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USER GUIDE

UGD040-1022

ResinWorks™

Central Drying and Conveying System

Corporate Office: 724.584.5500 | Instant Access 24/7 (Parts and Service): 800.458.1960 | Parts and Service: 814.437.6861

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: UGD040-1022

Serial Number(s):

Model Number(s):

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Table of Contents

1-1 Introduction

2-1 Description

3-1 Installation

AA Addendum

SECTION

1

Introduction

Purpose of the User Guide

This User Guide describes the Conair ResinWorks™ conveying and pre-conditioning system 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.

1 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 a qualified technician who is familiar with the construction, operation and potential hazards of this type of machine.

All wiring, disconnects and fuses should be installed by qualified electrical technician 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 (control center). 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 control center or performing non-standard operating procedures, such as routine maintenance. Only qualified personnel should perform troubleshooting procedures that require access to the control center while power is on.

(continued)

ATTENTION:

Read this so no one gets hurt (continued)

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.

CAUTION: Hot Surfaces.

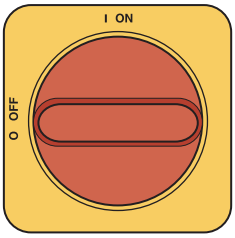
Always protect yourself from hot surfaces inside the dryer and hopper. Also exercise caution around exterior surfaces that may become hot during use. These include the hopper door frame, the exterior of an uninsulated hopper, the return air hose and the dryer's process filter housing and moisture exhaust outlet.

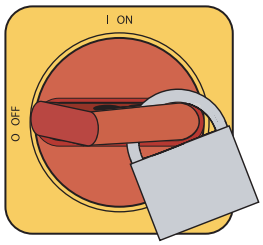
WARNING: Do not place aerosol, compressed gas or flammable materials on or near this equipment.

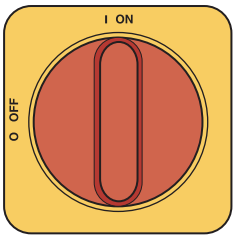
The hot temperatures associated with the drying process may cause aerosols or other flammable materials placed on the dryer or hopper to explode.

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 heater, 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.**

SECTION
2

Description

What is the ResinWorks Central Drying and Conveying System?

ResinWorks is a central drying and conveying system for providing materials to processing machines from a central area. The materials may be in a raw material state (straight from a silo, bin or box) or they may be blended, dried, ground, reclassified, etc. (pre-conditioned) before they are pneumatically transported to the end-use location; usually a processing machine throat.

Due to the wide variation in the ways that these systems can be configured, different instruction manuals must be referred to for a full understanding of all the ResinWorks components.

Typical Applications

The ResinWorks central drying and conveying system is designed for applications requiring drying temperatures from 150° - 375°F {66° - 191°C}.

The ResinWorks can be used successfully in applications that require:

- The ability to dry multiple materials requiring different drying temperature setpoints in a central drying system.
- The ability to easily take a hopper “off-line” for cleaning without shutting down the entire central drying system.
- The ability to move the equipment to a central location for safety, energy efficiency and ease of maintenance.

How it Works

The ResinWorks central drying and conveying system is comprised of multiple components working together to deliver dry, multiple materials to meet various production needs.

Central Dryer

The ResinWorks utilizes a central dryer to provide desiccated air to each hopper. The heaters at each hopper elevate the temperature for drying the specific material in each hopper.

ResinWorks Sled

The ResinWorks sled serves as the support structure for all hoppers in the system. The supply and return air, as well as the dry air conveying manifolds are integrated into the sled.

An optional control panel (if equipped) and air flow lever are located at each hopper station on the ResinWorks sled. This allows each hopper to be controlled individually based on the material in the hopper. The Start/Stop buttons and air flow lever (On/Off control) allows each hopper to be isolated from the rest of the system for cleaning without shutting down the entire system.

Hopper

The hoppers available with the ResinWorks system are insulated and made of stainless steel. They have large, easy-to-open doors that allow for easy cleaning.

Automatic Bypass Valve

The automatic bypass valve allows each hopper to be taken “off line” without having to manually adjust the air flow on any of the other hoppers.

Adjustable Purge Valve (APV)

The Adjustable Purge Valve (APV) meters the materials entering the conveying air stream for delivery to the destination. It also purges the line after delivery to prevent cross-contamination of materials.

(continued)

How it Works (continued)

Resin Selection Station (RSS)

The Resin Selection Station (RSS) (material distribution center) allows the user to direct the material from each hopper to any processing machine connected to the system. For example, the material from a specific hopper may need to be directed to six (6) separate processing machines. Each row in the material distribution center is fed by one of the specific hoppers.

1. Central Dryer
2. ResinWorks Sled
3. Hopper
4. Automatic Bypass Valve
5. Adjustable Purge Valve (APV)
6. Resin Selection Station (RSS)

Specifications: ResinWorks System

RESIN DRYING HOPPERS AND STANDS

Models	RWH 10-1	RWH 10-1.5	RWH 14-2	RWH 14-3	RWH 14-4	RWH 18-6	RWH 24-12	RWH 24-18	RWH 33-21	RWH 33-28	RWH 39-35‡**	RWH 39-42‡**	RWH 44-58‡**
Figure Number	Figure 1										Figure 2		
Performance characterstics													
Volume ft³ {liter}	1.0 {28}	1.5 {42}	2.0 {56}	3.0 {85}	4.0 {113}	6.0 {170}	12.0 {340}	18.0 {509}	21.0 {595}	28.0 {793}	35.0 {991}	42.0 {1189}	58.0 {1643}
Capacity @ 35 lb/ft³ lb {kg}	35.0 {16}	52.5 {24}	70.0 {31}	105.0 {48}	140 {63}	210.0 {95}	420.0{191}	630.0{286}	735.0{333}	980.0{445}	1225.0 {556}	1470.0 {667}	2030.0 {921}
Capacity @ 52 lb/ft³ lb {kg}	52.0 {23}	78.0 {35}	104.0 {47}	156.0 {71}	208.0 {94}	312.0 {142}	624.0 {283}	936.0 {425}	1092.0 {495}	1456.0 {660}	1820.0 {826}	2184.0 {991}	3016.0 {1368}
Air inlet/outlet OD {mm}	2.5 {64}								5.0 {127}				
Inside diameter OD {mm}	10.0 {254}		14.0 {356}			18.0 {457}	24.0 {610}		33.0 {838}		39.0 {991}		44.0 {991}
Material inlet	IT06					IT07							
Material outlet ID {mm}	2.38 {60}										3.0 {76}		
Material discharge (bottom)	IB02										IB03		
Voltages full load amps§													
Heater kW	4						10				30		
208 V/3 phase/60Hz	11.1						22.7*				N/A		
230 V/3 phase/60Hz	10.1						25.1				N/A		
400 V/3 phase/50Hz	5.8						14.4				43.7		
460 V/3 phase/60Hz	5.0						12.6				37.9		
575 V/3 phase/60Hz	4.0						10.1				30.4		
Standard sled dimensions inches {cm}													
A - Overall height†	65.5 {166}	78.5 {199}	65.5 {166}	78.7 {200}	86.5{220}			110.8{281}	90.4 {230}	115.3{293}	128.7{327}	138.9 {353}	144.5 {367}
B - Height below mounting flange	32.6 {83}		29.3 {74}			25.6 {65}	20.6 {52}		24.0 {61}		27.0 {69}		22.0 {56}
C - Panel height	41.3 {105}										41.8 {106}		
D - Sled width	25.0 {64}						36.0 {91}		45.0 {114}		69.0 {175}		74.0 {188}
E - Depth	51.3 {130}										59.0 {150}		64.0 {162}
Approximate weight lb {kg}													
Shipping weight	300 {136}	310 {141}	335 {152}	350 {159}	365 {166}	450 {204}	670 {304}	700 {318}	1000 {454}	1250 {567}	1700 {771}	1750 {794}	2000 {907}

Specification Notes

* Uses 230 V heater derated to 7.5 kW.

† For multi-hopper sled, be sure to use the largest hopper as the reference for the overall height.

‡ Conair 39 and 44 inch hoppers are mounted on individual sleds.

§ FLA ratings are per hopper. FLA ratings for a ResinWorks sled is the sum of the sled's individual hopper FLA ratings plus 1.2 amps.

** The optional gaylord-loading stand (available only on RWH39 and RWH44 sizes) increases overall height by 34 inches {86cm} on RWH39 models and 39 inches {99 cm} on RWH44, and weight by 100 lbs {45 kg}. It provides 60.5 inches {154} clearance below the flange.

Specifications can change without notice. Contact a Conair representative for the most current information.

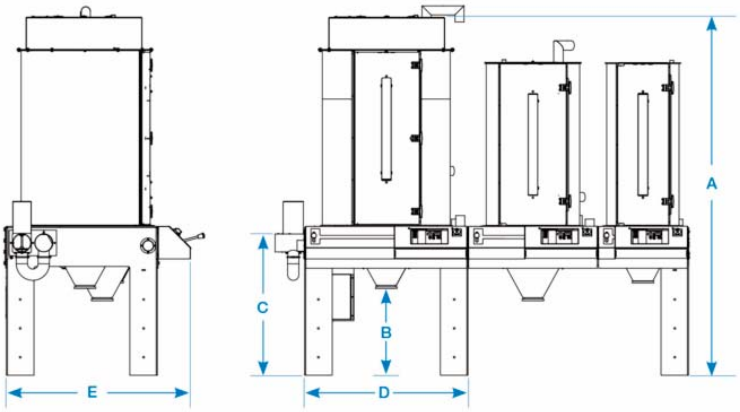
TPDS016-0619

Specifications: ResinWorks System (continued)

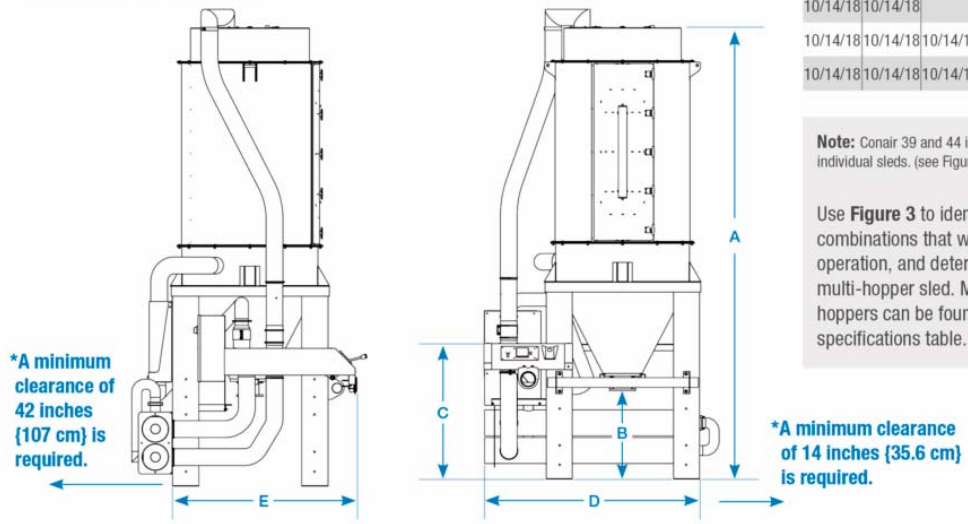
RESIN DRYING HOPPERS AND STANDS

Depending upon hopper requirements, ResinWorks drying systems may be configured with single-hopper sleds, multiple-hopper sleds or a combination of both.

Multi-Hopper Sled (Figure 1)



Single-Hopper Sled (Figure 2)



Hoppers that are 33 inches {84 cm} in diameter and smaller may be joined together onto a single sled and shipped as a unit, installed as a unit and connected into your drying system as a single unit **(see Figure 1)**. This consolidation greatly saves time and expense and once connected to the proper central drying unit, provides an optimum dehumidification system for all of your resins. Hoppers 39 inches {99 cm} and over in diameter are provided on their own individual floor stands (sleds) and each is equipped with air connections, heater, control, etc. **(see Figure 2)**.

Available Hopper Combinations (Figure 3)

RWH Hopper Models possible sled combinations				Sled Total Length	
				inches {mm}	ft. {cm}
33				45 {1143}	3.8 {116}
33	33			90 {2286}	7.5 {229}
33	33	24		126 {3200}	10.5 {320}
33	33	10/14/18		115 {2921}	9.6 {293}
33	24			70 {1778}	5.8 {177}
33	24	24		95 {2413}	7.9 {241}
33	24	10/14/18	10/14/18	131 {3327}	10.9 {332}
33	10/14/18	10/14/18	10/14/18	120 {3048}	10.0 {305}
24				36 {914}	3.0 {91}
24	24			72 {1829}	6.0 {183}
24	24	24		108 {2743}	9.0 {274}
24	24	14/18		97 {2464}	8.1 {247}
24	24	10/14/18	10/14/18	122 {3099}	10.2 {311}
24	10/14/18	10/14/18	10/14/18	111 {2814}	9.3 {283}
10/14/18				25 {635}	2.1 {64}
10/14/18	10/14/18			50 {1270}	4.2 {128}
10/14/18	10/14/18	10/14/18		75 {1905}	6.3 {192}
10/14/18	10/14/18	10/14/18	10/14/18	100 {2540}	8.3 {253}

Note: Conair 39 and 44 inch hoppers are mounted on their own individual sleds. (see Figure 2)

Use **Figure 3** to identify the available hopper combinations that would be right for your operation, and determine the overall width of each multi-hopper sled. More specific dimensions for hoppers can be found on the previous page, in the specifications table.

ResinWorks System Options

• Multiple Sled Connection Kit
This option allows the connection between multiple sleds for the integral supply, return and conveying manifolds. For each junction between sleds, a kit is required.

• Adjustable Purge Valve
New design! This valve controls material flow from material source to destination(s). This easy-to-clean and install valve has a discharge that rotates 360 degrees to allow complete purge of material lines.

• Hopper Discharge Drain Port
Facilitates hopper draining and cleanout.

• Precision Slide Gate
Use the precision Slide Gate to prevent material leakage when no purge valve or distribution box is specified on the hopper.

• Communications
Via Modbus.

• Temperature Setback RTD
Automatically reduces the drying temperature to a lower standby mode when the machine throughput is reduced or stopped to prevent overdrying of material.

SECTION
3

Installation

Unpacking the Boxes

The ResinWorks central drying and conveying system, depending on the model and options ordered, could include:

- ResinWorks sled
- Hoppers (installed) **NOTE:** For large hoppers the "high hat" or center section will not be bolted in place due to shipping constraints.
- Purge valve(s)
- Sled connection kit(s)
- Dry air conveying connection kit(s)
- Two (2) hoses to connect the central dryer to the sled (supply and return air hoses)
- Hose adapters (if required).

Other Equipment

- Resin Selection Station (RSS)
- Loaders/receivers
- Vacuum pump
- Dust collector
- Central loading control

1 **Carefully remove all components** from their shipping containers.

2 **Remove all packing material,** protective paper, tape and plastic.

3 **Carefully inspect all components** to make sure no damage occurred during shipping, and that you have all the necessary hardware.

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. This 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.

Preparing for Installation

The ResinWorks system is easy to install if you select and prepare the installation area properly.

⚠ **IMPORTANT:** Check the dryer orientation of your ResinWorks system. Standard configuration of the dryer is left-to-right. If your application requires right-to-left orientation, contact Conair Parts for a right-handed bypass valve.

Automatic bypass valves are available from Conair.

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

1 Make sure the mounting area provides:

- ❒ **A grounded power source supplying the correct current for your ResinWorks system.** All ResinWorks systems require three-phase power. Check the ResinWorks' serial tag for the correct amps, voltage and cycles. Field wiring should be completed by a qualified electrical technician at the planned location for the ResinWorks. All electrical wiring should comply with your region's electrical codes. *See Description section entitled, Specifications: ResinWorks System.*

✎ **NOTE:** Multi-sled ResinWorks systems will require separate power drops for each sled.

- ❒ **Close proximity to the central dryer to be used with the ResinWorks system.** Conair recommends using the hoses supplied with the dryer to make the connections between the dryer's delivery outlet and return air inlet and the ResinWorks delivery and return air manifolds.

- ❒ **If applicable, close proximity to the Cargo Caire dry air generator to be used with the ResinWorks system.** Conair recommends using the 3.0 inch {76.2 mm} flex hose supplied to make the connections between the Cargo Caire conveying air system and the ResinWorks conveying air manifolds.

✎ **NOTE:** If compressed air will be used for the conveying air used in conjunction with the ResinWorks system, the compressed air system and hoses are the responsibility of the customer. No compressed air hoses are supplied with the ResinWorks system.

- ❒ **Access to the plant's material feed and delivery systems.**

Installation of the ResinWorks System

⚠ **CAUTION:** You are responsible for the structural integrity of this installation.

✎ **NOTE:** The ResinWorks system is shipped with wooden supports bolted between the legs of the unit to keep them from being damaged during shipping and to aid in moving the unit to the installation location.

1 The bottom plates on the legs of the ResinWorks are bolted to the shipping skid. **Remove and discard the mounting bolts then remove all packing materials from the ResinWorks and its components. DO NOT remove the wooden supports bolted between the legs at this time.** The wooden supports stabilize the legs for transit and should be used to move the ResinWorks into its installation location.

⚠ **CAUTION:** Do not remove the wooden supports until the sled has been installed in its final location. Attempting to move the ResinWorks after the wooden supports have been removed from the legs of the unit could allow damage to the legs during movement.

2 **Once the ResinWorks is in its installation location and properly positioned, unbolt the wooden supports from the legs on the unit.** Discard the wooden supports and mounting hardware.

⚠ **WARNING:** Make sure the unit has been properly secured. The integrity of the installation is the responsibility of the customer.

✎ **NOTE:** Conair recommends that you bolt the ResinWorks sled to the concrete floor.

✎ **NOTE:** The bottom plates on the legs of the ResinWorks are designed to accept either adjustable footpads for leveling or lag bolts for securing the unit to the factory floor. The footpads and/or mounting hardware are the responsibility of the installer.

Mounting the ResinWorks Hopper High-Hat

⚠ **CAUTION:** You are responsible for the structural integrity of this installation.

✎ **NOTE:** Some ResinWorks hoppers, depending on size, are shipped with their hopper high-hat or center section removed for shipping.

To mount the hopper's high-hat or center section:

1. **Remove the high-hat or hopper center section from its shipping pallet, using an appropriately-sized wrench.** The high-hat or hopper center section will be shipped from Conair bolted the pallet.

2. **Raise the upper section of the hopper above the ResinWorks sled, using an appropriate lifting device.**

3. **Place the supplied gasket between the upper and lower sections of the ResinWorks hopper.** Ensure to use silicone to seal the gasket and the sections of the hopper.

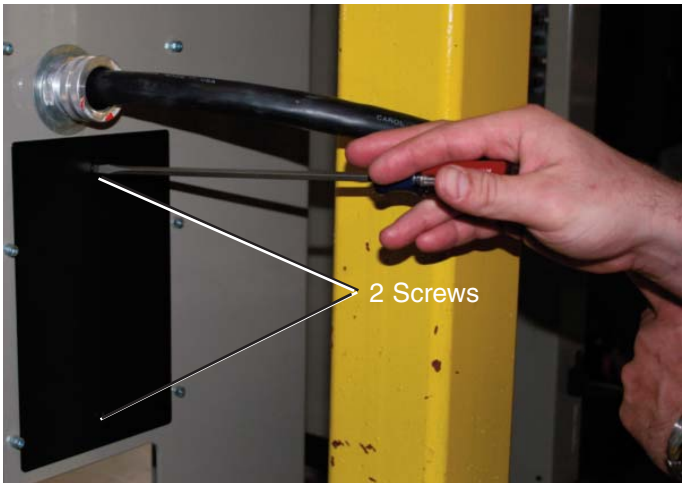
4. **Bolt the upper and lower hopper sections together using appropriate hardware, ensuring to secure the gasket between each section.**

Connecting the Main Power

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

NOTE: All components of the ResinWorks are pre-wired. The only electrical connection that must be made is the main power connection. This does not include optional accessories such as valves and loaders.

1 Remove the two (2) screws securing the power connection cover on the rear left corner of the ResinWorks.

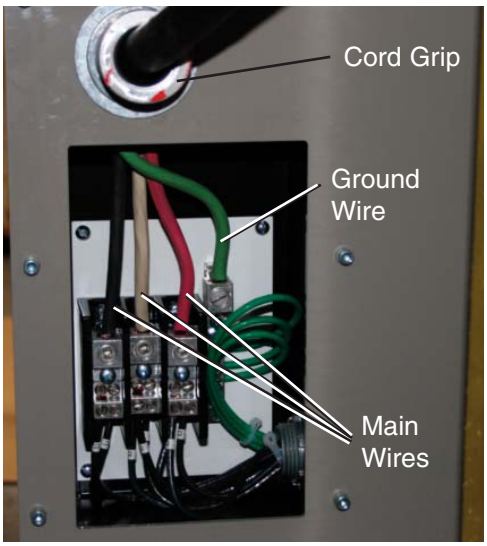


NOTE: Each sled will have a main power connection.

2 Feed the main power cable into the hole above the power connection cover. Secure the power cable to the frame with an appropriate cord grip (customer supplied).

3 Connect the ground wire and three (3) main wires to the proper terminals on the distribution plate.

4 Reinstall the power connection cover using the original hardware.



Connecting the Dryer to the ResinWorks

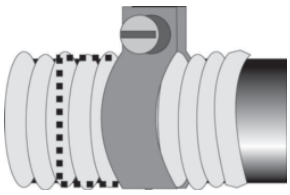
⚠ **CAUTION:** Before connecting a dryer a to single ResinWorks sled, make sure that the dryer is "phase corrected" and that the dryer's blower is turning in the correct direction. Refer to the manual supplied with your dryer for additional information.

✎ **NOTE:** The ResinWorks drying air delivery and return ports are 5 inches {127 mm} in diameter. If the ports on the dryer are smaller or larger, install the necessary adapters (included if needed) on the ResinWorks so the hoses supplied with the dryer can be connected. *See Installation section entitled, Connecting Air Hose Adapters.*

1 Connect one (1) of the supplied hoses to the drying air delivery inlet port of the ResinWorks sled using the clamp supplied. If you have an insulated hose, it should be installed on the delivery port.

✎ **NOTE:** The hoses supplied with the dryer can be cut if necessary for neat installation.

2 Route the ResinWorks dryer air delivery hose from Step 1 to the dryer's dry air delivery outlet. Secure the hose to the dryer outlet port using the supplied hose clamp.

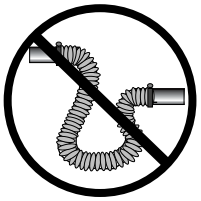


⚠ **IMPORTANT:** Always refer to the wiring diagrams that came with your ResinWorks before making electrical connections.

Adapters are available from Conair.

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

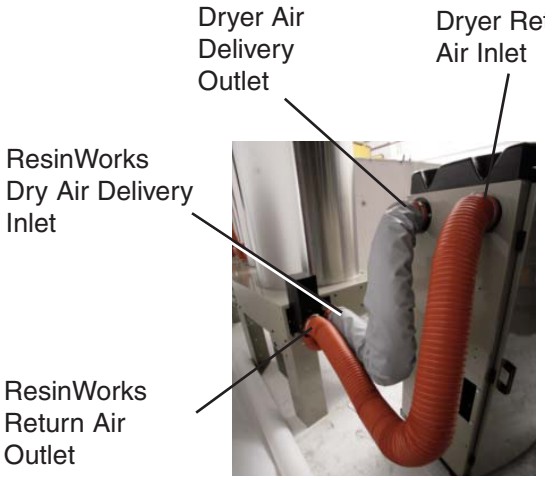
✎ **NOTE:** An insulated hose is not standard.

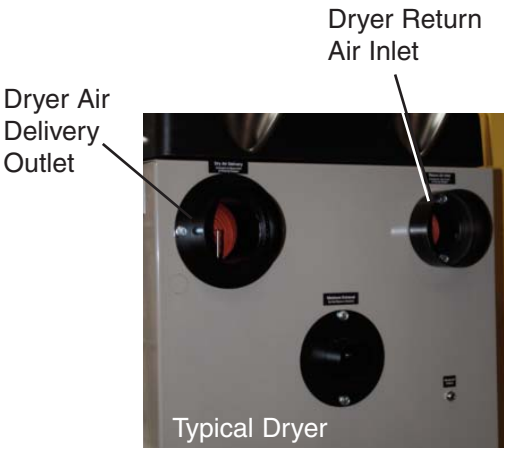


✎ **NOTE:** Do not allow the flexible hoses to kink or crimp.

Connecting the Dryer to the ResinWorks (continued)

3 **Connect the other supplied hose to the return air outlet of the ResinWorks** using the supplied hose clamp.





4 **Route the ResinWorks return air hose from Step 3 to the dryer return air inlet.** Secure the hose to the dryer inlet port using the supplied hose clamp.

⚠ **IMPORTANT:** If your setup requires the dryer to be located on the opposite side of the ResinWorks, a separate automatic bypass valve must be purchased to connect between the dryer and ResinWorks sled. The automatic bypass valve is **not** interchangeable from side to side.

Connecting the Dryer to a Single ResinWorks Hopper

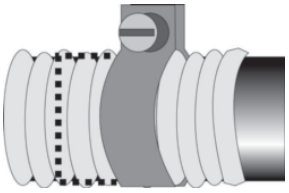
⚠ **CAUTION:** Before connecting a dryer to the ResinWorks, make sure that the dryer is "phase corrected" and that the dryer's blower is turning in the correct direction. Refer to the manual supplied with your dryer for additional information.

✎ **NOTE:** The single ResinWorks drying air delivery and return ports can be 5, 8 and 12 inches {127, 203 and 305 mm} in diameter. If the ports on the dryer are smaller or larger, install the necessary adapters (included if needed) on the ResinWorks so the hoses supplied with the dryer can be connected. *See Installation section entitled, Connecting Air Hose Adapters.*

1 Connect one (1) of the supplied hoses to the drying air delivery inlet port of the ResinWorks using the supplied clamp. If you have an insulated hose, it should be installed on the delivery port.

✎ **NOTE:** The hoses supplied with the dryer can be cut if necessary for neat installation.

2 Route the ResinWorks dryer air delivery hose from Step 1 to the dryer's dry air delivery outlet. Secure the hose to the dryer outlet port using the supplied hose clamp.



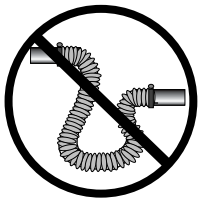
✎ **NOTE:** Each sled will have a main power connection.

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

Adapters are available from Conair.

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

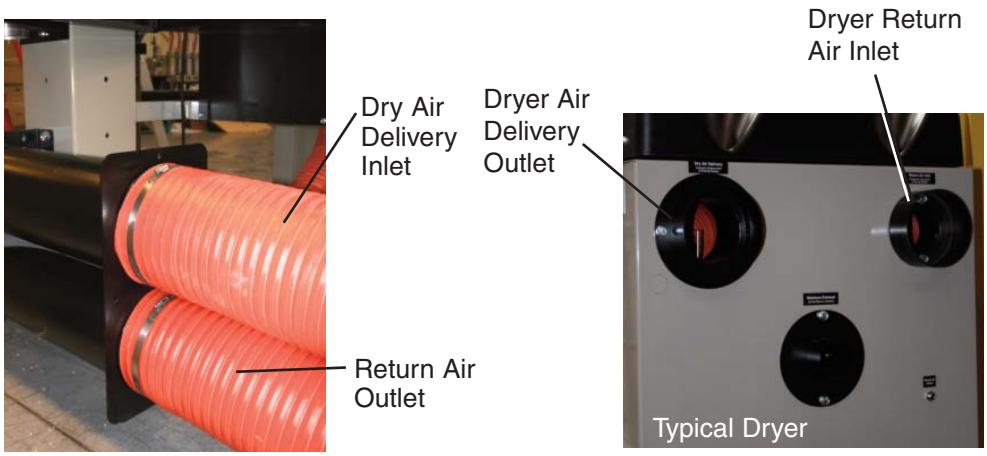
✎ **NOTE:** An insulated hose is not standard.



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

Connecting the Dryer to a Single ResinWorks Hopper (continued)

3 **Connect the other supplied hose to the return air outlet of the ResinWorks sled,** using the supplied hose clamp.



NOTE: Typical dry air inlet/outlet configuration shown. Location on larger model dryers are different. Refer to the labeling on your dryer.

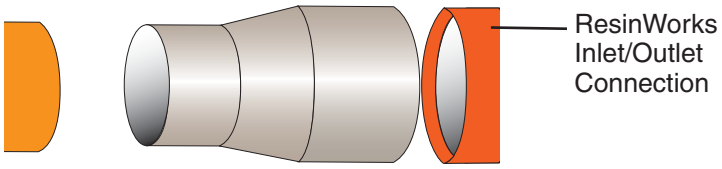
4 **Route the ResinWorks sled return air hose from Step 3 to the dryer return air inlet.** Secure the hose to the dryer inlet port using the supplied hose clamp.

Connecting Air Hose Adapters

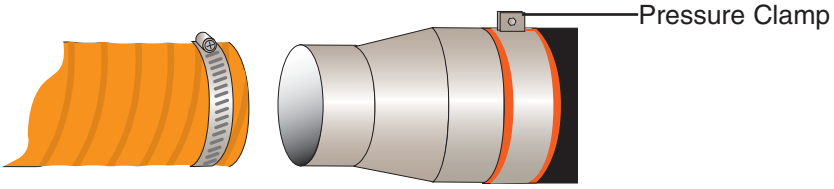
Depending on the ResinWorks hopper you purchased, you may need to install an air hose adapter to connect to your dryer.

To connect the air hose adapter:

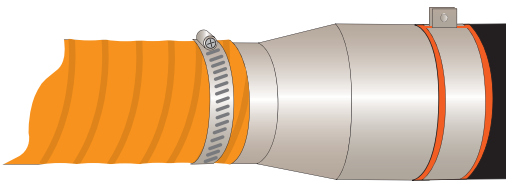
1 Place a high temperature gasket approximately half way down from the end of the dry air delivery inlet/outlet.



2 Place the hose adapter inside the high temperature gasket and flush to the ResinWorks inlet/outlet, secure with pressure clamp.



3 Attach the dryer inlet/outlet hose over the adapter, secure with clamp.



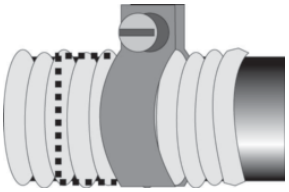
Adapters are available from Conair.

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

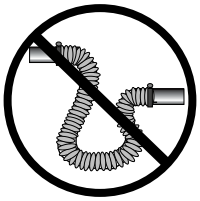
Connecting the Conditioned Air
(If Applicable)

This section only applies if you have purchased the Cargo Caire dry air generator option.

1 **Connect the supplied 3 inches {76.2 mm} hose to the conveying air inlet port of the ResinWorks,** using the supplied hose clamp.



2 **Route the ResinWorks conveying air hose to the conveying air source or an optional Cargo Caire unit or central dryer.** Secure the hose to the conveying air source, using the supplied hose clamp.



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

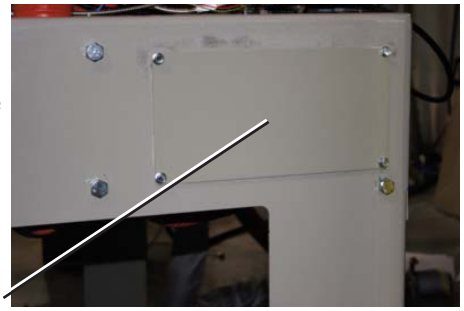
(continued)

Connecting Additional ResinWorks Sleds

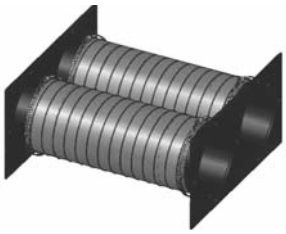
The ResinWorks systems can consist of as many as 20 hoppers, depending on specifications. This is accomplished by means of multiple ResinWorks sleds. Follow the instructions below to connect additional ResinWorks sleds.

TIP: It is best to have the larger hoppers close to the dryer. If you are adding a sled(s) to your system with large hoppers, and your current sled(s) has only smaller hoppers, the new sled should be situated as the first sled in the system. Contact your Conair Sales Representative for additional information.

1 Remove the hardware securing the drying air manifold cap to the right or left side (based on your specific installation) of the ResinWorks sled frame. Remove the drying air manifold cap.

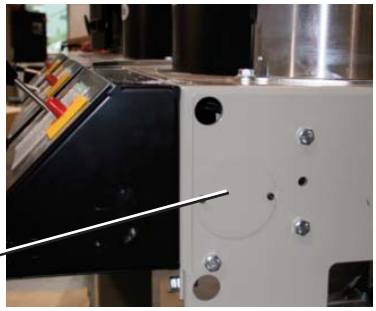


2 Align the drying air adapter manifold adapter kit with the drying air manifold. Secure the drying air adapter manifold to the ResinWorks frame using the hardware removed in Step 1 and the hardware supplied with the adapter kit.



NOTE: Apply a bead of high temperature silicone to one of the mating surfaces.

3 Remove the hardware securing the conveying air manifold cap to the right or left side (based on your specific installation) of the ResinWorks sled frame. Remove and discard the conveying air manifold cap.



(continued)

NOTE: The following instructions assume that the main ResinWorks sled has been set in the installation location, the main power connected, the dryer connected, and the conveying air (if applicable) connected to the unit.

Additional ResinWorks sleds are available from Conair.

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

NOTE: Steps 3 and 4 are only applicable if conveying air is used in the system. If conveying air is not used in the system, proceed to Step 5.

Connecting Additional ResinWorks Sleds (continued)

Additional ResinWorks sleds are available from Conair.

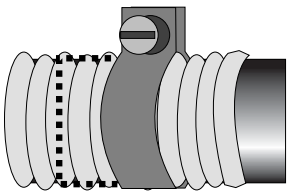
Contact Conair Parts
(800) 458 1960
From outside of the
United States, call:
(814) 437 6861

4 **Align the conveying air adapter manifold with the conveying air manifold.** Secure the conveying air adapter manifold to the ResinWorks frame using the hardware removed in Step 3 and the hardware supplied with the adapter kit.

✎ **NOTE:** Apply a bead of high temperature silicone to one of the mating surfaces.

5 **Install additional ResinWorks sled(s)** so that the side of the additional sled(s) is approximately 1 to 2 ft {0.31 to 0.61 m} (minimum of 8 in. {203.2 mm}) from the side of the main ResinWorks sled.

6 **Using the supplied hose and clamps, connect the outlet of the drying air adapter manifold on the main ResinWorks sled to the drying air inlet on the second ResinWorks sled.**



✎ **NOTE:** Step 8 is only applicable if conveying air is used in the system. If conveying air is not used in the system, proceed to Step 9.

7 **Using the supplied hose and clamps, connect the outlet of the return air adapter manifold on the main ResinWorks sled to the return air inlet on the second ResinWorks sled.**

8 **Using the supplied hose and clamps, connect the outlet of the conveying air adapter manifold on the main ResinWorks sled to the conveying air inlet on the second ResinWorks sled.**

✎ **NOTE:** If additional sleds are to be used, follow the instructions in this section for each additional sled.

9 ***See Installation section entitled, Connecting Main Power,*** to connect the second ResinWorks sled's main power.

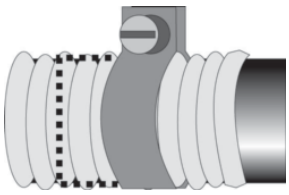
Connecting the ResinWorks Central Drying System to the Plant-wide Material Distribution System

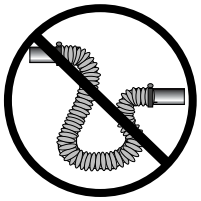
Material Conveying Lines (from the Drying Hoppers)

Materials dried in the hoppers of your ResinWorks system need to be directed to the final end use location. A wide variety of methods may be used for this transfer.

The ResinWorks Drying System is ideal for providing this transfer utilizing conveying air that is itself dry (with optional Cargo Caire), to assure that moisture will not be regained in the transfer process. If your plan includes this dry air conveying process, then the appropriate equipment for combining material from the drying hopper, mixing it with dry conveying air and then directing this air/material mix into the conveying line is provided with your system. It may include a simple take-off box or an Adjustable Purge Valve (APV). Each module has its own operating characteristics, but each mounts below the hopper and must be plumbed from its location towards the material distribution system.

Flex hose should be used for the connection at the base of the hopper to allow flexibility if/when removed. If supplied with your system, connection to the dry air manifold will have already been made. If not, then a flex hose connection to the dry air manifold will also be required. All flex hose connections should be as straight as possible and secured with hose clamps. Double check that all under-hopper components may be easily removed for service before finalizing your installation.





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

The path of the material transfer lines from the drying hopper sled to the end use location will vary depending upon the actual configuration of your system, but all lines should be adequately supported against vibration, coupled with leak proof connectors, and routed with minimal bends.

Refer to both your system flow schematic and the appropriate additional instruction manuals for more information regarding the material transfer system.

Connecting the Loading System to the ResinWorks

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

The hoppers available with the ResinWorks system are designed to accept a variety of loading systems. The lids supplied with the hoppers are designed to accept either a 12 inch {304.8 mm} loader (all hoppers) and/or an 8 inch {203.2 mm} loader (smaller hoppers only).

It is the responsibility of the installer to mount the loading system to the hoppers on the ResinWorks and make all necessary power and control connections.

Testing the Installation

You have completed the ResinWorks installation. Now it is time to make sure everything works.

1 **Fill each hopper to at least the 50% level (green area of the site glass).**

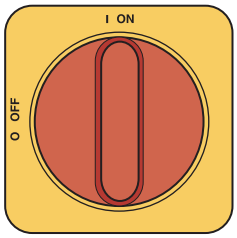
2 **Turn on the main power supply.**

3 **Turn on the dryer used with the ResinWorks system.**

4 **Turn the main power disconnect for each individual hopper to the "On" position.**

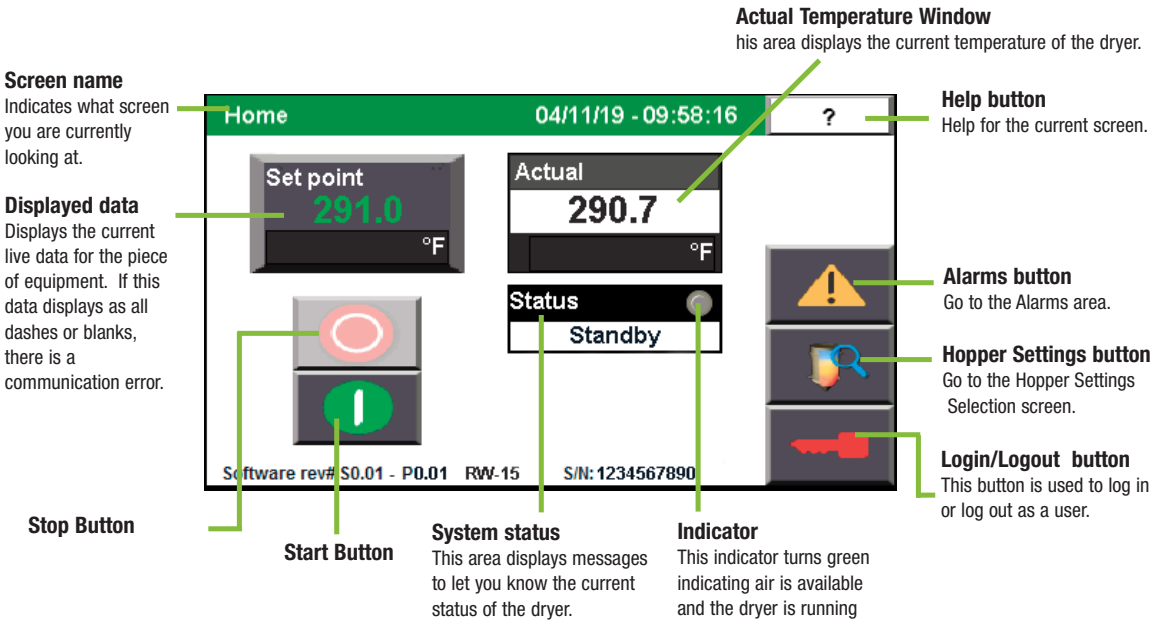
5 **Make sure the airflow valve(s) is in the "Open" position** (all the way up)**.**

✎ **NOTE:** The installation can be tested hopper by hopper, or all the hoppers at once. The decision is up to the installer.



