

HPRP Series

Refrigerated Type Compressed Air Dryers

Models: HPRP100, HPRP125, HPRP150, HPRP200, HPRP250, HPRP300, HPRP400, HPRP500, HPRP600, HPRP750

FORM NO.: 5002730 REVISION: 02/2017

READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT.



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GENERAL SAFETY INFORMATION

1. PRESSURIZED DEVICES:

This equipment is a pressure containing device.

- Do not exceed maximum operating pressure as shown on equipment serial number tag.
- Make sure equipment is depressurized before working on or disassembling it for service.



2. ELECTRICAL:

This equipment requires electricity to operate.

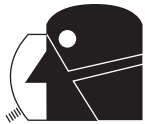
- Install equipment in compliance with all applicable electrical codes.
- Standard equipment is supplied with electrical enclosures not intended for installation in hazardous environments.
- Disconnect power supply to equipment when performing any electrical service work.



3. BREATHING AIR:

- Air treated by this equipment may not be suitable for breathing without further purification.

Refer to applicable standards and specifications for the requirements for breathing quality air.



RECEIVING, MOVING, AND UNPACKING

A. RECEIVING

This shipment has been thoroughly checked, packed and inspected before leaving our plant. It was received in good condition by the carrier and was so acknowledged.

Check for Visible Loss or Damage. If this shipment shows evidence of loss or damage at time of delivery to you, insist that a notation of this loss or damage be made on the delivery receipt by the carrier's agent.

B. UNPACKING

Check for Concealed Loss or Damage. When a shipment has been delivered to you in apparent good order, but concealed damage is found upon unpacking, notify the carrier immediately and insist on his agent inspecting the shipment. Concealed damage claims are not our responsibility as our terms are F.O.B. point of shipment.

C. MOVING

In moving or transporting dryer, do not tip dryer onto its side.

D. STORAGE/SHUT DOWN

CAUTION Dryer should not be stored outside (either packed or unpacked) or exposed to the weather. Damage to electrical and control components may result.

IMPORTANT: WATER-COOLED UNITS - If unit is shut down below freezing temperatures, the water-cooled condenser may freeze and cause permanent damage. Condenser must be drained when the unit is shut down.

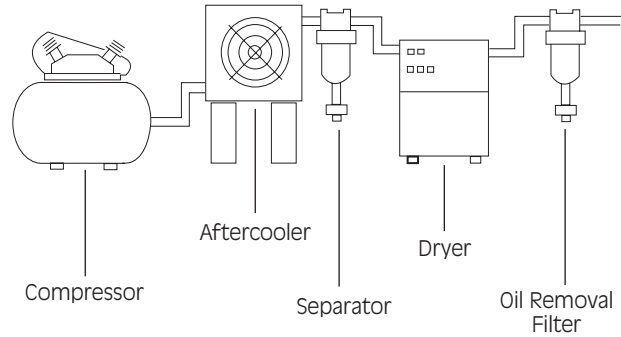
IMPORTANT: Do not store dryer in temperatures above 130°F, 54.4°C.

IMPORTANT: READ PRIOR TO STARTING THIS EQUIPMENT

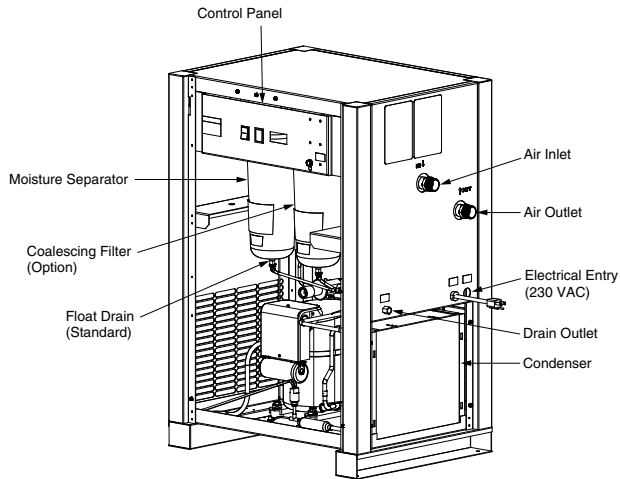
1.0 INSTALLATION

1.1 Location

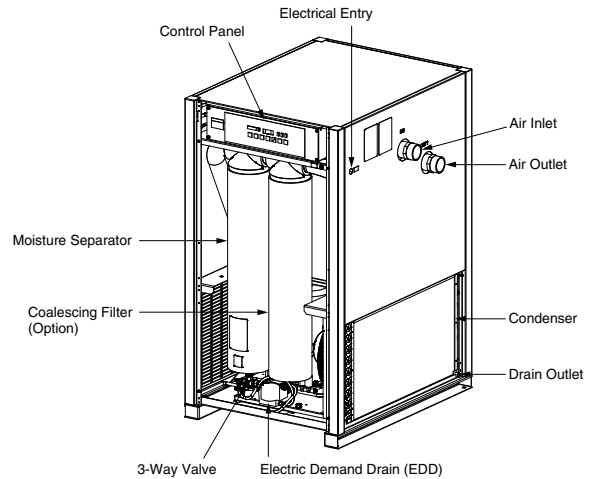
- A. For typical placement in a compressed air system, see drawing.
- B. Air compressor intake – Locate air compressor so that contaminants potentially harmful to the dryer (e.g. ammonia) are not drawn into the air system.
- C. Clearances Free air flow
 Front 36 inches (914 mm)
 Back 6 inches (152 mm)
 Sides 36 inches (914 mm)
 Service - To facilitate maintenance leave 36 inches (914 mm) of clearance in front of dryer.
- D. Standard units are designed to operate in ambients:
 Air-cooled: 40 to 110°F (4 to 43°C).
 Water-cooled: 40 to 130°F (4 to 54°C).
- E. Installations in altitudes above 4500 feet (1370 meters) –
 Dryer is adjusted to operate in altitudes up to 4500 feet (1370 meters). If dryer is installed in an altitude above this, and has not been preset at the factory for this altitude, contact manufacturer's Service Department.
- F. The installation of a flexible connection prior to the dryer is recommended to prevent possible damage from vibration.



NOTE: Outdoor installation – Standard units are designed for indoor installation. Contact manufacturer if installing outdoors.



Models 100, 125, & 150



Models 200, 250, 300, 400, 500, 600, & 750

1.2 Mounting

Mount the dryer on a level solid surface. Holes are provided in the dryer base to permanently mount the dryer to the floor.

1.3 Piping Connections

- A. **Air Inlet** - Connect compressed air line from air source to air inlet. (Reference markings on dryer for air inlet/outlet connection locations.)

⚠ WARNING Refer to Serial Number Tag for maximum working pressure. Do not exceed dryer's Maximum Working Pressure.

NOTE: Install dryer in air system at highest pressure possible (e.g. before pressure reducing valves).

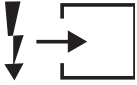
NOTE: Install dryer at coolest compressed air temperature possible. Maximum inlet compressed air temperature: 120°F (49°C). If inlet air exceeds this temperature, precool the air with an aftercooler.

- B. **Air Outlet** – Connect air outlet to downstream air lines.
- C. **Bypass piping** – If servicing the dryer without interrupting the air supply is desired, piping should include inlet and outlet valves and an air bypass valve.
- D. **Water cooled models** – cooling water inlet and outlet
1. Connect cooling water supply to cooling water inlet.
 2. Connect cooling water return line to cooling water outlet connection.

NOTE: Strainer and water regulating valve are supplied on water cooled models.

1.4 Electrical Connections


IMPORTANT: Use copper supply wires only.

- A. Dryer is designed to operate on the voltage, phase, and frequency listed on the serial number tag. 
- B. If dryer is supplied with a cord and plug, install in a receptacle of proper voltage.
- C. Electrical entry on larger dryers is through a hole in the cabinet. It is located on the right side panel when facing the front of the unit. Connect power source to terminal strip in electrical enclosure as shown on the wiring diagram included with the dryer.

NOTE: Refrigeration condensing unit is designed to run continuously and should NOT be wired to cycle on/off with the air compressor.

NOTE: ON MODELS 500, 600, and 750, CHECK FOR CORRECT PHASING OF UNIT. After starting the dryer, if an unusual noise is heard, or if the discharge line does not get hot, the refrigeration compressor may be running in the reverse direction. Immediately stop the dryer, reverse two of the power leads, restart the dryer, and verify the unusual noise is corrected and the refrigerant discharge line is hot. FAILURE TO DO SO MAY DAMAGE THE COMPRESSOR AND VOID THE WARRANTY.

1.5 Moisture Separator

- A. **Models 100-150:** Separator (and Oil Removal Filter where applicable) has an internal drain which automatically discharges condensate. 

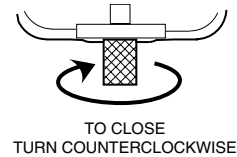
Models 200-750:

Separator (and Oil Removal Filter where applicable) has an electronic demand drain (EDD) which automatically discharges condensate.

NOTE: It may be desirable to pipe the condensate from the Automatic Drain outlet to a suitable drain.

- B. **Models 100-150:**

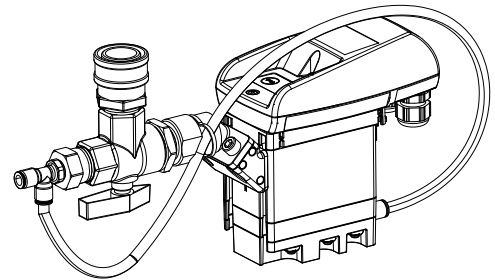
Separator has a knurled fitting with flexible drain tubing attached. Be sure knurled fitting is tightened by turning counter-clockwise before operating dryer.



- C. **Models 200-750**

For manual draining, convenient dryer depressurization, and EDD service, a three-way valve assembly has been installed at the bottom of the moisture separator (and cold coalescing filter where applicable). Review the following for proper drain function:

- Automatic Draining - Valve handle should be positioned parallel to the valve body (as shown), with the arrow on the handle pointing toward the EDD. In this position, condensate will flow from the bowl to the EDD.
- Drain Isolation (Shutdown) - Valve handle shall be turned perpendicular to the valve body (rotate 90°). In this position, condensate flow is shutoff.



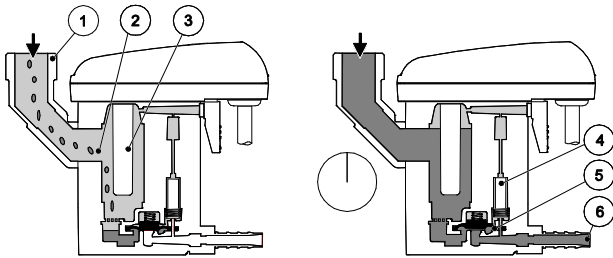
- Manual Draining - Drain valve handle shall be rotated slightly past the drain isolation position to allow throttling through the valve for manual discharge and depressurization.
- NOTE: The quick disconnect fitting allows removal of the entire drain assembly. **However, the unit must be depressurized prior to disassembly or serious injury may occur.**

NOTE: Discharge is at system pressure. Drain line should be anchored.

NOTE: Condensate may contain oil. Comply with applicable laws concerning proper disposal.

1.6 EDD Operation

- A. Verify that isolation valves are open. If the drain fails to discharge after the valve is energized, the electronic control circuit will repeatedly energize the valve in an attempt to clear the discharge port. If, after 60 seconds, the drain still fails to discharge, the control circuit then switches to the alarm mode. In this mode the valve is de-energized and the red alarm light is activated on the drain and the dryer controller. The valve is then automatically energized every 80 seconds for 60 seconds. Check the drain operation. Push drain (push-to-test) button on the Energy Management Monitor control board to energize drain. A flow of condensate and/or air should be present at the drain outlet. The alarm mode automatically clears after the drain returns to normal operation.
- B. The condensate flows through the feed line (1) into the condensate drain and accumulates in the housing (2). A capacitive sensor (3) continuously registers the liquid level. As soon as the container is filled, a fixed waiting period begins during which more condensate accumulates. After the waiting time has expired the pilot valve (4) is then activated and the diaphragm (5) opens the outlet line (6) for discharging the condensate. When the condensate drain has been emptied, the outlet line is closed again quickly and tightly without wasting compressed air.



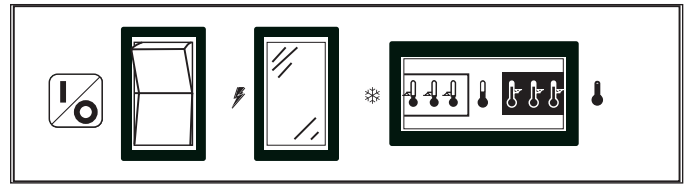
2.0 OPERATION

2.1 Minimum/Maximum Operating Conditions

- A. Maximum inlet air pressure: refer to dryer serial number tag
- B. Minimum inlet air pressure: 30 psig (2.1 kgf/cm²)
- C. Maximum inlet air temperature: 120°F (49°C)
- D. Maximum ambient temperature:
Air-cooled models: 110°F (43°C)
Water-cooled models: 130°F (54°C)
- E. Minimum ambient temperature: 40°F (4°C)

2.2 Start-Up

- A. **Models 100-150:**
Energize compressor by positioning the on/off switch in the on (I) position. Compressor on light will illuminate.



On/Off Switch Power-On Light Dewpoint Indicator (Green)

- B. **Models 200-750:**
Energize dryer. Green power on light will illuminate.

IMPORTANT: Energize dryer disconnect switch (provided by others, see NEC) 24 hours before refrigeration compressor is started! Never use the disconnect switch to shutdown the dryer for an extended period of time (except for repair). Failure to follow these instructions may result in a non-warrantable compressor failure.

NOTE: If there is no power to the control board for a period of two weeks or more, it may return to the default mode.

C. Program Monitor

Press and hold Program Mode button until Main Menu screen appears. Use the Up and Down arrow buttons to scroll through the list of submenu choices. Press Enter button to view the submenu that is displayed. Press ESC to exit the Main Menu and return to Display mode.

- Language selection
 - Use the 'Up' and 'Down' arrow buttons to scroll through the list of languages (choice of 13 available: English, Spanish, French, German, Portuguese, Italian, Polish, Danish, Dutch, Norwegian, Finnish, Swedish and Czech).
 - Press 'Enter' button to select the language that is displayed.
 - Push 'ESC' at any time to return to the Main Menu.
- Setting Date & Time
 - Press 'Enter' to edit value.
 - Use the 'Up' and 'Down' arrow buttons to set year (00 to 99 representing 2000 to 2099). Press 'Enter' to accept new value.
 - Use the 'Up' and 'Down' arrow buttons to set month (1-12). Press 'Enter' to accept new value.
 - Use the 'Up' and 'Down' arrow buttons to set day (01 to maximum for the month and year selected). Press 'Enter' to accept new value.
 - Use the 'Up' and 'Down' arrow buttons to set hours (00 to 23). Press 'Enter' to accept new value.
 - Use the 'Up' and 'Down' arrow buttons to set minutes (00 to 59). Press 'Enter' to accept new value.
 - Press 'Enter' to accept new value. Push 'ESC' at any time to return to the Main Menu.

3. Setting Schedule

- a. Use the 'Up' and 'Down' arrow buttons to select desired "Day of week + on/off". Press 'Enter' to adjust time.
- b. Use the 'Up' and 'Down' arrow buttons to set hour (00 to 23). Press 'Enter' to accept new value

NOTE: If the hour setting is '---:--', Press 'Enter' again to move the cursor under the "Day of week + on/off".

- c. Use the Up and Down arrow buttons to set minutes (00, 10, 20, 30, 40, 50; not shown if hour setting is '---:--'). Press 'Enter' to accept new value and return to "Day of week + on/off". Repeat steps a through c as needed.
- d. Push 'ESC' at any time to return to the Main Menu.

4. Hours To Service

- a. Use the 'Up' and 'Down' arrow buttons to scroll through the range of permissible values (0 to 9999) before service reminder is initiated. Press 'Enter' to move to next field. (Only hours that refrigeration compressor is operating are counted).

- b. Press 'ESC' at any time to return to the Main Menu.

