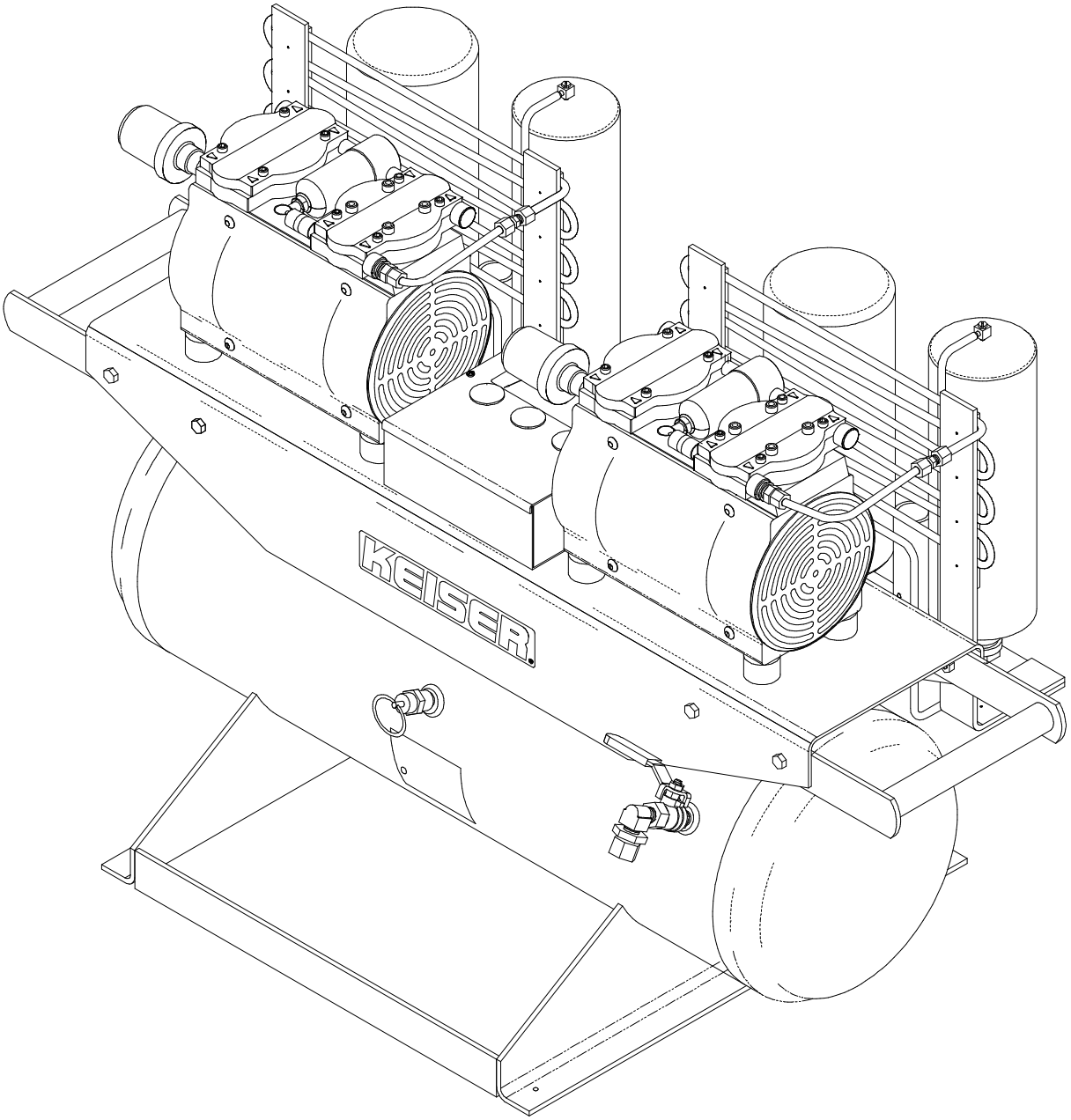
Compressor
Model 1030 / 1031

Maintenance Manual Rev F



KEISER®

Taking Performance to a Higher Level

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COMPRESSOR MODEL 1030 / 1031

Features

Model 1030:
- 115 VAC at 60 Hz, 1 hp, 1200 watts, 12 amps.
- Rated flow is 3.0 CFM at 100 psig.

Model 1031:
- 230 VAC at 50 Hz, 2/3 hp, 1000 watts, 6 amps.
- Rated flow of 2.4 CFM at 100 psig.

The following features are included with both models.
- Quiet operation, noise level of approximately 53 dB at 3 feet.
- Delivery of clean, dry, and oil-free air at room temperature.
- Unit dimensions of 20" wide x 48" long x 25" high.
- 10 gallons of air storage tank.
- Delivery of pressurized air between 100 psig and 125 psig.
- Computer controlled for alternating motors and demand.
- A redundant system consisting of two complete systems for reliability.

Description of Compressor

The compressor is divided into four major components. The compressor motor, the air drying system, the storage tanks, and the computer control system.

- *The air drying system*.
  The system consists of a dryer module and purge tank.

- *The storage tank*.
  The tank holds the pressurized air produced by the compressor.

- *The computer control system*.
  The computer control system controls and regulates the pressure that is delivered by the compressor. This system determines when and which motor will start and stop.

