

MAGUIRE PRODUCTS INC.

Vacuum Batch Dryer[®] - VBD-1000[®]
Touchscreen Controller

VBD-1000[®]

Vacuum Batch Dryer[®]
Touch Screen Controller

INSTALLATION • OPERATION • MAINTENANCE

VBD-1000® - Vacuum Dryer®

This document is the Original Instructions manual of the Maguire VBD-1000® Vacuum Dryer equipped with the Touchscreen Controller.

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To every person concerned with use and maintenance of the Maguire VBD-1000® it is recommended to read thoroughly these operating instructions. Maguire Products Inc. accepts no responsibility or liability for damage or malfunction of the equipment arising from non-observance of these operating instructions.

To avoid errors and to ensure trouble-free operation, it is essential that these operating instructions are read and understood by all personnel who are to use the equipment.

Should you have problems or difficulties with the equipment, please contact Maguire Products Inc. or your local Maguire distributor.

These operating instructions only apply to the equipment described within this manual.

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Accuracy of this Manual

We make every effort to keep this manual as correct and current as possible. However, technology and product changes may occur more rapidly than the reprinting of this manual. Generally, modifications made to the dryer design or to the operation of the software are may not reflected in the manual for several months. The date at the footer of this manual will indicate approximately how current this manual is. Likewise, your Dryer may have been produced at an earlier time and the information in this manual may not accurately describe your Dryer since this manual is written for the current line of Dryers in production (as of the date in the footer). We always reserve the right to make these changes without notice, and we do not guarantee the manual to be entirely accurate. If you question any information in this manual, or find errors, please let us know so that we may make the required corrections or provide you with accurate information. Additionally, we will gladly provide you with an updated copy of any manuals you need at any time. We welcome comments and suggestions on ways we can improve this manual.

For additional information, or to download the latest copy of this manual or any other Maguire manual, please visit our website or contact us directly.

On the Web at: www.maguire.com

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Warranty – Exclusive 5-Year

MAGUIRE PRODUCTS OFFERS THE MOST COMPREHENSIVE WARRANTY in the plastics auxiliary equipment industry. We warrant each MAGUIRE VBD Vacuum Dryer manufactured by us to be free from defects in material and workmanship under normal use and service; excluding only those items listed below as 'excluded items'; our obligation under this warranty being limited to making good at our factory any Dryer which shall, within FIVE (5) YEARS after delivery to the original purchaser, be RETURNED intact to us, transportation charges PREPAID, and which our examination shall disclose to our satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on our part, and MAGUIRE PRODUCTS neither assumes nor authorizes any other persons to assume for it any other liability in connection with the sale of its Dryers.



This warranty shall not apply to equipment repaired or altered outside MAGUIRE PRODUCTS INC. factory, unless such repair or alteration was, in our judgment, not responsible for the failure; nor which has been subject to misuse, negligence or accident, incorrect wiring by others, or installation or use not in accord with instructions furnished by Maguire Products, Inc.

Our liability under this warranty will extend only to equipment that is returned to our factory in Aston, Pennsylvania, PREPAID.

Please note that we always strive to satisfy our customers in whatever manner is deemed most expedient to overcome any problems they may have in connection with our equipment.

**GETTING STARTED:
PROCEED TO: SAFETY WARNINGS NEXT PAGE**

SAFETY WARNINGS



WARNING

HOT SURFACES:

As with all dryers, there are **HOT SURFACES** to avoid. Temperatures can reach 350F, (180C).



Typically, these surfaces are not at dangerous temperatures, however all hot surfaces should be avoided.

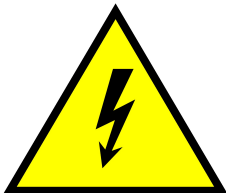


Warning Label indicate:
HOT SURFACES

USE CAUTION when removing
and installing canisters.

USE GLOVES

DO NOT REACH into the dryer
enclosure.



DANGER

RISK OF SHOCK:

**Disconnect power supply before
servicing the Dryer.**



GETTING STARTED: PROCEED TO: INSTALLATION - NEXT PAGE

Installation

Transport and Setup

Shipment

The VBD-1000 Dryer is shipped as separate components that require re-assembly.

The 3 main sections are:

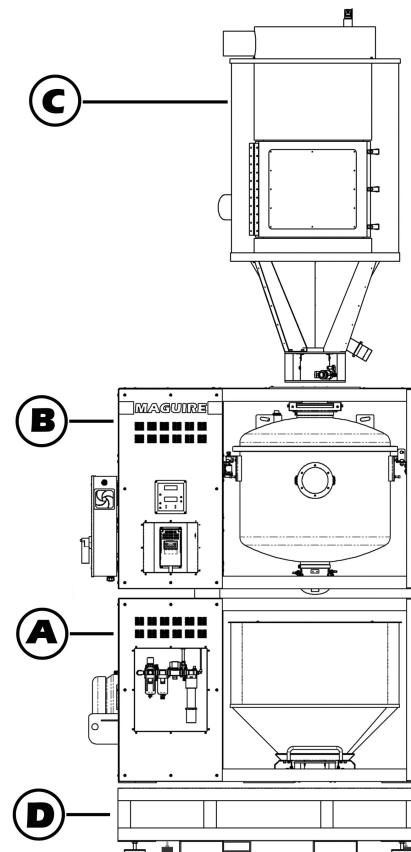
Retention Hopper Assembly (A) – Identified by the recessed pneumatics cabinet on the front panel and the removable Retention Hopper on the lower slide rail. Weight is 1920 lb (871 kg)

Vacuum Chamber Assembly (B) – Identified by the control panel on the front panel, the electrical cabinet on the left side and the hanging vacuum chamber. Weight is 1920 lb (871 kg).

Heating Hopper Assembly (C) – Identified as a tall heating hopper. Weight is 350 lb (159 kg)

Optional Base Frame (D) – a sub frame that elevates the Retention Hopper Assembly 16 inch allowing material to be convey from the base of the VBD Dryer. Weight of the Base Frame is 1303 lb (591 kg)

Other smaller components will be included. An optional mounting base section may be included.



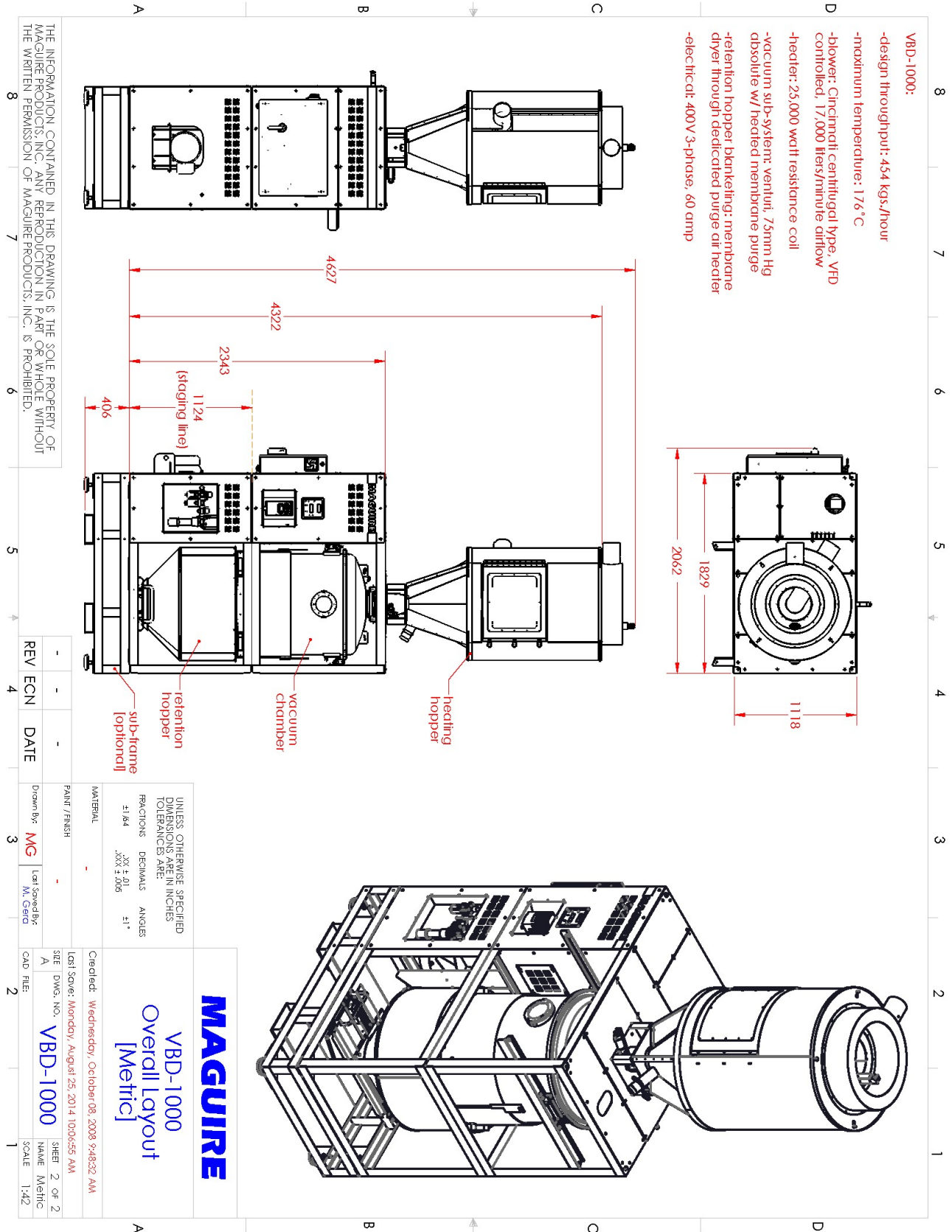
Lifting and Moving components of the Dryer

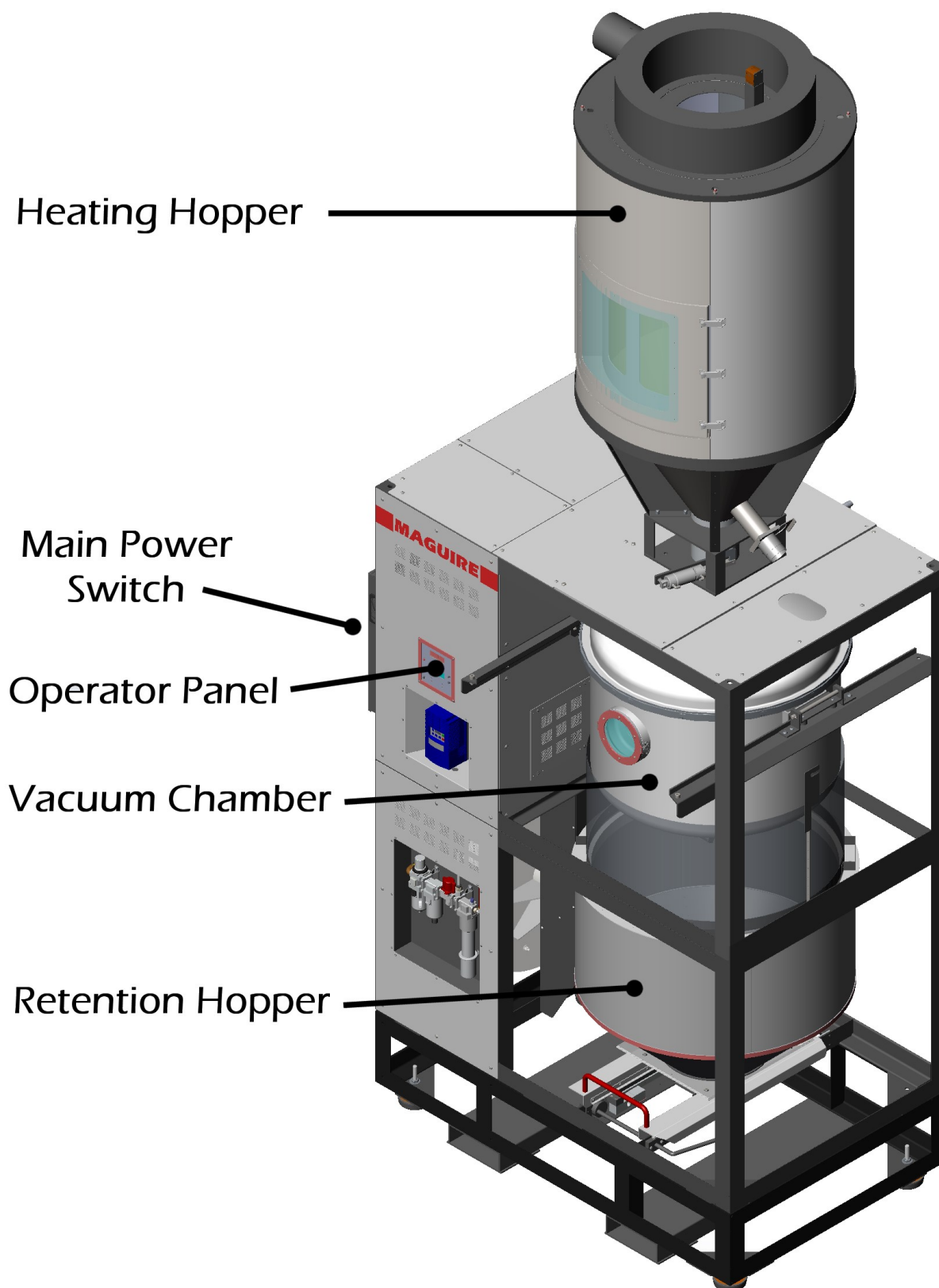


Ensure your lifting equipment is rated to lifting the weight of the individual sections of the VBD-1000.

The three main sections of the VBD-1000 Dryer are shipped with Forged Eye Bolts to be used specifically as lifting points. When lifting the Retention Hopper Assembly (A) and the Vacuum Chamber Assembly (B), utilize all 4 Forged Eye Bolts to distribute the weight evenly. The Retention Hopper Assembly uses two Forged Eye Bolts and should be lifted using both Forged Eye Bolts. The **Forged Eye Bolts must be removed** from the Retention Hopper Assembly (A) **BEFORE** lowering the Vacuum Chamber Assembly (B) into place.

VIEW	DESCRIPTION	DIMENSION
Top View	Overall Width	81 1/8"
Top View	Overall Depth	72"
Top View	Chamber Width	44"
Side View	Overall Height	182 1/8"
Side View	Chamber Height	170 1/8"
Side View	Retention Hopper Height	92 1/4"
Side View	Staging Line	44 1/4"
Side View	Sub-frame (optional)	16"





Dryer Assembly

Optional Base Frame

The Base Frame is used to raise VBD's Retention Hopper off of the floor. Weight of the Base Frame is 1303 lb (591 kg). Note: If the VBD is to be installed so that material is gravity fed out of the bottom of the Dryer, then this Base Frame is not necessary.

Level the Base Frame - If the Base Frame is to be used, it must be leveled at the installation location. The Base Frame of the VBD 1000 can be leveled two different ways. Leveled using the 4 leveling feet or by shimming the frame to the floor.



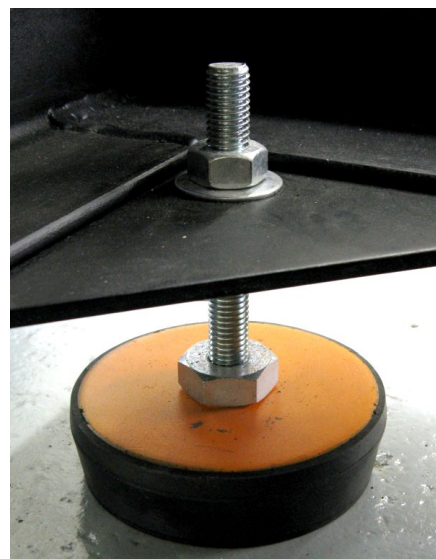
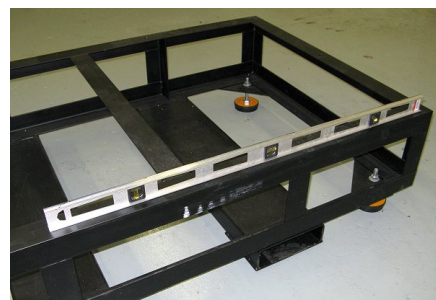
WARNING

If using the leveling feet, make sure the surface that the VBD 1000 will be install on can support the weight of the VBD at 4 corners. If the floor cannot support this weight in 4 small footprints, use leveling shims on the frame, not the leveling feet.



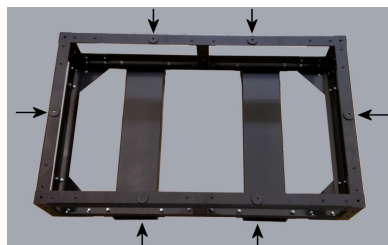
IMPORTANT!

When adjusting the leveling feet, keep the frame as close to the floor as possible. Over extending the threads below the frame is not recommended for stability reasons.



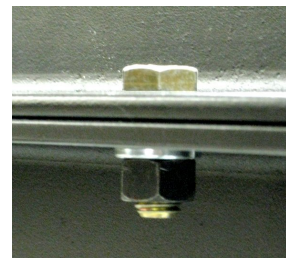
Installing Retention Hopper Assembly (Section A)

Set the 6 spacers at the locations shown below.



If using the Base Frame, lower the **Retention Hopper Assembly** onto the **Base Frame**. Secure the Retention Hopper Assembly to the Base Frame using the supplied hardware. The Retention Hopper Assembly is secured to the Base Frame using (10) 1/2-13 grade 8 bolts.

If the Base Frame is not used – Lower the **Retention Hopper Assembly** (Section A) into place. The Retention Hopper Assembly must be leveled BEFORE installing the next section.



Installing Vacuum Tank Assembly (Section B)

Lower the **Vacuum Tank Assembly (Section B)** onto the Retention Hopper Assembly. Align the enclosed side of each section (as shown in image at right). Align the bolt holes of each section.

Remove the rear panels of Retention Hopper Assembly (A) and Vacuum Tank Assembly (B) to gain access to the connections that need to be made within the enclosure. Install the 10 1/2-13 grade 8 bolts and tighten.

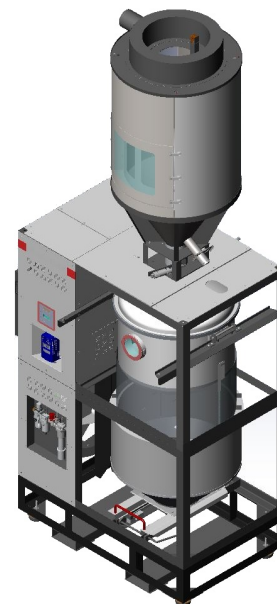


Install the Heating Hopper

Raise the Heating Hopper on top of section B of the VBD dryer.

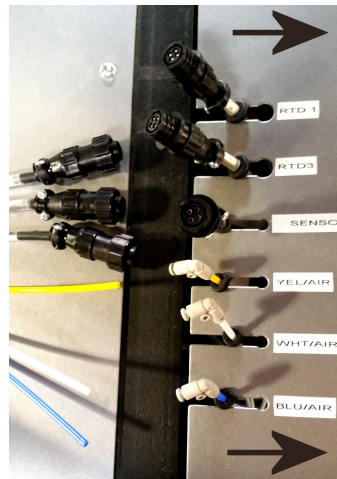
Position the Hopper so that the front hatch faces the same side of the dryer as the VBD's control panel.

Install the 10 1/2-13 grade 8 bolts and tighten.



Connect RTD Sensors and Air Lines

After installing the Heating Hopper, locate the upper sheet metal panel with the slotted holes. Remove the button head screws and bring the three air lines and 3 sensor cables through the slotted holes. Each sensor cable is labeled for the specific slots. Air lines are labeled yellow, white and blue. Also bring the rubber grommets through the sheet metal and install the grommets in the slot to protect the wires and air lines. Connect the air lines, Connect the sensor cables and reinstall the sheet metal panel.



Installing the Upper Vacuum Gate

Note: If your Upper Vacuum Slide Gate is already installed from factory, skip this step.

If the VBD-1000 Upper Vacuum Gate was shipped detached from the VBD-1000 it must be installed after the Heating Hopper is installed.

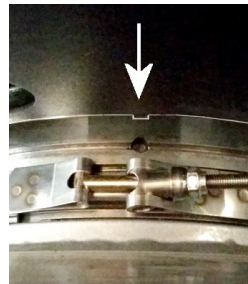
Items with this assembly:

- Upper Vacuum Gate
- Retainer Bracket
- two 1/4-20 1/2" button head screws

The Upper Vacuum Gate will install from the rear of the Dryer. Locate the slot on the mount ring at the very top of the Vacuum Tank. See photo at right.

