

DSS™
Smart Series®
DSS-15-11, DSS-15-12
& DSS-30-12



**Microprocessor-Based
Dual Indicating
Temperature Control Module**

User's Manual

D-M-E Company

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Printed in the United States of America

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WARRANTY

D-M-E Company warrants that this product will be free from defects in materials and workmanship for a period of three (3) years from the date of shipment. If any such product proves defective during this warranty period, D-M-E 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. D-M-E Company shall not be obligated to furnish service under this warranty; a) to repair damage resulting from attempts by personnel other than D-M-E 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 (in the 15 amp models) or triac and damage to the module from the use of improper styles of fuses. Use only ABC type replacement fuses. The maximum allowable fuse rating is 15 amps. Lower ratings may be used for improved protection.

SAFETY

D-M-E 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.

To Prevent 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. All unused slots of a main frame must be covered with the appropriately sized blank panels.
- 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.
- A ground connection must be present between the control cabinet and the heaters. D-M-E cables provide this. Custom cables may not.

To Prevent Product Damage:

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

D-M-E[®] Standard Smart Series[®] Dual Indicating Temperature Control Module DSS-15-11, DSS-15-12 & DSS-30-12

GENERAL DESCRIPTION:

The DSS™ is a D-M-E[®] Smart Series[®] dual indicating temperature control module. This microprocessor-based control module is designed to maintain the desired set point temperature even under the most adverse processing variables. The unit incorporates features common to both the SSM and the CSS controls, such as heater bake out, input failure alarms, auto or manual operation, and solid state outputs. Other features include 100% power switch, bumpless transfer, and enhanced noise immunity. The DSS™ module is designed to survive the elements that degrade control performance. Specialized circuitry is used to guard against electrical noise and static discharge. Fuzzy logic is used to prevent set point overshoot on startup and over and undershoots when changing set point.

OPERATION:

Automatic Mode: The microprocessor maintains temperature using a closed loop PID control method. Closed loop means the unit continuously looks at the process temperature to determine whether or not to adjust the power delivered to the heater. With PID control, it anticipates the system characteristics to make accurate adjustments and correct for errors. "Fuzzy logic" is used to minimize overshoots and undershoots of set point.

Auto-tuning: See Figure 1. Auto-tuning PID parameters are automatically initiated after power up, or when the set point is changed by greater than 100°F. Auto tuning begins when the process temperature is at 80% of set point. During auto tuning the heat proportional band is set to 0, and the control goes into the ON/OFF mode at 90% of the established set point. Once the control finishes "learning" the system, it returns to a standard PID control with the heat PID values automatically set as a result of auto tuning.

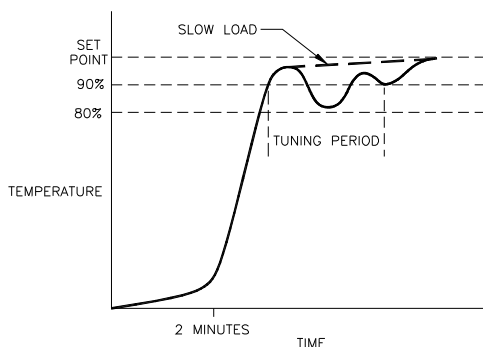


Figure 1 - Auto-tuning

Bumpless Transfer: While in the auto mode and within 5°F of set point, the control periodically calculates and records the average percent power required to keep the process temperature at set point. When the control is switched to manual mode, the last stored percent power becomes the manual set point. The percent power is stored before the fault occurs.

Power-Up: Upon power up, the unit retains the same set point and operation mode as when the unit was turned off. If the unit is turned off while at 100% power, upon power up it returns to the mode and set point retained before switching to 100% power.

Input Fault: Thermocouple break protection, and shorted or reversed thermocouple all override Smart Start[®] and normal modes. Output is inhibited, although bumpless transfer may be used to override, automatically or manually.

Manual Mode: For open thermocouple or other thermocouple failure, open loop-percent power is used. In manual mode, the microprocessor maintains a power level using an open loop power control method. Open loop means the process temperature is not used to determine whether or not adjustments should be made. This enables the user to continue production and override thermocouple wire breaks, short circuits, or lead reversal until the problem has been resolved. Manual mode overrides thermocouple break protection, reversed thermocouple, shorted thermocouple, and any normal modes.

