

USER GUIDE
UGD026-1210

Crystallizer

Models CR4, CR10, CR21, CR42, CR85, and CR135



Please record your equipment's model and serial number(s) and the date you received it in the spaces provided.

It's a good idea to record the model and serial number(s) of your equipment and the date you received it in the User Guide. Our service department uses this information, along with the manual number, to provide help for the specific equipment you installed.

Please keep this User Guide and all manuals, engineering prints and parts lists together for documentation of your equipment.

Date:

Manual Number: UGD026-1210

Serial Number(s):

Model Number(s):

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Purpose of the User Guide

This User Guide describes the Conair Crystallizer and explains step-by-step how to install, operate, maintain and repair this equipment.

Before installing this product, please take a few moments to read the User Guide and review the diagrams and safety information in the instruction packet. You also should review manuals covering associated equipment in your system. This review won't take long, and it could save you valuable installation and operating time later.

How the Guide is Organized

Symbols have been used to help organize the User Guide and call your attention to important information regarding safe installation and operation.



Symbols within triangles warn of conditions that could be hazardous to users or could damage equipment. Read and take precautions before proceeding.



Numbers indicate tasks or steps to be performed by the user.



A diamond indicates the equipment's response to an action performed by the user.



An open box marks items in a checklist.



A circle marks items in a list.



Indicates a tip. A tip is used to provide you with a suggestion that will help you with the maintenance and the operation of this equipment.



Indicates a note. A note is used to provide additional information about the steps you are following throughout the manual.

Your Responsibility as a User

You must be familiar with all safety procedures concerning installation, operation, and maintenance of this equipment. Responsible safety procedures include:

- Thorough review of this User Guide, paying particular attention to hazard warnings, appendices, and related diagrams.
- Thorough review of the equipment itself, with careful attention to voltage sources, intended use and warning labels.
- Thorough review of instruction manuals for associated equipment.
- Step-by-step adherence to instructions outlined in this User Guide.

ATTENTION:

Read this so no one gets hurt

We design equipment with the user's safety in mind. You can avoid the potential hazards identified on this machine by following the procedures outlined below and elsewhere in the User Guide.



WARNING: Improper installation, operation, or servicing may result in equipment damage or personal injury.

This equipment should be installed, adjusted, and serviced by qualified technical personnel who are familiar with the construction, operation, and potential hazards of this type of machine.

All wiring, disconnects, and fuses should be installed by qualified electrical technicians in accordance with electrical codes in your region. Always maintain a safe ground. Do not operate the equipment at power levels other than what is specified on the machine serial tag and data plate.




WARNING: Voltage hazard

This equipment is powered by three-phase alternating current, as specified on the machine serial tag and data plate.

A properly sized conductive ground wire from the incoming power supply must be connected to the chassis ground terminal inside the electrical enclosure. Improper grounding can result in severe personal injury and erratic machine operation.


Always disconnect and lock out the incoming main power source before opening the electrical enclosure or performing non-standard operating procedures, such as routine maintenance. Only qualified personnel should perform troubleshooting procedures that require access to the electrical enclosure while power is on.

How to Use the Lockout Device

 **CAUTION:** Before performing maintenance or repairs on this product, you should disconnect and lockout electrical power sources to prevent injury from unexpected energization or start-up. A lockable device has been provided to isolate this product from potentially hazardous electricity.

Lockout is the preferred method of isolating machines or equipment from energy sources. Your Conair product is equipped with the lockout device pictured below. To use the lockout device:

- 1 Stop or turn off the equipment.**
- 2 Isolate the equipment from the electric power.** Turn the rotary disconnect switch to the OFF, or “O” position.
- 3 Secure the device with an assigned lock or tag.** Insert a lock or tag in the holes to prevent movement.
- 4 The equipment is now locked out.**

 **WARNING:** Before removing lockout devices and returning switches to the ON position, make sure that all personnel are clear of the machine, tools have been removed, and all safety guards reinstalled.

To restore power to the crystallizer, turn the rotary disconnect back to the ON position:

- 1 Remove the lock or tag.**
- 2 Turn the rotary disconnect switch to the ON or “I” position.**



Description

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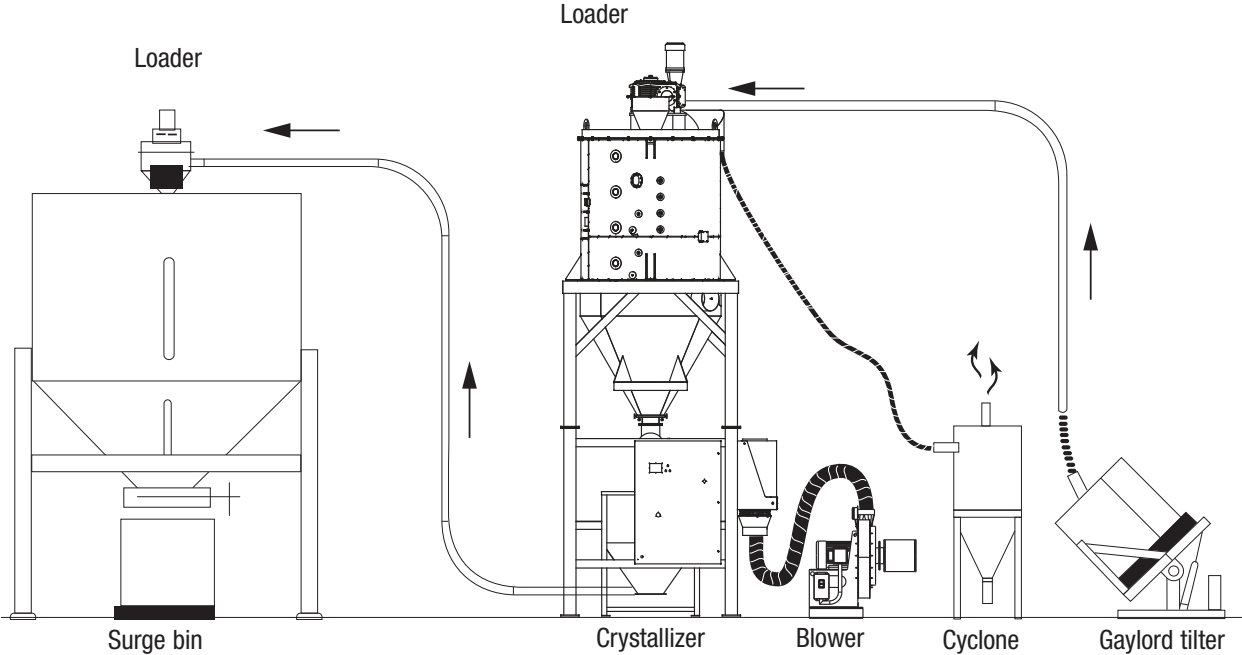
What is the Crystallizer?

Conair crystallizers allow processors to convert amorphous pellets or reclaimed flake into a crystalline state in preparation for high-temperature drying. The agitating hopper may also be used to keep other non free-flowing materials from bridging.

The crystallizer system may consist of the following components:

- Blower;
- Heater(s)
- Agitating hopper
- Floor stand
- Material discharge valve
- One insulated process air hose and other uninsulated hoses
- Process residence temperature probes
- Cyclone separator filtration system
- Air filters
- System process controls

Typical Applications



Description
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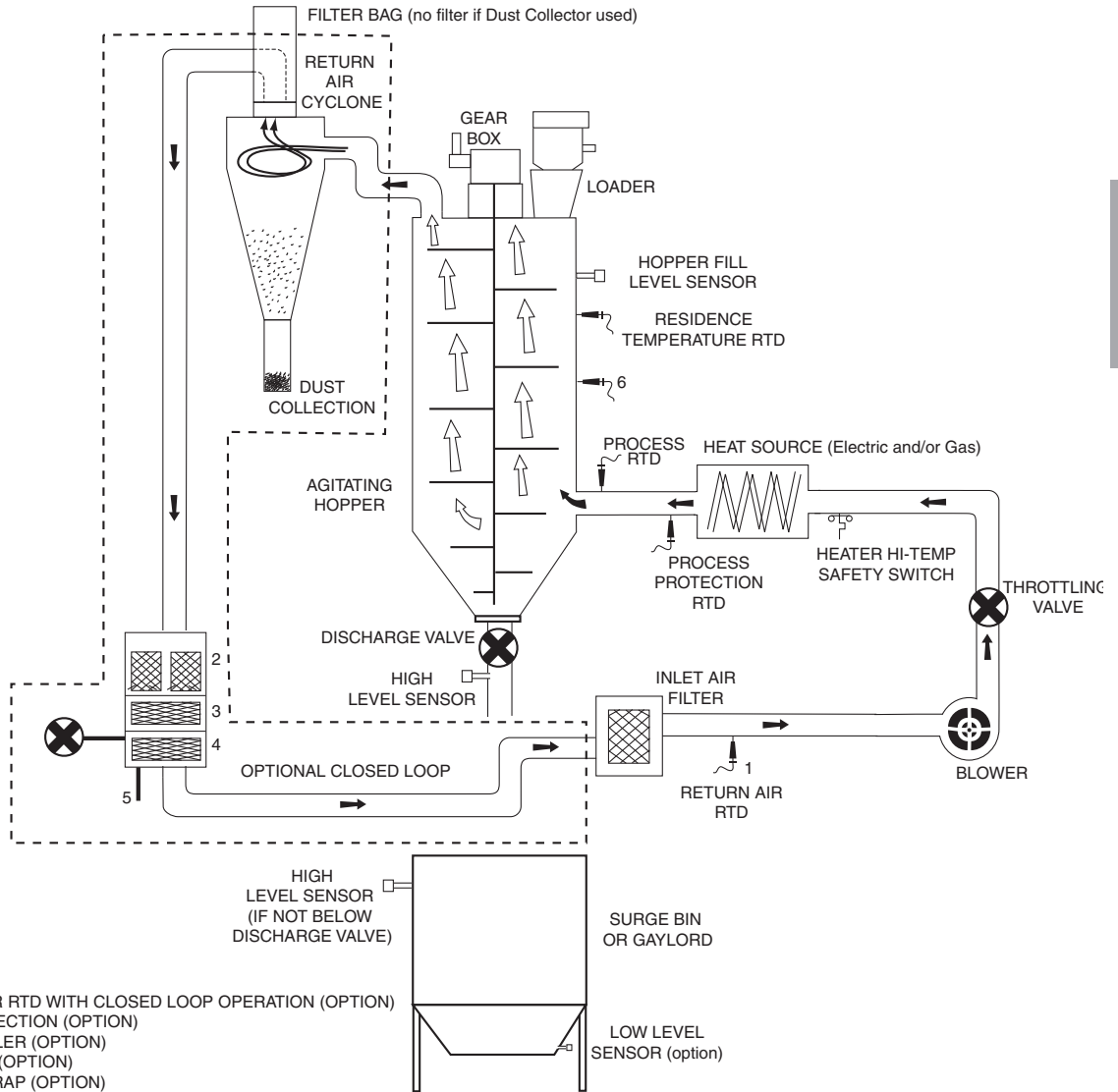
How It Works

Heated air is passed through the bed of amorphous material in the agitating hopper where the heat is absorbed. The amorphous material will begin to crystallize at its glass transition temperature (typically 180 - 200°F [82.2 - 93.3°C]). The blades of the agitator auger inside the hopper gently turn to lift and tumble the material. This action prevents agglomeration of the material during the transition between amorphous and crystalline states.

Once the set temperature profile within the agitating hopper is achieved, the crystallizer will deliver the crystalline material ready to be dried and processed. The system also has the capability to allow the material to cool to a preset temperature within the agitating hopper before delivery.

A high temperature loader can be used with the system to load amorphous material to the top of the agitating hopper to keep the hopper full.

How It Works (continued)



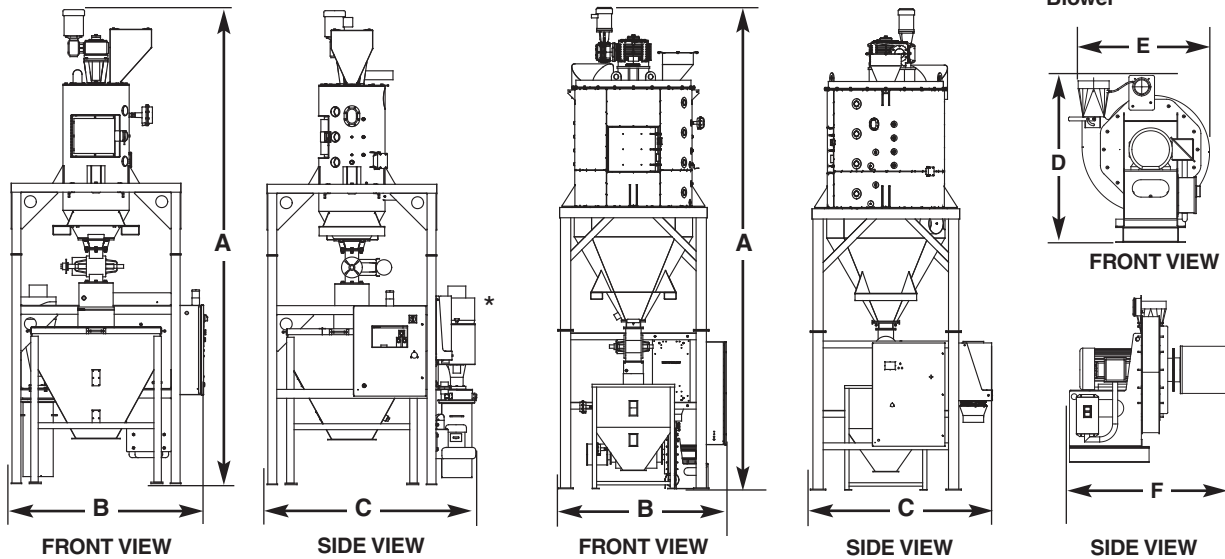
Description 2

- 1 RETURN AIR RTD WITH CLOSED LOOP OPERATION (OPTION)
- 2 DUST COLLECTION (OPTION)
- 3 AFTERCOOLER (OPTION)
- 4 DE-MISTER (OPTION)
- 5 VOLATILE TRAP (OPTION)
- 6 AUX TEMP RTD (OPTION)

Specifications: CR4-CR135

Model CR4 and CR10

Model CR21 - CR135



TPDM028-0408

| MODELS | CR4† | CR10† | CR21† | CR42† | CR85† | CR135† |
|---|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Performance characteristics | | | | | | |
| Throughput ft ³ /hr {l/hr} | 4 {113} | 10 {283} | 21 {595} | 42 {1189} | 85 {2407} | 135 {3823} |
| Heater energy source | electric or natural gas | electric or natural gas | electric or natural gas | electric or natural gas | electric or natural gas | electric or natural gas |
| Air circuit | open or closed loop | open or closed loop | open or closed loop | open or closed loop | open or closed loop | open or closed loop |
| Dimensions inches {mm} | | | | | | |
| A - Overall crystallizer height | 159.2 {4043.7} | 169.0 {4292.6} | 192.5 {4889.5} | 226.8 {5760.7} | 261.8 {6649.7} | 281.1 {7139.9} |
| B - Overall crystallizer width | 66.0 {1676.4} | 66.0 {1676.4} | 69.0 {1752.6} | 79.1 {2009.1} | 86.3 {2192.0} | 98.3 {2496.8} |
| C - Overall crystallizer depth | 70.5 {1790.7} | 75.0 {1905.0} | 70.1 {1780.5} | 81.4 {2067.6} | 94.2 {2392.7} | 106.3 {2700.0} |
| D - Blower height† | NA | NA | 37.8 {960.1} | 37.8 {960.1} | 37.8 {960.1} | 45.8 {1163.3} |
| E - Blower width† | NA | NA | 32.5 {825.5} | 32.5 {825.5} | 32.5 {825.5} | 37.5 {952.5} |
| F - Blower depth† | NA | NA | 68.4 {1734.4} | 70.4 {1788.2} | 77.5 {1968.5} | 80.6 {2047.2} |
| Approximate weight lbs {kg} | | | | | | |
| Crystallizer installed | 2863 {1299} | 3130 {1420} | 3315 {1504} | 4422 {2006} | 6590 {2989} | 7754 {3517} |
| Surge bin installed | 270 {122} | 270 {122} | 650 {295} | 650 {295} | 650 {295} | 650 {295} |
| Blower installed | NA | NA | 700 {318} | 800 {363} | 900 {408} | 1100 {499} |
| Voltage total amps | | | | | | |
| 230V/3 phase/60 Hz | 38.8 | NA | NA | NA | NA | NA |
| 400V/3 phase/50 Hz | 22.3 | 55.6 | 107.5 | 159.1 | 292.5 | 305.3 |
| 460V/3 phase/60 Hz | 19.3 | 48.4 | 93.5 | 138.4 | 254.4 | 265.5 |
| 575V/3 phase/60 Hz | 15.5 | 38.7 | 74.8 | 110.7 | 203.5 | 212.4 |
| Discharge type (via rotary air lock) | | | | | | |
| Surge bin 10 ft ³ {281 l/hr} | standard | standard | standard | NA | NA | NA |
| Surge bin 17 ft ³ {481 l/hr} | NA | NA | NA | standard | standard | standard |
| Blower noise level | | | | | | |
| <90 dbA @5 ft. | | | | | | |

SPECIFICATION NOTES:

* Shown with optional cyclone mounted on stand this applies to model CR4 only.

† The blowers on models CR4 and CR10 are located on the stand. Blowlers on models CR21, CR42, CR85 and CR135 are independent of the stand, adequate space will need to be planned for positioning of the blower on these models.

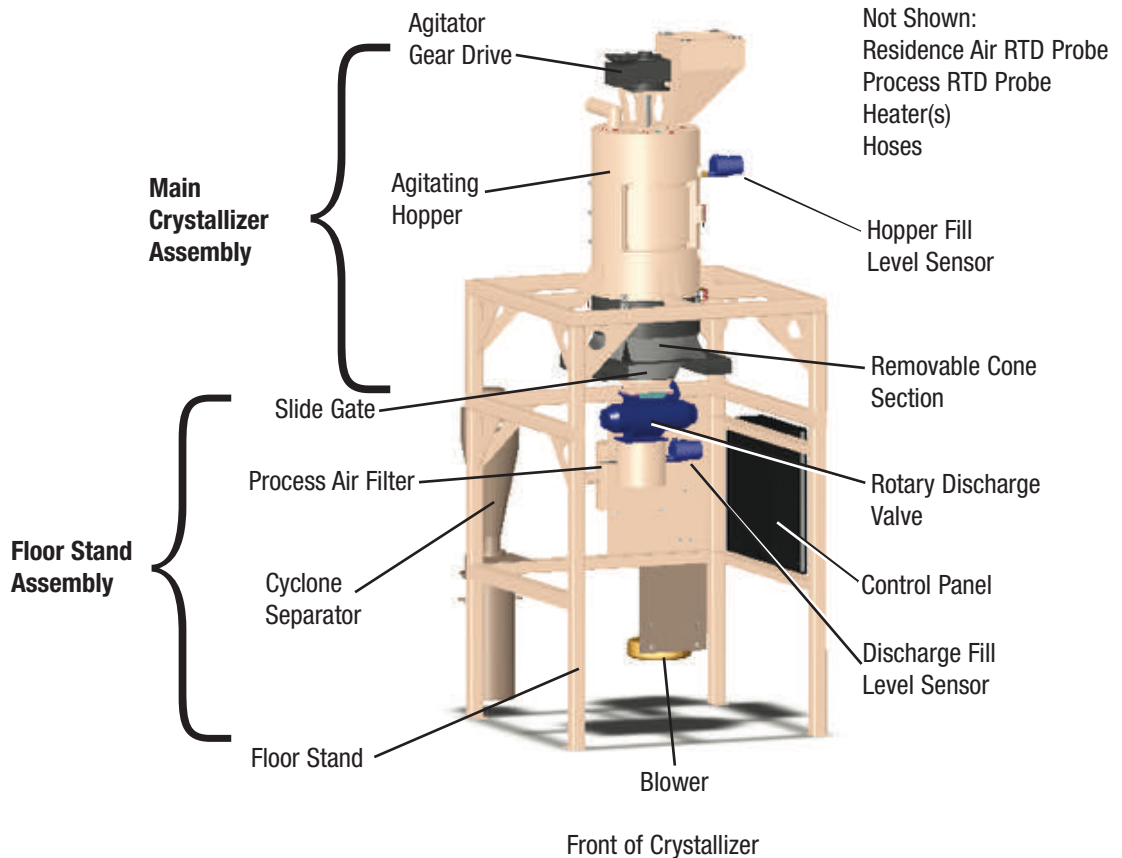
Specifications may change without notice. Consult a Conair representative for the most current information.

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Unpacking the Boxes

The crystallizer comes in two or more boxes, depending on the model and options ordered. The boxes could include (depends on the options selected):




1 Carefully remove the main crystallizer assembly (agitating hopper, removable cone section, and material slide gate), the floor stand assembly (floor stand, controls, control panel enclosure, blower, process air filter, and cyclone separator) and any other components from their shipping containers and set upright. Note that the main crystallizer assembly and the floor stand assembly are secured to their shipping container with bolts that pass through the bottom of the shipping container.

2 Remove all packing material, protective paper, tape, and plastic, including any inserted in the agitating hopper.

Unpacking the Boxes (continued)

- 3 Carefully inspect all components to make sure no damage occurred** during shipping, and that you have all the necessary hardware. If any damage is found, notify the shipping agent immediately.
- 4 Take a moment to record serial numbers and electrical power specifications** in the blanks provided on the back of the User Guide's title page. The information will be helpful if you ever need service or parts.
- 5 You are now ready to begin installation.** Follow the preparation steps on the next page.


 **NOTE:** Most larger main crystallizer assemblies will be laid on side for shipment. Place upright and remove shipping bracket to prepare for installation.

Floor Stand Components by Model:

CR4 includes: Floor stand, controls, control panel enclosure, blower, process air filter and cyclone separator.

CR10 includes: Floor stand, controls, control panel enclosure, blower and process air filter.

CR21, CR42, CR85 and CR135 include: Floor stand, controls and control panel enclosure.

 **NOTE:** Depending on the model you ordered, your floor stand may contain different components.

Preparing for Installation


The crystallizer is easy to install if you plan the location and prepare the installation area properly.

1 Make sure the installation area provides:


A grounded power source supplying the voltage and correct current for your crystallizer model. Check the crystallizer's serial tag for the correct amps, voltage, phase, and cycles. Field wiring should be completed by qualified personnel to the planned location for the crystallizer. All electrical wiring should comply with your region's electrical codes.

•➡ **Tip:** Conair recommends manual shut-off valves be installed in the water supply lines.

A source of water, if you intend to configure the crystallizer as a closed-loop system using an aftercooler. The crystallizer's optional aftercooler can use tower, city, or chiller water at temperatures of 40° to 85°F (4° to 29°C). Pipe should be run to the planned crystallizer location. Use flexible hose to connect the water pipes to the aftercooler.

 **NOTE:** On the larger crystallizer systems, water usage may exceed the smaller crystallizer system usage range of 1 to 2 gallon per minute {3.8-7.6 liters/min.}.

Minimum clearance for safe operation and maintenance. You should maintain a minimum of 36 in. (91 cm) clearance on at least three sides of the crystallizer.

 **NOTE:** The minimum clearance listed does not take into account a stand alone cyclone separator filtration system. If a stand alone cyclone separator filtration system is used, its location and size must be considered when determining the minimum clearance needed.

Preparing for Installation (continued)

- ❑ **A mounting area that will support the weight** of the crystallizer, floor stand, fully-loaded agitating hopper, and (if applicable) a fully-loaded high temperature loader.
- ❑ **Material and conveying lines installed.** If you plan to use vacuum or compressed air loaders to fill the agitating hopper, install conveying lines to the crystallizer location.

Securing the Crystallizer Floor Stand Assembly to the Floor



WARNING: You are responsible for the structural integrity of this installation.

After removing all crystallizer components from their shipping containers and inspecting all components for damage due to shipping, move the components to the prepared installation location. A forklift, hoist, or crane should be used to move the components.



CAUTION: Care should be taken while moving the main crystallizer assembly and the floor stand assembly to ensure that no damage is done to any of the components mounted to these assemblies.

It is important to fasten the floor stand assembly to a rigid floor structure. This will add rigidity to the installation and help to prevent accidents during operation and maintenance of the crystallizer.

Tools for installation:

- Forklift, hoist, or crane
- Other tools as dictated by the specific installation

Due to the varying size of Conair crystallizers, we recommend that you:


- Follow all applicable local building and safety codes;
- Use anchoring techniques and hardware suitable for the size and weight of the crystallizer; and
- Do not install any crystallizer components until the floor stand is secured to the floor.

Installing the Main Crystallizer Assembly on the Floor Stand Assembly

After the floor stand assembly has been secured to the floor, install the main crystallizer assembly on the floor stand using the following steps.


1 Make sure that all hoses and / or wires attached to the floor stand and main crystallizer assemblies are positioned away from the mating surfaces of the assemblies so they will not be damaged during this procedure.

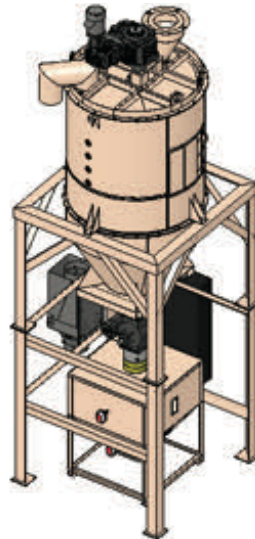
2 Using a forklift, hoist, or crane, lift the main crystallizer assembly above the floor stand.

 **CAUTION:** To prevent accident and injury, lift the main crystallizer assembly onto the floor stand assembly using a forklift, hoist, or crane.

3 Set the main crystallizer assembly on the floor stand as shown. Make sure the holes in the main crystallizer assembly align with the holes in the floor stand assembly.

