'.

MANUAL OPERATION:

To operate the control module manually push the 'MAN' key. The percentage of output power will be displayed in the setpoint window. Push the 'UP' and 'DOWN' keys respectively to change the output percentage. If thermocouple feedback is available the process temperature will be displayed. If thermocouple feedback is not available the process temperature window will be blank. Alarms will not operate in the manual mode.

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100% POWER KEY:

When the “100% PWR” key is pressed and held the module will put out full power until the key is released or the process temperature reaches the high temperature alarm limit. The audible alarm will sound when this key is held to make sure that it is not done in error. (The “100% PWR” key is disabled during soft start.

OPTIONS

P01 - Select Fahrenheit or Celsius temperature display. Factory set to “F” (Fahrenheit).

P02 - Select audible alarm ‘ON’ or ‘OFF’. Factory set to ‘ON’

P03 - Thermocouple break (Average Power Output). If this option is set to ‘APO’ and the thermocouple input is lost during operation the control module will alarm and indicate that the thermocouple input is open. However, instead of shutting the output power off the module will continue to put out the average amount of power that it had been prior to losing the thermocouple signal. This option is factory set to ‘APO’ but may be turned ‘OFF’ if unwanted.

P04 - Select control method. ‘FZY’ will control the zone temperature by adjusting the amperage to the heater. ‘PID’ will control the temperature by turning the heater on and off proportionately. Typically either method will control as well as the other. However, the ‘PID’ control method must be used when the control module is operating solid state relays. This option is usually preset to ‘FZY’ unless it is known that solid state relays are being used to switch the output power.

P05 - Select soft start time duration. The duration of the soft start cycle is adjustable from 0 to 20 minutes. The time duration is factory set at 5 minutes.

P06 - Low temperature alarm setting, adjustable 5 to 30 degrees below setpoint, preset at 30.

P07 - High temperature alarm settings, adjustable 5 to 30 degrees above setpoint, preset at 30.

P08 - Select ground fault detection sensitivity from 60 to 180mA or ‘OFF’.

P09 - This setting determines the length of time the control module will put out power without seeing a rise in process temperature. The time period is adjustable from 1 to 255 seconds and is preset at 120. If the module does not see a rise in temperature within the specified period of time it will assume that the heater circuit is open or the thermocouple wire is shorted. The error code ‘toH’ will be displayed in the process temp window and the output power will be inhibited.

P10 - This setting determines the length of time that the module will allow an uncontrolled rise in temperature before it shuts down and alarms. This time duration is

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adjustable from 1 to 99 seconds and is preset at 15. If the process temperature continues to rise beyond the setpoint for longer than the specified period of time the module will assume that the main triac is shorted and it will open the secondary triac to shut off the output power. The error code 'tSH' will be displayed in the process temp window. The secondary triac will also open any time the process temperature reaches the high temperature alarm limit.

P11 - Soft start lock. When set to 'ON' this option will prevent the module from being switched to automatic or manual control modes before the soft start cycle has completed. This option is factory set to 'ON'.

P12 - Control panel lockout. When set to 'LOC' this option will disable the front panel controls. This option is factory set to 'UnL' (unlocked). Once you have made your selection you can also lockout the entire options menu.

SECURITY LOCKOUT: Once you have selected your option setting you may lockout the options menu and assign a pin number that must be entered to access the options menu. To lockout the options menu use the following procedures:

1. Turn the control module "OFF".
2. Press and hold the "UP" key while turning the power switch "ON". Continue to hold the "UP" key until "PIN" is displayed in the process temperature window.
3. Using the "UP" and "DOWN" keys select a pin number in the setpoint window between 001 and 254, then press the "SEL OPTS" key to store your pin number.

After your pin number has been stored the module will require this pin number be entered to access the options menu.

To disable the menu lock out use the following procedure:

1. Turn the control module "OFF".
2. Press and hold the "UP" key while turning the power switch back on. Hold the "UP" key until "PIN" is displayed in the process temperature window.
3. Using the "DOWN" key enter 000 in the setpoint window and press the "SEL OPTS" key. You will now be able to access the options menu without a pin number.

CHANGING OPTION SETTINGS

To change the settings of any option, press the "SEL OPTS" key until the option number appears in the process temperature window. The current setting of that option will be displayed in the setpoint window. Use the "UP" and "DOWN" keys to change the option setting. To exit the options menu, continue to press the "SEL OPTS" key. The various options will be displayed in numeric order until you reach the end of the options menu. At that time "STR" will be displayed in the process temperature window. This means your settings have been stored and the unit will resume normal operation. It is advisable to make any changes at start up since the module will not control temperature while it is in the options menu.

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OPTION QUICK REFERENCE

OPTION	FUNCTION	DEFAULT SETTING
P01	DISPLAY DEGREES “F” OR “C”	DEGREES “F”
P02	AUDABLE ALARM “ON” OR “OFF”	ALARM “ON”
P03	T/C BREAK – AVERAGE POWER OUT/OFF	ON “APO”
P04	CONTROL METHOD SELECT “PID” OR “FZY”	BY APPLICATION
P05	ADJUST SOFT START TIME DURATION	5 MINUTES
P06	LOW TEMPERATURE ALARM SETTING	30 DEGREES “F”
P07	HIGH TEMPEARTURE ALARM SETTING	30 DEGREES “F”
P08	ADJUST GROUND FAULT SENSITIVITY	80 MILLIAMPS
P09	SET TIME DELAY TO SENSE OPEN HEATER	120 SECONDS
P10	SET TIME DELAY TO SENSE TRIAC SHORT	15 SECONDS
P11	SOFT START BYPASS LOCK “ON” / “OFF”	LOCK “ON”
P12	SECURITY LOCK OUT / “LOC” OR “UnL”	UNLOCKED “UnL”

ERROR CODE REFERENCE

CODE	DESCRIPTION
gFD	EXECSSIVE CURRENT LEAKAGE TO GROUND IN HEATER CICIRCUIT
toH	THERMOCOUPLE WIRE IS SHORTED OR HEATER CIRCUIT IS OPEN
tSH	MAIN TRIAC IS SHORTED

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TROUBLE SHOOTING

NOTE:

It is assumed that the system has been installed in accordance to the proper instructions, that all wiring is correct and that power to the system is as specified on the controller.

