



**Therma-Stor** LLC

4201 LIEN RD. • MADISON, WI 53704



**PHOENIX**

# Phoenix 4800D P/N - Desiccant Dehumidifier

## OWNER'S MANUAL

Installation, Operation & Service Instructions  
– READ AND SAVE THESE INSTRUCTIONS –

### The Phoenix 4800D

- 3032 pints/day AHAM
- 4800 CFM process airflow
- Dries in temperatures to 140°F
- Reaches dew points as low as -40°F
- 48"W x 120"L x 66"H (desiccant only)
- 48"W x 120"L x 74"H (desiccant with frame)
- 1550 lbs. (desiccant only)
- 1675 lbs. (desiccant with frame)
- 240 volt three phase
- 50 amps
- Propane cylinder and trailer mount available



Phoenix 4800D P

Part No. 4038030 (with frame)  
4038020 (without frame)

**FOR YOUR SAFETY: DO NOT** store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

### **! WARNING**

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information, call a qualified installer, service agency or the gas supplier.

**FOR YOUR SAFETY:** If you smell gas: **DO NOT** try to light any appliance. **DO NOT** touch any electrical switch. **IMMEDIATELY** call your gas supplier from a location away from the device. If the gas supplier cannot be reached, call the fire department.



WISCONSIN

TS-1047

Specifications subject to change without notice. 08/19 Rev. B

**1.800.533.7533**

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## **GENERAL HAZARD WARNING**

Failure to comply with the precautions and instructions provided with this unit can result in death, serious bodily injury and property loss or damage from hazards of fire, explosion, burn, asphyxiation, carbon monoxide poisoning, and/or electrical shock.

Only persons who can understand and follow the instructions should use or service this unit.

If you need assistance or unit information such as an instruction manual, label, etc., contact a qualified installer, service agency, gas supplier, or the manufacturer.

### **WARNING**

#### **FIRE, BURN, INHALATION, AND EXPLOSION HAZARD.**

Keep solid combustibles, such as building materials, paper, or cardboard, a safe distance away from the unit as recommended by the instructions. Never use the unit in spaces which do or may contain volatile or airborne combustibles, or products such as gasoline, solvents, paint thinner, dust particles or unknown chemicals.

### **WARNING**

Do NOT use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the appliance before shutting off the electrical supply.

### **WARNING**

Installation must conform to applicable local codes and/or the National Fuel Gas Code, ANSI Z223.1, the Standard for the Storage and Handling of Liquefied Petroleum Gases, ANSI/NFPA 58 and the Natural Gas and Propane Installation Code, CSA B149.1.

## **MISES EN GARDE GENERALES**

Le non-respect des mises en garde et des instructions fournies avec ce radiateur peut entrainer la mort, de graves blessures et des pertes materielles ou des dommages a la propriete resultant d'un incendie, d'une explosion, de brulures, d'asphyxie, d'empoisonnement au monoxyde, de carbone et/ou d'un choc electique.

Seules les personnes aptes a comprendre et a suivre les instructions devraient se servir de ce radiateur ou le reparer.

Si vous avez besoin d'aide ou d'informations concernant ce radiateur ou le reparer.

## **Avertissement**

Risque d'incendie, de brulures, d'inhalation et d'explosion. Garder les combustibles solides, tels les materiaux de construction, le papier et le carton, a bonne distance de ce radiateur, comme il est recommande dans les instructions. ne jamais utiliser cet appareil dans des endroits qui contiennent ou pourraient contenir des combustibles volatiles ou en suspension dans l'air tels l'essence, les solvants, les diluants pour peinture, les particules de poussieres ou des produits chimiques inconnus.

Other standards govern the use of fuel gases and heat producing products in specific applications. Your local authority can advise you about these.

### **WARNING**

You are responsible to secure all doors and accessories during transit.

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Serial No. \_\_\_\_\_

Purchase Date \_\_\_\_\_

Dealer's Name \_\_\_\_\_

Read the operation and maintenance instructions carefully before using this unit. Proper adherence to these instructions is essential to obtain maximum benefit from your Phoenix 4800D P/N.

# 1. Specifications

Part No.	4038030 (with frame) 4038020 (without frame)
Power	240 volt, 50A, Three Phase
Water Removal	3032 pints/day (175LPD) @ AHAM
Blower	4800 CFM Process Air Flow 2000 CFM Reactivation Air Flow
Operating Range	-10°F to 140°F
Filters	Process filter size: (2) 20" x 20" x 2" Reactivation filter size: (1) 20" x 20" x 2"
Duct Options	Heavy Duty PVC/Polyester Duct 20" x 25' 6" Pitch Heavy Duty PVC/Polyester Duct 20" x 25' 4" Pitch NOTE: Duct with 4" pitch is mandatory for the return duct if you are recirculating. Heavy Duty PVC recommended
Warranty	Year 1 - 100% Parts & Labor Year 2 - Silica Gel Rotor

## Dimensions

	Without Frame	With Frame
Width	48"	48"
Height	66"	72"
Length	120"	120"
Weight	1550 lb	1675 lb

## Accessories

4028364	18" x 25', 6" Pitch, Heavy Duty PVC/Polyester Duct
4029256	18" Lay Flat Duct
4035579	20" x 25', 4" Pitch, Heavy Duty PVC/Polyester Duct
4027327	External Temperature control
4020175	External Dehumidistat

## Air Filter Replacement

4028635	20" x 20" x 2" Filter (3 per unit)
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# 2. Operation

The function of the dehumidifier is to remove moisture (in the vapor state) from an air stream. This is accomplished by exposing the air to an adsorbing media (desiccant) in a sealed air stream (process). After the desiccant has adsorbed moisture, it is exposed to a second air stream at an elevated temperature (reactivation). This causes the moisture to be driven out of the desiccant preparing it for more moisture adsorption. This process is done on a continuous basis, providing a constant drying process. The two air streams (process and reactivation) are separated

by seals, which contact the desiccant media. Figure 1 illustrates the relationship of the seals and airflow pattern. The dehumidifier is designed with the two air streams flowing in opposite directions (counter flow) thereby maximizing the energy efficiency of the equipment.

## Principle of Operation

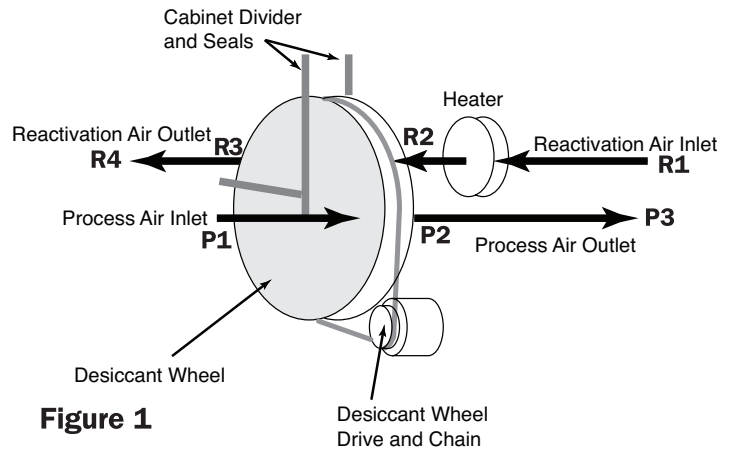


Figure 1

## 2.1 How the Phoenix 4800D P/N Works

The Phoenix 4800D P/N has two separate air streams that run through it – Process and Reactivation (Fig. 1).

### Process Air Stream:

**P1** – 4800 CFM of air enters the machine (Process Air Inlet) and...

**P2** – ...water vapor from incoming air is deposited (adsorbed) on the desiccant wheel.

**P3** – 4800 CFM of dry air exits the machine (Process Air Outlet).

### Reactivation Air Stream:

**R1** – 2000 CFM of air enters the machine (Reactivation Air Inlet) and...

**R2** – ... is heated by burner.

**R3** – Water vapor is picked up (desorbed) from the desiccant wheel by the hot air and...

**R4** – ... 2000 CFM of wet air exits the machine (Reactivation Air Outlet).

# 3 Installation

Proper installation is critical to the performance of the Phoenix 4800D P/N. Follow the guidelines below to maximize service life and performance.

### 3.1 Inspection

Thoroughly inspect the machine to insure no damage has occurred during shipping or on the job site.

The hose assembly shall be visually inspected prior to each use of the dehumidifier. If it is evident there is excessive abrasion or wear, or the hose is cut, it must be replaced prior to the dehumidifier being put into operation. The replacement hose assembly part is listed in the service parts list.

### 3.2 Location

**Note the following precautions when locating the Phoenix 4800D P/N:**

The Phoenix 4800D P/N must be located outdoors with reactivation outlet pointed away from open windows or building fresh air inlets. Position unit for shortest, straightest duct run to structure. Provisions for adequate combustion and ventilation air must be provided in accordance with section 5.3 of the National Fuel Gas Code ANSI Z223.1.

