Model 4069P User's Manual

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Another quality product from:

7128 Shady Oak Road, Eden Prairie, MN 55344
Phone: (952) 949-9009 Fax: (952) 949-9559
E-mail: info@researchinc.com
www.researchinc.com

Section **page**

Introduction

General Description

The Model 4069P ProfileIR curing System uses high intensity infrared lamps and polished aluminum reflectors to deliver heat precisely where it is needed for many curing and drying applications on extrusion lines. It can be used effectively to provide a surface cure to rubber extrusions, dry adhesives and coatings on rubber or metal, and provide in process curing between layers of multi layer cable. Depending on the model selected, diameters as small as ¼ inch or a large as 4 inches can be processed. This system includes, along with the Model 4069 ChamberIR heater, an operator interface pedestal with a PanelView 400+ terminal, a split quartz liner, height adjustment with plus/minus 15 degrees of tilt off horizontal, and convenient connection points for power, water and air. Optional features that can be ordered with the unit include an optical pyrometer to monitor product temperature, product motion sensing to shut power down if the line brakes, and an air nozzle kit to provide forced air inside the heating chamber to increase efficiencies in curing and drying.
The single chamber models are an efficient solution for most applications and the dual chamber models provide additional product support to allow fragile product to run through the system without breaking or drooping

Typical applications for the Model 4069P include:

- Surface cure on rubber extrusion
- Drying adhesives and coatings on rubber or metal
- Soften and Cure between multi-layer extrusions
- Cast and hold the shape extrusion
- Flash cure coatings between operations

Standard Features

Heater Module –A circular array of individual parabolic polished aluminum reflectors direct the infrared energy generated by the quartz lamps towards the center axis of the heater. Each heater houses either 12 or 18 reflectors, depending on the model. The 12 reflector model accepts product sizes up to 2 inches in diameter while the 18 reflector model accepts products up to 4 inches in diameter. Heated lengths of 10, 16, 25, and 38 inches (254, 406, 635, and 965 mm) are offered for the Model 4069P. For applications prone to product sagging a dual heater system with two 10” heated length chambers and an intermediate product support between them is available. The chamber’s clamshell design offers easy access for liner cleaning and lamp servicing by simply releasing the latches on the front of the chamber and lifting the upper half. Gas springs are provided to assist with the left gas spring having an integral extension lock. The factory installed ceramic end seal T3 style lamps provide precise levels of power to the product in the chamber. The lamps generate infrared energy at a peak wavelength of 1.2 microns at rated voltage. This wavelength is commonly known as short wavelength or NIR, (Near Infrared). The lamps reach 90% of full operating temperature within three seconds of a cold start. Radiant energy is dissipated to 10% five seconds after power is shut down. Additional lamps can be ordered separately from the heater.

Standard Features

Heater Positioning – The chamber is mounted to lifts at each end allowing for variations on product elevation. Each lift can operate independently allowing for up to 15° off chamber tilt. This can be useful when product sagging is occurring.

Water Cooling – Each reflector is designed with an internal coolant passageway to allow coolant to flow through its entire length during operation. Water lines run from the fittings on the base of the cart to the heater. Adequate cooling water is required during operation of the Model 4069E. Required cooling-water flow rates are listed in Specifications**.**

Air Cooling – A cooling fan is designed into the Model 4069 housing and provides ambient airflow through the heater body. This airflow helps to prevent air-borne contamination from depositing on the reflector surfaces. It also provides cooling to the quartz halogen lamp end seals.

Split Quartz Liner – A split quartz liner is included with the Model 4069 and provides contamination protection for the aluminum reflectors. When installed in the heater, the quartz liner protects the aluminum reflector and lamp from contaminants released in the heating process, resulting in maximum efficiency of the heater.

Operator Interface – The operator interface includes a PanelView 400+ terminal for controlling the system; lift control switches and a fast stop.

Power Control Cabinet – A NEMA 12 cabinet containing components to accurately control power to the system.

Optional Features

Product Motion Detection – An optional low torque roller providing rotational feedback can be positioned at either end of the chamber to signal product stoppage. If no signal is detected the system will shut down power to the chamber thus reducing the incidence of the product burning in the chamber. When motion is restored, the lamp voltage will be re-applied to the previous value.

Air Curing Nozzles – Optional twin air curing nozzles can be attached to the input end of the heater. These nozzles force air down the length of the quartz liner and provide a convective component to the curing process. This option includes a fitting for house air, a filter and regulator in addition to the nozzles.

Exhaust Hood – An optional exhaust hood attaches to the exit end of the single chamber system or between chambers on a dual chamber system to collect smoke and gasses given off during heating the process. 3 inch diameter is used all 12R units and a 4” diameter is used on all 18R units.

Pyrometer – The optional pyrometer is useful for monitoring product temperature in sensitive areas. The mounting bracket provides multiple sensing positions for full product coverage. This option includes a fitting for house air, a filter and regulator in addition to the pyrometer.

Booster Pump – An optional booster pump is available when plant water pressure is too low to provide adequate flow rate for proper cooling of the chamber. Pump will raise the water pressure up-to 50 PSI

Safety

General

The Model 4069P heater is designed for safe operation. Nevertheless, installation, maintenance, and operation of the heater can be dangerous for a careless operator or maintenance person. For your safety and the safety of others, read the instructions in this instruction manual and follow these safety practices to help prevent accident or injury.

INFRARED RADIATION - CAUTION! Continuous exposure to high-intensity infrared radiation at close proximity could be harmful to eyes or skin. Although infrared lamps emit negligible ultra violet electromagnetic radiation, harmful burns can still result if an operator is in close contact with lamps being operated at high intensity.

Because of the brilliant light emitted by infrared lamps at full intensity, it is recommended that eyes be shielded from the glare if observing the lamps for an extended period of time. Use suitable shaded lenses or dark glasses.

Gas Shock

A latching shock is installed on the left side of the model 4069 heater. The latch will prevent the heater from closing should the gas strut fail. When closing the heater pull the knob to release the latch while closing. Failure to release latch can cause damage to the heater if forced closed.

High Temperatures

Parts of the heater may exceed 500°F (260°C). Contact with the lamps, reflector, or metal parts near the lamps may cause severe burns.

WARNING!
NEVER place hands under or in front of the heating elements.
ALWAYS allow heating element to cool at least three minutes before touching the lamps or adjacent parts.

Electrical

There is danger of electrical shock when servicing the heater.

CAUTION! Observe all applicable local and national electrical codes and ensure that a safe electrical ground system is installed before attempting to operate the heater. Refer to the Section 5 for proper installation procedures.

WARNING!
ALWAYS disconnect the external power lines prior to servicing the heater.
ALWAYS disconnect the power lines AND any optional interlock circuits before installing or changing lamps.
NEVER operate the heater with end covers removed.

Specifications

Model Number*	Lamp Lighted Length, Inches (mm)	Lamp Wattage	Lamp Type	Lamp Part Number	Lamp Rated Voltage	Wattage Heater, kW	***Water Flow GPM (LPM)	Pressure Drop Through Heater @ Required Water Flow, psi +/- 5psi	Total Weight, Pounds (kg)
4069P-12R-10L-12kW-480V	10 (254)	1000	QIH240-1000RI2	103390-003	240	12.0	1.2 (4.5)	10	501 (227)
4069P-12R-16L-19kW-480V	16 (406)	1600	QIH240-1600RI2	103390-005	240	19.2	1.8 (6.9)	16	515 (234)
4069P-12R-25L-30kW-480V	25 (635)	2500	QIH480-2500RI2	103390-007	480	30.0	2.8 (10.6)**	31	535 (243)
4069P-12R-38L-46kW-480V	38 (965)	3800	QIH480-3800RI2	103390-010	480	45.6	4.2 (15.9)**	63	564 (256)
4069P-12R-10L-DUAL-18kW-480V	10 (254)	1000	QIH240-1000RI2	103390-003	240	24	2.4 (9)	20	575 (261)
4069P-18R-10L-18kW-480V	10 (254)	1000	QIH240-1000RI2	103390-003	240	18.0	1.7 (6.5)	15	523 (237)
4069P-18R-16L-29kW-480V	16 (406)	1600	QIH240-1600RI2	103390-005	240	28.8	2.7 (10.2)	29	550 (249)
4069P-18R-25L-45kW-480V	25 (635)	2500	QIH480-2500RI2	103390-007	480	45.0	4.2 (15.7)**	61	588 (267)
4069P-18R-38L-68kW-480V	38 (965)	3800	QIH480-3800RI2	103390-010	480	68.4	3.1 (11.9)**	37	639 (290)
4069P-18R-10L-DUAL-36kW-480V	10 (254)	1000	QIH240-1000RI2	103390-003	240	36	3.4 (13)	30	619 (281)

***** Recommended maximum product diameter for 12-reflector models is two inches.
Recommended maximum product diameter for 18-reflector models is four inches.