- *The compressor motor.*
  This is where the air is compressed and where most of the noise is generated.

Warning: *Keiser Corporation requires that the compressor be plugged directly into the wall outlet with the proper voltage and at 15 amps or greater for the 110 volt model and 10 amps for the 220 volt unit. The use of an extension cord can cause the unit to run irregular, or damage the compressor, or possibly do physical harm to you.*

Servicing

Caution: *Prior to performing any type of service to this unit, perform the following steps: Failure to follow these procedures may result in serious physical harm to you and/or damage to the unit.*

Safety procedures:

1. *Prior to servicing the compressor, unplug the unit from the electrical supply.*

2. *Slowly bleed all pressure stored in the compressor using the drain valve located on the bottom of the tank(figure 1).*

3. *After bleeding all of the pressure out of the compressor, close the drain valve.*

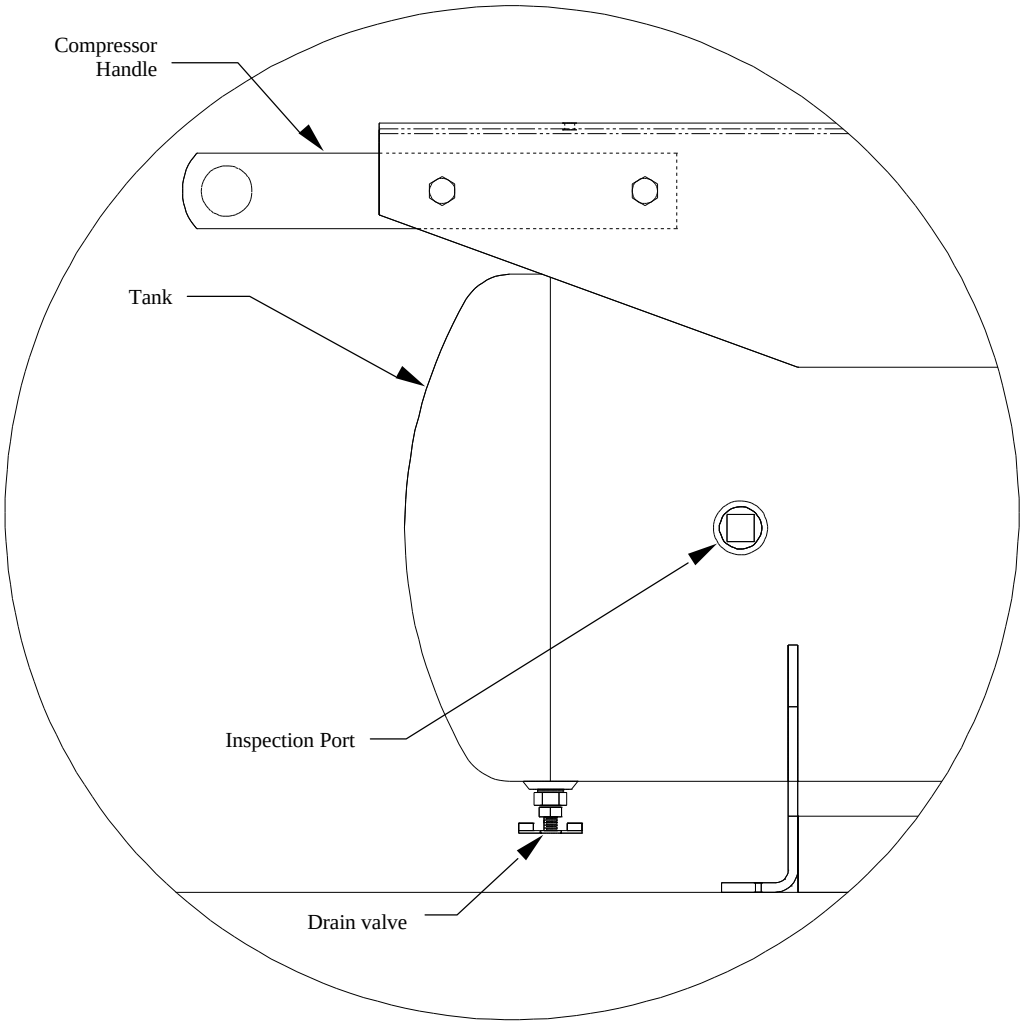
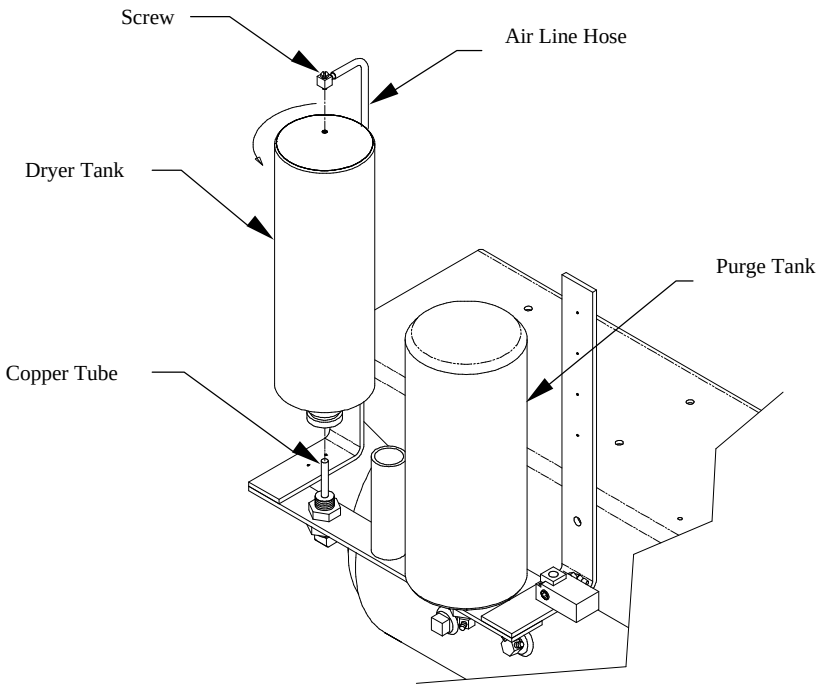