(continued)

Testing the Installation (continued)



6 **Set the set point temperature to 150°F {66°C}.**

7 **Press the Start button.**

8 **Verify that the heater(s) turn on and the actual temperature begins to rise towards the set point temperature.**

9 **Press the Stop button.**

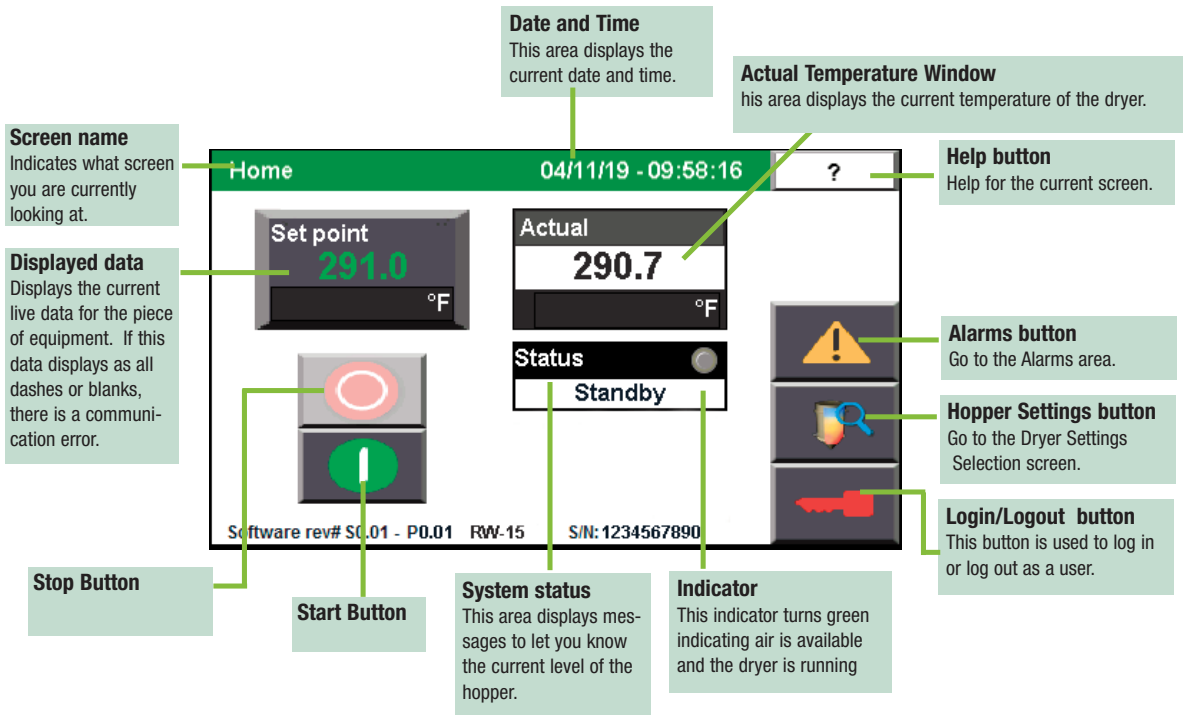
10 **Repeat Steps 4 through 8 for each hopper in the ResinWorks system,** if you are testing each hopper individually or if you have multiple single sled ResinWorks systems.

SECTION

4

Operation

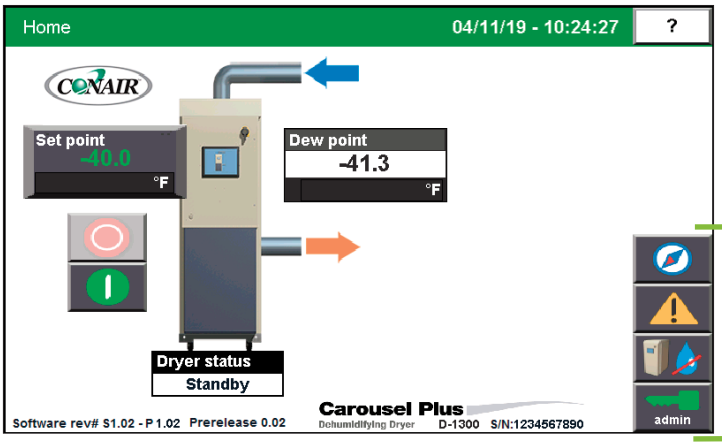
The ResinWorks System: DC Control Panel



NOTE: Your ResinWork system can be controlled by optional HMI screens at each station (if equipped) or by one central dryer control. If your ResinWorks stations do not have a control, adjust settings by each hopper at the dryer control.

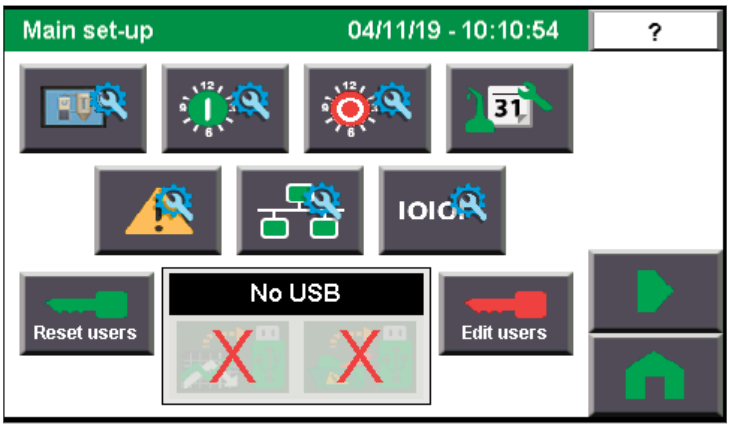
How to Navigate the Control Screens

Navigate through the control screens by touching any navigation "buttons".



Navigation Buttons
Touching the navigation buttons will take the user to the control screen selected.

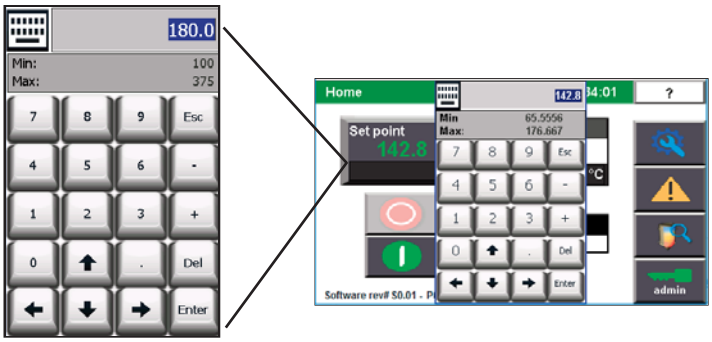
All beveled grey buttons on the DC-C control screen are selectable and will direct you to another screen. At any point, pressing the Home button will return you to the home screen.



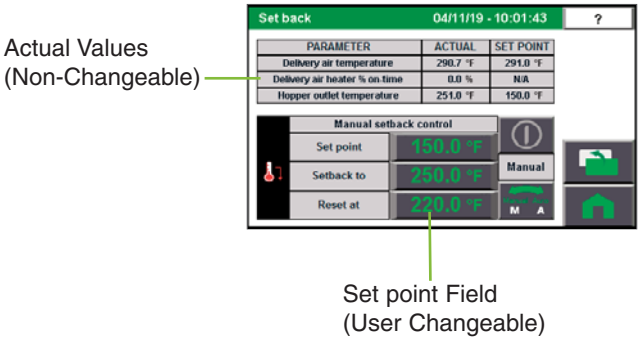
How to Navigate the Control Screens

(continued)

The user name, password and other information can be entered using the pop-up keyboard window that appears when an appropriate field is touched.



Set points can be entered within fields with raised beveled edges with green values. Values shown within flat rectangles are “actual” values and can not be changed.



(continued)

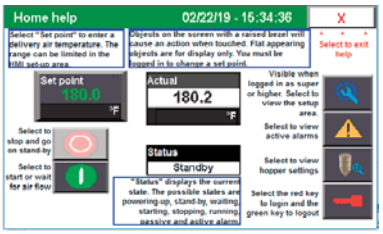
Control Function Flow Charts

The following flow charts provide a quick summary of the control functions. For an explanation of each control function, *see Operation section entitled, Control Function Descriptions.*

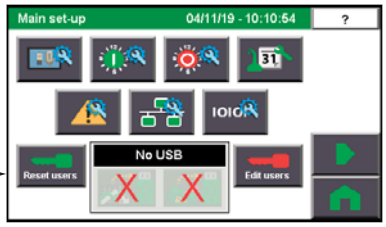
(continued)

Control Function Flow Charts

From the Home screen



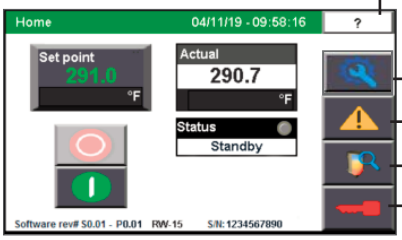
Help

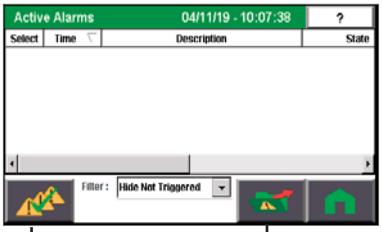


Main Setup

ResinWorks Home

(logged in as admin - wrench shows up



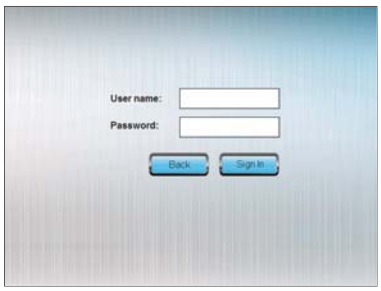


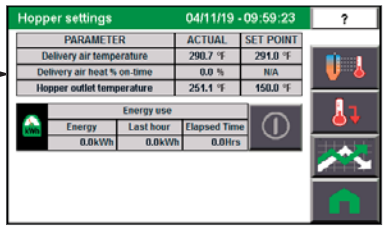
Active Alarms

Acknowledge Alarm

Alarm History

Login



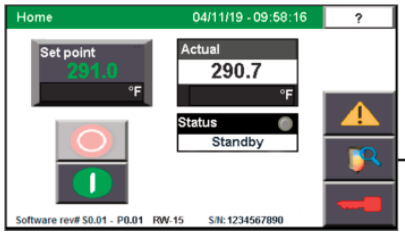


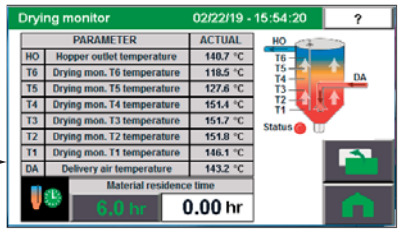
Hopper Settings

Control Function Flow Charts

From the Home screen

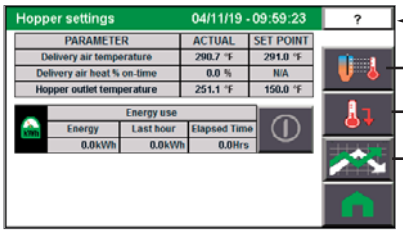
ResinWorks Home



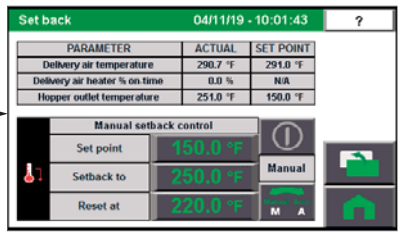


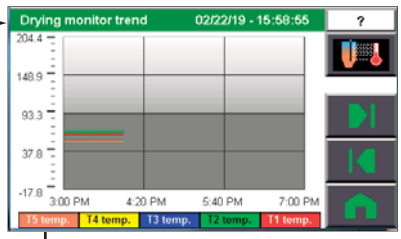
Drying Monitor

Hopper Settings

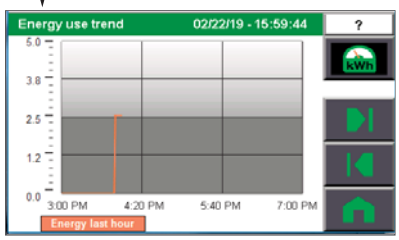


Set back





Drying Monitor Trend

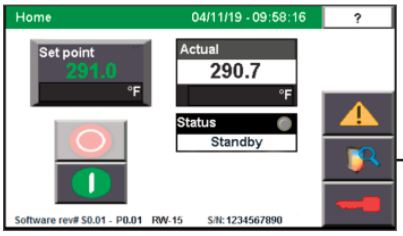


Energy Use Trend

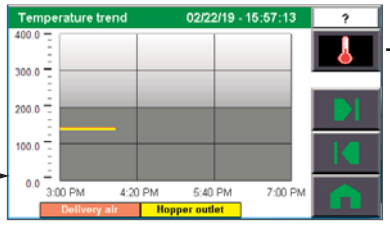
Control Function Flow Charts

From the Trend Selection screen

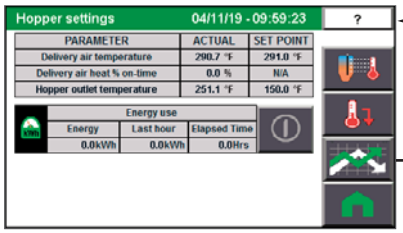
ResinWorks Home



Temperature

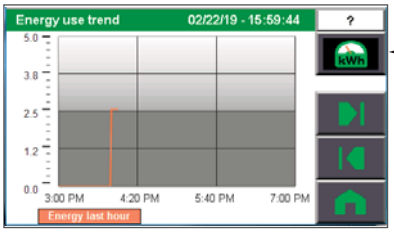


Hopper Settings

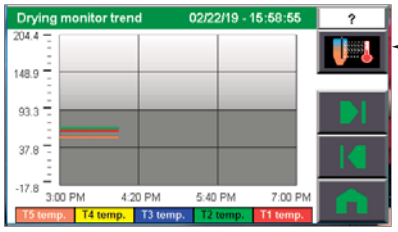


Heat On-time % Trend

Energy Use



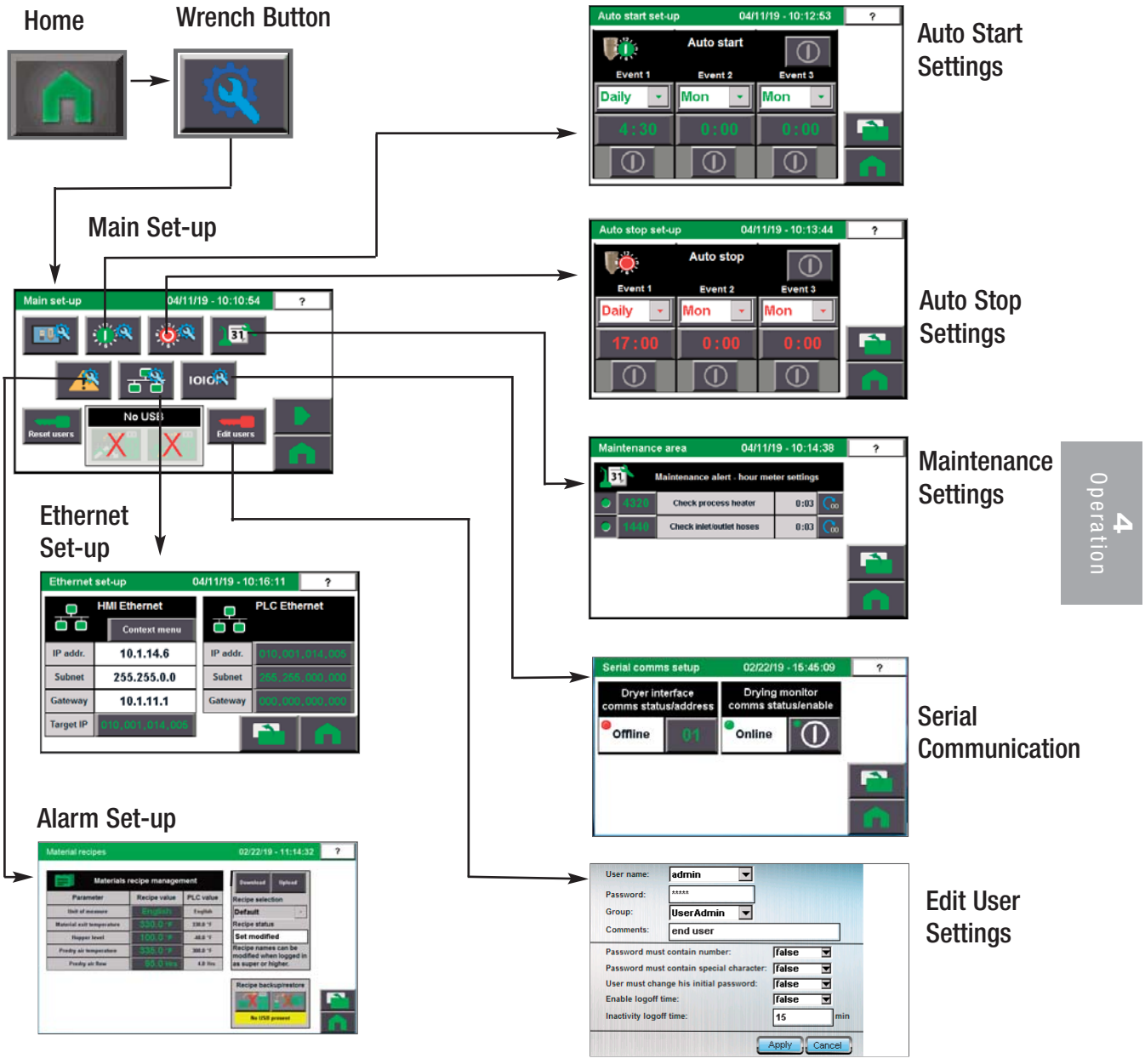
Drying Monitor (when installed)



Control Function Flow Charts

From the Main Setup screen

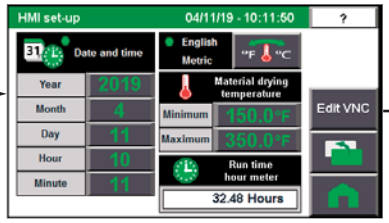
NOTE: Requires proper login credentials.

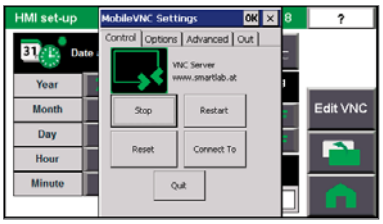


Control Function Flow Charts

From the Main Setup screen

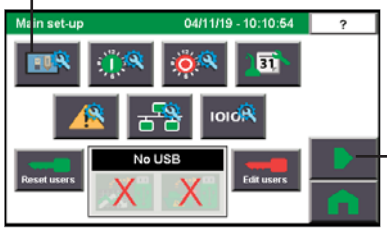
HMI
Set-up

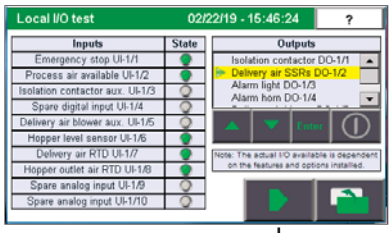




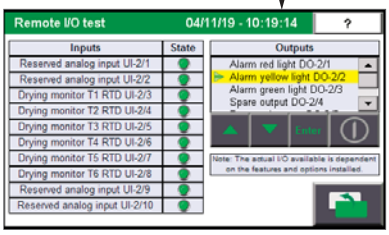
Edit VNC

Main Set-up





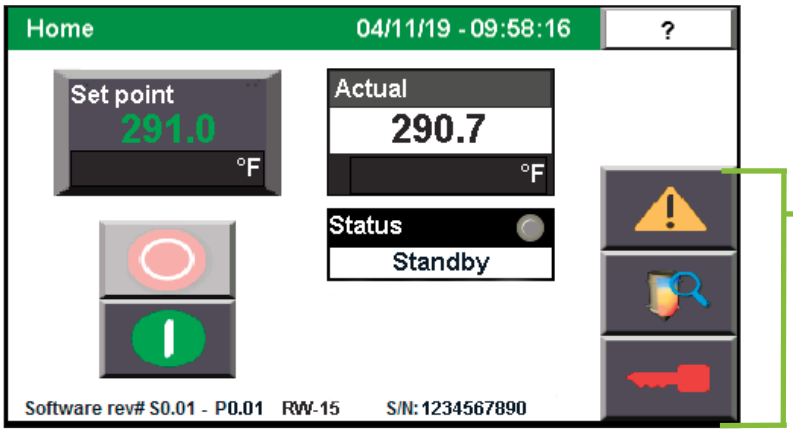
Local I/O
Test



Remote I/O
Test

Control Function Descriptions

Home Screen



Navigation Buttons
Touching the navigation buttons will take the user to the control screen selected.

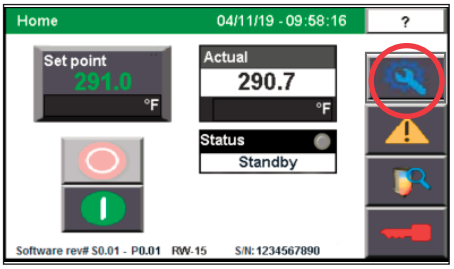
The Home screen provides the user with the current live information concerning the processes within the dehumidifying dryer including:

- Setpoint
- Actual Temperature
- Dryer Status
- Hopper Level

It tells the user the current status of the dryer blower (powering up, standby, starting or stopping, passive and shutdown alarms).

If the user is logged-in at the proper security level, changes can be made to:

- Setpoint - (Active material exit temperature) The setpoint is limited by the delivery air min/max located on the HMI set-up screen.



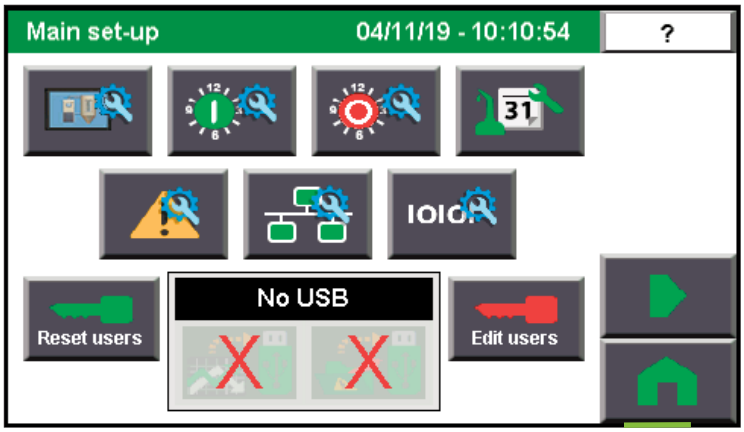
When logged in as “super or higher” the wrench button appears and when selected will give you access to the Setup Screen.

This screen also allows the user to start or stop the dryer. The user can also view the other system parameters, view alarms, view hopper settings, or log in by pressing the applicable buttons on the right of the screen.

NOTE: Live data is displayed as text inside a box. Set point boxes have beveled edge borders and green text. Set points can be changed, if the user has logged in at the proper security level, by pressing the set point boxes. This will launch a pop-up keypad window that can be used to change the set point. *See Operation section entitled, How to Navigate Control Screens.* After the new set point value has been entered, press the **"Enter"** key to lock in the new set point.

Control Function Descriptions

Main Set-up Screen



Access the Main Setup screen by pressing the Wrench button on the Home screen. The Main Setup screen provides the user with access to function screens including:

- HMI Setup to set time, limits or units
- Auto start and stop setup
- Maintenance Setup to enable /disable maintenance alerts
- Serial Comm Setup to monitor and enable/disable installed serial communications
- Ethernet Setup to monitor and change Ethernet communication settings
- Alarm Setup to access the alarm setup area

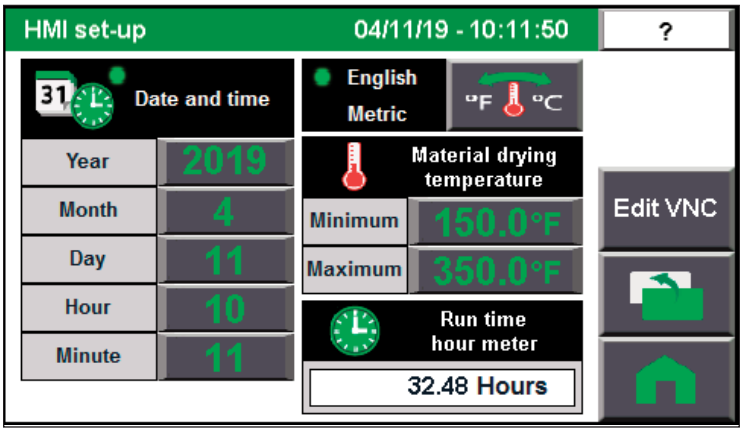
When visible in “Standby” selecting the green arrow button will give you access to the I/O test screen

The Edit User button allows you to set up security.

Inserting a USB flash dive into the HMI, enables saving the trend and alarm history. The files are saved in CSV format.

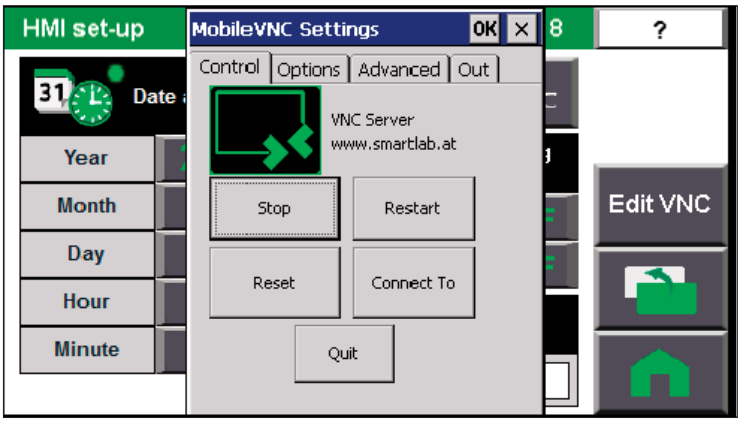
Control Function Descriptions

HMI Set-up Screen



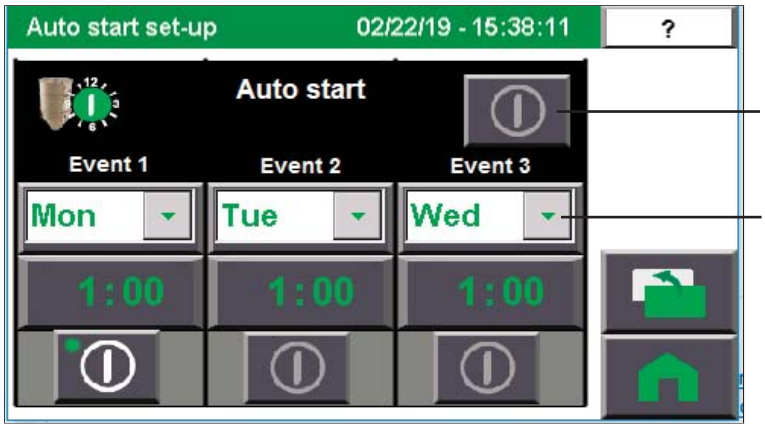
The HMI Set-up screen lets you set the Date and Time, Language, Run Time, and Material drying temperature.

1 Press the Edit VNC button to access a pop up window to set the VNC Server.
Requires "Admin" log-in.



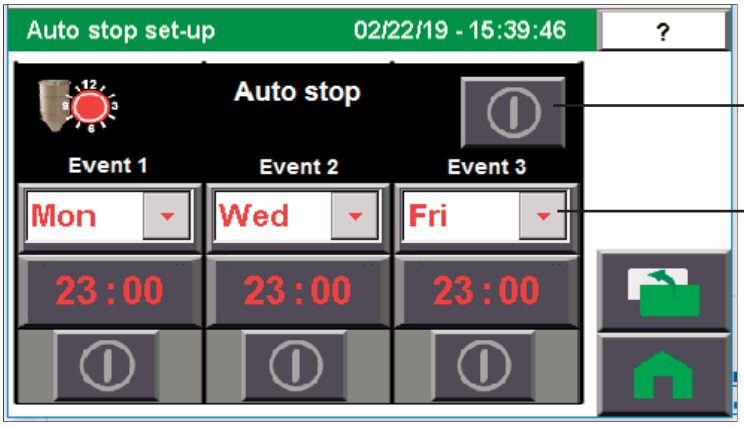
Control Function Descriptions

Auto Start Set-up Screen



The Auto Start function will automatically start the heat source on a predetermined day and time. Up to three different start events can be individually setup and enabled/disabled.

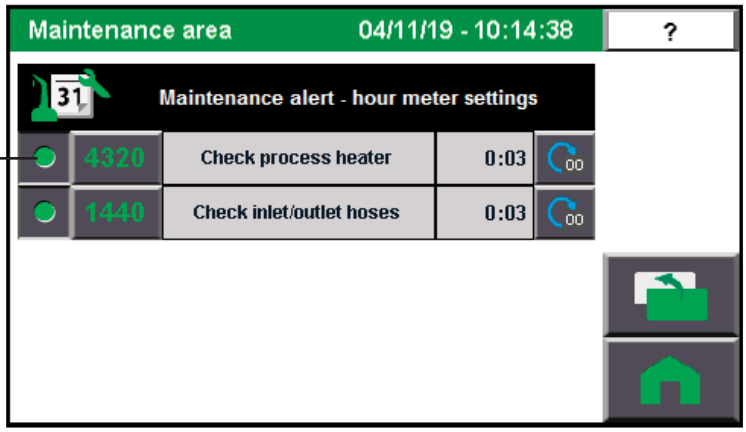
Auto Stop Set-up Screen



The Auto stop function will automatically stop the heat source on a predetermined day and time. Up to three different stop events can be individually setup and enabled/disabled.

Control Function Descriptions

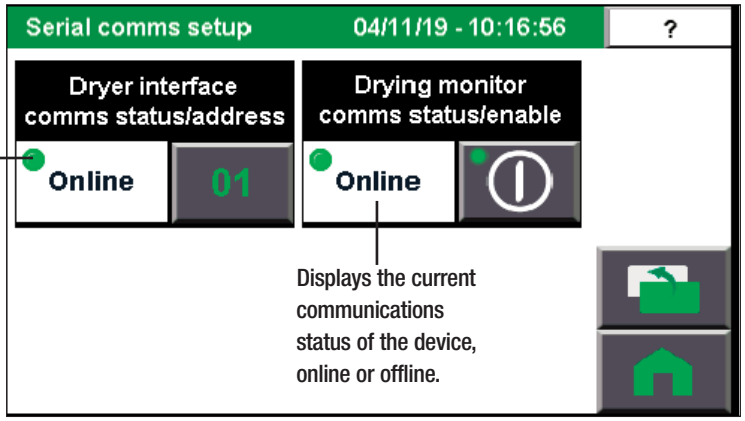
Maintenance Area Set-up Screen



Select push button to enable or disable each alert. Indicator is green when enabled and grey when disabled

Maintenance alerts will sound a passive alarm when the accumulated hours reach the set point. Acknowledging the alert automatically resets the accumulated time.

Serial Communication Set-up Screen

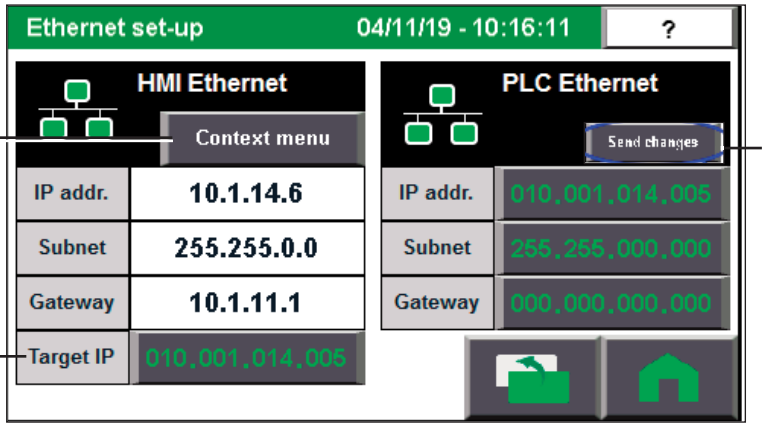


The indicator light for each device turns red when the communications are offline or have errors. The light turns green when online without errors.

The Serial Comms Setup screen provides a way to monitor and controls all the installed devices. The serial protocol is Modbus RTU. All devices must be set to 38.4K Baud, 8-Data bits, 1-Stop bit and Parity -None.

Control Function Descriptions

Ethernet Set-up Screen



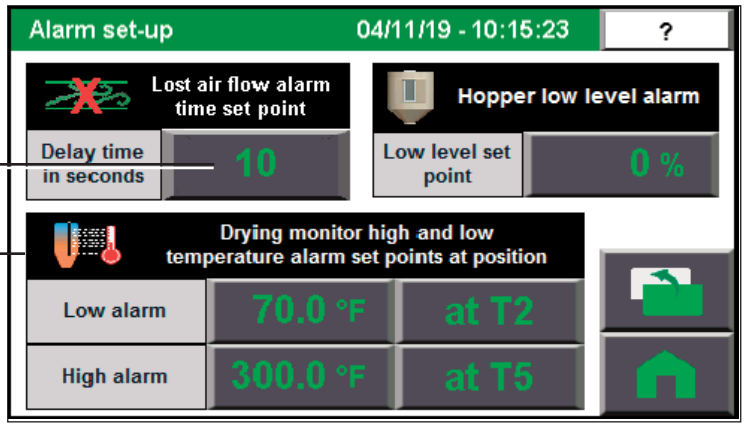
Step 3
Press this button, then on the menu select "show system settings". Under network set the new HMI IP address.

Step 2
Set the target IP to the new PLC IP address.

Step 1
Visible when settings are different. Verify new PLC settings before sending.

Changing the Ethernet settings requires the admin login. Only qualified personnel should attempt changes. Always record your new settings before making any changes. Select the individual octets to change the values. Always set the PLC first! Warning, communications will be lost after step #1. It will return after step #3 is completed.

Alarm Set-up Screen



Select to enter the amount of time that the system waits while running before shutting down on a loss of air flow. Range 5-15 seconds.

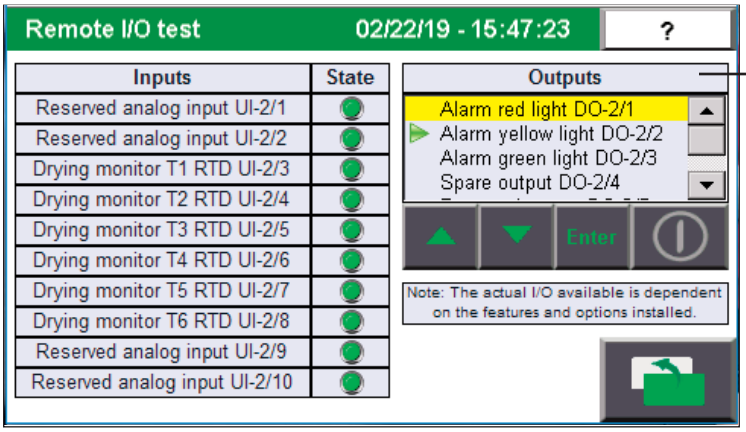
Only visible when drying monitor is installed.

The Alarm Set-up Screen enables you to set low and high temperature alarms at the same or different points in the drying hopper.

1 **Press the "at T" button to change the location in the drying hopper** each time it is released with T2 the lowest and T5 the highest position in the hopper. The alarms are passive.

Control Function Descriptions

I/O Test Screen



1 **To turn on an output, use the up/down arrow buttons to move the green position indicator to the desired output.**

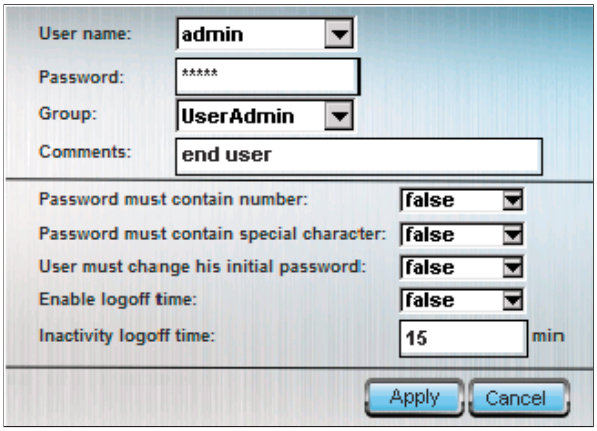
2 **Press the enter button to select the output.** The selected output is highlighted yellow.

3 **Once selected, press and hold the on/off button to energize the output.**

4 **Release the on/off button and the output turns back off.**

The I/O Test Screen displays a list of the controls digital and analog inputs. The status indicators are green when a digital input is on or when an analog input is ok. The indicator is gray when a digital input is off or when an analog input is out of range, not connected or short circuited.

Edit User Screen



The Edit User Screen allows you set up security measures.

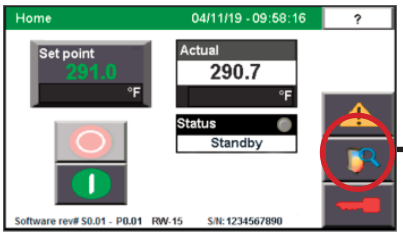
Control Function Descriptions (continued)

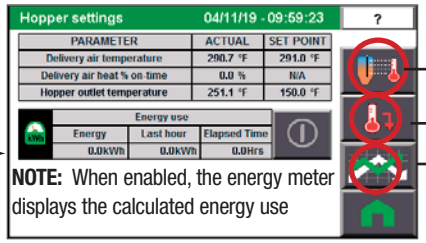
NOTE: Depending on which options your dryer has been configured with, and whether or not you have the Drying Monitor enabled, your screens and icons may be different from what is shown here. For example, if your ResinWorks system is Drying Monitor equipped, your hoppers will display as Drying Monitor hoppers (as shown in these graphics).

NOTE: A faded out or not vibrant stop button indicates that it is already stopped or stopping. A grayed out start button indicates it is already running or starting

NOTE: *See the Appendix of this User Guide for more information about using the Drying Monitor.*

Hopper Settings Screen

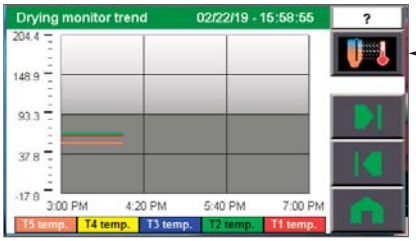




NOTE: When enabled, the energy meter displays the calculated energy use

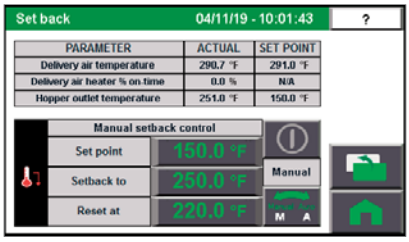
To access the Hopper Set-up screen:

1 From the Home screen Press the Hopper Settings button. The Hopper Settings screen provides the user with the list of hopper parameters and energy usage.



