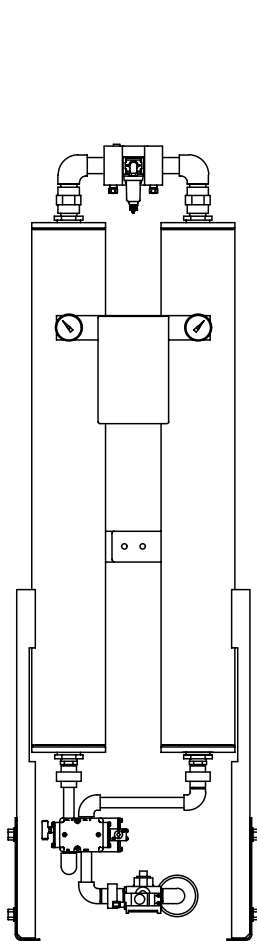
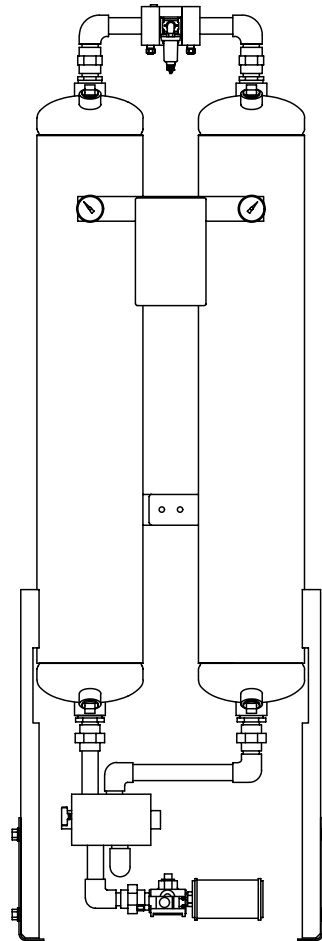


INSTALLATION, OPERATION & MAINTENANCE MANUAL FOR HEATLESS REGENERATIVE COMPRESSED AIR DRYER

models
HLS-55 through HLS-150



HLS-55/80



HLS-120/150

WARNING

READ ALL INFORMATION IN THIS MANUAL BEFORE BEGINNING INSTALLATION OR OPERATION OF THE DRYER. BEFORE STARTING INSTALLATION AND/OR MAINTENANCE PROCEDURES, TURN OFF THE MAIN POWER TO THE DRYER AND COMPLETELY DEPRESSURIZE THE UNIT TO PREVENT PERSONAL INJURY.

DO NOT REMOVE, REPAIR, OR REPLACE ANY ITEM ON THIS DRYER WHILE IT IS UNDER PRESSURE.

NEVER OPERATE THIS DRYER ABOVE THE RATED OPERATING CONDITIONS. OPERATION ABOVE SPECIFIED CONDITIONS WILL RESULT IN DECREASED PERFORMANCE, POSSIBLE DAMAGE TO THE UNIT AND/OR PERSONAL INJURY.

SEE BACK OF THIS MANUAL FOR ADDITIONAL SAFETY INSTRUCTIONS

1.1 HANDLING INSTRUCTIONS

WARNING

DO NOT LIFT THE DRYER BY THE INLET PIPING OR CONTROL BOX. THESE COMPONENTS ARE NOT DESIGNED TO HOLD THE WEIGHT OF THE DRYER. PERSONAL INJURY AND/OR EQUIPMENT DAMAGE MAY RESULT.

Lift the dryer by the outlet (top) piping or vessel center connector bar.

When lifting the unit make sure that the chains or cables are clear of all tubing and fragile components.

1.2 STORAGE INSTRUCTIONS

The ideal place to store the unit is indoors. The location should be free from corrosive gasses and extreme humidity. These conditions will cause damage to the unit. The unit should be covered with a tarpaulin to keep the unit clean.

If the unit is to be stored outdoors, it MUST BE covered completely. The cover must be adequate enough to prevent rain or snow from accumulating on the dryer. The location must be free of standing water and mud. The preferred location if outdoors, is on a paved surface.

1.3 EQUIPMENT CHECK

Inspect the dryer for any damage that may have occurred during shipment. Inspect all fittings, piping connections, fasteners, etc. for loose connections. Also check gauges for cracks or breakage.

IF DRYER HAS BEEN DAMAGED DURING SHIPMENT:

- (1) NOTIFY CARRIER IMMEDIATELY AND FILE A CLAIM.
- (2) CONSULT FACTORY BEFORE OPERATING THE DRYER.

SAFETY INSTRUCTIONS

SECTION 2

2.1 HANDLING

DO NOT LIFT THE DRYER BY INLET (BOTTOM) PIPING OR CONTROL BOX. THESE COMPONENTS ARE NOT DESIGNED TO HOLD THE WEIGHT OF THE DRYER. PERSONAL INJURY AND/OR EQUIPMENT DAMAGE MAY RESULT.

MAKE SURE THAT ALL EQUIPMENT BEING USED TO LIFT THE DRYER IS CAPABLE OF LIFTING THE WEIGHT OF THE DRYER.

IF THE DRYER IS TO BE TRANSPORTED OVERHEAD, MAKE SURE THAT ALL PERSONNEL ARE ALERTED AND SAFETY PROCEDURES ARE FOLLOWED.

2.2 INSTALLATION

BEFORE STARTING INSTALLATION AND/OR MAINTENANCE PROCEDURES, TURN OFF POWER AND DEPRESSURIZE UNIT TO PREVENT INJURY. SERIOUS PERSONAL INJURY MAY RESULT IF THESE SAFETY RULES ARE NOT FOLLOWED.

DO NOT REMOVE, REPAIR, OR REPLACE ANY ITEM ON DRYER WHILE IT IS UNDER PRESSURE. TURN OFF MAIN POWER TO THE DRYER AND DEPRESSURIZE THE DRYER COMPLETELY BEFORE STARTING INSTALLATION AND/OR MAINTENANCE PROCEDURES.

WHEN INSTALLING AND OPERATING THIS EQUIPMENT, COMPLY WITH THE NATIONAL ELECTRICAL CODE AND ANY APPLICABLE FEDERAL, STATE, AND LOCAL CODES.

WHEN INSTALLING THIS DRYER, MAKE SURE THAT THE NEMA RATING OF THE CONTROL BOX IS APPLICABLE TO THE INSTALLATION.

MAKE SURE THAT ALL CUSTOMER SUPPLIED WIRING AND ELECTRICAL DEVICES ARE PROPERLY SIZED TO HANDLE THE ELECTRICAL REQUIREMENTS OF THE DRYER.

ALWAYS WEAR EYE PROTECTION, GLOVES AND A RESPIRATORY PROTECTIVE DEVICE WHEN HANDLING THE DESICCANT. THE DUST FROM THE DESICCANT MAY CAUSE EYE AND SKIN IRRITATION. AVOID BREATHING THE DUST AND PROLONGED CONTACT WITH THE SKIN.

FIRST AID IN CASE OF EYE CONTACT WITH DESICCANT DUST; IMMEDIATELY FLUSH THE EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. CONSULT A PHYSICIAN.

2.3 OPERATION

DO NOT OPERATE DRYER IF THERE IS A LEAK IN EITHER VESSEL. IMMEDIATELY TAKE THE DRYER OUT OF SERVICE.

ANY DAMAGE TO THE VESSELS CAN MAKE THEM UNSAFE TO USE. INSPECT OUTSIDE AND INSIDE OF VESSELS REGULARLY FOR CORROSION AND ANY DAMAGE (I.E., DENTS, GOUGES OR BULGES). IF DAMAGED, TAKE OUT OF SERVICE IMMEDIATELY.

DO NOT OPERATE THIS DRYER ABOVE THE MAXIMUM RATED WORKING PRESSURE.

