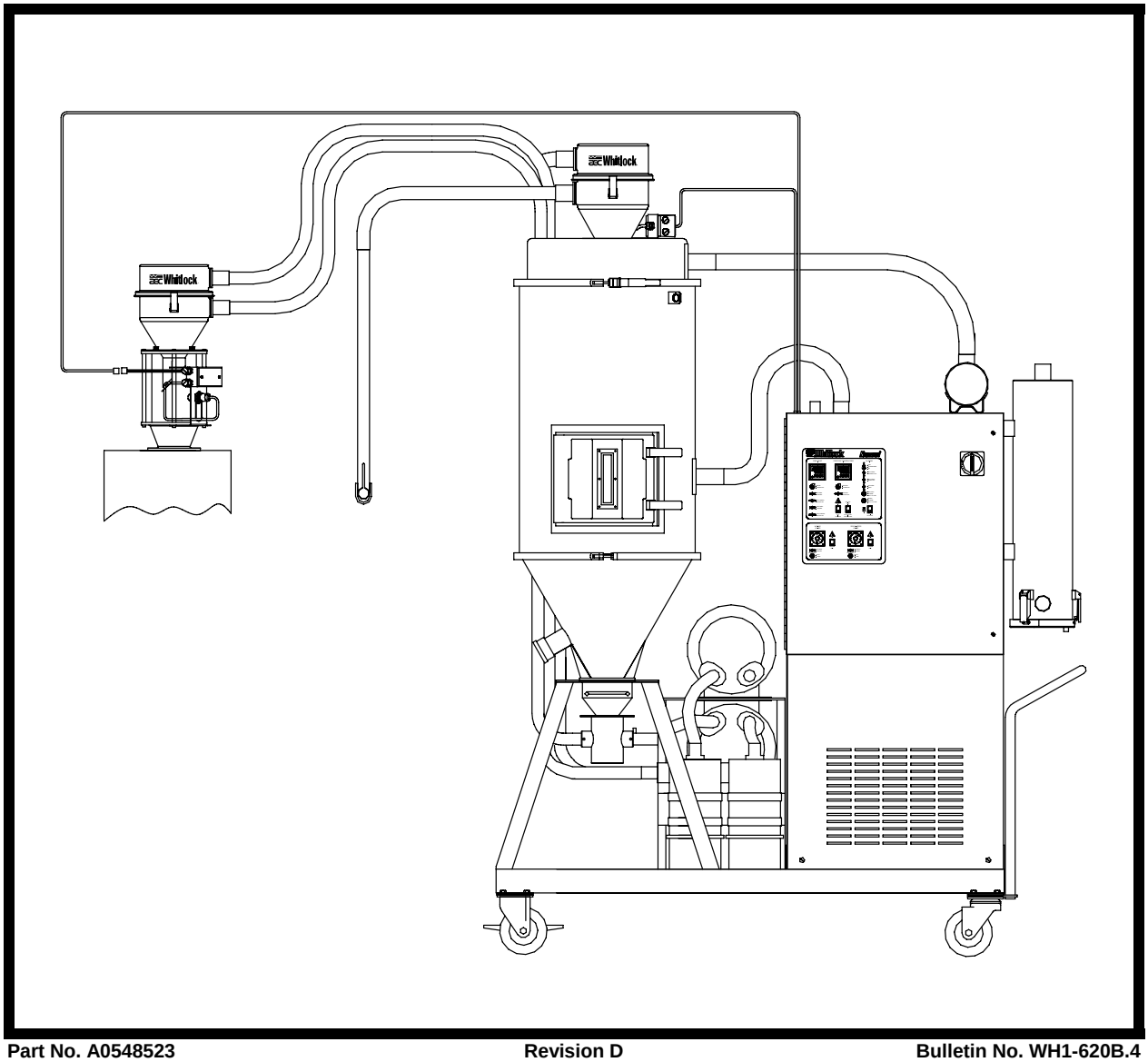
WHITLOCK • MATERIAL HANDLING

$30.00

Operation and Installation Manual

Nomad Series PD-2 to PD-4 Drying and Conveying Systems

Important! Read Carefully Before Attempting to Install or Operate Equipment



Part No. A0548523 **Revision D** **Bulletin No. WH1-620B.4**

Performance figures stated in this manual are based on a standard atmosphere of 59°F (15°C) at 29.92” Hg (1,014 millibars) at sea level, using 60 hz power. Altitude is an important consideration when specifying drying and conveying systems. AEC/Whitlock can advise you on proper selection and sizing of systems for your operating environment.

AEC/Whitlock is committed to a continuing program of product improvement. Specifications, appearance, and dimensions described in this manual are subject to change without notice.

Effective 4/25/2008
Part No. A0548523 Revision D Bulletin No. WH1-620B-4

Safety Considerations

AEC/Whitlock Nomad Series drying and conveying systems are designed to provide safe and reliable operation when installed and operated within design specifications, following national and local safety codes.

To avoid possible personnel injury or equipment damage when installing, operating, or maintaining this equipment, use good judgment and follow these safe practices:

- ☑ Follow all **SAFETY CODES**.
- ☑ Wear **SAFETY GLASSES** and **WORK GLOVES**.
- ☑ Disconnect and/or lock out power before servicing or maintaining the dryer.
- ☑ Use care when **LOADING**, **UNLOADING**, **RIGGING**, or **MOVING** this equipment.
- ☑ Operate this equipment within design specifications.
- ☑ **OPEN**, **TAG**, and **LOCK ALL DISCONNECTS** before working on this equipment. It is a good idea to remove the fuses and carry them with you
- ☑ Make sure the dryer and components are properly **GROUNDED** before switching on power.
- ☑ Do not jump or bypass any electrical safety control.
- ☑ Do not restore power until all tools, test equipment, etc. have been removed and the dryer and conveying equipment are fully reassembled.
- ☑ Only **PROPERLY TRAINED** personnel familiar with the information within this manual should work on this equipment.

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Charts and Figures

1 General Information

1-1 Models Covered

This manual provides instructions for installing and operating AEC/Whitlock Nomad Series PD-2, PD-3, and PD-4 portable drying and conveying systems with WD90, WD100, WD150, and WD225 cabinet-style dehumidifying dryers. The dryer number designation represents air flow capacity. The carts also include insulated drying hoppers and various levels of conveying options.

1-2 Equipment Function

Nomad Series portable drying and conveying systems are used for automatic pneumatic handling and drying of most free-flowing, dry, pelletized, or granular materials.

AEC/Whitlock dehumidifying dryers are designed to generate heated, dehumidified air at carefully controlled temperatures for use in closed-loop plastic drying systems. Moisture removal from hygroscopic (moisture attracting) plastic pellets is an essential step in the manufacture of high-quality plastic products. AEC/Whitlock dehumidifying dryers are used to generate very low dew point air heated to a controlled temperature for drying plastic pellets and regrind.

AEC/Whitlock Mass Flow Series drying hoppers are engineered to be used with the dehumidifying dryers. The dryer circulates hot air through the column of plastic resin in the drying hopper. The resin in the hopper is discharged through a slide gate in a “first in, first out” manner. Material conveying systems convey dry material from the drying hopper to a sight glass loader. The optional drying hopper loader conveys material from a gaylord to the drying hopper.

Nomad Series Portable Drying and Conveying systems are sized to meet the specific requirements stated by the purchaser at the time of purchase.

1-3 Necessary Documents

The documents listed below are necessary for the operation, installation, and maintenance of AEC/Whitlock Nomad carts. You can obtain additional copies from AEC, Inc. **Make sure that the appropriate personnel are familiar with these documents:**

- ☑ This manual.
- ☑ The schematic and assembly drawings included in the customer information packet.
- ☑ The Customer Parts List included in the information packet.
- ☑ Operation and installation manuals for any optional controls or auxiliary equipment in the drying system.

1-4 Standard Features

- ☑ Rugged compact cart with handle and sturdy 4” (10 cm) casters.
- ☑ Dual blower dryer with dual desiccant beds and 4-way compressed air operated valves.
- ☑ Up to 400ºF (204ºC) drying temperature range.
- ☑ Insulated drying hopper with sight glass.
- ☑ Cartridge type (two stage) air filters for all blowers.
- ☑ Integral Control Center for dryer and loading options.
- ☑ Electrical disconnect with all wiring to a common terminal point.
- ☑ PLC microprocessor control of the drying and conveying stations.
- ☑ Digital Dew Point monitor indicates dryer efficiency.
- ☑ Sequence shutdown of the dryer.

Level A – Machine Loader Only

- ☑ Sight glass loader with high efficiency centrifugal blower and adjustable convey timer.
- ☑ Cartridge type (two stage) air filters for the blower.
- ☑ Quick disconnect cable for sight glass loader material demand switch.
- ☑ Two (2) ten (10) -foot (3 m) lengths of vinyl flex hose and clamps.
- ☑ Closed loop dry air convey take-off compartment on discharge of drying hopper.

Level B – Drying Hopper Loader Only

- ☑ Drying hopper loader with high efficiency centrifugal blower and adjustable convey timer.
- ☑ Cartridge type (two stage) air filters for the blower.
- ☑ Quick disconnect cable for drying hopper loader material demand switch.
- ☑ Pick-up wand and ten (10) foot (3 m) length of vinyl flex hose and clamps.
- ☑ Standard take-off compartment (open loop) on discharge of drying hopper.

Level C – Both Machine Loader And Drying Hopper Loader

- ☑ Features of both level A and level B, including closed loop dry air convey take-off compartment.

1-5 Options

Options can tailor your AEC/Whitlock Nomad system to meet the exact requirements of the drying task being performed.

- ☑ 13X desiccant.
- ☑ Aftercoolers for high and low temperature applications.
- ☑ Seven day timer to allow programmable dryer startup.
- ☑ Audible/visual critical alarm.
- ☑ Fusing for blowers and heaters.
- ☑ Dirty Filter indicator for each individual blower.
- ☑ Proportioning valve for the drying hopper loader (Levels B and C).
- ☑ Stainless steel convey hose (Levels A and C).

Figure 1
Nomad PD-2 through PD-4 Specifications

Model number	Dryer model number	Hopper size				Process air flow		Output temperature range	Standard voltage	Full load amps ①
		cu. ft.	liters	lbs.	Kg	cfm	cmh			
PD-2	WD90	6.0	160	200	90.8	90	153	140°-400° F (60°-204°C)	460/3/60	24
PD-3	WD100	12.0	320	400	181.6	100	170	185°-400° F (85°-204°C)	460/3/60	27
PD-4A	WD150	12.0	320	400	181.6	150	255	160°-400° F (71°-204°C)	460/3/60	38
PD-4B	WD150	17.0	452	600	272.4	150	255	160°-400° F (71°-204°C)	460/3/60	38
PD-4C	WD225	23.0	612	800	363.2	225	382	160°-400° F (71°-204°C)	460/3/60	48

① Level C (Machine Loader and Drying Hopper Loader)

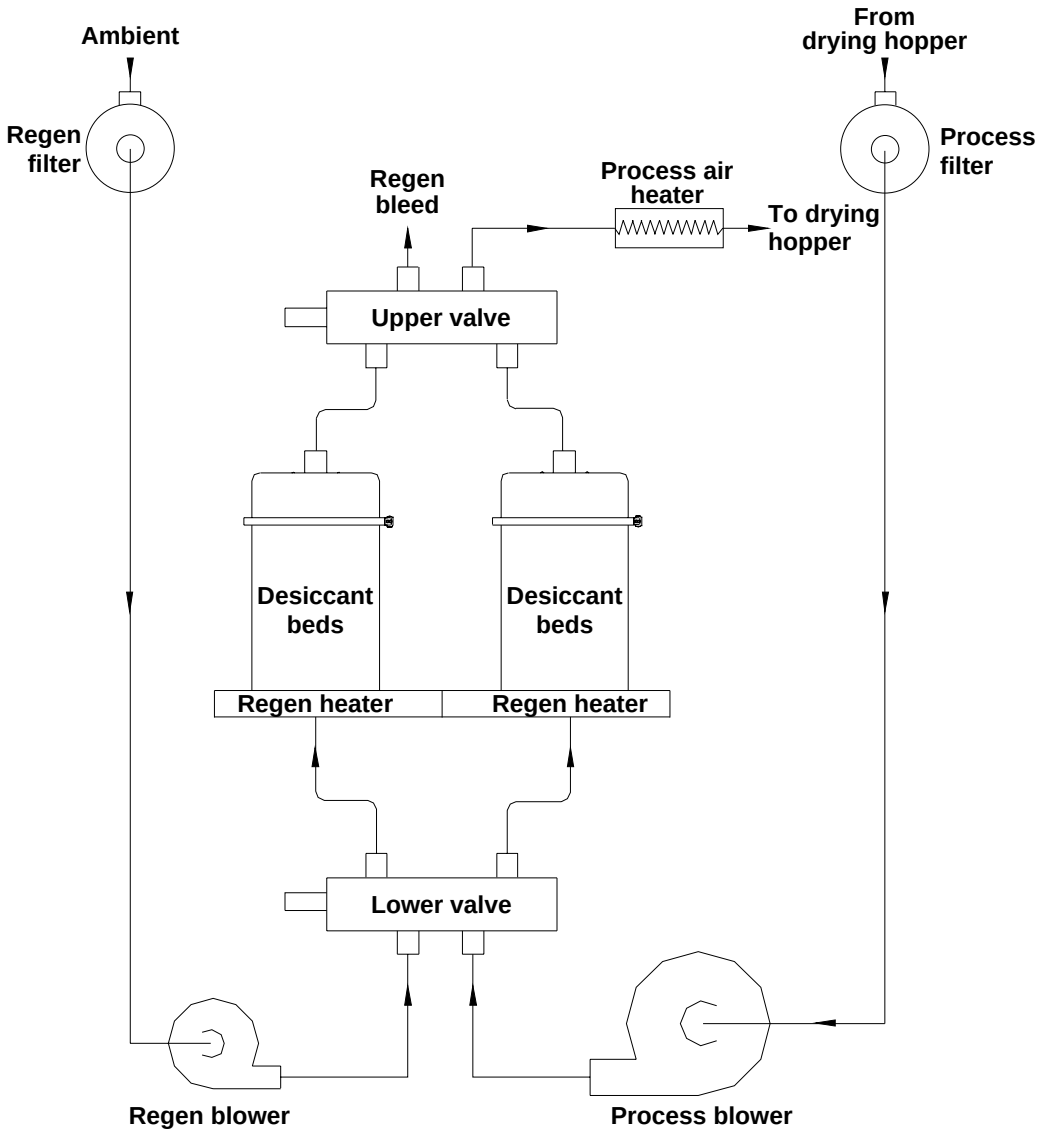
1-6 The Closed Loop Drying System

AEC/Whitlock dryers force hot, dry air through the resin in the drying hopper where the air picks up moisture from the material and is drawn back to the dryer.

In the dryer, a desiccant bed strips moisture from the air. The dryer then re-heats dried process air, and sends it back into the drying hopper to dry material again.

This system is a *closed loop*, because ambient (outside) air is *never* introduced into the process air. **AEC/Whitlock uses the closed loop system,** because the process air is typically **much drier** than ambient air, even after carrying moisture out of the plastic resin. Recycling process air maintains drying efficiency at a consistently high level.

Figure 2
Dryer Air Flow Diagram


Ambient
From drying hopper
Regen filter
Process filter
Regen bleed
Process air heater
To drying hopper
Upper valve
Desiccant beds
Desiccant beds
Regen heater
Regen heater
Lower valve
Regen blower
Process blower

1-7 What is Desiccant?

Desiccant is a material which attracts and holds (absorbs) water from the air. AEC/Whitlock dryers use a synthetic crystalline metal aluminosilicate desiccant blended with a clay binder and formed beads.

Absorbed water is driven from saturated desiccant by heating it to a high temperature (reducing desiccant capacity to hold water) and forcing air through it. This moisture removal process is called *regeneration*.

1-8 The Process/Regeneration Cycle

AEC/Whitlock dryers have two desiccant beds. While one bed is on-line in the process air loop, the other is off-line being regenerated.

When a desiccant bed is on-line, it absorbs moisture from the process air. In time, the bed becomes saturated with moisture and needs to be regenerated. The dryer automatically redirects the process airflow to the second bed and starts the regeneration cycle on the first bed.

During regeneration, the dryer heats air to over 500°F (260ºC) and forces it through the desiccant bed. Moisture driven off the bed bleeds to the atmosphere.

