

MAGUIRE PRODUCTS INC.

LPD[®] Dryer

LPD-1000[®]

Low Pressure Dryer[®]

INSTALLATION • OPERATION • MAINTENANCE

Maguire LPD[®] - Low Pressure Dryer[®]

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To every person concerned with use and maintenance of the Maguire LPD[®] 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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1 - Getting Started – READ THIS PAGE

PLEASE READ THIS PAGE

You don't have to read the entire manual....

BUT...

PLEASE READ THE NEXT TEN PAGES.

It will take about 10 minutes.

THESE PAGES COVER:

Warranty and Disclaimers:	What we Warranty and what we cannot promise.
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SAFETY Warnings:	Safety warnings.
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INSTALLATION:	Assembly and setup.
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OPERATION:	What buttons to push.
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MAGUIRE "LPD" Dryers are protected by U.S. patent 6,154,980. Additional U.S. and International patents are pending.

GETTING STARTED:

PROCEED TO: WARRANTY AND DISCLAIMERS NEXT PAGE

1.1 - Warranty – Exclusive 5-Year

MAGUIRE PRODUCTS offers **THE MOST COMPREHENSIVE WARRANTY** in the plastics auxiliary equipment industry. We warrant each MAGUIRE LPD 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.

Excluded Items:

The ability of the canisters to hold vacuum will be compromised if the vacuum seal edge is damaged from mishandling. We do not warranty canisters damaged from improper handling. We do, however, warranty the seals.

Disclaimers – 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. Materials vary widely throughout the 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.

GETTING STARTED:
PROCEED TO: SAFETY WARNINGS NEXT PAGE

1.2 – SAFETY WARNINGS



HOT SURFACES:

As with all dryers, there are **HOT SURFACES** to avoid. Temperatures can reach 300F (150C), or 350F, (180C) on high temperature models.



All heated surfaces are contained within the external enclosure. When the door is opened you can access and touch hot surfaces. 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.



INDEXING OF THE MATERIAL CANISTERS:

At the end of each cycle canisters automatically index.

The forces that cause rotation are light. However, the inertia of already moving canisters might cause injury. Additionally the disks above and below each canister close automatically and present a pinch point. For these reasons an interlock on the access door prevents all operations while the door is open.



DO NOT DEFEAT this interlock.

DO NOT try to index the canisters by hand, against the force of the positioning air cylinder. They will swing back rapidly when released.

If you disconnect the air supply and then rotate the canisters by hand, reconnecting the air will cause the canisters to swing rapidly back to their start position.

When connecting the air supply KEEP hands CLEAR. Have the DOOR CLOSED.



DOOR SAFETY INTERLOCK:

There is a safety interlock switch on the door. If you open the door, all operations will stop. After closing the door, you will need to press START to restart the dryer. Accumulated cycle time will not be lost.



RISK OF SHOCK:

Disconnect power supply before servicing the Dryer.



GETTING STARTED: PROCEED TO: INSTALLATION - NEXT PAGE

2 - Installation

2.1 – Transport, Setup

To help you identify your Dryer see: LPD Nomenclature / Order Code on page 74.

Shipment

The LPD 1000 Dryer is shipped pre-assembled with the exception of a few components that must be attached to the Dryer before use. The LPD 1000 Dryer frame is designed with forklift fork tubes and can be lifted using a forklift. The LPD Dryer weight is 2500 lbs (1135 kg). Protective wrap and wood may be attached to the Dryer and must be removed prior to use.

Setup Location



The LPD 1000 Dryer has 4 rubber leveling feet at the four corners of the Dryer's frame. If the Dryer will be installed on concrete, the leveling feet can be used. If the Dryer is to be installed on a wooden floor, it probably better to not use the leveling feet and instead allow the Dryer to rest on the fork tubes, which will allow the Dryer's weight to be distributed over a larger area.

Lifting



Falling Hazard:

Do not stand on top of the Dryer without proper fall arrest gear for safety.



DANGER OF INJURY!

If the weight is unevenly distributed, the Dryer may tip and injure people when it is lifted.

Lift the Dryer with a fork truck or suitable equipment. Weight of LPD 1000 Dryer model is 2500 (1134 kg). Lift points (fork tubes) are between the leveling feet, oriented from front or rear. The forklift forks must be within the fork tubes for stability when lifting.

The Dryer Hopper should be lifted onto the Dryer using a hoist or lifting device and should be lifted using the two attach points on top of the Dryer Hopper.

The Dryer Blower motor weighs 221 pounds (100 kg) and should be lifted using an appropriate lifting device, hoist or crane rated to handle the weight of the Dryer blower motor. Use the dryer blower motor attach point on top to lift the blower motor.

2.2 – Dryer Installation

2.2.1 – Installing the Blower Motor

The LPD 1000 Series Dryer is delivered with the blower motor un-installed. The blower motor weighs approximately 221 pounds (100 kg) and is delivered on a pallet separate from the Dryer itself. The blower motor is installed on the top of the Dryer. To install the blower onto the Dryer, follow these steps.



The LPD Dryer Blower motor weighs approximately 221 pounds (100 kg). Use an appropriate hoist or lifting device and attach it to the lift point located on top of the motor to lift the blower motor.

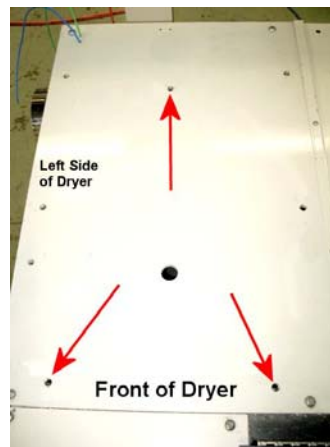


Using an appropriate crane or lifting device rated to handle the weight of the blower motor, lift the Dryer blower motor onto the top of the Dryer and lower it onto the rear left corner.

The Dryer motor should be oriented so that the large, finned circular side is facing the front of the Dryer (same side as the front access door).

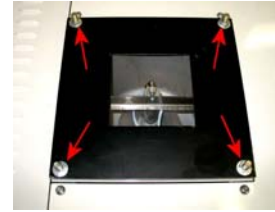
Lower the blower motor so that the bolt-down tabs on the blower motor align with the three bolt holes in the picture to the right.

When the blower motor mounting tabs are aligned with the bolt holes in the top of the Dryer, secure the blower motor with three ½ button head bolts.



2.2.2 - Hopper Installation on the LPD 1000 model Dryer

Located on the top of the Dryer is the material intake. At the four corners of the intake is 4 ½ inch studs. The Dryer Hopper will mount to these four studs and will be secured using the four ½ inch nylock nuts and washers.



The hopper is large and may require it to be mechanically lifted. To properly lift the hopper, use the two attach points at opposing corners of the hopper.



Place the hopper on the material intake and line up the four bolt holes in the hopper with the four studs in the fill hopper intake plate.



Orientate the hopper so that the Maguire logo is at the front of the Dryer and the cleanout valve is towards the rear of the dryer. The hopper access door will be located on the right side of the dryer.



Install the four ½" nuts and washers then firmly tighten by hand using a wrench.



2.2.3 – Install the Ambient Air Exchange Valve

Attach the Ambient Air Exchange Valve to the left, rear side of the Dryer. The 6-inch port is attached to the Dryer using the attached metal band clamp. The upper 4 inch port connects to the blower motor using the short piece of flex tube and attached hose clamps.



Ambient Air Exchange Valve Pneumatic Lines

The ambient air exchange valve pneumatic lines are the blue and green Teflon air lines that come out of the top of the Dryer. Connect the Ambient Air Exchange Valve pneumatic lines to the air cylinder located on the top of the Ambient Air Exchange Valve. The green line connects to the top of the air cylinder and the blue line connects to the bottom of the air cylinder.



2.2.4 - Attach the Air Filter Box Hose

One end of the hose connects to the top of the air filter box and the other end with the black air inlet elbow attaches to the left side of the Blower motor (left side when facing the rear of the blower motor).



2.2.5 - Compressed Air Connection

Connect an air supply to the air regulator's IN port using a male ½ " 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 canisters 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.

2.2.6 - Electrical Connection



RISK OF INJURY! Only qualified technicians should electrical connections.

Connect Blower Motor Power to Dryer



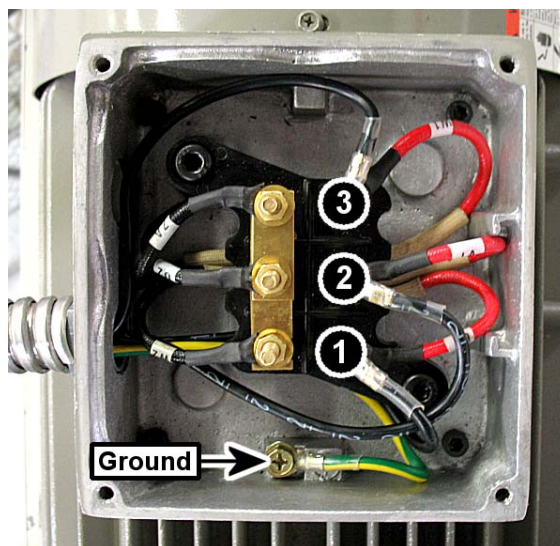
DANGER – DO NOT connect the Dryer to a power source before connecting the Dryer Blower Motor. The Dryer MUST remain disconnected from a power source until the Dryer Blower Motor is connected properly to the flex conduit power cable.



After installation of the Dryer Motor onto the top of the Dryer, the power cable must be connected to the Blower Motor. The flex conduit located on the left side of the Dryer supplies the power to the Blower Motor. Within the flex conduit is four wires. Three of the wires are black and labeled with a 1, 2, and 3. The fourth wire is a green/yellow wire and is the ground wire.

To connect power to the Blower Motor, follow these steps.

1. Open the terminal box located on top of the Blower Motor by removing the 4 screws.
2. Feed the flex conduit wires through the threaded terminal box hole. Note the numbers stamped onto the wire insulation 1, 2, and 3.
3. While facing the box with the conduit entering the left side of the box (as pictured to the right), route the numbered 3 black wire around the top to the opposite side and connect it to the number 3 terminal.
4. Route the numbered 2 and 1 black wires around the bottom to the opposite side and connect the number 2 wire to the number 2 terminal and the number one wire to the number 1 terminal.
5. Route the Green/Yellow Ground wire around the bottom center of the terminal box and connect it to the terminal screw in the terminal box housing.
6. After all four wires are connected; verify that the connections are correct. Then re-install the terminal box cover plate and gasket back onto the terminal box using the 4 screws.



A wiring diagram is molded into underside of the terminal box cover plate.

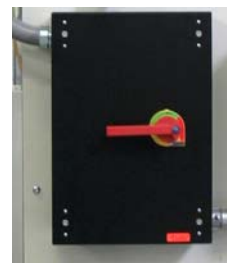
After the Blower motor is connected to the blower motor conduit, connect power to a properly fused circuit. Voltage and amp ratings are specified on the serial number plate. **See Wiring Diagrams on page 7 details.** THREE PHASE: 60 cycle 480 volts or 50 cycle 400 volts

2.2.7 - Confirm Correct Blower Rotation



On THREE PHASE units CONFIRM CORRECT BLOWER ROTATION by following these instructions:

Turn power on using main power switch.



Press: *

Display will say:

ENTER FIVE DIGIT
PASSWORD _ _ _ _ _

Press: 22222

Display will say:

TEMP=63°F v=0in
MODE=PROGRAM CAN=2

Press: **BLOWER** two times *quickly*
Blower turns ON then OFF



As the Blower motor slows, look at the back of the blower motor. Watch the rear cooling fan within blower motor. As it spins to a stop, verify that it is rotating **CLOCKWISE** as indicated by the arrow in the picture to the right.

If the cooling fan does not rotate clockwise, it is due the incorrect wiring of the blower motor at the wiring box. Review the blower motor wiring in the previous section.

If the rotation is correct, clockwise, proceed to the next step.



Press: **EXIT**

Display will say:

TEMP=63°F v=0in
MODE=AUTO CAN=2

PROCEED TO: OPERATION NEXT PAGE

3 - Operation

3.1 - Standard Operation

For a detailed description of Dryer controls see “Controls Description” on page 21.
To help you identify your Dryer see: LPD Nomenclature / Order Code on page 74.

1. Fill the hopper on top of the dryer with material.

2. Set the **TEMPERATURE** - (TEMP thumbwheel switches)

USE THE SAME temperature setting recommended by the resin manufacturer for conventional desiccant dryers.

DO NOT exceed the manufacturers recommended drying temperature unless you are sure the material will not soften and stick together.

Heat can be set as high as 350 f (180c).



3. Set the **CYCLE TIME** - (CYCLE thumbwheel switches)

See RECOMMENDED CYCLE TIMES, next page.

These are suggested starting points only. Run moisture tests to determine correct cycle times, or submit your material to us for determination. See form on page 71 for material testing.



4. OPERATOR STATION – Left Side

On the **POWER** box:

- a. Turn **MAIN POWER** on. (RED switch)



On power up, the canisters will index to a starting position based on the position when last shut down.



On the **CONTROLLER**:

- b. Turn **MODE** switch to **AUTO**.

- c. Press **CYCLE START**.

- d. Two timed cycles must be completed before material is available.



For a more indepth explanation of the operating sequence, please see Standard Operating Sequence on page 19.



If you ever run material that does not require drying, set both Temperature and Cycle time to 000. This keeps the heater off and allows indexing as required.

3.2 – Recommended Cycle Times

MATERIAL	FINAL MOISTURE % *	CYCLE TIME (MINUTES)**	DRYING TEMPERATURE***	
			°C	°F
ABS	0.10	30 - 35	80 - 85	180 – 190
ABS/PC	0.02	35 - 40	100	210
LCP	0.02	30 - 60	150	300
PA	0.20 - 0.10	30 - 40	80 - 85	180 – 190
PBT	0.02	30 - 35	120	250
PC	0.02	30 - 35	125	250
PC/PBT	0.02	30 - 35	125	250
PEEK	0.20 - 0.10	35 - 40	150	300
PEI	0.02	30 - 50	150	300
PES	0.05 - 0.02	35 - 40	150	300
PET (Molding Grade)	0.010	30 - 45	150	300
PET (Preform, Extrusion)	0.005	30 - 45	150	300
PMMA (Acrylic)	0.02 - 0.04	40	85	185
POM (Acetal)	0.20 - 0.10	45	80 - 110	180 – 230
PPO	0.02	45	100 - 120	210 – 250
PPS	0.02	45	150	300
PUR	0.02	45	125 - 140	260 – 280
PSU	0.02	35 - 40	150	300
SAN	0.20 - 0.10	30 - 50	80	180

* Final moisture content as recommended by the raw material manufacturer.

