DME
SmartSeries® TSM1512
USER MANUAL

Microprocessor-Based
Temperature Control Module
with Touch-Screen Color Display

DME
Every step of the way

Safety

DME Company products have been designed to be safe and simple to operate. As with any electronic equipment, you must observe standard safety procedures to protect both yourself and the equipment.

Requirements For Preventing Injuries:

- To avoid electrical shock or fire hazard, do not apply voltage to a terminal that exceeds the range specified for that terminal.
- To avoid mechanical injury, electrical shock or fire hazard, do not operate this product with covers or panels removed.
- To avoid electrical shock or fire hazard, do not operate this product when wet.
- To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.
- To avoid burn hazards, do not operate valve gates with operator gates open. Correct hookup of valve gates should only be performed with all operator guards in place.
- To avoid burn hazards and possible damage to equipment, do not leave hot runner systems at elevated temperature for extended periods of time. When the mold and machine are not operating, disconnect the molding machines injection unit from the hot runner system so that pressure may discharge through the sprue or manifold extension nozzle. Make certain the molding machines purge guard is in place.

To Prevent Product Damage:

- Do not operate this product from a power source that applies more than the voltages specified.

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Warranty

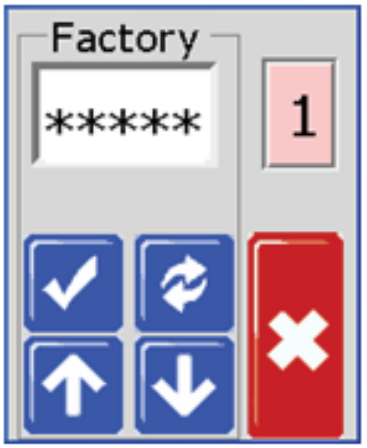
DME Company warrants that this product will be free from defects in materials and workmanship for a period of 90 days from the date of shipment. If any such product proves defective during this warranty period, DME Company, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. DME Company shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than DME Company representatives to repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; or c) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

This warranty excludes replacement of Fuses and Triacs, Calibration, and damage to the product from the use of improper styles of fuses. Use only product recommended replacement fuses.

KEEP THIS SHEET IN A PRIVATE LOCATION

TSM Controllers come with a fixed password which is entered via the two arrow keys.



The Password is…

(up, down, up, up, down)

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Introduction

Specifications

The following are general specifications. The actual controller supplied may differ in specified options.

Supply Voltage	95-265VAC single phase 50Hz/60Hz
Output Overload Protection	15A super-quick acting (FF) fuse on both legs
Power Output	15A/3000W per zone
Ground Fault Detection	20mA per zone
Thermocouple Input	Iron Constantan Fe/Con type 'J', or type 'K'
Control Method	Self tuning PID
Soft-Start with Auto Tune	Unique low voltage method for heater safety
Temperature Scale	Centigrade (Celsius) or Fahrenheit
Operating Range	0 – 472°C or 32 – 882°F
Control Accuracy	+/–1°C
Alarm Output	Available thru optional Communications Mainframe with built-in alarm or using optional TAS module.
Interface	2 inch, full-color LCD touch screen

Safety Instructions

DO NOT pull out a control module or enter the cabinet without first turning off the mainframe circuit breaker –there are unguarded terminals inside the cabinet which may have a dangerous potential across them.

Where a three-phase supply is used this potential may be at 380 volts or higher.

Safety Notices - an explanation

A WARNING symbol and message, shown here, identifies where there may be a hazardous situation which, if not avoided, may result in death or injury to personnel.

Most warnings pertain to electrical aspects and compliance is mandatory to minimize any personal danger.

Installation

Where to use this equipment

DME Hot Runner Temperature Controllers are designed for use in the plastics injection molding industry as temperature controllers for hot runner systems commonly used in mold tools. The controllers must not be used in residential, commercial or light-industrial environments. Furthermore, they must not be used in an explosive atmosphere or where there is a possibility of such an atmosphere developing.

They should be installed in a clean dry environment where the ambient conditions do not exceed the following limits:

* Ambient Temperature 10-50°C.
* Relative Humidity up to 95% (non-condensing)

When in use this controller does not emit audible noise in excess of 10dBA.

Controller — Tool Connections

The various connections to the system using the cables are covered in the SmartSeries® mainframe users manuals.

Controller Power Supplies

The controller mainframe can be manufactured to accept a wide range of supplies and sequence of phases. Refer to the serial plate on the controller mainframe cabinet for confirmation of the supply requirements.

Switching "On" and "Off"

The SmartSeries® Mainframe circuit breaker power switch is found mounted on the front of the Mainframe. It is sufficiently rated to disconnect the total load current during switch On and switch Off, but it is recommended to have the individual controllers set to "off" to prolong this main breaker.

Switching On

When the mainframe and controllers are switched on, all zones go into "Run" mode automatically to start heating the tool.

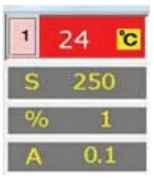
Switching off the whole controller

When you switch the power off all zone settings are memorized. If you have set different zones to slightly different temperatures in order to get optimum performance, then those settings are held and will be the same when you switch power back on.

Switching off individual modules

Each module has its own power switch. Use the rocker switch below the screen to turn the module off and on. The touch screen also has a power off feature – see below.

Switching off individual zones

To switch off any single zone touch, that zone to show the initial menu.	
Touch [⏻] to switch off that zone.	
Touch [**X**] to return to main screen.	
Note that zone now displays "OFF". (Repeat the same steps to switch back on again)	

Controller Modules

The controller is a modular unit that provides real time temperature control.

Each card has three main components:

- Thermocouple input circuits
- CPU
- Multi-voltage output triac

Thermocouple Inputs

The thermocouple input has preset responses for both J and K- type thermocouples. The selection of sensor type can be done in Program Menu; this in turn sets the CPU linearization to match the selected thermocouple type.