Figure 1

The Air Drying System

- The air drying system consists of a dryer module and a purge tank. The dryer module is the smaller tank that has a black air line attached to the top. The drying module's main purpose is to extract any moisture that may exist within the system and deliver dry pressurized air to the main air line. The purge tank is the larger tank located next to the dryer module. The purge tank's purpose is to dry the crystals in the dryer module canister (figure 2).



The Air Drying System Figure 2

- Servicing of the dryer module is recommend when the drying module becomes so saturated with moisture that it allows moisture to pass through it and into the main air pressure line. If this occurs, moisture will be visible in the exercise machine's filter element (refer to Keiser exercise machine maintenance manual) and at the tank drain when it is opened.
- The air dryer module is designed to be replaced without having to disassemble any of the major components. Using a standard screwdriver, unscrew the small screw that attaches the hose on to the top of the canister. (Figure 2).
- Twist the air dryer canister counter clockwise until it is completely loose. Pull the canister straight up. Be careful not to damage the copper tube that travels up inside the canister.
- Replace with a new canister, carefully sliding the copper tube up inside the bottom opening of the canister. Twist the canister clockwise hand tight and attach screw with hose to the top of the new canister.

- ***Air Intake Filter***

- The air intake filter is located on the compressor motor and filters all air entering the system. The Keiser compressor unit was designed to operate in an environmentally controlled room. The servicing of this filter is dependent upon the location of the compressor. If the compressor is located in a dirty or harsh environment, the filter must be checked or serviced every 6 months. We recommend replacing the filter once per year..
- To remove the inlet filter, twist the entire filter housing off and remove it from the unit.
- Replace the filter housing with a new one. Screw it into the compressor motor hand tight.

Troubleshooting

Keiser Corporation has always taken pride in designing and engineering the highest quality equipment on the market. Only the highest quality products have the *Keiser* name displayed, and this compressor is no exception. In the unlikely event that any malfunctions may occur, the following section will facilitate troubleshooting and replacing any part(s) that may fail. Remember that this compressor has two computers, two air drier systems, and two motors. If the right computer system indicates an error, then that error will be associated with the components on the right side, likewise a left error would indicate a problem with the components on the left side.

Computer Control System (CCS) Circuit Board

- The computer controls system (CCS) controls and regulates the compressor's motor. It monitors the pressure system and aids in troubleshooting when it senses a problem. If the CCS senses an irregular condition, it will display a system error code on the LED, located on the circuit board. If the CCS senses a serious condition, the CCS will shut that section of the system down and flash an error code on the LED (figure 3). All codes are explained in the troubleshooting section of this manual.
- The CCS keeps track of how long each motor has run since the last time the unit was plugged in. This information is used to help insure that each motor gets equal usage under light load conditions.

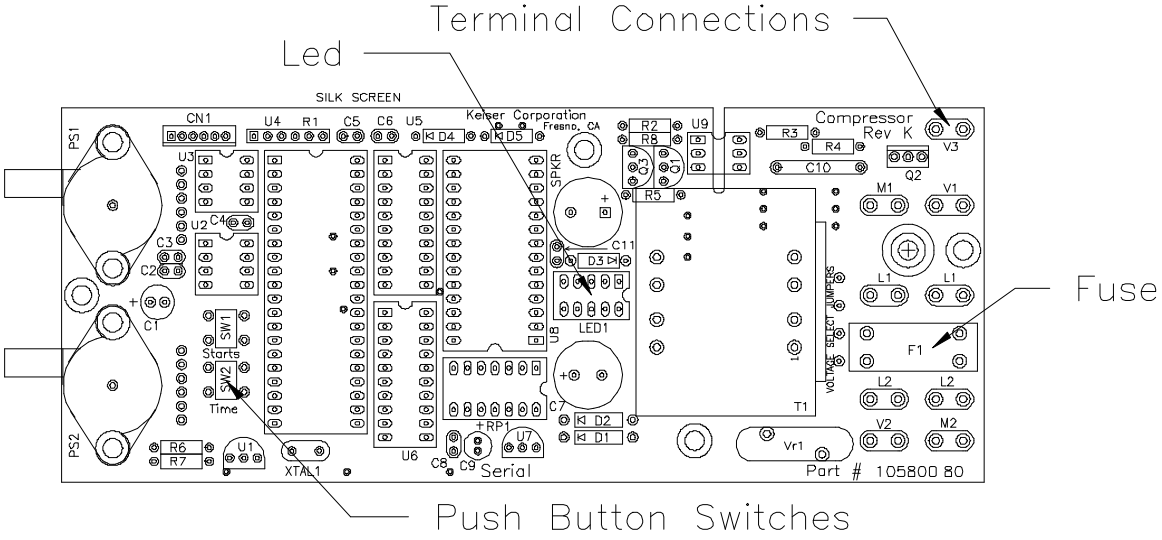


Figure 3 (Typical)