** Stated flow rates are for each of two flow paths.

*** Maximum inlet water temperature not to exceed 100° F (37°C)

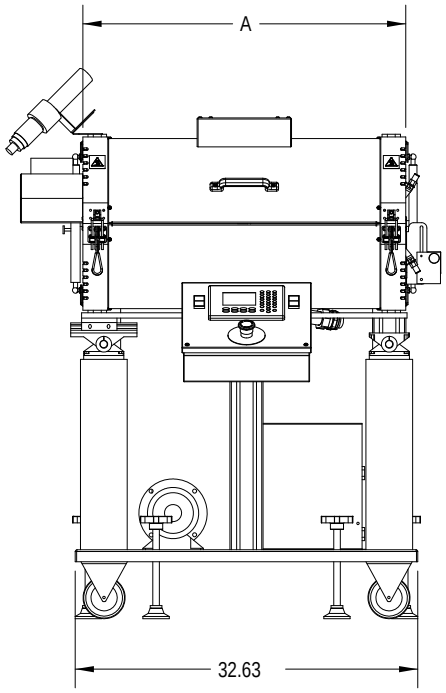
2 Inch Diameter ProfileIR Model 4069P

Single Chamber 2 Inch Diameter Profile				
Model	**4069P-12R-10L**	**4069-12R-16L**	**4069P-12R-25L**	**4069P-12R-38L**
Power Generated	12kW	19.2kW	30kW	45.6kW
Voltage	240 volt 3 phase	240 volt 3 phase	480 volt 3 phase	480 volt 3 phase
Max Current	29 amp	46 amp	36 amp	55 amp
Weight *	501 lb (227 kg)	515 lb (234 kg)	535 (243 kg)	564 lb (256 kg)
Lamp Type	103390-003	103390-005	103390-007	103390-010
Water Flow Requirement	1.2 gpm (4.5 lpm)	1.8 gpm (6.8 lpm)	2.8 gpm (10.6 lpm)	4.2 gpm (15.9 lpm)
Dual Chamber 2 Inch Diameter Profile				
Model	**4069P-12R-10L-Dual**			
Power Generated	25Kw			
Voltage	480 volt 3 phase			
Max Current	30 amp			
Weight *	575 lb (26 kg)			
Lamp Type	103390-003			
Water Type Flow Requirement	2.4 gpm (9 lpm)			

4 Inch Diameter ProfileIR Model 4069P

Single Chamber 4 Inch Diameter Profile				
Model	**4069P-18R-10L**	**4069-18R-16L**	**4069P-18R-25L**	**4069P-18R-38L**
Power Generated	18 kW	28.8kW	45kW	68.4 kW
Voltage	240 volt 3 phase	240 volt 3 phase	480 volt 3 phase	480 volt 3 phase
Max Current	43 amp	69 amp	55 amp	82 amp
Weight *	523 lb (237 kg)	550 lb (267 kg)	588 lb (267 kg)	639 lb (290 kg)
Lamp Type	103390-003	103390-005	103390-007	103390-010
Water Flow Requirement	1.7 gpm (6.4 lpm)	2.7 gpm (10.2 lpm)	4.2 gpm (15.9 lpm)	6.2 gpm (23.4 lpm)
Dual Chamber 4 Inch Diameter Profile				
Model	**4069P-18R-10L-Dual**			
Power Generated	36kW			
Voltage	480 volt 3 phase			
Max Current	43 amp			
Weight *	619 (28 kg)			
Lamp Type	103390-003			
Water Type Flow Requirement	3.4 gpm (12.8 lpm)			

DIMENSIONS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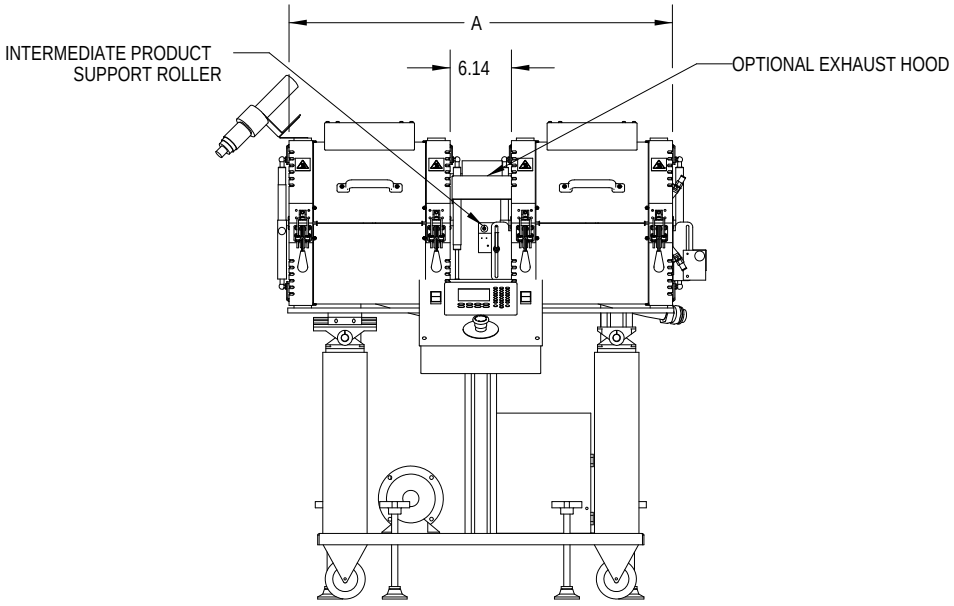
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INTERMEDIATE PRODUCT
SUPPORT ROLLER
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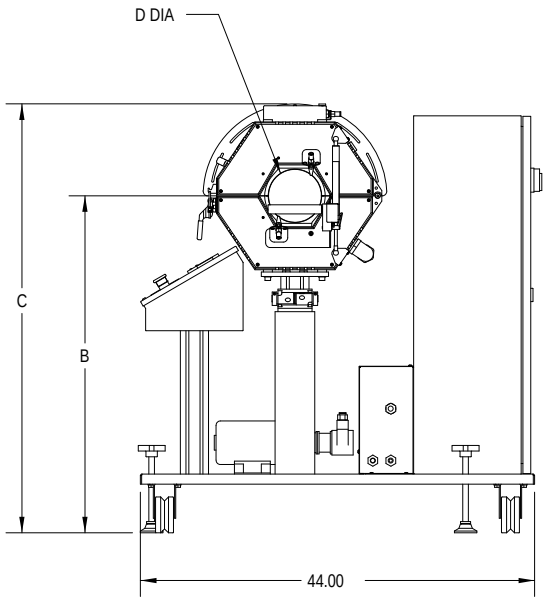
OPTIONAL EXHAUST HOOD

DIMENSIONS



MODEL NUMBER	A	B MIN MAX	C MIN MAX	D DIA
4069P-12R-10L	16.13 (410)	36.75 44.75 (933) (1137)	44.97 52.97 (1142) (1345)	3.22 (82)
4069P-12R-16L	21.75 (552)	36.75 44.75 (933) (1137)	44.97 52.97 (1142) (1345)	3.22 (82)
4069P-12R-25L	30.75 (781)	36.75 44.75 (933) (1137)	44.97 52.97 (1142) (1345)	3.22 (82)
4069P-12R-38L	43.75 (1111)	36.75 44.75 (933) (1137)	44.97 52.97 (1142) (1345)	3.22 (82)
4069P-18R-10L	16.13 (410)	38.00 46.00 (965) (1168)	47.89 55.89 (1216) (1419)	5.90 (150)
4069P-18R-16L	21.75 (552)	38.00 46.00 (965) (1168)	47.89 55.89 (1216) (1419)	5.90 (150)
4069P-18R-25L	30.75 (781)	38.00 46.00 (965) (1168)	47.89 55.89 (1216) (1419)	5.90 (150)
4069P-18R-38L	43.75 (1111)	38.00 46.00 (965) (1168)	47.89 55.89 (1216) (1419)	5.90 (150)
4069P-12R-10L-DUAL	38.39 (975)	36.75 44.75 (933) (1137)	44.97 52.97 (1142) (1345)	3.22 (82)
4069P-18R-10L-DUAL	38.39 (975)	38.00 46.00 (965) (1168)	47.89 55.89 (1216) (1419)	5.90 (150)

IN (MM)

Installation

This section describes how to wire the Model 4069P power control system. The features and options mentioned here are identified in the model number found inside the enclosure.

