µTC-15a
TEMPERATURE CONTROLLER

OPERATING INSTRUCTIONS

Please read these instructions thoroughly before using this instrument.

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

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ELECTRICAL LOCKOUT:

THE ELECTRICAL POWER SOURCE MUST BE LOCKED OUT WHENEVER ANYONE IS WORKING ON THE EQUIPMENT.

Each maintenance person should have a personal padlock, with only one key. When working on any equipment this person should use the padlock to lock out the electrical controls. It is most important that the only available key for the lock be in the pocket of the person who is working on the temperature control equipment. If other persons work on the same equipment, each should use their own different lock at a separate lockout station for the controls of the equipment. Accidental startup of the equipment may have tragic results.

In no case should the removal of, or work be performed on, the temperature control modules or main frames without following proper electrical lockout procedures.

LIFTING APPARATUS:

Temperature control equipment, like any other type of equipment, requires normal periodic maintenance or relocation if the user is to get the most for the investment in the equipment. One of the most flagrant of safety violations is the use of inadequate and unsafe lifting equipment. The temperature control equipment or parts thereof should be assembled, disassembled and moved with lifting facilities that have the capability of gently and slowly lifting and lowering the equipment or various parts.

WHEN USING A CRANE OR FORK LIFT, OPERATE WITHIN ITS RATED CAPACITY, THE SAFE RATED CAPACITY INCLUDES WEIGHT OF HOOKS, BLOCKS, AND ANY OTHER HANDLING DEVICES, SUCH AS CABLES, SLINGS, SPREADER BARS, ETC. CONSIDER THE WEIGHT OF ALL THESE AS PART OF THE LOAD TO BE LIFTED.

WARNING:
When inserting or removing control modules from the main frame, power must be turned off on both the module and main frame. If the module is inserted or removed while under a load, severe damage will result to both the control module and the main frame. Before replacing the module, the main frame must be inspected for damage by a qualified technician. Damage caused to control module and main frame as a result of improper insertion or removal, will not be covered under warranty.

PLANT SAFETY:
The safety procedures mentioned here do not eliminate all safety hazards found in the area of operation. However, they do highlight some procedures that have been found through long experience to improve safety conditions around temperature control systems. International Temperature Control Inc. welcomes inquiries about other suggested safety procedures for use around their equipment.

OUT OF SERVICE:
When the system is out of service, both the control module and main frame must be turned off.

STANDARD OPERATING FEATURES

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 OPERATIONS:

When the power switch on the module is turned on, the control module will look at the existing zone temperature and determine if the **"SOFT START"** cycle is needed. The **"SOFT START"** cycle will be activated any time the zone temperature is below 212° Fahrenheit when the module is turned on. Upon completion of the **"SOFT START"** cycle the module will automatically switch to the automatic mode. At this time the control module will apply the necessary power to bring the process temperature up to the setpoint temperature and maintain it there.

SETTING OPERATING TEMPERATURE:

The setpoint temperature is normally preset at 400° Fahrenheit at the factory. You can change the setpoint temperature at any time by pressing the **"UP"** or **"DOWN"** keys. The module will remember the last entered setpoint temperature after being shut off until later use.

SOFT START:

The **"SOFT START"** cycle applies a reduced output power to the heater at start up. The module only activates **"SOFT START"** if the initial process temperature at start up is below 212° F. The output power is gradually increased while the zone temperature is kept below 212° F. The "SOFT START" cycle time is factory set at 5 minutes.

MANUAL OPERATION:

To operate this control module manually, push the **"MAN"** key. The percentage of output power will be displayed in the setpoint window. Push the **"UP"** or **"DOWN"** keys to change the output percentage. If thermocouple feedback is not available the process temperature window will be blank**.** ***NOTE:*** *Alarms will not operate in the manual mode.*

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 limit. The audible alarm will sound when this key is held to make sure that it is not done in error. ***NOTE:*** *The* ***"100% PWR"*** *key is disabled during the* ***"SOFT START"*** *cycle.*

HIGH AMPERAGE INDICATION:

To help protect valuable molds and other related equipment, a safety device will alarm if a heater is drawing current above its rated capacity. Set the amperage in **OPTION "HiA"** to a value just above the heaters maximum current draw. The module will trigger an alarm and disable power to the heater if current exceeds the set value. Utilizing this feature can save time and expense by calling attention to a problem before damage occurs.