- Servicing of the CCS circuit board will become necessary in the unlikely event the board fails to operate within the specifications set by Keiser Corporation. The CCS circuit board

is located within the box between the two compressor motors. Replacing the CCS circuit board is the only servicing that can be done in the field.

- All terminal connections are clearly marked on the circuit board. We recommend that you label each wire using a pen and masking tape, as you remove them. This will help you when the time comes to reinstall all wiring. In the event that the labeling comes off or is not available, follow the circuit board diagram (Table 1).
- Once all wire connections have been removed, remove the air hoses by using long nose pliers and gently pry the hose off the barb. Care must be taken as the barb can be damaged easily. We recommend you label the air hoses.
- Remove the three screws and one nut that mount the circuit board to the box.
- Replace with new circuit board. Reinstall all fasteners.
- Prior to reinstalling the air lines, trim ¼ inch off the hose to remove any over stretch of the hose.
- Reinstall all wire connections using either Table 1 or the labels that were placed on each wire connection.

Circuit Board Terminals	**Wire Source**	**Wire Color**
M1	Motor	Black
V1	Solenoid Valve	Black
L1	Power	Black
L2	Power	White
V2	Solenoid Valve	Black
M2	Motor	White
V3	Solenoid Valve	Black

Table 1

Note: Solenoid valves manufactured by "MAC" connect across V1 & V2
Solenoid valves manufactured by "Allen Air" connect across V1 & V3 on Rev K boards or later
across V1 & L1 on Rev J boards or earlier

PUSH BUTTON SWITCHES

The functions of the Push Button Switches are:

Time: If this switch is pressed and held, the number of hours that this controller has applied power to the motor is displayed. There is no way to reset this number in the field.

Starts: If this switch is pressed and held, the number of times this controller has applied power to the motor is displayed. There is no way to reset this number in the field.

Both: If both switches are pressed and held, the pressure in the purge tank is displayed.

When the switches are released, the display reverts to displaying system pressure.

LEDS

- The compressor has an LED that displays the pressure and also any errors it might encounter while it is running. If you suspect a problem, look at the display to see if an error code is displayed. Normally the display will be reading pressure by sequentially displaying the pressure as one number after another. If there is an error the display will read "**E r**" and then a number. It will continue to repeat this error code until the error corrects itself or the unit is unplugged, and plugged back in to attempt to fix the error. Any time an error occurs, a small alarm will sound to alert someone of the condition. The alarm does not sound on errors that can retry and recover. The following is a list of error codes and their meaning:

  E r 1 - The computer thinks that the check valve is leaking. The computer detects this condition by watching the pressure drop in the purge tank. Once the purge tank pressure has fallen to about 5 psig, the computer tests the pressure in the main tank. If it has also fallen to a low value, this error condition is set. A very likely cause of this condition is a leaking check valve.

  E r 2, E r 8 - The unit is running for an extended period of time without reaching the shut off pressure. These errors are given when the unit runs for over an hour and pressure is not reaching the shut off setting (approximately 120 psi). The unit will still shut off every 5 minutes to allow itself to purge the dryer assembly, even if it does not reach the shut off pressure and it will display **E r 8**. If, after 20 cycles, the unit fails to reach the shut off pressure, the compressor will shut down and not restart, displaying **E r 2**. This condition means there must be a leak within the system or the compressor is not pumping properly. Shut off the valve supplying air to the main airline, and reset the compressor by unplugging it for a few seconds. Run the compressor and note if the compressor builds up pressure and shuts off. A view hole on top of the circuit box housing assembly will allow you to see at what pressure the compressor shuts off. If the compressor builds up pressure and shuts off, the leak is in one of the exercise machines or an air supply line leading to them. If the compressor does not build pressure, then the problem is in the compressor. In this case inspect the compressor for any leaks. If the compressor is not the problem then the machines should be unplugged and the valve opened to fill the air line. The machines should be plugged in one at a time to see which one has the leak.

  E r 3, **E r 4, E r 5** - Purge tank pressure did not drop as quickly as it should. The purge tank must bleed air through the dryer to regenerate it. This must happen before the compressor can restart. If this takes too long, then this error will be displayed. Probable cause is the solenoid valve or dryer module is plugged. Anything that restricts the air from exiting the purge tank through the drier and then to the solenoid valve can cause this error.

  E r 6 - Computer thinks the motor did not start. The motor was given a signal to start but pressure in the purge tank did not build up as fast as it should have. The motor or start circuit could be faulty. Drain the air, plug the unit in and listen for the compressor to attempt to start and see if the motor tries to start or the solenoid valve closes. If the motor does not start and the solenoid valve clicks, then the motor is faulty and must be replaced. If the solenoid valve does not click and the motor does not start, then the computer board must be replaced. It is best to use a voltmeter to insure that the computer is sending voltage to the motor. Contact Keiser Service for assistance. If the motor runs, then check plumbing to insure that all hoses are connected.