OPERATING CONDITIONS FOR PROPER PERFORMANCE OF THIS DRYER ARE DIFFERENT THAN MAXIMUM OPERATING CONDITIONS FOR THE VESSELS. BE SURE TO CHECK THE DRYER OPERATING CONDITIONS. SEE SECTION 3.1.

USE THIS DRYER FOR COMPRESSED AIR ONLY.

AIR FROM THIS DRYER IS NOT SUITABLE FOR BREATHABLE AIR SYSTEMS WITHOUT FURTHER TREATMENT.

DO NOT OPERATE THIS DRYER IF EITHER VESSEL HAS BEEN DAMAGED BY FIRE. TAKE OUT OF SERVICE IMMEDIATELY.

2.4 MAINTENANCE

DO NOT REMOVE, REPAIR, OR REPLACE ANY ITEM ON THE DRYER WHILE IT IS UNDER PRESSURE. TURN OFF MAIN POWER TO THE DRYER AND DEPRESSURIZE THE DRYER COMPLETELY BEFORE STARTING MAINTENANCE PROCEDURES.

DO NOT WELD OR GRIND ON EITHER VESSEL. IT WILL NOT BE SAFE TO OPERATE.

3.1 DRYER SPECIFICATIONS

WEIGHT (with desiccant installed)

HLS-55 230 lbs HLS-80.... 280 lbs HLS-120.... 385 lbs
 HLS-150.... 445 lbs

DIMENSIONS See SECTION 3.2

IN/OUT CONNECTION

HLS-55....1/2"NPT HLS-80....1"NPT HLS-120....1" NPT
 HLS-150....1"NPT

VESSELS (desiccant towers)

Design Pressure 150 PSIG
 Design Temperature -20°F TO 200°F

PIPING

Threaded pipe fittings: ANSI B16.3
 Threaded union fittings: ANSI B16.39
 Pipe: Carbon Steel, Schedule 40

VALVES

Inlet 4-Way, solenoid piloted
 Outlet Shuttle valve
 Purge 3-Way Valve (run as a 2-Way Valve), solenoid piloted

CONTROL AIR FILTER

Construction ... Zinc housing

ELECTRICAL

Nema 4 Electrical enclosure
 Standard 115V 115V/1PH/50-60Hz
 Optional 230V: 230V/1PH/50-60Hz

DESICCANT

Material Activated Alumina, 1/8" (2-5 MM) Bead type
 Quantity Per Tower (LBS)
 HLS-55....30.5 lbs HLS-80....43.5 lbs HLS-120....67.5 lbs
 HLS-150....82.5 lbs

OPERATING CONDITIONS

Inlet Air Pressure MIN 60 PSIG MAX 150 PSIG
 Inlet Air Temperature MIN 40°F MAX 120°F
 Ambient Air Temperature .. MIN 40°F MAX 120°F

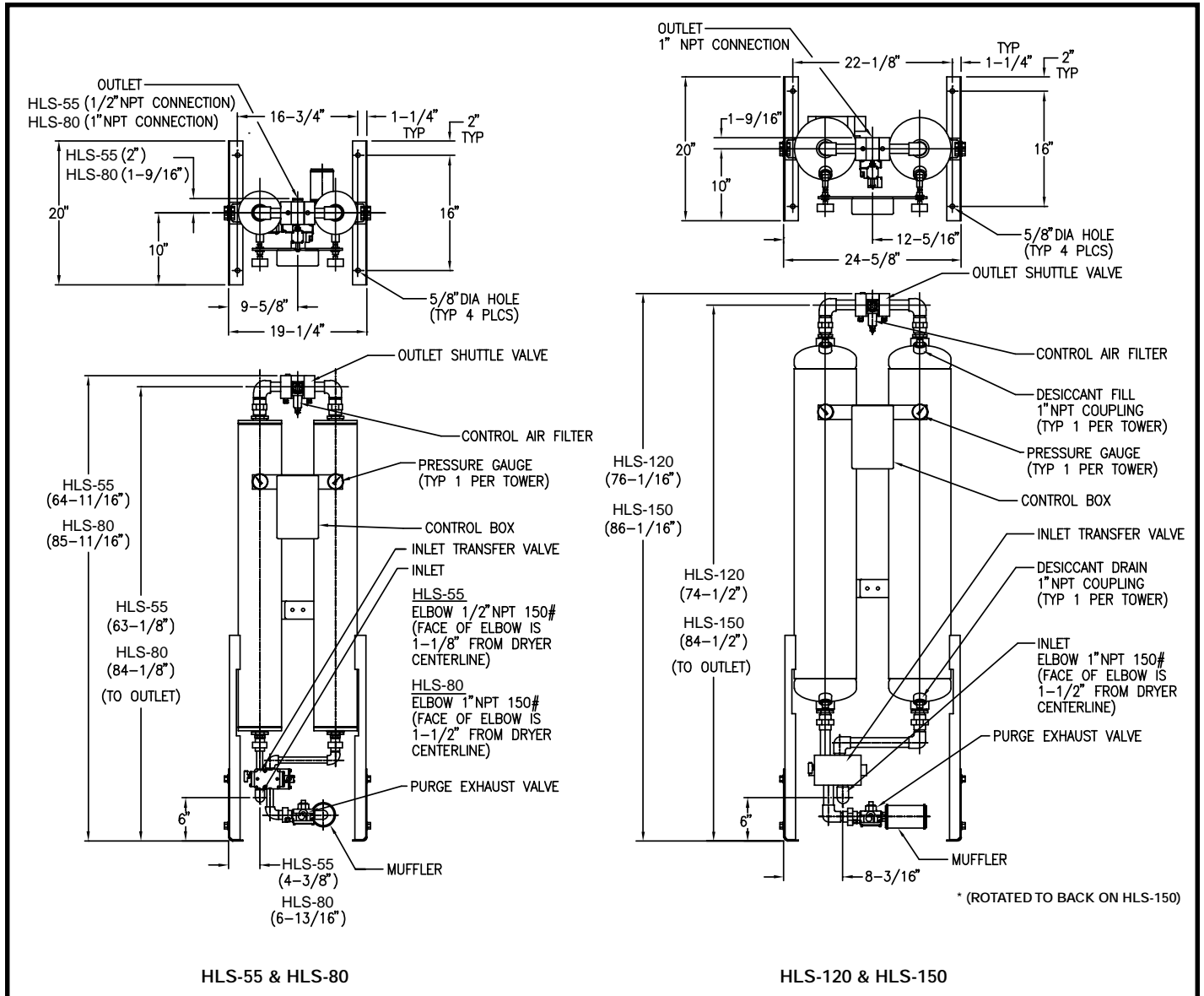
RATED INLET CONDITIONS

Inlet Air Pressure 100 PSIG
 Inlet Air Temperature 100°F
 Relative Humidity (saturation) 100% RH

FLOW CAPACITIES (SCFM) at various pressures (100°F)

	60 PSIG	75 PSIG	90 PSIG	100 PSIG	125 PSIG	150 PSIG
HLS-55	36	43	50	55	61	66
HLS-80	52	63	73	80	88	96
HLS-120	78	94	110	120	132	144
HLS-150	98	117	137	150	166	180

3.2 DIMENSIONS Models HLS-55 through HLS-150



4.1 LOCATION

WARNING

DO NOT INSTALL THIS DRYER IN AN ENVIRONMENT OF CORROSIVE CHEMICALS, EXPLOSIVE GASSES, POISONOUS GASSES, OR SATURATED STEAM HEAT.

Locate dryer in a protected, well vented area where ambient temperatures are between 40°F and 120°F. If this dryer must be installed where ambient temperatures are below 40°F, insulation and heat tracing must be properly installed on the inlet piping, purge exhaust line and the desiccant towers to prevent freezing of the equipment.

Position the dryer in the upright position on a solid, level, vibration free surface capable of supporting the dryer's weight. Allow sufficient clearance over and around the dryer. **Refer to SECTION 3.2 for dryer dimensions.**

The dryer should not be located in extremely dirty areas where airborne contaminants can accumulate on the dryer. If this cannot be prevented, the dryer should be cleaned periodically.