HIGH AND LOW TEMPERATURE ALARM:

The high & low temperature alarms have been factory set at 30° F. If the zone temperature drops 30° below the setpoint or if the temperature exceeds 30° above the setpoint, the alarm will be activated.

SHORTED TRIAC PROTECTION:

Within the circuitry are relays which disable power to the heater if the event the main triac is shorted. In a situation when power to the heater is detected when the temperature is well above the setpoint, the module will disable power to the heater. A **"tSH"** error code will then be displayed so damage to the mold or heater can be averted.

OPEN TRIAC/OPEN HEATER;

The module will alert the operator in the event of an open triac or heater, by displaying a **"toH"** error message in the upper window. This condition is detected if the heater fails to maintain or rise to setpoint temperature and there is an absence of current flowing to the heater. The time frame of this feature can be adjusted in the **"OPTION "tOH"**.

OPEN THERMOCOUPLE PROTECTION:

In the event a thermocouple fails in the open condition after reaching setpoint temperature, the module will automatically control temperature with stored Average Power Output information. This feature only operates at setpoint temperature.

REVERSED THERMOCOUPLE PROTECTION;

The module will scrutinize actual voltage through the thermocouple. In the event a negative voltage is detected, the **"REV"** led will flash and power will not be applied to the heater.

SHORTED THERMOCOUPLE INDICATION;

In the event a thermocouple fails to detect a rise in temperature while power is being applied to the heater, the module will activate an alarm. The **"OPEN"** and **"REV"** LED's will flash alternately.

SELECT OPTIONS

SELECT OPTIONS OPERATING PROCEDURE:

1. To enter the **SELECT OPTIONS** menu, press the **"SEL OPTS"** key until the option code appears in the process temperature (upper) window. As you scroll through the options menu, the current setting of each option will be displayed in the setpoint (lower) window.
2. To scroll through the options menu, continue to press the option's key until you get to the option you want to change.
3. To change an option setting, press the **"UP"** or **"DOWN"** keys.
4. To exit the **SELECT OPTIONS** menu, continue to press the **"SEL OPTS"** key until you reach the end of the option's menu. At that time **"Str"** will be displayed in the process temperature (upper) window, which indicates your settings have been stored and the unit will resume normal operations.

CAUTION: While in the Select Options menu, the module will not control temperature. Therefore it is recommended that any changes be made at start up.

SELECT OPTIONS "SEL OPTS":

C-F Celsius or Fahrenheit temperature setting. Factory set to **"F".**

AL Audible Alarm, on or off. Factory set to **"ON"**.

Out Output Power Method. **"FZy"** (fuzzy) or **"PID". "FZY"** will control the zone temperature by adjusting the amperage to the heater, providing a ripple free effect and improving heater life. **"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 module is operating solid state relays. This control method is usually factory set to **"FZy"** unless solid state relays are being used to switch output power.

tOH Open triac/Open heater. Select 0 – 255 seconds. Factory set at 180 seconds.

HiA High Amperage Indication. Select 1 – 16 amps. Factory set at 16 amps. If the module detects a current draw in excess of the set value, it will cut power to the heater and display an **"HiA"** warning. This option allows for setting a current warning level just above the maximum draw of the heater. When the instrument detects a current draw greater than the set value, it will alarm and shut off power to the heater.

bSt ***(optional)*** Global Boost requires modification to both the module and the main frame. This feature allows for the input of a temperature value by which the setpoint can be increased when the Global Boost is activated. Factory set at 30° F. Global Boost has a selectable temperature range of 0° to 100° F.

rSL Ramp Soft Start Lock prevents the Soft Start parameter from being overridden from the front panel. The Soft Start cycle must be completed prior to entering either manual or automatic control mode. Factory set to **"ON"** or select **"OFF"**.