Central Processor Unit (CPU)

The CPU provides the following facilities:

- closed and open loop control of the zone,
- processes thermocouple and current readings to show on display,
- checks for alarm conditions, including excess current, incorrect thermocouple wiring, zone over temperature condition, low impedance between heater and ground, and generates alarm information for the display screen and alarm relay,
- controls the output power to the on-board triac using a number of self-tuning algorithms

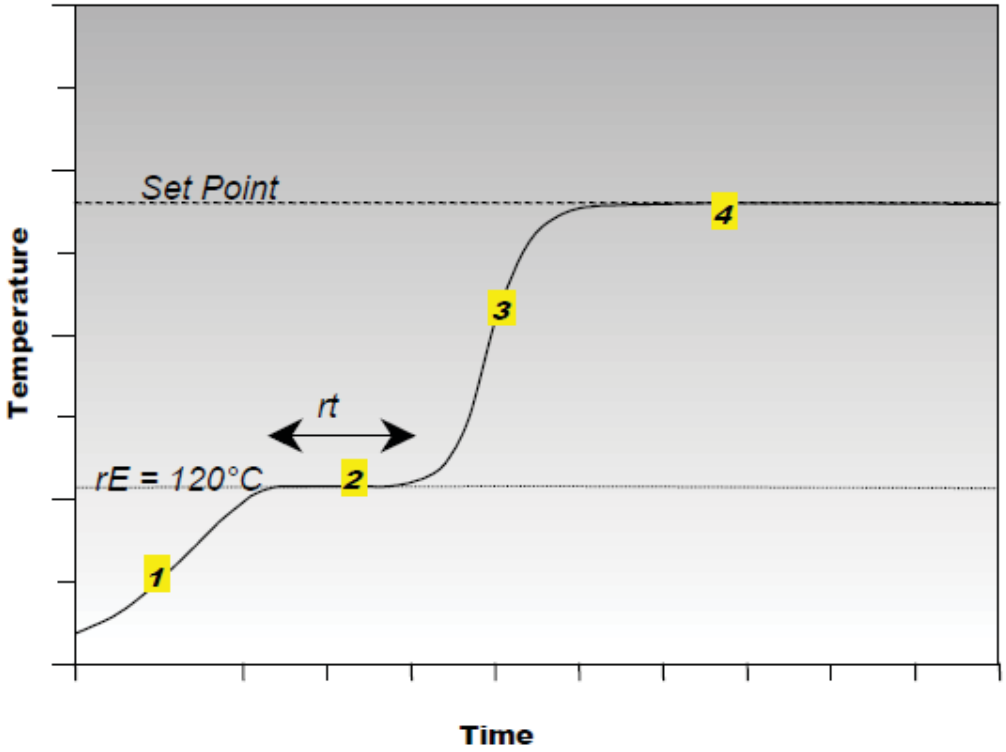
The card requires no analog calibration and is ready for use once set up from the display console.

Output Triac

The controller card has a soldered-in board triac that is capable of controlling heating loads of up to 15 Amps peak.

How the TSM15 Controller Works

DME TSM15 controllers are designed to perform in closed and open loop configurations. However, the normal operating mode is considered to be closed loop. This is illustrated in the following diagram and explained below.



The zone controller slowly ramps up the heater power and simultaneously looks for a positive temperature change at the thermocouple input. The controller verifies the actual rate of rise against a predetermined value in program parameter r1. Power is slowly increased until the correct rate of rise is achieved.

At ramp temperature rE, the dwell time rt is activated (2 minutes). This permits any residual moisture in the heating elements to be eliminated. After all zones achieve ramp temperature, they will continue heating up.

The controller continues to ramp up the temperature to the set point with the speed set in program parameter r2, which should be achieved with minimum over-shoot.

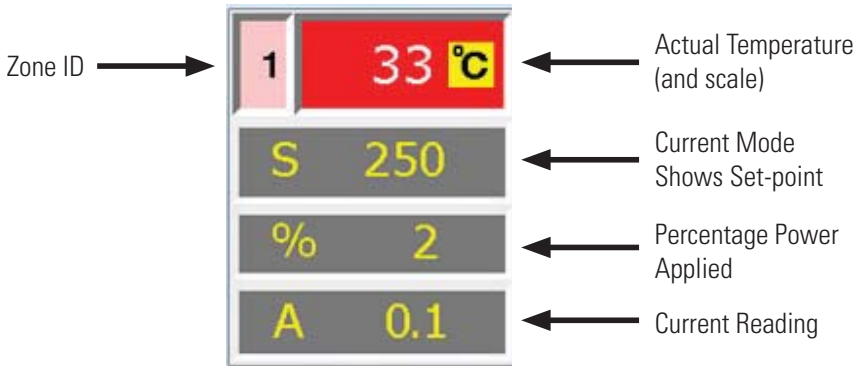
Having built a virtual model to map the tool and heater characteristics, the controller can maintain the temperature at an accurate point with virtually no deviation.

Navigation

This part of the manual introduces you to the controller card's operator display screens.

Main Display Screens

Once the controller card is turned on, it always shows temperature display for the zone along with set temperature, current applied power and percentage power with those various elements shown here.



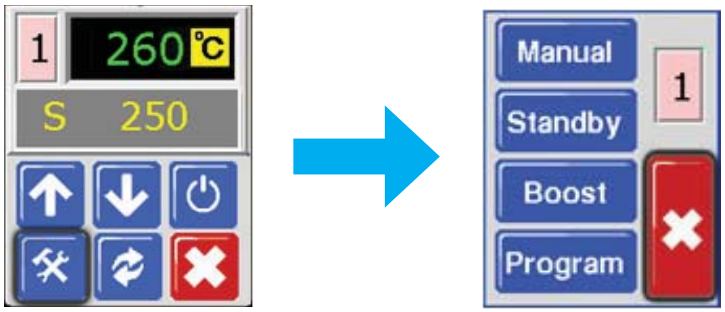
Initial Menu

Press anywhere in Zone area to get an initial menu for the zone – note that the initial menu will always appear at the bottom half of the screen.

In this menu, the buttons are as follows:

- Set the (auto) temperature or (manual) power level up or down by using the [↑] and [↓] buttons.
  Note – keeping your finger on the Up or Down button will allow the setting to roll on – it does not need repeated taps to alter the setting by a larger amount.
- Turn the zone on or off by using the [⏻] button.
- Select more functions by touching the [🛠] button.
- Escape from Manual back into the default Auto mode by touching the [↩] button.
- Leave this menu and return to zone display by touching the [✖] button.

Function Menu



Pressing [🛠] on the initial menu brings you to the Function menu which has three options and a "Program" menu

[**Manual**] puts the selected zone into manual operation.