** Recommended cycle time is based on average initial moisture content. For high initial moisture content cycle time should be extended 5 minutes. When in doubt contact Maguire Service.

*** 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 such as one manufactured by Arizona Instruments.

If you are not obtaining the results you want or if you would like us to test your material to determine the optimal drying cycle time, please see form on page 71 for material testing.

3.3 – Standard Operating Sequence

This section will help you understand what the dryer is doing as it runs.

Inside the dryer enclosure are three identical material canisters, which rotate through 3 stations:

- **Fill and Heat Station** (right rear)
- **Vacuum Station** (left rear)
- **Dispense Station** (front)

Each canister hangs in one of three positions in the “Canister Hanger Assembly”. These three positions are labeled 1,2 and 3. The number identifies the canisters position in the assembly.

With the material in the hopper above the **Fill and Heat station**, press **CYCLE START** to begin the sequence.



NOTE

On power up, the canisters will index to a starting position based on the position when last shut down.

"Operation" means the following actions occur:

1. The disks above and below each canister close.
2. The Blower turns on.
3. The vacuum generator turns on.
4. The air cylinder over the **Dispense Station** extends to open the canister dispense valve located inside the canister at the bottom, to deliver material to the process. If the bottom sensor was not uncovered at the time of indexing, the fill valve will delay opening until the sensor becomes uncovered.
5. The canister fill valve over the **Fill and Heat Station** opens, filling the canister.
6. The heater turns on.
7. With the opening of the Fill valve, the canister in the **Fill and Heat Station** begins to fill. Hot air enters the canister to heat the material as it fills. The heating process continues for the cycle time set on the Cycle Time thumbwheel. *At the same time, a vacuum is pulled on the canister in the **Vacuum Station**.*
8. After the cycle time elapses, the cycle ends and the canisters index counterclockwise to the next station. The heated material that was in the **Fill and Heat Station** has now moved to the **Vacuum Station**. Here the vacuum dries the full charge of heated material.



NOTE

The CYCLE TIMER only counts time when the heated air temperature is within 20 degrees of target, and the vacuum has reached 25 inches. Therefore, the first minute or so of each cycle does not count toward cycle time.

9. After the cycle time elapses, the cycle ends and the canisters index counterclockwise again to the next station. The dried material that was in the **Vacuum Station** has now moved to the **Dispense Station**. Two cycles have passed and the dried material is ready for production.

From now on, indexing occurs at the end of each cycle time. This is the standard mode, "advance on time". If you have selected the "advance when empty" option, then indexing occurs only when the level sensor below the **Dispense Station** indicates the dispensing canister is empty.



If you are using "advance when empty" option you have the ability to set a short fill time. If the time to use the material in the canister is more than double the minimum cycle time set on the cycle time thumbwheel, we suggest you decrease the Fill time so that the canister does not hold so much material. Excessively long cycle times may allow dried material to begin to re-absorb moisture.

3.4 – Operating Features/Options

Auto Start *22 - Allows for entry of a date/time to automatically start the dryer heating and vacuum cycle. See Star Functions on page 29 for more information.

Auto Stop *24 - Allows for entry of a date/time to automatically stop the dryer heating and vacuum cycle. See Star Functions on page 29 for more information.

Material Alarm *33 - Alarm to alert an operator that dry material is ready to be conveyed after a cold start of the dryer. See Star Functions on page 29 for more information.

Index Complete Alarm *34 – Alarm after every index and continue running. This is intended for lab environments where someone has to manually empty the canisters after each index. See Star Functions on page 29 for more information.

Cycle Time Alarm *36 – Alarm to alert an operator that material has run out before end of cycle.

Advance Options Time/Empty *44 - "Advance on Time" will advance the canisters (index) when the cycle timer times out, even if canister is not empty. "Advance on Empty" will advance only after the canister is empty. See Star Functions on page 29 for more information.

Dispense Valve Options *52 - Options for dispensing the front canister. Choose between "Enabled", "Disabled" and "Pulsed". Enabled for normal operation, disable will not dispense, and pulsed will pulse the dispense valve on and off when dispensing. See Star Functions on page 29 for more information.

Fill Valve Options *53 - Options for filling the canister. Choose between "Enabled" and "Disabled". Enabled for normal operation, disable will not fill the canister automatically. See Star Functions on page 29 for more information.

Key Functions - See the Keypad description of functions on page 26 for more information.

Empty key - Manually opens the bottom valve at the "Dispense Station" to empty a canister.

Fill key - Manually opens the fill valve, above the "FILL and HEAT station".

Convey Key – Manually shift hot air flow valves to convey material.

3.6 – Controls Description

3.6.1 – Controller & Operator Station

Controller - Right Side

- CYCLE START
- CYCLE STOP
- MODE
- INDEX
- SILENCE ALARM



CYCLE START

Press to START the cycle.
Lights when the unit is running automatically.



CYCLE STOP

Press to STOP the cycle.
Lights when the unit has been stopped by the operator or has stopped between cycles in the "clean out" mode.



MODE - AUTO / CLEAN

Select AUTO for normal automatic indexing of canisters.

Select CLEAN to PREVENT AUTOMATIC INDEXING.

This is for COLOR CHANGES. INDEXING will NOT occur automatically. Instead the ALARM will sound, and the operator knows to CLEAN OUT the empty canister for the next color.

With a CLEANED CANISTER in place, the door is closed and the INDEX button is pressed to restart the cycle.



When in Clean Mode, the cycle will continue until the canister is empty, up to 2 times the set cycle time.



INDEX

Press to MANUALLY ADVANCE the canisters (with Dryer stopped).

In the CLEAN mode, you must press the INDEX button to advance the canisters. The next cycle starts as soon as INDEXING is complete.

In the AUTO mode, the index button does not work unless you press CYCLE STOP first. INDEX then serves to manually advance the canisters. After INDEXING, press CYCLE START to start the next cycle.

When lit in combination with BLUE:
Cycle has timed out, indexing is about to occur automatically.

When lit in combination with AMBER:
Cycle has been stopped by the CYCLE STOP button.
INDEX button must be pressed to index the canisters.

When blinking in combination with AMBER:
Cycle has stopped in the "clean" mode, the operator must press the INDEX button to advance the canisters.



SILENCE ALARM

This button silences the STROBE and BEEPER ALARMS, but does not remedy the cause of the alarm.

ALARM SPEAKER



Controller – Front Panel

- TEMPERATURE
- CYCLE TIME
- DISPLAY
- KEYPAD
- STROBE LIGHT
- BEEPER ALARMS



TEMPERATURE Thumbwheel Setting

Up to 250f/120c degrees, standard model.
Up to 300f/150c on high heat model.



CYCLE TIME Thumbwheel Setting

The time in minutes for one cycle. Cycle times will vary depending on type of material. See Recommended Cycle Times chart on page 18.



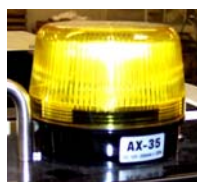
NOTE

Material that does not require drying may still be allowed to pass through the system by setting both thumbwheels to 000. The heater and vacuum will not operate, but indexing will still occur.



DISPLAY Vacuum Fluorescent Display (VFD)

All visual information will be displayed on this display.



Strobe Light

STROBE LIGHT and BEEPER ALARMS

The Strobe light flashes and the Beeper sounds when any condition occurs requiring operator intervention.



Beeper Alarm



MANUAL FILL

Press **Fill** to manually operate the fill valve, over the fill station canister. Useful if the canister is set for timed fill, and you need to add additional material to the canister. Works only when the dryer is running in AUTO Mode.

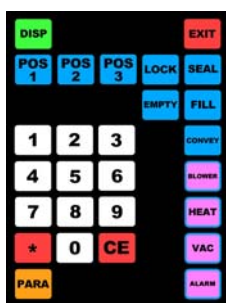


This button is not used



EMPTY KEY

Opens the bottom valve at the “DISPENSE station” to dispense the material in the canister above through the VTA chamber. Toggles Open / Close. Can be operated in Auto Mode while the door is open for cleanout.



KEYPAD

See next section for Keypad functions.

Controller – Left Side

- USB input / output
- ETHERNET input / output (future use)
- SERIAL input / output





USB PORT

This is a USB port. A USB Drive plugged in here allows information to be ported directly to a USB Drive giving the benefit of a permanent digital record.

Three printouts are available:

1. A listing of the internal parameter table.
(press ***77** in the PROGRAM mode.)
2. A periodic printout of temperature, vacuum reading, and elapsed cycle time. There is a detailed explanation of this printout in the PRINTED OUTPUTS section of this manual.
(press ***54** in the PROGRAM mode, use **"*"** to set printer flag ON.)
3. A listing of the alarm log.
(press ***76** in the PROGRAM mode.)

See **Print Outputs** on page 70 for more information about the ***54** printout. See Star Functions on page 29 for more information on ***77**, ***76** and ***54**.

The USB port can also be used to update the controller's software. For information about updating the controller software see Updating Controller Software and the Star function ***93**.



Notes about printing to a USB drive

When saving printout information to a USB drive, the USB drive must contain a folder named **maguire** and within the folder, a file labeled **PRINTER.TXT** must be present. It is this file, **PRINTER.TXT** that printout functions appended to. Also note that every time a print occurs to the file on the USB drive, the data is appended to the end of the file **PRINTER.TXT** and does not overwrite existing data within the file.



COMPUTER input / output

The computer port is a male DB9 serial port. This port can be used as an interface to upgrade the Dryer software.



CONVEY LEVEL SENSOR - plug receptacle

This plug is not used on the LPD-1000.

3.6.2 - Keypad

Description of Functions



Four modes are available:

Auto Mode	Automatic operation occurs ONLY in this mode. This mode is active when power is turned on.
Manual Mode	Allows operation of devices for testing. For MANUAL mode, press: * then (11111) or your own password.
Program Mode	Allows altering of operation logic. For PROGRAM mode, press: * then (22222) or your own password.
Advanced Mode	Allows altering of operation of advanced logic. Note: You should never need to access the Advanced Mode unless instructed to do so by a Maguire LPD Technician. For ADVANCED mode, press: * then (33333) or your own password.



NOTE

In Manual, Program or Advanced modes, automatic operation cannot occur. You can enter these modes only when the dryer has been STOPPED by pressing the CYCLE STOP button.



NOTE

To change passwords, see (*45), (*78) and (*79), below.

The following keys operate in ALL modes:



Display Key - Used to toggle the display. See key for descriptions.

Display when idle:

TEMP= 90c V=640mm
MODE=AUTO CAN=1

Display during operation:

TEMP= 90c V=640mm
CYC= 0:00 CAN=1

Press DISP to change to:

TEMP= 90c V=640mm
CYC= 0:00 HT=20%

Or

TEMP= 90c V=640mm
WED 12/05/2005 12:15

Display Key:	TEMP	temperature of air entering the canister: F or C.
	V	vacuum inside the canister: ins. or mm.
	CAN	Canister that is currently in the Dispense station. (1,2,3)
	CYC	accumulated time, this cycle: min:sec
	HT	percent of heater "on" time each second

**Exit Key**

Press to EXIT any and all sequences.

**Star Key**

Use for: Entering Manual or Program Mode password, entering into a star function or toggling individual star functions (on/off, enable/disable, etc).

**Clear Key**

Holding the "CE" key down while turning POWER ON performs a "CLEAR". See CLEAR ROUTINES section.

The following keys operate in **MANUAL** and **PROGRAM** modes:

**Position 1 Key**

Rotate the canister in "Position 1" around to the Dispense station.

**Position 2 Key**

Rotate the canister in "Position 2" around to the Dispense station.

**Position 3 Key**

Rotate the canister in "Position 3" around to the Dispense station.

**Lock Key**

Lock the canisters in position. Toggles Lock / Unlock

**Seal Key**

Close all Disks. Toggles Seal On / Off

**Fill Key**

Open the fill valve, above the "FILL and HEAT station". Toggles Open / Close
Also works while Dryer is running.

**Empty Key**

Opens the bottom valve at the "DISPENSE station" to dispense the material in the canister above through the VTA chamber. Toggles Open / Close
Can be operated in Auto Mode while the door is open for cleanout.

**Convey Key**

This key is not used on the LPD-1000

**Blower Key**

Turn on the blower. Toggles On / Off

**Heat Key**

Turn on the heater Toggles On / Off. Will not operate without blower running

**Vacuum Key**

Turn on the vacuum generator Toggles On / Hold (holds vacuum) / Off (releases vacuum)

**Alarm Key**

Activate the alarm. Toggle activate / deactivate

**Parameter Key**

Used to move forward through internal parameters list. Use * to move backwards through list. (Program and Advanced Mode only)

3.6.3 - Star Functions

Star functions are specific settings and routines that can be set in the Dryer. The star functions are divided into three groups, "Manual Mode", "Program Mode" and "Advanced Mode", which are separated by individual passwords. Manual Mode star functions are specific to daily operation and basic setup of the Dryer while Program Mode includes additional star functions that are more specific to administrative purposes. Advanced Mode star functions are restricted access because these star functions are not intended for typical operation of the Dryer but rather for default settings that should never be altered unless otherwise instructed to do so by a Maguire technician.

To enter into Manual Mode: Press * and enter the Manual Mode password (default is 11111).

To enter into Program Mode: Press * and enter the Program Mode password (default is 22222).

To enter into Advanced Mode: Press * and enter the Advanced Mode password (default is 33333).

