

ADK MODEL 6000
Indoor Automatic
Air Dehydration System



**INSTALLATION, OPERATING
& MAINTENANCE MANUAL**



McIntire

Featuring ADK Dry Air Systems

745 Clark Ave.
Bristol, CT 06010
1 800 4 DRY AIR (437-9247)

Thank you for choosing an ADK Air Dryer System by McIntire for your cable pressurization needs. All ADK Dryer Systems have been designed to provide years of outstanding performance and reliable service with minimal maintenance.

This manual covers the installation, operation, maintenance and servicing of the Air Dryer System. Please read it carefully to better understand the dryer's operation and maintenance requirements.

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The needs of the telecommunications industry have changed dramatically over the last decade and we have continued to develop our product line to better serve the requirements of this dynamic market. The acquisition of several, popular industry-related product lines make "The McIntire Companies" the single *largest* and *most complete* supplier of telecommunications pressurization equipment in the world. Our extensive catalog includes:

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McIntire

Featuring ADK Dry Air Systems

INSTALLATION AND OPERATING INSTRUCTIONS

ADK MODEL 6000 INDOOR AUTOMATIC AIR DEHYDRATION SYSTEM

DRYER SYSTEM LOG

Installation Data

Model No. _____

Serial No. _____

Compressor No. _____

Installation Date _____

Location _____

Yearly Maintenance Kits:

Ordered Installed

Operating Manual Information

Manual P/N 12744

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ADDENDA

Page No.	Revision	Date
All	Revised to show current specifications/electrical diagrams and manual formats	11/02

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**ADK MODEL 6000
AUTOMATIC AIR DEHYDRATION SYSTEM**

1.0 GENERAL

1.1.1 This manual contains the description, installation and maintenance instructions for the ADK Model 6000 Air Dryer. This dryer is designed to provide a continuous dry air flow at adjustable pressures of 0-15 PSIG for continuous feed pressure cables, pipe systems and other systems requiring dry air. The maximum emergency capacity is 7200 SCFD.

2.0 SPECIFICATIONS

CAPACITY*	
Normal	6000 SCFD
Emergency	7200 SCFD
POWER REQUIRMENTS	
6000	208/230 VAC 1PH, 60Hz 15 Amps
6000-2	220 Volts, 1PH, 50Hz, 15 Amps
DEW POINT	Below -40°F
HUMIDITY OF DELIVERED AIR	Below 1% at 70°F
DELIVERED AIR PRESSURE	0-15 PSIG
Low Pressure	Adjustable 0-15 PSIG
High Pressure	20 PSIG Maximum
OPERATING AMBIENT	Plus 33°F to 120°F
ALARMS	High/Low Pressure. Humidity, Low Output, Compressor Run Time
GAUGES	Output Flow, System Pressure, Output Pressure, Compressor Life
DIMENSIONS	49 1/8" High X 30 1/2" Wide X 24 5/16" Deep
WEIGHT	435 Lbs
<i>*Rated at 95 DB, 80°F WB, 29.92"Hg</i>	

3.0 COMPONENT DESCRIPTION

CABINET

3.1.1 The cabinet has a hinged top door and removable front panel. The electrical box is mounted to the top door and the box cover is secured by four (4) screws. The front panel is secured by a 1/2 turn handle.

3.1.2 The air compressors are mounted in the acoustically insulated and ventilated lower section of the unit.

AIR COMPRESSORS

3.2.1 The air compressors are mounted on slide out bases and can be easily removed from the housing by first removing two (2) hold-down bolts from the front corners of the sliding base. Slide the compressor out from the housing and disconnect the discharge tubing and the quick connect electrical terminals.

3.2.2 The air compressor is direct driven by a 3/4 HP motor which has a built in thermal overload protector which will automatically reset once the motor cools to a normal temperature.

3.2.3 The air compressor is a single stage, two-cylinder piston compressor which utilizes Teflon rings and skirts. No lubrication is required for either the compressor or the motor. It is recommended that the rings and valves be replaced annually.

**AIR COMPRESSOR CONTROL
SWITCHES**

3.3.1 The dryer is equipped with two separate compressor/ dryer systems. Each system operates start-stop depending on cable system output demand and can provide a normal capacity up to 3000 SCFD. If the output capacity requirement is less than 3000

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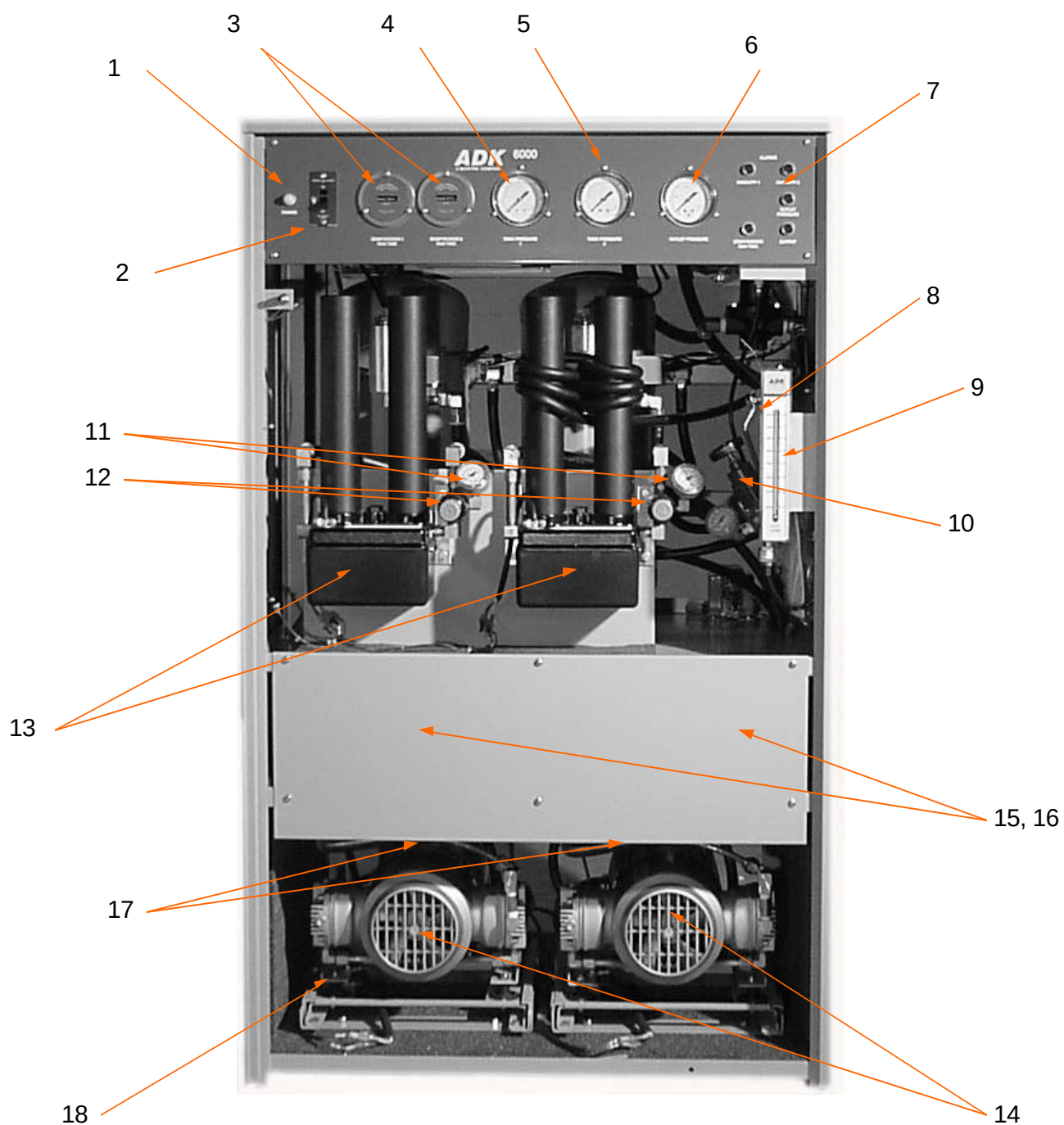


FIGURE 1-FRONT VIEW

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AUTOMATIC AIR DEHYDRATION SYSTEM

Index Number	Part Number	Description	QTY/Unit
1	3450-1	Power Lamp	1
2	5000-8-43	Start/Stop Switch	1
	7389B	Switch Heater	1
3	12082	Hourmeter 115 V, 60HZ	2
	21518	Hourmeter, 110V, 50 Hz	2
4	B-101	System Pressure Gauge 1	1
5	B-101	System Pressure Gauge 2	1
6	22601	Outlet Pressure Gauge	1
7	3450	Alarm Lamp	5
8	11620	High Pressure Shut-Off Valve	1
9	12398	Air Flow Meter	1
10	5000-6-17C	Primary Regulator	1
	3197	Flowmeter Pressure Gauge	1
	M-20707	Output Pressure Switch	1
11	3197	Air Dryer Pressure Gauge	2
12	4634	Capacity Control Valve	2
13	11930-1XX	Heatless Air Dryer, 115V, 60 HZ	2
	11930-4XX	Heatless Air Dryer, 110V, 50Hz	2
14	12770	Air Compressor, 60Hz	2
	3966-2	Air Compressor, 50Hz	2
	3986	Air Intake Filter	2
15	5000-7-1B	Ventilating Fan Motor	

FIGURE 1.2-FRONT VIEW PARTS LIST

ADK MODEL 6000 AUTOMATIC AIR DEHYDRATION SYSTEM

SCFD, the 48 Hour timer switch will automatically alternate the load from one compressor/dryer system to the other every 24 hours. If the capacity requirement is more than 3000 SCFD, the 48 hour timer can be by-passed by moving the override switch to the "on" position and both compressor/dryer systems will operate and provide a normal capacity of 6000 SCFD. Both Systems will operate start-stop.

