



Owners Manual

Refrigerated Air Dryer

MHT SERIES



IMPORTANT: READ THIS MANUAL CAREFULLY. IT CONTAINS INFORMATION ABOUT SAFETY AND THE SAFETY OF OTHERS. ALSO BECOME FAMILAR WITH THE PROPER INSTALLATION AND CONTROLS OF THE AIR DRYER BEFORE OPERATING. ONLY QUALIFIED, TRAINED AND LISCENSED PERSONAL SHOULD SERVICE OR OPERATE THIS EQUIPMENT.

CAUTION: THIS MACHINE CONTAINS HIGH PRESSURE GAS AND ELECTRICITY.

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NOTE:

If you need service on your dryer please have the following information:

- 1. Model #**
- 2. Serial #**
- 3. Voltage**
- 4. Nature of the problem**
- 5. Name of distributor that dryer was purchased from**

INTRODUCTION

Thank you for selecting an MHT Series refrigerated air dryer from **MACAIR INC.** The refrigerated air dryer is specifically designed and manufactured for drying and purifying compressed air generated by an air compressor.

PLEASE READ THIS INSTRUCTION MANUAL CAREFULLY BEFORE USING THE DRYER.

Please pay attention to the precautions in transportation, installation and operation that are listed in this manual. Please use the dryer according to our application guide and be sure to perform the proper preventative maintenance recommended in this manual. Failure to perform the preventative maintenance will void the air dryer warranty. Refrigeration used in this air dryer is environmentally friendly R134a and is available at local refrigeration wholesalers. Direct any question not covered in this manual to your distributor or call **MACAIR at (248) 624-6300**. Before calling with any questions always have the **air dryer model #, serial # and pressure gauge readings**. Service and maintenance can be obtained from your distributor. If you do not know your distributor please contact the factory. Authorization # must be obtained from **MACAIR INC.** before any parts or dryers are returned to the factory. **MACAIR INC.** will not be responsible for anything returned without authorization.

RECEIVING AND INSPECTION

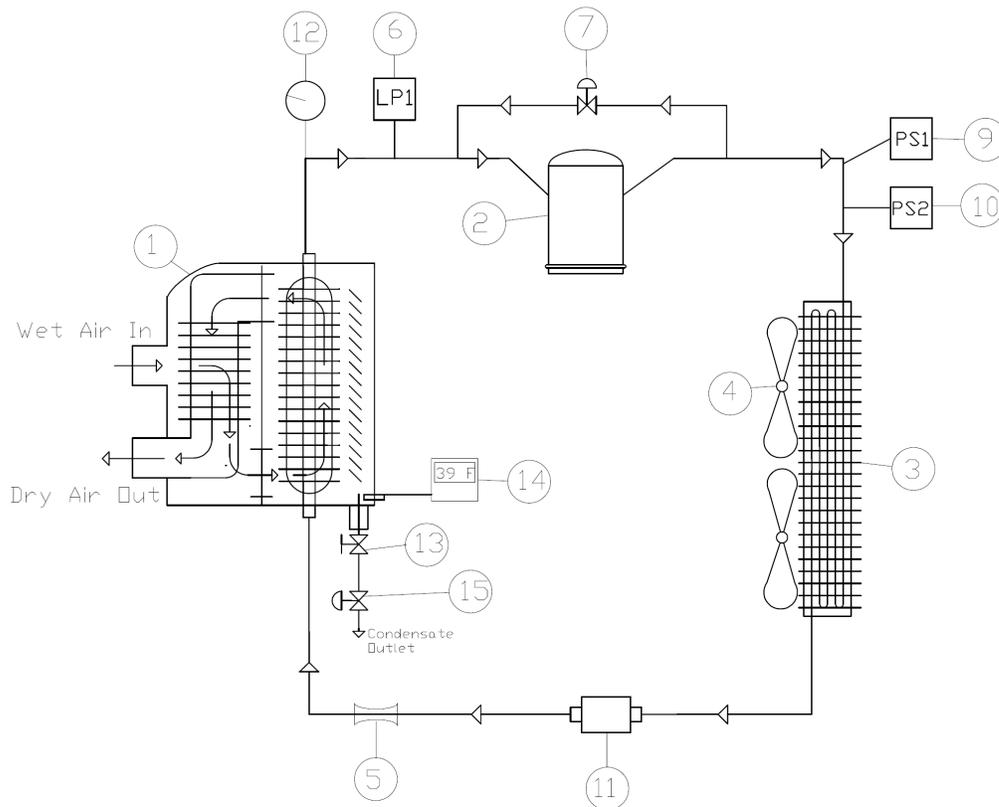
1. The dryer cannot be tilted on its' side or upside down during shipping.
2. Use forklift from the bottom of the dryer when installing and moving.
3. Dryers are shipped F.O.B. factory. Immediately upon arrival check the dryer for possible damage. If damage is found, report it to the carrier and file a damage claim.
4. Check dryer data label to be sure you have the right dryer. Check the data labels voltage and amperage to be sure it is correct and the one you ordered.
5. Check refrigeration gauges for pressure. **If gauges read 0 PSIG STOP! Do not start dryer. Call your distributor for service. This could mean there is a leak and refrigerant has leaked out.**

