A-PDII & H-PDII
OPERATING MANUAL

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DRYER OPERATION/ FEATURES

The PDII model dryer is a portable, dual hopper, self contained resin drying system. The PDII dryer series was developed to accommodate the customer who utilizes multiple resins and wishes to minimize mold press down-time by drying the resin prior to the material change-over. The PDII dryer can also be configured to allow the user to simultaneously dry and feed virgin and regrind, or two different resins.

Separate drying controls for each hopper give the operator the flexibility to dry at two different temperatures or allow the user to operate only one hopper to facilitate the cleaning and filling of the other hopper. These controls automatically divert air flow to and from each hopper and require no operator intervention other than actuating the control switch and setting the temperature.

Easy access to each hopper interior and takeoff box make cleaning quick and simple.

Each dryer can be equipped with various material feed and loading options which include:

Single and Dual Closed Loop Loaders that prevent material contamination by utilizing desiccated air to feed material to the receiver on the mold press.

Vacuum and DAC loaders that allow greater flexibility when dealing with a large volume of material.

Fixed and Variable Speed Auger Mixing packages that allow the user to blend virgin and regrind, and typically outperform standard proportional mixing systems that rely on vacuum and time for control.

Quick Disconnect material Feed Lines that allow for easy swapping of material lines between hoppers.

These options are discussed in more detail later in this manual.

HP4-X Design

Our patented HP4-X design incorporates 4 desiccant beds where two are stacked, one over the other. This nearly doubles the amount of desiccant available for drying the process air stream, and because of the tower design, the dryer is able to regenerate the desiccant in the same time as our ARID-X series. This allows the dryer to operate in very high humidity conditions without affecting the process air dew point. In fact, this design produces dew point levels of – 40' to -80' C for faster more complete drying of your material. Please see the Air Flow Diagram on Page 9.

ADC Control Module

The PDII series is supplied with the standard Advanced Dryer Control (ADC). The ADC is one of the most sophisticated yet operator friendly controls on the market. It has many more features than any control system as it provides the operator with more control and operationally more flexible. The microprocessor monitors and controls the dryer's regeneration cycle, operational hardware and their associated alarms. These features and the operating instructions are covered in detail in the ADC Manual for PDIIs included with your dryer.

Hopper Design

Dri-Air's "all stainless" hopper design utilizes a stainless steel inner shell surrounded by a stainless steel jacketed insulation layer. The easily removable stainless steel spreader cone promotes quick cleaning for material changes as well as proper material flow to ensure that the material is dried efficiently and no dried material is left at the hopper bottom that needs to be fed out prior to operating. You must ensure that your hoppers are adequately sized for your usage rate and are kept filled, to ensure that you have sufficient time to dry the material.

Closed Loop Loading System

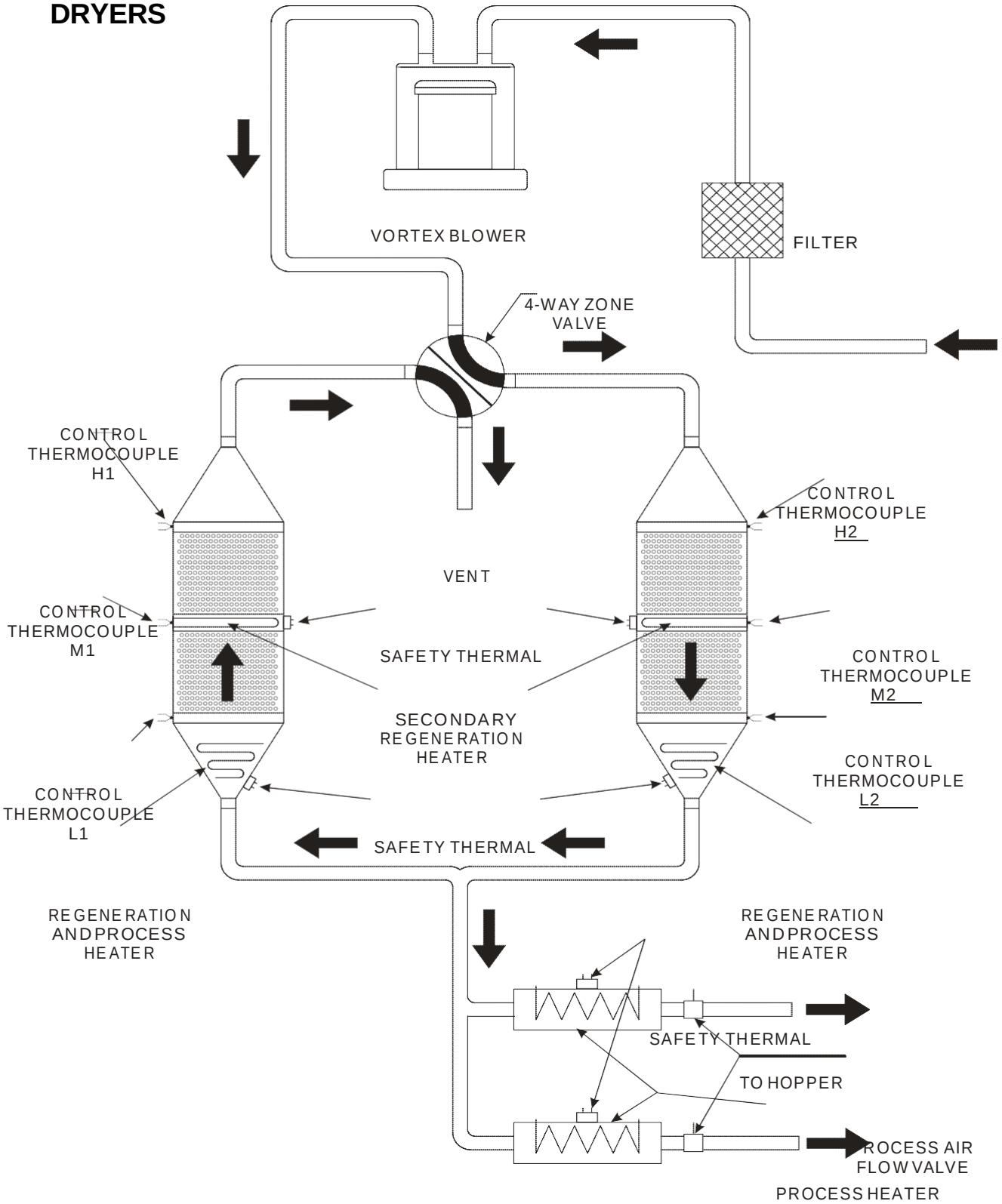
Dri-Air's closed loop loading system utilizes a dedicated blower, small receiver, filtration system and desiccated air to move the material from the dryer hopper to the molding machine. This eliminates the possibility that your material will be contaminated with moisture as with some other material transfer systems, helping to eliminate defects resulting from moisture contamination.