DRY AIR SYSTEM OUTPUT ALARM

3.4.1 The dry air system output alarm monitors the output of one or both of the compressor/dryer systems. If the pressure at the outlet of the primary regulator falls below 20 PSIG, because of high outlet flow or loss of compressor/dryer output performance, the output pressure switch will close and activate the dry air system output alarm. The output pressure switch is connected to the output time relay. If the output pressure switch remains closed for 7 1/2 consecutive minutes, the time delay relay will close and energize the output control relay. If one compressor/dryer system is operating at that time, the second compressor/dryer system will start and lock-in to operate and cycle as dictated by the compressor pressure switch. The central office alarm contacts will close and the alarm lamp will light.

3.4.2 Depressing the alarm reset switch, which is mounted on the top of the electrical box, will clear the alarm after the malfunction has been corrected.

COMPRESSOR RUN TIME ALARM

3.5.1 The alarm system will provide a visual and office alarm if the air compressors run for more than 10 minutes continuous. The alarm would indicate the deterioration of performance of one or both of the air compressors or high outlet flow. The alarm circuit is

shown in the wiring diagrams and the operation is as follows:

- a. *The compressor run time relay is connected electrically to the air compressor pressure switch. If the pressure switch contacts are closed for more than 10 minutes, the contacts of the compressor run time relay close, energizing the run time alarm relay.*
- b. *The run time alarm relay energizes the run time alarm lamp and closes the office alarm circuit.*
- c. *The alarm "locks-in." The reset switch will clear the alarm after the cause of the malfunction has been determined.*

AIR INTAKE FILTER

3.6.1 Each air compressor has two (2) intake filters. The filters have replaceable elements and it is recommended that the elements be replaced once every three (3) months. Replacement filter elements for the first year of operation are furnished with the air dryer.

VENTILATING FANS

3.7.1 The lower section of the unit is ventilated by two (2) continuously operating 9-watt fans. The fans are mounted directly over the air compressors.

HEATLESS AIR DRYERS

3.8.1 Two heatless air dryers are included in the air drying system. The heatless air dryer consists basically of a manifold with two (2) desiccants chambers, a cycle timer, two solenoid valves (3-way), two purge orifices, and two ball check valves.

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Index Number	Part Number	Description	QTY/ Unit
24	3739	Boost Transformer, 60 HZ Only	1
25	13317	Output Pressure Regulator	1
26	4564	Air Compressor Pressure Switch	1
27	5000-12-85	Humidity By-Pass Valve	2
28	12697	Humidity Sensing Tube	2
	5000-6-47D	Humidity Sensing Element	2
	4157	Adapter	2
	5000-6-47J	Humidity Tube Nut	2
	5000-1-18C	O-Ring	2
	12265-43	Sensing Element Cord	2
29	5000-6-33C	High/Low Pressure Alarm Switch	1
30	CCM-18	Test Valve	1

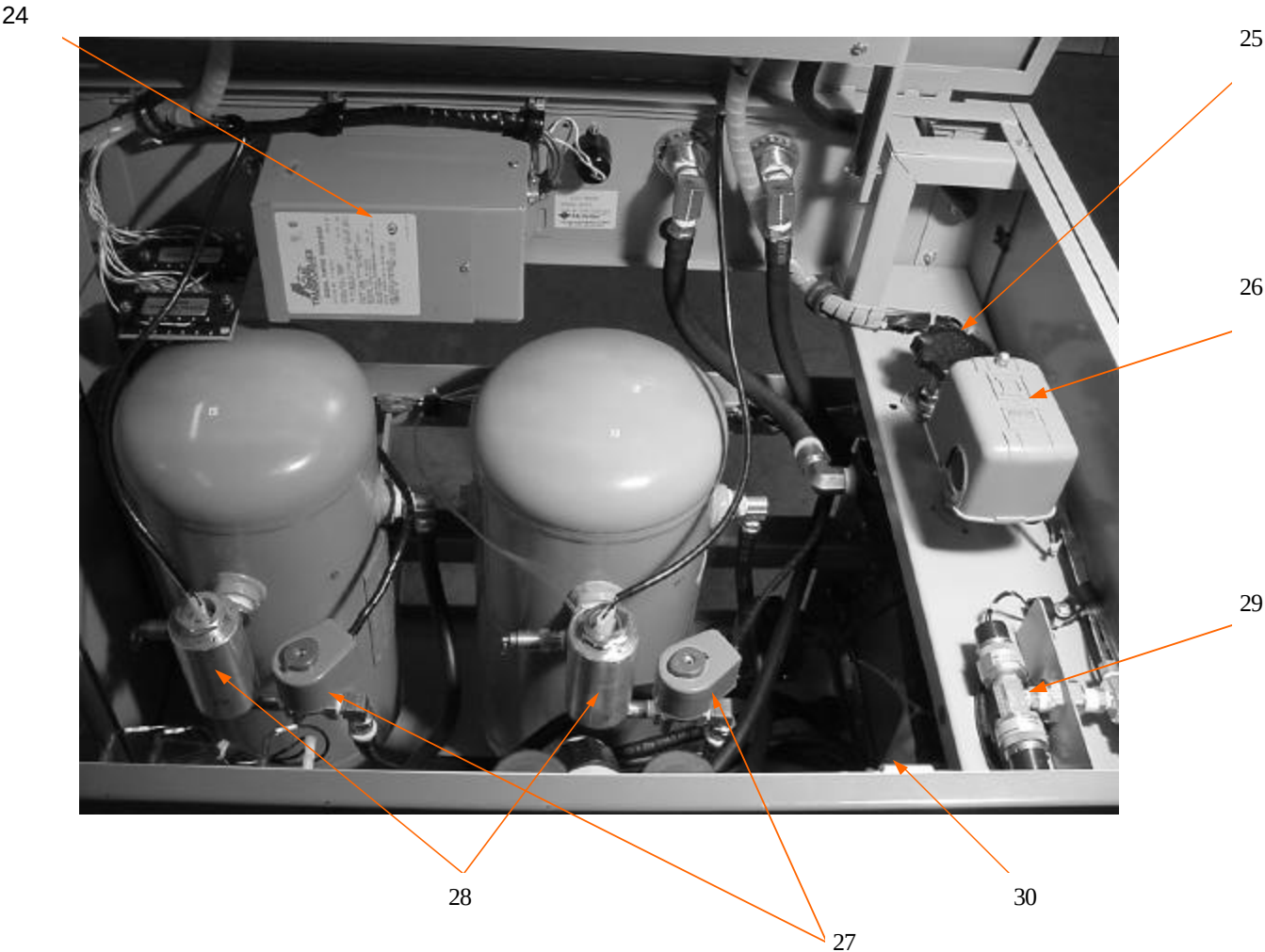


FIGURE 2-TOP VIEW

ADK MODEL 6000 AUTOMATIC AIR DEHYDRATION SYSTEM

3.8.2 The cycle timer energizes and de-energizes the two solenoid valves alternately every 30 seconds during which time the desiccant chambers are either drying the wet inlet air or being reactivated with dry air from the other chamber. The air dryer operation is as follows:

a. Chamber "A" Drying / Chamber "B" Reactivating (see Figure 3A)

Wet air, compressed up to 45 PSIG enters the energized solenoid valve "A" and passes to desiccant chamber "A" where the moisture is adsorbed by the desiccant for a period of 30 seconds. The ultra-dry air leaves the chamber through a ball check valve and the purge orifice to the dry air outlet.

The dry air is also routed to the closed ball check valve associated with chamber "B", which forces the air through the purge orifice. The orifice permits a controlled portion of the dry air to flow through the moist desiccant in chamber "B" at essentially atmospheric pressure. The dry air passes through the chamber for 30 seconds, which is sufficient time to completely reactivate the desiccant. The moist air leaves the chamber and is directed to the de-energized solenoid valve "B", through the exhaust port to atmosphere.

b. Chamber "B" Drying / Chamber "A" Reactivating (see Figure 3B)

At the end of the 30-second period described above, the cycle timer assembly de-energizes solenoid valve "A" and energizes solenoid valve "B".

The wet inlet air then passes to chamber "B" where it is dried and routed to the dry air outlet. A portion of the dry air is expanded through chamber "A", the desiccant is reactivated and the air moistened by reactivation is expelled through the exhaust port in solenoid valve "A".

*c. The 60-second cycle is engaged only when the air compressor is in operation. The timer **SHOULD NOT** be operating when the air compressor is idle, and therefore the actions described above should not be taking place.*

CAPACITY CONTROL VALVE

3.6.1 The heatless air dryer is equipped with a capacity control valve and a pressure gauge.

3.6.2 The capacity control valve is designed to keep a minimum constant pressure of 45 PSIG in the heatless air dryer while the compressor is in operation. The gauge will read as high as 50 PSIG, in conjunction with the tank pressure. Once the compressor is disengaged, the pressure from the tank will bleed back into the heatless air dryer until it has decreased to 45 PSIG. Once the gauge pressure has dropped to 45 PSIG, the capacity control valve will close and the pressure will drop to 0 PSIG immediately. Once the valve has closed, and the pressure has bled below 45 PSIG, the capacity control valve acts as a check to keep air from continuing to bleed back from the tank and keep the direction of flow to the cable plant.