DATA LABEL

The data label is affixed to the outside of the cabinet. This label identifies the air dryer's model and serial numbers and important technical data. Before installing the dryer check all of the information on the data label for the correct model and voltage. **If the model number and voltage are incorrect do not install the dryer. Do not put power to the dryer. Call your local distributor.**

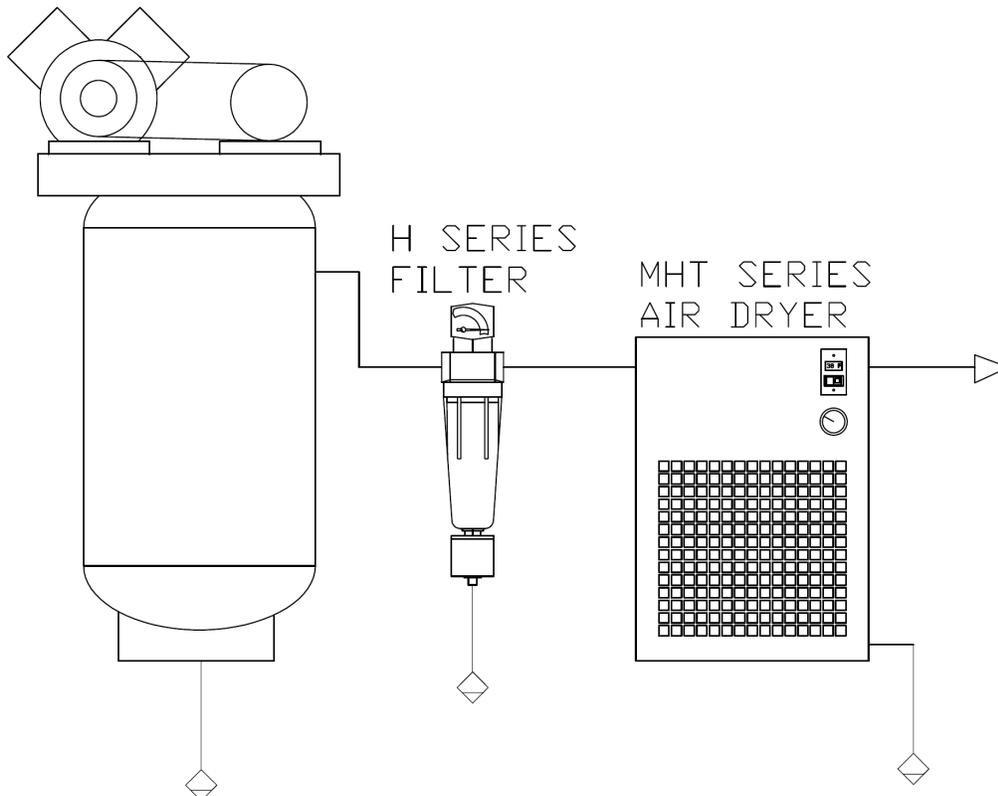
HOW THE AIR DRYER WORKS

MHT Series refrigerated compressed air dryers use refrigeration cooling to condense entrained moisture out of the compressed air stream. Warm saturated air enters the air-to-air heat exchanger at the dryer inlet. In the air-to-air heat exchanger the inlet air is pre-cooled by the outgoing cold air. The pre-cooled air then enters the air-to-refrigerant heat exchanger where it is cooled to its lowest point by the refrigeration in the evaporator. As the air is cooled, moisture in the air changes from a vapor to a liquid. The liquid condensate is removed from the airstream by the separator and discharged from the dryer by the automatic drain valve. The cold air is reheated by incoming warm air as it passes back through the air-to-air heat exchanger. Pre-cooling the inlet air reduces the heat load on the refrigerant compressor, permitting the use of a smaller refrigerant compressor. The outgoing cold air is reheated by the incoming hot air. As a result the outlet air is warmed up as it leaves the dryer. This prevents the outlet pipe from sweating. The air exits the dryer and is now clean and dry, ready for use.



DESCRIPTION OF COMPONENTS

- (1) **ADX HEAT EXCHANGER MODULE-** (Aluminum, Direct Expansion) The compact aluminum module contains the air-to-air heat exchanger, the air-to-refrigerant heat exchanger and the moisture separator.
- (2) **REFRIGERANT COMPRESSOR-** The main function of the compressor is to circulate the refrigerant. The compressor pumps refrigerant to the other components in the system so they can perform heat transfer functions. The compressor also separates the high pressure from the low pressure side of the refrigeration system.