The PDII series dryers have an additional option of a Dual Closed Loop Loading System. This allows the operator to feed different materials from each hopper to two separate presses or load the material hopper and molding press receiver with the same blower. Please refer to the Closed Loop Loader System section of this manual for proper installation and maintenance.

Auger Feeding/Mixing

The Auger Feed System can be used to feed and blend materials from each hopper. A fixed speed auger is used in conjunction with a variable speed auger to accurately blend materials at various rates and proportions. This feed system can be utilized to blend materials at ratios ranging from 5 to 75 percent with tolerances of +/- 2%. This auger based system utilizes volumetric metering that offers greater flexibility and accuracy than the standard proportional systems that rely on vacuum efficiency and time to properly proportion the materials and eliminate the layering problems commonly associated with these systems.

AIR FLOW SCHEMATIC FOR H-18 to H-100PDII DRYERS



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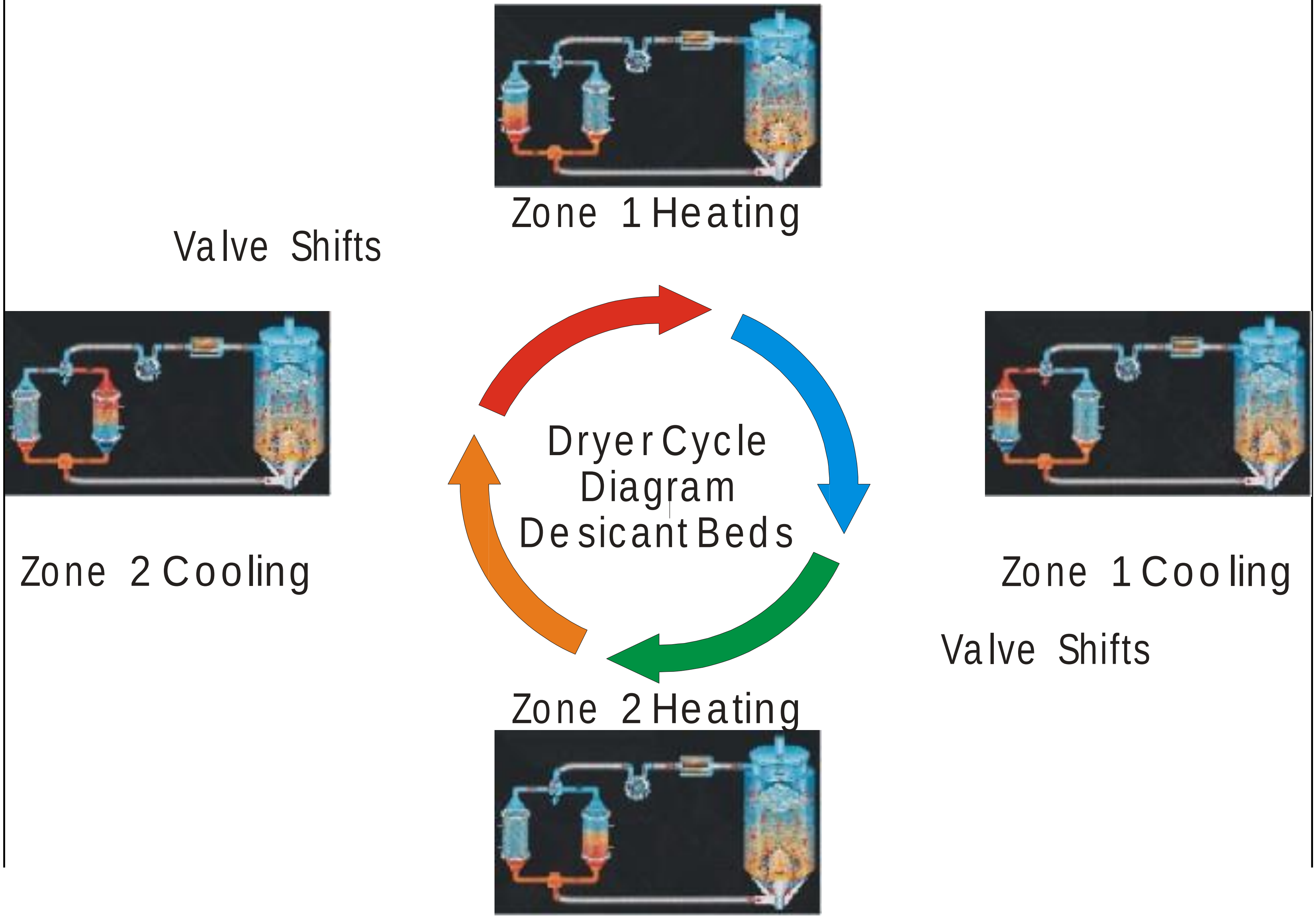


DRI-AIR INDUSTRIES, INC.

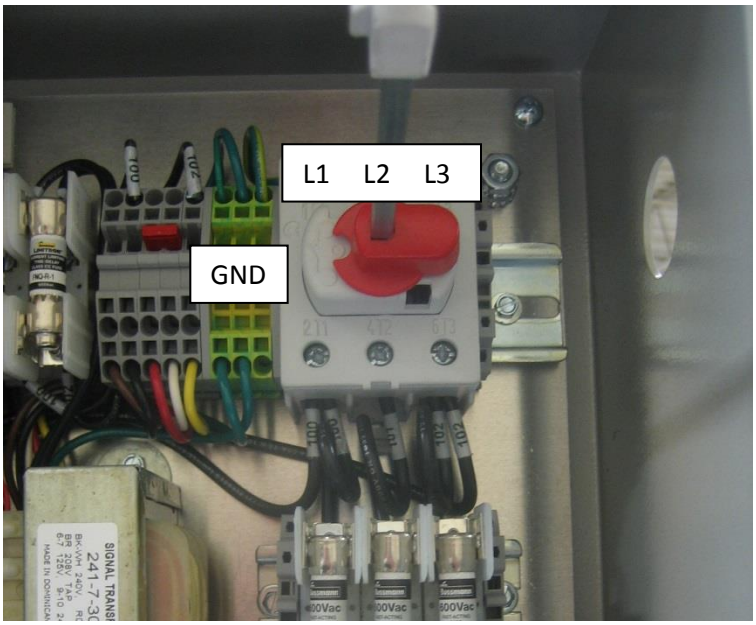
INSTALLATION PROCEDURE

Electrical Connection:

