

TSM1512 Touch Screen Temperature Control Module



RoHS/WEEE Compliant: Microprocessor-Based Temperature Control Modules

TSM-15-12



The TSM15 Smart Series Module has a color touch screen digital display providing readouts for Actual Temperature, Current Mode, Percentage Power and Current Reading. Closed-loop, fuzzy logic PID control, and auto-tuning of PID parameters provide precise control even under the most adverse processing conditions.

In the event of a thermocouple failure, the TSM can automatically invoke bumpless transfer to a percent power mode based on the last valid percentage learned before the thermocouple failure. If desired, manual bumpless transfer may be selected, in which case a thermocouple fault will turn off power to the heater until the manual percent power mode is activated by the operator.

The TSM boost level option limits boosting of the temperature by 75°C or 135°F to limit the degradation of material.

The TSM module also includes a Smart Start® mode to safely bake out damaging internal heater moisture at system start-up and to prolong heater life. Fast or slow load modes may also be selected to protect smaller heaters or compensate for “slow” loads such as externally heated manifolds. An accurate, durable and full-featured module, the TSM is fully compatible with all Smart Series or G-Series® 15 AMP mainframes.

Leak Detection capabilities (reference TSM1512 User Manual)

TSM15 SmartSeries® Controller with Default Settings (Factory Settings)

Zone temperature	260°C or 500°F
Standby level	100°C or 180°F
Boost level	75°C or 135°F
Over temperature range	10°C or 18°F
Under temperature range	
Ramp	On
Auto-Manual	On
Extended alarms for Manual, Standby and Boost	Off

When reconfiguring your controller for a new tool or environment, this chapter of the manual shows how to alter controller 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.



- ← ① Actual temperature (and scale)
- ← ② Current mode shows set-point
- ← ③ Percentage power applied
- ← ④ Current reading

Front Panel Controls and Indicators



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.

ERROR MESSAGE	CAUSE	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 sense the full heat rise that occurs at the tip. If left uncorrected, 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 main's 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 an ground fault.	Check your heater wiring for a low impedance path to the ground.
LINE	No mains supply synchronization pulses being received. The 3-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, 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, 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.