

Series IMP Hot Runner Controller Operator's Guide



Precautions

Warning



Use of this equipment in a manner not specified by the manufacturer may impair protection provided by the equipment.

In addition to presenting a potential fire hazard, high voltage and high temperature can damage equipment and cause severe injury or death. When installing or using this instrument, follow all instructions carefully and use approved safety controls.

Hazardous potentials exist on components inside the mainframe and controller. Always disconnect AC power to the mainframe when servicing the controllers or the mainframe.

Because these temperature controls or associated equipment may not always fail safe, an approved temperature and/or pressure safety control should be used for safe operation.

The controller power switch must be in the "OFF" position before you put a controller into an energized mainframe, or remove a controller from an energized mainframe. If the mainframe supports the SafeChange™ feature, enable SafeChange on the controller to reduce the possibility of damage to the controller when installing or removing a controller from the mainframe. Controllers are shipped with the SafeChange feature disabled. To determine whether the mainframe supports SafeChange and to enable SafeChange, follow the instructions in the _____.

Turn off power to the controller before cleaning the exterior of the controller. When cleaning the controller, follow the instructions on page iv.

Do not attempt to clean any part of a controller other than the front panel.

If you want to clean the front panel of a single controller, use the power switch on the front of the controller to turn it off, and then remove the controller from the mainframe.

If you want to clean the front panel of several controllers, turn off all controllers in the mainframe and turn off power to the mainframe before cleaning the controllers while they are in the mainframe.

While cleaning a controller's front panel, do not allow alcohol to enter the switch.

Allow controllers and mainframes to dry thoroughly before restoring power. Do not use a heater or compressed air to dry the units.

Failure to observe these precautions can result in exposure to a potentially lethal shock hazard.

Changing switch and jumper settings, and all wiring should be done by an experienced technician. The controller and wiring should be installed in accordance with national and local electrical codes. To avoid serious personal injury and damage to equipment, follow all warnings and cautions provided in the manual supplied with the mainframe.

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G® is a registered trademark of the DME Corporation.

CompuStep® is a registered trademark, and SafeChange™ is a trademark of Athena Controls, Inc.

Caution



If a controller shows signs of having been damaged during shipping, do not power up or install the controller. Save all packing materials and report any damage to the carrier immediately.

When the controller is powered up, the output may be activated. Consider the effects on your process before powering up the controller.

Do not locate this instrument where it may be subjected to excessive shock, vibration, dirt, moisture, oil, or other liquids.

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Specified operating ambient temperature is 32 to 150 °F (0 to 65 °C).



Notes on CE EMC Compliance

This unit is compliant with the following standards when properly installed into a grounded metal housing. EMC testing was conducted with a load of 1 amp and setpoint of 400 °F.

EMC directive (89/336/EEC)
 EN 50081-1 (1992 edition)
 EN 50082-1 (1992 edition)
 Low Voltage Directive (73/23/EEC)
 EN 61010-1 (1992 edition, Amendments 1, 2, 3, 4 and 11)



USE OF THIS EQUIPMENT IN A MANNER NOT SPECIFIED BY THE MANUFACTURER MAY IMPAIR PROTECTION PROVIDED BY THE EQUIPMENT!

UNIT	OUTPUT RATING (AMPS / VOLTS)	FUSE RATING (AMPS)	TYPE
IMP SERIES	15 / 265	15	Fast-Acting 'F'

CLEANING INSTRUCTIONS

- 1) Remove power from the unit prior to any cleaning operation.
- 2) Use a cotton cloth to gently and sparingly apply isopropyl alcohol only. Do not use cleaners or other solvents as they may damage the unit.
- 3) Allow the unit to dry completely prior to reapplying power.



Caution (refer to accompanying documents)



Caution, risk of electrical shock!

For more detailed cleaning instructions, see the next page.

To clean an IMP controller:



1. Read the safety warnings on page ii before you start cleaning a controller.
2. To clean the front panel of a single controller, put the controller power switch in the "OFF" position, and then remove the controller from the energized mainframe by pulling out the plunger on the locking pin (or loosening the locking screw), and pulling on the handle on the front of the controller.