STAR FUNCTION LIST (followed by explanation)

Press * and two numbers for the following functions:

	Default Setting	Mode		
		Manual	Program	Advanced
*05 Clears Alarm Log			✓	✓
*11 Select Date Format, Set current Date and Time		✓	✓	✓
*12 Restore Factory Default Settings.			✓	✓
*22 Auto Start Disable / Enable.	Disable	✓	✓	✓
*23 Copy the current "User Settings" into the Backup.	Disable		✓	✓
*24 Auto Stop Disable/Enable.		✓	✓	✓
*25 Display Firmware Status and Checksum				✓
*32 Copy the current "Backup" to the "User Settings".			✓	✓
*33 Material Ready Alarm, Disable / Enable.	Disable	✓	✓	✓
*34 Index Complete Alarm, Disable / Enable.	Disable	✓	✓	✓
*35 Alarm Log – Displays last 25 alarms in order of most recent.	Enable		✓	✓
*36 Cycle Time Alarm, Enable/Disable		✓	✓	✓
*39 (Not used on the LPD-1000)		✓	✓	✓
*40 (Not used on the LPD-1000)		✓	✓	✓
*44 Advance Modes: "Advance on Empty" or "Advance on Time".	Advance on Time	✓	✓	✓
*45 Change "Manual Mode" password.			✓	✓
*50 Material Dispense Mode: "Vacuum-Take-Off" or "Gravity".	Vacuum-Take-Off			✓
*52 Dispense Valve, Enable / Disable / Pulse.	Pulse	✓	✓	✓
*53 Fill Valve – Enable / Disable.	Enable	✓	✓	✓
*54 Print cycle information. (Enable / Disable).		✓	✓	✓
*66 Set LPD I.D. number (1-255).				✓
*76 Print Alarm Log			✓	✓
*77 Print parameters		✓	✓	✓
*78 Change "Program Mode" password.			✓	✓
*79 Change "Advanced Mode" password.				✓
*88 Select Language				✓
*89 Set temperature unit: Fahrenheit / Celsius.	Fahrenheit		✓	✓
*96 Used to access the flash card utility.				✓
*97 Temporary Maintenance Flag - disables interlock.			✓	✓

Star Functions – Full Explanations



Clears the Alarm Log

Press (*,0,5) to clear the alarm log. See *35 for information about the alarm log.



Select Date Format, Set current Date and Time

Press (*,1,1) to set the date format and to enter the correct date and time into the real-time clock. Correct date and time is helpful if you are retrieving information using a printer or are collecting data by computer.

The first display will indicate USA or EUROPE date format.
Use the CE key to toggle from one to the other.

USA will cause all dates to be displayed MONTH/DAY/YEAR.
EUROPE will cause all dates to display DAY/MONTH/YEAR.

SELECT DATE FORMAT
USA (MM/DD/YYYY)

SELECT DATE FORMAT
EUROPE (DD/MM/YYYY)

Press * to enter the current date and time. The correct date and time for Easter Standard Time were entered at the factory. You will want to correct this for your time zone. Enter the date and time using the keypad numbers. The date and time fields will advance as numbers are entered. Use the CE key to step through all the fields without change. After entering the minutes, the controller will exit to program mode and save the changes to date and time. Press Exit again to exit out of Program Mode.



Restore Factory Default Settings

Press (*,1,2) to restore the Dryer's hard-coded factory default settings.

RESTORE FACTORY
DEFAULT SETTINGS

Pressing *,1,2 restores Factory Default Settings into "User Settings" and "User Backup Settings" (retains certain important information). **It will not prompt for confirmation.** Resets immediately after *12 is pressed. Accessible in Program Mode Only.



Auto Start – Disabled/Enabled

Press (*,2,2) to select the Automatic Start option.

AUTO START
DISABLED

AUTO START
ENABLED

*22 allows for a day / time automatic start of the dryer heating and vacuum cycle, (the same as pressing the START button). For the Auto Start to occur, the Power switch must already be ON.

When *22 is selected use the CE key to toggle between DISABLED

and **ENABLED**. If you select **AUTO START DISABLED**, press ***** to exit.

If you select **AUTO START ENABLED**, use the ***** key to toggle through each weekday. Use the CE key to select between (MONDAY - NEVER) and (MONDAY __:__).

With (MONDAY __:__) (or any other day) selected, enter the time on that day you want the unit to start. Use a 24 hour clock. Example: (MONDAY 07:00), is 7 AM. 7 PM would be 19:00

Use the ***** key to go to next day.

Use the CE key to select NEVER or __:__.

Enter a time where you want an auto start to occur.

When finished, press **Exit** to save changes, then press **Exit** again to exit out of Program or Advanced Mode.



Save User Settings

Press (*****,**2**,**3**) to copy the current “**User Settings**” into “**User Backup Settings**”. For an explanation of the memory areas in the Dryer software as well as the use of the **Clear** and **Clear All** Routines see page 72.

SAVE USER SETTINGS

Once saved, this information is then available for retrieval using the CLEAR routine (press CE key on Power Up) or by using the ***32** function described next. When finished, press **Exit** to save changes, then press **Exit** again to exit out of Programming Mode. Accessible in Program Mode Only.



Auto Stop – Disabled/Enabled

Press (*****,**2**,**4**) to select the Automatic Stop option.

AUTO STOP
DISABLED

AUTO STOP
ENABLED

***24** allows for a date/time automatic stop of the dryer heating and vacuum cycle, (the same as pressing the STOP button).

When ***24** is selected use the CE key to toggle between **DISABLED** and **ENABLED**. If you select **AUTO STOP DISABLED**, press ***** to exit.

If you select **AUTO STOP ENABLED**, use the ***** key to toggle through each weekday. Use the CE key to select between (MONDAY - NEVER) and (MONDAY __:__).

With (MONDAY __:__) (or any other day) selected, enter the time on that day you want the unit to stop. Use a 24 hour clock. Example: (MONDAY 07:00), is 7 AM. 7 PM would be 19:00

Use the ***** key to go to next day.

Use the CE key to select NEVER or __:__.

Enter a time where you want an auto stop to occur.

When finished, press **Exit** to save changes, then press **Exit** again to exit out of Program or Advanced Mode.



Display Firmware Status and Checksum

Press (*****,**2**,**5**) to display the Firmware status and checksum.

FIRMWARE OK
CHECKSUM = xxxxxxxx

Displays the firmware status and checksum.

When finished, press **Exit**, and then press **Exit** again to exit out of Advanced Mode. Accessible in Advanced Mode Only.



Restore Saved User Settings

Press (*****,**3**,**2**) to copy the “**User Backup Settings**” into “**User Settings**”. For an explanation of the memory areas in the Dryer software as well as the use of the **Clear** and **Clear All** Routines see page 72.

RESTORE SAVED
USER SETTINGS

This is useful for retrieving correct information that you may have stored earlier in the “**User Backup Settings**”. Also, if you have been making changes to **User Settings** and now wish to restore all settings to what they were at power up, this is the function to use. When finished, press **Exit** to save changes, then press **Exit** again to exit out of Programming Mode. Accessible in Program Mode Only.



Material Ready Alarm – Disabled/Enabled

Press (*****,**3**,**3**) to enable or disable the material ready Alarm:

MATERIAL READY ALARM
DISABLED

MATERIAL READY ALARM
ENABLED CYCLES: 02

After Enabling Alarm, you must turn off power to the Dryer then turn it back on to activate the Material Ready Alarm.

When this is enabled (and power has been cycle off/on) the Dryer will complete the number of cycles set and then sound an alarm (but the machine will continue running). The alarm output will be “**MATERIAL READY**”. Pressing silence alarm will kill the alarm permanently (until the machine is de-powered, and then re-powered). The purpose of this alarm is to alert an operator that dry material is ready to be conveyed after a cold start of the dryer. **NOTE:** The dispense valve is disabled for the number of cycles specified.

Use the ***** key to toggle enabled, disabled. Use the number keys to enter the cycle count (use a leading zero for single digit values, i.e. 02).

When finished, press **Exit** to save changes, then press **Exit** again to exit out of Program or Manual Mode.



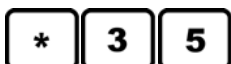
Index Alarm – Disabled/Enabled

Press (*,3,4) to enable or disable the Index Alarm:

INDEX ALARM
DISABLED

INDEX ALARM
ENABLED

When this is enabled, the machine will alarm after every index. It will not shutdown, just alarm. This is intended for lab environments where someone has to manually empty the canisters after each index. Use the * key to toggle enabled, disabled. When finished, press **Exit** to save changes, then press **Exit** again to exit out of Program or Manual Mode.

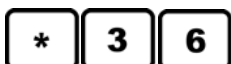


Alarm Log (Program and Advanced Mode Only)

Press (*,3,5) to view log of Alarm messages:

... Alarm message ...
... Date and Time ...

Displays last 25 alarms in the order of most recent occurrence. Use the * key to toggle through alarm messages. When finished, press **Exit**, then press **Exit** again to exit out of Advanced Mode.



Cycle Time Alarm – Enabled/Disabled

Press (*,3,6) to enable or disable the Cycle Alarm:

CYCLE ALARM DISABLED

CYCLE ALARM ENABLED
Alarm delay 10 sec.

When enabled you may set a time delay between uncovering the sensor and the alarm (defaults to 10 seconds). When this is enabled, the machine will alarm after the specified delay if the Vacuum Take-Off Assembly (VTA) runs out material before the end of the cycle. This indicates that the demand for material is exceeding the Dryers capacity to provide material. It will not shutdown, just alarm. Use the * key to toggle enabled, disabled. When finished, press **Exit** to save changes, then press **Exit** again to exit out of Program.

**Convey Mode**

(Not used on the LPD-1000)

**Convey Alarm – Disabled/Enabled**

(Not used on the LPD-1000)

**Advance on Time/Empty**

Press (*,4,4) to select between:

ADVANCE ON TIME

ADVANCE ON EMPTY
FILL TIME: ____

The default selection is **ADVANCE ON TIME**. This is the standard mode of operation. The canisters advance (index) when the cycle timer times out, even though it is not empty.

With **ADVANCE ON EMPTY** selected, canisters advance only after the canister is empty; the sensor in the vacuum take-off tray is uncovered. In this mode a full canister may take an hour or more to be consumed if throughput is low. Cooling of material and moisture pick up may be a problem. To solve that, you can shorten the fill, only partially filling the canister.

Fill time, in seconds, may be entered at this point. Each second equals about 2 pounds on LPD 100 / 200 series dryers, and 1/2 pound on LPD 30 series dryers. An entry of zero (00) will cause the fill valve to stay open, which means a full canister. Entries up to 9999 seconds are allowed. The CFT parameter holds the entry and it can be altered there as well. When finished, press **Exit** to save changes, then press **Exit** again to exit out of Program or Manual Mode.



Change Manual Mode Password

Press (*,4,5), followed by a 5 digit number to change the password number for entering the manual mode.

PASSWORD – 5 DIGITS
MANUAL MODE: 11111

The system is supplied with the number "11111" as the manual mode password number. If you wish to restrict use of this mode to only yourself, you may make up your own number and enter it here. When finished, press **Exit** to save changes, then press **Exit** again to exit out of Program Mode. Accessible in Program and Advanced Modes Only. If you forgot the Manual Mode password, it can be reset from Program and Advanced Modes.



Material Dispense Mode – Vacuum-Take-Off/Gravity Advanced Mode Only

Press (*,5,0) to alter the operation of the dispense valve.

MAT DISPENSE MODE
VACUUM-TAKE-OFF

MAT DISPENSE MODE
GRAVITY

When set to "Vacuum-Take-Off" the signal from the 4-pin "Convey" connector operates as it always has.

When set to "Gravity" the convey connector will be a switch that will enable or disable the "Empty" cylinder, meaning that if the path between pin 1 and pin 4 is open, the Empty cylinder will operate as it normally would (automatically). If the path between pin 1 and pin 4 is closed, the Empty cylinder will be disabled.

Use the * key to toggle through each dispense mode. When finished, press **Exit**, and then press **Exit** again to exit out of Advanced Mode. Accessible in Advanced Mode Only.



Dispense Valve - Disabled/Enabled/Pulsed

Press (*****,**5**,**2**) to alter the operation of the dispense valve.

DISPENSE VALVE
DISABLED

DISPENSE VALVE
ENABLED

DISPENSE VALVE
PULSED

Options are “Disabled”, “Enabled”, and “Pulsed”. Normal operation is “Enabled”. When “Disabled” selected, the dispense valve will not operate in the normal automatic way. The front canister will not empty. This is useful in a Lab environment, where the operator intends to remove the full canister from the dryer once the material is dried. When “Pulsed” is selected, dispense valve will pulse on and off when dispensing. Use the ***** key to toggle through each dispense mode. When finished, press **Exit** to save changes, then press **Exit** again to exit out of Manual or Program Mode.



Fill Valve - Disabled/Enabled

Press (*****,**5**,**3**) to alter the operation of the fill valve.

FILL VALVE
DISABLED

FILL VALVE
ENABLED

Options are “Disabled” and “Enabled”. Normal operation is “Enabled”. When “Disabled” selected, the fill valve will not operate in automatic mode and the canister in the Fill and Heat Station will not fill. This is useful in a Lab environment. Use the ***** key to toggle through each dispense mode. When finished, press **Exit** to save changes, then press **Exit** again to exit out of Manual or Program Mode.



Printer - Enabled/Disabled

Press (*****,**5**,**4**) to ENABLE printout of data during each cycle operation.

PRINTER DISABLED

PRINTER ENABLED
TIME INTERVAL: 010s

When “Enabled”, and with a USB Drive connected, a line of information prints repeatedly based on the “Time Interval” you select. A line of data prints at the end of the cycle as well as every time the vacuum turns on or off.

This data includes: date, time, elapsed cycle time, temperature, heater percentage on, vacuum. This is excellent information to track dryer performance. More detailed explanation of this information is in the **PRINTER OUTPUT** section of this manual on page 70.

Use the ***** key to toggle between **ENABLED** and **DISABLED**. When **ENABLED**, use the keypad to enter the desired **TIME INTERVAL**, in seconds.

When finished, press **Exit** to save changes, then press **Exit** again to exit out of Manual or Program Mode.



Notes about printing to a USB drive

NOTE

When saving printout information to a USB drive, the USB drive must contain a folder named **maguire** and within the folder, a file labeled **PRINTER.TXT** must be present. It is this file, **PRINTER.TXT** that printout functions appended to. Also note that every time a print occurs to the file on the USB drive, the data is appended to the end of the file **PRINTER.TXT** and does not overwrite existing data within the file.



Display LPD I.D. Number Advanced Mode Only

Press (*****,**6**,**6**) to enter an identification number for this particular Dryer.

LPD COMMUNICATIONS
ID. NUMBER: 000

This I.D. number appears on all printed reports. If you have more than one unit, this helps to identify reports. Valid numbers are 001 to 254 and need not be consecutive.

In future releases of the Maguire LPD Dryer, software will be available for data acquisition using a computer to automatically gather information. When software is available, each LPD controller must have a unique address. NOTE: Software is not available at this time.

When finished, press **Exit**, and then press **Exit** again to get out of Advanced Mode. Accessible in Advanced Mode Only.