Smart Start[®]: Smart Start[®] is automatic on start-up in the auto mode, and provides a linear ramp to set point for heater bake out. Smart Start[®] is complete when five minutes expires or when set point is reached.

100% Power: When 100% PWR is pressed, the output is full on until the timeout period is complete. The new DSS-1512 uses software programming to set the time period. See page 6 for setup information.

FEATURE/FUNCTION:

Auto Tuning: Fuzzy logic, microprocessor-based PID control.

Dual Display: Upper display shows process temperature while lower display shows desired set point temperature.

Smart Start[®]: Safely bakes out damaging internal heater moisture.

100% Power Option: Breaks through cavity gate freeze off.

EMI Resistant: Stable/reliable operation.

Auto/Manual: Flexibility in control modes.

Input Fault Indication: Alerts operator to a problem and takes corrective action.

Bumpless Transfer: Minimizes set point adjustment when switching to manual mode.

Standby Heat: Applies a low temperature set point to heaters to prevent moisture build-up, and material degradation.

Temperature Alarm: Sends a signal to a D-M-E[®] TAS-05-XX module, which produces an audio/visual alarm and provides a relay contact closure.

KEYS AND DISPLAYS:

See Figure 2.

1. **Smart Start® Illuminated:** Indicates Smart Start® is on.
2. **Process Temperature Display:** Shows process temperature and error codes.
3. **Temperature Deviation Indicators:** Displays the magnitude of process temperature deviation from set point.
4. **Set Point Display:** The auto and manual set points are displayed here.
5. **Auto/Manual Switch:** Selects automatic closed loop (temperature set point) or manual (% power) open loop control modes.
6. **Auto Light:** Auto mode is selected.
7. **Manual Light:** Manual mode is selected.
8. **100% Power Switch:** Initiates 100% power output. Time out is software selectable. See page 6 for setup information.
9. **100% Power Light:** Indicates control is in 100% power mode.
10. **Up Arrow:** Increases desired set point value.
11. **Down Arrow:** Decreases desired set point value.
12. **F1/F2 Lights:** Illuminated when fuse has blown. (15 Amp unit only).
13. **Power On/Off Switch.** (Circuit breaker used on DSS-30 unit).

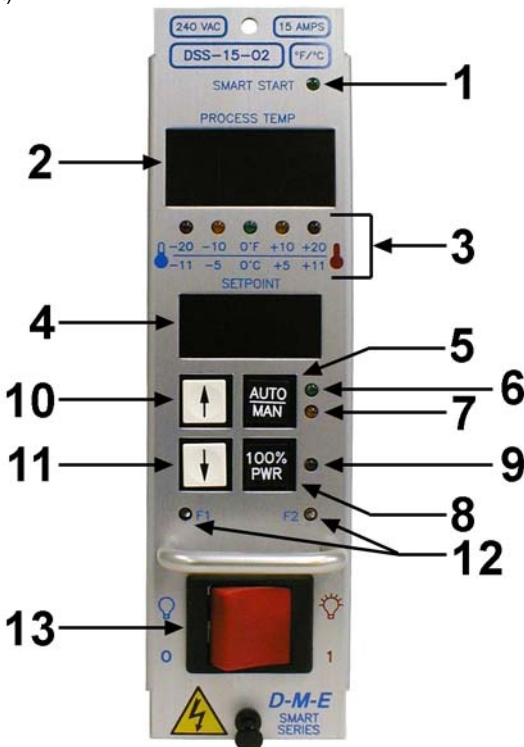


Figure 2 - DSS-15-12 Module

DISPLAYS AND INDICATORS:

Upper Display: The upper display is a three digit, seven segment display showing process temperature and error codes.

With a thermocouple in manual mode, the display reads process temperature. While in the manual mode, without a thermocouple, the display reads oPi (open input). The display range is from ambient to 999°F/537°C. Also see diagnostic section for information on diagnostics that are displayed when

an input fault is present. Upon power up, "deg" will be displayed.