If you measure the temperature of the air bled to the atmosphere (bleed temperature), you should observe a rise after a period of time. This condition, *bed breakthrough*, indicates that the bed is dry. At bed breakthrough, the bleed air temperature peaks between 350°F (176ºC) and 400°F (204ºC).

The Dew Point meter measures the dew point of the process air. A properly regenerated bed produces process air dew point of -40°F (-40ºC). This ultra-low humidity level is more than adequate to dry plastics to as little as .003% moisture, depending on the process and material.

1-9 Closed Loop Machine Conveying

A high efficiency centrifugal blower and special designed take-off compartment provides closed loop dry air conveying of material from the drying hopper to a sight glass loader located at the press.

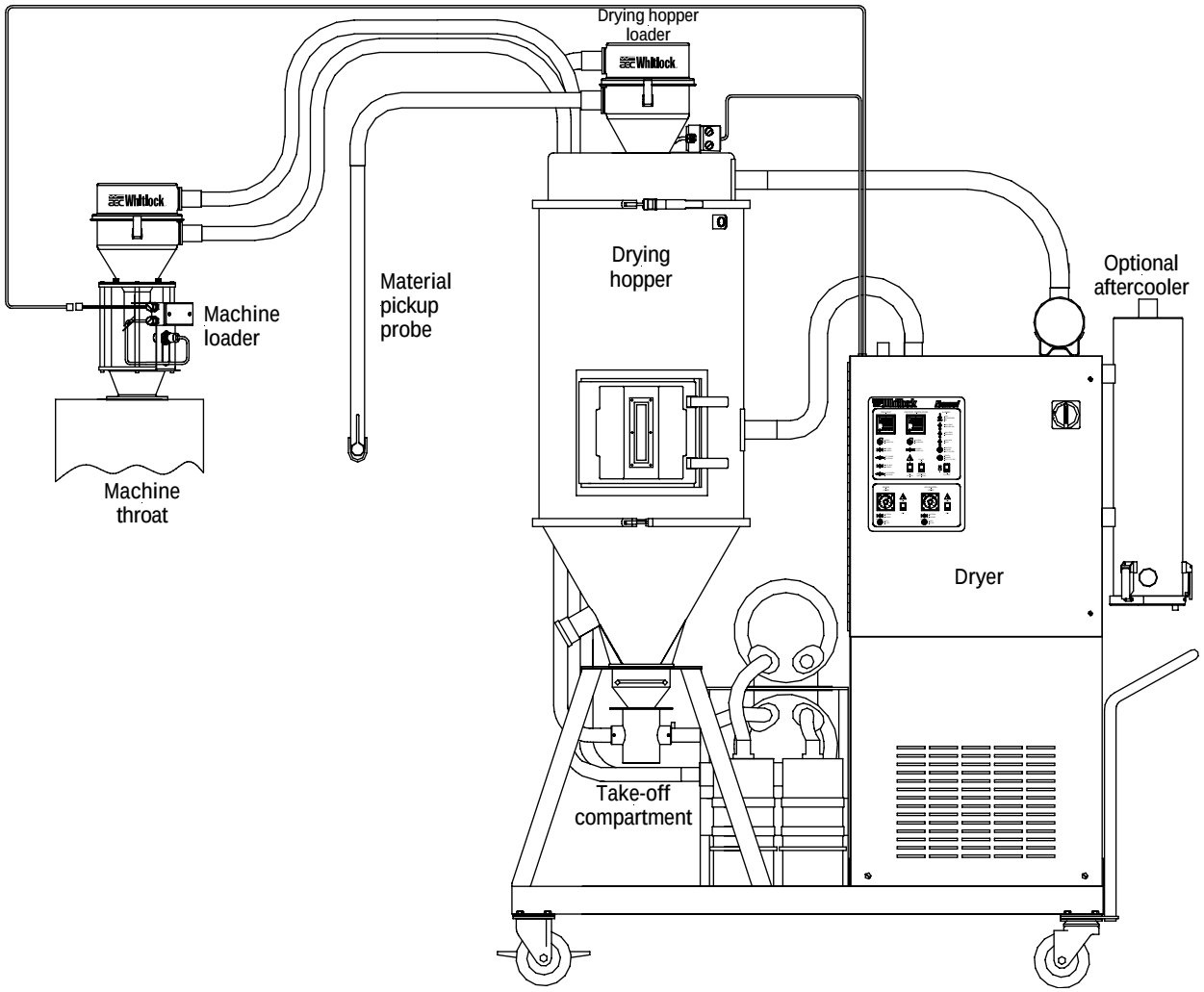
The single-station control includes a low level sensor that sends a signal to the PLC and starts the blower and conveys material for a set amount of time. An adjustable convey timer is located on the control panel. Once the convey time is over, the blower shuts down and starts a dump delay time to allow material to flow into the processing machine. If a demand is still present, the PLC starts the convey cycle over.

1-10 Specifying a Drying/Conveying System

Many variables were considered in the selection of your drying system, including type of materials, residence time, throughput of the extruder or injection molding machine, ambient air moisture and temperature, and the altitude at the processing site. If your operating environment changes, AEC/Whitlock can advise you on necessary equipment and process time and temperature modifications required for your system.

AEC/Whitlock can advise you on your system capabilities based on system makeup, distance, material, and the conveying rates you select.

Figure 3
Typical Nomad System with Cabinet-Style Dryer



2 Shipping Information

2-1 Unpacking and Inspection

You should inspect your Whitlock dehumidifying dryer for possible shipping damage. Save the container and packing materials for re-shipment if they are in reusable condition.

Thoroughly check the equipment for any damage that might have occurred in transit, such as broken or loose wiring and components, loose hardware and mounting screws, etc. In case of breakage, damage, shortage, or incorrect shipment, refer to the following sections.

2-2 In the Event of Shipping Damages

Important!

According to the contract terms and conditions of the Carrier, the responsibility of the Shipper ends at the time and place of shipment.

The Carrier then assumes full responsibility of the shipment.

- ☑ Notify the transportation company's local agent if you discover damage.
- ☑ Hold the damaged goods and packing material for the examining agent's inspection. **Do not return any goods to AEC, Inc. before the transportation company inspection and authorization**.
- ☑ File a claim against the transportation company. Substantiate the claim by referring to the agent's report. A certified copy of our invoice is available upon request. The original Bill of Lading is attached to our original invoice. If the shipment was prepaid, write us for a receipted transportation bill.
- ☑ Advise AEC, Inc. regarding your wish for replacement and to obtain an RMA (return material authorization) number.

2-3 If the Shipment is Not Complete

Check the packing list. The apparent shortage may be intentional. Back-ordered items are noted on the packing list. You should have:

- ☑ Nomad drying/conveying system.
- ☑ Sight glass loader.
- ☑ Material tubing.
- ☑ Bill of Lading.
- ☑ Packing list.
- ☑ Operation and Installation packet.
- ☑ Electrical schematic and panel layout drawings.
- ☑ Component instruction manuals.

Re-inspect the container and packing material to see if you missed any smaller items during unpacking. Determine that the item was not inadvertently taken from the area before you checked in the shipment. Notify AEC, Inc. immediately of the shortage.

2-4 If the Shipment is Not Correct

If the shipment is not what you ordered, **contact the parts and service department immediately** at [847] 273-7700. Have the item and order numbers ready to expedite the return. *Hold the items until you receive shipping instructions.*

2-5 Returns

Important!

Do not return any damaged or incorrect items until you receive shipping instructions from AEC, Inc.

3 Installation

3-1 Work Rules

The installation, operation, and maintenance of this equipment must be conducted in accordance with all applicable work and safety codes for the installation location. This may include, but is not limited to, OSHA, NEC, CSA, and any other local, national, and international regulations.

- Read and follow these operating instructions when installing, operating, and maintaining this equipment. If the instructions become damaged or unreadable, additional copies are available from AEC/Whitlock.
- Only qualified personnel familiar with this equipment should work on or with this dryer.
- Work with approved tools and devices.
- Disconnect the electricity before maintenance or service. If the dryer is installed with a power cord that can be unplugged, unplug it. If the dryer is permanently wired to a power main, a fused power disconnect must be installed to allow the disconnect to be locked in the **OFF** position. Open and lock out the disconnect installed in the control enclosure.

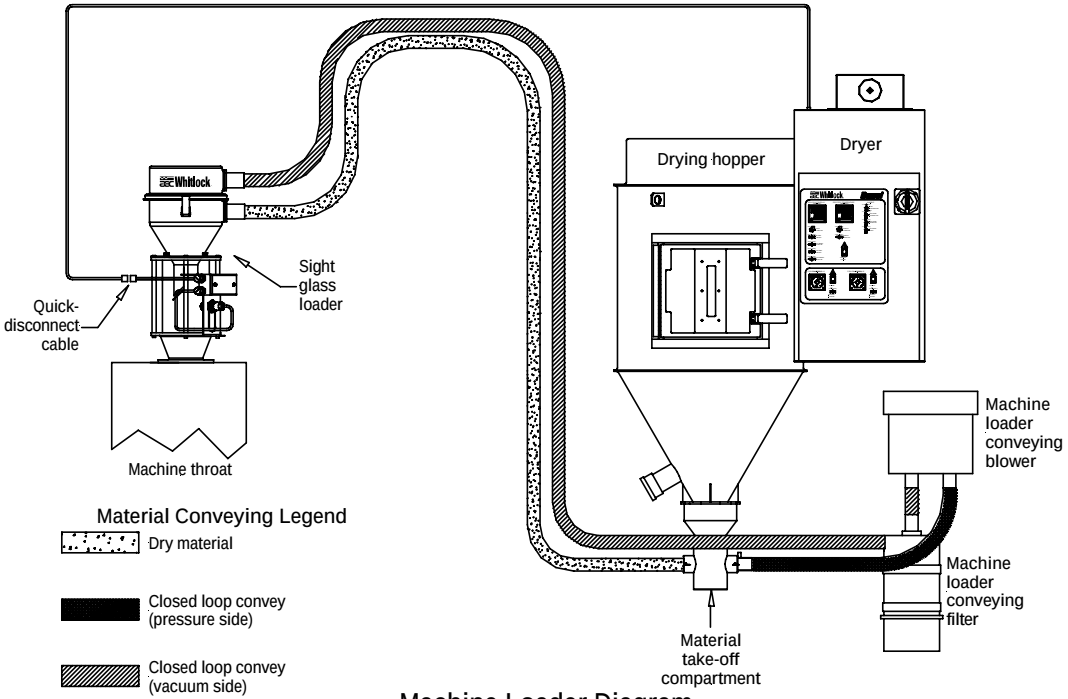
3-2 Positioning Your Nomad System

The Nomad system was designed to be wheeled into place. The entire assembly is mounted on a rugged, compact frame with an integral handle. The cart is equipped with sturdy, 6” (15 cm) heavy duty casters, two locking and two swivel.

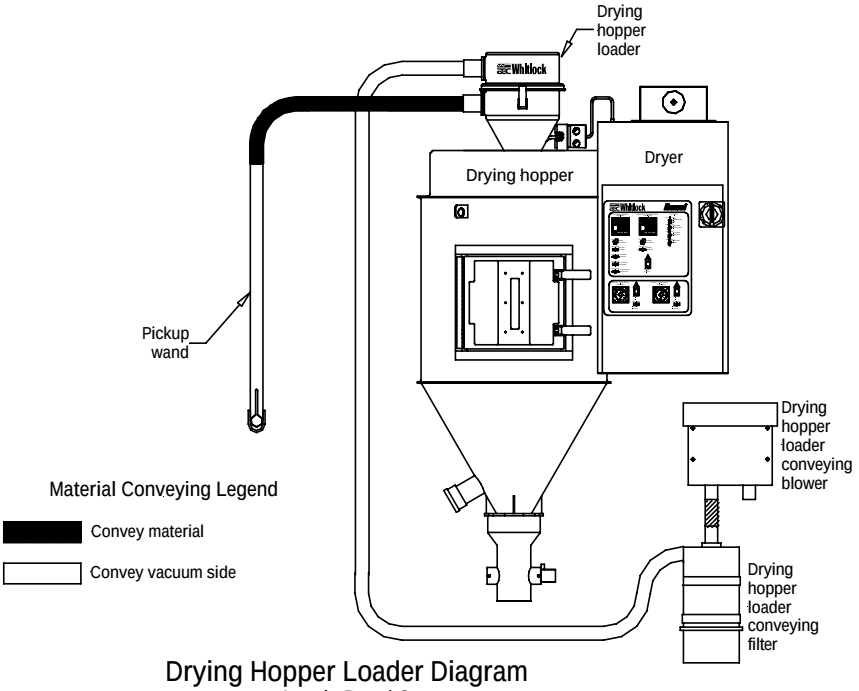
Caution!

Use caution and observe safety rules when placing your cart!

Figure 4
Typical Machine Loader and Drying Hopper Loader Diagrams



Machine Loader Diagram
Levels A and C



Drying Hopper Loader Diagram
Levels B and C

3-3 Drying Hopper

Removing the Rust Inhibitor

Rust preventative has been applied to internal unfinished surfaces. **Remove rust inhibitor *before*** using the drying hopper.

Using a non-water based degreasing agent, clean all inside surfaces of the drying hopper. Allow components to dry **thoroughly**.

Inspect the inside of the drying hopper for loose connections, foreign objects, or a blocked diffuser.

Air Trap Considerations

AEC/Whitlock's exclusive air trap assembly in the top of the drying hopper prevents ambient air from contaminating the material being dried.

- ☑ Keep the material level at the mid point of the air trap for maximum efficiency.
- ☑ Use a hopper loader or vacuum conveying system to maintain the proper material level.

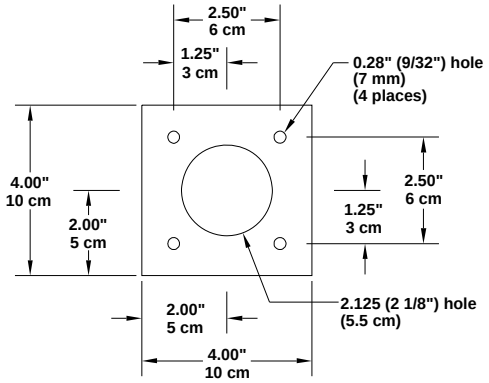
3-4 Installing the Sight Glass Loader

Levels A and C

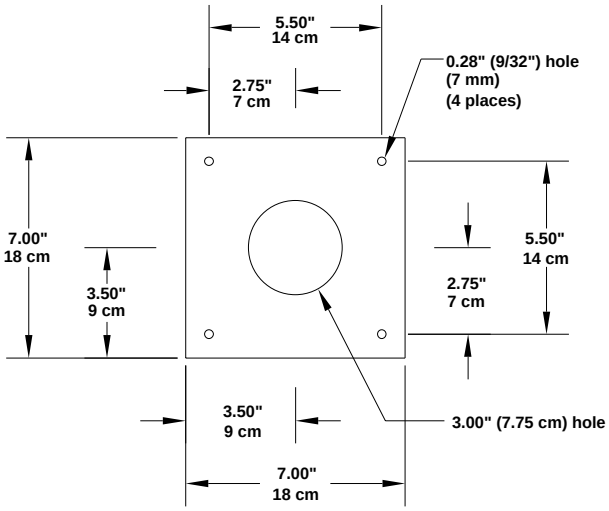
- ☑ Sight glass loaders use flange mountings. See Figure 5 on Page 18 for sight glass flange templates. You can mount the material receiver hopper directly to the processing machine by cutting a hole in the machine bin lid and fastening the receiver to it. The material receiver mounting flange mates with existing AEC/Whitlock equipment and uses the same mounting holes as previous AEC/Whitlock models.
- ☑ Complete the vacuum and material tubing from the take-off tubes located on the Nomad cart. See Section 3-6 on the following page for information on installing material/vacuum tubing.
- ☑ Connect the quick disconnect cable for the demand sensor to the Nomad cart. See Figure 9 on Page 26 for more information.

Figure 5
Sight Glass Hopper Flange Templates

Models SGV011, SGV012



Optional Models SGV031/032



3-5 Flange Mounting Tips

- ☑ Run a bead of silicone sealant around the mounting flange before seating the vacuum hopper. This makes a better seal.
- ☑ Use rivets to mount the hopper. Nuts and bolts can loosen, fall off, and damage process equipment.
- ☑ Check across the mounting flange with a bubble level. **A level installation is important for proper hopper dump**.
- ☑ Properly ground all sight glass loaders and vacuum hoppers.

3-6 Installing Material/Vacuum Tubing

Note: System capacity is directly affected by the pressure drop in the overall system, such as number of material line bends, footage of pipe, Y-tubes, T-tubes, etc.