Print the Alarm Log

Press (*****,**7**,**6**) to print a copy of the last 25 alarms. A USB Drive must be connected to the USB port. The printout will display a list of the last 25 alarms including the date and time of each alarm. When saving printout information to a USB drive, the USB drive must contain a folder named **maguire** and within the folder, a file labeled **PRINTER.TXT** must be present.

PRINTING



Print Parameters

Press (*****,**7**,**7**) to print a copy of all internal parameters. A USB printer or USB Drive must be connected and ready. The printout will display the Dryer software version, the controller I.D. number, a list of all parameters and their current values. When saving printout information to a USB drive, the USB drive must contain a folder named **maguire** and within the folder, a file labeled **PRINTER.TXT** must be present.

PRINTING



Change Program Mode Password

Press (*****,**7**,**8**, followed by a 5 digit number) to change the PASSWORD number for entering the PROGRAM mode. The default password is "22222". To restrict use of this mode, you may create your own number and enter it here. If you forget your password number, call us for help.

PASSWORD – 5 DIGITS
PROGRAM MODE: 22222

When finished, press **Exit** to save changes, then press **Exit** again to exit out of Programming Mode. Accessible in Program and Advanced Mode. If you forgot the Program Mode password, it can be reset from Advanced Mode.



Change Advanced Mode Password Advanced Mode Only

Press (*****,**7**,**9**, followed by a 5 digit number) to change the PASSWORD number for entering the ADVANCED mode. The default password is "33333". To restrict use of this mode, you may create your own number and enter it here. If you forget your password number, call us for help.

PASSWORD – 5 DIGITS
PROGRAM MODE: 33333

When finished, press **Exit** to save changes, then press **Exit** again to exit out of Advanced Mode. Accessible in Advanced Mode Only. If you forgot the Advanced Mode password, please call Maguire Products.



Select Language Format

Press (*****,**8**,**8**) to select the language format.

SELECT LANGUAGE
ENGLISH

Use the ***** key to toggle between languages ENGLISH, FRANCAIS, ITALIANO, DEUTCH, CZECH. Note: ENGLISH5,6,7 are placeholders for future additions to the language choices.

When finished, press **Exit** to save changes, then press **Exit** again to exit out of Advanced Mode.



Temperature Format - Fahrenheit/Celsius

Press (*****,**8**,**9**) to select the Temperature format unit, "Fahrenheit" or "Celsius".

TEMPERATURE FORMAT
FAHRENHEIT

TEMPERATURE FORMAT
CELSIUS

Use the ***** key to toggle between "Fahrenheit" and "Celsius".

When finished, press **Exit** to save changes, then press **Exit** again to exit out of Manual or Program Mode.



Update Controller Software From USB Drive

Press (*****,**9**,**3**) to initiate a software update from the USB Drive. Pressing *****,**9**,**3** will cause the controller to search the USB drive for a folder named **maguire** and 3 files within the folder **maguire** named: **UPDATER3.BIN**, **912DGxxxxx.crc**, and **912DGxxxxx.s28**. If more than one .s28 file exists in the maguire folder, the controller will prompt you to select the version. Press the ***** key to toggle between versions. Press the **CE** key to select the version you want to upload. The controller will then verify the file. If verification is successful the controller will upload the new software. **DO NOT** turn off the controller during this process. Wait until you see **Update Complete!** Then turn off the controller and turn it back on again.



Access Flash Card Utility Advanced Mode Only

Press (*****,**9**,**6**); to access to the flash card utility.

Flash-card: <none>

This utility is used for updating the Dryer software.

When finished, press **Exit**, and then press **Exit** again to exit out of Advanced Mode. Accessible in Advanced Mode Only.



Operating Mode Normal/Service

Press (*****,**9**,**7**); display will say (NORMAL). Press the ***** key to toggle between Normal and Service Operating Modes.

OPERATING MODE
NORMAL

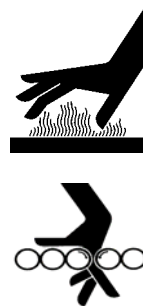
OPERATING MODE
SERVICE

Selecting SERVICE will allow all devices to continue operating with the door open. The door safety interlock is bypassed. This feature allows service personal to temporarily observe operation for trouble shooting and diagnostic purposes without removing panels or in some other way defeating the safety interlock.



WARNING! Using *****,**9**,**7** disables the door safety interlock and exposes service personnel to potential safety hazards.

Use extreme caution when using *****,**9**,**7** and be aware of hot surfaces, pinch hazards and moving objects.



Service Mode in European Dryer Models does not allow activation of canister indexing.

Use the ***** key to toggle between Normal and Service Operating Modes.



You must turn off Service Mode (return to OPERATING MODE: NORMAL), to return to Auto Mode.

When finished, press **Exit**, and then press **Exit** again to exit out of Advanced Mode. Accessible in Advanced Mode Only.

3.6.4 – Parameters



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

Changes to the parameter table will be indicated in the detailed description of the parameter explaining the change and when it occurred.

All Low Pressure Dryer controllers operate according to certain internal Parameters. Because customer requirements vary, we have made the following parameters accessible for change through the keypad in Program Mode. Advanced Mode parameters are separated to restrict access because these parameters are either set to defaults that should never be altered or are default settings that are optimal for proper dryer operation. **You should never need to access the Advanced Parameters unless instructed to do so by a Maguire LPD Technician.**

To access the optional parameters, enter into Program Mode:
Press * and enter the Program Mode password (default is 22222).

To enter into Advanced Mode:
Press * and enter the Advanced Mode password (default is 33333).

Press the PARA key repeatedly to view the parameters.
Parameters values are always five digits, using leading zeros as required.

TIMES	Are expressed as full seconds or full minutes.
PERCENTS	are expressed in full percents.
TEMPERATURES	are expressed in full degrees (Fahrenheit or Celsius).

COMPLETE PARAMETER LIST - BRIEF EXPLANATIONS

The following parameters are both Program Mode and Advanced Mode parameters.

PARAMETER	SHORT DESCRIPTION	MODE	
		Program	Advanced
DRY	Drying Cycle Time - minutes	✓	✓
TTP	Target Temperature - degrees (Fahrenheit or Celsius) See *89	✓	✓
CFT	Canister Fill Time, in Advance on Empty mode only.		✓
SHP	Start heat - Percentage Heat On time - %		✓
NHA	No Heat Alarm - seconds		✓
STC	Start Temperature Control - F degrees delta		✓
HTO	Heat Adjustment Time - seconds		✓
TDF	Temperature Rise Too Fast - F degrees		✓
HAL	Heat Adjustment Limit - percent		✓
HCT	Heat Cycle Multiplier		✓
BTM	Blower: off on high temp, on before Heat - seconds		✓
ECD	Delay New Cycle - seconds		✓
NVT	No Vacuum Threshold - Inches of Mercury		✓
LRT	Lock Release Time - seconds		✓
PST	Position Settle Time - seconds		✓
LDD	Lock Detect Delay - seconds		✓
HOT	Heater OFF Temperature		✓
ATS	Anticipated Temp - Sooner		✓
ATL	Anticipated Temp - Later		✓
NCT	No change Temperature		✓
RCC	Rate of Correction Constant		✓
MAX	Maximum Temperature - degrees	✓	✓
CFA	(Not used on the LPD-1000)	✓	✓
VPD	Vacuum Pressure Differential		✓
VAL	Vacuum Alarm		✓
PRG	Purge Interval/Time - frequency and time	✓	✓
HDY	(Not used on the LPD-1000)		✓
DOP	Door Open Pause, minutes before cycle is aborted.		✓
EDC	(Not used on the LPD-1000)		✓
DBS	Delay Blower Start - seconds	✓	✓
PHD	Pre Heat delay - seconds.		✓
HFT	Heat Failure Time - Seconds / Temperature		✓
DPO	Dispense Pulsing Value (Dispense Pulse Option)	✓	✓
FPO	Fill Pulse Option	✓	✓
ATO	Temperature Offset		✓
LTP	Low Temperature Percent		✓
BOV	Blower Off Vacuum		✓

COMPLETE PARAMETER LIST – DEFAULT VALUES PER MODEL

Shown are default parameter values at the time of publication.

PARAMETER	LPD 1000	LPD 200	LPD 100	LPD 30
DRY	0	0	0	0
TTP	0	0	0	0
CFT	10300	60	90	60
SHP	100	100	100	100
NHA	10080	10060	10060	10060
STC	100	100	100	100
HTO	5	5	5	5
TDF	5	5	5	5
HAL	505	510	510	510
HCT	1	1	1	1
BTM	4	4	4	4
ECD	10	10	10	10
NVT	1	1	1	1
LRT	1008	1003	1003	1003
PST	10	3	3	3
LDD	5	3	3	3
HOT	6	3	3	3
ATS	12	12	12	12
ATL	40	40	40	40
NCT	10	5	5	5
RCC	8	8	8	8
MAX	350	350	350	350
CFA	1003	1003	1003	1003
VPD	2627	2627	2627	2627
VAL	25180	25090	25120	25090
PRG	0	0	0	0
HDY	5005	5005	5005	5005
DOP	5	5	5	5
EDC	2	2	2	2
DBS	0	2	2	2
PHD	30	30	30	30
HFT	6010	6005	6005	6005
DPO	1110	3106	3106	3106
FPO	3100	3100	3100	3100
ATO	10	0	8	0
LTP	0	0	0	0
BOV	5	0	0	0

PARAMETERS - FULL EXPLANATIONS – also see “Changing / Saving Parameters” on page 51.

The following parameters are listed in the order in which they are found in the Dryer's parameter list. Some parameters are accessible in Program Mode and may be changed if necessary. Others are accessible in Advanced Mode and are noted. See the list on the previous page for each parameter's mode. **Note: You should never need to access the Advanced Parameters unless instructed to do so by a Maguire LPD Technician.** These parameters are restricted access because they are either set to a default setting that should never be altered or are default settings that are optimal for proper dryer operation.

DRY – Drying Cycle Time - minutes

The minimum time required for the complete drying of one batch. This assures adequate heat time to heat the material and also adequate vacuum time to dry the material. The cycle time thumbwheel switch is normally used to set this value. If this parameter is set to a value, then this value overrides the thumbwheel switch. Otherwise leave this parameter set to zero so the thumbwheel switches control. You must enter 5 digits. Use leading zeros. Example: 00030 is 30 minutes. Default setting is 00000.

TTP - Target Temperature - degrees (Fahrenheit or Celsius)

This is at least 20 degrees below the softening point of the plastic to prevent clumping of pellets, but must be over 150/160 to assure boil off of moisture under vacuum. The temperature thumbwheel switch is normally used to set the target temperature. If this parameter is set to a value, then this value overrides the thumbwheel switch. Otherwise leave this parameter set to zero so the thumbwheel switches control. You must enter 5 digits. Use leading zeros. Example: 00250 is 250 degrees Fahrenheit. Default is 00000. Also see *89, for setting the temperature format.

CFT - Canister Fill Time – seconds**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

When *44 is set to “Advance on Empty” the CFT parameter value is used for the Fill Time. Setting the fill time in *44 (Advance on Empty) sets the last 4 digits in the CFT parameter. Note: Setting the fill time in the CFT parameter will set the fill time in *44. The first digit (1xxxx) enables/disables the Fill Sensor. The last 4 digits (x0300) is the fill time in seconds. (default: 300 seconds)

Also see *74 **Fill Alarm (enable/disable)**. If *74 has been enabled, the Fill Alarm will sound if the fill sensor hasn't been covered in the time set in the CFT parameter.

SHP - Start heat – Heat On time – percent**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

The heater temperature is controlled by turning power on and off every second. The percentage of ON time each second determines the power to the heater. This parameter sets the initial starting Percentage of Heat-On time, placing a starting limit on heater capacity in case the heater is entirely too strong for the job. For the equipment we have provided, leave this parameter set to 100.

NHA - No Heat Alarm – seconds**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

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. This is a one-time check. After satisfying this condition, we assume heating is OK.

After the Dryer reaches set temperature, and is stable, we use this parameter to detect heat loss. If the temperature drops 10 degrees or more below target, and stays there for longer then the time specified in this parameter, the “NO HEAT” alarm will sound.

STC - Start Temperature Control – F degrees delta**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

This parameter specifies the degrees below Target temperature where heater control begins. The heater stays at full startup power (100 percent on) until this temperature is reached. Once this point is reached, temperature control begins.

HTO - Heat Adjustment Time – seconds**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

This parameter determines the maximum time between heat control adjustments. It should be set high enough to allow time for a change to be seen by the heat sensor. It should not be less then the time for some feedback to occur. Too short a time results in excessive control adjustments and overshooting. Too long a time may result in overshooting under some conditions because necessary adjustments do not occur rapidly enough.

TDF - Temperature Rise Too Fast – F degrees**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

Temperature rise of this amount in less time then the HTO parameter (above) will force an immediate checking of the heat power setting. This allows for more frequent downward adjustment, if necessary, during rapid temperature ramp up. It controls during rapid temp rise only.

HAL - Heat Adjustment Limit**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

HAL parameter has 2 fields. First field, digits 2 and 3, set the heat adjustment limit in the upward direction. Second field, digits 4 and 5, set the heat adjustment limit in the downward direction. Additionally, the limits are now absolute values instead of a percentage from the current heat percentage. There is also a new default value, which is 00510.

The overheat protection code is also affected by this change. Whenever temperature exceeds (target+HOT) degrees, heaters are shut off and heat percentage decreased by HAL%. Now it will simply reduce heat percentage by the maximum downward adjustment.

Old Definition of HAL:**(Heat Adjustment Limit - percentage point change)**

The Maximum Heat adjustments that can occur in one adjustment cycle. This limits the maximum percentage heat adjustment per adjustment cycle to prevent excessive adjusting before correct feedback can occur. What we are adjusting is the percentage of time the heater is turned on each second. 005xx is the limit to an UPWARD adjustment. Xxx10 is the limit to a downward adjustment. For example, if the "percentage on" is currently 60, then this parameter would limit the next adjustment to no more than 5 points up, or 10 points down, to either 65 or 50.

HCT - Heat Cycle Multiplier**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

Standard heater on/off cycle is 1 second. If you wish to have longer cycles, set this multiplier to some greater value. We currently see no advantage to longer cycle times.

**BTM – Blower OFF time if heat is off, and temp is exceeded.
Blower On Time before Heat-On – seconds****DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY**

The first 3 digits (000xx) indicate, in seconds, how long the blower will be turned off if the heater duty cycle has dropped to zero, and the temperature is still climbing. This occurs when the requested temperature is low, usually below 180F (82C) on a 100 series dryer, and the blower by itself generates enough heat to exceed the set temperature. Default is 0 seconds (off).