Normally problems have two basic forms:

First, relate to the Controller, Wiring, Heaters or Thermocouples. These problems usually present themselves as abnormal indications on the control module, i.e. absence of or blinking lights & displays and error codes.

Second, revolve around the design and/or manufacturing of the mold, the hot runner system (manifold), or the actual processing conditions. These problems are often difficult to identify and repair.

PROBLEMS:

The module will not turn on:

SOLUTIONS:

1. Check input power.
2. Ensure input power is in proper phase.
3. Check power cord connections.
4. Check that main frame is turned on.
5. Check fuses (Bussman ABC-15), if blown check for wiring short.
6. Swap module with known good module.
7. Return defective module for repairs.

Temperature won't settle on set point:

1. Give module more time to settle on set point.
2. Molding process may have a wide variation in temperature. Check to see if changes in display temperature are in the same cycle as molding process.

Lights dim:

1. Check actual input voltage, should be same as module rating.

Module appears to operate properly, but no power is being applied to the heater:

1. Main frame is not set up for Anti-Arching.
2. Move jumper from pin position #2 & #3 (Enabled) to pin position #1 & #2 (Disabled).

Mold is unusually cold:

1. Allow tool to warm up in Soft Start mode.
2. Check mold thermocouple/heater wiring.

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	<ol style="list-style-type: none">3. Thermocouple/Heater not wired to proper zone.4. Thermocouple/Heater defective.5. Make sure input power voltage is correct.6. Return defective module for repairs.
Temperature above set-point:	<ol style="list-style-type: none">1. Thermocouple shorted or not wired correctly.2. Triac shorted.
Tool overheats:	<ol style="list-style-type: none">1. Is temperature display set to F°.2. Check thermocouple.3. Replace triac.4. Return defective module for repairs.
Open thermocouple:	<ol style="list-style-type: none">1. Check thermocouple & mold wiring.2. Check fuses on Thermocouple input circuit
Reversed thermocouple:	<ol style="list-style-type: none">1. Correct thermocouple mold wiring.
Ground Fault:	<ol style="list-style-type: none">1. Heater/Wiring is wet – if so dry out.2. Replace heater.3. Repair heater wiring.
Module blows fuses:	<ol style="list-style-type: none">1. Make sure heater size does not exceed module rating.2. Make sure this is not the result of a shorted heater or a short in the tool wiring. Do not replace module until problem is corrected as damage may result. <p>NOTE: Blown fuses are not caused by the module, they are caused by an outside factor.</p>
Temperature Oscillation:	<ol style="list-style-type: none">1. This is usually caused by the location, or the thermocouple being too far from the heater it is controlling. Proper procedures dictate that the heater & thermocouple should be within 1/2” of each other.2. Oscillation can also be caused when the melt temperature is significantly above or below the set point.
Temperature too high:	<ol style="list-style-type: none">1. Normally this is caused by heat from adjacent zones.2. The melt temperature of the plastic is

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hotter than the set point for the zone.
3. Thermocouple may not be wired to the same control module as the heater.

No heat indication:

1. Heater is not connected.
2. Heater is too small.
3. Heater is burned out.
4. Heater is too far from thermocouple.

It is also possible something has occurred electrically to upset the microprocessor in the control module. It indicates that there is more interference in the power line to the control system than the filtering in the power supply can accommodate. A random occurrence is not cause for concern. The solution usually is to connect the controller as close to the electrical service supply as possible, and not to the molding machine, where motors, solenoids, etc can cause interference.

OTHER FALSE ALARMS

- You may experience false alarms due to the time settings of certain options. The factory settings may not be the proper setting for your particular zone characteristics.
- Zones that heat slowly may need extended time for open heater and shorted thermocouple detection (**tOh**). Conversely you may want to decrease the time for zones that heat to rapidly.
- If you are in a situation where mold changes are frequent and you do not want to take the time to adjust these settings to the mold characteristics, you can set all of the settings to the highest level or in some cases turn them off. However, this will substantially reduce the control module's many diagnostic benefits and its ability to prevent heater runaway and mold damage.

If an instrument is not functioning properly or needs calibration, we highly recommend that you return it to ITC for service. In most cases your module will not be correctly repaired at other facilities.

Please call us if you need assistance with any problem. Phone: (989) 876-8075

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INTERNATIONAL TEMPERATURE CONTROL, Inc.

This temperature control system incorporates a special "Anti-Arcing" feature

The control modules that were shipped with this unit have a special "Anti-Arcing" circuit that will help to prevent damage to the module and main frame in the event that the module is removed under load. This feature should not be considered a substitute for proper handling procedures, but rather as a supplemental protection device. If you wish to use these control modules in an older main frame, i.e. one that is not set up for this option, the anti-arcing feature must be disabled on the control module. This is very easily done by moving the illustrated jumper from the lower position to the upper position (see below). If this module is installed in a main frame that is not equipped for this feature, no damage will be caused as a result. The module will appear to operate normally, but no power will be put out to the heater.

This main frame will operate with all standard control modules regardless of the availability of this feature.