NOTE: On dryers with air-cooled condensers, regular condenser cleaning is recommended. Dirtiness of ambient air at installation site will determine frequency of service. Typically once a month is recommended. Dryers contain an integral 3 micron filter. As the filter element accumulates solid contaminants, differential pressure increases. Solid particulate load in the compressed air supply will determine frequency of service. Typically element changeout is recommended at least annually.

5. Push ESC button to exit program mode

6. Manual Operation

- a. To manually turn the refrigeration system on or off use 'On/Off' button; Push 'Schedule On/Off and Enter' button to return to schedule.

NOTE: After power interruption dryer will reenergize in Manual override, refrigeration system off. To restart Schedule: Push 'Schedule On/Off and Enter' button.

D. Starting Dryer

IMPORTANT: Dryer must be energized 24 hours before starting refrigeration compressor.

NOTE: It is recommended that dryer be started 15 minutes before compressed air flow begins.

1. On water-cooled models: after 24 hours, begin cooling water flow.
2. Check for proper electrical voltage.
3. Slowly pressurize unit air side by opening inlet isolation valve. Check for leaks.
4. After 15 minutes, open outlet isolation valve slowly.
5. Close air bypass valve.

CONTROL PANEL

1. Temperature Indicator
2. Operator Interface Display
3. Power-on Light
4. Compressor-on Light
5. Alarm / Service Light
6. Schedule On/Off and Enter Button
 - a. In Display Mode: Press to toggle between SCHEDULED MODE and MANUAL MODE.
 - b. In Program Mode:
 - i. Press to move to a lower level menu.
 - ii. Press to accept a value that has been edited.
7. Program Mode (i) and Esc
 - a. In Display Mode: Press and hold to enter Program Mode.
 - b. In Program Mode: Press to move to a higher level menu.
8. Up Arrow
 - a. In Display Mode: Press to cycle to next Display screen
 - b. In Program Mode:
 - i. Press to view the next item in a list or to increment a variable to a higher value.
 - ii. When the top of the list (or highest value) is displayed, pressing the up button will cause the display to wrap to the bottom of the list (or lowest value).
9. Down Arrow
 - a. In Display Mode: Press to cycle to previous Display screen
 - b. In Program Mode:
 - i. Press to view the previous item in a list or to decrement a variable to a lower value.
 - ii. When the bottom of the list (or lowest value) is displayed, pressing the down button will cause the display to wrap to the top of the list (or highest value).
10. 1/0: Press at any time to turn the dryer on/off.
11. Drain test: Press at any time to momentarily open the drains.
12. Reset: Press at any time to clear the alarm/service message (if shown) and the alarm LED.

6. Dryer may be operated in Manual or Scheduled Modes.
NOTE: ON MODELS 500, 600, and 750, CHECK FOR CORRECT PHASING OF UNIT. After starting the dryer, if an unusual noise is heard, or if the discharge line does not get hot, the refrigeration compressor may be running in the reverse direction. Immediately stop the dryer, reverse two of the power leads, restart the dryer, and verify the unusual noise is corrected and the refrigerant discharge line is hot. FAILURE TO DO SO MAY DAMAGE THE COMPRESSOR AND VOID THE WARRANTY.

Manual Mode - push On/Off button - refrigeration compressor will start and run, green Compressor-on light will illuminate. In this mode compressor will run continuously and will not be turned on and off by the monitor. MANUAL MODE will appear on interface panel.

Schedule Mode - push Schedule On/Off and Enter button. SCHEDULED MODE will appear on the interface panel. The compressor will then turn on or off as programmed.

NOTE: Dryer may be returned to the Manual Mode at any time using the 'Schedule On/Off and Enter' button or by pressing On/Off button. MANUAL MODE will appear on interface panel. To reinstitute Schedule, push the 'Schedule On/Off and Enter' button again.

NOTE: Restart after the power interruption. Unit will be in MANUAL MODE mode, refrigeration compressor, off when power is restored after power interruption.

7. To reinstitute SCHEDULED MODE, push 'Schedule On/Off and Enter' button.

IMPORTANT: Dryer must be energized 24 hours before refrigeration compressor is started.

E. Operating Check Points

1. Check that green Power-on light is illuminated
2. Check that green Compressor-on light is illuminated if dryer is on in the manual mode or it is a scheduled on time

IMPORTANT: Refrigeration compressor must be restarted after power interruption.

3. Check interface panel

NOTE: Interface panel will scroll through three screens (Current Time/Operating Status, Hours to Service and Total Operating Hours).

- a. Verify that current time is correct
- b. Check HRS TO SERVICE: this indicates time remaining until service is required; allow time for required maintenance items to be ordered
- c. Check operating status:
MANUAL MODE - Dryer is either running continuously (not being controlled by the scheduled on/off times) or the refrigeration compressor has been shut off using the 'On/Off' button.
SCHEDULED MODE - Refrigeration compressor is being turned on and off by the monitor per-programmed schedule (see B.3. to set schedule).
- d. Check Temperature indicator - indicator should read in the green area.

e. Check Alarm/Service light If illuminated, check Interface panel.

- 1) If SERVICE DRYER appears, scheduled maintenance time has elapsed (HRS TO SERVICE is 0). Perform needed service and reset service interval (see B.3.).
- 2) If ALARM appears, a dryer fault is indicated; see Troubleshooting Guide for possible remedies. After fault correction push Reset button to turn Fault alarm off.

Type of FAULTS:

LOW PRESSURE - the refrigeration compressor control circuit has opened because of low suction pressure.

HIGH PRESSURE - the refrigeration compressor control circuit has opened because of high head pressure. The high pressure switch must be reset manually once the fault is corrected. Red reset button is located on pressure switch inside unit.

HIGH TEMPERATURE - compressed air temperature is above the set point.

COMPRESSOR - Normally open (NO) auxiliary contact on the compressor contactor is open when the dryer is on.

HEATER - Normally closed (NC) auxiliary contact on the compressor contactor is open when the dryer is off.

TEMP SENSOR - Occurs if the temperature sensor circuit is open or shorted. If open, none of the LED's in the temperature display will be illuminated. If shorted, all the LEDs in the temperature display will be illuminated.

DRAIN - electric drain contains a high water level alarm that activates if drain fails to discharge.

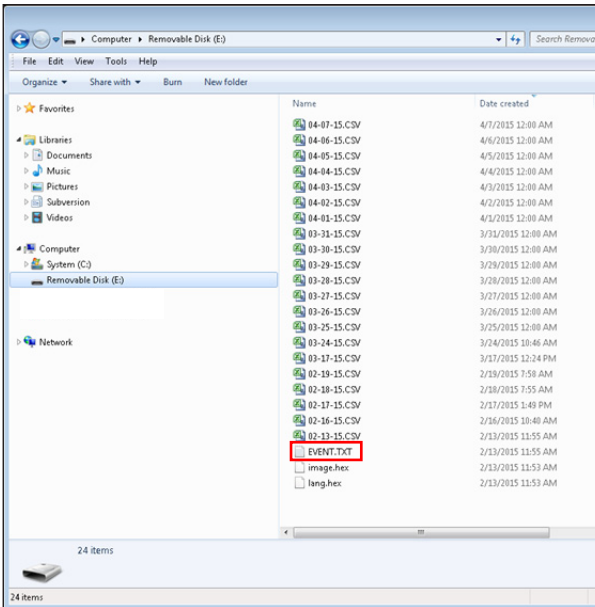
f. Check drain operation - push Drain (push-to-test) button to energize electric drain. A flow of condensate and/or air should be present at the drain outlet.

2.3 Using the RS-485 Port Connector (J8)

This connector provides RS-485 compatible signals from the internal master microprocessor. Using jumpers on the headers supplied near the connector (J12), 120 ohm termination resistors can be connected and the system can be connected for either two-wire or four-wire operation (half or full duplex). To connect the termination resistors, install jumpers on J12 in the direction shown by the white bars printed above the connector.

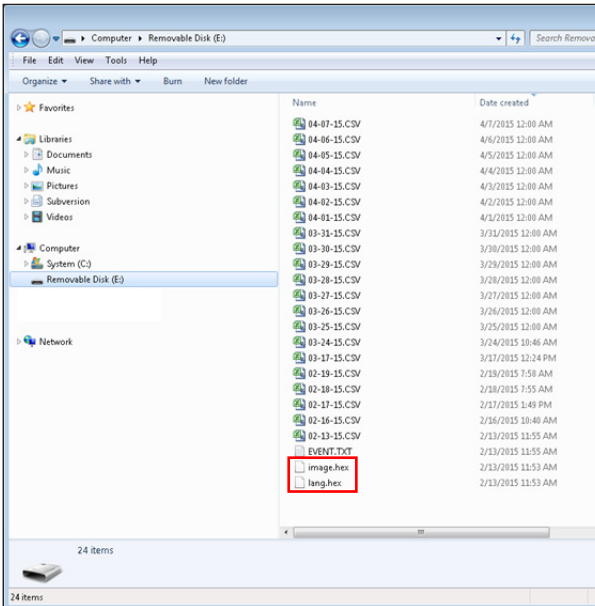
If the jumpers are removed no termination of the RS-485 bus is in effect. Usually, these jumpers must be in position for proper operation of the bus.

J10 contains the two-wire/four-wire jumper. If the jumper is set in W2 place, the circuit is set up for two-wire operation. If the jumper is set in W4 place, the circuit is set up for four-wire operation. Selection of jumper settings must be determined by the customer's system. The jumpers are supplied as standard and are installed as shown at the factory. Be sure to set the jumpers properly for your system.



3. USB Bootloader

Firmware updates for the EMM connect can be performed via the USB flash drive. In order to perform a firmware update; place the image.hex and lang.hex files provided by SPX in the root folder of a USB thumb drive.



With the dryer controller powered off install the USB flash drive in the USB host port on the EMM connect. Then while holding the enter button on the front panel apply power to the controller. Once the power LED begins blinking rapidly you can release the enter button. The controller will reboot when the update is complete. On startup the current firmware version will be shown on the text display.



2.5 Using the Ethernet Feature (J3)

The EMM connect is equipped with an Ethernet port located at J3 on the control board which allows the customer to connect the dryer to a local area network. The customer can then monitor the dryer status and performance via Web Interface or ModbusTCP.

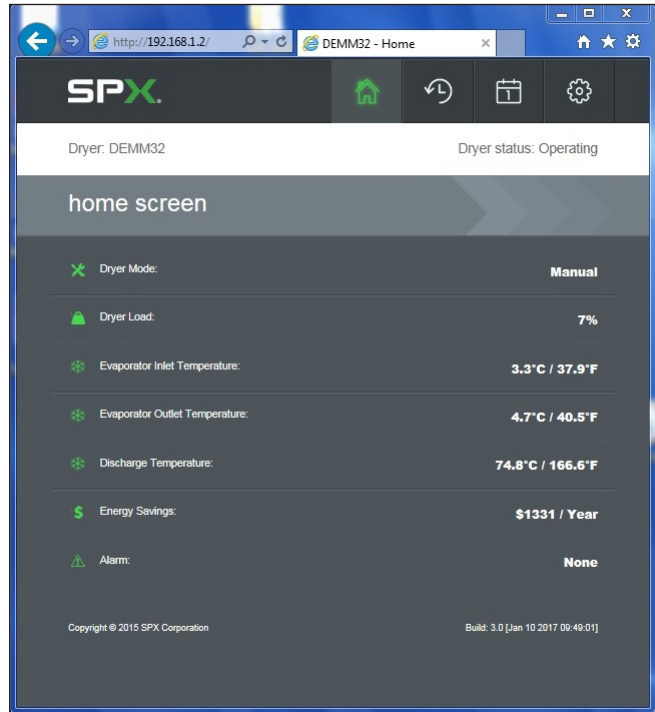
1. Web Interface

After assigning an IP address to the dryer the IP address can be entered into the address bar of any web browser to connect to the web interface.

The first page displayed is the home screen. Displayed on this page are the dryers operating status, operating mode, current dryer load, evaporator inlet temperature, evaporator outlet temperature, discharge temperature, energy savings, and any active alarms. The navigation bar at the top of this page can be used to view event history, dryer scheduler, and dryer settings.

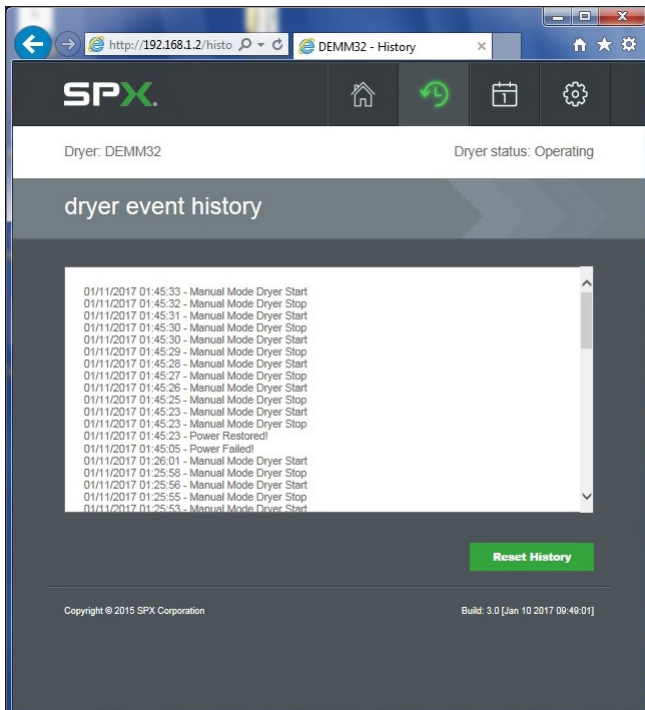
Energy savings is shown as the estimated annual energy savings based on the actual energy cost (entered on the settings page) and the average dryer load over the last 30 days.

Figure 1: Home Screen



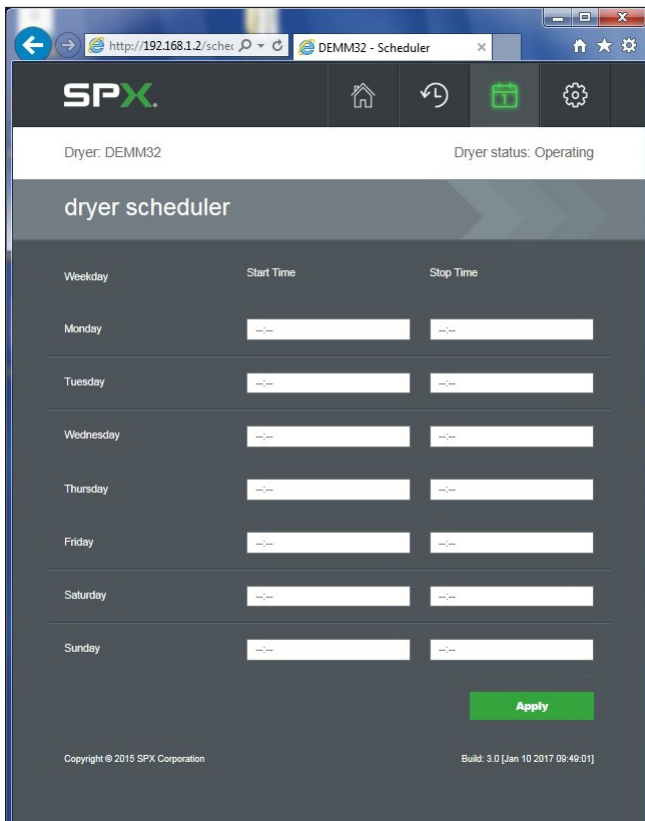
The event history page shows the last 64 timestamped events that have occurred on the dryer. These events include power failure/recovery, dryer mode changes, dryer status changes, and alarms.