- (3) **CONDENSER-** Condenses the vapor into a liquid.
- (4) **FILTER-DRIER-** Absorbs and filters out any moisture or debris that maybe in the refrigeration system. Moisture can cause freeze-ups and dirt particles can plug capillary tubes causing system malfunctions.
- (5) **CAPILLARY TUBE-** The metering device meters liquid refrigerant from the liquid line to the evaporator. The capillary tube is a restriction that separates the high pressure side from the low pressure side in the refrigeration system.
- (6) **LPI - LOW PRESSURE SAFETY CUT OUT-** Prevents damage to the refrigerant compressor in the event of a refrigerant leak or low refrigerant pressure.
- (7) **HOT GAS BYPASS VALVE-** HGBV respond to changes in suction pressure. As the air flow (or heat load) on the dryer changes the suction pressure will change. An increase in air flow causes an increase an increase in suction pressure. A decrease in air flow causes a decrease in suction pressure. During periods of low air flow the HGBV meters hot gas from the hot gas line of the high side to the inlet of the air-to-refrigerant.
- (9) **PS1 - HIGH PRESSURE SAFETY SHUTDOWN-** Prevents damage to the refrigerant compressor and other components in the event of high refrigerant pressure due to fan motor failure, dirty condenser or over-capacity.
- (10) **PS2 - FAN CYCLING SWITCH-** Cycles the condenser fan motor on and off to maintain the proper condensing pressure dryer period of fluctuating loads and ambient conditions.
- (12) **REFRIGERATION SUCTION PRESSURE GAUGE-** Continuously monitors the refrigerant suction or low side pressure. Is used as a troubleshooting device.
Should Read: On R134a dryers. (28 psig to 34 psig)
- (13) **Y STRAINER**
- (15) **CONDENSATE DRAIN**
- (16) **CONDENSER FAN MOTORS-** Drives ambient air over condenser coils.