E r 7 - Compressor stopped because pressure did not rise quickly enough in storage tanks. A large leak probably exists in one of the exercise machines or in the compressor plumbing or the air distribution system.

E r 9 – The computer thinks that the intake muffler is plugged. It detects this condition by testing the rate of pressure increase in the drier when the compressor first starts.

E r A The computer is not able to communicate with the other computer. The communications cable is damaged or the computer itself has a defect. Check the condition of the cable. Either computer could cause itself or the other to display this error.

Check Valve

- A check valve is installed between the purge tank and the main air pressure in the storage tank. This check valve allows the purging of the drying module and the purge tank while maintaining system pressure in the main tank (figure 4).

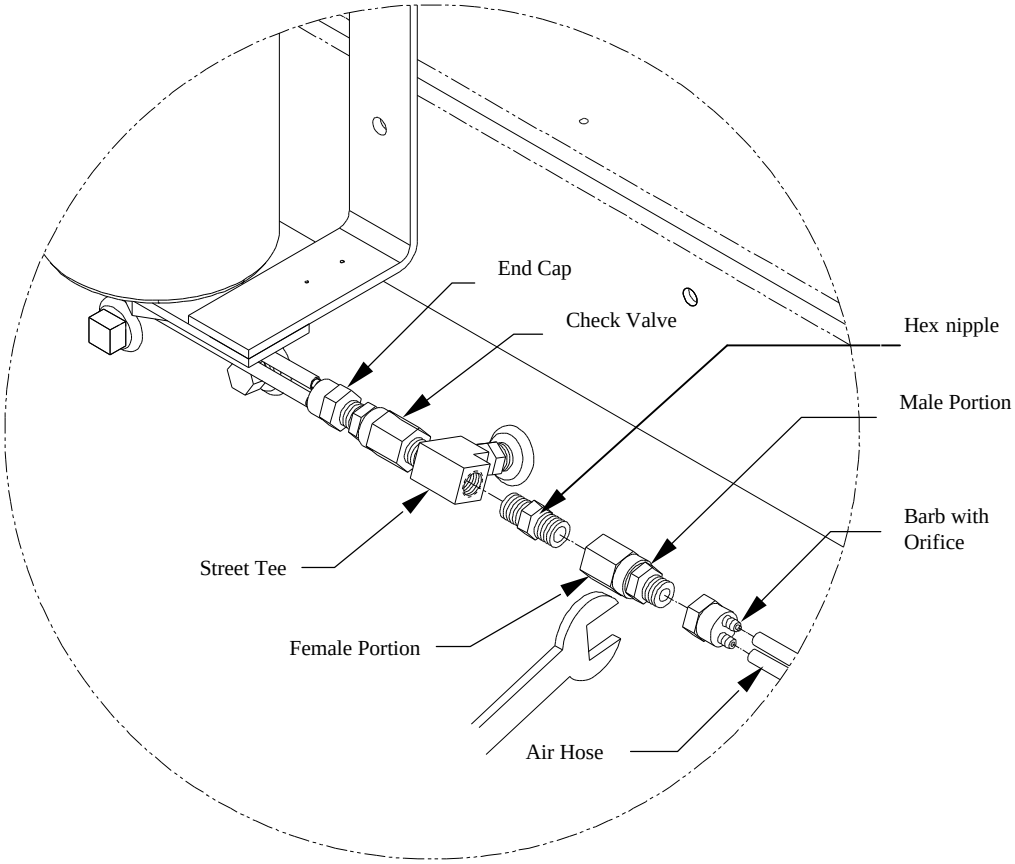


Figure 4

Caution: Follow all safety procedures prescribed earlier

- When the compressor shuts off, the solenoid valve bleeds off the pressure in the drier module. This should take less than 1 minute. If air continues to bleed from the drier sponge for more than 1 minute, the most likely problem is the check valve. This may be confirmed by an error code "**E r 1"** on the Computer control system (CCS) circuit board (Refer to the CCS section on page 7-8). If the check valve is leaking, it will allow air from the main storage tank to leak into the air drier module and out to the atmosphere. The computer will shut this side of the compressor down, but the leak will continue. The other side of the compressor will continue to run trying to replenish the air that is leaking. If this occurs, the manual valve on the solenoid, which is located on the side of the compressor that is leaking, can be closed to enable the compressor to build pressure. The leaking check valve should then be replaced. Once the check valve is replaced, the manual valve must be reopened.

- The check valve is mounted on the main tank under the drier assemblies on the backside near the center (figure 4).

- To remove the check valve, label the “Top hose” and “Bottom Hose” and remove the air hoses that are connected to the end cap. Be careful not to damage the barbs when removing hoses. When unscrewing the end cap, a wrench must be placed on the male portion of the check valve to keep it from rotating (figure 4).

- To unscrew the check valve, place a wrench on the female portion of the valve and rotate it (figure 4). You may need to hold the hex nipple on one side to prevent it from loosening.