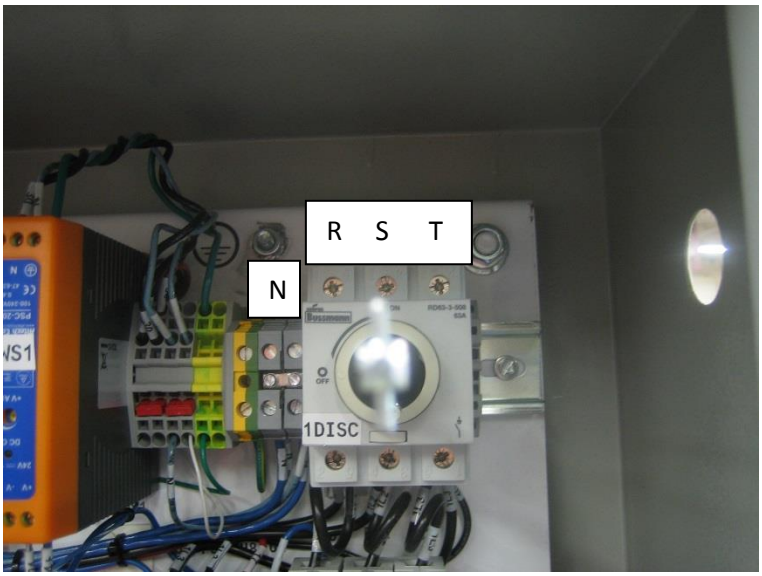
Open electrical access door on the electrical panel enclosure by turning the disconnect off and turning the door clamp to release the latchInsert the incoming power cable or conduit through the hole provided on the side of themachine.

« *use approved wire and fastening means* «

FOR 230 / 480 / 575 VOLT 3 PHASE
3 WIRE WITH GROUND



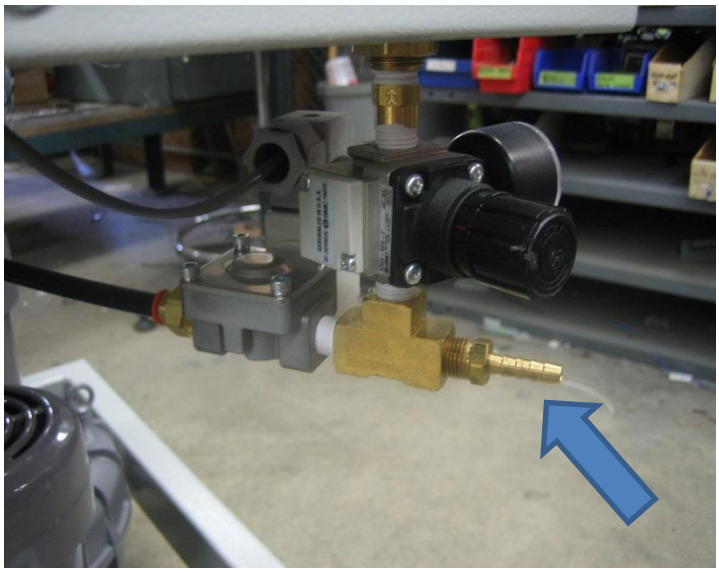
FOR 380 / 400 / 415 VOLT 3 PHASE
4 WIRE WITH GROUND



Compressed Air Connection:

Compressed air is required to operate the closed loop loader option and receiver valves. A minimum of 60 psi is required, maximum not to exceed 110 psi.

A barbed nipple is provided to attach factory compressed air hose to dryer in the lower left corner of the Tower Cabinet.



The compressed air system includes a regulator that is factory set to the proper pressure.

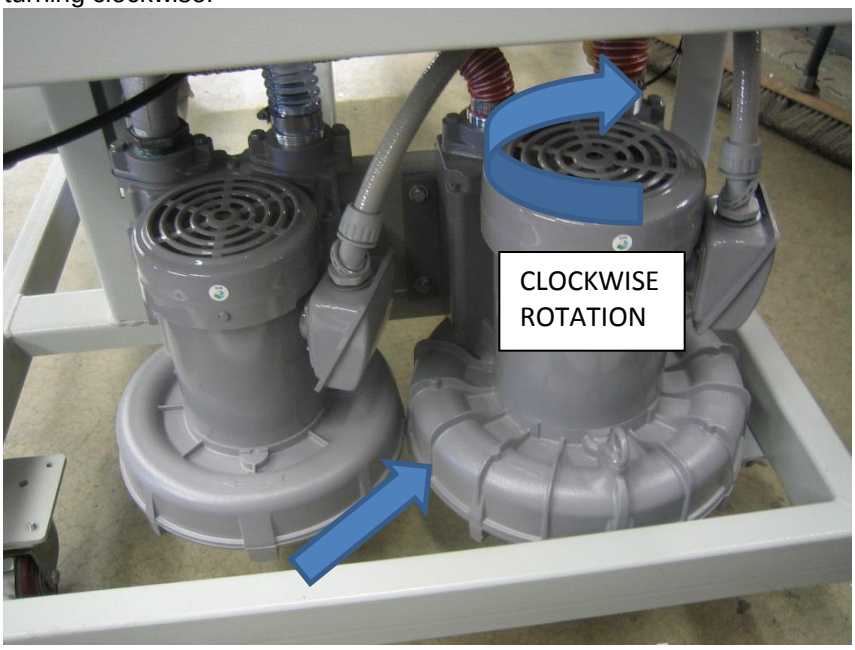
IMPORTANT - DRYER WILL NOT OPERATE UNLESS COMPRESSED AIR IS CONNECTED.

3 PHASE DRYER INSTALLATION
CHECK FOR CORRECT MOTOR ROTATION
BEFORE RUNNING DRYER

The ADC controls has the ability to determine if the blower rotation is correct. Installed on the dryer is a pressure switch that is activated when the blower is blowing the proper direction.

In operation, the blower will run clockwise as you are looking down on the cooling impellor on the blower.

To check blower motor rotation, turn on the power to the dryer and press the **ON/ START** touch pad. Observe the cooling fan on the top of the blower motor on the right hand side and verify the fan is turning clockwise.



If the motor is not turning clockwise, the controls will come up with a BLOWER ROTATION ALARM. If the blower is operating the counter clockwise, turn off and disconnect the power and swap wires S and T and retest blower rotation.

If the dryer blower is rotating the proper direction, the loader blower will operate in the same direction.

The unit is now ready for operation.

After completing the dryer installation and start-up procedures, the unit is ready for operation unless it has been equipped with the options discussed below. Prior to beginning operation of the dryer, you may need to install and set up the optional components/systems that accompanied the unit. The Closed Loop Loading and Auger Feed/Mixing Systems or the Vacuum Loaders will require additional installation steps.