[**Standby**] decreases that zone temperature by a pre-set amount.

[**Boost**] raises that zone temperature by a pre-set amount. The temperatures remain at this raised level for two minutes then restores to Normal level.

[🔄] To return to **Auto**, touch main screen to display the Function menu

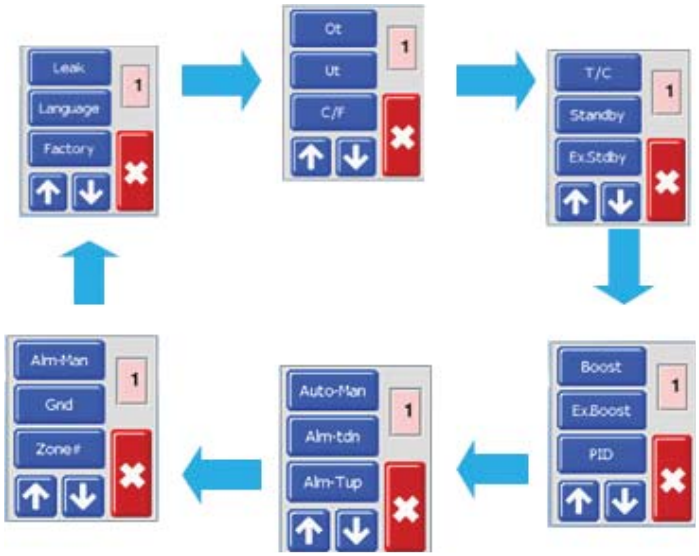
[**Program**] puts the unit into the **Program Menu's** of the controller.

Select [**Program**] from the Function menu to reveal further set-up options. Next, press the [🡅] and [🡇] buttons to cycle through the various options seen in this diagram.

A more complete description of these various parameters is explained later in the Set-up and Running sections of this user manual.

Select [**Program**] from the function menu to reveal further set-up options. After you enter the program menu then [🡅] and [🡇] buttons cycle you through the various options seen in the above diagram.

A more complete description of these various parameters is explained further on in the Setting-up and Running sections of this user-manual.



Setting up your Controller

New TSM15 SmartSeries® controller leaves the factory with their default settings which are as shown in this table.

Description	Default Value	Description	Default Value
Zone Temperature	500 °F (260 °C)	PID -	AUTO
Zone Manual % Power	0	Auto-Man -	On
Ot – Over Temp Range	20 °F (11 °C)	Alm-tdn -	Off
Ut – Under Temp Range	20 °F (11 °C)	Alm-Tup -	Off
C/F – Degs F or C	F	Alm-Man -	Off
T/C – Sensor Type	J	Gnd -	Off
Standby – Standby Offset	180 °F (100 °C)	Zone# -	0
ExStdby – TAS Standby	Disable	Leak -	100
Boost – Boost Offset	36 °F (20 °C)	Language -	English
ExBoost -	Disable	Factory – M.Dis	Not checked

When reconfiguring your controller to a new tool or environment, refer to this chapter of the manual that shows how to alter those default settings to your preferred values and, afterward, to save them.

Should anything seem wrong with your new settings then it is possible to restore the default settings at any time. (see "Restore Default" on page 34).

What is covered in this section

Setting your preferred temperature scale

Matching sensor types (J or K), (must use matching TC type wiring in mainframes, cables, mold terminal boxes and the TC sensor type)

Changing zone PID characteristics

Setting Boost offset level

Setting Standby offset level

Monitoring temperature limits

Setting response to thermocouple failure

Inhibiting users from switching to Manual, Standby or Boost

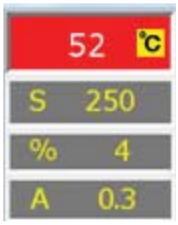
Extending alarms for Manual, Standby or Boost operation

Language

Setting the required temperatures

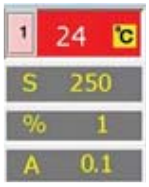
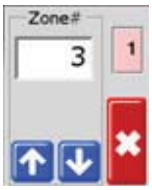
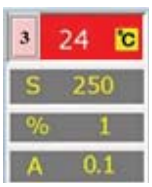
Setting Zone Numbering

The TSM1512 Controller has an option that allows numbering the zones in a logical sequence. The zone number default is blank; but can be set to display 1 to 99.



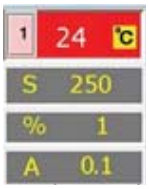
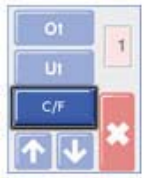
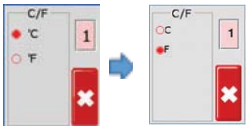
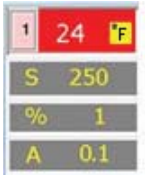
Default Zone # Blank

Zone # 1

To set the zone number, proceed as follows: From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [🡅] or [🡇] to find the Zone# option.	
Touch [**Zone#**] to open the zone numbering option.	
Use [🡅] and/or [🡇] to set the desired zone number. Entering 0 will display a blank zone area; valid numbers are 1 to 99.	
Touch [✖] twice to return to the main display.	

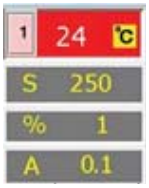
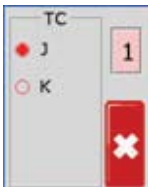
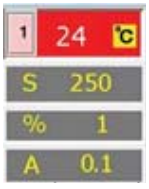
Setting the Temperature Scale

The TSM1512 Controller can show temperature in Fahrenheit or Celsius. Changes in this parameter apply to this controller card.

From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [🡅] or [🡇] to find the C/F option.	
Touch [**C/F**] to open the Temperature Scale option.	
Select either [**C**] or [**F**] to suit the local operating preference.	
Touch [✖] twice to return to the main display.	

Matching Sensor Types

There are two different types of thermocouple sensors; J-type and K-type, which have different characteristics. The sensor type is normally configured to a J-type before leaving the factory and should only be altered in extreme circumstances. Changes in this parameter apply to this controller card, but the entire system must be matched with J or K-type Cables, Mainframes, Mold Terminal Boxes and T/C's in the mold.