- To install the new check valve, clean threads on the male part of the tee. Apply a small amount of Locktite ® 242 on the threads. Install the check valve, place the wrench on the female portion of the valve and rotate (figure 4).

- Apply a small amount of Locktite ® 242 to the threads on the check valve. Place a wrench on the male portion of the valve, hold the valve and screw on the end cap.

  Note: The end cap has two barbs that are attached to it. One of the barbs contains a small plastic orifice. Make sure the barb with the small orifice ends up on top while the other barb is directly underneath it.

- Trim ¼ inch off the air hoses to eliminate the over stretch and reinstall the air hoses to the end cap being careful to attach them to the correct barb.

- ***Solenoid Valve***

- The solenoid valves allow purge air to pass through the air drier canisters. These valves are mounted on the bracket that holds the drier assembly.

- The solenoid valves are also equipped with a shut-off valve installed on the solenoid itself. In the event one of the check valves fail, the manual shut-off valve can be used to stop the leak created by the leaking check valve. The other half of the compressor will continue working until the bad check valve can be replaced.

- To remove the solenoid valve, remove the wires going from the valve to the computer. Review and make note which terminals the wires go to. Remove the wires from the circuit board by holding the electrical terminals and pulling straight up.

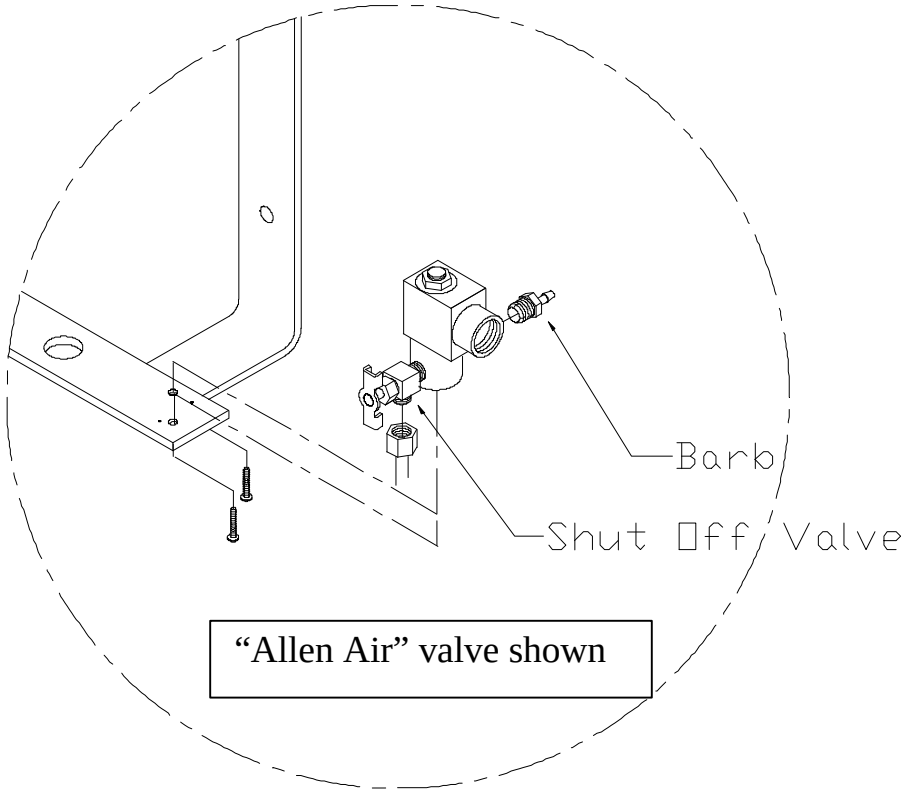


Figure 5

- Using a pair of needle nose pliers, place the jaws on either side of the air hose, and *gently* pry the hose off the barb that is mounted to the valve. Take care not to damage the barbs (figure 5).

- Install the new valve and tighten the mounting screws.

- Check the ends of the air hoses for any cracks or over stretching. Always trim ¼ inch off the ends of the air hoses where they have stretched. When reinstalling the air hoses, push the edge of the hose onto the last ridge of each barb.

- Reconnect the wire terminals to their corresponding locations on the circuit board.

- ***Compressor Motor***

- The *Keiser* compressor motor is a highly durable motor that should last years without experiencing malfunctions. If the motor fails to perform, contact our service department to determine if a new motor is needed.

- If you need to replace the motor yourself, the following procedures will assist you:

1. Disconnect the electrical wires from the motor that leads to the computer control circuit board. Disconnect the ground wire (green wire) from the grounding screw at this time also.

2. Remove the nut that holds the Teflon hose to the motor (figure 6).

3. Remove the four nuts that mount the motor to the frame. Be careful when unscrewing the nuts to hold the rubber mounts to keep them from twisting.