4 Secure the main crystallizer assembly to the floor stand assembly using the supplied bolts.

 **NOTE:** Make sure that the fork lift tubes are in line with the open side of the floorstand.



Tools for installation:

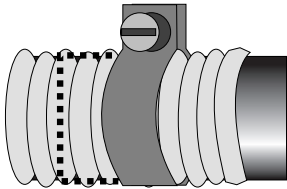
- Forklift, hoist, or crane
- Appropriate size wrenches or sockets and ratchets

Connecting the Process Air Hose to the Agitating Hopper Air Inlet

Mounting

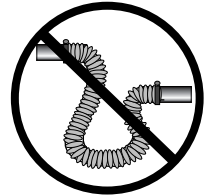
Hardware:

- One hose clamp




1 Route the process air hose to the process air inlet on the removable cone section using the short insulated hose section. Attach the other end to the process heater outlet.

2 Route the process air hose to the process air inlet on the removable cone section using the short insulated hose section. Attach the other end to the process heater outlet.




3 With the supplied hose clamp loosely on the process air hose, slide the hose onto the process air inlet tube and the heater outlet.

 **NOTE:** Do not allow the flexible hoses to kink or crimp.

4 Tighten the clamps to secure the process air hose to the air inlet and heater outlet.

Tools for installation:

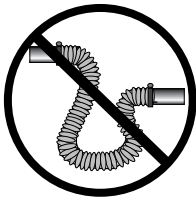
- Flat blade screwdriver
- Ladder

 **CAUTION:** Because of the high temperature of the air passing through the process air hose, insulation should be installed on the hose in any area where it can be accidentally touched during crystallizer operation.




Connecting the Return Air Hose to the Cyclone Separator (Option)

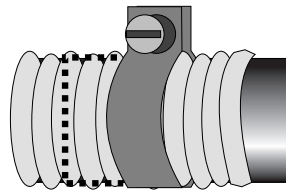
1 The crystallizer is shipped with the return air hose that needs to be connected to the agitating hopper outlet. Use the supplied hose to interconnect. **Route the return air hose from the hopper outlet to the return air inlet on the cyclone separator.**



2 With the supplied hose clamp loosely on the return air hose, **slide the hose onto the return air inlet tube** on the cyclone separator.

3 **Tighten the clamp** to secure the return air hose to the return air inlet.

 **NOTE:** Do not allow the flexible hoses to kink or crimp.




Mounting Hardware:

- One hose clamp (if supplied)

Tools for installation:


- Flat blade screwdriver
- Ladder

 **CAUTION:** Because of the high temperature of the air passing through the return air hose, insulation should be installed on the hose in any area where it can be accidentally touched during crystallizer operation.

 **NOTE:** The cyclone may be mounted on a stand or self-standing.

Installing the Process RTD Probe

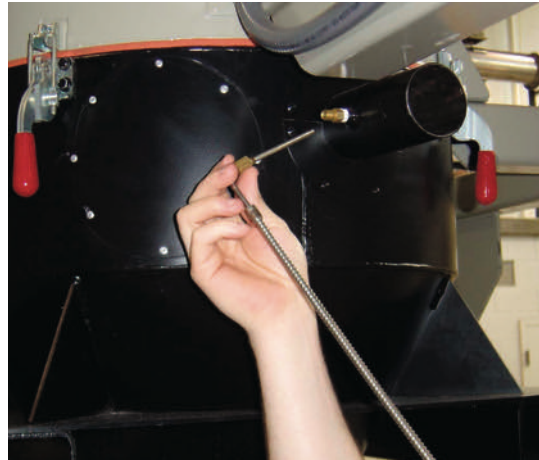
The Process RTD Probe monitors the temperature of the process air as it enters the agitator hopper air inlet. If the probe is not installed correctly, temperature readings will be inaccurate.

 **NOTE:** The process RTD probe may have been connected to the crystallizer control panel enclosure and temporarily secured to the process air hose before the unit was shipped. Free the RTD probe from the process air hose and examine its connection at the crystallizer control panel to ensure it is still properly connected. If the probe is not connected to the control panel, connect it now.



Tools for installation:

- Appropriate size wrench



1 Route the process RTD probe to the process air inlet on the removable cone section.

2 Insert the process RTD probe at the process air inlet on the agitator hopper. The end of the probe **MUST NOT** touch the walls of the inlet. The tip of the probe should be approximately in the center of the tube. Tighten the nuts to lock the probe in place.

3 Coil any excess cable and secure it with a wire tie.

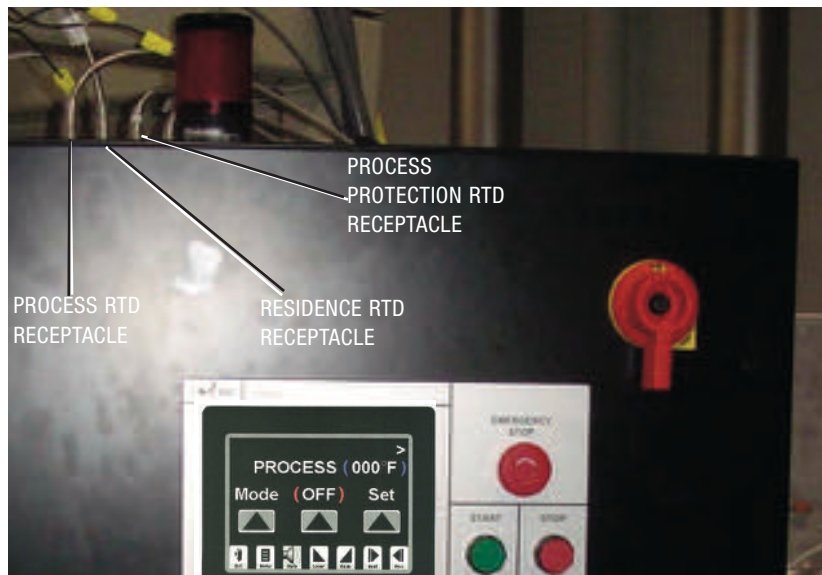
Connecting the Residence RTD Probe

The residence RTD probe monitors the temperature of the material within the agitating hopper. If the probe is not installed and connected correctly, temperature readings will be inaccurate.



1 Route the residence RTD cable to the top of the crystallizer control panel enclosure.

2 Plug the probe's cable into the residence RTD receptacle on the top of the crystallizer control panel enclosure. The receptacle is the second from the left when viewed from the front of the control panel enclosure. Hand tighten the connector. Coil any excess cable and secure it with a wire tie.



NOTE: The residence RTD probe was mounted in the agitating hopper before the unit was shipped. Inspect the mounting to ensure it was not damaged during shipping or unpacking.

Tools for installation:

- Ladder

NOTE: If the process protection RTD has not yet been connected to the control panel enclosure, make that connection now. The process protection RTD connection is the third from the left when viewed from the front of the control panel enclosure.

Installing the Rotary Discharge Valve


The rotary discharge valve and material discharge chute were shipped with the crystallizer but not mounted to the unit. Follow the instruction below to install the rotary discharge valve and material discharge chute.

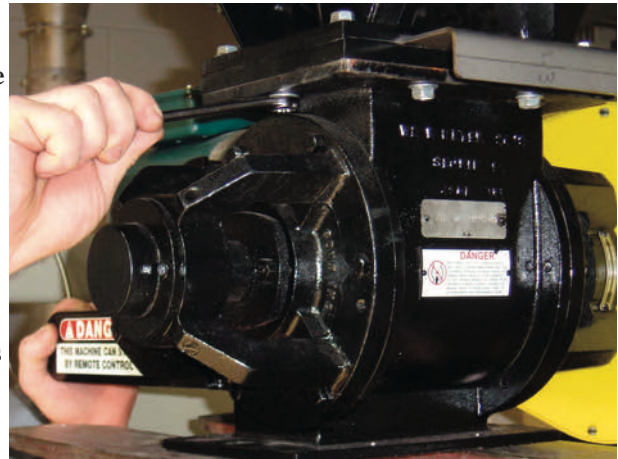
1 Using a forklift, hoist, or crane, **raise the rotary discharge valve up to the slide gate** on the bottom of the removable cone section.

2 **Align the holes in the discharge valve with the tapped holes in the slide gate mechanism.**

3 **Secure the discharge valve to the slide gate mechanism** using the four self-locking bolts supplied.

4 **Align the holes in the material discharge chute with the holes at the bottom of the delivery auger.** Secure the material discharge chute to the delivery auger using the four self-locking bolts supplied.

 **NOTE:** The fill level sensor in the material discharge chute should be oriented towards the rear of the crystallizer.




Tools for installation:

- Forklift, hoist, or crane
- Appropriate size wrenches or sockets and ratchets
- Ladder

Installing the Rotary Discharge Valve

(continued)

 **CAUTION:** Always refer to the wiring diagrams that came with your crystallizer before making electrical connections. Electrical connections should be made only by qualified personnel.



5 Route the power / control quick connect cable from the crystallizer control panel enclosure to the rotary discharge valve. The connector will be a 4 pin connector and will be exiting from the bottom of the control enclosure.


6 Connect the power / control quick connect cable to the receptacle on the discharge valve.

7 Route the quick connect cable for the fill level sensor from the crystallizer control panel enclosure to the fill level sensor.

8 Connect the quick connect cable to the receptacle on the fill level sensor.

9 Coil any excess cables and secure with wire ties. Make sure you leave enough slack so the cables can be disconnected to allow for cleaning of the removable cone section.



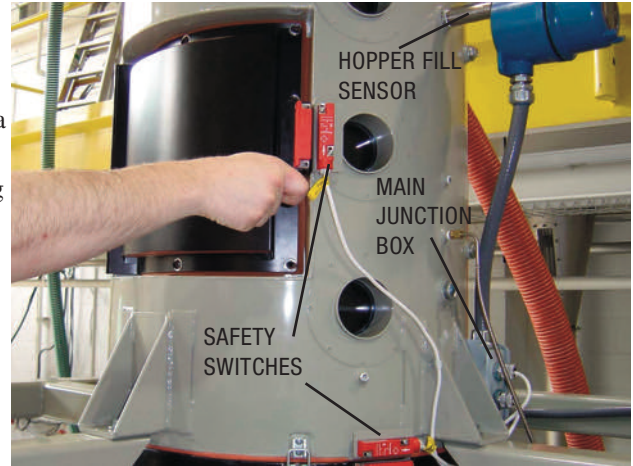
 **NOTE:** Rotation will be checked later.

Connecting the Load Level Sensor, Safety Switches, and Loader

⚠ CAUTION: Always refer to the wiring diagrams that came with your crystallizer before making electrical connections. Electrical connections should be made only by qualified personnel.

✎ NOTE: The load level sensor was installed in the agitating hopper before the unit was shipped. Inspect the mountings to ensure they were not damaged during shipping or unpacking.

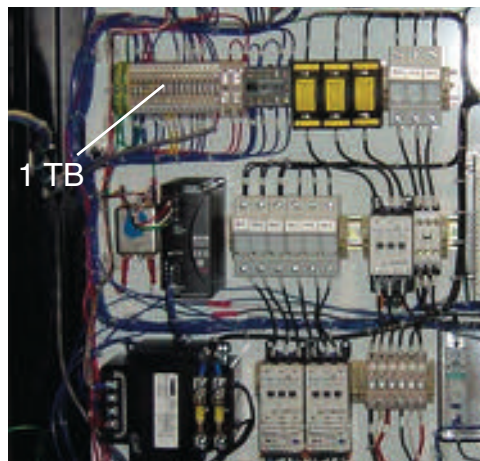
The wires for the load level sensor and safety switches are routed to a main junction box on the side of the agitating hopper before shipment. The cable exiting the junction box must be routed and connected in the control panel enclosure.



Tools for installation:

- Flat blade screwdriver
- Ladder

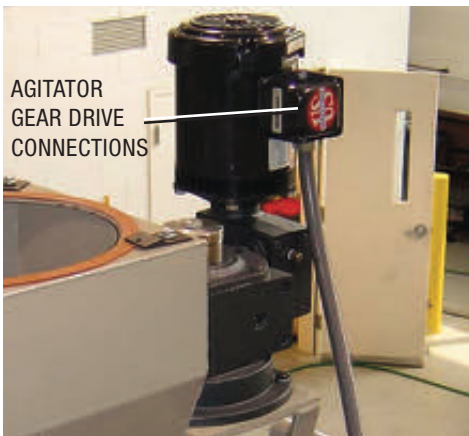
1 Route the 8 pin yellow cable from the main junction to the right side of the crystallizer control panel then into the control panel enclosure through existing holes.



Connecting the Agitator Gear Drive to the Control Panel

⚠ CAUTION: Always refer to the wiring diagrams that came with your crystallizer before making electrical connections. Electrical connections should be made only by qualified personnel.

✎ NOTE: The connections at the agitator gear drive were made before the unit was shipped. Inspect the connections to ensure they were not damaged during shipping or unpacking.



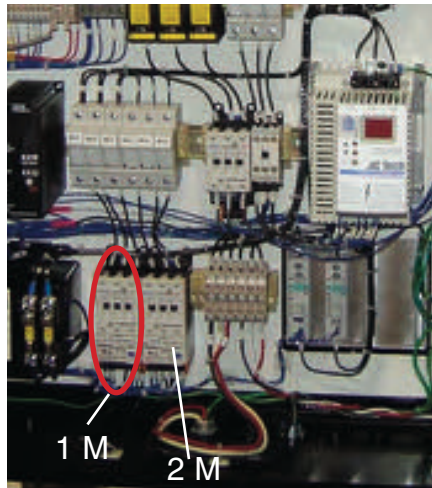
1 Route the cable from the agitator gear drive to the crystallizer control panel then into the control panel enclosure.

2 Refer to the wiring diagram supplied with the crystallizer to confirm the correct connection point within the control panel enclosure.

3 Connect the wires from the agitator gear drive to the agitator contactor (1 M terminals).

4 Coil any excess cable from the agitator gear drive and secure it with wire ties.

✎ NOTE: Rotation will be checked later.



Tools for installation:

- Flat blade screwdriver
- Ladder

Installing a High Temperature Loader

Tools for installation:

- Forklift, hoist, or crane
- Dependent on application

•➡ **Tip:** Conair recommends that a high temperature loader be installed in a crystallizer system purchased from Conair for recirculation of material during startup.

If a high temperature loader is to be mounted to the top of the agitating hopper, follow the installation instructions, specifications, and wiring diagrams supplied with the loader. Also refer to the loader's installation instructions and operations manual for power, level switch, and compressed air connections / specifications.

Installing Additional Level Sensors

There are additional level sensors that could be placed in the crystallizing system.

To add the high level sensor:

- 1 Place the high level sensor in the discharge chute of the material discharge (gaylord fill).**
- 2 Route the 5 (five) pin yellow cable from the bottom of the crystallizer control enclosure to the sensor and plug it in.** Operation will be checked during start up.

To add the optional low level sensor:

- 1 Place the low level sensor at the bottom of the surge bin.** This senses low level.
- 2 Route the 6 (six) pin yellow cable from the bottom of the crystallizer control enclosure to the sensor and plug it in.** Operation will be checked during start up.

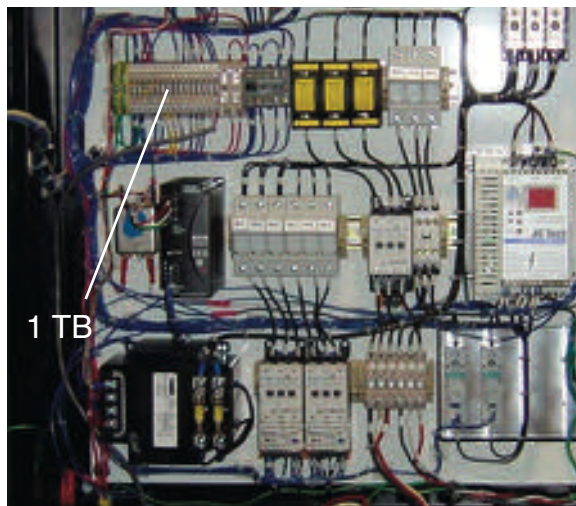
Connecting the Loader Demand Cable (If an Optional Loader Is Installed on the Crystallizer)

⚠ CAUTION: Always refer to the wiring diagrams that came with your crystallizer before making electrical connections. Electrical connections should be made only by qualified personnel.

- 1** Route the cable from the loader to the right side of the crystallizer control panel then into the control panel enclosure through existing hole.
- 2** Refer to the wiring diagram supplied with the crystallizer to determine the correct connection point within the control panel enclosure.
- 3** Connect the wires from the loader to the 1 TB terminals in the crystallizer control panel.

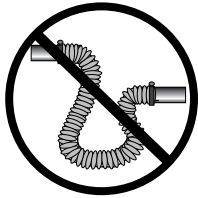
📎 NOTE: If the loader was supplied by Conair, the connection was made. *See Installation section entitled, Connecting the Load Level Sensor, Safety Switches, and Loader.* Simply connect the cable to the UTB on the loader. If your loader was not supplied by Conair, you will need to wire the loader into the cable that is extending from the junction box.


📎 NOTE: Refer to the information supplied with your loader for more specific instructions regarding loader demand. *See Operation section entitled, Control Function Description, for information on control screens 16 and 16A which are used to set loader demand.*



Tools for installation:

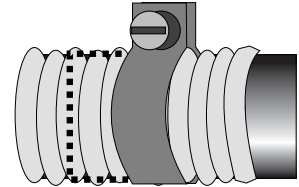
- Flat blade screwdriver
- Ladder



 **NOTE:** Do not allow the flexible hoses to kink or crimp.


Connecting Process Blower to Process Heater Inlet


- 1** On CR21 - CR135 crystallizers the process blower is a self-standing blower. This will need connected to the process heater inlet using the supplied un-insulated hose.
- 2** With the supplied hose clamp loosely on the process air hose, **slide the hose onto the process air inlet tube.**
- 3** **Tighten the clamp** to secure the process air hose to the air inlet. (Rotation will be checked later.)



 **NOTE:** See Appendix section entitled, "Blower Installation and Maintenance" for more information.

Connecting the Process Blower to the Control Panel

 **CAUTION:** Always refer to the wiring diagrams that came with your crystallizer before making electrical connections. Electrical connections should be made only by qualified personnel.

 **NOTE:** The connections at the process blower were made before the unit was shipped. Inspect the connections to ensure they were not damaged during shipping or unpacking.

On larger units (CR21, CR42, CR85 and CR135) that have a self-standing blower the connection will need to be made from the blower to the control enclosure.

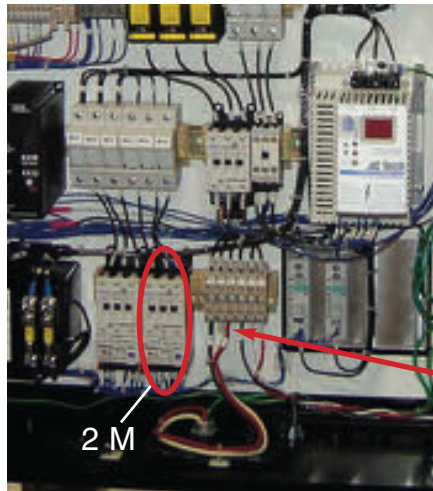
1 Route the cable from the process blower to the crystallizer control panel then into the control panel enclosure.

2 Refer to the wiring diagram supplied with the crystallizer to confirm the correct connection point within the control panel enclosure.

3 Connect the wires from the process blower to the blower contactor (2 M terminals).


4 Coil any excess cable from the process blower and secure it with wire ties.

 **NOTE:** Rotation will be checked later.



Tools for installation:

- Flat blade screwdriver
- Ladder

 **NOTE:** The heater wires are often connected at the factory and shipped connected. If your heater is not connected, refer to your wiring guide to make the connections.

Connecting the Main Power



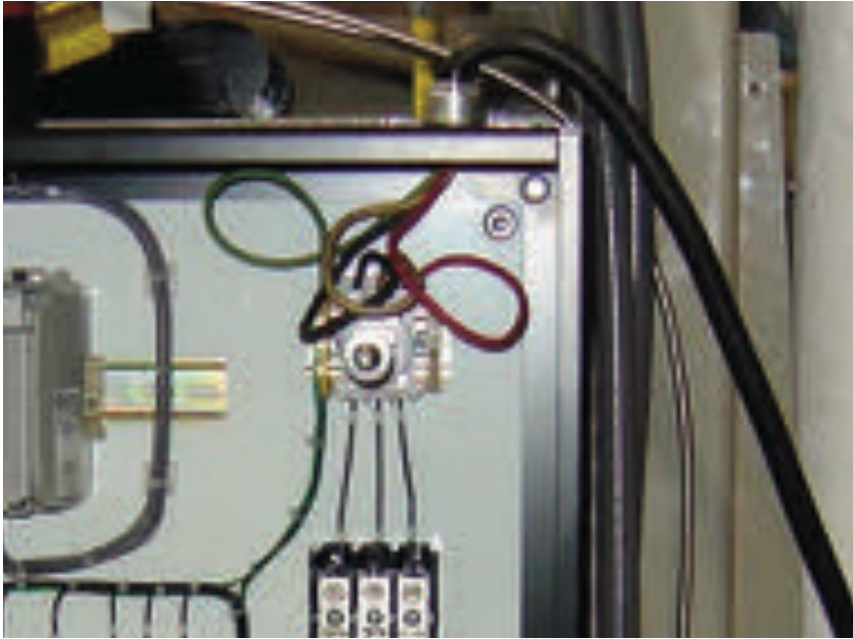
CAUTION: Always disconnect and lock out the main power sources before making electrical connections. Electrical connections should be made only by qualified personnel.

- 1 Turn the disconnect dial on the crystallizer control panel door to the Off or “O” position.** Lock out the main power (see Page 1-5 for complete lock out information). Open the control panel door to access the crystallizer’s electrical enclosure.



- 2 Insert the main power wire through the knockout in the top of the enclosure.** Secure the wire with a rubber compression fitting or strain relief.

Connecting the Main Power (continued)



IMPORTANT: Always refer to the wiring diagrams that came with your crystallizer before making electrical connections.

- 3** Connect the power wires to the three terminals at the top of the power disconnect holder.
- 4** Connect the ground wire to the ground lug as shown in the photo.

Checking for Proper Rotation and Operation of Crystallizer Components (Models CR4 and CR10)



CAUTION: Always disconnect and lock out the main power sources before making electrical connections. Electrical connections should be made only by qualified personnel.

All components were tested at Conair and verified to be in phase. When these items were disconnected before shipment and reconnected by the installer they could have been wired out of phase.

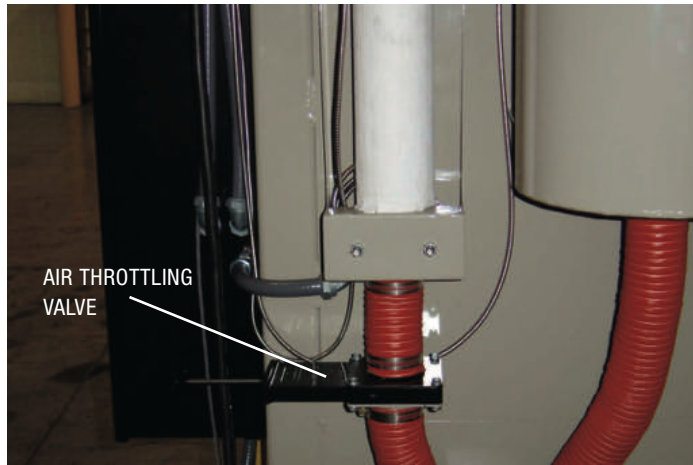


IMPORTANT: This procedure must be performed before loading material into the hopper.



CAUTION: This step must be performed before the crystallizer is put into operation.

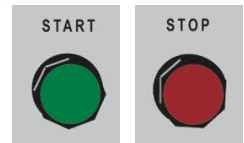
1 Open the air-throttling valve located between the blower and the heater.



2 Turn on the main power to the crystallizer. Make sure the crystallizer's disconnect dial is in the ON position. This powers up the control.



3 Press the Start button (for no more than 5-10 seconds) followed by the Stop button. Pressing the Start button will cause the blower to start “winding-up” and pressing the Stop button cuts the power to the blower which will take a few seconds to “wind down”.



Checking for Proper Rotation and Operation of Crystallizer Components (Model CR4 and CR10) *(continued)*

4 Place your hand over the process air filter intake.

If suction is present, the crystallizer has been wired in phase.
If you feel air blowing from the intake, the crystallizer has been wired out of phase and must be rewired.

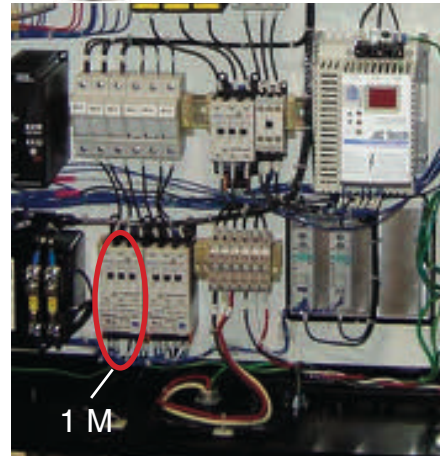
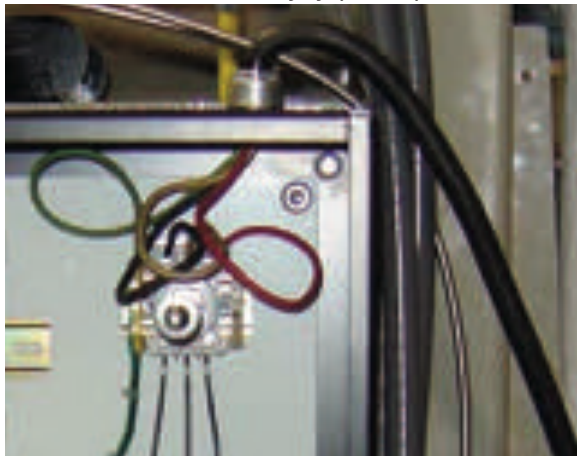
5 Verify that the rotation of the agitator gear box on the top of the crystallizer is correct. From the top looking downward, rotation should be clockwise.