4.2 PIPING AND ANCILLARY EQUIPMENT

IMPORTANT

Make sure that the inlet air piping is connected to the bottom and the outlet air piping is connected to the top of the dryer.

Make sure that the inlet and outlet piping to and from the dryer is properly supported. Excessive stress may cause damage and/or dryer malfunction.

Remove protective caps or covers from all valves before installing this dryer.

If this dryer is to be installed into an existing piping system, clean the existing inlet piping to remove all accumulated dirt, pipe scale, etc., before connecting the dryer. Make sure that the inlet and outlet shutoff valves are tightly closed before connecting to the existing piping system.

When installing the piping and any additional components, make sure that adequate pipe supports are used. Excessive stress on the dryer and components may cause damage or premature failure. Use either overhead or stiff-leg type supports.

Make sure that the piping is correctly connected to the dryer. The inlet is the bottom connection and the outlet is the top connection. **Reference SECTION 3.2 for dryer dimensions and connection locations.**

Once the location has been determined, place the dryer into position. **Reference SECTION 1 for handling instructions.**

4.2-1 BYPASS PIPING (optional)

The installation of bypass piping is not required, but will allow the dryer and filter(s) to be taken off stream without interrupting the air system.

In Figure 4A, a recommended bypass piping layout and additional components are shown. Basic bypass piping should include an inlet isolation valve, a bypass valve, and an outlet isolation valve. The isolation and bypass valves must be bubble-tight.

4.2-2 FILTERS

CAUTION

A PROPERLY RATED COALESCING PREFILTER MUST BE INSTALLED BEFORE THE DRYER TO REMOVE LUBRICATING OILS, DUST AND PIPE SCALE CONTAMINATION. FAILURE TO USE A PREFILTER WILL RESULT IN DAMAGE TO THE DRYER AND VOIDS THE WARRANTY.

Make sure that the elements are installed in all filter housings prior to start up.

A coalescing prefilter must be installed before the dryer to remove lubricating oils, dust and pipe scale contamination. It is recommended that a high efficiency coalescing filter with an automatic drain or electric drain valve be installed. The filter should be equipped with a pressure differential indicator to monitor the condition of the element.

A particulate afterfilter should be installed downstream of the dryer. The afterfilter will remove any desiccant dust. The afterfilter should be equipped with a pressure differential indicator to monitor the condition of the element.

Make sure that the filters are properly installed according to the instructions provided with them.

4.3 REMOTE PURGE EXHAUST PIPING

To reduce the noise during purging and tower depressurization, this dryer was supplied with a muffler for installation on the purge exhaust valve. If the sound or humidity discharged from this dryer is unacceptable, the purge of this dryer can be piped remotely away.

IMPORTANT

Make sure that the piping is as short as possible and does not create back pressure on the dryer. To prevent liquid accumulation in the piping and purge valve, the piping must be at the same level or lower than the purge valve.

The purge line must be vented to atmospheric pressure. If the ambient temperature at the venting end of the piping is subject to temperatures below 32°F, freeze protection must be installed.

The purge valve has threaded pipe connections. Reference Section 3.2 for location. Use adequate pipe supports on the piping to prevent stress on the valve.

The distance will determine the size of piping that is recommended. For distances of 10 feet or less, use piping of the same size as the purge valve. For distances up to 20 feet, use piping one size larger than the purge valve.

4.4 INSTALLING PRESSURE RELIEF VALVES

CAUTION

THESE VESSELS MUST BE PROTECTED BY PRESSURE RELIEF VALVES. Refer to OSHA 1910.169 Par. b, Sub. Par (3) and ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, UG-125 through UG-136. Also check government regulations, i.e., state and local codes.

Relief valve connection ports were NOT provided on this dryer. It is recommended that relief valves be installed to comply with all applicable codes. The relief valves should be full flow type, rated for the dryer operating conditions. For recommended location see Figure 4A.

4.5 INSTALLING THE PURGE MUFFLER

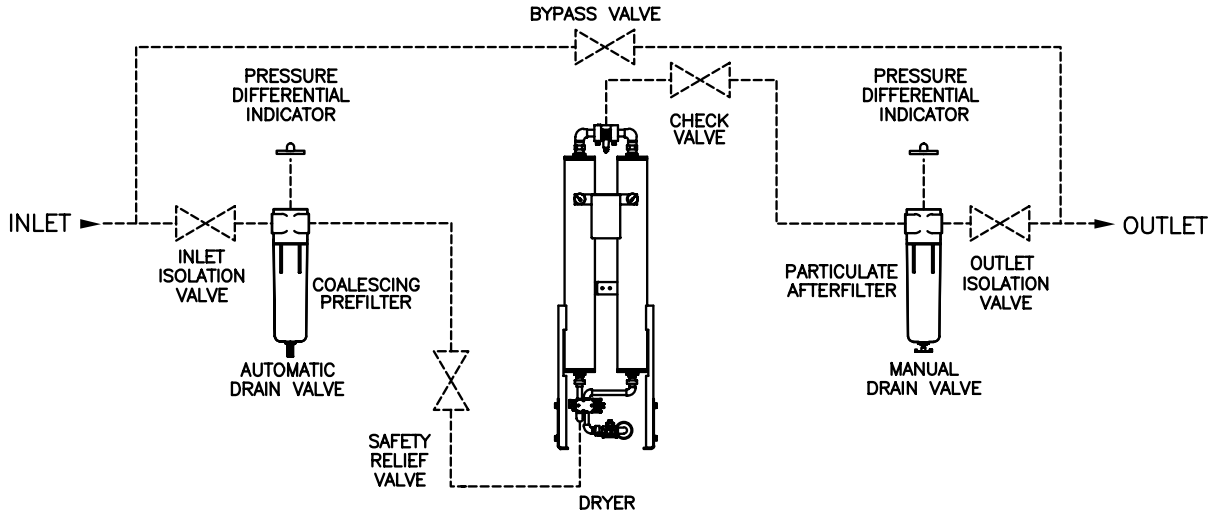
To reduce the sound level during purge and tower depressurization, this dryer was supplied with a muffler for installation on the purge exhaust valve. For muffler location **Reference SECTION 3.2.**

The muffler was shipped separately. It should **NOT** be installed until the dryer has been operated for several hours. From desiccant installation, some dust may be present in the desiccant towers. Operating the dryer with the muffler installed immediately after the towers have been filled with desiccant or at initial start up may cause the muffler to clog.

IMPORTANT

The dryer must be operated for several hours without the muffler after the towers have been filled with desiccant. This will prevent the muffler from becoming clogged.

FIGURE 4A RECOMMENDED PIPING CONFIGURATION AND COMPONENTS



DRYER		PREFILTER		DEL-P INDICATOR	AFTERFILTER		DEL-P INDICATOR
MODEL	IN/OUT	MODEL	IN/OUT	MODEL	MODEL	IN/OUT	MODEL
HLS-55	1/2" NPT(F)	F200-0055-1/2-C-AD	1/2" NPT(F)	PD-6	F200-0055-1/2-RB-MD	1/2" NPT(F)	PD-6
HLS-80	1" NPT(F)	F200-0085-3/4-C-AD	3/4" NPT(F)	PD-6	F200-0085-3/4-RB-MD	3/4" NPT(F)	PD-6
HLS-120	1" NPT(F)	F200-0150-1-C-AD	1" NPT(F)	PD-6	F200-0150-1-RB-MD	1" NPT(F)	PD-6
HLS-150	1" NPT(F)	F200-0150-1-C-AD	1" NPT(F)	PD-6	F200-0150-1-RB-MD	1" NPT(F)	PD-6

4.6 ELECTRICAL CONNECTIONS

WARNING

SERIOUS PERSONAL INJURY AND DAMAGE TO THE DRYER WILL OCCUR IF THE DRYER IS CONNECTED TO A POWER SOURCE OTHER THAN THE VOLTAGE LISTED ON THE DATA TAG.