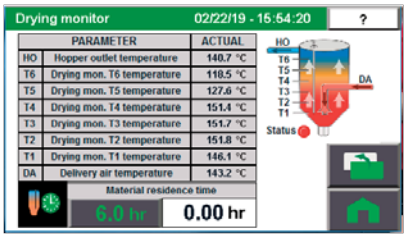
2 From the Hopper Settings screen Press the navigation buttons on the right side of the screen.

From the Hopper Settings screen the user can navigate to:



The Drying monitor screen to see dryer parameters, set Material residence time, and see the status light turn green when the material residence time set point is reached.

The Set back screen to adjust set points manually.



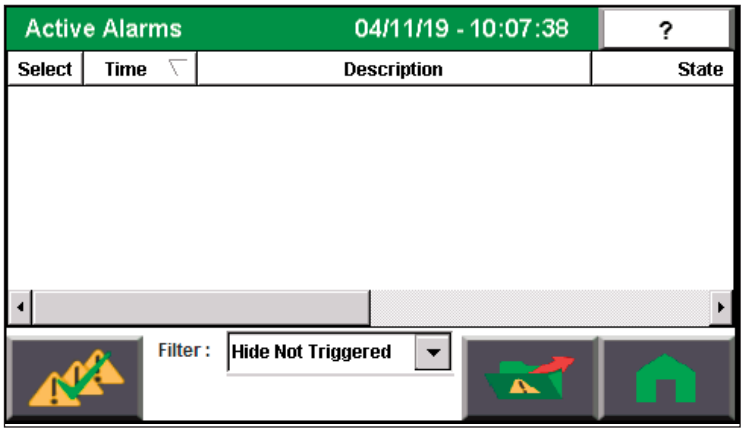
The Drying Monitor Trend screen to see four hours of trend data. Up to 14 days of data are stored for viewing.

Available trends are:

- Temperature
- % On Time
- Drying Monitor
- Energy Use

Control Function Descriptions

Active Alarms Screen



Access the Active Alarms screen by pressing the Alarm button on the Home screen. The alarms displayed on the Active Alarm screen can be filtered between the default view "hide not triggered" or inactive alarms and "show all" alarms.

Select the Acknowledge/reset button to acknowledge an alarm.

Select the Alarm History button to view the Alarm History screen.

Security Login Pop-up

This page pops up after pressing the Security Key button to log in as a user. After logging in (see table below for login information), the Security Key button will display the current login level of the user.

Level	User	Password	Password Editable
1 (Low)	oper	oper	No
2	maint	maint	Yes
3	super	super	Yes
4 (High)	admin	admin	Yes + reset

ResinWorks Control Alarms

Passive Alarms

Passive alarms flash and display process temperature until the alarm condition goes away, or it becomes a shut down alarm.

Shut Down Alarms

Shut Down alarms flash and display process temperature. The ResinWorks process air heaters should stop when the process temperature is below 150°F {66°C} but should still flash the alarm code until the **"Acknowledge Alarm"** button is pressed. If the alarm condition is still active, the ResinWorks cannot start. It will flash the alarm code again. If the alarm condition is not active, the display should return to the normal default screen display and the ResinWorks is ready to run.

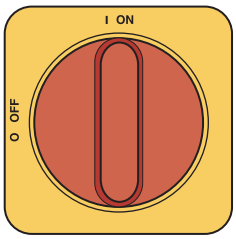
Alarms place the control in "Standby" mode. After the alarm is corrected and acknowledged, press the Start button to restart the process control.

Initial Operation

1 **Hopper material:** Fill the hopper(s) with the material to be heated.

⚠ **WARNING: Fire potential -** The electric heating elements are exposed to the air going into the hopper. It is important that there is no debris in this air stream. Under no circumstances should the tube heater be ran in a dirty air stream as material passing through the heater could ignite embers and shoot sparks into the hopper, which could catch fire.

2 **Hopper residence time:** The material throughput rate must be determined by the size of the hopper, the drying time required and the extent of drying desired for the product.



Normal Operation To Start Processing

1 **Turn on the main power to the ResinWorks system.** Make sure the ResinWorks disconnect dial is in the ON position. This powers up the control If equipped and the display lights will illuminate.

2 **Determine what the ResinWorks' setpoint must be for your process and materials.** Consult your material supplier.

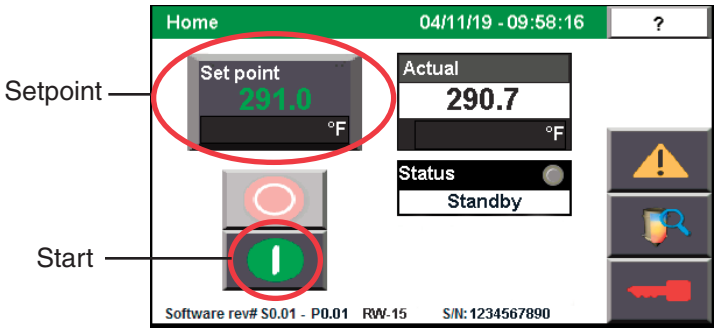
3 **Make sure there is material in the hoppers.**

4 **Start the dryer that is connected to the ResinWorks system.** Status indication turns green.

5 **Ensure the flow of conveying air (optional Cargo Caire) to the ResinWorks,** if supplied.

6 **Make sure the air flow valve is in the "Open" position** (all the way up).

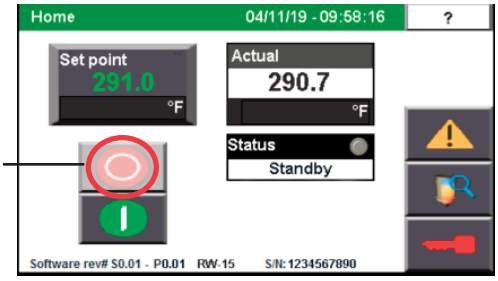
7 **Set the processing temperature.** Press Setpoint temp to select the temperature.



8 **Press Start to start heating.**

Normal Operation To Stop Processing

1 Press Stop.



IMPORTANT: Always turn off the ResinWorks **BEFORE** the dryer.

2 Allow the ResinWorks to cool to below 150°F {65.5°C}.

3 Turn the air flow valve "Off" (all the way down).

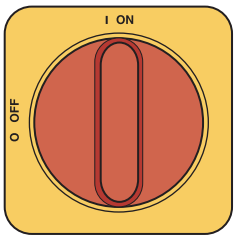
4 Turn off the dryer and conveying air (Cargo Caire), if applicable.

5 Be sure to disconnect and lockout the main power if you have stopped the ResinWorks to perform maintenance or repair.

IMPORTANT: Lockout the main power. It is also important to note that each hopper is equipped with a lockout device.

CAUTION: Improper shut down can cause damage to your ResinWorks system.

NOTE: If an individual hopper is not in use, it is recommended that the airflow valve is off. If the airflow remains on, it may effect air flow to the rest of your ResinWorks system.



Normal Operation To Start Processing (Multiple Hoppers)

1 **Turn on the main power to the ResinWorks system.** Make sure the ResinWorks disconnect dial is in the ON position. This powers up the control and the display lights will illuminate.

2 **Determine what the ResinWorks' setpoint must be for your process and material.** Consult your material supplier.

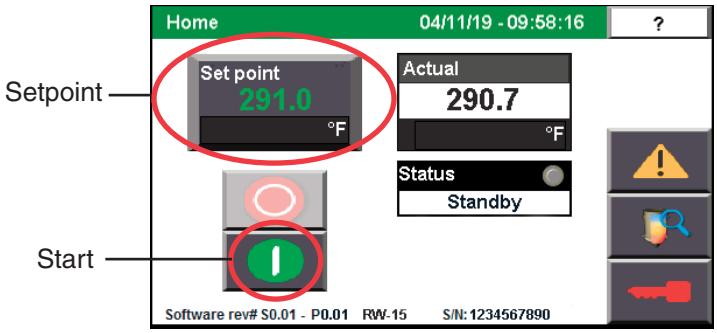
3 **Make sure there is material in all the hoppers to be used.**

4 **Start the dryer that is connected to the ResinWorks system.**

5 **Ensure the flow of conveying air (optional Cargo Caire) to the ResinWorks,** if supplied.

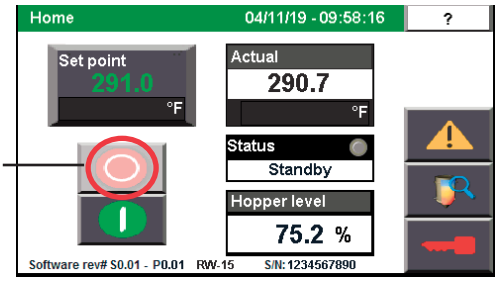
6 **Make sure the air flow valve is in the "Open" position** (all the way up).

7 **Set the processing temperature.**



8 **Press start to start heating all the hoppers.**

Normal Operation To Stop Processing
(Single Hopper)



1 **Press Stop.**

⚠ **IMPORTANT:** Always turn off the ResinWorks **BEFORE** the dryer.

2 **Allow the ResinWorks to cool to below 150°F {65.5°C}.**

3 **Turn the air flow valve "Off"** (all the way down).

4 **Turn off the dryer and conveying air (Cargo Caire),** if applicable.

5 **Be sure to disconnect and lockout the main power on the hopper** if you have stopped the ResinWorks to perform maintenance or repair.

⚠ **IMPORTANT:** Lockout the main power. It is also important to note that the hopper is equipped with a lockout device.

⚠ **CAUTION:** Improper shut down can cause damage to your ResinWorks system.

Adjusting the Manual Air Bypass Valve (39 and 44 inch hoppers)

When using large, single sled ResinWorks systems, adjustment of the manual air bypass valve is required. Typically, when the ResinWorks sled is in-use the air flow adjustment lever is in the "opened" position the bypass valve will need to be closed. The opposite is also true when the ResinWorks sled in not in-use and the air flow lever is in the "closed" position.

To adjust the manual air bypass valve:

✎ **NOTE:** It may be necessary to open or close the manual bypass valve depending upon the amount of hoppers or airflow within your system.

1. **Upon initial setup of your ResinWorks system, the manual bypass valve (located on the back of the ResinWorks sled) should be fully closed** and the air flow lever is fully open (all the way up). Proper adjustment of the manual bypass valve is also dependent on the type of material to be processed.
2. **Make sure there is material in the hopper to be used.**
3. **Start the dryer that is connected to the ResinWorks system.**

✎ **NOTE:** As hoppers are added to your system, in addition to adjusting the manual bypass valve, it may be necessary to adjust the end-of-line bypass valve. When all hoppers are in use, the end-of-line bypass valve is almost closed, the opposite is true when hoppers are not used.

4. **Ensure the flow of conveying air (optional Cargo Caire) to the ResinWorks,** if supplied.
5. **Turn on the main power to the ResinWorks system.** Make sure the ResinWorks disconnect dial on the hopper to be used is in the ON position. This powers up the control and the display lights will illuminate.
6. **Set the processing temperature.** Press the Setpoint temp to select the temperature.
7. **Check to ensure proper air flow through the ResinWorks hopper. If too much air flow is reaching the hopper slightly open the manual air bypass valve to allow air to recirculate back to the dryer or Contact a Conair Service Technician for your particular air flow requirements.**
8. **Press Start to start heating on the hopper to be used.**

Initial ResinWorks Autostart

(Carousel Plus Dryers only)

The ResinWorks system can be configured to start drying automatically in conjunction with your dryer's autostart function. Correct preparation must be followed for this feature to function properly with the ResinWorks system.

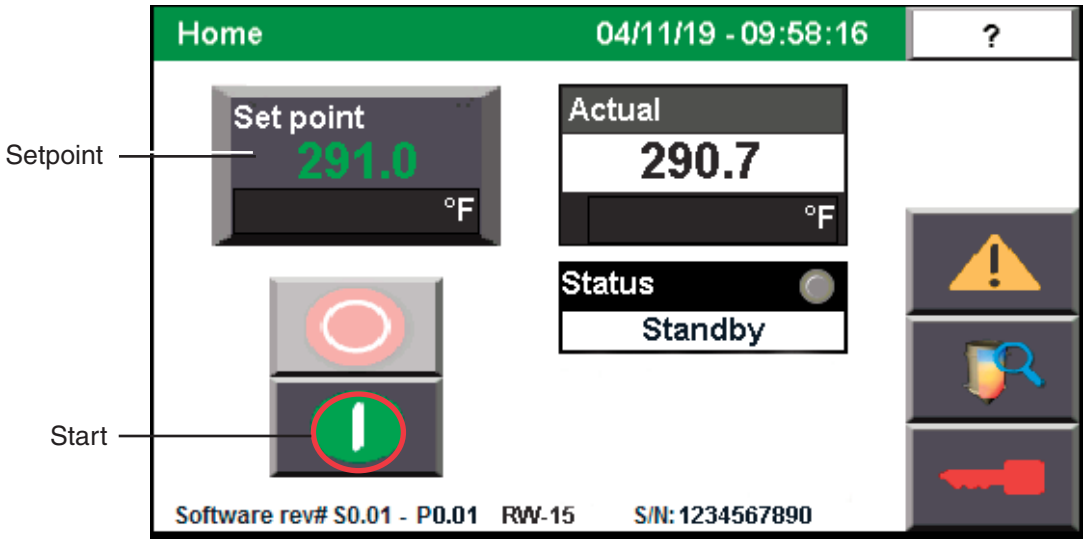
To configure the ResinWorks system to start automatically:

1 Determine what the ResinWorks' setpoint must be for your process and material.

2 Check to ensure there is material in the ResinWorks hopper(s).

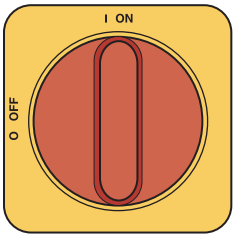
3 Turn on the main power to the ResinWorks. Make sure the ResinWorks' disconnect dial is in the ON position. This powers up the control (if equipped) and the display lights will illuminate.

4 Set the drying temperature. Press the Setpoint temp to select the temperature.



5 Press Start or set the auto start function. The control will wait at this state until it detects airflow from the dryer. The air flow status indicator will turn green. Once airflow is detected, the ResinWorks' heaters will be enabled and your material will start to dry.

NOTE: Reference your particular dryer manual for steps to activate Autostart.



NOTE: This procedure must be repeated for each individual hopper station.

Operational ResinWorks Autostart

(Carousel Plus Dryers only)

The ResinWorks and dryer must be shut down properly in order for the ResinWorks to automatically start again using the dryer's autostart function.

To shut down the ResinWorks:

1 Press Stop.

⚠ **IMPORTANT:** Always turn off the ResinWorks **BEFORE** the dryer.

2 Allow the ResinWorks' heaters to cool to below 150°F {65.5°C}.

3 Press the "Stop" button on the dryer to allow proper cool down.

4 Once the blowers on the dryer have stopped running, press start on the ResinWorks. The ResinWorks will remain in Standby mode until it detects airflow from the dryer. Once airflow is detected, the ResinWorks' heaters will be enabled and your material will start to dry.

⚠ **CAUTION:** Improper shut down can cause damage to your heater.

✎ **NOTE:** This procedure must be repeated for each individual hopper station.

✎ **NOTE:** Reference your particular dryer manual for steps to activate Autostart.

SECTION
5

Maintenance

Preventative Maintenance Checklist

The ResinWorks conveying and preconditioning system requires little maintenance. Conair recommends the following maintenance schedule and tasks.

- **Whenever you change material or process**
  - ❒ **Change the ResinWorks setpoint if it must be changed.**
- **Daily or weekly as needed**
  - ❒ **Inspect the inlet and outlet hoses.**
    Tighten the hose clamps if loose. Replace hoses if worn or damaged.
  - ❒ **Inspect the filters on the central dryer (process and regeneration).**
    Clean or replace the filter as necessary.
- **Monthly or as often as needed**
  - ❒ **Inspect the main power wires, heater wires and conduit and RTD probe wires for damage and wear.**
    Replace any damaged or worn wire or conduit.
  - ❒ **Check for any damage to the control panel.**
    Replace if damaged.
  - ❒ **Check for damage to the heater.**
    Replace if damaged.
  - ❒ **Clean dirt from exterior surfaces with a cloth dampened with water.**

Cleaning the Hoppers

CAUTION: Hot surfaces. Always protect yourself from hot surfaces inside and outside the dryer and drying hopper.

The hopper, spreader cone and discharge assembly should be cleaned thoroughly between material changes to prevent resin contamination.

1 **Place a container beneath the hopper's drain port** to catch the material.

2 **Close the optional hopper slide gate or remove material from the hopper before removing the distribution box or Adjustable Purge Valve (APV).**

3 **Disconnect the hoses and remove the distribution box or Adjustable Purge Valve (APV) under the hopper.** Allow the remaining material to drain into a bucket.

4 **Remove the spreader cone.** Open the hopper door. Reach into the hopper. Grasp the spreader cone tube, lift up slightly, twist and then push down to release it. Tilt the cone assembly and pull it out through the hopper door.

(continued)

Cleaning the Hoppers (continued)

5 **Clean the spreader cone and the inside of the hopper.** Make sure you also clean the return air screen at the return air outlet of the hopper.

6 **Repeat the steps in reverse order** to reassemble the hopper **before** adding material.

SECTION

6

Troubleshooting

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.

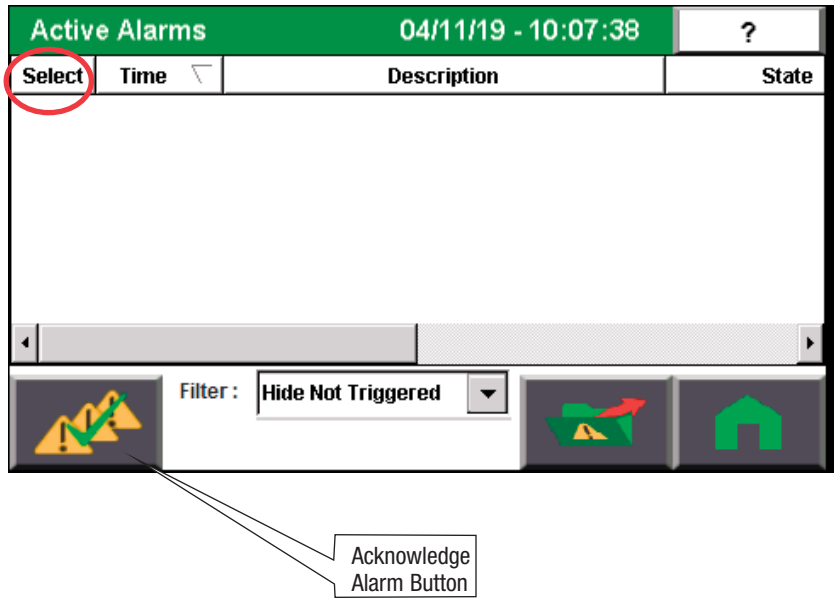
Before you start disassembling the components of the ResinWorks conveying and preconditioning system be sure to:

❑ **Diagnose causes from the control panel.**

1 **Select the alarm or press the word "Select" to select all alarms, then press the "Acknowledge Alarm" button to acknowledge the alarm.**

2 **Address the alarm message and fix the problem.**

3 **Press Start to restart normal control.** If the alarm reappears the problem was not fixed.



(continued)

Before Beginning (continued)

❑ **Find the wiring and equipment diagrams that were shipped with your ResinWorks system.** 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 ResinWorks conveying and preconditioning system 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 technicians should examine and correct problems that require opening the ResinWorks' control panel or using electrical wires to diagnose the cause.

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

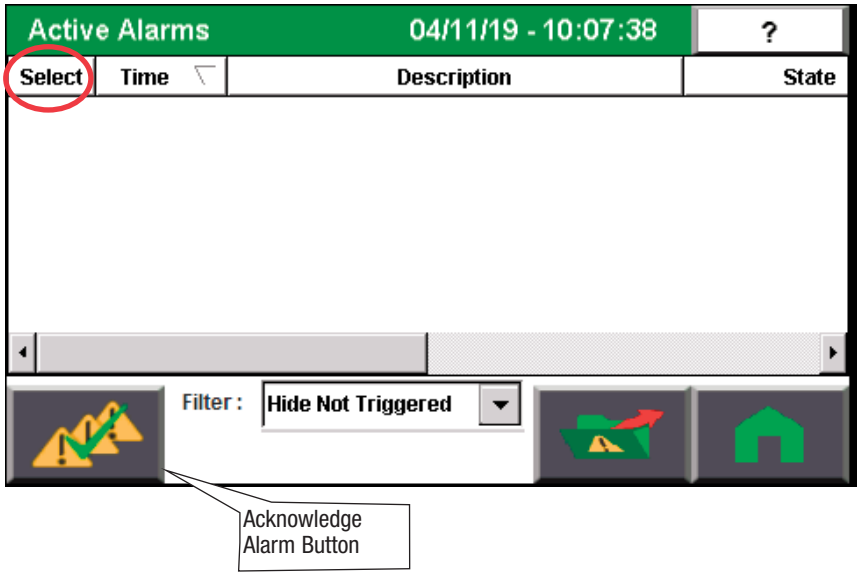
CAUTION: Hot surfaces. Always protect yourself from hot surfaces inside and outside of the ResinWorks.

How to Identify the Cause of a Problem

Most process malfunctions are indicated by an illuminated alarm light on the ResinWorks conveying and preconditioning system control panel.

A problem can trigger two types of alarms:

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



When the alarm light is displayed:

1. **Select the alarm or press the word "Select" to select all alarms, then press the "Acknowledge Alarm" button to acknowledge the alarm.**
2. **Correct the error**, *see Troubleshooting section.*
3. **Press Start to clear and restart normal control.** If the alarm reappears, the problem was not fixed.

Shut Down Alarms

The ResinWorks will shutdown automatically to prevent damage to the equipment or personnel.

Problem	Possible cause	Solution
Process High Temperature Control Fault – If the process temperature exceeds the process high temperature setpoint, it shuts down the ResinWorks. Defaults are set to 385°F {196.1°C} for 20 seconds.	The RTD temperature probe is not installed correctly.	Make sure the RTD temperature probe tip is in the center of the hopper inlet tube.
	The air lines are restricted or loose.	Straighten any crimps in the hoses. Tighten any loose hoses.
	Solid state relay (SSR) has failed.	Replace the solid state relay (SSR).
	Output on the board has failed.	Replace the board.
Process Temperature Loop Break– If the process temperature is outside of the operator entered deviation, alarm band (see Process High Temperature Deviation passive alarm) and the process temperature is not moving towards the setpoint at a rate greater than specified. It shuts down the dryer. Defaults are set at 3°F {1.7°C} over 20 seconds.	Process RTD is loose or has fallen out.	Check the process RTD and tighten if needed.
	The process heater has failed.	Check the heater fuses, and resistance across each leg of the process heater. *See Troubleshooting section entitled, Replacing Fuses.*
	The air lines are restricted or loose.	Straighten any crimps in the hoses. Tighten any loose hoses.
	Output on the board failed “Open”.	Replace the board.
	Drying or setback setpoint is too low.	Adjust the setpoint.

Shut Down Alarms (continued)

The ResinWorks will shutdown automatically to prevent damage to the equipment or personnel.

Problem	Possible cause	Solution
Process Heater Safety Switch – The snap switch in the process heater tube opens due to excessive temperature.	There is an air flow blockage or loose hoses.	Remove the blockage. Tighten any loose hoses.
	The isolation contactor failed in the closed position.	Replace the isolation contactor.
	The heater solid state relays (SSRs) failed.	Replace the failed heater solid state relays (SSRs).
	No air flow or the airflow is reversed.	Turn on the blower. Reverse the connection points of the hoses. Check the operation of the differential pressure switch.
Airflow Switch Loss – The airflow to the ResinWorks system has been interrupted for a duration longer then 10 seconds.	The dryer for the ResinWorks system has been turned off.	Restart the dryer.
	Too short of an alarm delay setpoint.	Increase the duration of alarm delay, *see Operation section, entitled, Control Descriptions, Screen 14.*

Shut Down Alarms (continued)

The ResinWorks will shutdown automatically to prevent damage to the equipment or personnel.

Problem	Possible cause	Solution
Process RTD fault – If a RTD is faulty.	The connection for the RTD is loose.	Check the RTD plug connection and tighten if needed.
	The connection of the RTD plug on the control board is loose.	Check the plug connection and tighten if needed.
	One of the RTDs has failed.	Replace the RTD.
	The RTD is enabled but wired incorrectly.	Move the wires to the proper terminals (see the wiring diagrams supplied with the unit).
PLC error detected.	Internal control board problem.	Replace the control board.

Passive Alarms

The heater continues to operate, but this problem could prevent correct heating of your material. Note that once the **"Acknowledge Alarm"** button is pressed once, the blinking red LED becomes solid. A passive alarm will go away when the alarm condition is cleared.

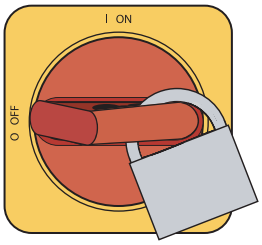
Problem	Possible cause	Solution
Process Temperature Deviation– The process temperature exceeds the deviation band as entered for the specified time. Default values are 10°F {5.5°C} for 5 sec.	One of the solid state relays (SSRs) has failed.	Replace the failed solid state relays (SSR).
	The process RTD is loose or has fallen out.	Check the process RTD and tighten if needed.
	The air hose connections are loose.	Tighten all air hose connections.
	The heater has failed.	Replace the failed heating element. *See Troubleshooting section entitled, Replacing the Process Heater.*
Drying Monitor T1 RTD fault		
Drying Monitor T2 RTD Fault		
Drying Monitor T3 RTD Fault		
Drying Monitor T4 RTD Fault		
Drying Monitor T5 RTD Fault		
Drying Monitor T6 RTD Fault		
Remote IO Communications Fault		

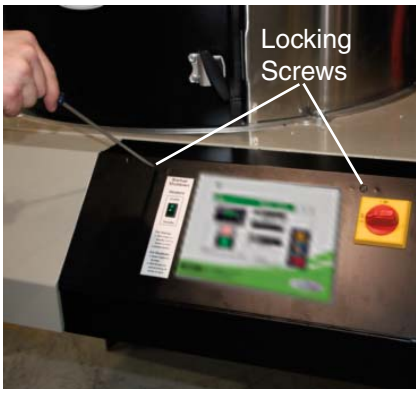
Opening the Hopper Station Control Panel

To open the control panel:

1 Lockout the power with the main power disconnect switch.

NOTE: If the main power disconnect switch is in the "On" position, the control panel CANNOT be opened.





2 Turn the two (2) locking screws 1/2 turn counterclockwise.

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

3 Pull the top of the control panel away from the sled. The panel is hinged on the bottom and opens out towards the technician.

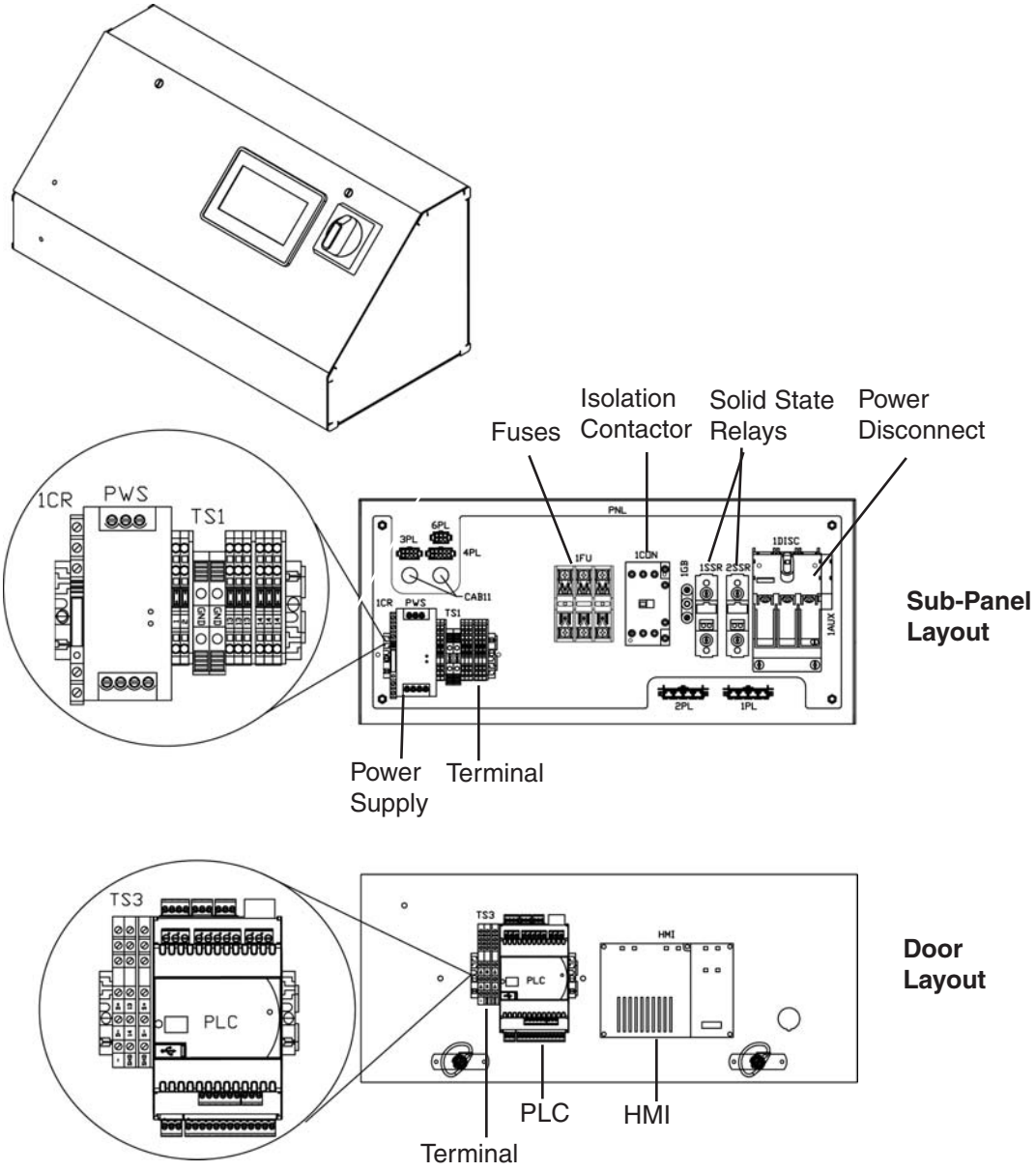
CAUTION: This should be preformed by qualified personnel according to local, regional, and national regulations..

4 This gives access to all control circuit components including the:

- Power disconnect
- SSRs for the process heater
- Isolation contactor
- Fuses
- High voltage terminal going from 460V to 110V
- Low voltage terminal (24V) to power the control panel
- Power Supply
- Communications board (optional)
- PLC
- HMI

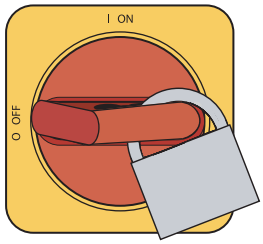
(continued)

Opening the Control Panel (continued)

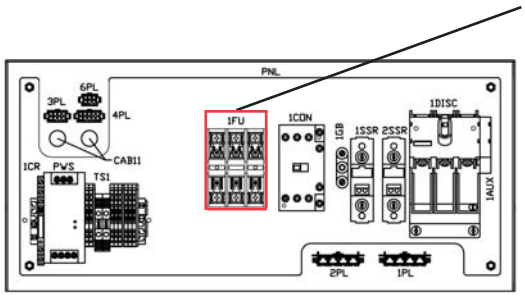


Replacing Fuses

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



2 **Open the control panel.** *See Troubleshooting section entitled, Opening the Control Panel.*

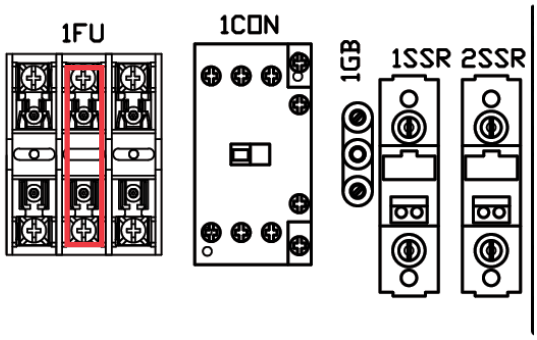


Fuse Blocks

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

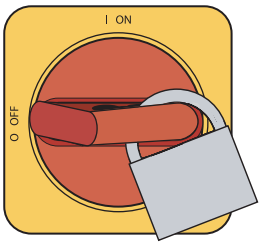
⚠ **IMPORTANT**: Always refer to the wiring diagrams that came with your ResinWorks to locate specific electrical components. Illustrations in the User Guide are intended to be representative only.

3 **Check the fuse.** If necessary, pull the fuse out and replace it with a fuse of the same type and rating.



Replacement fuses are available from Conair.

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



Checking Process Solid State Relays (SSRs)

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

2 **Open the control panel.** *See Troubleshooting section entitled, Opening the Control Panel.*

3 **Locate the process solid state relays (SSRs).** Refer to the wiring diagrams that came with your ResinWorks.

4 **Check the resistance using an ohmmeter.**

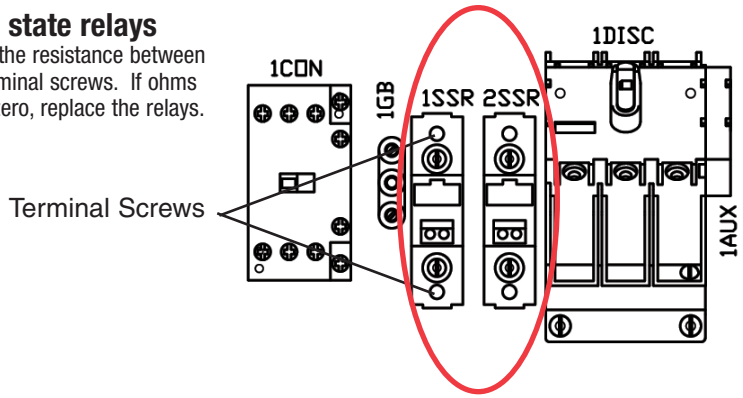
IMPORTANT: Always refer to the wiring diagrams that came with your ResinWorks to locate specific electrical components. Illustrations in the User Guide are intended to be representative only.

Replacement solid state relays (SSRs) are available from Conair.

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

Solid state relays

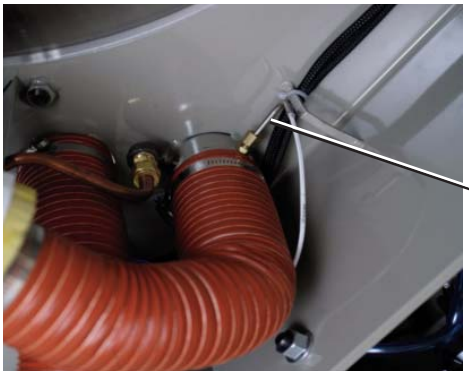
Check the resistance between the terminal screws. If ohms equal zero, replace the relays.



Checking or Replacing Temperature Sensors

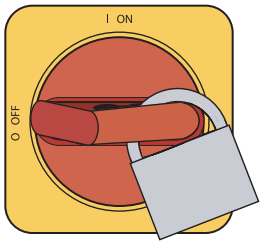
The ResinWorks process air heater uses RTD sensors to monitor the process temperature in the hoppers and the setback temperature (optional) in the return air elbow.

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



Typical location of the Process RTD at the hopper inlet.

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 a component or if the sensor or wiring is damaged. The tip of the sensor should be centered within its receptacle. Sensor wires should be attached to the appropriate connectors in the ResinWorks' wiring.

4 **To check with an ohm meter,** measure the resistance across the RTDs. The resistance should be approximately 1100 ohm at room temperature.

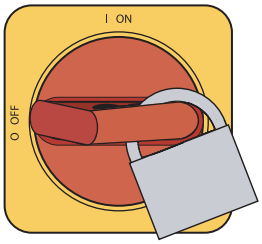
NOTE: The CAREL uses PT1000 RTDs. Legacy systems used PT100 RTDs.

5 **If an RTD sensor is found to be defective, replace the sensor.** To replace the sensor, locate the RTD wiring harness connector and disconnect the RTD harness from the connector. Remove the RTD sensor from its mounting location.

6 **Install the new RTD sensor by installing the RTD in its mounting location.** Route the RTD harness to its connector and plug the harness into the connector.

Replacement sensors are available from Conair.
Contact Conair Parts
(800) 458 1960
From outside of the United States, call:
(814) 437 6861

Replacing the Process Heater



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

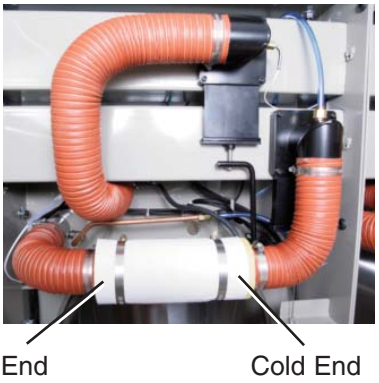
2 **Locate the heater wiring harness connector and disconnect the harness**.

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

Replacement process heaters are available from Conair.

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

3 **Note the orientation of the "hot" and "cold" ends of the heater. The new heater MUST be installed in the same orientation.** The heater wires are on the "cold" end of the heater.



4 **Remove the hose clamps at both ends of the process heater**. Pull the hoses of both ends of the process heater. The process heater is now free.

5 **Remove the hose clamps securing the insulation to the heater.** Carefully remove the insulation from the heater.

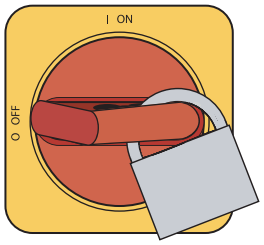
6 **Slide the insulation onto the new process heater and secure it using the original hose clamps.**

7 **To install the new process heater, align the heater then slide the hoses onto the heater.** Secure the hoses to the heater using the original hose clamps.

8 **Route the process heater harness to its connection point and plug the harness into its connector.**

Replacing the Air Flow Static Pressure Switch

If the air flow static pressure switch fails to detect the pressure drop between the heater inlet and ambient, it should be replaced.



1 **Stop the ResinWorks, disconnect and lockout the main power.**

2 The air flow static pressure switch is mounted to the inside of the sled frame. **Locate the pressure switch and trace the wiring harness to its connection point. Unplug the pressure switch harness from its connector.**

3 **Disconnect the hose from the high side port of the pressure switch,** after noting the correct connection point. The low side port has no hose connected to it.

4 **Remove and retain the screws securing the pressure switch to the sled frame.** Remove the pressure switch.

5 **Align the new pressure switch with the mounting holes.** Secure the new pressure switch to the sled frame using the original mounting hardware.

6 **Connect the hose to the same port from which it was removed.**

7 **Route the pressure switch wiring harness to the connection point.** Connect the harness to the pressure switch connector.

8 **Test the system** to ensure that the new air flow static switch is detecting the pressure drop between the heater inlet and ambient. *See Installation section entitled, Testing the system.*

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 process heaters are available from Conair.

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

NOTE: The air flow static pressure switch must be mounted with the diaphragm vertical.

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

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.

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:

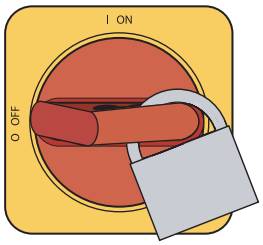
- Inspect the equipment and perform alterations or adjustments to satisfy performance claims. (Charges for such inspections and corrections will be waived unless failure to meet warranty is due to misapplication, improper installation, poor maintenance practices or improper operation.)
- Replace the 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.