Always ensure the Phoenix 4800D P/N is located with the reactivation outlet pointed such that the reactivation air exhausts to the atmosphere in an unoccupied area and can NOT be drawn into any nearby structure. Do not exhaust reactivation air across walkways or towards buildings, openable windows, or building openings. Do not allow the reactivation outlet to become obstructed by snow, construction debris, etc. Maintain a minimum 4' clearance around electric and gas meters, regulators, and relief equipment. Locate device a minimum of 10' from combustible constructions. Be aware that reactivation air contains flue gasses that, over time, can degrade some building materials. Do not connect device to a chimney flue serving a separate appliance designed to burn solid fuel.

Do not direct process or reactivation air streams toward any Propane-gas container within 20' (6m).

### 3.3 Ducting Options

When conditions warrant the use of a desiccant dehumidifier, use one of the setups described below to achieve efficient drying, while avoiding secondary damage. Review Section 2.1 to understand the desiccant drying process. Always ensure that the Reactivation Outlet duct is vented to the outdoors to minimize the possibility of secondary damage.

#### Neutral Pressure Setup

Many drying applications require neutral pressure operation. In this setup, the Process Air Inlet pulls air from the affected area (drying chamber) and returns dried, processed air to the affected area via the Process Air Outlet.

#### Positive Pressure Setup

For Positive Pressure operation, the Process Air Inlet pulls air from outside the drying chamber, while the Process Air Outlet is ducted into the chamber.

### 3.4 Ducting Installation

The duct requirements of the Phoenix 4800D P/N are much more critical than those of refrigerant-based dehumidifiers. **ALL SUPPLY AND RETURN AIR DUCTING FOR THE Phoenix 4800D P/N MUST BE AIR AND VAPOR TIGHT.** This is extremely important for proper performance. Ensure that reactivation discharge air does not enter the process or reactivation inlets.

Using excess duct length significantly reduces air flow volume through duct. This is true in any application. If the job at hand needs a short length of duct, cut a section to the appropriate length. If air flow is restricted by excess length, performance will suffer. The same can be said of excess bends in the ducting.

Multiple duct sizes are used on the Phoenix 4800D P/N (see below). All ducting materials are available from Therma-Stor LLC (see accessories list in Section 1).

#### Process inlet: 18" flex duct.

To attach flex ducts to the process air intake, push the wire of the first few loops beyond the 2 holes in the duct collar. Push the metal rod through the duct and duct collar piercing the duct in two places. Tape or a hose clamp can be used to create an airtight seal. Alternatively, the duct wire can be pushed past the weld beads on the duct collar and the duct can be secured with hose clamps or ratcheting straps. If using only one inlet connection, the other can be left closed.

#### Process outlet: 18" flex or lay flat plastic duct.

To attach flex ducts to the process air outlet, push the wire of the first few loops beyond the 2 holes in the duct collar. Push the metal rod through the duct and duct collar piercing the duct in two places. Tape or a hose clamp can be used to create an airtight seal. Alternatively, the duct wire can be pushed past the weld beads on the duct collar and the duct can be secured with hose clamps or ratcheting straps.

When using 18" lay flat ducting, slip over the outlet collar and zip-tie or duct tape in place.

#### Reactivation outlet: 10" flex duct or lay flat.

To attach flex duct to the reactivation air outlet, push the wire of the first couple of loops beyond the weld beads on an outlet collar. Secure with hose clamp.



### 3.5 Avoiding Secondary Damage

The Phoenix 4800D P/N is a powerful tool capable of removing a great deal of water from most environments. Care must be taken to avoid secondary damage of over-drying and or unexpected condensation.

The Phoenix 4800D P/N removes vapor water from the incoming process air stream and transfers it to the outgoing reactivation air stream. The reactivation exhaust air is hot and wet.

Take care to prevent the reactivation exhaust air stream from causing secondary damage due to condensation. Always ensure the Phoenix 4800D P/N is located with the reactivation outlet pointed such that reactivation air will NOT be drawn back into the structure.

The Phoenix 4800D P/N does not produce liquid water internal to the machine. There is no condensate pump and no drain hose.

The Phoenix 4800D P/N desiccant dehumidifier will continue to remove water from already dry, cold air. It is possible to over-dry objects and or structures.

Care must be taken to avoid secondary damage due to over-drying.

### 3.6 Electrical Requirements

A 240 volt, three-phase, 50A power source is required to operate the Phoenix 4800D P/N.

All local and state codes must be strictly adhered to and good electrical practices should be followed to achieve the best installation possible. The Phoenix 4800D P/N must be properly wired to an adequate power source. The electrical grounding of the appliance shall be in compliance with the National Electrical Code, ANSI/NFPA 70, or the CSA C22.1, Canadian Electrical Code, Part I. Serious damage to the motors and controls can occur if incorrect voltage is applied.

(See Electrical Schematic drawing in the back of this manual for internal wiring.)

### 3.7 Gas Supply Requirements

The Phoenix 4800D P/N can be operated using either propane (LP) or natural gas (NG). Connect the supply piping as outlined in the table below. 3/4" ID hose/piping is acceptable for runs up to 20 ft. from the meter/regulator, but use 1" ID hose/piping for runs up to 70 ft.

Common Scenarios					
Supply Pressure	Fuel	Where Found	Regulator Required?	Where to Hook Up	Pipe Fitting Size
4-11"WC	LP or NG	Downstream of second-stage regulator	No	Upper Pipe	3/4" NPT (male or female)
2-6 psig	NG	Industrial applications	Yes, but not included*	Upper Pipe	
5-20 psig	LP	Downstream of first-stage (tank) regulator	Yes - Included with unit	Lower Pipe	

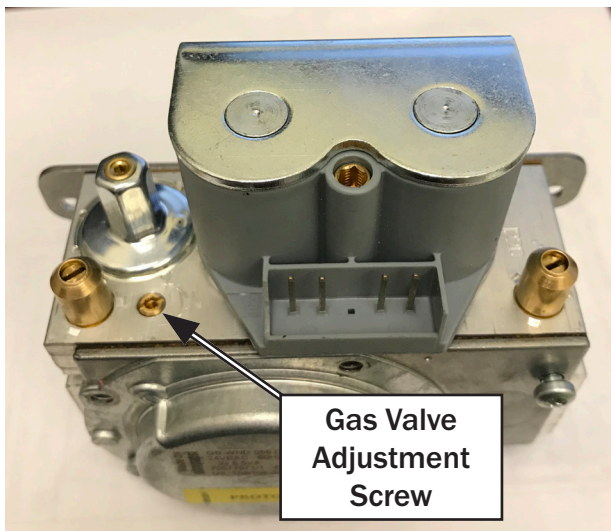
\* - Regulator must be rated for at least 250kBTU/hr

### 3.8 Gas Valve Adjustment

The Phoenix 4800D P/N is designed to burn 250 kBTU/hr of either LP or NG. It is calibrated for LP at the factory in Madison, WI. If the unit is operated using NG the burner must be adjusted before operating the unit.

The small brass adjustment screw shown in the picture can be turned with a flathead screwdriver. The other screws shown do not require adjustment. To establish a baseline setting for either fuel:

1. Turn the adjustment screw clockwise (tighten it) until it stops.
2. For LP, turn the adjustment screw counter-clockwise approximately 3-1/2 turns.
3. For NG, back out the adjustment screw an additional 2-1/2 turns. NG requires a total of about 6 turns backed out from the fully turned-in position.
4. The burner adjustment will be fine-tuned later once the unit is operated. Refer to Section 4.2 for more information.



## 4 Operating Instructions

Refer to the Operating Instructions label located next to the control panel of your Phoenix 4800D P/N.

User-supplied power cord, cord grip, and branch protection appropriate for the electrical load must be supplied. See device for FLA rating.

The Phoenix 4800D P/N dehumidifier comes complete and ready for operation. All that is required is to provide the proper power source, propane or natural gas supply, and duct connections (described above).

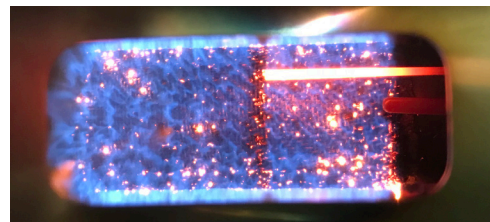
### 4.1 Connection and Start-Up Procedure

1. **STOP!** Read the safety information on unit label.
2. Turn off all electric power to this appliance - Turn the Main Disconnect to the **OFF** position.

3. Connect gas source. (Refer to section 3.7 for details)
4. Open gas supply shut off valve.
5. Open appliance shut off valve.
6. Energize power source and turn Main Disconnect switch to **ON**.
7. Press F1 to start the unit.
8. Set process damper to obtain a maximum of 1.5" water column pressure as read on pressure gauge.
9. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" (printed on the unit) and call your service technician or gas supplier.