INSTALLATION AND LOCATION CONTINUED

VENTILATION– Install dryer only in a well-ventilated, clean, dry area and keep at least 3 feet between the dryer, other equipment and the walls.

DRYER LOCATION– Make sure there is approximately 3 feet around the dryer for service and maintenance purposes. Do not install the dryer outside. The air dryer must not be exposed to direct sunlight, rain or snow. Do not install the dryer in an environment with fire, high temperature or low temperatures. Make sure the dryer is installed in an environment that is clean and dry. Dust and dirt particles will clog the air-cooled condenser. A clogged and dirty condenser will reduce the performance of the dryer and will eventually cause damage to it.

AMBIENT TEMPERATURES– Suitable ambient temperature for the refrigerant dryer is a MIN of 40°F to a Max of 110°F. The performance of the dryer will be significantly decreased when the air dryer is subject to temperatures higher than 110°F. For installations with ambient temperatures higher than 110°F it is recommended to use a water-cooled condenser on the dryer. Contact your distributor for details.

SELECTING PROPER IN AND OUT PIPING AND PIPING DESIGN– Pipe diameter should be sized according to air flow requirements. Do not mix the air inlet and outlet air flow. **It is recommended that a vibration absorber be installed on the dryer inlet and outlet to eliminate vibration from the compressor.** Do not use the inlet and outlet of the air dryer to support the weight of the air piping.

3 VALVE BYPASS AND ISOLATION VALVES– Should be installed on the air dryer outlet and inlet ports to allow for bypassing, depressurizing and proper maintenance and servicing of the air dryer.

CONDENSATE DRAINS– Condensate drains must be properly piped from the dryer to prevent moisture re-entrainment. The dryer is equipped with an automatic drain valve that controls the discharge of the condensate and a manual valve to manually drain condensate. The user must run a drain line to an environmentally approved condensate collection/disposal system.

ELECTRICAL INSTALLATION– The dryer data label lists the electrical power requirements for the air dryer. The user must confirm that the line voltage matches the voltage listed on the data label. (**Warning– Operating the air dryer with improper line voltage will void the warranty.**) Provide the proper size wire, disconnect switches and fuses in accordance with applicable codes. Field wiring must comply with local and national fire safety and electrical codes. Standard dryer’s enclosures and controls are designed to meet NEMA 1 Type 1 electrical standards. All wiring is complete. Connect power leads as indicated in the electrical schematic. Ground the frame properly. Once power is connected turn the power on to the dryer.

MAXIMUM WORKING PRESSURE - 232 psig.

CAUTION:

BREATHING AIR APPLICATIONS– This dryer has not been tested for breathing air applications. The owner is advised to do its own testing and use for breathing air applications at own risk.

DRYER CONTROLS

1. On/Off switch– Turns the refrigerant compressor on/off.
2. Power On Light– Indicates there is power to the dryer.
3. Digital Dew-Point Temp. Indicator– indicates the approximate dew point temp of the compressed air.
4. Refrigerant Suction Pressure Gauge
5. Hot Gas Bypass Valve– Controls the evaporator pressure
6. Fan Cycling Switch– Cycles the condenser fan on and off based on the condensing pressure. (See Figure 1)
7. High Pressure Shutdown w/Manual reset– Cut Out 300 PSIG
8. Low Pressure Shutdown– Cut Out 10 psig / Cut In 25 psig
9. Programmable Electronic Auto-Drain Valve– Automatically controls the draining of liquid condensate removed by the dryer.

START UP

The following procedure must be followed to start your air dryer. Failure to follow this start up procedure will void your warranty. If problems occur during start up, contact your distributor.

1. Turn off the On/Off switch.
2. Verify the main electrical supply voltage matches the voltage specified on the data label.
3. Do not turn the dryer on during this warm up period.
4. Check the proper connection and support of the compressed air lines to the dryer .
5. Check dryer bypass and isolation valve system.
6. Confirm that the inlet and ambient air temperature, pressure and flow to the dryer meet specified requirements.
7. Confirm that the condensate drain lines from the separator are properly piped to an environmentally approved disposal system.