Use the minimum effective amount of vinyl flex hose to maximize material line efficiency. Keep material lines as straight as possible.

Important!

Vacuum leaks anywhere in your system reduce capacity.

- ☑ Vacuum leaks anywhere in the system reduce system capacity.
- ☑ Keep the number of material tube bends to a minimum for maximum system capacity.
- ☑ Use long radius tube bends on material lines.
- ☑ Keep the total footage of material conveying flex hose to a minimum. Long flex hose material runs reduce system capacity.
- ☑ Support tubing about every ten feet with straps, pipe hangers, or brackets.
- ☑ Tube joints must be rigid to prevent vacuum or material leaks.
- ☑ **Cut tube ends square and chamfer edges smooth**. Use a fixed band saw or power miter saw when making cuts. You can use a tubing cutter on aluminum tubing; for cutting stainless steel, use a saw with a carbide or diamond-impregnated saw blade. Chamfer stainless steel edge cuts with a die grinder or a hardened rasp file.
- ☑ Clean all tubing after cutting and before assembly. Run a rag dampened in a non-volatile cleaning solvent through all tubing and couplers to remove sediment from shipping or cutting. Run a quantity of low-grade material through new lines to remove any remaining sediment, and ***discard the material immediately***.
- ☑ **Tube ends must butt together inside couplers**.
- ☑ Tighten tube coupler nuts **from the center outward** to create a tight seal and allow proper contact of the internal grounding strip.
- ☑ **Each material tubing run must maintain a continuous ground through the tubing and couplers, from pickup point to vacuum hopper. Ungrounded flexible hoses should have ground wires wound around the outside**.
- ☑ If you must cut bends, cut the straight section and allow enough straight length for complete insertion into a coupler.
- ☑ You can attach a quick-change or standard tube coupler to vinyl flex hose by inserting a stub of hard tube into the hose and securing it with a hose clamp. Make sure that enough tube extends from the hose to properly install the quick-change or coupler. Apply clear silicone caulk around adjoining tube seams for exterior bolted couplers.
- ☑ If you use stainless flexible material hose, the material flow must be in the same direction as the arrows on the hose. Material direction is not critical with vinyl flex hose.

3-7 Adjusting the Machine Loader Closed Loop Dry Air Take-Off Compartment

Levels A and C

The FCO-1.5MD model fast take-off compartment has an adjustable inner tube fitted to the fixed outer tube. A hold-down screw on the outer tube locks down the adjustable inner tube. Loosen the screw to adjust the inner tube.

Vary the distance of the indicator knob from the outer collar (See Figure 6) to control the flow of material to be conveyed. Adjust the inner tube so that the inside edge of the vertical knob touches the outer collar. This position is the minimum and factory-recommended setting. **The minimum and factory setting should adequately meet the throughput requirements on Nomad cart systems.**

For higher flow rates, increase the distance by pulling the adjustable tube away until you get the flow rate you want. The maximum amount of material should be conveyed when the adjustable inner tube is pulled all the way out.

Note: This condition may cause the flow to be unsteady, **and eventually may plug up the line.**

Along with the take-off adjustment, **take special care** when setting the convey time:

- Too short of a time shortens the service life of the blower.
- Too long of a convey time causes material to back up in the convey line, which could lead to plugging.

Suggested convey time is a minimum of five (5) seconds and a maximum of twelve (12) seconds.

Basic Tips

Every material has different conveying characteristics because of factors such as bulk density and particle size. Some material is easier to flow than others. That is why the inner tube is adjustable to give you the flexibility to control how much material you want to convey.

1. When adjusting the inner tube, **always** adjust from the inside out. Start from the tube positioned all the way in (minimum setting), then slowly pull the inner tube out until the distance from the outer edge to the indicator knob is one eighth of an inch (⅛" / 3 mm). This is the eighth-inch (⅛" / 3 mm) setting.

If higher rates are required, pull the tube out in increments of one eighth of an inch (⅛" / 3 mm). Check the rate. If you still require a higher flow rate, repeat these procedures to go to the next setting.

Important!

Never set the inner tube all the way out to start with the maximum flow rate!

2. Check the flexible hose used for conveying material from the FCO to the sight glass loader inlet. Make sure that the hose is straight down from the bend to the inlet. If there are any loops cut the hose to the right length to **remove the bends.**

   The hose lengths are cut at factory to ten feet (10'/3 m); but if the hose is too long, cut it to the right length.

3. Every time you change the material make sure you:
   - Purge all the material in the line.
   - Adjust the inner tube all the way in. (Factory recommended setting)
   - Slowly adjust by one eighth of an inch (⅛" / 3 mm) increments if you want a higher throughput.

   The distance is measured from the inside edge of the indicator knob to the outer edge of the collar on the take-off compartment. Adjust the inner tube out in the increments of one eighth of an inch (⅛" / 3 mm) until you get the rate you want.

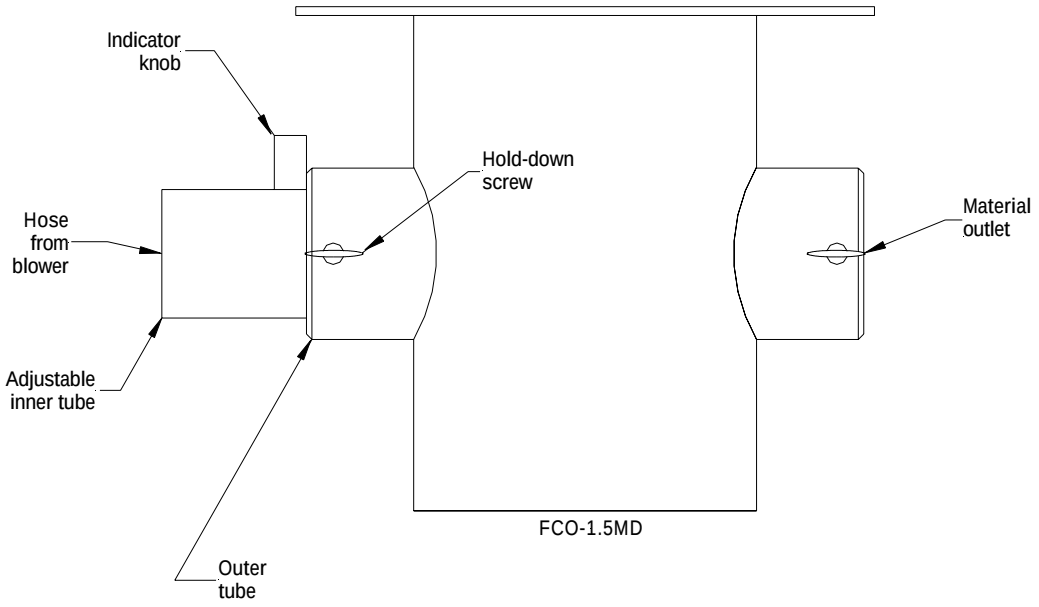
If Material is Not Conveying or the Line Plugs Up…

1. Make sure the inner tube is not set beyond the outer limit, the five-eighths inch (⅝" / 16 mm) setting:
   - Adjust the inner tube to a reduced convey flow setting.

2. Make sure that the flex connection to the machine hopper inlet is straight, without any bends:
   - Trim the hose length just enough to reach the machine hopper.

3. Make sure the convey time is not set too high:
   - Lower the convey time.

Figure 6
Machine Loader Dry Air Closed Loop Take-Off Compartment



3-8 Adjusting Sight Glass Proximity Sensor Sensitivity

You can adjust the sensitivity of the material level proximity sensor in the sight glass. The factory setting is correct for most applications. The sensor is factory-installed to the frame; however, you should install the sensor at the material level height you want.

When adjusting, fill the glass and verify that the sensor detects your material. **The LED on the switch *goes out* when it detects material**.

- For **increased** sensitivity, turn the potentiometer **clockwise**.
- For *decreased* sensitivity, turn the potentiometer *counterclockwise*.

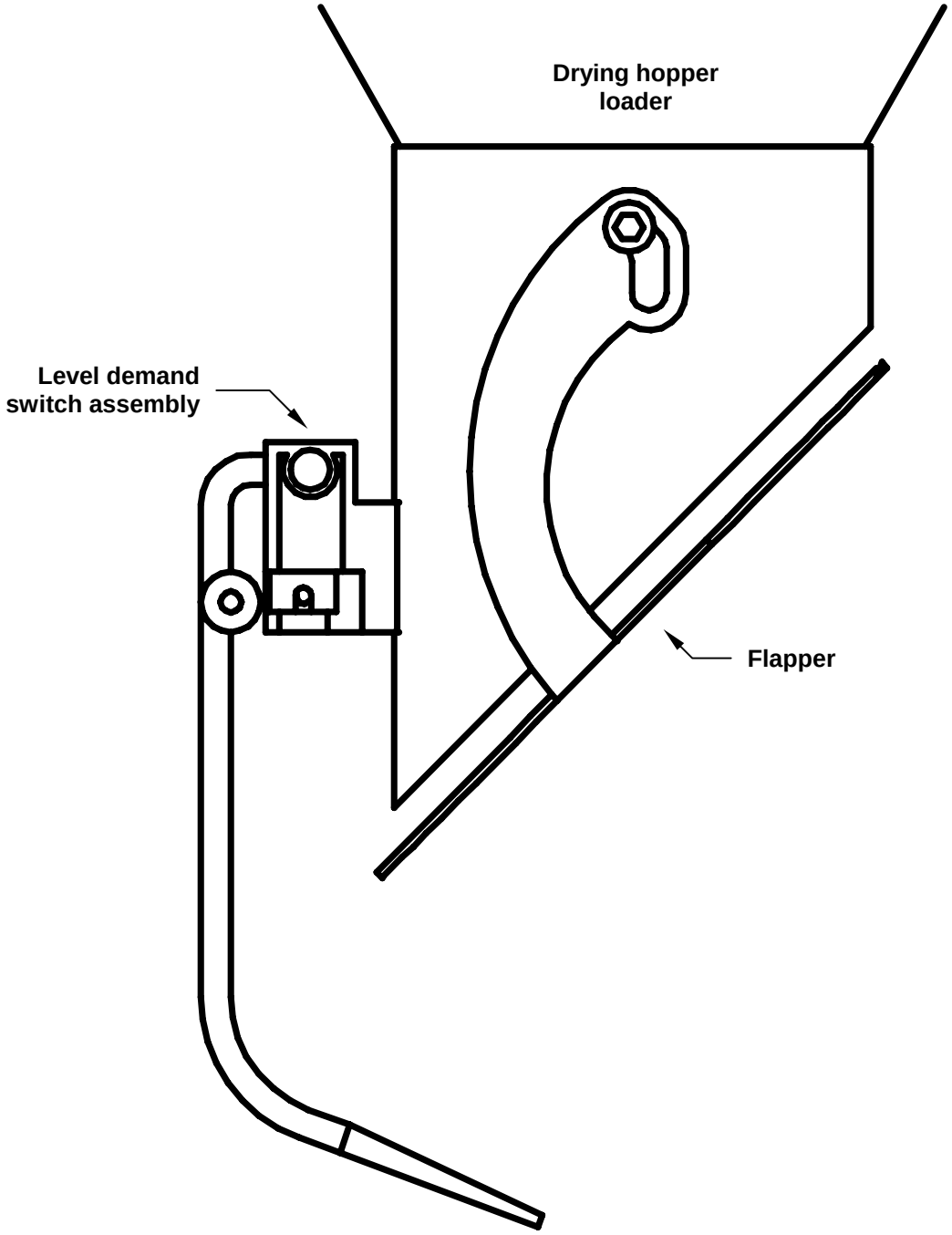
3-9 Drying Hopper Loader

Levels B and C

☑ The drying hopper loader may have been shipped loose. Mount the drying hopper loader to top cover of drying hopper. The drying cover has the appropriate bolt holes supplied to mount the vacuum hopper. See Section 3-5 on Page 18 for mounting tips.

- ☑ Complete the vacuum tubing from the filter cartridge to the vacuum inlet tube located on top of the vacuum receiver. See Section 3-6 on Page 18 for recommendations.
- ☑ Install the pickup probe. See Section 3-11 on Page 23 for pickup probe installation information.
- ☑ Connect the quick disconnect cable for the demand switch to the Nomad cart.

Figure 7
Hopper Loader Flapper Detail

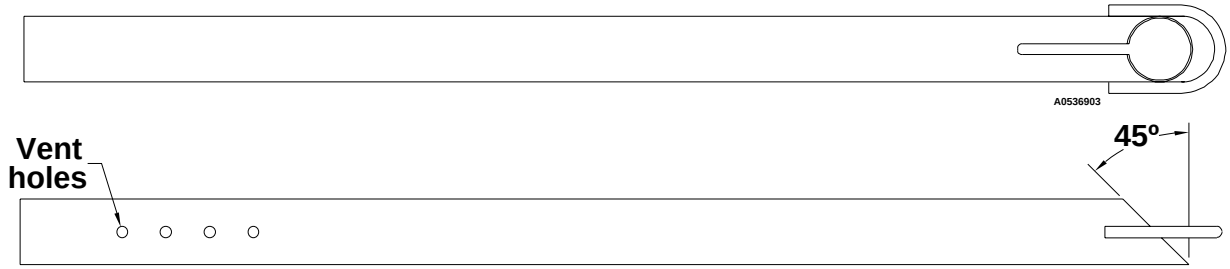

Drying hopper
loader
Level demand
switch assembly
Flapper

3-10 Installing the Pickup Probe for Hopper Loaders

Pickup probes are used to empty gaylords or bulk material containers located beside the processing machine. The VacTrac conveying system can use horizontal take-offs or vertical pickup probes (or a combination of the two) to supply material to the vacuum hoppers.

- ☑ For maximum conveying rates, locate the supply container near the vacuum hopper.
- ☑ Connect the pickup probe to a vacuum hopper material inlet tube with a minimum amount of tubing, bends, and flex hose.
- ☑ Secure the flex hose at the probe and the material inlet with hose clamps. Be sure to avoid loops and kinks, and install grounding wire around the outside of flex hose to prevent static built-up. Make sure you ground both ends of the grounding wire.
- ☑ Put the pickup probe in the material supply. The burrowing action of the probe provides a steady flow of material.
- ☑ To vary the convey rate, cover or open the vent holes on the pickup probe as needed with the inlet tube.
- ☑ If your material bridges frequently and triggers No-Convey alarm conditions, you should consider using a gaylord tilter or tilter/jogger to supply a steady stream of material to your VacTrac system.

Figure 8
Typical Pickup Probe



3-11 Connecting Cooling Water to the Optional Aftercooler

High temperature applications (300°F to 400°F / 148°C to 204°C) require aftercoolers to cool moist air returning to the dryer from the drying hopper. An aftercooler cools the return air by 100°F (38°C); this maintains dryer efficiency and condenses unwanted plasticizers from the airstream. Aftercoolers are also required in extremely low temperature applications.

Installing Water Lines

- Use the ½" (about 13 mm) brass pipe nipples for water line connections. Inlet and outlet line positions do not matter.
- Make sure you grip the nipple tightly when attaching a fitting. Doing so prevents damage to the soft copper coils. You should make connections with flexible hose to allow removing the coil assembly for cleaning.
- The aftercooler is designed to utilize either tower or city water as warm as 85ºF (29ºC). Recommended flow rate is one to three (1 to 3) gallons per minute (4 to 11 liters per minute).

3-12 Connecting Compressed Air

Note: Connect compressed air to the dryer before operation.

Caution!

Excessive air pressure damages the neoprene components of the air distribution valve.

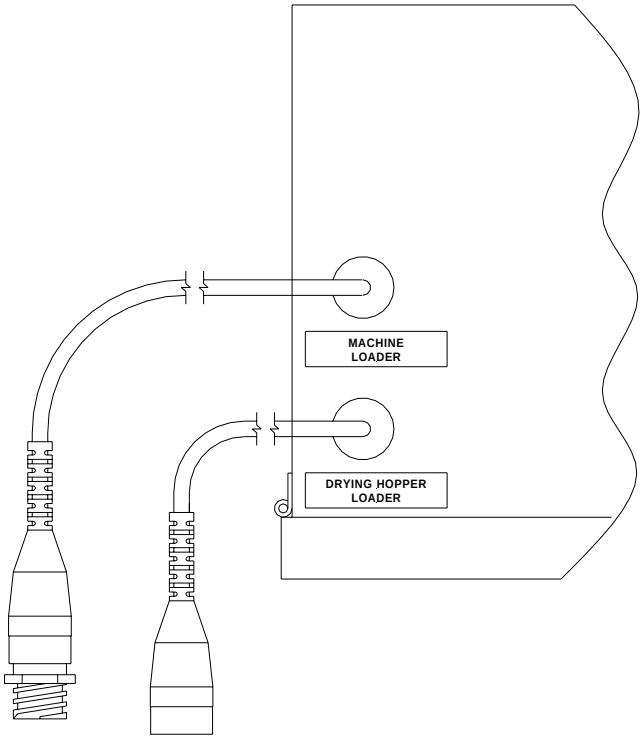
- Connect to a clean, dry, lightly lubricated source of 80 psi (551 kPa/5.51 bars)compressed air.
- A pressure gauge and regulator are recommended components of your plant air supply.
- Connect the air supply using a ¼" NPT fitting.