Hopper Loaders:

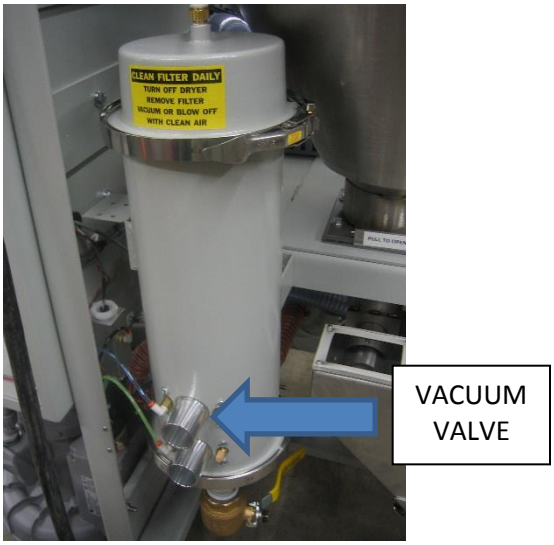
Hopper loaders are vacuum loaders that pull the undried material into the drying hoppers.

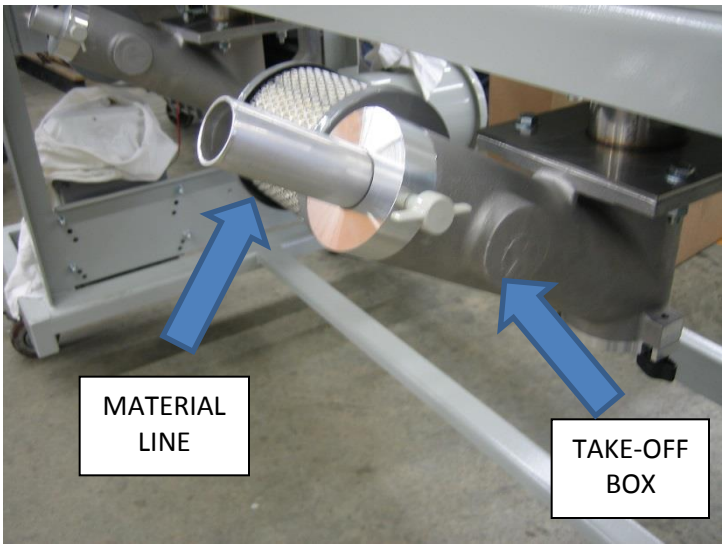
To install and operate the Vacuum Loaders, simply follow the procedures detailed in the Instruction Manuals included with loaders that were shipped with your dryer. These options will require separate power and compressed air sources, and operate independently of the dryer's controls.

CLOSED LOOP LOADING SYSTEM

Closed Loop Loading System:
The Closed Loop Loading and/or Auger Feed/Mixing systems is an option that conveys plastic pellets to the feed throat of the molding machine without introducing wet, outside air. The loading system is integrated into the dryer controls and do not operate independently of the dryer. The operating parameters for these systems have been set at the factory and have been designed for your application.

The loading system consists or two parts: the conveying system and the blending system.
The conveying system is comprised of the following parts: blower to create the vacuum, filter to remove dust and material from coming back to the loader blower, v box, and the Dri-Shot receiver (DS-1) that is mounted on top of the press to receive and store the material that has been conveyed.



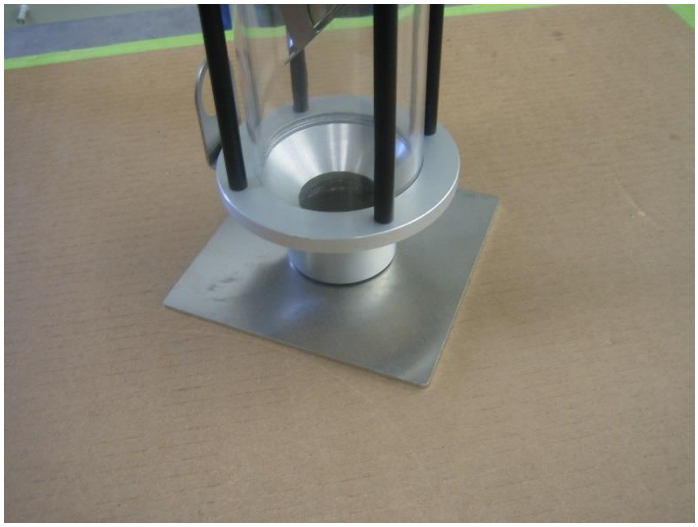

MATERIAL
LINE
TAKE-OFF
BOX


DRI-AIR
DRI-AIR
DS-1
RECEIVER

RECEIVER INSTALLATION

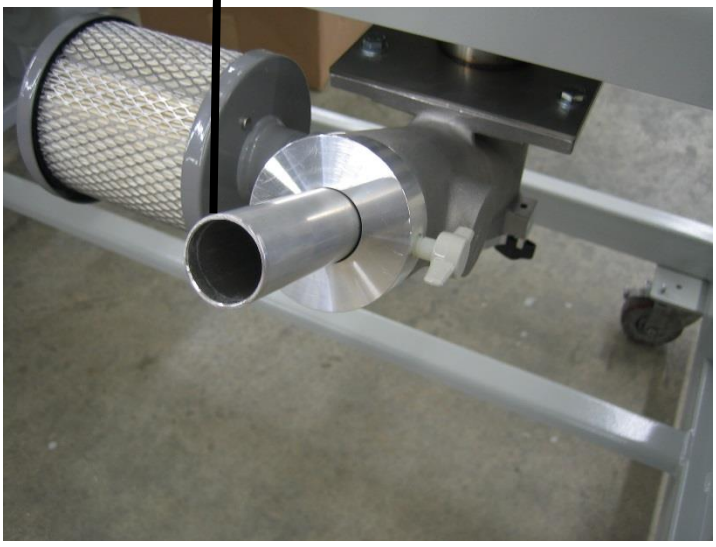
INSTALLATION

The DS-1 receiver will be mounted on top of the feed throat. The bottom of the DS-1 has a slip fit adapter that allows the customer to remove and clean the receiver without having to unbolt the receiver from the feed throat. Unless a custom bolt pattern has been provided, the adapter for the DS-1 will be a blank 6" X 6" flange. This adapter is provided for the customer to drill out to match the feed-throat bolt pattern.



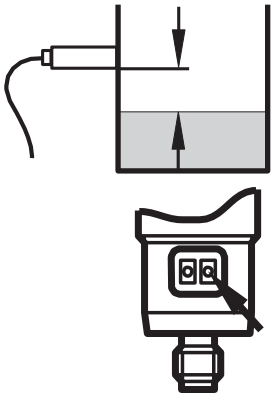
The dryer is supplied with all of the components to convey the dry plastic to the molding machine. Two 12 ft PVC hoses are provided to attach the loading system filter and take-off box to the receiver (DS-1). These hoses normally come in 1.25" ID for the material line and 1.5" ID for the vacuum line. Dryers with mixing systems or customer specified can have material lines that are 1.5".