Lower Display: The lower display is a three-digit seven-segment display used to show set point. The manual, auto, and 100% power modes are shown here. The AUTO/MAN key selects between automatic and manual operation, while the 100% PWR key selects 100% power mode. "F" or "C" will be displayed on power up.

LED Indicators:

SMART START® - During Smart Start® the green LED is on.

Deviation LED's:

Green indicates a temperature deviation from setpoint of less than +/-10°F/5°C.

Yellow indicates a temperature deviation from setpoint of greater than or equal to +/-10°F/5°C and less than +/-20°F/11°C.

Red indicates a temperature deviation from setpoint of greater than or equal to +/-20°F/11°C and less than +/-30°F/17°C.

Flashing red indicates a temperature deviation from setpoint of greater than or equal to +/-30°F/17°C.

AUTO - The green LED adjacent to the AUTO key is on while in the automatic mode.

MAN - The yellow LED adjacent to the MAN key is on while in the manual mode.

100% PWR - The red LED next to the 100% PWR key flashes while in 100% power mode. All other LED's are off in this mode.

F1 and F2 - The orange neon light turns on when its corresponding fuse clears. (DSS-15 only).

Keys:

See Figure 3.

AUTO/MAN: The Auto/Man key provides either automatic or manual percent power control. Adjust the temperature set point while in the Auto mode. The illuminated green LED indicates the Auto mode. Adjust the percent power while in the manual mode. The illuminated yellow LED indicates manual mode. This key is also used to select bumpless transfer mode on power up.

UP/DOWN ARROWS: Adjust the auto or manual set point via the up/down arrow keys. The new set point is automatically entered 1 second after the last key is pressed. The up arrow key is also used to select degrees F or C operation on power up. The down arrow key is also used to select load type (fast or slow) on power up.



Figure 3 - Keys

100% PWR: When the 100% PWR key is pressed, 100% power is applied to the load for a time period determined by software. See page 6 for setup information. Press any key to disable, and the control returns to the previous set mode. When in 100% power, it is indicated by the red LED flashing next to the 100% PWR key, and "100" flashing in the lower display.

CONTROLS AND INDICATORS:

Auto/Manual Selection: Push-button switch with LED indicators adjacent to switch.

Set Point Adjustment: Push-button up & down arrow keys.

100% Power Selection: Push-button switch with LED indicator adjacent. See page 6 for setup information.

Power On/Off: 16 Amp rocker switch. On the DSS-30, a 30 Amp circuit breaker is used. Both are UL, CSA, & VDE approved.

Set Point Display: Three 0.4", seven-segment digit display. Also displays alarm codes and flashing "100" for 100% power operation.

Process Display: Three 0.56", seven-segment digit display..

100% Power Indicator: Red LED adjacent to 100% power key flashes. Setpoint display flashes "100."

Auto Indication: Illuminates green LED adjacent to Auto/Man key.

Manual Indication: Illuminates yellow LED adjacent to Auto/Man key.

Smart Start[®] Indication: Illuminates green LED above the process display.

Shorted T/C Indication: Flashes "Shi" in process display.

Open T/C Indication: Flashes "oPi" in process display.

Reversed T/C Indication: Flashes "bci" in process display.

Temperature Deviation Indicators: Five separate LED's - +/- 20°F/11°C = **Red**, +/-10°F/5°C = **Yellow**, 0°= **Green**

Blown Fuse Indicators: Two orange indicators for Fuse 1 (F1) and Fuse 2 (F2). (Used in 15 Amp unit only).

BUMPLESS TRANSFER:

"Bumpless transfer" is defined as a thermocouple failure causing the module to automatically switch into manual percent power mode, if the module has learned the percent power. To force the module into this mode, press the "AUTO/MAN" key simultaneously while turning the power on. The upper display will show "AUt" and the lower display will show "bPL" for 3 seconds indicating that automatic bumpless transfer mode has been selected. This mode will now be stored in the modules permanent memory. To deactivate the bumpless transfer mode - repeat the power on procedure while pressing the "AUTO/MAN" key. This will cause the module to display, "inh" in the upper display, and "Out" in the lower display, indicating that the output power will be inhibited upon thermocouple failure. The user will have to then place the unit in the manual mode to gain control of the output power.