WIRING

WARNING!
Hazardous voltages are present at the main disconnect switch and load terminals.

Always remove AC line voltage from the system before making contact with internal assemblies, line or load wiring, or fuses. Also remove AC line voltage from the system
before making connections, equipment changes, or resistance measurements.

Conduit entry into the system should be made near the right side of the cabinet for power wiring. Assure that metal fragments are not allowed to fall into the equipment while holes are made for conduit fittings. See Figure 1. Referring to the wiring specification in the table, connect the external power lines to the top of the disconnect switch.

Wire Ratings:

Wire Temperature Rating:	75°C or Higher
Line/Load Wiring Voltage Rating (240 VAC systems)	300 VAC Minimum
Line/Load Wiring Voltage Rating (480 VAC systems)	600 VAC Minimum

Minimum Allowable Wire Sizes:

NOTE:
Ampacity ratings are based on NEC 310-16 using 75℃ copper wire.

Current Rating of System	Line Connections	Ground Connection
30 Amp	10 AWG	10 AWG
60 Amp	6 AWG	8 AWG
90 Amp	3 AWG	8 AWG

Remote Inputs:

Remote Interlock	Dry contact (open to stop)
Fast Stop	Dry contact (open to stop)

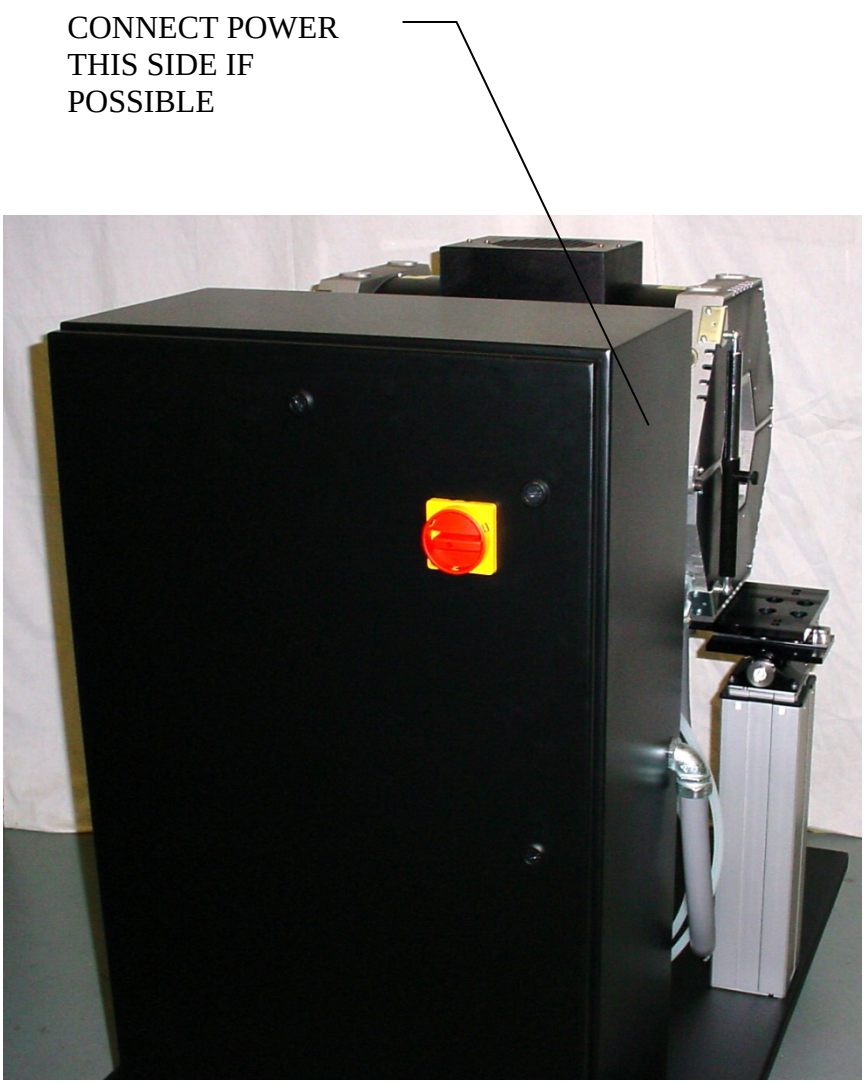


Figure 1.

CONTROL CONNECTIONS

Remote Interlock Switch

This feature provides for remote process interlock of the heater power. This is accomplished by setting the heater power levels to 0 when switch is open and will resume power levels when switch is closed. With the interlock open, the heater cannot be turned on from the control system front panel. The switch contacts (dry) must be open during the heater off condition. If this feature is desired, connect using the following procedure:

1. Remove the factory-installed jumper at terminal block 1TB pins 20 and 21.

2. Connect the contacts of the switch to terminal block 1TB pins 20 and 21.

If more than one interlock switch is used in a system, wire the contacts in series and then connect to the system.

Remote Fast Stop

This feature provides for remote process fast stop shutdown of the heater power, water and fan cooling. This is accomplished by opening the heater power controller contactor. With the fast stop switch open, the heater cannot be turned on from the control system front panel. The switch contacts (dry) must be open during the heater off condition. If this feature is desired, connect using the following procedure:

3. Remove the factory-installed jumper at terminal block 1TB pins 22 and 23.

4. Connect the contacts of the switch to terminal block 1TB pins 22 and 23.

If more than remote fast stop switch is used in a system, wire the contacts in series and then connect to the system.

Water Connections

Use male 3/8” NPT fittings to connect the water input and output ports. See Specifications for required flow rates.

Air Connections

Use a male 3/8” NPT fitting for the air input connection when the optional Air Curing Nozzles and/or Pyrometer have been ordered.

Figure 3

Operation

Main Disconnect Switch

The main disconnect switch turns on and off the power control system. Note the following:

Before turning on the disconnect switch, check the following:

1. The load is wired and ready for power to be applied to it.

2. All safety precautions are observed.

OPERATOR

CONTROL PANEL

The operator control panel consists of the PanelView terminal, right side and left side lift control switches, and a fast stop switch.

Lift Control Switches (2)

The white and black switches enable tilting of heater +/- 15° and have up/down travel of 8 inches. The white switch raises the heater, the black switch lowers the heater.

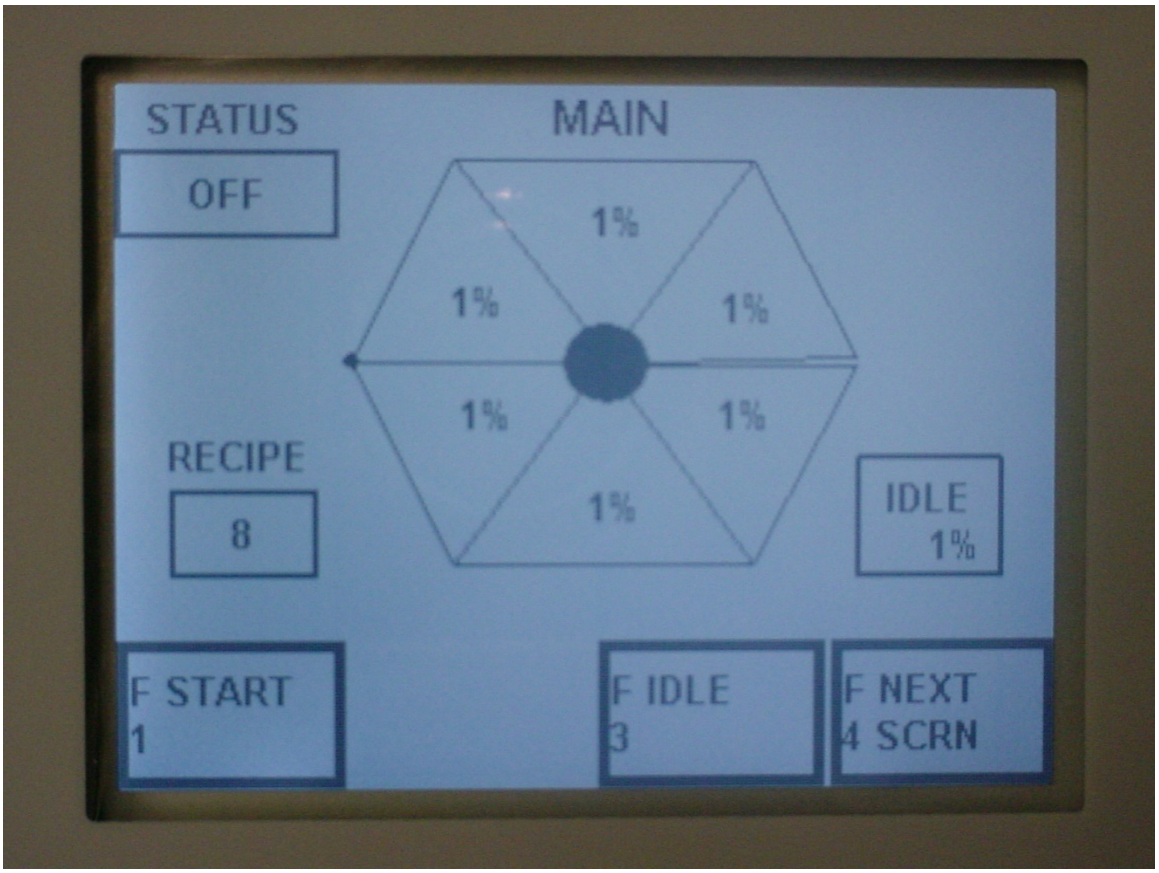
Fast Stop Switch (Red button, yellow background)

The Fast stop switch enables the immediate shutdown of the heater. The heater contactor is turned off and the PLC is set to Stop. Push to trip the switch, twist to reset or release the switch.