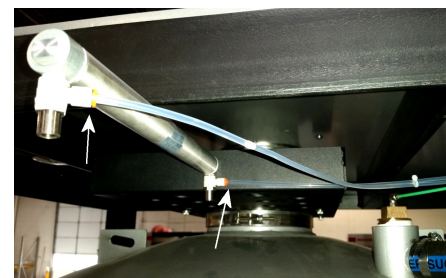
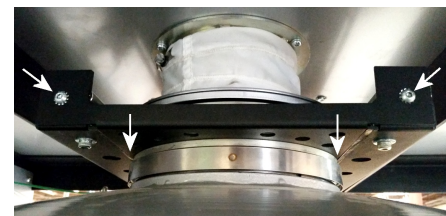
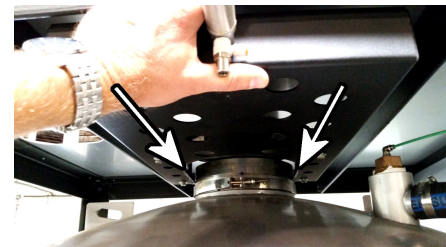
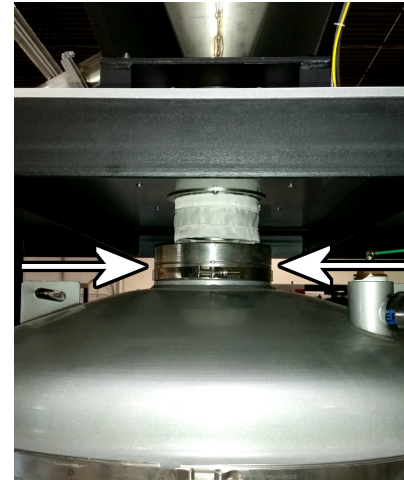
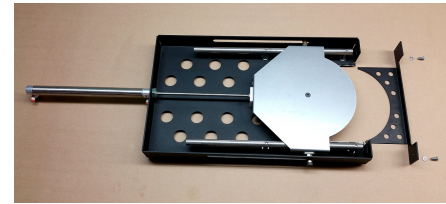
With the Slide Gate facing up, slide the Upper Vacuum Gate assembly into the slot on the mount ring as shown in the photo to the right. Slide the Upper Vacuum Gate onto the mount ring until it fully seats into the slot. It may be helpful to slide the Upper Vacuum Gate left and right as it is installed.

Note: To fully seat the Vacuum Gate onto the mount ring, the tab in the inner arch of the Upper Vacuum Gate must go into the recessed hole of the mount ring on the Vacuum Chamber.



From the front side of the Dryer, install the Retaining Bracket onto the Upper Vacuum Gate and fully into the slot on the mount ring and secure it using the two 1/4-20 1/2" button head screws.

Install the two 5/32 (4mm) airlines onto the Upper Vacuum Gate air cylinder. The shorter line will connect to the air cylinder fitting closest to the slide gate.



Engaging the Load Cells

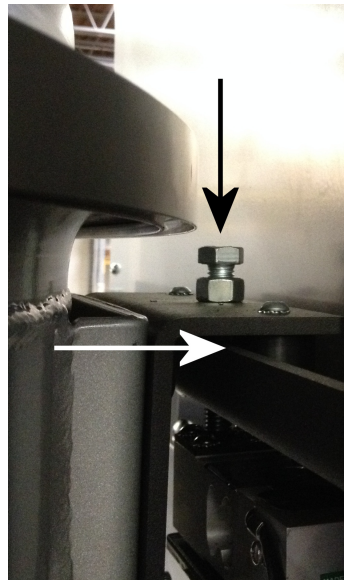


The Load cells are disengaged for shipping and must be engaged for proper operation of the VBD-1000 Dryer. There are two sets of load cells: the Vacuum Chamber load cell and the Retention Hopper load cell pair.

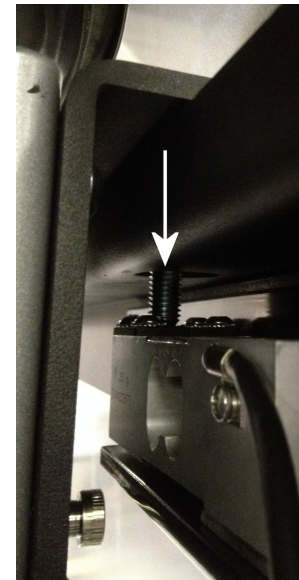
Vacuum Chamber Load Cell

The Vacuum Chamber load cell is located between the Vacuum Chamber and the Vacuum Chamber Assembly (B).

To engage the load cell, turn the load cell lifting bolt down until it engages the load cell located below. Continue turning until the Vacuum Chamber hanger is lifted 1/4 inch (6mm) off of the sliding rail.



Lifting bolt, 1/4" (6mm) gap



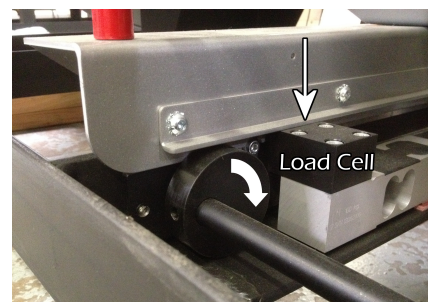
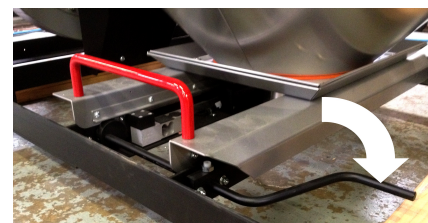
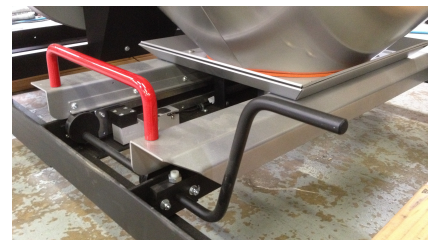
Engage load cell

Retention Hopper Load Cell Pair

The Retention Hopper load cell pair is located in front of and below the Retention Hopper.

To engage the Retention Hopper load cell pair, remove the packaging straps from the Retention Hopper Lifting Lever. Lower the Retention hopper onto the load cell by pressing the lever back and down. This will engage the Retention Hopper lower frame onto the load cell pair.

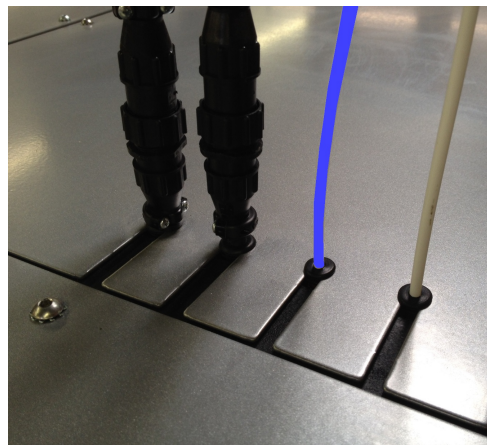
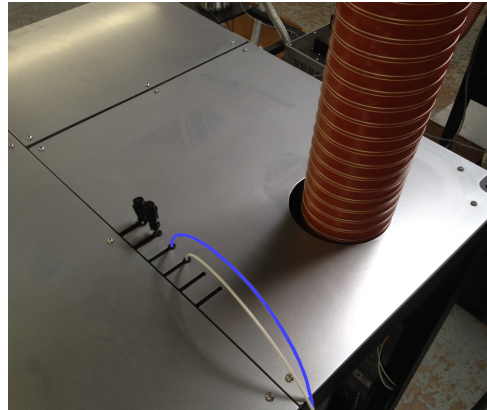
When the Retention Hopper Lifting Lever is in its upright position, the lever's cams lift the weigh off of the load cell pair and allow the Retention Hopper to be pulled out for servicing and cleaning purposes.



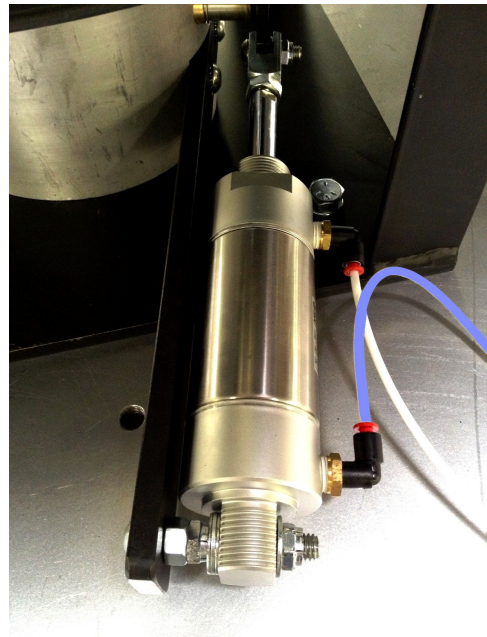
Heating Hopper Dump Valve Air Lines

There is one white and one blue 5/32 inch air line, two RTD thermometer cables and one sensor wire (not pictured) bundled within the VBD-1000 enclosure for safety during shipping of the VBD-1000. The air lines and cables must be brought through the enclosure using the predrilled slotted keyholes in the top panel.

To install remove the top panel and locate the air lines and RTD thermometer cables. On each air line and wire is a rubber grommet. Slide the rubber grommet into the slotted keyhole in the sheet metal, then re-install the top panel.

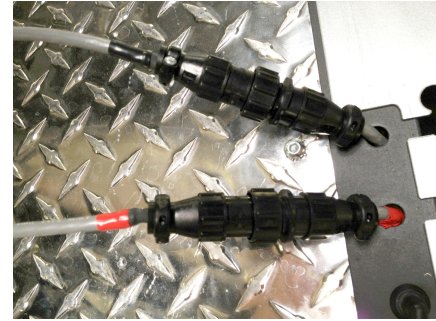


Test air line orientation: connect air supply to VBD-1000. With the VBD power turned off, the air cylinder should be extended as shown in photo to the right. Air cylinder is extended closing the butterfly valve inside the base of the hopper.



Connect RTD Thermometers

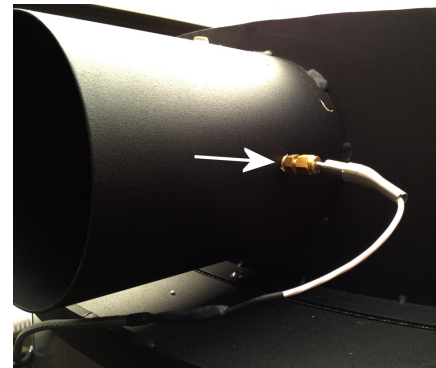
The RTD thermometer cables are terminated on one end with a CPC connector. The Inlet RTD cable is marked with a red band. This is the shorter of the two cables. Connect the cables as shown with the red banded cable connecting to the CPC connector with the matching red band.



Secure the Heating Hopper Inlet RTD thermometer to the side heat inlet of the heating hopper. Secure the cable to frame of the heating hopper.

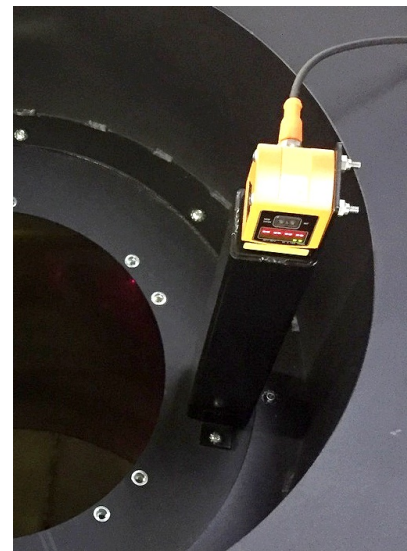


Route the longer RTD thermometer cable up to the exhaust port on the top of the heating hopper and secure the RTD thermometer as shown. Secure the cable to frame of the heating hopper.



Install Heating Hopper Level Sensor and Bracket

Install the Heating Hopper bracket and sensor on top of Heating Hopper (as shown). Locate the sensor cable that exits the top of the VBD Heating Hopper and attach the sensor cable to the sensor.



Dryer Internal Assembly



If your Dryer has been shipped with the Retention Hopper Assembly and the Vacuum Tank Assembly together as one shipment (sections A and B in the diagrams), then the Dryer Internal Assembly instructions are not necessary as they are pre-assembled.

Remove the rear panels of Retention Hopper Assembly (A) and Vacuum Tank Assembly (B) to gain access to the connections that need to be made within the enclosure.

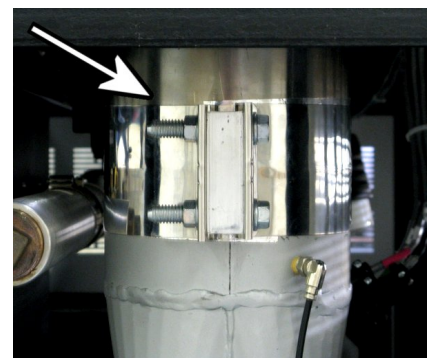
Summary of internal connections:

- Heating Hopper Heater connected to blower outlet.
- Power Junction Box Plug
- Purge Air Solenoid Valve Electrical Plug
- Electrical Field Joints (Color Coded)
- $\frac{3}{4}$ inch Purge Line
- $\frac{5}{32}$ inch air lines

Install the Heating Hopper Heater

The Heater is a polished steel 6-inch cylinder that is pre-wired and secured within the cabinet during shipping. This heater must be attached to the outlet of the blower using the attached 6-inch clamp. First loosen the clamp attached to the blower's output. Leave the clamp on the blower. Then remove the shipping material securing the Heating Hopper Heater.

Carefully rest the Heater on top of the blower output so that the heater rests directly on the blower's 6-inch output. Tighten the clamp firmly to secure the Heater to the blower.



Dryer External Connections

Once assembled, installation requires electrical, pneumatic air line connection and intake and output material lines to be connected.

Compressed Air Connection

Connect an air supply to the air regulator's IN port using a male 1/2 " NPT fitting.

An operating air pressure of 80 psi (5.5 bar) while the vacuum generator is running is required for proper operation of the Dryer.

If your air supply has oil in it, add an oil separator (coalescing filter).

Oil in the air will combine with dust drawn from the vacuum tank forming a paste inside the vacuum generator. It will stop working and require cleaning.

Observe the air pressure gauge to be sure the pressure maintains 80 psi (5.5 bar) while the vacuum generator is running as you check and adjust the regulator. If pressure drops below 80 psi, adjust the regulator. If the pressure cannot be maintained at 80 psi (5.5 bar) while the vacuum generator is running, then the air supply line is not adequate.



Do not supply Dryer with a lubricated air supply. Damage to Dryer may result. Use only a clean, dry, oil-free air supply.

Electrical Connection



RISK OF INJURY!
Only qualified technicians should make electrical connections.



Connect Main Power

The electrical cable located on the left side of the Dryer on the power box supplies the power to the Dryer. Within the cable is four wires. Three of the wires are black and labeled with a number: 1, 2, and 3. The fourth wire is a green/yellow wire and is the ground wire.

Connect power to a properly fused disconnect.

See page 81 for the High Voltage Wiring Diagram

**THREE PHASE: 60 cycle 480 volts
 or 50 cycle 400 volts**

Confirm Correct 3-Phase Electrical Connection

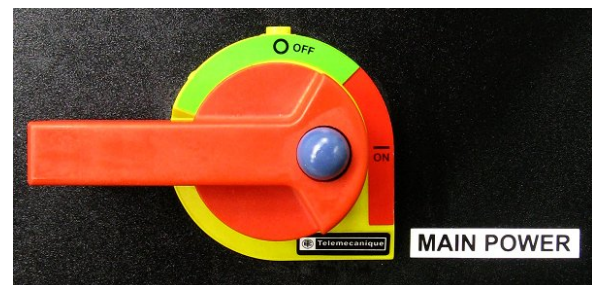


THREE PHASE Unit - CONFIRM proper 3-Phase power connection by following these instructions:

Turn power on using main power switch.

On the outside of the electrical box below the power switch is a red 3-Phase indicator light.

If 3-Phase power is correctly connected, the controller will power up and the red indicator light will NOT be lit.



Temperature Sensor Locations

T1 – Heating Hopper Air Inlet

T1s – Heating Hopper Air Inlet Temperature **Setting**

T1a – Heating Hopper Air Inlet Temperature **Actual**

T2 – Dry Purge Air Temperature

T2s – Dry Purge Air Temperature **Setting**

T2a – Dry Purge Air Temperature **Actual**

T3 – Heating Hopper Air Outlet Temperature

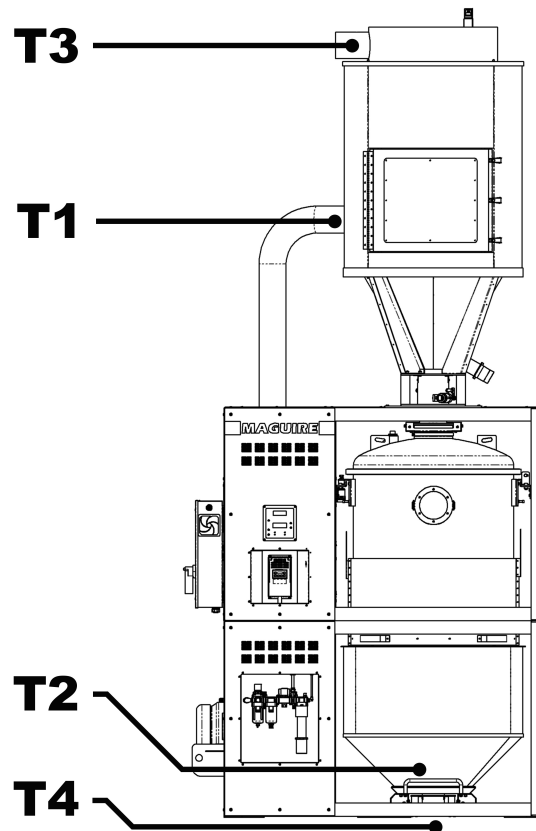
T3s – Heating Hopper Air Outlet Temperature **Setting**

T3a – Heating Hopper Air Outlet Temperature **Actual**

T4 – Material Outlet Temperature (optional)

T4s – Material Outlet Temperature **Setting**

T4a – Material Outlet Temperature **Actual**



Home Screen Overview



*Shown with enabled options:
Auto Shutdown, Batch Mode,
and Preheat, VBD-1000 screen*

T1 Actual - Actual Heating Hopper inlet air temperature

T1 Setpoint - Heating Hopper inlet air temperature Setpoint. Touch to adjust.

T2 Temp – Actual Heating Hopper temperature

Vacuum Time – Vacuum Time Actual and Vacuum Time Setpoint. Touch to adjust.

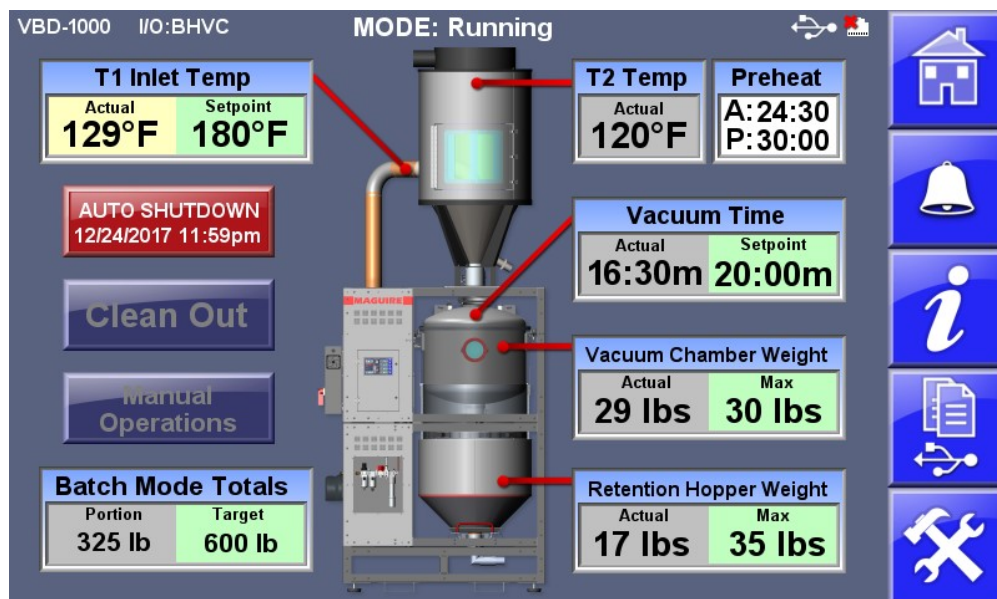
Vacuum Chamber Weight
Vacuum Chamber Actual and Maximum Weight

Retention Hopper Weight
Actual and maximum weight

Title Bar - Located across the top of the screen, the title bar displays Model, ID, I/O status, current operating mode, date and time, Ethernet and USB status.