Once the Auto mode set point is reached, and the controller is placed in the Standby Heat mode, if a T/C failure occurs, the DSS™ will switch to manual percent power mode and continue controlling power. When the DSS™ is released from the Standby Heat mode, the unit will use the last valid percent power it learned prior to entering the Standby Heat mode and it will continue to control power in the Manual percent power mode.

If the module has reached set point in the Auto mode, and the T/C fails, the unit will switch to Manual percent power mode and continue controlling power. If the module is then instructed to switch to the Standby Heat mode, the unit will set power level to 0%, (no output.)

If the module has not reached set point in the Auto mode, and the T/C fails, the unit will switch to Manual percent power mode and continue with the last valid Manual percent power stored before the T/C failure occurred, or the factory setting of 0%. If the unit is now instructed to switch to the Standby Heat mode, the unit will set the power level to 0%, (no output.) If the module is in Standby Heat Mode and the T/C fails, the unit

will switch to Manual mode and will continue controlling power at a learned by temporary percent power, or 0% if a value has not been properly learned while in Standby Heat. Upon release from Standby Heat Mode, the unit will use the last valid percent power it learned prior to entering the Standby Heat Mode and it will continue to control power in the Manual percent power mode.

TEMPERATURE MODE F/C:

To set the temperature mode in degrees F or C, press the up arrow key, (increment key), while simultaneously turning the power on to the unit. The word "dEg" will appear in the upper display, and either " F " or " C " will appear in the lower display. To change the mode, turn the power off for 5 seconds and then turn power back on while pressing the increment key. The display will then indicate which mode the unit is in.



Figure 4 - Temperature Mode

LOAD TYPE SELECTION:

The type of the load is selected by depressing the down arrow key simultaneously while powering the unit on. This will select a fast or a slow load. A fast load is described as a mold temperature rise of no less than 3 degrees F in 60 seconds. A slow load is a change of no less than 3 degrees F in 250 seconds. This feature is provided so that a fast or slow load can be selected allowing the easy detection of shorted thermocouple inputs. For proper protection of heaters and the molding system, a fast response should be selected unless slow temperature rise is expected, as is the case with manifold or barrel heaters.



Figure 5 - Fast Load Selected



Figure 6 - Slow Load Selected

STANDBY HEAT:

When the D-M-E® TAS-05-XX module initiates a Standby Heat signal, any DSS™ module in the auto mode will immediately set the set-point temperature to 200°F/93°C. This function is useful for the continuous application of low power to heaters to prevent moisture build-up and initiate quick start-ups. *

* A communications style main frame is required to support this feature.

ALARM OUTPUT:

When the D-M-E® TAS-05-XX module is installed in the D-M-E® mainframe, this DSS™ output feature will activate the alarm output feature on the TAS-05-XX module. The TAS module will produce an audio alarm and provide a relay contact closure when a temperature alarm occurs. This feature is disabled upon power-up until the process temperature is within 10°F of set-point temperature, or until an error occurs. It is also disabled when changing to or from the Standby heat mode. * Once the set-point temperature is reached, a deviation of +/-30°F will activate the alarm. The process must get within +/-25°F to turn the alarm off (alarm hysteresis = 5°F).

When standby heat is engaged, the alarm is inactive until the process falls to 210°F. When leaving standby heat, the alarm is also inactive until the process is within 10°F of set point. This prevents alarms during ramping.

In the manual mode, the alarm is inactive except for errors. Errors always cause an alarm. If the unit is in output inhibit mode, the alarm occurs during an error and is cleared by placing the unit in the manual mode. If the DSS™ is in auto-bumpless mode, the alarm will stay on even though the unit goes to the manual mode. The user can silence the alarm by pressing and holding the auto/manual key for one second. When errors are corrected and the unit is back in auto mode the alarm is inactive until the process reaches +/-10°F of set point.

JUMPER SETTINGS:

CAUTION: The following description refers to the voltage setting of the module. If not properly set damage to the unit will result and personal injury may result. See figure 7 for a component layout.