If the 45 PSIG capacity control valve setting is incorrect, adjust the valve while the air compressor is operating, and the tank pressure is below 35 PSIG as follows:

ADK MODEL 6000
AUTOMATIC AIR DEHYDRATION SYSTEM

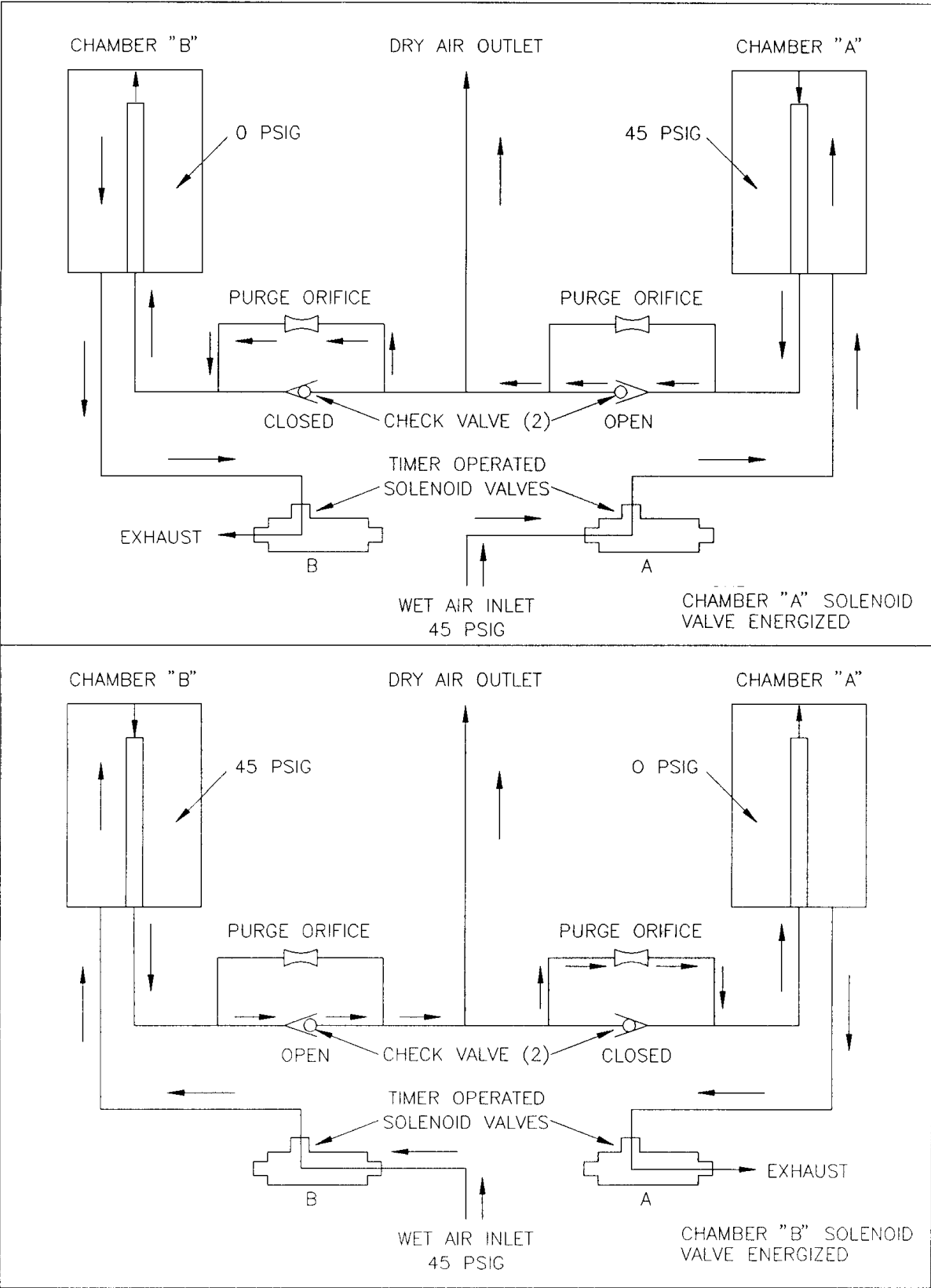


FIGURE 3-HEATLESS AIR DRYER AIR FLOW DIAGRAM

ADK MODEL 6000 AUTOMATIC AIR DEHYDRATION SYSTEM

- a. *Pull up on the adjusting knob to unlock the valve.*
- b. *Turn the valve knob clockwise to increase, or counterclockwise to decrease until 45 PSIG is read on the heatless air dryer gauge. Then depress the locking collar toward the valve body to lock the setting.*

AIR STORAGE TANK

3.7.1 The air storage tank is a mild steel, ASME coded pressure vessel which stores the dry air delivered from the heatless air dryer. The pressure in the tank ranges from 25 to 50 PSIG.

SYSTEM PRESSURE GAUGE

3.8.1 The 0-60 system pressure gauges indicates the air tank pressure for each system.

HUMIDITY ALARM SYSTEM

3.9.1 Two humidity alarm systems are included in the air dryer, one for each air drying system.

3.9.2 The humidity alarm is designed to open a circuit and shut off air flow from the air storage tank in the event that the humidity of the delivered air rises above the humidity alarm point. If only one of the air drying systems has failed, the second drying system will continue to deliver dry air to the high and low pressure outlets.

3.9.3 Two humidity alarm lamps are mounted on the gauge panel and they will provide a visual indication as to which drying system is in alarm.

3.9.4 The humidity alarm circuit is shown in the wiring diagrams (figs. 2 & 3) and the operation of the alarm system(s) is as follows:

a. *The humidity solenoid valve is connected to the humidity alarm through the normally open contacts of the humidity relay. The office alarm circuit terminates at an alarm plug located at the rear of the unit.*

b. *During normal operation, the humidity monitor board will be closed, energizing the humidity relay and the solenoid valve. The humidity alarm lamp is out, the office alarm circuit is open and the solenoid valve permits dry air to pass into the cable system.*

c. *If the humidity of the air rises above the alarm point, the humidity monitor board contacts open, de-energizing both the humidity relay and the solenoid valve. The humidity alarm lamp is energized, the office alarm circuit closes and the solenoid valve shuts off air flow from the air storage tank.*

3.9.5 To check the operation of the humidity alarm, first shut off the air dryer start/stop switch. Allow all of the air to bleed from the storage tanks through the humidity by-pass valve.

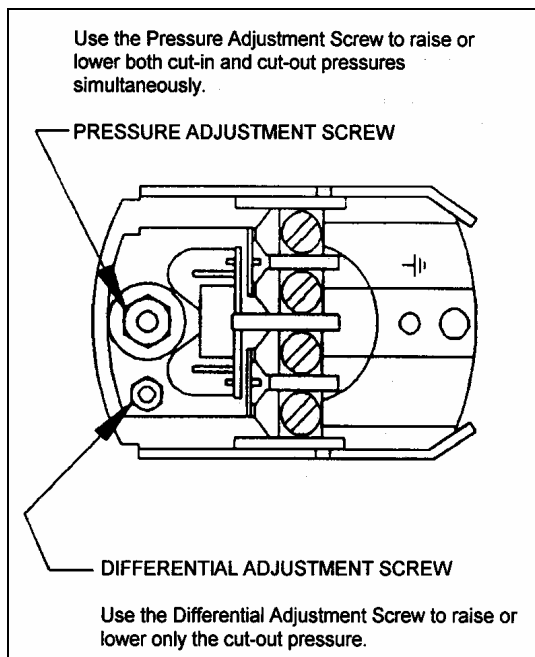
3.9.6 Loosen and remove the hex nuts from the top of the humidity sensing tubes. Then, pull out the sensing element, exposing them to ambient air. Leaving the sensors exposed, turn the air dryer start/stop switch to the "on" position. The humidity alarm lamps should be energized and the central office alarm circuit should be closed. Placing a hand over the sensor manifold, air should be bypassing through the by pass valves as well.

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AIR COMPRESSOR PRESSURE SWITCH

3.10.1 The air compressor pressure switch starts and stops the air compressors and heatless air dryers and is factor adjusted to maintain pressure in the air storage tanks between 25 ± 2 PSIG and 45 ± 2 PSIG.

3.10.2 If necessary, the pressure switch can be adjusted by observing the system pressure gauges and proceeding as follows:



1. *Pressure Adjustment Screw- Each turn of this screw changes both the cut in and cut out pressure. To increase pressure, turn the screw clockwise. To decrease pressure, turn the screw counterclockwise.*
2. *Differential Adjustment Screw-Each turn of this screw changes only the cut out pressure (or differential.) To increase the differential, turn the screw clockwise. To decrease the differential, turn screw counterclockwise.*

NOTE: A replacement Air Compressor Pressure Switch, P/N 4564, comes factory set at 20 PSI cut-in pressure, and 40 PSI cut-out pressure. The replacement must be adjusted upon installation.

AIR FLOW METER

3.11.1 The air flow meter gives the total instantaneous flow of air to the cable system. The flow meter range is 1000-8000 SCFD and is calibrated at 20 PSIG. The primary regulator reduces the system pressure to 20 PSIG as noted on the flow meter pressure gauge.

3.11.2 If necessary, the primary regulator can be re-adjusted to 20 PSIG by loosening the lock nut and turning the handle clockwise to increase to counterclockwise to decrease the pressure. When the 20 PSIG setting has been made, retighten the lock nut.