Navigation Menu - Located along the right side of the screen, these buttons allow quick navigation to frequently used and top level screens. The middle three buttons are soft buttons that can be changed or removed.

Start / Shutdown (Auto Shutdown shown above) Button - Main Start Stop Control Button of the Dryer.



Preheat – Preheat Time Actual and Preheat Time Setpoint. Touch to adjust.

Info (i) - Access to advance information.

Additional information can be accessed by touching the Heating Hopper, Vacuum Chamber and the Retention Hopper.

Navigation Menu



Home Screen

Pressing the Home Screen button from any other screen will return the operator to the main Home Screen.



Alarm and Event

Alarm and Event Log displays a history of alarms and other events with a date and time stamps and description.



Print Center

A menu screen of print related options including Totals, Parameters, Alarm History, Events, Cycle History, Diagnostics. See page 67.



Setup Login

Password protected access to advanced Dryer and System configuration information.



Info Screen

System Information including firmware versions, IP and MAC address and machine operating tags.

Run Dryer - See page 23

Clean Out – See page 57

Manual Operations - See page 30

Top Level Menu:

Start Up and Operation

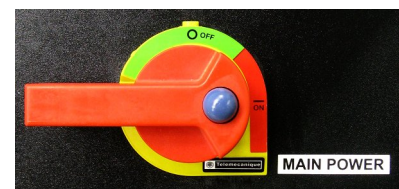
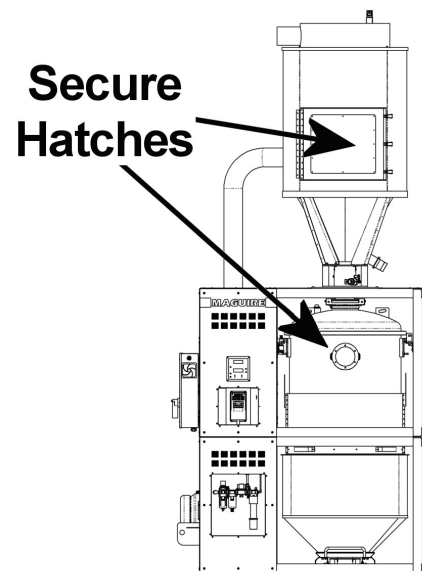
This section will help you understand what the dryer is doing during operation from a cold start. There are 3 concurrent operations. Heating, Vacuum and, Retention. Cold startup begins with Preheat. Preheat only occurs before the first cycle of the dryer's initial startup, otherwise each cycle begins with material heating. The vacuum operation pulls and holds a vacuum on the material for at least the Vacuum Time Set-point (or longer if material remains in the Retention Hopper). The Retention operation holds the dried material in the Retention Hopper, blanketing the material with hot, dry air, until the material is conveyed away.

Important: Inspect the VBD, verify that machine is clear of all material from all tanks, heating hopper, Vacuum Chamber and Retention Hopper. To facilitate a Clean Out, use the Clean Out function accessible from the home screen.

Startup and Operation Instructions

- 1. ENSURE HATCH IS CLOSED.** There is a hatch located on the upper Heating Hopper. Ensure all 3 latches are closed. Also be sure the removable Lower Retention Hopper is in place.
- 2. Load material into the Upper Heating Hopper.** Wait for the Heating Hopper to fill with material before starting the Dryer.
- 3. Turn on Main Power** by rotating the 60 AMP Main Disconnect Handle to the Red ON position. This powers up the VBD-1000 Dryer.

On initial power up of the VBD, the Control Panel powers ON automatically. If the main power is ON but the Control Panel is OFF, press and hold the Red Power Button located on the Control Panel for 2 seconds. (Note: The VBD's Control Panel can be powered OFF without powering down the Main Power by pressing and holding the Red Power button for 4 seconds).



4. On the Home Screen:

T1 Inlet Temp Setpoint – This is heat hopper inlet temperature. By the end of the preheat cycle time, all material in the Heating Hopper will be heated to this temperature. By default, the Setpoint temperature is set to 150°F. Contact the material manufacturer for temperature recommendations.

T1 Inlet Temp	
Actual	Setpoint
123°F	150°F

Preheat Time – This is the duration of heating from a cold start.

Preheat
00:00
00:00

Vacuum Time – This is the minimum duration of a vacuum cycle. Actual vacuum cycle times will vary according to the throughput. The default vacuum time is 20 minutes. In the vast majority of drying operations, this time is adequate and does not need to be adjusted. Special circumstances may require different vacuum times. Please consult a Maguire Dryer Technical for additional information.

Vacuum Time	
Actual	Setpoint
00:00	20:00

Press the setpoint field to adjust the setting. Use the on-screen keypad to enter the setpoint and press the green check to complete the setting adjustment.

5. Press the **START** button to start the dryer.



6. The display will show that the dryer is running in **PREHEAT** mode and display the following:

T1 Actual - Actual Heating Hopper inlet air temperature

T1 Setpoint - Heating Hopper inlet air temperature Setpoint.

T2 Temp – Actual Heating Hopper temperature

Vacuum Time – Vacuum Time Actual and Vacuum Time Setpoint.

Vacuum Chamber Weight - Vacuum Chamber Actual/Maximum Weight.

- 7.

What is happening when the dryer is running:

During the Pre-heat operation material in the heating hopper is brought up to temperature (T1s). Preheat time is determined by the specified Preheat Time on the Pre-Start screen (timed preheat, default 60 minutes) or by the Preheat Setup Auto option, which sets an inlet to outlet temperature delta and a minimum preheat time.

After pre-heat, approximately one third of the material in the heating hopper is dispensed into vacuum chamber, and the first vacuum cycle begins. Each vacuum cycle has a minimum vacuum time, set on the Pre-start screen, or the main run screen (VTs). (default is 20 minutes).

The loader loads the Heating Hopper with new material as the Vacuum Chamber receives the heated material and heating cycle begins concurrent to vacuum cycle (the first vacuum cycle is timed). The new batch of material in the upper portion of the heating hopper will take less time to heat. Minimum time in the heating is dictated vacuum time.

After first vacuum cycle, material is then dispensed into retention hopper ready for use. Material in the retention hopper is blanketed with dry air.

The rate of consumption of dried material from the retention hopper ultimately dictates the amount of time that the material will be preheated and under vacuum. **Examples:** If it takes 30 minutes to deplete the retention hopper, the vacuum cycle will run past its 20 minute setpoint (pre-start screen) to 30 minutes. This is normal operation. However if the retention hopper is depleted in 15 minutes and the vacuum time is set to 20 minutes, there will be a 5 minute window where no material is available. This indicates that the throughput of the dryer has been exceeded. If the Throughput Alarm is enabled (Alarm Setup), a Throughput Alarm (Alarm Code 20) will be triggered.

Shutdown – Immediate or Planned

End Preheat - (shown only if in a preheat cycle)

Skips the preheat allowing material to immediately pass down to the Vacuum Chamber (example: material has already been heated and dryer has been taking offline briefly and powered back on).

A blue rectangular button with a slight gradient and a thin black border. The text "End Preheat" is centered in white, bold, sans-serif font.

At any point during the preheat cycle or standard operation (operation after initial preheat cycle), pressing the red Shutdown button will bring up the Shutdown Options screen with the following shutdown options:

A red rectangular button with a slight gradient and a thin black border. The text "Shutdown" is centered in white, bold, sans-serif font.

Shutdown – Shutdown will continue to run the dryer and process the material in the Vacuum Chamber and the Retention Hopper until they are empty. Selecting Planned Shutdown will display the Cooldown option.

A blue rectangular button with a slight gradient and a thin black border. The text "Shutdown" is centered in white, bold, sans-serif font.

Cooldown (ON/OFF) – When enabled Cooldown will gradually bring down the temperature of the material in the heating hopper to the specified temperature (Cooldown Temp) over the specified time period (Cooldown Time).

A blue rectangular button with a slight gradient and a thin black border. The text "Cooldown" is centered in white, bold, sans-serif font.

To adjust the Cooldown Temperature and Cooldown Time use the arrow buttons   to adjust the setting. Press **ENTER** to advance through the digits and to complete the setting adjustment.

Press the **Shutdown** button to shutdown.

Pressing the red power button during a Planned Shutdown will display the Immediate Shutdown Screen allowing initiation of an immediate shutdown of the dryer.

Pause – Press the Vacuum Chamber will display the Vacuum Chamber Setup screen. Pause is the red button at the bottom of the screen. Pauses the vacuum timer indefinitely. To restart after a pause, press RESUME.

A red rectangular button with a slight gradient and a thin black border. The text "PAUSE" is centered in white, bold, sans-serif font.

Auto Shutdown – Initiates a shutdown (see above) at specified date and time. For further explanation on how to set the Auto Stop date and time see page 27.

A red rectangular button with a slight gradient and a thin black border. The text "AUTO SHUTDOWN" is centered in white, bold, sans-serif font. Below it, the date and time "12/24/2017 11:59pm" are displayed in a smaller white font.

Immediate Shutdown – Fast but controlled shutdown of the heater, blower, the vacuum system and the purge system.

A blue rectangular button with a slight gradient and a thin black border. The text "Immediate Shutdown" is centered in white, bold, sans-serif font.

Cancel - Exits the shutdown prompt screen, doing nothing.

Auto-Stop Setup

Auto-Stop initiates a shutdown at a specified time on specific days of the week. To enable and configure Auto-Stop follow the steps below.

Press		Display will prompt for a password. (default: 22222)	Then press:	
Press	Dryer Configuration	Display will show the Dryer Configuration categories.		
Press	Auto-Stop Setup	Display will show the Auto-Stop screen.		
To Enable Auto-Stop:				
Press		Auto-Stop Enabled	to enable Auto-Stop. Display will show Auto-Stop scheduling.	
Press	Schedule	Set the time of day Auto-Stop should occur.		
Press		to select the days of the week Auto-Stop should occur.		
Press		to save the Auto-Stop settings.		
Press		the Home Button to return to the Home Screen.		



Advanced Information

Pressing  on the Home Screen will display additional information such as readings of all RTD thermometers, vacuum time elapsed, absolute pressure in the Vacuum Chamber, blower drive frequency.

T1 Actual - Actual Heating Hopper inlet air temperature.

T1 Setpoint - Heating Hopper inlet air temperature Setpoint.

Heat Hopper - Heating Percent (%) output.

T2 Temp – Actual Heating Hopper temperature

Fill Info – The desired weight of material to be dispensed into the Vacuum Chamber.

Bulk Density - Bulk density of material in either pounds per cubic foot or kilograms per liter.

Cycle Count - Total number of cycles since start button was pressed.

Cycle Time - Total time to process a completed batch of dry material.

Valve Timing - Fill - Total time to fill the Vacuum Chamber.

Valve Timing - Dump - Total time to dump the Vacuum Chamber.

Totalizer - Calculated total of all cycles since last clear of totals.

Thruput - Calculated throughput, weight per hour.

Vacuum - Vacuum Chamber Actual Weight

Retention - Current material weight in Retention Hopper.

Residence – Actual Vacuum Time.

Recommended Drying Temperatures

MATERIAL	FINAL MOISTURE % *	DRYING TEMPERATURE**	
		°C	°F
ABS	0.10	80 - 85	180 – 190
ABS/PC	0.02	100	210
LCP	0.02	150	300
PA	0.20 - 0.10	80 - 85	180 – 190
PBT	0.02	120	250
PC	0.02	125	250
PC/PBT	0.02	125	250
PEEK	0.20 - 0.10	150	300
PEI	0.02	150	300
PES	0.05 - 0.02	150	300
PET (Molding Grade)	0.010	150-180	300-350
PET (Preform, Extrusion)	0.005	150-180	300-350
PMMA (Acrylic)	0.02 - 0.04	79	175
POM (Acetal)	0.20 - 0.10	80 - 110	180 – 230
PPO	0.02	100 - 120	210 – 250
PPS	0.02	150	300
PUR	0.02	125 - 140	260 – 280
PSU	0.02	150	300
SAN	0.20 - 0.10	80	180
* Final moisture content as recommended by the raw material manufacturer.			
** Drying temperature as recommended by the material manufacturer.			

Drying is accomplished when all material reaches the proper temperature, and is then placed under sufficient vacuum for a sufficient period of time.

Measurement of moisture content of material, both prior to and after drying, is accomplished by using a moisture analyzer.

Setup Menu Map - Brief Explanation

This section contains a brief explanation of the Setup menu. For detailed information see Setup Menu Full Explanation immediately following this section.

▶		Setup (password protected) – Settings and Options Menus
	▶	Dryer Configuration - Dryer specific settings
	▶	Alarm Setup – Enable or disable various alarms.
	▶	Auto-Stop Setup - Scheduling Auto-Stop of the dryer.
	▶	Dry Purge Setup - Configuration of dry purge.
	▶	Preheat Setup - Configuration of Preheat.
	▶	Auto-Start Setup - Scheduling Auto-Start of the dryer.
	▶	Convey Setup - Configuration of material convey and loaders.
	▶	Load-cell Setup - Loadcell calibration, zero and full calibration.
	▶	Parameters - Operation Parameters
	▶	Blower • BDT - Blower Delay Time (Seconds) • BLF - VFD Low Limit • BHF - VFD High Limit • BDF - VFD Frequency • BZL - VFD Zero Level • BLA - VFD Level Adjustment • BHT - VFD Heat Throttle • BAC - VFD Air Flow Cutback • BTC - VFD Temperature Cutback • BTA - VFD Throttle Adjustment
	▶	Heater • PTS - Preheat Temperature Setting • PHT - Preheat Time • PTD - Preheat Target Delta • RTS - Run Temperature Set-Point • PT1 - PD Loop Proportional • DT1 - PD Loop Derivative • UT1 - PD Loop Update Time • OT1 - Heat1 Over-Target Alarm • NH1 - Heat1 No Heat Alarm • SO1 - Heat1 Set-Point Off. Percent • MP1 - Heat1 Max Percent • RO1 – Heat1Restart Offset • MAX - Max Temp Set-Point • ESL - Energy Savings Limit • ESD - Energy Savings Differential • EST - Energy Saver Time • RMP - Temperature Ramp Settings • CTM - Cool-Down Temperature • CTR - Cool-Down Timer
	▶	System • ELT - Event Logging Time

			►	Dispensing • VCH - Vac. Chamber Hi Level • VCL - Vacuum Chamber Low Level • RHH - Ret. Hopper Hi Level • RHL - Retention Hopper Low Level • BLK - Bulk Density • VFR - Vacuum Chamber Fill Rate • VDR - Vacuum Chamber Dump Rate • VFT - Chamber Fill Time • VDT - Chamber Dump Time • FLA - Fill Lag Time • DLA - Dump Lag Time • VGD - Vacuum Gate Delay • VFA - Chamber Fill Adjust • HDD - Heating Hopper Dump Delay • VCT - Vacuum Chamber Dump Threshold • CDR - Chamber Dump Reties • RAL - Residence Alarm • BCH - Batch Size • LTP - Loader Trip Point • LTC - Loader Thruput Cutoff • HHV - Heating Hopper Volume (optional) • HHU - Heating Hopper High Level (optional) • HLA - Heating Hopper Level Alarm (optional) • HHL - Heating Hopper Low Level
			►	Load-Cell • KDF - Loadcell Stable Wt. • LST - Load Cell Stable Time • LCZ - Loadcell Zero • WST - Weight Settle Time • LZ1 - Loadcell 1 Zero • LZ2 - Loadcell 2 Zero
			►	Vacuum • VTs - Vacuum Time Setting • VPL - Vacuum Pressure Low • VPD - Vacuum Pressure Delta • VSO - Vacuum Shutdown Offset • LVT - Low Vacuum Timeout • NVT - No Vacuum Timeout • VPT - Chamber Purge Timer • VPI - Chamber Purge Interval • ATM - Atmospheric Pressure
	►	System Configuration		System specific settings
		►	Print Options	
		►	Print Parameters - Prints parameter report to USB Flash Drive	
		►	Print Alarms and Events - Prints alarms and events to USB Flash Drive	
		►	Copy Log File - Copies raw log file to USB drive.	
		►	Print Alarm History - Prints Alarm History to USB Flash Drive	
		►	Print All - Prints all above reports to USB Flash Drive	
		►	Diagnostics	
		►	System Information - Firmware, bootloader, I/O versions	
		►	Load-Cell Diagnostics - Loadcell raw counts	

			▶	Alarm and Event Log - Alarms and Events displayed and printable
			▶	Live Diagnostics - Live Cycle diagnostic report, printable history
			▶	Communication Diagnostics - Information for communications
		▶	Resets	
			▶	User Settings - Save / Restore User entered Settings
			▶	Restore All - Restores factory default settings
			▶	Firmware Updates - Reads USB drive for updates, selects and updates firmware. Contact Maguire Products Inc. for updates.
			▶	Factory Access - Factory Access Only
			▶	Restore Parameters - Restores factory default parameters
		▶	Preferences	
			▶	Change Passwords - Change Admin and Operator passwords
			▶	Display Options – On-screen information display preferences
			▶	Language - Language selection
			▶	Screen Options - Screen saver, brightness, calibration, options
			▶	Date and Time
			▶	Weight Units - pounds, ounces, grams kilograms
			▶	Menu Bar Options - menu button preferences
		▶	Communications	
			▶	MLAN I.D. Number - Set Dryer identification number
			▶	Modbus Server - enable/disable Modbus TCP
			▶	TCP/IP Configuration - Sets IP address, Subnet mask, gateway
			▶	MLAN Serial Baud Rate - Set baud rate of MLAN over serial

Modes of Operation

Three modes of operation (on Home Screen): **Run Dryer**, **Manual Operations**, **Clean Out**.

Run Dryer - See Operation on page 23.

Manual Operations – Options that allow direct control over specific outputs.

Operate Outputs

Alarm Audio – OFF/ON – Operates audible alarm.

Alarm Strobe – OFF/ON – Operates strobe.

Dry Purge Supply – CLOSED/OPEN of dry purge supply air valve

Vac Gate Upper – OPEN/CLOSED – Material gate above vacuum chamber.

Vac Gate Lower – OPEN/CLOSED – visible disk shaped gate below vacuum chamber.

Vac Cham Fill – OPEN/CLOSED - Gate located at the base of the heating hopper.

Vac Cham Dump – OPEN/CLOSED – Internal gate (not visible) located at the base of the vacuum chamber.

Vac Gen Supply – OPEN/CLOSED – Vacuum generator supply. When operating, the vacuum generator supply pulls a vacuum on the vacuum chamber.

Vac Gen Check – OPEN/CLOSED – Vacuum generator check valve located on the vacuum generator. Holds the vacuum on the vacuum chamber.

Vac Cham Purge – OPEN/CLOSED – Located below the vacuum generator. When open the vacuum on the vacuum chamber is released.

Blower Test – Operates the blower.

Blower: OFF/ON toggle using ENTER button.

Aux: OFF/ON toggle using ENTER button.

Fail Safe: OFF/ON toggle using ENTER button.

T1s: Heating Hopper inlet temp setpoint.

T1a: Heating Hopper inlet temp actual.

Vacuum Test - Tests the Vacuum System

Vac: Vacuum pressure readout

Start Test: Starts the vacuum test. Runs the vacuum generator system.

Evac Time: Amount of time in minutes/seconds to attain the vacuum setpoint during the current test.

Cycle: Amount of time in minutes/seconds between vacuum generator runs during a vacuum hold. Used to determine vacuum chamber seal integrity.

Pset: Absolute pressure that the Vacuum Chamber will be evacuated to. See VPL parameter.

Pdel: The pressure difference above VPL at while the vacuum generator turns back on. See VPD parameter.

Purge Cham: OFF/CYC/ON

Vacuum Chamber Timed Dispense – Opens valves for specified milliseconds.

Fill: Fill Time of the Vacuum Chamber in milliseconds.

Dump: Dump time of the Vacuum Chamber in milliseconds.