Alternatively, if you plan to clean the front panel of several controllers, put the power switch of every controller in the mainframe in the "OFF" position, and then turn off power to the entire mainframe. After the mainframe has been de-energized, you can clean the controllers while they are in the mainframe.

3. Use a cotton cloth to gently and sparingly apply isopropyl alcohol to the front panel of the controller. Do not use cleaning solutions or other solvents. Use of anything other than isopropyl alcohol can result in damage to the controller.

Do not allow alcohol to enter the power switch on the controller's front panel.

4. Allow the controller to air-dry thoroughly. Do not use a heater or compressed air to dry the unit.
5. Inspect all surfaces to make sure that they are completely dry.
6. When the controller is completely dry, re-install it and return it to service.

1. Introduction

1.1 About This Guide

This manual contains instructions for operating Series IMP Hot Runner controllers.

Instructions for setting up, maintaining, and cleaning the controllers are in the *Series IMP Hot Runner Controller Setup and Operation Manual*.

Instructions for wiring, installing, and troubleshooting the controllers are in the manual supplied with the mainframe.

1.2 About the Controllers

1.2.1 Zones Controlled

Each IMP unit is designed to control one temperature zone.

1.2.2 Modes of Operation

Series IMP controllers can operate in:

- closed loop mode – Output is automatically calculated by controller, based on the difference between the setpoint and the process value.
- manual – You set the output percentage.

Instructions for changing the mode, setpoint, and output percentage are on page 3.

1.2.3 Soft Start for Heater Bake Out

All Series IMP Hot Runner controllers support a soft start feature to extend the life of the heaters and the molds.

The soft start allows slow dissipation of moisture in heaters by gradually applying power to the heaters.

The orange soft start indicator (item 1 in the photo on page 2) is on during soft start in closed loop (auto) mode.

1.2.4 Deviation Alarms

Each Series IMP Hot Runner controller supports deviation alarms. The orange ALARM LED (item 9 in the photo on page 2) lights if the process value;

- falls below the zone setpoint minus the low alarm value (30 °F), or
- rises above the zone setpoint plus the high alarm value (30 °F).

The alarm status indicator remains lit as long as the process value deviates from the setpoint by at least 30 °F.

While a zone is in alarm, **HI** or **LO** is also displayed.

1.2.5 Loop Break Detection

When loop break detection has been enabled during setup, the controller monitors input change.

If the input value does not change within five minutes while the controller is operating in closed loop (auto) mode, the controller goes to manual mode with 0% output, which can then be adjusted. See page 4 for error messages

1.2.6 Sensor Error Monitoring

The controller can detect a reversed sensor or open sensor. See page 4 for error messages.

1.2.7 Current Display

The operator can display the output current (expressed in tenths of an amp). Instructions for displaying the current output are on page 3.

2. Operation

2.1 IMP Front Panel



1 – soft start indicator – lit (orange) when soft start is active; flashes when controller is placed in standby by an external signal

2 – output status indicator – lit (orange) when output is on

3 – unit of measure indicator – lit for degrees Fahrenheit; off for degrees Celsius

4 – process value (PV) display (closed loop mode) or output percent (manual mode); alternates with error message if necessary; operator can choose to display output current (in tenths of an amp)

5 – setpoint decrease buttons

6 – setpoint (SP) display

7 – setpoint increase buttons

8 – up key – increases output percent (manual mode); press and hold for rapid change

9 – alarm indicator – lit (orange) when PV varies from the SP by the deviation alarm value (low or high)

10 – down key – decreases output percent (manual mode); press and hold for rapid change

11 – manual mode indicator – lit for manual mode; off for closed loop (auto) mode

12 – mode key – changes mode; active mode indicated by manual mode indicator (11)

13 – power switch

Power must be off when removing or installing controller. Power switch (at bottom of front panel) is not shown.

2.2 Operation Basics

2.2.1 See PV

To see the process value: Look at the LED display for the PV when the controller is in closed loop (auto mode).

- If a process alarm has been detected, **HI** or **LO** alternates with the PV.
- If an error has been detected, the error message alternates with the PV. Error messages are on page 4.