First locate the 1.25" hose that will convey the dry plastic to the receiver. On the dryer side, the hose will attach to the take-off box at the bottom of the drying hopper. The other side of the hose will attach to the lower receiver port. The vacuum hose wil go from the port on the filter canister to the elbow on the top of the receiver.



PROXIMITY SENSOR ADJUSTMENT

The proximity sensors supplied with the receiver may require adjustment to operate properly. When positioning the sensors, ensure that they are placed as close as possible to the outer surface of the receiver as they operate by sensing the density of the material in the receiver. Vertically position the lower sensor to set the material level at which the load cycle will initiate and the upper sensor to set the material level at which the load cycle will stop. **CAUTION: Do not overfill the receiver as material may be drawn back into the blowback filter canister.**



To adjust the sensor's sensitivity, using the basic teach empty state, the unit suppresses the installation environment. The basic teach empty state resets the unit, an adjustment teach already carried out is deleted.

Empty the tank until the level is at least 20 mm below sensor.

Set the unit as normally closed (output opens when the tank is full): Press [OUT ON] for min. 2s (max 6s). While pressing the pushbutton, the LED lights continuously.

CLOSED LOOP LOADER OPERATION

The loading system conveys the dry plastic to the feed throat of the molding machine on demand. The proximity switch located on the receiver will notify the dryer when more material is required at the feed throat.

When the material level falls below the proximity switch, the sensor will illuminate indicating that the loading cycle must begin. When the loading cycle begins, there is a solenoid located on top of the loading system filter canister. The filter canister is designed in a sock configuration to offer maximum surface area and efficient performance. When the loading system begins, the solenoid valve will activate 3 times (3 pulses) in order to blow any dust or material from the filter sock.

After the pulsing of the filter canister, the blower will turn on and the vacuum valve for the receiver will open. The vacuum valve will cause the flap on the receiver to pull up sealing the receiver body.

With the blower running and valve open, the loading system will convey material for a specified period of time determined by ADC controls. This time is called the fill time. The fill time allows the system to dose a particular amount of material to the receiver. This amount of material can be adjusted to yield the desired amount of material in the receiver.

After the fill time has ended, and the loader blower and vacuum valve will stop and close. The loading system will turn off for another specified period of time to allow the conveyed material to drain out of the receiver. This time is called the clean out time. This time can also be adjusted by an on board potentiometer. This timer is used to turn off the augers and allow the loading system to continue running to clear the conveying lines of material. The time can be increased if material is left in the hose at the end of the load cycle or reduced if the loading system is running and the hoses are clear.

When the clean out timer ends, so will the loading cycle. All blowers and valves will turn off allowing the material in the receiver to drop. If the material does not satisfy the sensor, the loading cycle will restart.

LOADING SYSTEM ALARMS

For the loading system, a no load alarm has been installed. This alarm will turn on the system alarm light and the audible alarm steady. This alarm is activated when the loading system attempts to load the molding machine/extruder 3 times (default value). If the proximity switch is not satisfied at the end of the 3rd load, the alarm will be activated. The alarm can be cleared by satisfying the proximity switch or turning the receiver rocker switch off and then on.

CLOSED LOOP LOADER TROUBLESHOOTING

1. Ensure the proximity sensor is adjusted and working properly. The sensors LED should be lit when the receiver is empty. Check that the sensor are tightened on the bracket and the cable connectors are tight and correct.

2. Check system for leaks. Tighten hose clamps. Check seal at receiver/feed throat interface by comparing vacuum levels as directed in previous section on Receiver Installation.

3. Ensure the blower operates. Check the electrical system to see if the relay is working and that the blower overload is not tripped. Trip window will be orange/yellow if tripped. Check to see that the blower rotation is correct (clockwise).

4. Ensure that the compressed air is connected to the system and the pressure regulator is set to 60 psi. Does the air valve open when the system calls for material? The air line to the valve can be easily disconnected by pushing in on the plastic sleeve and removing the hose. The air line should be pressurized when the system is loading.

5. Ensure the drain valve at the bottom of the filter is closed properly.

CLOSED LOOP LOADER MAINTENANCE

Daily Maintenance:

CAUTION: Clean filter when loader is not working.

The filter is cleaned automatically with an air blast at the start of each loading cycle. The canister needs to be drained periodically by opening the valve at the bottom of the canister. Gently bang on the side of the cannister with your hand to loosen any fines and close the valve.

Monthly Maintenance:

Clean filter sock by removing the quick clamp on the filter canister and removing cover. Remove the bag assembly and blow off with compressed air. Reinstall bag assembly, cover and quick clamp, checking that the seal is proper. This maintenance may need to be performed more frequently if your material is dusty.

Tighten all hoses and hose clamps and check for leaks.

AUGER FEED MIX SYSTEM (OPTIONAL)

The Auger Feed Mix System utilizes a fixed speed auger in conjunction with a variable speed auger to blend materials from each hopper to the user's desired proportions. The auger and motor assembly for each hopper is located directly below the hopper, and feed a central takeoff box connected to the mold press loading system. The controls for each auger motor are in a control box located on the hopper support frame. Each auger motor is actuated by a 3 position toggle switch located on the front of the control box. The auger situated below Hopper 1 (left side hopper) is operated by a fixed speed AC motor, while the auger below Hopper 2 is operated by a variable speed DC motor controlled by a 10-turn potentiometer located on the Auger Feed Mix System Control Box. The system allows the user to blend materials at ratios ranging from 5 to 75 percent with accuracies in the range of +/-2%.

AUGER FEED SETUP

To set up the Mix System, first remove all the shipping straps attached to the system feed tubes and motor clamps. Ensure that there is material in each hopper and the slide gates for each hopper are open. Remove the V-Box Feed Tube Assembly from the augers and follow the steps detailed below.

1. Actuate Auger 1 (fixed speed auger) by putting the toggle switch in the TEST (down) position. This will operate the auger for a 15 second interval. Allow the material to drop into a container. Weigh the resin dispensed by the auger (Do not include wt. of container). This will establish the "Constant Portion" for your proportional mix formula (See page 27 in this manual for formula). Repeat this several times by returning the toggle switch to the OFF (Middle) position and back to the TEST position so that you obtain an average result which will be more reliable.

2. Return the toggle switch for Auger 1 to the OFF (middle) position and put the toggle switch for Auger 2 in the TEST (down) position. Auger 2 will operate for 15 seconds. If the auger is not at the correct speed setting, turn the potentiometer to the right to increase the motor speed or to the left to decrease the speed. Allow the material to drop into a container. Weigh the dispensed material and compare it to the desired weight as determined by your proportional mix formula.