HIGH PRESSURE SHUT OFF VALVE

3.12 This is a $\frac{1}{4}$ turn ball valve which is used to shut off the high pressure outlet if it is not being used. The valve is open when the handle is horizontal.

OUTLET PRESSURE GAUGE

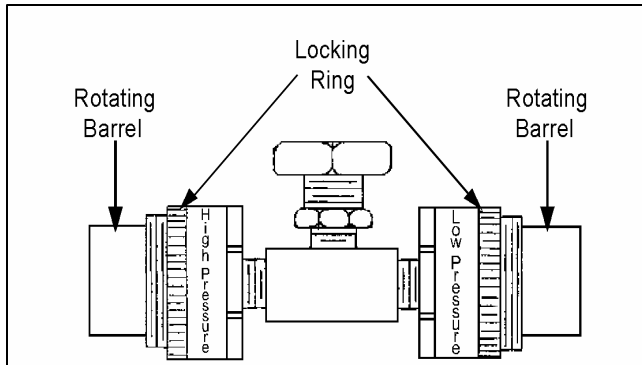
3.13 This 0-15 PSIG gauge measures the pressure at the low pressure outlet.

HIGH-LOW PRESSURE ALARM SYSTEM

3.14 The high-low pressure alarm switch is connected electrically to the pressure alarm relay coil and the pressure alarm lamp. It will provide a visual alarm and an activated office alarm circuit if the air dryer output pressure falls below or rises above preset values. The alarm is factory-preset to operate at 6.5 ± 1.5

ADK MODEL 6000 AUTOMATIC AIR DEHYDRATION SYSTEM

PSIG and 10 ± 1.5 PSIG. If necessary the switch can be adjusted as follows:



a. Loosen the locking ring on the switch to be set.

b. Raise the alarm set point by rotating the barrel counter-clockwise or lower the set point by rotating the barrel clockwise until the corresponding alarm light just activates on the instrument panel.

c. Tighten the locking ring FINGER TIGHT.

ELECTRICAL SYSTEM

3.15.1 The electrical diagram for 208/230 Volt, single-phase, 60 Hz units is shown in figure 4. The power circuit should be fused for 20 amperes.

NOTE: If it is necessary to operate a MOD 6000 air dryer from a 230-1-60 power source, a power conversion kit, P/N 12391 can be ordered from the McIntire sales department.

3.15.2 The air dryer can be supplied for operation from other voltages and frequencies upon request.

BOOST TRANSFORMER

3.16 All electrical components in the air dryer are rated for either 230 Volts or 115 Volts; therefore a 10% boost transformer is included in the circuit and is utilized when the incoming power source is 208 Volts.

START-STOP SWITCH

3.17 The start-stop switch is located on the left side of the front panel. The switch is equipped with an 18.6 ampere switch heater. If an overload in the air dryer occurs, the mechanism in the switch moves the switch lever to the mid position. The switch may be reset by waiting 10 minutes and then by moving the switch lever to the "off" position and then to the "on" position.

POWER LAMP

3.18 This white lamp, which is located on the left side of the front panel, is energized when the start-stop switch is moved to the "on" position.

CONTROL TRANSFORMER

3.19 The control transformer reduces the incoming power to 115 Volts to operate the various air dryer control and alarm components which are rated for 115 Volts.

COMPRESSOR POWER CONTACTOR

3.20 The power contactors, which are operated by the air compressor pressure switch, control the operation of the air compressors. The contactors are equipped with heavy duty 30 ampere contacts.

HOURLMETERS

3.21 The hourmeters, which are located on the left side of the gauge panel,

FIGURE 4—Electrical Diagram



WIRING DIAGRAM - MOD 6000

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ADK MODEL 6000
AUTOMATIC AIR DEHYDRATION SYSTEM

Index Number	Part Number	Description	QTY/UNIT
33	—	Terminal Block D	1
34	5000-12-86	Pressure Alarm Relay	1
36	11247	Compressor Power Contactor	2
37	—	Terminal Block B	1
38	11597	Humidity Alarm Relay	2
39	—	Terminal Block A	1
40	22262	Humidity Monitor Board	2
41	—	Terminal Block C	1
42	13377	48-Hour Timer Switch	1
43	11597	Output Alarm Control Relay	1
44	13387	Output Alarm Time Delay Relay	1
45	12693	Compressor Time Relay	1
46	11597	Compressor Run Time Alarm Relay	1
47	—	Terminal Block F	1

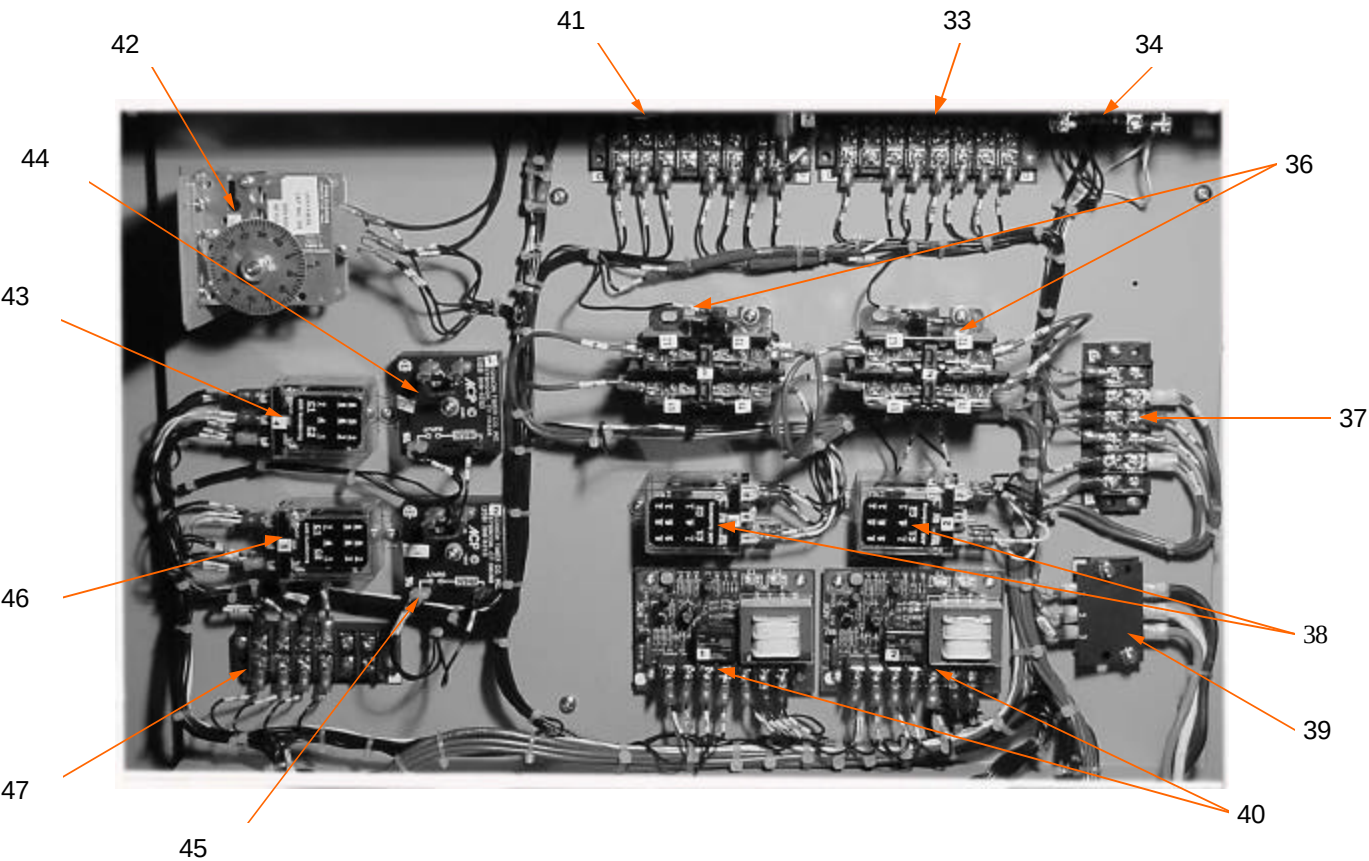


FIGURE 5-ELECTRICAL PANEL

ADK MODEL 6000 AUTOMATIC AIR DEHYDRATION SYSTEM

measure the total time that the air compressors and heatless air dryer have operated. This information can be used to establish routine air dryer maintenance intervals.

4.0 PRINCIPLES OF OPERATION

AIR SYSTEM

4.1.1 The air flow schematic is shown in figure 6. The air dryer contains two separate air drying systems, each consisting basically of an air compressor, pre-cooler, heatless air dryer, capacity control valve, air storage tank and humidity alarm system.

4.1.2 In operation, ambient air is drawn in through air filters and into the air compressors where it is compressed to a maximum pressure of 25 PSIG. The compressed air flows through pre-coolers to the heatless air dryers.

4.1.3 In the heatless air dryers, virtually all of the moisture in the air is adsorbed in the desiccant (See Paragraph 3.8.2 for a detailed description of the heatless air dryer operation.) The dried air flows through a capacity control valve which maintains a constant 45 PSIG pressure in the heatless air dryer when the air compressor is operating and also prevents the air dryer from delivering more than the maximum emergency flow rate.