Installing the Setback RTD (optional)



⚠ **IMPORTANT:** Always refer to the proper wiring diagram supplied with your equipment before making electrical connections.

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

✎ **NOTE:** The wiring for the optional setback RTD is pre-installed at the factory before the ResinWorks system is shipped. It is located under the surface of the ResinWorks sled at the left rear corner near the delivery air manifold.

1 **Locate the existing wiring and connector for the setback RTD.** It is located under the surface of the ResinWorks sled at the left rear corner near the delivery air manifold.

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

2 **Remove pipe plug from the return air elbow.**

3 **Insert the setback RTD probe into the return air elbow.** Center the end of the probe so that the tip is in the center of the air flow. Tighten the nut to lock the RTD in place.

✎ **NOTE:** The RTD probe should **NOT** touch the inlet tube walls.

(continued)

Installing the Setback RTD (optional)

(continued)

4 **Plug the connector on the setback RTD wiring into the RTD connector.**

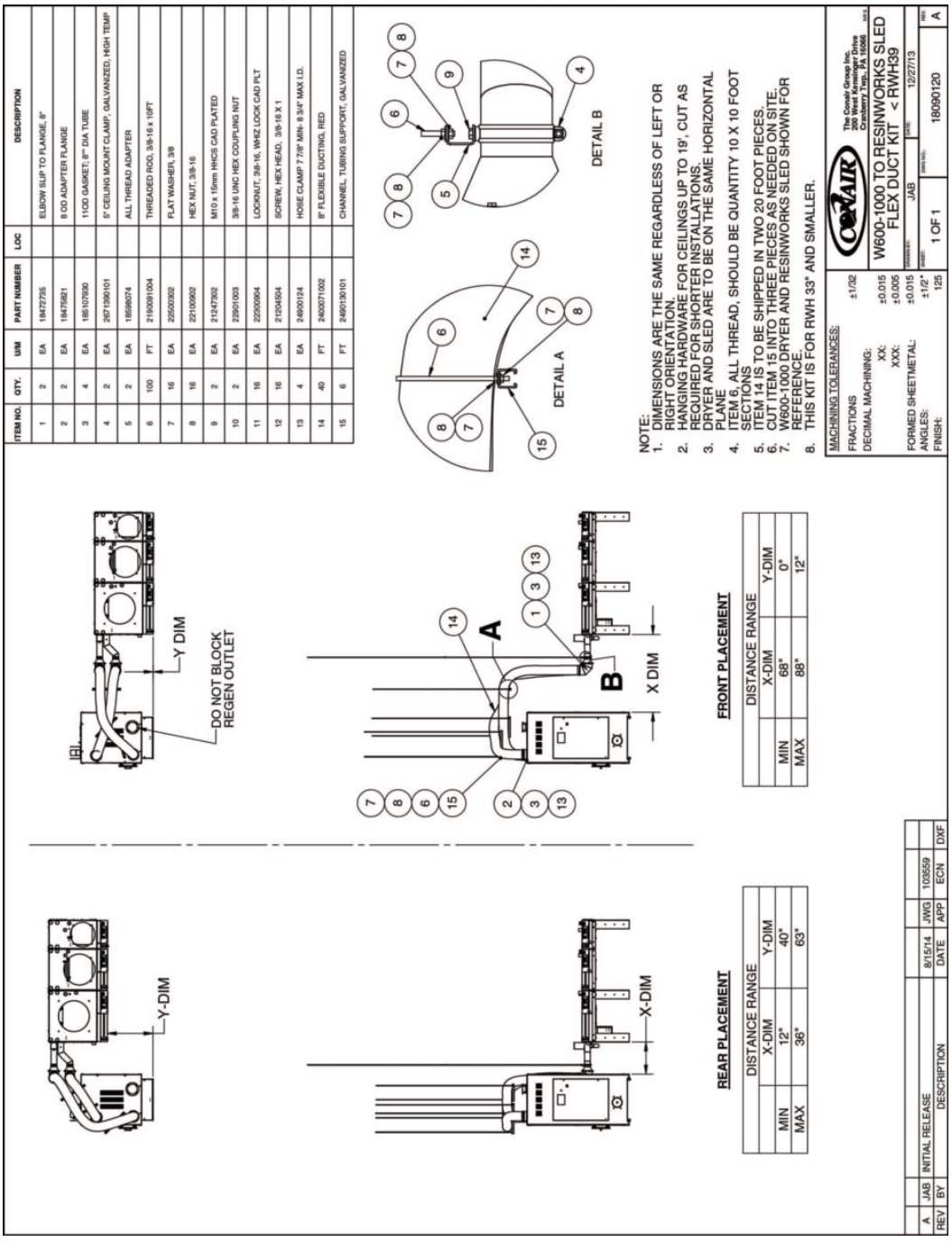
5 ***See Operation section Control Function Descriptions, Screen 31,*** **to "activate" the setback RTD on the control.**

SECTION

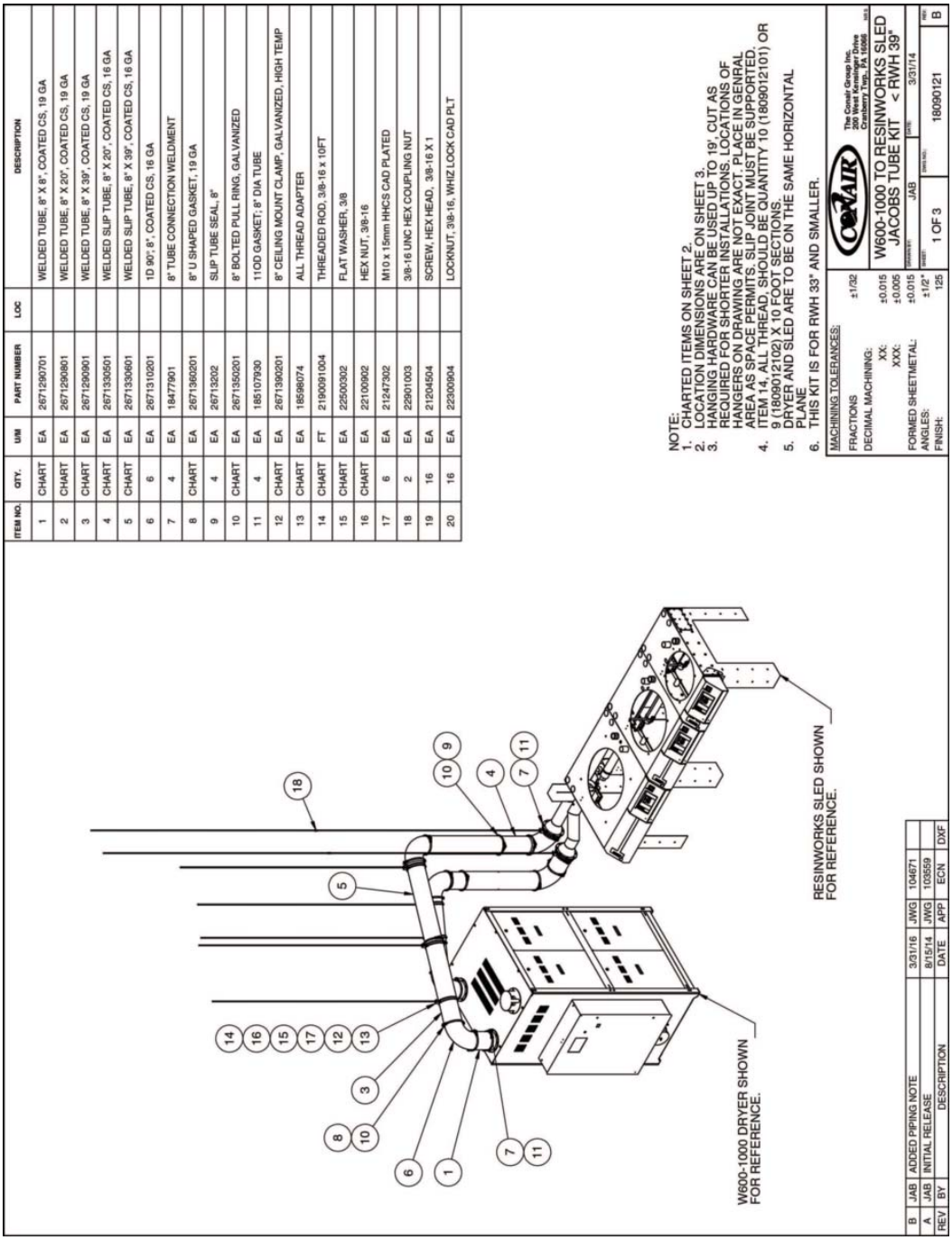
C

Appendix C-Drawings

18090120 - W600-1000 To Sled Flex Hose<RWH39



18090121- W600-1000 To Sled Jacobs<RWH39



ITEM NO.	QTY.	U/M	PART NUMBER	LOC	DESCRIPTION
1	CHART	EA	2671290701		WELDED TUBE, 8" X 8", COATED CS, 19 GA
2	CHART	EA	2671290801		WELDED TUBE, 8" X 20", COATED CS, 19 GA
3	CHART	EA	2671290901		WELDED TUBE, 8" X 39", COATED CS, 19 GA
4	CHART	EA	2671330501		WELDED SLIP TUBE, 8" X 20", COATED CS, 16 GA
5	CHART	EA	2671330601		WELDED SLIP TUBE, 8" X 39", COATED CS, 16 GA
6	6	EA	2671310201		1D 90°, 6", COATED CS, 16 GA
7	4	EA	18477901		8" TUBE CONNECTION WELDMENT
8	CHART	EA	2671360201		8" U SHAPED GASKET, 19 GA
9	4	EA	26713202		SLIP TUBE SEAL, 8"
10	CHART	EA	2671350201		8" BOLTED PULL RING, GALVANIZED
11	4	EA	185107930		11OD GASKET; 8" DIA TUBE
12	CHART	EA	2671390201		8" CEILING MOUNT CLAMP, GALVANIZED, HIGH TEMP
13	CHART	EA	18598074		ALL THREAD ADAPTER
14	CHART	FT	2190091004		THREADED ROD, 3/8-16 x 10FT
15	CHART	EA	22500302		FLAT WASHER, 3/8
16	CHART	EA	22100902		HEX NUT, 3/8-16
17	6	EA	21247302		M10 x 15mm HHCS CAD PLATED
18	2	EA	22901003		3/8-16 UNC HEX COUPLING NUT
19	16	EA	21204504		SCREW, HEX HEAD, 3/8-16 X 1
20	16	EA	22300904		LOCKNUT, 3/8-16, WHIZ LOCK CAD PLT

NOTE:
1. CHARTED ITEMS ON SHEET 2.
2. LOCATION DIMENSIONS ARE ON SHEET 3.
3. HANGING HARDWARE CAN BE USED UP TO 19', CUT AS REQUIRED FOR SHORTER INSTALLATIONS. LOCATIONS OF HANGERS ON DRAWING ARE NOT EXACT. PLACE IN GENRAL AREA AS SPACE PERMITS. SLIP JOINT MUST BE SUPPORTED.
4. ITEM 14, ALL THREAD, SHOULD BE QUANTITY 10 (18090121O1) OR 9 (18090121O2) X 10 FOOT SECTIONS.
5. DRYER AND SLED ARE TO BE ON THE SAME HORIZONTAL PLANE
6. THIS KIT IS FOR RWH 33" AND SMALLER.

MACHINING TOLERANCES:	
FRACTIONS	±1/32
DECIMAL MACHINING:	
XX:	±0.015
XXX:	±0.005
FORMED SHEETMETAL:	±0.015
ANGLES:	±1/2°
FINISH:	125

The Conair Group Inc.
200 West Kensinger Drive
Cranberry Twp., PA 16066

W600-1000 TO RESINWORKS SLED
JACOBS TUBE KIT < RWH 39"

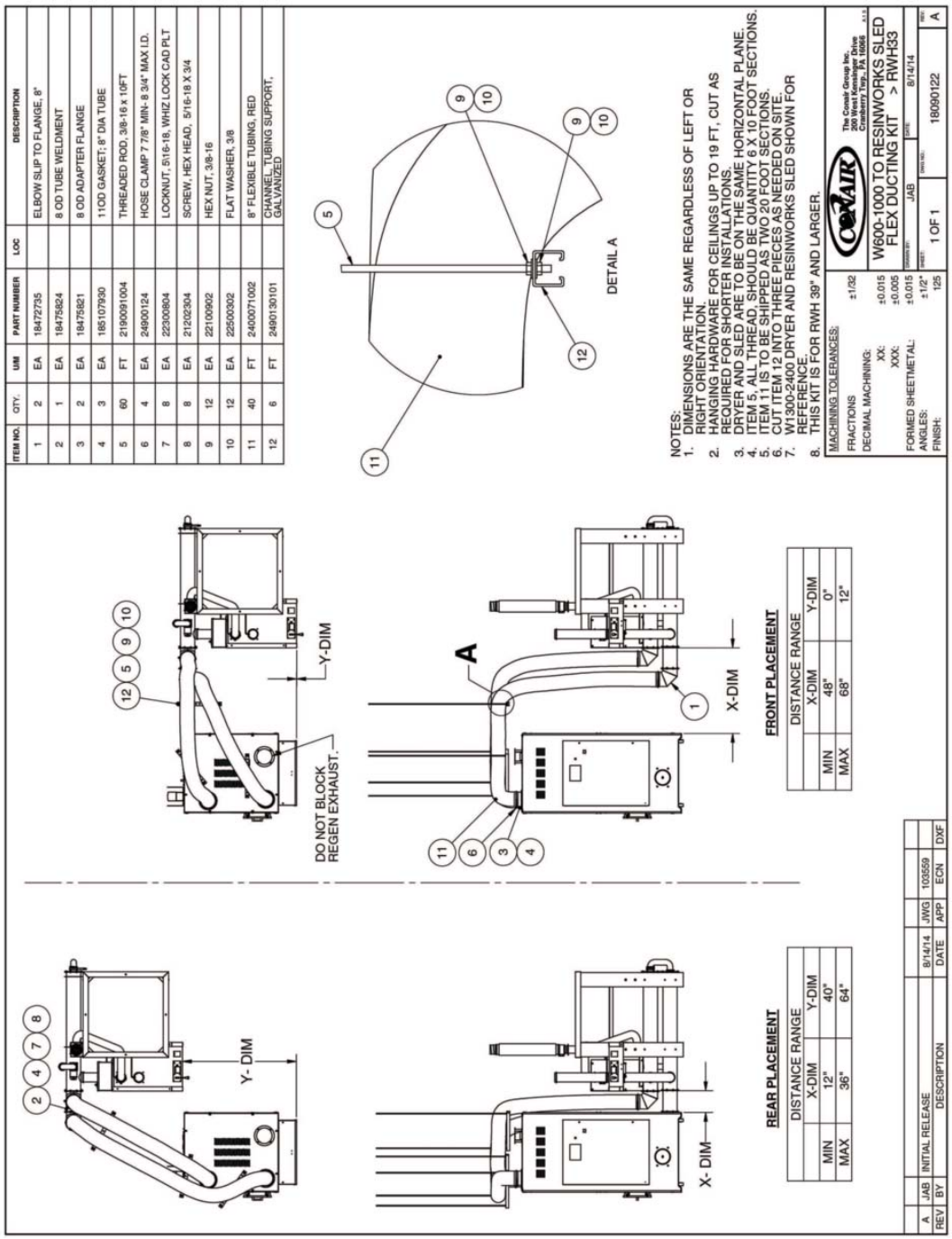
DRAWN BY:	JAB	DATE:	3/31/14	REV:
SHEET:	1 OF 3	DWG NO.:	18090121	B

W600-1000 DRYER SHOWN FOR REFERENCE.

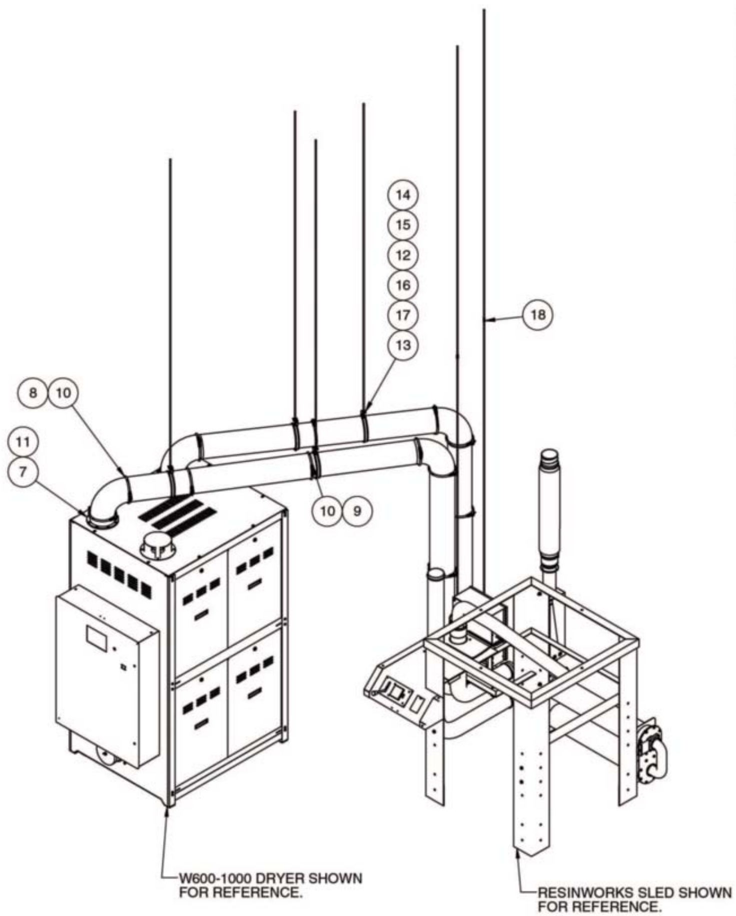
RESINWORKS SLED SHOWN FOR REFERENCE.

REV	BY	DESCRIPTION	DATE	APP	ECN	DXF
B	JAB	ADDED PIPING NOTE	3/31/16	JWG	104671	
A	JAB	INITIAL RELEASE	8/15/14	JWG	103559	

18090122- W600-1000 To Sled Flex Hose>RWH33



18090123- W600-1000 To Sled Jacobs>RWH33



ITEM NO.	QTY.	U/M	PART NUMBER	LOC	DESCRIPTION
1	CHART	EA	2671290701		WELDED TUBE, 8" X 8", COATED CS, 19 GA
2	CHART	EA	2671290801		WELDED TUBE, 8" X 20", COATED CS, 19 GA
3	4	EA	2671290901		WELDED TUBE, 8" X 39", COATED CS, 19 GA
4	4	EA	2671330601		WELDED SLIP TUBE, 8" X 39", COATED CS, 16 GA
5	CHART	EA	2671300201		45°TUBE SEGMENT, 8", COATED CS, 16 GA
6	CHART	EA	2671310201		1D 90°, 8", COATED CS, 16 GA
7	4	EA	18477901		8" TUBE CONNECTION WELDMENT
8	CHART	EA	2671360201		8" U SHAPED GASKET, 19 GA
9	4	EA	26713202		SLIP TUBE SEAL, 8"
10	CHART	EA	2671350201		8" BOLTED PULL RING, GALVANIZED
11	2	EA	185107930		11OD GASKET; 8" DIA TUBE
12	80	FT	2190091004		THREADED ROD, 3/8-16 x 10FT
13	6	EA	18598074		ALL THREAD ADAPTER
14	12	EA	22500302		FLAT WASHER, 3/8
15	12	EA	22100902		HEX NUT, 3/8-16
16	6	EA	21247302		M10 x 15mm HHCS CAD PLATED
17	6	EA	2671390201		8" CEILING MOUNT CLAMP, GALVANIZED, HIGH TEMP
18	2	EA	22901003		3/8-16 UNC HEX COUPLING NUT

NOTES:
1. CHARTED ITEMS ON SHEET 2
2. LOCATION DIMENSIONS ARE ON SHEET 3
3. HANGING HARDWARE CAN BE USED UP TO 19FT CEILING, CUT AS REQUIRED FOR SHORTER INSTALLATIONS. LOCATIONS OF HANGERS ON DRAWING ARE NOT EXACT. PLACE IN GENERAL ARE AS SPACE PERMITS. SLIT JOINT MUST BE SUPPORTED.
4. ITEM 12, ALL THREAD, SHOULD BE QUANTITY 8 X 10 FOOT SECTIONS.
5. DRYER AND SLED ARE TO BE ON THE SAME HORIZONTAL PLANE.
6. THIS KIT IS FOR RWH 39" AND LARGER.

REV	BY	DESCRIPTION	DATE	APP	ECN	DXF
B	JAB	ADDED TUBING NOTE	3/31/16	JWG	104671	
A	JAB	INITIAL RELEASE	8/14/14	JWG	103559	

MACHINING TOLERANCES:

FRACTIONS	±1/32
DECIMAL MACHINING:	
XX:	±0.015
XXX:	±0.005
FORMED SHEETMETAL:	±0.015
ANGLES:	±1/2°
FINISH:	125

CONAIR

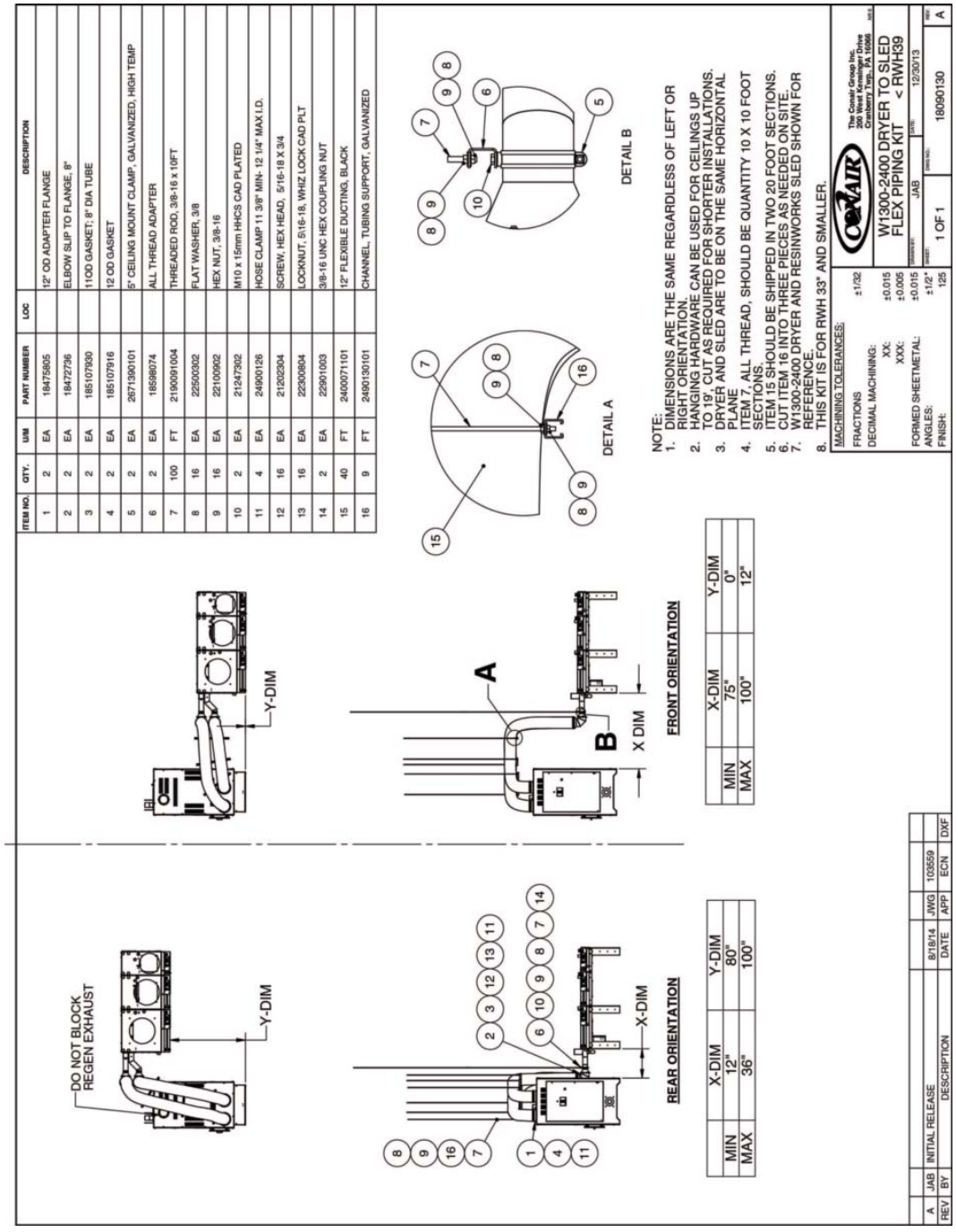
The Conair Group Inc.
200 West Kensinger Drive
Cranberry Twp., PA 16066

W600-1000 DRYER TO SLED
JACOBS PIPING KIT > RWH 33

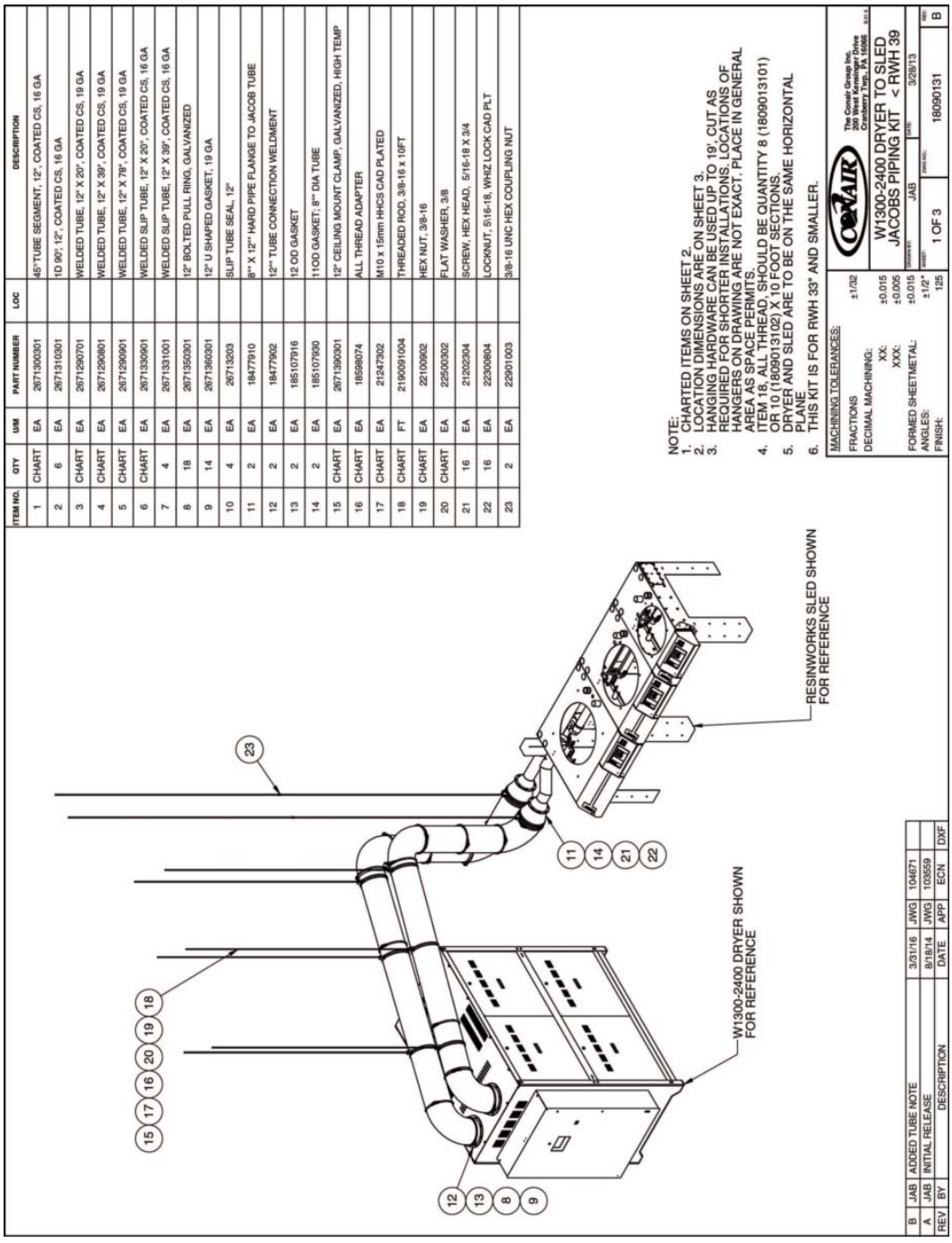
DRAWN BY	DATE	SHEET	DWG NO.	REV
JAB	8/14/14	1 OF 3	18090123	B

C Appendix

18090130- W1300-2400 To Sled Flex Hose<RWH39



18090131- W1300-2400 To Sled Jacobs<RWH39



ITEM NO.	QTY	U/M	PART NUMBER	LOC	DESCRIPTION
1	CHART	EA	2671300301		45° TUBE SEGMENT, 12", COATED CS, 16 GA
2	6	EA	2671310301		1D 90°, 12", COATED CS, 16 GA
3	CHART	EA	2671290701		WELDED TUBE, 12" X 20", COATED CS, 19 GA
4	CHART	EA	2671290801		WELDED TUBE, 12" X 39", COATED CS, 19 GA
5	CHART	EA	2671290901		WELDED TUBE, 12" X 78", COATED CS, 19 GA
6	CHART	EA	2671330901		WELDED SLIP TUBE, 12" X 20", COATED CS, 16 GA
7	4	EA	2671331001		WELDED SLIP TUBE, 12" X 39", COATED CS, 16 GA
8	18	EA	2671350301		12" BOLTED PULL RING, GALVANIZED
9	14	EA	2671360301		12" U SHAPED GASKET, 19 GA
10	4	EA	26713203		SLIP TUBE SEAL, 12"
11	2	EA	18477910		8"" X 12"" HARD PIPE FLANGE TO JACOB TUBE
12	2	EA	18477902		12"" TUBE CONNECTION WELDMENT
13	2	EA	185107916		12 OD GASKET
14	2	EA	185107930		11OD GASKET; 8"" DIA TUBE
15	CHART	EA	2671390301		12" CEILING MOUNT CLAMP, GALVANIZED, HIGH TEMP
16	CHART	EA	18598074		ALL THREAD ADAPTER
17	CHART	EA	21247302		M10 x 15mm HHCS CAD PLATED
18	CHART	FT	2190091004		THREADED ROD, 3/8-16 x 10FT
19	CHART	EA	22100902		HEX NUT, 3/8-16
20	CHART	EA	22500302		FLAT WASHER, 3/8
21	16	EA	21202304		SCREW, HEX HEAD, 5/16-18 X 3/4
22	16	EA	22300804		LOCKNUT, 5/16-18, WHIZ LOCK CAD PLT
23	2	EA	22901003		3/8-16 UNC HEX COUPLING NUT

NOTE:
1. CHARTED ITEMS ON SHEET 2.
2. LOCATION DIMENSIONS ARE ON SHEET 3.
3. HANGING HARDWARE CAN BE USED UP TO 19', CUT AS REQUIRED FOR SHORTER INSTALLATIONS. LOCATIONS OF HANGERS ON DRAWING ARE NOT EXACT. PLACE IN GENERAL AREA AS SPACE PERMITS.
4. ITEM 18, ALL THREAD, SHOULD BE QUANTITY 8 (18090131O1) OR 10 (18090131O2) X 10 FOOT SECTIONS.
5. DRYER AND SLED ARE TO BE ON THE SAME HORIZONTAL PLANE
6. THIS KIT IS FOR RWH 33" AND SMALLER.

MACHINING TOLERANCES:
FRACTIONS ±1/32
DECIMAL MACHINING:
XX: ±0.015
XXX: ±0.005
FORMED SHEETMETAL: ±0.015
ANGLES: ±1/2°
FINISH: 125

The Conair Group Inc.
One Cummings Point Road
Cranberry Twp., PA 16066

W1300-2400 DRYER TO SLED JACOBS PIPING KIT < RWH 39

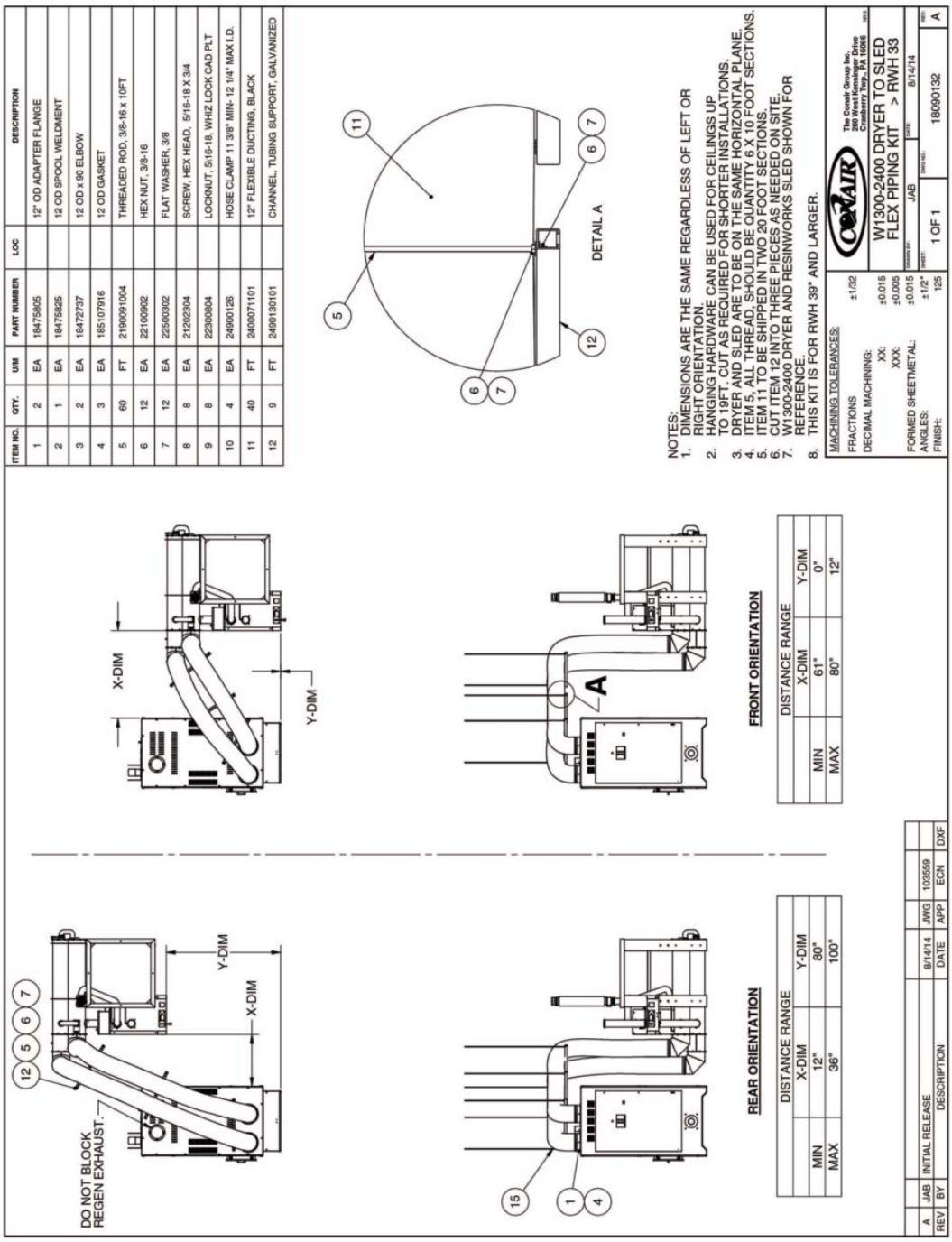
DRAWN: JAB 3/28/13
1 OF 3
18090131
REV: B