The compressed air indicator switch prevents the dryer from starting without an 80 psi (551 kPa/5.51 bars) air supply. If the air supply drops to below 60 psi (413 kPa/ 4.13bars) during operation, the dryer shuts down until at least 80 psi (551 kPa/5.51 bars) is restored.

3-13 Making Electrical Connections

- ☑ Fulfill all national, state, and local safety and electrical code requirements.
- ☑ Connections should be made by a qualified electrician.
- ☑ **Make sure all electrical connections are tight**.
- ☑ Connect main power to the dryer at the disconnect or terminals in the upper right corner of the control enclosure.
- ☑ Install a fused disconnect with a lockout feature in the power main leading to the dryer.
- ☑ The power drop must include a ground wire.
- ☑ Make sure quick disconnect cables are connected at the junction boxes on the sight glass loader (Machine Loader) and the optional vacuum hopper (drying hopper loader).

Figure 9
Typical Quick Disconnect Cable Connections



! WARNING !

Proper grounding of the main power line is *critical!*

3-14 Checking for Proper Blower Rotation

Three-Phase Models

The blower rotates properly when air flows from the delivery outlet and a vacuum is felt on the blower inlet.

Caution!

In three-phase models, incorrect phasing of power leads *can cause backward rotation of blower motors and CONTAMINATION OF THE DESICCANT!*

Always check blower rotation *before* putting material in the drying hopper!

If the three-phase blower rotates improperly, reverse any two wires at the fused disconnect outside the dryer or at the disconnect/terminal in the control enclosure. This assures that the blower rotates in the proper direction.

- Notes -

4 Controls

4-1 Control Panel Indicator Lights and Switches

Rocker Switches

System ON/OFF Rocker Switch

Press the **ON/OFF** rocker switch energizes or de-energizes control power to the indicator panel, allowing separate control of the dryer and conveying systems.

Dryer ON/Sequence Shutdown Rocker Switch

Press the **ON/Sequence Shutdown** rocker switch to start the dryer. Move this switch to the Sequence Shutdown position to turn off the process heaters, finish the regeneration cycle and then turn off the dryer.

Machine Loading ON/OFF Rocker Switch

Press the **ON/OFF** rocker switch to start or stop the machine loader conveying system.

Optional Drying Hopper Loader ON/OFF Rocker Switch

Press the **ON/OFF** rocker switch to start or stop the Drying Hopper loader conveying system.

Optional Alarm Silence Rocker Switch

Press the **Alarm Silence** switch to silence the horn when a high temperature alarm activates. The alarm repeats every five minutes until the problem causing the alarm condition is cleared.

Indicating Lights

Regen Blower On Light

The **Regen Blower On** indicator lights when the regeneration blower energizes.

Left Bed In Regen Light

The **Left Bed In Regen** LED lights when the left bed is in regeneration.

Left Bed Heater Light

The **Left Bed Heater** indicator lights when the left bed regenerates and is in the heat-up portion of the regeneration cycle.

Right Bed In Regen Light

The **Right Bed In Regen** LED lights when the right bed is in regeneration.

Right Bed Heater Light

The **Right Bed Heater** indicator lights when the right bed regenerates and is in the heat-up portion of the regeneration cycle.

Process Blower On Light

The **Process Blower On** indicator lights when the process blower energizes.

Process Heater On Light

The **Process Heater On** indicator lights when the process air heater is energized.

Low Compressed Air Light

The **Low Compressed Air** alarm indicator lights when the dryer compressed air supply drops below 60 psi (413kPa/ 4.13 bars). Upon loss of compressed air, the pressure switch opens and sends a signal to the PLC controller to shut down dryer operation. Dryer operation automatically resumes when 80 psi (551 kPa/ 5.51 bars) air is restored.

High Temp Process Air Light

The **High Temp Process Air** alarm indicator lights when the temperature at the process air thermocouple is above the high alarm set value. Upon high temperature alarm condition the process heaters turn off, the process blower remain on.

The alarm mode and value are factory-set to track 25º above the process set point. The alarm value is an upper-limit deviation above the process set point. When the temperature at the process thermocouple returns to within the acceptable range, the alarm output de-energizes and all heaters turn on again automatically.

High Temp Regen Air Light

The **High Temperature Regen Air** alarm indicator lights when the thermostat above the regeneration heater assembly senses an abnormally high temperature.

The regeneration heaters shut down until the temperature falls below the alarm point. The regeneration blower continues to run for cooling the heaters and desiccant bed. The alarm condition clears when the temperature drops below the thermostat setpoint. The heaters re-energize automatically.

High Dew Point Light

The **High Dew Point** alarm indicator lights when the process air delivery dew point exceeds a dew point of -10°F (-23°C).

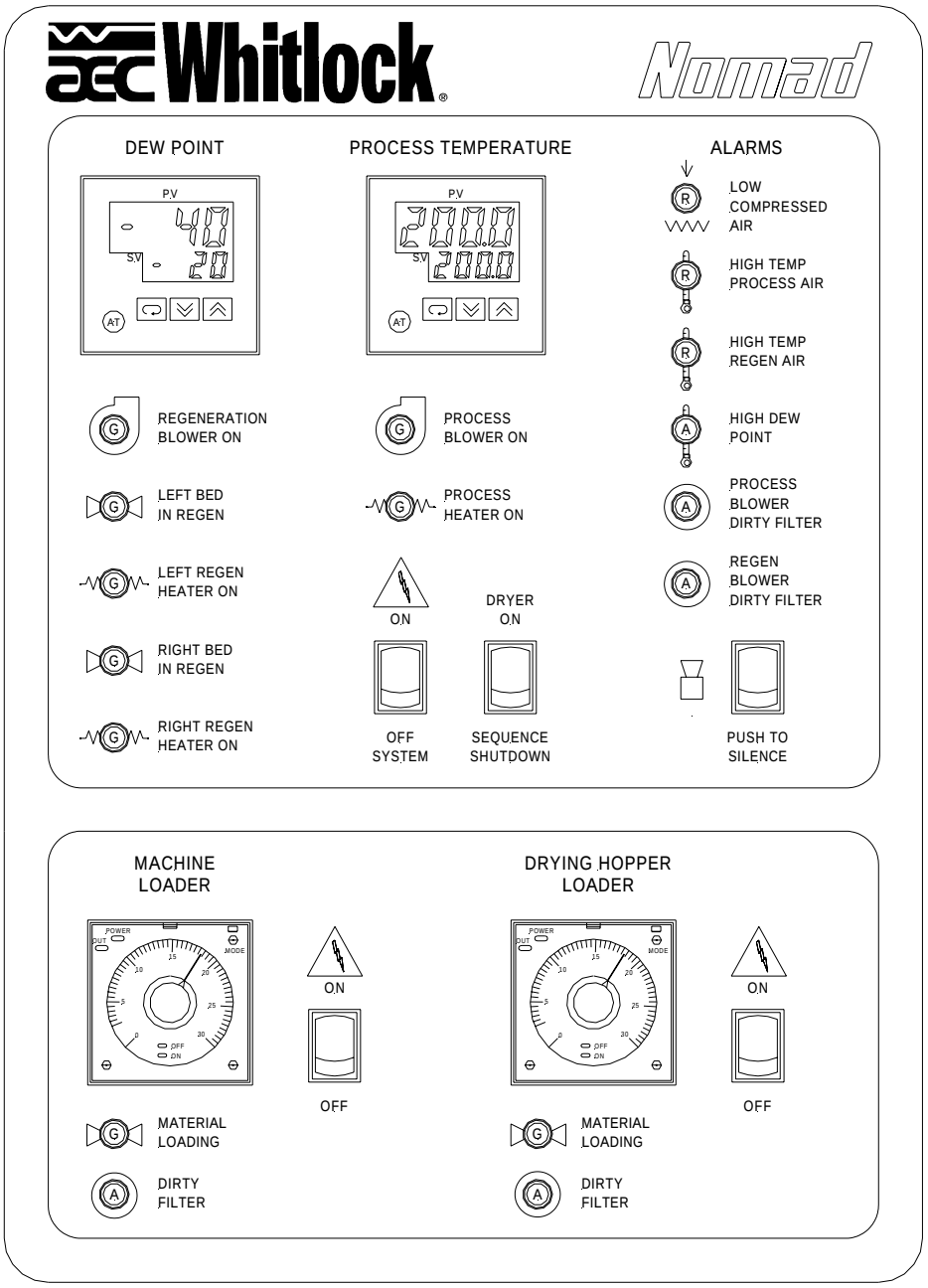
Material Loading Light

The **Material Loading** indicator lights when material is being conveyed.

Optional Dirty Filter Light

If installed, the **Dirty Filter** alarm indicator lights when the pressure differential across the process, regeneration and conveying air return filter exceeds the pressure switch setting. Service the filter when this indicator lights. The indicator and the alarm condition clears after you service and reinstall the filter.

Figure 10
Typical Nomad Interface Panel


Whitlock
Nomad
DEW POINT
PROCESS TEMPERATURE
ALARMS
PV
SV
40
20
200.0
200.0
AT
REGENERATION BLOWER ON
LEFT BED IN REGEN
LEFT REGEN HEATER ON
RIGHT BED IN REGEN
RIGHT REGEN HEATER ON
PROCESS BLOWER ON
PROCESS HEATER ON
ON
DRYER ON
OFF SYSTEM
SEQUENCE SHUTDOWN
LOW COMPRESSED AIR
HIGH TEMP PROCESS AIR
HIGH TEMP REGEN AIR
HIGH DEW POINT
PROCESS BLOWER DIRTY FILTER
REGEN BLOWER DIRTY FILTER
PUSH TO SILENCE
MACHINE LOADER
DRYING HOPPER LOADER
POWER
OUT
MODE
OFF
ON
MATERIAL LOADING
DIRTY FILTER

4-2 Process Air Dew Point Display

The Dew Point display indicates the current process air delivery moisture content. The display uses a microprocessor-based controller for reading dew point air temperature. The controller is a modular, self-contained removable unit in the mounting housing. All parameters are factory-set and adjusted; no field adjustment to the internal controls is necessary. The high dew point alarm is also factory adjusted.

4-3 Process Air Temperature Controller

AEC/Whitlock dryers use a microprocessor-based PID temperature controller for maintaining process air temperature. The controller is a modular, self-contained unit you can remove from the mounting housing. All parameters except for the process air set point is factory set and adjusted; no field adjustment to the internal controls is necessary.

4-4 Machine Loader Timer

AEC/Whitlock Nomad systems use a solid-state analog-set 1/16 DIN machine loading timer. It has a large dial for setting convey times and has several timing modes available.

4-5 Optional Drying Hopper Loader Timer

If installed, AEC/Whitlock Nomad systems use a solid-state analog-set 1/16 DIN drying hopper loading timer. It has a large dial for setting convey times, and has several timing modes.

4-6 Identifying Temperature Controller LED Indicators

—— PV —— **Process Value Numeric LED**

During normal operation, the process value (**PV**) numeric LED indicator displays the process temperature at the **To Process** thermocouple. It also lists parameters during setup and error messages if any errors occur.

—— SV —— **Set Value Numeric LED**

During normal operation, the set value (**SV**) numeric LED indicator displays the process set point you selected for the dryer. The dryer then maintains this set point temperature. This LED indicator also displays parameter and pre-set function values during setup.

OUT1 - Lit when control output 1 turns on.

The **OUT** indicator lights when the controller signals the process heaters to be energized.

OUT2 - Lit when control output 2 turns on.

Not used in this application.

MANU - Lit when the manual operation mode is being used.

STOP - Lit when control operation has been stopped.

Not used in this application.

RMT - Lit during remote operation.

Not used in this application.

AT - Flashes during auto-tuning.

SUB1 Lit when the output function assigned to auxiliary output 1 turns on.

The **SUB1** indicator lights when the process temperature exceeds the set point temperature by more than the alarm deviation value. This alarm output de-energizes the heaters. Heaters re-energize when the temperature falls within the acceptable range.

4-7 Identifying Temperature Controller Keys

 **Display Key**

This key shifts the display to the next set of parameters. Then, the menu screen displays.

 **Down Key**

The Down arrow key lets you lower the process air set point temperature. During setup, it lets you decrease the value of the parameter displayed on the set point LED readout.

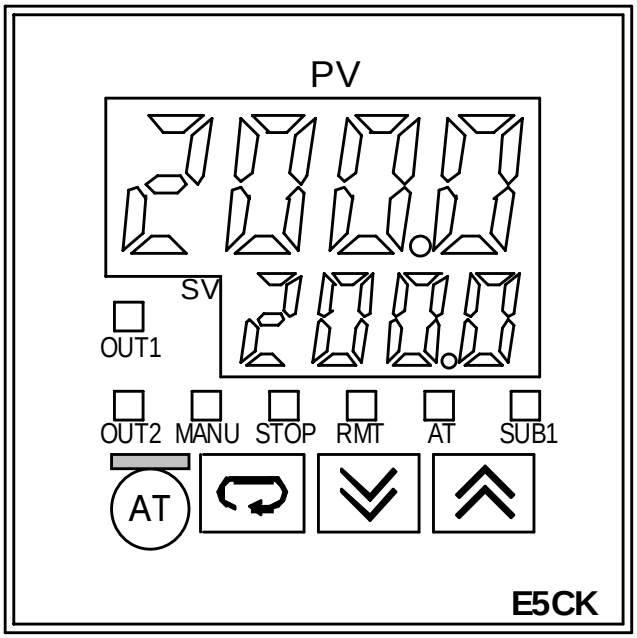
 **Up Key**

The Up arrow key lets you raise the process air set point temperature. During setup, it lets you increase the value of the parameter displayed on the set point LED readout.

Auto-Tune Key

Hold down for two seconds to initiate auto-tune. Repeat to cancel.

Figure 11
Typical Nomad Temperature Controller



4-8 Setting the Process Air Temperature

To change the process air temperature set point with the dryer running:

- Press ▲ to **raise** the set point to the temperature you want.
- Press ▼ to *lower* the set point to the temperature you want.
- Press the AT Auto-tune key to initiate auto-tuning.

4-9 Setting the Shift on Dew Point

Nomad dryers shift air flow from the on-line desiccant bed to the regenerated desiccant bed, based on actual dew point demand, not fixed time cycles. After the off-line bed regenerates, the PLC controller waits for a high dew point signal from the process air dew point controller before switching beds. The PLC controller has a four (4) -hour timer override if it does not receive a signal from the dew point control.

- Set the shift on dew point set point to the highest process air moisture content you want to allow before the dryer shifts air flow to the regenerated desiccant bed. The dew point controller is set at the factory for -20ºF (-29ºC).
- To change the dew point setting, press the  Up Arrow and  Down Arrow keys to the shift point you want.

4-10 Setting the High Dew Point Alarm

The high dew point alarm is factory set for -10ºF (-23ºC). The high dew point alarm will energize the "High Dew Point" light. Entering the Level 1 operating parameter changes the high dew point alarm setting.

1. Press  once (keep the pressure on the button for about 1-1.5 seconds) in order to switch between modes. Level 0 displays.
2. Press  to display Level 1. ***Lu-1*** displays.
3. Press  once more for about one to one and a half seconds. Now use short presses  until ***AL-1*** displays.
4. Press  and  to set the higher or lower value for the high dew point alarm.
5. Press  for about one to one and a half seconds. Level 1 displays.
6. Press  until Level 0 displays.
7. Press  for about one to one and a half seconds to go to Operating mode.

Note: The E5CK controller has several levels of securities to lock out access to parameters and menu settings. If the controller will not allow you to change settings, see Section 6-8 on Page 60 to set the E5CK security to access the function you need.