To convert from 240VAC to 120VAC

- W10 - Jumper installed
- W9 - Jumper not installed
- W8 - Jumper installed

To convert from 120VAC to 240VAC

- W10 - Jumper not installed

- W9 - Jumper installed
- W8 - Jumper not installed

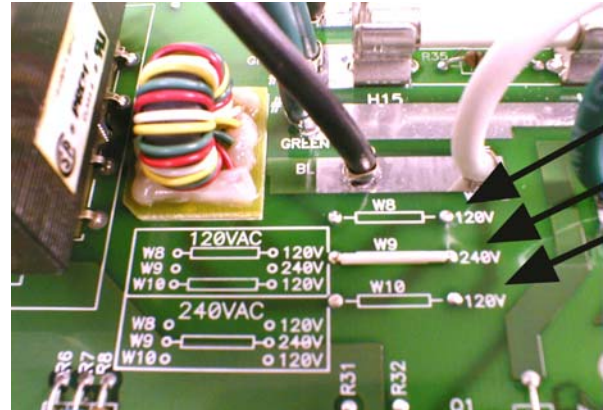


Figure 7 - Voltage Jumper Settings

100% POWER SETTINGS:

100% PWR Timer Settings

Press and hold the 100% power button while turning power on. The module will enter a setup mode where the user can select a time setting of 0, 15 or 30 seconds using the up and down arrows. Once the time has been set, press the 100% power button again to program the setting into memory.

DIAGNOSTICS:

The DSS™ diagnostics automatically alert the user to a fault condition.

Shi: Shorted thermocouple displays flashing **Shi** alternating with the process temperature every 7 seconds.

Troubleshooting - Check for damage to the thermocouple lead wire. Also check for bare, twisted or pinched leads, open load fuse (F1, F2) or excessive distance between the heater and thermocouple or low watt density may also trigger this diagnostic. Slow loads such as externally heated manifolds may trigger this diagnostic when a fast load is selected. See Load Type Selection section on page 5 to select a slow load response. The **Shi** diagnostic latches upon fault. It is necessary to turn the module off and back on to reset the module. If automatic bumpless transfer is invoked, the module will lock into manual until the module is turned off and back on.



Figure 8 - Shi Diagnostic

oPi: Open thermocouple Indicated by **oPi** flashing while in the auto mode (if output is inhibited), or on steady in the manual oPi mode.



Figure 9 - oPi Diagnostic

Troubleshooting - Check the thermocouple connections and wires for broken leads, check for damage to the sensor, or check for open fusible link resistor, R42. See Figure 15

bci: Reversed thermocouple. Displays flashing **bci** while in the auto mode (if output is inhibited), or on steady in the manual bci mode.



Figure 10 - bci Diagnostic

Troubleshooting - Check thermocouple wiring for reversed leads.

Over / Under temperature: The red deviation LED on the left, flashes when the process temperature is below set point by 30°F or more. The red deviation LED on the right flashes when the process is above set point by 30°F or more.

Troubleshooting - Under temperature:

Check for heater failure, open wiring, low voltage, t/c problem, or open load fuse (F1, F2) conditions.

Over temperature:

Check for output failure, shorted triac, heater shorted to ground, shorts to other heater leads, or interaction with other zones of heat.



Figure 11 - Side Panel

CALIBRATION PROCEDURE:

Equipment needed:

1. Type J thermocouple simulator

Test Procedure:

1. Connect the thermocouple simulator to the thermocouple input on the DSS™.
2. Insert a jumper in positions CAL on jumper J1. The inhibit position does not require a jumper.
3. Power the unit on and wait 5 minutes for warm up. The displays will indicate "CAL 0".
4. Set the thermocouple simulator to 32°F and wait five seconds.
5. Press the down arrow key one time. After approximately 10 seconds the displays will indicate "CAL 999".
6. Set the thermocouple simulator to 1000°F and wait five seconds.
7. Press the "AUTO/MAN" key one time. After approximately 10 seconds the displays will indicate "CAL End".
8. Press the 100% Power key one time. The upper display will indicate "999" and the lower display will indicate " 75".
9. Turn power off. Remove the CAL jumper on J1 and put it on INH. The unit is now calibrated.

RETURN POLICY:

The D-M-E® DSS™ modules are warranted for 3-year parts and labor, excluding fuses and triac.