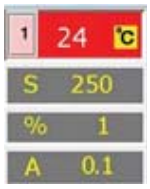
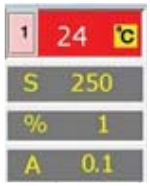
From the Temperature Display Screen, touch either zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [↑] or [↓] to find the T/C option.	
Touch [**T/C**] to open the sensor-type option.	
Select either [**J**] or [**K**] to suit the tool in use. J is the industry standard and factory default.	
Touch [✖] twice to return to the main display.	

Changing zone PID Characteristics

On initial start-up, each controller tests the zone heater characteristic and determines an appropriate PID curve for that zone. Occasionally the controller may not pick an optimum PID setting or it may be preferred to override this setting and change the zone response time.

In this situation, you may select and alter the PID setting for any zone. Generally speaking, a small nozzle works best on a "Fast" setting while a larger manifold uses "Med(ium)" setting and a much larger heating platen uses a "Slow" setting.

Also note that once the controller has run and the PID curve has been selected, then the screen will show which speed was automatically selected by making the outer circle blue. In the example below PID has selected "Fast" and displays a blue circle there.

From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [🡅] or [🡇] to find the PID option.	
Touch [**PID**] to open the PID option.	
Touch [**PID**] and select an alternative timing. **Note:** The BLUE circle around the "Fast" button is the automatic tune value. Note the others are RED outer circles and the selected value is a SOLID circle.	
Touch [✖] twice to return to the main display.	

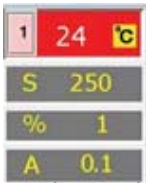
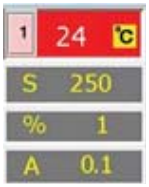
Setting Boost Value

Before you can use the Boost function, you must first configure the Boost value. The Boost setting is an offset value which is added to the Automatic Temperature Control Mode Setpoint for this control zone.

The Boost timer period is 2 minutes and is not configurable.

When "Boost" is activated, the controller will raise the zone temperature by the "Boost" amount. Please note that, on a slow responding manifold, if a high boost temperature is set, the zone may not reach the set boost temperature before the boost time limit expires.

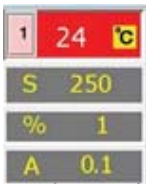
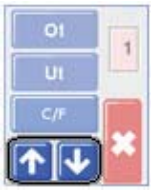
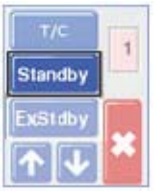
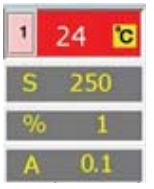
The default or factory "Boost" setting is 36 °F (20 °C). If your controller is set in Celsius at 200ºC, temperature will rise to 220ºC. If your controller is set in Fahrenheit at 400ºF, temperature will boost up to 436ºF.

From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [🡅] or [🡇] to find the Boost option.	
Touch [**Boost**] to open the value setting option.	
Use [🡅] and/or [🡇] to set the desired Boost temperature.	
Touch [✖] twice to return to the main display.	

Setting Standby Value

Before you activate Standby function, you must first configure the Standby temperature value. The Standby settings made here are only for Standby Temperature and are individually set for each zone. When standby is activated, those zones with any standby value configured will reduce their temperature.

The default or factory Standby setting is 100°C or 180°F. If your controller is set in Celsius at 300°C, temperature will lower to 200°C. If your controller is set in Fahrenheit at 580°F, temperature will lower to 400°F.

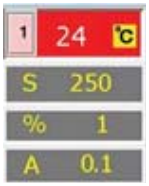
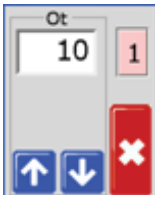
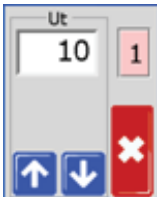
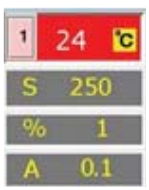
From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [🡅] or [🡇] to find the Standby option.	
Touch the [**Standby**] button to open the value setting option.	
Use [🡅] and/or [🡇] to set the desired Standby Temperature. **Note:** *Hold your finger on 🡅 or 🡇 to raise or lower value by large amounts.*	
Touch [✖] twice to return to the main display.	

Monitoring Temperature Limits

Your controller card monitors the actual temperature of each zone and verifies that the zone is operating within specific limits. Rather than fixed points of temperature, the Ot (Over temperature) and Ut (Under temperature) Limits are set as deviation over or under the set point. If these temperature limits are exceeded, the alarm on the TSM1512 card changes state which interacts with the optional DME TAS Module in a SmartSeries® communications mainframe to trigger an External Alarm Contact to be used by the customer as needed.

Warn and Alarm limits

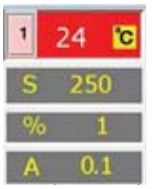
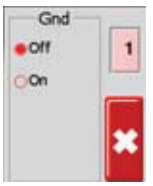
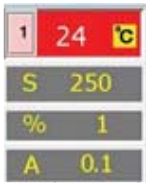
Although there is only one upper and one lower Alarm setting, each gives a visual warning at half way point. If an upper alarm is set to 10° then a Warning will show at 5°. The same holds true for the under temp alarm level.

From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [🡅] or [🡇] to find the Over Temp Limit option. Touch [**Ot**] to open the value setting option.	
Use [🡅] and/or [🡇] to set the desired Over Temperature Limit. **Note:** Hold your finger on 🡅 or 🡇 to raise or lower value by large amounts.	
Touch [✖] to return then [**Ut**] to open the Under Temperature Limit. Use [🡅] and/or [🡇] to set the desired Over Temperature Limit.	
Touch [✖] twice to return to the main display.	

Setting Ground Fault Detection

The default setting is "On"; the controller will start to decrease power if it detects more than a 20mA leakage current. If it detects ground leakage of 40 mA or more then it reduces output to zero.

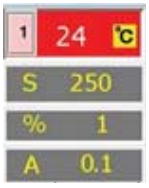
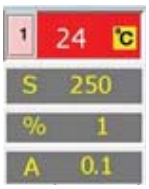
If the option is set to "Off" then the zone will continue to deliver normal power.

From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [🡅] or [🡇] to find the Ground selection	
Touch [**Gnd**] to open the page and set it to On or Off as required.	
Touch [✖] twice to return to the main display.	