### 4.2 Adjusting Flame Characteristics

1. After ignition has been established, the display screen will change to solid white and indicate that the unit is operating normally.
2. Look through the window in the regen inlet plenum (opposite side from the digital display) to observe the flame.
3. The picture below shows the ideal flame. It is mostly blue, but has some orange tips. If the flame is:
  - a. Very blue (too lean) –
    - Remove the reactivation filter
    - Remove the cover over the gas valve and combustion blower
    - Turn the adjustment screw (see section 3.8 for picture) 1/4-turn counter-clockwise. This will make the fuel:air mix more rich.
    - Replace the gas valve cover and the reactivation filter, then check the flame again.
  - b. Very orange with long orange tips jumping from the burner (too rich) –
    - Remove the reactivation filter
    - Remove the cover over the gas valve and combustion blower
    - Turn the adjustment screw (see section 3.8 for picture) 1/4-turn clockwise. This will make the fuel:air mix more lean.
    - Replace the gas valve cover and the reactivation filter, then check the flame again.



### 4.3 Cool Down

1. Press F2 to stop the unit.
2. The reactivation blower and rotor drive motor will continue operating for 1 minute to cool the burner and desiccant wheel. All other components will turn off.
3. The display backlight will switch from white to yellow and will show a timer indicating how long until it is safe to shut off unit.
4. When the timer expires, the display will return to Standby Mode. The main disconnect can now be switched to OFF.

## WARNING

Failure to follow **COOL DOWN PROCEDURE** may result in damage to unit due to overheating. **ALWAYS** follow **COOL DOWN PROCEDURE** before shutting down the unit.

### 4.4 Shut Down & Disconnection Procedure

1. Verify cool down procedure has been followed, and that display has returned to STANDBY MODE (solid yellow).
2. Close appliance gas shut off valve.
3. Close gas supply shut off valve.
4. Turn main disconnect switch to OFF.
5. De-energize, lock out, and tag out electric power source.
6. Lock out power source.
7. Disconnect power cable.
8. Disconnect propane or natural gas source.

## 5 Control Panel

### 5.1 Main Disconnect

The main disconnect switches power from the source to the panel. Power must be disconnected at the source prior to accessing control panel. Access to the control panel with power applied is **ONLY** by qualified service personnel with the appropriate personal protective equipment. Power is present up to disconnect even in OFF position. Disconnect power at the source before opening panel.

### 5.2 Digital Display Screen

The display screen shows the status of the unit and also contains buttons to control the unit.

Four buttons on the display are used to control the unit:

- F1/START - Press to start operating the unit. If the external control is calling for dehumidification, the unit will enter DEHU(midification) MODE. If there is no call for drying, the unit will enter FAN ON MODE. See F3/FAN MODE below for more information.
- F2/STOP - Press to stop operating the unit. This will trigger a 1-minute cool down period, then the unit will return to STANDBY MODE. See Section 4.3 for more information on the Cool Down procedure.
- F3/FAN MODE - When there is no call for dehumidification, the unit operates in FAN ON MODE. The process blower runs to circulate air through the building even when no dehumidification is needed. Pressing F3 will toggle to FAN AUTO MODE, where the process blower only runs when there is a call for dehumidification. Pressing F3 again will toggle back to FAN ON MODE, and so on.
- F4/MORE INFO - During a fault condition, pressing F4 will display additional information to help troubleshoot the fault condition. The display will change to solid red for easier reading. Continuing to press F4 will cycle through any additional screens. The F4 button has no effect when the unit is operating normally.
- ESC, ENTER, and the four cursor keys are not used on this unit.

The screen uses three different backlight colors to indicate the status from a distance:

Solid Yellow – Waiting to Run

- STANDBY MODE– after switching on the main disconnect, the unit enters STANDBY MODE. Nothing is operating at this time. The unit will also return to STANDBY MODE after the 1-minute cool down period has ended.
- COOL DOWN MODE – after pressing F2 to stop the unit, it enters COOL DOWN MODE. It operates the reactivation blower and rotor motor for 1 minute to cool the burner and the desiccant wheel. See Section 4.2 for more information on the cool down procedure.

Blinking Yellow and White - No Fault Condition, but Not All Components Running

- DEHU(midification) MODE - The backlight blinks yellow and white until all components are energized. The operator ought to wait by the unit to ensure that everything starts before leaving. See Section 7.3 for details about the startup sequence.
- FAN ON MODE - The display shows “WAITING FOR EXT CTRL TO CLOSE” and the process blower runs. Pressing F3 toggles to FAN AUTO MODE.
- FAN AUTO MODE - The display shows “WAITING FOR EXT CTRL TO CLOSE” and nothing runs. Pressing F3 toggles to FAN ON MODE.

Solid White – Operating Normally

- DEHU MODE - All components are running and the unit is dehumidifying



## Flashing Yellow and Red or Solid Red – Fault Condition

- If a fault has been detected, the display will contain information to troubleshoot the fault. Pressing F4 will cycle to additional screens with more information about the fault. The unit may energize the reactivation blower and rotor motor to cool down the burner and desiccant wheel if it is safe or necessary.
- After pressing F4, the display will switch from flashing yellow/red to solid red. This makes it easier to read the information on the screen.
- The F1 button cannot be used to restart the unit if a fault has occurred. Shut off the main disconnect, correct the fault condition, then turn the main disconnect back on to continue operating the unit.

## 5.3 External Control

The unit starts dehumidifying once the main disconnect is turned on and the F1 button has been pressed. The machine will continue to dehumidify in all conditions until the power is turned off. No dehumidistat is provided to monitor process inlet air condition (see over-dry warning section 3.5). An external control (dehumidistat, thermostat or other contact) can be wired in place of the jumper across terminals 100 and 4080. The external control must be designed to operate a 24 VAC circuit.

## 5.4 Alarm Buzzer

The alarm buzzer sounds to indicate that a fault condition exists. The display screen (see Section 5.2) will show information to troubleshoot the fault. To restart the unit, shut off the main disconnect, correct the fault condition, then turn the main disconnect back on.

An external alarm can be wired to relay output terminals 4440 and 4442. Relay contacts are rated 5A resistive/2A inductive at 12/24 V AC/DC, 5A resistive/3A inductive at 115/120/230/240 VAC

## 5.5 Hour Meter

The hour meter will run whenever any motor on the Phoenix 4800D P/N is operating. This hour meter measures the cumulative time of operation in one-tenth hour increments. This meter is often used to verify hours on a job or to schedule maintenance.

# 6 Maintenance

## 6.1 General Maintenance

A definitive time schedule should be established for inspecting all rotating parts and components. Inspection requirements depend on the frequency of operation, transport, and operating conditions. Periodically check the condition of the air filter, rotating parts, and fasteners to ensure they are secure and in proper working order. Periodically check airflow to make sure there are no obstructions to airflow in outlet or inlet ductwork.

Recommended minimum inspections:

- Upon installation
- After 1 week of operation.
- Annually thereafter or upon loss of performance.

## 6.2 Cabinet

**Disconnect power before removing access panels.**

Remove panel fasteners and panels from unit to access internal components. The condition of the cabinet gaskets should be observed during inspection and servicing to insure a good seal. Any leaks must be sealed and panels securely fastened for proper dehumidifier operation.

## 6.3 Air Filters

The maintenance interval for the filter depends directly on the cleanliness of the air entering the dehumidifier. It is suggested that a program be established to assure that the filters are replaced or cleaned prior to becoming clogged to the point they create a system problem.

Three aluminum (20"x20"x2") air filters must be checked regularly. Two filters are located near the process air inlet. The other one is located near the reactivation air inlet.

Wash the filters with fresh water. Clean the filter from the downstream side, forcing debris toward the filter inlet. Dry the filters completely before installing them in unit. Replacement filters can be ordered from the factory or purchased locally if available.

**DO NOT** operate the unit without the filters or with less effective filters as the desiccant wheel inside the unit will become clogged and require disassembly to clean.

## 6.4 Blower and Motor

Blower and motor bearings are permanently lubricated and do not require maintenance. Inspect blower wheel blades for accumulation of dust and dirt. Clean thoroughly with compressed air and or vacuum. The wheel should not strike the housing or the inlet ring. Make sure wheel is rotating in the proper direction.

## 6.5 Drive Motor

The media drive motor is permanently lubricated and requires no maintenance.

## 6.6 Rotor Drive Chain

A spring loaded tensioner keeps the chain sufficiently tensioned. Check the chain for signs of excessive wear. Replace as necessary. If additional tension is required, simply tighten the nuts on the tension springs as required.

## 6.7 Seals

High temperature seals separate the process and reactivation compartments. Normally, the seals will not require service or replacement. However, should damage occur, or if poor performance as the result of an air leak is suspected, the following inspection must be performed to determine whether the seals should be replaced:

### Inspection:

- 1) Turn the unit off and remove the access covers.
- 2) Visually inspect for gaps between the desiccant media and the seals.
- 3) If significant gaps, wear, or damage are observed, the seal needs to be replaced.

## 6.8 Desiccant Media

The silica gel desiccant media supplied with the dehumidifier will last indefinitely under ideal conditions. Due to the nature of desiccants they make very good filters. The life of the desiccant is directly related to the airborne contaminants passed through it. Atmospheric contaminants, exposure to acidic gases/or air streams, and contact with petroleum based airborne particles can reduce the efficiency of the desiccant media. The preferred method of cleaning is to blow dust out with compressed air. Proper filtration and preventing contact with chemicals will greatly improve the life of the desiccant. Inspect the face of the media to see that no surface damage has occurred. If damage is noticed, please contact Therma-Stor at 1-800-533-7533 x8459 for assistance. The rotor should turn smoothly upon the shaft, if not check the support bearings.