Contact D-M-E® Customer Service for return authorization for repairs or warranties. Replacement parts are also available through the Customer Service Department.

D-M-E® Customer Service	
West Coast, U.S.	(323) 263-9261
Elsewhere in U.S.	(800) 626-6653
Canada	(905) 677-6370

D-M-E® WORLD HEADQUARTERS

29111 STEPHENSON HIGHWAY
MADISON HEIGHTS, MICHIGAN 48071
TELEX: (248) 398-6174

REPLACEMENT PARTS LIST:

To meet warranty requirements, use only D-M-E® parts.

Replacement Part Number	
Reference	Designator, Description
RPM0091	T1, Transformer 240/120 VAC
DSS0003	U6 Microprocessor (Contains D-M-E® proprietary software)
RPM0022	Q1 Triac Driver, TLP3052
RPM0023	Triac - 40 amp, 600 volt, Q6040P (Note: must apply a thin coat of heatsink compound)
RPM0024	SW1, Power Rocker Switch, 16 Amp, 250 VAC (used on DSS-15)
RPM0027	Handle (used on DSS-15)
RPM0050	R42, Flameproof Fusible link resistor WARNING! DO NOT SUBSTITUTE
ABC15	F1, F2, Fuse , 15 Amp, 250 VAC (used on DSS-15)
RPM0089	F3, Fuse , 200mA, 250V, Sub-miniature

COMMUNICATION CONNECTOR COMPATIBILITY:

The Communication Connector strip in your mainframe communicates to all the other modules in the rack. If the communications connector in your mainframe has pins 3 & 4 missing, you must order a new communication strip from D-M-E® allowing the alarm feature in this module to function properly with the TAS-05-XX module. It will not work without these pins installed.

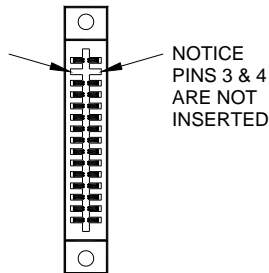


Figure 12 - Connector In Mainframe

TRIAC GATE CUTOFF; POWER CONNECTOR COMPATIBILITY

The modules power output can now be inhibited until the module is fully seated into a mainframe zone connector, if an operator mistakenly inserts the module into the zone slot while under live power.

NOTE: This feature is meant as a safeguard to reduce the possibility, not prevent, damage to the copper fingers on the module. CAUTION: Never remove or insert modules when mainframe circuit breaker is on.

Older main frames do not have a pin in the 3rd position from the top. D-M-E supplies a pin with every DSS module to upgrade existing main frames.

In order for this feature to operate correctly, the zone power connector in the mainframe must have an unterminated pin installed in the third position of the connector. If this pin is missing, it can be ordered through D-M-E® using replacement part RPM0046.

This feature can be disabled on the module by installing jumper J11, Gate Cutoff, located near the modules power connector. See figure 13.

NOTE: If J11 is removed, and the mainframe power connector pin is missing from position 3, the module will be unable to output any power until J11 is replaced.

NOTE: If you are using a non D-M-E® mainframe, or an older D-M-E® mainframe that does not have pin 3 installed, install jumper J11. This will however defeat the anti-arc feature.

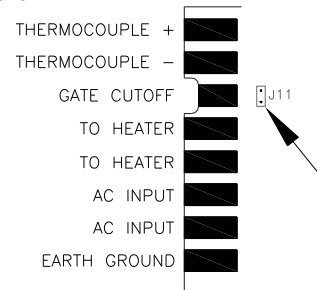


Figure 13 - Gate Cutoff Jumper, J11

EUROPEAN CONFORMITY (CE) REQUIREMENTS

This module is shipped with a 3MM x 10MM screw that is used to secure the module to a mainframe for the purpose of satisfying CE requirements. See figure 14.

When the module is screwed down securely, this module is considered to be CE compliant.