3. Return toggle switch for Auger 2 to the OFF (middle) position and repeat the previous step until you obtain the desired weight. After obtaining your desired weight, repeat the cycle several times to ensure that the auger is feeding the correct amount of material. Record the potentiometer setting and lock the potentiometer at the desired setting by pushing the locking tab to the right. Reinstall the V-Box Feed Tube Assembly and begin operation.

AUGER FEED OPERATION

To operate the system, put the toggle switches for each auger in the RUN (up) position. When the low material sensor on the mold press receiver calls for material, the loader blower will actuate and the augers will begin to feed material two seconds after the blower starts. The augers will continue to feed until the upper sensor is satisfied. The blower will continue to operate for a factory set period of time to clean out the material feed line and then shut down.

To prevent damage to the augers, the V-Box Feed Tubes are equipped with material sensors that will shut the auger motor off if the feed tube fills with material due to the loss of vacuum in the loading system or material bridging. If this occurs, clean out the feed tube and continue operation.

AUGER FEED SYSTEM MAINTENANCE

The Auger Feed Mix System is designed for easy cleaning and maintenance. Follow the steps detailed below to clean the system.

V-Box Collection Tubes

Remove the V-Box Tube Assembly by loosening thumb screws on inlet tubes, removing material hose and detaching material sensor plugs. Loosen wing nuts fastening plugs at top of tube and remove plugs. Clean tubes with compressed air or wipe thoroughly.

Auger Tubes & Takeoff Box

After removing V-Box Assembly, unlatch clean-out cover on bottom of auger assembly takeoff box. Remove motor and auger assembly by loosening clamp on motor side of auger assembly and detaching motor power cord. Pull motor and auger assembly from feed tube and clean takeoff box, tube and auger with compressed air or wipe thoroughly. When reinstalling motor and auger assembly be sure to place guide tab on auger tube in the up position so that it fits into the notch on the takeoff box.

MATERIAL SAMPLER (OPTIONAL)

Your dryer's mixing system may be equipped with our Material Sampler option. This allows you to operate each auger individually to obtain a small amount of material for moisture content or other testing.

To operate, remove the end cap on the top of the V-Box Colection Tube and insert the Material Sampler Container into the tube. Press the Sample Feed button located on the Auger Feed System Control Box. The respective auger will operate for as long as the button is depressed, feeding material into the Sampler Container. Remove the sampler, return the end cap to the tube and resume operation.

DRYER OPERATION TROUBLE SHOOTING

The new Dri-Air Standard PLC and MICROPROCESSOR Electrics were designed for quick diagnosis of problems.

If a problem is encountered while operating the dryer please follow the steps below before proceeding with other diagnostic steps.

1. Check the Power Circuit:

a. Incoming power fuses or circuit breaker
b. All dryer fuses:
   Each fuse, with the exception of the main fuses, has a blown fuse indicator light that illuminates when the fuse is blown.
c. Is power supplied to the unit?
d. Check heater continuity using a volt ohmmeter.

2. Compressed Air:

a. Is compressed air connected with at least 60 PSI.
b. Check water separator and drain if necessary.
c. Pressure gauge should read 60 PSI.

3. Air Flow Circuit:

a. Ensure Zone Valve position corresponds to the regeneration cycle by comparing the Zone position lights on the Zone Valve to the ZONE position lights on the dryer panel.
b. Make sure that all hoses are connected, not crushed, and free from obstructions.
c. Inspect filter and make sure cover is tight and the filter is clean.
d. Is at least one hopper air control valve actuated. The toggle switch(es) on panel door **must** be actuated.

4. Control Circuit:

a. Using the PLC/MICRO Display Panel ZONE indicator in the lower right hand corner as a guide for the dryer regeneration cycle, check that all inputs/outputs are proper for the part of the regeneration cycle that the machine is in.
b. Monitor the ADC output lights to ensure the corresponding relays are turning on and there is an output voltage to the heater.

5. Operating Conditions:

a. Check the process temperature. It should **not** be set below 140° F (60° C) because the unit will go into high temp alarm.

A. Check that the air flow is not obstructed.
B. Check blower rotation
C. Check heater for continuity.

Check the limit first by pressing the SET button on the temperature control and holding until AL is displayed. The setting shown indicated the amount over set point that the alarm will be actuated. It is factory set to 50°F (30°C) and should not be set below 30°F (16°C) or it will actuate too soon.

If the temp exceeds the set point check the following:

1. Remove the hose from the top of the hopper to check air flow. There should be air flow out of the hopper with a suction on the hose. If there is little or no flow, check the inlet hose.
2. Inspect the filter to make sure that it is clean and not affecting the air flow.
3. Check the power boards to see if one of the solid state relays has failed on. Using an ammeter or voltmeter on the output to the heater, see if there is power when the LED is not lit which will indicate a failed relay.
4. Check the valve position.

DRI-AIR ROTARY ZONE VALVE

The Dri-Air rotary zone valve is designed to provide very little flow restriction and no leakage. It incorporates high temperature, self adjusting seals for years of trouble free service. The electrical controls are built into the end of the valve and include zone position lights.

Trouble shooting is easy. If the lights indicating position do not match the zone displayed on the control panel, or there are no lights, the valve is not working properly.