4.1.4 The air from the capacity control valves is routed to the air storage tanks. The air pressure in the tanks is monitored by the air compressor pressure switch, which starts the air compressors when the tank pressure falls to 25 PSIG and stops the air compressors when the pressure rises to 50 PSIG.

4.1.5 The air flow is divided between regulated and non-regulated outputs,

low and high pressure outlets respectively. The low-pressure airflow passes through a pressure regulator, a high/low pressure alarm switch and an outlet pressure gauge before leaving the dryer. The high-pressure airflow is opened only by a ¼ turn ball valve.

5.0 INSTALLATION

5.1 Inspect the air dryer for evidence of exterior or interior shipping damage and immediately report any such damage to the carrier.

5.2 Remove the wooden shipping blocks from the air compressor mounting bases.

5.3 Locate the air dryer as to provide adequate air circulation through the unit.

5.4 The air dryer is designed to operate from a 208 Volt power source. If the unit is to be operated from a 230 Volt power source, it will be necessary to install a P/N 12391 Power Conversion Kit (see paragraph 3.16)

5.5 A six-foot long, three-conductor power cord with a twist-lock plug is furnished with the dryer and should be plugged into a suitable outlet. The incoming circuit should be fused for 20 Amps.

5.6.1 The High/Low outlet pressure alarm, Humidity Alarms, Compressor Run Time Alarm and the Low Output Alarm contacts are connected to terminal blocks "G" and "H" which are mounted to the inside of the rear panel next to the boost transformer. The five alarms are connected in parallel so that any alarm contact closure will provide a contact closure across terminal 5 on terminal block "G" and terminal 5 on terminal block "H"

5.6.2 Route the office alarm pair into the air dryer through the grommets alarm

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AUTOMATIC AIR DEHYDRATION SYSTEM

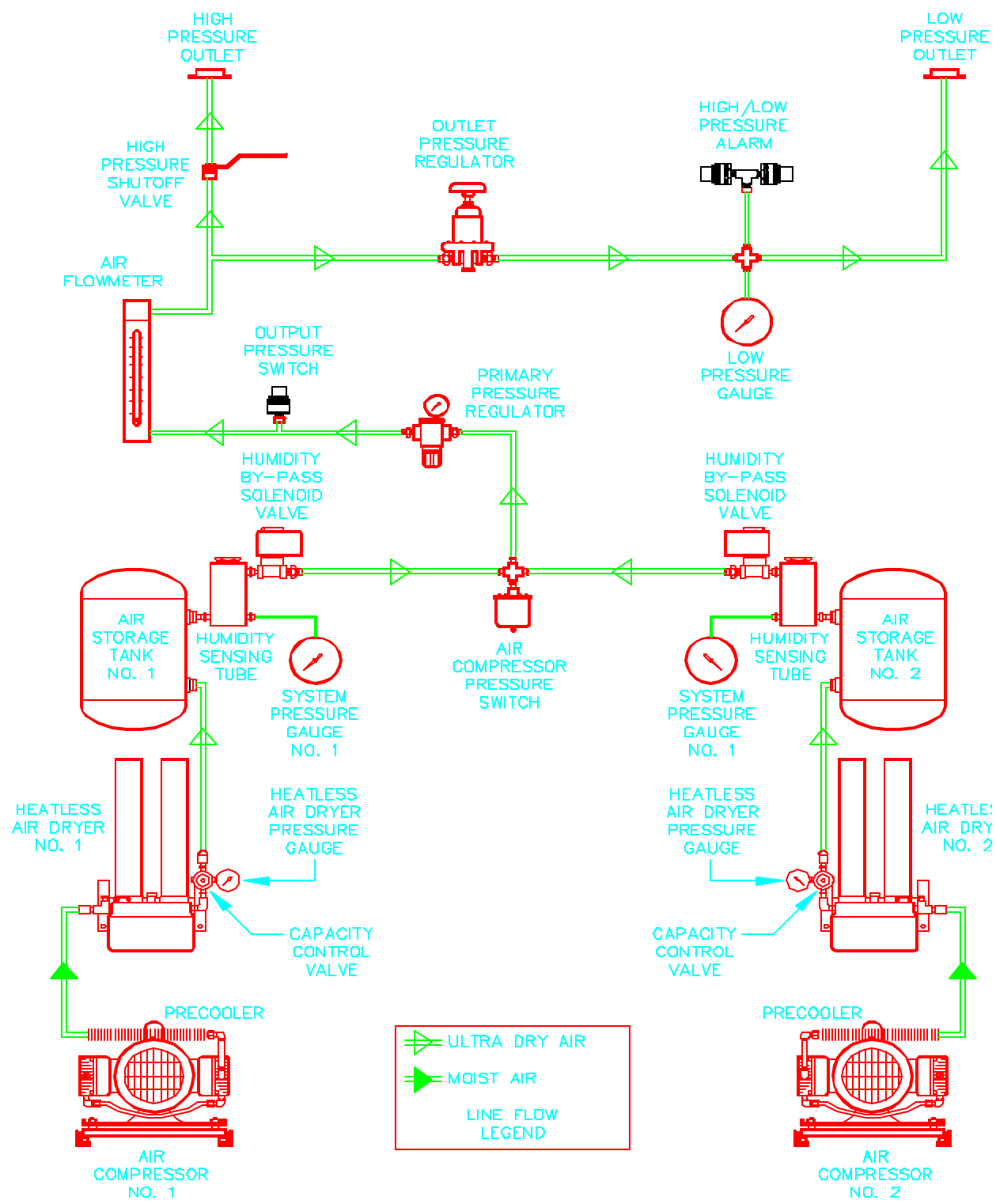


FIGURE 6—AIR FLOW SCHEMATIC

ADK MODEL 6000 AUTOMATIC AIR DEHYDRATION SYSTEM

hole in the rear panel and up to terminal blocks "G" and "H". Connect one lead to terminal 5 on terminal block "G" and the other lead to terminal 5 on terminal block "H".

NOTE: Although it is recommended that the office alarm pair be connected directly to the alarm terminal blocks, a twist lock alarm plug set is provided in the air dryer accessory kit that can be installed on the rear panel. To install, remove the grommet from the alarm hole and mount the recessed male plug in its place using the screws and nuts provided. Route wire #43 and wire #44 from the alarm plug to the alarm terminal blocks and connect them to terminal 5 on terminal block "G" and terminal block "H" respectively. Connect the office alarm pair to the female receptacle.

5.7.1 Move the override switch, located at the top of the electrical box to the "on" position. The two compressor/dryer systems will be connected to operate. If after the air dryer has operated for several days it is found that the output flow is considerably below 3000 SCFD, as indicated on the outlet flowmeter, the override switch can be moved to the "off" position and only one system will operate. The 48-hour timer switch will alternate the two compressor/dryer systems every 24 hours.

5.7.2 If the outlet flow is close to or above 3000 SCFD, it is recommended that the override switch be in the "on" position so that both compressor/dryer systems will be operating.

5.8 Move the start/stop switch to the "on" position.

5.9.1 Loosen the lock nut on the output pressure regulator and turn the handwheel all the way out and allow the

pressure, shown on the system pressure gauges, to build up to 45 ± 2 PSIG. The air compressors will stop at this pressure.

5.9.2 While the air compressors are operating, check that the capacity control valves maintain a constant 45 PSIG in the heatless air dryer. (This pressure is noted on the air dryer pressure gauges) If necessary, adjust the capacity control valves as outlined in paragraph 3.6.

5.10 Allow the unit to run until the humidity alarms clear, which will be noted when the humidity alarm lamps go out. During this period, check that the air compressor start/stop cycle is 25 ± 2 to 45 ± 2 PSIG. If necessary, adjust the air compressor pressure switch as outlined in paragraph 3.10.2.

5.11 Check that the pressure on the flowmeter pressure gauge is 20 PSIG. If necessary, adjust the primary pressure regulator as outlined in paragraph 3.11.2.

5.12 Connect the air dryer to the cable system. The air outlets are 3/8" FPT; 1/2" FPT is available by removing the bushing. The high-pressure outlet is plugged.

5.13 Adjust the air outlet pressure regulator to obtain the desired outlet pressure as indicated on the outlet pressure gauge.

5.14 If necessary, re-adjust the high/low pressure alarm switch to the desired settings. The adjusting procedure is outlined in paragraph 3.14.

5.15 Check all air fittings for leakage.

ADK MODEL 6000 AUTOMATIC AIR DEHYDRATION SYSTEM

5.16 It is recommended that the air dryer be rechecked after the first 24 hours of operation.

NOTE: If the outlet flow rate from the air dryer is low (less than 30% of normal capacity) the air compressor and heatless dryer will run for very short periods during each cycle. This could reduce the reactivation efficiency of the heatless dryer to the point that there could be occasional humidity alarms. A minor adjustment of the air compressor pressure switch will prevent this problem from occurring. Refer to paragraph 3.10.2. Turn the differential adjusting screw clockwise to raise the cut-out pressure set point to 52 PSIG. This higher cut-out set point will cause the capacity control valve to remain open for a few seconds after the compressor shuts down. During that period, dry air from the air storage tank will back-purge the desiccant towers and provide a higher level of reactivation.

6.0 ALARM WIRING OPTIONS

6.1 The air dryer alarm system is wired at the factory to provide a Normally-Open, Closed on Alarm Combined Signal (single Office Alarm Pair). Refer to paragraph 5.6 for instructions on connecting the office alarm pair.