Figure 2: Event History



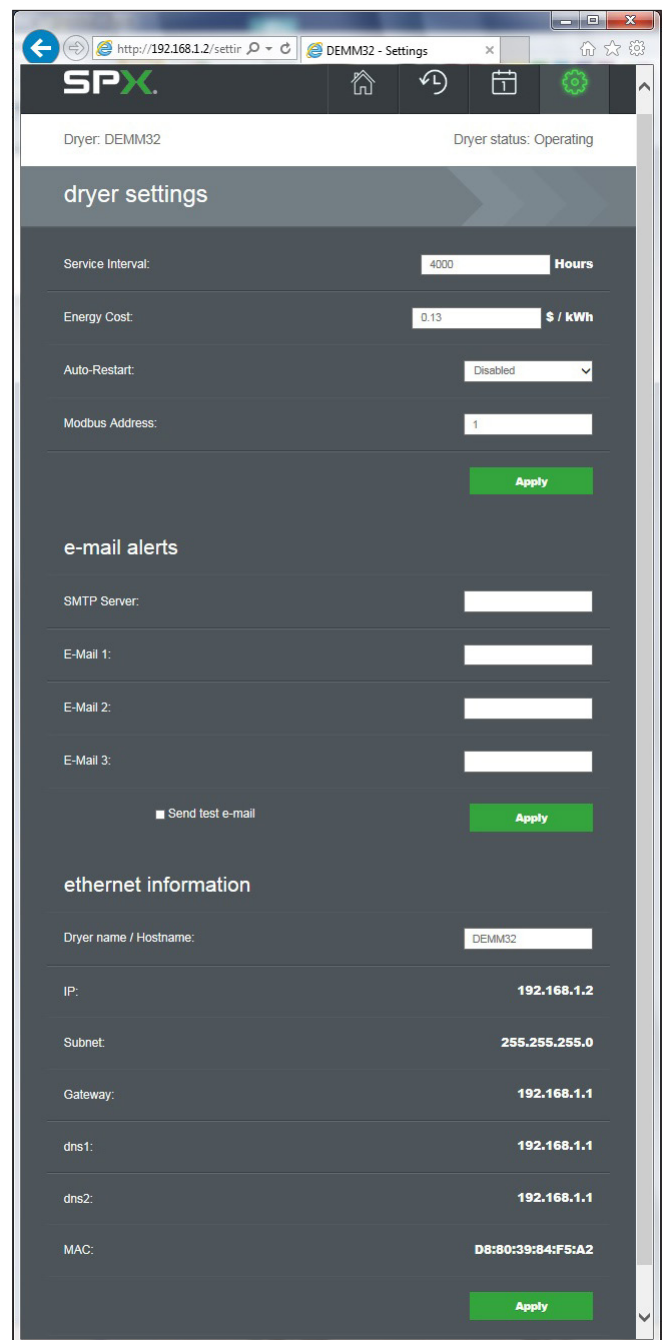
The dryer scheduler page allows the customer to view/edit the daily start/stop times that will be used when operating the dryer in scheduled mode.

Figure 3: Schedule



The dryer settings screen allows the customer to view/edit various dryer set points and setup E-mail alerts that will send an e-mail to up to 3 different e-mail addresses whenever an alarm or warning occurs on the dryer.

Figure 4: Settings



2. Modbus TCP

The Modbus TCP connection allows you to continuously monitor the dryer from a DCS system which implements a Modbus TCP master. The dryer controller implements a ModbusTCP server on port 502. The following Modbus register table provides a list of data that is available.

Modbus Registers

Holding Register		Name	Units	Description
Reference	Address			
40001	0x0000	DRYER_STATUS	Status ID	Status ID for the dryer
40002	0x0001	ALARM_STATUS	Flag Bits	Alarm flag bits
40003	0x0002	WARNING_STATUS	Flag Bits	Warning flag bits
40004	0x0003	RESERVED	N/A	Reserved
40005	0x0004	SERVICE_TIMER	Hours	Timer to service
40006	0x0005	TOTAL_TIMER	Hours	Total operating hours
40007	0x0006	EVAPORATOR_INLET_TEMP	1/10th Degree Celsius	Evaporator inlet temperature
40008	0x0007	DISCHARGE_TEMP	1/10th Degree Celsius	Discharge temperature
40009	0x0008	DRYER_LOAD	%	Dryer load
40010	0x0009	SAVINGS	Dollars / Euros	Energy savings
40011	0x000A	EVAPORATOR_OUTLET_TEMP	1/10th Degree Celsius	Evaporator outlet temperature
40012	0x000B			
40013	0x000C			
40014	0x000D			
40015	0x000E			
40016	0x000F			
40017	0x0010	DRYER_MODEL	Model_ID	Dryer model
40018	0x0011	DRYER_MODE	Mode_ID	Dryer mode
40019	0x0012	SERVICE_INTERVAL	Hours	Service interval
40020	0x0013	AUTO_RESTART	Boolean	Auto-restart (0=Disabled, 1=Enabled)
40021	0x0014	UI_LANGUAGE	Language_ID	User interface language
40022	0x0015	RESERVED	N/A	Reserved
40023	0x0016	RESERVED	N/A	Reserved
40024	0x0017	ENERGY_COST	Integer	Energy cost (Cost / kWh)
40025	0x0018	AUDIBLE_ALARM	Boolean	Audible Alarm (0=Disabled, 1=Enabled)
40026	0x0019	MODBUS_ADDRESS	Integer	Modbus Address
40027	0x001A	FULL_POWER	Watts	Full load power
40028	0x001B			
40029	0x001C			
40030	0x001D			
40031	0x001E			
40032	0x001F			
40033	0x0020	ALARM_MSG_1	Integer	Alarm message #1 phrase id
40034	0x0021	ALARM_MSG_2	Integer	Alarm message #2 phrase id
40035	0x0022			
40036	0x0023			
40037	0x0024			
40038	0x0025			
40039	0x0026			
40040	0x0027			
40041	0x0028	INPUT_STATUS	Flag Bits	Digital Input Status
40042	0x0029	OUTPUT_STATUS	Flag Bits	Digital Output Status
40043	0x002A	ANALOGI01	1/10th Degree Celsius	Analog Input [0]
40044	0x002B	ANALOGI11	1/10th Degree Celsius	Analog Input [1]
40045	0x002C	ANALOGI21	1/10th Degree Celsius	Analog Input [2]
40046	0x002D	PV	1/10th Degree Celsius	Process value
40047	0x002E	P	Integer	P Term
40048	0x002F	I	Integer	I Term
40049	0x0030	D	Integer	D Term
40050	0x0031	FIXED_LOAD	Seconds	Fixed cycle load period
40051	0x0032	FIXED_UNLOAD	Seconds	Fixed cycle unload period
40052	0x0033	FIXED_TIME	Seconds	Fixed mode timeout period
40053	0x0034	DELTA_PID_CALC	1/10th Degree Celsius	PID calculation set point
40054	0x0035	DELTA_PID_CTRL	1/10th Degree Celsius	PID control set point

Modbus Register Details

Page 1 of 3

Dryer Status		
Register	40001	
Decimal	Hex	Description
0	0x0000	Standby
1	0x0001	Fixed
2	0x0002	PID
3	0x0003	Reserved
4	0x0004	Reserved
5	0x0005	Reserved
6	0x0006	Reserved
7	0x0007	Reserved

Dryer Alarm Flags		
Register	40002	
Bit	Mask	Description
0	0x0001	High Discharge Temperature
1	0x0002	High Refrigerant Pressure
2	0x0004	Low Refrigerant Pressure
3	0x0008	Compressor #1
4	0x0010	Compressor #2
5	0x0020	Oil Protection #1
6	0x0040	Oil Protection #2
7	0x0080	Phase Reversal
8	0x0100	Phase Loss
9	0x0200	Evaporator Temperature Sensor Failure
10	0x0400	Glycol Temperature Sensor Failure
11	0x0800	Evaporator Outlet Temperature Sensor Failure
12	0x1000	Discharge Temperature Sensor failure
13	0x2000	High Super Heat
14	0x4000	Reserved
15	0x8000	Reserved

Dryer Warning Flags		
Register	40003	
Bit	Mask	Description
0	0x0001	High Evaporator Temperature
1	0x0002	High Glycol Temperature
2	0x0004	Heater #1
3	0x0008	Heater #2
4	0x0010	Drain #1
5	0x0020	Drain #2
6	0x0040	Filter #1
7	0x0080	Filter #2
8	0x0100	Reserved
9	0x0200	Reserved
10	0x0400	Reserved
11	0x0800	Reserved
12	0x1000	Reserved
13	0x2000	Reserved
14	0x4000	Reserved
15	0x8000	Reserved

Modbus Register Details

Page 2 of 3

Dryer Model		
Register	40017	
Decimal	Hex	Description
0	0x0000	Non-Cycling MRD
1	0x0001	Non-Cycling LRD
2	0x0002	ES-MRD 90
3	0x0003	ES-MRD 120
4	0x0004	ES-MRD 140
5	0x0005	ES-MRD 190
6	0x0006	ES-MRD 245
7	0x0007	ES-MRD 280
8	0x0008	ES-MRD 360
9	0x0009	ES-MRD 450
10	0x000A	ES-MRD 540
11	0x000B	ES-MRD 675
12	0x000C	DEMM 800
13	0x000D	DEMM 1000
14	0x000E	DEMM 1250
15	0x000F	DEMM 1500
16	0x0010	DEMM 1750
17	0x0011	DEMM 2000
18	0x0012	DEMM 2500
19	0x0013	DEMM 3000
20	0x0014	Reserved
21	0x0015	Reserved
22	0x0016	Reserved
23	0x0017	Reserved
24	0x0018	Reserved
25	0x0019	Reserved
26	0x001A	Reserved
27	0x001B	Reserved
28	0x001C	Reserved
29	0x001D	Reserved
30	0x001E	Reserved
31	0x001F	Reserved

Dryer Mode		
Register(s)	40018	
Decimal	Hex	Description
0	0x0000	Manual Mode
1	0x0001	Scheduled Mode
2	0x0002	Remote Mode
3	0x0003	Reserved
4	0x0004	Reserved
5	0x0005	Reserved
6	0x0006	Reserved
7	0x0007	Reserved

Modbus Register Details

Page 3 of 3

UI Language		
Register(s)	40021	
Decimal	Mask	Description
0	0x0000	English
1	0x0001	Spanish
2	0x0002	French
3	0x0003	German
4	0x0004	Portuguese
5	0x0005	Italian
6	0x0006	Polish
7	0x0007	Danish
8	0x0008	Dutch
9	0x0009	Norwegian
10	0x000A	Finnish
11	0x000B	Swedish
12	0x000C	Czech
13	0x000D	Reserved
14	0x000E	Reserved
15	0x000F	Reserved

3.0 MAINTENANCE

3.1 Daily

- A. Check separator to make sure the automatic drain is discharging.

3.2 Weekly

- A. Blow down the separator weekly by pushing the test button on the control panel.

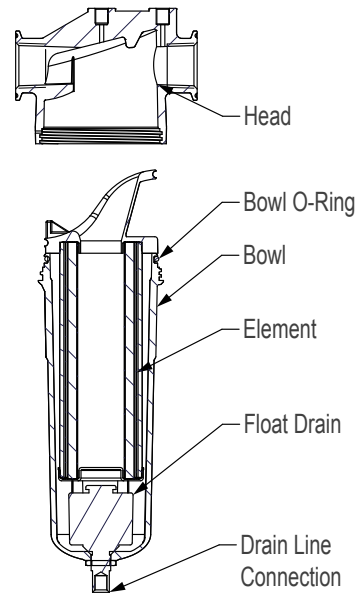
3.3 Monthly

- A. Clean off the accumulated dust and dirt on the condenser coil monthly.

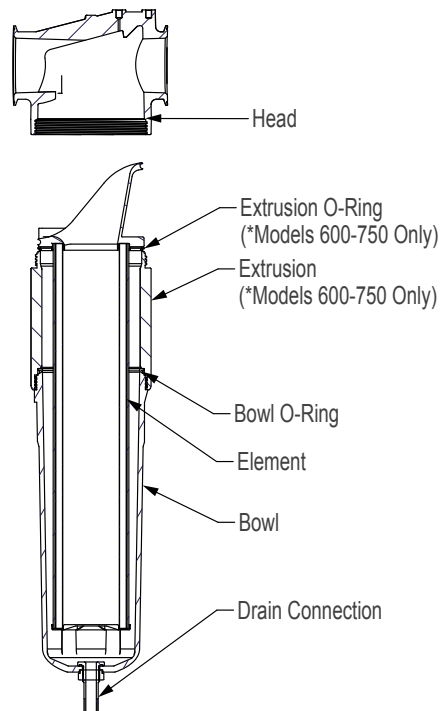
3.4 Annually

- A. Replace the filter element in the moisture separator annually. Also replace the cold coalescing filter element annually where applicable.
- B. Replace the drain service unit annually.
- C. Maintenance kits are available to facilitate annual maintenance.

Models 100-150



Models 200-750



4.0 TROUBLESHOOTING GUIDE: MODELS 100-150

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
A) Water downstream of dryer	<ol style="list-style-type: none"> 1. Residual free moisture remaining in downstream pipelines 2. Air bypass system is open 3. Inlet and Outlet connections are reversed 4. Air lines downstream of dryer are exposed to temperatures below the dew point. 5. Excessive free moisture (bulk liquid) at dryer inlet. 6. Condensate not being drained Drain mechanism is clogged or inoperative. 7. Drain line is restricted or frozen. 8. Electric drains-timer not set to allow for sufficient condensate removal. 9. Dryer overloaded resulting in elevated dew point. 10. Refrigeration system not functioning 	<p>Blow out system with dry air</p> <p>Check valve positions Check for correct connection Insulate or heat trace air lines exposed to low ambients or dry air to lower dew point Install separator ahead of dryer</p> <p>Replace drain mechanism if inoperative.</p> <p>Open drain line. Electric drains-reset time so that all liquid is discharged Check inlet air temperature and pressure, flow rate (compressor capacity) and ambient air or water temperature. See D below</p>
B) High pressure drop across dryer	<ol style="list-style-type: none"> 1. Excessive air flow 2. Freezing of moisture in evaporator because of refrigeration system fault 3. Separator filter element clogged 	<p>Check flow rate See D below</p> <p>Replace filter element</p>
C) Dew point indicator in red area	<ol style="list-style-type: none"> 1. Dryer overloaded resulting in high air outlet temperature 2. Refrigeration system not functioning properly resulting in high air outlet temperature 	<p>See A 7</p> <p>See D below</p>
D) Refrigeration system not functioning properly <ol style="list-style-type: none"> 1. Power on light off 2. Refrigeration compressor cycles on and off 	<ol style="list-style-type: none"> a. Power failure b. Line disconnect switch open c. Blown fuses, open breaker d. Faulty wiring, loose terminals <ol style="list-style-type: none"> a. High or low ambient conditions b. Air-cooled - Dirty, clogged condenser fins, obstructed flow across condenser, faulty fan motor or fan control switch. 	<p>Check for power to unit Close disconnect switch Check for continuity Have electrician check electrical connections.</p> <p>Check min./max. temperature ranges</p> <p>Clean condenser and check for free air flow, if problem persists contact qualified refrigeration repairman or manufacturer's service department.</p>

TROUBLESHOOTING GUIDE: MODELS 200-750

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
A) Water downstream of dryer	<ol style="list-style-type: none"> 1. Residual free moisture remaining in downstream pipelines 2. Air bypass system is open 3. Inlet and Outlet connections are reversed 4. Air lines downstream of dryer are exposed to temperatures below the dew point. 5. Excessive free moisture (bulk liquid) at dryer inlet. 6. Condensate not being drained 7. Dryer overloaded resulting in elevated dew point. 8. Refrigeration system not functioning 	<ol style="list-style-type: none"> 1. Blow out system with dry air 2. Check valve positions 3. Check for correct connection 4. Insulate or heat trace air lines exposed to low ambients or dry air to lower dew point 5. Install separator ahead of dryer 6. See C below 7. See C below 8. See C below
B) High pressure drop across dryer	<ol style="list-style-type: none"> 1. Excessive air flow 2. Freezing of moisture in evaporator because of refrigeration system fault 3. Filter loaded with solid particulates 	<ol style="list-style-type: none"> 1. Check flow rate 2. See C below 3. Replace filter element
C) Checkpoint faults <ol style="list-style-type: none"> 1. Power on light off 2. Compressor on light off 3. Alarm/Service alert light on <ul style="list-style-type: none"> -check Display for active conditions SERVICE DRYER LOW PRESSURE HIGH PRESSURE NOTE: If high refrigerant pressure occurs, switch must be manually reset HIGH TEMPERATURE (also observed as high reading on temperature indicator) DRAIN COMPRESSOR HEATER TEMP SENSOR 	<ol style="list-style-type: none"> a. Power failure; open circuit a. Compressor commanded off by manual switch or programmed schedule b. Open circuit c. Control circuit open on high or low pressure cutout a. Service interval specified has elapsed a. Hot gas bypass valve requires adjustment b. Low on refrigerant a. Lack of condenser cooling <ul style="list-style-type: none"> Air-cooled - Ambient temperature too high, clogged condenser fins, obstructed flow across condenser, faulty fan motor or fan control switch. Water-cooled - Cooling temperature too high, flow too low, clogged strainer, faulty water regulating valve a. Dryer overloaded b. Refrigeration system off or not cooling sufficiently a. Drain line restricted or frozen b. Drain mechanism faulty a. Faulty compressor contactor. b. Faulty N.O. auxiliary contact on compressor contactor. a. Faulty compressor contactor. b. Faulty N.C. auxiliary contact on compressor contactor. a. Temperature sensor or wiring to sensor is open (none of LED's in the temperature display will be illuminated). b. Temperature sensor or wiring to sensor is shorted (all of the LEDs in the temperature display will be illuminated). 	<ol style="list-style-type: none"> a. Check for power to dryer a. Check current command status b. Check power to compressor c. Check display for fault a. Perform scheduled service a. Contact qualified technician or manufacturer's service department Check air temperature 6" in front of condenser; Clean condenser and check for free air flow; Check fan and switch operation Check cooling medium temperature and flow, clean strainer, check valve operation a. Check compressed air flow, temperature, and pressure b. Check power to unit, power to compressor, Low or High pressure faults Have qualified technician evaluate system a. Open drain line b. Turn 3-way valve to horizontal position and open petcock for manual draining. Rebuild drain mechanism. a. Check wiring and operation of contactor. b. Check wiring and operation of auxiliary contact. a. Check wiring and operation of contactor. b. Check wiring and operation of auxiliary contact. a. Replace sensor or repair wiring. b. Replace sensor or repair wiring.