INITIAL RUN PROCEDURE

After start up and checks are complete and after the main electrical power to the dryer has been turned on

1. Turn ON the dryer On/Off switch.
2. After 15 seconds observe the refrigerant suction pressure gauge. It should start to pull down immediately.
3. Let the dryer run for 15 minutes.
4. Check the refrigerant suction pressure gauge
Should Read: On R134a dryers (28 psig to 34 psig)
6. Check the DEWPOINT TEMP INDICATOR. After about 15 min it should read 35°F to 39°F.
7. Verify that the condenser fan motor is operating. The fan will cycle on and off.
8. Allow compressed air to flow through the dryer.
9. Confirm that condensate is discharging from the condensate drain. This may take 30-60 min.
10. Make sure bypass valves are closed and 100% of the air from the compressor is flowing through the dryer.

WEEKLY MAINTENANCE

- Clean air cooled condenser coils– Blow off all dust and dirt that is on the condenser fins with a compressed air maintenance gun.
- While cleaning condenser fins take caution to no damage the fins.

WARNING: DRYER FAILURE DUE TO A DIRTY CONDENSER IS NOT COVERED UNDER WARRANTY

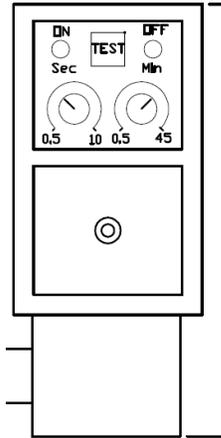
HOW TO SET THE CONDENSATE DRAIN OPEN & CLOSED TIME

(LOCATE DRAIN VALVE)

1. The OPEN (ON) time is adjustable from 0.5 sec to 10 sec. Drains are set at factory to open for 6 sec. When drain opens the on light will light.
2. The CLOSED (OFF) time is adjustable 0.5 min to 45 min. Drains are set at factory to stay closed for 10 min. When drain is closed the off light will light.

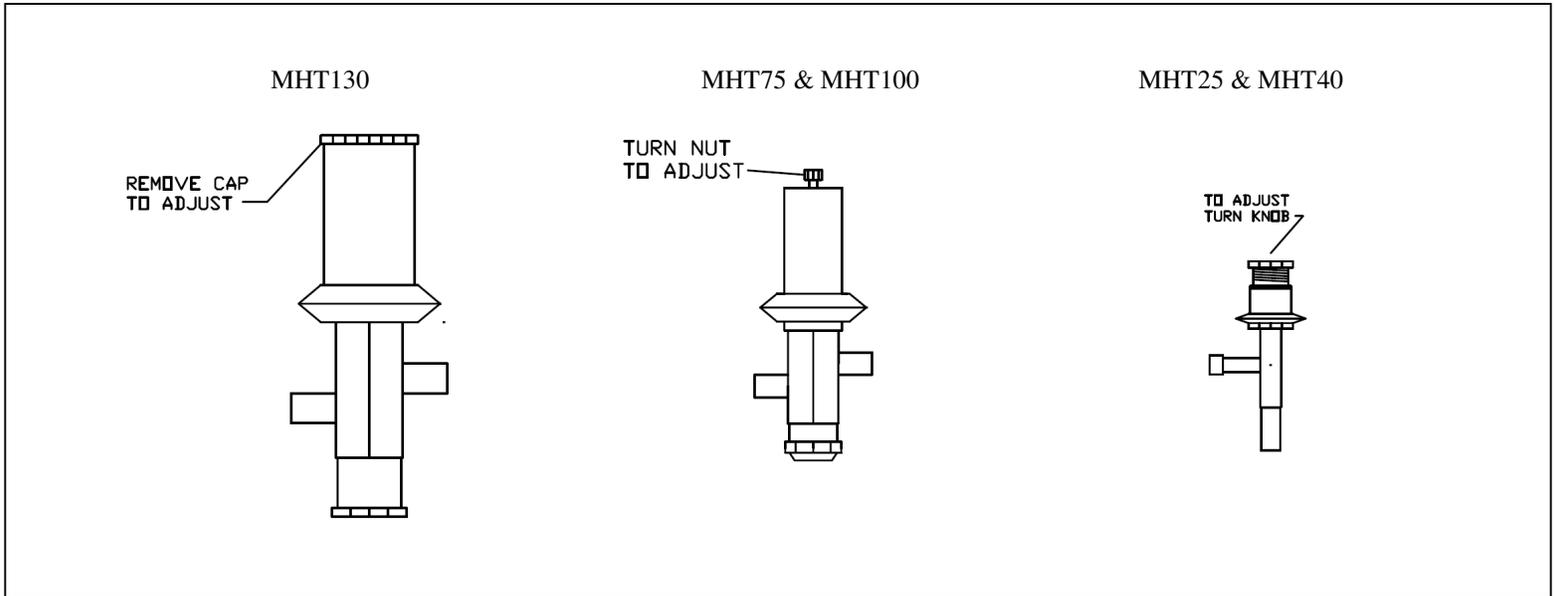
You may increase or decrease this based on moisture levels in the air.