6 If both air flow and agitator rotation are incorrect simply switching two of the three incoming lines will put the entire unit in correct rotation.

If rotation is incorrect on the agitator, then two of the three wires will need to be switched on the contactor that is feeding the agitator gear drive (1M).



CAUTION: Always disconnect and lock out the main power sources before making electrical connections. Electrical connections should be made only by qualified personnel.



WARNING: All wiring, disconnects, and fuses should be installed by qualified electrical technicians in accordance with electrical codes in your region. Always maintain a safe ground. Do not operate the equipment at power levels other than what is specified on the machine serial tag and data plate.

Checking for Proper Rotation and Operation of Crystallizer Components (*Models CR21, CR42, CR85, and CR135*)



CAUTION: Always disconnect and lock out the main power sources before making electrical connections. Electrical connections should be made only by qualified personnel.



IMPORTANT: This procedure must be performed before loading material into the hopper.



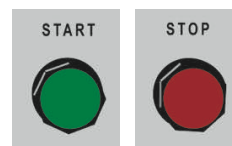
CAUTION: This step must be performed before the crystallizer is put into operation.

1 Open the air-throttling valve located between the blower and the heater.



2 Turn on the main power to the crystallizer. Make sure the crystallizer's disconnect dial is in the ON position. This powers up the control.

3 Press the Start button (for no more than 5-10 seconds) followed by the Stop button. Pressing the Start button will cause the blower to start “winding-up” and pressing the Stop button cuts the power to the blower which will take a few seconds to “wind down”.



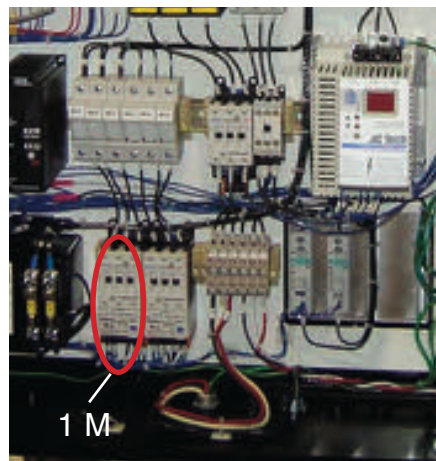
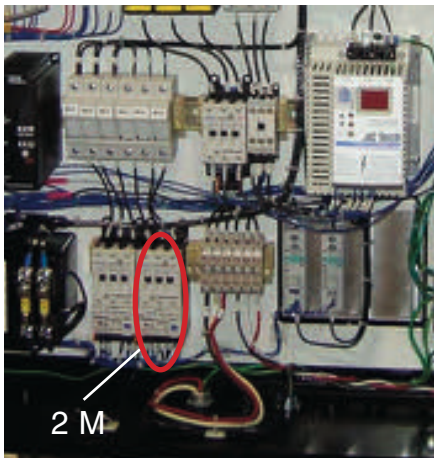
Checking for Proper Rotation and Operation of Crystallizer Components (Models CR21, CR42, CR85, and CR135)

(continued)

- 4** Verify that the process blower impeller is rotating correctly according to the rotation arrow.
- 5** Verify that the rotation of the agitator gear box on the top of the crystallizer is correct. From the top looking downward, rotation should be clockwise.
- 6** If both air flow and agitator rotation are incorrect, switch two of the three wires on contactor 2M.
If rotation is incorrect on the agitator, then two of the three wires will need to be switched on the contactor that is feeding the agitator gear drive (1M).



CAUTION: Always disconnect and lock out the main power sources before making electrical connections. Electrical connections should be made only by qualified personnel.



WARNING: All wiring, disconnects, and fuses should be installed by qualified electrical technicians in accordance with electrical codes in your region. Always maintain a safe ground. Do not operate the equipment at power levels other than what is specified on the machine serial tag and data plate.

Checking for Proper Rotation and Operation of Crystallizer Components- Material Discharge Rotation Models CR21, CR42, CR85 and CR135 (continued)



IMPORTANT: This procedure must be performed before loading material into the hopper.

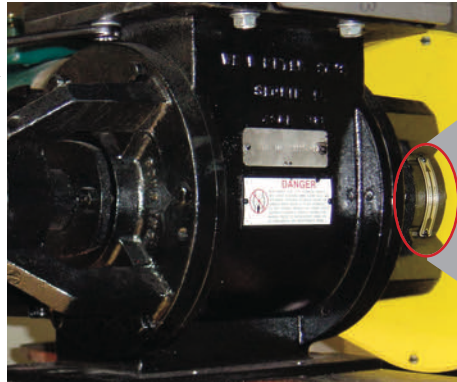


CAUTION: This step must be performed before the crystallizer is put into operation.



CAUTION: Always disconnect and lock out the main power sources before making electrical connections. Electrical connections should be made only by qualified personnel.

- 1** With power on to control, set crystallizer mode to manual. *See Operation section entitled, Control Function Flow Charts.*
- 2** Enable material discharge. *See Operation section entitled, Control Function Flow Charts.*
- 3** Discharge should start. Look at rotation of shaft on the material discharge.



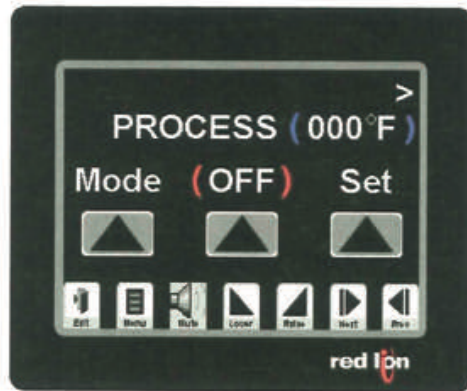
NOTE: Refer to the arrow on the side of the discharge. Rotation should be in the direction of the arrow.

- 4** If incorrect, switch the wires from the VFD to the motor.

Testing the Installation

You have completed the installation. Now it's time to make sure everything works.

- 1 Make sure there is no material in the agitating hopper.** If you have mounted a loader or vacuum receiver on the hopper, disconnect the material inlet hose at the source.
- 2 Turn on the main power to the crystallizer.** Make sure the crystallizer's disconnect dial is in the ON position. This powers up the control.
- 3 Set the process temperature.** Use the soft keys and numeric keypad to set the process and residence temperatures *See Operation section for more detailed instructions.*



4 Press the START button.

If everything is installed correctly:

- The process blower turns on.
- The process heater turns on.
- The agitator turns on.



5 Press the STOP button.

If everything is installed correctly:

- The process blower will continue running as needed to cool the heater.



- 6 The test is over.** If the crystallizer performed the normal operating sequences as outlined, you can load the agitating hopper and begin operation. If it did not, *see Troubleshooting section for more detailed instructions.*

Operation

| | |
|--|------|
| Crystallizer control panel | 4-2 |
| Control function flow charts | 4-3 |
| Control function description | 4-8 |
| Crystallizer initial setup | 4-21 |

Crystallizer Control Panel

The crystallizer control panel provides an intuitive, user-friendly method to interface with the crystallizer. Information is viewed and entered at the control panel.

Soft Keys

The soft keys are denoted by the arrowhead on each. During setup and operation, the operator can use these keys to choose the next "page" to be accessed. Text will appear directly above the key identifying its current function. Think of the text as the soft key function indicator or title. The soft keys will be referred to in this manual from left to right as SK 1, SK 2, and SK 3 respectively.

LCD Screen

The screen shows various information and pages depending on operator actions. In addition, it is used to indicate warnings and alarms. It is used mostly for viewing the status of the crystallizer and for setting parameters.

Red Parenthesis

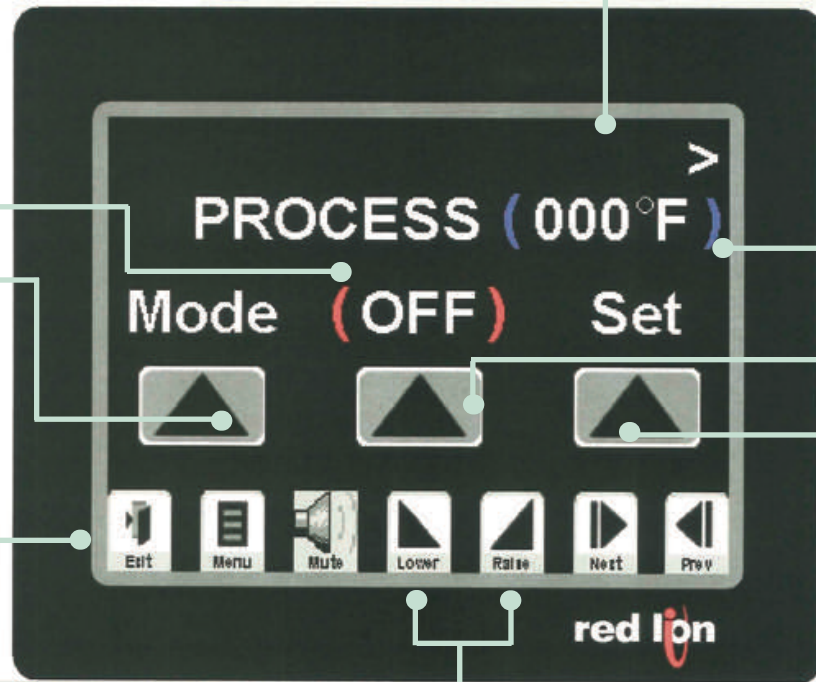
The red parenthesis indicates that material is being held because it has not been in the hopper at temperature long enough.

SK 1

Soft key #1

Fixed Function Keys

The fixed function keys are located below and to the sides of the numeric keys. They contain universal symbols and text. The fixed function keys are Exit, Menu, Mute, Lower, Raise, Next, and Prev (previous).



Blue Parenthesis

The blue parenthesis indicates that Setback (option) is in operation and heater is working properly.

SK 2

Soft key #2

SK 3

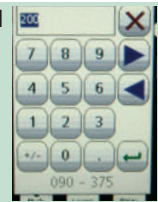
Soft key #3

Lower and Raise

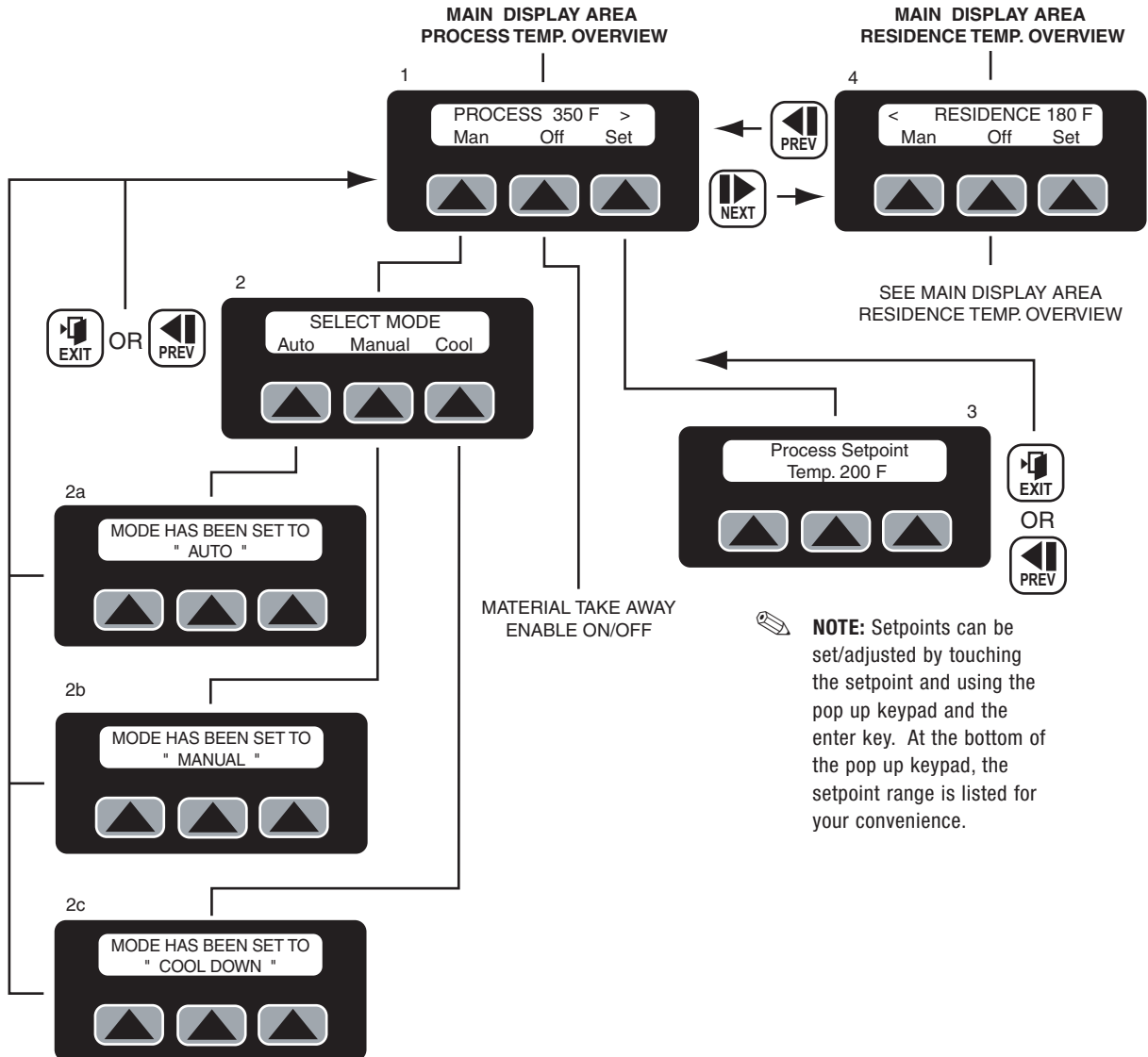
The Lower and Raise keys are used to adjust the speed of the material discharge. Lower decreases material discharge speed. Raise increases material discharge speed.

Pop Up Numeric Keypad

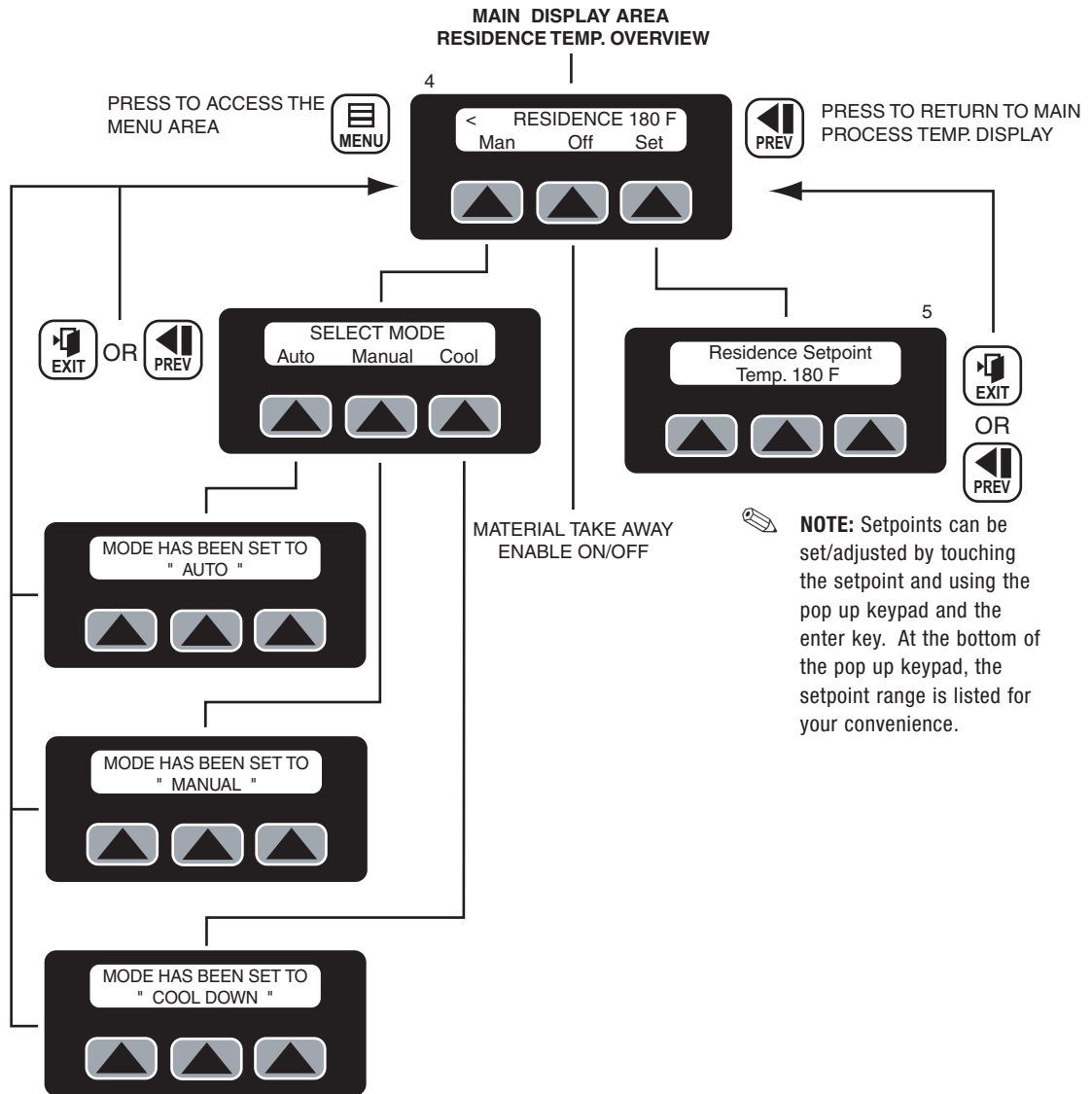
A pop up window (which opens when you press on a setpoint) has keys numbered 0 through 9. The numbers permit data entry of the parameters.



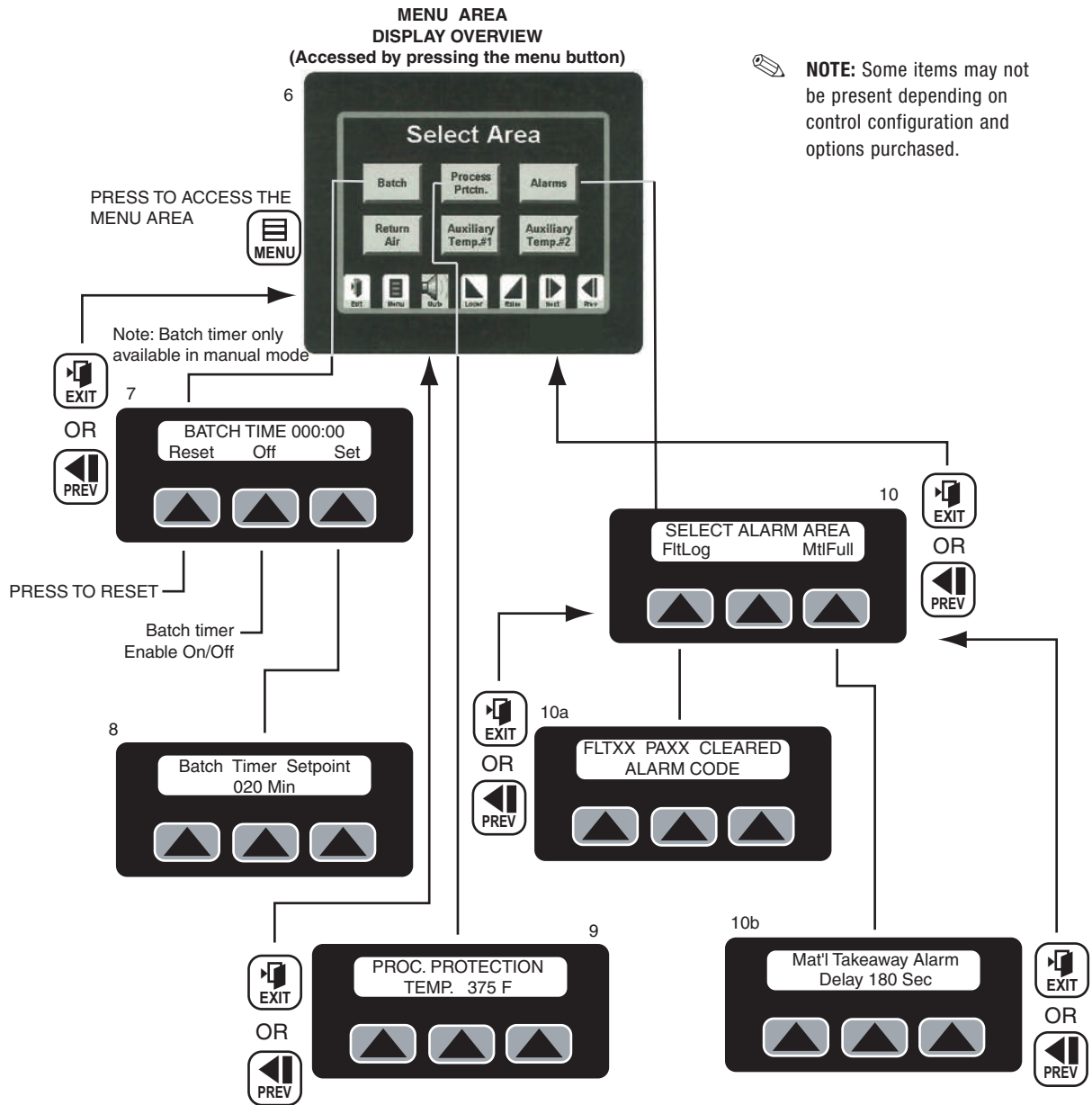
Control Function Flow Charts



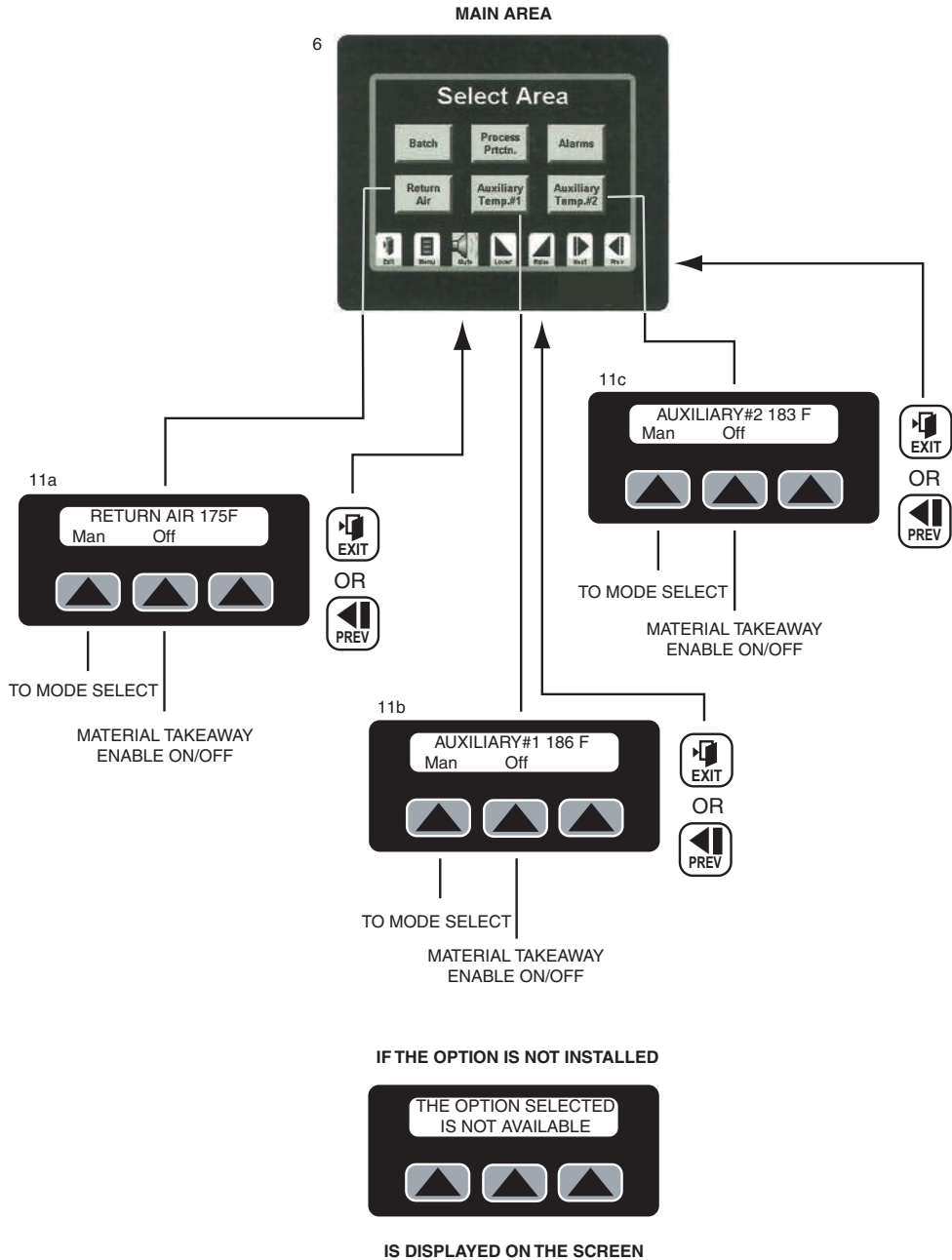
Control Function Flow Charts (Cont.)