The last 2 digits (xxx04) indicate the delay, in seconds, after the blower is started, before the Heater is turned on. This assures that the blower is up to speed and air is flowing over the heater, before powering up the heater.

ECD - End of Cycle Delay - seconds

This is the delay, in seconds that the "Dispense Station" level sensor must be uncovered before the next cycle is initiated. This prevents a momentary uncovering of the sensor, during conveying for example, from ending a cycle and advancing the canisters prematurely. You must enter 5 digits. Use leading zeros. Example: 00005 is 5 seconds. Default is 00005.

NVT - No Vacuum Threshold - Inches (or mm) of Mercury**DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY**

Readings below this setting are considered Atmospheric Pressure. Indexing of canisters is delayed until this value (or lower) is reached. This assures the vacuum disks are released before an attempt is made to advance the canisters. If unit is set for Metric, this number will be set to 00025 millimeters.

LRT - Lock Release Time - seconds**DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY**

The first 2 digits (01xxx) indicate, in seconds, an added delay time after a canister bleed when pressure reaches the NVT setting and the lock is released. Default is set to 1 second (01xxx).

The last 3 digits (xx003) indicate the delay, in seconds, after the lock is released, before indexing occurs. This assures the lock is fully released before indexing.

PST - Position Settle Time - seconds**DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY**

This is the time, in seconds, that is allowed for indexing to the next position. After this time the software checks to be sure that the canisters did advance, and then operates the lock solenoid.

LDD - Lock Detect Delay - seconds**DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY**

After the lock solenoid is activated, this is the time, in seconds, that lock detect must be present continuously before the cycle begins. This assures the cam is fully seated into the detent, which assures that canister movement has stopped. At the end of this time the cycle starts. If this time out does not occur within 5 seconds of operation of the lock, an ALARM will sound.

HOT - Heater OFF Temperature**DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY**

Degrees above Target (TTP), which forces the Heater OFF. This limits unintentional overshoot. It is a safety, not part of normal heat control logic. If it does occur a downward temperature adjustment to heater percent on time occurs before the heater is turned back on.

ATS and ATL - Anticipated Temperatures – Sooner and Later**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

The next two parameters, ATS and ATL, work together to anticipate two future temperatures, allowing control logic to keep the rate of rise correct, allowing rapid temperature rise while preventing overshoot. By looking at two consecutive temperature readings, a rate of change is calculated and from this, two forward anticipated temperatures are calculated; one sooner and one later. Temperature adjustments ONLY occur when both forward temperatures are over or both are under the target.

When both are OVER, adjustment is DOWNWARD. When both are UNDER, adjustment is UPWARD.

ATS - Anticipated Temp – Sooner – seconds**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

This parameter specifies the “sooner” time forward, in seconds, to anticipate temperature. It controls when temperature is climbing or falling too RAPIDLY. Higher numbers cause more cautious corrections.

Lower Numbers allow logic to ramp up to temperature more quickly. If temperature overshoots on initial ramp up, this number is too low.

ATL - Anticipated Temp – Later – seconds**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

This parameter specifies the “later” time forward, in seconds, to anticipate temperature. This parameter controls when temperature is climbing or falling to SLOWLY. Higher numbers cause more cautious corrections, useful to prevent hunting once target has been reached, or nearly reached.

NCT - No change Temperature – 0.1 degrees**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

This prevents adjustments from occurring if BOTH the ATS and ATL temperatures are within this limit, in 1/10 degree, of TARGET. Using the default setting (NCT 00005), if both future temperatures calculated using ATS and ATL are within ½ (0.5) degrees of Target, no adjustment occurs.

RCC - Rate of Correction Constant**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

Interacts with the adjustment amount math routine to fix the extent of correction that an error causes. Lower numbers cause larger corrections, but may produce hunting. Higher numbers produce smaller corrections, and are safer, but slow correction response time. The number is used in a software algorithm to calculate corrections. Call us if you want to know exactly how it works. We have to leave our competitors something to figure out on their own. If hunting above and below target occurs continuously, raise this number.

MAX - Maximum Temperature - F degrees

This number is the maximum temperature limit that the Dryer will run up to. Any temperature setting on the Temperature thumbwheel, above this number will be limited to this maximum temperature. If the thumbwheel is set to a temperature above this MAX setting, the “TARGET TEMP TOO HIGH” alarm activates. On power up, the software determines which heat sensor is present and adjusts this parameter automatically, to either 250f or 300f (120c or 150c).

CFA - Convey Failure Alarm - sec / tries - ignore sensor flag

Not used on the LPD-1000

VPD - Vacuum Pressure Differential – inches of mercury**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

This parameter sets the vacuum readings that turn the vacuum circuit ON and OFF.

This serves to reduce compressed air consumption.

Using the default settings, the vacuum generator stays on until a vacuum of 27 inches is reached. Then it turns off and remains off until vacuum falls below 26 inches. Entering unreachable numbers, like 03540, keeps the vacuum on all the time. If unit is set for Metric, this number is still set in INCHES of mercury.

VAL - Vacuum Alarm – inches / seconds**DO NOT CHANGE THIS PARAMETER – ADVANCED MODE ONLY**

This parameter sets the point at which the system ALARMS if a proper vacuum is not established. If a VACUUM of 25 inches is not reached within 90 seconds after the start of a cycle, the Alarm sounds.

Additionally, if, after reaching 25, the vacuum drops to 2 inches below 25 (23), the alarm sounds. Vacuum is necessary for drying. If this alarm sounds, a vacuum problem exists and must be corrected.

Read “NOTE” above.

PRG - Vacuum Purge frequency and time

This parameter instructs the software to operate the purge valve for a period of time in seconds (e.g. xx015 is 15 seconds), once every xx minutes (10xxx is 10 minutes). The purge valve will also operate one additional time at the end of the cycle to bleed off vacuum.

HDY - Heat during and delay after convey – percent / seconds

Not used on the LPD-1000

DOP - Door Open Pause before cycle is aborted - minutes**DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY**

If the door is opened during operation the system shuts off. Closing the door will restart the cycle at the same timing point when shut down. This parameter sets a time limit, after which the cycle timer will be reset to zero. A new full cycle time will take place upon restart. Default is 5 minutes.

EDC - Empty Delay Close, use with Convey with Purge *39 - seconds

Not used on the LPD-1000

DBS - Delay Blower Start, allows fill time for canister - seconds

This parameter delays the blower start if you want the canister to fill first. With a partially filled canister, the blower may blow the material up into the air and plug the screen at the top, or cause the filter to clog with small particles prematurely. Delaying blower start up prevents this. But this does add to the cycle time. Leave it set to 00000 unless you have this particular problem.

PHD - Pre Heat delay - seconds

DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY

This parameter delays all heat adjustments at the start of each cycle, for the time specified. When cold material is shifted into position after indexing, the initial heat readings swing widely. This delays temperature adjustment until some stability is reached.

HFT - Heat Failure Time - Seconds / Temperature

DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY

This parameter tells the software what is the very least to expect when the heat percentage on time is increased. The default value says that after 30 seconds, the temperature should not be below current setting by more than 5 degrees. After a call for more heat, if the temperature drops more than is possible with all systems working correctly, this parameter will cause a shut down of the dryer.

DPO - Dispense Pulse Option

This parameter allows pulsing of the dispense/empty valve. The pulse options are set by a parameter DPO. The parameter encodes three options:

The first two digits (01xxx) sets dispense valve "on time" to 1 second.

The middle digit (xx1xx) sets dispense valve "off time" to 1 second.

The last two digits (xxx10) sets the number of pulse attempts/retries.

The default value for DPO is 01110, which gives an on time of 1 second, an off time of 1 sec, and up to 10 retries.

With the Dispense Valve set to "Pulsed" (*52), the Dryer will begin opening/closing the dispense/empty valve when the resin-bin sensor uncovers. It will continue pulsing the valve until the bin sensor covers or the retry counter reaches zero. When running timed cycles a zero retry counter causes a cycle alarm; advance on empty, however, will signal the end of the cycle.

Note that the pulse retries will override the ECD parameter setting (which sets how long to wait for the sensor to cover again). When the sensor covers the software will force the dispense valve to a fixed positions depending on mode: in convey & purge mode the valve is kept closed (after a delay), in all other cases the valve is kept open.

FPO – Fill Valve Pulsing (Fill Pulse Option)

With the first digit set to 1 (1xxxx), the fill valve will pulse, opening/closing the fill valve at the beginning of a cycle.

The 2nd digit (x3xxx) sets the pulse “on time” in seconds. (default: 3 seconds)

The 3rd digit (xx1xx) sets fill valve “off time” to in seconds. (default: 1 seconds)

The last two digits (xxx00) sets the number of pulse or if set to 00 (xxx00), it will continue pulsing until the VTA sensor is covered.

ATO - Temperature Offset**DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY**

Allows setting an offset to the set-point temperature (always positive) so that the Dryer targets a higher temperature than dialed. This offset is so the air is at the set-point temperature by the time it reaches the plastic pellets. The displayed temperature is the current temperature minus the offset. The ATO parameter has a default value of 0 degrees.

LTP - Low Temperature Percent
*(for future use)***DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY**

The low percentage is set by a new advanced parameter (LTP) and defaults to 0%. Changing LTP will adjust the slope of the interpolated line. When temperature is close to target temperature the interpolation does not apply, relying instead on the previous cycle's heat percentage. Setting LTP to 0 disables the interpolation calculation and reverts to old behavior based on the SHP parameter (eventually the SHP parameter will be removed).

BOV - Blower Off Vacuum – inHg or mmHg**DO NOT CHANGE THIS PARAMETER - ADVANCED MODE ONLY**

Setting Blower Off Vacuum parameter to a non-zero value will slightly alter the end-of-cycle shutdown sequence. Instead of turning the heater/blower off instantly when the cycle time ends, it will continue running the heater/blower while the vacuum bleeds to the pressure set in the BOV parameter. BOV defaults to 0 for all models except the 1000 lb models where it defaults to 4 inHg (102 mmHg).

3.6.5 - Changing / Saving Parameters

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.

To access the internal parameters you must enter into Program Mode.

The Program Mode default password is: 22222

To change a PARAMETER, the sequence of keystrokes is as follows:

Press:	*	Display will say:	ENTER FIVE DIGIT PASSWORD _ _ _ _ _
Press:	22222	Display will say:	TEMP=63°F v=0in MODE=PROGRAM CAN=2
Press:	PARA	Display will say:	DRYING CYCLE TIME MINUTES: DRY 00000
Press:	PARA	to walk FORWARD through parameter list.	
Press:	*	to BACK UP in the parameter list.	
When the PARAMETER you want is displayed, enter a new setting using the number keys. You must enter 5 digits. Use leading zeros.			
Press:	EXIT	Display will say:	TEMP=63°F v=0in MODE=PROGRAM CAN=2
Press	EXIT again to return to Auto Mode.		

Additional information can be found in the KEYPAD section on page 26.

SAVING PARAMETERS into “User Backup Settings”

If the changes you have made are PERMANENT, SAVE them in the “**User Backup Settings**” using the ***23** function. Sometimes during normal operation, electrical noise or RF (Radio Frequency) noise will corrupt the processor memory. It may be necessary to do a CLEAR to fix this problem.

A “CLEAR” will clear all data from the “**User Settings**” (the current settings in use) and replace it with information stored in the “**User Backup Settings**”. So it is a good idea to have an exact copy of your User Settings stored in the backup for just such an emergency.

To copy ALL PARAMETERS into the “**User Backup Settings**”, the sequence of keystrokes is as follows:

Press: *	Display will say:	ENTER FIVE DIGIT PASSWORD _ _ _ _ _
Press: 22222	Display will say:	TEMP=63°F v=0in MODE=PROGRAM CAN=2
Press: *23	Display will briefly say:	SAVE USER SETTINGS
	Then display will revert back to:	TEMP=63°F v=0in MODE=PROGRAM CAN=2
The current User Settings have been saved into User Backup Settings		
Press EXIT again to return to Auto Mode.		

With this done, all correct Parameters may be restored from **User Backup Settings** to **User Settings** at any time by doing a CLEAR. To do a CLEAR, hold the “CE” key down when turning POWER ON.

4 – Maintenance and Service

4.1 - Clean / Replace Air Filter

The air filter must be periodically cleaned or replaced.



Do not access filter while Dryer is running.

A clogged filter will result in a lower than usual heater on-time duty cycle and a delay in reaching temperature.

The partially blocked, slower moving air cannot remove heat from the heating element as effectively, and therefore the heater on time percentage is lower. A delay in temperature rise will eventually result in an alarm. Your particular processing conditions will determine how frequently this filter should be checked or cleaned.



Filter location for Models 1000 is in the filter box located at the rear of the Dryer. To access the air filter, unlatch the filter door. The filter is secured in place by a hand wheel located under the filter within the filter box. See picture to the right.

Clean or replace filter as necessary.



To clean filter, knock any larger debris off the filter, then blow compressed air through the filter from the inside blowing out through the filter paper. With the filter removed, clean out the box with a vacuum.

The frequency of cleaning depends on the type of material being processed and the number of hours that the Dryer is run per shift.

Filter location for Models 1000 is in the filter box located at the rear of the Dryer.



Do not run the dryer without the proper filter installed. Damage to the blower may result.

4.2 - Cleaning the Vacuum Takeoff Assembly (VTA)

The Vacuum Takeoff Assembly (otherwise known as the VTA) is located under the front canister. It is hinged and is accessible by swinging it out. The material convey line must be removed to access the VTA.



4.3 - Canister Cleaning



Canisters and surrounding parts may be hot. Use of gloves is recommended.



Canisters and surrounding parts may be sharp or present a pinching hazard. Use of gloves is recommended. Be aware of pinch hazards.



Canister Cleaning:



Do not damage the edge of the canister. The upper and lower edge of the canister must not be damaged to ensure a proper seal while drying material. Take care not to damage the edge of the canisters.

The canister in the front position is accessible through the front door and the top hatch. To access the front canister for cleaning, open the Dryer's front door and swing out the upper disk assembly. Open the top hatch to access the canister from the top.



4.4 Fill Hopper and Fill Valve Cleaning

Material may be manually removed from the Fill Hopper using the manual dispense port located at the rear of the Fill Hopper.