Setting Mold Leak Detection

By monitoring average power it may be deduced that any zone that starts to require a higher power level to maintain some temperature may have a fault condition. The most common fault to exhibit this behavior is that of plastic melt leaking away from the nozzle. This in turn requires more power to heat the extra plastic which is possibly leaking somewhere into the mold or runner system.

Leak Detection in the TSM15 is a means of setting a known power level above which the unit triggers an output alarm and gives visual signal if extra power is measured. In this case, the alarm is the common outgoing alarm condition and the visual signal is seen when the power level in the zone window displays **red** rather than normal yellow.

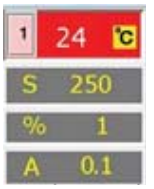
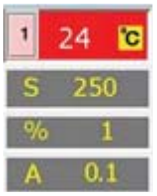
From the Temperature Display Screen, touch either zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [↑] or [↓] to find the Leak option.	
Touch [**Leak**] then touch [↑] and [↓] to set the Leak Detection power level	
Touch [✖] twice to return to the main display	

Setting Response to Thermocouple Failure *(Bumpless Transfer)*

Choose a response for any zone that detects a failed thermocouple.

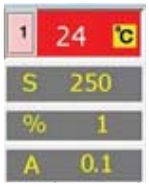
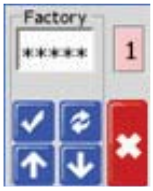
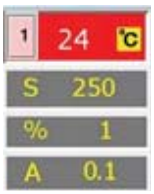
Normal (Auto-Man OFF) – No corrective action taken - the zone power sets down to 0% and it shows a T/C fatal alarm.

Auto-Manual (Auto-Man ON) – The zone has sufficient data after 10 minutes of steady running, to switch to Manual mode at a percent power level that should hold the previous temperature.

From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [🡅] or [🡇] to find the Auto-Man option.	
Touch [**Auto-man**] and set it to On.	
Touch [✖] twice to return to the main display.	

Inhibiting users from switching to Manual, Standby or Boost

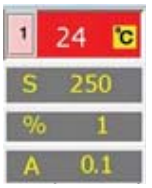
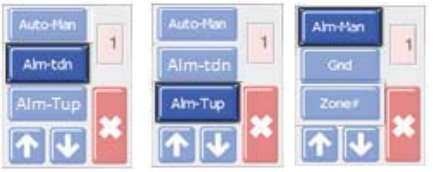
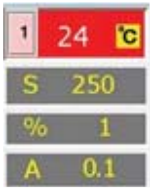
It is possible to stop a user from selecting Manual Control, or Standby or Boost functions. To do this, open the Factory settings page and click the M.Dis (Manual Disabled) box as shown below.

From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [↑] or [↓] to find the [**Factory**] option.	
Enter the password and then touch [✓] to access the next screen.	
Check the M.Dis box.	
Touch [✓] to return to the main display.	
To check this setting touch [🛠] and [**Program**] to see these function buttons grayed out and that they no longer function. To reset, return to the Factory box and uncheck M.Dis.	

Extending Alarms for Manual, Standby or Boost operation

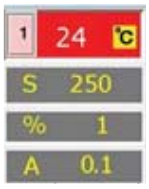
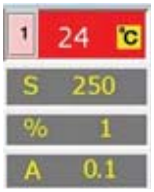
There are currently three extra conditions which may be selected to generate external alarm conditions. These options give an outgoing (closing) signal if the controller is set to Standby (Alm-tdn), Boost (Alm-Tup) or Manual (Alm-Man).

The default condition is "Off" but any, or all, may be changed to "On" in which case activating Manual, Standby or Boost may generate an alarm output. This Alarm signal can use the Optional SmartSeries® Communications Mainframe with a TAS module to trigger an external relay contact for customer use.

From the Temperature Display Screen, touch the zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program menu.	
Touch [🡅] or [🡇] to find Alarm option. Shown is [**Alm-tdn**], but can choose [**Alm-Tup**] or [**Alm-Man**]	
Touch any of the three options [**Alm-tdn**], [**Alm-Tup**] or [**Alm-Man**] to open the page and set it to On.	
Touch [✖] once to return to the Alarm Selection in order to select more Alarm options	
Touch [✖] a second time to return to the main display.	

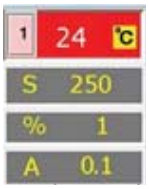
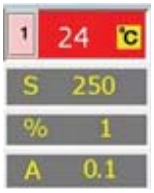
Language

There are five language options available for the TSM1512 controller and selection is as follows.

From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu.	
Touch [🡅] or [🡇] to find the Language option.	
Touch [**Language**] to set the required language.	
Touch [✖] twice to return to the main display.	

Setting the Required Zone Temperatures

Once all the user options have been set then you should set the normal operating temperatures.

From the main display touch the zone whose temperature you wish to set.	
Use [↑] and/or [↓] to adjust the set temperature. **Note:** you do not need to touch just once for each degree change - keeping your finger or stylus on the button will allow the temperature to run up or down until it reaches the desired set point.	
Touch [✖] to return to the main display. Repeat for other zones.	

Running your Controller

'Running your controller' is concerned with everyday use of the controller for normal production use. This is considered as selecting an appropriate run mode for the mold according to whether the tool is working or waiting. It may also be necessary to make changes to the heater temperatures.

What is included in this section

Run Mode

Off Mode

Standby Mode

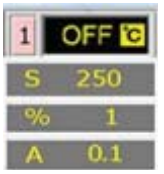
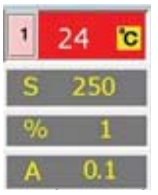
Manual Mode (open loop control)

Standby Mode

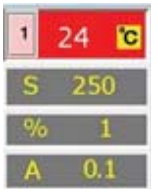
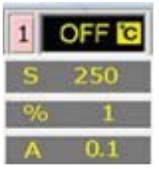
Boost Mode – how to apply a short increase

Changing Set Temperature

Run Mode

Controller here shows the zone turned Off.	
Touch that zone, and then touch [⏻] to Start	
Touch [✖] to return to main screen and see zone is now in Auto-Run mode. Repeat these steps for the other zone if needed.	