# 7 Service

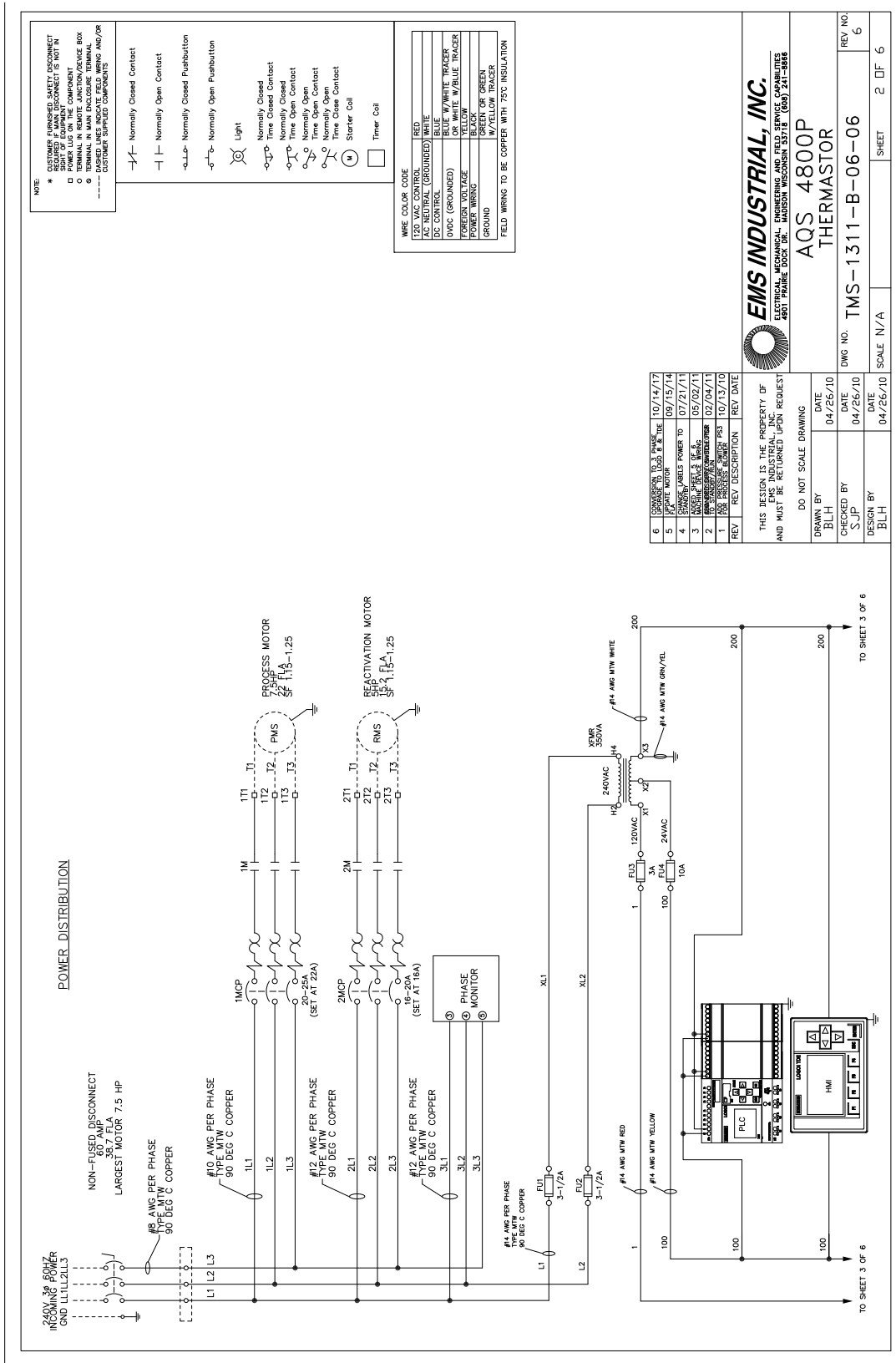
## CAUTION

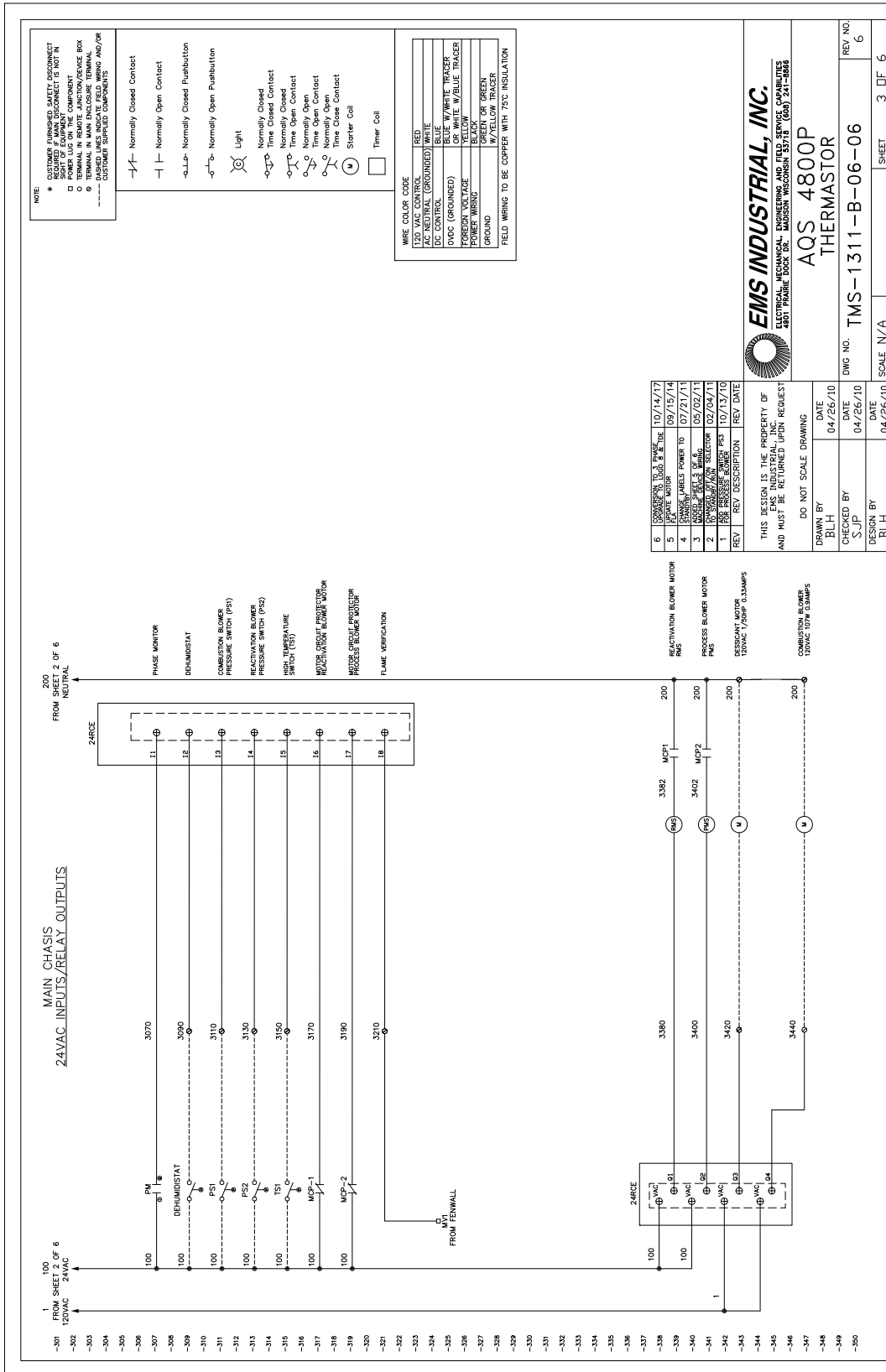
**Servicing the Phoenix 4800D P/N with its high voltage circuitry presents a health hazard which could result in death, serious bodily injury, and/or property damage. Only qualified service people should service this unit.**