Input Status – Shows status of various inputs

Blower – OFF/ON

Level – Heating Hopper Level (0-100%)

Pressure – LOW/OK

VAC – Vacuum chamber absolute pressure (mmHg)

Primary OT – Primary Heater temperature switch - OK/OVERTMP

Purge OT - Purge Heater temperature switch - OK/OVERTMP

HH Rem. Dump – Remote heating hopper dump – ON/OFF

VC LC – Raw counts of the vacuum chamber loadcell

RH LC - Raw counts of the retention hopper loadcell

T1 – Heating hopper inlet temperature

T2 – Heating hopper outlet temperature

T4 – Material exit temperature (optional RTD)

Heater Test – Operates heater and blower that supplies heat to the Heating Hopper.

T1s: Heating Hopper inlet temp setpoint.

T1a: Heating Hopper inlet temp actual.

Start: Starts the heater test. Blower will run during test.

Heater Output: Heater duty cycle expressed in percent

Blower: Status of blower

Control: PID or manual. Controller will modulate the heater as it would during auto cycle. In manual mode the operator can select a heater duty cycle.

Edit Settings: Easy access to heater control parameters

Clean Out – Clean Out opens all valves and allows for material evacuation and cleanout.

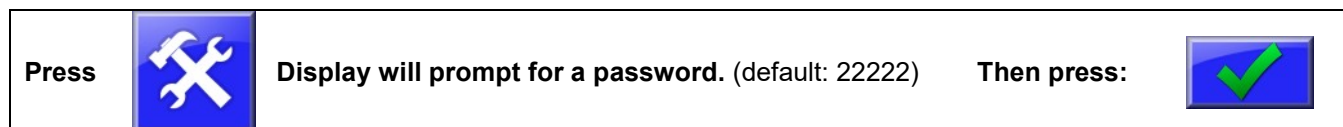
Dump Heat Hopper – Opens the Vacuum Chamber Fill Valve, drains the Heating Hopper.

Dump Vacuum Chamber – Opens Vacuum Chamber dump valve, draining Vacuum Chamber

Dump All – Opens both the Vacuum Chamber Fill Valve and Vacuum Chamber dump valve

Setup Menu – Full Explanation

Setup is a password protected area for accessing Dryer or System specific configuration settings. Setup is accessible from the main screen by pressing:



Parameters – All Dryers operate according to certain internal PARAMETERS. Because customer requirements vary widely, we have made a wide range of parameters accessible for change through the touchscreen. Parameters are grouped into the following categories: Blower, Heater, System, Dispensing, Load-Cell, and Vacuum. Parameters are covered on page 41.

Setup is divided into two categories: Dryer Configuration and System Configuration.

Dryer Configuration includes device specific settings such as: Alarm Setup, Auto-Stop Setup, Dry Purge Setup, Preheat Setup, Auto-Start Setup, Convey Setup, Load-Cell Setup, and Parameters.

System Configuration includes system wide general settings such as: print options, diagnostics, resets, system preferences, and communications settings.

The following section describes the features within the Setup Menu.

Dryer Configuration

Setup Menu Option Alarm Setup

Description / Options

Material Shortage Alarm

- WARN:** In the event of a material shortage, activate the audible alarm and strobe light but continue retrying for material.
- SHUTDOWN:** In the event of a material shortage, activate the audible alarm and strobe light and automatically initiate a planned shutdown. Audible alarm with sound for 15 seconds and the strobe will flash until the dryer is completely shut down.
- OFF:** Disables the Material Shortage alarm

When Material Shortage Alarm is in Warn or Shutdown Mode Fill Retries are ENABLED. When set to OFF, Fill Retries are disabled.

Material Ready Alarm - If the Material Ready alarm is enabled, this alarm will trigger after the first and only first batch of material has completed a full vacuum cycle. After 15 seconds, the audible portion of this alarm will automatically silence. The first batch of material will remain under vacuum indefinitely until this alarm is cleared. There are two main purposes of this alarm:

1. To alert the operator that dry material is ready for the process.
2. To act as a hold-back, when necessary, giving the operator additional time to prepare the process.

1st: Material Ready Alarm sounds after the first and only the first batch of material is ready to drop from the Vacuum Chamber.

ON: Material Ready Alarm sounds after every batch of material is ready to drop from the Vacuum Chamber. This mode can be useful in lab environments.

OFF: Disables the Material Ready Alarm

Material Temperature Alarm - When the Material Temp alarm is enabled, during any instance where the Heating Hopper is called upon to dispense material into the vacuum chamber and the T2 (heating hopper exit) temperature is below the ESM parameter level, this alarm will trigger. Its purpose is to alert the operator that insufficient heating has occurred, most likely from a process throughput that exceeds the capacity of the VBD.

ON: When the Material Temperature Alarm is enabled, the alarm will sound when this alarm is triggered.

OFF: Disables the Material Temperature Alarm

Residence Alarm (labeled “Residence”) - When the Residence Alarm is enabled, an alarm will sound if dried material has sat in the retention hopper too long. The RAL parameter determines when a residence alarm will occur based on elapsed time and weight of remaining material in the retention hopper. See the RAL parameter for more information.

ON: When the Residence Alarm is enabled, the alarm will sound when this alarm is triggered.

OFF: Disables the Residence Alarm

Throughput Alarm - If the Throughput alarm is enabled, the alarm will sound if the material in the Retention Hopper is used faster than the dryer can produce dried material. (Material level reaches RTL

parameter before the Vacuum Time Setting expires VTS parameter)

ON: If the Throughput alarm is enabled, the alarm will sound when this alarm is triggered.

OFF: Disables the Throughput alarm

Vacuum Chamber Dump Alarm - If the Vacuum Chamber Dump alarm is enabled, the dispensing of material from the vacuum chamber into the retention hopper is monitored using the CDR (Chamber Dump Retries) parameter. CDR's default settings of 05003 requires that at least 50% of the material that is in the vacuum chamber be detected in the retention hopper after the dispense. If it's under 50% the dispense will retry 3 times before triggering the alarm. Retries will continue indefinitely until 50% is satisfied.

ON: If the Vacuum Chamber Dump alarm is enabled, the alarm will sound when this alarm is triggered.

OFF: Disables both the vacuum chamber dump alarm and vacuum chamber Dump retries.

Print Alarm Log - Prints the Alarm Log. See page 67.

Clear Alarm Log - Clears the Alarm Log. See page 67.

Auto-Start Setup Auto-Starts the Dryer at a specified Time and Day(s). Can be set to Auto-Start the Dryer at one time only or on a repeated schedule. Must be turned ON in Display Setup (see below).

Auto-Stop Setup Auto-Stop the Dryer at a specified Time and Day(s). Can be set to Auto-Stop the Dryer at one time only or on a repeated schedule. Must be turned ON in Display Setup (see below).

Convey Setup **Convey Setup - Material Convey Options - Optional** - Uses dedicated outputs on the I/O board that may be used to control customer supplied Loader(s).

See the I/O Board Wiring Diagram at the end of this manual.

- **Loader 1** - Off / Auto - Stops loader that supplies the heating hopper for shutdown sequence.
- **Loader 2** - Off / Auto - When material is ready, loader will convey material away from dryer retention hopper. When enabled, select Throughput or Weight.
- **Reset Totalizer** - Resets Weighed totals to zero. Totals are the amount of material that has been conveyed away from the dryer since the Totalizer has been reset.

Dry Purge Setup

Purge Cham - OFF/CYC/ON – Controls when the vacuum chamber is purged with membrane dried air.

OFF – No vacuum chamber purging occurs.

CYC - Vacuum chamber purging occurs during allotted vacuum cycle time (VTs).

ON – Vacuum chamber purging occurs during allotted vacuum cycle time (VTs) and extended vacuum if applicable.

Purge Interval - Interval in seconds between purges.

Purge Duration - Duration in seconds that the purge will occur.

Preheat Setup

Preheat Mode - Auto or time - Preheat time for the material in the Material Hopper. Default preheat time is 30 minutes.

Preheat Time - The Preheat Time is the duration of preheat time.

Parameters

Parameters access. See page 41.

System Configuration**Print Options**

Print Setup - See page 67

- **Print Parameters** - Prints the parameter list to a USB.
- **Print Alarm History** - Prints the Alarm History to USB.
- **Print Alarms and Event:** Prints Alarm and Events to USB.
- **Print All** - Prints parameters, events, and alarms to USB.
- **Copy Log File** – Copies raw log file to USB.

System Preferences

Change Passwords - Sets the Setup Menu Password. Default password is 22222. Setting the password to 00000 disables password protection.

Date and Time - Set time, date and date format.

Display Options - Show / Hide Information and options on the controller screens

- **Batch Mode - ON/OFF** – When ON, the option to dry a batch of material is displayed on the home screen.
- **Cycle Info - ON/OFF** – Displays Cycle info on main screen.
- **Dispense Time - ON/OFF** – Displays the fill time on main screen.
- **Residence Time - ON/OFF** – When ON, displays a

countdown timer (RAL parameter) indicating when an alarm will sound alerting that material has sat in the retention hopper too long.

- **Show Throughput** – Displays throughput (lbs or kgs per hour)
- **Show T4 Temperature** - Displays actual temperature.

Display Units: Fahrenheit (°F) or Celsius (°C), Pounds (lbs) or Kilograms (kgs), Pressure: Absolute or Differential, Pressure units: mmHg or inHg.

Language – Set current language.

Menu Bar Options – Allows changes to right-side menu buttons.

Screen Options – Screen Saver options, Screen Brightness, Screen Calibration and On-Screen Options. On-Screen Options is information shown across the top of the home screen including: Date/Time, Model Number, MLAN ID, USB Connectivity, Ethernet Connectivity.

Diagnostics

System Information – System Information displays specific system related information about the controller and Dryer.

Load-Cell Diagnostics – Displays Vacuum Chamber and Retention Hopper loadcell diagnostics information.

Alarm and Event Log – Displays the Alarm and Event Log screen.

Communications

Blender I.D. Number – Sets the Blender ID number. Enter an identification number for this particular weigh scale blender. This I.D. number will appear on all printed reports. If you have more than one unit, this helps to identify reports. If you are using the MLAN Protocol to automatically gather data, then each controller must have a unique address. Valid numbers are 000 to 255.

Modbus Server – Enable or disable Modbus TCP.

TCP/IP Configuration – Enable DHCP or set a static IP address, subnet mask and default gateway.

For more information on communications see page 51.

Resets

User Settings – Save/Restore Settings – Used for saving or restoring previously saved parameters. For more information on Saving and Restoring Settings, see “Saving Parameters in the User Backup Settings” on page 72.

Factory Access – For factory access only.

Restore All – Restores Factory Defaults.

**WARNING: Only do a Restore All
when directed by a Maguire Technician.**

Restore Parameters – Resets parameters back to factory defaults.

Firmware Update - Update VBD-1000 firmware. See page 73.

Parameters

All Maguire VBD controllers operate according to certain internal PARAMETERS. Because customer requirements vary widely, we have made parameters accessible for change through the keypad. In most cases, these parameters will never need to be changed. Some parameters that are routinely adjusted values are adjustable from the main display. To access and edit the parameters, see **Changing Parameters** in this section:



IMPORTANT!

Changing parameters can have an impact on the Dryers performance. It is highly recommended that a supervisor change the default Program Mode password to protect the values. Prior to making any changes, make sure you understand what you are doing. If in doubt contact a Maguire Dryer Technician before making changes to your dryer.

Blower Parameters:

BDT	Blower Delay Time
BLF	VFD Low Limit
BHF	VFD High Limit
BDF	VFD Frequency
BZL	VFD Zero Level
BLA	VFD Level Adjustment
BHT	VFD Heat Throttle

Dispensing Parameters:

VCH	Vac. Chamber Hi Level
VCL	Vacuum Chamber Low Level
RHH	Ret. Hopper Hi Level
RHL	Retention Hopper Low Level
BLK	Bulk Density
VFR	Vacuum Chamber Fill Rate
VDR	Vacuum Chamber Dump Rate
VFT	Chamber Fill Time
VDT	Chamber Dump Time
FLA	Fill Lag Time
DLA	Dump Lag Time
VGD	Vacuum Gate Delay
VFA	Chamber Fill Adjust
HDD	Heating Hopper Dump Delay
VCT	Vacuum Chamber Dump Threshold
CDR	Chamber Dump Reties
RAL	Residence Alarm
BCH	Batch Size
LTP	Loader Trip Point
LTC	Loader Thruput Cutoff
HHV	Heating Hopper Volume
HHU	Heating Hopper High Level
HLA	Heating Hopper Level Alarm

Heater Parameters:

PTS	Preheat Temperature Setting
PHT	Preheat Time
PTD	Preheat Target Delta
RTS	Run Temperature Set-Point
PT1	PD Loop Proportional
DT1	PD Loop Derivative
UT1	PD Loop Update Time
OT1	Heat1 Over-Target Alarm
NH1	Heat1 No Heat Alarm
SO1	Heat1 Set-Point Off. Percent
MP1	Heat1 Max Percent
MAX	Max Temp Set-Point
ESM	Energy Savings Mode
EST	Energy Savings Time
RMP	Temperature Ramp Settings
CTM	Cool-Down Temperature
CTR	Cool-Down Timer

Load Cell Parameters:

KDF	Loadcell Stable Wt.
LST	Load Cell Stable Time
LCZ	Loadcell Zero
WST	Weight Settle Time
LZ1	Loadcell 1 Zero
LZ2	Loadcell 2 Zero

Vacuum Parameters:

VTs	Vacuum Time Setting
VPL	Vacuum Pressure Low
VPD	Vacuum Pressure Delta
VSO	Vacuum Shutdown Offset
LVT	Low Vacuum Timeout
NVT	No Vacuum Timeout
VPT	Chamber Purge Timer
VPI	Chamber Purge Interval
ATM	Atmospheric Pressure

System Parameters:

ELT	Event Logging Time
-----	--------------------

Parameter Units

TIMES	Are expressed as full seconds or full minutes.
PERCENTS	are expressed in full percents.
TEMPERATURES	are expressed in full degrees (Fahrenheit or Celsius).
TERM	used to calculate a value.

3-letter **Parameter title (units) – default parameter value**
 Acronym Parameter description

Blower Parameters**BDT Blower Delay Time (Time in seconds) – 02002**

The first two digits are the delay in seconds between powering the blower and powering the heating hopper heater. The last two digits are the delay in seconds between powering down the blower and powering down the heating hopper heater.

BDF VFD Frequency (Hz) – 00060

The frequency, in Hz, that the VFD will power the blower motor with. The blower RPMs, as well as the airflow, are directly proportional to this frequency.

BHF VFD High Limit (Hz) – 00060

The maximum VFD frequency, in Hz, that the blower may be set to from the Blower Setup menu. The maximum settable value for this parameter is 000060.

BLF VFD Low Limit (Hz) – 00025

The minimum VFD frequency, in Hz, that the blower may be set to from the Blower Setup menu. The minimum settable value for this parameter is 000025.

BZL VFD Zero Level (%) – 00045

The heating hopper level, expressed as a percentage, that triggers the VFD to reduce speed to the BLA setting.

BLA VFD Level Adjustment (Hz) – 00025

The frequency, in Hz, that the blower will run at if the heating hopper level is at or below the BZL level. This reduced blower speed eliminates popcorning when the heating hopper material level is low.

BHT VFD Heat Throttle (%) – 00100

Percentage of adjustment to the heater's on-time at the point when the material has finished exiting the heat hopper and the blower starts. A reduced heater on-time percentage (from 100%) reduces the heat exposure to the new material entering the heat hopper. Activated when the level sensor is below BZL (parameter). Setting the first digit to a 1 overrides the percent adjustment and effectively turns off the heater when material is below the BZL threshold.

Dispensing Parameters

- VCH Vacuum Chamber High Level – weight - 00035**
Amount of material dispensed into the Vacuum Chamber from the heating hopper. Also known as the “Fill Weight”.
- VCL Vacuum Chamber Low Level – weight - 00005**
Two conditions are triggered by VTL.
When in Clean Mode, the Vacuum Chamber fill valve will be open when the amount of material in the Vacuum Chamber is at or below this weight. When starting in Auto Cycle, the “material in Vacuum Chamber” warning will be triggered when the amount of material is at or above this level.
- RHH Retention Hopper High Level – weight - 00035**
Amount of material (the high level) dispensed into the Retention Hopper from the Vacuum Chamber.
- RHL Retention Hopper Low Level – weight - 00005**
Three conditions are triggered by RTL.
When in Clean Mode, the Vacuum Chamber dump valve will be open when the amount of material in the Retention Hopper is at or below this weight. When starting an Auto Cycle, the “material in Retention Hopper” warning will be triggered when the amount of material is at or above this level. When in Auto Cycle, the amount of material in the Retention Hopper must be at or below this level in order for the Vacuum Chamber to dump.
- BLK Bulk Density - Bulk density of the material in either pounds per cubic foot or kilograms per liter (depending on the weigh unit of measurement in Loadcell Setup).**
- VFR Vacuum Chamber Fill Rate – grams/second – 00580**
Learned fill rate of the Vacuum Chamber in seconds. Used to calculate a precise Vacuum Chamber fill time.
- VDR Vacuum Chamber Dump Rate – grams/second – 00580**
Learned dump rate of the Vacuum Chamber in seconds. Used to calculate a precise Vacuum Chamber dump time.
- VFT Vessel Fill Time (Time in seconds) – 00035**
The time in seconds that the Vacuum Chamber fill valve will be open assuming that the Vacuum Chamber High Level (VTH) is not reached first.
- VDT Vessel Dump Time - (Time in seconds) – 00035**
The time in seconds that the Vacuum Chamber dump valve will be open assuming that the Retention Hopper High Level (RTH) is not reached first.
- FLA Fill Lag Time (ms) – 00175**
The time, in milliseconds, that is added to every vacuum chamber fill valve opening operation. This compensates for the fill valve opening delay caused by the inherent

lag in any mechanical device.

DLA Dump Lag Time (ms) – 00100

The time, in milliseconds, that is added to every vacuum chamber dump valve opening operation. This compensates for the dump valve opening delay caused by the inherent lag in any mechanical device.

VGD Vacuum Gate Delay (Time in seconds) – 00303

Format: XXXYY - XXX = lower vacuum gate, YY = upper vacuum gate
The amount of time in seconds after a vacuum gates opens before the vacuum chamber fill or dump valve can open. (Opening of Vacuum Chamber fill valve or dump valve).

VFA Vacuum Fill Adjust (Retries, percent) – 00310

Two part parameter. The first three digits are the number of retries to fill the Vacuum Chamber (default 3 retries). Last two digits are the minimum allowable percent under the targeted maximum fill weight of the Vacuum Chamber (VTH parameter). After the third failed retry the “Low Batch” alarm is generated while the VBD continues to retry.

HDD Heat Hopper Dump Delay - Seconds - 0004

Delay in seconds between the heating system shutdown and material dump from the heating hopper to the Vacuum Chamber. This delay allows time for the blower to stop.

VCT Vacuum Dump Threshold – grams/second – 00115

During a Vacuum Chamber dump (into the Retention Hopper), the material flow rate is constantly calculated. When the flow rate reaches VTT, indicating that the chamber is empty, the Vacuum Chamber dump valve is closed.

CDR Chamber Dump Retries (%/Retries) – 05003

Controls the Vacuum Chamber Dump Alarm.

Format: XXXYY - XXX = percentage, YY = number of retries

When the vacuum chamber dumps material into the retention hopper, if less than 50% of the material that should have dropped is detected in the retention hopper, a dump retry will occur. After 3 failed retries a VC DUMP alarm will trigger.

RAL Residence Alarm – pounds / minutes - 05120

When the Residence Alarm is enabled, this parameter will determine when a residence alarm will occur. This parameter contains two variables. The first two digits are weight (in lbs or kgs) and the last three digits are minutes. For example, if after 120 minutes there are less than 5 lbs (or kgs) of material removed from the retention hopper, the Residence Alarm will sound (if enabled, see the Alarm Setup menu).

BCH Batch Mode – weight (lbs/kgs) – 00000

The amount of material in pounds or kilograms that will be dried during a batch run.

LTP Loader Trip Point – weight (1/10 pound or kilogram) – 00005

If loader 2 (downstream loader) is enabled, and the amount of material in the retention hopper is at or above this weight, the loader 2 output turns on.

LTC Loader Throughput Cutoff – weight/minute – 00005

When loader 2 (downstream loader) mode is set to “THRUPUT”, and the amount of material in the Retention Hopper is at or below the LTP parameter, and the throughput is below this parameter (LTC), turn the loader 2 output off.