DO NOT PUT FINGERS INTO VALVE WITH POWER ON

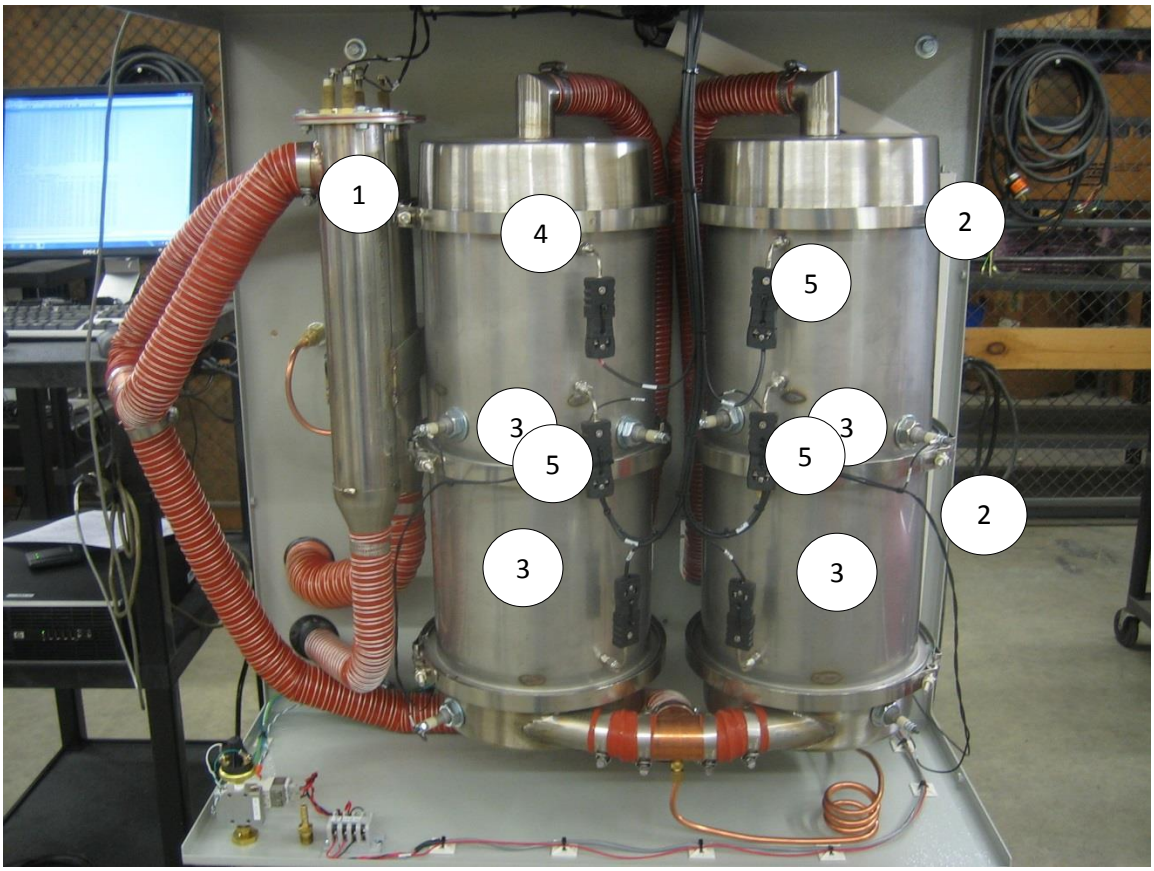
If you are experiencing problems with the valve, check the following:

1. Check to see if the tab is actuating a zone position switch on the valve's circuit board.

2. Check all electrical connections to make sure they are tight.

3. Contact factory with the serial number of the dryer for a replacement valve.

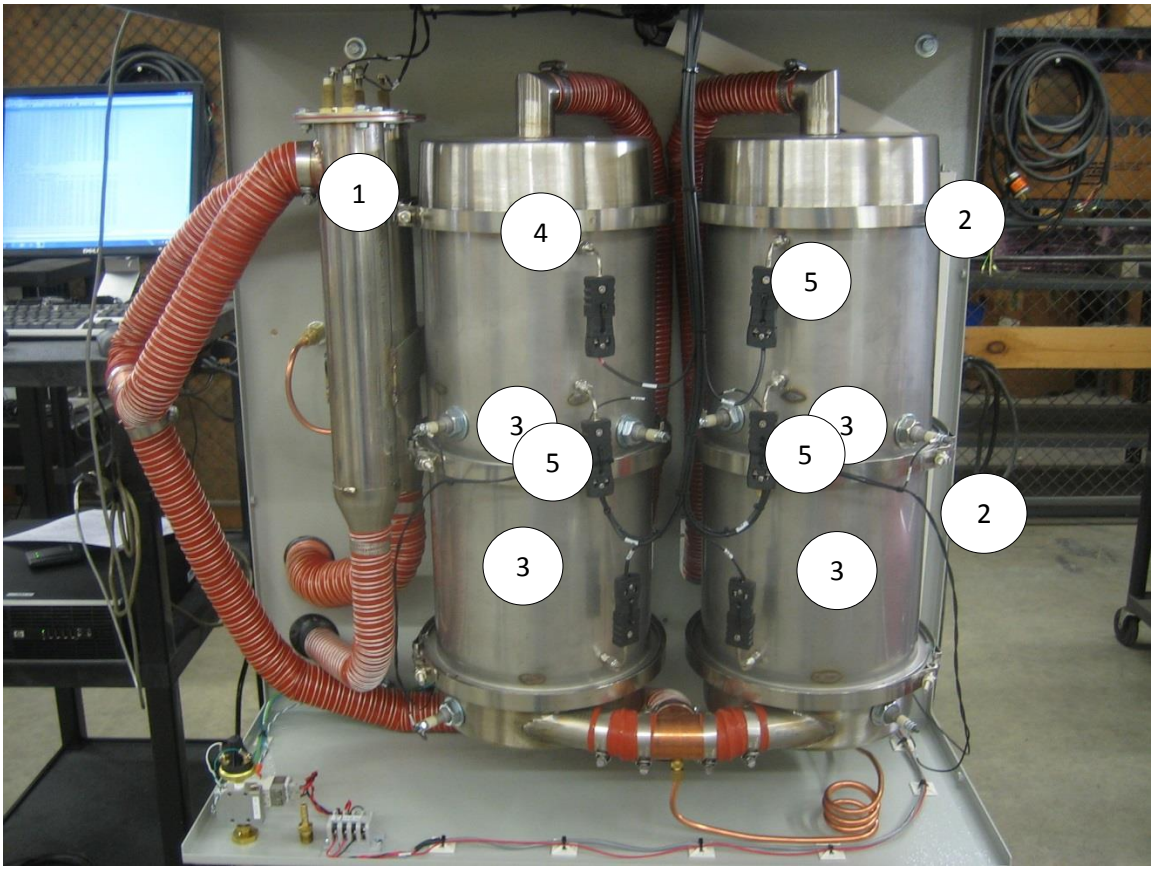
MECHANICAL



Description	Part#
Blower 150CFM	88254
Blower 100CFM	84868
3 - Heater 2000W pancake	83934
1 - Heater 2500W foldback	84204
Latch SS small over center	80151
Hose 1.75”HI temp	80022
2 - Clamp V-band 10 ¼”	81172
Valve dri-air rotary 24V	85438
Gasket 4” dia silicone	80091
Filter element 50-300 CFM	81331
5 - Thermocouple 1/8”x9”	82175
4 - Gasket tower 9”	82795
Filter CLL Sock Style Short	82389
Fan cooling 4.5” 24VDC	85687
Thermocouple 1/8”x3”	87361
Dewpoint Sensor	85374