4. Replacement of the new motor is done in reverse order of disassembly.

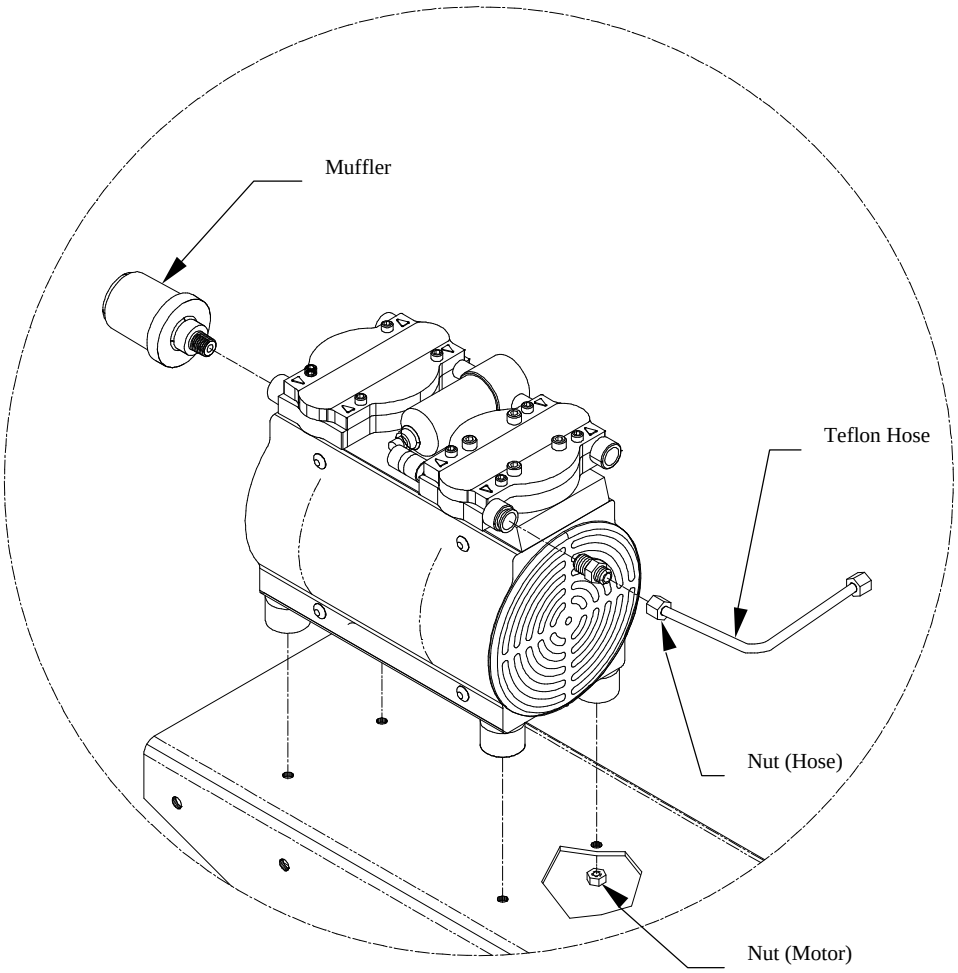


Figure 6

Extended Troubleshooting

Use this procedure to determine if your Keiser air compressor is performing correctly.

1. Unplug the compressor. Next drain the tank by opening the drain petcock at the bottom of the tank. Close the petcock when the tank is completely drained. The output valve (valve that allows air to the exercise machines) should be closed for the duration of this entire test.
2. Close the drain valve and plug the compressor in. Start timing with a stopwatch when the motors start. Both motors should start at about the same time, several seconds after plugging the unit in. If they do not, locate and repair the cause of this problem before proceeding. If a solenoid valve clicks (several seconds after plugging the unit in) and its motor does not start, the motor is defective. If a motor starts immediately, there is a problem with the electronic controller and it must be replaced.
3. Record the time it takes for the motors to stop. The total time should be about 4 minutes at sea level. This is the empty pump up time. See table 2 for times at other elevations. The pressure should display 117 – 124 PSIG at this time. The pressure readings should be within 4 PSI from one side to the other.
4. Verify that the unit is holding steady pressure (not leaking). Pressure could drop 1 to 2 PSI in the first minute due to thermal effects but should not drop after that. Leave it sit for at least 2 minutes. After setting for over a minute, the air bleeding from the drain sponge should stop. If there is still air coming out of either sponge chamber after 2 minutes. A check valve is leaking or a solenoid valve is partially plugged.
5. Unplug the unit for a few seconds then plug it back in. Next lower the pressure at a rate of approximately 1 PSI per cycle of the display until the compressors both start. Start timing when the compressors start.
6. Let the compressors run until they just stop. Record the time to the stop and start timing again. The time you just recorded is the run time, and the time you are just starting is the bleed time. If you do not have a split time or dual stop watch, you may have to repeat the procedure and time run time and bleed time separately on two passes.
7. Very quickly drop the pressure in the system to about 90 PSIG by using the tank drain valve.
8. Stop timing when the compressors start again. This is the bleed down time. It should be about 45 seconds. If this time is much longer than it should be, suspect a plugged solenoid valve or hoses running to and from it. Make a note to observe that the difference in time from the first compressor stopping until the second compressor stops is about the same as the time from the first compressor to start until the final compressor starts.
9. If the run time is too long, try running the test with the intake mufflers removed. If the time is still too long, run the test on each compressor separately to determine which compressor is the cause of the problem.
10. To run the same test on one compressor at a time, lower the pressure slowly, then when the motor starts; stop the leak. Repeat for the other motor. If the same motor starts each time you can disconnect the wires to the motor on the side you do not want to test.