HHV Heating Hopper Volume – 10ths of cubic feet or 10ths of liter.

The amount of material that the heating hopper can hold taking into account dead space at the top and how far the loader hangs into the heating hopper. This parameter is used to calculate the beginning of an auto shutdown when loader #1 is set to auto. Installation of an optional heating hopper extension would necessitate changing this parameter.

HHU Heating Hopper High Level (%) – 00095

The level, expressed as a percentage, that the heating hopper will be filled to when Loader #1 is set to AUTO (and the heating hopper loader signal cable is wired in series to the Loader #1 control relay). Note that the deadband is 5%.

HLA Heating Hopper Level Alarm (%) – 00050

The level, expressed as a percentage, that the Heating Hopper Level Alarm will trigger if enabled in the Alarm Setup menu. Any heating hopper level at or below this level will trigger the alarm.

Heater Parameters**PTS Heat1 Temperature Set-Point (Temperature) – 00150**

Heating hopper air inlet temperature setting in F° or C°

PHT Preheat Time – Time in Minutes – 00030

Time in Minutes that the material in the heating hopper is heated following a cold start before normal Run Dryer sequence starts.

PTD Preheat Target Delta – Degrees – 00030

When preheat mode is set to AUTO (not time), the preheat cycle will end when the temperature of the air exiting the heating hopper (T2) is within PTD degrees of the air entering the heating hopper (T1).

RTS Run Temperature Setting – Degrees – 00150

The heating hopper air inlet temperature setting in °F or °C. This is the temperature that the resin is heated to before the vacuum cycle, and is shown as “T1a” on the status screen.

PT1 Heat1 Proportional – Term – 00040

This parameter is used to make adjustments to the heating hopper heat output. Changes to this parameter should not be made unless directed by a Maguire Technician. The proportional term (or “gain”) makes a change to the heating hopper heater output that is proportional to the current error value difference between set-point and actual temperature.

DT1 Heat1 Derivative – Term – 00015

This parameter is used to make adjustments to the heating hopper heat output. Changes to this parameter should not be made unless directed by a Maguire Technician. The rate of change of the process error is calculated by determining the slope of the error over time (i.e., its first derivative with respect to time) and multiplying this rate of change by the derivative gain.

UT1 Heat1 Update Time – Time – 00415

This parameter has two parts. The first three digits is the amount of time, in seconds, between PID updates if the heating hopper inlet temperature, T1a, is ABOVE setpoint. The last two digits is the amount of time, in seconds, between PID updates if the heating hopper inlet temperature, T1a, is BELOW setpoint.

OT1 Heat1 Over-Temp Alarm – Percent – 06006

The first three digits is the time in seconds by which the actual temperature must be above the set-point temperature of the heating hopper heater by the value in degrees represented in the 4th and 5th digits of this parameter before an over-temp alarm condition occurs.

NH1 Heat Hopper No Heat Alarm – Seconds – 120

This is the maximum time limit, in seconds, after the heat cycle begins, during which one of the following two conditions must be detected: Either the temperature must climb 20 degrees, or the temperature must move at least 20 percent toward the target temperature. If neither condition is met the “NO HEAT” alarm will sound. Such an occurrence would signal a failure of either the heater or the blower. This parameter protects the heater from burn out in the event the blower fails or airflow is blocked.

SO1 Heat Hopper Set-Point Offset – degrees – 03002

Heating hopper set-point temperature offset. Used for heat control. Offset from the target in degrees. First 3 digits are the number of seconds to hold the offset setpoint temperature. 4th and 5th digits are the number of degrees below the target setpoint.

MP1 Heat Hopper Maximum Percent – Percent – 00100

Limits the duty cycle of the heater.

MAX Max Temp Set-Point (Temperature) – 00350

The maximum allowable temperature in whole degrees.

ESM Energy Savings Mode – temperature – 000125

When Energy Saver Mode is enabled, and the temperature of the air exiting the heating hopper is at or above this level and the Energy Savings Time has elapsed, trigger Energy Saver Mode.

EST Energy Savings Time – minutes – 00030

If Energy Savings Mode is enabled and Energy Savings Mode has been activated, the Energy Saving Time is the time that will elapse before Energy Savings Mode is reactivated to bring the temperature of the material back up.

RMP Temperature Ramp Settings (Increments/Minute/Degrees) – 52036

Format: XYYZZ - X = number of increments, YY = duration of ramp in minutes, ZZ = temperature delta

For example, with RMP set to 52020: When temperature ramping is turned on, over the course of 20 minutes, a 20 degree C ramp will occur, in 5 increments of 4 degrees C.

CTM Cool-Down Temperature – Degrees - 00120 Fahrenheit or 00050 Celsius

Cool-down target temperature for the heat hopper during the Planned Shutdown.

CTR Cool-Down Timer – Minutes - 00030

Targeted elapsed time to cool-down target temperature (CTM parameter).

Load Cell Parameters**KDF Loadcell Stable Weight – counts – 00006**

Maximum allowable fluctuation in raw loadcell counts to produce a stable weight reading.

LST Loadcell Stable Time – milliseconds – 00100

Duration in milliseconds that raw loadcell counts must remain within KDF to produce a stable loadcell reading.

LCZ Loadcell Zero – counts – 01000

Minimal allowable counts when zeroing load cells.

WST Weight Settle Time – seconds – 00005

Delay time in seconds after the vacuum chamber fill valve closes to allow material to settle and the dryer to acquire an accurate weigh reading.

LZ1 Load Cell 1 Zero – counts – 00000

Factory set reference point in counts for retention hopper load cell. This parameter should not be changed unless directed by a Maguire technician or if load cells are replaced. If load cells are replaced, instructions will be provided. When this parameter is set to zero (00000), restriction on loadcell calibration is disabled.

LZ2 Load Cell 2 Zero – counts – 00000

Factory set reference point in counts for vacuum chamber load cell. This parameter should not be changed unless directed by a Maguire technician or if load cells are replaced. If load cells are replaced, instructions will be provided. When this parameter is set to zero (00000), restriction on loadcell calibration is disabled.

Vacuum Parameters

- VTs Vacuum Time Setting (Time in minutes) – 00020**
The length of a vacuum cycle in minutes.
- VPL Vacuum Pressure Low (mm Hg abs.) – 00080**
The pressure (absolute mm, absolute inches, differential mm, differential inches) at which the vacuum system will attempt to attain before stopping and holding said pressure. Default shown is absolute mm.
- VPD Vacuum Pressure Delta (mm of mercury) – 00020**
The pressure difference above VPL at while the vacuum generator turns back on. This value is the mm of mercury above VPL.
- VSO Vacuum Shutdown Offset – Seconds – 00015**
Amount of time in seconds before the Vacuum Timer Setting (VTS) expires at which time Vacuum Chamber equalization will commence.
- LVT Low Vacuum Timeout – Seconds – 00120**
Time in seconds that the vacuum generator will run before a LOW VACUUM ALARM is triggered. Vacuum generator continues to attempt to pull a target vacuum pressure after alarm sounds.
- NVT No Vacuum Timeout (retries, time in seconds) – 00345**
The first three digits are the number of retries that the vacuum gates will cycle if vacuum is not achieved. During a retry the vacuum gates are cycled opened and closed. The last two digits Amount of time in seconds the chamber pressure must reach 200mm of mercury below atmosphere to not trigger a retry.
- VPT Vacuum Purge Timer – seconds – 00005**
During equalization of the Vacuum Chamber, this is additional time in seconds beyond calculated atmospheric pressure, to allow for true pressure equalization.
- VPI Vessel Purge Interval – seconds/seconds – 15180**
Frequency and duration of dry air purge of the Vacuum Chamber. Default is a frequency of 3 minutes (180 seconds) for a purge duration of 15 second.
- ATM Atmospheric Pressure – mm Hg (absolute) – 00760**
The measured ambient atmospheric pressure. This parameter is updated once per cycle. Do not change this parameter.

System Parameters

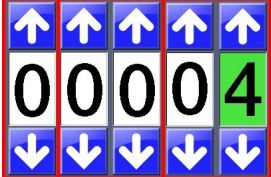
- ELT Event Logging Time (Time in seconds) – 00060**
Time in seconds between logging data (when logging is enabled).

Changing Parameters



Changing parameters can have an impact on the Dryers performance. It is highly recommended that a supervisor change the default Program Mode password to protect the parameter values. Prior to making any parameter changes, make sure you understand what you are doing.

Navigating and Making Changes to Parameters:

Press		Display will prompt for a password. (default: 22222)	Then press:	
Press	Dryer Configuration	Display will show the Dryer Configuration categories.		
Press	Parameters	Display will show the categories of Parameters. Parameters are divided into 6 categories. Blower, Heater, System, Dispensing, Load-Cell, and Vacuum.		
Press	The category that would contain the parameter you want to adjust.	Categories will have several parameters indicated by a 3-letter acronym on the left of the screen. Some categories have multiple pages. Navigate pages using the arrow buttons at the lower-left of the screen.		
Press	The parameter that you want to adjust.	Display will show 5 digits. Press the up or down arrows to adjust.		
Press		To save the parameter adjustment or press the red X to cancel and exit.		

Batch Mode

Batch Mode enables the dryer to dry a predetermined amount of material and then automatically stop and display a message indicating the batch is complete. To turn on Batch Mode see: System Configuration / System Preferences / Display Options / Batch Mode.

To enable and run the dryer in Batch Mode follow these steps from the Home Screen:

Press	Start Batch	Start Batch button is located on the Home Screen after Batch Mode is enabled. Display will show: Batch Start Options.
Press	Set Batch Target	Keypad screen will display. Enter Batch Weight.
Press		To save the batch weight or press the red X to cancel and exit.
Press	Reset Totalizer	to reset the totalized value back to zero (if applicable).
Press		To save the entered batch weight and begin the batch and start the Dryer. Press the red X to cancel.

Communications Setup

VBD-1000 communications enabled software communication over Ethernet using the MLAN Protocol. For more information about the MLAN Protocol and the VBD-1000 Dryer see the MLAN Protocol manual, available on the Maguire Products Inc website.



MLAN communications over Ethernet use port 9999 to communicate. Modbus communications, when enabled (see below), use port 502.

Setting the MLAN ID Number

Press		Display will prompt for a password. (default: 22222)	Then press:	
Press		Display will show the System Configuration categories.		
Press	Communications	Display will show the System Communications categories.		
Press	MLAN I.D. Number	Display will show the MLAN I.D. Number screen.		
		On this screen, enter the new ID number using the keypad. Valid I.D. numbers are 1 through 254.		
Press		To save the Changes.		

Setting the IP Address, Subnet Mask, Gateway

Press		Display will prompt for a password. (default: 22222)	Then press:	
Press		Display will show the System Configuration categories.		
Press	Communications	Display will show the System Communications categories.		
Press	TCP/IP Configuration	Display will show the TCP/IP Configuration screen. On this screen, enter the IP Address, Subnet Mask and Default Gateway. Use the keypad to enter the number into the field highlighted in green. To advance to the next field, touch the field you want to edit and type the desired value.		
Press		To save the Changes.		

Enabling Modbus

Press		Display will prompt for a password . (default: 22222)	Then press:	
Press		Display will show the System Configuration categories.		
Press	Communications	Display will show the System Communications categories.		
Press	Modbus Server	Display will show the Modbus Server screen. On this screen, press the checkbox Enable to enable Modbus.		
Press		To save the Changes.		

Maintenance

Drain and purge Air Filter / Regulator

The purpose of the air filter is to remove moisture and contaminants from the compressed air supply and protect the pneumatic components of the Dryer. The air filter must be periodically purged of moisture.



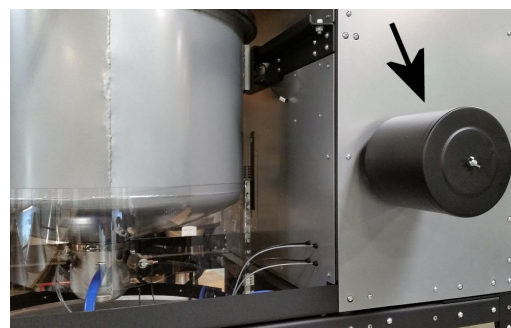
IMPORTANT!

Do not supply Dryer with a lubricated air supply. Damage to Dryer may result. Use only a clean, dry, oil-free air supply.



Clean Air Filter

The purpose of the air filter located on the back of the dryer enclosure is to remove contaminants from the ambient air supply and protect the heating components of the Dryer. The air filter must be periodically checked and cleaned. Recommended cleaning interval is monthly. More frequent in very dusty environments.



Air Pressure Adjustments

Air Pressure



Air pressure affects the ability to draw a high vacuum. We recommend a pressure setting of **80 PSI while the dryer is running**. Air is used when the **vacuum generator** is running so observe the PSI while the Dryer is drawing a vacuum. The gauge should continue to read this setting even when the vacuum unit is on. If it does not maintain pressure your supply line is not sized properly.



IMPORTANT!

Do not supply Dryer with a lubricated air supply. Damage to Dryer may result. Use only a clean, dry, oil-free air supply.

Loadcell Calibration

Zero Weight Calibration

BE SURE The Air supply is on.
 BE SURE The Vacuum Chamber and Retention Hopper is EMPTY.
 BE SURE The Vacuum Chamber and Retention Hopper are hanging / resting freely on the load cells.
 BE SURE The air lines are connected.

LOAD CELL ZERO CALIBRATION

The sequence is as follows:

Press		Display will prompt for a password. (default: 22222)	Then press:	
Press	Dryer Configuration	Display will show menu options		
Press	Load-Cell Setup	Display will show Load-Cell Calibration Screen		
Press	Vacuum Chamber Zero/Full Calibration		Display will show the ZERO / FULL Calibration screen.	
Press	ZERO	Display will say: Confirm Vacuum Chamber is empty then press ZERO. Gram weight of 0 follows successful calibration.		
Press		To return to the Load-Cell Setup screen.		
Press	Retention Hopper Zero/Full Calibration		Display will show the ZERO / FULL Calibration screen.	
Press	ZERO	Display will say: Confirm Retention Hopper is empty then press ZERO. Gram weight of 0 follows successful calibration.		
Press		To return to the Load-Cell Setup screen.		
Press		To return to the Main Screen.		

The ZERO point of the load cells is now set properly. FULL weight calibration may also be done at this time, however, it probably is NOT NECESSARY. When load cell readings shift due to rough handling, the entire range of readings from ZERO to FULL shift together. The ZERO weight calibration routine resets the full range of the cells and, therefore, corrects FULL weight readings as well.

Full Weight Calibration

When SETTING FULL WEIGHT, BE SURE you know the exact weight (in grams or pounds) that you are adding to the chamber. Place this weight in the chamber.

Enter the EXACT weight that you have placed in the chamber. Weigh units are in tenths of a pound or tenths of a kilogram depending on the weigh units set in LOAD Cell Setup menu. The weight should be close to 35.0 lbs or 16.0 kilograms.

After FULL weight calibration, if the display says (BAD CELL), the weight you are using does not match the weight you entered, the chamber is not free to move, OR the load cells are bad.

Full Weight Calibrations - Full weight calibration will be done on both the Vacuum Chamber and Retention Hopper. It is recommended to use a known weight of material for the Full Calibration. Place approximately 35 lb of material into the Heating Hopper. Using Manual Operations, Operation Outputs, Vac Cham Fill, dispense the material from the Heating Hopper to the Vacuum Chamber prior to entering the Full Calibration Routine.

If material totals are being observed loadcell full weigh calibration is recommended periodically (approximately every six months).

The ZERO point of the load cells is now set properly. FULL weight calibration may also be done at this time, however, it probably is NOT NECESSARY. When load cell readings shift due to rough handling, the entire range of readings from ZERO to FULL shift together. The ZERO weight calibration routine resets the full range of the cells and, therefore, corrects FULL weight readings as well.

Press		Display will prompt for a password. (default: 22222)	Then press:	
Press	Dryer Configuration	Display will show the Dryer Configuration categories.		
Press	Load-Cell Setup	Display will show the Load-Cell Setup screen.		
Press	Vacuum Chamber Zero/Full Calibration		Display will show the ZERO / FULL Calibration screen.	
Press	ZERO	Display will say: Confirm Vacuum Chamber is empty then press ZERO. Gram weight of 0 follows successful calibration.		
Press	FULL	Display will show a keypad and the message: Enter the known weight and then press ENTER. Enter your known weight in GRAMS and then press ENTER.		

Place the known weight in the Vacuum Chamber and then properly re-install the Vacuum Chamber into the Dryer. Press CONTINUE to proceed.

Wait while calibrating load cells. Do not touch weigh bin during calibration. After Full calibration has proceeded successfully, you will be prompted.

Press



**To exit Zero / Full Weight Calibration screen.
Repeat procedure for Retention Hopper.**

Clean Out Procedure

Clean Out dumps the Heating Hopper or the Vacuum Chamber or both at the same time. The following explains how to perform these procedures.



HEATING HOPPER HOT SURFACES:

As with all dryers, there are **HOT SURFACES** to avoid. Temperatures can reach 350F, (180C). Typically these surfaces are not at dangerous temperatures, however all hot surfaces should be avoided.



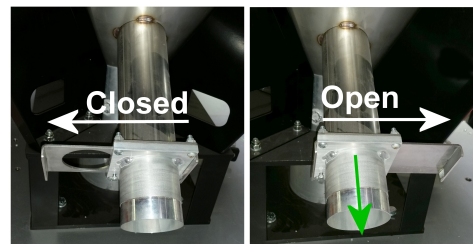
Do Not Perform a Clean Out Unless VBD-1000 Dryer is First Properly Shut Down.

For proper shutdown procedure, see Startup and Operation on page 26.

During the Clean Out, keep hands and tools clear of all valves. DO NOT reach into machine during Clean Out.

Using the Heating Hopper Clean Out

The Heating Hopper has a front side door for access to the full internal height of the Heating Hopper. The Heating Hopper is non-removable. Prior to opening the front access door, removal of all material is recommended. Material in the Heating Hopper can be evacuated using the Heating Hopper Manual Drain Valve located on the right-side base of the Heating Hopper. To evacuate material from the Heating Hopper using the Heating Hopper Manual Dump Valve, use 3-inch tubing to direct the material into a holding bin.



Note: use of the Heating Hopper Manual Dump Valve is optional. Material can be dumped into the vacuum chamber, then into the retention hopper and conveyed away from the VTA at the base of the dryer.

Emptying the Heating Hopper

Press	Clean Out	The Clean Out button is located on the Home Screen. Display will show: Batch Start Clean Out Mode screen. Both the Dump Heating Hopper screen button and the Heating Hopper Drain Valve button (located near the upper rear of the Vacuum Chamber area) can be used to empty the Heating Hopper.
Press	Dump Heating Hopper	Confirmation window will appear.
Press		to Dump Heating Hopper and start the Clean Out.

Emptying the Vacuum Chamber

The Vacuum Chamber is non-removable. The Vacuum Chamber has a front facing cleanout hatch. Prior to opening the front access hatch, removal of all material is recommended.

IMPORTANT: During the Clean Out, keep hands and tools clear of all valves. **DO NOT** reach into machine during Clean Out.

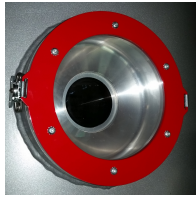
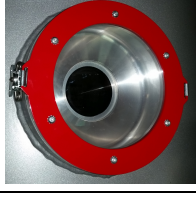
Press	Clean Out	The Clean Out button is located on the Home Screen. Display will show: Batch Start Clean Out Mode screen. Both the Dump Heating Hopper screen button and the Heating Hopper Drain Valve button (located near the upper rear of the Vacuum Chamber area) can be used to empty the Heating Hopper.
Press	Dump Vacuum Chamber	status window will appear.
Press		to return to the Home Screen.

Clean Out / Dump All – Dump All opens all valves allowing material to flow freely through the dryer. Material in the Heating Hopper will pass into the Vacuum Chamber and then pass into the Retention Hopper. In this mode, it is possible to empty the entire dryer using a conveying system pulling from the material outlet at the base of the dryer.

IMPORTANT: During the Clean Out, keep hands and tools clear of all valves. **DO NOT** reach into machine during Clean Out.