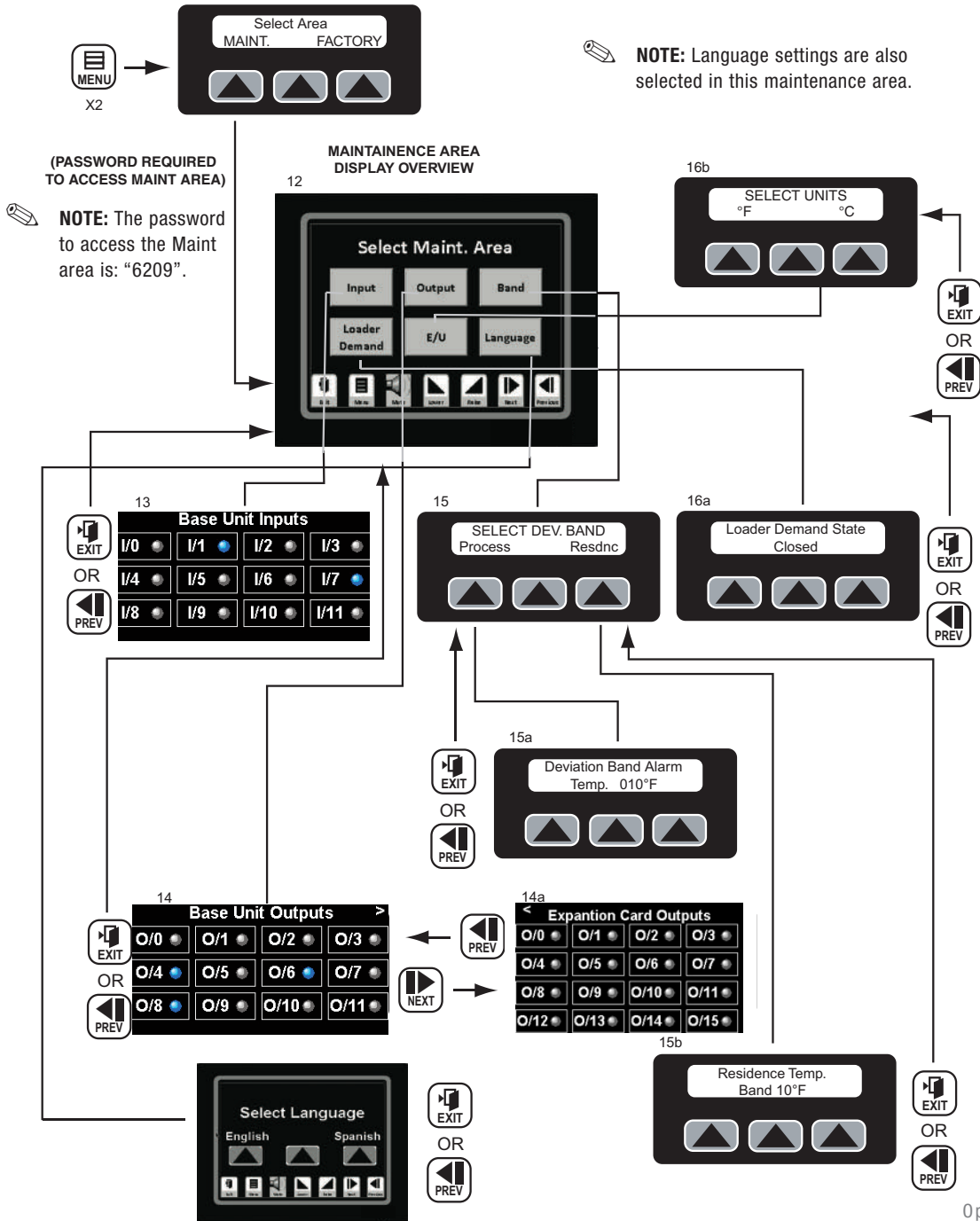
Control Function Flow Charts (Cont.)



Control Function Flow Charts (Cont.)




Control Function Flow Charts (Cont.)



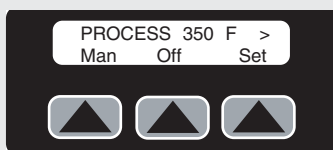
Control Function Description

This section describes the control function screens, how to set the crystallizing parameters, and how to navigate between the control screens.

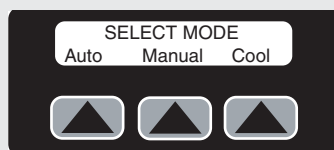
 **NOTE:** Throughout this section, Soft Key 1 will be referred to as "SK 1", Soft Key 2 as "SK 2", and Soft Key 3 as "SK 3".

Screen

SCREEN 1



SCREEN 2



Function

After initialization, the Process Temperature screen is visible. The default display for this screen is the **actual** process temperature. This is the actual temperature of the air that is being delivered to the crystallizing hopper. From this screen, you can select several options. By pressing SK 1, the Operating Mode of the discharge can be changed. By pressing SK 2, the Discharge can be toggled on or off. By pressing SK 3, the Process Temperature Setpoint can be changed. This is the main control screen and the screen will always default to this screen.

Pressing SK 1 from the Process Temperature screen (Screen 1) will allow you to change the Operating Mode of the crystallizer. This is a very important selection and **should be selected on the basis of how the crystallizer will be operated.**



NOTE: This SK 1 selection is available on each Mode screen to allow the user to toggle between modes.

If, after accessing the Select Mode screen, you decide not to change the Operating Mode, simply press the EXIT or PREV fixed function keys to return to the Process Temperature screen.

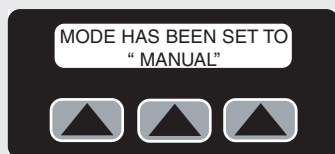
Control Function Description (Cont.)

Screen

SCREEN 2a



SCREEN 2b



SCREEN 2c



Function

Auto Mode Selection - This mode should be selected (SK 1) for an on-line process when the crystallizer is feeding a continuous process(s) and the material is being discharged at a rate that co-corresponds with the amount of material that is being loaded into the crystallizer. When running in Automatic Mode, there are a few factors that will control the operation of the discharge valve. The first is residence temperature, the second is the material hopper level, and the third is the hopper discharge material level.

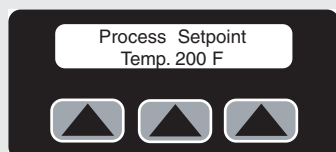
Manual Mode Selection - This mode should be selected (SK 2) when the operator will be controlling the operation of the discharge manually. The discharge will not be controlled from the residence temperature, however, the residence temperature will create a passive alarm if set improperly. This mode should be used when the initial heel of crystalline material is being made or a single batch of material is being processed. In this mode the discharge valve can be opened with the crystallizer stopped or running.

Cool Down Mode Selection - This mode can be selected (SK 3) to cool down a batch of material before discharging the material from the crystallizing hopper. It is important to note that the material can only be cooled down to a temperature above the lowest temperature that can be supplied to the crystallizing hopper. Most likely, this temperature will be about 130°F (54.4°C). It should be sufficient to cool the material to a level so it can be safely discharged to Gaylord.

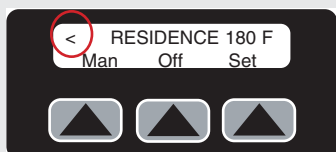
Control Function Description (Cont.)

Screen

SCREEN 3



SCREEN 4



Function

To change the air temperature delivery setpoint or process setpoint, from Screen 1 press SK 3 (Set). When pressed, you will move to the Process Setpoint screen, which allows you to view and change the actual process setpoint. To change this value, use the numeric keypad and enter the new value at which you would like to process material. When done, press ENTER to accept the new value.

If, after accessing the Process Setpoint screen, you decide not to change the setpoint, simply press the EXIT or PREV fixed function keys to return to the Process Temperature screen.

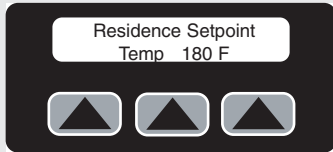
In the upper right corner of the Process Temperature screen (Screen 1), there is a right carrot. By selecting the NEXT fixed function key, you enter the Residence Temperature screen. This screen displays the actual temperature of the material as sensed by the RTD probe located $2/3^{\text{rds}}$ of the way up the crystallizer hopper body. This temperature is an important part of the process and ensures that the material is maintaining a temperature sufficient for the crystallizing process to occur. Once the crystallizer is running and has reached stabilization, the actual residence temperature should be noted. This is about where the unit will continue to run as long as the throughput remains constant and the incoming material level stays full.

If, after accessing the Residence Temperature screen, you decide not to change the residence temperature, simply press the EXIT or PREV fixed function keys to return to the Process Temperature screen.

Control Function Description (Cont.)

Screen

SCREEN 5



Function

Once the correct value for the residence temperature is known, it should be entered into the control as a controlling factor for the process. By pressing SK 3 (Set) on the Residence Temperature screen (Screen 4), you will access the Residence Setpoint screen that allows you to enter the value that was determined as a stabilization point. Depending on the operating mode selected, if this actual residence temperature deviates below this setpoint temperature by 10°F (5.5°C) (the default setting), the discharge will stop and not run until the residence temperature reaches this value again.

If, after accessing the Residence Setpoint screen, you decide not to change the residence setpoint, simply press the EXIT or PREV fixed function keys to return to the Residence Temperature screen.

Residence Temperature Impact on Automatic Mode -

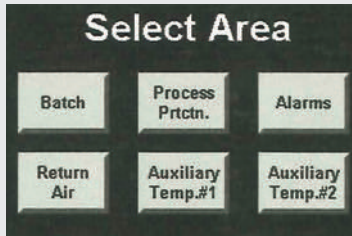
Once the actual residence temperature is reached, the auger can be enabled (this does not occur automatically, it must be enabled once the residence setpoint is reached). Once the discharge is enabled, it will run as long as the material discharge level sensor is uncovered, the material hopper level stays covered, and the residence temperature stays equal to the set level (within 10°F [5.5°C]). If the temperature falls 10°F (5.5°C) below this setpoint, alarm PA 1 will flash and the discharge will disable until the temperature comes back in the 10°F (5.5°C) deviation band. When it does, the discharge will re-enable and start to discharge material again.

Control Function Description (Cont.)

Screen

SCREEN 5 (Cont.)

SCREEN 6




Function

Residence Temperature Impact on Manual Mode -

Residence temperature does not disable the discharge while running in the Manual Mode. In Manual Mode, the residence temperature can be used for monitoring the process but it will not control the process. This mode should be used when the unit is running a small batch or the material is being circulated on start up to make the initial pre-charge of crystalline material. If a tighter constraint needs to be held on the process, the crystallizer should be run in Automatic Mode. To take advantage of all of the alarms, the unit should be run in Automatic Mode.

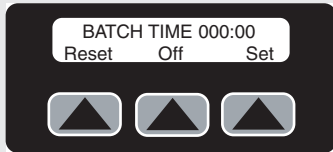
By pressing the MENU fixed function key one time, you can access the SELECT AREA screen. From this main menu screen, there are six selections. Batch, Process Protection, Alarms, Return Air, and the Auxiliary Temperature areas can be accessed by pressing the appropriate button.

 **NOTE:** If an option is not enabled, the button will not be displayed.

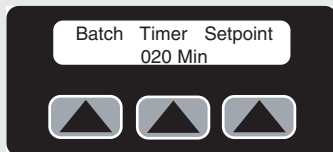
Control Function Description (Cont.)

Screen

SCREEN 7




SCREEN 8



Function

By pressing BATCH on the Select Area screen (Screen 6), you will access the Batch Timer screen. This is useful if you would like to agitate and heat a batch of material for a known length of time.

 **NOTE:** This selection is only available in the Manual Mode and cannot be selected in any other mode.

If the unit is in the Manual Mode and the Batch Timer is currently running, the actual incrementing accumulated time will be displayed on this screen. If SK 1 (Reset) is selected, the timer-accumulated value will be reset to zero. SK 2 (Off / On) enables and disables the Batch Timer.

By pressing SK 3 (Set) on the Batch Timer screen (Screen 7), you can enter the desired Batch Time Setpoint for which you would like to crystallize the current batch. Once the desired batch time is entered through the numeric keys, press ENTER. If, after accessing the Batch Time Setpoint screen, you decide not to set the batch setpoint, simply press the EXIT or PREV fixed function keys to return to the Batch Timer screen

Once a value is keyed in for a Batch Time, you will be sent back to the Batch Timer screen. To enable the timer, press SK 2 (Off / On) and the timer will start to accumulate to the batch setpoint. When the accumulated value reaches the preset value, an alarm (PA 8) will sound and indicate that the batch is ready to be discharged. When the alarm (PA 8) is acknowledged, the timer will automatically reset and the Batch Mode will switch to Off.

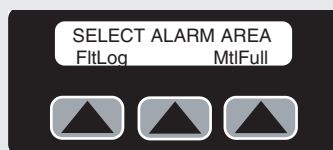
Control Function Description (Cont.)

Screen

SCREEN 9



SCREEN 10



SCREEN 10a



Function

By pressing Prtctn from the SELECT AREA screen (Screen 6), the user will be able to view the Process Protection Temperature. This is the temperature of the process air at the outlet of the heater tube(s) and is a valuable troubleshooting tool if a temperature problem arises. This is the actual value that the Process Protection Temperature Differential is monitoring along with the actual Process Temperature.

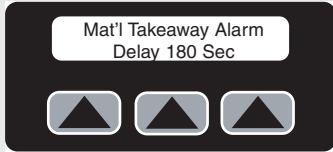
By pressing Alarm from the main SELECT AREA screen (Screen 6), the user can access two commonly used alarms areas. These areas are accessible from SK 1 (FltLog [Fault Log]) and from SK 3 (MtlFull [Material Full]).

The FltLog (fault log) is an actual log of the last 20 alarms that occurred for the crystallizer. This screen will show the fault log number (FLT 0 - FLT 19), what alarm the fault is (PA 1 - PA 8) or (AL 1 - AL 14), if the alarm is still active or cleared, and what the description of the actual code is (much like what is displayed on the screen when an actual alarm occurs). This log will run as "first in" and "first out" so after the first alarm is logged, it will cycle out of the log after 19 additional alarms are encountered. To scroll between Fault Logs, press the NEXT or PREV fixed function keys.

Control Function Description (Cont.)

Screen

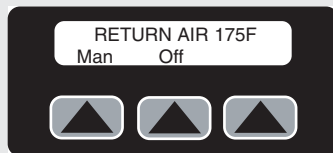
SCREEN10b




Function

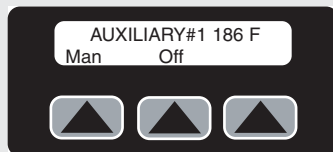
The MtlFull (material full) alarm is the time delay from when the material discharge level sensor is made until the passive alarm (PA 6) is displayed. This alarm should be set at a value sufficient to notify you if a problem has occurred downstream of the crystallizer and material is no longer being taken away from the crystallizer. When this alarm occurs, the material discharge will stop until the level sensor clears itself of material.

SCREEN 11a

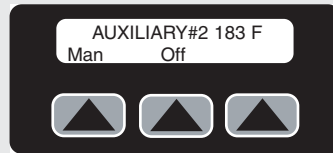


To view the optional Return Air RTD (if purchased), press Return Air to view the return air temperature of the process return air temperature at the blower inlet.

 **NOTE:** This is only used for closed looped operation where the return air temperature of the blower is critical.



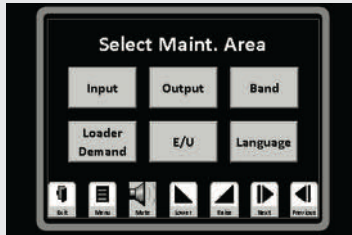
The two additional RTD's (Auxiliary Temp. #1) and (Auxiliary Temp. #2) respectively are for monitoring two other locations in the crystallizer hopper body. These are also optional and added for customers who require additional material monitoring capabilities.



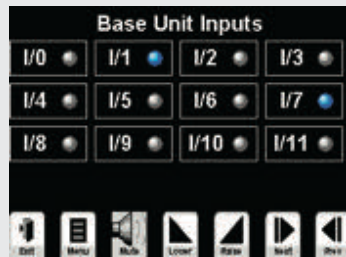
Control Function Description (Cont.)

Screen

SCREEN 12



SCREEN 13



Function

By pressing the MENU fixed function key two times (or once from SELECT AREA screen [Screen 11]), you will enter a SELECT AREA screen that allows you to view two selections: SK 1 (MAINT.) and SK 3 (FACTORY). You should not need to enter the FACTORY setup menu. By pressing SK 1 (MAINT.) and keying in the correct password through the keypad when prompted (default password for this area is 6209), you will enter a SELECT MAINT. AREA screen. From this screen you will be able to view, monitor, or change six separate areas (Input Status, Output Status, and Deviation Band, Loader Demand, Units F or C, and Language).

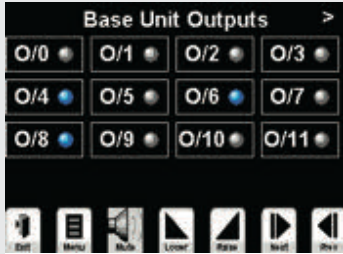
By pressing Input Status on the MAINT. AREA screen (Screen 12), you will be able to view the state of base unit inputs that the PLC is monitoring. This is a very handy troubleshooting screen and will allow the user to ensure that the correct inputs are on or off as necessary. Viewing from the left to the right, the table should decrease in order from input 11 to input 0. The base unit inputs are below:

| | | |
|----|---|---------------------------------------|
| 11 | = | Spare |
| 10 | = | Material takeaway level sensor |
| 9 | = | Loader demand |
| 8 | = | Variable speed discharge fault |
| 7 | = | Spare |
| 6 | = | Door and cone safety switches |
| 5 | = | Agitator motor overload contact |
| 4 | = | Process blower overload contact |
| 3 | = | Agitator motor overload |
| 2 | = | System stop |
| 1 | = | System start |
| 0 | = | Emergency stop / master control relay |

Control Function Description (cont.)

Screen

SCREEN 14



Function

By pressing Output Status on the MAINT. AREA screen (Screen 12), you can view the state of the outputs (BASE UNITS OUTPUTS - Screen 14) that the PLC is monitoring. This also is a very handy troubleshooting tool that allows the user to monitor the actual outputs that are enabled at the time of viewing. The first screen will be the base unit PLC outputs and by selecting NEXT, you can view the EXP. CARD OUTPUTS screen (Screen 14a).

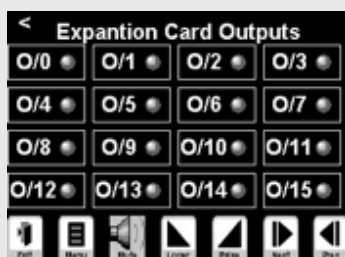
BASE UNIT OUTPUTS (Screen 14) (From left to right)

| | | |
|----|---|----------------------------------|
| 11 | = | Spare |
| 10 | = | Material takeaway full |
| 9 | = | Material takeaway increase speed |
| 8 | = | Material takeaway decrease speed |
| 7 | = | Material takeaway run / stop |
| 6 | = | Spare |
| 5 | = | Spare |
| 4 | = | Spare |
| 3 | = | Spare |
| 2 | = | Process blower on / off |
| 1 | = | Agitator motor overload contact |
| 0 | = | Master control relay |

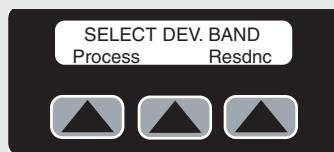
Control Function Description (Cont.)

Screen

SCREEN 14a



SCREEN 15



Function

Press NEXT on Screen 14 to access the EXP. CARD OUTPUTS screen (Screen 14a) to view the expanded card outputs, which are listed below.

EXP. CARD OUTPUTS (Screen 14a) (From left to right)

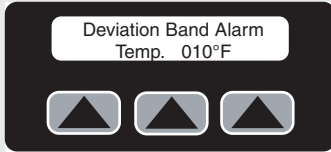
| | | |
|----|---|-------------------------|
| 15 | = | Spare |
| 14 | = | Spare |
| 13 | = | Spare |
| 12 | = | Spare |
| 11 | = | Spare |
| 10 | = | Spare |
| 9 | = | Spare |
| 8 | = | Spare |
| 7 | = | Alarm light |
| 6 | = | Alarm horn |
| 5 | = | Process heater on / off |
| 4 | = | Process heater on / off |
| 3 | = | Process heater on / off |
| 2 | = | Process heater on / off |
| 1 | = | Process heater on / off |
| 0 | = | Process heater on / off |

By pressing Deviation Bands from the MAINT. AREA screen (Screen 12), you can chose between the two more commonly accessed Deviation Band Temperatures: Process Deviation Band (SK 1 - Process) and Residence Temperature Deviation Band Alarm (SK 3 - Resdnc).

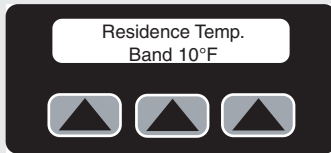
Control Function Description (cont.)

Screen

SCREEN 15a



SCREEN 15b



Function

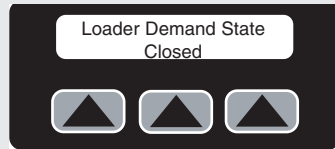
By pressing SK 1 (Process) on Screen 15, you will view the Deviation Band Alarm screen (Screen 15a) for the process. This is the value that the actual process temperature can deviate from the setpoint above or below before alarm PA 2 will initiate. The default value for this band is 10°F (5.5°C) and should be sufficient for most processes. If you entered this screen by accident, or decide that you do not want to change the temperature, press EXIT or PREV to leave the screen.

By pressing SK 3 (Resdnc) on Screen 15, you will view the Residence Temp. Band screen (Screen 15b). This temperature is the amount that the actual residence temperature can deviate below the residence temperature setpoint before the auger will be disabled in Auto Mode. Normally, 10°F (5.5°C) should be sufficient for most applications once the residence temperature stabilization temperature is determined. If you entered this screen by accident, or decide that you do not want to change the temperature, press EXIT or PREV to leave the screen.

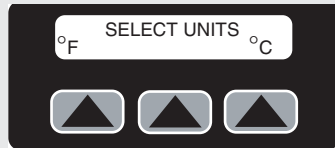
Control Function Description (Cont.)

Screen

SCREEN 16a



SCREEN 16b



SCREEN 16c



Function

From this screen, you can select the demand type for the loading system that is supplying material to the crystallizer. The choices are Closed or Open, which refers to the type of demand the system is looking for in its normal state. Most, but not all of Conair loaders will require a closed setting that is the default setting. Pressing SK 2 will toggle from Closed to Open. If you entered this screen by accident, or decide that you do not want to change the temperature, press EXIT or PREV to leave the screen.

From this screen, you can select either °F or °C for operation.

From this screen, you can select either English or Spanish language platform.

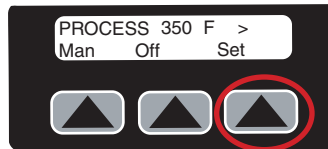
Crystallizer Initial Set Up

After the crystallizer is installed and the correct operation of all of the components is tested the crystallizer is ready to operate. Before starting perform the following additional steps:

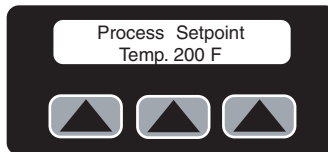
Input Temperature Setpoint(s) - Process

Input the correct crystallizing temperature setpoint for the material that you will be running. This temperature can vary greatly depending on material type; therefore Conair cannot recommend the correct temperature. Contact your material supplier for suggested temperature setpoints.

- 1 Select SK 3 from the Main screen.



- 2 Input your required temperature. You can press on the temperature and use the pop up keypad to enter the desired setpoint, followed by the green enter arrow.



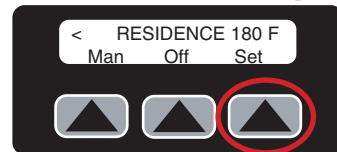
Input Temperature Setpoint(s) - Residence

The residence temperature is the temperature level that is maintained in the agitating stage during operation. Initially this temperature should be set very low so it will not cause any nuisance alarms.

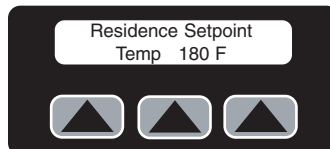
- 1 Select "Next" (a fixed function key) from the Main screen.



- 2 Select "Set".



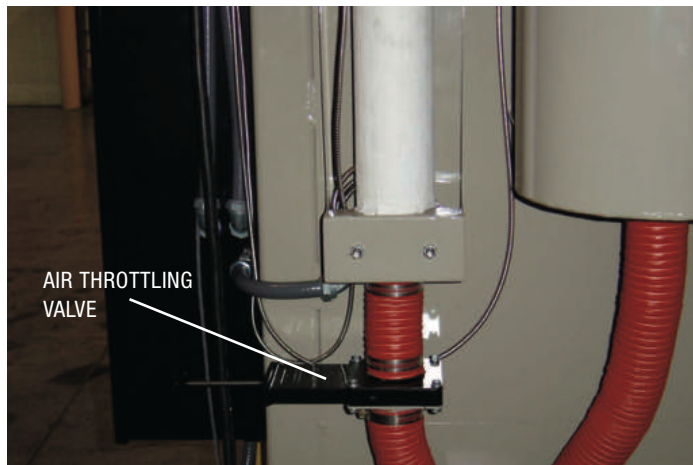
- 3 Use the pop up keypad and input a temperature of approximately 100°F (38°C) and press "Enter". The temperature will be adjusted for your process later.




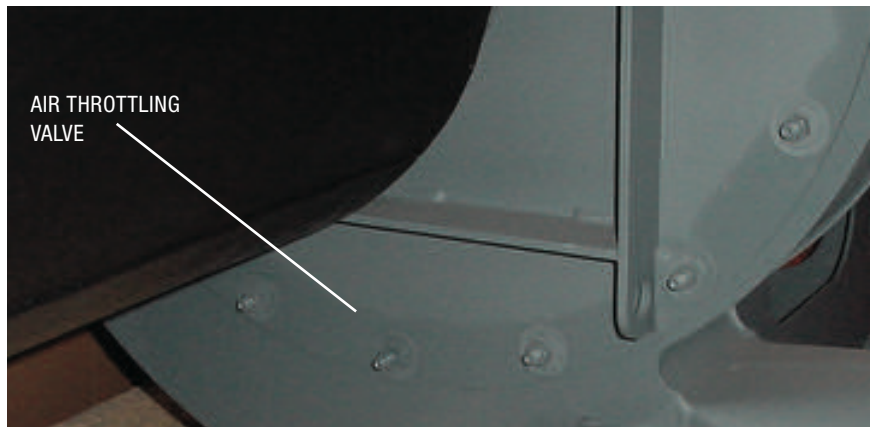
Crystallizer Initial Set Up (Cont.)