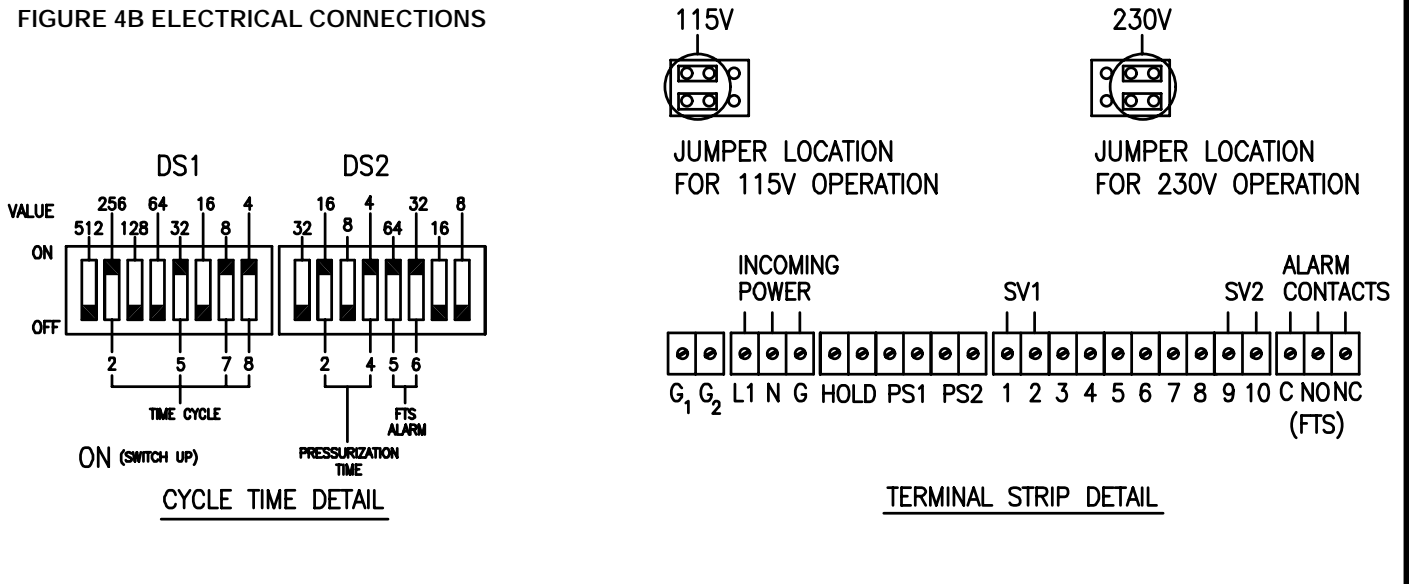
WHEN INSTALLING THE ELECTRICAL CONNECTIONS FOR THIS DRYER, COMPLY WITH NATIONAL ELECTRICAL CODE AND ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES.

Check the electrical rating of the dryer as listed on the dryer data tag. Make sure that the power source is correct for the dryer rating.

Remove the box cover to access the power supply and alarm terminals. Wire the power supply as shown in Figure 4B. Connect the wiring and necessary components to the dryer box. Comply with all codes applicable for this installation.

The power supply to the dryer will be connected into the dryer control box. A 7/8" dia hole was provided in the bottom of the box for the connection of conduit or a cord grip connector.

FIGURE 4B ELECTRICAL CONNECTIONS



5.1 START UP

WARNING

BEFORE STARTING THIS DRYER, FOLLOW THE INSTALLATION INSTRUCTIONS AND PROCEDURES COMPLETELY. SERIOUS PERSONAL INJURY CAN RESULT IF INSTRUCTIONS ARE NOT CAREFULLY AND COMPLETELY FOLLOWED.

DO NOT REMOVE, REPAIR, OR REPLACE ANY ITEM ON THIS DRYER WHILE IT IS UNDER PRESSURE.

IMPORTANT

TO START THE DRYER YOU MUST PRESS THE RUN SWITCH WHICH WILL LIGHT THE RUN LED.

If the dryer is being started up for the first time or after the desiccant has been changed, the purge muffler must be removed. Operate the dryer until no desiccant dust is visible at the purge valve. Then the muffler can be reinstalled.

If bypass piping was installed on this dryer as outlined in SECTION 4.2, close the inlet and outlet isolation valves. Open the bypass valve.

Pressurize the air system. Once the air system is pressurized, slowly open the inlet isolation valve. Check timing settings in control box. The dryer should be factory set as shown in Figure 4B.

Energize the power supply to the dryer. Both towers will pressurize. Several seconds later one tower will depressurize. Open the outlet isolation valve.

5.2 PURGE FLOW ORIFICE

DRYER MODEL	ORIFICE SIZE	FLOW AT 100 PSIG	BLANK ORIFICE P/N
HLS-55	3/32" DIA	9.5 SCFM	26-1933
HLS-80	7/64" DIA	12.9 SCFM	26-1933
HLS-120	9/64" DIA	21.4 SCFM	26-1933
HLS-150	5/32" DIA	26.4 SCFM	26-1933

The Purge Orifice is located at the top of the outlet valve. Purge can be adjusted by taking a blank orifice and drilling a new size hole.

5.3 CONDITIONING THE DESICCANT BED

To condition the desiccant bed, the dryer is operated without any outlet flow, while the towers regenerate with purge air.

Close the outlet isolation valve and pressurize the system. Energize the power supply and start the dryer. Observe the dryer for several cycles. Make sure that it is operating properly.

At initial start up or after extended shutdowns (over one month), the dryer may take 24 to 48 hours of continuous operation for the bed to be conditioned. Moisture that has accumulated on the desiccant bed should be removed before the dryer is placed on stream.

PRINCIPLE OF OPERATION

SECTION 6

6.1 PRINCIPLE OF OPERATION

HLS Series Heatless Regenerative Air Dryers utilize the pressure swing principle of operation. The desiccant bed in one tower dries the air stream while the desiccant bed in the other tower is regenerated.

A purge of dry air is used for tower regeneration. It is taken from the outlet of the dryer. To allow the correct amount of dry air to flow into the regenerating tower, dryers are equipped with a purge metering orifice. The heat created during adsorption of moisture in the drying tower is retained in the desiccant bed and increases the moisture removal capacity of the purge air.

When the dryer is pressurized and the power supply to the dryer is energized, the dryer will begin operation. To achieve maximum performance from this dryer, it should be operated continuously. Operating this dryer for single shift periods may result in varied outlet dew point performance.

The dryer operation consists of four stages; REPRESSURIZATION, CHANGEOVER/DEPRESSURIZATION, DRYING and REGENERATION.

6.1-1 REPRESSURIZATION STAGE

Repressurization occurs in the regenerating tower. Repressurization must occur before tower changover. This reduces shock to the desiccant and the possibility of downstream pressure spikes.

The purge valve is closed and the purge air, which was vented to atmosphere earlier in the cycle, is now used to repressurize the regenerated tower.