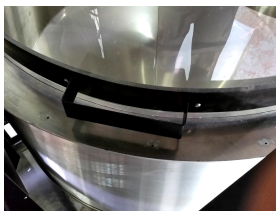
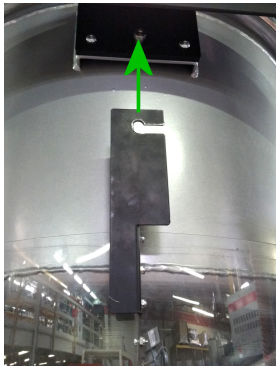
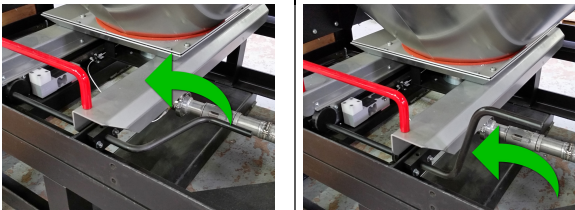
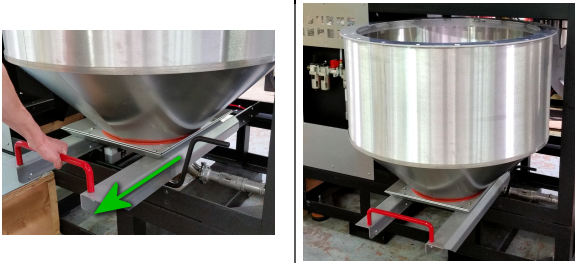
Press	Clean Out	The Clean Out button is located on the Home Screen. Display will show: Batch Start Clean Out Mode screen. Both the Dump Heating Hopper screen button and the Heating Hopper Drain Valve button (located near the upper rear of the Vacuum Chamber area) can be used to empty the Heating Hopper.
Press	Dump All	Confirmation window will appear.
Press		to start the Clean Out.
Press		to return to the Home Screen.

Cleanout of the Vacuum Chamber

Access to the Vacuum Chamber through the cleanout hatch located on the front of the Vacuum Chamber.	
To remove the hatch insert rotate the two butterfly latches and then unhook from the hatch faceplate.	
Using two hands slide the hatch insert out of the Vacuum Chamber. Use caution handling the Vacuum Chamber Hatch. Do not drop.	
Access the interior of the Vacuum Chamber through the hatch opening.	
When cleanout is complete, clean the seal around the hatch insert and then re-secure the hatch to the Vacuum Chamber.	

Cleanout of the Retention Hopper

The Retention Hopper will slide out for easy access. Prior to sliding out the Retention Hopper remove all material. Sliding out the Retention Hopper will open the bottom drain of the hopper.

To slide the Retention Hopper out you must first raise the Retention Hopper Skirt. Raising the skirt requires two people. Locate the two skirt handles.	
Using the lift handles, raise the skirt up and secure the skirt on the two Skirt Hangers.	
Locate the black lift handle and raise the Retention Hopper by rotating the lift handle up and towards the front of the Dryer.	
With the lift handle raised, use the red handle to slide the Retention Hopper out towards the front of the Dryer.	
When cleanout is complete, slide the Retention Hopper back into the Dryer, then lower the Retention Hopper using the black lift handle. Finally lower the Retention Hopper Skirt.	

Alarms - Cause and Solution

Typically problems are indicated by an alarm condition on the Dryer controller's display with an audible alarm and a flashing strobe light. The following alarm troubleshooting chart will describe the alarm condition and possible causes and solutions.

Alarm Display:

Troubleshooting:

BLOWER FAILURE ALARM:01	Problem: The blower is not running. Motor contactor overload relay has tripped. See wiring diagram on page 80 for Blower Motor Contactor. Item # 3, overload relay on wiring diagram. This alarm will trigger a dryer shutdown. Solution: Reset contactor. Check that blower motor shaft is not locked. Check line voltage to machine; make sure voltage is not too low which can cause an increase in amperage. Check that power source has not lost a phase.
ALARM:02 HH NO HEAT	Problem: No heat or inadequate heat detected by the Heating Hopper inlet RTD. This alarm is triggered by the NH1 parameter. NH1 parameter is the maximum time limit, in seconds, after the heat cycle begins, during which one of the following two conditions must be detected: Either the temperature must climb 20 degrees, or the temperature must move at least 20 percent toward the target temperature. If neither condition is met the "NO HEAT" alarm will sound. Such an occurrence would signal a failure of either the heater or the airflow from the blower. This parameter and consequent alarm protects the heater from burn out in the event the blower fails or airflow is blocked. Solution: Check for airflow from the blower. Check blower inlet obstruction, check that 2" air duct from blower to heater is not detached, obstructed or perforated. Check 2" air duct from top of heater to heating hopper inlet for detachment, obstruction or perforation. Check resistance across heater. Disconnecting heater from circuit is not necessary to measure resistance. Measurement should read 80 ohms. See wiring diagram on page 80. If the dryer's heater shorted, the result would be a trip of the breaker or fuse supplying power to the VBD-1000 dryer.
ALARM:03 HH SP EXCEEDED	Problem: The heating hopper air inlet temperature has drifted above set-point. If the Heating hopper air inlet temperature (T1a sensor) is over the degrees specified in parameter OT1 (default 6° F or 6° C) for a time greater than the time in seconds specified in OT1, then the alarm is triggered and the heater output will drop by 20%. The alarm will occur but the machine will keep running. See OT1 parameter for more information. Solution: No solution is necessary under normal circumstances as the dryer is alerting to a temperature adjustment. If this alarm continued to repeat, contact Maguire Technical Support.

ALARM:04 HH OVERHEAT	Problem: The heating air temperature has drifted above set-point. If the heating air temperature (T1a sensor) is over the degrees specified in parameter OT1 (default 6° F or 6° C) for a time greater than the time in seconds specified in OT1, then the alarm is triggered and the heater output will drop by 20%. The alarm will occur but the machine will keep running. See OT1 parameter for more information. Solution: No solution is necessary under normal circumstances as the dryer is alerting to a temperature adjustment. If this alarm continued to repeat, contact Maguire Technical Support.
ALARM:05 PURGE HTR NO HEAT	Problem: No heat or inadequate heat detected by the Purge Heater RTD. This alarm is triggered by the NH2 parameter. NH2 parameter is the maximum time limit, in seconds, after the heat cycle begins, during which one of the following two conditions must be detected: Either the temperature must climb 10 degrees, or the temperature must move at least 10 percent toward the target temperature. If neither condition is met the "NO HEAT" alarm will sound. Such an occurrence would signal a failure of either the heater or the compressed airflow. This parameter and consequent alarm protects the purge heater from burn out in the event the compressed air failure or airflow is blocked. Solution: Check compressed airflow to the purge heater is adequate. Check that the air line that supplies the solenoid valve in the inlet of the purge heater is properly attached.
ALARM:06 PURGE SP EXCEEDED	Problem: The purge air temperature has drifted above set-point. If the purge air inlet temperature (T2a sensor) is over the degrees specified in parameter OT2 (default 6° F or 6° C) for a time greater than the time in seconds specified in OT2, then the alarm is triggered and the heater output will drop by 20%. The alarm will occur but the machine will keep running. See OT2 parameter for more information. Solution: No solution is necessary under normal circumstances as the dryer is alerting to a temperature adjustment. If this alarm continued to repeat, contact Maguire Technical Support.
ALARM:07 PURGE OVERHEAT	Problem: The purge air temperature has drifted above set-point. If the purge air temperature (T2a sensor) is over the degrees specified in parameter OT2 (default 6° F or 6° C) for a time greater than the time in seconds specified in OT2, then the alarm is triggered and the heater output will drop by 20%. The alarm will occur but the machine will keep running. See OT2 parameter for more information. Solution: No solution is necessary under normal circumstances as the dryer is alerting to a temperature adjustment. If this alarm continued to repeat, contact Maguire Technical Support.

NO VACUUM ALARM:08	Problem: The dryer failed to pull a vacuum after three attempts. Dryer attempted to pull a vacuum 200mm below atmosphere within 45 seconds (default). Dryer attempted three times (number of default retries). After each attempt vacuum was equalized and vacuum gates were opened and closed in an attempt to reseal the Vacuum Chamber (possible debris or pellets preventing adequate seal). Defaults are controlled the NVT parameter (retries and seconds). This alarm is non-fatal. Dryer will continue to reseal after alarming. Solution: If Dryer continues to alarm, check: compressed air connection and pressure (dryer's regulator should be reading 85psi). Check for debris in seals above and below Vacuum Chamber.
RETEN.NOT PRESENT ALARM:09	Problem: The Retention Hopper is missing. If retention hopper loadcell (pair) is reading 23.2 pounds (10000 grams) below tare during AUTO run, this alarm is triggered and Dryer stops (fatal). This alarm is generally caused by a missing Retention Hopper but may also be caused by dryer Retention Hopper load cells having been zero calibrated while material was in the Retention Hopper, or faulty loadcells. Solution: If Retention Hopper is missing replace Retention Hopper. If Retention Hopper is in place, ensure the tank is empty and zero calibrate the load cells. If load cells are damaged, a zero calibration may detect this.
RTD FAILURE ALARM:11	Problem: RTD (temperature sensor) reading is above or below max/min reading RTD Sensor is probably disconnected or damaged. Check temperature display reading in a cool state. Temperature should display room temperature. If reading is below -25C or above 450C RTD sensor has failed. Solution: Contact Maguire Technical Support for a replacement RTD Sensor.
MATERIAL SHORTAGE ALARM:12	Problem: Maximum Fill Time (VFT parameter) has been reached before target material weight (VTH parameter) has been achieved. This alarm is triggered when the VFT parameter has been reached (Vessel Fill Time) before the VTH (Vacuum Chamber High level), indicating shortage of material in heating hopper or possible valve jam. The outcome of this alarm is controlled by the Material Shortage Alarm settings. Solution: Check material supply. Check Vacuum Chamber fill valve located at the base of the heating hopper.
LOW AIR PRESSURE ALARM:15	Problem: Air pressure sensor has detected air pressure below 50 psi. Solution: Check exhausting lockout valve located on the front lower left side of VBD-1000. Ensure that the valve is open. Check pressure of air supply.

HH FAIL-SAFE ALARM:16	Problem: The heating hopper heater thermal safety switch has opened due to an overheat condition. Located on the top of the Heater Tube is a Temperature Safety Switch. If the temperature of the heater exceeds the safety switch maximum, this switch opens, shutting down the entire dryer (FATAL Alarm). Solution: Allow the dryer to cool. Open the left side panel of the dryer and locate the Heater Tube Safety Switch on the upper side of the stainless steel heater tube. Press the red safety switch button to reset the Temperature Safety Switch. If problem occurs repeatedly, contact Maguire Technical Support.
PH FAIL-SAFE ALARM:17	Problem: The purge heater thermal safety switch has opened due to an overheat condition. Located on the side of the purge heater tube is a Temperature Safety Switch. If the temperature of the purge heater exceeds the safety switch maximum, this switch opens, shutting down the entire dryer (FATAL Alarm). Solution: Allow the dryer to cool. Open the left side panel of the dryer and locate the purge heater thermal safety switch on the side of the stainless steel purge heater tube. Press the red reset button to reset the thermal safety switch. If problem occurs repeatedly, contact Maguire Technical Support.
VC MISSING ALARM:18	Problem: The Vacuum Chamber is missing. If Vacuum Chamber load cell is reading 33 pounds (15000 grams) below tare during AUTO run, this alarm is triggered and Dryer stops (fatal). This alarm is generally caused by a missing Vacuum Chamber but may also be caused by the dryer Vacuum Chamber load cells having been zero calibrated while material was in the Vacuum Chamber. Solution: If Vacuum Chamber is missing replace Vacuum Chamber. If Vacuum Chamber is in place, ensure the tank is empty and zero calibrate the load cells. If load cells are damaged, a zero calibration may detect this.
RH MISSING ALARM:19	Problem: The Retention Hopper is missing. If Retention Hopper load cell is reading 23.2 pounds (10000 grams) below tare during AUTO run, this alarm is triggered and Dryer stops (fatal). This alarm is generally caused by a missing Retention Hopper but may also be caused by dryer Retention Hopper load cells having been zero calibrated while material was in the Retention Hopper. Solution: If Retention Hopper is missing replace Retention Hopper. If Retention Hopper is in place, ensure the hopper is empty and zero calibrate the load cells. If load cells are damaged, a zero calibration may detect this.

THROUGHPUT ALARM:20	Problem: The throughput of the dryer has been exceeded. This is an optional alarm (under alarms menu), defaulted to enabled. This alarm is triggered when the Retention Hopper low level has been reached before the vacuum timer has elapsed. This means demand for material has exceeded dried material supplied. This alarm is non-fatal, dryer continues to run. Solution: This is cause by exceeding material demand.
LOW VACUUM ALARM:21	Problem: Dryer failed to pull vacuum down to target vacuum pressure set in VPL parameter. Dryer attempted to pull a vacuum down to target vacuum pressure within 120 seconds (default value in LVT parameter). Possible causes and Solution: If dryer alarms, check: compressed air connection and pressure (dryer's regulator should be reading 85psi). Check for debris in seals above and below Vacuum Chamber. Alarm may also have been caused by a vacuum leak. Contact Maguire technical support if cause is not found.
LOW BATCH ALARM:22	Problem: Material supplied to Vacuum Chamber is below minimum allowable weight. This alarm is triggered by the VFA parameter (Vessel Fill Adjust) and pertains to filling the Vacuum Chamber. The VFA parameter is a two part parameter. The first three digits are the number of retries to fill the Vacuum Chamber (default 3 retries). Last two digits are the minimum allowable percent under the targeted maximum fill weight of the Vacuum Chamber (VTH parameter). After the third failed retry the "Low Batch" alarm is generated while the retries continue. Solution: Check material supply feeding the heating hopper. Check heating hopper material flow (sticking material, melted material, hard to flow regrind). Check Vacuum Chamber Fill Valve (butterfly valve below heating hopper). Check air pressure (80 psi).
RESIDENCE ALARM ALARM:23	Problem: Material has been in the retention hopper too long. This alarm is triggered by the RAL parameter. When the Residence Alarm has been enabled, this alarm will sound if not enough material has been removed from the retention hopper in the time specified in the RAL parameter. For more information, see the RAL parameter on page 41. Solution: To prevent this alarm: decrease fill weight, or turn on Fill Weight Adjust (Material Setup menu).
BATCH COMPLETE ALARM:24	Batch is complete This alarm triggers at the end of a batch run, the end being defined as the time at which the retention hopper is depleted to the HHL parameter level after the final vacuum chamber dump of said batch run.

MATERIAL SHUTDOWN ALARM:25	Material Shutdown This alarm triggers if the Material Shortage alarm is set to "SHUTDOWN" and is it determined that the heating hopper has been fully depleted of material via the VFA parameter criteria. When this alarm triggers, the VBD enters a Shutdown state automatically. This alarm can be useful. For example: at the end of the day, one can intentionally run the heating hopper empty (by turning off its feed loader) and have the VBD automatically initiate a shut down at the appropriate time.
MATERIAL READY ALARM:26	Material Ready If the Material Ready alarm is enabled under the "Alarm Setup" menu, this alarm will trigger after the first and only first batch of material has completed a full vacuum cycle. After 15 seconds, the audible portion of this alarm will automatically silence. The first batch of material will remain under vacuum indefinitely until this alarm is cleared. There are two main purposes of this alarm: 1. To alert the operator that dry material is ready for the process. 2. To act as a hold-back, when necessary, giving the operator additional time to prepare the process.
AUTO SHUTDOWN ALARM:27	Auto Shutdown This alarm triggers when an Auto Shutdown, that is, a shut down at a pre-determined time, has commenced. "Commencement" is defines as the time at which the final vacuum chamber fill has occurred.
HH MATERIAL LOW ALARM:28	Heating Hopper Material On VBD's with an optional Heating Hopper Level sensor, this alarm triggers when the "HH Mat. Level" alarm is enabled under the "Alarm Setup" menu and the level in the heating hopper has dropped below the HHA parameter value.
MATERIAL TEMP ALARM:29	Material Temp When the Material Temp alarm is enabled under the "Alarm Setup" menu, during any instance where the Heating Hopper is called upon to dispense material into the vacuum chamber and the T2 (heating hopper exit) temperature is below the ESM parameter level, this alarm will trigger. Its purpose is to alert the operator that insufficient heating has occurred, most likely from a process throughput that exceeds the capacity of the VBD.

Print Center Logs and Print Outputs



Print Center is available from the Home Screen by pressing by pressing the Pinter Center button. Print Center displays a menu screen of print related options including Parameters, Events and Alarms, raw data log file and Alarm History. To print the Alarm Log, Parameters or Event Log a USB Flash Drive must be plugged into the VBD.

Files will be created on the flash drive in the root of the drive.

VBDALARM.LOG - Alarm Log

VBDEVENT.LOG - Event Log

VBDPARAM.TXT - Parameter Report

Print Parameters	Prints the full parameter and parameter values as well as other information list to the USB flash drive.
Print Event and Alarms	A combination of machine status lines at defined intervals as well as mechanical events as they occur.
Print Alarm History	Prints to USB any alarms recorded since the alarm log was last cleared.
Copy Log File	Copies raw log file to USB stick for analysis by a Maguire technician.
Print All	Prints all of the above logs to USB.

Alarm and Event Log



Alarm and Event Log displays a history of alarms currently active alarms and other events with a date and time stamps and description. Press the upper or lower half of the event display windows to page up or page down. Alarms can be silenced from this screen. Other options in this screen include: Print to USB and Clear the Alarm Log. To print the Alarm and Events Log a USB Flash Drive must be plugged into the VBD.

Files will be created on the flash drive in the root of the drive.

VBDALARM.LOG - Alarm Log

VBDEVENT.LOG - Event Log

Logs and Print Outputs

Alarm Log - Display of the most recent log outputs. Toggle Select button to Alarm Log.

Event Log - The Event log is written to a file on a USB drive. To write the log file, toggle to wrench mode, Print Setup, Print Event Log. Each log entry is a single line of information that was recorded about the Dryer at the moment the line in the log was written.

The following is a description of the columns of information in a log. Note: line wrap in the manual due to page space constraints. Actual log file continues as a single line with a carriage return after "ABS:"

Column	Example	Description
1	08-20-2017	Date of the log (the date is stored in the Dryer).
2	10:10:08	Time of the log.
3	MODE: PHT	Current mode of the dryer when the log entry was written.
4	T1s: 180F	T1s (Heating Hopper Inlet temperature Setpoint)
5	T1a: 90F	T1a (Heating Hopper Inlet Actual Temperature)
6	H1: 0.0	Heating Hopper Heater Duty Cycle
7	T2s: 180F	Dry Purge Air Temperature Setpoint
8	T2a: 77F	Dry Purge Air Actual Temperature
9	H2: 7.5	Dry Purge Heater Duty Cycle
10	T3: 84F	Heating Hopper Outlet Air Temperature
11	T4: 78F	Optional T4 Material Exit Temperature
12	BLW: 0.00ma	Blower Speed Reference (4-20 mA)
13	LS: 98%	Heating Hopper Level Sensor (percent)
14	VTIME: 00:00/20:00	Vacuum Time (actual/setpoint in seconds)
15	ABS: 753mmHg	Vacuum Chamber Pressure
16	VT LC: 7	Vacuum Chamber Loadcell Reading (weight in lbs or kgs)
17	RH LC: 6	Retention Hopper Loadcell Reading (weight in lbs or kgs)
18	THROUGHPUT: 0	Throughput (lbs or kgs / hour)

Example of a VBD Event Log:

VBD Event Log
MODEL: 1000
CPU Firmware: N0819B
I/O Firmware: N0819B
Serial#: 000000-00

08-20-2014 12:25:17

08-20-2014 10:10:04 | *** OPERATOR START ***
08-20-2014 10:10:05 | *** DRYER STARTED ***
08-20-2014 10:10:05 | *** BLOWER STARTED ***
08-20-2014 10:10:05 | *** DRYPURGE SUPPLY VALVE: ON ***
08-20-2014 10:10:05 | *** HEATER FAIL-SAFE: HIGH ***
08-20-2014 10:10:05 | *** BLOWER STATUS: STARTED ***

08-20-2014 10:10:08 | MODE: PHT | T1s: 180F | T1a: 90F | H1: 0.0 | T2s: 180F | T2a: 77F | H2: 7.5 | T3: 84F | T4: 78F | BLW: 0.00ma | LS: 98% | VTIME: 00:00/20:00 | ABS: 753mmHg | VT LC: 7 | RH LC: 6 | THROUGHPUT: 0

08-20-2014 10:10:15 | *** HEATING HOPPER HEATER STARTED ***

08-20-2014 10:10:23 | MODE: PHT | T1s: 180F | T1a: 90F | H1: 10.8 | T2s: 180F | T2a: 78F | H2: 7.5 | T3: 85F | T4: 78F | BLW: 0.00ma | LS: 98% | VTIME: 00:00/20:00 | ABS: 753mmHg | VT LC: 6 | RH LC: 6 | THROUGHPUT: 0

08-20-2014 10:10:39 | MODE: PHT | T1s: 180F | T1a: 112F | H1: 20.3 | T2s: 180F | T2a: 80F | H2: 14.3 | T3: 87F | T4: 78F | BLW: 0.00ma | LS: 98% | VTIME: 00:00/20:00 | ABS: 753mmHg | VT LC: 6 | RH LC: 6 | THROUGHPUT: 0

08-20-2014 10:10:54 | MODE: PHT | T1s: 180F | T1a: 145F | H1: 23.0 | T2s: 180F | T2a: 82F | H2: 14.3 | T3: 88F | T4: 78F | BLW: 0.00ma | LS: 98% | VTIME: 00:00/20:00 | ABS: 753mmHg | VT LC: 6 | RH LC: 6 | THROUGHPUT: 0

08-20-2014 10:11:09 | MODE: PHT | T1s: 180F | T1a: 165F | H1: 22.0 | T2s: 180F | T2a: 85F | H2: 20.3 | T3: 89F | T4: 79F | BLW: 0.00ma | LS: 98% | VTIME: 00:00/20:00 | ABS: 753mmHg | VT LC: 6 | RH LC: 6 | THROUGHPUT: 0

08-20-2014 10:11:24 | MODE: PHT | T1s: 180F | T1a: 172F | H1: 21.2 | T2s: 180F | T2a: 88F | H2: 20.3 | T3: 89F | T4: 79F | BLW: 0.00ma | LS: 98% | VTIME: 00:00/20:00 | ABS: 753mmHg | VT LC: 6 | RH LC: 10 | THROUGHPUT: 0

08-20-2014 10:11:39 | MODE: PHT | T1s: 180F | T1a: 174F | H1: 21.2 | T2s: 180F | T2a: 91F | H2: 25.5 | T3: 89F | T4: 80F | BLW: 0.00ma | LS: 98% | VTIME: 00:00/20:00 | ABS: 755mmHg | VT LC: 6 | RH LC: 10 | THROUGHPUT: 0

Interpreting the Parameter Printout

First column is the parameter's description.