NOTE: After fault correction, press reset button to clear display

5.0 REFERENCE

SIZING

Determining dryer capacity at actual operating conditions

To determine the maximum inlet flow capacity of a dryer at various operating conditions, multiply the rated capacity from Table 1 by the multipliers shown in Table 2.

Example: How many scfm can an air-cooled model 400 handle when compressed air to be dried is at 200 psig and 100°F; ambient air temperature is 80°F?

Answer: $400 \times 1.22 \times 1.12 = 547$ scfm.

TABLE 1

Rated capacity (scfm) and pressure drop @ 100 psig inlet pressure, 100°F inlet temperature, and 100°F ambient temperature

MODEL		100	125	150	200	250
Rated capacity of air-cooled models (scfm)	60 Hz	100	125	150	200	250
	50 Hz	84	105	125	170	210

MODEL		300	400	500	600	750
Rated capacity of air-cooled models (scfm)	60 Hz	300	400	500	600	750
	50 Hz	250	340	420	540	630

TABLE 2

Air capacity correction factors (Multipliers)

INLET COMPRESSED AIR CONDITIONS						
INLET PRESSURES		INLET TEMPERATURES				
psig	kgf/cm ²	80°F 27°C	90°F 32°C	100°F 38°C	110°F 43°C	120°F 49°C
50	3.5	1.35	1.05	0.84	0.69	0.56
80	5.6	1.50	1.17	0.95	0.79	0.66
100	7.0	1.55	1.23	1.00	0.82	0.70
125	8.8	1.63	1.31	1.07	0.91	0.74
150	10.5	1.70	1.37	1.13	0.95	0.80
175	12.3	1.75	1.42	1.18	0.99	0.84
200	14.0	1.80	1.47	1.22	1.03	0.89

COOLING MEDIUM*		
AMBIENT TEMPERATURE		MULTIPLIER
°F	°C	
80	27	1.12
90	32	1.06
100	38	1.00
110	43	0.94

*Air-cooled models; water-cooled models use 1.15 multiplier if cooling water is below 35°C, 95°F.

ENGINEERING DATA GUIDE: MODELS 100-250

Air System Data						
Rated Flow Capacity at 100°F, 100 psig Inlet, 100°F Ambient Temperature		100	125	150	200	250
Maximum / Minimum Inlet Air Pressure (compressed air at inlet to dryer)	232 psig (16 barg) / 30 psig (2.1 barg)					
Maximum / Minimum Inlet Air Temperature (compressed air at inlet to dryer)	120°F (49°C) / 40°F (4°C)					
Maximum / Minimum Ambient Temperature	110°F (43°C) / 40°F (4°C)					
Outlet Air Temperature (nominal at rated conditions)	85°F (29°C)					
Refrigeration System Data						
Refrigeration Capacity @ 35°F Evaporator & 100°F Ambient (BTU/hr)	60 Hz	4510	7130	8900	15200	
	50 Hz	4600	7200	7420	12700	
Refrigerant Type	R-134A					
Refrigerant Charge	See Data Tag on Dryer					
Suction Pressure Setting - Hot Gas Bypass Valve (psig)	30.5 psig (2.1 barg)					
Compressor Control Ranges (out-in)	High	N/A			281 - 190 psig (19.4 - 13.1 barg)	
	Low	N/A			22 - 34 psig (1.5 - 2.3 barg)	
Air-Cooled Condenser						
Air Flow Across Condenser (cfm) (air-cooled models)	60 Hz	300	450	710	1070	
	50 Hz	250	370	590	890	
Condenser Fan Switch Setting (in-out)	Fan 1	110 - 70 psig (7.6 - 4.8 barg)			113 - 78 psig (7.8 - 5.4 barg)	
	Fan 2	N/A				
Water-Cooled Condenser						
Water Regulating Valve Setting	N/A			135 psig (9.3 barg)		
Required Available Water Pressure Differential	N/A			40 psig (2.8 barg) - minimum		
Flow Required with 85°F Cooling Water (gallons per minute)	60 Hz	N/A			1.1	2.0
	50 Hz	N/A			0.9	1.7
Electrical Data						
Nominal Voltage	115/1/60			208-230/3/60		
Min. - Max. Voltage	104 - 127			187 - 253		
Input Power @ Rated Flow (watts)	875	1070	1100	1255	1962	
Rated Load Amps**	9.5	13.0	13.0	7.5	10.4	
Locked Rotor Amps**	44.0	70.0	70.0	51.0	66.0	
Minimum Circuit Ampacity	12.8	18.0	18.0	10.5	15.9	
Branch Circuit Fuse Size (amps)	20	25	25	15	20	
Resistance (ohms)	4.3 S / 0.6 R	1.06 S / 0.42 R	1.06 S / 0.42 R	1.8	1.3	
Nominal Voltage	208-230/1/60			460/3/60		
Min. - Max. Voltage	187 - 253			414 - 506		
Input Power @ Rated Flow (watts)	875	1070	1100	1255	1962	
Rated Load Amps**	4.4	6.5	6.5	3.6	4.7	
Locked Rotor Amps**	20.8	35.0	35.0	25.0	33.0	
Minimum Circuit Ampacity	6.0	9.1	9.1	5.2	7.5	
Branch Circuit Fuse Size (amps)	15	15	15	15	15	
Resistance (ohms) Main/Start	7.55 S / 2.52 R	3.95 S / 1.47 R	3.95 S / 1.47 R	7.4	5.0	
Nominal Voltage	240/1/50			575/3/60		
Min. - Max. Voltage	216 - 264			518 - 633		
Input Power @ Rated Flow (watts)	612	749	770	1255	1962	
Rated Load Amps	4.5	5.0	5.0	3.6	4.7	
Locked Rotor Amps	21.0	30.0	30.0	25.0	33.0	
Minimum Circuit Ampacity	6.2	7.3	7.3	4.2	6.0	
Branch Circuit Fuse Size (amps)	15	15	15	15	15	
Resistance (ohms)	12.7 S / 2.7 R	4.38 S / 1.92 R	4.38 S / 1.92 R	7.4	5.0	
Nominal Voltage	N/A			380-420/3/50		
Min. - Max. Voltage	N/A			342 - 462		
Input Power @ Rated Flow (watts)	N/A			1002	1613	
Rated Load Amps**	N/A			3.6	4.7	
Locked Rotor Amps**	N/A			25.0	33.0	
Minimum Circuit Ampacity	N/A			5.2	7.5	
Branch Circuit Fuse Size (amps)	N/A			15	15	
Resistance (ohms)	N/A			7.4	5.0	

* For 60 Hz, 35°F Evaporator, 100°F Ambient; for 50Hz, 35°F Evaporator, 77°F Ambient

** Compressor Only

ENGINEERING DATA GUIDE: MODELS 300-750

Air System Data						
Rated Flow Capacity at 100°F, 100 psig Inlet, 100°F Ambient Temperature		300	400	500	600	750
Maximum / Minimum Inlet Air Pressure (compressed air at inlet to dryer)		232 psig (16 barg) / 30 psig (2 barg)				
Maximum / Minimum Inlet Air Temperature (compressed air at inlet to dryer)		120°F (49°C) / 40°F (4°C)				
Maximum / Minimum Ambient Temperature		110°F (43°C) / 40°F (4°C)				
Outlet Air Temperature (nominal at rated conditions)		85°F (29°C)				
Refrigeration System Data						
Refrigeration Capacity @ 35°F Evaporator & 100°F Ambient (BTU/hr)	60 Hz	15200	19200	22000	30500	
	50 Hz	12700	16000	18300	25400	
Refrigerant Type		R-134A				
Refrigerant Charge		See Data Tag on Dryer				
Suction Pressure Setting - Hot Gas Bypass Valve (psig)		30.5 psig (2.1 barg)				
Compressor Control Ranges (out-in)	High	281 - 190 psig (19.4 - 13.1 barg)				
	Low	22 - 34 psig (1.5 - 2.3 barg)				
Air-Cooled Condensers						
Air Flow Across Condenser (cfm) (air-cooled models)	60 Hz	1070	2470	1680	2170	
	50 Hz	890	2060	1400	1810	
Condenser Fan Switch Setting (in-out)	Fan 1	113 - 78 psig (7.8 - 5.4 barg)				
	Fan 2	N/A	183 - 124 psig (12.6 - 8.6 barg)			
Water-Cooled Condensers						
Water Regulating Valve Setting		135 psig (9.3 barg)				
Required Available Water Pressure Differential		40 psig (2.8 barg) - minimum				
Flow Required with 85°F Cooling Water (gallons per minute)	60 Hz	2.0	2.1	4.9	6.8	
	50 Hz	1.7	1.8	4.1	5.6	
Electrical Data						
Nominal Voltage		208-230/3/60				
Min. - Max. Voltage		187 - 253				
Input Power @ Rated Flow (watts)		1999	2031	2680	4120	
Rated Load Amps**		10.4		11.4	22.1	
Locked Rotor Amps**		66.0		75.0	115.0	
Minimum Circuit Ampacity		15.9		20.0	30.4	
Branch Circuit Fuse Size (amps)		20		25	45	
Resistance (ohms)		1.3		1.1	0.7	
Nominal Voltage		460/3/60				
Min. - Max. Voltage		414 - 506				
Input Power @ Rated Flow (watts)		1999	2031	2680	4120	
Rated Load Amps**		4.7		5.1	9.6	
Locked Rotor Amps**		33.0		40.0	63.0	
Minimum Circuit Ampacity		7.5		9.6	15.2	
Branch Circuit Fuse Size (amps)		15		15	20	
Resistance (ohms) Main/Start		5.0		4.1	2.7	
Nominal Voltage		575/3/60				
Min. - Max. Voltage		518 - 633				
Input Power @ Rated Flow (watts)		1999	2031	2680	4120	
Rated Load Amps		4.7		5.1	9.6	
Locked Rotor Amps		33.0		40.0	63.0	
Minimum Circuit Ampacity		7.5		7.7	12.2	
Branch Circuit Fuse Size (amps)		15		15	20	
Resistance (ohms)		5.0		4.1	2.7	
Nominal Voltage		380-420/3/50				
Min. - Max. Voltage		342 - 462				
Input Power @ Rated Flow (watts)		1622	1667	1992	2860	
Rated Load Amps**		4.7		5.1	9.6	
Locked Rotor Amps**		33.0		40.0	63.0	
Minimum Circuit Ampacity		7.5		8.1	15.2	
Branch Circuit Fuse Size (amps)		15		15	20	
Resistance (ohms)		5.0		4.1	2.7	

* For 60 Hz, 35°F Evaporator, 100°F Ambient; for 50Hz, 35°F Evaporator, 77°F Ambient

** Compressor Only

DRYER SET POINT TABLE

DIP Switch Settings

DIP Switch	Description	On	Off
1	Evaporator Outlet Temperature Sensor	Disabled	Enabled
2	Status Menu Scrolling	Disabled	Enabled
3	Reserved	N/A	N/A
4	Reserved	N/A	N/A

Dryer Configuration

Description	Units	Lower	Upper	Increment	Default
Service Interval	Hours	0	9999	1	4000
Energy Cost	Decimal	0.00	0.99	0.01	0.13
Total Hours	Hours	0	999999	1	0
Modbus Device Address	Integer	1	247	1	1

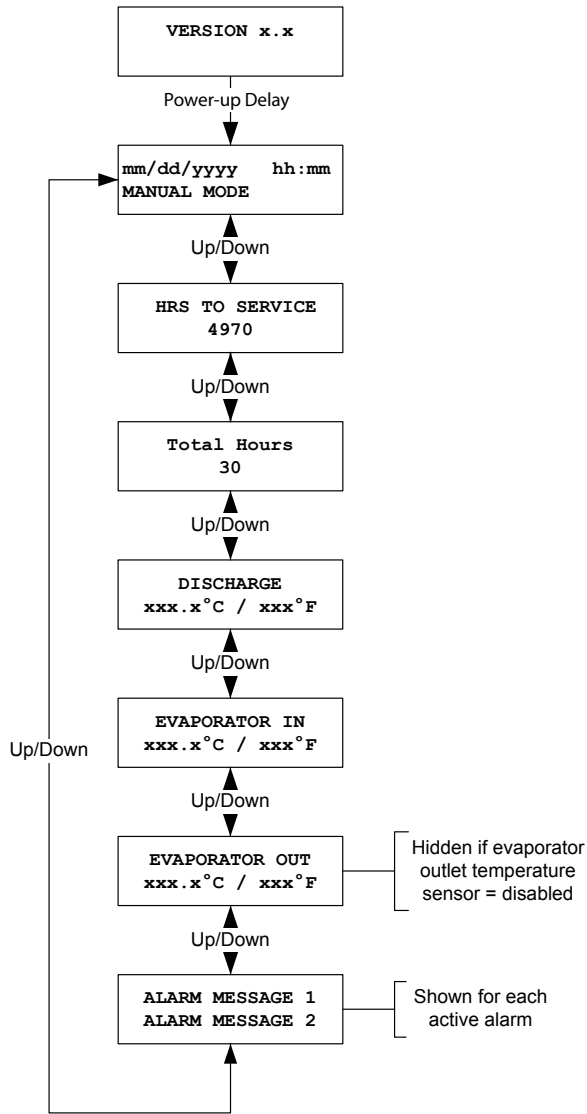
DRYER ALARM TABLE

Alarm Conditions

Alarm Text	Alarm Trigger	Delay	Monitored	Exit Condition	Alarm Action
HIGH PRESSURE	High pressure switch open	1 Second	Always	Manually reset the high pressure switch. Alarm reset button pressed	Halt compressors De-energize alarm relay #1
LOW PRESSURE	Low pressure switch open	3 Minutes	Always	Alarm reset button pressed	Halt compressors De-energize alarm relay #1
COMPRESSOR	Motor protection #1 switch open	1 Second	Primary Compressor On	Alarm reset button pressed	Halt compressors De-energize alarm relay #1
HEATER	Heater switch open	1 Second	Standby	Alarm reset button pressed	De-energize alarm relay #2
DRAIN 1	Drain #1 switch open	1 Second	Dryer On	Alarm reset button pressed	De-energize alarm relay #2
DRAIN 2	Drain #2 switch open	1 Second	Dryer On	Alarm reset button pressed	De-energize alarm relay #2
SERVICE DRYER	Dryer service interval > 0 AND Dryer service timer > Dryer service interval	None	Always	Alarm reset button pressed	De-energize alarm relay #2
EVAPORATOR TEMP SENSOR	Evaporator temperature sensor out of range	1 Second	Always	Alarm reset button pressed	Halt compressors De-energize alarm relay #1