## CAUTION

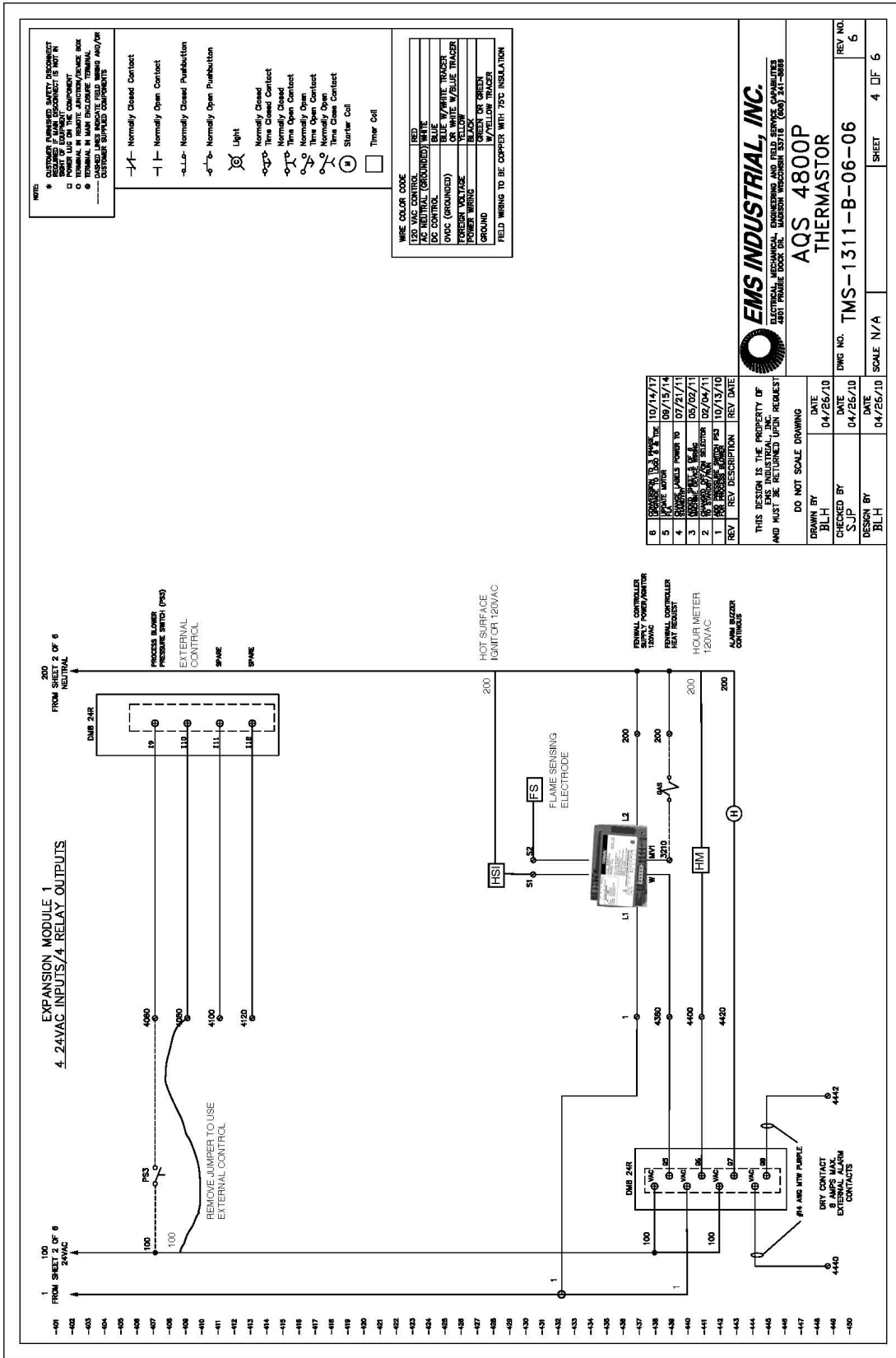
**ELECTRICAL SHOCK HAZARD: Electrical power must be present to perform some tests; these tests should be performed only by a qualified service person.**











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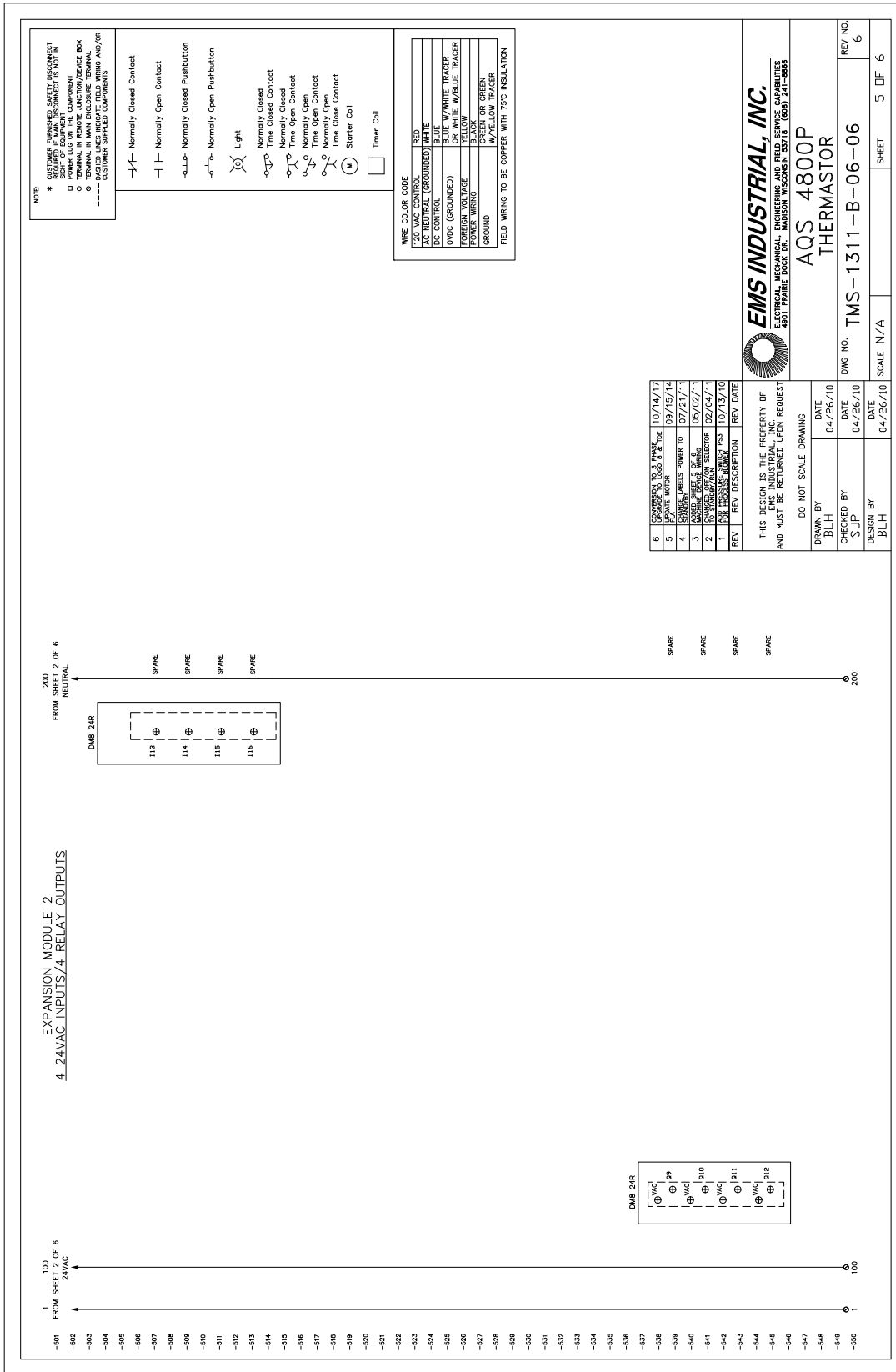
**AQS 4800P  
 THERMASTOR**