PAd The front panel keys lockout with the exception of **"SEL OPTS"** This lockout prevents accidental changing of temperature settings, etc. Select **"LOC"** or **"uLC"**

ANTI-ARCING FEATURE

This temperature control module is equipped with our innovative **Anti-arcing** feature that will help prevent damage to eh control module and main frame in the event the module is inadvertently removed under load. This feature should not be considered a substitute for proper handling procedures, but rather a supplemental protection mechanism.

If this control module is inserted into a main frame not equipped for **Anti-arcing**, the instrument will not provide power to the heater and the **"toH"** error code will be displayed. If this condition occurs, the **Anti-arcing** jumper can be moved from the #2 & #3 enabled position to the #1 & #2 disabled position. By repositioning the jumper in the Anti-arcing disabled position, the module will function in a main frame not equipped with the **Anti-arcing** feature.

NOTE: This feature only works with ITC's updated TC-2000 main frames
NOTE: The **Anti-arcing** feature will not prevent damage if the jumper is not in the enabled position

NOTE: The **Anti-arcing** feature of this module will not prevent damage if the module is used in a main frame not properly equipped for **Anti-arcing**

ITC main frames manufactured prior to March 2000 were not equipped with the Anti-arcing feature. They can be upgraded with the Anti-arcing feature by installing Contact (#MF-ECC) in position #3 of the Card Edge Connector (#MF-EC). Please consult the factory. *(Refer to the enclosed Anti-arcing sheet for more information.)*

ERROR CODES - Displayed in process temperature (upper) window

- HiA High Amperage overrun. The module detects current greater than the set value in OPTION "HiA" and will disable power to the heater.
- tOH The module triac or the heater circuit is open. The module detects an under temperature condition for a time period longer than the set value in OPTION "tOH" and no current is detected.
- tSH Main triac is shorted. An over temperature condition has occurred and current flow is detected. The module will disable power to the heater.

µTC-15a "SEL OPTS" Parameter Chart

CODE	FUNCTION	SETTINGS
C-F	Temperature Display Mode	°C or (°F)
AL	Audible Alarm	(ON) or OFF
Out	Output Type	(FZy) or Pid
tOH	Open Triac/Open Heater	0 – 255 seconds (180)
HiA	Maximum Current	1.0 – 16.0 Amps (16.0)
bSt	Temperature Boost Increment	0° - 100° F (30°)
rSL	Soft Start Lock	(ON) or OFF
PAd	Front Panel Lock	LOC or (uLC)

** Factory Settings in Parenthesis **

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:	**SOLUTIONS:**
The module will not turn on:	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-arcing. 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. 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:	1. Thermocouple shorted or not wired correctly. 2. Triac shorted.

Tool overheats:	1. Is temperature display set to F°? 2. Check thermocouple. 3. Replace triac. 4. Return defective module for repairs.
Open thermocouple:	1. Check thermocouple & mold wiring. 2. Check fuses on Thermocouple input circuit
Reversed thermocouple:	1. Correct thermocouple mold wiring.
Ground Fault:	1. Heater/Wiring is wet – if so dry out. 2. Replace heater. 3. Repair heater wiring.
Module blows fuses:	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. NOTE: Blown fuses are not caused by the module, they are caused by an outside factor.
Temperature Oscillation:	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:	1. Normally this is caused by heat from adjacent zones. 2. The melt temperature of the plastic is hotter then 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

PRODUCT SPECIFICATIONS;