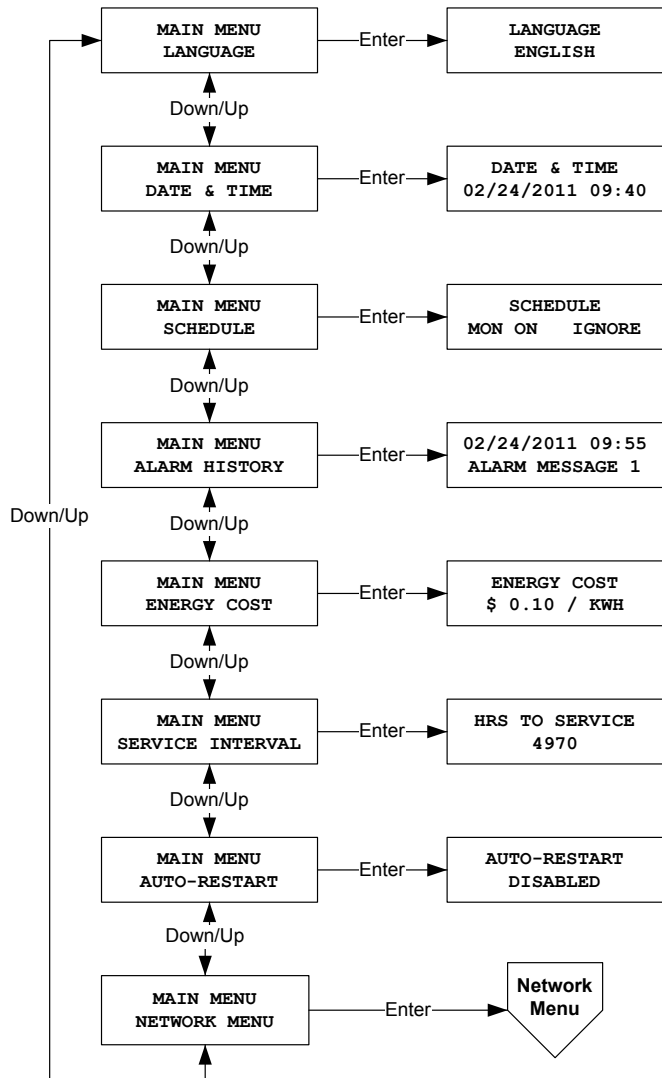
CONTROLLER SCREEN SHOTS

Status Menu Screens



CONTROLLER SCREEN SHOTS

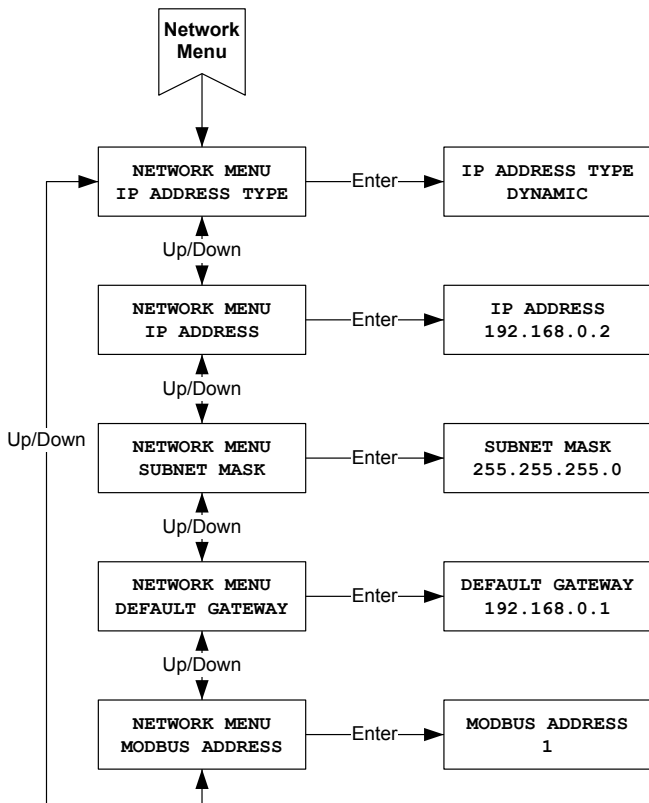
Setup Menu Screens



NOTE: Press & hold ESC button for 3 seconds to enter setup menu.

CONTROLLER SCREEN SHOTS

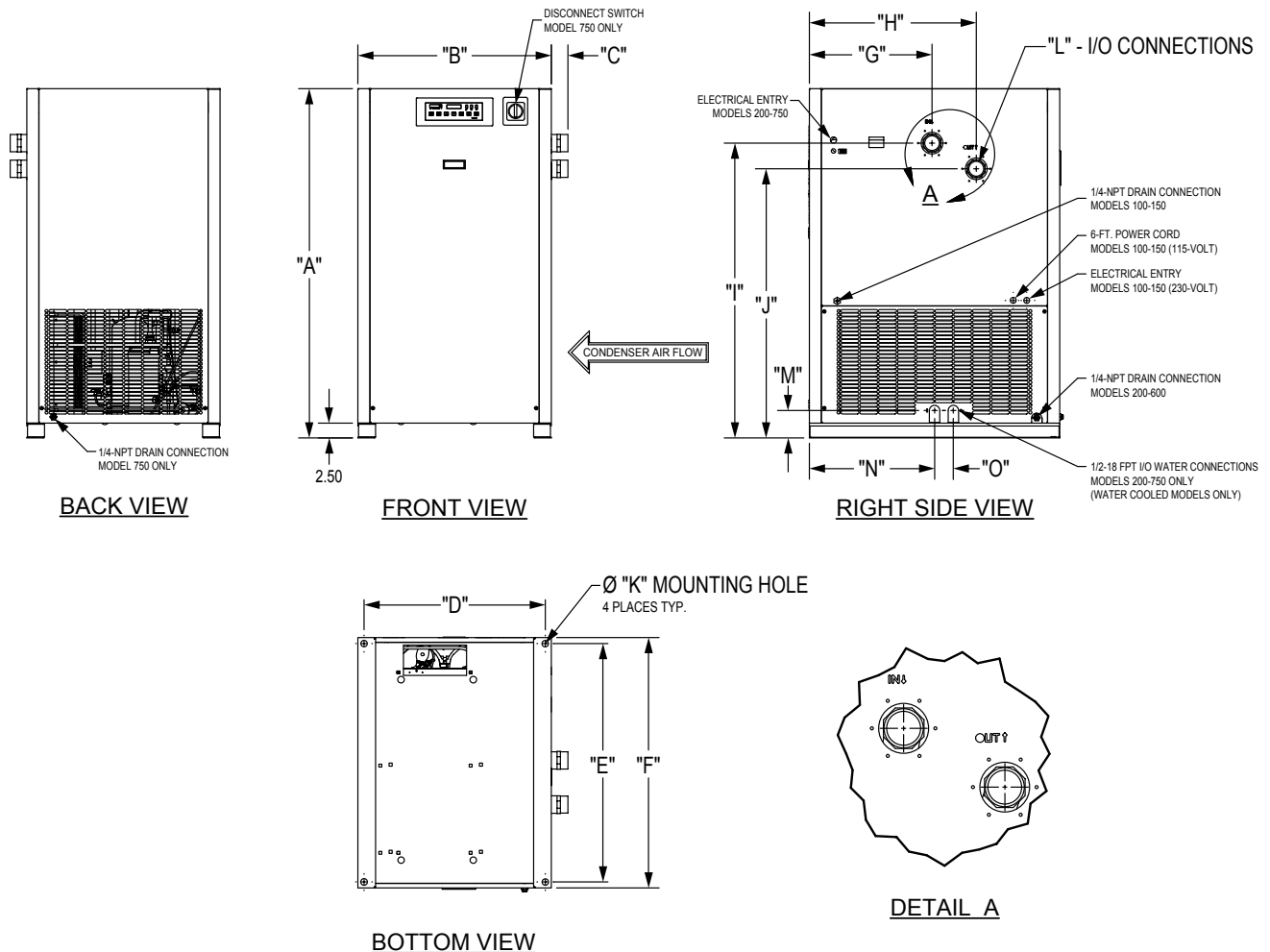
Network Menu Screens



6.0 DIMENSIONS / WEIGHTS

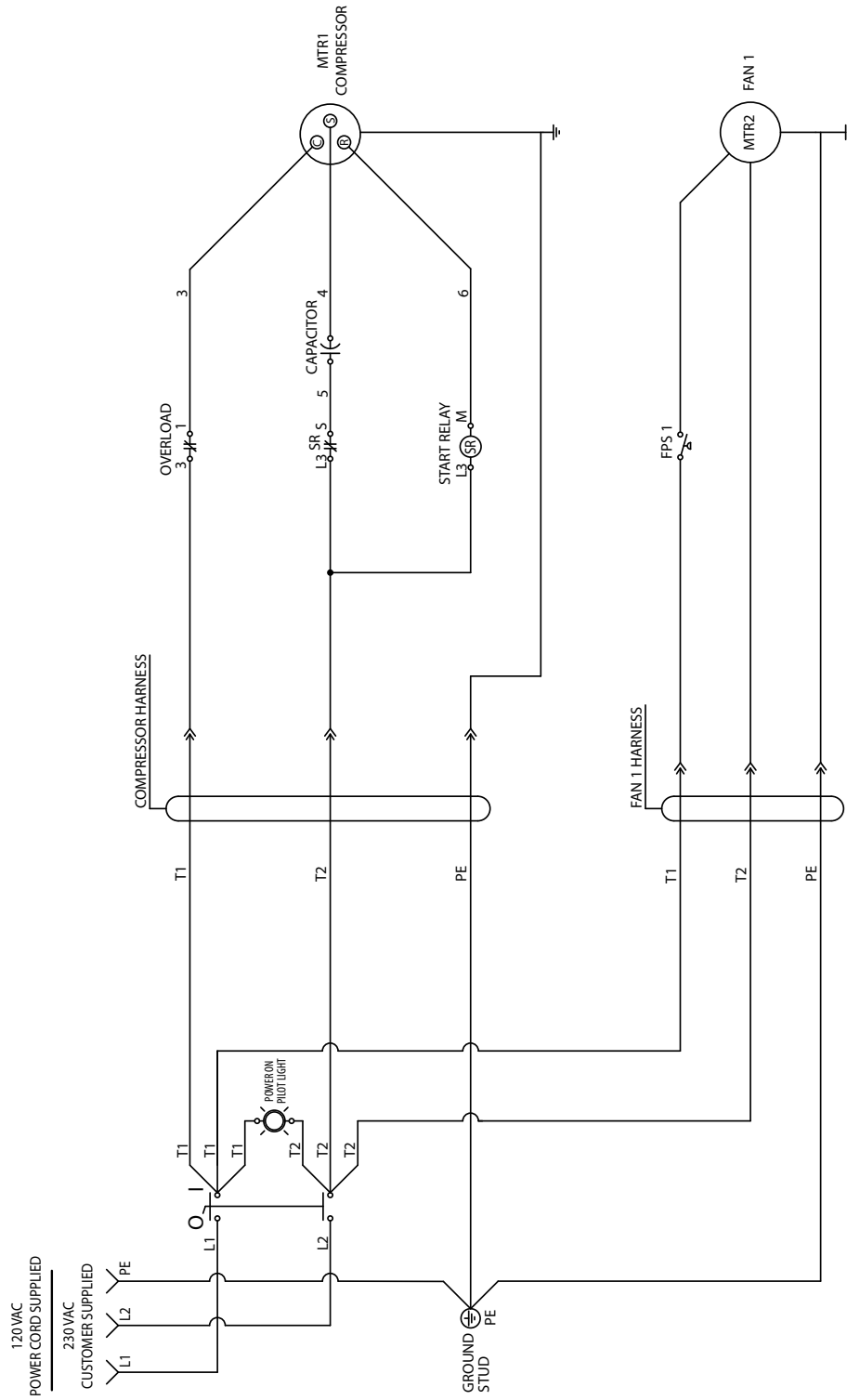
Dimensions, inches (mm)										
Model	100	125	150	200	250	300	400	500	600	750
A	37.56 (954)	37.56 (954)	37.56 (954)	38.60 (980)	38.60 (980)	45.38 (1153)	45.38 (1153)	58.06 (1475)	58.06 (1475)	58.06 (1475)
B	25.62 (651)	25.62 (651)	25.62 (651)	32.15 (817)	32.15 (817)	32.15 (817)	32.15 (817)	32.15 (817)	32.15 (817)	32.15 (817)
C	1.63 (41)	1.63 (41)	1.63 (41)	1.88 (48)	1.88 (48)	1.88 (48)	2.63 (67)	2.77 (70)	2.77 (70)	2.77 (70)
D	23.62 (600)	23.62 (600)	23.62 (600)	30.15 (766)	30.15 (766)	30.15 (766)	30.15 (766)	30.15 (766)	30.15 (766)	30.15 (766)
E	17.62 (448)	17.62 (448)	17.62 (448)	30.15 (766)	30.15 (766)	30.15 (766)	30.15 (766)	39.62 (1006)	39.62 (1006)	39.62 (1006)
F	19.62 (498)	19.62 (498)	19.62 (498)	32.15 (817)	32.15 (817)	32.15 (817)	32.15 (817)	41.62 (1057)	41.62 (1057)	41.62 (1057)
G	9.58 (243)	9.58 (243)	9.58 (243)	7.64 (194)	7.64 (194)	13.51 (343)	16.25 (413)	20.44 (519)	20.44 (519)	20.44 (519)
H	14.96 (380)	14.96 (380)	14.96 (380)	15.80 (401)	15.80 (401)	21.82 (554)	25.68 (652)	27.79 (706)	27.79 (706)	27.79 (706)
I	28.54 (725)	28.54 (725)	28.54 (725)	30.19 (767)	30.19 (767)	29.98 (761)	36.89 (937)	49.06 (1246)	49.06 (1246)	49.06 (1246)
J	25.02 (636)	25.02 (636)	25.02 (636)	26.04 (661)	26.04 (661)	25.74 (654)	32.82 (833)	44.78 (1137)	44.78 (1137)	44.78 (1137)
K	0.31 (7.9)	0.31 (7.9)	0.31 (7.9)	0.31 (7.9)	0.31 (7.9)	0.31 (7.9)	0.31 (7.9)	0.63 (16)	0.63 (16)	0.63 (16)
L	1 MPT	1 MPT	1 MPT	1.5 MPT	1.5 MPT	1.5 MPT	2 MPT	2.5 MPT	2.5 MPT	2.5 MPT
M	N/A	N/A	N/A	4.56 (116)	4.56 (116)	4.56 (116)	4.56 (116)	4.81 (122)	4.81 (122)	4.81 (122)
N	N/A	N/A	N/A	9.84 (250)	9.84 (250)	9.84 (250)	9.84 (250)	20.82 (529)	20.82 (529)	20.82 (529)
O	N/A	N/A	N/A	3.13 (80)	3.13 (80)	3.13 (80)	3.13 (80)	3.13 (80)	3.13 (80)	3.13 (80)
Weight lbs (kg)	210 (95)	238 (108)	243 (110)	407 (185)	435 (197)	472 (214)	510 (231)	679 (308)	701 (318)	738 (335)

NOTE: Dimensions and Weights are for reference only. Request certified drawings for construction purposes.