Push the TEST button to manually open the drain valve.



HOW TO MAKE MINOR REFRIGERANT SUCTION PRESSURE (EVAP TEMP) ADJUSTMENTS

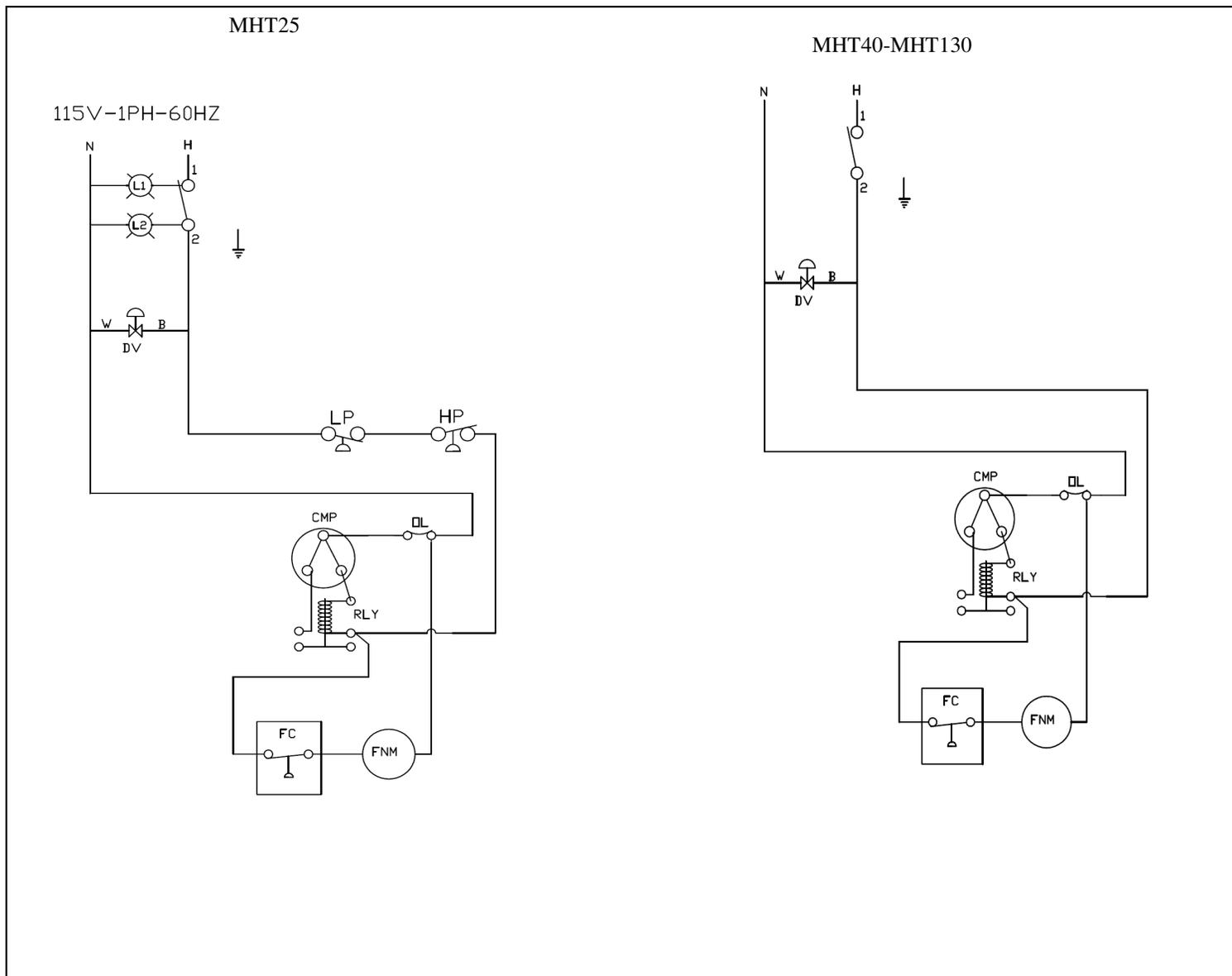
1. Keep dryer running under a no load by turning off or bypassing the compressed air.
2. Remove dryer top and locate the Hot Gas Bypass Valve.
3. Remove cap on Hot Gas Bypass Valve and using an allen wrench turn valve counter clockwise to decrease the suction pressure and clockwise to increase the suction pressure. Make 1/2 turn adjustments and wait 2 to 3 minutes for suction pressure to stabilize. Make more adjustments if needed.