2.2.2 See if Output is On

To see if the output is on: Look at the Heat indicator above the PV. This orange indicator is on when the output is on.

2.2.3 Monitor for Alarms

To watch for process alarms: Look at the orange ALARM LED.

This LED lights if the process value goes above or below the zone setpoint by the deviation alarm value (30 °F).

The alarm status indicator remains lit as long as the process value deviates from the setpoint by at least 30 °F.

While a zone is in alarm, **HI** or **LO** is also displayed (alternating with PV).

2.2.4 Change Mode

To change the mode: Press MODE.

- When the controller is in manual mode, the Manual LED is lit.
- When the controller is in closed loop (auto) mode, the Manual LED is off.

The Manual LED is item 11 in the photo on page 2.

2.2.5 Change Setpoint

To change the setpoint (closed loop mode): Press + or – buttons (items 5 and 7 in the photo on page 2) until the rotary numbers show the new value you want. The range of valid setpoints is 100 to 999 °F (37 to 537 °C).

2.2.6 Change Output

To change the output (manual mode):

Press the ▲ or ▼ key until the displayed value has been changed to the new value you want. These keys are items 8 and 10 in the photo on page 2.

2.2.7 Standby Mode

To place all IMP controllers in the mainframe in standby mode: use the external switch on the mainframe to set the controllers to standby.

- When the controller is in closed loop mode, the lower of these two values will be used:
 - (1) standby setpoint 250 °F (121 °C), or
 - (2) the most recently configured setpoint.
- When the controller is in manual mode, the standby output percentage will be one-fourth of the output percentage you set most recently using the ▲ and ▼ keys.

While the controller is in standby, the CF (CompuStep soft start) LED flashes. (This LED is item 1 in the photo on page 2.)

2.2.8 Display Current Output

To display the current output: Press and hold the MODE key for more than a second. As long as the MODE key is pressed, the current output will be displayed, alternating with **-R-**. The current is expressed in tenths of an amp. For example, if the output is 8.3 amps, the controller will display **083** (alternating with **-R-**).

2.3 What Happens When You Power Up the Controller

2.3.1 Turn on Controller

Turn on the controller by pressing the "I" end of the 16 A power switch on the front panel. When an IMP controller is powered up, it displays its firmware level. Next, all segments of the display and all LED indicators light. The output remains off.

2.3.2 Put Controller in Closed Loop Mode

To put the controller into closed loop mode: Push the MODE button until the Manual LED is off. What happens next depends on the process value. A soft start may be done; see description below.

To stop the soft start (not recommended): Press the MODE key to take the controller out of closed loop (auto) mode. Press the MODE key again to return the controller to closed loop mode.

2.3.3 Watch Soft Start

A soft start is executed:

- every time the controller starts and the process value is less than 200 °F (93 °C), and
- every time the controller is returned to closed loop (automatic) operation and the PV is less than 200°F (93 °C).

During a soft start the CF LED is lit.

3. Error Messages

3.1 Introduction

Usually the controller displays only the process variable on the LED display

However, when the controller detects a problem with the input, messages are also displayed to alert you to conditions that require your immediate attention.

3.2 Summary of Error Messages

If the controller detects a problem, an error message will alternate with the PV. These messages are summarized below.

	Open Sensor Detected	Loop Break Detected	Reversed Sensor Leads Detected	Out-of-Range Setpoint Detected
error display (alternates with PV)	goes high first briefly (see Note 1 below), then <i>OPn / tC</i>	goes low first (see Note 1 below), then after five minutes <i>Err / LOP / Ht</i>	goes low first (see Note 2 below), then <i>rEa / tC / changing numerical values</i>	 <i>Err / SEt</i>
output	off (0%)	on while low, then off (see Note 1)	on while low, then off (see Note 2)	<i>calculated output based on closest setpoint limit value</i>
alarm LED	on	on	on	off

Note 1: At first, a falsely increasing process value is displayed on the top line; the setpoint remains on display on the lower line, and the output remains on until the process value is greater than the setpoint.

Note 2: At first, *Lb* alternates with display of the decreasing process value on the top line; the setpoint remains on display on the lower line, and the output remains on until the sensor error is detected.