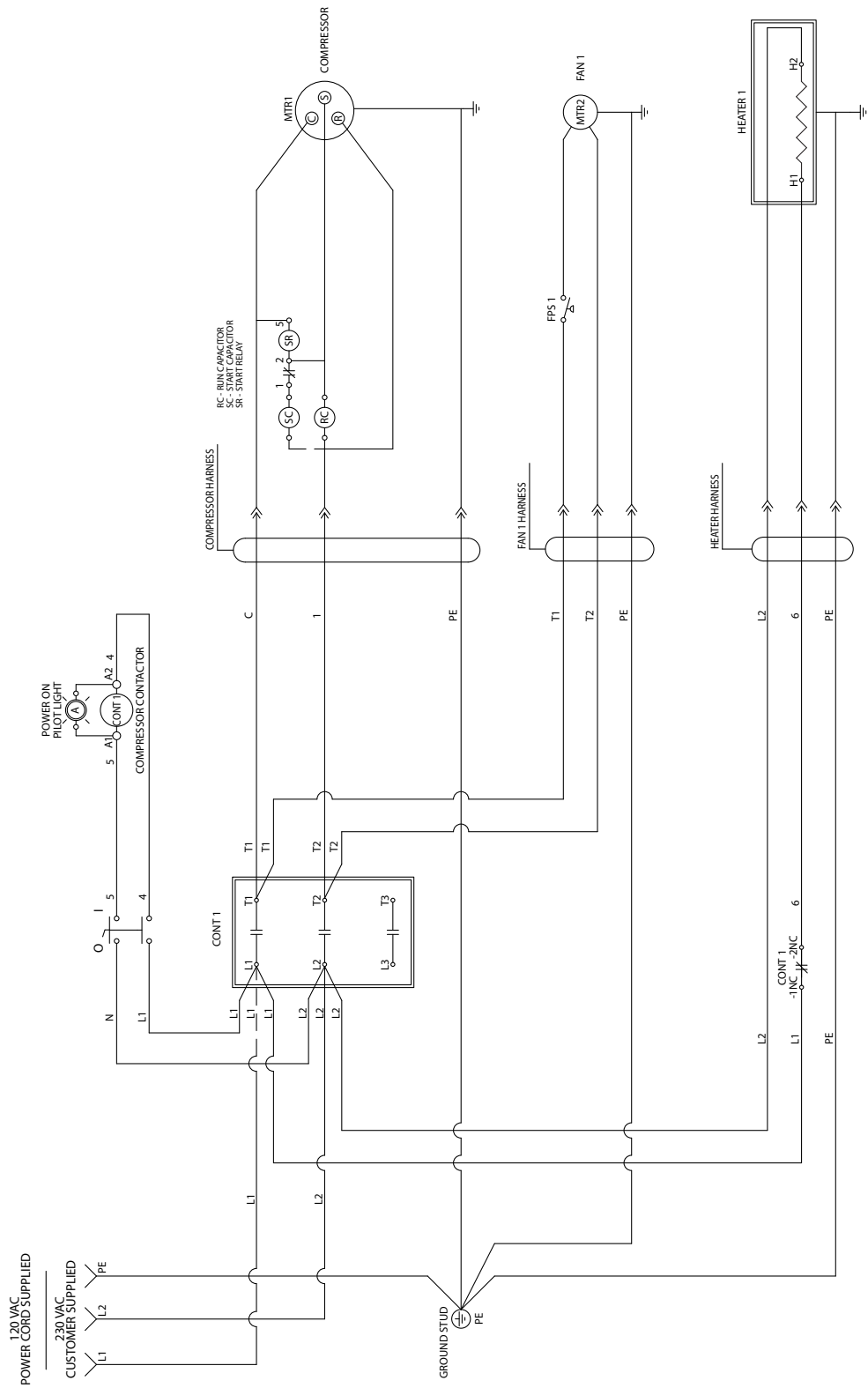
7.0 WIRING DIAGRAM

Model 100 (120/230 VAC)



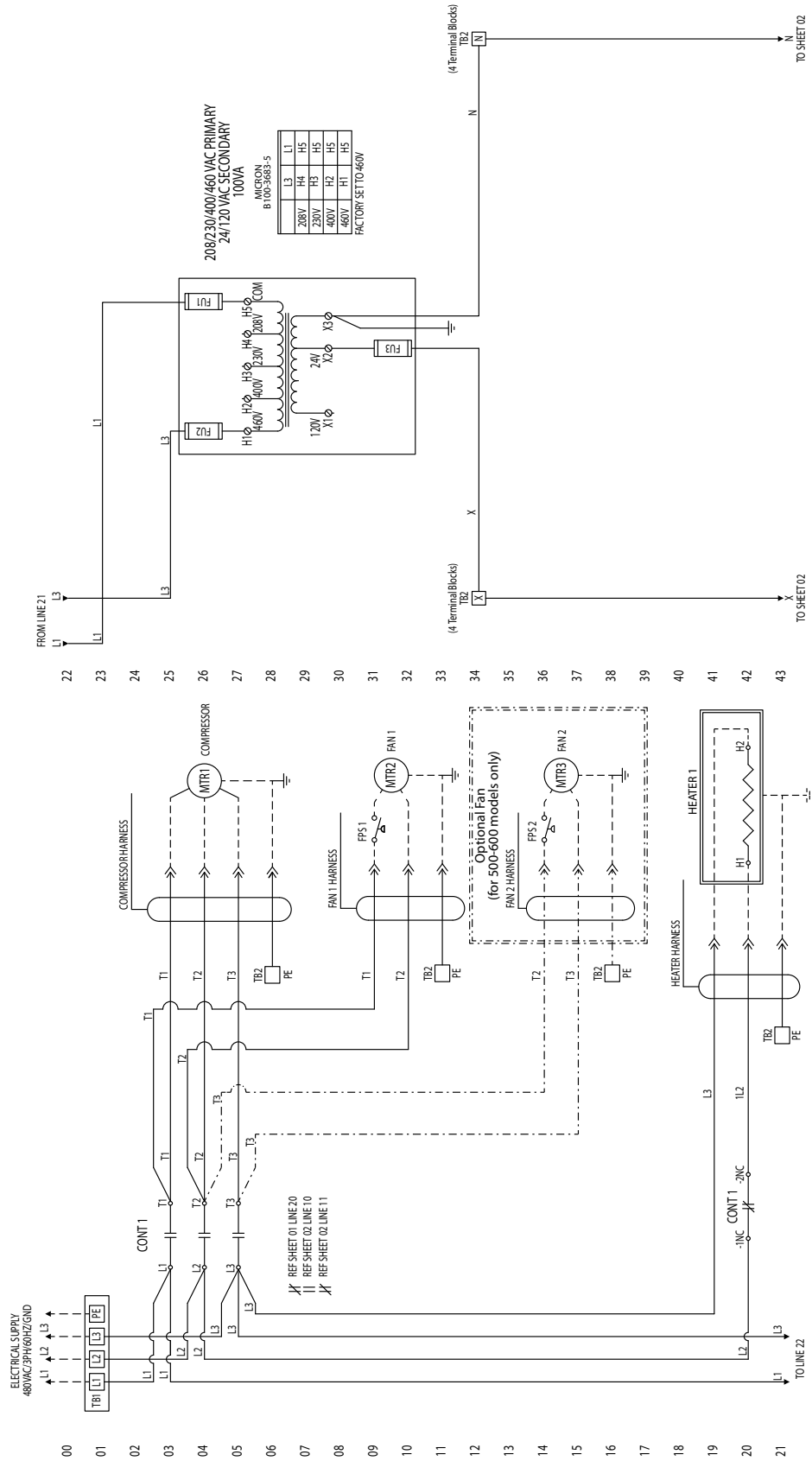
WIRING DIAGRAM

Models 125-150 (120/230 VAC)