Second column is the parameter's 3-letter acronym.

Third column is the parameter's setting in RAM, which is the currently loaded user settings.

Fourth column is the parameter's default setting in ROM (Read Only Memory). This is the factory default.

Fifth column is the lower limit of the parameter's value.

Sixth column is the upper limit of the parameter's value.

Seventh column is the units of the parameter.

Example of a Parameter Printout:

VBD-1000 Parameters

Mon 08/15/2016 17:04
CPU Firmware: P0812A
I/O Firmware: P0812A
CPU Bootloader: 1.03
I/O Bootloader: 1.03
Serial#: 000000-00
MAC Address: 00:1C:1A:00:4B:0F

INDEX	NAME	ABBR	RAM	DFT	LO LIMIT	HI LIMIT	UNITS
Blower:							
B1	Blower Delay Time	BDT	01002	01002	00000	99999	Second
B2	VFD Low Limit	BLF	00025	00025	00025	00060	Freq
B3	VFD High Limit	BHF	00060	00060	00050	00070	Freq
B4	VFD Drive	BDF	00040	00040	00000	65535	Freq
B5	VFD Zero Level	BZL	00045	00045	00000	00100	Percent
B6	VFD Level Adjustment	BLA	00025	00025	00025	00060	Freq
B7	VFD Heat Throttle	BHT	00100	00100	00000	65535	Percent
B8	VFD Air Flow Cutback	BAC	00000	00000	00000	65535	Freq/Sec
B9	VFD Temp. Cutback	BTC	00000	00000	00000	65535	Freq/Deg
B10	VFD Throttle Adjust	BTA	00000	00000	00000	65535	Freq/Sec

Dispensing:

D1	Vac. Cham. Hi Level	VCH	00300	00300	00000	00350	Weight
D2	Vac. Cham. Low Level	VCL	00025	00025	00000	00100	Weight
D3	Ret. Hop. Hi Level	RHH	00375	00375	00000	00385	Weight
D4	Ret. Hop. Low Level	RHL	00025	00025	00000	00227	Weight
D5	Bulk Density	BLK	00035	00035	00000	65535	Weight
D6	Vac.Cham. Fill Rate	VFR	12000	12000	02500	15000	Gram/Sec
D7	Vac.Cham. Dump Rate	VDR	00000	00000	00000	15000	Gram/Sec
D8	Chamber Fill Time	VFT	00025	00025	00000	99999	Second
D9	Chamber Dump Time	VDT	00060	00060	00000	99999	Second
D10	Fill Lag Time	FLA	00400	00400	00000	01000	Time
D11	Dump Lag Time	DLA	00300	00300	00000	01000	Time
D12	Vacuum Gate Delay	VGD	00404	00404	00000	65535	Second
D13	Chamber Fill Adjust	VFA	00450	00450	00000	65535	Cnt/Pct
D14	HH Dump Delay	HDD	00015	00015	00000	65535	Second
D15	Vac. Dump Threshold	VCT	00250	00250	00000	65535	Gram/Sec
D16	Chamber Dump Retries	CDR	05003	05003	00000	10099	Perc/Ret
D17	Residence Alarm	RAL	20120	20120	00000	65999	Wt/Min
D18	Batch Size	BCH	00000	00000	00000	65535	Weight
D19	Loader Trip Point	LTP	00050	00050	00000	00250	Weight
D20	Ldr. Thruput Cutoff	LTC	00005	00005	00000	65535	Wt/Min
D21	Heat Hopper Volume	HHV	00205	00205	00000	65535	Volume
D22	Heat Hopper Hi Level	HHU	00095	00095	00000	65535	Percent
D23	HH Level Alarm	HLA	00050	00050	00000	00100	Percent

Heater:

H1-1	Preheat Temperature	PTS	00150	00150	00074	00375	Degree
H1-2	Preheat Time	PHT	00060	00060	00001	00999	Minute
H1-3	Preheat Targ. Delta	PTD	00030	00030	00000	65535	Degree
H1-4	Heat1 Temp Set-Point	RTS	00150	00150	00074	00375	Degree
H1-5	Heat1 Proportional	PT1	00040	00040	00000	00100	Term
H1-6	Heat1 Derivative	DT1	00015	00015	00000	00100	Term
H1-7	Heat1 Update Time	UT1	00415	00415	00000	65535	Sec/Sec
H1-8	Heat1 OverTarg Alarm	OT1	06006	06006	00000	65535	Sec/Deg
H1-9	Heat1 No Heat Alarm	NH1	00090	00090	00000	65535	Second

H1-10	Heat1 Set-Point Off.	SO1	03002	03002	00000	65535	Sec/Deg
H1-11	Heat1 Max. Percent	MP1	00100	00100	00000	00100	Percent
H1-12	Heat1 Restart Offset	RO1	05040	05040	00000	65535	Pct/Sec
H1-13	Max Temp Set-Point	MAX	00350	00350	00074	00375	Degree
H1-14	Energy Savings Mode	ESM	00150	00150	00000	65535	Degree
H1-15	Energy Savings Time	EST	00030	00030	00000	65535	Minute
H1-16	Ramp Settings	RMP	52036	52036	00000	99999	Min/Deg
H1-17	Cool-Down Temp.	CTM	00120	00120	00032	00300	Degree
H1-18	Cool-Down Timer	CTR	00060	00060	00000	65535	Minutes
H2-1	Heat2 Temp Set-Point	PGS	00150	00150	00074	00375	Degree
H2-2	Heat2 Proportional	PT2	00030	00030	00000	65535	Term
H2-3	Heat2 Derivative	DT2	00015	00015	00000	65535	Term
H2-4	Heat2 Update Time	UT2	00830	00830	00000	65535	Second
H2-5	Heat2 OverTarg Alarm	OT2	09006	09006	00000	65535	Sec/Deg
H2-6	Heat2 No Heat Alarm	NH2	00180	00180	00000	65535	Second
H2-7	Heat2 Set-Point Off.	SO2	00006	00006	00000	65535	Pct/Sec
H2-8	Heat2 Fixed Output	FO2	00000	00000	00000	65535	Percent
H2-9	Dry Purge Delay	DPD	00003	00003	00000	65535	Second
H2-10	Purge and Shutdown	PST	00020	00020	00000	65535	Minutes

Load Cell:

L1	Loadcell Stable Wt.	KDF	00200	00006	00000	65535	Number
L2	Loadcell Stable Time	LST	00100	00100	00000	65535	Millisec
L3	Loadcell Zero	LCZ	01000	01000	00000	65535	Number
L4	Weight Settle Time	WST	01005	01005	00003	65535	Second
L5	Loadcell 1 Zero	LZ1	00000	00000	00000	65535	Number
L6	Loadcell 2 Zero	LZ2	00000	00000	00000	65535	Number

Vacuum:

V1	Vacuum Time Setting	VTs	05020	05020	00001	65535	Minute
V2	Vac. Pressure Low	VPL	00125	00125	00000	65535	Number
V3	Vac. Pressure Delta	VPD	00020	00020	00000	65535	Number
V4	Vac. Shutdown Offset	VSO	00060	00060	00000	65535	Second
V5	Low Vacuum Timeout	LVT	00150	00150	00000	65535	Second
V6	No Vacuum Timeout	NVT	00345	00345	00000	65535	Cnt/Sec
V7	Cham. Purge Timer	VPT	00015	00015	00000	65535	Second
V8	Cham. Purge Interval	VPI	35240	35240	00000	65535	Sec/Sec
V9	Atmospheric Pressure	ATM	00760	00760	00000	00999	mmHg

System:

S1	Event Logging Time	ELT	00060	00060	00001	65535	Second
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Alarm Flags:

Material Shortage Alarm	Warn
Material Ready	Off
Material Temp	Off
HH Level Alarm	Off
Residence	Off
Throughput Alarm	On
Dump Retry	On

Display Flags:

Auto Shutdown	Off
Batch Mode	Off
Cycle Info	On
Display	Temp.
Fill Time	On
Dump Time	On
I/O Status	On
Preheat Temp	Off
Preheat Temp.	On
Residence Time	Off
Screen Timeout	Off
Vacuum Time	On

Heat Settings:

Temperature Unit	Fahrenheit
Preheat Mode	Timed
Energy Saver	Off
Ramp	Off
DryPurge Temp.	Auto

Misc. Settings:

Auto-Fill Adjust	Off
HH Level Sensor	Off
Loader 1	Off
Loader 2	Off
Loader 2 Mode	Thruput
Purge Chamber	On

Admin. Settings:

Blower	VFD
T4	On
T5	Off

LOADCELL CALIBRATION

NAME	ZERO	DELTA	FULL	LAST ZERO	LAST FULL
RH LC: 3303829	1588575	15422	Fri 06/17/2016 11:01	Thu 01/01/1970 00:00	
VT LC: 3364083	1408275	16147	Fri 06/17/2016 11:01	Thu 01/01/1970 00:00	

Saving and Restoring User Settings

All parameter information can be saved to the User Backup Settings for future retrieval.
To SAVE all parameter information to the User Backup Settings:

Press		Display will prompt for a password. (default: 22222)	Then press:	
Press	System Configuration	Display will show the System Configuration categories.		
Press	Resets	Display will show the categories of System resets: User Settings, Factory Access, Restore All, Restore Parameters, Firmware Update.		
Press	User Settings	Display will show Restore User Settings / Save User Settings.		
Press	Save User Settings	Display will prompt for confirmation to save user settings.		
Press		To save the user settings including parameters or press the red X to cancel and exit.		

Restoring Parameters from Backup

Press		Display will prompt for a password. (default: 22222)	Then press:	
Press	System Configuration	Display will show the System Configuration categories.		
Press	Resets	Display will show the categories of System resets: User Settings, Factory Access, Restore All, Restore Parameters, Firmware Update.		
Press	User Settings	Display will show Restore User Settings / Save User Settings.		
Press	Restore User Settings	Display will prompt for confirmation to Restore user settings.		
Press		To restore the user settings including parameters or press the red X to cancel and exit.		

Updating the VBD Firmware

When the VBD control panel is turned on, the first screen displayed will show the current firmware version. If necessary the firmware in the VBD can be updated using a firmware update supplied by Maguire Products. Firmware updates use the USB port located below the control screen. The following instructions detail how to do a firmware update.



IMPORTANT!

Do not turn off controller or remove the flash drive while firmware is updating! Doing so may corrupt the controller's firmware.

Copy	the new firmware update into a USB flash drive. (do not put in a directory)	
Insert	the USB Flash drive into the USB port on the VBD.	
Press	 Display will prompt for a password. (default: 22222)	Then press: 
Press	System Configuration	Display will show the System Configuration categories.
Press	Resets	Display will show System reset options.
Press	Firmware Update	The controller will search the USB drive for a firmware update file with the XUF extension.
Select	the file from the white display area on the left. If more than one firmware version is stored on the flash drive, multiple version will be displayed in the white display area. If the display is blank check USB for the file and that the file is location directly on the drive (not in a sub-folder). Exit out of this screen and enter again to refresh the display window.	
Highlight	the version in the white panel on the left and press PROGRAM .	
Press		To proceed with the firmware update or press the red X to cancel and exit. 
The display will show progress in transferring to the internal SD card, then it will show progress in verifying the update file. Then the controller will prompt: <i>"Please toggle power."</i> At this time, remove the flash drive, power off the controller then on. When the controller restarts the display will show progress updating to the new firmware. When complete, the display will show: UPDATES COMPLETE Toggle power . At this time turn off power, then turn back on.		

Additional Firmware Update Information

Software updates can be supplied electronically, via email or by download. Software updates are named according to their date of release. For instance **VTQ0620A.XUF** can be interpreted as VT=Vacuum Touchscreen, Q=2017 (Q=2017), 06=June, 20=June 20th, A=the first revision for that day. During the update process detailed above, new software found on the USB flash drive is first copied to an internally mounted SD card. From the SD card, the software is then loaded into the VBD. If there is ever a problem with the VBD and the USB port cannot be used or the VBD software is corrupted and cannot load new software through the menu, new software can be acquired from Maguire and renamed **UPDATE.XUF**. This renamed software can be copied onto the Flash Drive and inserted into the USB port of the VBD. When the VBD is turned on, this **UPDATE.XUF** file will be automatically loaded into the VBD, restoring the software.

General Information

VBD-1000 Technical Specifications

SCOPE

- Provide up to 1,000 pounds per hour (454 kg/hr) of dry material to an injection perform process utilizing energy efficient vacuum drying technology. Drying temperature will be 350° F (185° C) with a final moisture level of 50 ppm or less, and an IV range of 0.82 ±0.02

POWDER REQUIREMENTS

- Voltage: 480 Vac, 3 Phase, 60 Hz or 400 Vac, 3 Phase, 50 Hz
- FLA: 60
- Disconnect: 100 Amp Fused at 70 Amps
- Air: 85 psi or 6 bar
- Heating Element: Primary: 40 Kw, Secondary: 3 kW (purge circuit)
- Blower: 10 HP, 600 scfm @ 40" water 23" dia. Cincinnati centrifical w/ Variable Frequency Drive

HEATING HOPPER

- Capacity: 1,000 lbs (454 kg)
- Double insulated construction, 4" of R-15 insulation
- Large Access Door, 18" x 18"
- Diffuser cone removable without tools
- 304 Stainless steel internal wall construction, material contact

VACUUM CHAMBER

- Capacity: 400 lb (180 kg)
- Rail mounted for ease of access or removal
- Double insulated construction, 4" of R-7.5 insulation
- Access Hatch, insulated glass with captive air gap insulation
- 304 Stainless steel internal wall construction, material contact
- Cam-lock fitting on vacuum connection
- Unions on most air connections for ease of maintenance
- Adjustable height, paddle style, material level control
- V-band clamps on major connections for quick access

MATERIAL SHUT-OFF / VACUUM VALVE

- Single assembly dual acting valve
- Butterfly style material shut-off valve
- Swing valve for vacuum shut-off

RETENTION HOPPER

- Capacity: 400 lb (180 kg)
- Double insulated construction, 4" of R-7.5 insulation
- 304 Stainless steel internal wall construction, material contact
- Adjustable height, paddle style, material level control

CONTROLLER

- Microprocessor based control (Motorola 6812)
- 4 x 20 character Blue back lit display
- 4 Digit 1" high Red LED for display of Actual or Set Temperature
- Icon representation of function
- Flash Memory, SD card with micro capability
- Ethernet & USB ports
- Optional CANbus communications for remote / repeater control
- Anodized bezel

ELECTRICS

- Main Disconnect, 100 Amp, 70 Amp Class J fuses
- Altec Euro style disconnects
- Step down transformer with regulated DC power supply
- 70 cfm cooling fan, bottom vented
- 10 HP Centrifugal blower, 600 scfm w/ VFD
- RTD Inputs, 4: Heating hopper inlet, Heating hopper exit, Dry Purge inlet - Vacuum Vessel, Material exit - Retention Hopper

DRY AIR PURGE CIRCUIT

- Air filter regulator
- Coalescing Filter, 1/10th micron for removal of oil and fine particulates
- Exhaust Shut-off
- Compressed Air Dryer, 500 liter/min.
- 3,000 kW heater dedicated for dry air purge

The majority of the dry air is directed to the retention hopper, the vacuum vessel receives a constant low volume of -40 dew point dry air. At the end of the vacuum cycle during atmospheric equalization a valve shifts to allow an inrush of dry air.

VACUUM CIRCUIT

- 8 Element, 3 Stage PIAB configuration for maximum effectiveness
- Expandable manifold to accept future add-ons
- 1" Electro-pneumatic check valve
- Balanced pressure regulator to insure the maximum efficient operational level

OTHER FEATURES

- Noise reduction assembly on blower inlet with filter

OPTIONS

- Magnehelic gauge on blower
- Power Analyzer

line no.	parameter	Domestic/Canadian		European	
		value	units	value	units
1	maximum throughput	1000	lbs./hour	454	kgs./hour
2	complete unit weight, empty	2950	lbs.	1338	kgs.
3	voltage	240/480/575	volts	400	volts
4	full load amps (FLA)	107/53/45	amps	64	amps
5	phase	3	Ø	3	Ø
6	frequency	60	Hz	50	Hz
7	compressed air supply line requirement (I.D.)	0.50	inches	12.7	mm
8	compressed air supply pressure	85	psi	0.59	MPa
9	blower model	HP-6C23	Cincinnati	HP-6C23	Cincinnati
10	blower power	10	HP	7.46	kW
11	blower airflow, nominal	600	SCFM	16990	L/min
12	blower pressure, nominal	30	inches H ₂ O	75	mbar
13	blower noise level	78	db(A)	78	db(A)
14	primary heater power	35000	watts	35000	watts
15	purge heater power	2000	watts	2000	watts
16	maximum run temperature	375	°F	190	°C
17	vacuum generator model	Xi 3-stage	PIAB	Xi 3-stage	PIAB
18	vacuum generator supply pressure	65	psi	0.45	MPa
19	vacuum generator air consumption*	38.8	SCFM	1099	L/min
20	heating hopper material capacity, no drop tube	24.3	cu. ft.	688	L
21	heating hopper material capacity, 8" drop tube	20.6	cu. ft.	583	L
22	heating hopper absolute capacity	26.1	cu. ft.	739	L
23	vacuum tank material capacity	10	cu. ft.	283	L
24	vacuum tank absolute air capacity	17.4	cu. ft.	493	L
25	vacuum tank normal evacuation volume	12.8	cu. ft.	362	L
26	vacuum tank weight, empty	311	lbs.	141	kgs.
27	retention hopper material capacity	11	cu. ft.	311	L
28	retention hopper absolute capacity	13.4	cu. ft.	379	L
29	retention hopper weight, empty	76	lbs.	34	kgs.

* when running

Theory of Operation / Performance

THEORY OF VACUUM DRYING

Water boils at 212 F (100 C) degrees. However, this is only true at sea level, which is to say at standard atmospheric pressure, which is 14.7 pounds/sq in (1 bar), also expressed as 29.92 inches (760mm) of Mercury (Hg).

At lower pressures the boiling point of water is reduced.