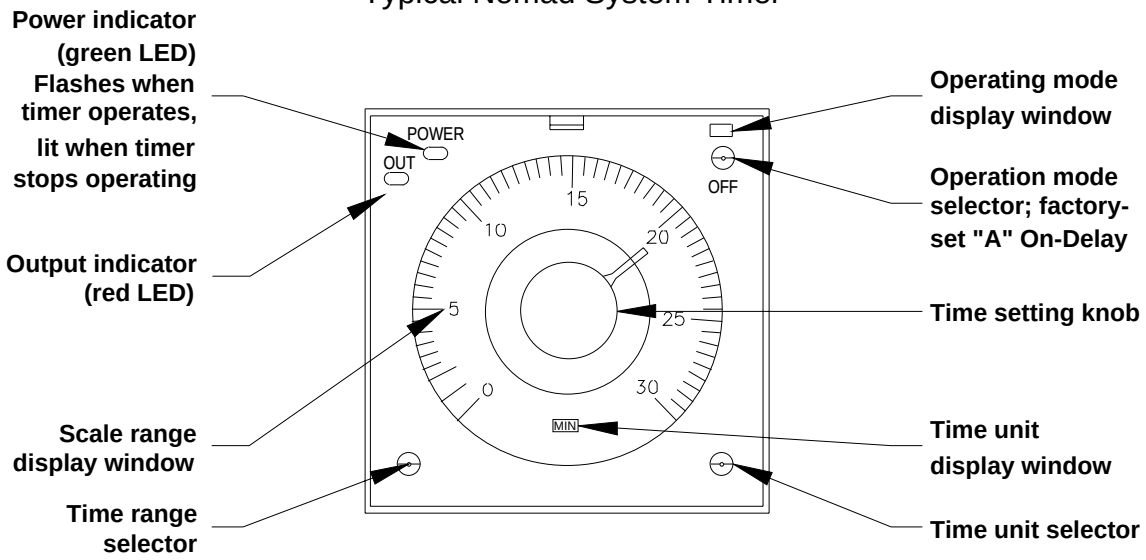
4-11 Setting the Convey Timer and Range Selection

Set the convey timer by rotating the large dial to the convey time you want. The time units is factory set for seconds. The time range is factory set to 0-30 seconds. The operating mode is set to A for on-delay. Remove the black cover to gain access to the time unit selector and the time range selector.

The rotary selector switches are located under the dial. Turn the lower right rotary selector switch to set the time unit selection. By turning the screw, the time units will cycle between seconds, minutes, hours, and ten (10) hours.

Turn the lower left rotary selector switch to set the time range selection. The dial digits appear in the windows around the time setting knob. The dial digits change when different time ranges are selected. Time ranges are 0-0.5, 0-1, 0-5 and 0-10.

Figure 12
Typical Nomad System Timer



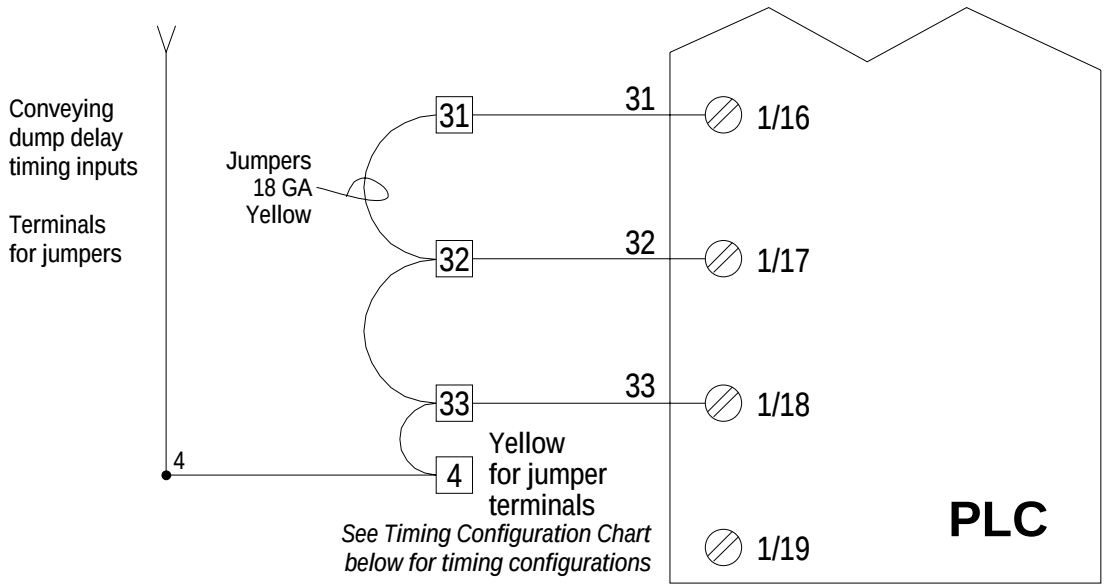
Range Selection Table

Time range	Time units			
	sec(onds)	min(utes)	hrs (hours)	10h (ten hours)
1.2	0.05 to 1.2	0.12 to 1.2	0.12 to 1.2	1.2 to 12
3	0.3 to 3	0.3 to 3	0.3 to 3	3 to 30
12	1.2 to 12	1.2 to 12	1.2 to 12	12 to 120
30	3 to 30	3 to 30	3 to 30	30 to 300
0	Instantaneous output			

4-12 Convey Dump Delay Setting

After the convey timer times out, the PLC will start a dump delay before allowing the convey cycle to start again. The dump delay time is adjusted by jumper inputs into the PLC. The yellow jumpers are wired into yellow terminal blocks located on the sub-panel. For example, a ten (10) second dump delay would have a yellow jumper wired from a number four terminal to number 33 (PLC I/18) terminal. Terminals number 31 and 32 would have no jumpers. Dump delay time is the same for both convey stations.

Figure 13
Dump Delay Settings



Timing Configuration Chart

1/16	1/17	1/18	Dump delay preset
0	0	0	5 seconds
0	0	1	10 seconds
0	1	0	15 seconds
0	1	1	20 seconds
1	0	0	25 seconds
1	0	1	30 seconds
1	1	0	35 seconds
1	1	1	40 seconds

Note: Jumpers are provided for setting the dump delay time. Use this chart to remove or add jumpers and set the dump delay time you want.

4-13 PLC Controller

The PLC controller uses an Allen-Bradley programmable logic controller (PLC). This "brick"-type controller has 32 I/O points: twenty (20) inputs and twelve (12) outputs, all inputs and outputs are 115 VAC.

All programming and logic is factory-installed on an EEPROM chip and cannot be modified. A battery backup retains programming if power fails. Battery life is five (5) years at room temperature.

If the alarm indicator blinks intermittently, replace the battery within one week.

4-14 PLC LED Indicators

Input LED Indicators

System Start/Sequence Shutdown (I/0)

When **ON**, activates the operation of the dryer portion.

Compressed Air Input (I/1)

This input point is jumpered because this unit does not contain the feature thereof.

Process Blower Enable (I/2)

Confirms the operation of the process blower.

Bed Switch Set Point Input (I/4)

Since this is strictly a time base unit, this device is jumpered so that it constantly yields power to this input point.

High Regen Temp Alarm, Right Bed (I/5)

When **OFF,** indicates a situation of a temperature exceeding the set level in the right regen bed.

High Regen Temp Alarm, Left Bed (I/6)

When **OFF,** indicates a situation of a temperature exceeding the set level in the right regen bed.

Universal Alarm Input (I/7)

Not used here.

High Process Temp Alarm (I/8)

When **ON,** sends the information to the PLC to be used later in forming alarm procedure.

Push To Silence (I/9) (Optional)

When the existing rocker switch is pressed, the audible horn will be silenced and flashing strobe will be turned off. Also, it serves as an alarm acknowledgment.

Machine Loader Power On (I/10)

When **ON,** enables the Machine Loader conveying process.

Machine Loader Demand Proximity Switch (I/11)

When **ON,** indicates a demand in the sight glass loader; this activates the conveying cycle.

Machine Loader Loading Complete (I/12)

An input coming from a conveying timer that indicates when the conveying time is complete.

Drying Hopper Convey Power On (I/13)

Optional

When **ON,** enables the Drying Hopper conveying process.

Drying Hopper Convey Demand Reed Switch (I/14)

Optional

When **ON,** indicates a demand in the Hopper Loader; this activates the conveying cycle.

Convey To Process Loading Complete (I/15)

Optional

An input coming from a conveying timer that indicates when the conveying time is complete.

Dump Relay Jumper Setup (I/16, I/17, I/18)

These inputs determine the dump delay time period—a period that follows conveying period.

Output LED Indicators

Blower On (O/0)

The **Blower On** indicator lights when the blower energizes.

Process Heater Enable (O/2)

The **Process Heater Enable** activates the process heater. The indicator lights when the process heater is energized. This condition occurs when no blower failures or high temperature conditions exist.

Right Bed Regeneration Output (O/5)

The right **Bed Regeneration Output** activates the right bed regeneration indicator lights when the right bed regenerates. When this indicator is off, the left bed is energized.

Left/Right Regen Heater Output (O/3, O/4)

The **Regen Heater Output** indicator lights when the indicated bed regeneration heater energizes.

High Regen Temp Alarm (O/6)

When **ON,** indicates a high regen temp condition in either the left or right bed.

Alarm Horn Output (O/7)

Optional

The **Alarm Horn Strobe Output** indicates a high process temperature condition and optional critical low level at the drying hopper.

Machine Loader Convey Blower (O/8)

When **ON**, the **Machine Loader** convey blower contactor is energized.

Drying Hopper Convey Blower (O/9)

Optional

When **ON**, the **Drying Hopper** convey blower contactor is energized.

Machine Loader Convey Timer (O/10)

When **ON,** the convey timer starts timing a loading process.

Drying Hopper Convey Timer (O/11)

Optional

When **ON,** the convey timer starts timing a loading process.

Status LED Indicators

Power

The **Power** indicator lights when the PLC receives 115V control power.

Run

The **Run** indicator lights when the PLC executes the program in normal conditions.

Fault

The **Fault** indicator lights when the PLC program has a problem or failure condition.

Force

The **Force** indicator is not used.