Air-flow adjustment

The blowers that are provided with the crystallizers are capable of operating in a wide range of airflow situations. It will be necessary to adjust the correct airflow for your particular application. Before starting adjust the throttling valves to about the 70% level (see below). The airflow will be fine tuned later in the process. Essentially, the airflow will needed be adjusted so that your required temperature can be maintained at the required throughput. If too much airflow is supplied it will cause carryover problems from the agitating hopper, possibly percolate the material, and possibly generate enough pressure in the top of the hopper to keep the material from discharging from the loader. If too little air flow is supplied, the material will not heat adequately and will process incorrectly.



 **NOTE:** Depending on your crystallizer size and model, you may have the larger or smaller throttling valve shown to the right.

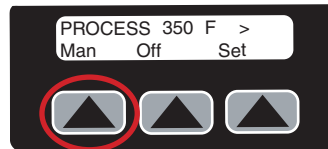


Crystallizer Initial Set Up(cont.)

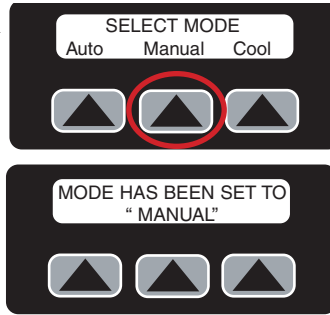
Select Mode

For initial start-up it is recommended to start in the Manual mode (Man). This will allow you alter temperatures and other settings during start-up without causing any nuisance alarms. This can be done by selecting SK1 from the main screen and then selecting manual mode (see operation 4-3). If the bottom left of the main screen indicates "Man" the manual mode is already set.

- 1 Select SK 1 from the Main screen.**



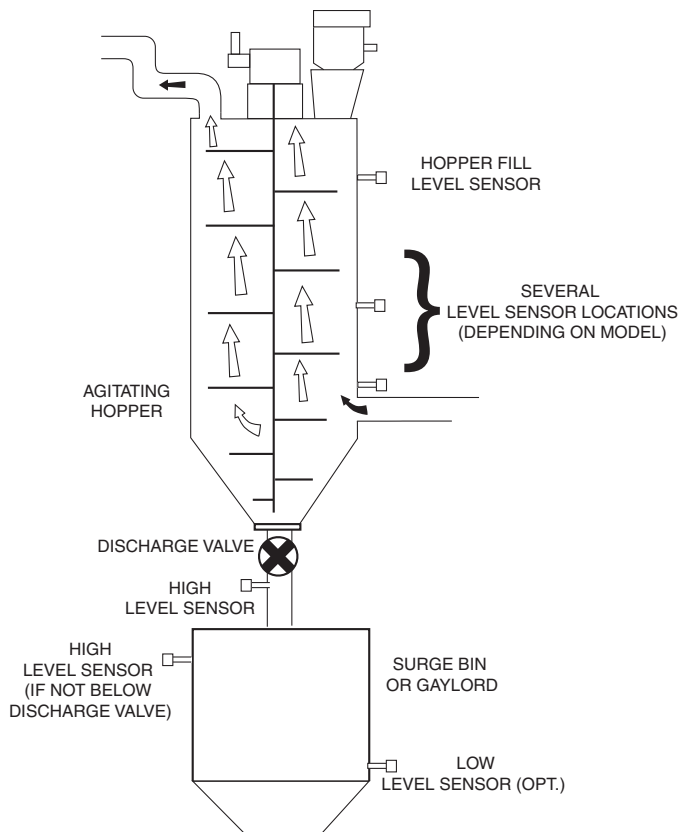
- 2 Select Manual mode.** The screen will display, "Mode has been set to MANUAL".



Crystallizer Initial Set Up (Cont.)

Level Sensor Location and Adjustment

There are several optional level sensors that may be installed in the crystallizing system. A level sensor is typically placed toward the top of the agitating hopper to control material level in the hopper. Another can be placed in the discharge chute below the material discharge or placed in the upper section of the surge bin, which controls a fill point and protects the discharge



auger. Additionally, there is an optional sensor that could be placed in the bottom of the surge bin that controls alarming for low-level situations. During initial assembly and testing, Conair adjusts the empty setting for these sensors but it is very possible that during the initial start-up the sensors may need to be readjusted, especially for the full settings. The sensor may need to be readjusted when the level sensor temperature reaches the actual material temperature and most likely will need to be readjusted if you plan on running several material types of varying bulk densities.

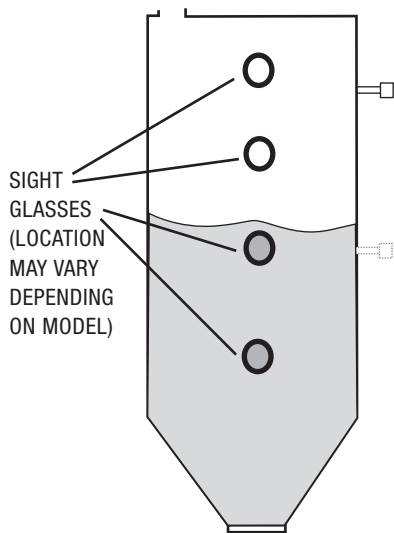
The manufacturer's operational manual for the level sensor is included as an appendix to this user guide. Refer to the manufacturer's manual for proper adjustment and operation.





Crystallizer Initial Set Up (Cont.)


Initial Hopper Filling

During initial filling of the agitating hopper the material level in the hopper should be watched closely to make sure that the sensor is switching states when the material reaches it. This can be done by watching the LED indicator on the sensor. Watch the level through the sight glasses in the hopper, when the material comes in contact with the sensor the LED indicator should change state and the loader should stop loading. Once it stops it should not load again until the level drops below the sensor and remains below for about seven seconds. If the LED does not change state when the material comes in contact with the sensor, adjust it accordingly. Conair recommends watching a few cycles to make sure that the operation is consistent. If the LED does change state and the loader continues to load there is a problem with the demand wiring on the installed loader and it will need to be repaired.



 **NOTE:** One sensor in hopper as standard.

 **NOTE:** The LED sensor light blinks when material is not in contact with the sensor. The LED sensor light is on solid when the sensor is covered with material.

 **NOTE:** The sensor may need to be readjusted when the level sensor temperature reaches the actual material temperature and most likely will need to be readjusted if you plan on running several material types of varying bulk densities.

Crystallizer Initial Set Up (Cont.)

Initial Surge Bin Filling or Gaylor Filling



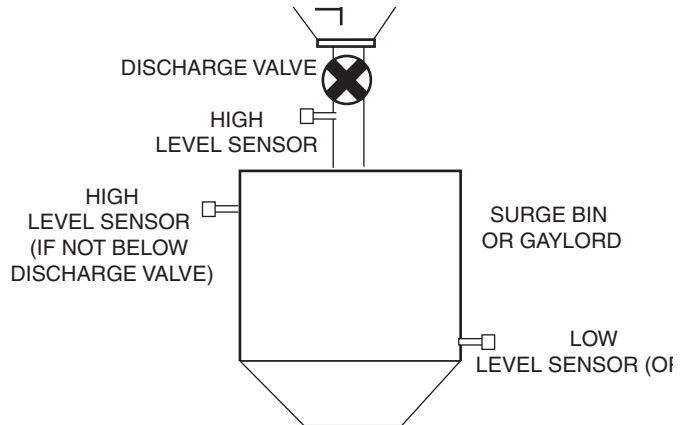
LEVEL
SENSOR
LED LIGHT



CAUTION: If the level sensor is not working properly, damage to equipment may occur.

After the crystallizing process is complete and the material is discharged from the crystallizer, it may also be necessary to adjust the level sensor that is controlling the fill point of the surge bin.

This level sensor may be placed in the material discharge chute or in the top of the surge bin. It is very important to insure that this level sensor is working correctly, if material



backs up into the material discharge damage could occur. This can be done by watching the LED indicator on the sensor. Watch the level in the surge bin through the sight glass or lid in the surge bin, when the material comes in contact with the sensor the LED indicator should change state and the material discharge should stop running. Once it stops it should not run again until the level drops below the sensor. Conair recommends watching a few cycles to make sure that the operation is consistent. Refer to the level sensor manufacturer's instruction guide located in the appendix of this user guide for adjustment instructions.

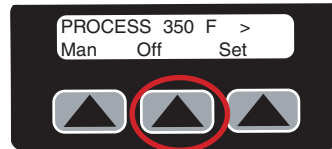


NOTE: The LED sensor light blinks when material is not in contact with the sensor. The LED sensor light is on solid when the sensor is covered with material.

Crystallizer Initial Set Up(Cont.)

Discharge Auger Operation and Calibration

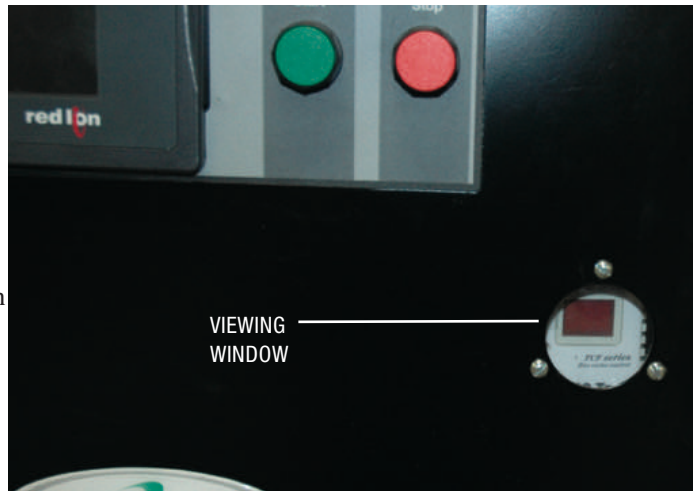
The discharge auger can be operated by pressing the SK2 button while on the main display area screen. Pressing the key once will start the discharge and pressing it again will stop the discharge.



Pressing the raise or lower fixed function keys on the crystallizer control panel controls the VFD frequency output, which in turn changes the speed of the discharge.



The frequency setting can be viewed through the viewing window in the right side of the Crystallizer control panel. When the crystallizer is in operation the speed should be adjusted to match the rated throughput of the crystallizer. Throughputs are listed in the chart below.



Crystallizer Initial Set Up (Cont.)

Discharge Auger Calibration

The material discharge auger can be adjusted to operate over a wide range of material output rates. It is a good practice to determine what VFD setting will correspond to a particular rate for your particular material type. This will allow you to know exactly how many pounds per hour of material you are discharging simply by looking at the VFD setting. Complete the following steps to calibrate your discharge auger:

- 1 Fill the crystallizer with the material that you plan to process.**
- 2 Start running the discharge auger at full speed -60 Hz.**
- 3 Use a vessel (fiber drum or other appropriate sized bucket) to capture a one-minute sample of material.** More or less can be used, but the calculations below are to calculate using a minute of captured material. If a different time interval is used, the calculation would need to be altered accordingly.
- 4 Weigh the vessel.** Make sure you zero the scale so that you are only reading material weight (not the weight of the vessel.)
- 5 For this example, we will assume that our one-minute sample weighed 10 pounds.** After this value is measured, **perform the following calculations:**

$(10 \text{ pounds / minute}) * (60 \text{ minutes / hour}) = 600 \text{ pounds / hour @ full 60 Hz setting}$

From this information we can determine what our setting would need to be to achieve a certain pounds per hour output for each particular crystallizer size by the following: For this example assume that we require 400 pounds / hour output.

$(600 \text{ pounds / hour}) / 60 \text{ Hz (maximum output)} = 10 \text{ pounds per hour / 1 Hz setting}$

$(400 \text{ pounds / hour}) / (10 \text{ pounds per hour / 1 Hz setting}) = 40 \text{ Hz setting to achieve rate}$

This method can be used to determine the output of any crystallizer and to determine the exact setting for any particular output required. It is important to remember that this calibration is only good for one material, if your process changes material you will need to perform this calibration each time.

Crystallizer Initial Set Up (cont.)

Initial Start Up

1 Press Start. All the components should start and the actual temperature should start to climb to your actual set point. If this does not happen, review corrective actions in the troubleshooting section of this manual. Once the system is operating and at steady temperature the initial crystallizing process can be started.

When the crystallizer is started it will be necessary to create or add a pre-charge of crystalline material into the cone section of the agitating hopper. This pre-charge of material will help to ensure that no agglomeration occurs in the cone section, which could impede the flow of material from the agitating hopper. Two different methods can be used to accomplish this.

The first and easiest method of charging the crystallizer is with a batch of crystalline material (same material you are processing). If you do not have any pre-crystalline material, refer to the alternative method on the next page.

- 2 Fill the hopper with enough material to reach a level which fully fills the removable cone section.**
- 3** Once this material is placed into the agitating hopper and the unit is running, **load amorphous material on top of the crystalline material until the hopper is full.**
- 4 Refer to the level sensor adjustment portion of the set-up section while filling material.**
- 5 Once the hopper is initially full let the material heat and agitate until the residence temperature probe reads similar to the process setpoint temperature.** Usually this process takes about one hour. You should be able to see the crystallizing process occurring in the various sight glasses and eventually throughout the entire hopper.

Once this initial process is complete you are now ready to start dynamic operation of the crystallizing system. You will be able to bring amorphous material into the top of the crystallizing hopper and discharge fully crystalline material from the bottom of the hopper.



WARNING: Gloves and safety glasses are recommended when performing this process. The material is going to become hot and without proper precautions, burns could occur.

continued. . .

Crystallizer Initial Set Up (Cont.)

Initial Start Up (Con't)

Alternatively, if no pre-crystalline material exists or if a small batch of material is going to be processed complete the following:

- 2 Add two or three loads of material into the hopper and start the material discharge.** It is possible with this small amount of material in the hopper that the airflow may need adjusted for the material to dump correctly from the loader. Once the hopper is filled to a higher level the airflow can be increased.
- 3 Begin to circulate the material from the outlet of the discharge auger back into the loader.**
- 4 Continue this process until the first few loads of material has changed states and is now crystalline.**
- 5 Add one or two more loads of material and continue to circulate the material.**
- 6 Continue this process until the removable cone section is full of free flowing crystalline material.**
- 7 Once it is full, stop the material re-circulation and fill the hopper** (monitor agitating hopper material level sensor).
- 8 Once the hopper is initially full, let the material heat and agitate until the residence temperature probe reads similar to the process setpoint temperature.** Usually this process takes about one hour. You should be able to see the crystallizing process occurring in the various sight glasses and eventually throughout the entire hopper.



WARNING: Gloves and safety glasses are recommended when performing this process. The material is going to become hot and without proper precautions, burns could occur.

Once this initial process is complete you are now ready to start dynamic operation of the crystallizing system. You will be able to bring amorphous material into the top of the crystallizing hopper and discharge fully crystalline material from the bottom of the hopper.

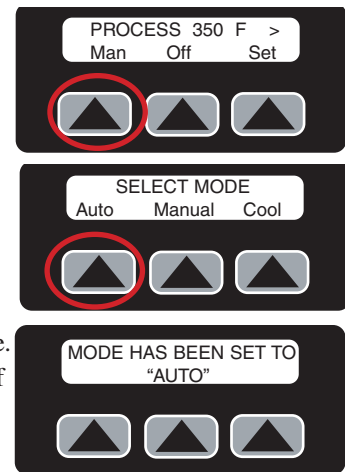
Crystallizer Initial Set Up(Cont.)

Dynamic Operation

Dynamic operation can be achieved in both the manual mode "Man" and the automatic mode "Auto" but the "Auto" mode will give much better control of the crystallizing system. During operation in "Auto" mode the on board PLC is monitoring various points in the process to make sure that you are getting the required residence time at temperature in the hopper to complete the crystallizing process. This is achieved by monitoring both the material level and material temperature in the hopper. Conair recommends that "Auto" mode be used when possible. To operate in "Auto":

- 1 Press SKI from the main display area.**
- 2 Select Auto (SKI) again.** You will get indication that the mode is switched to Auto.
- 3 Press SK2 on the main display area and set the VFD output at the speed required for your process.** (*See discharge valve operation and calibration section.*) Material will begin to discharge at the required rate. After a certain time, amorphous material should also load into the top of the agitating hopper.
- 4 Watch the hopper level during the initial start of dynamic operation to make sure that the level sensor in the agitating hopper is calling for material when the material level drops below the sensor** –if it is not adjust as necessary. (Refer to the manufacturer’s instructions for the level sensor for proper adjustment procedures.)
- 5 Continue dynamic operation and monitor the various level sensor probes in the surge bin or material discharge chute.** If the unit is filling a gaylord there will be one level sensor placed in the discharge chute under the discharge valve, which will disengage when the gaylord is full. When this level is met PA11 will enable and the discharge valve will disengage. Once a new gaylord is placed under the crystallizer the alarm can be silenced and the process will need to be restarted which can be done by turning the discharge auger to on (SK2). If the unit is filling a surge bin the material level will fill between two sensors in the surge bin. The bottom sensor will start the discharge valve and the upper sensor will disable the discharge valve. This operation will allow the valve discharge rate to be tuned to the rate of the system and eliminate constant starting and stopping of the discharge valve.

continued. . .



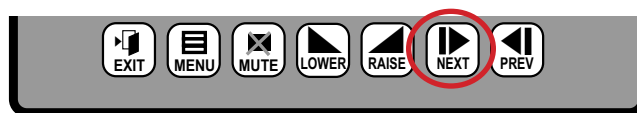
Crystallizer Initial Set Up(Cont.)

Dynamic Operation (Con't)

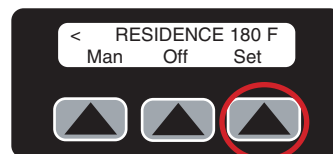
When the system is running you will see that the Residence temperature is decreasing as the new material is being processed through the crystallizing hopper. This will continue for some time but will eventually reach a stabilization point. This stabilization point is where your system is going to run on a continuous basis at your current throughput.

Once this temperature is determined, set the Residence temperature to a level of about 15°F (-9.44°C) below that measured level. Use the following steps to set the Residence temperature:

- 1** Selecting the "next" fixed function key from the main screen.

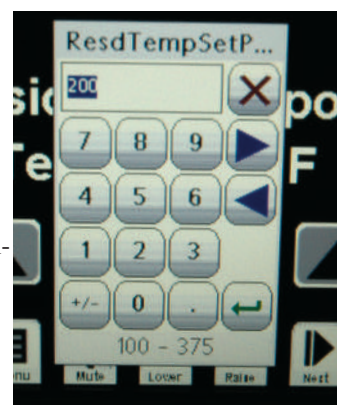


- 2** Selecting "Set" (see operation 4→4).



- 3** Click the temperature setpoint to enter the residence temperature desired. This will insure that the correct material temperature is maintained in the hopper during the crystallizing process.

If the material temperature drops below this level the discharge will disable and an alarm will be initiated. If this occurs most likely something has changed in the process such as material throughput, airflow through the hopper, or temperature level of the incoming air. Refer to the Troubleshooting section of this user guide to determine the cause of the alarm.



Crystallizer Initial Set Up(Cont.)


Shutdown and Restart

If you are required to shut the crystallizer down for some reason there are certain steps that should be taken to minimize the amount of work required when re-starting the system. The main objective is to maintain a certain amount of crystalline material in the agitating hopper so that a new charge of crystalline material will not need to be made when re-starting.

- 1 Run the crystallizer until it is about half empty** during shutdown.
- 2 Stopping the material discharge.** Allow the crystallizer to heat and agitate until the material is fully crystalline.
- 3 Shutdown the crystallizer.** If necessary, a couple hundred pounds of material can be discharged from the crystallizer and saved in a separate container to be reloaded during the start-up process.

Crystallizer Initial Set Up (Cont.)

Batch Mode and Cool Down Mode

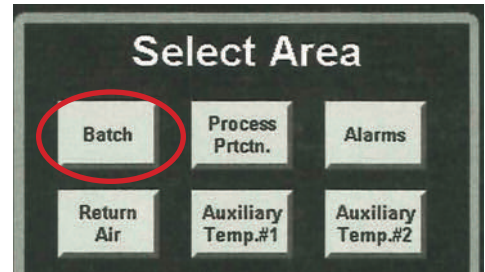
 **IMPORTANT:** If you are running a batch of material, it is also important to cool down the batch before discharging the material to gaylords or drums. (See Operation section entitled, “Control Function and Description” for more information.)

Another method of running the crystallizer is in batch mode. This mode will allow you to fill the crystallizer with a certain amount of material and run it for a set length of time. Once the time is complete an alarm will sound that indicate that the material is ready to discharge. To begin using batch mode:

1 Press the “Menu” button (only once).



2 Press “Batch”.



3 Press the SK3 button to set the batch timer setpoint. Enter the amount of time (in minutes) desired for your operation. Time can be entered by clicking the setpoint time and using the pop up keypad to enter the setpoint.



4 Press the SK2 button to turn the batch timer on. An alarm will sound when the batch is complete.



Maintenance

| | |
|--|------|
| Preventative maintenance checklist | 5-2 |
| Cleaning the process air filter (CR4 and CR10) | 5-3 |
| Cleaning the process air filter (CR21 and CR135) | 5-6 |
| Cleaning the cyclone separator filter sock . . . | 5-8 |
| Cleaning the cyclone separator collection tank | 5-10 |
| Cleaning the heat sink | 5-12 |
| Cleaning the agitating hopper (Minor cleaning) | 5-13 |
| Cleaning the agitating hopper and removable cone section (Major cleaning) | 5-14 |
| Cleaning the aftercooler coils | 5-21 |
| Inspecting hoses and gaskets | 5-21 |

Preventative Maintenance Checklist

Routine maintenance will ensure optimum operation and performance of the crystallizer. We recommend the following maintenance schedule and tasks.

- **Whenever you change materials**

- Clean the loader that fills the agitating hopper (see the appropriate loader user guide.)**
- Clean the agitator hopper and removable cone section.**
- Empty and clean the cyclone separator collecting tank and dust filter.**

- **Weekly, or as often as needed**


- Clean the return air and dust collector filters.**
You may need to clean filters more often than weekly. Frequency depends on how much material you process and how dusty or full of fines it is.
- Inspect hoses and hose connections.**
Check for damage, kinks, or loose hose clamps. Replace any hoses that show signs of damage or wear. Reposition and tighten loose hose clamps.

- **Monthly**

- Clean the optional aftercooler coils (closed loop systems only).**
You may need to clean the coils more often than monthly. Frequency will depend on the type and volume of material you process.


- **Every six months**

- Inspect gaskets for damage or wear.**
Damaged gaskets can allow moisture to seep into the closed-loop drying system. Replace any gasket that is torn or cracked.

 **NOTE:** See the maintenance sections of the other manufactures manuals included in the appendix of this manual.

Cleaning the Process Air Filter (CR4 and CR10)

A clogged process air filter reduces airflow and crystallizer efficiency. Cleaning frequency depends on how much material you process and how dusty it is.

 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

 **CAUTION:** Hot surfaces. Always protect yourself from hot surfaces inside and outside the crystallizer.

1 Isolate the equipment from the electric power by turning the rotary disconnect switch to the OFF, or "O" position. See Section 1 - Introduction for complete lockout procedures.

2 Remove the process air filter lid by removing the speed nut securing it to the process air filter assembly.



Tools for cleaning:

- Vacuum or air compressor
- Cleaning cloth



Cleaning the Process Air Filter (continued)

- 3 Remove the process air filter element** by removing the speed nut securing the filter in the process air filter canister then lifting the element from the process air filter canister.



- 4 Clean the process air filter element using a vacuum or compressed air.** If using a vacuum, repeatedly apply the vacuum to the outside of the filter element until all debris is removed. If using compressed air, clean the filter element by blowing the compressed air from the inside out. Replace the filter if it is damaged, worn, or still clogged after cleaning.



CAUTION: If you use compressed air to clean any filters or equipment, you must wear eye protection and observe all OSHA and other safety regulations pertaining to the use of compressed air.

- 5 Clean the inside of the process air filter canister** and remove any debris in the canister.
- 6 Install the filter element in the process air filter canister** by aligning it on the stud then sliding it into the canister.

Cleaning the Process Air Filter (continued)



- 7** Secure the filter element in the canister by installing the speed nut. Snug the nut by hand to insure a tight fit at the bottom of the filter.
- 8** Install the process air filter lid on the stud then slide it onto the canister. Secure the lid by installing and tightening the speed nut.


Cleaning the Process Air Filter (CR21 and CR135)

Tools for cleaning:

- Vacuum or air compressor
- Cleaning cloth



A clogged process air filter reduces airflow and crystallizer efficiency. Cleaning frequency depends on how much material you process and how dusty it is.

 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.


 **CAUTION:** Hot surfaces. Always protect yourself from hot surfaces inside and outside the crystallizer.

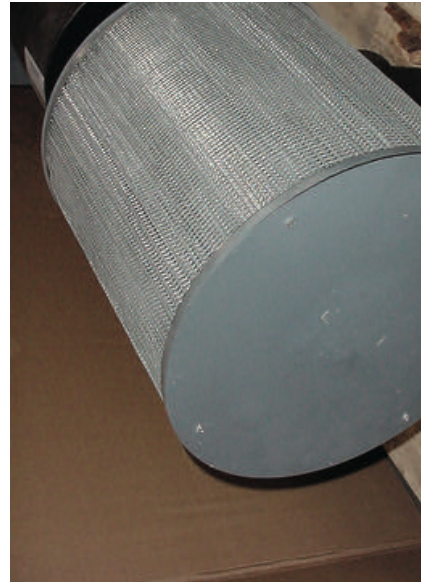
1 Isolate the equipment from the electric power by turning the rotary disconnect switch to the OFF, or "O" position. *(See Section 1 - Introduction for complete lockout procedures.)*

2 Remove the bolts or nuts that are holding the filter end cap in place.

3 Remove the end cap.

4 Remove the filter media.

 **NOTE:** In closed loop systems, clean the filter and, if applicable, clean the secondary dust collector.



Cleaning the Process Air Filter (CR21 and CR135) (continued)

- 5 Clean the process air filter element using an industrial vacuum cleaner.** If using a vacuum, repeatedly apply the vacuum to the outside of the filter element until all debris is removed.
Replace the filter if it is damaged, worn, or still clogged after cleaning.