PANELVIEW TERMINAL

The PanelView terminal consists of a LCD display with keypad. 4 user screens are available: MAIN, RECIPE, ALARM, and OPTION. The selection of the screens are made with the F4 (NEXT SCREEN) key and the F5 (Previous Screen) key. The F5 key does not have a legend displayed on the screen.

Note: The PanelView terminal is **not** a touchscreen, legends are displayed to guide the operator. All entries are made from the keypad.



MAIN SCREEN

NOTE: The START key will not be displayed or active if the recipe displayed on the RECIPE screen and the loaded recipe, displayed on the MAIN screen do not match.

The **MAIN** screen allows monitoring of the system status, viewing the current recipe, Starting/Stopping the recipe and changing between Idle and Run. The display in the center represents a cross-sectional view of the heater, with the hinge on the left side and the opening side on the right. The darkened circle in the center represents the heating cavity and it will blink when power is applied to the lamps.

Three keys are displayed and function when this screen is displayed, a fourth key is active but not displayed.

F1 START key: This key will start and stop the system, once the system is started the legend in the F1 box will change to STOP allowing the F1 key to stop the system and the STATUS box will display RUNNING. The system will not start if an alarm condition exists and ALARM will be displayed in the STATUS box, see the ALARM SCREEN page for more details.

F3 IDLE key: This key will toggle the system between the zone power levels and the idle power levels. Zone power levels are displayed in the 6 pie shaped heater sections. The legend in the F3 box displays IDLE when running or RESUME while in IDLE.

F4 NEXT SCRN key: This key will change the display to the next screen in the following order: MAIN, RECIPE, ALARMS, and OPTIONS. Each of these screens has the F4 key active.

F8 PREV SCRN key: This key is active on each of the screens but has no legend displayed. This key will change the display to the previous screen in the following order: MAIN, OPTIONS, ALARMS, and RECIPE.

The system status will display one of the following: OFF, RUNNING, IDLE, WAITING, and ALARM.

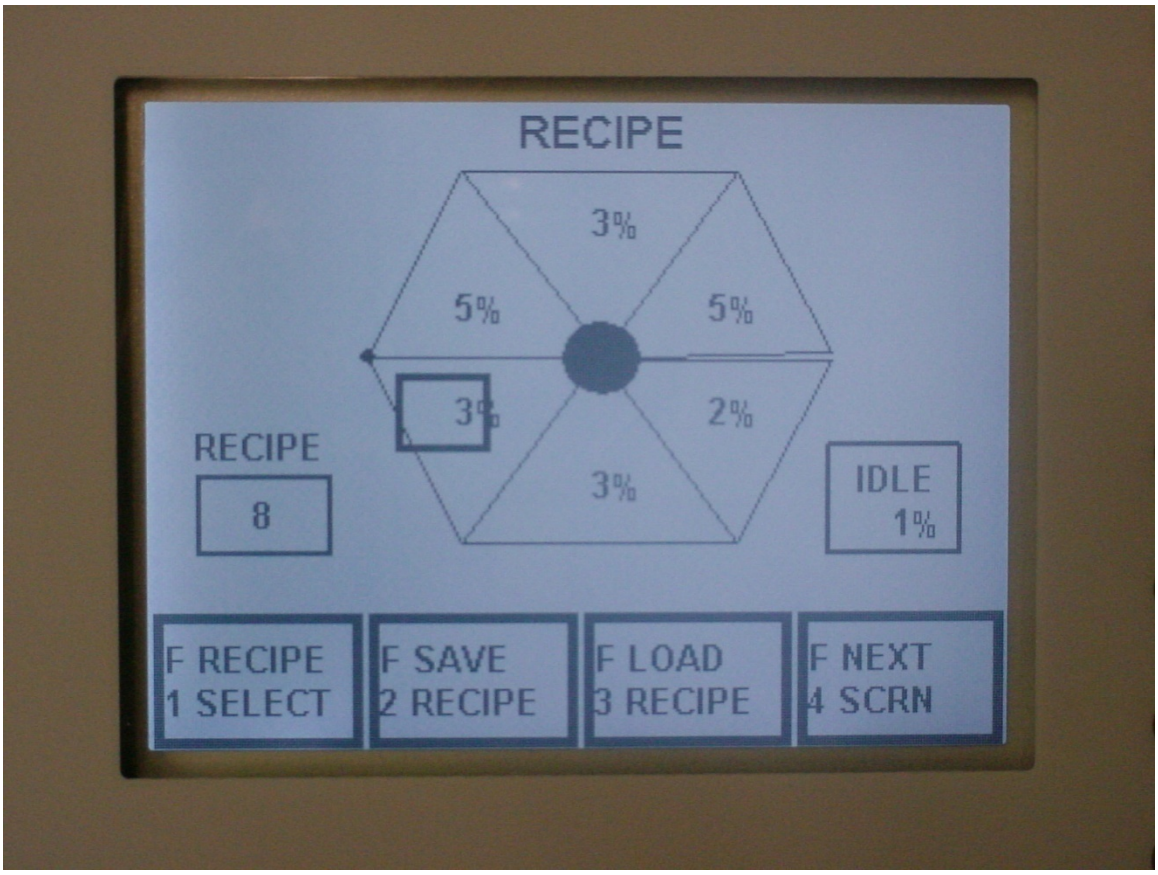
OFF displays when the heater is off and the system is shut down.

RUNNING is displayed when the system is operating at the zone power settings of the selected recipe.

IDLE is displayed when the system is operating at the idle power setting of the current recipe.

WAITING displays for one of two conditions: 1. The Remote Interlock contacts are not closed or jumpered out. 2. The Motion Detect Option has been enabled and product is not moving. In this condition the system is ready to go with the zone power levels at 0 and just “waiting” for the condition to change. Once the condition changes the power levels go back to the recipe settings

ALARM is displayed when one of the alarm conditions exist. See the Alarms Screen page for more details.