6.2.1 The air dryer can also be wired to provide other types of alarm signals. The options are:

Closed on Alarm, Separate Office Pair
Open on Alarm, Combined Office Pair
Open on Alarm, Separate Office Pair

6.2.2 The rear panel of the air dryer has a wire routing hole with a grommet in it for the office alarm pair(s). If desired, the grommet may be removed and an

alarm plug installed in its place. A twist lock alarm plug set is provided in the air dryer accessory kit. For the wiring diagram for this unit, refer to figure 4.

NORMALLY OPEN, CLOSED ON ALARM SEPARATE OFFICE ALARM PAIRS

6.3 To convert from closed-on-alarm common alarm, to closed on alarm, separate alarm signals it is necessary to rewire terminal block "G" and terminal block "H" in the air dryer as explained below:

1. Remove the eight terminal block jumpers that are across terminals 1 through 5 on both terminal blocks
2. Move wire #46 from terminal 1 on TB-H to terminal 2 on TB-G and wire 68 from terminal 2 on TB-G to terminal 1 on TB-H
3. Move wire 52 from TB-H3 to TB-G4 and wire 70 from TB-G4 to TB-H3.
4. Move wire 58 from TB-H3 to TB-G6.
5. Route the individual office alarm pairs through the grommeted alarm hole in the rear panel and up to the alarm terminal blocks. See Figure 7. Connect the alarm pairs as follows:

a. Connect the high/low outlet pressure alarm pair to TB-G1 and TB-G2.

b. Connect the output alarm pair to TB-G3 and TB-G4.

c. Connect the compressor run time alarm to TB-G5 and TB-G6.

d. Connect the humidity alarm pair for system 1 to TB-H1 and TB-H2.

e. Connect the humidity alarm pair for system 2 to TB-H3 and TB-H4.

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**NORMALLY CLOSED, OPEN ON
ALARM COMBINED OFFICE ALARM
PAIR**

6.4.1 To convert from closed on alarm combined to open on alarm combined alarm signals, it is necessary to rewire the alarm relays in the air dryer electrical box. It is also necessary to rewire terminal block "G" and terminal block "H."

CAUTION: DISCONNECT INCOMING POWER TO THE AIR DRYER BEFORE REMOVING THE ELECTRICAL BOX COVER.

6.4.2 In the air dryer electrical box:
(Refer to figure 15 for alarm relay locations) See figure 8.

1. Move wire 67 from terminal 8 to terminal 9 on the humidity alarm #1 relay (R1)
2. Move wire 69 from terminal 8 to terminal 9 on the humidity alarm relay #2 (R2)
3. Move wire 46 from terminal 2 to terminal 5 on the high/low pressure alarm relay (R3)
4. Move wire 52 from terminal 6 to terminal 5 on the output alarm control relay (R4)
5. Move wire 58 from terminal 9 to terminal 8 on the compressor run time alarm relay (R5)

6.4.3 On TB-G and TB-H: (Terminal blocks G and H are mounted to the inside of the rear panel next to the boost transformer) See Figure 9.

1. Remove the terminal block jumpers that are across terminals 1 and 2, 3 and 4 on both terminal blocks. Remove the terminal block jumper that is across TB-H4 and TB-H5.
2. Move wire 46 from TB-H1 to TB-G2 and wire 68 from TB-G2 to TB-H1.

3. Move wire 52 from TB-H3 to TB-G4 and wire 70 from TB-G4 to TB-H3.
4. Move wire 58 from TB-H5 to TB-G6.
5. Connect one end of the wire assembly that is supplied in the air dryer accessory kit to TB-G6 and the other end to TB-H1.
6. Connect one lead of the office alarm pair to TB-G1 and the other lead to TB-H4.

**NORMALLY CLOSED, OPEN ON
ALARM SEPARATE OFFICE ALARM
PAIRS**

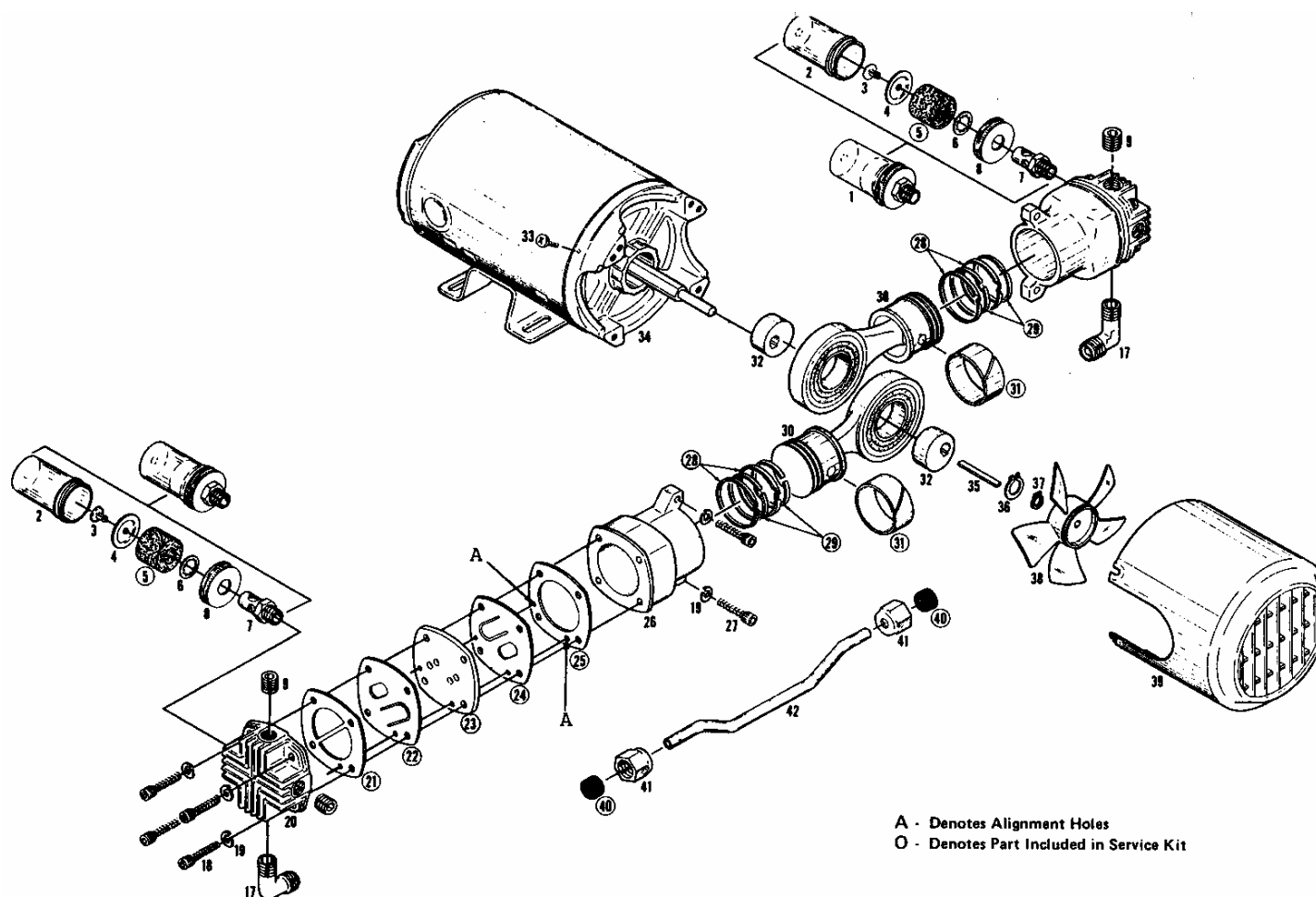
6.5.1 To convert from closed on alarm combined to open on alarm separate alarm signals, it is necessary to rewire the alarm relays in the air dryer electrical box. It is also necessary to rewire terminal block "G" and terminal block "H"

CAUTION: DISCONNECT THE INCOMING POWER TO THE AIR DRYER BEFORE REMOVING THE ELECTRICAL BOX COVER.

6.5.2 In the air dryer electrical box:
(Refer to figure 15 for alarm relay locations) See figure 10

1. Move wire 67 from terminal 8 to terminal 9 on the humidity alarm relay #1 (R1)
2. Move wire 69 from terminal 8 to terminal 9 on the humidity alarm relay #2 (R2)
3. Move wire 46 from terminal 2 to terminal 5 on the high/low pressure alarm relay (R3)
4. Move wire 52 from terminal 6 to terminal 5 on the output alarm control relay (R4)
5. Move wire 58 from terminal 9 to terminal 8 on the compressor run time alarm relay (R5)

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LEGEND AND SPARE PARTS

Index Number	Part Number	Description	Index Number	Part Number	Description
1	11688	AIR INTAKE FILTER ASSY.	30	3872	PISTON ROD ASSY.
2	11689	DISC	32	13328	ECCENTRIC
3	3986	FELT FILTER ELEMENT	33	4033	SCREW
9	3998	PIPE PLUG	34	4037	BRACKET
10	3996	SAFETY VALVE	35	4040	SQUARE KEY
17	4024	MANIFOLD ELBOW	37	4041	RETAINING RING
18	4025	HEAD SCREW	38	3873	FAN
19	4026	LOCK WASHER	39	3871	SHROUD
20	3875	CYLINDER HEAD	40	3864	MANIFOLD SLEEVE
26	3874	CYLINDER	41	4043	MANIFOLD NUT
27	3979	CYLINDER SCREW	42	4050	MANIFOLD

*Note: Index numbers shown circled in drawing are included in maintenance kit p/n 3860.
Maintenance kit p/n 3865 also includes 3870 Valve Plate, index number 23*

Figure 7-Oiless Piston Compressor

ADK MODEL 6000 AUTOMATIC AIR DEHYDRATION SYSTEM

6.5.3 On TB-G and TB-H (Terminal blocks "G" and "H" are mounted to the inside of the rear panel next to the boost transformer) See Figure 11.