The Fill Hopper has an access door located on the right side of the hopper for cleanout.

To manually dispense the material in the Fill Hopper, enter Manually mode, then press "Seal" and then "Fill".



Do Not open the hopper access door if material is above the window.



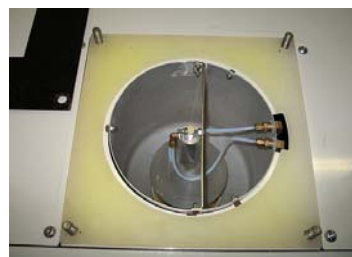
Fill Valve Cleaning

When changing material, if is necessary to clean the fill hopper be sure to also clean the Fill Valve.

To access the Fill Valve, the Fill Hopper must first be removed (see instructions in the installation section for Fill Hopper).

After Fill Hopper has been removed, remove the Fill Valve and disconnect the Fill Valve pneumatic lines. Clean as necessary.

When reassembling the Fill Valve, reconnect the Fill Valve's pneumatic lines and re-insert fill valve into the dryer.



4.5 - Clean / Inspect the silicone disk seals

To ensure a proper canister seal, wipe all 3 silicone seals located at the base and top of each canister with a damp cloth and a mild, non-combustible, common household cleaner. Inspect the 5 seals for damage. Replace if necessary.

To access the rear seals, the rear panel must be removed. The front lower VTA seal is accessible by swinging out the VTA assembly.



4.6 - Drain and purge Air Filter / Regulator

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



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

4.7 - Adjustments

Air Pressure = Vacuum



Air pressure affects the ability to draw a high vacuum. We recommend a pressure setting of **80 PSI while the vacuum generator is running**. 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.



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

Indexing Speed

Smoothness of the indexing depends on the proper adjustment of the exhaust flow control valves, located on the air supply to each of the three "position" cylinders. When adjusted correctly, the canister will rotate fully to the next position, but without overshoot. Each adjuster controls canister movement only when the cylinder to which it is mounted is de-energized. In other words, it controls cylinder exhaust air. All three must be adjusted to assure correct operation into each position.

These are factory set 2 full turns counterclockwise (from fully closed).

Closing Rate of All Top and Bottom Disks

The air cylinders that operate the disks above and below the vacuum station, below the heat station, and above and below the Dispense station, are all operated by ONE solenoid. There is a flow control device in the air line to slow down the closing and prevent slamming of these disks. This device is located inside the cabinet, behind the controller, accessible when the cabinet door is opened.

These are factory set 2 full turns counterclockwise (from fully closed).

Lock Cylinder Engagement Rate

The cylinder that engages the cam to lock the canisters in position, has a flow control on it to allow for smooth engagement.

It is factory set $\frac{3}{4}$ of a turn counterclockwise (from fully closed).

Correct Canister Indexing / Location

The LOCK cylinder presses a roller into a cam to locate and lock the canisters in the exact correct position. If, after locking, the canister positions are NOT correct, there is an adjustment. The roller is bolted to an arm. This arm pivots from a point near the front edge of the top disk. This pivot point is in a slotted hole. With the locking roller engaged against the cam, loosen the pivot bolt and rotate the entire canister assembly as required to the perfect position. Re-tighten the bolt. Note: Some units use a bracket with four mounting bolts and all must be loosened for adjustment.

Material Conveying Rate

When material is conveyed to the process machine, the rate at which material is picked up by the air stream is important. Too little takes too long to load, too much may block the required flow of air. This rate is adjustable. Open the door. Under the front canister there is a window to view the flow of material. Adjustment devices vary. Adjust the air flow as required.

Ambient Air / Process Air Exchange Valve

200 Series Dryers have an automatic Ambient Air Exchange Valve.

Higher horsepower blowers impart considerable heat to the process air. Temperatures may rise above the set point, even with the heater remaining off. To counter these unwanted high temperatures, it is necessary to allow some, or all, hot process air to escape to atmosphere while cooler ambient air is drawn into the blower.

If temperature exceeds set point, the valve opens to allow temperature to stabilize at a point where the heaters are cycling just enough for control.

4.8 - Check Out Procedure

If you have reason to disassembled and reassemble parts of your dryer, this procedure will confirm that all air line connections are correct.

1. Have NO MATERIAL in the hopper above the unit.
2. Place ALL switches OFF; POWER OFF.
3. Connect air supply.
4. Open door and rotate the carousel by hand so that the canister or canisters rotate through all stations. There should be no interference.

If interference is noted, then visually inspect for mechanical interference.

No POSITION cylinders should be pulling at the carousel.
The LOCK should NOT be engaged.
The FILL valve should be closed (cylinder retracted).

5. Turn the POWER switch on, and go into **PROGRAM mode**.

6. Press the SEAL key. Confirm that all disks engage the canisters:
 - a. one below the heat station.
 - b. one above and one below the vacuum station.
 - c. one above and one below the dispense station.

7. Press the LOCK key.

Confirm the LOCK engages.

8. Press the FILL key.

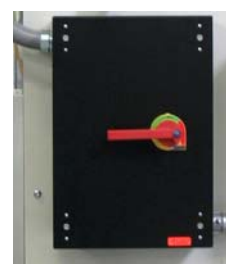
Confirm the valve opens, cylinder extends.

9. Press the CONVEY key.

Confirm the air valves shift.

10. Press each POSITION key.

When the buttons are pressed in numerical order, confirm that each advances the canisters in a Counter Clockwise direction (viewed from above) (POS1, then POS2, then POS3, then POS1, etc). POS1 retracts the rear cylinder. POS2 retracts the left cylinder, POS3 retracts the right cylinder.



4.9 - Control Panel Removal

The control panel is removable for service. If you have a controller problem, a complete new control panel may be installed in minutes.

1. Unplug the low voltage power connection from the box below.
2. Remove two screws to open the door.
3. Inside, unplug ribbon cable from the terminal strip board.
4. Disconnect the vacuum line (green tube) at the quick disconnect.
5. Unscrew large plastic nut from back surface; top center.
6. Tilt controller and lift slightly to remove.

4.10 – Diagnostic / Test Mode

The Low Pressure Dryer Diagnostic / Test Mode allows testing of the various inputs and outputs.



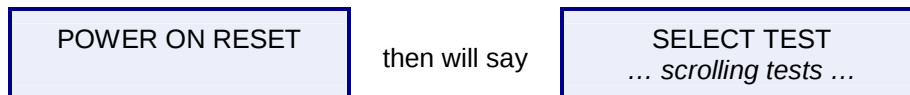
WARNING

Operating diagnostic mode can present a hazard under particular tests where pinch points may be exposed or high heat conditions are present as with the HEATER test. It is highly recommended that Diagnostics / Test Mode should be used only if instructed to do so by a Maguire LPD Technician.



To enter the DIAGNOSTIC / TEST MODE, holding down the 5 key and the blank key to the right of the 6 key, while turning the Dryer's power on.

Release the keys when the display says:



Select the test number from the scrolling list:

1	KEYPAD	Supplies visual feedback for keys pressed. Blank keys display the key's row and column position in the matrix.
2	DISPLAY	Tests all fields in display and displays character set.
3	THUMBWHEEL	Displays the thumbwheel switch settings. TOP (TEMP thumbwheel), MID (CYCLE thumbwheel), BOT (not applicable).
4	HEATER	Test heater – Set the heat percent (%) using the temperature thumbwheel, then press the HEAT button to start the heat process, press HEAT again to stop.
5	VACUUM	Test vacuum – Draws a vacuum.
6	CANISTER	Test canister position.
7	MISC I/O	Test various I/O, interactive
8	PRINTER	Sends the ASCII character set to a USB Drive connected to the Dryer.
9	SEAL	Draws a vacuum to test the seals.

Press EXIT to exit any test. Press EXIT again to exit **Diagnostic / Test Mode**.

4.11 - Control Inputs and Outputs

Inputs:

5 volt digital temperature signal

Located in the hot air inlet port directly under the heat station.

Material supply level sensor (24 volt)

Located on the side of the Vacuum Takeoff Assembly (VTA), to send a signal that there is material in the VTA.

Lock detection switch

Mounted on the locking bar to assure the cam roller has dropped into a detent, assuring full correct position after indexing.

Door Interlock switches

Mounted on the front door and the top hatch, to stop all operation while the doors are open.

Vacuum detection device

Mounted on the circuit board, with a small air line running to it.

This provides an analog signal to the circuit board for a vacuum reading, over the full range of 0 to 30 inches vacuum.

Heater overheat thermal switch

Heater overheat is a manual reset thermal disk (opens at 293° F) mounted on the stainless steel tube that contains the heater elements. This would signal a blower failure or blocked air flow. This will break the control circuit to the solid state heater relays.

Cabinet ambient air overheat switch

Cabinet overheat is a manual reset thermal disk (opens at 185° F) mounted inside the cabinet above the heater outlet end. This would signal an hot air hose failure. This will break the control circuit to the solid-state heater relays.

Receiver level sensor

Tells when the receiver is low, and the air flow valve must shift to convey material to the receiver.

Operator Station inputs:

Cycle Start

Cycle Stop

Mode Select - Auto/Clean

Index

Alarm Silence button

Front Panel Inputs:

Keypad

Temperature thumbwheel switches (3 digits)

Cycle time thumbwheel switches (3 digits)

Outputs:

Air solenoid bank (located left of control panel):

Location	Color	Activated by:	What it does:	Visual
1	White	Position 1	Pulls the canisters into position 1.	
2	Gray	Position 2	Pulls the canisters into position 2.	
3	Black	Position 3	Pulls the canisters into position 3.	
4	Green	Lock	Operates the locking roller on the position cam.	
5	Red	Seal	Closes the 2 vacuum disks, the bottom heater disk, and raises the bottom material take off disk while lowering the top cover disk.	
6	Blue	Fill	Shifts (opens) the valve above the Fill and Heat Station to allow filling of the canister.	
7			Not used	
8	Orange	Empty	Opens the front canister dispense valve.	

Additional outputs:

Air Venturi valve	Turns on the air to the air venturi vacuum generator.
Heater	We use 3 solid-state relays (each rated 25 amps) cycling them on and off every second, to control the heater.
Blower	We use a contactor to control the blower motor.
Check Valve	Opens to let air into the vacuum canister for optional purging of moist air during the cycle, and allowing air in at the end of the cycle.

Operator Station / Controller inputs/outputs:

Green Light	Cycle Start
Amber Light	Cycle Stop
White Light	Index
VFD display	Vacuum Fluorescent Display (VFD), 2 x 20 character lines
Strobe and Beeper	Alarms, visual and audible
DB9 port	Computer communications port
USB port	USB Drive port
4-pin port	Convey sensor port (not used on LPD-1000)

"LOCK" Switch Location

The "lock" sensor switch is located in the front, on the top deck surface. It is mounted under the bar, which holds the cam roller that locks the canisters in place.

4.12 - Decommissioning and Disposal

Overall Construction

On the Series 30 models, there is no frame, all side and top panels make up the box-like structure. On the Series 100 and 200 models, the frame is comprised of a steel angle frame that is welded together.

Materials

The Dryer is made of steel parts, rubber parts, electrical parts, electronic parts, silicone parts, stainless steel parts, brass parts, Teflon tubing, and aluminum.

List below are some examples of the Dryer parts:

- **Steel Parts:**
Frame, side panels, top deck, Vacuum Takeoff Assembly (VTA) u-channel, center shaft, cam, cylinder brackets, canister support brackets, door, top panels, shifting valve box, air filter box.
- **Rubber Parts:**
Wheels, filter, vacuum hoses.
- **Stainless Steel Parts:**
Canisters, vacuum disks, heater disks, Vacuum Takeoff Assembly (VTA) box and chute, canister handle brackets, upper heat disk screen
- **Brass Parts:**
Pneumatic fittings
- **Aluminum Parts:**
Fill hopper spinning, center tubes in canisters, upper heat plenum, lower heat disk casting, vacuum generator, air cylinders
- **Teflon Parts:**
Air line tubing
- **Plastic Parts:**
Vacuum Takeoff Assembly (VTA) window, canister window, level sensor window (in cabinet)
- **Electrical / Electronic Items:**
Relay box assembly, controller assembly, pneumatic solenoid valve stack, heater assembly, door switch assembly, purge valve assembly, wiring
- **Silicone Parts:**
Hoses, upper/lower canister disk seals, filter box lid gasket, fill valve canister cone/hood insert, fill valve o-ring, insulation jacket on canisters

5 – Troubleshooting / Software

5.1 – 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:
*** ERROR *** CANS. DID NOT INDEX	Problem: Canisters failed to advance during indexing. The "lock" switch was not forced open by the movement of the canisters. This error typically means the canisters failed to move at all. Solution: Check Air Pressure, set to 80 psi with vacuum generator engaged. Check for obstructions in cabinet. Possible stuck switch (highly unlikely).
*** ERROR *** CANS. DID NOT LOCK	Problem: Canisters failed to LOCK in place after indexing. The "lock" switch is not closed, indicating the cam disk (and canisters) did not advance fully to a correct position. Solution: Check Air Pressure, set to 80 psi with vacuum generator engaged. Check for obstructions in cabinet. Check for stuck dispense valve.
*** ERROR *** VACUUM FAILURE	Problem: Vacuum failed to reach target (25 inches within 90 seconds), or unable to maintain target vacuum. Controlled by the vacuum sensor in the controller. Solution: Check Air Pressure, set to 80 psi with vacuum generator engaged (air pressure possibly too high or too low). Check for contaminated, dirty or damaged canister seal located at the base of the vacuum station. Check for damaged or distorted edges on the canisters (top and bottom edge). If only one canister fails to hold a vacuum, check the top and bottom edges of that canister. Check that each canister is properly secured in the "Canister Hanger Assembly".
*** ERROR *** NO HEAT	Problem: Sufficient heat rise was not detected within time specified by the NHA parameter. Controlled by the "temperature" sensor. This error also occurs if target temperature is not maintained. Solution: Check for clogged air filter. Check for open (tripped) heater circuit breaker. Possible defective temperature sensor. Possible defective heater. Check that blower rotation is not rotating backwards, indicating incorrect wiring of blower.