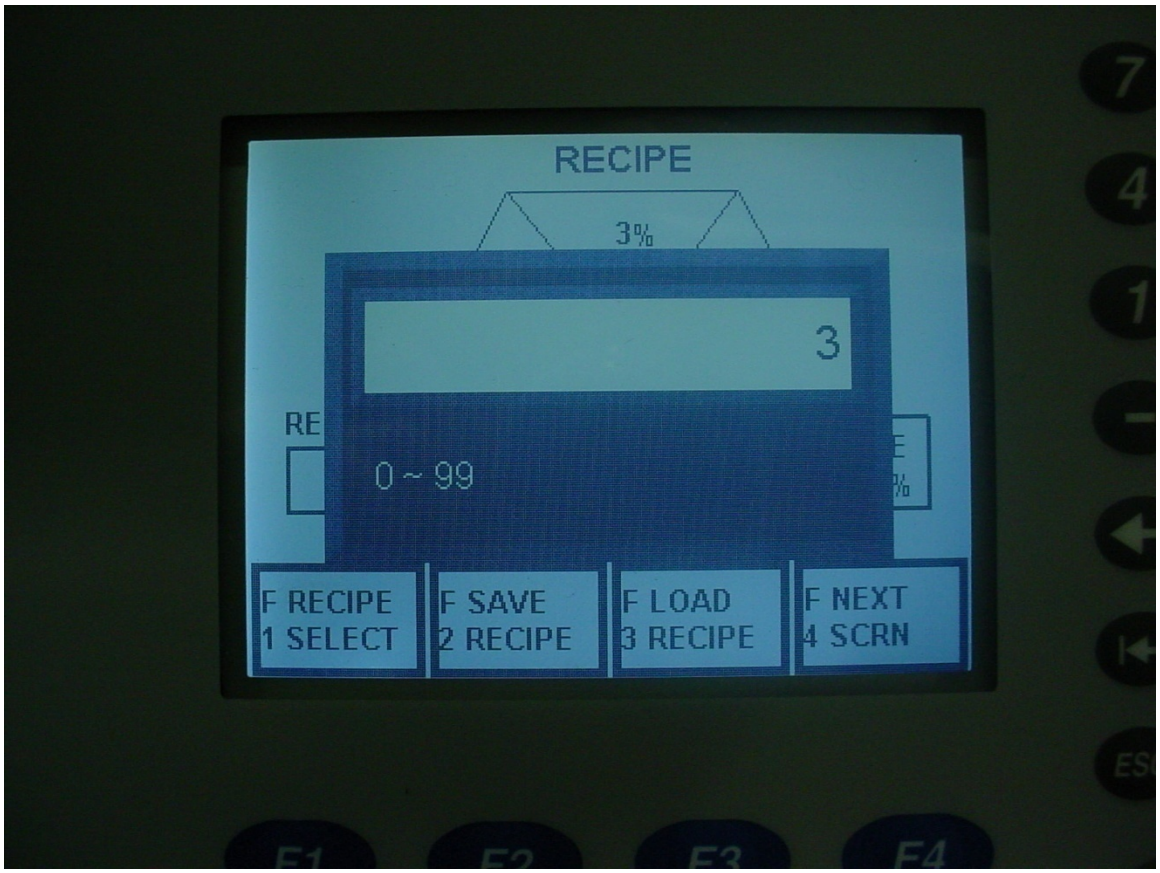
RECIPE SCREEN

The **RECIPE** screen allows recipe selection, loading, creation or modification, and saving of up to twenty recipes.

Recipe Selection The F1 key (RECIPE SELECT) will step through the recipes from 1 to 20 and wrap back to 1. The zone power levels and idle power level will be displayed as each recipe appears on the screen. The F5 key is does not have a legend displayed, but it will select the previous recipe.
Note: The RECIPE SELECT key is not displayed or available while in the RUNNING mode. Only the current recipe may be modified at this time.

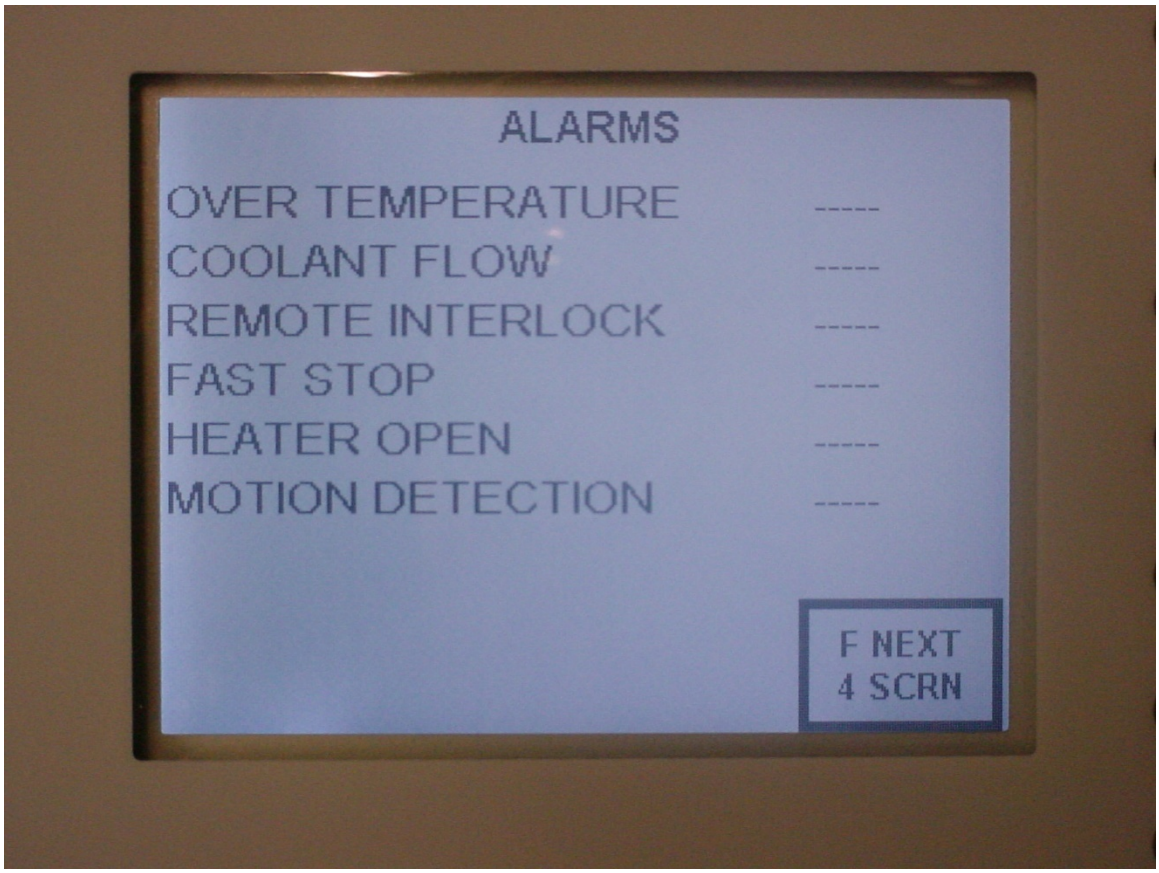
Recipe Loading The F3 key (LOAD RECIPE) will take the selected recipe and load it into active memory and change the display to the MAIN screen, to allow the recipe to be run. Only after a recipe has been loaded, can it be run.

Recipe Creation/Modification After the recipe has been selected, changes can be made to it. The Tab (→|) and Back Tab (|←) keys are used to move between the heating zones and idle power. The Enter key (↵) is used to open the data entry window to allow power level selection, 0 to 99%. The power level is entered on the numeric keypad keys 0-9. The escape key (ESC) will abort an entry that has been started. The backspace key (←) can be used for making changes. The enter key will then load the power level into the temporary memory storage until saved by the F2 key into nonvolatile memory.



Changes to the current recipe can be made while in the RUNNING mode. Select the heating zone, change the power level and press F3 LOAD RECIPE. This will make a change to the current power levels but only while it remains in RUNNING mode. By Saving the recipe before Loading the change becomes part of the saved recipe in nonvolatile memory.

Recipe Saving The F2 key (SAVE RECIPE) will save the current recipe into nonvolatile memory. Recipes that are not saved will revert back to zero or the last saved value after a power cycle or after resuming from an idle state.



ALARMS SCREEN

The **ALARMS** screen displays the status of each of the alarms. The dashed line (-----) indicates no alarm. Alarms are of one of two types, either a Critical or a Minor alarm. A Critical alarm will turn the system to off, dropping out the heater contactor. It is due to an abnormal condition that could damage equipment or harm personnel. A Minor alarm puts the system in a waiting state where the power level to the heaters is changed to 0%; once the condition has cleared the power level returns to the pre-alarm level.

OVER TEMPERATURE The Over Temperature alarm is a Critical alarm. A thermostat inside the 4069 Chamber heater monitors the reflector temperature, when the preset value is exceeded the system alarms and shuts down.