Figure 14
Typical Subpanel Layout

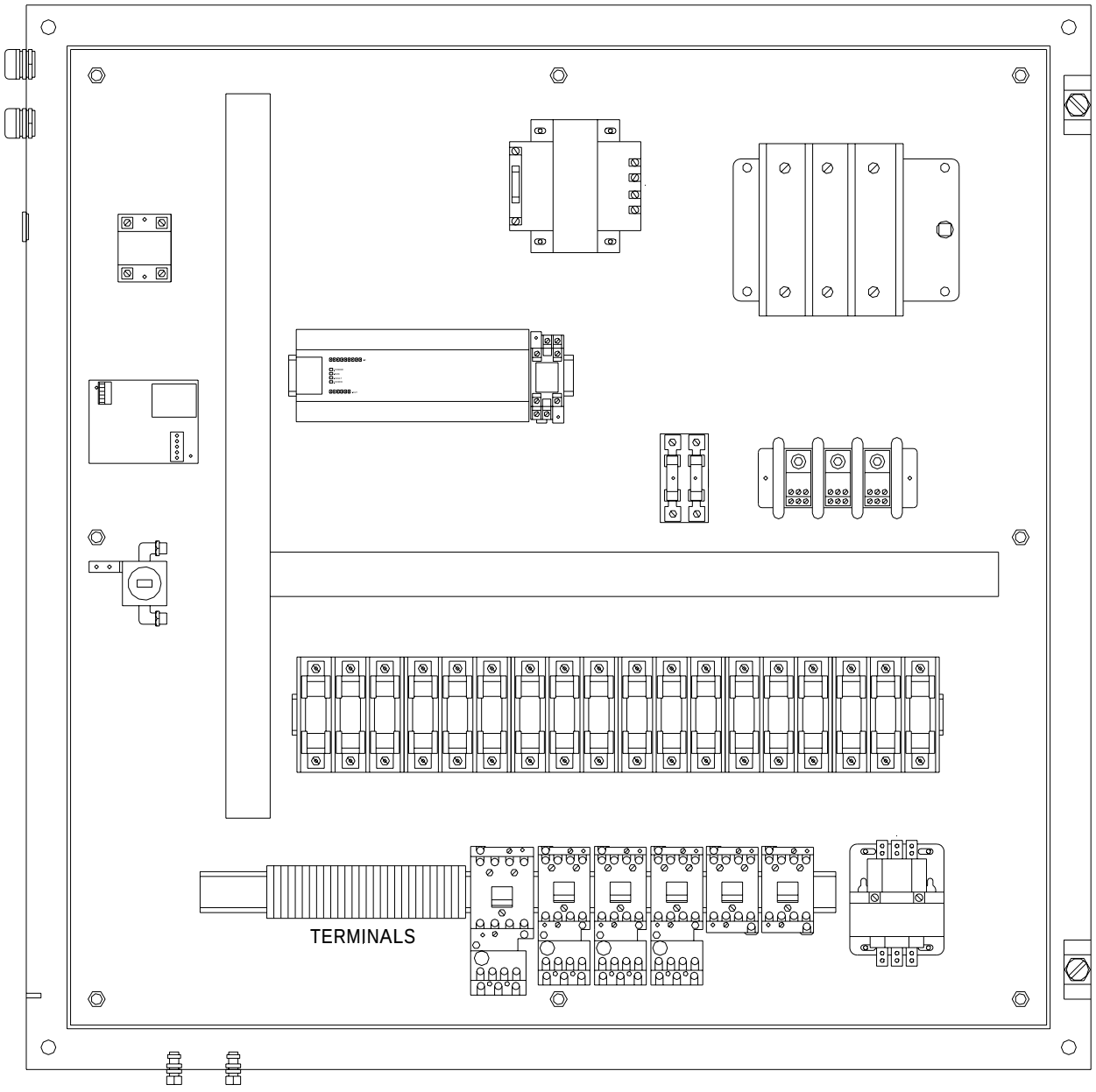


Figure 15
Typical PD2-4 Electrical Schematic, Drawing 1

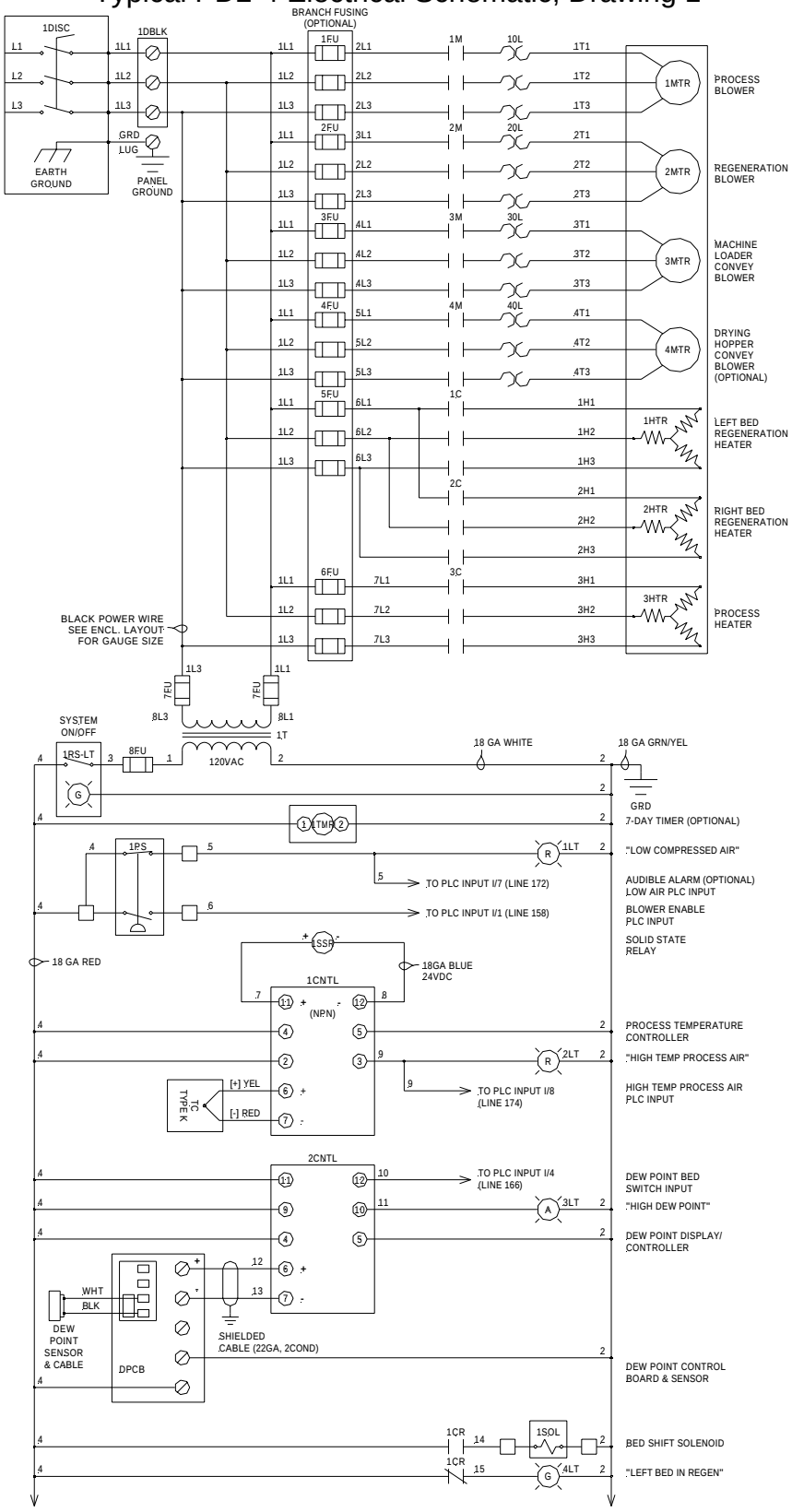
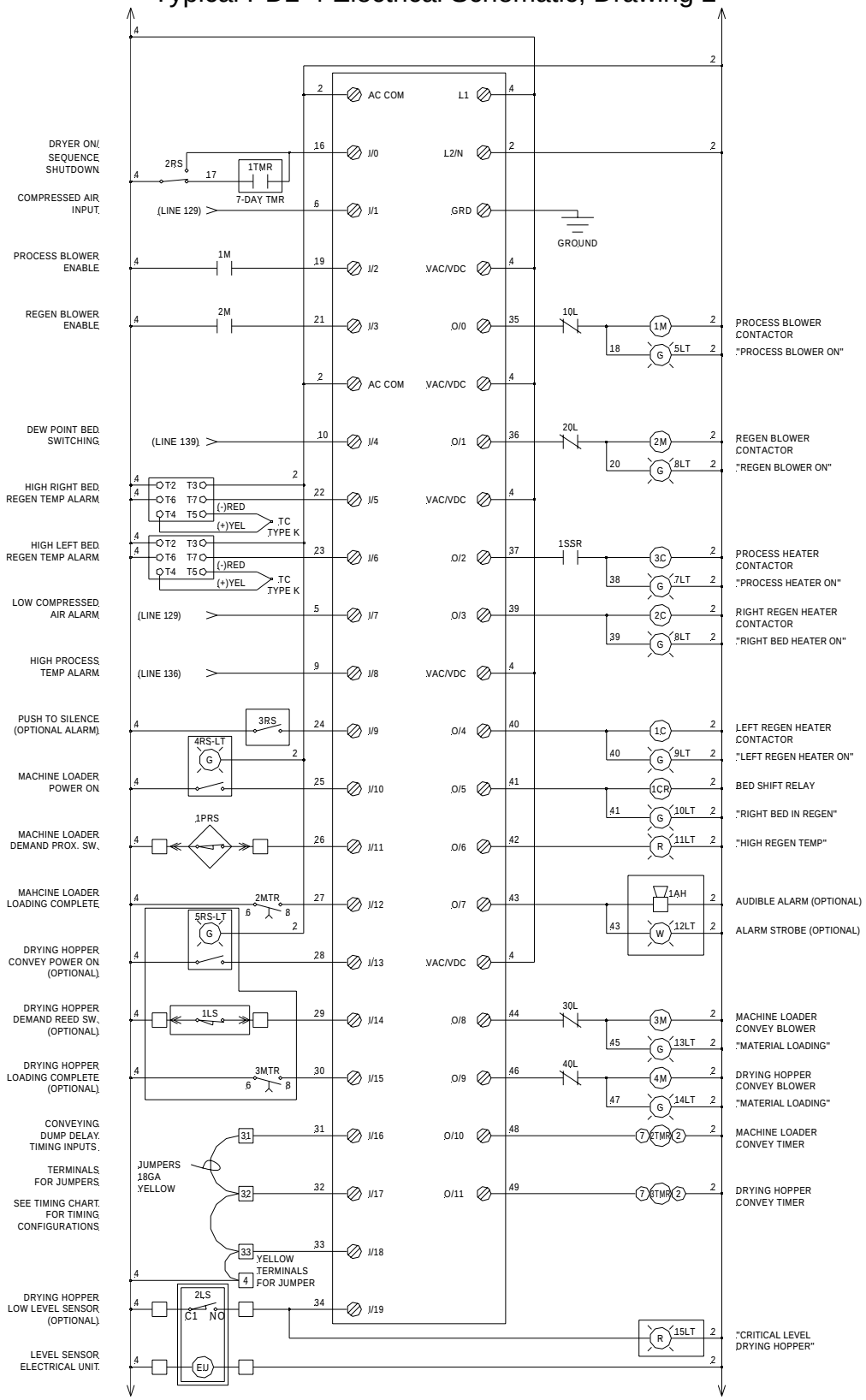


Figure 15
Typical PD2-4 Electrical Schematic, Drawing 2

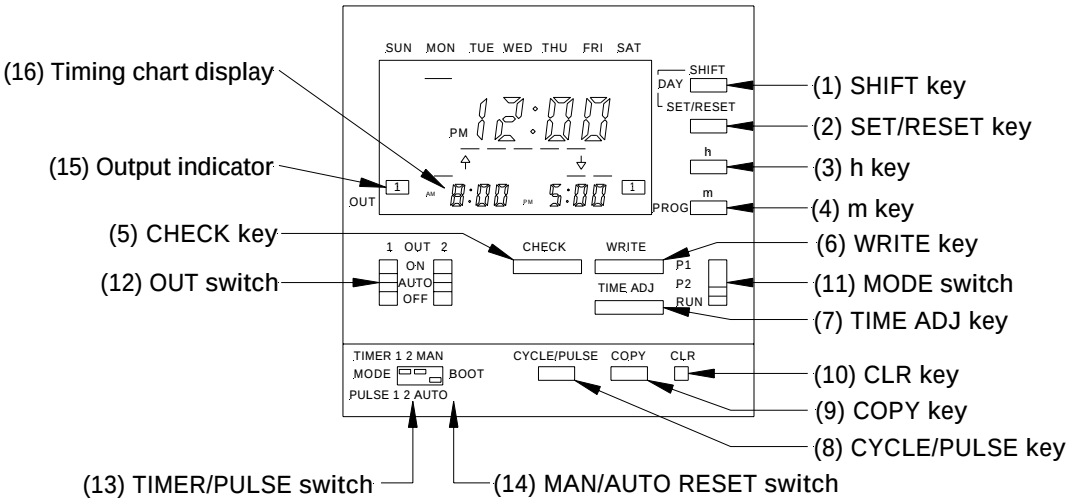


These schematics are for **reference only**. Refer to the electrical schematic in your Customer Information Packet.

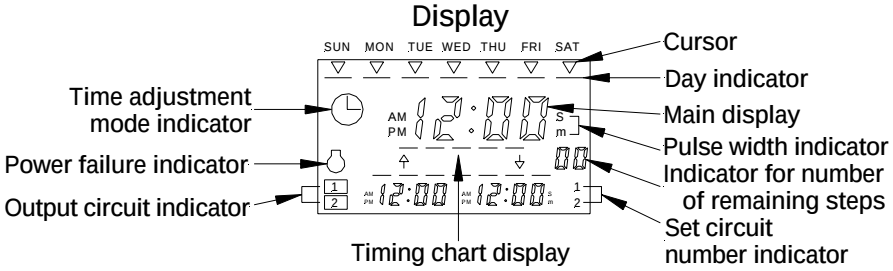
4-15 Optional Seven Day Timer

The seven-day timer can be programmed for daily or weekly (over midnight) on/off operation. An internal battery back up holds the settings in memory when the dryer is de-energized.

Timer



Display



No.	Function
1	Shifts the cursor (∇) specifying a day to the right.
2	Sets or cancels (reset) a specified day.
3, 4	Sets a time or ON/OFF time width. (hours, minutes)
5	Monitors the parameters set for an operation during an operation.
6	Sets parameters. (Write)
7	Sets a time adjustment mode.
8	Specifies a cyclic operation, or sets a pulse width. (Not used)
9	Specifies a day substitution operation. (Copy)
10	Cancels the parameters set for each circuit, or a day substitution operation.
11	P1: Circuit 1 programming mode. P2: Circuit 2 programming mode. Run: Run mode.
12	ON: Turns on the output regardless of the program AUTO: Executes according to the program. OFF: Turns off the output regardless of the program.
13	TIMER: Executes an ordinary timer or cyclic operation. PULSE: Executes a pulse-output operation.
14	Specifies automatic or manual operation following a power failure.
15	The Output indicator will light when the timer output is energized. (Dryer On)
16	Displays the time at which the next operation will be preformed.

Important!

For timer operation, the "System Power" rocker switch must be in the "ON" position and the "Dryer/on Sequence shutdown" rocker switch must be in the "SEQUENCE SHUTDOWN" position.

- The **OUT** switch (#12) should be set to **AUTO**.
- The **P1**-**P2 RUN** mode switch (#11) should be set to **RUN** for normal 7-day timer operation, set to **P1** for changing times; **P2** is not used. Open the front cover; the **MODE** switch (#13) must have Mode 1 set to **TIMER** (up); **2** is not used, **BOOT** (#14) is set to **AUTO** (down).
- Program 1 is operational; Program 2 is **not used**.

Note: To bypass the 7-day timer operation, turn the 7-day timer **OUT** switch (#12) to off. Turn the **Dryer/On Sequence Shutdown** rocker switch located on the dryer control panel to **DRYER ON**.

Programming the Optional Timer

Setting the Current Day of the Week, Hour, and Minute

1. Apply main power to the dryer.
2. The 7-Day timer **MODE** selector switch (#11) should be in the **RUN** position.
3. Hold the **TIME ADJ** key (#7) for 1 second or longer.
4. Press the **SHIFT** key (#1) to move the cursor (∇) to the desired day position. Holding down this key advances the day.
5. Press the **SET** key (#2). The bar mark will turn on under the chosen day.
6. Press the **h** key (#3) to adjust the hours. Holding the key will rapidly advance the hour.
7. Press the **m** key (#4) to adjust the minutes.
8. Press the **WRITE** key (#6) to store the correct time.
9. The time and day can be adjusted or changed while the timer is operating.

Daily Timer Operation

Daily time is typically set to operate from 8:00 AM and to stop at 5:00 PM from Monday through Friday.

1. Set the **MODE** switch (#11) to **P1**.
2. Press the **SHIFT** key (#1) to move the cursor to the desired day of the week. Or select several days at once by using the **SHIFT** (#1) and **SET** keys (#2). The bar mark will turn on under the chosen days.

3. Press the **SET** key (#2).
4. Set the desired start time by pressing the **h** key (#3) to adjust the hour. Holding this key will rapidly advance the hour.
5. Press the **m** key (#4) to adjust the minutes.
6. Press the **WRITE** key (#6) to store the start time in the timer memory.
7. Next, set the stop time by using the **h** and **m** keys, then press **WRITE**.
8. Turn the **MODE** switch (#11) to run.

Multiple-Day Operation

Multiple day operation will start the dryer on one day and run continuously for several days before stopping the dryer.

1. Turn the **MODE** switch (#11) to **P1**.
2. Select the desired start day with the **SHIFT** (#1) and **SET** keys (#2).
3. Set the start time with the **h** and **m** keys.
4. Press the **WRITE** key (#6) to store the dryer startup hour in the timer memory.
5. Next cancel the day that was just set by using the **RESET** key (#2).
6. Now select the stop day by using the **SHIFT** (#1) and **SET** key (#2).
7. Set the stop time with the **h** and **m** keys.
8. Press the **WRITE** key (#6).
9. Turn the **MODE** switch (#11) to **RUN**.

Checking the Set Time

The set times can be checked in the sequence the timer is to operate.

1. Press the **CHECK** key (#5). Each time the key is pressed the operation schedule is displayed in the time sequence.
2. If the time switch is left untouched for 20 seconds during check, the display automatically returns to **RUN** mode.

Day Override

If a holiday occurs during the weekly operation, the off time for Sunday can be executed for the holidays. The override will execute for one week only, then the timer will automatically go back to the previous program.

1. Hold the **COPY** key (#9) for one (1) second or longer. Make sure that the mode selector switch is in **RUN** mode.
2. Select the day(s) you want with the **SHIFT** (#1) and **SET** keys (#2). If a previous override had been set, this will show up when you first hold the **COPY** key. To clear a previous override, press the **CLR** key (#10).
3. Press the **WRITE** key (#6).
4. Select Sunday (or another shutdown day) with the **SHIFT** (#1) and **SET** keys (#2).
5. Press the **WRITE** key (#6).

Canceling the Settings

All the operations can be cancelled.

1. Set **MODE** selector switch (#11) to **P1**.
2. Press the **CLR** key (#10).

Note: The 7-day timer cycle and pulse output are not used for dryer applications.

- Notes -

5 Startup, Shutdown, and Operation

5-1 Pre-Startup Checks

1. Verify that the drying hopper is clean of rust-prohibitive oil or any foreign objects.
2. Verify that process and return hose connections are tight.
3. If your dryer has a water-cooled aftercooler, make sure that sufficient cooling water flows properly through the coil and that you have bled any trapped air from the system. Make sure that the aftercooler has the proper supply water temperature.
4. Check all companion equipment, such as the sight glass loader and drying hopper loader; verify that all convey tubing is in place and the loading system is ready for operation.
5. Make sure quick disconnect cables are connected at the junction boxes on the sight glass loader (**Machine Convey**) and the optional vacuum hopper (**Drying Hopper Convey**).
6. Verify that all electrical connection are **tight** and the unit is properly grounded.
7. With main power on, turn the dryer on until the process blower starts, verify blower rotation.
8. Turn on the machine loader and verify blower rotation; repeat for the drying hopper loader.

Important!

Clean the rust-preventing oil from inside the drying hopper.

Failure to clean the hopper fouls the desiccant and *voids your warranty!*

5-2 Startup

1. Turn on (energize) the disconnect switch in your power drop.
2. Turn the system **ON/OFF** switch to **ON** to energize the display panel.
3. Close the slidegate at the bottom of the drying hopper.
4. On three-phase models, make sure that the blowers turn in the right direction.
5. Fill the drying hopper with material. Use optional Drying Hopper Loader by turning on the Drying Hopper Loader **ON/OFF** switch and setting the convey timer.
6. Turn the **DRYER ON/SEQUENCE SHUTDOWN** switch to **ON** to start the dryer.
7. The process blower will start.
8. Set the process set point on the temperature controller to the recommend drying temperature provided by the resin manufacturer. Press and hold the Auto-Tune key on the process temperature controller for two (2) seconds to initiate the auto-tune function.

9. After the proper pre-drying time for the initial hopper fill has elapsed, fully open the drying hopper slide gate.
10. Turn the machine loader **ON/OFF** switch to **ON,** and set the convey timer for the proper conveying time. A ten- (10-) second convey time is recommend to start.
11. Adjust the inner tube on the take-off compartment if material does not flow easily to the sight glass loader on the molding press.
12. If you are running out of material at the sight glass before the machine loader starts the convey cycle again, lower the dump delay time by adjusting the yellow jumpers inside the control panel.

Note: To allow proper residence time during continuous processing, maintain the material level in the hopper at the midpoint of the air trap assembly.

5-3 Shutdown

1. Turn off the conveying system supplying the drying hopper.
2. When processing is complete, close the hopper slide gate and shut down any in-line companion equipment, such as the aftercooler.
3. Turn the **dryer ON/OFF** selector switch to the **SEQUENCE SHUTDOWN** position. The sequence shutdown operation turns off process heaters and keeps the process blower on for twenty minutes to cool down the process. The regeneration cycle of the off-line bed completes the cycle before the dryer shuts down completely.
4. To override the sequence shutdown turn the system **ON/OFF** switch to **OFF**.
5. To completely shut off the unit after sequence shutdown has completed, turn the system **ON/OFF** switch to **OFF**.
6. If needed, empty the drying hopper.
7. For maintenance or a long term shutdown, open (de-energize) the electrical disconnects at the dryer and at the power drop.

6 Maintenance

6-1 Work Rules

The installation, operation, and maintenance of this equipment is to be conducted in accordance with all applicable work and safety codes for the installation location. This may include, but is not limited to, OSHA, NEC, CSA, and any other local, national, and international regulations.