6.1-2 CHANGEOVER/DEPRESSURIZATION STAGE

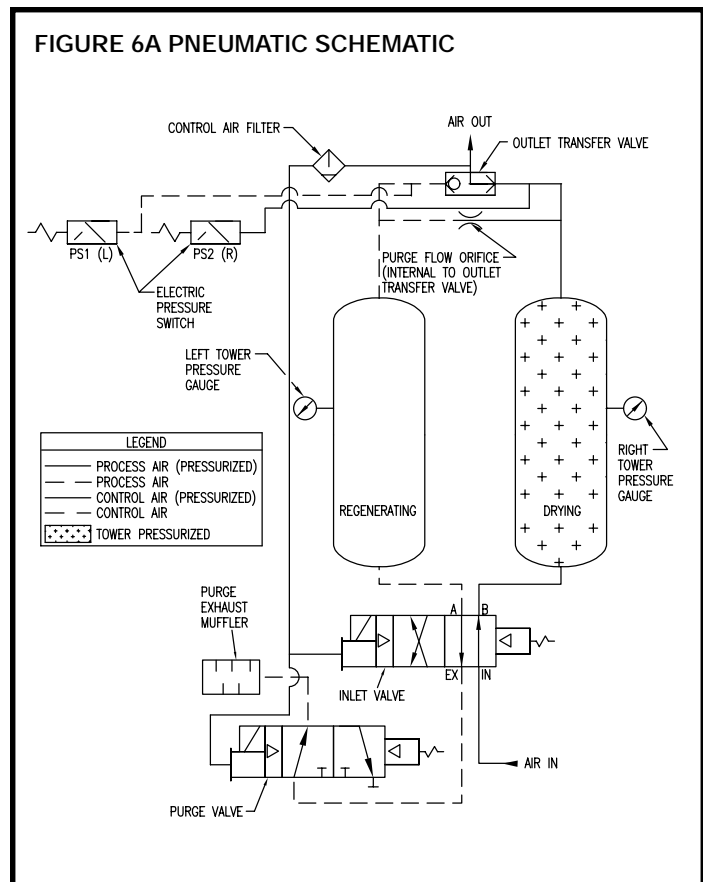
Tower changeover occurs after the previous regenerating tower is pressurized. The controller signals the inlet transfer valve to switch. The tower that was on line and drying the process air will begin to depressurize.

6.1-3 DRYING AND REGENERATION STAGE

During the drying stage, one tower is pressurized with process air. This tower is in the drying stage. The process air passes through the desiccant bed, which adsorbs moisture from the air.

The regeneration stage of one tower occurs at the same time as the drying stage in the opposite tower. During the regeneration stage, a percentage of dry air is directed through the desiccant bed of the offstream tower. The purge air is vented through the purge valve to the atmosphere.

FIGURE 6A PNEUMATIC SCHEMATIC



7.1 CONTROLLER

The Controller is a compact NEMA 4 control box. It has the following features:

- Dryer Status LEDs
- POWER ON LED - L/R TOWER DRYING LED
- RUN LED - L/R TOWER REGENERATING LED
- LEDS
- HOLD LED - DRYER PURGING LED
- SWITCHING FAILURE LED

The Dryer Status LEDs are located on the front panel of the control box. Figure 7A shows the location of each.

When the Left tower is pressurized and on line drying the process air, the corresponding LEFT TOWER DRYING LED is illuminated. When the right tower is pressurized and on line drying the process air, the corresponding RIGHT TOWER DRYING LED is illuminated.

The DRYER PURGING LED is illuminated when the purge exhaust valve is energized open. During repressurization this LED will not be illuminated. Repressurization occurs for approximately 20 seconds just before tower changeover.

The operation sequence of the dryer is shown in FIGURE 7B TIMING CHART.

SWITCHING FAILURE:

When there is a switching failure, the LED will be lit. This will energize the contacts shown in FIGURE 4B. The contacts can be wired for remote annunciation. To reset the Switching Failure Alarm press the run button on the control box front panel.

HOLD FEATURE:

For low load or static pressure conditions, the hold contacts shown on Figure 4B can be wired to an auxiliary set of normally closed contacts on the compressor starter. This will stop the cycling of the dryer and repressurize both towers of the dryer, until there is demand on the compressor. The Hold LED will light, if the dryer is wired as described and the compressor is not running.

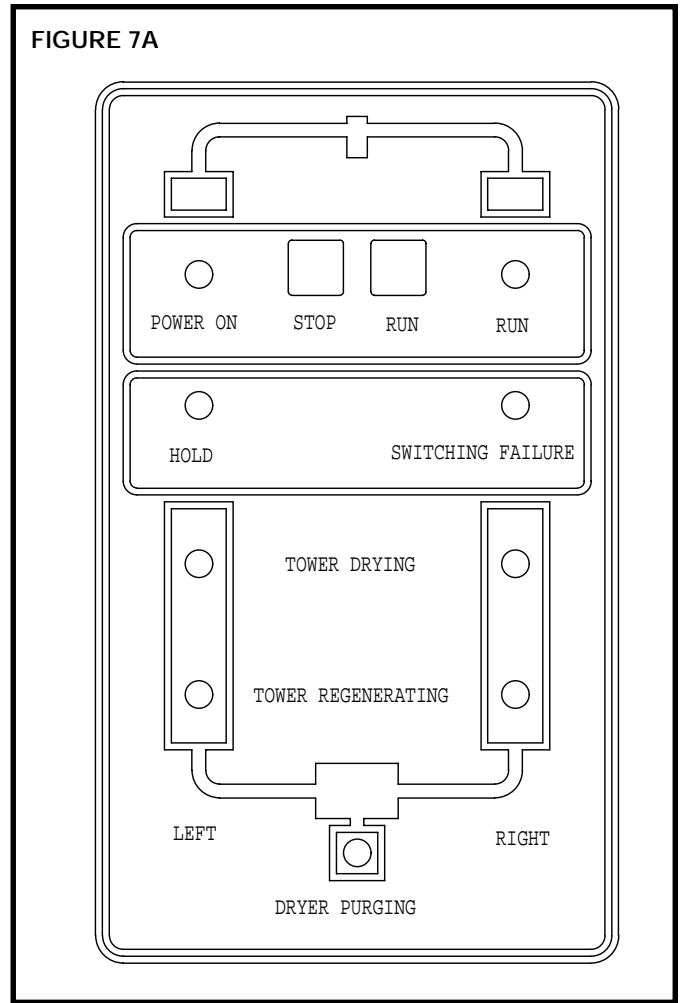
7.2 SETTING THE CYCLE TIME

Reference Figure 4B:

The setting for the time cycle is a **5 min/half cycle**. For the half cycle time setting, the switches indicated for **DS1 (2, 5, 7, & 8)** as shown in the **CYCLE TIME DETAIL** have been factory set by pushing the switches up. The values for these switches are **(256, 32, 8, & 4) sec.**, so when added together equal **300 sec or 5 min**. **WE DO NOT RECOMMEND** a time cycle setting below **2 min/half cycle**. For this half cycle time setting, the switches that need to be pushed up are **DS1 (4, 5, 6, & 7)** there values are **(64, 32, 16, & 8) sec.** so when added together equal **120 sec or 2 min**.

The setting for the pressurization time is **20 sec**. For the pressurization time setting, the switches indicated for **DS2 (2 & 4)** as shown in the **CYCLE TIME DETAIL** have been factory set by pushing the switches up. The values for these switches are **(16 & 4) sec.**, so when added together equal **20sec**. **WE DO NOT RECOMMEND CHANGING THIS SETTING.**

FIGURE 7A



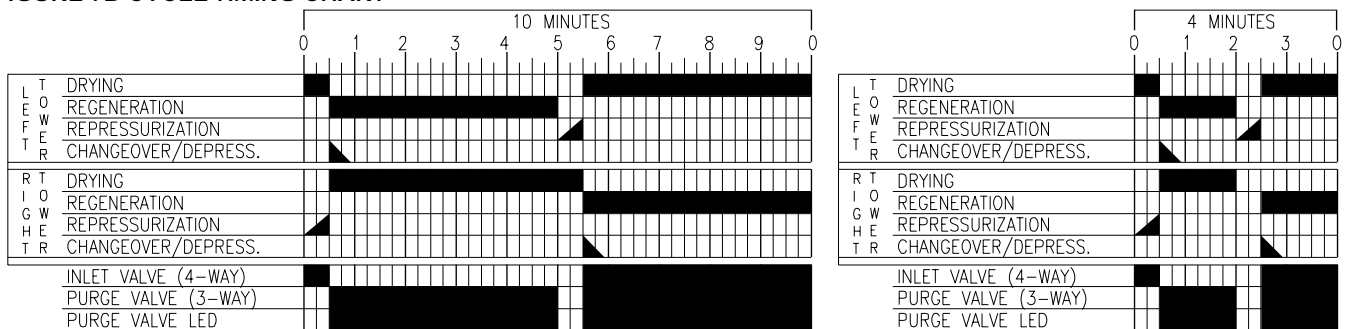
The setting for the alarm time is **96 sec**. For the alarm time setting, the switches indicated for **DS2 (5 & 6)** as shown in the **CYCLE TIME DETAIL** have been factory set by pushing the switches up. The values for these switches are **(64 & 32) sec.**, so when added together equal **96 sec**. **WE DO NOT RECOMMEND CHANGING THIS SETTING.**

NOTE: THE ALARM TIME SETTING NEEDS TO BE LESS THEN THE HALF CYCLE TIME SETTING OR THIS WILL NEGATE THE ALARM FUNCTION.