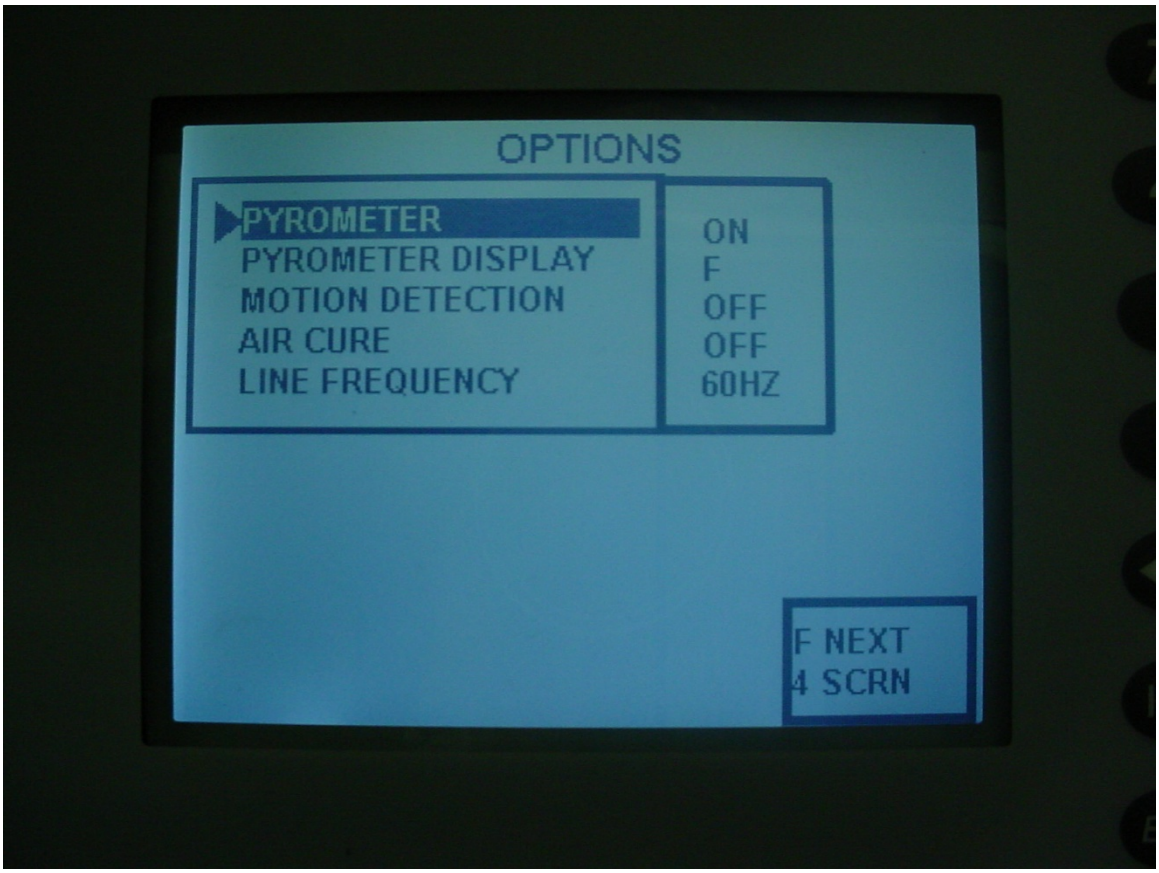
COOLANT FLOW The Coolant Flow alarm is a Critical alarm. A flow switch on the system monitors the coolant flow through the 4069 Chamber heater. If it does not meet a minimum value or .25 gallon/minute (gpm) it will alarm and shut the system down. Note: A flow rate of .25 gpm is significantly less than the heater requirement of 1.2 to 6.2 gpm depending on the heater. Inadequate coolant flow can be a cause for the Over Temperature alarm.

REMOTE INTERLOCK The Remote Interlock alarm is a Minor alarm. This is a customer driven feature that can be used to signal a line stoppage or any occurrence where the heaters should be temporarily turned off. The opening of a dry contact is required to trip this alarm, a jumper is installed from the factory to bypass this alarm until it is hooked up. See the schematic for the location to make the connection.

FAST STOP The Fast Stop Alarm is a Critical alarm. It is typically used in an emergency, where the heat needs to be turned off in a hurry. The Fast Stop can be initiated from the operator panel (the red mushroom switch) or it can be wired into the production line. The opening of a dry contact is required to trip this alarm, a jumper is installed from the factory to bypass this alarm until it is hooked up. See the schematic for the location to make the connection.

HEATER OPEN The Heater Open alarm is a Critical alarm. If opened while running a very intense light would be directed at the operator

MOTION DETECT The Motion Detect alarm is a Minor alarm. It functions with the optional motion sensor, to set power output levels to 0 when the product is not moving. It can be enabled and disabled in the OPTIONS menu.



OPTIONS SCREEN

The **OPTIONS** screen displays the status of each of the alarms. The dashed line (-----) indicates no alarm. Alarms are of one of two types, either a Critical or a Minor alarm. A Critical alarm will turn the system to off , dropping out the heater contactor. It is due to an abnormal condition that could damage equipment or harm personnel. A Minor alarm puts the system in a waiting state where the power level to the heaters is changed to 0%; once the condition has cleared the power level returns to the pre-alarm level.

PYROMETER An option Pyrometer (optical temperature sensor) is available for the 4069P. The pyrometer when installed and enabled will display the temperature measured on the MAIN screen.

PYROMETER DISPLAY The temperature read by the Pyrometer Option can be displayed in either degrees Fahrenheit or degrees Celsius by making the appropriate selection here.

MOTION DETECTION An optional motion detection sensor is available for the 4069P. The motion detection feature, when installed, can be enabled and disabled by this selection. It consists of a Teflon

covered roller and sensor, when enabled it will change the output power level to 0 when no motion is detected for more than 2 seconds.

AIR CURE An optional air cure feature is available for the 4069P. The air cure feature, when installed, can be enabled and disabled by this selection. When enabled, a solenoid valve will be opened when starting a recipe, allowing compressed air, directed by adjustable nozzles, to be directed through the heating chamber.

LINE FREQUENCY The system is capable of running on AC power at 60 Hz (USA) or at 50 Hz (Europe). This selection must be set appropriately in order for the output power levels to work correctly.

Maintenance and Trouble Shooting

ROUTINE MAINTENANCE

The following bi-monthly routine maintenance is suggested:

1. Remove power connection to the system. Lock out power if possible. Carefully vacuum any dust or dirt collecting within the enclosure. Use caution to not disturb the wiring. Service more often in dust locations.

2. Clean the outside of the enclosure with glass cleaner and a soft cotton cloth as necessary.

LAMP REMOVAL, REPLACEMENT, INSTALLATION:

The T3-style lamps are installed into the Model 4069 when shipped from the factory. The following procedure details the process to replace the lamps in the Model 4069 (reference Figure 6, 7, & 8):

Note:
Remove all power from the heater BEFORE attempting to install/replace the lamps.
Allow a minimum of ½-inch (12 mm) of slack in the lamp leads so that the leads are not taut when inserted into the lamp terminal blocks.
Always take care to handle all lamps by the ceramic end seals and use clean cotton or latex gloves to prevent contamination of the quartz lamp envelopes.

1. Remove quartz liner (see next section). Take this opportunity to clean the liner.
2. Remove end-cover screws (4 per end cover).
3. Remove end covers on both ends of the heater.
4. Remove end-reflector screws (2 per reflector)
5. Remove end reflectors on both ends.
6. Carefully disengage lamp from clips (both ends).
7. Slide the end of the lamp through the rectangular cutout in the end casting on one end of the heater through the rectangular cutout in the end casting of the other end of the heater.
8. Position the lamp over the lamp clips so that the lighted portion of the lamp is equally space in the reflector.

   Note: Be sure that the Gas Fill Tip is facing away from the reflector

9. While holding the lamp on both ends by the ceramic end seals, with light pressure push the lamp into the lamp clips. A slight twisting motion of the lamp, while pushing the lamp into the clip, helps the lamp to seat properly.

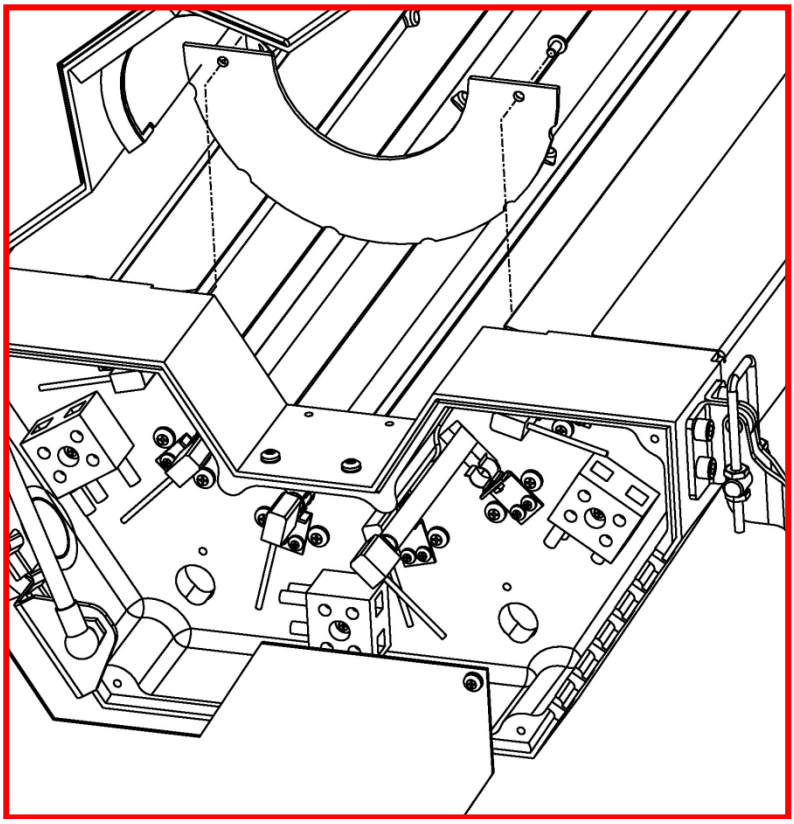


Figure 6.