TARGET TEMP TOO HIGH	Problem: The Thumbwheel switch setting exceeds the maximum allowable temperature as defined by the MAX parameter. Solution: Re-adjust Temperature Thumbwheel. Verify MAX parameter value.
TARGET TEMP TOO LOW	Problem: The target temperature is set below freezing (32F or 0C). Solution: Re-adjust Temperature Thumbwheel.
*** ERROR *** CYCLE TIME	Problem: The level sensor under the dispense (front) canister is uncovered (canister empty) before the cycle time is complete. Solution: Possible material demand exceeds Cycle Time. Re-adjust to a shorter cycle time or reduce material demand.
*** PROBLEM *** NO HEAT RISE	Problem: There has been a drop in temperature in spite of a request by the software to increase the temperature and sufficient time for the increase to take place. Controlled by the HFT parameter. Solution: Check for clogged air filter. Check for open (tripped) heater circuit breaker. Possible defective temperature sensor. Possible defective heater.
*** ERROR *** FAIL SAFE ALARM	Problem: Potential overheat condition in cabinet causing one or more heat snap disc(s) open. Solution: Possible blower overload condition. Check for clogged air filter. Check for open (tripped) blower circuit breaker. Check integrity of internal heater hoses (heat blowing into cabinet).
*** ERROR *** BAD TEMP. SENSOR	Problem: The temperature sensor located at the base of the Fill and Heat Station is not reporting temperature data. The Display will read 999. Solution: Check Temperature sensor located at the base of the Fill and Heat Station.
*** ERROR *** TEMP ABOVE SET POINT	Problem: The temperature of the material in the canister exceeds the Temperature Thumbwheel setting. Solution: Contact Maguire technical support.

NO TARGET TEMP SET!	Problem: The Target Temperature Thumbwheel is set to 000. Solution: Reset Target Temperature thumbwheel. Note: If Target Temperature (TEMP) thumbwheel and Cycle Time (CYCLE) thumbwheel are both set to 000, then the Dryer will run and cycle without heat.
CYCLE TIME NOT SET!	Problem: The Cycle Time Thumbwheel is set to 000. Solution: Reset Cycle Time thumbwheel. Note: If Target Temperature (TEMP) thumbwheel and Cycle Time (CYCLE) thumbwheel are both set to 000, then the Dryer will run and cycle without heat.
*** PROBLEM *** FATAL ERROR	Problem: Internal software failure. Occurs only if there is a failure reading/writing the internal non-volatile memory. Solution: Power off Dryer and power back on. If problem persists, contact Maguire technical support.

5.2 - Possible Service Issues

5.2.1 – Loss of Vacuum

If ALL canisters fail to hold vacuum:

1. Confirm adequate air pressure, set 80 PSI when vacuum generator is on.
2. Check the rubber seals on the top and bottom disks.
Wipe clean with a mild household cleaner if they are contaminated by dust and powder, etc. Check for deep cuts.
3. Confirm the vacuum disk s are loose and can tilt slightly so they properly self align to the canister surface.
4. Check the air solenoid.
Air should be blowing out the vacuum venturi exhaust port.
5. Check the Vacuum Generator.
If it is slow to reach full vacuum the vacuum generator may be contaminated from oil in the compressed air mixing with dust drawn from the canister. If your air is oily, add an oil separator.

If only ONE canister fails to hold vacuum:

1. Inspect the contact edges of the canisters for damage.
2. Confirm all through-bolt connections are tight.
3. Confirm the canister seam is air tight. Add tape along this seam to check.

5.2.2 – Damaged Vacuum Disks

Over time, the vacuum rubber seals may become grooved or loose resiliency and not seal well. Our experience with these gaskets is limited to about 3 years. If you have problems, they can be easily replaced. The vacuum disks, when installed properly, are free to move slightly for self-alignment.

5.2.3 – Heater Safety Switches Tripped

The heater is controlled by software turning power on and off every second. The percentage of ON time, displayed during operation, gives some indication as to how hot the material has become. As material comes up to temperature, the percentage ON time becomes lower. The displayed temperature is the inlet air as it enters the heating canister. If the system does not show an increasing temperature within a set time after cycle start, an air flow or heater problem is indicated, and the system shuts down.

There are two high temperature SAFETY CUT OFF switches. One is mounted directly to the heater element cartridge. If the blower fails or the air stream is blocked, overheating of the heater element cartridge will trip this safety switch at 300 degrees F (150C). The second is mounted inside the cabinet above the heater outlet. It measures ambient air inside the cabinet and trips at 185F (85C). If a hot air tube fails, inside ambient temperature will rise and this switch will trip. Either switch will break the control power to the heater relays, which will shortly result in a **FAIL SAFE ALARM** condition. (See Alarm Conditions on page 65). Both switches are MANUAL reset only, and you have to remove the rear cover to access them. We do this so you will then be able to inspect all internal parts closely. These switches should never trip. If they do, something else has failed.

5.2.4 – Filter Clogged

A clogged filter will result in a lower than usual heater on-time duty cycle and a delay in reaching temperature. The partially blocked, slower moving air cannot remove heat from the heating element as effectively, and therefore the heater on time percentage is lower. A delay in temperature rise will eventually result in an alarm.

Your particular processing conditions will determine how frequently this filter should be checked or cleaned.

See Clean / Replace Air Filter on page 54.

5.3 – Print Outputs

As an aid to monitoring dryer performance and documenting operation, a printout of dryer operation information may be obtained for each cycle. This is done by activating the *54 printer function and connecting a USB Drive to the USB port.

A typical printout for each cycle looks like this:

```
08/23/2000 ID: 000 TARGET: 160 F CYCLE: 020 m FILL: 011 s
02:17:19 PM 0:00 TEMP: 133.7 F HEAT: 26% VAC: 5 in Hg.
02:17:39 PM 0:00 TEMP: 143.7 F HEAT: 29% VAC: 17 in Hg.
02:17:59 PM 0:00 TEMP: 153.6 F HEAT: 29% VAC: 21 in Hg.
02:18:19 PM 0:00 TEMP: 157.8 F HEAT: 29% VAC: 24 in Hg.
02:18:19 PM 0:00 TEMP: 157.8 F HEAT: 29% VAC: 24 in Hg.
02:18:28 PM 0:08 TEMP: 159.0 F HEAT: 29% VAC: 25 in Hg.
02:19:33 PM 1:05 TEMP: 160.1 F HEAT: 23% VAC: 28 OFF 2:23
02:21:22 PM 2:54 TEMP: 160.1 F HEAT: 23% VAC: 25 ON 6:23
02:23:28 PM 5:00 TEMP: 160.1 F HEAT: 23% VAC: 28 in Hg.
02:28:28 PM 10:00 TEMP: 160.1 F HEAT: 23% VAC: 28 in Hg.
```

The first line is a "header" line for each cycle:

Date	Unit ID number	Thumbwheel settings
08/23/2000	ID: 000	TARGET: 160 F CYCLE: 020 m FILL: 005 s

The header is followed by lines of information that print as often as you specify in the frequency entry. In addition, a line prints every time the vacuum turns on and every time it turns off.

Each line includes:

Time	accumulated cycle time	current temperature	heater duty cycle	current vacuum
02:28:28 PM	10:08	TEMP: 160.1 F	HEAT: 23%	VAC: 28 in Hg.

Note: Current Temperature is the actual air stream temperature including the offset. See the ATO parameter (Air Temperature Offset) for more information.

Vacuum ON/OFF lines also give the time the vacuum was ON or OFF.

Time	accumulated cycle time	current temperature	heater duty cycle	current vacuum ON/OFF
02:19:33 PM	10:08	TEMP: 160.1 F	HEAT: 23%	VAC: 28 OFF 2:23

In this example, vacuum was OFF for 2 minutes, 23 seconds.



Notes about printing to a USB drive

When saving printout information to a USB drive, the USB drive must contain a folder named **maguire** and within the folder, a file labeled **PRINTER.TXT** must be present. It is this file, **PRINTER.TXT** that printout functions appended to. Also note that every time a print occurs to the file on the USB drive, the data is appended to the end of the file PRINTER.TXT and does not overwrite existing data within the file.

5.4 – Material not drying correctly – Feedback Form

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 such as one manufactured by Arizona Instruments.

If you are not obtaining the results you want or if you would like us to test your material to determine the optimal drying cycle time, please provide us with the following information below.

A sample of your material may be required for our own testing. We would need at least 35 pounds.

General material type: (PET, NYLON, etc.):
Manufacturer:
Material designation:
Desiccant dryer recommended drying temperature:
Desiccant dryer recommended drying time:
Target moisture level for processing:
LPD Temperature:
LPD Cycle time:
Vacuum reading reached:
Moisture content before drying:
Moisture content obtained after drying:
Other comments:

5.5 - Dryer Software – Backup, Restore, Factory Reset

Locations of stored Dryer settings and their purpose

There are 3 memory areas where Dryer settings are stored:

1. **User Settings** - The current settings in use. When you make parameter changes and/or enable features, the changes (if any) are recorded into the user-settings when you exit PROGRAM or MANUAL mode. When changes are made to User Settings, the changes are stored in EEPROM memory so that they are not lost when the Dryer is powered off.
2. **User Backup Settings** – The area in memory where User Settings are backed up into when the ***23** function is used. If User Setting were never backed up using ***23** then Factory default settings reside in this memory location. "User Backup Settings" can be restored into "User Settings" using the ***32** function.
3. **Factory Default Settings** - The area in memory that holds the Dryer model's factory default settings. The Factory Default Settings are hard-coded default settings for each model. Factory Default Setting can be restored using the ***12** function or by doing a CLEAR ALL.

For information on using ***12**, ***23** and ***32**, see **Star Functions** on page 29.

"CLEAR" Routine

The "CLEAR" routine will copy "User Backup Settings" into "User Settings". If "User Backup Settings" were not intentionally saved earlier (using ***23**), then the CLEAR routine is essentially restoring Factory Default Settings. The Clear routine is the same as using the ***32** function.

To execute a "CLEAR", hold down the "CE" key while turning POWER ON, then release the "CE" key. When done correctly, the display will say ***** CLEAR *****

"CLEAR ALL" Routine

The "CLEAR ALL" routine sets both current "User Settings" and "User Backup Settings" to the Dryer's model-specific default settings (the hard-coded values contained within the software itself). However, a CLEAR ALL will preserve the most important user-defined settings, which are: manual mode and program mode passwords, language configuration, calibration points, and temperature format.

There are only TWO times when you want to do a CLEAR ALL.

1. When new software has been installed. Information may reside in memory locations that do not match the new program. CLEAR ALL fixes this.
2. When all else fails.
CLEAR ALL will sometimes fix problems that the simple CLEAR routine misses.

To execute a "CLEAR ALL", hold down the left (DISP), middle (not identified, black), and right (EXIT) keys on the top row while turning POWER ON, then release the keys. When done correctly, the display will say ***** CLEAR ALL *****

6 – General Information

6.1 – LPD Model Specification Chart

LPD Series 30, 100, 200 models only. The LPD Series 1000 is not shown in this chart. Please contact Maguire Products for more information. This information may change as development changes occur.



	LPD 30		LPD 100		LPD 200	
Regional Specifications	USA	Europe / Asia	USA	Europe / Asia	USA	Europe / Asia
Standard version max.	265° F	130° C	265° F	130° C	265° F	130° C
High Heat version max.	300° F	150° C	300° F	150° C	300° F	150° C
Throughput	30 lb/h	15 kg/h	100 lb/h	45 kg/h	200 lb/h	90 kg/h
Canister volume	0.32 cu ft	9 l	1.1 cu ft	30 l	2 cu ft	57 l
Empty weight	550 lb	250 kg	730 lb	250 kg	950 lb	430 kg
Packing weight	620 lb	280 kg	800 lb	360 kg	1010 lb	460 kg
Packing dim. (L x W x H)	40"x35"x75"	100x90x190 cm	40"x35"x85"	100x90x220 cm	40"x35"x95"	100x90x240 cm
Heater element	3 kW / 13A	3 kW / 13 A	5 kW / 22A	5 kW / 22 A	5 kW / 22 A	5 kW / 22 A
Blower	0.5 hp / 2.5 A	0.37 kW / 2.5 A	2.5 hp / 6.2 A	1.86 kW / 6.2 A	3.5 hp / 6.2 A	2.6 kW / 6.2 A
Total Power Supply	480V/3Ph/60Hz	400V/3Ph/50Hz	480V/3Ph/60Hz	400V/3Ph/50Hz	480V/3Ph/60Hz	400V/3Ph/50Hz
	3.47 kW / 16 A	3.47 kW / 16 A	6.96 kW / 20 A	6.96 kW / 20 A	7.7 kW / 30 A	7.7 kW / 20 A
Compressed air requirement	80 psi	7 bar	80 psi	7 bar	80 psi	7 bar
Compressed usage	0.4 cfm	0.7 m3/h	2 cfm	3.4 m3/h	2.4 cfm	4 m3/h
Footprint Dimensions - inches	16 x 16	16 x 16	28 x 28	28 x 28	30 x 31	30 x 31

* US voltage: 480, Europe / Asia voltage: 400

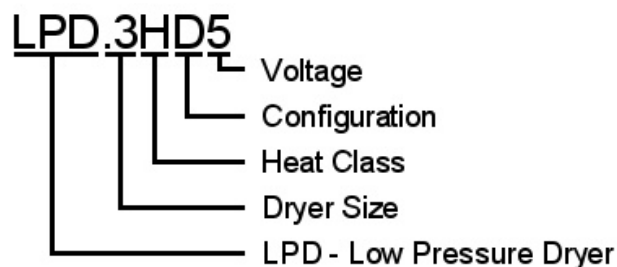
Throughputs listed here are nominal. Actual throughput depends on the material and drying requirements.

6.2 - LPD Nomenclature / Order Code

The Dryer identification plate is located inside the front door of the Dryer and mounted to the top, left side of the Dryer frame. This plate has specific information about your Dryer including: Product Classification / Dryer Size / Heat Option / Configuration / Voltage. The following information will help you decipher what is found on the identification plate.

YEAR: The year Dryer was manufactured.

MODEL: See below for descriptions of each field in the model number.



LPD	Low Pressure Dryer	
Dryer Size (Series)	.3	Series LPD-30
	1	Series LPD-100
	2	Series LPD-200
	10	Series LPD-1000
Heat Class	S	Standard
	H	High Heat
Configuration	D	Domestic
	E	European
	C	Canadian
	A	Asia
Voltage	2	230 volt, 3 Phase, 60 Hz
	4	400 volt, 3 Phase, 50 Hz
	5	575 volt, 3 Phase, 60 Hz
	8	480 volt, 3 Phase, 60 Hz

Example: LPD.3HD5 LPD-30, High Heat, Domestic, 575 volt, 3 Phase, 60 Hz

SER #: Unique **Serial Number** of Dryer – **Dryer Version**

AMP: Amperage rating of Dryer

HZ: Hertz requirements.