Off Mode

Controller here shows the zone turned Normal Run Mode.	
Touch a zone and then touch [⏻] to Stop.	
Touch [✖] to return to main screen and see zone is now in OFF mode. Repeat these steps for the other zone if needed.	

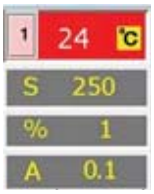
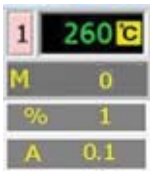
Power Completely Off Mode

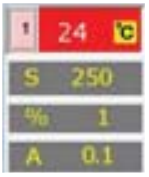
Turn the module power completely off/on by toggling the RED Switch on the lower front of the individual card.	

Manual Mode

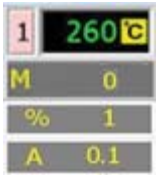
Manual mode (open loop) can be selected as an alternative to running in Auto (closed loop).

If the screen at step three below shows the Manual, Standby and Boost buttons are "grayed out", then this function has been inhibited (see page 23).

From the Temperature Display Screen, touch zone to obtain the initial menu. **Note:** The "S" in front of the 250 indicates Temperature Set point and an "M" indicates Manual % Power Setting.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Manual**] to enter manual mode and go to open-loop working.	
Touch [✖] to return to main display and see that Zone is now running in Manual Mode.	

Return to Auto, touch main screen press , press done 

Manual Mode - Power Level

Touch the Manual zone to obtain the initial menu.	
Touch [🡅] to raise, or [🡇] to lower, the power setting (and hence the temperature). M 0 to 100 adjustment.	

Standby and Boost Mode

There are two options for switching to Standby or Boost mode.

1) You can set each zone individually by using the module touch screens.
2) Alternatively you can switch all zones together by using the OptionalI DME SmartSeries® Communications style mainframe with a TAS module or Built-in Frame Option shown below. See separate TAS and Mainframe User's Manual for more information.

TAS Module Off/Standby/ Normal/Boost

TAS shown in Communications Mainframe

MFTA-205 Mainframe Options with built in Alarm only

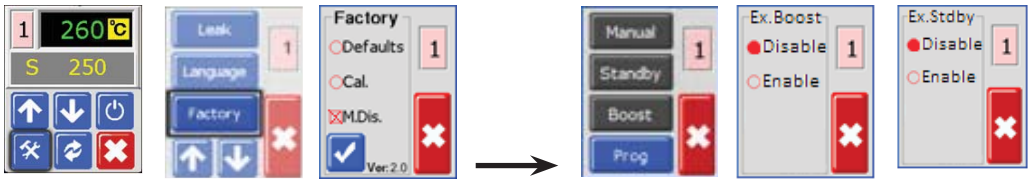
TAS Module Off – whole Mainframe: Switch the TAS Module OFF / IDLE / NORMAL / BOOST selector switch to the OFF Position. All zones are set to OFF and display " S EOFF "

TAS Standby "Ex.Stdby" – whole Mainframe: Switch the TAS Module Off / IDLE / Normal / Boost selector switch to the IDLE Position. All zones are set down by the standby amount and remain at that lower temperature until the switch is restored to the centre off position. The " Ex.Stdby " must be Enabled for this function to work.

TAS Boost "Ex.Boost" – whole Mainframe (TAS Module Only) Switch the TAS Module Off / IDLE / Normal / Boost selector switch to the BOOST Position. All zones are raised by the boost amount for a set period of two minutes even though the switch may be left in Boost position. The " Ex.Boost" must be enabled for this function to work.

DISABLE Manual, Standby, Ex.Stdby, Boost or Ex.Boost option

Note that if the Factory setting has been set to Manual Disable then the TAS IDLE/BOOST selector switch will have no effect on controller temperature. If you suspect it may have been set then touch any zone and then touch [🛠] to obtain the Function menu. If the three buttons have been grayed out, as in this view, then Manual, Standby, Boost and Ex.Boost, Ex.Stdby are not available.



Funct. Menu Factory+PW Check [x] M.Dis. GREY OUT Dis.TAS BOOST Dis.TAS IDLE.

NOTE: Optional TAS OFF → " S EOFF" still works with TAS module and cannot be disabled.

Also, See "Restoring factory settings and recalibration" page 37 for M.Dis. Setting.

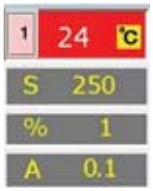
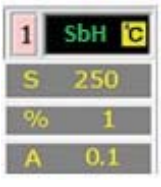
Standby/Boost individual zones

These are described in the following text.

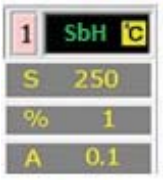
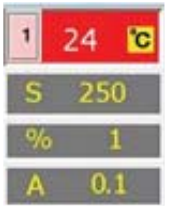
Standby mode – Individual zones

This mode is for when the mold cycles are paused. In this condition, all the zone temperatures can be reduced by the predetermined amount, which helps to prevent degradation on certain materials. To set the Standby Offset, refer to "Setting Standby Value" on page 18. Once standby mode is activated, the zone will reduce the Temperature Setpoint by the standby offset value.

If the screen at step three below shows the Manual, Standby and Boost buttons are "grayed out", then this function has been inhibited (see page 23).

From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu. Touch [**Standby**] to enter Standby mode and reduce zone temperatures.	
The screen reverts to the main display but the standby temperature and confirmation message "SbH" flash alternately in the Actual Temperature window.	

To come out of standby

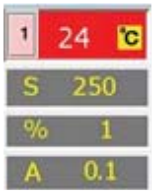
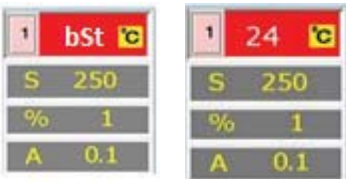
Touch the Standby Zone to obtain the initial menu.	
Touch [[🔄]] to come out of Standby and revert to Auto.	
Touch [✖] to return to main display.	

Boost Mode – Individual zones

This mode provides a means of temporarily boosting the zone temperature for a fixed period of 2 minutes.

The controller zone must first reach setpoint temperature before the boost function will operate.

If the screen at step three below shows the Manual, Standby and Boost buttons are grayed out, then this function has been inhibited (see page 23).