10. Cut wire to a length allowing for a service loop.
11. Strip back the insulation on the end of the lamp leads approximately 1-1/2 inches (38 mm).
12. Insert the bare wire of each insulated lamp lead into the ceramic terminal block position that previously held the old lamp. Push each lead wire into the terminal block far enough so, that when tightened, the setscrew will hold the lead securely.
13. Tighten the setscrews in each terminal block so the lead wires are held securely (1.0 Ft.-Lbs. [1.4 N-m]).
14. Form a loop within each lead along its length. This loop will act as a strain relief within the lead during normal operation of the heater.
15. Reinstall the end reflectors, end covers, and quartz liner.

Note:
Remove all power from the heater BEFORE attempting to install/replace the lamps. Always use clean cotton or latex gloves when handling the split quartz liner so as not to deposit any oils or grease from your hands onto the surface of the split quartz liner.

SPLIT QUARTZ LINER CLEANING AND REPLACEMENT

1. Open the Model 4069 Heater to allow access to each heater half for split quartz liner installation.
2. Loosen the screws of one liner bracket and slide the bracket away from the quartz-liner of one liner half at one end of the heater, while supporting the liner with other hand.

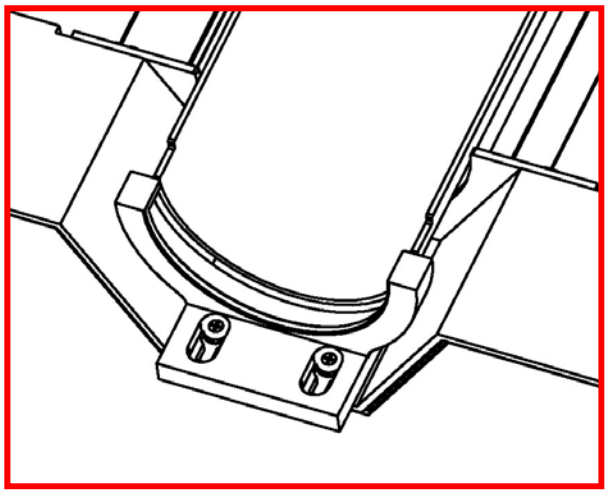


Figure 7

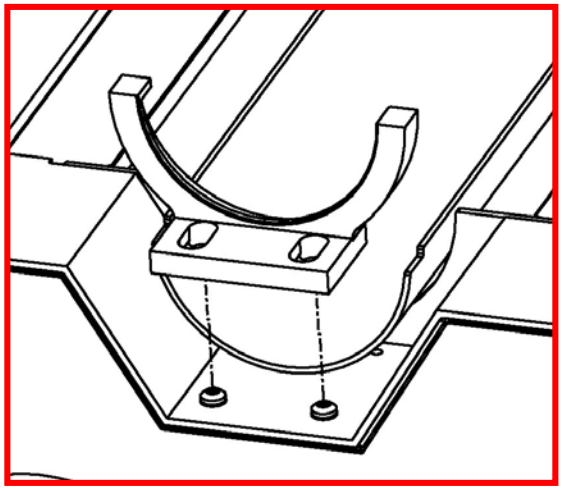


Figure 8

3. Remove the bracket from the end casting of the heater.
4. Gently slide the quartz liner out of the grooves of the liner bracket from the opposite end. Take care so that the quartz liner does chip or crack as it is removed.

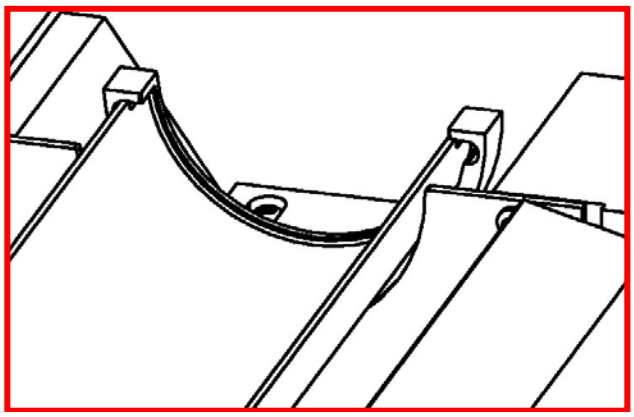


Figure 9

5. If cleaning the liner, use a non-abrasive glass cleaner (i.e. household ammonia and water or isopropyl alcohol) and a clean, dry, lint-free cloth. After cleaning, do not touch the outside surface of the liner unless wearing cotton gloves.
6. Reinsert the edges of the liner into the grooves of the quartz-liner bracket.
7. Reinstall the other bracket and secure with the two bracket screws.
8. Repeat this process for the other half of the liner.

CLEANING THE REFLECTORS

Clean reflectors provide the greatest radiant efficiency. If the reflector surface becomes contaminated, it reflects less energy. The energy that is not reflected is lost, absorbed by the reflectors, and removed by the cooling water and air.

The following procedure should be used to clean the Model 4069 reflectors:

1. Remove the lamps and quartz liner as described in Lamp Removal/Replacement/Installation and Split Quartz Liner Cleaning and Replacement.
2. Clean the reflectors with a mixture of warm water and common household ammonia followed by a thorough wipe-down using a clean, water-dampened flannel cloth.
3. Depending on the type of contamination present on the reflector, a suitable solvent may be required to remove the contamination. The solvent must be selected based on its inability to adversely affect the aluminum reflector.
4. Thoroughly wipe the reflector using the warm water/household ammonia mixture followed by the dampened flannel cloth.
5. Replace the lamps and quartz liner, as outlined in Lamp Removal/Replacement/Installation and Section Split Quartz Liner Cleaning and Replacement.

If necessary, the reflectors may require re-polishing. This is permissible because the reflector is solid aluminum and can be re-polished many times without damage from continued erosion. A fine particle polishing compound, such as a chrome, semi-chrome, or soft metal polishing compound may be used. These types of compounds can be found at a local automotive or metal-polishing supply house. Follow the polishing instructions listed on the polishing product.

REMOVING THE REFLECTORS

The reflectors can be removed from the Model 4069 Heater to make cleaning and maintenance easier. The following procedure should be used to remove the Model 4069 reflectors:

Note:
Remove all power from the heater BEFORE attempting to install/replace the heater reflectors.

1. Drain all cooling fluid from the heater and blow out the heater cooling lines with compressed air.
2. Remove the heater-cover screws and heater cover.