1. Remove the eight (8) terminal block jumpers that are across terminals 1 through 5 on both terminal blocks.
2. Move wire 46 from TB-H, terminal 1 (TB-H1) to TB-G2 and wire 68 from TB-G2 to TB-H1
3. Move wire 52 from TB-H3 to TB-G4 and wire 70 from TB-G4 to TB-H3.
4. Move wire 58 from TB-H3 to TB-G6.
5. Route the individual office alarm pairs through the grommets alarm hole in the rear panel and up to the alarm terminal blocks. Connect the alarm pairs as follows:
 - a. *Connect the high/low outlet pressure alarm pair to TB-G1 and TB-G2.*
 - b. *Connect the output alarm pair to TB-G3 and TB-G4.*
 - c. *Connect the compressor Run time alarm pair to TB-G5 and TB-G6.*
 - d. *Connect the humidity alarm pair for system 1 to TB-H1 and TB-H2.*
 - e. *Connect the humidity alarm pair for system 2 to TB-H3 and TB-H4.*

7.0 GENERAL MAINTENANCE

7.1.1 To ensure continued satisfactory operation, it is recommended that inspection and maintenance procedures be performed at scheduled intervals. Refer to appendix A for the full maintenance schedule.

7.1.2 A maintenance kit is supplied with each dryer that provides all the parts necessary for normal

maintenance during the first year of operation. After the first year, an annual maintenance kit P/N 6000M should be ordered. It contains all parts necessary to perform maintenance to both piston compressors.

THREE MONTH INSPECTION

7.2.1 Replace the filter felts in the air compressor intake filters. Do not attempt to clean and reuse the old felts.

7.1.3 Check the operation of the humidity alarm system. Refer to paragraph 3.9.1.

7.2.3 Check the operation of the high/low output pressure alarm. Refer to figure 3.16.

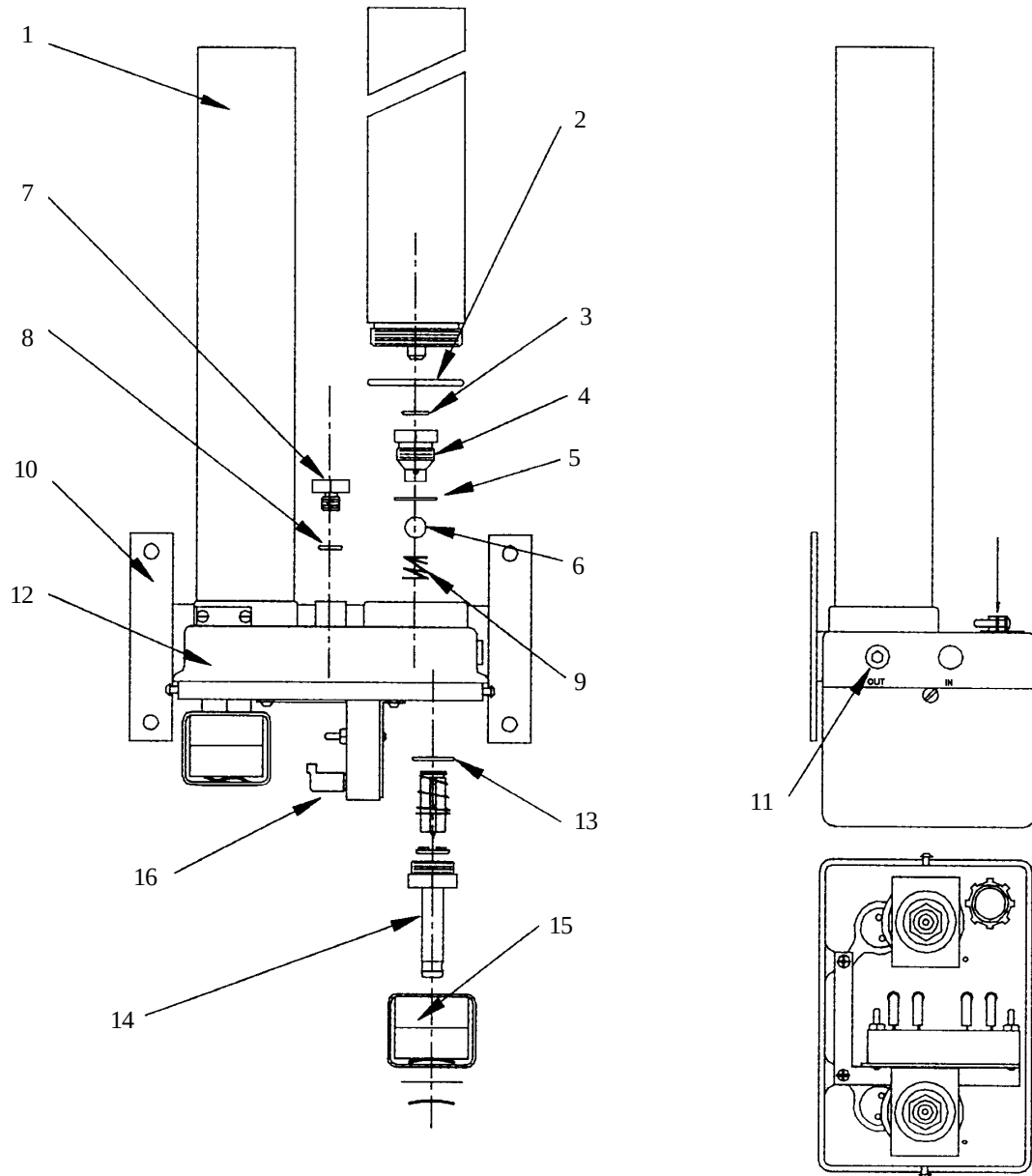
7.2.4 Check that the pressure cycle in the air storage tanks is 25 ± 2 to 45 ± 2 PSIG. If necessary, adjust the air compressor pressure switch as outlined in paragraph 3.10.

ANNUAL COMPRESSOR MAINTENANCE

7.3.2 Change the piston rings and valves in the air compressor as follows: (Refer to Figure 7)

A. Disassembly

1. *Remove the air compressor from the unit. It will not be necessary to remove the compressor from the mounting base.*
2. *Disconnect the manifold tubing at the elbow fittings on both the heads.*
3. *Remove the four (4) cylinder head screws and lift off the cylinder head and valve components from both heads.*



HEATLESS AIR DRYER LEGEND AND PARTS LIST

Index Number	Part Number	Description
1	11389	DESICCANT CHAMBER
2	11390	O-RING
3	11391	O-RING
4	11663-146	PURGE ORIFICE
5	11394	O-RING
6	11395	CHECK VALVE BALL
7	11397	HEX PLUG
8	11398	O-RING
9	11396	SPRING
10	11153	MANIFOLD BRACKET
11	11399	PIPE PLUG
12	11191	MANIFOLD
13	11400	O-RING
14	11401	SOLENOID BASE
15	11403	SOLENOID COIL
16	89006	SOLID STATE TIMER
	200-498	SOLENOID MAINTENANCE KIT
	200-499	HEATLESS AIR DRYER MAINTENANCE KIT

FIGURE 8-EXPLODED VIEW OF THE HEATLESS AIR DRYER

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4. Remove the two (2) cylinder screws and two (2) lock washers, and lift out both cylinders.

5. Remove the piston rings, piston seals and rider rings from both pistons.

B. Assembly

1. Install the new piston seals, piston rings and rider rings on the piston. Locate the ring joints approximately opposite each other.

2. Slide the cylinder over the piston and attach the cylinder to the bracket with the screws and lock washers. **TIGHTEN THE SCREWS FINGER TIGHT.** Move the piston to the top center position, and adjust the cylinder flush with the top of the piston. Tighten the cylinder screws securely.

3. The valve assemblies furnished with the maintenance kit are tied together with a plastic tie. They are assembled in the proper sequence. **DO NOT CUT THE TIES UNTIL THE VALVES ARE PARTIALLY INSTALLED.**

4. Place the valve assembly on the head with the alignment hole in the valve assembly, in line with the alignment hole in the head. Insert screws through two of the holes in the head. Place the head and valve assembly on the cylinder, and position them with the manifold elbow facing "in", toward the compressor. Loosely engage the two screws in the cylinder. cut the plastic tie and install the remaining screws and lock washers. **DO NOT TIGHTEN THE SCREWS AT THIS TIME.**

NOTE: On top of each cylinder head the ends of two fins have been omitted. They are always in the discharge ports.

5. Install manifold nuts and new seals on the manifold, and assemble it to the elbow fitting on the head assembly. **DO NOT TIGHTEN THE NUTS.**

6. Install the second head assembly and assemble the manifold. Tighten all head screws and manifold nuts.

7. Install the air compressor in the unit. Start the air dryer and check all fittings for leakage.

HEATLESS AIR DRYER
MAINTENANCE

7.4.1 No field adjustments or lubrication is required on the heatless air dryer. If the air is in humidity alarm, check the operation as follows:

1. The air dryer has a solid state timer which switches from one tower to the other every 30 seconds. Listen for a strong air purge every 30± 5 seconds. If no purge occurs, proceed to step 2. If purge occurs every 30 seconds, replace the check balls and clean the purge orifice with an air gun.