A50-100PDII and H50-100PDII

MECHANICAL



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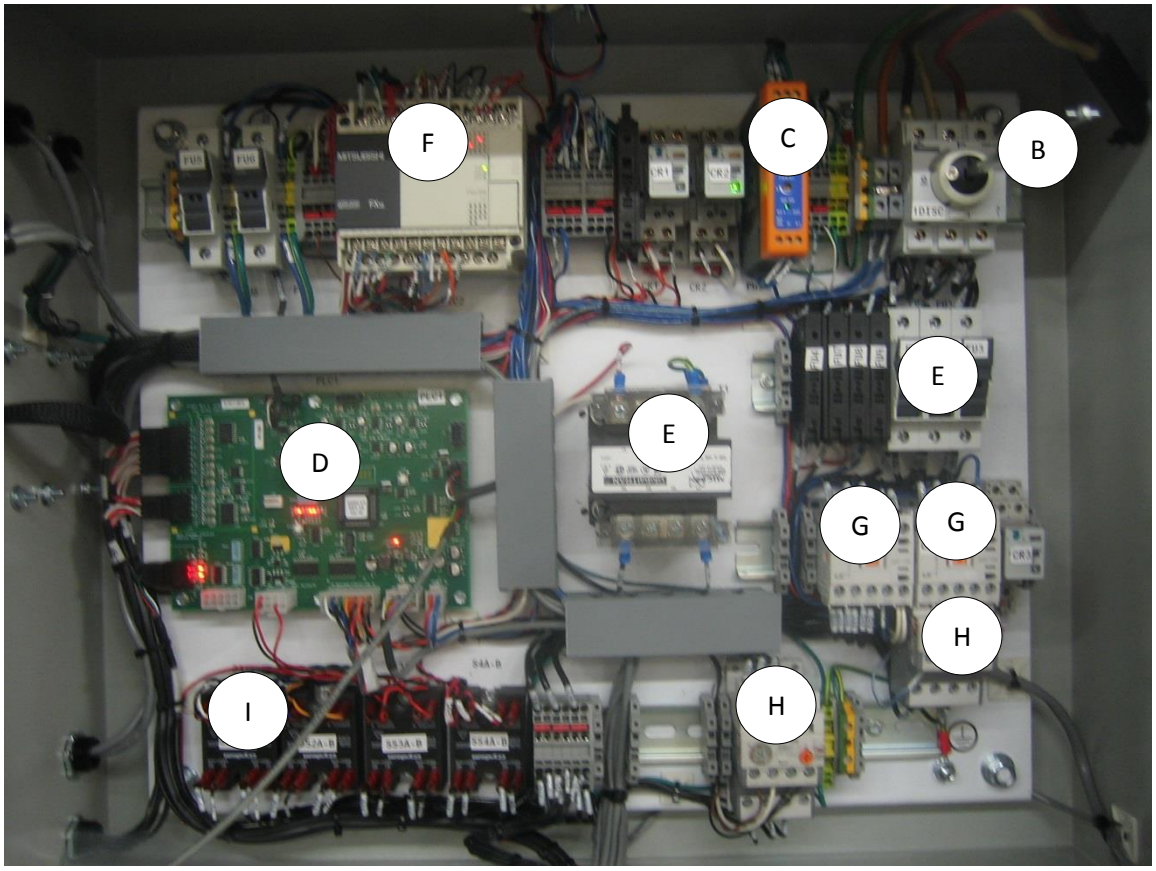
Valve dri-air rotary 24V	85438
Gasket 4” dia silicone	80091
Filter element 50-300 CFM	81331
5 - Thermocouple 1/8”x9”	82175
4 - Gasket tower 9”	82795
Filter CLL Sock Style Short	82389
Fan cooling 4.5” 24VDC	85687
Thermocouple 1/8”x3”	87361
Dewpoint Sensor	85374

ELECTRICAL



Description		Part#
G - Contactor 12A 600V 24VDC	C1 & C2	85355
H - Overload 0.63-1-LS	OL1	85359
H - Overload 0.63-1-LS	OL2	85359
I - Relay SS 40A 480V DC 2P	SS1-SS4	85364
B - Switch disconnect 40A switch	DISC1	87716
A - Holder fuse		84691
Sensor proximity DC autotune	PRS1-5	85533
Board display ADC		84930-1
Keypad membrane ADC		85197
C - Power supply 24VDC 25W	PWS1	85351
D - Board mother ADC	PLC1	85584-3
E - Transformer 24 VAC sec 400 VAC pri	T1	84761
F – Mitsubishi PLC 30IO	PLC2	84571
J – Relay 2 pole 24 VDC	CR1-3	85947

PROPORTIONAL MIX FORMULAS

The following formulas are to be utilized to determine the material feed rates for the variable speed auger. Select the formula to be used based on the proportional mix that the user specifies. If the proportional mix is based on a proportion of the TOTAL output, then you should use Formula 1. If the mix is based on the proportion of "virgin" (fixed speed auger), then you should use Formula 2.

FORMULA 1

This formula is to be used if the mix proportion is expressed as a percent of the TOTAL mix. For example; 85% Virgin, 15% regrind.

DATA REQUIRED

FIXED AUGER % of TOTAL _____

VARIABLE AUGER % of TOTAL _____

FIXED AUGER OUTPUT (grams) _____

COMPUTATION

Divide ***Fixed Auger % of Total*** by ***Variable Auger % of Total*** to obtain the ***MIX RATIO***.

Divide ***Fixed Auger Output*** by ***MIX RATIO*** to obtain ***VARIABLE AUGER OUTPUT*** (grams of material from Variable Speed Auger).

EXAMPLE 1

Fixed Auger % (FA) = 85
Variable Auger % (VA)= 15
Fixed Auger Output (FAO)= 1000g

Mix Ratio (MR) = FA%/VA%
Mix Ratio = 85/15
Mix Ratio = 5.667

Variable Auger Output = FAO/MR
Variable Auger Output = 1000g/5.667
Variable Auger Output = 176.5g

FORMULA 2

This formula is to be used when the mix proportion is expressed a percent of virgin (Fixed Auger Output). For example; Regrind output is to be equal to 15% of virgin.

DATA REQUIRED

FIXED AUGER OUTPUT (grams) _____

VARIABLE AUGER % of Fixed Auger Output _____

COMPUTATION

Divide ***Variable Auger %*** by **100** to obtain ***DECIMAL EQUIVALENT***.

Multiply ***Fixed Auger Output*** by ***Variable Auger % DECIMAL EQUIVALENT*** to obtain ***VARIABLE AUGER OUTPUT*** (grams of material from Variable Speed Auger).

EXAMPLE 2

Fixed Auger Output (FAO)= 1000g
Variable Auger % of Output (VAO)= 15

Decimal Equivalent (DE)= VAO/100
Decimal Equivalent = 15/100
Decimal Equivalent = .15

Variable Auger Output = FAO x DE
Variable Auger Output = 1000g x .15
Variable Auger Output = 150g

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