CAUTION: If you use compressed air to clean any filters or equipment, you must wear eye protection and observe all OSHA and other safety regulations pertaining to the use of compressed air.

- 6 Reinstall in reverse order.**


Cleaning the Cyclone Separator Filter Sock

Tools for cleaning:

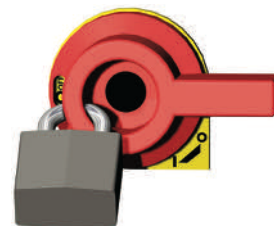
- Flat blade screwdriver
- Vacuum or air compressor


 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

 **CAUTION:** Hot surfaces. Always protect yourself from hot surfaces inside and outside the crystallizer.


 **NOTE:** A cyclone separator filter sock is used in an open loop system. If the crystallizer is configured as a closed-loop system, see Appendix C for aftercooler cleaning information.

1 Isolate the equipment from the electric power by turning the rotary disconnect switch to the OFF, or "O" position. *(See Section 1 - Introduction for complete lockout procedures.)*



 **NOTE:** The cyclone separator filter sock should be removed and cleaned before emptying and cleaning the cyclone separator collection tank. As the filter sock is removed, debris can fall from the filter into the collection tank.



 **CAUTION:** Because of the size of the particles collected by the cyclone separator filter sock, appropriate respiratory protection measures must be taken before attempting to remove or clean the filter sock. Contact your Safety Administrator about the procedures approved by your company and O.S.H.A. for specific respiratory protection measures.

2 Remove the cyclone separator filter sock by loosening the clamp and lifting the filter sock from the cyclone separator return air outlet.

Cleaning the Cyclone Separator Filter Sock (continued)



3 Carefully turn the filter sock inside out.

4 Clean the filter sock using an industrial vacuum cleaner. If using a vacuum, repeatedly apply the vacuum to the turned-out surface of the filter sock until all dust and debris are removed. Replace the filter sock if it is damaged, worn, or clogged after cleaning.



CAUTION: If you use compressed air to clean any filters or equipment, you must wear eye protection and observe all OSHA and other safety regulations pertaining to the use of compressed air.

5 If re-installing the original filter sock, carefully turn the filter bag outside in.


6 Install the filter sock on the cyclone separator by sliding it over the return air outlet.

7 Secure the filter sock to the cyclone separator by tightening the clamp around the base of the filter and the return air outlet.

Cleaning the Cyclone Separator Collection Tank

Tools for cleaning:


- Container to hold contents of the collection tank
- Cleaning cloth

 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

 **CAUTION: Hot surfaces.** Always protect yourself from hot surfaces inside and outside the crystallizer.

1 Isolate the equipment from the electric power by turning the rotary disconnect switch to the OFF, or "O" position. *(See Section 1 - Introduction for complete lockout procedures.)*



 **NOTE:** The cyclone separator filter sock should be removed and cleaned before emptying and cleaning the cyclone separator collection tank. As the filter sock is removed, debris can fall from the filter into the collection tank.

2 Release the three latches securing the collection tank to the bottom of the cyclone separator. The collection tank should be held in place as the clamps are released.



Cleaning the Cyclone Separator Collection Tank (continued)

- 3** Lower the collection tank down and away from the cyclone separator.
- 4** Empty the contents of the collection tank into a suitable container and wipe any residue from the tank.
- 5** Align the collection tank with the bottom of the cyclone separator.
- 6** Lift the collection tank up to meet the bottom of the cyclone separator and secure the latches.

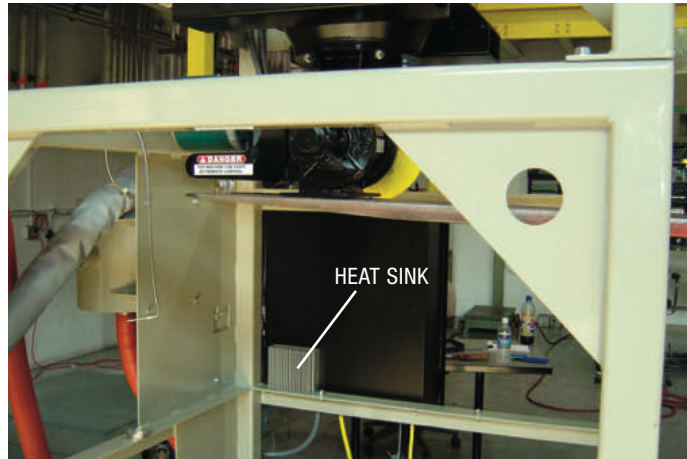


Cleaning the Heat Sink

There is a heat sink mounted to the back of the control panel enclosure. If this becomes covered with dust or material you are processing, its functioning will be effected.

Tools for cleaning:

- Vacuum, brush, or air compressor





- 1** Using a vacuum, brush, or air compressor, **clear any dust or material from the heat sink.**




CAUTION: If you use compressed air to clean any filters or equipment, you must wear eye protection and observe all OSHA and other safety regulations pertaining to the use of compressed air.

Cleaning the Agitating Hopper (Minor Cleaning)

 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

 **CAUTION:** Hot surfaces. Always protect yourself from hot surfaces inside and outside the crystallizer.

 **CAUTION:** Be sure that you have disconnected and locked out the main power supply. There is a severe risk of personal injury should the agitator become energized while accessing it for cleaning or repair.



1 Disconnect and lockout the main power supply. 

2 Remove all of the bolts securing the door to the agitating hopper.
Open the door.



3 Inspect the gasket on the top lip of the removable cone section. Replace the gasket if it is damaged or show signs of wear.

4 Clean the inside of the agitating hopper and the agitator auger using a cleaning cloth or an industrial vacuum cleaner. Make sure to thoroughly clean the surfaces. Pellets can lay on top of the blades in difficult to see areas.

5 Close the door and secure it to the agitating hopper using the bolts removed in Step 2. Be careful not to cross-thread the bolts.

Tools for cleaning:

- Appropriate size wrenches or sockets and ratchets
- Cleaning cloth or industrial vacuum cleaner
- Ladder



CAUTION: If you use compressed air to clean any filters or equipment, you must wear eye protection and observe all OSHA and other safety regulations pertaining to the use of compressed air.



Cleaning the Agitating Hopper and Removable Cone Section (Major Cleaning)

Tools for cleaning:


- Forklift, hoist, or crane
- Appropriate size wrenches or sockets and ratchets
- Cleaning cloth or air compressor
- Container suitable for collecting removed material

 **LIFTING: Danger of injury to personnel or equipment.**

Use proper precautions when lifting. If the weight is unevenly distributed when lifted the unit may tip and injure people or damage the equipment. Use the eye bolts provided to lift the crystallizer.

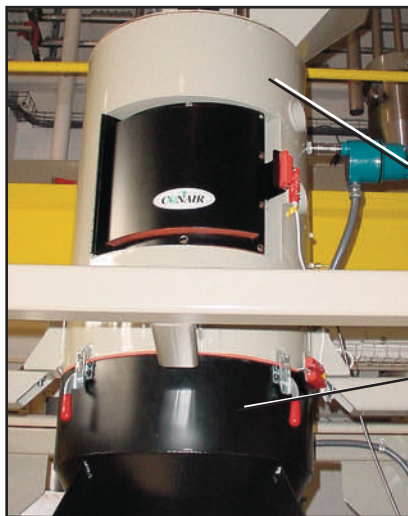
 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

 **CAUTION: Hot surfaces.** Always protect yourself from hot surfaces inside and outside the crystallizer.

 **CAUTION:** Be sure that you have disconnected and locked out the main power supply. There is a severe risk of personal injury should the agitator become energized while accessing it for cleaning or repair.



1 Disconnect and lockout the main power supply. 



AGITATING HOPPER

REMOVABLE CONE SECTION

2 Remove the process air hose from the process air inlet tube by loosening the clamps and pulling the hose from the inlet tube.



Cleaning the Agitating Hopper and Removable Cone Section (Major Cleaning) (continued)



3 Remove the process RTD from the process air inlet tube by loosening the fitting and pulling the RTD from the inlet tube.


4 Remove the power/control cable from the rotary discharge valve and the material level sensor by loosening the quick connector and pulling the cable from its receptacle.




5 Support the weight of the removable cone section and rotary discharge valve with a forklift, hoist, or crane (lifting device).

Cleaning the Agitating Hopper and Removable Cone Section (Major Cleaning) (continued)

- 6 Release the four latches** securing the removable cone section to the bottom of the agitating hopper and, using the forklift, hoist, or crane, lower the removable cone section and rotary discharge valve.

 **NOTE:** The removable cone section and discharge valve must be lowered straight down from the agitating hopper because the lower agitator auger section extends well below the bottom of the agitating hopper.


 **NOTE:** Larger crystallizer models are bolted together and not held with clamps.



- 7 Move the removable cone section and rotary discharge valve** away from the crystallizer once they have been lowered enough to clear the lower agitator auger section. Set the assembly on the floor.




Cleaning the Agitating Hopper and Removable Cone Section (Major Cleaning) (continued)

 **NOTE:** There are two locating pins in the rim of the removable cone section. These are used to ensure proper alignment of the removable cone section, the screen in the cone section, and the agitating hopper.

8 Remove the screen from inside the removable cone section.

9 Clean the screen and the inside of the removable cone section using a cleaning cloth. Check to make sure the vents of the screen are not clogged with material. If any material is lodged in the vents, use a cleaning cloth or an industrial vacuum cleaner, if necessary, to dislodge the material (see photos below).

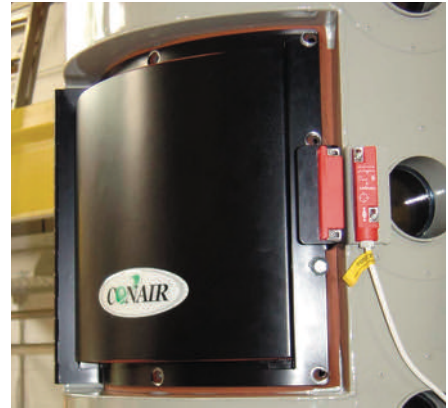


 **CAUTION:** If you use compressed air to clean any filters or equipment, you must wear eye protection and observe all OSHA and other safety regulations pertaining to the use of compressed air.



Cleaning the Agitating Hopper and Removable Cone Section (Major Cleaning) (continued)

10 Remove all of the bolts securing the door to the agitating hopper. Open the door.



11 Inspect the gasket on the top lip of the removable cone section. Replace the gasket if it is damaged or show signs of wear.



12 Clean the inside of the agitating hopper, the agitator auger, the breaker bars, and the lower agitator auger section using a cleaning cloth.

13 Close the door and secure it to the agitating hopper using the bolts removed in Step 10.

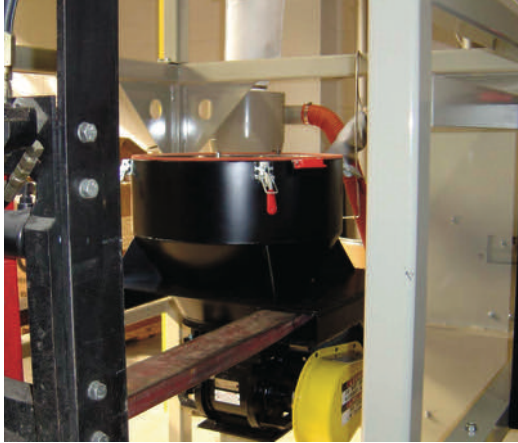
14 Install the screen in the removable cone section by aligning the holes in the lip of the screen with the two locating pins on the cone section.



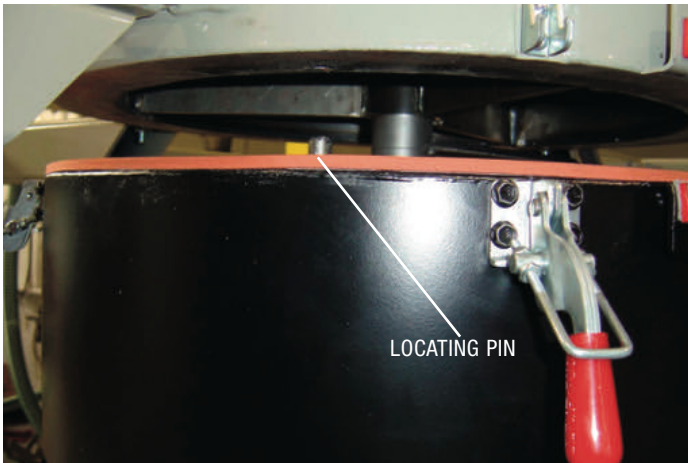
Cleaning the Agitating Hopper and Removable Cone Section (Major Cleaning) (continued)

15 Move the removable cone section into installation position below the agitating hopper. Make sure that all latches are open and out of the way.

16 Install the removable cone section on the agitating hopper by slowly raising it up until it is flush with the bottom of the agitating hopper.



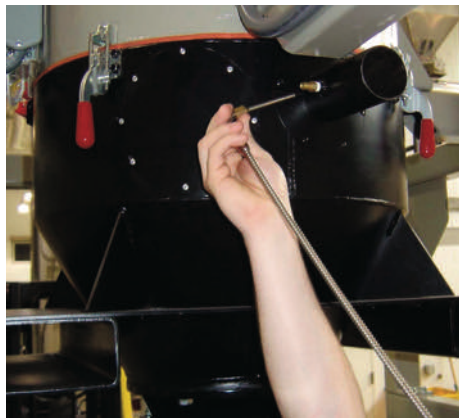
CAUTION: Ensure that the locating pins on the removable cone section are aligned with the holes in the bottom of the agitating hopper. If they are not properly aligned, the removable cone section and / or the agitating hopper can be damaged.



17 Secure the removable cone section to the agitating hopper by closing the four latches (may be bolted on larger crystallizer models). Once it is fully secure, relieve the pressure on the lifting device used and remove the lifting device.

Cleaning the Agitating Hopper and Removable Cone Section (Major Cleaning) (continued)

- 18** Install the power / control cable on the rotary discharge valve and the material level sensor by plugging the cable into its receptacle and tightening the quick connector.



- 19** Install the process RTD in the process air inlet tube by inserting it into the process air inlet tube and tightening the fitting.

- 20** Connect the process air hose to the process air inlet tube by sliding the hose onto the inlet tube and tightening the clamp.



Cleaning the Aftercooler Coils



If you are running the crystallizer as a closed-loop system using the optional aftercooler, you need to clean the cooling coils to keep them working efficiently. See the appendix for details.

Inspecting Hoses and Gaskets



Loose or damaged hoses and gaskets can allow moisture to seep into the crystallizer system if you are using either an open loop or closed-loop system.

- 1 Follow the hose routing of all the hoses and inspect all hoses, clamps, fittings, and gaskets.**
- 2 Tighten any loose hose clamps or fittings.**
- 3 Replace worn or damaged hoses and gaskets.**

Troubleshooting

| | |
|--|------|
| Before beginning | 6-2 |
| A few words of caution | 6-3 |
| How to identify the cause of a problem | 6-4 |
| Alarm indicators | |
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| Replacing the agitator inner bearing | 6-37 |

Before Beginning

You can avoid most problems by following the recommended installation and maintenance procedures outlined in this User Guide. If you do have a problem, this section will help you determine what caused it and how to fix it.

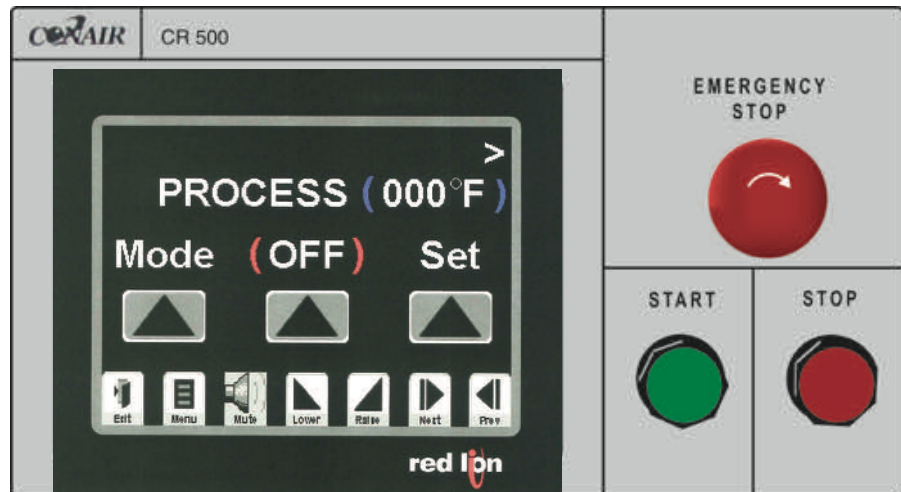
Before you begin to take diagnostic actions, be sure to:

Diagnose cause(s) of the problem from the control panel.

1 Access the alarm screens to determine the cause of the alarm.

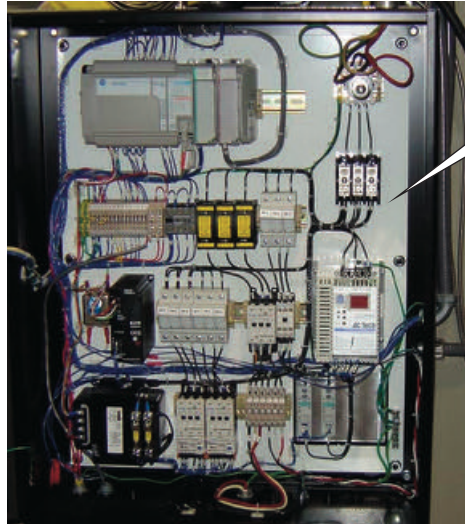
2 Address the alarm message and fix the problem.

3 Clear the alarm. If the alarm reappears the problem was not fixed.



Before Beginning (continued)

- ❑ **Diagnose causes from inside the control panel.** You can locate many problems from the control panel.




See warnings below. Open the electrical enclosure to check fuses and heater contactors.

- ❑ **Find the wiring and equipment diagrams that were shipped with your crystallizer.** These diagrams are the best reference for correcting a problem. The diagrams also will note any custom features, such as special wiring or alarm capabilities, not covered in this User Guide.

A Few Words of Caution

The crystallizer is equipped with numerous safety devices. Do not remove or disable them. Improper corrective action can lead to hazardous conditions and should never be attempted to sustain production.

 **WARNING: Only qualified service personnel should examine and correct problems that require opening the crystallizer's control panel or using electrical wires to diagnose the cause.**

 **WARNING: High voltage. Always stop the crystallizer, disconnect and lock out the main power source before troubleshooting or performing repairs.**

 **CAUTION: Hot surfaces. Always protect yourself from hot surfaces inside and outside of the crystallizer.**

How to Identify the Cause of a Problem

Most crystallizer malfunctions are indicated by an alarm messages that appear in the LCD display on the crystallizer's control panel.

A problem can trigger two types of alarms:

- **Shut Down:** The crystallizer has automatically shut down because it detected a serious problem that could damage your material or crystallizer.
- **Passive:** The crystallizer continues to operate, but warns of a problem that could prevent correct crystallization of your material. If ignored, this problem could lead to a condition that will shut down the crystallizer.

When the alarm is displayed:

- 1 Press the Mute button to silence the audible alarm and display the alarm message.**
- 2 Find the error message in the diagnostics tables** of this Troubleshooting section.
- 3 Note that pressing the Mute button a second time will clear the alarm.**

Alarm Indicators

Passive Alarms

Problem

PA1 Residence Temperature Unsatisfactory- Actual display is "Residence Temp. Unsatisfactory".

This alarm indicates that the material temperature inside of the crystallizer hopper body has dropped below a level that is required to fully crystallize the material during operation. If this occurs in manual mode, the discharge will shutdown, alarm, and wait until the residence temperature reaches the required setpoint again. The crystallizer should continue to operate normally except for the discharge.

Possible cause

The material discharge is set at a level above the rated throughput of the crystallizer or the value is set incorrectly for normal operation.



NOTE: Conair cannot determine this value. The customer will need to determine the temperature at which their process stabilizes then and proceed. This temperature should generally be around 200 - 250°F (93.3 - 121.2°C).

The residence RTD has been removed from the crystallizing hopper.

The process airflow throttling valve is not open to a level sufficient enough to provide adequate airflow to the system.

The return air filter is clogged.

The air sock (filter bag) located on the outlet of the cyclone filtration system is clogged and is creating a back pressure on the system, limiting the airflow through the hopper.

Solution

Make sure that the crystallizer is running at the stated throughput.

Visually inspect the RTD to make sure that it is still inserted into the side of the crystallizer.

Check the airflow throttling valve and adjust accordingly.

Clean or replace the return air filter.

Clean or replace the air sock (filter bag) on the cyclone filtration system (if equipped).

Alarm Indicators (Cont.)

Passive Alarms

| Problem | Possible cause | Solution |
|--|--|--|
| <p>PA2 Temperature Deviation from Setpoint- Actual display is "Process Temp. Deviation".</p> <p>This alarm indicates that the actual temperature has dropped below or above the required setpoint by more than the default value of 5°F (2.3°C) or the user-specified value. This only occurs after the required process setpoint has been reached one time. The deviation band is set at 10° F (5.5°C) (default value). This corresponds to a setting of 5°F (2.3°C) above and below setpoint.</p> | <p>One of the solid state relays (SSRs) controlling the heater(s) has failed.</p> <p>The process RTD was removed from the air stream.</p> <p>The process air supply hoses are loose.</p> | <p>Replace the failed SSRs.</p> <p>Check the process RTD and tighten if necessary.</p> <p>Tighten all air hose connections.</p> |
| <p>PA3 Return Air Unsatisfactory- Actual display is "Return Air Unsatisfactory".</p> <p>This alarm indicates that the return air temperature has elevated to a temperature above 150°F (65.6°C). This temperature is close to the maximum temperature that should be returning to the blower assembly. This alarm will only be enabled in closed loop operation.</p> | <p>Material throughput has been reduced or stopped. As the material sets in static mode, the temperature profile of the material in the crystallizing hopper will continue to rise. If this occurs, the return air temperature of the system will rise to a level that is insufficient for the process blower.</p> <p>The airflow in the crystallizing hopper is at a level that is higher than required to thoroughly crystallize the material at the throughput of the system.</p> <p>The material level in the hopper is incorrect.</p> <p>The aftercooler coil (closed-loop system only) may not have sufficient water flow to remove the required amount of heat from the system.</p> | <p>If the material throughput for the system has stopped, it may be necessary to lower the process temperature until the system throughput resumes again.</p> <p>Adjust the airflow throttling valve as necessary.</p> <p>Make sure that the material level sensor in the crystallizing hopper is covered. If not, fill the hopper to the correct level.</p> <p>Adjust the water flow to the aftercooler as necessary.</p> |

Alarm Indicators (Cont.)

Passive Alarms

Problem

PA4 Low Hopper Material Level-Actual display is "Low Hopper Material Level".

This alarm indicates that the material level sensor has been uncovered for more than 120 seconds **after** the level was initially met. If in Auto mode, the discharge auger will disable.

PA5 Material Takeaway Motor Protector Overload-Actual displayed is "Material Takeaway Drive Fault".

This alarm indicates that the variable frequency drive (VFD) fault is tripped. This indicates that a problem has occurred with the discharge motor or the VFD itself.

Possible cause

It is possible that some problem may have occurred with the loading system. This may include, but not limited to, the material pickup tube is out of the material, the material supply is empty, or the vacuum pump could have a problem.

There may be a problem with the crystallizing hopper material level indicator.

It is difficult to determine what may have caused a VFD problem. Possible causes include, but are not limited to: an overheating problem or something may have become lodged in the discharge.

The wires supplying power to the unit may have become loose.

Solution

Check the material supply and the rest of the vacuum system.

Check the material level sensor that is in the top of the crystallizing hopper.

Check the VFD fault code on the display of the VFD. Check the supplied manual for a reference to the code (see VFD appendix). Fix as necessary.

Check all wiring and make sure the power cable is plugged into the discharge .

Alarm Indicators (Cont.)

Passive Alarms

Problem

PA6 Material Takeaway Full-Actual display is "Material Takeaway Full".

This alarm indicates that the surge bin or distribution box under the crystallizer is full. The discharge will disable as long as this fill sensor is covered. Once the sensor is uncovered it will automatically restart as long as the unit is in automatic and the residence RTD temperature is above the setpoint. Regardless of mode, the discharge will stop and wait for the material level to clear before restarting the discharge. This alarm will be displayed if the sensor is covered for 120 seconds or longer.

PA7 Material Surge Bin Level Low (Optional)-Actual display is "Material Surge Bin Level Low".

This alarm indicates that the device being filled from the material discharge is low in level. This could cause the process to be starved. The alarm will occur 120 seconds after the level is initially met in the surge bin.

Possible cause

The Gaylord or other vessel that the crystallizer is filling is full.

The process that the crystallizer is feeding is stopped.

There is a problem with the loading system that is removing material from the crystallizer.

There is a problem with the material takeaway level sensor.



NOTE: This alarm will occur, but the takeaway will not turn off if the optional low level sensor is present but not covered.

The crystallizer may not be running at a rate sufficient to keep up with the required material throughput level.

It is possible that the crystallizer discharge has been inadvertently disabled.

Solution

Disable the discharge and empty or change the Gaylord under the crystallizer discharge.

Make sure that the process the crystallizer is feeding is still operating.

Check the material takeaway loading system or process to ensure that there are no problems.

Check the material discharge sensor that resides below the discharge valve and make sure that it is plugged in and adjusted correctly.

Check the rate of the discharge and adjust accordingly.

Make sure the discharge is enabled.

Alarm Indicators (Cont.)

Passive Alarms

Problem

PA8 Batch Timer

Complete-Actual display is "Batch Timer Complete".

This alarm indicates that the batch timer has reached the user-defined setpoint. When the MUTE button is pressed, the timer will be reset and the timer will disable until it is set again. No other steps can be taken.

PA9 AUX Temp #1 RTD

Malfunction-Actual display is "Temp 1 RTD Integrity".