REV NO. 6

DWG NO. TMS-1311-B-06-06

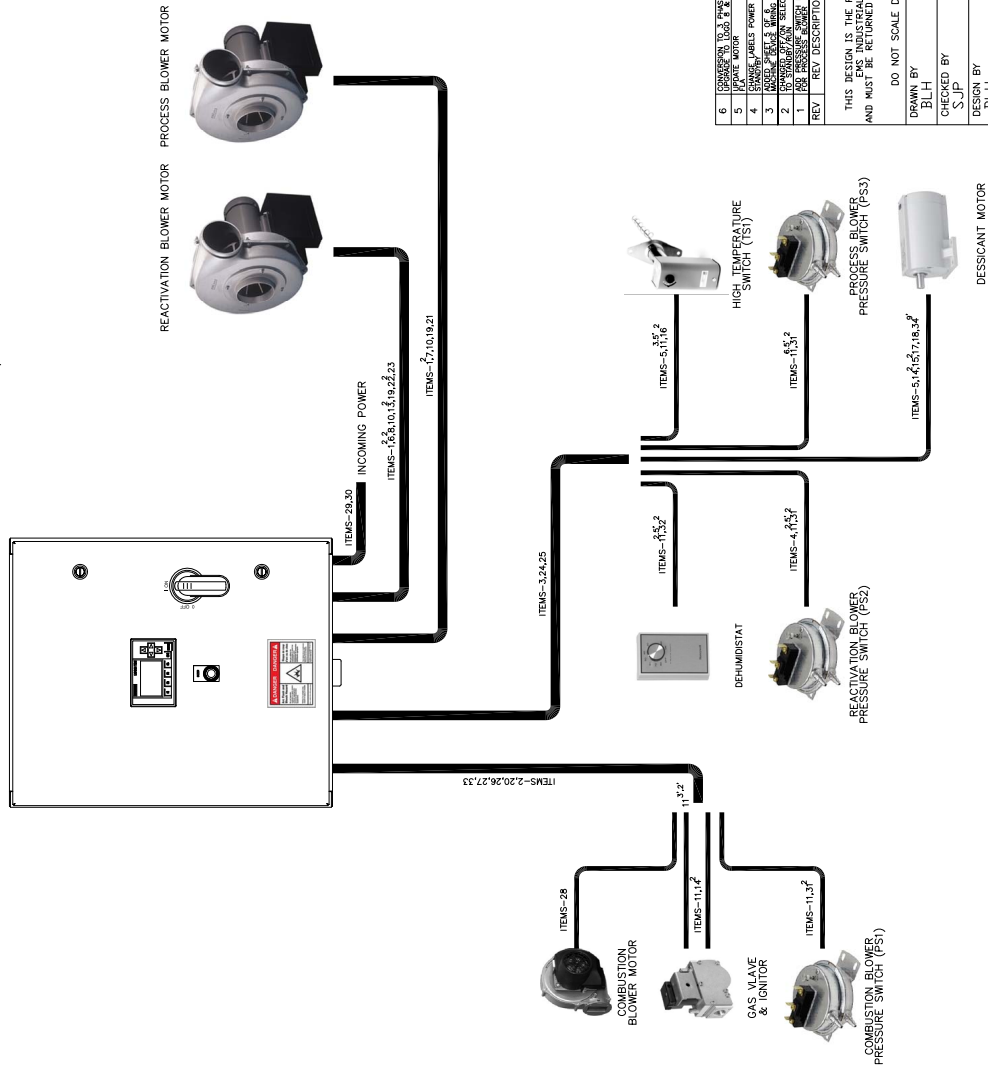
SCALE N/A

SHEET 4 OF 6



**AQS 4800P**  
**THERMASTOR**

MACHINE/DEVICE WIRING



REV	REV DESCRIPTION	REV DATE
1	FOR REVISION	10/13/10
2	FOR REVISION	02/04/11
3	FOR REVISION	05/02/11
4	FOR REVISION	07/21/11
5	FOR REVISION	09/15/14
6	FOR REVISION	10/14/17

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DO NOT SCALE DRAWING

DRAWN BY	DATE
BLH	04/26/10
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SJP	04/26/10
DESIGN BY	DATE
BLH	04/26/10

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QMS 4800P

TMS-1311-B-06-06

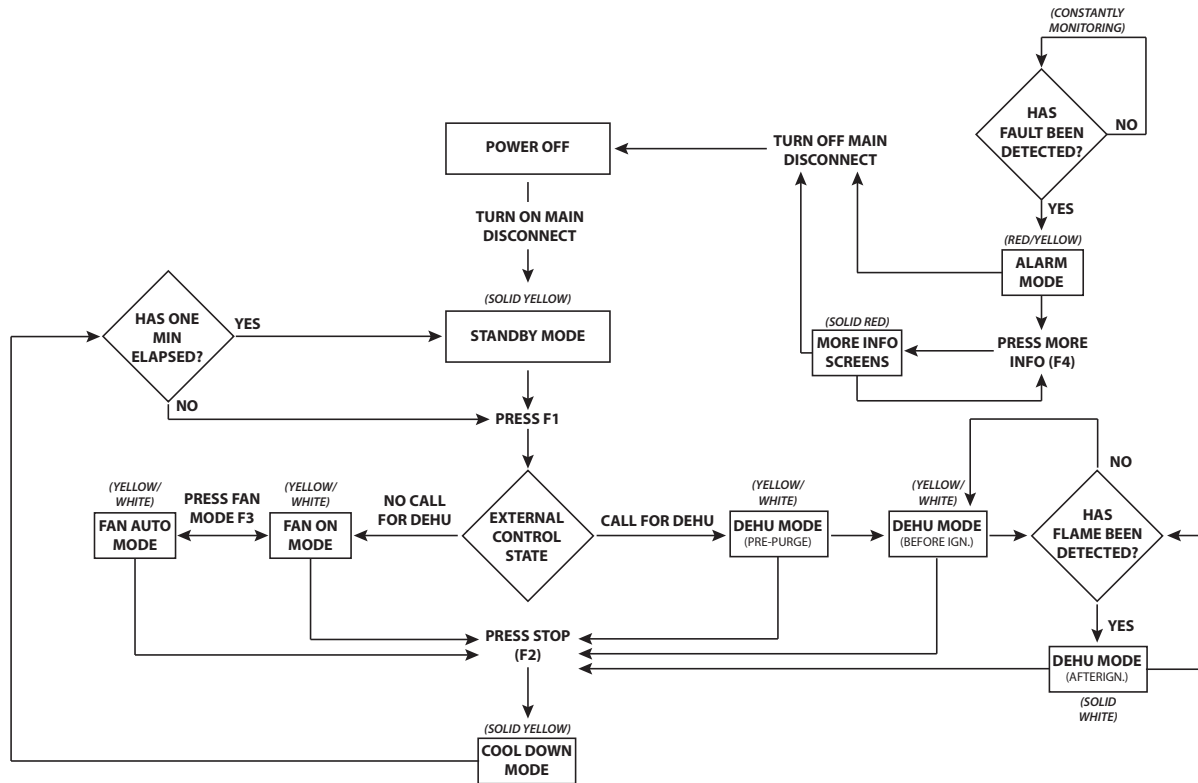
DWG NO. TMS-1311-B-06-06

REV NO. 6

SCALE N/A

SHEET 6 OF 6

## 7.2 Display Screen Flow Chart



## 7.3 Operating Modes

Operating Mode	Backlight Color	Process Blower	Reactivation Blower	Burner System	Rotor Motor	Hour Meter
Standby	Yellow	-	-	-	-	-
DEHU - Pre-Purge	Flashing White/Yellow	ON	ON	-	ON	ON
DEHU-Before Ignition	Flashing White/Yellow	ON	ON	ON	ON	ON
DEHU-After Ignition	White	ON	ON	ON	ON	ON
FAN ON	Flashing White/Yellow	ON	-	-	-	ON
FAN AUTO	Flashing White/Yellow	-	-	-	-	-
COOL DOWN	Yellow	-	ON	-	ON	ON
ALARM	Flashing Red/Yellow	-	*	-	*	*

\* - The blower motor, rotor motor, and hour meter run during ALARM MODE to cool the desiccant wheel and burner if it is safe and necessary. See Section 7.4 for more information.

## 7.4 Faults

### 7.4.1 Pressure Switch Closed At Start

What is Checked?	All three pressure switches must be open at startup. If any switch is closed before any blowers are running, this indicates the switch may be faulty.
When Checked/Triggered?	The states of the switches are checked immediately after the LOGO boots up (shortly after the main disconnect is switched on).
Sensor/Switch Location(S)	<ul style="list-style-type: none"> <li>The reactivation pressure switch is located inside the 3rd access panel to the right of the control panel.</li> <li>The process pressure switch is located inside the access panel directly to the right of the control panel.</li> <li>The combustion pressure switch is located behind the filter in the reactivation inlet plenum.</li> </ul>
Terminals in Panel	Reactivation PS – 100 and 3130, 24 VAC Process PS – 100 and 4060, 24 VAC Combustion PS – 100 and 3110, 24 VAC
Possible Causes/Resolutions	<ul style="list-style-type: none"> <li>If unit was stopped and restarted soon after, blowers may still be spinning. Wait 15-30 seconds for blowers to stop, then restart unit.</li> <li>Wires may be loose or plugged into wrong terminals on switches. Should be plugged into COM and NO terminals.</li> <li>Switch(es) may be faulty. Replace switch(es).</li> </ul>
Cool Down Time	None

### 7.4.2 Combustion Pressure Switch Fault

What is Checked?	Checking for sufficient pressure drop through combustion blower. The switch will close to indicate there is enough airflow for a good flame.
When Checked/Triggered?	The switch must close and stay closed within 8 seconds after the combustion blower starts.
Sensor/Switch Location(S)	Behind the filter in the reactivation inlet plenum
Terminals in Panel	100 and 3110, 24 VAC. Closed when there is sufficient airflow.
Possible Causes/Resolutions	<ul style="list-style-type: none"> <li>Combustion blower not working. Blower requires 120 VAC between terminals 1 and 3440. Check that blower is plugged in and that fan blade spins freely.</li> <li>Obstruction at reactivation filter. Clean filter or remove obstruction.</li> <li>Wires may be loose or plugged into wrong terminals on the switch. Should be plugged into COM and NO terminals.</li> <li>Damaged or disconnected hose. Hose connects from (-) port on PS to fitting on gray swirl plate. (+) port on PS is open.</li> </ul>
Cool Down Time	5 minutes