Voltage	208 to 240 vac, single phase
Current	15 Amps
Frequency	50/60 Hz
Wattage	3,600
Physical configuration	Plugs in for easy interchangeability
Compatibility	Compatible with "G" Series housings
Size	2" Wide, 7" High 7-1/2" Deep
Weight	1-1/2#
DC Power Supply	Internally generated, regulated and compensated
Module Power Usage	Less than 5 watts, excluding load
Setpoint Range	0° to 999° F (537° C)
Control Accuracy	+/- 1° F (0.5° C) depending on total thermal mass
Calibration Accuracy	Better than 0.2% of full range
Thermocouple	Type "J" grounded or ungrounded
External Thermocouple Resistance	High impedance potentiometric input allows long distance T/C wiring
Thermocouple Isolation	Isolated form ground & supply voltages
Output Drive	Internal solid state triac, zero crossing AC pulse
Overload Protection	Fuses on both sides of AC line
Transient Protection	dv/dt and transient pulse suppression
Shorted Triac Heater Protection	Highly sensitivity, fast acting relays cut power to load
Power Line Isolation	Optically and transformer isolation from AC lines. Isolation voltage greater than 2500 volts
Display	Dual LED displays, 3-digit, 7-segment
Manual Mode	Maintains constant output power to within 1% of manual set power. Adjustable from 0 to 100%
Soft Start	Variable stepped voltage, phase fixed
Soft Start Duration	5 minutes
Soft Start Override Temperature	212° F (100° C)
Operational Modes	Soft Start Proceeds Auto Mode. Thermocouple break overrides Soft Start and Auto Mode. Manual Mode overrides thermocouple break, reverse / shorted thermocouple and Auto Mode. Output is disabled during all fault conditions.
Cold Junction Compensation	Automatic, better than 0.02° F/F (0.01° C/C).
Open Thermocouple Protection	Automatically disables power to heater or Average Power Output (APO).
Reversed Thermocouple Protection	Automatically disables power to heater.
Shorted Thermocouple Protection	Automatically disables power to heater.

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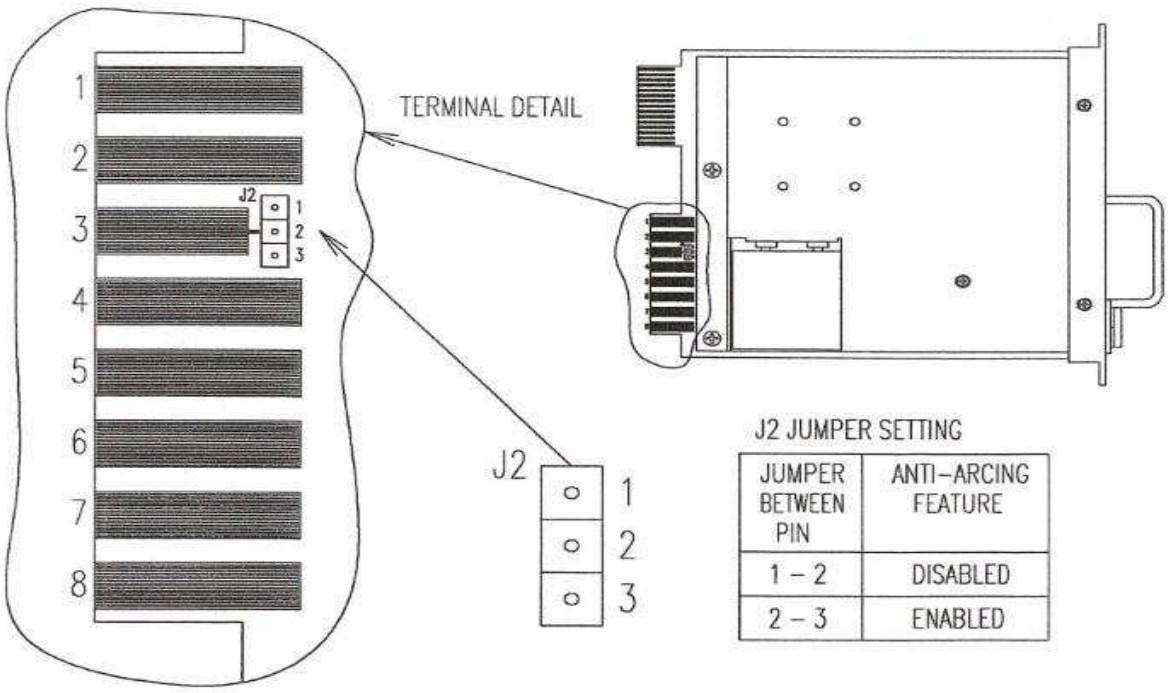
INTERNATIONAL TEMPERATURE CONTROL, Inc.

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

The control modules that were shipped with this unit have a special "Anti-Arching" 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 suplimental 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.



J2 JUMPER SETTING

JUMPER BETWEEN PIN	ANTI-ARCING FEATURE
1 – 2	DISABLED
2 – 3	ENABLED