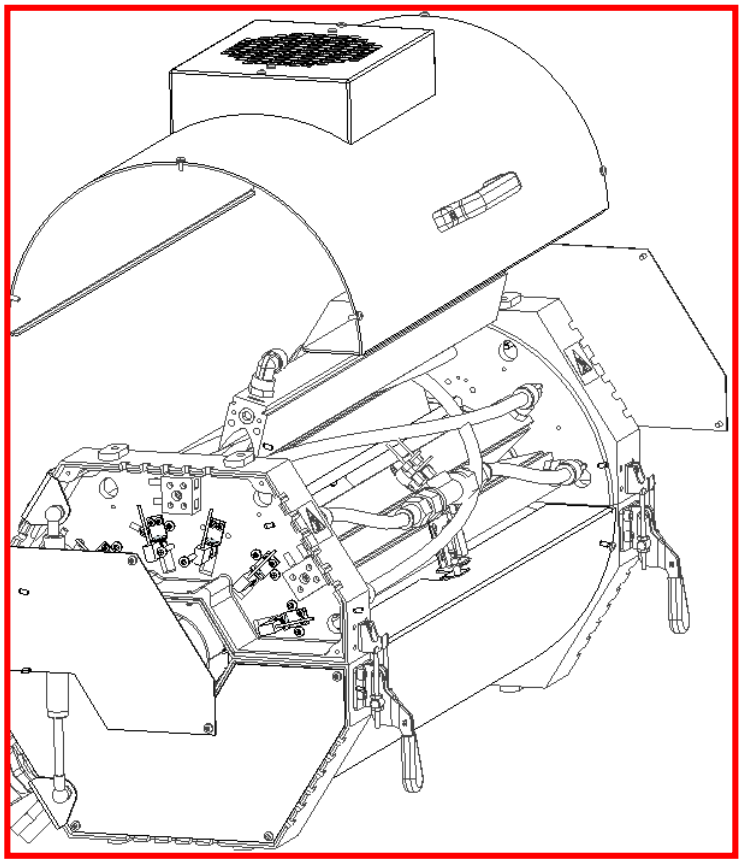


Figure 10

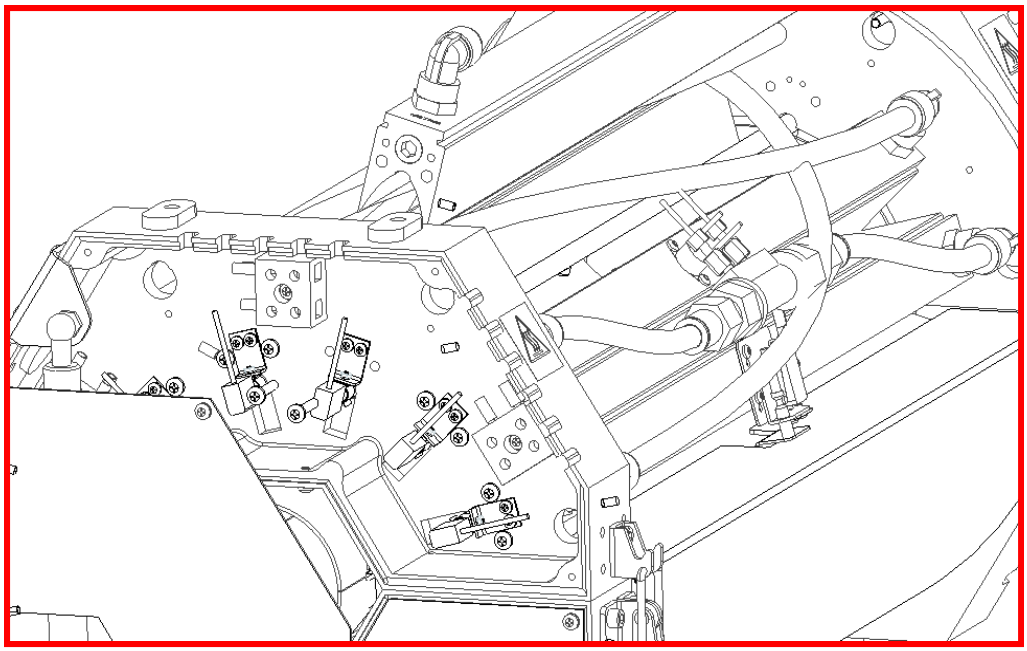


Figure 11

3. Disconnect the cooling line from the reflector to be maintained.
4. Loosen all screw from all reflectors on one side of the end casting of the reflector to be maintained.
5. Remove the reflector mounting screws from the end casting of the reflector to be maintained.
6. Remove the reflector.

TROUBLE-SHOOTING

Symptom	Action
System will not start.	1. Verify the F1 START legend is displayed on the MAIN screen. If not, the recipe on the MAIN screen and the recipe on the RECIPE screen do not match. Load the desired recipe with the F3 LOAD key on the RECIPE screen. 2. Check the STATUS box on the MAIN screen, if it is ALARM, go to the ALARM screen, find and clear the alarm. 3. Check the STATUS box on the MAIN screen , if it is WAITING, go to the ALARM screen and find out if it is Motion Detection or Remote Interlock causing the condition. - Motion Detection will clear when the product rotates the roller or can be disabled on the OPTIONS screen. – Remote Interlock is jumpered out from the factory 1TB20 and 22, or it can be connected into the production line.
Power levels displayed on the MAIN screen do not match the RECIPE screen.	1. Verify the F3 IDLE key has not been pressed, legend on screen will display RESUME if it has. 2. Selected recipe has not been loaded. Go to RECIPE screen and LOAD the recipe. 3. Current recipe has been changed and not saved. Set the recipe power levels to the desired level, then SAVE and LOAD the recipe
Lamp zone not turning on.	1. Check load (zone) fuses. 10FU – 21FU 2. Check for burned out or broken lamps. 3. Check zone power level in recipe.
Operator Terminal has no display.	1. Verify disconnect switch is turned on and incoming power is ok. 2. Check Line fuses. 1FU – 3FU 3. Check for green LED on the 24 VDC power supply, then check power supply fuses if not lit. 4FU- 6FU
Cannot change recipes.	1. Recipe change is only allowed when the STATUS box displays OFF. While RUNNING the RECIPE SELECT key is disabled, and the key legend is not displayed. Stop the system and then change recipes.

PLC DIGITAL I/O MAPPING

DIGITAL INPUTS	DESCRIPTION
0	Flow Switch
1	Thermostat
2	Heater Closed
3	Fast Stop
4	Remote Interlock
5	Motion Sensor

DIGITAL OUTPUTS	DESCRIPTION
0	Heater Enable
1	Cooling Solenoid / Fan
2	Heating Zone 1
3	Heating Zone 2
4	Heating Zone 3
5	Heating Zone 4
6	Heating Zone 5
7	Heating Zone 6
8	Air Cure Solenoid

The PLC should have 3 green LED's on: Power, Run, and the COM 0 LED should be flashing. (Communications to the Operator Terminal) The Amber LED's on the PLC indicate the state of the Digital Inputs and Outputs.

Accessories, Spare, and Replacement Parts – Controls & Cart

Model	Description
	Control Cabinet:
096191-006	Contactor- 3 phase, 100 amp, 24 VDC coil
107556-009	Fuse-Cubefuse, 100 amp
086445-016	Fuse-Time Delay, “CC”, 6 amp, 600 VAC
099395-001	Switch-On /Off, 3 phase, 100 amp
099396-001	Switch Actuator-Red/Yellow
107549-001	Power Supply-480 VAC in, 24VDC out
080821-001	Relay-DPDT, 10 amp, 24VDC, 650 ohm
055899-015	Relay-SS, DC, 125 amp, 480 VAC
066798-004	Varistor-Assembled, 480 VAC
	Control Console:
107392-004	Switch-Push Button, 2 head
107392-001	Switch-Push Button, E-stop
107390-002	Contact Block-Normally open
107390-001	Contact Block-Normally closed
107439-001	Actuator-Telescopic, 8” lift, 24 V
	Cart
106783-011	Replacement Gas Spring for 4069-12R-10L
106783-012	Replacement Gas Spring for 4069-12R-16L
106783-013	Replacement Gas Spring for 4069-12R-25L
106783-014	Replacement Gas Spring for 4069-12R-38L
106784-011	Replacement Gas Spring for 4069-18R-10L
106784-012	Replacement Gas Spring for 4069-18R-16L
106784-013	Replacement Gas Spring for 4069-18R-25L
106784-014	Replacement Gas Spring for 4069-18R-38L
106783-013	Replacement Gas Spring for 4069-12-DUAL
106784-013	Replacement Gas Spring for 4069-18-DUAL
	Gas Spring with Latch Replacement
107358-011	Replacement Gas Spring & Latch for 4069-12R-10L
107358-012	Replacement Gas Spring & Latch for 4069-12R-16L
107358-014	Replacement Gas Spring & Latch for 4069-12R-25L
107358-014	Replacement Gas Spring & Latch for 4069-12R-38L
107396-011	Replacement Gas Spring & Latch for 4069-18R-10L
107396-012	Replacement Gas Spring & Latch for 4069-18R-16L
107396-013	Replacement Gas Spring & Latch for 4069-18R-25L
107396-014	Replacement Gas Spring & Latch for 4069-18R-38L

Accessories, Spare, and Replacement Parts – Heater

Model	Description
	Replacement Lamp For:
103390-003	12kW or 18kW maximum-power rated heater (10 inch length, 1000-watts)
103390-004	24kW or 36kW maximum-power rated heater (10 inch length, 2000-watts)
103390-005	19kW or 29kW maximum-power rated heater (16 inch length, 1600-watts)
103390-007	30kW or 45kW maximum-power rated heater (25 inch length, 2500-watts)
103390-010	46kW or 68kW maximum-power rated heater (38 inch length, 3800-watts)
	Replacement Reflector For:
106721-001	10-inch length
106721-002	16-inch length
106721-003	25-inch length
106721-004	38-inch length
	Replacement End Reflectors (Four required per heater) for:
106778-001	12-reflector size heater
106778-002	18-reflector size heater
	Spare Split Quartz Liner Half (Two required per heater) for:
106895-001	12-reflector, 10-inch length
106895-002	12-reflector, 16-inch length
106895-003	12-reflector, 25-inch length
106895-004	12-reflector, 38-inch length
106895-005	18-reflector, 10-inch length
106895-006	18-reflector, 16-inch length
106895-007	18-reflector, 25-inch length
106895-008	18-reflector, 38-inch length
M4069P	**Additional User Manual**