This alarm indicates that the process temperature RTD is not connected to the control or that the RTD is faulty.

PA10 AUX Temp #2 RTD

Malfunction-Actual display is "Temp 1 RTD Integrity".

This alarm is the same as PA9 but #2 instead of #1.

PA11 Gaylord being filled

is full -Actual display is "Gaylord is full".

This alarm indicates that the gaylord being filled under the crystallizer is filled. Once the alarm is muted, the process will have to be manually restored.

Possible cause

The batch that was processing is completed.

The connection in the electrical enclosure for the process RTD is loose.

The RTD is not installed into the receptacle on the top of the control panel enclosure.

The RTD is faulty.

see PA9 above.

The gaylord being filled is full.

There is a problem with the material take away level sensor or it is adjusted incorrectly.

Solution

None. The crystallizer is ready to process another batch.

Remove power from the system and check all wiring connections for the RTD in question.

Make sure the RTD is installed into the receptacle in the top of the control panel enclosure.

Replace the RTD.

see PA9 above.

Acknowledge the alarm and restart the discharge valve after the gaylord is replaced.

Check to make sure the sensor is plugged in and adjusted properly.

Alarm Indicators (Cont.)

Shutdown Alarms

| Problem | Possible cause | Solution |
|--|---|--|
| <p>AL1 Emergency Stop Button is Pressed-Actual display is "Check Emergency Stop Push Button".</p> <p>This alarm indicates that the Emergency Stop Button was pressed.</p> | <p>The emergency stop button has been pressed.</p> | <p>Determine why the button was pressed, release the button, and restart the unit.</p> |
| <p>AL2 Check Process Blower Overload-Actual display is "Process Blower Overload Tripped".</p> <p>This alarm will cause an immediate shutdown and indicates that the process blower overload is tripped.</p> | <p>The process blower current draw has exceeded the full load amperage rating of the motor.</p> | <p>Press the mute button and wait about 15 minutes with the power on for the overload to automatically reset. If the alarm occurs again, have a qualified electrician monitor the current draw of the motor.</p> |
| | <p>The process blower has mechanically failed or is unable to rotate freely.</p> | <p>Remove the power from the unit and check the blower for mechanical failure and free rotation. After inspecting, wait 3 to 15 minutes with power on to the crystallizer to allow the overload to reset. Once reset, attempt to restart the unit.</p> |
| | <p>The process blower has failed electrically.</p> | <p>Remove power from the unit and make sure that no wires have come unhooked or have shorted. Fix the wiring as necessary. Wait 3 to 15 minutes, or until the overload resets, and then restart the unit.</p> |
| | <p>The overload is set incorrectly.</p> | <p>With the power removed, check the setting on the overload. It should be 125% of the maximum current draw on the nameplate of the unit. Adjust as necessary, wait 3 to 15 minutes for the overload to reset, and then restart the unit.</p> |

Alarm Indicators

Shutdown Alarms

| Problem | Possible cause | Solution |
|--|--|---|
| <p>AL3 Check Agitator Motor Overload-Actual display is "Agitator Motor Overload Tripped".</p> <p>This alarm will cause an immediate shutdown and indicates that the agitator motor overload is tripped.</p> | <p>The agitator motor current draw has exceeded the full load amperage rating of the motor.</p> <p>The agitator may be experiencing higher than normal resistance in the material.</p> <p>The agitator motor has failed electrically.</p> <p>There is a problem with the double reduction gearbox.</p> <p>The overload is set incorrectly.</p> | <p>Press the mute button and wait about 15 minutes with the power on for the overload to automatically reset. If the alarm occurs again, have a qualified electrician monitor the current draw of the motor.</p> <p>Make sure that the temperature is set at the correct value to sufficiently crystallize the material. If the temperature is too high or low, the material may be agglomerating more than normal.</p> <p>Remove power from the unit and make sure that no wires have come unhooked or have shorted. Fix the wiring as necessary. Wait 3 to 15 minutes, or until the overload resets, and then restart the unit.</p> <p>Visually inspect the double reduction gearbox and make sure that there are no major oil leaks occurring anywhere on the gearbox. Remove the oil fill plug and make sure that the oil level is just to bottom of this hole. Additionally, make sure that there are no obstructions on any of the breather holes towards the top of the gearbox.</p> <p>With the power removed, check the setting on the overload. It should be 125% of the maximum current draw on the nameplate of the unit. Adjust as necessary, wait 3 to 15 minutes for the overload to reset, and then restart the unit.</p> |

Alarm Indicators (Cont.) Shutdown Alarms

| Problem | Possible cause | Solution |
|---|--|---|
| <p>AL4 Process Heater High Temperature Limit-Actual display is "Process Heater High Temp. Switch".</p> <p>This alarm indicates that the process heater internal safety snap switch is open, which indicates an over temperature condition.</p> | <p>There may be an airflow blockage or a loose hose in the system.</p> <p>The isolation contactor may have failed in the closed position.</p> <p>The solid state relays may have failed.</p> | <p>Make sure that there are no crimps in any of the hoses feeding the heater tube, make sure all of the hoses are in position and tight, and make sure that the airflow throttling valve is open to the blower.</p> <p>Replace the isolation contactor.</p> <p>Replace the failed solid state relays.</p> |
| <p>AL5 Delivery Air RTD Malfunction-Actual display is "Process Temp. RTD Malfunction".</p> <p>This alarm indicates that the process temperature RTD is not connected to the control or that the RTD is faulty.</p> | <p>The connection in the electrical enclosure for the process RTD is loose.</p> <p>The RTD is not installed into the receptacle on the top of the control panel enclosure.</p> <p>The RTD is faulty.</p> | <p>Remove power from the system and check all the wiring connections for the RTD in question.</p> <p>Make sure the RTD is installed into the receptacle in the top of the control panel enclosure.</p> <p>Replace the RTD.</p> |

Alarm Indicators (Cont.)

Shutdown Alarms

Problem

AL6 Return Air Temperature Exceeded Limit-Actual display is "Return Air Temp. High Limit".

This alarm indicates that the return air has elevated above the standard default value of 180°F (82.2°C), which is too high for normal operation.

Possible cause

The material throughput has been reduced or stopped. As the material sets in static mode, the temperature profile of the material in the crystallizing hopper will continue to rise. If this occurs, the return air temperature of the system will rise to a level that is insufficient for the process blower (closed-loop system only).

The airflow in the crystallizing hopper is at a level that is higher than required to thoroughly crystallize the material at the throughput of the system.

Check the material level in the hopper.

The aftercooler coil may not have sufficient water flow to remove the required amount of heat from the system (closed-loop system only).

Solution

If the material throughput for the system has stopped, it may be necessary to lower the process temperature until the system throughput resumes again.

Adjust the airflow throttling valve as necessary.

Make sure that the material level sensor in the crystallizing hopper is covered. If not, fill the crystallizer to the correct level.

Adjust the water flow to the aftercooler as necessary.

Alarm Indicators (Cont.)

Shutdown Alarms

| Problem | Possible cause | Solution |
|---|---|--|
| <p>AL7 Return Air RTD Malfunction-Actual display is "Return Air RTD Malfunction".</p> <p>This alarm indicates that the return air temperature RTD is not connected to the control or the RTD is faulty. This alarm is only active when the option is installed.</p> | <p>The connection in the electrical enclosure for the process RTD is loose.</p> <p>The RTD is not installed into the plug on the top of the control panel enclosure.</p> <p>The RTD is faulty.</p> | <p>Remove power from the system and check all the wiring connections for the RTD in question.</p> <p>Make sure that the RTD is installed into the receptacle in the top of the control panel enclosure.</p> <p>Replace the RTD.</p> |
| <p>AL8 Process Temperature Loop Break-Actual display is "Process Temp. Loop Break".</p> <p>This alarm indicates that the temperature is either low or high (outside of the deviation band). This indicates that the temperature is not changing 2°F (0.9°C) towards the process setpoint every 20 seconds.</p> | <p>The process RTD may not be directly centered in the air stream or has fallen out of the air stream.</p> <p>The process heater element, fuses, or SSR may have failed.</p> <p>The airlines feeding the crystallizer may be restricted or loose.</p> <p>Airflow is flowing in the wrong direction.</p> | <p>Check the process air RTD positioning and tightness and adjust or tighten if necessary.</p> <p>Remove power from the unit and check the resistance of the heater fuses and the heater element with an ohmmeter. Replace the heater fuse(s), heater element, or SSR if any of these have failed.</p> <p>Straighten or fix any crimps in the hose and tighten the clamps as necessary.</p> <p>Reverse any two main power wires and check the direction of the air flow. <i>See Section 3 - Installation for more information.</i></p> |

Alarm Indicators (Cont.)

Shutdown Alarms

Problem

AL9 Residence Temperature RTD Malfunction-Actual display is "Residence Temp RTD Malfunction".

This alarm indicates that the residence temperature RTD is not connected to the control or that the RTD is faulty.

AL10 Process Protection RTD Malfunction -Actual display is "Process Prot. RTD Malfunction".

This alarm indicates that the process protection RTD is not connected to the control or that the RTD is faulty.

AL 11 Process Protection Temperature Differential - Actual display is "Process Prot. Temp Deviation".

This alarm indicates that the process protection temperature is at a temperature of 150°F (65.5°C) higher than the actual air temperature entering the crystallizing hopper for 30 seconds. This temperature is the actual temperature at the outlet of the heater tube.

Possible cause

The connection in the control panel enclosure for the process RTD is loose.

The RTD is not installed into the plug on the top of the control panel enclosure.

The RTD is faulty.

The connection in the control panel enclosure for the process RTD is loose.

The RTD is not installed into the plug on the top of the control panel enclosure.

The RTD is faulty.

The process airlines are restricted or loose.

The process RTD has fallen out of the air stream.

Solution

Remove power from the system and check all the wiring connections for the RTD in question.

Make sure that the RTD is installed into the receptacle in the top of the control panel enclosure.

Replace the RTD.

Remove power from the system and check all the wiring connections for the RTD in question.

Make sure that the RTD is installed into the receptacle in the top of the control panel enclosure.

Replace the RTD.

Check for any airflow blockages in the process line between the heater outlet and the crystallizer inlet. Make sure that the airflow throttling valve on the crystallizer is open to provide a sufficient amount of airflow to the system.


Check the process air RTD and tighten or adjust as necessary.

Alarm Indicators (Cont.)

Shutdown Alarms

| Problem | Possible cause | Solution |
|---|---|--|
| <p>AL12 Process Protection Over Temperature-Actual display is "Process Prot. Temp. High Limit".</p> <p>This alarm indicates that the process heater has reached a temperature of 600°F (315.5°C), which is more than the maximum allowed at the RTD.</p> | <p>The process protection RTD is not installed correctly.</p> | <p>Make sure that the process protection RTD is installed correctly and that the RTD is in the hottest part of the air stream (in the center of the tube).</p> |
| <p>AL13 Check Hopper Door Safety Switch or Cone Safety Switch-Actual display is "Safety Switch Open".</p> <p>This alarm will cause an immediate shutdown and indicates that either the hopper clean out door is open or the cone section is removed from the hopper.</p> | <p>The airlines are restricted, are loose, or have come unhooked.</p> <p>The airflow throttling valve is closed or adjusted at a level not suitable for correct operation.</p> | <p>Fix any restricted or kinked process airlines and tighten the clamps as necessary.</p> <p>Check the airflow throttling valve and adjust accordingly.</p> |
| <p>AL14 Process Heater Percentage Output 95%-Actual display is "Process Control = or > than 95%".</p> <p>This alarm indicates that the process heater(s) have been locked at 95% or better for 120 seconds or more. This will cause an immediate shutdown.</p> | <p>The safety switches on the door are not positioned within 0.375 in. (9.35 mm) of one another.</p> <p>The hopper clean out door is open</p> <p>The removable cone section is not in position on the hopper.</p> <p>If everything is on position, it is possible that the fuseable link in the actuator part of the door switch has failed. This fuseable link insures that the device will not weld shut and cause user injury.</p> | <p>Reposition the safety switches as necessary.</p> <p>Close the hopper clean out door.</p> <p>Correctly position / install the removable cone section.</p> <p>Check the safety switches and fuseable links more closely and replace if necessary.</p> |
| <p>AL14 Process Heater Percentage Output 95%-Actual display is "Process Control = or > than 95%".</p> <p>This alarm indicates that the process heater(s) have been locked at 95% or better for 120 seconds or more. This will cause an immediate shutdown.</p> | <p>The process RTD is not located in the proper position to sense the correct air temperature or may have been inadvertently removed from the air stream.</p> <p>The process air hose feeding the hopper is removed or unhooked.</p> <p>The airflow throttling valve on the blower is shut or cut back too far for correct operation.</p> <p>The process blower is providing too much airflow.</p> | <p>Check the position of the process RTD and adjust as necessary.</p> <p>Make sure the process air hose is hooked to the hopper air inlet.</p> <p>Adjust the airflow throttling valve as necessary.</p> <p>Adjust the airflow throttling valve as necessary.</p> |

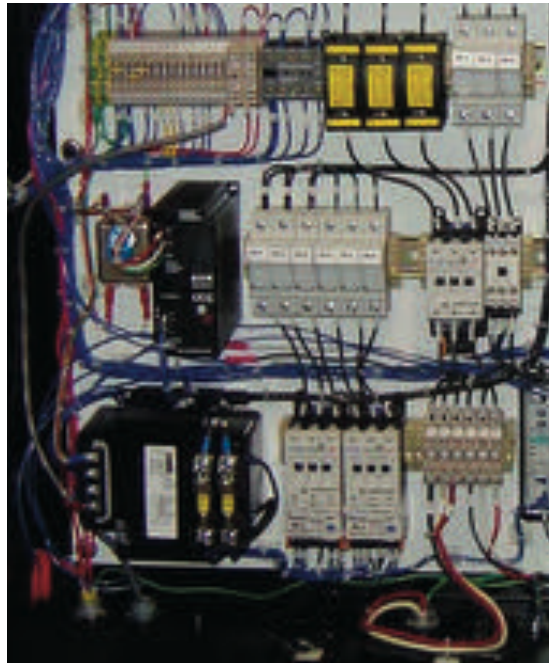
Replacing the Fuses

- 1 Disconnect and lockout the main power supply.** 
- 2 Open the control panel door.**
- 3 Locate or identify the suspected faulty fuse.**
- 4 Check the fuse.** If necessary, pull the fuse out and replace it with a fuse of the same type and rating.



Fuse Blocks

To locate the appropriate fuse and replacement part, refer to the wiring diagrams that came with your crystallizer.




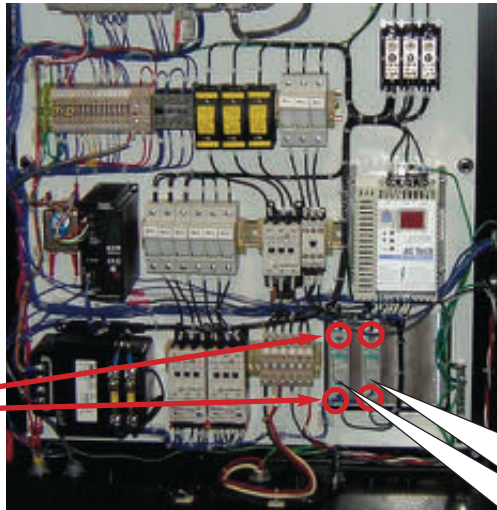
IMPORTANT: Always refer to the wiring diagrams that came with your crystallizer to locate specific electrical components. Illustrations in the User Guide are intended to be representative only.

Checking the Heater Solid State Relay



IMPORTANT: Always refer to the wiring diagrams that came with your crystallizer to locate specific electrical components. Illustrations in the User Guide are intended to be representative only.

- 1 Disconnect and lockout the main power supply.** 
- 2 Open the control panel door.**
- 3 Locate the process heater solid state relay.** Refer to the wiring diagrams that came with your dryer.
- 4 Turn power on to the machine.**
- 5 Start the dryer.**
- 6 Measure voltage across the high voltage connections using a voltmeter.** When relay is energized, as indicated by the LED (green) voltage should be read 0 (zero). When relay is de-energized, LED off, full voltage should be measured across the relay. When relay is off, if voltage reads zero, relay is bad and needs replaced. Repeat this procedure for each relay.

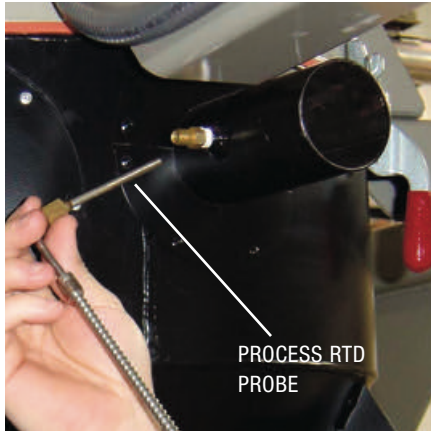


NOTE: Measure voltage using a voltmeter across the two high voltage connections of each relay. (Shown here circled in red.)

Process heater solid state relays
If ohms equal zero or infinity, replace the relays.


Checking or Replacing the Temperature Sensors

The crystallizer uses RTD sensors to monitor the process air and residence temperatures. In addition, optional RTD sensors can be ordered with the system to monitor temperatures at other locations within the system.




IMPORTANT: Always refer to the wiring diagrams that came with your crystallizer to locate specific electrical components. Illustrations in the User Guide are intended to be representative only.


To check or replace an RTD sensor:

- 1 Disconnect and lockout the main power supply.** 
- 2 Locate the RTD sensors.**
- 3 Check the sensor positions and conditions.** Temperature readings will be incorrect, if the sensors are touching the wall of an air hose or pipe or if the sensor or wiring is damaged. The tip of the sensor should be centered within the air hose or pipe. Sensor wires should be attached to the appropriate connection points in the crystallizer's control panel or micro-processor board.
- 4 To check with ohm meter,** measure the resistance across the RTD. The resistance should be approximately 110 ohms at room temperature.
- 5 Replace the sensor, if necessary.**



Replacing the Air-Throttling Valve (CR4-CR10 models)

 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

 **CAUTION: Hot surfaces.** Always protect yourself from hot surfaces inside and outside the crystallizer.

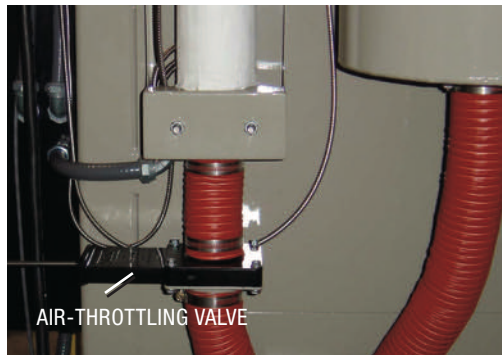
Tools for replacement:

- Appropriate size wrenches or sockets and ratchets
- Flat blade screwdriver

1 Disconnect and lockout the main power supply.



2 Remove the hose connecting the air-throttling valve to the heater by loosening the hose clamp and pulling the hose from air-throttling valve outlet.




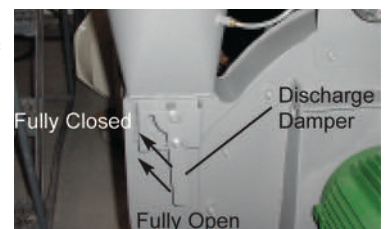
3 Free the air throttling valve from the mounting bracket by removing the four nuts and bolts.

4 Inspect the seals and replace if necessary.


5 Install the new air-throttling valve by aligning it with the holes in the mounting bracket and securing it using the original hardware.

6 Connect the hose from the bottom of the heater to the air-throttling valve outlet and secure it by tightening the hose clamp.

 **NOTE:** On Crystallizer models CR2, CR42, CR85, and CR135 - The damper valve is integral in the outlet of the blower and should not need servicing.



Replacing the Blower

 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

 **CAUTION: Hot surfaces.** Always protect yourself from hot surfaces inside and outside the crystallizer.

1 Disconnect and lockout the main power supply.



Tools for replacement:

- Appropriate size wrenches or sockets and ratchets
- Flat blade screwdriver



2 Reference the wiring diagram and / or trace the wires from the blower into the control panel enclosure. Disconnect the wires from the blower junction box.

3 Remove the hose connecting the process air filter to the blower air inlet by loosening the hose clamp and pulling the hose from blower air inlet.

4 Remove the hose connecting the blower air outlet to the air-throttling valve by loosening the hose clamp and pulling the hose from blower air outlet.

5 Free the blower from its mounting bracket by removing the four nuts and bolts.

6 Remove the manifolds/hose adapters from the blower and reinstall them on the new blower.

Replacing the Blower

(continued)

- 7** Install the new blower by aligning it with the holes in the mounting bracket and securing it using the original hardware removed in Step 5.
- 8** Connect the hose from the bottom of air-throttling valve to the blower air outlet and secure it by tightening the hose clamp.
- 9** Connect the hose from the process air filter to the blower air inlet and secure it by tightening the hose clamp.



CAUTION: Always refer to the wiring diagrams that came with your crystallizer before making electrical connections. Electrical connections should be made only by qualified personnel.

- 10** Reference the wiring diagram to re-attach the blower wires within the junction box of the new blower.
- 11** Make sure the blower fuses are not blown before trying the new blower.

Replacing the Lower Agitator Section

 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

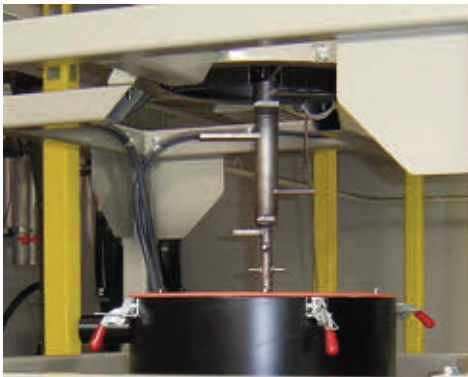
 **CAUTION: Hot surfaces.** Always protect yourself from hot surfaces inside and outside the crystallizer.

1 Disconnect and lockout the main power supply.



Tools for replacement:

- Forklift, hoist, or crane
- Appropriate size wrenches or sockets and ratchets
- Container suitable for collecting removed material
- Block of wood
- Mallet or hammer



2 Remove the removable cone section and discharge valve by referring to Section 5, “Cleaning the Agitating Hopper and Removeable Cone” and following Steps 2 through 7.

3 Break the lower agitator auger section loose from the upper agitator auger by using a block of wood and hammer or mallet to drive the lower agitator auger section in a clockwise direction.



Replacing the Lower Agitator Section Section (continued)

- 4 Remove the lower agitator section** by turning it clockwise by hand until it is unthreaded from the upper agitator.

- 5 Coat the male threads** on the new lower agitator section with anti-seizing compound to lubricate and protect the threads.

- 6 Install the new lower agitator section** by aligning it with the threads inside of the upper agitator and turning it counter-clockwise by hand until it is completely threaded into the upper agitator.



Replacing the Lower Agitator Section

(continued)

7 Tighten the lower agitator section by using a block of wood and a hammer or mallet to "bump" the auger section in a counter-clockwise direction.



8 Install the removable cone section and discharge valve by *referring to Section 5, "Cleaning the Agitating Hopper and Removeable Cone"* and following Steps 13 through 20.

Replacing the Agitator Gear Drive

Tools for replacement:

- Forklift, hoist, or crane
- Appropriate size wrenches or sockets and ratchets
- Appropriate size Allen wrench
- Ladder



NOTE: Turn off the crystallizer and allow it to cool before attempting any maintenance activity.



CAUTION: Hot surfaces. Always protect yourself from hot surfaces inside and outside the crystallizer.

- 1 Disconnect and lockout the main power supply.**



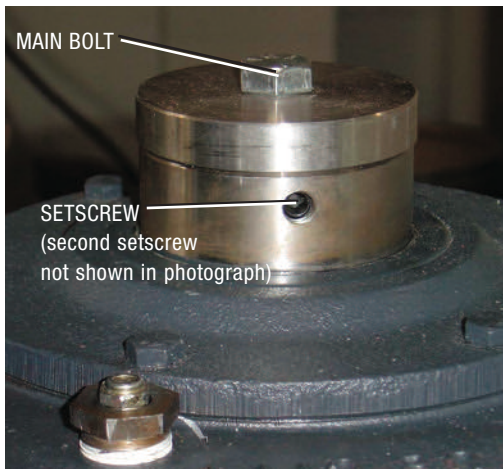
CAUTION: Always refer to the wiring diagrams that came with your crystallizer before making electrical connections. Electrical connections should be made only by qualified personnel.

- 2 Disconnect the power / control cable at the agitator gear drive** by disconnecting the wires on the motor junction box.


Replacing the Agitator Gear Drive

(continued)

3 Loosen the two setscrews in the agitator gear drive cap that secure the key in the agitator shaft.




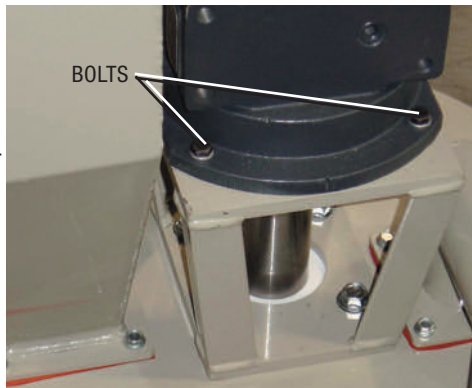
4 Remove the main bolt that extends through the top of the gear drive into the agitator shaft.

 **NOTE:** As the bolt is loosened, the agitator shaft will begin to slide down out of the gear drive.

5 Remove the key from the keyway in the interface of the agitator shaft and gear drive.

6 Free the agitator gear drive by removing the four bolts that secure it to the mounting bracket.

 **NOTE:** If the air seal on the agitator shaft is to be replaced, the agitator gear drive can be removed complete with the mounting bracket by removing the bolts that secure the mounting bracket to the hopper lid. (See "Replacing the Air Seal" on page 6-31.)



7 Remove the agitator gear drive using a hoist or crane to lift it straight up from the mounting bracket and agitator shaft.