REV	BY	DESCRIPTION	DATE	APP	ECN	DXF
B	JAB	ADDED TUBE NOTE	3/31/16	JWG	104671	
A	JAB	INITIAL RELEASE	8/18/14	JWG	103559	

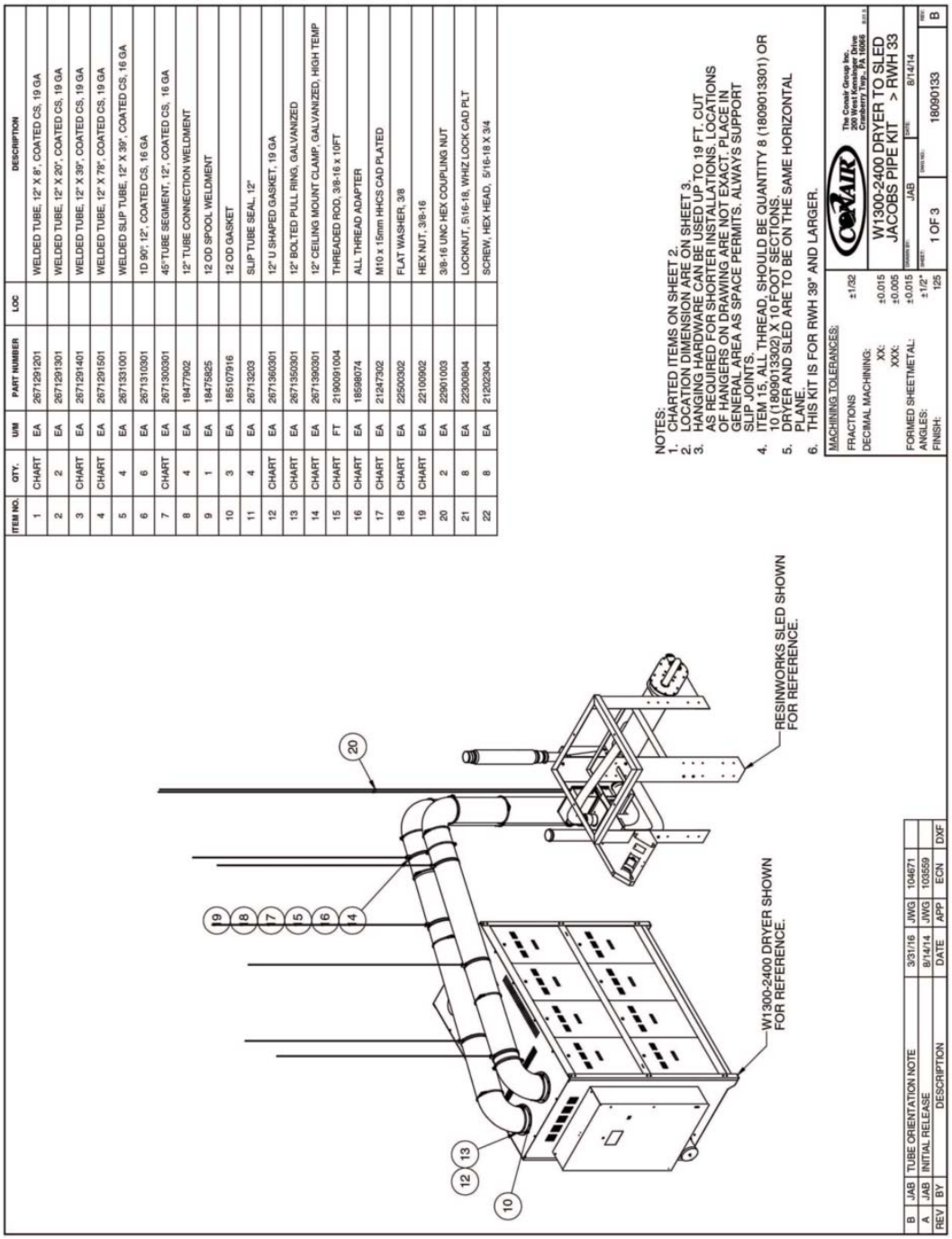
W1300-2400 DRYER SHOWN FOR REFERENCE

RESINWORKS SLED SHOWN FOR REFERENCE

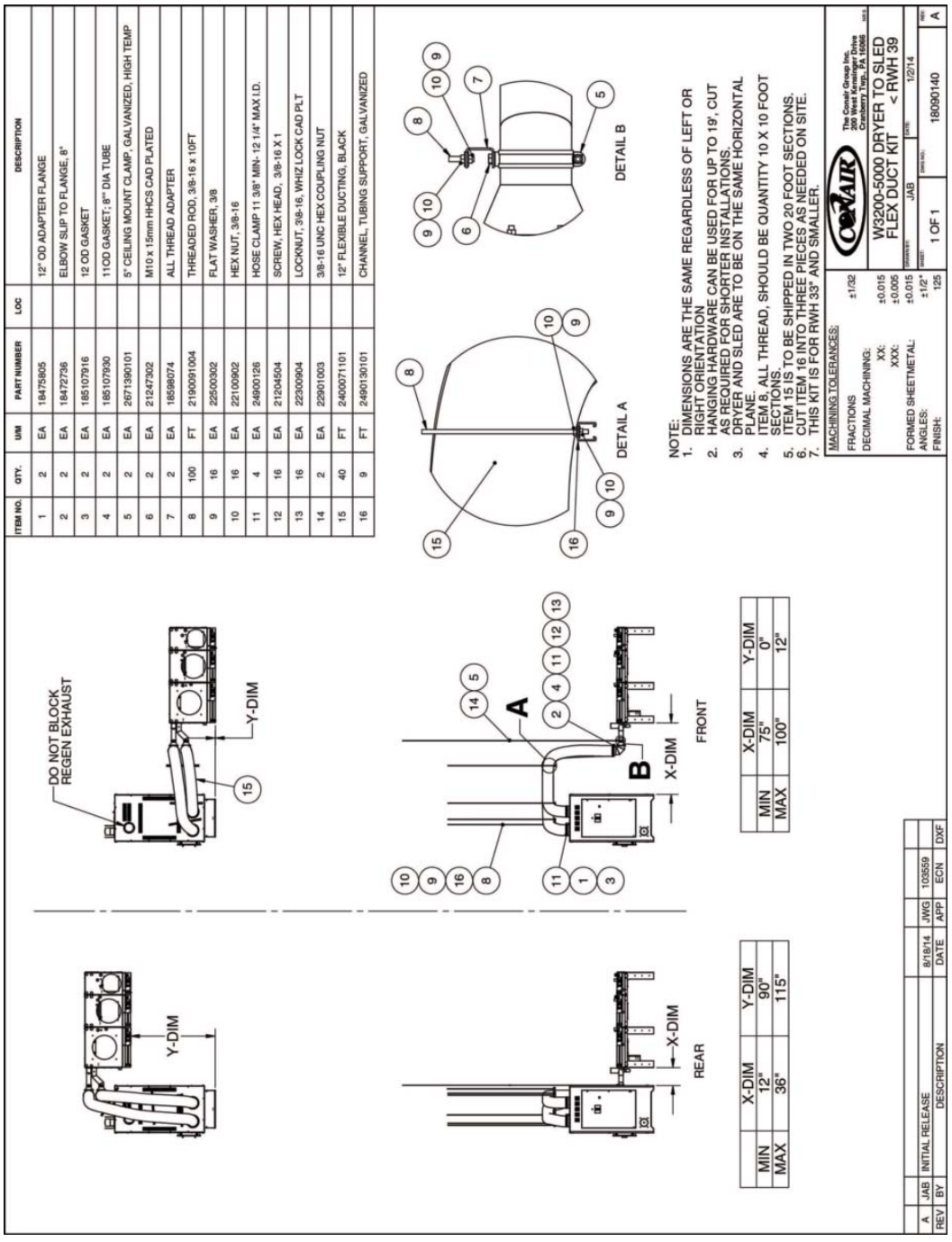
18090132- W1300-2400 To Sled Flex Hose>RWH33



18090133- W1300-2400 To Sled Jacobs>RWH33



18090140- W3200-5000 To Sled Flex Hose<RWH39

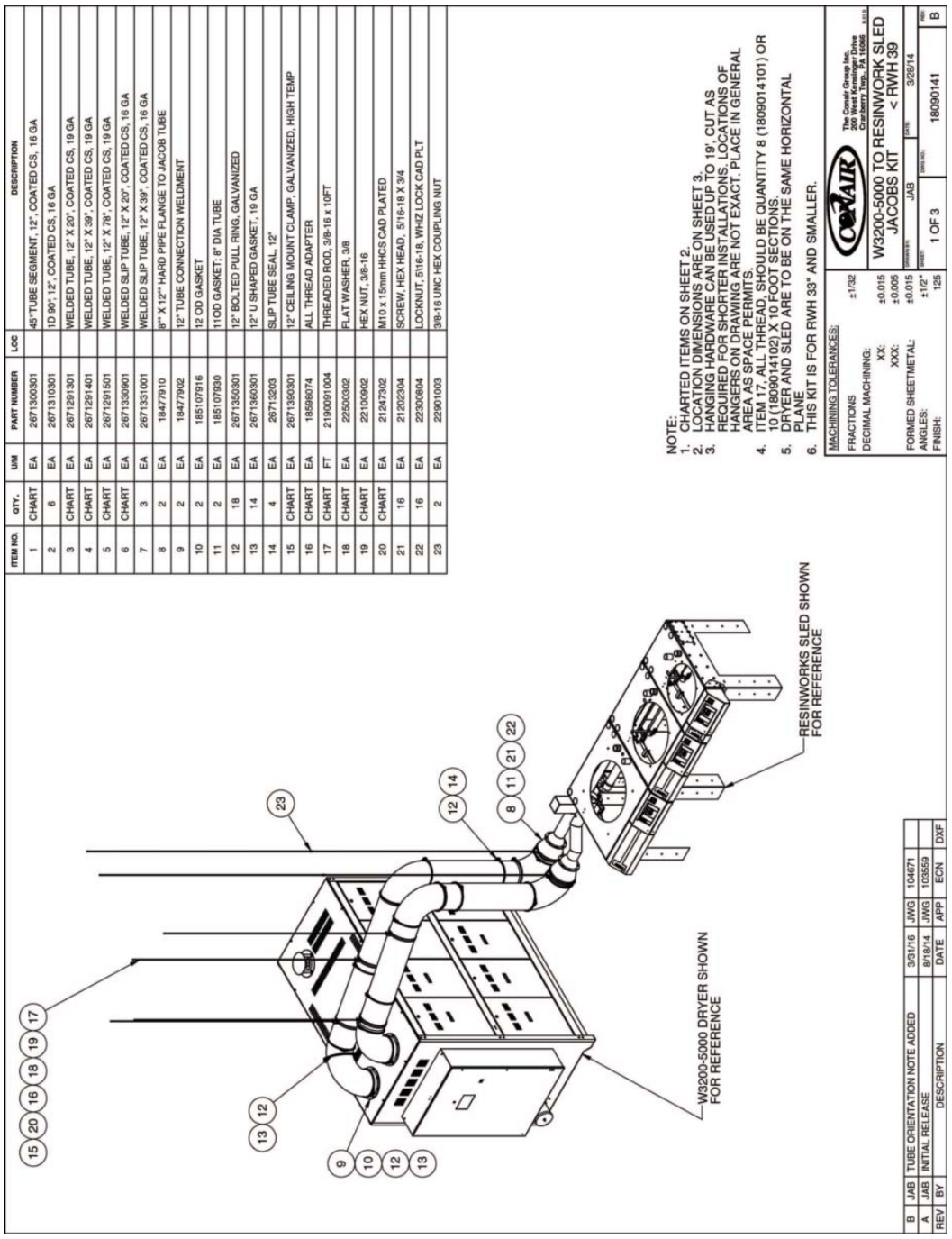


ITEM NO.	QTY.	U/M	PART NUMBER	LOC	DESCRIPTION
1	2	EA	18475805		12" OD ADAPTER FLANGE
2	2	EA	18472736		ELBOW SLIP TO FLANGE, 8"
3	2	EA	185107916		12 OD GASKET
4	2	EA	185107930		11OD GASKET, 8"" DIA TUBE
5	2	EA	2671390101		5" CEILING MOUNT CLAMP, GALVANIZED, HIGH TEMP
6	2	EA	21247302		M10 x 15mm HHCS CAD PLATED
7	2	EA	18598074		ALL THREAD ADAPTER
8	100	FT	2190091004		THREADED ROD, 3/8-16 x 10FT
9	16	EA	22500302		FLAT WASHER, 3/8
10	16	EA	22100902		HEX NUT, 3/8-16
11	4	EA	24900126		HOSE CLAMP 11 3/8" MIN- 12 1/4" MAX I.D.
12	16	EA	21204504		SCREW, HEX HEAD, 3/8-16 X 1
13	16	EA	22300904		LOCKNUT, 3/8-16, WHIZ LOCK CAD PLT
14	2	EA	22901003		3/8-16 UNC HEX COUPLING NUT
15	40	FT	2400071101		12" FLEXIBLE DUCTING, BLACK
16	9	FT	2490130101		CHANNEL, TUBING SUPPORT, GALVANIZED

	X-DIM	Y-DIM
MIN	12"	90"
MAX	36"	115"

	X-DIM	Y-DIM
MIN	75"	0"
MAX	100"	12"

18090141- W3200-5000 To Sled Jacobs<RWH39



ITEM NO.	QTY.	U/M	PART NUMBER	LOC	DESCRIPTION
1	CHART	EA	2671300301		45° TUBE SEGMENT, 12", COATED CS, 16 GA
2	6	EA	2671310301		1D 90°; 12", COATED CS, 16 GA
3	CHART	EA	2671291301		WELDED TUBE, 12" X 20", COATED CS, 19 GA
4	CHART	EA	2671291401		WELDED TUBE, 12" X 39", COATED CS, 19 GA
5	CHART	EA	2671291501		WELDED TUBE, 12" X 78", COATED CS, 19 GA
6	CHART	EA	2671330901		WELDED SLIP TUBE, 12" X 20", COATED CS, 16 GA
7	3	EA	2671331001		WELDED SLIP TUBE, 12" X 39", COATED CS, 16 GA
8	2	EA	18477910		8" X 12"" HARD PIPE FLANGE TO JACOB TUBE
9	2	EA	18477902		12"" TUBE CONNECTION WELDMENT
10	2	EA	185107916		12 OD GASKET
11	2	EA	185107930		11OD GASKET; 8" DIA TUBE
12	18	EA	2671350301		12" BOLTED PULL RING, GALVANIZED
13	14	EA	2671360301		12" U SHAPED GASKET, 19 GA
14	4	EA	26713203		SLIP TUBE SEAL, 12"
15	CHART	EA	2671390301		12" CEILING MOUNT CLAMP, GALVANIZED, HIGH TEMP
16	CHART	EA	18598074		ALL THREAD ADAPTER
17	CHART	FT	2190091004		THREADED ROD, 3/8-16 x 10FT
18	CHART	EA	22500302		FLAT WASHER, 3/8
19	CHART	EA	22100902		HEX NUT, 3/8-16
20	CHART	EA	21247302		M10 x 15mm HHCS CAD PLATED
21	16	EA	21202304		SCREW, HEX HEAD, 5/16-18 X 3/4
22	16	EA	22300804		LOCKNUT, 5/16-18, WHIZ LOCK CAD PLT
23	2	EA	22901003		3/8-16 UNC HEX COUPLING NUT

NOTE:
1. CHARTED ITEMS ON SHEET 2.
2. LOCATION DIMENSIONS ARE ON SHEET 3.
3. HANGING HARDWARE CAN BE USED UP TO 19", CUT AS REQUIRED FOR SHORTER INSTALLATIONS. LOCATIONS OF HANGERS ON DRAWING ARE NOT EXACT. PLACE IN GENERAL AREA AS SPACE PERMITS.
4. ITEM 17, ALL THREAD, SHOULD BE QUANTITY 8 (18090141O1) OR 10 (18090141O2) X 10 FOOT SECTIONS.
5. DRYER AND SLED ARE TO BE ON THE SAME HORIZONTAL PLANE
6. THIS KIT IS FOR RWH 33" AND SMALLER.

W3200-5000 DRYER SHOWN FOR REFERENCE

RESINWORKS SLED SHOWN FOR REFERENCE

REV	BY	DESCRIPTION	DATE	APP	ECN	DXF
B	JAB	TUBE ORIENTATION NOTE ADDED	3/31/16	JWG	104671	
A	JAB	INITIAL RELEASE	8/18/14	JWG	103559	

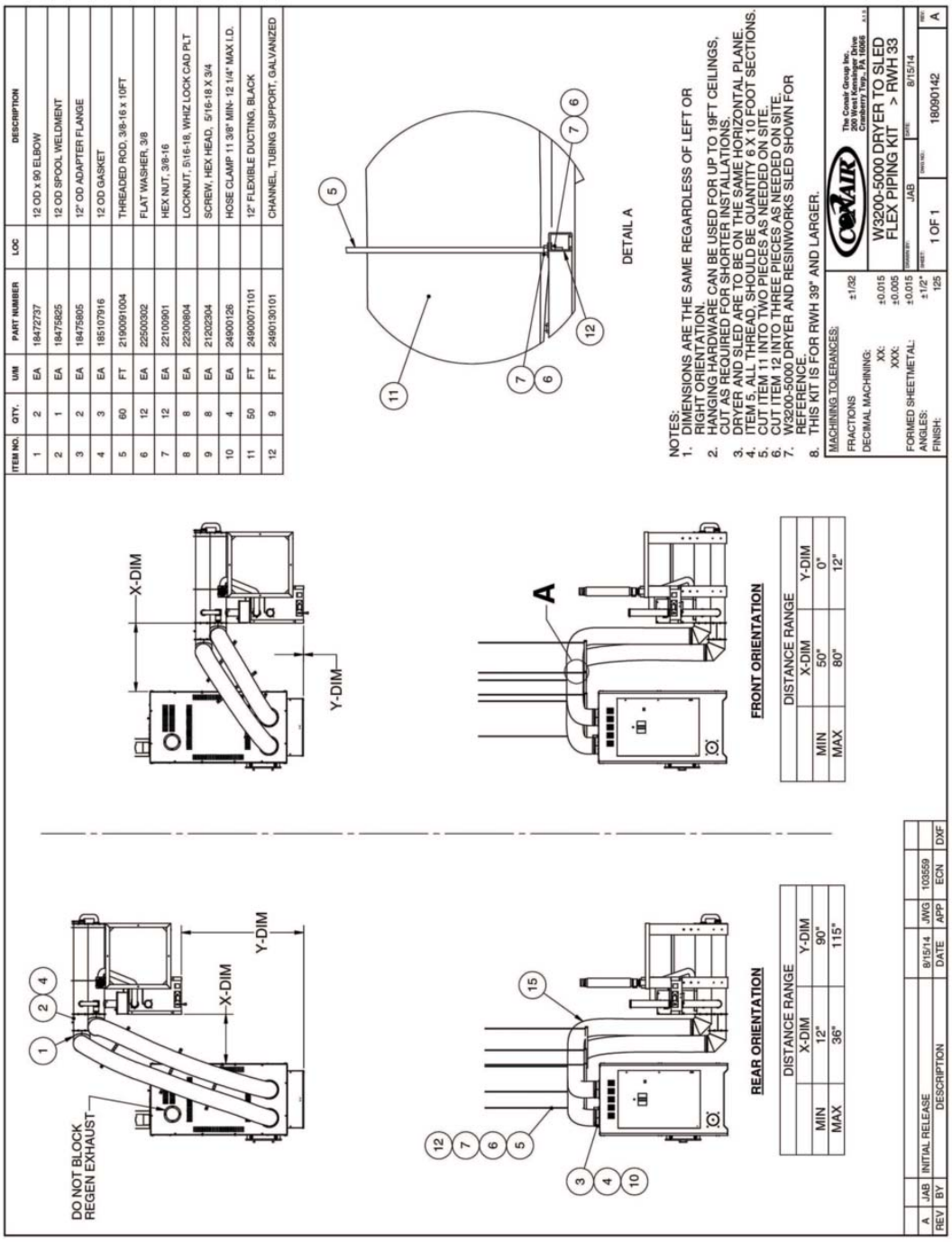
MACHINING TOLERANCES:
FRACTIONS ±1/32
DECIMAL MACHINING:
XX: ±0.015
XXX: ±0.005
FORMED SHEETMETAL: ±0.015
ANGLES: ±1/2°
FINISH: 125

The Conair Group Inc.
200 West Kensinger Drive
Cranberry Twp., PA 16066

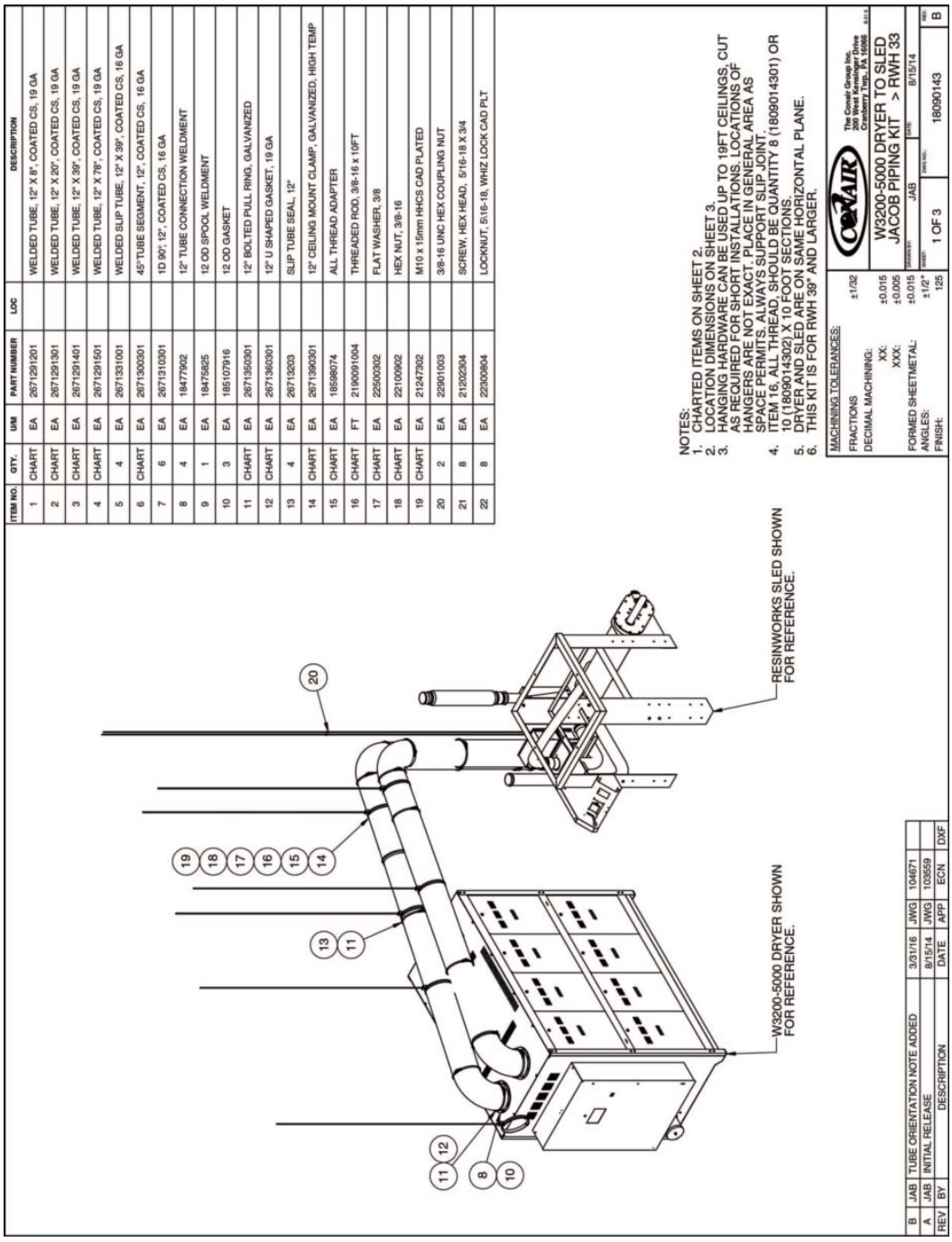
W3200-5000 TO RESINWORK SLED JACOBS KIT < RWH 39

DRAWN: JAB DATE: 3/28/14
SHEET: 1 OF 3
DWG NO: 18090141
REV: B

18090142- W3200-5000 To Sled Flex Hose>RWH33



18090143- W3200-5000 To Sled Jacobs>RWH33



ITEM NO.	QTY.	U/M	PART NUMBER	LOC	DESCRIPTION
1	CHART	EA	2671291201		WELDED TUBE, 12" X 8", COATED CS, 19 GA
2	CHART	EA	2671291301		WELDED TUBE, 12" X 20", COATED CS, 19 GA
3	CHART	EA	2671291401		WELDED TUBE, 12" X 39", COATED CS, 19 GA
4	CHART	EA	2671291501		WELDED TUBE, 12" X 78", COATED CS, 19 GA
5	4	EA	2671331001		WELDED SLIP TUBE, 12" X 39", COATED CS, 16 GA
6	CHART	EA	2671300301		45° TUBE SEGMENT, 12", COATED CS, 16 GA
7	6	EA	2671310301		1D 90°, 12", COATED CS, 16 GA
8	4	EA	18477902		12" TUBE CONNECTION WELDMENT
9	1	EA	18475825		12 OD SPOOL WELDMENT
10	3	EA	185107916		12 OD GASKET
11	CHART	EA	2671350301		12" BOLTED PULL RING, GALVANIZED
12	CHART	EA	2671360301		12" U SHAPED GASKET, 19 GA
13	4	EA	26713203		SLIP TUBE SEAL, 12"
14	CHART	EA	2671390301		12" CEILING MOUNT CLAMP, GALVANIZED, HIGH TEMP
15	CHART	EA	18598074		ALL THREAD ADAPTER
16	CHART	FT	2190091004		THREADED ROD, 3/8-16 x 10FT
17	CHART	EA	22503302		FLAT WASHER, 3/8
18	CHART	EA	22100902		HEX NUT, 3/8-16
19	CHART	EA	21247302		M10 x 15mm HHCS CAD PLATED
20	2	EA	22901003		3/8-16 UNC HEX COUPLING NUT
21	8	EA	21202304		SCREW, HEX HEAD, 5/16-18 X 3/4
22	8	EA	22300804		LOCKNUT, 5/16-18, WHIZ LOCK CAD PLT

NOTES:
1. CHARTED ITEMS ON SHEET 2.
2. LOCATION DIMENSIONS ON SHEET 3.
3. HANGING HARDWARE CAN BE USED UP TO 19FT CEILINGS, CUT AS REQUIRED FOR SHORT INSTALLATIONS. LOCATIONS OF HANGERS ARE NOT EXACT. PLACE IN GENERAL AREA AS SPACE PERMITS. ALWAYS SUPPORT SLIP JOINT.
4. ITEM 16, ALL THREAD, SHOULD BE QUANTITY 8 (18090143O1) OR 10 (18090143O2) X 10 FOOT SECTIONS.
5. DRYER AND SLED ARE ON SAME HORIZONTAL PLANE.
6. THIS KIT IS FOR RWH 39" AND LARGER.

RESINWORKS SLED SHOWN FOR REFERENCE.

W3200-5000 DRYER SHOWN FOR REFERENCE.

MACHINING TOLERANCES:	
FRACTIONS	±1/32
DECIMAL MACHINING:	
XX:	±0.015
XXX:	±0.005
FORMED SHEETMETAL:	±0.015
ANGLES:	±1/2°
FINISH:	125

The Conair Group Inc.
One Conair Corporate Drive
Cranberry Twp., PA 16066

W3200-5000 DRYER TO SLED JACOB PIPING KIT > RWH 33

DRAWN: JAB DATE: 8/15/14
MODEL: 1 OF 3 DWG NO.: 18090143 REV: B

REV	BY	DESCRIPTION	DATE	APP	ECN	DXF
B	JAB	TUBE ORIENTATION NOTE ADDED	3/31/16	JWG	104671	
A	JAB	INITIAL RELEASE	8/15/14	JWG	103559	

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Addendum - AA Communication Protocols for Common Controls

Modbus Communications

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Table of Contents

A-1 Modbus Communications

SECTION

AA

Modbus Communications

Description of Modbus Communications

The common controls series of products from Conair use standard Modbus communications protocol to allow the user to access the control boards for supervisory type functions. For example, you may want to display the drying temperature for all hoppers in a facility in one central location. By connecting all the dryers to a central computer, the temperatures and setpoints can be displayed in one location using a standard SCADA software program such as Wonderware or RSView.

All ResinWorks hoppers are provided with a Modbus TCP/IP Ethernet interface. When connected to a Conair dryer the hopper parameters are available at the dryer. Getting the data from the dryer greatly reduces the number of connections required.

Installing the Modbus Communication Hardware

The hardware required for Modbus communications is included with the product when it is shipped. Connectors and cabling must be supplied by the user or ordered from Conair.

Using the Modbus Parameter List

The Modbus interface uses standard Modbus protocol to communicate with a common controls system. The data that may be retrieved is arranged in a parameter list. By using the Modbus register read and write commands, the desired data may be read from or written to the controller. The list of data that may be set or retrieved with the common controls system is arranged in Modbus registers.

(continued)

Using the Modbus Parameter List (continued)

⚠ **CAUTION:** The list of data that may be read and written to by the user is arranged in a specific location. Writing to a location with improper data, or writing to an incorrect location outside of the specified range may cause your common controls system to become inoperative or to operate in a manner that may damage your process. Be certain that you understand each parameter and its effect before changing anything. Conair recommends that you initially attempt to read from the registers and do not attempt any writes. Once the information you are trying to read has been confirmed as accurate, you can program your new/additional data. All Conair remote heat sources "ResinWorks, HTC, CGT and HAD" use the same registers. All registers are not active on all products.

Modbus Parameter / TAG List

RHS-C CAREL remote heat source
HMI/Remote Configuration Tags 03/05/2019
CAREL mini series PLC w/CAREL pcd HMI
PLC Default IP Adress 10.1.14.5
HMI Default IP Adress 10.1.14.6

Data Types:
Bool
Int
Uint
Real

Access
RW = Read Write, Modbus 4X and 0X
RO = Read Only, Modbus 3X and 1X

Tag Name	Modbus 1X	Type	E/U	Access RO	Notes Modbus 1X discrete inputs
Gx_User_Status.	1X	Bool Structure	NA	RO	Modbus 100001 - 100036
RhsStatus	100001	Bool			Remote heat source status, True=On, False=Off
SetBkEnabled	100002	Bool			Setback control enabled when true
SetBkActv	100003	Bool			Setback control active when true
AutoStartEnabled	100004	Bool			Main auto start enabled when true
AutoStopEnabled	100005	Bool			Main auto stop enabled when true
HopperLowLevel	100006	Bool			Drying hopper low level, (True = low)
DryMonCommsActv	100007	Bool			Drying monitor expansion I/O communications (True=Active)
TrueRateCommsActv	100008	Bool			TrueRate communications active when true
VfdCommsActv	100009	Bool			Delivery air VFD communications online without errors
VfdRemoteActv	100010	Bool			Delivery air VFD keypad/remote, (True = remote active)
NetChgActv	100011	Bool			Network settings have changed (True=Yes)
BurnerCommsActv	100012	Bool			Burner control communications online without errors
HostCommsOnline	100013	Bool			Host interface communicating without errors
HostCommsError	100014	Bool			Host interface communication error
MaterialRdy	100015	Bool			Marerial ready to use when true
ProcAirAvail	100016	Bool			Process air available when true
UI1_1	100017	Bool			Universal input 1/2 state (True=On or Ok), Process air available
UI1_2	100018	Bool			Universal input 1/2 state (True=On or Ok), Process air available
UI1_3	100019	Bool			Universal input 1/3 state (True=On or Ok), Isolation contactor aux.
UI1_4	100020	Bool			Universal input 1/4 state (True=On or Ok), Spare digital
UI1_5	100021	Bool			Universal input 1/5 state (True=On or Ok), Delivery air blower aux.
UI1_6	100022	Bool			Universal input 1/6 state (True=On or Ok), Hopper level
UI1_7	100023	Bool			Universal input 1/7 state (True=On or Ok),Delivery air temperature
UI1_8	100024	Bool			Universal input 1/8 state (True=On or Ok), Hopper outlet air temperature
UI1_9	100025	Bool			Universal input 1/9 state (True=On or Ok), Delivery air dew point
UI1_10	100026	Bool			Universal input 1/10 state (True=On or Ok), Spare analog
UI2_1	100027	Bool			Universal input 2/1 state (True=On or Ok), Reserved 4-20mA
UI2_2	100028	Bool			Universal input 2/2 state (True=On or Ok), Reserved PT1000 RTD
UI2_3	100029	Bool			Universal input 2/3 state (True=On or Ok), Drying monitor T1 RTD
UI2_4	100030	Bool			Universal input 2/4 state (True=On or Ok), Drying monitor T2 RTD
UI2_5	100031	Bool			Universal input 2/5 state (True=On or Ok), Drying monitor T3 RTD
UI2_6	100032	Bool			Universal input 2/6 state (True=On or Ok), Drying monitor T4 RTD
UI2_7	100033	Bool			Universal input 2/7 state (True=On or Ok), Drying monitor T5 RTD
UI2_8	100034	Bool			Universal input 2/8 state (True=On or Ok), Drying monitor T6 RTD
UI2_9	100035	Bool			Universal input 2/9 state (True=On or Ok), Reserved PT1000 RTD
UI2_10	100036	Bool			Universal input 2/10 state (True=On or Ok), Reserved 4-20mA
Gb_UserAutoStartStatus[1..7]	1X	Bool Array	NA	RO	Auto start event status, Modbus 100065 - 100067
[1]	100065	Bool			Event #1 start enable status, (True = enabled)
[2]	100066	Bool			Event #2 start enable status, (True = enabled)
[3]	100067	Bool			Event #3 start enable status, (True = enabled)
Gb_UserAutoStopStatus[1..7]	1X	Bool Array	NA	RO	Auto stop event status, Modbus 100068 - 100070
[1]	100068	Bool			Event #1 stop enable status, (True = enabled)
[2]	100069	Bool			Event #2 stop enable status, (True = enabled)
[3]	100070	Bool			Event #3 stop enable status, (True = enabled)
Gx_User_BurnerStates.	1X	Bool Structure	NA	RO	Burner control states, bool structure
Initiate	100079	Bool			Burner control initiate state active when true
Standby	100080	Bool			Burner control standby state active when true
Purge	100081	Bool			Burner control purge state active when true

Modbus Parameter / TAG List (continued)

Tag Name		Modbus	Type	E/U	Access	Notes	
	PilotIgnition	100082	Bool			Burner control pilot-ignition state active when true	
	MainIgnition	100083	Bool			Burner control main-ignition state active when true	
	Run	100084	Bool			Burner control run state active when true	
	PostPurge	100085	Bool			Burner control post purge state active when true	
	PreIgnition	100086	Bool			Burner control pre-ignition state active when true	
	ValveProving	100087	Bool			Burner control valve proving state active when true	
	Alarm	100088	Bool			Burner control alarm state active when true, lockout also true	
	Hold	100089	Bool			Burner control hold state active when true, one other may also be true	
	Lockout	100090	Bool			Burner control lockout state active when true, alarm also true	
Gb_Alarms_Shutdown[1..24]		1X	Bool Array	NA	RO	Shutdown alarms, Modbus 100101 - 100124	
	[1]	100101	Bool			E-stop pressed - Shutdown	
	[2]	100102	Bool			Process temperature control fault- Shutdown	(loop break)
	[3]	100103	Bool			Process heater safety switch - Shutdown	
	[4]	100104	Bool			Air flow switch loss - Shutdown	
	[5]	100105	Bool			Process RTD fault- Shutdown	
	[6]	100106	Bool			PLC error detected - Shutdown	
	[7]	100107	Bool			Process blower overload- Shutdown	(Optional)
	[8]	100108	Bool			Variable speed drive fault - Shutdown	(Optional)
	[9]	100109	Bool			Startup failed at process blower - Shutdown	(Optional)
	[10]	100110	Bool			Startup failed at isolation contactor - Shutdown	(electric heat)
	[11]	100111	Bool			Startup failed at PID enable - Shutdown	(both heats)
	[12]	100112	Bool			Startup failed at interlocks - Shutdown	(gas heat)
	[13]	100113	Bool			Startup failed at purge - Shutdown	(gas heat)
	[14]	100114	Bool			Startup failed at pilot ignition - Shutdown	(gas heat)
	[15]	100115	Bool			Startup failed at main ignition - Shutdown	(gas heat)
	[16]	100116	Bool			Delivery air VFD communications fault - Shutdown	(Optional)
	[17]	100117	Bool			Combustion air VFD communications fault - Shutdown	(gas heat)
	[18]	100118	Bool			Burner control communications fault - Shutdown	(gas heat)
	[19]	100119	Bool			Burner control lockout - Shutdown	(gas heat)
	[20]	100120	Bool			Material exit temperature RTD fault - Shutdown	(ES1 dryer only)
	[21]	100121	Bool			Spare - Shutdown	
	[22]	100122	Bool			Spare - Shutdown	
	[23]	100123	Bool			Spare - Shutdown	
	[24]	100124	Bool			Spare - Shutdown	
Gb_Alarms_Passive[1..24]		1X	Bool Array	NA	RO	Passive alarms, Modbus 100201 - 100224	
	[1]	100201	Bool			Drying monitor low temperature - Passive	(Optional)
	[2]	100202	Bool			Drying monitor high temperature - Passive	(Optional)
	[3]	100203	Bool			Dewpoint high - Passive	(Optional)
	[4]	100204	Bool			Drying hopper low level - Passive	(Optional)
	[5]	100205	Bool			Material is ready to use - Passive	(Optional)
	[6]	100206	Bool			Dew point sensor fault - Passive	(Optional)
	[7]	100207	Bool			Hopper outlet RTD fault - Passive	(Optional)
	[8]	100208	Bool			Drying monitor T1 RTD fault - Passive	(Optional)
	[9]	100209	Bool			Drying monitor T2 RTD fault - Passive	(Optional)
	[10]	100210	Bool			Drying monitor T3 RTD fault - Passive	(Optional)
	[11]	100211	Bool			Drying monitor T4 RTD fault - Passive	(Optional)
	[12]	100212	Bool			Drying monitor T5 RTD fault - Passive	(Optional)
	[13]	100213	Bool			Drying monitor T6 RTD fault - Passive	(Optional)
	[14]	100214	Bool			Remote I/O communications fault - Passive	(Optional)
	[15]	100215	Bool			TrueRate communications fault - Passive	(Optional)
	[16]	100216	Bool			Burner control initialization failed - Passive	(GasTrac only)
	[17]	100217	Bool			Continuous level sensor fault - Passive	
	[18]	100218	Bool			Delivery air flow sensor fault - Passive	(ES1 dryer only)
	[19]	100219	Bool			Spare - Passive	
	[20]	100220	Bool			Spare - Passive	
	[21]	100221	Bool			Spare - Passive	

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Modbus Parameter / TAG List (continued)

Tag Name		Modbus	Type	E/U	Access	Notes
	[22]	100222	Bool			Spare - Passive
	[23]	100223	Bool			Spare - Passive
	[24]	100224	Bool			Spare - Passive
Gx_MaintAlert[1..16].State		1X	Bool Array	NA	RO	Maintenance alert triggers to the HMI or Remote
	[1]	100301	Bool			Check process heater
	[2]	100302	Bool			Check combustion burner
	[3]	100303	Bool			Check inlet/outlet hoses
	[4]	100304	Bool			Clean or replace blower filter
	[5]	100305	Bool			Clean or replace combustion air filter
	[6]	100306	Bool			Clean flame detector lens
	[7]	100307	Bool			Clean or replace spark igniter
	[8]	100308	Bool			Spare - Alert
	[9]	100309	Bool			Spare - Alert
	[10]	100310	Bool			Spare - Alert
	[11]	100311	Bool			Spare - Alert
	[12]	100312	Bool			Spare - Alert
	[13]	100313	Bool			Spare - Alert
	[14]	100314	Bool			Spare - Alert
	[15]	100315	Bool			Spare - Alert
	[16]	100316	Bool			Spare - Alert
		3X			**RO**	**Modbus 3X input registers**
Gx_MaintAlert[1..16].ActualHours		3X	Uint Array	Hrs	RO	Maintenance alert actual hours to the HMI or Remote
	[1]	300301	Uint			Maintenance alert 1 actual hours
	[2]	300302	Uint			Maintenance alert 2 actual hours
	[3]	300303	Uint			Maintenance alert 3 actual hours
	[4]	300304	Uint			Maintenance alert 4 actual hours
	[5]	300305	Uint			Maintenance alert 5 actual hours
	[6]	300306	Uint			Maintenance alert 6 actual hours
	[7]	300307	Uint			Maintenance alert 7 actual hours
	[8]	300308	Uint			Spare maintenance alert 8 actual hours
	[9]	300309	Uint			Spare maintenance alert 9 actual hours
	[10]	300310	Uint			Spare maintenance alert 10 actual hours
	[11]	300311	Uint			Spare maintenance alert 11 actual hours
	[12]	300312	Uint			Spare maintenance alert 12 actual hours
	[13]	300313	Uint			Spare maintenance alert 13 actual hours
	[14]	300314	Uint			Spare maintenance alert 14 actual hours
	[15]	300315	Uint			Spare maintenance alert 15 actual hours
	[16]	300316	Uint			Spare maintenance alert 16 actual hours
		300317 to 300350 Reserved				
Gx_MaintAlert[1..16].ActualMinutes		3X	Uint Array	Min	RO	Maintenance alert actual minutes to the HMI or Remote
	[1]	300351	Uint			Maintenance alert 1 actual minutes
	[2]	300352	Uint			Maintenance alert 2 actual minutes
	[3]	300353	Uint			Maintenance alert 3 actual minutes
	[4]	300354	Uint			Maintenance alert 4 actual minutes
	[5]	300355	Uint			Maintenance alert 5 actual minutes
	[6]	300356	Uint			Maintenance alert 6 actual minutes
	[7]	300357	Uint			Maintenance alert 7 actual minutes
	[8]	300358	Uint			Spare maintenance alert 8 actual minutes
	[9]	300359	Uint			Spare maintenance alert 9 actual minutes
	[10]	300360	Uint			Spare maintenance alert 10 actual minutes
	[11]	300361	Uint			Spare maintenance alert 11 actual minutes
	[12]	300362	Uint			Spare maintenance alert 12 actual minutes
	[13]	300363	Uint			Spare maintenance alert 13 actual minutes
	[14]	300364	Uint			Spare maintenance alert 14 actual minutes
	[15]	300365	Uint			Spare maintenance alert 15 actual minutes

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Modbus Parameter / TAG List (continued)