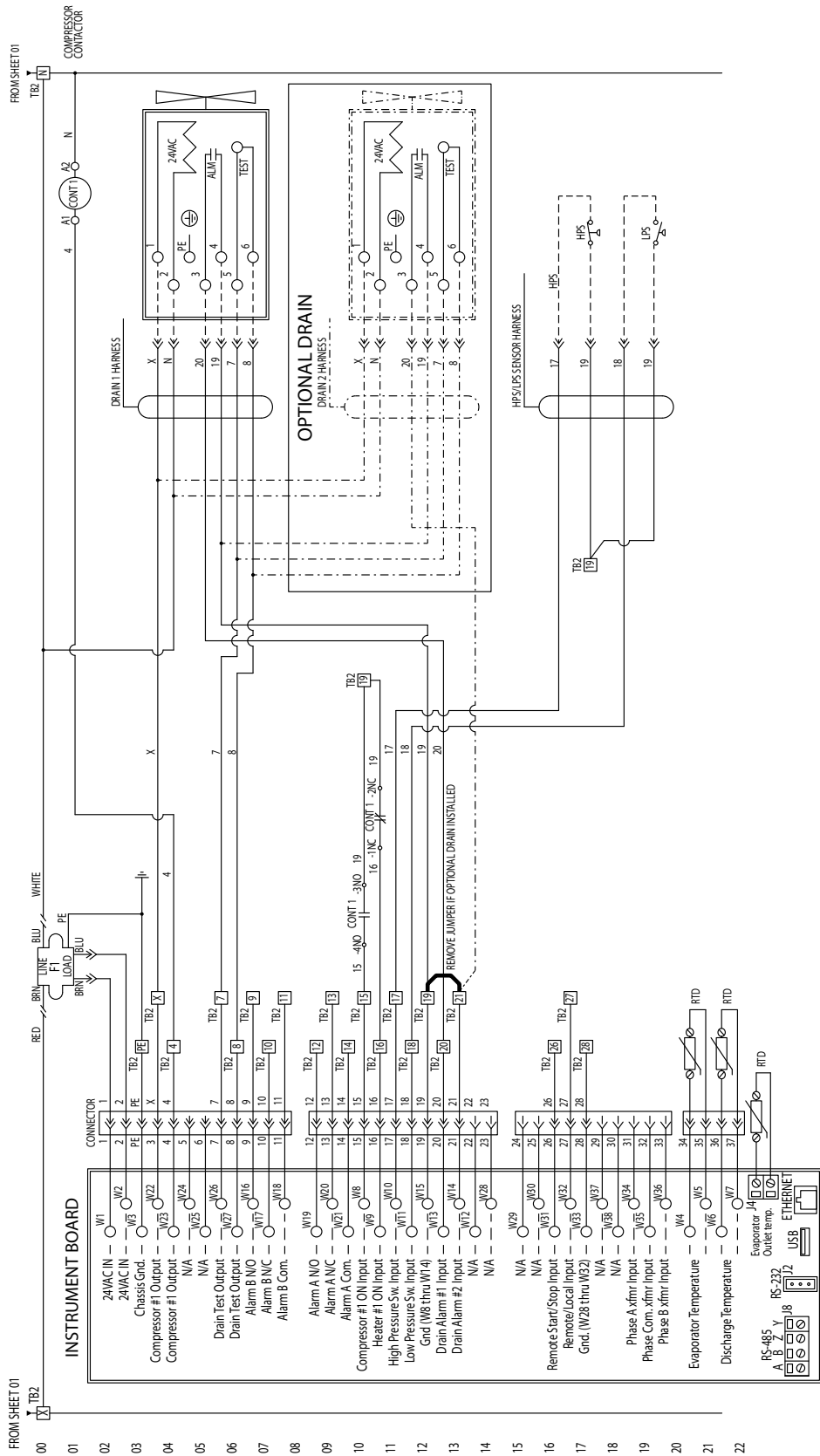
WIRING DIAGRAM

Models 200-600 (460 VAC)
Sheet 1 of 2



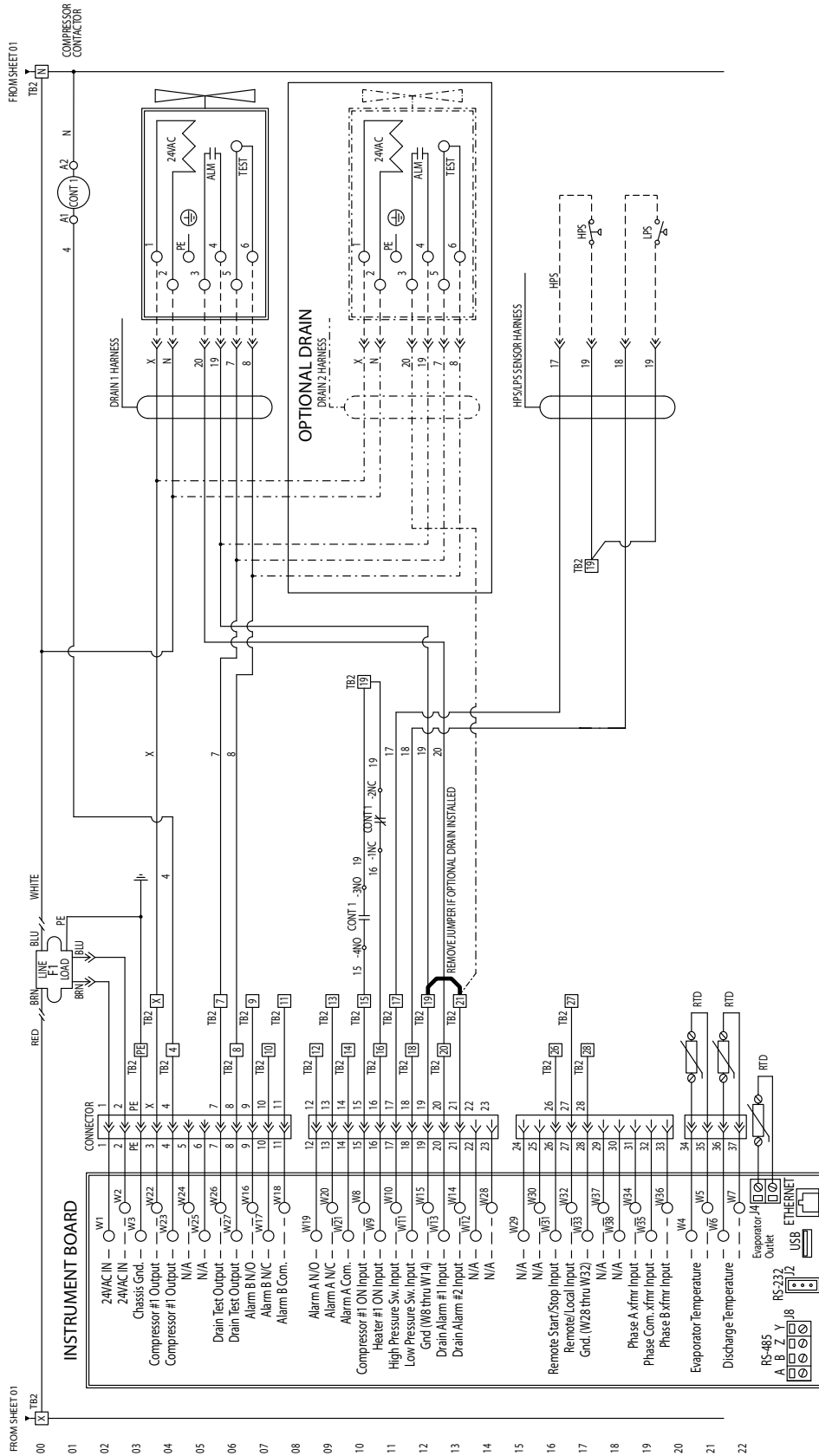
WIRING DIAGRAM

Models 200-600 (460 VAC)
Sheet 2 of 2



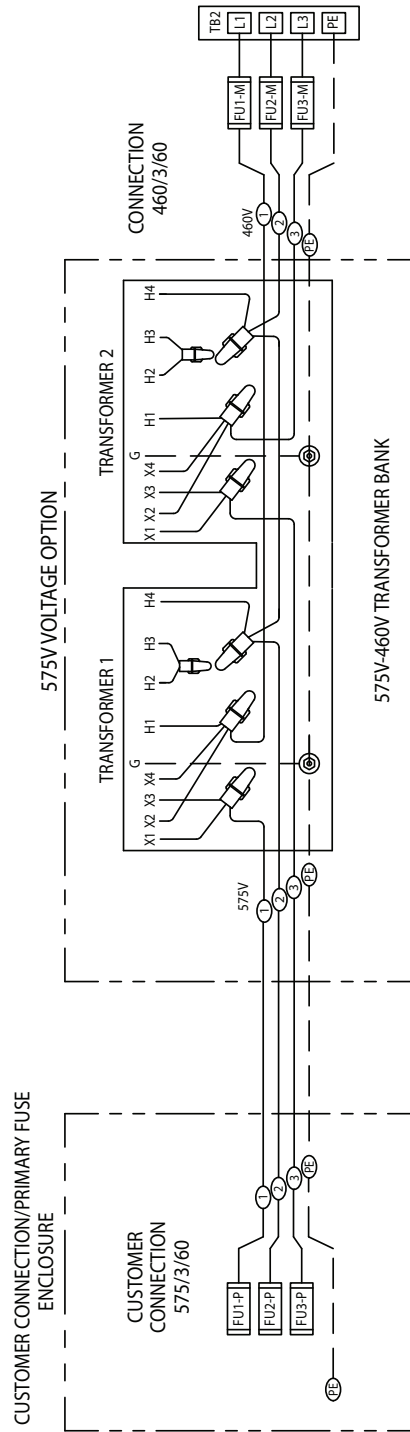
WIRING DIAGRAM

Model 750 (460 VAC)
Sheet 2 of 2



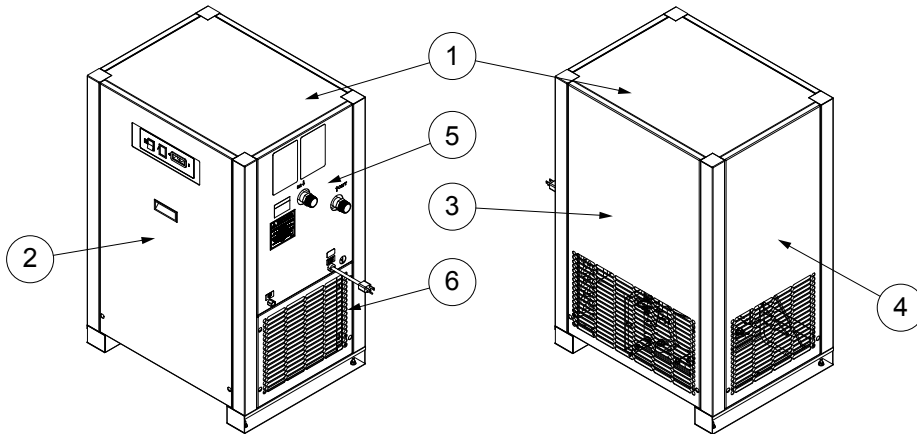
WIRING DIAGRAM

Models 200-750, 575-460/3/60 Transformer Pack



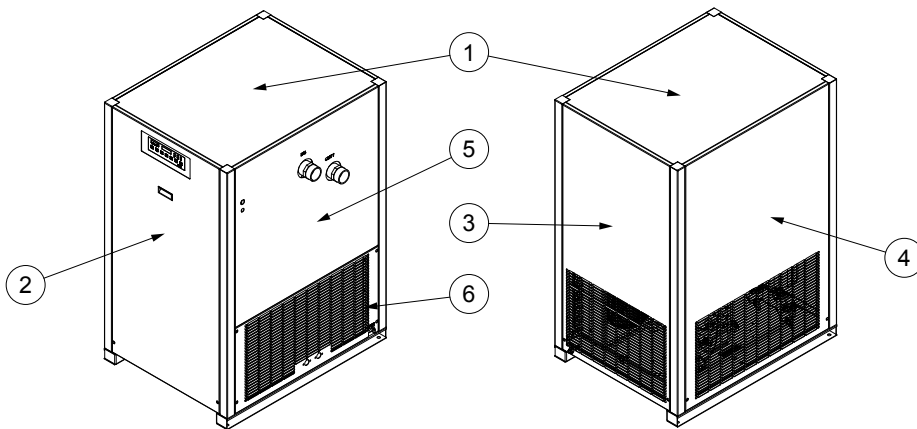
8.0 REPLACEMENT PARTS: CABINET PANELS (ALL MODELS)

REPLACEMENT CABINET PARTS- Models 100 through 150



ID #	PARTS DESCRIPTION	100	125	150
1	Cabinet Panel - Top	5002067	5002067	5002067
2	Cabinet Panel - Front	5002068	5002068	5002068
3	Cabinet Panel - Rear	5002072	5002072	5002072
4	Cabinet Panel - Left	5002069	5002069	5002069
5	Cabinet Panel - Right Upper	5002070	5002070	5002070
6	Cabinet Panel - Right Lower	5002071	5002071	5002071

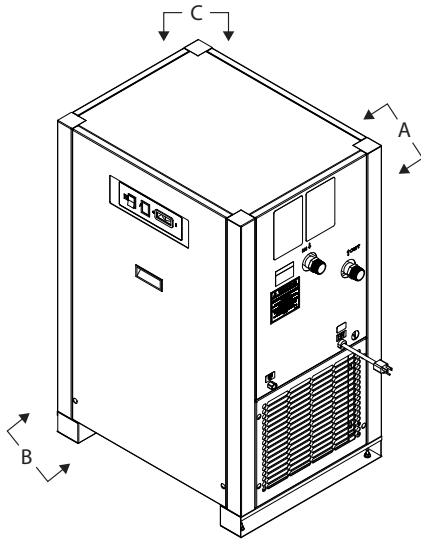
REPLACEMENT CABINET PARTS- Models 200 through 750



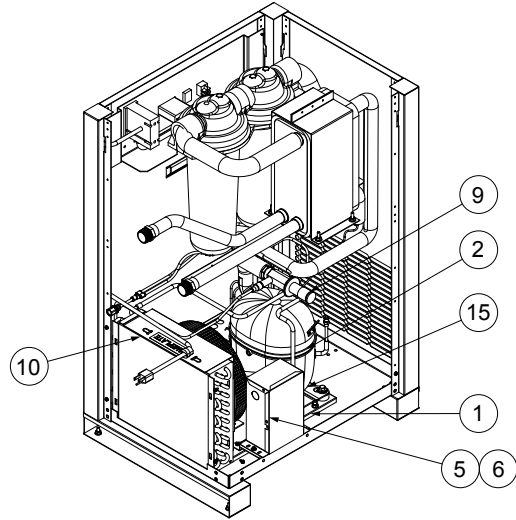
ID #	PARTS DESCRIPTION	200	250	300	400	500	600	750
1	Cabinet Panel - Top	5002082	5002082	5002082	5002082	5002106	5002106	5002106
2	Cabinet Panel - Front	5002083	5002083	5002095	5002095	5002107	5002107	5003092
3	Cabinet Panel - Rear	5002084	5002084	5002096	5002096	5002111	5002111	5002111
4	Cabinet Panel - Left	5002084	5002084	5002096	5002096	5002108	5002108	5002108
5	Cabinet Panel - Right upper	5002085	5002085	5002097	5002102	5002109	5002109	5002109
6	Cabinet Panel - Right lower	5002086	5002086	5002098	5002098	5002110	5002110	5002110

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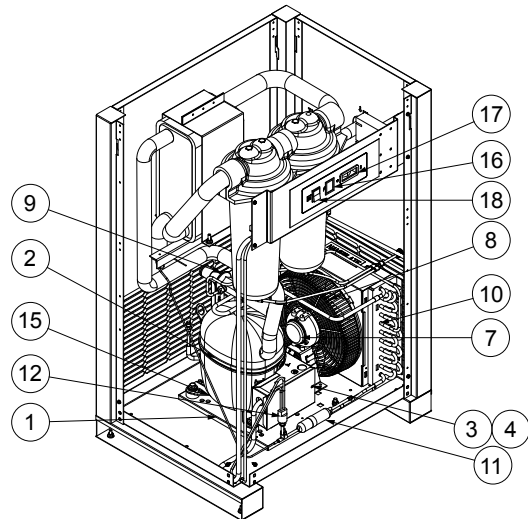
REPLACEMENT PARTS: MODELS 100 THROUGH 150



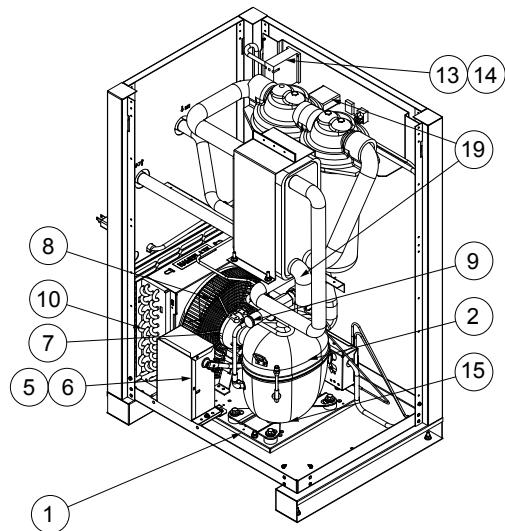
VIEW ORIENTATION REFERENCE



RIGHT REAR, VIEW-A
(covers and center support shelf removed for clarity)



RIGHT FRONT, VIEW-B
(covers and center support shelf removed for clarity)



LEFT REAR, VIEW-C
(covers and center support shelf removed for clarity)

REPLACEMENT PARTS: MODELS 100 THROUGH 150

MAINTENANCE KITS

MODEL	Kit Components	100	125	150
Standard Kit	Separator Element, O-Ring, Drain Service Kit, Lube Packet, Service Reminder Decal	HPRPMK30S	HPRPMK31S	HPRPMK32S
Cold Coalescing Kit	Separator Element, Cold Coalescing Element, O-Ring, Drain Service Kit, Lube Packet, Service Reminder Decal	HPRPMK50S	HPRPMK51S	HPRPMK52S

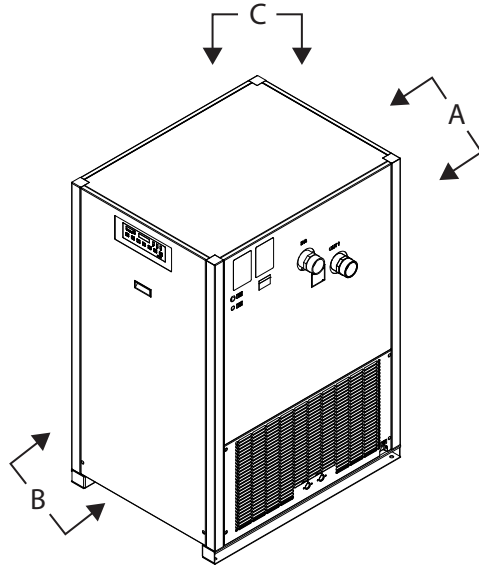
REPLACEMENT PARTS

ID #	PARTS DESCRIPTION	100			125			150		
		115/1/60 100/1/50	208- 230/1/60	220- 240/1/50	115/1/60 100/1/50	208-230/1/60	220-240/1/50	115/1/60 100/1/50	208-230/1/60	220-240/1/50
1	Condensing Unit Assembly ¹	5002001	5002002	5002003	7427771	7427772	7427773	7427771	7427772	7427773
2	Compressor (Only)	5002243	5002250	5002256	7427777	7427778	7427779	7427777	7427778	7427779
3	Overload ²	5002244	5002251	5002257	3233219	3233220	3252935	3233219	3233220	3252935
4	Start Relay ²	5002245	5002252	5002258	7427780	7427781	7427782	7427780	7427781	7427782
5	Start Capacitor	5002246	5002253	5002253	7427783	7427784	7427784	7427783	7427784	7427784
6	Run Capacitor	N/A	N/A	N/A	7427785	7427786	7427787	7427785	7427786	7427787
7	Fan Motor	5002247	5002254	5002259	3233151	3210368	3210368	3233151	3210368	3210368
8	Fan Blade	5002248	5002255	5002255	3219405	3219405	3219405	3219405	3219405	3219405
9	Hot Gas Bypass Valve	5002350	5002350	5002350	5002350	5002350	5002350	5002350	5002350	5002350
10	Condenser	5002249	5002249	5002249	3232828	3232828	3232828	3232828	3232828	3232828
11	Filter/Dryer	3223808	3223808	3223808	3223809	3223809	3223809	3223809	3223809	3223809
12	Fan Pressure Switch	3230761	3230761	3230761	3230761	3230761	3230761	3230761	3230761	3230761
13	Contactors	N/A	N/A	N/A	5002260	5002262	5002262	5002260	5002262	5002262
14	Auxiliary Contactor	N/A	N/A	N/A	5002261	5002263	5002263	5002261	5002263	5002263
15	Crankcase Heater	N/A	N/A	N/A	3223258	3223259	3223259	3223258	3223259	3223259
16	Light Assembly (Green)	3227421	3215356	3215356	3227421	3215356	3215356	3227421	3215356	3215356
17	Dew Point Indicator	3224008	3224008	3224008	3224008	3224008	3224008	3224008	3224008	3224008
18	On-Off Switch	3230777	3230777	3230777	3230777	3230777	3230777	3230777	3230777	3230777
19	Temperature Sensor	3210926	3210926	3210926	3210926	3210926	3210926	3210926	3210926	3210926
20	Digital PC Board Fuse ²	5002943	5002943	5002943	5002943	5002943	5002943	5002943	5002943	5002943

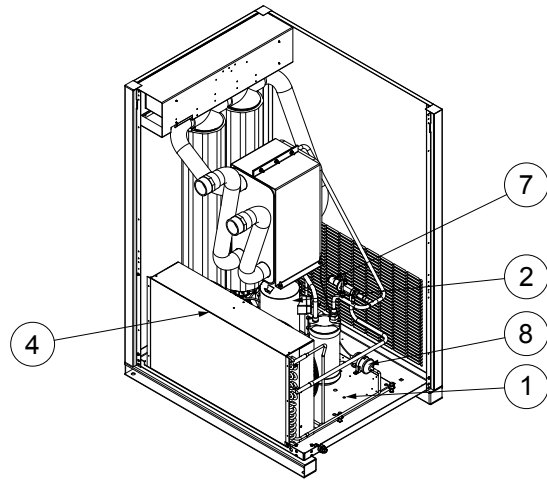
¹ Condensing Unit Assembly consists of: Compressor, Condenser, Fan Assembly, Hot Gas Bypass Valve, Filter/Dryer, Base Pan, Accumulator (in some cases) and interconnecting piping.

² Item 20 is located in the electrical enclosure located behind the control panel. Refer to the appropriate Electrical Schematic to identify part.