From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu. Touch [**Boost**] to enter boost mode for the fixed 2 minute period.	
The screen reverts to main display but the boosted temperature and confirmation message "bSt" flash alternately in the Actual Temperature window. This may not occur if the controller has not yet reached setpoint temperature.	

Changing Set Temperature (Auto or Manual)

Using the up and down buttons changes temperature setting for both Auto and Manual zones

Increase Setting Touch on the zone to display the initial menu and touch [↑] to raise the temperature. Touch [✖] to revert to main Display.	
Decrease Setting Touch on the zone to display the initial menu and touch [↓] to lower the temperature. Touch [✖] to revert to main Display.	

Maintaining your controller

Servicing and repairing your controller

Always isolate your controller at electrical power source before you open the unit to inspect it or replace fuses.

When it comes to machine maintenance there is very little that you need to do to maintain it.

Replacement parts

DME does not expect that you will need to repair any controller parts at board level, other than fuses. In the unlikely event of any board failures, then DME provides repair and exchange services.

Cleaning and Inspection

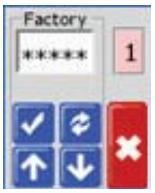
Any excess dust that has entered into the cabinet may be removed with a light brush and vacuum cleaner.

External cables should be checked to see that there is no damage to the flexible conduit, plugs or sockets. If the flexible cables have been pinched, if there is visible damage, or if there are any exposed conductors, then, for your own safety, it must be replaced.

If the equipment is subject to vibration then DME recommends the use of an insulated screwdriver to check that no terminals have loosened.

Restoring Factory Settings and Recalibration

There are two main functions which are available for restoration and recalibration. These are available via the Factory option which is password protected.

From the Temperature Display Screen, touch zone to obtain the initial menu.	
Touch [🛠] to obtain the Function Menu.	
Touch [**Program**] to obtain the Program Menu Touch [↑] or [↓] to find the [**Factory**] option.	
Enter the password and then touch [✓] to access the next screen. (Password located in front of this guide.)	
The Factory screen displays options which are... **Defaults** – restore the unit to default settings **CAL** – enter a calibration check routine **M.Dis** – enable or disable user options These are described below…	

Default settings

These are the settings which would have been applicable when the unit left the factory. They are:

Description	Default Value	Description	Default Value
Zone Temperature	500 °F (260 °C)	PID -	AUTO
Zone Manual Power	0%	Auto-Man -	On
Ot – Over Temp Range	20 °F (11 °C)	Alm-tdn -	Off
Ut – Under Temp Range	20 °F (11 °C)	Alm-Tup -	Off
C/F – Degs F or C	F	Alm-Man -	Off
T/C – Sensor Type	J	Gnd -	Off
Standby – Standby Offset	180 °F (100 °C)	Zone# -	0
ExStdby – TAS Standby	Disable	Leak -	100
Boost – Boost Offset	36 °F (20 °C)	Language -	English
ExBoost -	Disable	Factory – M.Dis	Not checked

Calibration Routine

Before starting calibration of the Thermocouple Input, you need:

a) a Thermocouple simulator capable of providing accurate set points of 20°C and 400°C.

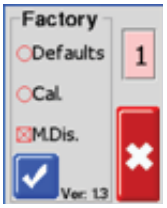
b) a suitable connector plug to connect your simulator to the appropriate zones without any heater zones being connected. If in doubt consult the wiring diagram to check for heater and T/C pin connections.

Calibration sequence

1. Connect the simulator to the normal T/C inputs for both zones on the module being calibrated.
2. Touch [Cal] and [✓] to start the calibration routine.
3. The screen asks for a 20°C source – set the T/C simulator to 20°C.
4. The screen timer counts down as it sets the low range setting.
5. The screen asks for 400°C source – set the T/C simulator to 400°C.
6. The screen timer counts down as it sets the high range setting.
7. The screen indicates that the calibration has completed.
8. Remove the T/C simulator and temporary connector.

M.Dis Option

It is possible to stop a user from selecting Manual Control, or Standby or Boost function. To do so, check the M.Dis (Manual Disabled) box on this screen



Troubleshooting

Individual Card Diagnostics

The control system has several features which provide a diagnosis of faults in the control system, the tool heaters and thermocouple sensors.

If a zone temperature is seen to deviate from the actual setting beyond the alarm limits then the display will change to White text in Red box and generate a remote alarm

The following is a list of alarm conditions that may be detected and which will also activate the output contacts.

0 ERROR MESSAGE	1 CAUSE	2 ACTION
ERR!	Little or no temperature rise has been detected in that zone. When the console starts to apply power it expects to see an equivalent heat rise at the thermocouple. If the Thermocouple has been trapped and pinched elsewhere in the tool or cable then it cannot see the full heat rise that occurs at the tip. If left uncorrected then there is a danger that the zone could overheat and damage the tip. Instead the circuit maintains the output at whatever level it reached when the monitor circuit detected the fault	Check thermocouple wiring, it may be reversed. Heater wiring may be faulty or element may be open circuit.
FUSE	The output fuse for that zone has failed. Please Note: A fuse can only fail due to a fault external to the controller. Identify and rectify the fault before replacing the fuse. **Note:** *The fuse detection circuit requires a continuous low level current through a high impedance bleed resistor to maintain the alarm condition. As a result the load circuit is still connected to the mains voltage supply and it is not safe to attempt to repair or replace the fuse without first isolating the circuit. If the fuse in question is mounted on a control card then it is safe to unplug the board in order to isolate the circuit and replace the fuse on the card.*	Replace the fuse with one of the same rating and type, i.e. High Rupture Current load fuse. The blown fuse is located on the control card.
GND	The system has detected a ground fault.	Check your heater wiring for a low impedance path to the ground.
LINE	No mains supply synchronisation pulses being received. The three-phase supply is used in a cross-over detection circuit to generate timing pulses for accurate phase control and firing the triac. If the phase detection fails on one or two phases then there is no pulse to use to measure phase angle and the LINE error message is generated. Meanwhile, all circuits on the healthy phases will continue to work normally.	There is a phase detection circuit on each TSM15-Series card and a common phase detection circuit on all other controller types. Although a fault in such circuits may cause the LINE error message, such fault is very rarely seen. The most common error is either the absence of one phase or, if a plug has been re-wired incorrectly, a swapped phase and neutral. If a LINE error message occurs then switch off and isolate the controller then check supply wiring for presence of all three phases.
REV	The card has detected an abnormal input at the T/C termination that indicates a shorted or Reversed thermocouple.	If the REV alarm persists then you should switch off the controller and investigate the offending zone.
T/C	An open circuit thermocouple has been detected and no auto-response has been selected in the T/C Open Error column of the Setup page.	For immediate recovery you can change to open loop control. Make a note of the above action so that when the controller is free you can check to see whether the input fuse on the control card has ruptured. If the fuse is good then you may need to check the wiring for faults or even replace the thermocouple.