Tag Name	Modbus	Type	E/U	Access	Notes	
[16]	300366	Uint			Spare maintenance alert 16 actual minutes	
	300367 to 300400 Reserved					
Gn_User_RhsHtrSz_Act	300495	Dint	N/A	RO	Remote heat source electric heater size, 1 - 9 = 4kW - 270kW 1 = 4kW 2 = 10kW 3 = 15kW 4 = 30kW 5 = 60kW 6 = 90kW 7 = 120kW 8 = 180kW 9 = 270kW	
Gn_User_RhsCgtSz_Act	300497	Dint	N/A	RO	Remote heat source Milacron gastrac size, 1 - 5 1 = CGT150 2 = CGT250 3 = CGT350 4 = CGT500 5 = CGT700	
Gi_User_RhsPkg_Act	300499	Int	N/A	RO	Remote heat source feature package, 1-4 1 = Base 2 = Setback 3 = Drying monitor 4 = ES1 Dryer	
Gi_User_RhsType_Act	300500	Int	N/A	RO	Remote heat source type actual, 1 - 5 1 = HTC (electric) 2 = ResinWorks (electric) 3 = HAD (electric) 4 = CGT (natural gas) 5 = MRC (micro resin cart)	
Gi_User_PlcSwRev_Act	300501	Int	N/A	RO	PLC software revision, 100 = 1.00	
Gi_User_RhsState_Act	300502	Int	NA	RO	Remote heat source state actual, 0 - 9 0=Powering up 1=Standby 2=Waiting 3=Starting 4=Stopping 5=Running 6= Passive Alarm 7=Shutdown Alarm 8=Comms Loss 9=Test mode 10=Tuning	
Gu_User_BurnerSeqState	300503	Uint	NA	RO	Burner control sequence state, See table 20 of Honeywell manual	(Gas heat)
Gu_User_BurnerFaultCode	300504	Uint	NA	RO	Burner control fault code, See table 22 of Honeywell manual	(Gas heat)
Gu_User_BurnerPurgeTime	300505	Uint	NA	RO	Burner control purge time in seconds	(Gas heat)
Gr_User_DelAirTempSP_Act	300506	Real	°F-°C	RO	Delivery air temperature set point actual	
Gr_User_DelAirTemp_Act	300508	Real	°F-°C	RO	Delivery air temperature actual	
Gr_User_SetBkActvtnTempSP_Act	300510	Real	°F-°C	RO	Setback activation temperature set point actual	(Optional)
Gr_User_HprOutletTemp_Act	300512	Real	°F-°C	RO	Hopper outlet temperature actual	(Optional)
Gr_User_SetBkToTempSP_Act	300514	Real	°F-°C	RO	Setback to temperature set point actual	(Optional)
Gr_User_SetBkRstTempSP_Act	300516	Real	°F-°C	RO	Setback reset at temperature set point actual	(Optional)
Gr_User_ProcessOnTime_Act	300518	Real	%	RO	Delivery air heater on-time actual, 0-100%	

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Modbus Parameter / TAG List (continued)

Tag Name	Modbus	Type	E/U	Access	Notes	
Gr_User_EnergyHours_Act	300520	Real	Hrs	RO	Energy measurement total hours	
Gr_User_EnergyLastHour_Act	300522	Real	kWh	RO	Energer used in the last hour	
Gr_User_EnergyTotalKWHr_Act	300524	Real	kWh	RO	Total energy used	
Gr_User_TotalRunHrs_Act	300526	Real	Hrs	RO	Hopper temperature control total running hours actual	
Gr_User_DryingMonT1_Act	300528	Real	°F-°C	RO	Drying monitor, position T1 temperature actual	(Optional)
Gr_User_DryingMonT2_Act	300530	Real	°F-°C	RO	Drying monitor, position T2 temperature actual	(Optional)
Gr_User_DryingMonT3_Act	300532	Real	°F-°C	RO	Drying monitor, position T3 temperature actual	(Optional)
Gr_User_DryingMonT4_Act	300534	Real	°F-°C	RO	Drying monitor, position T4 temperature actual	(Optional)
Gr_User_DryingMonT5_Act	300536	Real	°F-°C	RO	Drying monitor, position T5 temperature actual	(Optional)
Gr_User_DryingMonT6_Act	300538	Real	°F-°C	RO	Drying monitor, position T6 temperature actual	(Optional)
Gr_User_DelAirDewpoint_Act	300540	Real	°F-°C	RO	Delivery air dew point actual, -76 to +40F	(Optional)
Gr_User_DelAirFlow_Act	300542	Real	Hz	RO	Delivery air flow VFD %speed actual, 0-100%	(Optional)
Gr_User_Throughput_Act	300544	Real	lb/hr-kg/hr	RO	Material troughput of the hopper	(Optional)
Gr_User_BulkDensity_Act	300546	Real	lb/F³-kg/M³	RO	Bulk density of the material in the hopper	(Optional)
Gr_User_RsdncTime_Act	300548	Real	Hrs	RO	Hopper residence time actual	(Optional)
Gr_User_BurnerFlameSig	300550	Real	Volts	RO	Burner control flame signal volts, 0.0-25.5 volts	(Gas heat)
Gr_User_HprLevelAct	300552	Real	%	RO	Hopper level actual, 0.0-100.0%	(Optional)
Gr_User_MatlExtTempAct	300554	Real	F/C	RO	Material exit temperature actual	(Optional)
Gr_User_DelAirVelAct	300556	Real	fpm	RO	Delivery air velocity actual	(Optional)
	0X			**RW**	**Modbus 0X coils**	
Gx_User_Control.	0X	Bool Structure	NA	RW	Modbus 000001 - 000032	
Start	000001	Bool			Start command True=start, resets to false	
Stop	000002	Bool			Stop command True=stop, resets to false	
EngUnit	000003	Bool			Engineering units (False=english, True=Metric)	
AckAlarm	000004	Bool			Acknowledge alarm PB	
EnergyMeterEn	000005	Bool			Energy meter enable PB	
AutoStartEn	000006	Bool			Main auto start enable PB	
AutoStopEn	000007	Bool			Main auto stop enable PB	
SetBkCtrlEn	000008	Bool			Setback temperature control enable PB	
SetBkMode	000009	Bool			Setback setpoints mode (False=Man, True=Auto)	
RemCommsEn	000010	Bool			Drying monitor, remote exp. I/O communications enable	
VfdCommsEn	000011	Bool			Delivery/Combustion air VFD communications enable	
Spare_Bit_12	000012	Bool			Place holder for the protocol	
TrueRateCommsEn	000013	Bool			TrueRate throughput, communications enable	
BurnerCommsEn	000014	Bool			Burner control, communications enable	
TestOutput	000015	Bool			Test mode, test PLC output PB	
TestRemOutput	000016	Bool			Test mode, test remote output PB	
SaveDelAirDflt	000017	Bool			Save delivery air PID gains as default	
LoadDfltDelAir	000018	Bool			Load the default delivery air PID gains	
NetChgEn	000019	Bool			Network communications change enable, true = apply	
Spare_Bit_20	000020	Bool			Place holder for the protocol	
Spare_Bit_21	000021	Bool			Place holder for the protocol	
Spare_Bit_22	000022	Bool			Place holder for the protocol	
Spare_Bit_23	000023	Bool			Place holder for the protocol	
Spare_Bit_24	000024	Bool			Place holder for the protocol	
Spare_Bit_25	000025	Bool			Place holder for the protocol	
Spare_Bit_26	000026	Bool			Place holder for the protocol	
Spare_Bit_27	000027	Bool			Place holder for the protocol	
Spare_Bit_28	000028	Bool			Place holder for the protocol	
Spare_Bit_29	000029	Bool			Place holder for the protocol	
Spare_Bit_30	000030	Bool			Place holder for the protocol	
Spare_Bit_31	000031	Bool			Place holder for the protocol	
Spare_Bit_32	000032	Bool			Place holder for the protocol	
Gb_User_AutoStartEn[1..3]	0X	Bool Array	NA	RW	Three auto start events, Modbus 000065 - 000067	
[1]	000065	Bool			Event #1 start enable, true=enable	
[2]	000066	Bool			Event #2 start enable, true=enable	
[3]	000067	Bool			Event #3 start enable, true=enable	

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Modbus Parameter / TAG List (continued)

Tag Name		Modbus	Type	E/U	Access	Notes
Gb_User_AutoStopEn[1..3]		0X	Bool Array	NA	RW	Three auto stop events, Modbus 000068 - 000070
	[1]	000068	Bool			Event #1 stop enable, true=enable
	[2]	000069	Bool			Event #2 stop enable, true=enable
	[3]	000070	Bool			Event #3 stop enable, true=enable
Gx_MaintAlert[1..16].Enable		0X	Bool Array	NA	RW	Enable maintenance alerts from the HMI or Remote
	[1]	000301	Bool			Maintenane alert 1 enable
	[2]	000302	Bool			Maintenane alert 2 enable
	[3]	000303	Bool			Maintenane alert 3 enable
	[4]	000304	Bool			Maintenane alert 4 enable
	[5]	000305	Bool			Maintenane alert 5 enable
	[6]	000306	Bool			Maintenane alert 6 enable
	[7]	000307	Bool			Maintenane alert 7 enable
	[8]	000308	Bool			Spare maintenane alert 8 enable
	[9]	000309	Bool			Spare maintenane alert 9 enable
	[10]	000310	Bool			Spare maintenane alert 10 enable
	[11]	000311	Bool			Spare maintenane alert 11 enable
	[12]	000312	Bool			Spare maintenane alert 12 enable
	[13]	000313	Bool			Spare maintenane alert 13 enable
	[14]	000314	Bool			Spare maintenane alert 14 enable
	[15]	000315	Bool			Spare maintenane alert 15 enable
	[16]	000316	Bool			Spare maintenane alert 16 enable
		000317 to 000350 Reserved				
Gx_MaintAlert[1..16].Reset		0X	Bool Array	NA	RW	Reset maintenance alert time or count from the HMI or Remote
	[1]	000351	Bool			Maintenane alert 1 reset
	[2]	000352	Bool			Maintenane alert 2 reset
	[3]	000353	Bool			Maintenane alert 3 reset
	[4]	000354	Bool			Maintenane alert 4 reset
	[5]	000355	Bool			Maintenane alert 5 reset
	[6]	000356	Bool			Maintenane alert 6 reset
	[7]	000357	Bool			Maintenane alert 7 reset
	[8]	000358	Bool			Spare maintenane alert 8 reset
	[9]	000359	Bool			Spare maintenane alert 9 reset
	[10]	000360	Bool			Spare maintenane alert 10 reset
	[11]	000361	Bool			Spare maintenane alert 11 reset
	[12]	000362	Bool			Spare maintenane alert 12 reset
	[13]	000363	Bool			Spare maintenane alert 13 reset
	[14]	000364	Bool			Spare maintenane alert 14 reset
	[15]	000365	Bool			Spare maintenane alert 15 reset
	[16]	000366	Bool			Spare maintenane alert 16 reset
		000367 to 000400 Resurved				
		4X			**RW**	**Modbus 4X holding registers**
Gx_MaintAlert[1..16].TimeSetPoint		4X	Uint Array	Hrs	RW	Maintenance alert time set points from the HMI or Remote
	[1]	400301	Uint			Maintenane alert 1 "Check process heater" time (Range 720 - 8640hrs)
	[2]	400302	Uint			Maintenane alert 2 "Check combustion burner" time (Range 720 - 8640hrs)
	[3]	400303	Uint			Maintenane alert 3 "Check inlet/outlet hoses" time (Range 168 - 4320hrs)
	[4]	400304	Uint			Maintenane alert 4 "Check or replace blower filter" time (Range 8 - 720hrs)
	[5]	400305	Uint			Maintenane alert 5 "Check or replace combustion air filter" time (Range 8 - 720hrs)
	[6]	400306	Uint			Maintenane alert 6 "Clean flame detector lens" time (Range 4320 - 12960hrs)
	[7]	400307	Uint			Maintenane alert 7 "Clean or replace spark igniter" time (Range 4320 - 12960hrs)
	[8]	400308	Uint			Spare maintenane alert 8 time (Hours)
	[9]	400309	Uint			Spare maintenane alert 9 time (Hours)
	[10]	400310	Uint			Spare maintenane alert 10 time (Hours)
	[11]	400311	Uint			Spare maintenane alert 11 time (Hours)
	[12]	400312	Uint			Spare maintenane alert 12 time (Hours)

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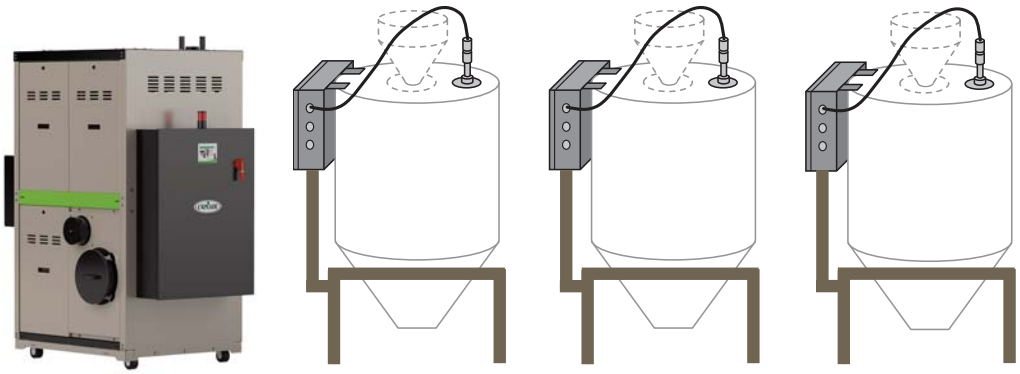
Modbus Parameter / TAG List (continued)

Tag Name		Modbus	Type	E/U	Access	Notes
	[13]	400313	Uint			Spare maintenane alert 13 time (Hours)
	[14]	400314	Uint			Spare maintenane alert 14 time (Hours)
	[15]	400315	Uint			Spare maintenane alert 15 time (Hours)
	[16]	400316	Uint			Spare maintenane alert 16 time (Hours)
		400317 to 400350 Resurved				
Gr_User_DelAirTemp_SP		400530	Real	°F-°C	RW	Delivery air temperature set point, min to max
Gr_User_SetBkToTempSP		400532	Real	°F-°C	RW	Setback function, setback to temperature set point (ProcMin-ProcSp)
Gr_User_SetBkActvtnTempSP		400534	Real	°F-°C	RW	Setback function, activation hopper outlet temperature set point (ProcMin-ProcSp)
Gr_User_SetBkRstTempSP		400536	Real	°F-°C	RW	Setback function, reset at temperature set point (ProcMin-SetBkToSp)
Gr_User_DelAirDewpoint_SP		400538	Real	°F-°C	RW	Delivery air dew point set point
Gr_User_DelAirTempSP_Max		400540	Real	°F-°C	RW	Delivery air temperature set point max limit, min to 375F
Gr_User_DelAirTempSP_Min		400542	Real	°F-°C	RW	Delivery air temperature set point min limit, 100F to max
Gr_User_HprLevel_SP		400544	Real	%	RW	Hopper level set point (60.0-100.0%)
Gu_User_AirLossAlarm_SP		400546	Uint	Sec	RW	Air loss alarm set point, 3-15 seconds
Gr_User_DewpointHighAlarm_SP		400547	Real	°F-°C	RW	High dew point alarm set point
Gu_User_DryingMonHiAlmPos_SP		400549	Uint	N/A	RW	Drying monitor high temperature alarm position set point, 0-3 0 = T2 1 = T3 2 = T4 3 = T5 (default)
Gr_User_DryingMonHighAlarm_SP		400550	Real	°F-°C	RW	Drying monitor high temperature alarm set point
Gu_User_DryingMonLoAlmPos_SP		400552	Uint	N/A	RW	Drying monitor low temperature alarm position set point, 0-3 0 = T2 (default) 1 = T3 2 = T4 3 = T5
Gr_User_DryingMonLowAlarm_SP		400553	Real	°F-°C	RW	Drying monitor low temperature alarm set point
Gr_User_DelAirFlow_SP		400555	Real	%	RW	Delivery air flow set point, 60.0-100.0%
Gr_User_RsdncTime_SP		400557	Real	Hrs	RW	Material residence time, 1-10 hrs
Gr_User_HprLowLevelAlarm_SP		400559	Real	%	RW	Drying hopper low level alarm set point, 0.0-Level set point
Gx_User_AutoStart_SP[1..3]		4X	Structured Array		RW	Auto start event setpoint ellements
	[1].Weekday	400601	Uint	Hr	RW	Auto start event #1 weekday set point, range 1 to 8, Mon to Sun and Daily
	[1].Hour	400602	Uint	Hr	RW	Auto start event #1 hour of the day, range 0-23
	[1].Minute	400603	Uint	Min	RW	Auto start event #1 minute of the hour, range 0-59
	[2].Weekday	400604	Uint	Hr	RW	Auto start event #2 weekday set point, range 1 to 8, Mon to Sun and Daily
	[2].Hour	400605	Uint	Min	RW	Auto start event #2 hour of the day, range 0-23
	[2].Minute	400606	Uint	Hr	RW	Auto start event #2 minute of the hour, range 0-59
	[3].Weekday	400607	Uint	Min	RW	Auto start event #3 weekday set point, range 1 to 8, Mon to Sun and Daily
	[3].Hour	400608	Uint	Hr	RW	Auto start event #3 hour of the day, range 0-23
	[3].Minute	400609	Uint	Min	RW	Auto start event #3 minute of the hour, range 0-59
Gx_User_AutoStop_SP[1..3]		4X	Structured Array		RW	Auto stop event setpoint ellements
	[1].Weekday	400610	Uint	Hr	RW	Auto stop event #1 weekday set point, range 1 to 8, Mon to Sun and Daily
	[1].Hour	400611	Uint	Min	RW	Auto stop event #1 hour of the day, range 0-23
	[1].Minute	400612	Uint	Hr	RW	Auto stop event #1 minute of the hour, range 0-59
	[2].Weekday	400613	Uint	Min	RW	Auto stop event #2 weekday set point, range 1 to 8, Mon to Sun and Daily
	[2].Hour	400614	Uint	Hr	RW	Auto stop event #2 hour of the day, range 0-23
	[2].Minute	400615	Uint	Min	RW	Auto stop event #2 minute of the hour, range 0-59
	[3].Weekday	400616	Uint	Hr	RW	Auto stop vent #3 weekday set point, range 1 to 8, Mon to Sun and Daily
	[3].Hour	400617	Uint	Min	RW	Auto stop event #3 hour of the day, range 0-23
	[3].Minute	400618	Uint	Hr	RW	Auto stop event #3 minute of the hour, range 0-59

Appendix

Drying Monitor DM-4

For use with D Series Dryers with DC-C Control



Zero Mechanical State (ZMS)

⚠ **CAUTION:** Before performing maintenance or repairs on this product, you should disconnect and lockout electrical power sources to prevent injury from unexpected energizing or start-up.

During maintenance, it is essential that the system be put into a state which eliminates the possibility of components making an unexpected and dangerous movement. This procedure is typically referred to as lockout. After all energy sources have been neutralized, the system is in the zero mechanical state (ZMS). This provides maximum protection against unexpected mechanical movement.

The lockout procedure must include all energy sources:

- Electrical power supply
- Compressed air supply
- Hydraulic fluids under pressure
- Potential energy from suspended parts
- Energy in springs
- Any other source that might cause unexpected mechanical movement

The following is a recommended Zero Mechanical State procedure which must be followed prior to any inspection, or maintenance of the Dryer Monitor hopper probe(s).

1 **Turn off the loading device installed to the top of the drying hopper to assure that it does not attempt to load the hopper with material.**

2 **Perform the proper shutdown sequence to the connected dryer or drying system and allow all hopper components (internally and externally) to adequately cool.**

3 **Disconnect and lock out the primary electrical supply feeding the dryer.**

4 **Drain the drying hopper, at least to a level that fully exposes the probe; typically just below the air spreader cone in the hopper, as observed through a sight glass or viewing window.**

5 **Carefully open the drying hopper door and clarify that material level is below the probe and that the temperature of all hopper surfaces and the probe are adequately reduced to make touching and handling safe.**

6 **Use caution working in elevated areas and use approved fall prevention measures and carefully disconnect the drying monitor probe from its junction box on the top of the hopper.**

7 **The probe is now accessible for maintenance, replacement, adjustment or repairs.**

⚠ **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.

What is the Drying Monitor™?

The Drying Monitor is the latest generation of technology created for analyzing drying performance from a multi-zone, resistance temperature detector (RTD) probe installed in the drying hopper. Embedded into the DC-C dryer control software, the Drying Monitor is designed to provide early detection of poor drying conditions and provide alarms for correcting problems. Up to 16 hoppers can be monitored.

Drying Monitor probes are supplied for any size or brand of drying hopper and are installed through the lid of the hopper (or from the bottom of the hopper up) and extend to the base of the air diffuser. Probe signals are then continuously fed back to the control where each hopper's temperature profile can be viewed, trended and used to determine if proper drying is taking place according to required drying parameters.

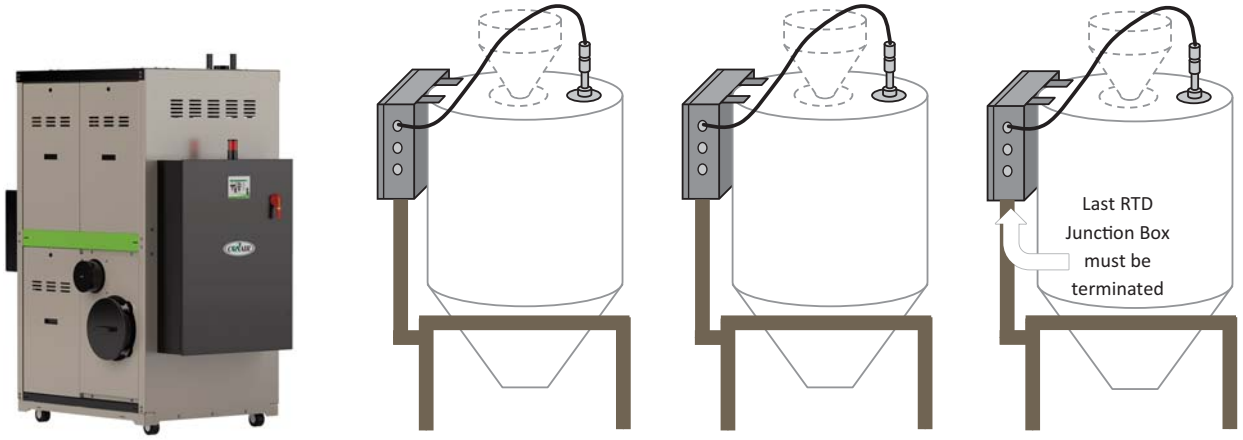
Typical Applications

The Drying Monitor is ideal for applications that require strict monitoring of the drying process to meet product quality specifications. The DM can also aid in the prevention of product rejects through early identification of potential drying problems.

The DM will alert the operator, through a passive alarm shown on the local hopper control monitor that one of these common drying problems may exist:

- A change in the temperature profile within the drying hopper.
- Loss of air flow through the drying hopper.
- A reduction or loss of drying time at the selected and programmed drying temperature.

Note: Drying Monitor is also provided as an independent control and probe set for dryers not equipped with DC-C. This independent version is called the DM4-i. On the DM4-i version of Drying Monitor, an independent TouchView control provides the operator interface. For more information on the DM4-i version of the Drying Monitor, contact Conair.



Multi-hopper Drying Monitor

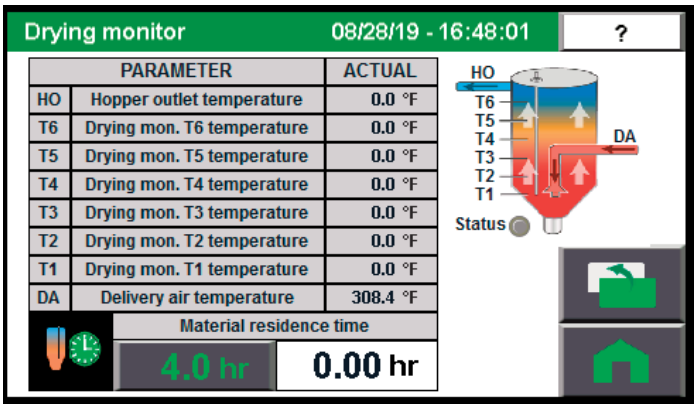
How the Drying Monitor Works

The Drying Monitor consists of stainless steel, 6-zone, temperature probes installed in drying hoppers that sense the specific temperature profile of the hoppers and compares their profiles to the requirements needed for proper drying in a specific hopper for a specific material.

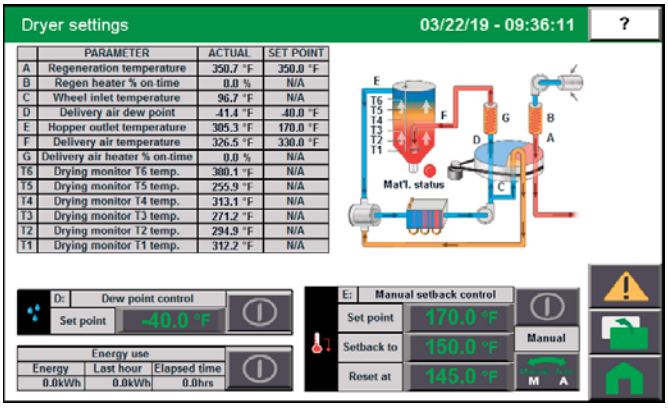
Interpretation of that temperature profile by the DM leads directly to predicting under or over dried material, inadequate air flow, clogged filters, heater failure, excess throughput for that hopper size, unresponsive loading, over capacity drying and many other conditions that are likely to produce scrap and waste time, energy and material.

The DM will store all temperature readings and organize the data into logical groups for review or downloading to a spreadsheet program for analysis. The DM has memory capacity to store seven days of data for each hopper in the system.

Alarms are displayed on the local hopper control and also stored for future reference. Pressing the Alarms button will take you to the alarm list.



Example of a remote heat source



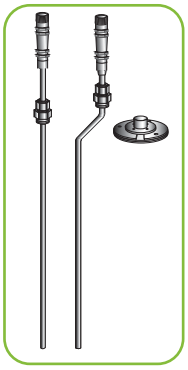
Example of a stand alone standard dryer

Drying Monitor System Components

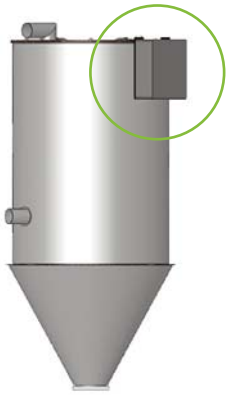
The Drying Monitor system consists of:

A Conair Carousel Plus dryer with DC-C control that connects to up to 16 probes via RTD junction boxes at each hopper.

Stainless steel, 6-zone, temperature probes are installed in each of the drying hoppers. These probes are sized specifically for the hoppers they will be installed into and hang from the lid of the hopper approximately halfway between the centerline and the inside wall of the hopper. Some hoppers (especially those fitted with loading equipment) often require probes with an offset to allow location in one position on the lid and another vertical position in the hopper. Conair hoppers are typically outfitted to readily receive a DM probe. Non-Conair or older Conair hoppers will require adaptation for probe installation according to instructions supplied in this manual.



RTD junction boxes link the cable from the hopper probe into the ModBus communications interface, and back to the local heat control (HTC, ResinWorks, Gastrac or standalone dryer). All remote heat controls are daisy chained back to the dryer.



Cable sets are custom ordered in lengths of 5 feet {1.5 meters}, 10 feet {3.0 meters}, 15 feet {4.6 meters}, 20 feet {6.1 meters}, 50 feet {15.2 meters, 75 feet {22.9 meters} and 100 feet {30.5 meters} long.

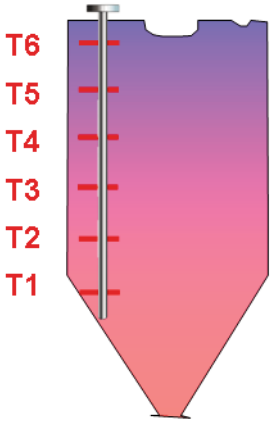
To order a cable set:

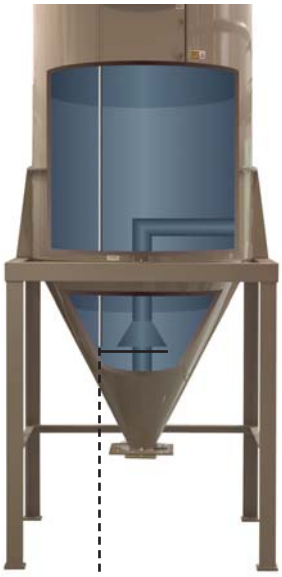
Contact Conair Parts
1 800 458 1960
From outside of the United States, call:
814 437 6861

5 ft {1.5 m}- 1886780405
10 ft {3.0 m}- 18886780410
15 ft {4.6 m}- 18886780415
20 ft {6.1 m}- 18886780420
50 ft {15.2 m}- 18886780450
75 ft {22.9 m}- 18886780475
100 ft {30.5 m}- 188867804100

✎ **Note**: Cables can be shortened in the field by a qualified technician. It is better to order a cable length that is too long and shorten it in the field than to have a cable that is too short.

RTD Sensor Positions in the Hopper



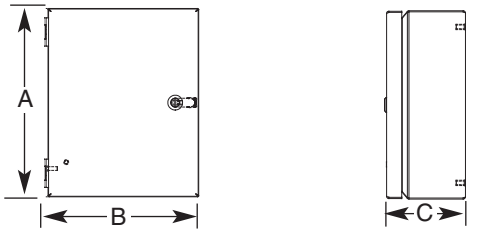


Probe lines up with the bottom of the diffuser cone section

RTD's will be referred to in this user guide and on your DM display as T1, T2, T3, T4, T5, and T6. T1 is the lower most temperature sensor within the DM temperature probe and is positioned at the bottom of the diffuser cone section. T6 is the upper most temperature sensor in the DM temperature probe and is located near the top of the hopper when installed. Position T6 is always located in the air void above the bed of material in the hopper.

Specifications

Probe junction box



Front view **Side view**

MODEL	DM
Control box type	**DM probe junction box**
Dimensions inches {mm}	
A- Height	10.0 {254}
B- Width	8.0 {203}
C- Depth	4.0 {101}
Weight lb {kg}	
Installed	29 {13}
Shipping	36 {16}

SPECIFICATION NOTES

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

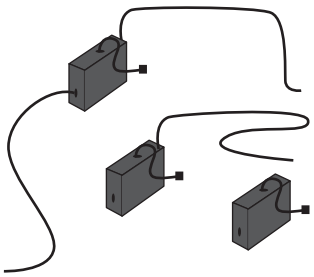
The DM is also available as a independent option, with its own TouchView control panel, to monitor up to 30 hoppers. Contact Conair for more information on the DM4-i.

Unpacking the Boxes

The DM software is included as part of your DC-C control. The necessary hardware (not included as part of the dryer - must be ordered separately) comes in two or more shipping containers, depending on the options ordered.

The DM consists of:

- One or more stainless steel probes
- An RTD junction box for each probe, including associated mounting hardware
- ModBus connecting cables and
- If ordered, installation hardware for each probe.



Packaging for the DM system can be varied depending upon what has been ordered, so carefully inventory all items.

NOTE: You must have local hopper control (HMI) to use DM4-i as part of a central drying system.

To order a hopper mount adapter kit, part #18169902:

Contact Conair Parts
1 800 458 1960
From outside of the United States, call:
814 437 6861

1 **Carefully remove all components** from their shipping containers.

2 **Remove all packing material, protective paper, tape, and plastic.** Do not discard installation notice tags.

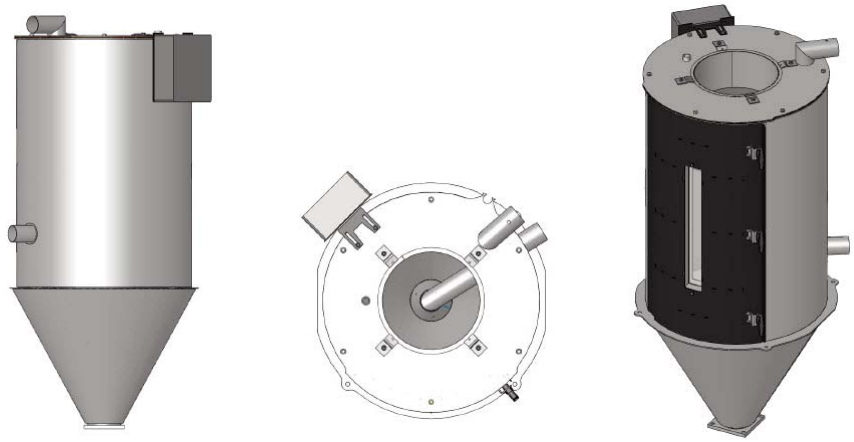
3 **Carefully inspect all components** to make sure no damage occurred during shipping, and that you have all the necessary hardware.

TIP: Inspect all of the equipment in the presence of the fright carrier's representative for damage during shipment. Note any damage on the delivery receipt before signing it. If damage is evident, file a claim immediately against the carrier as it is their responsibility to pay for any damage incurred during shipping. Make sure to include a detailed report of the damage along with photos. Note that RTD probes are delicate and may not operate properly if bent or otherwise damaged.

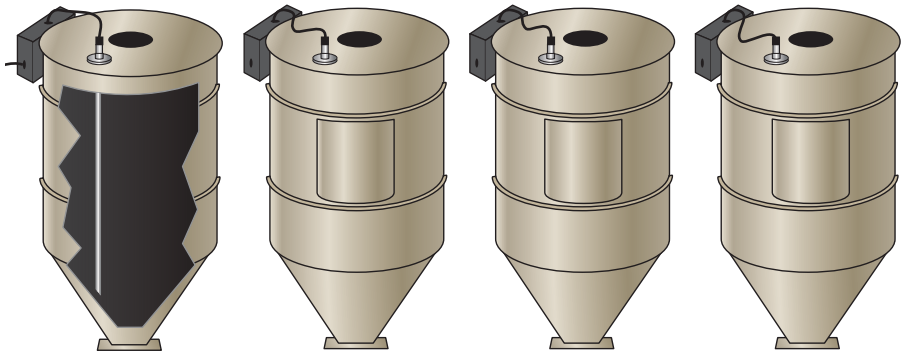
4 **Take a moment to record serial numbers.** Also record the drying hopper's model number and specifications. This information will be helpful if you ever need service or parts.

Preparing for Installation

In addition to mounting the probe into the hopper, each hopper will be equipped with an RTD Junction Box. This box provides the link from the probe to the ModBus interconnection cables that will connect each hopper to the heater control panel.



The RTD Junction Box should be mounted in a safe location, at the top of the hopper as near as possible to the hopper probe and if possible, not directly above the hopper, to minimize transmitted heat from the hopper to the junction box. Stay clear of loading equipment that may require service access and be sure to mount the box so that it is not likely to be used as step or hand-hold during service procedures.



⚠ **IMPORTANT:** The DC-C controlled dryer, and any junction boxes should not be installed in extreme temperature locations. Ambient air temperatures below 41°F {5°C} and above 104°F {40°C} should be avoided.

Installing the Probe

CAUTION: Hopper surfaces may be hot. Make sure the drying hopper is empty and has cooled to room temperature before installing the probe assembly. Failure to do so can lead to serious injury.

The DM probe is inserted through a hole in the top of the drying hopper and secured to a threaded coupling with a compression fitting. Mounting adapter plates may be necessary.

CAUTION: Always disconnect and lock out the main power supply before beginning the installation process.

There are three mounting methods for the probe:

- **Select Mounting Method 1** if you purchased a new Conair CH series drying hopper equipped with a factory-installed coupling for the probe.
- **Select Mounting Method 2** if you are installing the probe and coupling in a drying hopper that has enough overhead clearance to insert the probe from the top of the hopper.
- **Select Mounting Method 3** if you are installing the probe and adapter kit on a drying hopper that does not have enough overhead clearance to insert the probe from the top.

Mounting Method 1
(New Conair hopper with Factory Installed coupling)

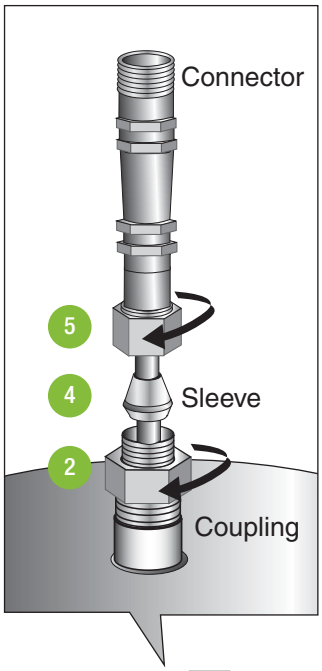
1 **Insert the probe through the coupling** in the top of the drying hopper.

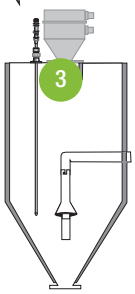
2 **Screw the fitting into the coupling.** Tighten with a wrench.

3 **Make sure the probe is the correct size.** The probe should extend from just above the top of the hopper into the hopper, with the tip approximately in-line with the bottom edge of the diffuser cone.

4 **Push the compression sleeve into the fitting.**

5 **Tighten the nut over the sleeve.** The compression sleeve will crimp the tube to hold the probe in place. Be sure to position the connector in such a way as to avoid interference of the cable with the loader, etc. Use a wrench to tighten the nut so that it covers the threads.





NOTE: The mounting adapter kit will only be included if the DM was ordered as a retrofit kit.

NOTE: If the angled probe is used, the bend (dog leg) in the probe must be oriented so that it is angled in toward the center of the hopper.

CAUTION: Always disconnect and lock out the main power supply before beginning the installation process.

CAUTION: Hopper surfaces may be hot. Make sure the drying hopper is empty and has cooled to room temperature before installing the probe assembly. Failure to do so can lead to serious injury.

Tools for Installation:

❒ 7/8-in. wrench

CAUTION: Always disconnect and lock out the main power supply before beginning the installation process.

CAUTION: Hopper surfaces may be hot. Make sure the drying hopper is empty and has cooled to room temperature before installing the probe assembly. Failure to do so can lead to serious injury.

IMPORTANT: Stretch cloth or plastic across the inside of the hopper to catch metal shavings from the hole you will drill in the top of the hopper.

NOTE: The mounting adapter kit will only be included if the DM was ordered as a retrofit kit. Remove the mounting adapter plates from the probe assembly, you will not need them. You will need the gasket.

Tools for Installation:

- ❒ Drill and 10-32 tap
- ❒ Knife
- ❒ Flathead screwdriver
- ❒ 7/8-in. wrench

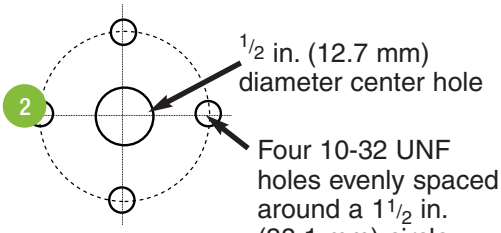
NOTE: If the angled probe is used, the bend (dog leg) in the probe must be oriented so that it is angled in toward the center of the hopper.

Mounting Method 2

(Drying hopper with enough overhead clearance to insert probe from the top of the hopper)

1 **Reference the drawings at the end of this user guide** and select the drawing that reflects your installation. Drill the appropriate hole in the top of the hopper.

2 **Drill and tap four 10-32 UNF holes** to match the hole pattern in the coupling.

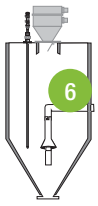


3 **Secure the gasket and coupling to the hopper** with the four 10-32 screws. Remove any excess gasket with a knife.

4 **Insert the probe through the coupling** in the top of the hopper.

5 **Screw the fitting into the coupling.** Tighten with a wrench.