In addition, you must observe the following specific work rules:

- ☑ Keep these operating instructions on hand and follow them when installing, operating, or maintaining your dryer.
- ☑ If these instructions become damaged or unreadable, you can obtain additional copies from AEC/Whitlock.
- ☑ Only qualified personnel familiar with this equipment should work on or with this unit.
- ☑ Work only with approved tools and devices.
- ☑ Disconnect power before servicing your dryer. If the disconnect switch you installed has a lockout, lock it in the **OFF** position before you perform any maintenance or service.

6-2 Servicing Process Air Filters

Important!

Operating the dryer without the process air filter installed *voids your warranty!*

Filter cleaning is an important part of your dryer maintenance program.

Nomad carts have a single cartridge canister-type filter in the process and conveying air loop. The process filter is mounted above the process blower on the rear of the dryer. The conveying filters are located under the drying hopper next to the conveying blowers. These filters protects the blowers from plastic fines drawn in from the drying hopper. Regular filter cleaning is essential to keep your dryer operating at peak efficiency.

You can wash or blow out the filters, but remember, you reduce dirt holding capacity with each washing. The risk of dirt reaching the clean side of the filter during cleaning, plus possible filter damage from high pressure washing or blowing, makes washing a gamble.

You can carefully clean or wash the filter when airflow becomes restricted. Do **not** wash filters more than six (6) times or use them for more than a year, whichever comes first.

Use a detergent that won't damage filter media. Such a detergent permits easy removal of dirt particles through flushing and rinsing. An effective detergent removes the fine particles from the pores of the filter media.

The filter manufacturer recommends FM 1400 washing compound. It is formulated specifically for air filter element cleaning. It is non-sudsing and works in hot or cold water. FM 1400 contains biodegradable synthetic detergents and is non-phosphate, non-NTA. For more information, contact Filter Service Corporation, 2603 A West Main, Farmington, NM 1-505-326-1127.

Recommendations for Cleaning and Replacing Filters

- Turn off and/or lock out electrical power to the dryer.
- Remove the threaded fastener securing the filter access cover, then remove the cover.
- Remove the nut on the center retaining rod to remove the filter cartridge.

Vacuuming

Try vacuum-cleaning a soiled filter first. Vacuuming removes most large particles and surface contaminants, and may suffice for the first time you clean a filter. Use a commercial-duty (recommended) or household vacuum cleaner. Vacuum the filter from the air intake (dirty) side only.

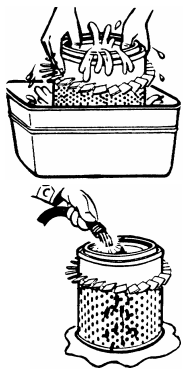
Cleaning with Compressed Air

Blow clean, dry compressed air up and down the pleats, blowing out the filter from the clean side. Remove loose dirt from the filter with compressed air or a water hose. Compressed air should be less than 100 psi (689.5 kPa/6.89 bars). Use a ⅛" (3 mm) dia. nozzle at least 2" (5 cm) away from the filter. Don't shoot the air in a crisscross motion against the grain of the pleats—you may damage it.

Washing

As a last resort, wash the filter. However, do so only if the pressure drop is too high from fine dirt embedded in the filter, or if oily mist is present near the intake air location. Soak in a solution of FM 1400 or comparable detergent and warm water from five to ten minutes, then gently agitate for several minutes.

Rinse thoroughly with clean water to remove all detergent.



Important!

Let the filter dry completely before returning it to service!

A damp filter can contaminate the closed loop system of the dryer.

Do not use a light bulb to dry the filter. You should get satisfactory filtration after second or third washings; however, dirt-holding capacity of the filter **decreases** after each washing.

After each cleaning:

- Inspect the filter element. *Briefly* hold a light bulb behind the element and look for any fatigued paper or residual dirt. Inspect for holes and tears by looking though the filter toward a bright light. Check for damaged gaskets or dented metal parts. ***Do not re-use a damaged filter!***
- Inspect the end plates. Any damage here can allow air to bypass the filter.
- Look for rust on the end plates and metal core. Rust particles can flake off and contaminate the dryer and resin.
- Check the gasket for damage. A damaged gasket allows contaminants into the process. Replace as needed.
- Allow the filter to dry before re-using. Circulate warm air at less than 160ºF (71ºC). Do not use a light bulb to dry the filter.

6-3 Servicing the Dew Point Monitor

The accuracy of the dew point monitor on Nomad cart systems depends on proper operation of the dew point sensor and the control board. The dew point sensor is in the process air stream and is therefore susceptible to contamination.

Dew point sensor life depends on:

- Air temperature and flow passing over the sensor.
- The amount of fines (dust) in the process air.
- The amount of plasticizer vapor in the process air.

The dryer operator should monitor the initial dew point sensor readings and establish a periodic replacement schedule as needed.

Caution!

Do not attempt to check the continuity or resistance of the dew point sensor.

The sensor will be destroyed!

6-4 Symptoms of Worn Desiccant

The moisture absorption capacity of the desiccant used in your AEC/Whitlock dryer degrades after an indefinite period of time. Useful life depends on variables such as material moisture content, plasticizer vapors in the return air, and number of regeneration cycles.

Your AEC/Whitlock dryer may need new desiccant if it exhibits any of the following symptoms:

- Plastic material is not being dried sufficiently (high scrap/reject rate).
- Air temperature at the top of the regenerating desiccant bed rapidly climbs to 350°F (177ºC) or more shortly after the start of regeneration, even though a saturated bed has just started heating.
- The process air dew point measured with a portable dew point monitor is higher than -10°F (-23ºC) throughout the process drying cycle.
- Smoke or dust blows out of the process air outlet.
- Noticeable amounts of desiccant in the beds is a medium-brown color or darker.

If you notice any of these signs, replace the desiccant in the desiccant beds. Desiccant replacement kits are available from the AEC/Whitlock Parts Department. If you want, an AEC/Whitlock technician can repack desiccant beds at your site.

! WARNING !

Desiccant material causes eye irritation!

Breathing may be harmful and may cause skin irritation!

- **Do not get in eyes.**
- **Avoid prolonged contact with skin.**
- **Use with adequate ventilation.**
- **Wash thoroughly after handling.**

: FIRST AID :

In case of eye contact,
immediately flush eyes with plenty of water
for at least 15 minutes.

If irritation persists, see a physician.

6-5 Replacing Worn Desiccant

Caution!

Make sure desiccant beds are sufficiently cool before replacing worn desiccant.

1. Disconnect the electrical and compressed air supply.
2. Remove the rear and side shrouds to expose the desiccant beds.
3. Free the bed covers by removing the hex nuts on the retaining rods and remove the upper screens from both beds.
4. Remove the desiccant in one of the following ways:
   - Vacuum out the desiccant.
   - Remove the entire bed from the frame and dump it out. To do this, remove the hose connections, unclamp the beds, and unbolt from the regen heater assembly.

   Make sure the bed interiors are clean.

Important!

You should properly dispose of any discarded desiccant. Consult local disposal regulations for more information.

Before re-packing the beds, determine the proper amount of desiccant for the dryer being serviced. See Figure 14 on the following page for more information. Pre-measured desiccant kits are available from the Whitlock Parts Department at AEC, Inc.

Attach the beds to the frame for Steps 6 through 9.

6. Carefully place half of the large bead in the bottom of the beds, in an even layer, on the bottom screen. Place the small bead on top of it, in an even layer.

   Carefully place an even layer of the remaining large beads over the small beads.
7. Install the top screen, making sure that the edge is in contact with the sides of the bed all the way around. Install the washers and nuts and tighten down.

   Gently tap the around the sides of the desiccant canister with a rubber mallet to settle the desiccant. As settling occurs, re-tighten the nuts.

   Repeat the tapping and tightening process until little additional settling occurs.
8. Install the covers and gaskets on the beds, making sure they are tight and sealed. Replace desiccant bed gasket if necessary.
9. Re-connect any hoses that were disconnected.

10. Re-install the rear and side shrouds. Re-connect the compressed air supply and electrical power.

Figure 16
Required Desiccant Amounts per Bed; Type 4X Desiccant (2 beds per unit)

Dryer model	Large bead (Type 4X)			Small bead (Type 4X)			Total per bed	
	Part no.	lbs.	Kg	Part no.	lbs.	Kg	lbs.	Kg
WD90	W00000892	3.0	1.362	W00000893	21.0	9.534	24.0	10.896
WD100		3.0	1.362		21.0	9.534	24.0	10.896
WD150		9.0	4.086		30.0	13.620	39.0	17.706
WD225		9.0	4.086		30.0	13.620	39.0	17.706

Type 13X Desiccant

Dryer model	Large bead (Type 13X)			Small bead (Type 13X)			Total per bed	
	Part no.	lbs.	Kg	Part no.	lbs.	Kg	lbs.	Kg
WD90	W00018050	3.0	1.362	W00018051	21.0	9.534	24.0	10.896
WD100		3.0	1.362		21.0	9.534	24.0	10.896
WD150		9.0	4.086		30.0	13.620	39.0	17.706
WD225		9.0	4.086		30.0	13.620	39.0	17.706

6-6 Replacing the Process Heater

Nomad Series dehumidifying dryers use Calrod-type heater elements mounted in a heater tube located in the top rear of the cabinet. The wattage of the heater varies with model, voltage, temperature range, etc., but the replacement procedure is the same.

! WARNING !

Disconnect and lock out power before you replace heater elements!

Procedures

1. Remove the bolts securing the process heater access cover.
2. Sketch the heater wiring configuration so you can properly re-wire the heater.
3. Remove the wires to the heater plate assembly being removed or replaced.
4. Remove the bolts securing the heater plate assembly, and slide out the assembly.
5. Remove the heater from the mounting plate by removing the large brass nuts and washers.

6. Re-install the heater and heater plate assemblies in reverse order. Install new heater gaskets and securely tighten all fasteners.

Caution!

Heater loops should not touch each other.

"Hot spots" lead to premature heater failure!

7. Reinstall the wires based on the sketch you made earlier.
8. Secure the heater access cover.

6-7 Replacing the Regeneration Heater

Nomad Series dehumidifying dryers use heater elements located below each desiccant bed.

! WARNING !

Disconnect and lock out power before you replace heater elements!

1. Remove the cover plate secured by bolts.
2. Sketch the heater wiring configuration so you can properly re-assemble the heaters.
3. Remove the wiring for the heater being removed or replaced.
4. Remove the bolts securing each heater mounting plate. Slide out the heater.
5. Re-install the new heaters in reverse order. Install new heater gaskets and securely tighten all fasteners.

Caution!

Heater loops should not touch each other.

"Hot spots" lead to premature heater failure!

6. Re-install the wiring based on the sketch you made earlier.
7. Secure the heater access cover.

6-8 Restoring the E5CK Temperature Controller and Dew Point Meter to Factory Setup

If preset parameters on the controller have been tampered with and it no longer properly controls temperature and displays dew point, you can restore the controller to factory setup.

E5CK Operating Parameters

The E5CK has several mode selections. Within each mode are numerous parameters that can be set. The setting is different for the temperature control unit and the dew point display.

Before you can access the several modes of operating parameters, you must change the security lock-out of the controller. AEC factory sets the security level to protect the parameters from being accidentally changed. Below is an explanation of the operating modes, how to change out the security level and the AEC default settings.

Available E5CK Modes

Menu Display

Level 0 Mode

For normal operation. Execute AT auto-tuning, change to manual mode.

Level 1 Mode

For adjusting primary control parameters. Execute: Set alarm values; set the control period; set PID parameters.

Level 2 Mode

For adjusting secondary control parameters. Nomad Cart uses E5CK default settings.

Setup Mode

For setting the basic specifications. Set parameters for input type, scaling, output assignments and direct/reverse operation.

Expansion Mode

For setting expanded functions. Set: ST (self-tuning), SP setting limiter. Select: advance PID or **ON/OFF** control.

Option Mode

This mode is only accessible when and option board is installed.

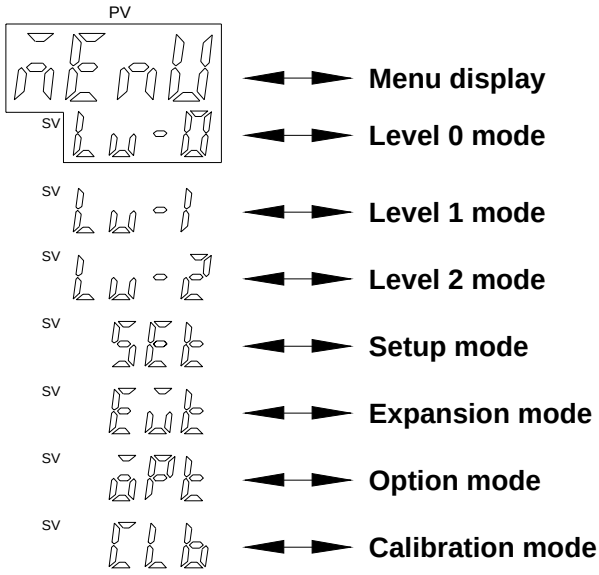
Calibration Mode

For calibrating communication unit E53-CKF. Not used.

Manual Mode

Sets the controller to manual operation mode. Not used on Nomads.

Figure 17
Display Readout for Mode Settings



Setting E5CK Security in Protect Mode

1. To access protect mode, press and hold the AT **AT** key and the display key for more than one and a half to two (1.5 to 2) seconds.

2. The display should read ***SECr*** for security mode. If you press the display key for short presses you will toggle between (***SECr***) and (***KEYP***) for AT protect.

3. With the display reading ***SECr***, set the security levels by the arrow up and down keys. Change the security level to 1 to make changes to the operating parameters. The temperature controller is factory set to Security Level 5, the dew point indicator is factory set to Security Level 3.

Available Security Levels

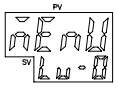
Mode	Security level						
	0	1	2	3	4	5	6
Calibration	X						
Option	X	X					
Expansion	X	X					
Setup	X	X					
Level 2	X	X	X				
Level 1	X	X	X	X			
Level 0	X	X	X	X	X	X	

Any mode marked with an X is displayed in the Security Level indicated. To return to the main display (run mode), press and hold the AT and display key for 1.5 to 2 seconds.

Entering Operating Parameters to Select Modes

To enter the menu display:

1. Press  for one second (keep the pressure on the button for about 1.5 to 2 seconds).

   The screen displays  .

2. Press the  Up Arrow key to toggle through the different modes.

   The **SV** readout displays the mode you selected.

3. To switch parameters within a mode, press the  Display key once more for about one and a half to two (1.5 to 2) seconds.

   The **PV** readout displays the different parameters within each mode.

4. Use short presses on the  Display key to display each parameter within a mode.

   The **SV** readout displays the different values for the parameter within a mode.

5. Press  and  to set the higher or lower the values of a parameter.

6. Press  for about one and a half to two (1.5 to 2) seconds to move up a level back into the different modes.

7. Press  until Level 0 displays.

8. Press  for about one to one and a half (1 to 1.5) seconds to go to Operating mode.

Factory Settings E5CK for Process Temperature

1. Remove controller from housing and check for output board number E53-QR4R (Pulse NPN/Relay).
2. Make sure jumper setting for input type is set for thermocouple **TC-PT**, middle jumper.
3. Return controller to housing.
4. Press the  Display key for one (1) second to enter Menu Display.
5. Press the  Arrow Up key to get to Setup mode.
6. To switch parameters within Setup mode, press the  Display key.