IMPORTANT

Operating this dryer on the 4 minute cycle will more than double the wear on the dryer components. To reduce wear on the dryer, operate the dryer on the 10 minute cycle if the -40°F dew point is acceptable.

FIGURE 7B CYCLE TIMING CHART



8.1 SHUTDOWN PROCEDURES

Shutoff the air supply to the dryer. If bypass piping and valves were installed, close the inlet and outlet isolation valves and open the bypass valve. Let the dryer cycle until it is totally depressurized.

MAINTENANCE & TROUBLESHOOTING

SECTION 9

9.1 DAILY INSPECTION

The following procedures should be performed daily:

- Check the dryer operating conditions, inlet temperature, ambient temperature, inlet pressure and inlet flow.
- Monitor the dryer for one complete cycle. Make sure that it is operating properly. Visually check the dryer and piping for damage.
- Check the purge muffler. Purge air should be exhausting from the valve. If oil is present, the dryer and air system may be contaminated with lubricants.
- Inspect all upstream equipment, aftercoolers, separators, drains and filters. Make sure that all bypass valves are tightly closed.
- Check the prefilter(s) for proper draining. If the prefilter is not equipped with an automatic drain, it must be manually drained. Check the pressure differential indicator on all prefilters and afterfilters. If the differential pressure is unacceptable, replace the elements.

9.2 SCHEDULED MAINTENANCE

12 MONTHS

- Replace purge muffler element
- Replace the control air filter element

24-60 MONTHS

- The desiccant in the towers should be replaced every two to five years. The life of the desiccant will vary depending on the inlet air conditions. Systems with excessive contaminants and/or inadequate filtration will decrease the life span of the desiccant drastically. Once the desiccant is contaminated with lubricants, it must be replaced.

9.3 DESICCANT REPLACEMENT

WARNING

DO NOT ATTEMPT TO REMOVE ANY ITEM UNTIL ALL AIR PRESSURE IS OUT OF THE VESSEL. CHECK ALL TOWER PRESSURE GAUGES, MAKING SURE THAT THEY ARE AT 0 PSIG AND THAT INCOMING PRESSURE HAS BEEN TURNED OFF.

ALWAYS WEAR EYE PROTECTION AND GLOVES WHEN HANDLING THE DESICCANT. DUST FROM THE DESICCANT MAY CAUSE EYE AND SKIN IRRITATION. AVOID BREATHING THE DUST AND PROLONGED CONTACT WITH THE SKIN.

FIRST AID IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. CONSULT A PHYSICIAN.

Take dryer off stream following the **SHUTDOWN PROCEDURES IN SECTION 8**.

For **HLS-55 and HLS-80**:

Carefully disconnect the inlet and outlet piping assemblies from the dryer and process piping. Disconnect the piping assemblies at the union connections. Unthread the bushing/diffusers from the bottom of each vessel to drain the old desiccant.

Remove any oil, dirt, or scale from the towers and piping. Do NOT weld, grind or sandblast the vessels. The vessels may be steam cleaned internally and externally to remove dirt and oil.

CAUTION

Make sure that the towers are clean to prevent contamination of new desiccant.

Reinstall the bushing/diffusers in the bottom of the vessels. Install the inlet piping assembly. Apply pipe thread sealant as necessary.

Remove the bushing/diffusers from the top of the vessels. Load desiccant through these ports. **REFER TO SECTION 3.1 FOR PROPER DESICCANT AMOUNTS.**

Reinstall the bushing/diffusers in the top of the vessels. Install the outlet piping assembly. Reconnect the dryer to the process piping. Apply pipe thread sealant as necessary.

Follow **START UP PROCEDURES IN SECTION 5.1** to start up and place dryer in operation.

For HLS-120 and HLS-150 fill and drain ports are provided, so piping disassembly is not required.

9.4 CONTROL AIR FILTER REPLACEMENT

Close the dryer inlet and outlet isolation valves (and open bypass valve if provided). Turn off the power and completely depressurize the dryer.

WARNING

DO NOT REMOVE THE FILTER BOWL FROM HEAD UNTIL HOUSING IS COMPLETELY DEPRESSURIZED.

After all pressure is out of the dryer, grasp the filter bowl firmly. While pushing the bowl upward, turn it clockwise to remove it from the filter head.

Unthread the used element from the head. Discard the used element properly.

Remove new element from the shipping package. Thread the new element into the filter head.

Position the bowl in the filter head. While pushing the bowl upward into the head, turn the bowl counterclockwise to lock it in place.

Following the start up procedures for the dryer, place the dryer on stream.

9.5 TROUBLESHOOTING

The following check list should be used as a guideline for troubleshooting problems.

IS THE POWER ON AND RUN SWITCH PRESSED?

Check the main power source and check that the Power LED is lit. Make sure that the dryer Run switch has been pressed and that the Run LED is lit

IS THE SYSTEM PRESSURIZED?

The dryer is designed to operate at 60 to 150 psig. Check the upstream equipment and any isolation or bypass valves.

IS THE DRYER CYCLING?

- **IS THE CONTROL SYSTEM WORKING?**
Is there incoming power to the control box.
- **IS THERE CONTROL AIR PRESSURE, 60 PSIG MINIMUM.**
Make sure that the dryer inlet pressure is above 60 PSIG. Check the control air filter element and replace it with a new element. Reference Section 9.4 for element replacement instructions.
- **IS THE INLET VALVE FAULTY?**
Rebuild or replace the inlet valve as necessary. Use manual override to check.
- **IS THE PURGE EXHAUST VALVE FAULTY?**
Rebuild or replace the faulty purge exhaust valve. Use manual override to check.
- **IS THE OUTLET VALVE FAULTY?**
Check the outlet shuttle valve.

ARE THE TOWERS DEPRESSURIZING?

Check the purge valve for proper operation. Check the purge muffler. It might be clogged. If clogged or damaged, replace it. Use manual override to check. (This should cause depressurization.)

IS THE DEW POINT ACCEPTABLE?

- **ARE THE INLET CONDITIONS WITHIN THE SPECIFICATIONS?**
Reference Section 3.1 for the inlet conditions of the dryer. Correct the inlet conditions if necessary. Excessive inlet flow will greatly reduce the performance of the dryer.
- **WAS THE DESICCANT INSTALLED?**
Make sure that the desiccant was installed. Reference Section 9.3 for desiccant installation procedures.
- **IS THE DESICCANT CONTAMINATED WITH LUBRICANTS?**
Check the condition of the desiccant bed. If the bed is contaminated with lubricants, replace the desiccant following the procedures in Section 9.3.
- **IS THE DESICCANT CONTAMINATED WITH MOISTURE?**
If the dryer was operated under excessive inlet conditions, the desiccant bed may be saturated with liquid moisture. Check upstream equipment such as aftercoolers. Check the actual inlet conditions, correct them and condition the bed following the procedures in Section 5.3.
- **ARE THE BYPASS VALVES OPEN OR LEAKING?**
Check the valves (if installed). Repair or replace if faulty.