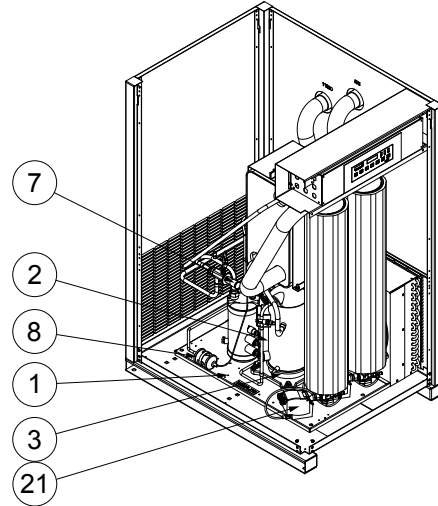
REPLACEMENT PARTS: MODELS 200 THROUGH 750 (AIR-COOLED UNITS)



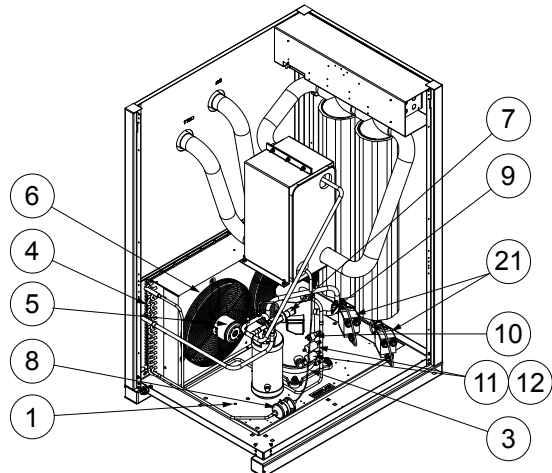
VIEW ORIENTATION REFERENCE



RIGHT REAR, VIEW-A
(covers and center support shelf removed for clarity)



RIGHT FRONT, VIEW-B
(covers and center support shelf removed for clarity)



LEFT REAR, VIEW-C
(covers and center support shelf removed for clarity)

REPLACEMENT PARTS: MODELS 200 THROUGH 750 (AIR-COOLED UNITS)

MAINTENANCE KITS

MODEL	Kit Components	200	250	300	400	500	600	750
Standard Kit	Separator Element, O-Ring, Drain Service Kit, Lube Packet	HPRPMK33D2	HPRPMK33D2	HPRPMK34D2	HPRPMK35D2	HPRPMK36D2	HPRPMK37D2	HPRPMK37D2
Cold Coalescing Kit	Separator Element, Cold Coalescing Element, O-Ring, Drain Service Kit, Lube Packet	HPRPMK53D2	HPRPMK53D2	HPRPMK54D2	HPRPMK55D2	HPRPMK56D2	HPRPMK57D2	HPRPMK57D2
Service Kit - Demand Drain		7428278	7428278	7428278	7428278	7428278	7428278	7428278

REPLACEMENT PARTS

ID #	PARTS DESCRIPTION	208-230/3/60					380-420/3/50, 460/3/60, and 575/3/60				
		200	250, 300, 400	500	600	750	200	250, 300, 400	500	600	750
1	Condensing Unit Assembly ¹	5002007	5002009	5002011	5002013	5002015	5002008	5002010	5002012	5002014	5002016
2	Compressor (Only)	3221303	3232809	3221304	5002921	7428008	3210937	3211540	3210939	5002930	7428007
3	Crankcase Heater	3232974	3232974	3232974	7450246	7450246	3232975	3232975	3232975	4010507	4010507
4	Condenser	3232829	3232830	3232831	5002924	3232832	3232829	3232830	3232831	5002924	3232832
5	Fan Motor	3238932	3233153	3233153	5002922	3233153	3233152	3228005	3228005	5002931	3228005
6	Fan Blade	3232640	3232642	3219406	5002923	3219406	3232640	3232642	3219406	5002923	3219406
7	Hot Gas By-Pass Valve	5002350	5002350	5002350	5002351	5002351	5002350	5002350	5002350	5002351	5002351
8	Filter Dryer (Liquid Line)	5002925	5002925	5002925	5002925	5002925	5002925	5002925	5002925	5002925	5002925
9	Low Refrigerant Pressure Switch	4006372	4006372	4006372	4006372	4006372	4006372	4006372	4006372	4006372	4006372
10	High Refrigerant Pressure Switch	3230764	3230764	3230764	3230764	3230764	3230764	3230764	3230764	3230764	3230764
11	Fan Cutout Switch 1	3230762	3230762	3230762	3230762	3230762	3230762	3230762	3230762	3230762	3230762
12	Fan Cutout Switch 2	N/A	N/A	3230763	3230763	3230763	N/A	N/A	3230763	3230763	3230763
13	Contact ²	5002926	5002926	5002926	5002926	5002928	5002926	5002926	5002926	5002926	5002928
14	Auxiliary Contacts ²	5002927	5002927	5002927	5002927	5002929	5002927	5002927	5002927	5002927	5002927
15	Transformer 230/400/460 ²	3159128	3159128	3159128	3159128	3159128	3159128	3159128	3159128	3159128	3159128
16	Fuse Primary ²	3223962	3223962	3223962	3223962	3223962	3223953	3223953	3223953	3223953	3223953
17	Fuse Secondary ²	4010495	4010495	4010495	4010495	4010495	4010495	4010495	4010495	4010495	4010495
18	Digital PC Board ^{2,3}	7426184	7426184	7426184	7426184	7426184	7426184	7426184	7426184	7426184	7426184
19	Digital PC Board Fuse ²	5002943	5002943	5002943	5002943	5002943	5002943	5002943	5002943	5002943	5002943
20	Temperature Sensor (RTD) ²	5007289	5007289	5007289	5007289	5007289	5007289	5007289	5007289	5007289	5007289
21	Electric Demand Drain (Optional)	7428268	7428268	7428268	7428268	7428268	7428268	7428268	7428268	7428268	7428268
22	Power Transformer (575V) ²	3073856	3073856	3073856	3073856	3073856	3073856	3073856	3073856	3073856	3073856

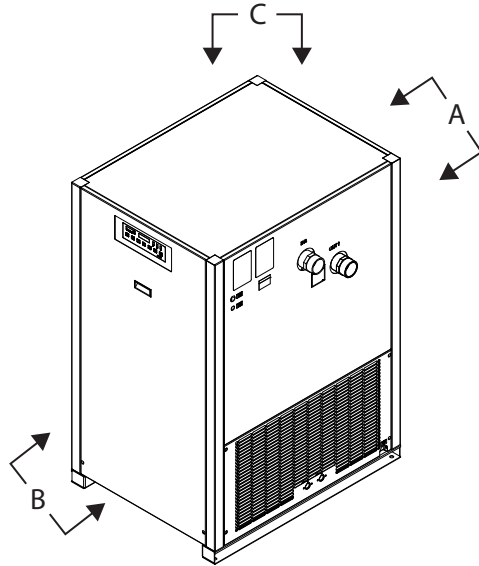
¹ Condensing Unit Assembly consists of: Compressor, Condenser, Fan Assembly, Hot Gas Bypass Valve, Filter/Dryer, Base Pan, Accumulator (in some cases) and interconnecting piping.

² Items 13, 14, 15, 16, 17, 18, 19, 20, and 22 are located in the electrical enclosure located behind the control panel. Refer to the appropriate Electrical Schematic to identify part.

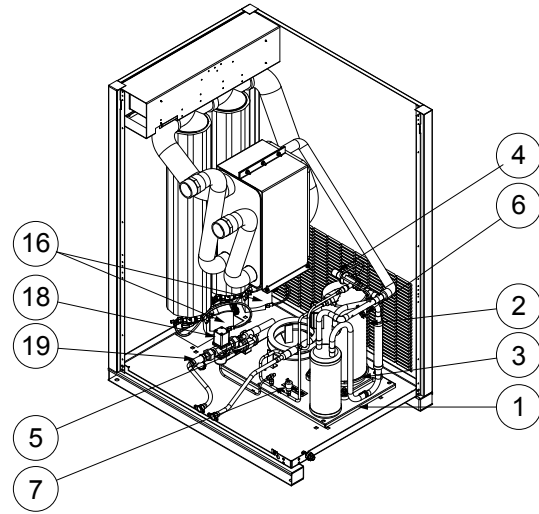
³ NOTE: Consult factory with the dryer serial number when ordering Item 18, Digital PC Board.

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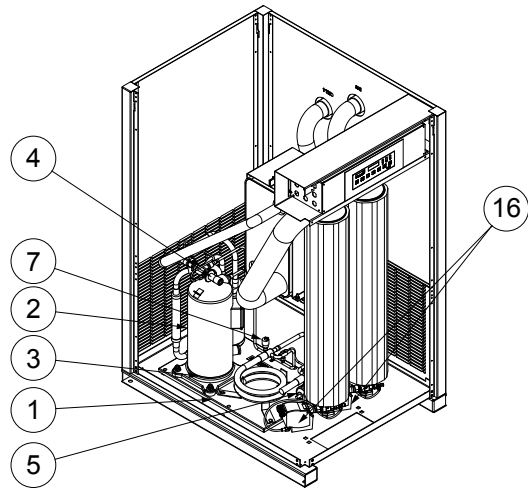
REPLACEMENT PARTS: MODELS 200 THROUGH 750 (WATER-COOLED UNITS)



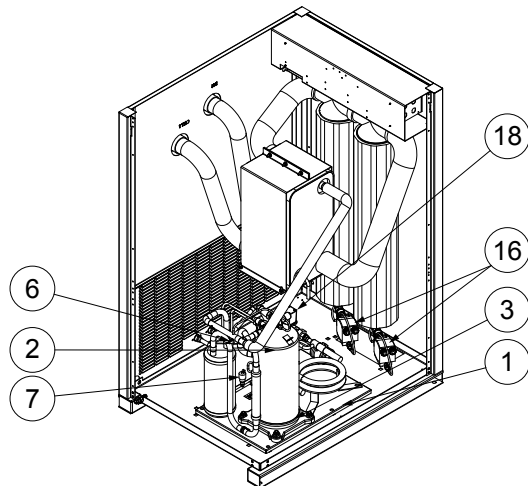
VIEW ORIENTATION REFERENCE



RIGHT REAR, VIEW-A
(covers and center support shelf removed for clarity)



RIGHT FRONT, VIEW-B
(covers and center support shelf removed for clarity)



LEFT REAR, VIEW-C
(covers and center support shelf removed for clarity)

REPLACEMENT PARTS: MODELS 200 THROUGH 750 (WATER-COOLED UNITS)

MAINTENANCE KITS

MODEL	Kit Components	200	250	300	400	500	600	750
Standard Kit	Separator Element, O-Ring, Drain Service Kit, Lube Packet	HPRPMK33D2	HPRPMK33D2	HPRPMK34D2	HPRPMK35D2	HPRPMK36D2	HPRPMK37D2	HPRPMK37D2
Cold Coalescing Kit	Separator Element, Cold Coalescing Element, O-Ring, Drain Service Kit, Lube Packet	HPRPMK53D2	HPRPMK53D2	HPRPMK54D2	HPRPMK55D2	HPRPMK56D2	HPRPMK57D2	HPRPMK57D2
Service Kit - Demand Drain		7428278	7428278	7428278	7428278	7428278	7428278	7428278

REPLACEMENT PARTS

ID #	PARTS DESCRIPTION	208-230/3/60					380-420/3/50, 460/3/60, and 575/3/60				
		200	250, 300, 400	500	600	750	200	250, 300, 400	500	600	750
1	Condensing Unit Assembly ¹	5002007	5002009	5002011	5002013	5002015	5002008	5002010	5002012	5002014	5002016
2	Compressor (Only)	3221303	3232809	3221304	5002921	7428008	3210937	3211540	3210939	5002930	7428007
3	Crankcase Heater	3232974	3232974	3232974	7450246	7450246	3232975	3232975	3232975	4010507	4010507
4	Hot Gas By-Pass Valve	5002350	5002350	5002350	5002351	5002351	5002350	5002350	5002350	5002351	5002351
5	Filter Dryer (Liquid Line)	5002925	5002925	5002925	5002925	5002925	5002925	5002925	5002925	5002925	5002925
6	Low Refrigerant Pressure Switch	4006372	4006372	4006372	4006372	4006372	4006372	4006372	4006372	4006372	4006372
7	High Refrigerant Pressure Switch	3230764	3230764	3230764	3230764	3230764	3230764	3230764	3230764	3230764	3230764
8	Contact ²	5002926	5002926	5002926	5002926	5002928	5002926	5002926	5002926	5002926	5002928
9	Auxiliary Contacts ²	5002927	5002927	5002927	5002927	5002929	5002927	5002927	5002927	5002927	5002927
10	Transformer 230/400/460 ²	3159128	3159128	3159128	3159128	3159128	3159128	3159128	3159128	3159128	3159128
11	Fuse Primary ²	3223962	3223962	3223962	3223962	3223962	3223953	3223953	3223953	3223953	3223953
12	Fuse Secondary ²	4010495	4010495	4010495	4010495	4010495	4010495	4010495	4010495	4010495	4010495
13	Digital PC Board ^{2,3}	7426184	7426184	7426184	7426184	7426184	7426184	7426184	7426184	7426184	7426184
14	Digital PC Board Fuse ²	5002943	5002943	5002943	5002943	5002943	5002943	5002943	5002943	5002943	5002943
15	Temperature Sensor (RTD) ²	5007289	5007289	5007289	5007289	5007289	5007289	5007289	5007289	5007289	5007289
16	Electric Demand Drain	7428268	7428268	7428268	7428268	7428268	7428268	7428268	7428268	7428268	7428268
17	Power Transformer (575V) ²	3073856	3073856	3073856	3073856	3073856	3073856	3073856	3073856	3073856	3073856
18	Cooling Water Regulating Valve	3232502	3232502	3232502	3232502	3232502	3232502	3232502	3232502	3232502	3232502
19	Cooling Water Strainer Screen	3230672	3230672	3230672	3230672	3230672	3230672	3230672	3230672	3230672	3230672

¹ Condensing Unit Assembly consists of: Compressor, Condenser, Fan Assembly, Hot Gas Bypass Valve, Filter/Dryer, Base Pan, Accumulator (in some cases) and interconnecting piping.

² Items 8, 9, 10, 11, 12, 13, 14, 15, and 17 are located in the electrical enclosure located behind the control panel. Refer to the appropriate Electrical Schematic to identify part.

³ NOTE: Consult factory with the dryer serial number when ordering Item 13, Digital PC Board.

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NOTES

WARRANTY

The manufacturer warrants the product manufactured by it, when properly installed, operated, applied, and maintained in accordance with procedures and recommendations outlined in manufacturer's instruction manuals, to be free from defects in material or workmanship for a period as specified below, provided such defect is discovered and brought to the manufacturer's attention within the aforesaid warranty period.

The manufacturer will repair or replace any product or part determined to be defective by the manufacturer within the warranty period, provided such defect occurred in normal service and not as a result of misuse, abuse, neglect or accident. Normal maintenance items requiring routine replacement are not warranted. The warranty covers parts and labor for the warranty period unless otherwise specified. Repair or replacement shall be made at the factory or the installation site, at the sole option of the manufacturer. Any service performed on the product by anyone other than the manufacturer must first be authorized by the manufacturer.

Unauthorized service voids the warranty and any resulting charge or subsequent claim will not be paid. Products repaired or replaced under warranty shall be warranted for the unexpired portion of the warranty applying to the original product.

The foregoing is the exclusive remedy of any buyer of the manufacturer's product. The maximum damages liability of the manufacturer is the original purchase price of the product or part.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, OR STATUTORY, AND IS EXPRESSLY IN LIEU OF THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. THE MANUFACTURER SHALL NOT BE LIABLE FOR LOSS OR DAMAGE BY REASON OF STRICT LIABILITY IN TORT OR ITS NEGLIGENCE IN WHATEVER MANNER INCLUDING DESIGN, MANUFACTURE OR INSPECTION OF THE EQUIPMENT OR ITS FAILURE TO DISCOVER, REPORT, REPAIR, OR MODIFY LATENT DEFECTS INHERENT THEREIN.

THE MANUFACTURER, HIS REPRESENTATIVE OR DISTRIBUTOR SHALL NOT BE LIABLE FOR LOSS OF USE OF THE PRODUCT OR OTHER INCIDENTAL OR CONSEQUENTIAL COSTS, EXPENSES, OR DAMAGES INCURRED BY THE BUYER, WHETHER ARISING FROM BREACH OF WARRANTY, NEGLIGENCE OR STRICT LIABILITY IN TORT.

The manufacturer does not warrant any product, part, material, component, or accessory manufactured by others and sold or supplied in connection with the sale of manufacturer's products.

Warranty Period

Parts and labor for two (2) years from the date of shipment from the factory; heat exchangers are covered (parts only) for an additional three (3) years (total of five (5)). On units that manufacturer requests be returned to the factory, a one time removal/reinstallation labor allowance as noted in the Service Warranty Policies and Procedures Handbook will apply. Freight to the factory from the installation site and to the installation site from the factory will be paid by the manufacturer; means of transportation to be specified by manufacturer.

AUTHORIZATION FROM THE SERVICE DEPARTMENT IS NECESSARY BEFORE MATERIAL IS RETURNED TO THE FACTORY OR IN-WARRANTY REPAIRS ARE MADE.

SERVICE DEPARTMENT: (724) 746-1100

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Specifications may change without notice.

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