#### 7.4.3 React Pressure Switch Fault

What is Checked?	Checking for sufficient pressure drop across desiccant wheel in reactivation plenum. The switch will close to indicate there is enough airflow to carry the heat from the burner to the wheel.
When Checked/Triggered?	The switch must close and stay closed within 8 seconds after the reactivation blower starts.
Sensor/Switch Location(S)	Inside the 3rd access panel to the right of the control panel
Terminals in Panel	100 and 3130, 24 VAC. Closed when there is sufficient airflow.
Possible Causes/Resolutions	<ul style="list-style-type: none"> <li>• Reactivation blower not working. Blower requires 240 VAC, 3PH between terminals at contactor. Check that blade spins freely.</li> <li>• Obstruction at reactivation filter. Clean filter or remove obstruction.</li> <li>• Obstruction at reactivation outlet screen. Remove obstruction.</li> <li>• Wires may be loose or plugged into wrong terminals on the switch. Should be plugged into COM and NO terminals.</li> <li>• Damaged or disconnected hose. One hose connects from (-) port on PS to brass fitting in reactivation outlet plenum (inside same door as switch). (+) port on PS connects to brass fitting in reactivation inlet plenum (inside first door to the right of the control panel).</li> </ul>
Cool Down Time	5 minutes

#### 7.4.4 Process Pressure Switch Fault

What is Checked?	Checking that process outlet is at a higher pressure than the reactivation inlet. The switch stays open as long as the differential is large enough to indicate that combustion gases aren't able to leak into the conditioned space.
When Checked/Triggered?	The switch must close and stay closed within 8 seconds after the reactivation blower starts.
Sensor/Switch Location(S)	Inside the 1st access panel to the right of the control panel
Terminals in Panel	100 and 4060, 24 VAC. Open during safe operation.
Possible Causes/Resolutions	<ul style="list-style-type: none"> <li>• Reactivation blower not working. Blower requires 240 VAC, 3PH between terminals at contactor. Check that blade spins freely.</li> <li>• Obstruction at process filter or duct cover(s) still in place. Clean filter or remove obstruction/duct cover(s).</li> <li>• Obstruction at process outlet screen or duct cover still in place. Remove obstruction/duct cover</li> <li>• Wires may be loose or plugged into wrong terminals on the switch. Should be plugged into COM and NO terminals.</li> <li>• Damaged or disconnected hose. The hose connects from the (+) port on PS to the brass fitting in reactivation inlet plenum (inside same door as switch). (+) port on PS is left open to process outlet.</li> </ul>
Cool Down Time	5 minutes

#### 7.4.5 React Overload Relay Fault

What is Checked?	Checking that the overcurrent protection for the reactivation blower is not tripped. During normal operation (when the OLR is not tripped), the relay contacts take their switched states. That is, the COM-NC contact will be open, and the COM-NO contact will be closed when the unit is operating without fault.
When Checked/Triggered?	Whenever the unit is powered on
Sensor/Switch Location(S)	Inside the control panel (labeled 2MCP)
Terminals in Panel	100 and 3170, 24 VAC. Open when operating normally.
Possible Causes/Resolutions	<ul style="list-style-type: none"> <li>• Reactivation blower blade may be stuck or restricted. Check that blade spins freely.</li> <li>• Short or other wiring fault at blower. Check wiring in panel and at motor.</li> <li>• Check rotation direction of blower. Reverse two wires to reverse rotation.</li> <li>• Correct cause of the trip before resetting the OLR.</li> </ul>
Cool Down Time	None

#### 7.4.6 Process Overload Relay Fault

What is Checked?	Checking that the overcurrent protection for the process blower is not tripped. During normal operation (when the OLR is not tripped), the relay contacts take their switched states. That is, the COM-NC contact will be open, and the COMNO contact will be closed when the unit is operating without fault.
When Checked/Triggered?	Whenever the unit is powered on
Sensor/Switch Location(S)	Inside the control panel (labeled 1MCP)
Terminals in Panel	100 and 3190, 24 VAC. Open when operating normally.
Possible Causes/Resolutions	<ul style="list-style-type: none"> <li>• Process blower blade may be stuck or restricted. Check that blade spins freely.</li> <li>• Short or other wiring fault at blower. Check wiring in panel and at motor.</li> <li>• Check rotation direction of blower. Reverse two wires to reverse rotation.</li> <li>• Correct cause of the trip before resetting the OLR.</li> </ul>
Cool Down Time	5 minutes

#### 7.4.7 Failure to Ignite Flame

<p>What is Checked?</p>	<p>Checking whether the flame has lit. When the flame is lit, the flame sensor sends a micro-amp signal to the ignition module. As long as this signal is being received, the ignition module will de-energize the hot surface ignitor and hold the gas valve open to keep the flame burning.</p> <p>While trying for ignition, the gas valve only stays open for 7 seconds at a time. If the gas valve remains open for 10 consecutive seconds or longer, this indicates that a steady flame has been achieved, since only the flame sensor would be able to hold the gas valve open this long.</p>
<p>When Checked/Triggered?</p>	<p>As soon as the unit enters DEHU MODE, the ignition module will begin a series of three tries for ignition. If a steady flame (gas valve open for &gt;10 seconds) hasn't been detected within three tries for ignition, this fault will be triggered. If the flame has been established, but goes out, the ignition module will try three more times.</p>
<p>Sensor/Switch Location(S)</p>	<ul style="list-style-type: none"> <li>• The flame sensor is located in the regen inlet plenum behind the filter and the combustion blower/gas valve access cover. It has only a single wire.</li> <li>• The ignition module is mounted to the door of the control panel.</li> </ul>
<p>Terminals in Panel</p>	<ul style="list-style-type: none"> <li>• Gas Valve (Input to LOGO) - 100 and 3210, 24 VAC</li> <li>• Call For Heat (Input to Ignition Module) - 100 and 4380, 24 VAC</li> <li>• Flame Sensor (Input to Ignition Module) - S2 (microamps DC)</li> </ul>
<p>Possible Causes/Resolutions</p>	<ul style="list-style-type: none"> <li>• Insufficient gas pressure or flow. Check that supply valves are open and that regulators are adjusted correctly.</li> <li>• Ignitor not glowing. Confirm 120V is present between S1 and ground. Check for open circuit across ignitor.</li> <li>• Gas valve not opening. Check that 24V is present between MV1 and ground.</li> <li>• Defective flame sensor. Replace sensor.</li> <li>• Defective ignition module. If onboard LED is steady on, replace control.</li> </ul>
<p>Cool Down Time</p>	<p>5 minutes</p>

#### 7.4.8 Over-temp Fault

What is Checked?	Checking that the temperature of the reactivation air entering the desiccant wheel stays below the safe limit. This protects the desiccant wheel from damage due to overheating.
When Checked/Triggered?	Any time after the LOGO has booted up, if the temperature switch opens for 2 seconds (consecutively), this fault is triggered.
Sensor/Switch Location(S)	In reactivation inlet plenum downstream of burner, but before desiccant wheel. Access temperature switch through 1st door to the right of the control panel.
Terminals in Panel	100 and 3150, 24 VAC. Closed when temperature is within safe range.
Possible Causes/Resolutions	<ul style="list-style-type: none"> <li>• Reduced airflow through reactivation inlet plenum. Check for obstructions at filter or at blower outlet screen.</li> <li>• Flame may be too rich (burns too hot). Refer to section 4.2 for info on adjusting the flame.</li> </ul>
Cool Down Time	5 minutes

#### 7.4.9 No Dehumidification Fault

What is Checked?	A humidistat in the process outlet airstream monitors the relative humidity of the process air after it has passed through the desiccant wheel. After operating for some time, if this humidity is too high, this could indicate that the unit is not sufficiently drying the air.
When Checked/Triggered?	Once the unit has been operating in DEHU MODE for 20 minutes, if the humidity sensed by the humidistat is above 50% RH, this fault is triggered.
Sensor/Switch Location(S)	Inside the 1st door to the right of the control panel
Terminals in Panel	100 and 3090, 24 VAC. Open when dehumidifying properly.
Possible Causes/Resolutions	<ul style="list-style-type: none"> <li>• Process inlet humidity is too high or the wheel is saturated with moisture. Restart the unit to continue drying the wheel.</li> <li>• Process inlet temperature is too low. Restart unit to continue drying and heating space. Raising the temperature will lower the RH of air, even if no moisture is removed.</li> <li>• Humidity sensor is set too low. Increase setpoint. 50% RH is the suggested setting to detect reduced drying.</li> <li>• Humidity sensor is off calibration. Check RH of process outlet air with hygrometer. Replace humidistat.</li> </ul>
Cool Down Time	5 minutes

#### 7.4.10 Phase/Voltage Monitor Fault

What is Checked?	<p>The phase/voltage monitor analyzes the supply power for the following problems:</p> <ul style="list-style-type: none"> <li>• Over-voltage</li> <li>• Under-voltage</li> <li>• Phase Imbalance/Loss Of Phase</li> <li>• Phase Reversal</li> </ul> <p>The phase/voltage monitor relay contacts switch once safe conditions are detected. That is, during normal operation, the COM-NO contact will close, and vice versa.</p>
When Checked/Triggered?	The phase/voltage monitor COM-NO relay contact must close within 4 seconds of the LOGO booting up.
Sensor/Switch Location(S)	Inside the control panel (marked PM)
Terminals in Panel	100 and 3070, 24VAC. Closed when operating correctly.
Possible Causes/Resolutions	<ul style="list-style-type: none"> <li>• Supply power wired out of phase. LED on P/V monitor will be solid red. Reverse any two wires.</li> <li>• Supply voltage below 208 VAC. LED on P/V monitor will blink red twice. Check supply voltage or generator settings.</li> <li>• Supply voltage above 253 VAC. LED on P/V monitor will blink red three times. Check supply voltage or generator settings.</li> <li>• Loss of phase or phase imbalance greater than 6%. LED on P/V monitor will blink red once. Check for blown fuse/tripped breaker.</li> </ul>
Cool Down Time	None

#### 7.4.11 Stuck Gas Valve Fault

What is Checked?	Checking whether gas valve is still open (energized) when there is no call for heat.
When Checked/Triggered?	2 seconds after there is no longer a call for heat, if the gas valve is receiving power from the ignition module, this fault is triggered.
Sensor/Switch Location(S)	Mounted to inside of control panel door
Terminals in Panel	100 and 3210, 24 VAC. Will measure 0V between terminals if gas valve is held open (receiving power).
Possible Causes/Resolutions	<ul style="list-style-type: none"> <li>• Ignition controller fault. Check for steady/blinking red LED on ignition module. Replace.</li> <li>• Loose or incorrect wiring at ignition module.</li> </ul>
Cool Down Time	Reactivation blower and rotor motor run continuously until main disconnect is shut off.