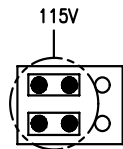
9.6 WIRING DIAGRAMS

NOTE:
RED LED FLASHING ON AND OFF IS INDICATING THE TIMER IS ACTIVE

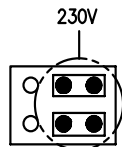
RED LED

JUMPER

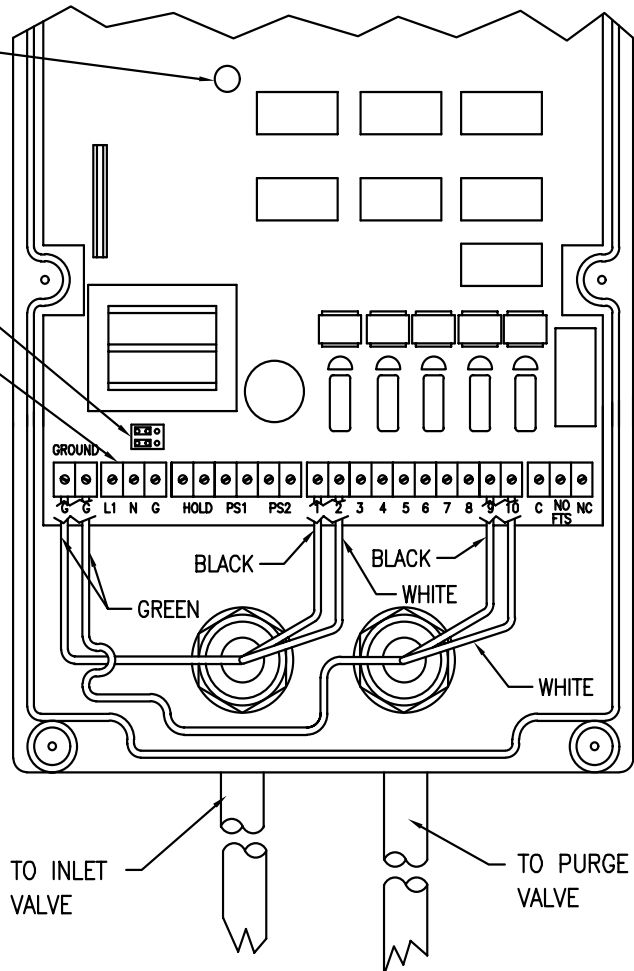
CUSTOMER POWER CONTACTS ARE: L1, N and G



115V
BOARD IS DUAL VOLTAGE RATED. JUMPER MUST BE SET AS SHOWN FOR 115V OPERATION.

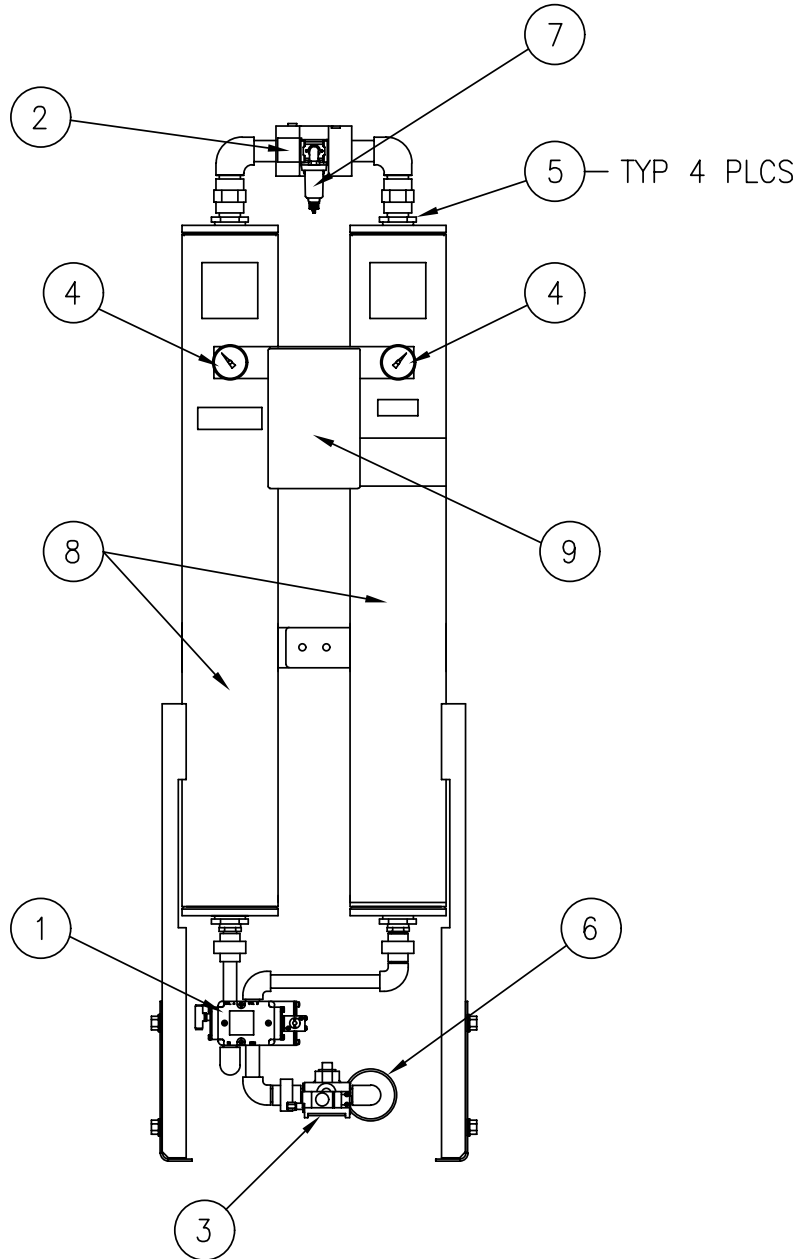


230V
BOARD IS DUAL VOLTAGE RATED. JUMPER MUST BE SET AS SHOWN FOR 230V OPERATION.