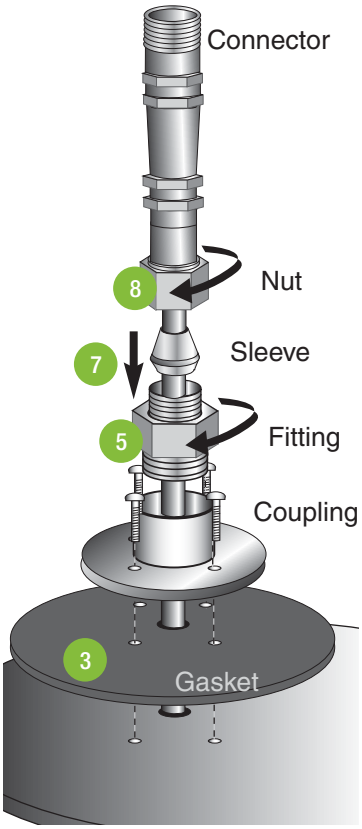
6 **Make sure the probe is the correct size.** The probe should extend from just above the top of the hopper into the hopper, with the tip approximately in-line with the bottom edge of the diffuser cone.



7 **Push the compression sleeve into the fitting.**

8 **Tighten the nut over the sleeve.** The compression sleeve will crimp the tube to hold the probe in place. Be sure to position the connector in such a way as to avoid interference of the cable with the loader, etc. Use a wrench to tighten the nut so that it covers the threads.

9 **Thoroughly clean the inside of the hopper** to remove any debris left from installation of the probe.

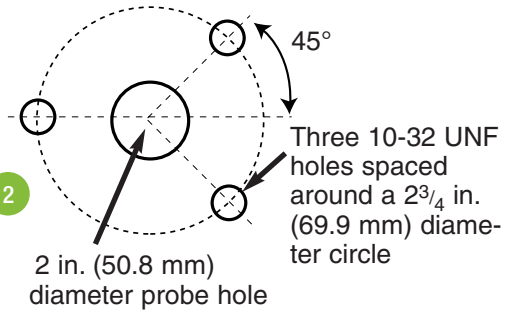


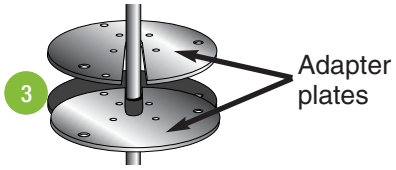
Mounting Method 3

(Not enough overhead clearance to insert the probe from the top of the hopper)

1 **Reference the drawings at the end of this user guide** and select the drawing that reflects your installation. Drill the appropriate hole in the top of the hopper.

2 **Drill and tap three 10-32 UNF holes** to match the screw pattern in the adapter plates and gasket. You can use the template in the appendix.

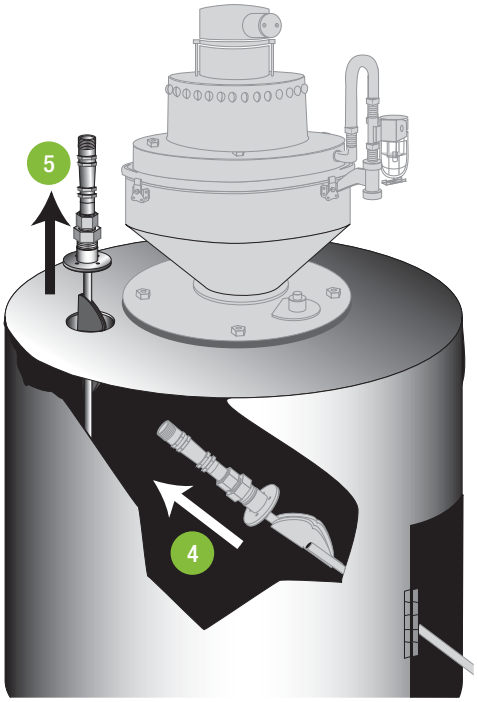




3 **Remove the two adapter plates from the probe mounting assembly.** Set the adapter plates aside for use in Step 7.

4 **Insert the probe and mounting assembly through the door of the hopper.**

5 **Pull the probe and mounting assembly through the hole in the top of the hopper.** Fold the gasket around the probe so that it will fit through the hole.



Tools for Installation:

- ❒ Drill and 10-32 tap
- ❒ Flathead screwdriver
- ❒ 7/8-in. wrench
- ❒ 2-in. hole saw

CAUTION: Always disconnect and lock out the main power supply before beginning the installation process.

CAUTION: Hopper surfaces may be hot. Make sure the drying hopper is empty and has cooled to room temperature before installing the probe assembly. Failure to do so can lead to serious injury.

IMPORTANT: Stretch cloth or plastic across the inside of the hopper to catch metal shavings from the hole you will drill in the top of the hopper.

NOTE: If the angled probe is used, the bend (dog leg) in the probe must be oriented so that it is angled in toward the center of the hopper.

(continued)

Mounting Method 3 (continued)

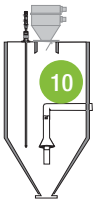
6 **Place the gasket over the probe hole.**

7 **Place the adapter plates over the gasket and secure** them to the hopper with three 10-32 UNF screws. Make sure the adapter plate with the threaded holes is on the bottom, and that the slots in the adapter plates are oriented in the opposite direction as shown. *See drawing to right, #7.*

8 **Secure the coupling to the adapter plates** with the four 10-32 UNF screws.

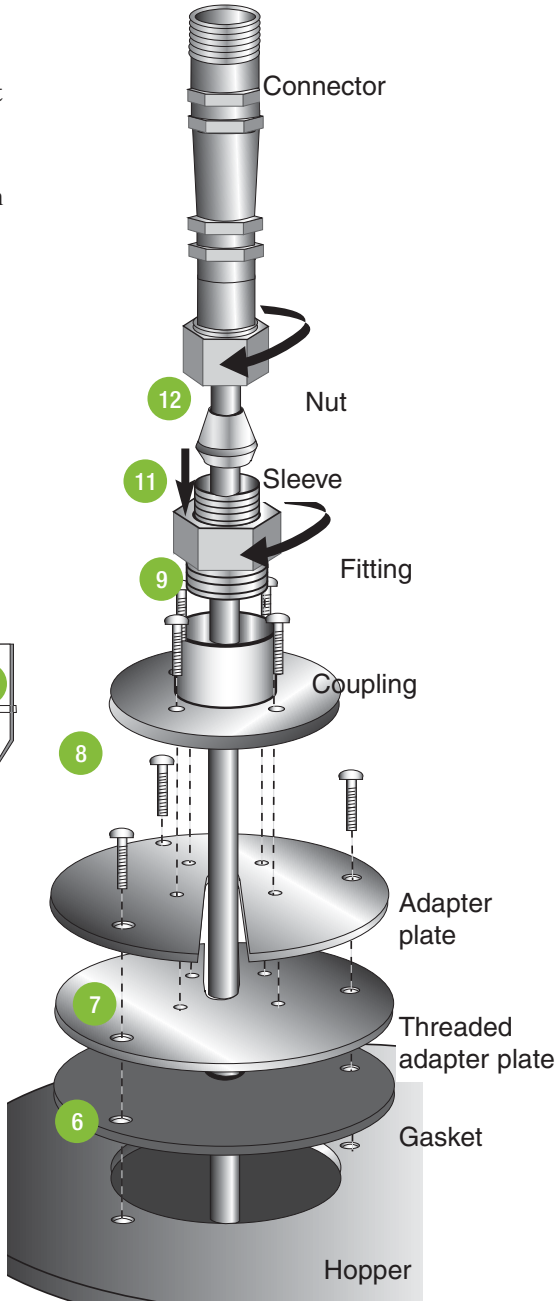
9 **Screw the fitting into the coupling.** Tighten with a wrench.

10 **Make sure the probe is the correct size.** The probe should extend from just above the top of the hopper into the hopper, with the tip approximately in-line with the bottom edge of the diffuser cone.



11 **Push the compression sleeve into the fitting.**

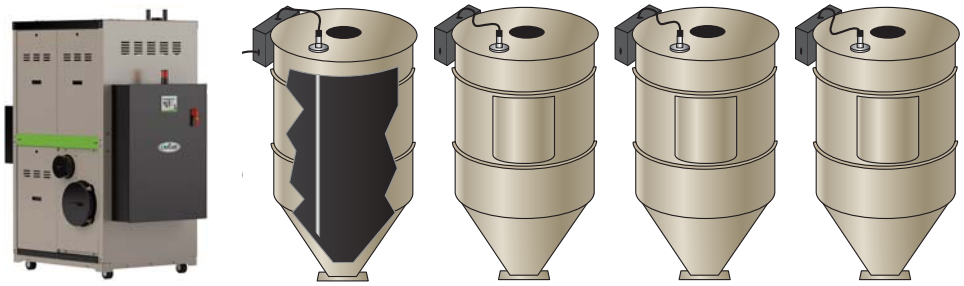
12 **Tighten the nut over the sleeve.** The compression sleeve will crimp the tube to hold the probe in place. Be sure to position the connector in such a way as to avoid interference of the cable with the loader, etc. Use a wrench to tighten the nut so that it covers the threads.



13 **Thoroughly clean the inside of the hopper** to remove any debris left from installation of the probe.

Preparing for Electrical Installation

1 Using the ModBus cables provided, connect the RTD box to the heat source being used (HTC, ResinWorks, Gastrac or standalone dryer) for each hopper. Repeat this for each hopper and heat source of the ModBus. Avoid parallel runs with your factory's power cables, and material conveying lines.



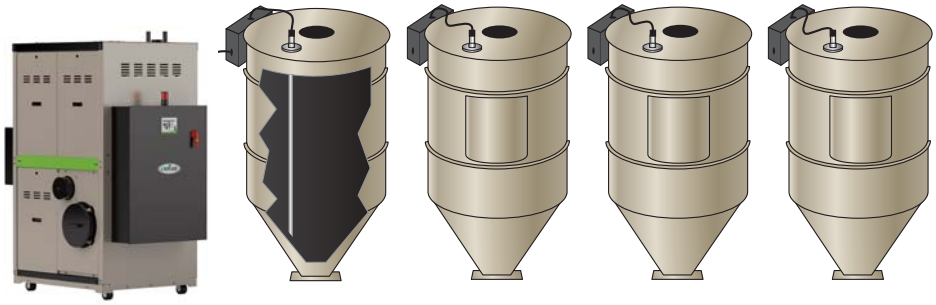
NOTE: RTD junction boxes connect via Modbus to the heater control and multiple heater controls are daisy chain wired Modbus connection back to the dryer control.

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

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

Installing ModBus Cable Sets

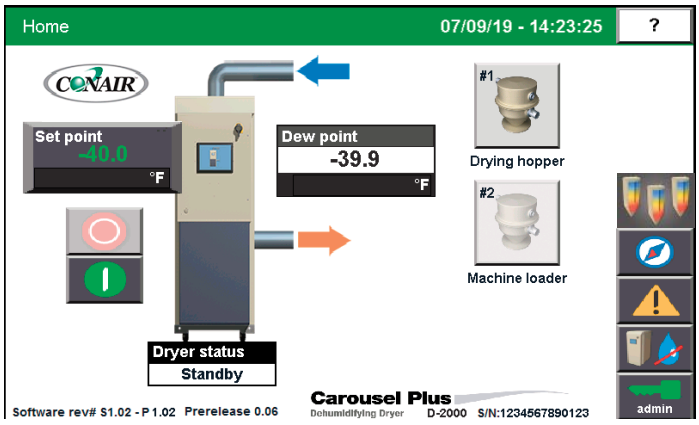
Cables are available in a wide variety of lengths and a cable assembly should be supplied with each probe/junction box set in the system. Plan your installation appropriately, determining which cable length has been selected for each hopper/junction box with consideration to neat cable routing. Cables should be routed away from heated surfaces, material conveying lines, or moving equipment and not run in parallel to three-phase power lines. Support each cable as needed to prevent strain on the connectors.



Carefully install each cable set from the remote heat source control to the hopper, firmly screwing the connectors into place on each panel.

Navigating the DC-C with Drying Monitor Enabled (ResinWorks Configuration)

The System Home screen on the dryer.



Navigation buttons for all DC-C functions are located on the right side of the screen and will appear in this location on all screens. The selection of buttons will change based on the specific screen. From the Overview page the buttons include:

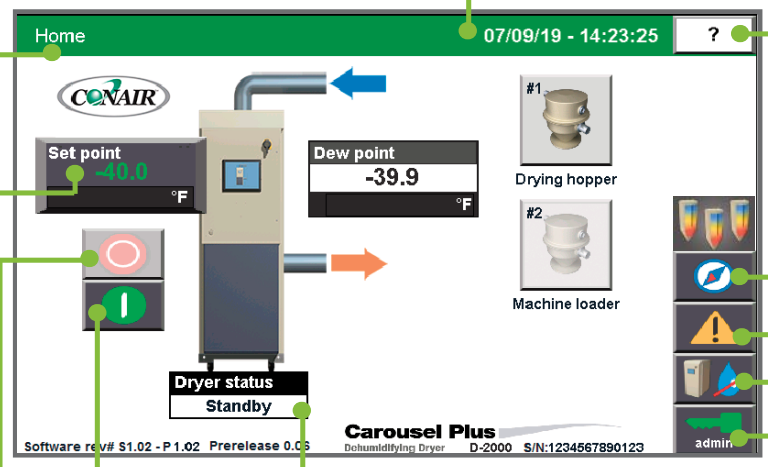
A **Hopper Selector Button** for viewing of all hoppers included in the system (up to 15).

An **Alarm Log Button** for viewing of not only active alarms, but also alarms that have appeared in the past.

A **Trend Selection Button** for viewing hoppers to show trends for each hopper.

The Home Button
On pages other than the Home page, a “Home” button will appear in the lower right corner, allowing the user to return to the home screen at any time.

The Drying Monitor Screens of the DC-C (RW Configuration)



Date and Time
This area displays the current date and time.

Screen name
Indicates what screen you are currently looking at.

Displayed data
Displays the current live data for the piece of equipment. If this data displays as all dashes or blanks, there is a communication error.

Help button
Help for the current screen.

Navigation button
Go to the Navigation screen

Alarms button
Go to the Alarms area.

Dryer Settings button
Go to the Dryer Settings Selection screen.

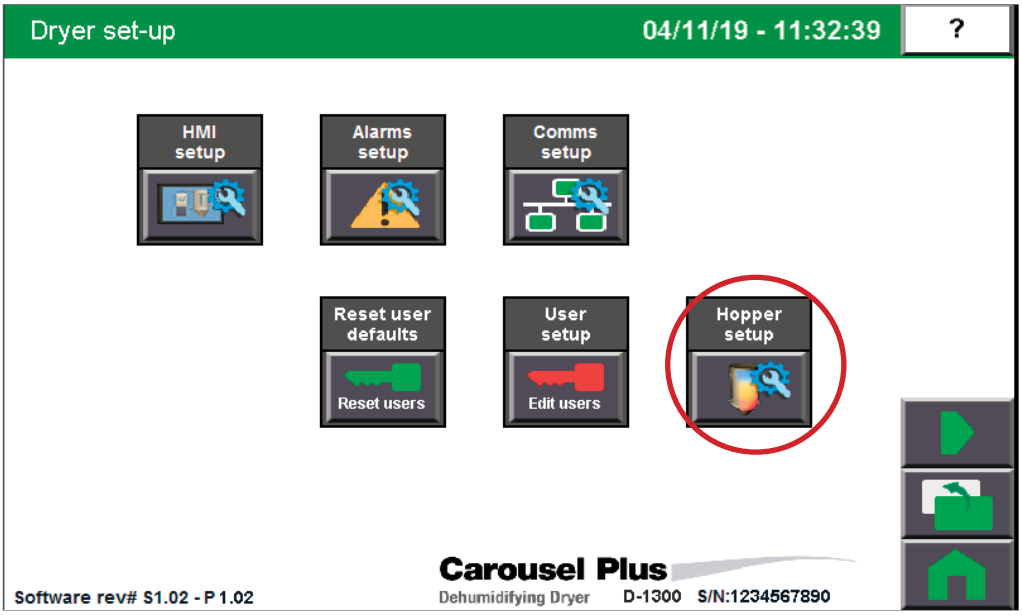
Login/Logout button
This button is used to log in or log out as a user.

Stop Button

Start Button

System status
This area displays messages to let you know the current status of the dryer.

Configuring the DC-C for DM Operation

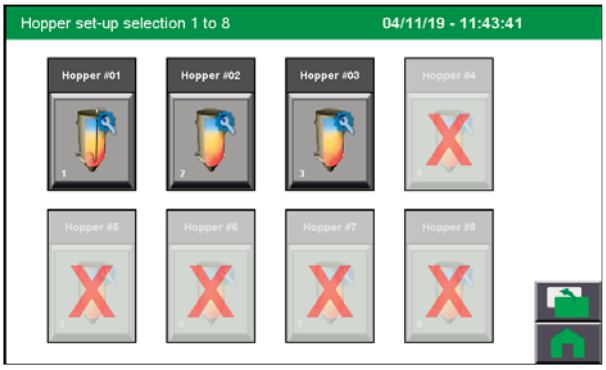


Before using the DM functionality of your DC-C dryer control, the DC-C must be set to communicate to your installed Drying Monitor hardware.

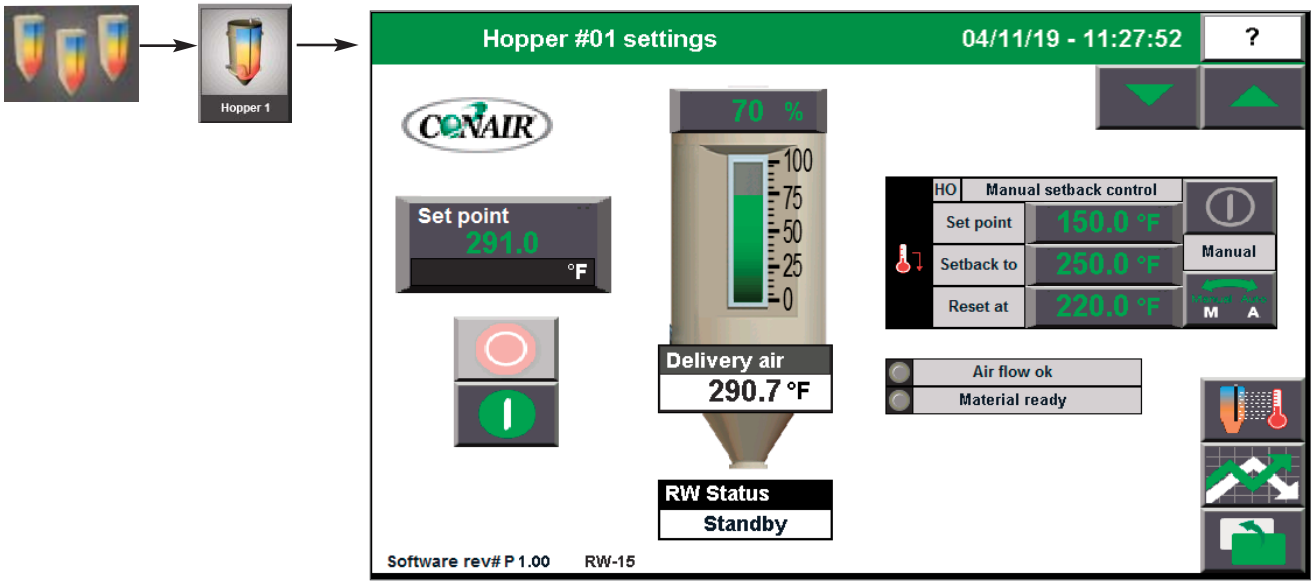
To set up the DC-C to use the DM:

1 Press the Dryer Seup button. The System Settings screen will open.

2 Press the Hopper Setup button. The Hopper Setup screen will open.



Navigating the DM Individual Hopper Screens



Detailed Hopper View

From the **Hopper Selection** screen, any hopper can be spotlighted by pressing its icon and a detailed view of that hopper will appear and its name will be shown in the green stripe.

From the detailed hopper view, you will see all the information about that hopper.

NOTE: Each hopper in your system will be displayed individually.

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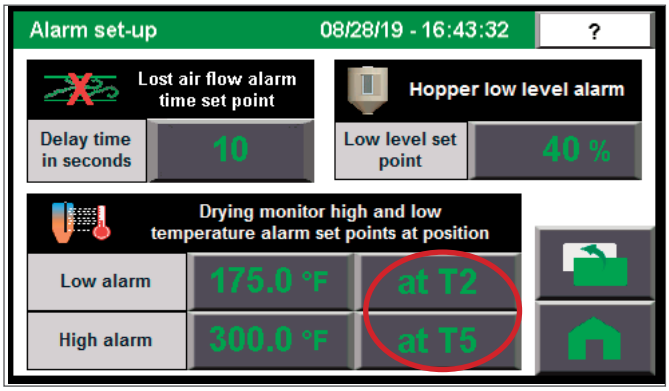
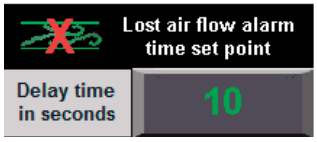
Navigating the DM Screens from the Hopper Temperature Control (GasTrac, ResinWorks, or HTC)

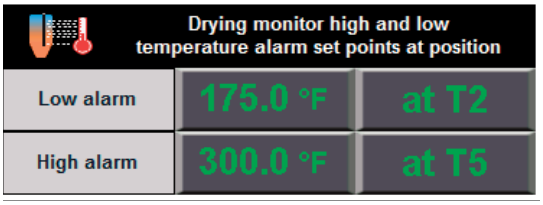


DM Settings



Alarm Time: Select to enter the amount of time in seconds that the system waits while running, before shutting down on a loss of air flow. Range 5-15 seconds.

✎ **NOTE:** Only visible when drying mnitor is installed.

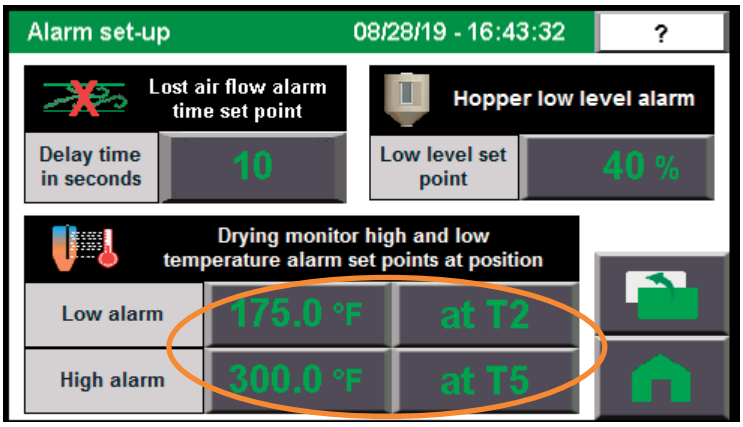


✎ **NOTE:** The Alarm Location can be set to T2, T3, T4, or T5.

Alarm Setpoint and Location: Low and high temperature alarms can be set at the same or different points in the drying hopper. Selecting the "at T" pushbutton changes the locatin the drying hopper each time it is released. The available positions are T2 lowest, through T5 the highest position in the hopper. The alarms are passive.

Setting Up Your DM: The Basics- Alarm Location (Simple)

The **Alarm Location** establishes the location in the drying hopper where the actual drying temperature is within a certain range of the process temperature. The user sets the point on the RTD probe to assure good drying with proper temperature delivery.



In drying, the material must be exposed to the process temperature for a set period of time (refer to your dryer manual for more information) to assure good drying. The DM's multiple temperature sensors allow you to select the specific point where the material will see that process temperature for 4 hours, or the remainder of its travel through the hopper on its way to processing. The 'drying zone" is between sensor T1 (the bottom sensor, located at the hot air entry point of the hopper)and the selected "Alarm Location" sensor T4.

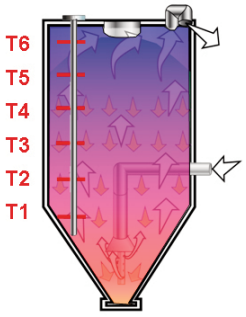
This critical position in the hopper, called the "Alarm Location" will monitor the temperature reading to assure that material will be within a certain range of the process temperature for the determined time, assuring good drying. Default value of the temperature range is within 10°F of the process temperature. This default value can be changed on the set-up screen in case tighter or looser tolerances are required by your application.

Setting Up Your DM: The Basics- Alarm Location (Advanced)

NOTE: You will need to know the bulk density of your material to calculate your drying hopper volume in cubic feet (ft^3). See *Operation: Understanding Bulk Density.*

NOTE: Nuisance alarms may trigger if the selected RTD position is too close to the alarm set point. In this case, the operator would either simply select a lower RTD or adjust the alarm set point lower within the alarm band.

Why would an operator want to use the Advanced method for selecting an RTD to use as the **Alarm Location**? The advanced Alarm Location selection may be desirable for processes where the operator wants to pick an RTD at a specific material residence time level at a given throughput. To select an RTD as a monitoring position for the alarm setpoint (advanced) the operator will need to consider the following drying parameters:



- hopper capacity (ft^3)
- throughput rate
- bulk density
- drying (residence) time

EXAMPLE calculation

1. lbs per hour throughput	**100**
2. drying time (residence time)	**4 hours**
3. material's bulk density (lbs/ft^3)	**35 lbs/ft^3**
4. drying hopper capacity (ft^3)	**15 lbs/ft^3**

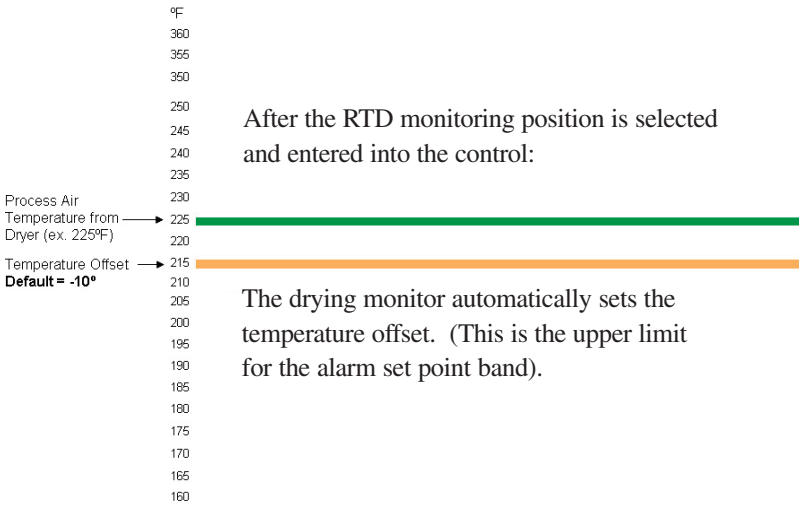
A 15 ft^3 hopper holds 525 lbs of material at 35 lbs/ft^3 (35 ft^3 x 15).
Use the chart in *Operation: Drying Hopper Volume by Model Number.*

- RTD T5 is likely at a 440 lb fill level (35 ft^3 x 12.6).
- RTD T4 is at the 320 lbs level (35 ft^3 x 9.15)

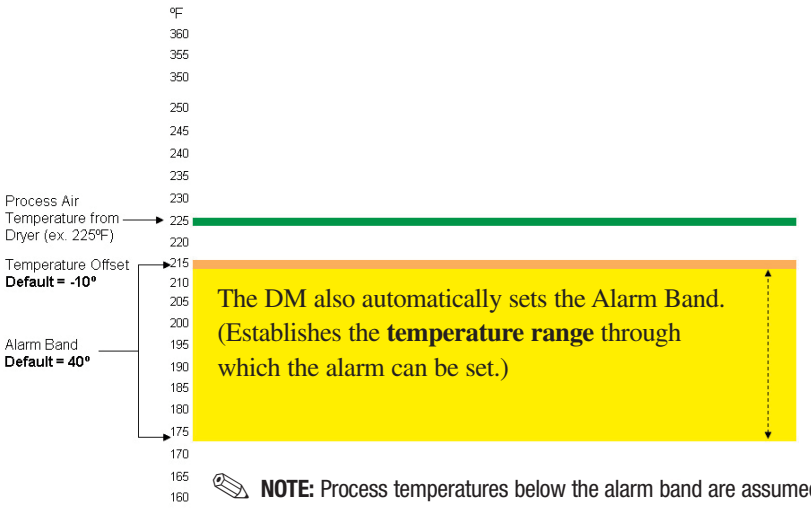
This position is at the 3/4 point of the material load.

RTD T5 is closest to the desired monitoring point of 400 lbs (100 lbs/hr x 4 hrs). Since T5 is closest to the desired monitoring point, select T5.

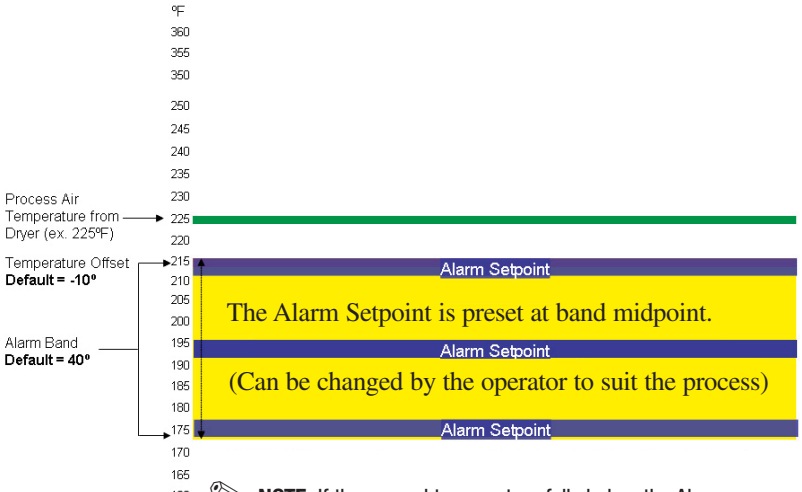
Check the temperature reading at T5 to confirm that the temperature is not at or below the alarm set point (default is 30 deg. below process). If necessary, adjust the alarm set point.



Setting Up Your DM: The Basics- Alarm Location (Advanced) (continued)



NOTE: Process temperatures below the alarm band are assumed to be insufficient to dry the material.



NOTE: If the sensed temperature falls below the Alarm Setpoint for a longer period than the Delay Time (default is five minutes), the alarm will trigger an alarm message on the control.

NOTE: From a cold start: If, after a preset time period, the temperature read at the selected alarm RTD does not reach the Alarm Setpoint, DM triggers “Temperature Not Met” alarm.

(continued)

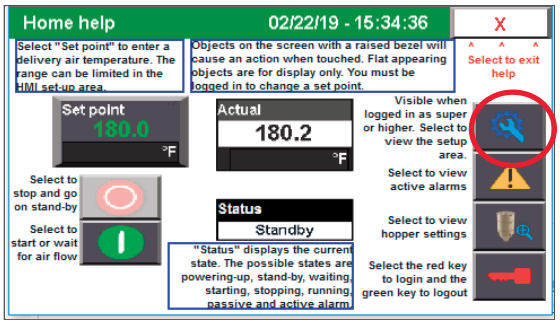
Setting Up Your DM: The Basics- Alarm Setpoint

Alarm Setpoint

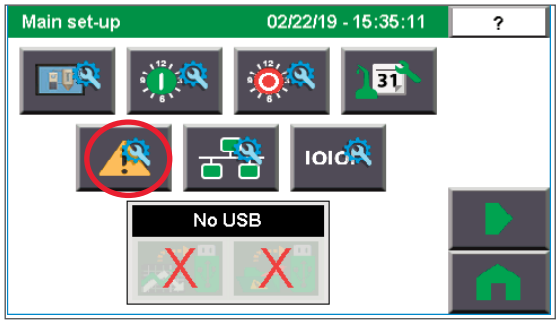
The alarm setpoint is automatically established on the "Hopper Settings" screen but can be adjusted on the set-up screen. This value acts as a default level of temperature performance. If the temperature reported on the alarm location falls below this level for longer than an adjustable time range (default, 5 minutes), the DM will alarm that the material is not being properly dried. The alarm setpoint relationship with the process setpoint (referred to as "band") as well as the time range before alarm notification can be adjusted on the Set up screen.

Remote Heat Source Procedure

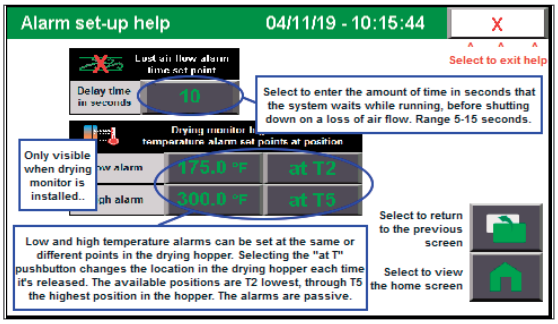
1 Press setup button from the home screen (logged in at appropriate level to see setup button),



2 Press Alarm setup button (triangle with wrench) from setup screen .



3 Set settings for probe postition temperatures that you would like to activate the alarm notifications from Alarm setup screen,



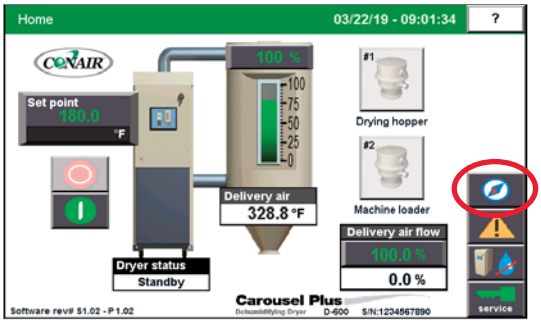
Once the process temperature and alarm location are established for the first hopper, the remaining hoppers in the system may be set up in an identical fashion.

Once hopper settings are made, only setting the Process Temp is required to align the DM functions with a particular drying application. But if necessary, further fine tuning of the process conditions can be made on the DM Set-up screen.

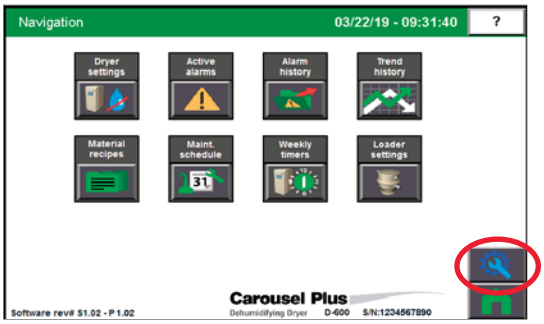
Setting Up Your DM: The Basics- Alarm Setpoint (continued)

From Stand Alone Dryer Screen Procedure

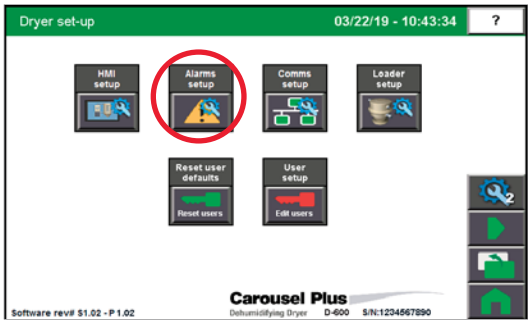
1 **Press the Navigation button.**



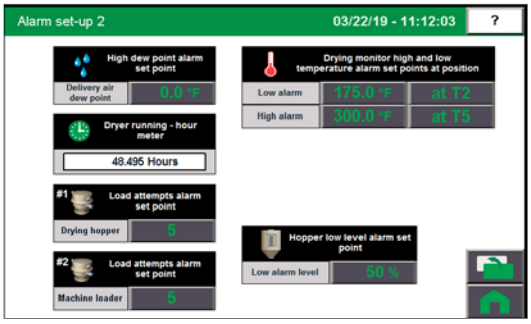
2 **Press the setup button (wrench).**



3 **Press the alarm setup button.**



4 **Set Drying Monitor high and low set points and positons.**



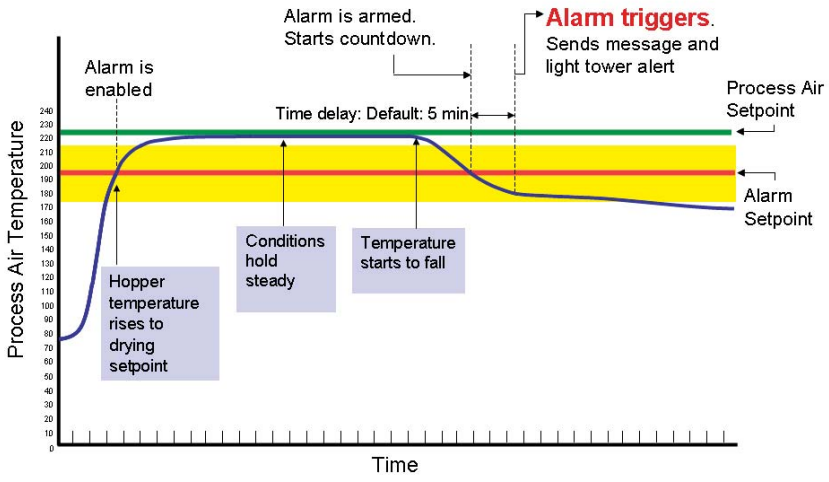
Drying Hopper Material Change

What happens when there is a drying hopper material change?

1 Change the process temperature. For example, let's say the process temperature is changed to 205°F from 225°F. If the DM is being used on a central drying with an HTC or Heater Pack, the process temperature on that hopper must be changed.

2 If material characteristics require a parameter adjustment, adjust that now. Otherwise, no further operator action is required.

This graph shows the time sequence of a DM alarm indicating low hopper air temperature, that could result in improperly dried material.



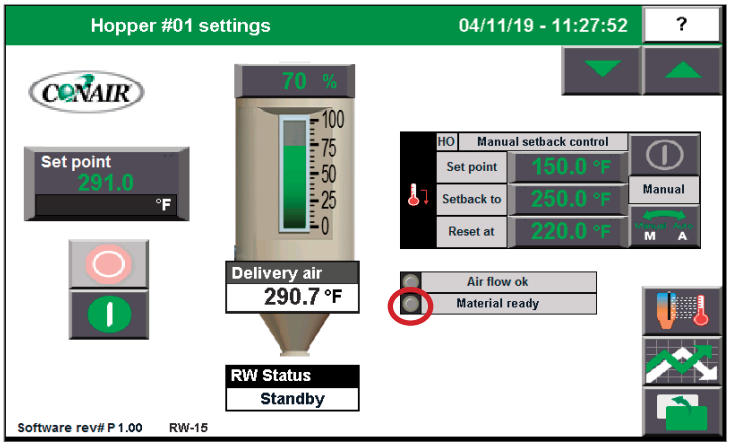
Material Ready Interlock Feature

The Drying Monitor option on your Carousel Plus dryer allows you to utilize Conair's Material Ready feature. This feature ensures that material is not conveyed to the machine until it has been dried at the proper temperature for the proper amount of time.

How does it work?

When T1, T2, or T3 locations of the Drying Monitor probe reach 95% of the setpoint for a user specified residence time, the interlock activates to allow material to convey to the molding machine or extruder. Until the material has dried for the proper amount of time at the proper temperature, the interlock will not allow material to be moved from the drying hopper. A material ready indicator is shown on the dryer control or the local hopper control (HTC, ResinWorks, or GasTrac control) indicating that material is ready.

If the temperature drops below 95% of setpoint, the residence timer stops until it returns to the setpoint range. It then continues counting up toward the desired residence time. For example - You have the residence time set at 4 hours. Your material reaches 95% of setpoint and dries for 2 hours within that range, but then drops to below 95% of setpoint for 10 minutes. After 10 minutes, your temperature returns to 95% of setpoint. The timer begins counting at 2 hours and continues until you reach the residence time of 4 hours. That 10 minutes did not count toward the residence time. But the time at temperature that was achieved was banked until the material reached the setpoint temperature again. (It did not restart the timer at 0 minutes - you got credit for time the material had already dried.)



This feature is designed to eliminate undried material making it to the molding machine, therefore eliminating the production of parts that are inferior due to moisture in the material.