MOD: not used

230 volt, 3 phase, 60 Hz Domestic, Canada, Asia
 400 volt, 3 phase, 50 Hz European, Asia
 480 volt, 3 phase, 60 Hz Domestic, Canada, Asia
 575 volt, 3 phase, 60 Hz Canada

LPD Blower Sizes

LPD Model	Frequency	Blower Mfg.	Blower Model #	Blower Size	Rating	Max. Free Flow CFM
LPD-30	60 Hz	Fuji	VFC300A-7W MG	.56 HP	.56 HP	56
LPD-30	50 Hz	Fuji (Electror)	VD22	.84 HP	.62 HP	60
LPD-100	60 Hz	All-Star	HB-329	1.1 HP	1.1 HP	103
LPD-100	50 Hz	All-Star	HB-429-12	2.0 HP	1.66 HP	145
LPD-200	60 Hz	All-Star	HB-439	3.0 HP	3.0 HP	145
LPD-200	50 Hz	All-Star	HB-529	3.5 HP	2.91 HP	219
LPD-1000	60 Hz	All-Star	HB-929	15.0 HP	15.0 HP	808
(To obtain 50Hz HP rating just multiply the 60Hz HP rating by 5/6)						

6.3 - Features

You have purchased the most innovative dryer to be made available to the plastics industry in over 50 years (at least that's what we think). This is a dryer that does not use dry air to dry material. Instead, it uses reduced pressure (more commonly called vacuum) to lower the boiling point of water, thereby causing all moisture to rapidly "boil" off at temperatures well below the normal boiling point of water.

Here is why this dryer is so much better:

1. The capital cost of this technology is comparable to a desiccant dryer.
2. Operating cost is LESS THEN HALF that of a desiccant dryer and in many cases reduced by as much as 80 percent.
3. Your "Monday morning" start up time is cut from 4 hours to under an hour.
4. Your material change over time is reduced to ZERO if you plan ahead about one hour. Color changes can be made "On the fly" with NO lost time.
5. The routine desiccant maintenance associated with desiccant dryers is eliminated. Our dryer has no "routine" maintenance items.
6. For those who sometimes forget to plan ahead, your unused inventory of blended material is 40 minutes, not 4 hours.
7. Plastics often loose physical properties when exposed to high heat for extended periods. Our dryer dramatically shortens this heat time, minimizing or eliminating these problems.

We did not invent vacuum drying.

But...

We did invent the multi stage process used in our LPD dryers. We are the first to bring Vacuum drying technology to the plastics industry in a package that is affordable, reliable, and simple to operate.

We hope you are as proud as we are to be a part of this revolution in drying technology.

Note to our Competitors:

Our would-be competitors will, no doubt, be among the first to read this manual. We wish to tell them that all inventive aspects of this new technology are subject to domestic and international patents either issued or now pending. We intend to aggressively pursue our rights under these patents at such time when they issue.

6.4 - Our Design Philosophy

While we do have competitors, our equipment is different. Here is why.

When we design equipment, we have FIVE objectives. All are important, but not all are obvious. In their order of importance they are:

1. FUNCTION:

This is very simple; the customer has certain requirements, and we must meet these Requirements. This is the most obvious consideration, the first consideration, and the one consideration that can most easily be tested and compared.

2. RELIABILITY:

This is not so easy to test. Time and experience is the only way to be sure equipment will last a long time, require little or no maintenance, and provide maximum "up" time. The true cost of equipment can be much higher when maintenance and lost production time are added in.

3. SERVICEABILITY:

When it breaks, how easily can it be serviced. Can your employees do it, do it quickly, and do it right? Is skilled and costly outside service required? Are parts readily available? How much time will it take to get it running again.

4. EASE OF USE:

What percentage of your employees will be able to run this equipment. All of them? Only the best of them? Maybe only the engineers in the office? How about the night shift? Ease of use is very important. Production suffers when equipment is difficult to understand and operate.

5. PRICE:

Very important. Especially to us. Customers often consider this the most important item and it is easy to compare.

Our competitors often get number 1 and 5 right, "Function" and "Price". On the other hand "Reliability", "Serviceability", and "Ease of use" are difficult to measure, hard to value, and hard to use as selling points. They are also much more difficult features to achieve in the design. We take these three objectives very seriously, incorporating them into product from the very beginning of the design process. Lost production time, while difficult to predict, is very expensive. For that reason we place these design goals ahead of cost. In the long run our customers are better served by this philosophy and, therefore, so are we.

6.5 - 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 manufactures 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 LPD 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.

6.6 - Warranty

MAGUIRE PRODUCTS offers THE MOST COMPREHENSIVE WARRANTY in the plastics auxiliary equipment industry. We warrant each MAGUIRE LPD 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.

EXCLUDED ITEMS:

The ability of the canisters to hold vacuum will be compromised if the vacuum seal edge is damaged from mishandling. We do not warranty canisters damaged from improper handling. We do, however, warranty the seals.

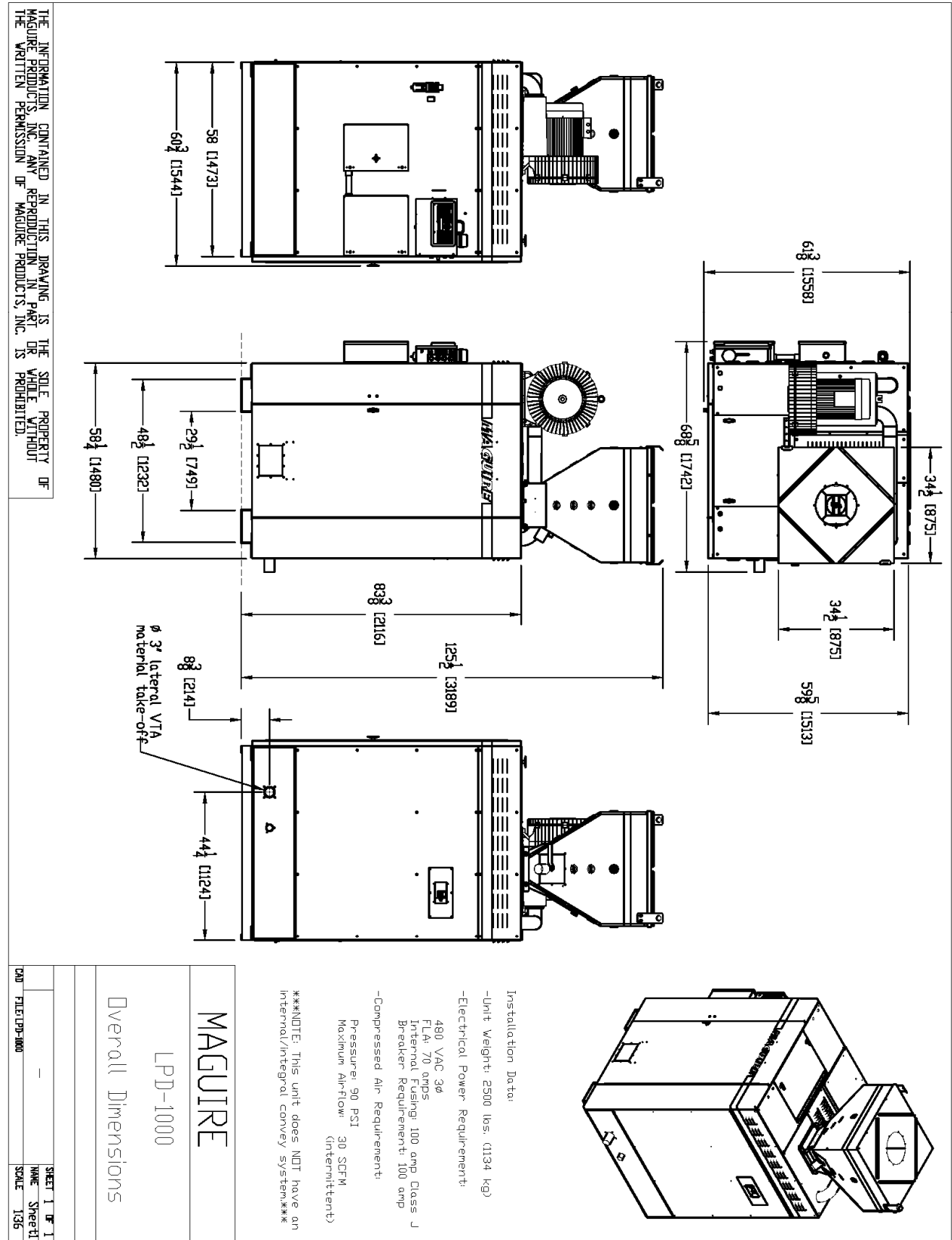
DISCLAIMER - PRODUCTION of FAULTY PRODUCT

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.

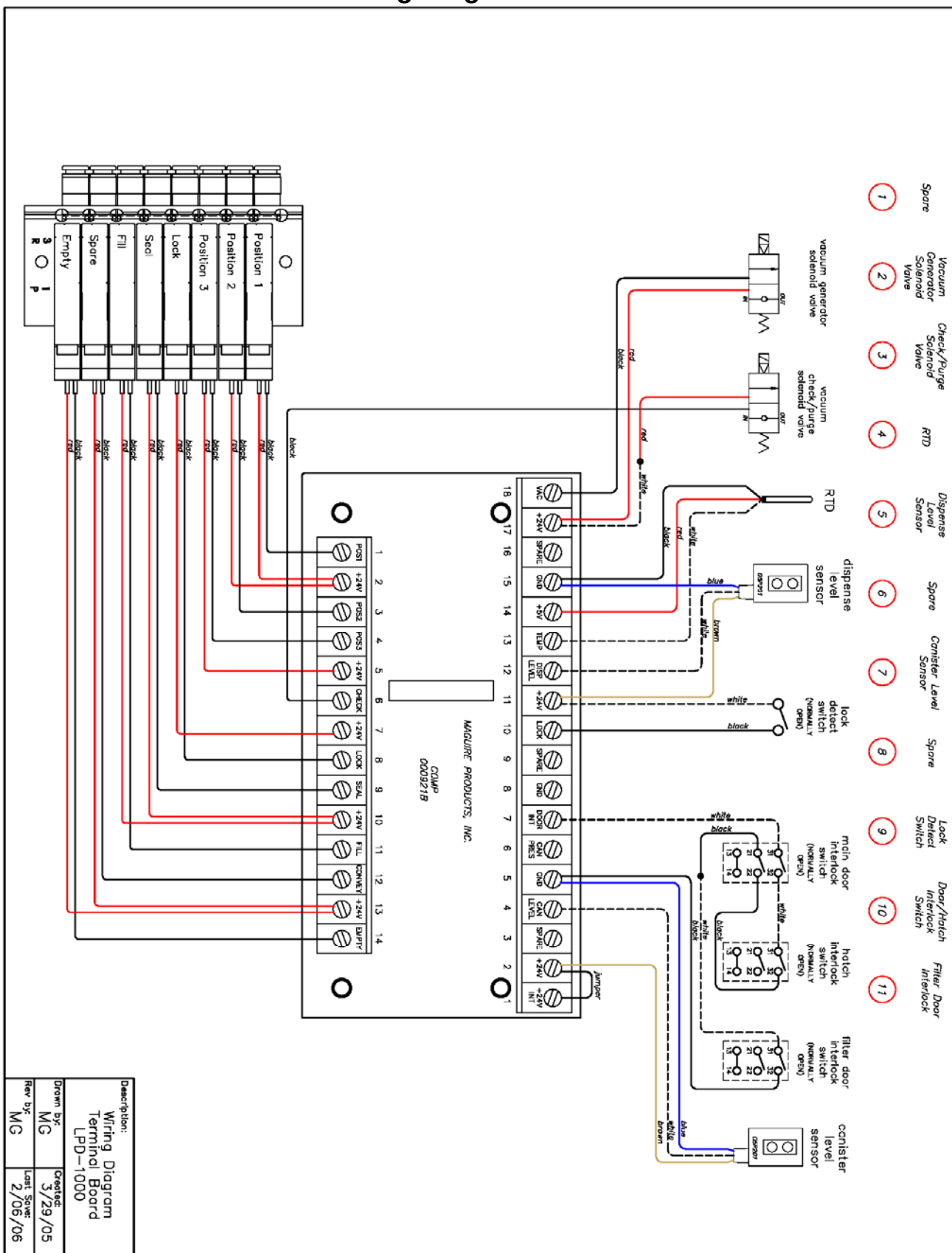
We will only be responsible to correct, repair, replace, or accept return for full refund, our equipment if it fails to perform as designed, or we have inadvertently misrepresented our equipment for your application. If for any reason this disclaimer is not acceptable, we will accept return of the equipment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

6.7 – LPD-1000 Diagrams

LPD-1000 Overall Dimensions



LPD-1000 Terminal Board Wiring Diagram



Transformer Troubleshooting Data:
 (nominal secondary voltages):
 top 08<->top 10: 20 VAC
 top 08<->top 08: 10 VAC
 top 08<->top 10: 10 VAC

COMPONENTS

Line#	Maguire P/N	Qty	Description
1	ehT25403	1	heater, 25000W, 400VAC, 3ø
2	ehT15	1	transformer, 240VAC->10VAC, 20VAC
3	ehm12	3	solid state relay, 480V, 75 A
4	ehm16	2	RFI filter, 240 VAC
5	epgm18	1	standard sex plug, 9 pin
6	epgm20	1	clamp - standard sex plug
7	esGGC32D	1	motor contactor, 50 A
8	-	1	VFD, 20 HP, 380-500 VAC
9	es3P18U3	1	mechanical 'ice cube' relay, 24VDC
10	esPSNUT	3	bus bar, 3 phase, 6 pin
11	ecf-120	1	power feed lug
12	ecf-120	1	cooling fan, 120mm

CIRCUIT BREAKERS

Line#	Maguire P/N	Qty	Description
B1	eg-.3E2	1	1/3 A E-trip breaker, 2 pole
B2	eg-.30G3	1	30 A G-trip breaker, 3 pole
B3	eg-.60G3	1	60 A G-trip breaker, 3 pole

Model: LPD-1000
Voltage: 400 VAC 3ø
FLA: 61.8 Amps
Breaker: 100 Amps
Drawn by: MG
Date drawn: 11/4/04
Rev by: MG
Lost Updated: 8/1/07

[illegible]

6.8 - Technical Support and Contact Information

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