8 Lift the new agitator gear drive above the agitator shaft using a hoist or crane and align it with the shaft.

9 Carefully lower the agitator drive gear on to the agitator shaft and align the holes in the gear drive with the holes in the mounting bracket.

Replacing the Agitator Gear Drive

(continued)

- 10** Secure the agitator gear drive to the mounting bracket by installing the original bolts removed in Step 7.
- 11** Align the keyway on the agitator shaft with the keyway in the gear drive and insert the key removed in Step 5.
- 12** Install the gear drive and start the main bolt in the agitator shaft.
- 13** Fully tighten the main bolt in the gear drive.

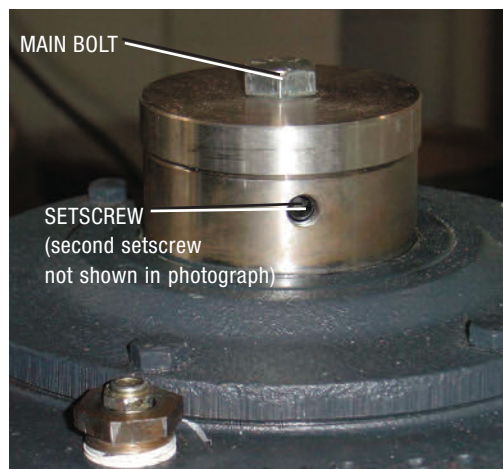


NOTE: As the bolt is being tightened, the agitator shaft will be pulled up until seated against the gear drive cap.

- 14** Fully tighten the two setscrews in the agitator gear drive cap that secure the keys in the agitator shaft.




CAUTION: Always refer to the wiring diagrams that came with your crystallizer before making electrical connections. Electrical connections should be made only by qualified personnel.



- 15** Connect the power / control cable at the agitator gear drive by connecting the wires into the junction box of the new motor.

Replacing the Agitator Air Seal

 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

 **CAUTION: Hot surfaces.** Always protect yourself from hot surfaces inside and outside the crystallizer.

1 Disconnect and lockout the main power supply.



2 Remove bolts from agitator seal holder.

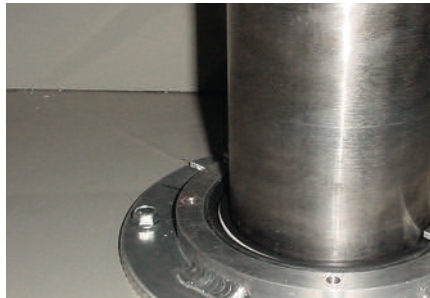
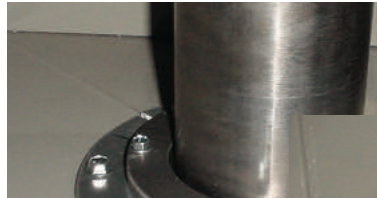
3 Remove the two covers from the air seal holder.

4 Remove split air seal from air seal holder. Note the top and bottom of the seal.



Tools for replacement:

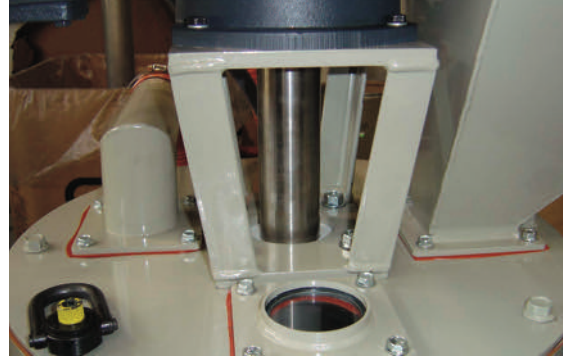
- Appropriate size wrenches or sockets and ratchets
- Appropriate size Allen wrench
- Ladder



Replacing the Agitator Air Seal


(continued)

5 Reinstall using reverse of removal.



Replacing the Agitator

There are two different methods for replacing the agitator depending on the head room clearance available and lifting capabilities available in your application. The following method is for lifting the agitator out the top of the crystallizer (this method is not for low clearance situations. Use the alternative method listed on later pages for low clearance removal.)

 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

 **CAUTION: Hot surfaces.** Always protect yourself from hot surfaces inside and outside the crystallizer.

Tools for replacement:

- Hoist or crane
- Appropriate size wrenches or sockets and ratchets
- Appropriate size Allen wrench
- Hammer
- Drift
- Ladder

1 Disconnect and lockout the main power supply.



2 Remove the removable cone section and discharge valve by referring to Section 5, “Cleaning the Agitating Hopper and Removeable Cone” and following Steps 2 through 7.

3 Remove the lower agitator auger section by referring to Section 6, “Replacing the Lower Agitator Auger” and following Steps 3 and 4.


4 Remove the agitator gear drive by referring to Section 6, “Replacing the Agitator Gear Drive” and following Steps 2 through 8.

5 Loosen the breaker bars in the agitating hopper by removing the bolts that secure the breaker bars to the hopper.



Replacing the Agitator (continued)

- 6 Drive the breaker bars from their mounting holes** using a hammer and suitable drift.

 **NOTE:** Be careful not to harm the female threads in the end of the breaker bars.

- 7 Fully remove the breaker bars** from the hopper by pulling them out from the opposite end of the hopper.

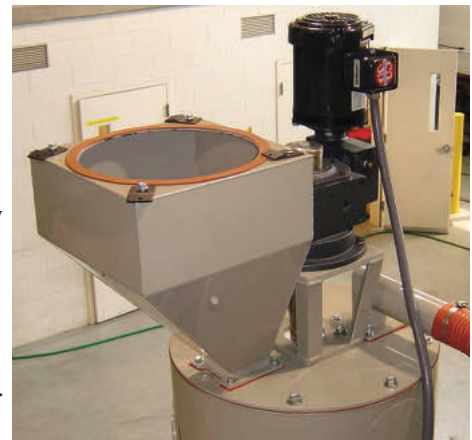


WARNING: The agitating hopper lid will be removed during the next steps. Since various types of loaders or delivery systems can be mounted to the lid for use with the crystallizer, it is the **RESPONSIBILITY OF THE USER** to determine if the loader or delivery system must be removed before the agitating hopper lid can be safely removed.

- 8 Remove the loader or delivery system** from the agitating hopper lid if determined to be necessary (see WARNING above).


- 9 Free the agitating hopper lid** by removing the bolts securing it to the hopper.

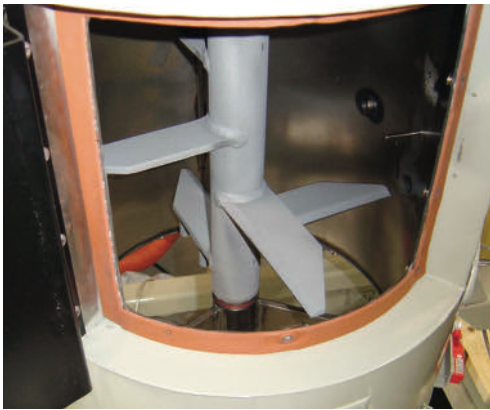
- 10 Remove the agitating hopper lid** using a suitable hoist or crane.



Replacing the Agitator (continued)


- 11 Remove the agitator** by lifting it straight up out of the agitating hopper using a suitable hoist of crane.

 **CAUTION:** As the agitator is being lifted from the hopper, care should be taken to ensure that the residence RTD and hopper fill level sensor are not damaged. This can be avoided by manipulating the agitator position as it is pulled up and away from the hopper.




- 12 Examine the agitator inner bearing** located in the bearing support, mid-way in the agitating hopper. If the bearing shows signs of wear, *see Section 6, “Replacing the Agitator Auger Inner Bearing”* for instructions.

- 13 Install the new agitator** by lifting it above the agitating hopper, aligning it with the hopper, then slowly lowering it into the hopper. Make sure that the agitator auger properly aligns with and completely seats in main bearing in the bottom of the hopper.

 **CAUTION:** As the agitator is being lowered into the hopper, care should be taken to ensure that the hopper fill level sensor and residence RTD are not damaged. This can be avoided by manipulating the agitator position as it is lowered into the hopper.

- 14 Examine the condition of the gasket at the top of the agitating hopper.** If any damage is detected, replace the gasket.


 **WARNING:** The agitating hopper lid will be installed during the next steps. Since various types of loaders or delivery systems can be mounted to the lid for use with the crystallizer, it is the RESPONSIBILITY OF THE USER to determine if the loader or delivery system must be removed before the agitating hopper lid can be safely installed.

Replacing the Agitator (continued)

- 15** Align the agitating hopper lid with the hopper then lower it into place using a suitable hoist or crane.
- 16** Secure the agitating hopper lid by installing the bolts removed in Step 9.
- 17** If the loader or delivery system was removed from the agitating hopper lid, reinstall it at this time (see WARNING on previous page).
- 18** Slide the breaker bars into the side of the hopper. Make sure they align properly with holes in the opposite side of the hopper. Once properly aligned, they can be driven into place if necessary.
- 19** Secure the breaker bars using the original hardware removed in Step 5. Do not over-tighten the bolts securing the breaker bars. Equipment damage can occur.
- 20** Install the agitator gear drive by *referring to Section 6, “Replacing the Agitator Gear Drive”* and following Steps 8 through 16.
- 21** Install the lower agitator auger section by *referring to Section 6, “Replacing the Lower Agitator Section”* and following Steps 5 and 6.
- 22** Install the removable cone section and discharge valve by *referring to Section 5, “Cleaning the Agitating Hopper and Removeable Cone”* and following Steps 13 through 20.

Replacing the Agitator (Alternative Method)

There are two different methods for replacing the agitator depending on the head room clearance available and lifting capabilities available in your application. The following method is for lowering the agitator out the bottom of the crystallizer. This method is for low overhead clearance situations.

 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

 **CAUTION: Hot surfaces.** Always protect yourself from hot surfaces inside and outside the crystallizer.

Tools for replacement:

- Hoist or crane
- Appropriate size wrenches or sockets and ratchets
- Appropriate size Allen wrench
- Hammer
- Drift
- Ladder
- Cable

- 1 Disconnect and lockout the main power supply.**



- 2 Remove the removable cone section and discharge valve by referring to Section 5, “Cleaning the Agitating Hopper and Removeable Cone” and following Steps 2 through 7.**


- 3 Remove the lower agitator auger section by referring to Section 6, “Replacing the Lower Agitator Auger Section” and following Steps 3 and 4.**



- 4 Loosen the breaker bars in the agitating hopper by removing the bolts that secure the breaker bars to the hopper.**

Replacing the Agitator Alternative Method) (continued)

5 Drive the breaker bars from their mounting holes using a hammer and suitable drift.

 **NOTE:** Be careful not to harm the female threads in the end of the breaker bars.

6 Fully remove the breaker bars from the hopper by pulling them out from the opposite end of the hopper.



7 Referring to Section 6, “Replacing Agitator Gear Drive” and perform steps 3-5.

8 Install an eye bolt or similar into the location where the main bolt was removed. Hook a cable to similar onto the eye bolt.





9 Remove the inner support. *Refer to Section 6, “Replacing the Agitator Inner Support Bearing”* steps 4-5.

10 Lower shaft through the bottom of the crystallizer. Carefully rotate the agitator to miss sensors and RTD's while lowering.



Replacing the Agitator Inner Support Bearing

 **NOTE:** Turn off the crystallizer and allow it to cool before attempting any maintenance activity.

 **CAUTION: Hot surfaces.** Always protect yourself from hot surfaces inside and outside the crystallizer.

1 Disconnect and lockout the main power supply.



2 Remove the removable cone section and discharge valve by *referring to Section 5, “Cleaning the Agitating Hopper and Removeable Cone (Major Cleaning)”* and following Steps 2 through 7.

3 Remove the lower agitator auger section by *referring to Section 6, “Replacing the Lower Agitator Auger Section”* and following Steps 3 and 4.

4 Remove bolts installed above the lower bearing support.

Tools for replacement:

- Appropriate size wrenches or sockets and ratchets
- Appropriate size Allen wrench
- Hammer
- Ladder

Replacing the Agitator Inner Support Bearing (continued)

5 Lift bearing support upward and turn clockwise (looking bottom up) and remove.

6 Remove bearing and replace.

7 Installation is reverse of removal. Make sure to use Loctite and fully tighten the bolts above the inner bearing support. (Removed in step 4.)



We're Here to Help


Conair has made the largest investment in customer support in the plastics industry. Our service experts are available to help with any problem you might have installing and operating your equipment. Your Conair sales representative also can help analyze the nature of your problem, assuring that it did not result from misapplication or improper use.

Additional manuals and prints for your Conair equipment may be ordered through the Customer Service or Parts Department for a nominal fee. Most manuals can be downloaded free of charge from the product section of the Conair website.
www.conairgroup.com

How to Contact Customer Service

To contact Customer Service personnel, call:



 **NOTE:** Normal operating hours are 8:00 am - 5:00 pm (EST). After hours emergency service is available at the same phone number.

You can commission Conair service personnel to provide on-site service by contacting the Customer Service Department.

Before You Call...

If you do have a problem, please complete the following checklist before calling Conair:

- Make sure you have all model, control type and serial numbers from the serial tag, and parts list numbers for your particular equipment. Service personnel will need this information to assist you..
- Make sure power is supplied to the equipment.
- Make sure that all connectors and wires within and between control systems and related components have been installed correctly.
- Check the troubleshooting guide of this manual for a solution.
- Thoroughly examine the instruction manual(s) for associated equipment, especially controls. Each manual may have its own troubleshooting guide to help you.
- Check that the equipment has been operated as described in this manual.
- Check accompanying schematic drawings for information on special considerations.

Equipment Guarantee

Conair guarantees the machinery and equipment on this order, for a period as defined in the quotation from date of shipment, against defects in material and workmanship under the normal use and service for which it was recommended (except for parts that are typically replaced after normal usage, such as filters, liner plates, etc.). Conair's guarantee is limited to replacing, at our option, the part or parts determined by us to be defective after examination. The customer assumes the cost of transportation of the part or parts to and from the factory.

Performance Warranty

Conair warrants that this equipment will perform at or above the ratings stated in specific quotations covering the equipment or as detailed in engineering specifications, provided the equipment is applied, installed, operated and maintained in the recommended manner as outlined in our quotation or specifications.

Should performance not meet warranted levels, Conair at its discretion will exercise one of the following options:

- Inspect the equipment and perform alterations or adjustments to satisfy performance claims. (Charges for such inspections and corrections will be waived unless failure to meet warranty is due to misapplication, improper installation, poor maintenance practices or improper operation.)
- Replace the original equipment with other Conair equipment that will meet original performance claims at no extra cost to the customer.
- Refund the invoiced cost to the customer. Credit is subject to prior notice by the customer at which time a Return Goods Authorization Number (RGA) will be issued by Conair's Service Department. Returned equipment must be well crated and in proper operating condition, including all parts. Returns must be prepaid.

Purchaser must notify Conair in writing of any claim and provide a customer receipt and other evidence that a claim is being made.

Warranty Limitations

Except for the Equipment Guarantee and Performance Warranty stated above, Conair disclaims all other warranties with respect to the equipment, express or implied, arising by operation of law, course of dealing, usage of trade or otherwise, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.

Replacing the Heater (smaller models)

Tools for replacement:

- Appropriate size wrenches or sockets and ratchets
- Flat blade screwdriver
- Utility knife

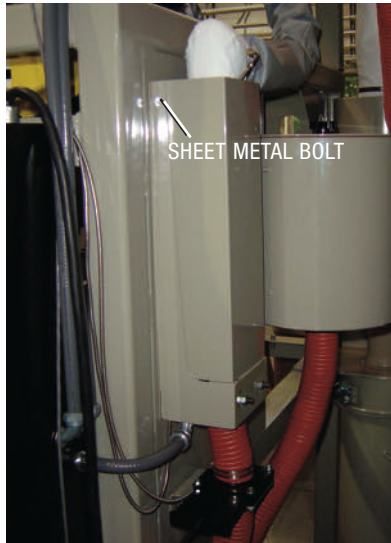


NOTE: Turn off the crystallizer and allow it to cool before attempting any maintenance activity.



CAUTION: Hot surfaces. Always protect yourself from hot surfaces inside and outside the crystallizer.

- 1 Isolate the equipment from the electric power** by turning the rotary disconnect switch to the OFF, or "O" position. See Section 1 - Introduction for complete lockout procedures.



- 2 Loosen the heater cover** by removing the two sheet metal bolts located near the top left and right sides of the heater cover.

- 3 Remove the heater cover** by tilting the top away from the heater and then lifting it out of the slots in the heater mounting bracket.



Replacing the Heater (smaller models) (continued)

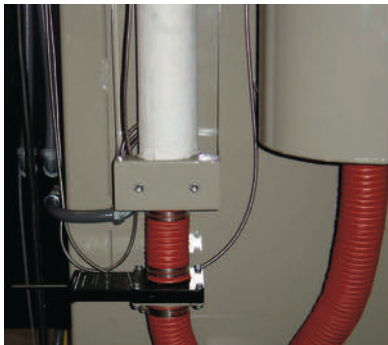
- 4** Remove and save the heater RTD and fitting. They will be installed in the new heater.



- 5** Remove the insulation from the heater tube by cutting the insulation with a utility knife line from top to bottom. Spread the insulation apart and slide it off the heater. Be careful not to destroy the insulation, it will be reinstalled later in this process.

- 6** Remove the process air hose from the top of the heater by loosening the hose clamp and pulling the hose off of the heater outlet.

- 7** Remove the air inlet hose from the bottom of the heater by loosening the hose clamp and pulling the hose off of the heater inlet.



Replacing the Heater (smaller models)

(continued)

8 Reference the wiring diagram and / or trace the wires from the heater into the control panel enclosure. Disconnect the wires from the relays and terminal strips

9 Loosen the heater tube by loosening the two acorn nuts that secure the "U" bolt on the heater.

10 Remove the heater tube by sliding it out of the "U" bolt, lifting it from the mounting bracket, and pulling the wires through the conduit at the same time.



NOTE: It may be necessary to disconnect the conduit from the control panel enclosure and / or the heater mounting bracket to ease the wire removal / insertion.

11 Check the ID mark on the side of the heater for kW rating and voltage. The ID mark is on the outside of the tube near the end with the lead wires. Make sure the kW and voltage is the same as the replacement heater.

12 Insert the new heater tube through the "U" bolt and into the mounting bracket. Note that the RTD opening should be pointing directly away from the back of the crystallizer. Tighten the acorn nuts on the "U" bolt to secure the heater.

13 Feed the heater wires through the conduit to the control panel enclosure. Applying petroleum jelly on the tips of the new heater wires to will make it easier to feed them through the conduit to the control panel enclosure.



CAUTION: Always refer to the wiring diagrams that came with your crystallizer before making electrical connections. Electrical connections should be made only by qualified personnel.

14 Reference the wiring diagram to re-attach the heater wires within the control panel enclosure.

15 Slide the original insulation onto the heater. Make sure the hole for the RTD aligns with the RTD mounting hole. Use duct tape to cover the seam that was cut in the insulation during removal and to hold the insulation on the heater.

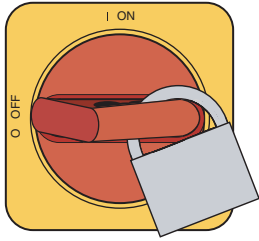
16 Install the RTD and fitting in the 1/8" (3.18 mm) NPT hole near the top of the heater tube (in the same place it was removed from in Step 4).

Replacing the Heater (smaller models)

(continued)

- 17 Re-install the air inlet hose** on the air inlet at the bottom of the heater.
Tighten the hose clamp.
- 18 Re-install the process air hose** on the process air outlet at the top the heater.
Tighten the hose clamp.
- 19 Re-install the heater cover** by aligning the tabs on the bottom of the heater cover with the slots in the heater mounting bracket. Tilt the top of the cover up towards the heater and install the two sheet metal bolts removed in Step 2 to secure the cover.
- 20 Make sure the heater fuses are not blown** before trying the new heater.



Replacing the Heating Elements (larger models)



! **IMPORTANT:** Always refer to the wiring diagrams that came with your heater to locate specific electrical components. Illustrations in the User Guide are intended to be representative only.

Replacement heating elements are available from Conair.

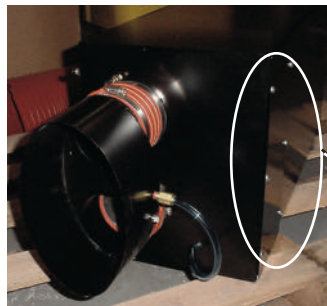
Contact Conair Parts
(800) 458 1960
From outside of the
United States, call:
(814) 437 6861

- 1 Disconnect and lockout the main power.** 
- 2 Gain access to the heating elements** by removing screws that secure the heating element cover to the enclosure. 

- 3 Remove the heating element cover** by tilting the top away from the enclosure slightly, then lifting the cover up and away from the enclosure.



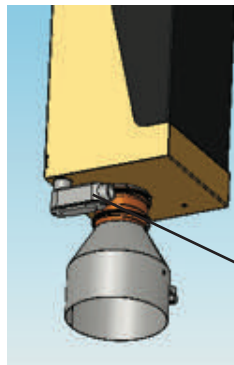
- 4 Determine which heater(s) is not functioning.**
See Installation section entitled, Testing the Installation.



- 5 Remove the screws securing the electrical cover plate** to the heating element enclosure. Remove the electrical cover plate.

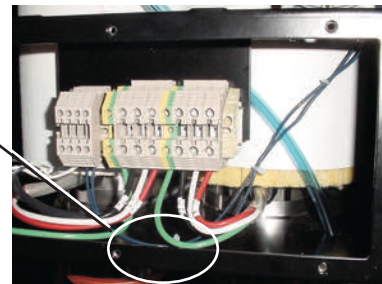
Screws to Remove
- Large Heaters

- 6 Disconnect the heating element leads from the terminals on the terminal block,** after noting connection points.



Heater
Connection
Junction Box

Heater
Wires



Replacing the Heating Elements (larger models) (continued)

7 Remove the hose clamp securing the insulated hose to the outlet of the heating element. Remove the hose.

8 Remove the hose clamps securing the heating element to the heater inlet.

9 Remove the internal hose clamp.

10 Lift the heating element out of the enclosure.

11 Slide the insulation off the heater, or make a cut the entire length of the insulation sleeve to aid removal.

12 Check the ID mark on the side of the heating element for kW rating and voltage. The ID mark is on the outside of the tube near the end with the lead wires. Make sure the kW and voltage is the same as the replacement heating element.

13 Slide the original insulation over the new heater or, if the insulation was cut for removal, wrap the cut insulation sleeve around the new heater and secure it with duct tape.

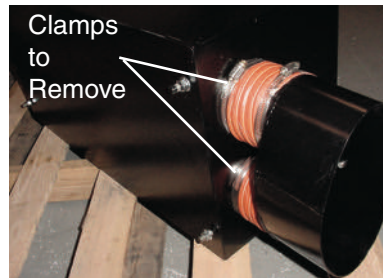
14 Set the new heating element into the enclosure. Secure the heating element to the heater inlet with the original three (3) hose clamps.


15 Connect the insulated outlet hose to the outlet of the heating element. Secure the hose with the original hose clamp.

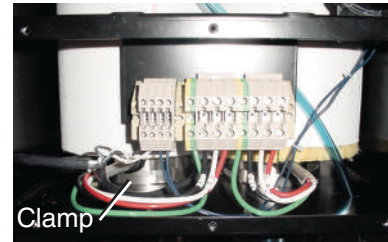
16 Route the heating element leads to the terminal block. Connect the heating element leads to the original terminals on the terminal block. Re-install the electrical cover plate.

17 Re-install the heating element cover on the enclosure.

18 Test the system to ensure that the new heating element is functioning correctly.



 **Note:** For larger units (above 60 kW), it may be necessary to remove the front heaters to access the rear heaters.



Replacement heating elements are available from Conair.

Contact Conair Parts
(800) 458 1960
From outside of the
United States, call:
(814) 437 6861

Installing an Aftercooler (Optional for Closed-Loop Systems Only)

The aftercooler option is used only if the crystallizer will be configured as a "closed loop" system. Its function is to cool the return air before it is returned to the process air filter and blower for recirculation.

You can add an aftercooler to the crystallizer by ordering the optional aftercooler assembly. Installation is easy.

The optional aftercooler requires a source of city, tower, or chiller water and a discharge or return line. You can use water at temperatures up to 85°F (30°C). But the water flow should be at least 2 gal/min (7.6 liters/min).



❖ **TIP:** Make the water supply and discharge / return connections with flexible hoses at least 24 in. (61 cm) long. This allows you to easily remove the aftercooler assembly for cleaning.

1 Stop the crystallizer and lockout the main power.



2 Install the aftercooler near the crystallizer in close proximity to the cyclone separator and process air filter.

3 Connect the water supply line to the aftercooler inlet. If a manual shut off valve is used, it should be mounted on the inlet line.


4 Connect the water discharge or return line to the aftercooler outlet.



NOTE: Water to the aftercooler should be turned off when the crystallizer is not running to prevent condensation.

Cleaning the Aftercooler

If your crystallizer is configured as a closed-loop system and uses an aftercooler, you need to clean the aftercooler coils to keep them working efficiently. Cleaning frequency depends on the type and amount of material you process.

- 1 Stop the crystallizer and lockout the main power.** 
- 2 Turn off the water flow to the water supply line.** Disconnect supply and return lines.
- 3 Remove the hardware securing the aftercooler** in the aftercooler housing.



• **TIP:** If the aftercooler was installed using the recommended 24 inch (61 cm) of flexible hoses, there is no need to disconnect the hoses from the aftercooler inlet and outlet.

- 4 Remove the aftercooler assembly** from the aftercooler housing.
- 5 Clean the aftercooler** assembly using a mild soap and water. Let the aftercooler dry thoroughly before installation.



CAUTION: During the cleaning process, **DO NOT** cut or remove the stainless steel wire that holds the aftercooler assembly together.

- 6 Inspect the condition of the gasket.** If it is damaged, replace the gasket.
- 7 Reassemble** by repeating the steps in reverse order.