Other Possible Fault Conditions

Rapid Temperature Fluctuations

The most likely cause of temperature fluctuations is extraneous voltages being picked up by the thermocouple cable, i.e. common mode. This may be due to poor grounding of the tool, a faulty shielded thermocouple wire or, alternatively, a faulty heater. We recommend that all ground connections be tested.

Ground Fault Detection

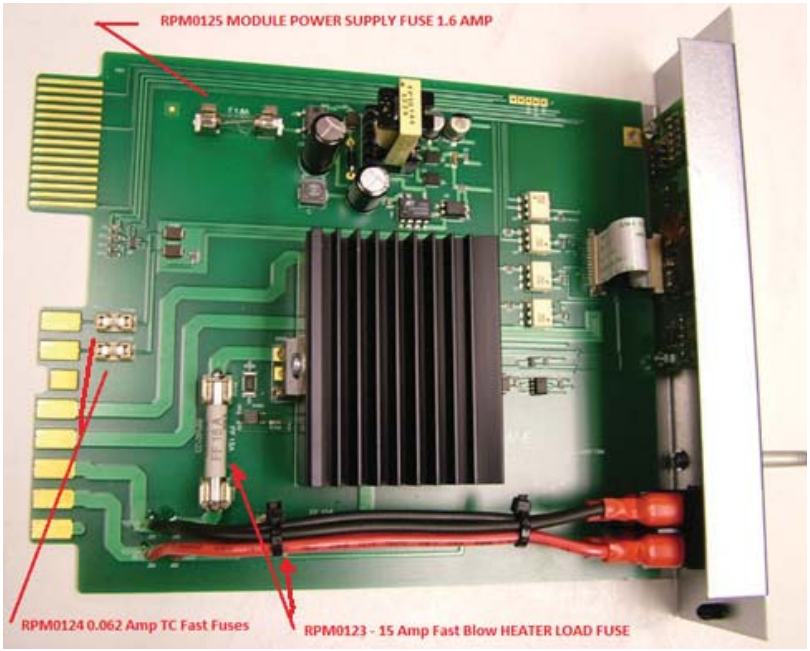
The Ground fault detection detects any fault caused by ground leakage current. Ground faults can be caused if a tool has been idle for some time and moisture has formed inside a heater. It may be possible to identify the heater and repair the faulty zone by using the adjacent heaters to heat it up and dry it out.

Module Removal

To remove a control module from its slot, unscrew the top screw first then pull the black "nylatch retention" knob out until It stops. It is recommended to switch the zone power Red Power Rocker Switch OFF and turn the Mainframe Breaker off before removing the controller zone. There is no need to completely remove the main electrical supply from the mainframe; however, if operational requirements allow, the cabinet may be isolated.

Controller Cards

Each module card has separate protection fuses for its on-board power supply, the T/C input and for the heating load output.



On-board Power Supply - DME RPM0125

The module power supply has a mains-voltage glass fuse located alongside the power supply circuit.

Class	20mm Glass fuse
Rating	T 1.6 A

Output Fuse Type: HRC High Speed DME RPM0123

If the module shows a "FUSE" alarm then the card may be easily removed and the fuse(s) changed. Only use Ceramic Body Fuses on Control Cards, NEVER use glass bodied fuses.

Class	1¼" Ceramic FF Fast blow fuse
Rating	15A

Input Fuse Type: Surface-mount Quick-blow RPM0124

If the module shows a "T/C" alarm then this may indicate that the input fuse has ruptured. The card may be easily removed and the fuse(s) changed.

Part Code	Fits in Surface mount base
Rating	62mA

Power Rocker Switch on Front Panel of Controller RPM0008

NYL-0001 = "NYLATCH" Module Retention Plunger and Grommet (10/PKG) - NOTE: at the bottom front of each module

Installing Module

This module is shipped with a 3MM x 10MM screw that is used to secure the module to a mainframe. (see figure 8)

Never remove or insert modules when mainframe circuit breaker is on.

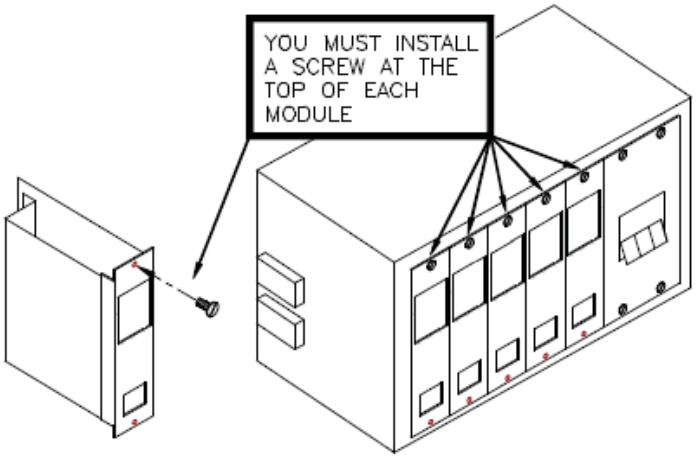


Figure – Top Module Screw Installation

Return Policy

The DME TSM1512 is warranted for 90-days parts and labor, excluding Fuses and Triacs. Contact DME Customer Service for return authorization for repairs, or warranties. Replacement parts are also available through Customer Service.

DME Customer Service

U.S.:	1-800-626-6653
Canada:	1-905-677-6370

Service Center U.S.A.
DME World Headquarters
29111 Stephenson Highway
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NOTES:

This manual is intended for use with software Version 1.0 for the TSM15 SmartSeries® Controller

The DME quality policy is one of continuous improvement and we reserve the right to alter product specifications at any time without notice.

Revision Tracking:

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