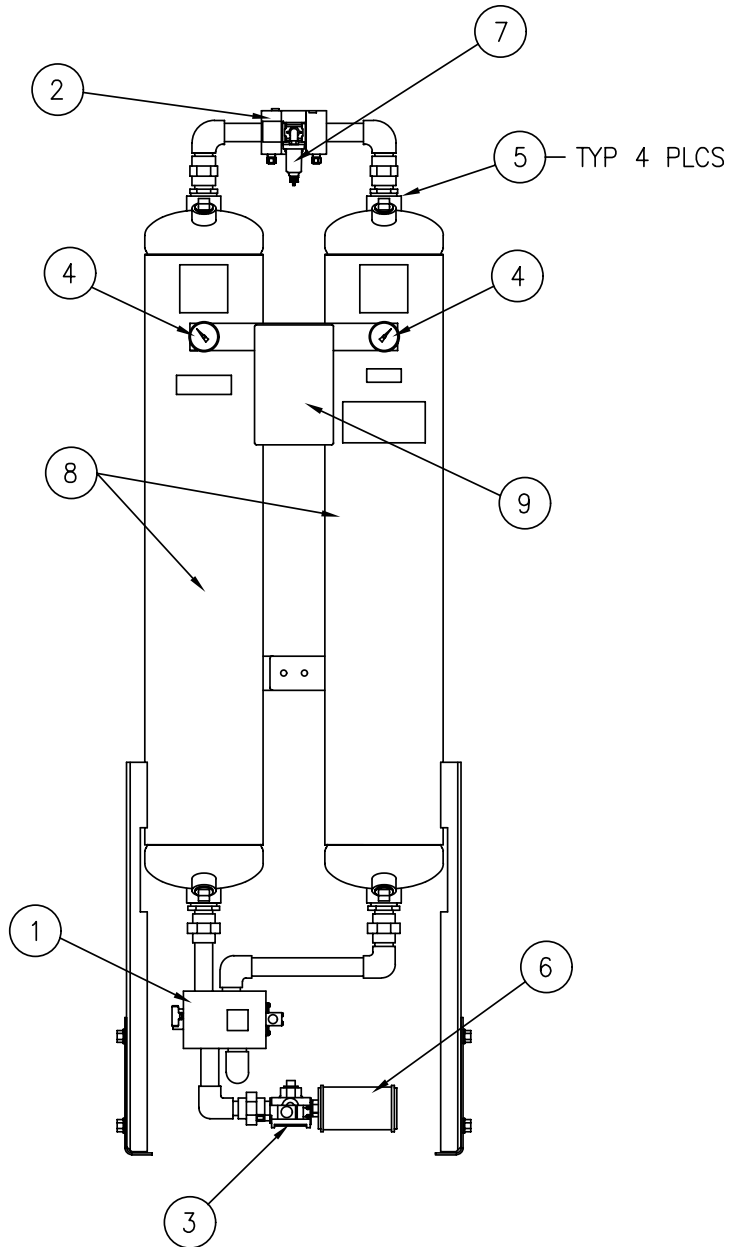


CAUTION
THE DRYER CONTROL CIRCUIT IS DUAL VOLTAGE RATED. NEVER SET THE BOARD TO A VOLTAGE OTHER THAN THE VOLTAGE RATING OF THE DRYER LISTED ON THE DRYER DATA TAG. SETTING THE BOARD INCORRECTLY WILL CAUSE DAMAGE TO THE INLET AND PURGE VALVES AND POSSIBLE PERSONAL INJURY OR FIRE.

ITEM	DESCRIPTION	HLS-55 (115V)		HLS-55 (230V)		HLS-80 (115V)		HLS-80 (230V)	
		PART NO.	QTY	PART NO.	QTY	PART NO.	QTY	PART NO.	QTY
1	Inlet Transfer Valve, 4-way	14-2072	1	14-2073	1	14-2074	1	14-2075	1
a	Repair kit for 4-way valve	26-6516	1	26-6516	1	26-6515	1	26-6515	1
b	Valve pilot for 4-way valve	26-6518	1	26-6518	1	26-6518	1	26-6518	1
c	4-way valve without base	26-6520	1	26-6522	1	26-6521	1	26-6523	1
2	Outlet Shuttle Valve	14-2071	1	14-2071	1	14-2071	1	14-2071	1
3	Purge Valve, 3-way	14-2076	1	14-2077	1	14-2078	1	14-2079	1
a	Repair Kit for 3-way valve	26-6514	1	26-6514	1	26-6514	1	26-6514	1
b	Valve pilot for 3-way valve	26-6517	1	26-6517	1	26-6517	1	26-6517	1
4	Pressure Gauge	29-0344	2	29-0344	2	29-0344	2	29-0344	2
5	Diffuser/Desiccant Retainer	26-6464	4	26-6464	4	26-6464	4	26-6464	4
6	Purge Exhaust Muffler	26-6152	1	26-6152	1	26-3734	1	26-3734	1
a	Element, purge exhaust muffler	26-6251	1	26-6251	1	26-6539	1	26-6539	1
7	Control Air Filter	26-6830	1	26-6830	1	26-6830	1	26-6830	1
a	Element, control air filter	26-6831	1	26-6831	1	26-6831	1	26-6831	1
8	Desiccant								
	Activated Alumina, 1/8" dia, 25# pail	33-0237	3	33-0237	3	33-0237	4	33-0237	4
9	Control Box (complete)	46-2771	1	46-2771	1	46-2771	1	46-2771	1
a	Circuit Board only	26-6469	1	26-6469	1	26-6469	1	26-6469	1
b	Membrane Panel	26-6356	1	26-6356	1	26-6356	1	26-6356	1
c	Pressure Switch	26-5284	2	26-5284	2	26-5284	2	26-5284	2



ITEM	DESCRIPTION	HLS-120 (115V)		HLS-120 (230V)		HLS-150 (115V)		HLS-150 (230V)	
		PART NO.	QTY	PART NO.	QTY	PART NO.	QTY	PART NO.	QTY
1	Inlet Transfer Valve, 4-way	14-2074	1	14-2075	1	14-2074	1	14-2075	1
a	Repair kit for 4-way valve	26-6515	1	26-6515	1	26-6515	1	26-6515	1
b	Valve pilot for 4-way valve	26-6518	1	26-6518	1	26-6518	1	26-6518	1
c	4-way valve without base	26-6521	1	26-6523	1	26-6521	1	26-6523	1
2	Outlet Shuttle Valve	14-2071	1	14-2071	1	14-2071	1	14-2071	1
3	Purge Valve, 3-way	14-2078	1	14-2079	1	14-2080	1	14-2081	1
a	Repair Kit for 3-way valve	26-6514	1	26-6514	1	26-6250	1	26-6250	1
b	Valve pilot for 3-way valve	26-6517	1	26-6517	1	26-6519	1	26-6519	1
4	Pressure Gauge	29-0344	2	29-0344	2	29-0344	2	29-0344	2
5	Diffuser/Desiccant Retainer	26-6464	4	26-6464	4	26-6464	4	26-6464	4
6	Purge Exhaust Muffler	26-3734	1	26-3734	1	26-3262	1	26-3262	1
a	Element, purge exhaust muffler	26-6539	1	26-6539	1	26-5774	1	26-5774	1
7	Control Air Filter	26-6830	1	26-6830	1	26-6830	1	26-6830	1
a	Element, control air filter	26-6831	1	26-6831	1	26-6831	1	26-6831	1
8	Desiccant								
	Activated Alumina, 1/8" dia, 25# pail	33-0237	6	33-0237	6	33-0237	7	33-0237	7
9	Control Box (complete)	46-2771	1	46-2771	1	46-2771	1	46-2771	1
a	Circuit Board only	26-6469	1	26-6469	1	26-6469	1	26-6469	1
b	Membrane Panel	26-6356	1	26-6356	1	26-6356	1	26-6356	1
c	Pressure Switch	26-5284	2	26-5284	2	26-5284	2	26-5284	2



SAFETY PRECAUTIONS

Safety is everybody's business and is based on your use of good common sense. All situations or circumstances cannot always be predicted and covered by established rules. Therefore, use your past experience, watch out for safety hazards and be cautious.

<p>⚠ DANGER</p>  <p>DISCHARGE AIR USED FOR BREATHING WILL CAUSE SEVERE INJURY OR DEATH. CONSULT FILTRATION SPECIALIST FOR ADDITIONAL FILTRATIONS AND TREATMENT EQUIPMENT TO MEET HEALTH AND SAFETY REGULATIONS.</p>	<p>⚠ DANGER</p>  <p>AIR AND OIL UNDER PRESSURE WILL CAUSE SEVERE PERSONAL INJURY OR DEATH. SHUT DOWN COMPRESSOR AND RELIEVE SYSTEM OF ALL PRESSURE BEFORE REMOVING VALVES, CAPS, PLUGS, FITTINGS, BOLTS AND FILTER.</p>	<p>⚠ WARNING</p>  <p>ELECTRICAL SHOCK FROM IMPROPER GROUNDING CAN CAUSE INJURY OR DEATH.</p> <p>GROUND UNIT AND RELATED EQUIPMENT ACCORDING TO NATIONAL ELECTRICAL CODE AND LOCAL REGULATIONS.</p>	<p>⚠ WARNING</p>  <p>READ THE OPERATOR'S MANUAL BEFORE STARTING THIS UNIT. FAILURE TO ADHERE TO INSTRUCTIONS CAN RESULT IN SEVERE PERSONAL INJURY OR DEATH. REPLACEMENT MANUALS CAN BE PURCHASED BY CONTACTING THE MANUFACTURER.</p>
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