## 7.5 Troubleshooting



**ELECTRICAL SHOCK HAZARD:** Electrical power must be present to perform some tests; these tests should be performed only by a qualified service person.

Refer to section 7.4 regarding interpreting fault messages.

<b>Trouble</b>	<b>Probable Fault</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
Unit Stopped (fan off, no heater)	Power/Control Failure	<ol style="list-style-type: none"> <li>1. Main power off</li> <li>2. Main disconnect open</li> <li>3. Selector switch open</li> <li>4. Dehumidistat</li> </ol>	<p>Check main power and cable</p> <p>Close or replace disconnect</p> <p>Close or replace switch</p> <p>Repair or replace</p>
Fan off (Rotor turns)	Power/Mechanical Failure	<ol style="list-style-type: none"> <li>1. Motor circuit breaker or overload tripped</li> <li>2. Contactor failure</li> <li>3. Motor winding failure</li> <li>4. Fan motor failure</li> </ol>	<p>Reset circuit breaker or overload</p> <p>Repair or replace</p> <p>Repair or replace</p> <p>Repair or replace</p>
Unit running but humidity rises	Excessive infiltration of humid air into the controlled area	<ol style="list-style-type: none"> <li>1. Excessive unconditioned make-up air</li> <li>2. Leaking ducts or air handling equipment outside controlled area</li> <li>3. Access opening to area not sealed</li> <li>4. Area not vapor tight</li> </ol>	<p>Reduce make-up air</p> <p>Seal leaks</p> <p>Close and seal</p> <p>Seal with paint or vapor barrier</p>
	Faulty humidity controls	<ol style="list-style-type: none"> <li>1. Dehumidistat needs adjustment</li> <li>2. Improper settings</li> <li>3. Defective</li> </ol>	<p>Re-adjust</p> <p>Re-adjust</p> <p>Replace</p>
	Inadequate air flow	<ol style="list-style-type: none"> <li>1. Dirty filter</li> <li>2. Obstruction at inlet, outlet or ducting</li> <li>3. Clogged desiccant media (high pressure differential across media)</li> </ol>	<p>Clean or replace</p> <p>Remove obstruction</p> <p>Remove and replace media rotor</p>
	Inadequate or no reactivation heat power	<ol style="list-style-type: none"> <li>1. No Fuel</li> <li>2. No power to ignition module</li> <li>3. Overtemp switch failure</li> <li>4. Igniter failure</li> <li>5. Gas Valve Failure</li> <li>6. Ignition control failure</li> </ol>	<p>Check for fuel in tank, verify valves open</p> <p>Watch for igniter glow through inspection window, verify to transformer and ignition module</p> <p>Check continuity of overtemp switches</p> <p>If igniter module has power, watch for igniter glow through inspection window</p> <p>With gas valves OFF, power on the device and check for voltage at the gas valve</p> <p>Check power to ignition module, replace if igniter outputs are never energized and LED never blinks (allow several minutes to verify)</p>
	Air seals and gaskets	<ol style="list-style-type: none"> <li>1. Air leaking into dehumidifier</li> <li>2. Air bypassing media or leaking seals</li> </ol>	<p>Replace access door gaskets</p> <p>Check media position, replace seals</p>
	Ineffective desiccant media	<ol style="list-style-type: none"> <li>1. Chain</li> <li>2. Motor/gear box</li> <li>3. Damaged desiccant rotor</li> <li>4. Contaminated or damaged desiccant</li> </ol>	<p>Repair or replace</p> <p>Repair or replace</p> <p>Repair or replace</p> <p>Replace desiccant rotor</p>

## 7.6 Service Parts

Item	Part No.	Description
1	4020175	Humidity Control
2	4028010	Magnehelic Gauge
3	4039061	Thermostat, 350° F
4	4028015	Ignition Module
5	4038338	Hot Surface Ignitor
6	4038339	Flame Sensing Electrode
7	4038545	Inspection Window Glass, 5x5"
8	4030602	Gas Valve
9	4027229	Process Blower
10	4027228	Reactivation Blower
11	4030603	Combustion Blower
12	4028635	Washable Air Filter 20x20x2
13	4029107	Duct Cover
14	4029314	Duct Cover Retainer
15	4031199	Gas supply hose, 15 ft
16	4030601	LP Pressure Regulator (2nd Stage)
17	4039062	Combustion Pressure Switch
18	4039063	Reactivation Pressure Switch
19	4039064	Process Pressure Switch



**Therma-Stor<sup>®</sup> LLC**  
4201 LIEN RD. • MADISON, WI 53704



**PHOENIX**

## Phoenix 4800 Desiccant Dehumidifier

### LIMITED WARRANTY

**Warrantor:**

Therma-Stor LLC

4201 Lien Rd.

Madison, WI 53704

Telephone: 1-800-533-7533

**Who Is Covered:** This warranty extends only to the original end-user of the Phoenix 4800D P/N dehumidifier and may not be assigned or transferred.

**Year One:** Therma-Stor LLC warrants that, for one (1) year the Phoenix 4800D P/N dehumidifier will operate free from any defects in materials and workmanship, or Therma-Stor LLC will, at its option, repair or replace the defective part(s), free of any charge.

**Year(s) Two Through Five:** Therma-Stor LLC further warrants that for a period of five (5) years, the condenser, evaporator, and compressor of the Phoenix 4800D P/N dehumidifier will operate free of any defects in material or workmanship, or Therma-Stor LLC, at its option, will repair or replace the defective part(s), provided that all labor and transportation charges for the part(s) shall be borne by the end-user.

**Year(s) One Through Seven:** Materials and workmanship of the housing are covered.

**End-User Responsibilities:** Warranty service must be performed by a Servicer authorized by Therma-Stor LLC. If the end-user is unable to locate or obtain warranty service from an authorized Servicer, he should call Therma-Stor LLC at the above number and ask for the Therma-Stor Service Department, which will then arrange for covered warranty service. Warranty service will be performed during normal working hours.

The end-user must present proof of purchase (lease) upon request, by use of the warranty card or other reasonable and reliable means. The end-user is responsible for normal care. This warranty does not cover any defect, malfunction, etc. resulting from misuse, abuse, lack of normal care, corrosion, freezing, tampering, modification, unauthorized or improper repair or installation, accident, acts of nature or any other cause beyond Therma-Stor LLC's reasonable control.

**Limitation and Exclusions:** If any Phoenix 4800D P/N Dehumidifier part is repaired or replaced, the new part shall be warranted for only the remainder of the original warranty period applicable thereto (but all warranty periods will be extended by the period of time, if any, that the Phoenix 4800D P/N Dehumidifier is out of service while awaiting covered warranty service).

**UPON THE EXPIRATION OF THE WRITTEN WARRANTY APPLICABLE TO THE Phoenix 4800D P/N DEHUMIDIFIER OR ANY PART THEREOF, ALL OTHER WARRANTIES IMPLIED BY LAW, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL ALSO EXPIRE. ALL WARRANTIES MADE BY THERMA-STOR LLC ARE SET FORTH HEREIN, AND NO CLAIM MAY BE MADE AGAINST THERMA-STOR LLC BASED ON ANY ORAL WARRANTY. IN NO EVENT SHALL THERMA-STOR LLC, IN CONNECTION WITH THE SALE, INSTALLATION, USE, REPAIR OR REPLACEMENT OF ANY Phoenix 4800D P/N DEHUMIDIFIER OR PART THEREOF BE LIABLE UNDER ANY LEGAL THEORY FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES INCLUDING WITHOUT LIMITATION WATER DAMAGE (THE END-USER SHOULD TAKE PRECAUTIONS AGAINST SAME), LOST PROFITS, DELAY, OR LOSS OF USE OR DAMAGE TO ANY REAL OR PERSONAL PROPERTY.**

Some states do not allow limitations on how long an implied warranty lasts, and some do not allow the exclusion or limitation of incidental or consequential damages, so one or both of these limitations may not apply to you.

**Legal Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.



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