Standard atmospheric pressure can support a column of Mercury 29.92 inches (760mm) high. If we pull a perfect vacuum above a column of Mercury, the mercury will rise in that column 29.92 inches and, for that reason, the number we can expect to read on the vacuum gauge, at full vacuum, is 29.92 inches. Lesser vacuums read lower numbers. No vacuum reads zero.

When water is subjected to a vacuum level of 25 inches (635mm) of mercury, it will boil at 133F (56C) degrees. When plastic pellets are heated to 160F (71C) degrees, or greater, and subjected to a vacuum of 25 inches (635mm), the water vapor within wants very much to boil. This increased molecular activity within the pellet and the greatly reduced pressure surrounding the pellet drives the moisture from the pellet in a remarkably short time. This then is the reason for the remarkable short drying time of a vacuum dryer.

PERFORMANCE

The true measure of a dryer's performance is determined by the moisture content of the resin after the dryer has done its job. Resin moisture content, however, is not easily measured, so dryer manufacturers use other criteria to assure performance.

Conventional "desiccant" dryers use DEW POINT as a measure of performance. This is a measure of the dryness of the air passing over the resin, but not the dryness of the resin itself.

For example, for a particular resin, experience may tell us that 180f (82c) degree air dried to minus 40 dew point, and passed over the material for 4 hours, is sufficient to reduce the moisture content of that resin to the required level of dryness.

Since our VBD Dryer does NOT use dry air, we have no "dew point" to measure.

In our case, for the same resin, experience tells us that a vacuum of 25 inches (635mm) applied for 20 minutes to material that has been heated to 180f (82c) degrees, is sufficient to reduce the moisture content of that same resin to the correct level of dryness.

Therefore, just as desiccant driers assure dry material by measuring temperature and DEW POINT over time, we assure dry material by measuring temperature and VACUUM over time.

When we assure that a certain temperature has been reached and a certain vacuum level achieved for a correct length of time, we can then be assured the material is dry.

You may visually assess performance by monitoring temperature and vacuum levels yourself. Of course, the final test is in the quality of the product you manufacture. We welcome your comments and observations.

Warranty

MAGUIRE PRODUCTS offers THE MOST COMPREHENSIVE WARRANTY in the plastics auxiliary equipment industry. We warrant each MAGUIRE VBD DRYER manufactured by us to be free from defects in material and workmanship under normal use and service; our obligation under this warranty being limited to making good at our factory any Dryer which shall, within FIVE (5) YEARS after delivery to the original purchaser, be RETURNED intact to us, transportation charges PREPAID, and which our examination shall disclose to our satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on our part, and MAGUIRE PRODUCTS neither assumes nor authorizes any other persons to assume for it any other liability in connection with the sale of its Dryers.



This warranty shall not apply to equipment repaired or altered outside MAGUIRE PRODUCTS INC. factory, unless such repair or alteration was, in our judgment, not responsible for the failure; nor which has been subject to misuse, negligence or accident, incorrect wiring by others, or installation or use not in accord with instructions furnished by Maguire Products, Inc.

Our liability under this warranty will extend only to equipment that is returned to our factory in Aston, Pennsylvania, PREPAID.

Please note that we always strive to satisfy our customers in whatever manner is deemed most expedient to overcome any problems they may have in connection with our equipment.

DISCLAIMER - PRODUCTION of FAULTY PRODUCT

This dryer is of a new design. We have had excellent results in all tests performed to date, but we HAVE NOT tested every material available to the plastics industry. We have not anticipated all possible materials, processing conditions, and requirements. We are not certain that our equipment will perform properly in all instances. You must observe and verify the performance level of this equipment in your plant as part of your overall manufacturing process. You must verify to your own satisfaction that this level of performance meets your requirements. We CAN NOT be responsible for losses due to product not dried correctly, even when due to equipment malfunction or design incorrect for your requirements; and/or any consequential losses due to our equipment not drying material to your requirements.

We will only be responsible to correct, repair, replace, or accept return for full refund, our equipment if it fails to perform as designed, or we have inadvertently misrepresented our equipment for your application. If for any reason this disclaimer is not acceptable, we will accept return of the equipment for full refund, including freight costs both ways.

VBD-1000 Recommended Spare Parts List

Note: it is recommended that items #1 - #8 be kept on hand by the maintenance department.

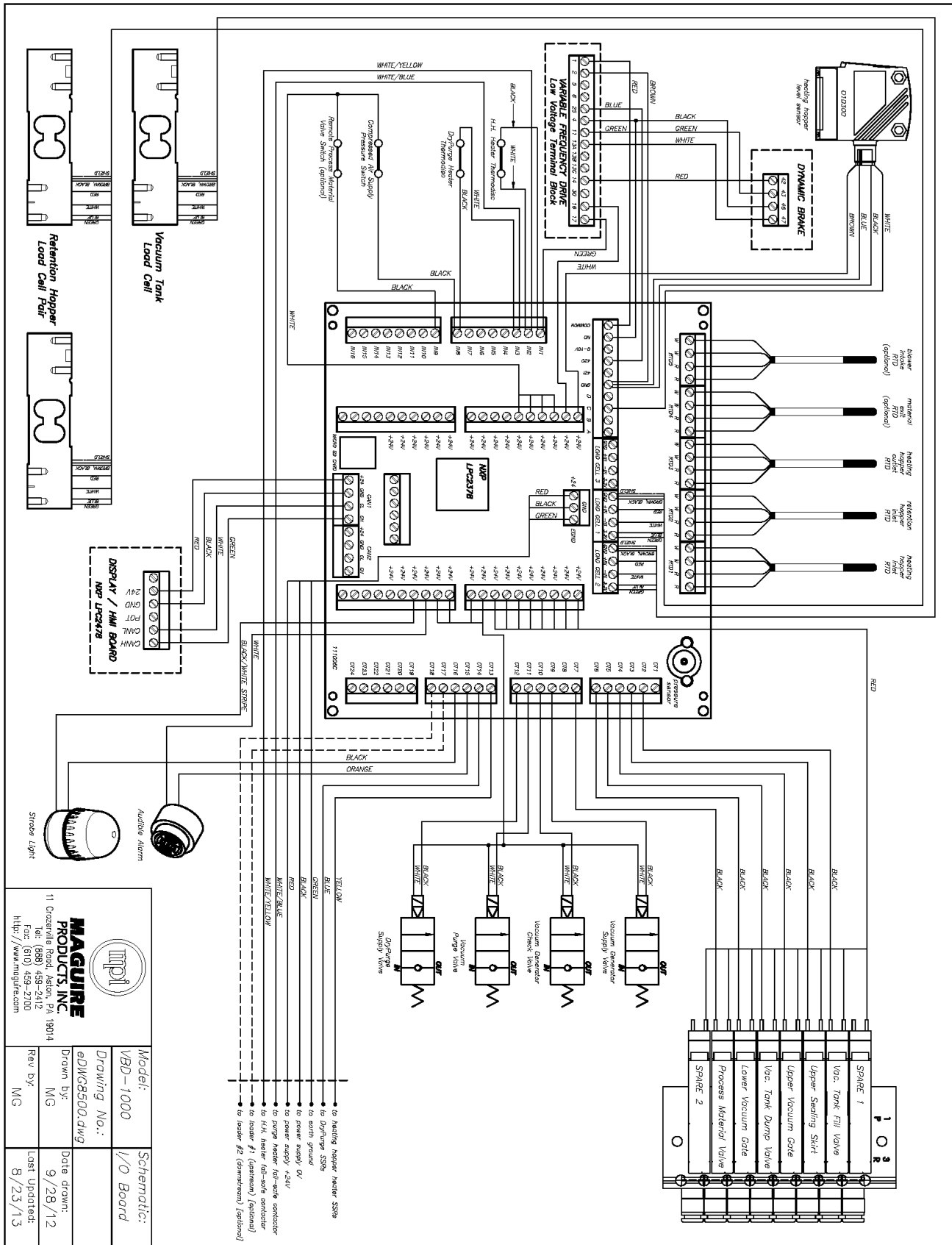
line item	MPI p/n	Description	General Location
1	hf21-E	replacement filter element, blower intake	upper rear panel
2	8520-10	silicone seal, vacuum chamber dump valve	vacuum chamber
3	go-369V	o-ring, size 369, Viton	upper vacuum gate
4	go-364V	o-ring, size 364, Viton	lower vacuum gate
5	8520-03	vac. seal plate assy., vac. cham. dump valve	lower vacuum gate
6	nvD-seg	solenoid valve segment, 4-way, 24 VDC	main cabinet
7	nf-AW40f	filter element, for "AW30" series regulator	pneumatics cabinet
8	nf-AFM40f	filter element, for oil separator	pneumatics cabinet

Other Potential Replacement Parts

9	es4TAT5	fuse, 60 amp class J, AJT60	electrical cabinet
10	ezd-.5t	fuse, 1/2 amp time delay, Midget style	electrical cabinet
11	eg-.3E2	circuit breaker, .3 amp, E-trip, 2-pole	electrical cabinet
12	eg-10C2	circuit breaker, 10 amp, E-trip, 2-pole	electrical cabinet
13	eg-30C3	circuit breaker, 30 amp, C-trip, 3-pole	electrical cabinet
14	eg-60C3	circuit breaker, 60 amp, C-trip, 3-pole	electrical cabinet
15	es3RT2016	motor contactor, 3 pole, 20A, 24 VDC	electrical cabinet
16	esCGC32D	motor contactor, 3 pole, 50A, 24 VDC	electrical cabinet
17	ehr09	relay, SS, 480V 25A, 24-265 VAC signal	electrical cabinet
18	ehr11	relay, SS, 480V 50A, 24-265 VAC signal	electrical cabinet
19	eRTD2-64	4-wire 100 ohm RTD, 1/8" dia. x 4" long	heating hopper
20	eRTD2-32	4-wire 100 ohm RTD, 1/8" dia. x 2" long	mat. outflow valve
21	elc100V	load cell, 100 kg capacity	retention hopper
22	elc250V	load cell, 250 kg capacity	vacuum chamber
23	esp-50	pressure switch, 50 psi set-point, 1/8" NPT	main cabinet
24	eabVBD-01	I/O circuit board	electrical cabinet
25	eabVBD-03	display / HMI circuit board	front control panel
26	eabVBD-04	pendant circuit board (.8" 4-digit numeric)	front control panel
27	nmd-09E	replacement element, for membrane air dryer	pneumatics cabinet
28	eht35-40	tube heater, 35,000 watt 3-phase 400 VAC	main cabinet
29	eht35-48	tube heater, 35,000 watt 3-phase 480 VAC	main cabinet
30	ehsl-02	strobe light, red, magnetic base, 24VDC	electrical cabinet
31	ehb-2	piezo buzzer, 24VDC	electrical cabinet
32	esw-09H	interlock handle, red/yellow pistol	electrical cabinet
33	ecf-120	cooling fan, 120mm, 106 CFM, 115VAC .24A	electrical cabinet

Wiring Diagrams

Low Voltage Wiring Diagram



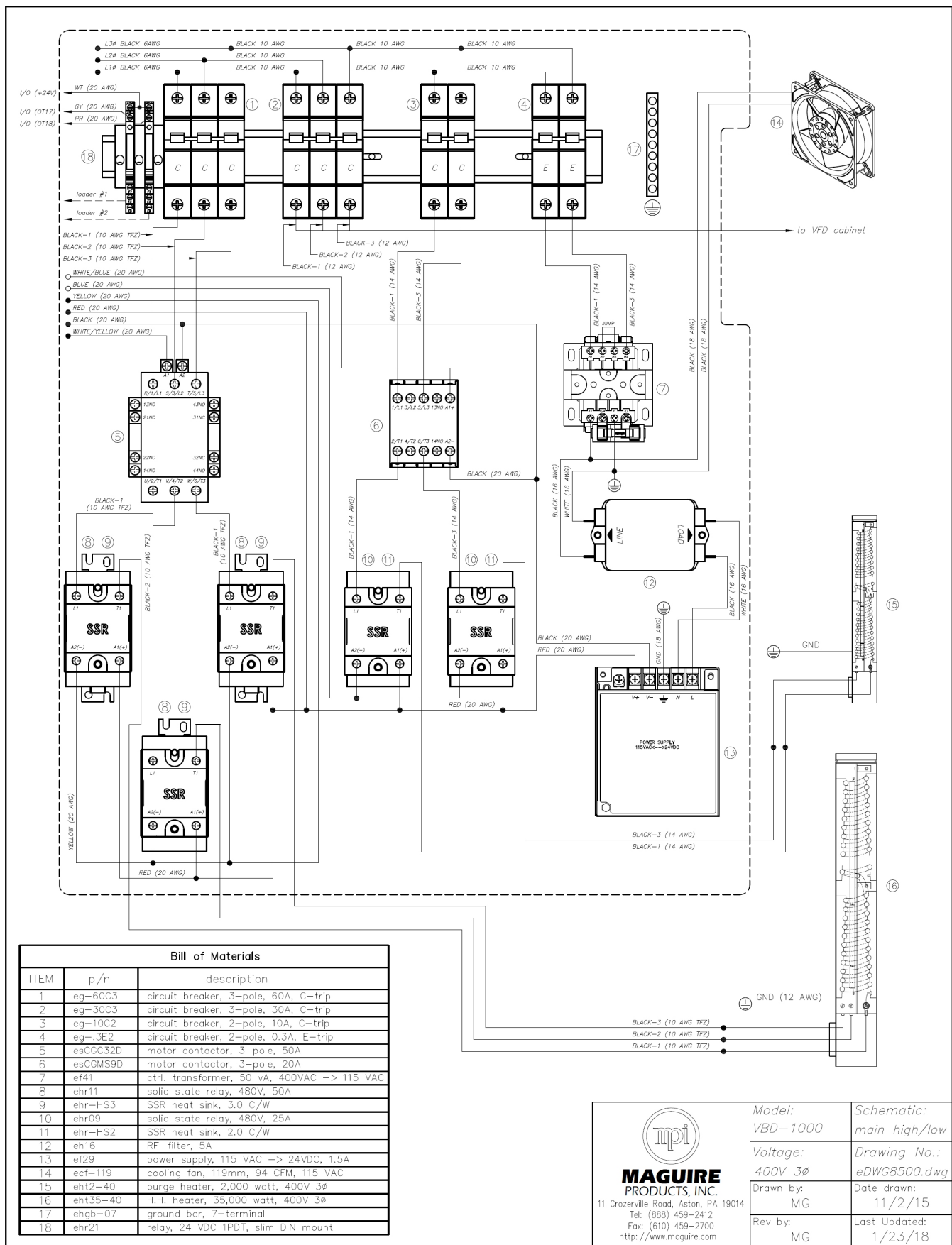
VFD Parameter Settings

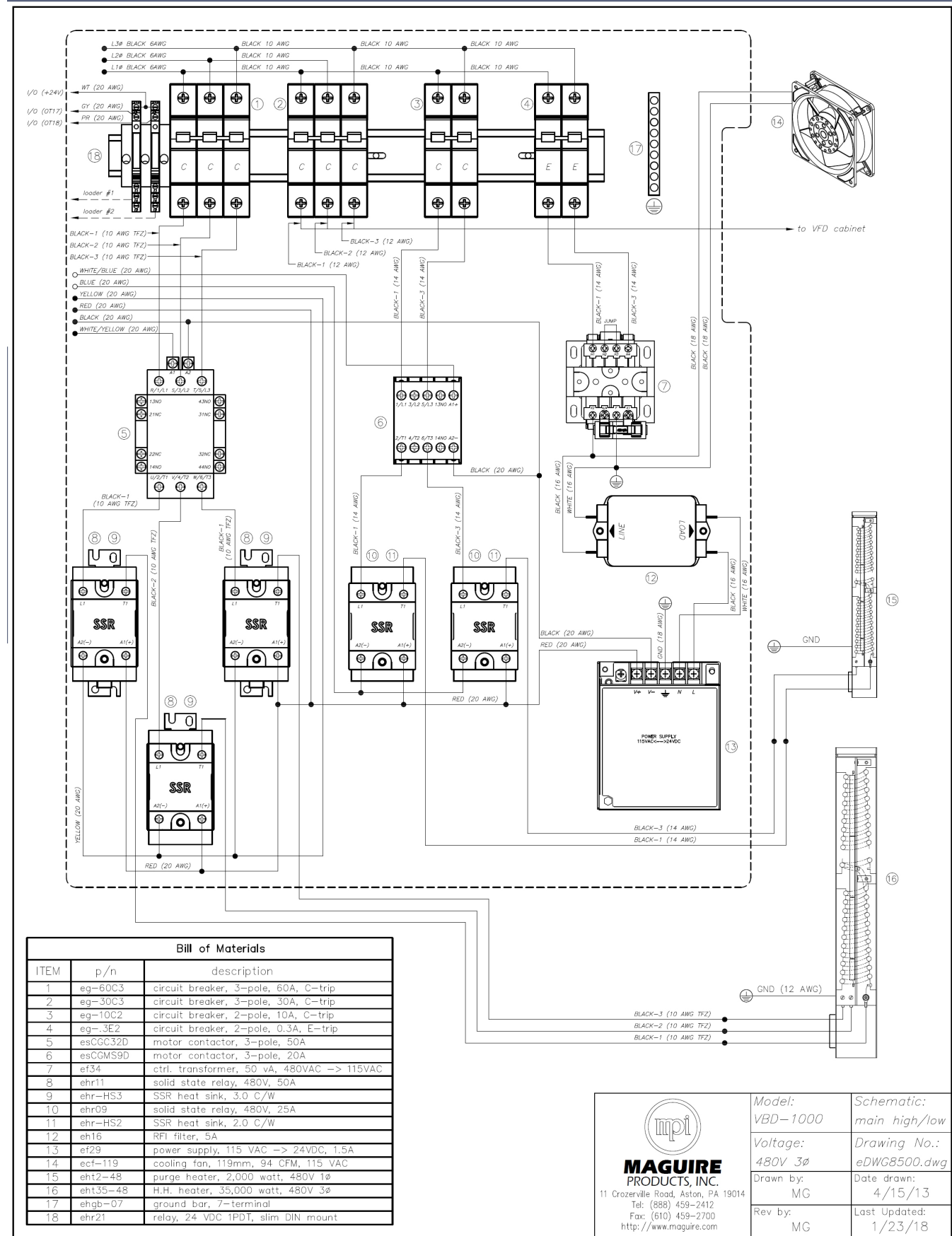
para.	name	set
Pr.8	deceleration time	20.00
Pr.9	electronic thermal O/L	*
Pr.41	up-to-freq. sensitivity	35
Pr.42	output freq. detection	20.00
Pr.72	PWM selection	5
Pr.83	rated motor voltage	*
Pr.162	automatic restart sel.	13
Pr.180	RL terminal fun. sel.	4
Pr.186	CS terminal function sel.	6
Pr.194	FU terminal fun. sel.	9999
Pr.195	ASCI terminal fun. sel.	9999
Pr.268	monitor decimal digits	0
Pr.870	speed detection hysteresis	5.0

* set to motor nameplate

Bill of Materials

ITEM	p/n	description
1	eVFD-LVF4	variable frequency drive, 39.16 amp
2	chr21	relay, 24 VDC 1PDT, slim DIN mount
3	mWEG10HP	motor, 10 HP, 208-230/460V 3-phase
4	edvVBD-02	HMI / display circuit board, VBD
5	eBR-110	braking resistor, 110 Ohm





DECLARATION OF CONFORMITY



2006/42/EC Machinery Directive

2014/30/EU EMC Directive



Name of manufacturer or supplier

Maguire Products Inc.

Full postal address including country of origin

11 Crozerville Road, Aston, Pennsylvania 19014, USA

Description of product

Name, type or model, batch or serial number

Model:

Serial Number:

Standards used, including number, title, issue date and other relative documents

EN4414 (2010); EN11201 (2010); EN12100 (2010); EN13849-1 (2015); EN13850 (2015); EN13857 (2008)
EN14119 (2013); EN14120 (2015); EN60204-1 (AC:2010) and EN61310 (2008)

Name of Responsible Person within the EU - Mr Paul Edmondson Director

Full postal address if different from manufacturers

Maguire Europe Sales Limited, Unit F, Vanguard, Tame Park, Tamworth, Staffs, B77 5DY, UK

Declaration

I declare that as the manufacturer, the above information in relation to the supply / manufacture of this product, is in conformity with the stated standards and other related documents following the provisions of the above Directives and their amendments.

Responsible Person: Mr Steve Maguire

Signature

Position

Signature of Steve Maguire
President



ORIGINAL

Date

www.maguire.com

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