Figure 18
Setting List for Process Temperature Controller, Part No. A0548565

Mode	Parameter	Setting range	Default	AEC setting
Protect	SECr Security	0 to 6	1	5
Protect	YEYP A/M Key Protect	ON/OFF	OFF	ON
Manual	Manual MV	-5.0 to 105.0%	0.0	Default

Mode	Parameter	Setting range	Default	AEC setting
Level 0	SP Set Point	SP Lower Limit to Upper Limit EU	0	Default
Level 0	r-S Run/Stop	Run/Stop	Run	Default
Level 1	SP-0 Set Point 0	SP Lower to Upper EU	0	Default
Level 1	SP-1 Set Point 1	SP Lower to Upper EU	0	Default
Level 1	AL-1 Alarm Value 1	-1999 to 9999 EU	0	25.0
Level 1	AL-2 Alarm Value 2	-1999 to 9999 EU	0	25.0
Level 1	AL-3 Alarm Value 3	-1999 to 9999 EU	0	Default
Level 1	P Proportional Band	0.1 to 999.9% FS	10.0	4.4
Level 1	I Integral Time	0 to 3999 SEC	233	84
Level 1	d Derivative Timer	0 to 3999 SEC	40	13
Level 1	C-SC Cooling Coefficient	0.01 to 99.99	1.00	Default
Level 1	C-db Dead Band	-19.99 to 99.99%FS	0.00	Default
Level 1	6F-r Manual Reset Value	0.0 to 100.0%	50.0	Default
Level 1	HYS Hysteresis (Heat)	0.01 to 99.99%FS	0.10	Default
Level 1	CHYS Hysteresis (Cool)	0.01 to 99.99%FS	0.10	Default
Level 1	CP Control Period (Heat)	1 to 99 SEC	20	Default
Level 1	C-CP Control Period (Cool)	1 to 99 SEC	20	Default

Mode	Parameter	Setting range	Default	AEC setting
Level 2	r-L Remote/Local	RMT/LCL	LCL	Default
Level 2	SPrU Sp Ramp Time Unit	M(Minutes)/H(Hours)	M	Default
Level 2	SPrE Sp Ramp Set Value	0 to 9999 EU	0	Default
Level 2	LbA LBA Detection Time	0 to 9999 SEC	0	Default
Level 2	Au-5 MV at Stop	-5.0 to 105.0%	0.0	Default
Level 2	Au-E MV at PV Error	-5.0 to 105.0%	0.0	Default
Level 2	6L-L MV Upper Limit	MV Lower Limit +0.1 to 105.0%	105.0	Default
Level 2	6L-L MV Lower Limit	-5.0 to MV Upper Limit –0.1%	-5.0	Default
Level 2	6rL MV Change Rate Limit	0.0 to 100.0%/SEC	0.0	Default
Level 2	CnF Input Digital Filter	0 to 9999 SEC	0	Default
Level 2	ALH1 Alarm 1 Hysteresis	0.01 to 99.99%	0.02	Default
Level 2	ALH2 Alarm 2 Hysteresis	0.01 to 99.99%	0.02	Default
Level 2	ALH3 Alarm 3 Hysteresis	0.01 to 99.99%	0.02	Default
Level 2	Cn5H Input Shift Upper Limit	-199.9 to 999.9 °C	0.0	Default
Level 2	Cn5L Input Shift Lower Limit	-999.9 to 999.9 °C	0.0	Default

Figure 18
Setting List for Process Temperature Controller, Part No. A0555756 Cont'd.

Mode	Parameter	Setting range	*Default*	AEC setting
Setup	Cn-E Input Type	0 to 21	2	3
Setup	Cn-H Scaling Upper Limit	Scaling Lower Limit +1 to 9999 EU	-100	Default
Setup	Cn-L Scaling Lower Limit	-1999 to SP Setting Upper Limit -0.1 EU	0	Default
Setup	dP Decimal Point	0 to 3	0	Default
Setup	d-U °C/F Selection	°C/F	°C	°F
Setup	CnCE Parameter Initialize	Yes/No	No	Default
Setup	6UE1 Control Output 1 Assignment	Heat/Cool/Alarm 1/Alarm 2/Alarm 3/ LBA	Heat	Default
Setup	6UE2 Control Output 2 Assignment	Heat/Cool/Alarm 1/Alarm 2/Alarm 3/ LBA	AL-1	Default
Setup	Sub 1 Auxiliary Output 1 Assignment	Alarm 1/Alm 2/Alm 3/LBA/S.ERR/E333	AL-1	Default
Setup	ALE1 Alarm 1 Type	0 to 11	2	Default
Setup	AL1n Alarm 1 open in alarm	NO/NC	NO	Default
Setup	ALE2 Alarm 2 Type	0 to 11	2	Default
Setup	AL2n Alarm 2 open in alarm	NO/NC	NO	Default
Setup	ALE3 Alarm Type	0 to 11	2	Default
Setup	AL3n Alarm 3 open in alarm	NO/NC	NO	Default
Setup	6rEu Direct/Reverse Operation	OR-R/OR-D	OR-R	Default

Figure 18
Setting List for Process Temperature Controller, Part No. A0555756 Cont'd.

Mode	Parameter	Setting range	*Default*	AEC setting
Expansion	SL-H Set Point Upper Limit	SP Lower Limit +1 to Scaling Upper Limit	1300	400.0
Expansion	SL-L Set Point Lower Limit	Scaling Upper Limit to SP Lower Limit	-200	0
Expansion	CnEL PID/ON/OFF	PID/ON/OFF	PID	Default
Expansion	SE ST Adaptive Tuning (Fuzzy)	OFF/ON	OFF	Default
Expansion	SE-b ST Stable Range	0.1 to 999.9 °C/F	15	Default
Expansion	ALFA α	0.01 to 1.00	0.65	Default
Expansion	AE-G AT Calculated Gain	0.1 to 10.0	1.0	Default
Expansion	rESE Standby Sequence Reset Setting Method	0/1	0	Default
Expansion	rEE Automatic Return of Display Mode	0 to 99 SEC	0	Default
Expansion	AE-H AT Hysteresis	0.1 to 9.9% FS	0.2	Default
Expansion	LbAb LBA Detection Width	0.0 to 999.9% FS	0.2	Default

Option Boards

Available Option Boards

Option Type	RE232C	RS-485	Event Input	Transfer Output
Board Number	E53-CK01	E53-CK03	E53-CKB	E53-CKF

Mode	Parameter	Setting range	*Default*	AEC setting
Option	Eu-A Multi-SP Function	0/1	0	Default
Option	Eu-1 Event Input Assign 1	STOP/MAN	STOP	Default
Option	SbCE Communication Stop Bit	½ BITS	2	Default
Option	Len Comm. Data Length	7/8 BITS	7	Default
Option	PrEY Commication Parity	None/Even/Odd	Even	Default
Option	6PS Comm. Baud Rate	1.2/2.4/4.8/9.6/19.2	9.6 kbps	Default
Option	U-n6 Comm. Unit No.	0 to 99	0	Default
Option	Er-E Transfer Output Type	SP/SP-M/PV/O/C-O	SP	Default
Option	Er-H Xfer Output Upper Limit	5	5	Default
Option	Er-L Xfer Output Lower Limit	5	5	Default

Note: Use the Default setting for any setting not listed here.

E5CK Factory Setting for Dew Point

1. Make sure jumper setting for input type is set for Current Input (I), right jumper.
2. Return controller to housing.
3. Press the  Display Key for one (1) second to enter Menu Display.
4. Press the  Arrow Up to switch between menus.
5. To switch parameters within a menu, press  Arrow Up.

Figure 19
Setting List for Dew Point Controller, Part No. A0548567

Mode	Parameter	Setting range	*Default*	AEC setting
Protect	SECr Security	0 to 6	1	3
Protect	YEYP A/M Key Protect	ON/OFF	OFF	ON
Manual	Manual MV	-5.0 to 105.0 %	0.0	Default
Level 0	SP Set Point	SP lower limit to upper limit EU	0	Default
Level 0	r-S Run/Stop	Run/Stop	Run	Default
Level 1	AL-1 Alarm Value 1	-1999 to 9999 EU	0	-10.0°F/-23°C
Level 1	AL-2 Alarm Value 2	-1999 to 9999 EU	0	-10.0°F/-23°C
Level 1	C-db Dead Band	-19.99 to 99.99%FS	0.00	Default
Level 1	HYS Hysteresis (Heat)	0.01 to 99.99% FS	0.10	Default
Level 1	CHYS Hysteresis (Cool)	0.01 to 99.99 FS	0.10	Default
Level 2	SPrU Sp Ramp Time Unit	M(Minutes)/H(Hours)	M	Default
Level 2	SPrt Sp Ramp Set Value	0 to 9999 EU	0	Default
Level 2	CnF Input Digital Filter	0 to 9999 SEC	0	Default
Level 2	ALH1 Alarm 1 Hysteresis	0.01 to 99.99%	0.02	Default
Level 2	ALH2 Alarm 2 Hysteresis	0.01 to 99.99%	0.02	Default
Level 2	Cn5H input shift upper limit	-199.9 to 999.9°C	0.0	Default
Level 2	Cn5L input shift lower limit	-999.9 to 999.9°C	0.0	Default

Figure 19
Setting List for Dew Point Controller Part No. A0548567 Cont'd.

Mode	Parameter	Setting range	*Default*	AEC setting
Setup	Cn-t Input Type	0 to 21	2	17
Setup	Cn-H Scaling Upper Limit	Scaling Lower Limit +1 to 9999 EU	-100	15°F/-9C
Setup	Cn-L Scaling Lower Limit	-1999 to SP Setting Upper Limit –0.1 EU	0	-40°F/-40C
Setup	dP Decimal Point	0 to 3	0	Default
Setup	CnCE Parameter Initialize	Yes/No	No	Default
Setup	6Ut1 Control Output 1 Assignment	Heat/Cool/Alarm 1/Alarm 2/ Alarm 3/LBA	Heat	COOL
Setup	6Ut2 Control Output 2 Assignment	Heat/Cool/Alarm 1/Alarm 2/ Alarm 3/LBA	AL-1	Default
SetUp	Sub 1 Auxiliary Output 1 Assignment	Alarm 1/Alm 2/Alm 3/LBA/S. ERR/E333	AL-2	Default
Setup	ALt1 Alarm 1 Type	0 to 11	2	8
Setup	AL1n Alarm 1 open in alarm	NO/NC	NO	Default
Setup	ALt2 Alarm 2 Type	0 to 11	2	8
Setup	AL2n Alarm 2 open in alarm	NO/NC	NO	Default
Setup	6rEU Direct/Reverse Operation	OR-R/OR-D	OR-R	Default
Expansion	SL-H Set Point Upper Limit	SP Lower Limit +1 to Scaling Upper Limit	1300	15°F/-9C
Expansion	SL-L Set Point Lower Limit	Scaling Upper Limit to Sp Lower Limit	-200	-40°F/-40C
Expansion	CntL PID/ON/OFF	PID/ON-OFF	PID	ON-OFF
Expansion	rESt Standby Sequence Reset Setting Method	0/1	0	Default
Expansion	rEt Automatic Return of Display Mode	0 to 99 SEC	0	Default

- Notes -

7 Troubleshooting

Problem	Possible cause	Corrective action
Little or no air coming from the process delivery tube.	Dirty filter.	Clean or replace filter.
	Desiccant beds are contaminated by material or plasticizer leaking into the system.	Replace desiccant.
	Blower overload has tripped.	Fix the problem and reset the overload.
	Blower fins filled with dust or contaminants.	Remove blower side plate, clean baffles, replace.
Suction in delivery tube, pressure from the return tube.	Phase is reversed on power drop coming into the dryer.	**Stop the dryer.** If the dryer was connected to the drying hopper, check to see if the desiccant and process air heater has been contaminated with resin. If so, replace the desiccant and remove any resin carry-over. Otherwise, change the phase of two legs of the three-phase power drop.
Loss or reduction of process air temperature.	Process heaters are faulty.	Check for open heaters. Replace if required.
	Solid-state temperature controller faulty.	Replace.
	Process temperature was adjusted in error by plant personnel.	Make sure that plant personnel are aware of the proper temperature set point. A sign posted next to the controller is helpful.
Loss or reduction in drying capacity.	Process heaters are faulty.	Replace.
	Desiccant beds are contaminated.	Replace desiccant.
	Material being dried differs from material specified at the time of purchase.	Drying systems are designed for the material which was originally specified. Different materials may need a longer residence time or different drying temperature.
	Break in flex hose to/from drying hopper.	Inspect for air leaks; replace if necessary.

Problem	Possible cause	Corrective action
Loss or reduction in drying capacity. (Cont'd.)	Airflow valve sticking or failing to shift.	Check for proper operation of valve actuators. Repair or replace if necessary.
	Blower fins filled with dust or contaminants.	Remove blower side plate, clean baffles, replace. Replace filter elements.
PLC Regeneration Bed LED indicators both off.	Insufficient power to PLC (Power LED is off).	Check power supply and power wiring to PLC.
	Faulty PLC (PLC Power light is on, Run light is off, and/or Error light is on).	Replace PLC.
PLC Regeneration Heater Left/Right output indicators both off.	Regenerating bed cooldown.	None.
	Blower Input indicator is off.	Verify that blower contactor is on. Check input wiring to PLC.
	Process air in high-temperature condition.	None.
	Insufficient power to PLC (Power light is off).	Check power supply and power wiring to PLC.
	Faulty PLC (PLC Power light is on, Run light is off, and/or Error light is on).	Replace PLC.
Material in drying hopper cakes, or meltdown occurs.	Process temperature set too high due to operator error.	Check resin manufacturer's data sheet for proper drying temperature. Make sure plant personnel are aware of the correct process temperature set point.
	High temperature alarm not set properly.	Reset high temperature alarm.
	Process set point is out of acceptable range.	Restore temperature controller to factory pre-sets.
	Function set for degrees Celsius (ºC), set point at degrees Fahrenheit (ºF).	Verify correct Celsius or Fahrenheit settings.
Poor dew point performance.	Burned out regeneration heater.	Repair or replace.
	Contaminated or worn out desiccant.	Replace.
	Leaking process air hoses.	Repair or replace.
	Dryer operates beyond its capacity.	Check dryer and drying hopper sizing.
	Bad dew point sensor.	Replace.
	Fouled dew point sensor manifold.	Clear obstruction. Air should flow freely through sensor.

Problem	Possible cause	Corrective action
Nothing displays when the controller is turned on.	The internal mechanism is not inserted properly into the housing.	Properly insert the internal mechanism into the housing.
	The power supply is not connected to its terminals properly.	Properly connect the power supply to the power supply terminals.
	No power is supplied, or the supplied power is not within the specified range.	Supply a voltage of 85 to 125 VAC to the power supply terminals of the controller.
	Disconnect switch or Control Power switch not set to **ON**. Control Power fuse blown.	Check control power fuse for continuity. Turn disconnect switch and control power switch **ON**.
Process value is abnormal or not obtained.	Input polarity on thermo-couple is wrong or connection is wrong.	Properly wire the terminals.
	No compensating lead wires used for extension of the thermocouple.	Use proper compensating lead wires and terminals.
	Thermocouple and controller are connected by wires other than proper lead wires.	Use a dedicated thermo-couple connector. If a connector is a metal different from the thermocouple and controller, a temperature error may result.
	Sensor is broken or short-circuited.	Replace with a good sensor.
	The controller is influenced by noise or other induction.	Separate input wires as far as possible from the origin of the noise.
	Celcius temperatures used instead of Fahrenheit or vice versa.	Setup mode level 2 display d-U. S-V display shows setting.

Determining Temperature Controller Errors or Sensor Errors

Using a Thermocouple

If the controller displays a temperature that is close to room temperature (70ºF/21ºC) when you short-circuit controller input terminals, the controller is normal and the sensor is probably broken, short-circuited, or incorrectly wired.

Using a Platinum Resistance Thermometer

If the controller displays a temperature of about 0.0°C (32ºF) when you insert a 100-ohm resistor between terminals **A** and **–B** of the controller, and you short-circuit controller terminals **+B** and **–B**, the controller is normal and the sensor is probably broken, short-circuited, or incorrectly wired.

Preventive Maintenance Checklist

AEC/Whitlock Nomad Drying/Conveying Systems

System model #	Serial #

Every week	Date/ By	Date/ By	Date/ By	Date/ By	Date/ By	Date/ By	Date/ By	Date/ By	Date/ By	Date/ By	Date/ By	Date/ By	Date/ By
Inspect all filters for wear, replace/clean if dirty or worn.													
Check air regulator to make sure pressure is 60-80 psi (413.7 to 551.6 kPa /4.1 to 5.5 bars). (If applicable)													

Every month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lock out electrical power and inspect electrical wiring for integrity.												
Lock out electrical power and check heater elements for continuity using an ohmmeter.												
Check dew point and temperature tracking with an external dew point monitor and pyrometer.												
Visually inspect the shifting of the airflow valve during one cycle.												

Every year	Next scheduled inspection	Actual inspection Date/By	Next scheduled inspection	Actual inspection Date/By
Inspect desiccant. Replace if brown or broken.				

Every two years	Scheduled replacement date	Actual replacement Date/Work done by	Scheduled replacement date	Actual replacement Date/Work done by
Replace desiccant.				

- Photocopy this page for your maintenance records -

Service Notes

Service Notes

Service Notes

Parts Department

Call toll-free 7am–5pm CST [800] 423-3183 or call [847] 273-7700

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