TROUBLE SHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
Evaporator temp is to low	Hot gas bypass valve needs adjusting	Adjust or replace
	Evaporator pressure gauge bad	Replace
	Capillary tube blocked	Replace
	Temp or Pressure reset set to low	Reset
	Refrigerant leak	Find leak, fix and add refrigerant
Evaporator temp is to high	Ambient temp is to high	Improve ventilation in area
	Hot gas valve needs adjusting	Adjust or replace
	Condenser blocked or plugged	Clean condenser
	Flow is to high going in dryer	Change air compressor
	Compressor valves are damaged	Replace compressor

ELECTRICAL SCHEMATICS



TECHNICAL DATA

TECHNICAL SPECIFICATIONS	DRYER MODEL				
	MHT25	MHT40	MHT60	MHT100	MHT130
RATED CAPACITY IN SCFM	25	75	100	125	200
PRESSURE DROP (PSID)	1.2	1.4	1.6	1.75	1.8
MIN/MAX INLET PRESSURE	20 PSIG / 230 PSIG				
MAX INLET TEMP	120F				
MIN/MAX AMBIENT TEMP	45 F / 110 F				
VOLTAGE	115-1-60			230-1-60	
VOLTAGE RANGE	126-103			253-187	
REF COMPRESSOR HP	1/3	1/3	1/2	3/4	1
RLA: RUN LOAD AMPS	5.82	5.82	9.5	13.7	7
LRA: LOCK ROTOR AMPS	32	32	48	69	41
MAX FUSE SIZE	20	20	20	30	15
MIN. CIRCUIT CAPACITY	11.54	11.54	12.4	18.5	9.9
REFRIGERANT TYPE	R134a				
REFRIGERANTE AMOUNT	SEE DATA LABEL				
REFRIG. SUCTION PRESSURE	28 PSIG				
SHIPPING WGT (LBS)	115	180	195	205	250



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