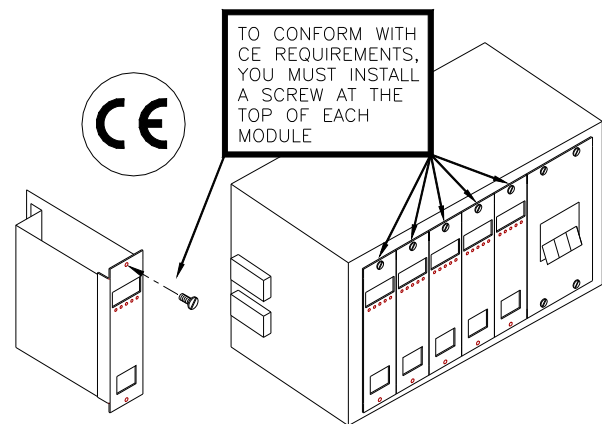


Figure 14 - CE Compliance

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

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PERFORMANCE SPECIFICATIONS:

Auto and Manual Control Modes: High-speed time proportioning Selective Cycle[®].

Temperature Range: Ambient to 999°F/537°C.

Control Accuracy: +/-1°F/0.5°C dependent on the total thermal system.

Temperature Stability: +/-0.5% of full scale over the ambient range of 32° to 120°F / 0° to 50°C.

Calibration Accuracy: Better than 0.2% of full scale.

Power response time: 0.538 seconds.

Manual Control: Adjustable from 0 - 100%, maintains output power within 1% of set point.

Smart Start[®]: Linear voltage ramping.

Maximum Smart Start[®] Duration: 5 minutes.

Smart Start[®] Override Temperature: 256°F/124°C.

100% Power: Applies 100% power to the output. Software selectable zero, 15 or 30 seconds.

Operational Priority -

Smart Start[®] precedes auto mode.

Thermocouple (T/C) break, reversed or shorted T/C overrides Smart Start[®] and auto modes.

Manual control overrides the auto mode, T/C breaks, reversed or shorted thermocouples.

Output is inhibited during all fault conditions, unless bumpless transfer is selected.

INPUT SPECIFICATIONS:

Thermocouple Sensor: Type J, grounded or ungrounded.

External T/C Resistance: Less than 0.1°F/ohm.

T/C Isolation: Isolated by control circuit power supply.

Cold Junction Compensation: Automatic, better than 0.03°F/°F (0.015°C/°C).

T/C Break, Reversed & Shorted Protection: Automatically inhibits power to heater, or invokes bumpless transfer

Input Impedance: 5.6 Megohms.

Input Amplifier Stability: Greater than 0.02°F/°F (0.01°C/°C).

Common Mode Rejection Ratio: Greater than 120 dB.

Power Supply Rejection Ratio: Greater than 110 dB.

OUTPUT SPECIFICATIONS:

Voltage / Power Capability: 240VAC nominal, single phase, (120VAC available).

15 AMP: 3600 watts @240VAC (1800 watts @ 120VAC).

30 AMP: 7200 watts @240VAC (3600 watts @ 120VAC).

Output Drive: Internal solid state triac, triggered by zero AC crossing pulses.

Overload Protection:

15 AMP: Fuses are provided on both sides of AC line.

30 AMP: Fast acting circuit breaker.

Transient Protection: dv/dt and transient pulse suppression included.

Power Line Protection: Optically and transformer isolated from AC lines. Isolation voltage is greater than 2500 volts.

ELECTRICAL POWER SPECIFICATIONS:

Input Voltage: 240/120 +10%/-15%.

Frequency: 50/60 Hz.

DC Power Supply's: Internally generated, regulated, and compensated. Transformer isolated from AC lines.

Module Power Usage: Less than 6 watts, excluding load.

Dimensions:

15 AMP: Width 2.0" (5.08 cm), Height 7.0" (17.78 cm), and Depth 7.5" (19.05 cm).

30 AMP: Width 4.0" (10.16 cm), Height 7.0" (17.78 cm), and Depth 7.5" (19.05 cm).

NOTE: Standard (240 VAC) modules are compatible with main frames wired for either 240 VAC three phase (standard) or 240 VAC single phase. Use DSS-15-11 (15 amp) or DSS-30-11 (30 amp) for 120 VAC operation.

Fuse Requirements: (2) ABC-15 fuses, F1 & F2, Applies to DSS-15-11 and DSS-15-12 only.

(Note: (2) spare fuses included with module)

(1) 200-mA sub-miniature fuse. (F3). See figure 15.