Drying Hopper Volume by Model Number

Drying Hopper	Hopper Diameter	Volume (ft.³)	RTD Position	RTD Distance from the top	Volume up to RTD position (ft.³)
CH/RW 10-1	10	1	5	8.38	0.85
		1	4	12.88	0.65
		1	3	17.38	0.45
		1	2	21.88	0.28
		1	1	26.612	0.09
CH/RW 10-1.5	10	1.5	5	8.88	1.37
		1.5	4	16.13	1.04
		1.5	3	23.38	0.72
		1.5	2	30.63	0.46
		1.5	1	37.88	0.15
CH/RW 14-2	14	2	5	8.75221183	1.62
		2	4	13.75221183	1.18
		2	3	18.75221183	0.78
		2	2	23.75221183	0.35
		2	1	28.75221183	0.14
CH/RW 14-3	14	3	5	9.25	2.87
		3	4	17.25	2.17
		3	3	25.25	1.47
		3	2	33.25	0.80
		3	1	41.25	0.16
CH/RW 14-4	14	4	5	8.87	3.62
		4	4	19.12	2.72
		4	3	29.37	1.82
		4	2	39.62	0.95
		4	1	49.87	0.14
CH18-4	18	4	5	12.725	3.19
		4	4	18.225	2.38
		4	3	23.725	1.64
		4	2	29.225	0.84
		4	1	34.725	0.25
RW 18-5	18	5	5	10.41	4.36
		5	4	18.66	3.17
		5	3	26.91	1.97
		5	2	35.16	0.85
		5	1	43.41	0.25
CH/RW 18-6	18	6	5	10.12	5.87
		6	4	20.66	4.39
		6	3	30.91	2.92
		6	2	41.16	1.52
		6	1	51.41	0.25

(continued)

Drying Hopper Volume by Model Number

(continued)

Drying Hopper	Hopper Diameter	Volume (ft.³)	RTD Position	RTD Distance from the top	Volume up to RTD position (ft.³)
CH 24-8	24	8	5	13.23	7.38
		8	4	20.73	5.50
		8	3	28.23	3.56
		8	2	35.73	1.58
		8	1	43.23	0.39
RW 24-9	24	9	5	10.79	8.73
		9	4	19.54	6.48
		9	3	28.35	4.22
		9	2	37.04	2.09
		9	1	45.79	0.47
CH/RW 24-12	24	12	5	53.33	10.89
		12	4	42.58	8.14
		12	3	31.83	5.39
		12	2	21.08	2.72
		12	1	10.33	0.52
CH/RW 24-15	24	15	5	11.13	12.60
		15	4	24.63	9.14
		15	3	38.13	5.69
		15	2	51.63	2.32
		15	1	65.13	0.57
CH/RW 24-18	24	18	5	10.88	15.56
		18	4	27.38	11.35
		18	3	43.88	7.15
		18	2	60.38	2.94
		18	1	76.88	0.55
CH/RW 33-21	33	21	5	18.30	19.66
		21	4	29.80	13.96
		21	3	41.30	8.27
		21	2	52.80	2.95
		21	1	64.05	1.63
CH/RW 33-28	33	28	5	20.30	25.68
		28	4	34.80	18.52
		28	3	49.30	11.36
		28	2	63.80	4.19
		28	1	78.30	1.68
CH/RW 39-35	39	35	5	25.25	35.32
		35	4	38.75	25.98
		35	3	52.25	16.65
		35	2	65.75	7.83
		35	1	79.25	1.83

(continued)

Drying Hopper Volume by Model Number

(continued)

Drying Hopper	Hopper Diameter	Volume (ft.³)	RTD Position	RTD Distance from the top	Volume up to RTD position (ft.³)
CH/RW 39-42	39	42	5	25.25	42.38
		42	4	41.25	31.32
		42	3	57.25	20.26
		42	2	73.25	9.72
		42	1	89.25	1.90
CH/RW 44-58	44	58	5	27.00	59.24
		58	4	44.50	43.84
		58	3	62.00	28.45
		58	2	79.50	13.55
		58	1	97.00	2.73
CH 54-70	54	70	5	22.98	66.76
		70	4	33.48	52.85
		70	3	43.98	38.93
		70	2	54.48	25.01
		70	1	64.98	15.68
CH 54-85	54	85	5	23.98	80.12
		85	4	36.98	62.89
		85	3	49.98	45.67
		85	2	62.98	28.52
		85	1	75.98	15.17
CH 54-99	54	99	5	26.98	92.93
		99	4	42.73	73.05
		99	3	56.98	53.17
		99	2	71.98	33.40
		99	1	86.98	15.61
CH54-114	54	114	5	28.98	92.36
		114	4	47.23	69.17
		114	3	63.98	45.98
		114	2	81.48	22.78
		114	1	98.98	16.15
CH 54-129	54	129	5	29.98	116.87
		129	4	49.98	90.36
		129	3	69.98	63.85
		129	2	89.98	37.36
		129	1	109.98	16.15
CH 64-158	64	158	5	28.98	145.06
		158	4	46.98	111.55
		158	3	64.98	78.04
		158	2	82.98	44.98
		158	1	100.98	20.21

(continued)

Drying Hopper Volume by Model Number

(continued)

Drying Hopper	Hopper Diameter	Volume ($ft.^3$)	RTD Position	RTD Distance from the top	Volume up to RTD position ($ft.^3$)
CH 64-187	64	187	5	30.98	176.67
		187	4	52.23	137.11
		187	3	73.48	97.55
		187	2	94.73	58.15
		187	1	115.98	20.73
CH 64-215	64	215	5	33.98	198.55
		215	4	58.23	153.40
		215	3	82.48	108.25
		215	2	106.73	63.16
		215	1	130.98	20.73
CH 64-248	64	248	5	34.48	229.24
		248	4	62.48	177.12
		248	3	90.48	124.99
		248	2	118.48	72.86
		248	1	146.48	23.49
CH 74-245	74	245	5	30.98	180.95
		245	4	50.48	132.42
		245	3	69.98	40.15
		245	2	89.48	22.59
		245	1	108.98	5.62
CH 74-366	74	366	5	38.98	304.39
		366	4	68.48	230.97
		366	3	97.98	157.55
		366	2	127.48	29.68
		366	1	156.98	5.90
CH 74-487	74	487	5	47.98	369.86
		487	4	86.98	272.79
		487	3	125.98	175.72
		487	2	164.98	42.10
		487	1	203.98	6.78

Understanding Bulk Density

Bulk density is the weight of material in pellet form, where the material has a lot of free space between pellets. It is not a specification that material suppliers typically provide. You may need to calculate the bulk density. It is important not to confuse bulk density with material density, which is the weight of the plastic in solid form without any air gaps between pellets.

How to calculate the bulk density-

1. **You will need a container or bucket that you know the volume of to calculate the bulk density of your material.**

2. **Weigh the empty container and record the weight.**

3. **Fill the container with your material, level it off at the top with a straight edge.**

4. **Weigh the container with material in it.** Record this weight.

5. **Subtract the weight of the empty container from the weight of the container** with the material present. The result will be the weight of the material for the volume of the container.

6. **Convert the number you calculated in step 4, to lbs. per cubic foot. (lbs/ft^3)** For example, if your container had a volume of 0.5 ft^3 and the material weight was 20 lbs., divide 20 lbs by 0.5 ft^3. The result: The bulk density of the material is 40 lbs/ft^3.

Interpreting Drying Monitor Trend Curves

⚠ **IMPORTANT:** The descriptions and curve examples shown in this user guide are for general reference only and may not relate to the characteristics of your specific drying process. These guidelines are intended to make the user aware of common temperature patterns of common drying applications to allow correct identification of proper or improper drying through observation of the temperature patterns within the drying hopper as displayed by the DM.

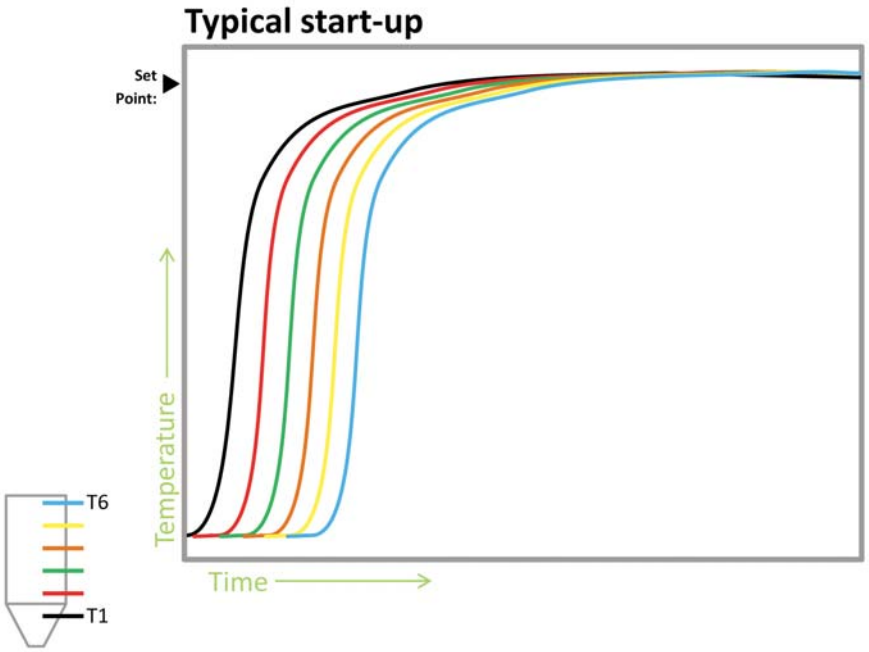
Any of these variables can effect how your drying system's particular trending curves and data will be displayed:

- hopper size and length/diameter relationship
- drying system and heat/air delivery capability
- bulk density of material being dried
- drying temperature
- condition of the drying equipment's heaters, filters and blowers and heat/air delivery system
- proper installation, condition and connection of the DM hopper probe
- type and regularity of the automated loading system being employed
- level of the material in the hopper
- temperature of incoming, new material
- specific location of probe sensors, once installed

✎ **NOTE:** Conair recommends that users familiarize themselves with these guidelines to develop an understanding of typical drying parameters and then apply those principles to monitor their own particular drying system.

Interpreting DM Trend Curves-
Typical Startup

Upon start-up with a full hopper of material, temperatures read by all DM probes will rise towards the drying set point temperature, starting with T1. If processing does not start (no material taken away from the hopper) eventually all the probes (with the possible exception of T6 if it is above the material level) will come very close to the process temperature.



All probes align with set point temperature: All temperature zones will align with the inlet temperature. The material is not yet moving, so temperatures become uniform.

Interpreting Drying Monitor Trend Curves- Normal Operation

NOTE: If the alarm location sensor never reaches the drying temperature setpoint, there is a problem with the drying system and it should be examined for proper operation. Refer to the user guide for your dryer.

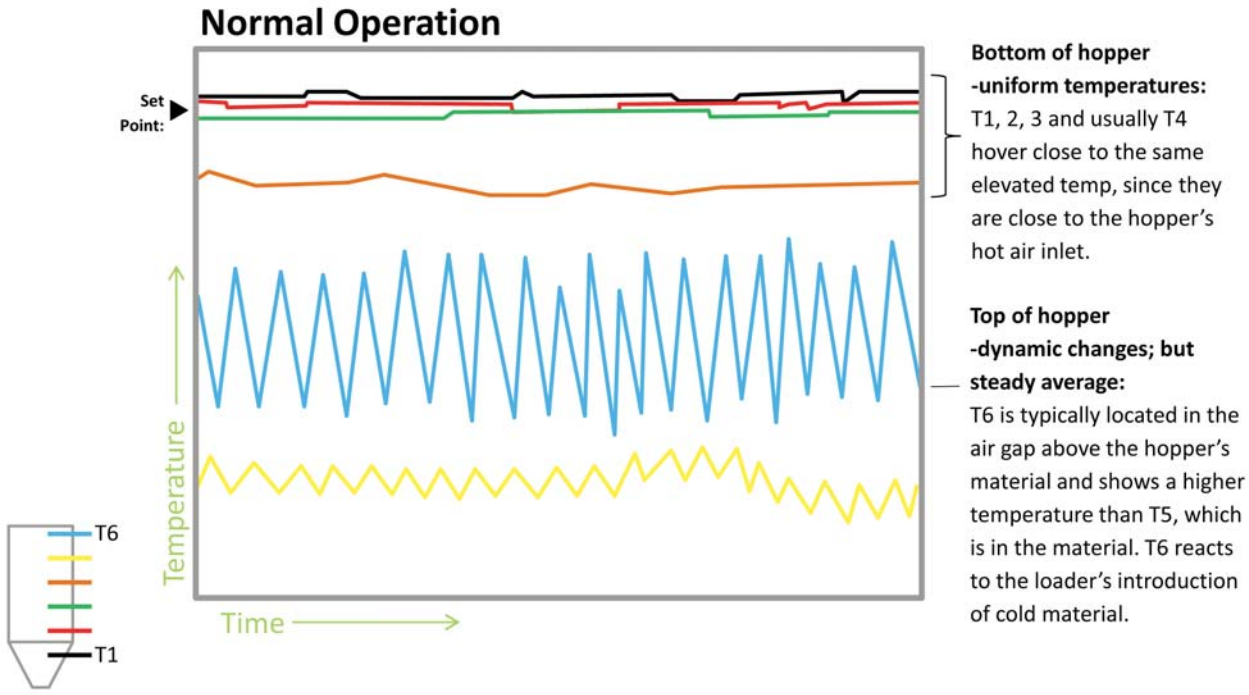
NOTE: If equipped with material ready introduce drying temp must be at 95°F at setpoint for use selected residence time.

The DM can be used to determine when successful drying is underway and processing of material can begin, using the following guidelines:

- *See Operation:Setting Up Your DM: The Basics-Alarm Location* for establishing the "alarm location" sensor for your drying system (this is typically T3 or T4).
- The alarm location sensor can be used to determine when the hopper's material has been sufficiently exposed to proper drying temperature for the proper length of time (residence time) and processing of the material in the hopper can begin.
- Processing can begin when the alarm location sensor (typically T3 or T4) has stabilized at the drying temperature setpoint for approximately 50% of the required residence time.

  Example: If the material drying temperature is 250°F and the required residence time is 4 hours, once the alarm location sensor has displayed 250°F for 2 hours (50% of 4 hours), processing can begin.

In normal operation, T1 will read closest to the process air temperature.



(continued)

Interpreting Drying Monitor Trend Curves- Normal Operation (continued)

In normal operation with material flowing through to the process, readings from T1, T2 and T3 will typically be very close to the process air temperature. T4 and T5 (and T6 if it is located in material) will display temperatures descending in value from the process temperature.

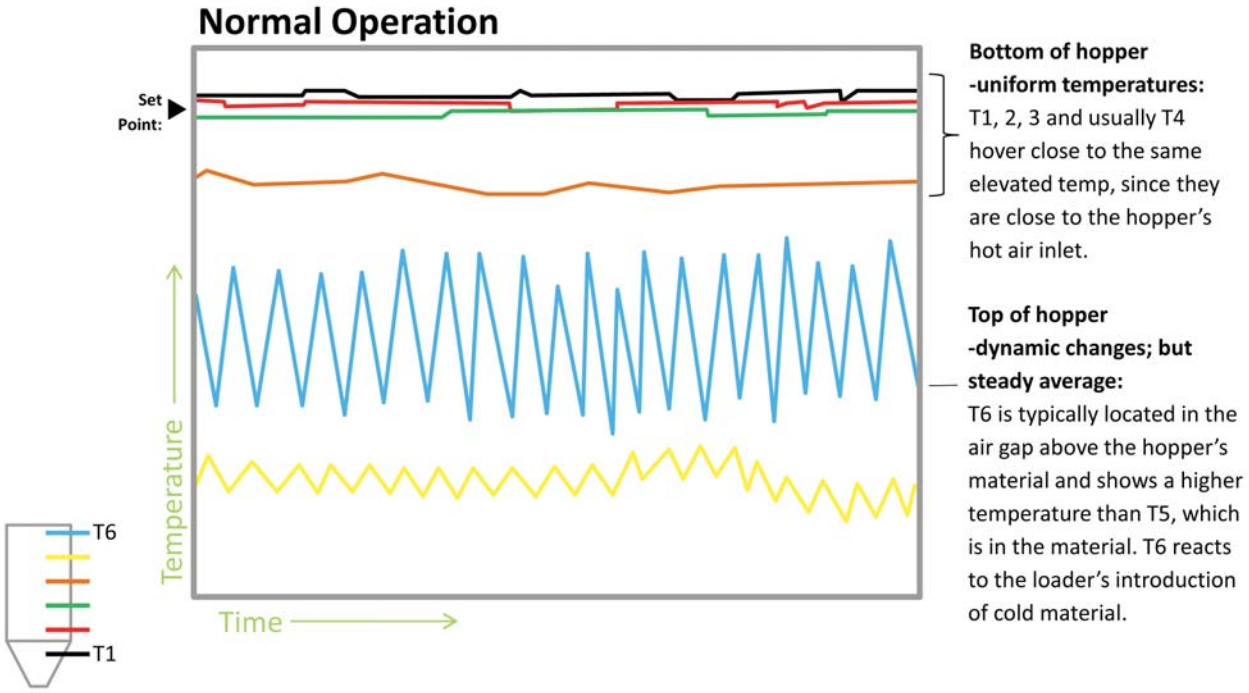
In normal operation with material flowing through to the process, if T6 is located in the air space at the top of the hopper (where there is no material), it will display a higher temperature than T5, which is typically located within the material. This is because a sensor in the open air is not in contact with heat-consuming resin. This is especially true at higher (275+°F) drying temperatures.

The hopper design, and how the material comes to rest in the hopper (the "angle of repose") and the loading system being used typically dictate the size of the "no-material" area at the top of the hopper depending upon:

- where the demand switch for loading more material is located
- how far into the hopper the discharge of the loader/receiver extends

The DM can show a reaction to successful automated material loading as a drop in the T5 temperature (from the loading of new, cold material), alternating with a rise of T5 (as the new material absorbs drying heat). This reaction can be seen as a saw-tooth up/down temperature pattern.

NOTE: Hoppers being used at less than full capacity (hoppers using demand sensors on their viewing windows for loading, small drying jobs, hoppers that are larger than necessary for the drying task, etc) are likely to have more than one sensor exposed to air and not material, and this should be taken into consideration when analyzing DM data. This consideration is also important when selecting the " alarm location" sensor. *(See Operation: Setting Up Your DM: The Basics-Alarm Location.)*



Interpreting Drying Monitor Trend Curves- Material Flow problems

If material flow through the drying hopper is slowed down (a decrease in material throughput), the difference in temperature readings between T1 and T5 will steadily decrease. T4 and T5 will gradually align towards the T1 temperature since the slower moving material will absorb more of the drying heat.

If material flow is stopped (no material is leaving the hopper) and prior to any energy saving functions in the dryer being engaged, the temperature readings from T4, T5 and T6 will begin to increase and align with the process temperature. The stopped material now has time to more fully absorb drying heat.

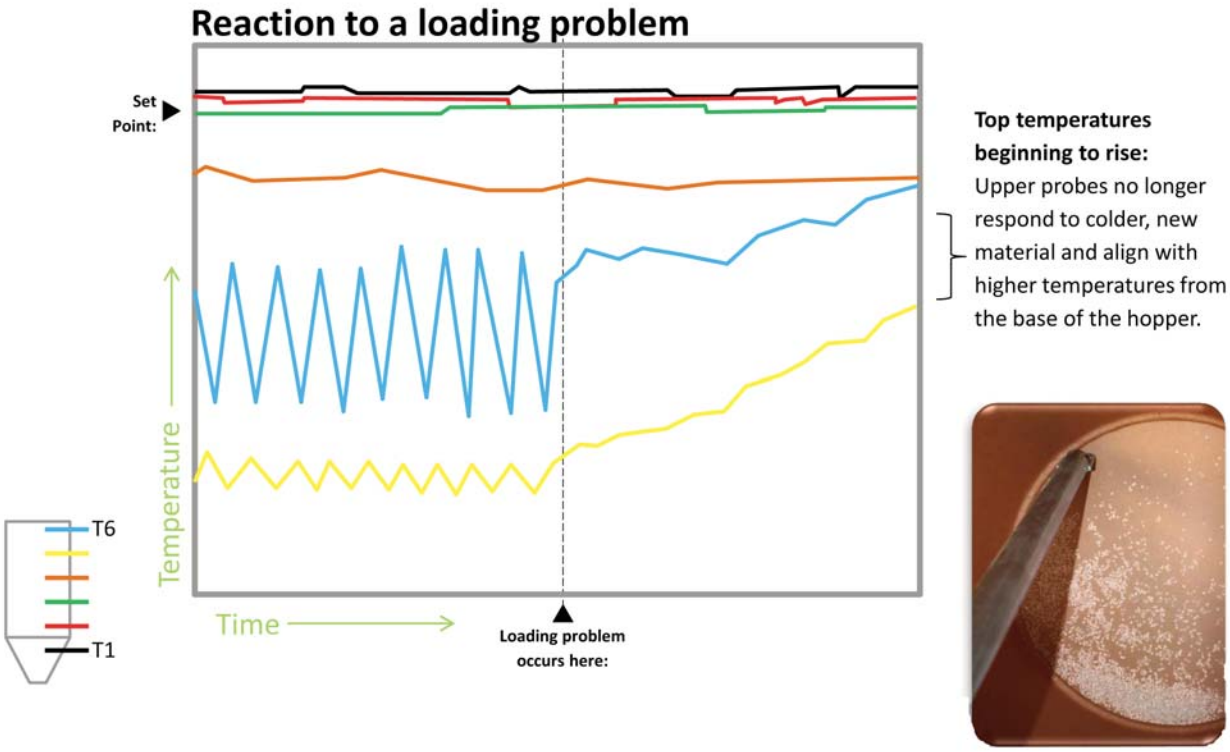
If material flow increases (an increase in throughput), the difference in temperature readings between T1 through T5 will steadily increase. The faster moving material now spends less time being heated so the difference in temperatures read at the bottom of the hopper compared to the top, will display a greater spread.

✎ **NOTE:** An increase in the difference between T1 through T5 (as described above) can also be the result of an increase in the quantity of reground material being dried in the hopper. Increasing the quantity of regrind decreases the bulk density of the material being dried and increases the flow of material.

Interpreting Drying Monitor Trend Curves- Loading problems

If the loading function stops (no new material being supplied to the hopper) while normal operation is underway, T5 and T6 will increase in temperature as the heat-consuming material level in the hopper decreases. T4 will eventually follow, especially if it also becomes exposed to air and not material.

✎ **NOTE:** Successful drying is in jeopardy if the material supply to the hopper is interrupted. Even if the problem is corrected and the hopper is refilled, the incoming material will not be exposed to the proper length of residence time for successful drying.

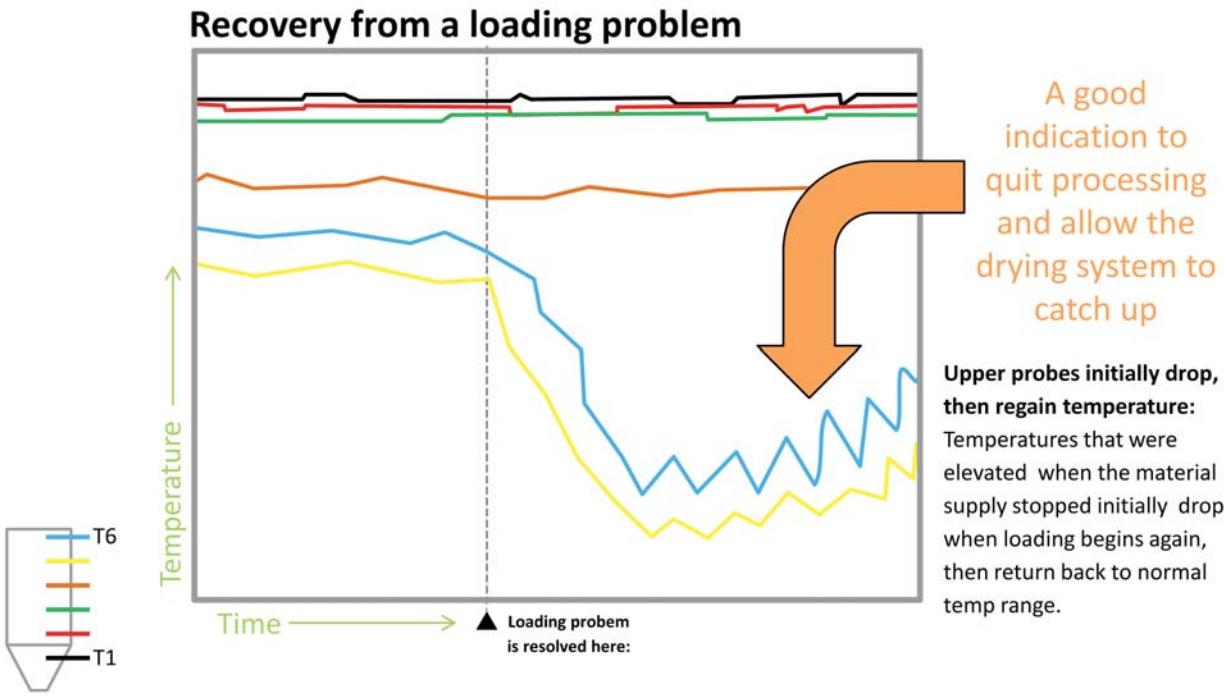


(continued)

Interpreting Drying Monitor Trend Curves- Loading problems (continued)

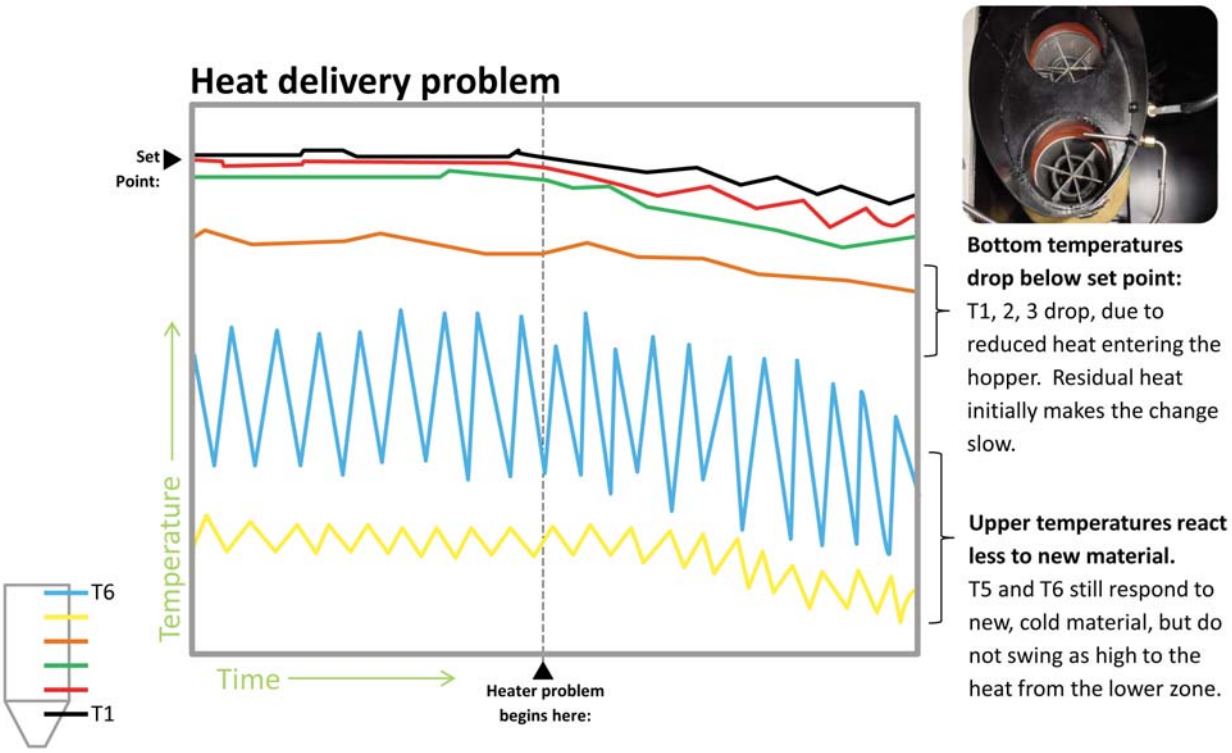
When automatic loading is restored, (new material is once again supplied to the hopper), T3 through T5 will initially drop in temperature from exposure to the new, colder material coming into the hopper, and then begin to rise and realign into a normal temperature profile for the hopper.

✎ **NOTE:** The drop in temperature displayed by T3 through T5 is a reaction to a quantity of cold material being introduced into the hopper following a lapse of automatic loading. This drop can be compared to a 'cold front' of material moving down through the hopper that has not been exposed to drying in the hopper for a long enough residence time. Temporary halting of the process should be considered to allow the drying system to catch up and deliver proper residence time to this new material, to prevent production of insufficiently dried product. If the process is not stopped, this 'cold front' will eventually be seen to a lesser degree, on T2, then T1.



Interpreting Drying Monitor Trend Curves- Problems with Heat Supply

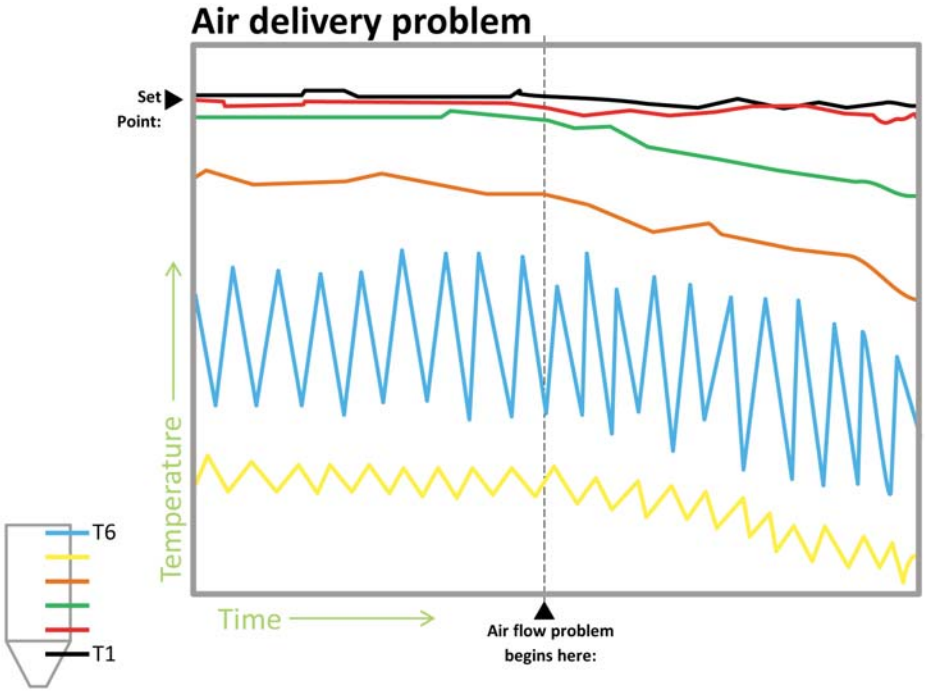
Problems with the heat supply (reduced temperature) to the drying hopper initially show up as a reduction in T1 and T2 temperature readings. Frequently, this reduction does not display immediately due to the residual heat of the material. The remaining probes will also sequentially decrease in temperature as the problem continues.



Interpreting Drying Monitor Trend Curves- Air Supply Problems

Problems with the air supply to the drying hopper (I.E: clogged filters or blocked drying air supply line) initially show up as a reduction in the T5, T4, and eventually T3 temperature readings since the air flow is no longer strong enough to carry the drying heat up through the hopper. The remaining probes will also decrease in temperature as the problem continues, even though T1 and T2 continue to display levels close to the process temperature. This can be a very gradual reaction to filters gradually becoming clogged.

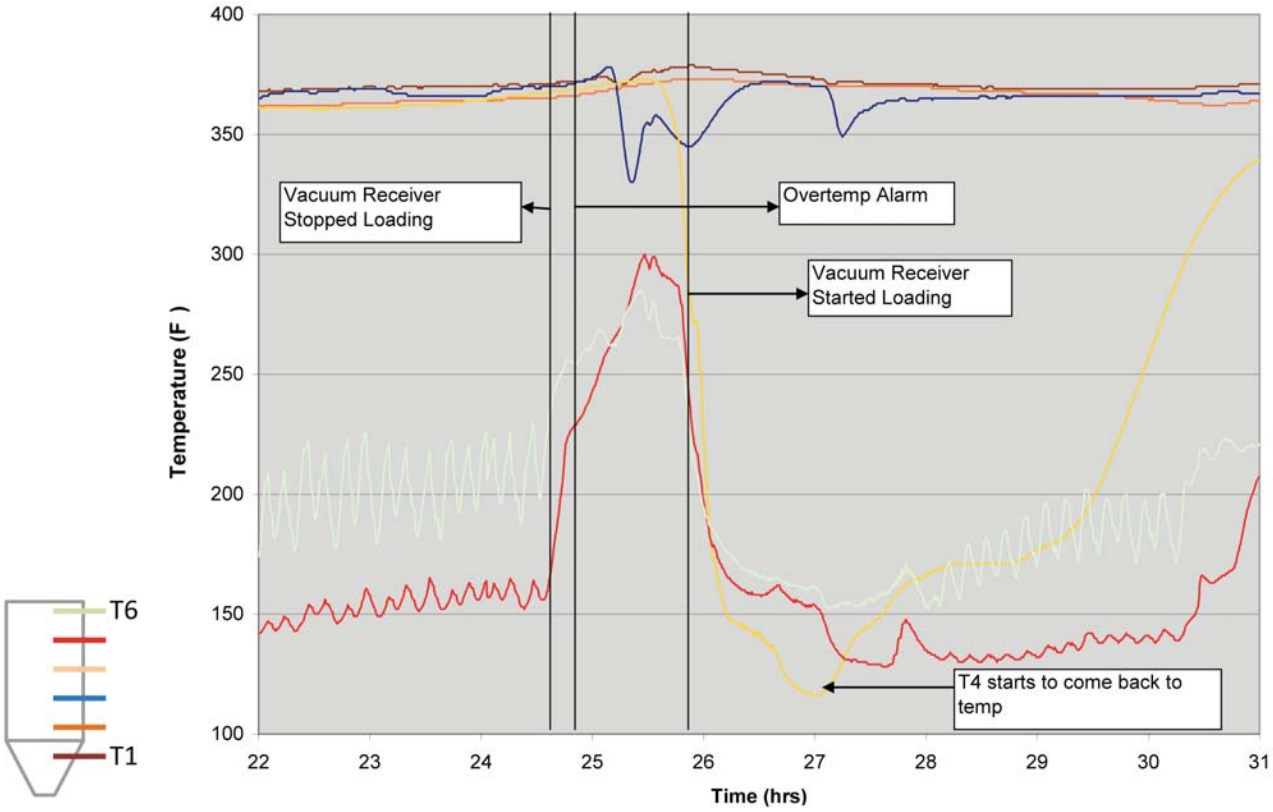
✎ **NOTE:** A decrease of T3 (as described above) can also be the result of an increase in throughput or an increase in the quantity of reground material being dried in the hopper. Increasing the quantity of regrind decreases the bulk density of the material being dried.



Mid temperatures react to reduced air flow.
T4 and T5 begin to drop since air flow is not strong enough to drive heat to them. T3 will eventually follow. But T1 and T2 often stay strong since they are still receiving the proper heat, in spite of reduced air flow.

Interpreting Drying Monitor Trend Curves- Actual DM Trend Analysis

Below is an actual trend analysis used by a PET bottle processor to find the cause of overnight process variations.



Preventative maintenance schedule

No specific maintenance schedule is required for the Drying Monitor since there are no moving parts. All components of the system are electrical in nature, but like any component in a factory, can be prone to unforeseen breakage.

In the event of breakage, replace the component(s). Do not attempt repair.

- **When material is changed.** Since a key component of the DM is the temperature probe(s) and they are exposed to your material and elevated temperatures, they should be checked whenever their host drying hopper is drained, cleaned, etc. No specific preventative maintenance is required beyond wiping down and examining for damage whenever the hopper is empty, cool and available for inspection. In the event of visible damage or non-operation, replace the probe. Do not attempt repair.

In addition, the coupling assembly that holds the probe in place should be closely examined from the top of the hopper and inside the hopper to be sure it is intact and has not been damaged or become loose as a result of use in the hopper.

- **Monthly, or as often as needed**
  - ❒ **Check that the cables and junction boxes associated with the DM.** Make sure all cables are intact, undamaged, out of harm's way, etc.
  - ❒ **Correct the mounting integrity of junction boxes as required and re-route the ModBus cables to avoid high amperage electrical lines and/or moving, hot or sharp objects.**

What the Drying Monitor Can Tell You

The DM monitors the temperature profile of the material in the hopper using six Resistance Temperature Device (RTD) sensors. These RTD sensors are located at evenly spaced positions in the drying hopper. Monitoring the six sensors creates an accurate profile of the hopper's temperature gradient. This simple gradient measuring system informs the user that major characteristics of good drying are present (or not).

Heat: Each probe precisely measures the heat being created by the dryers heating system and more importantly, the changes that heat goes through as it is combined with the flow of material through the hopper. Heated air is going up in the hopper and is constantly facing a refreshed supply of material while that material is flowing down and into the process, which creates a predictable heat profile for good drying inside the hopper. The DM keeps precise track of that profile and alerts you if something is not as it should be for good drying.

Air flow: Air is the medium that carries heat to the drying hopper and carries moisture away from the material. By keeping track of different heat zones in the drying hopper, the DM is also passively keeping track of the air flow through the hopper.

Time: The DM interprets the temperature findings from the drying hopper and knows how long material needs to be kept at the correct temperature for good drying. Once again, by measuring each of the six zones the DM can tell you if you are getting good drying performance or if something is not correct for success.

Understanding Alarms

The DM monitors each hopper and will give you an alarm if the temperature falls below your established alarm setpoint. See *Operation: Setting Up Your DM: The Basics- Alarm Setpoint* for more information about setting the alarm setpoint.

The DM uses the DC-C's alarm system to alert the user to an alarm condition. Refer to the User Guide that came with your dryer for more information on understanding alarms.

The information in the alarm notification box on your DC-C screen tells you which hopper has triggered the alarm, and at what time the alarm delay was met. For example, after being at temperature, Hopper 1 fell below the alarm setpoint for a period of time longer than the alarm delay. The DM triggered an alarm so that you can determine the problem and avoid downtime due to material not being properly dried.

Drying Monitor Problems

Symptom	Possible cause	Solution
Hopper data does not display	**Connection to RTD(s) in hopper(s) is incorrect or disconnected.**	❒ Check integrity of cable connections from drying monitor panel to RTD junction boxes to RTD.
	The last hopper in the ModBus string is not terminated.	❒ See section **Terminating the final RTD Junction Box** for properly terminating the last hopper
	Loose or damaged connectors in the ModBus cables.	❒ Check all connections and replace cable set(s) that are damaged
	Damaged connectors on the hopper probe.	❒ Replace the hopper probe.
	Defective temp sensor(s) within the probe.	❒ Replace the hopper probe.
Hopper alarm message appears on touch screen.	**A low temperature condition has been sensed by the drying monitor in the hopper listed in the alarm message**	❒ Press trend button on Drying Monitor, and select the alarm hopper to view the specific time the temperature dropped, to pinpoint possible problem. ❒ Review settings in the hopper set-up screen to assure the drying monitor settings are correct for the current drying task. ❒ Check drying system for insufficient air flow caused by blower malfunction or damaged or plugged air connection to hopper from dryer. ❒ Check if drying system material throughput has elevated due to process change or sharing of material with another process, beyond the capabilities of the drying system.