2. Using a voltmeter, verify that 115 VAC is alternately being applied from the switch "common" terminal and "N.O." and "N.C." terminals. If the 115 VAC is being applied to the terminals, repair the solenoid valves using the 200-499 Heatless Air Dryer repair kit. If the 115 VAC is not being applied, replace the timer assembly.

ADK MODEL 6000 AUTOMATIC AIR DEHYDRATION SYSTEM

3. If the air dryer is in humidity alarm after the above steps have been completed, contact The McIntire Service department at 1-800-4 DRY AIR (437-9247)

8.0 TROUBLESHOOTING PROCEDURES

8.1.1 Outlined below are the recommended steps that should be taken to determine the proper corrective action in the event of a failure in the ADK Model 6000 Air Dryer. The troubleshooting procedures cover three categories of failure mode:

1. Air Dryer is not running.
2. Air Dryer is in humidity alarm.
3. Air Dryer is in low pressure alarm.

8.1.2 While these procedures do not cover all possible causes of failure, they do cover the most likely causes of failure for this type of electro-mechanical equipment. If the cause of a failure cannot be determined, after following these procedures, call The McIntire Service Department at 1-800-4 DRY AIR (437-9247).

8.1.3 The following is recommended test equipment for troubleshooting an air dryer:

Multimeter (Volt-Ohmmeter)
Clamp-on Ammeter (amprobe or equivalent)
Thermometer (Dial type with metal stem)

FAILURE MODE

Possible Cause

Troubleshooting/Remedy

1. AIR DRYER IS NOT RUNNING

Power Lamp is out, no power to any electrical component in the unit.

Air Dryer Power Switch is Off

Make sure that the air dryer start/stop switch is in the "on" position.

External Power Circuit Breaker is Tripped

Check the incoming power terminal board (TB-A). If there is no voltage noted, trace for an open external circuit and repair.

Main Air Dryer Power Lines Open or Switch Defective

With switch in ON position, check for voltage at distribution terminal board. If none, disconnect external power and trace for open in main power circuit. Replace defective wiring or switch.

2. Unit in Humidity Alarm

Defective Humidity Monitor Board or Humidity Alarm Relay

Unplug the humidity sensing cable at the humidity tube. If the humidity lamp goes out, the by-pass solenoid valve energizes and the alarm contacts open, it indicates that the humidity monitor board and humidity alarm relay are operating properly. If none of the above happens, it indicates that the humidity monitor board is defective.

If, before and after the humidity sensing cable is unplugged, the humidity alarm lamp is off, but the alarm contacts are closed and the by-pass solenoid is bypassing air, check the voltage is defective. If there is zero volts, the humidity alarm relay is defective.

Low Outlet Flow

The drying efficiency of the heatless dryer is seriously impaired in the compressor and heatless dryer are

ADK MODEL 6000 AUTOMATIC AIR DEHYDRATION SYSTEM

energized less than 20 seconds during each cycle, due to low outlet flow. The drying performance of the heatless dryer in this short-cycling situation can be brought back to normal by raising the compressor pressure switch setting by 5 to 7 PSIG (see the manual for instructions). This will provide a limited back purge of the dryer towers during the off cycle and improve the drying efficiency.

Capacity Control Valve is Set Too Low

The pressure gauge on the capacity control valve, mounted at the outlet of the heatless dryer, should indicate between 45 and 50 PSIG when the air compressor is running. If the capacity control valve is set too low, there will be insufficient purge flow and the heatless dryer will go wet. Refer to the manual for adjustment instructions.

Heatless Dryer is Defective

Turn off the air dryer and disconnect the hose from the outlet of the capacity control valve. This will allow the heatless dryer to run continuously during the trouble shooting procedure. Remove the manifold cover from the heatless dryer and restart the air dryer. The heatless air dryer should alternate drying towers every 30 seconds as evidenced by a strong blast of purge air followed by a steady stream of air until the opposite tower does the same. If this is not happening, check the following:

A. Check that the timer is working properly. (See Paragraph 7.4.1)

B. The cycle timer should energize and de-energize the two solenoid valves alternately every 30 seconds. This can be determined by placing the blade of a small screwdriver at the bottom of the solenoid valves. If the solenoid valve is energized, a slight magnetic pull of the screwdriver will be noted. If one or both

of the solenoid valves is not being energized and de-energized, it is an indication of a defective solenoid valve coil, electrical connection or timer.

First check the solenoid valve connections. To check the timer switch and solenoid valve coils, connect one lead of the voltmeter to the "COMMON" terminal on the switch and the other lead alternately to the "NO" and "NC" terminals. When 115 VAC is measured, the corresponding solenoid valve should be de-energized. If 115 VAC is not measured across either the "COMMON" and "NO" or "COMMON" and "NC" terminals, the switch is defective and the timer should be replaced.

If the switch is working properly, the solenoid valve should be replaced.

C. During normal operation, a small flow of air should be purging from the de-energized solenoid; there should be no air purge from the energized. If no air is noted from an energized solenoid valve, it is an indication of a defective valve and the valve should be replaced.

Excessive air purge from a de-energized solenoid valve is an indication that the check valve is not seating properly or that the solenoid valve is defective. Excessive purge can be determined by placing a finger under the de-energized valves noting a significant difference in purge flows. If excessive purge flow is noted, the check valve ball should be cleaned or replaced, or the solenoid valve should be replaced.

If no air purge is evident from a de-energized solenoid valve, it is an indication of a plugged purge orifice. The orifice should be cleaned or replaced.

3. LOW PRESSURE ALARM

**ADK MODEL 6000
AUTOMATIC AIR DEHYDRATION SYSTEM**

Outlet Pressure Regulator is out of adjustment

Readjust or replace the regulator

Pressure Alarm Switch Setpoint is too High

Check the outlet pressure gauge. If it is in a normal range, readjust the pressure alarm switch or replace if necessary.

Air Compressor is Not Running

If the tank pressure is below 25 PSIG and the air compressor is not running, check the compressor electric circuit. Check that the compressor can be rotated freely. Repair or replace if necessary.

Excessive Outlet Flow

Check the outlet flowmeter. If the outlet flow is close to the maximum rated capacity of the air dryer, an additional air dryer will have to be installed or the outlet pressure and alarm Setpoint will have to be reduced.

Air Leak in the Air Dryer

Check all piping and air components for leaks. Repair or replace if necessary.

Compressor Capacity is Low

Shut off the air dryer and allow the tank to bleed to below 15 PSIG. Back out the outlet pressure regulator adjusting knob to stop the outlet flow. Restart one air dryer system and time the tank pressure build up from 20 PSIG to 40 PSIG. The normal amount of time to build up sufficient pressure is 40 seconds for the MOD 6000. If the buildup time is significantly longer than normal, check the air compressor for the following:

A. General Leaks

B. Safety Valve Leakage

C. Cracked Valves, plugged intake filters, worn piston rings and blown head gaskets.

D. Proper orientation of intake and discharge valves.

E. Scored Cylinder walls.

If none of the above is found, the compressor should be rebuilt or replaced.

McIntire Limited Warranty

McIntire warrants each of its products submitted below against defects in material and workmanship for the period set forth in connection with such product, when installed, maintained and operated in accordance with the instructions. Such warranty is limited, in McIntire's discretion, to the repair or replacement of defective items or the refund of the purchase price paid to McIntire. McIntire assumes no responsibility for damage due to improper installation or operation of the equipment above the rated capacity; whether intentional or otherwise.

This warranty does not apply to products which have been altered, improperly installed, maintained or repaired, damaged by accident, negligence, misuse or the use of anything other than *GENUINE* McIntire Replacement Parts.

AIR DRYERS:

Including compressors, two (2) years from the date of shipment when equipped with a centrifugal compressor; or one (1) year from the date of shipment when equipped with a reciprocating compressor.

COMPRESSORS:

- a) Replacement compressors obtained during any warranty period are warranted only to the end of the original warranty period of the air dryer. A replacement compressor may be either new or reconditioned, sent at McIntire's discretion
- b) Centrifugal and reciprocating compressors purchased separately are warranted for two (2) years and one (1) year respectively from the date of shipment

REFRIGERATION UNITS:

For refrigeration type air dryers, the refrigeration unit is warranted for five (5) years. Replacement refrigeration units obtained during any warranty period are warranted only to the end of the original warranty period of the air dryer. A replacement refrigeration unit may be either new or reconditioned, sent at McIntire's discretion

CONVERSION OR MAINTENANCE KITS FOR AIR DRYERS:

McIntire makes no representation or warranty with respect to any of the components therein except, if applicable, for compressors which are warranted as stated above.

It is expressly understood and agreed that McIntire shall not be liable for special, indirect, or consequential damages: or shall any recovery of any kind be greater in amount than the purchase price of the items sold. Buyer assumes all risks and liability for loss, damage or injury to persons or property of Buyer, or others, arising out of the use or the possession of any item sold hereunder.

THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS AND THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, EXCEPT AS SET FORTH ABOVE. THIS WARRANTY EXCLUDES ALL INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Note:

To protect your warranty, the return of components believed to have failed within the warranty period must be done with the approval of the McIntire Service Department, freight prepaid. Contact McIntire Technical Service at 1 800 4 DRY AIR (437-9247) and request a Return Goods Authorization (RGA) form for component return. Replacement components are billed upon shipment. The returned component will be evaluated for "in-warranty" determination and subsequent credit