11. Approximate times at various altitudes.

	Sea Level	4000 Feet	7000 Feet
Fill Time	4 minutes	4 MN 45 SEC	5 MN 20 SEC
Bleed Time	45 seconds	50 seconds	47 seconds
Run Time (BOTH)	1 MN 20 SEC	1 MN 30 SEC	
Run Time (ONE)	1 MN 55 SEC	2 MN 10 SEC	

Table 2

The effects of some common failures are as follows.

Check Valve Leaking. On the air compressor when a check valve leaks on one side, the system will build to full pressure from a cold start (unit plugged in with no pressure in the tank). When the compressor motors stop the solenoid valves will open allowing air to drain from the drier through the sponge. Since a check valve is bad, there will be constant air coming from the sponge on the bad side. The compressor on the other side will start when the system pressure drops back to the start pressure and air will continue leaking from the sponge on the bad side. Eventually the good side will time out after several cycles through Er8 and stop at Er2. The bad side will have stopped at Er5 or Er3 while this is happening. Once the good side times out and stops completely, the pressure will drop almost all the way to 0 and the bad compressor will start up again. The clue that will help find the cause of this problem is to feel for air leaking from the sponge continuously after the compressor stops. If you do not have another check valve, it is possible to keep the system in service on one compressor by closing the petcock valve located on the solenoid valve on the side with the leaky check valve

Solenoid Valve Leaking. If the solenoid valve develops a leak, several different error messages are possible from the display. Air will be escaping from the sponge chamber while the compressor is running. If air is coming from the sponge chamber while the compressor motor is running, the solenoid valve is leaking and must be changed.

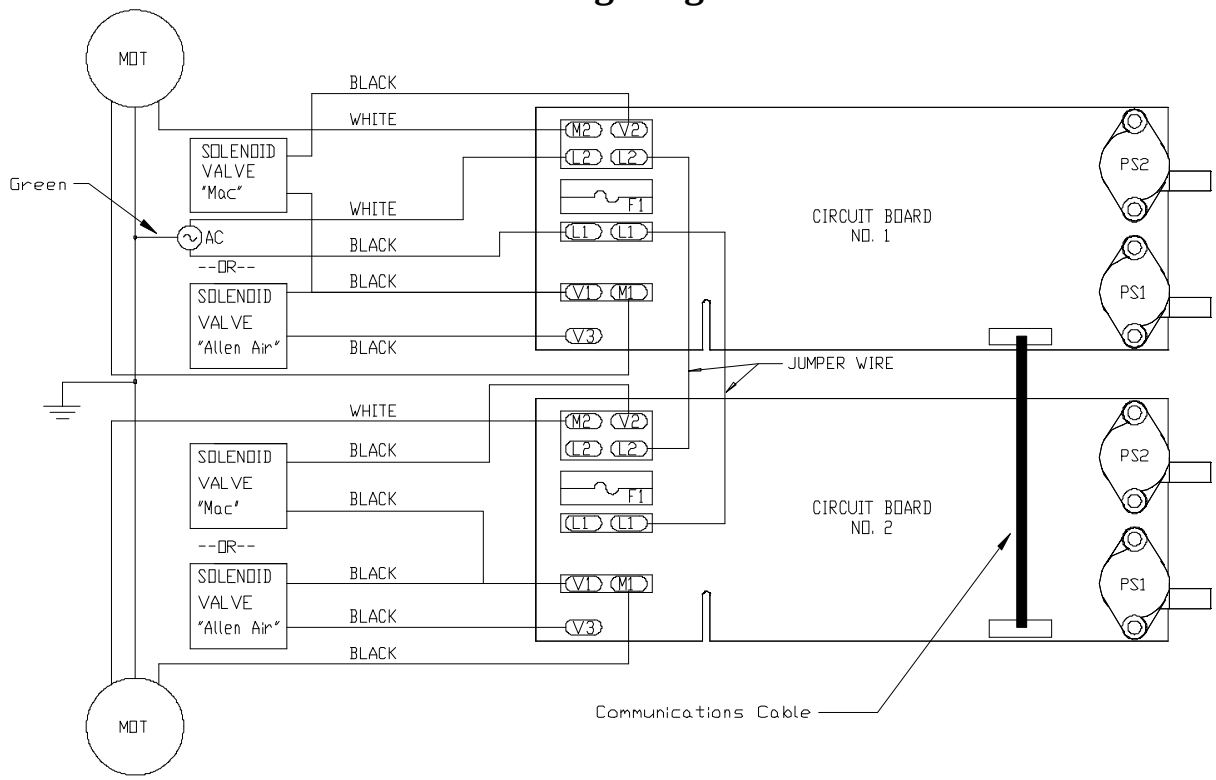
Intake Muffler Plugged. When the air flow through the intake muffler is reduced, the display may display Er9. Usually this error message will last only for a short time while the compressor is building up pressure. This problem can easily be confused with the error messages that occur when the solenoid valve leaks. In the case of the plugged muffler, there will not be any air leaking from the sponge chamber.

Solenoid Valve Plugged. If the solenoid valve becomes blocked so as to reduce the air flow through it, the display will show Er3 or Er4 or Er5 with Er5 the most likely. If the blockage is not too serious this problem will reset itself, however does warrant attention. The emergency shutoff petcock valve on the solenoid valve being closed could also cause this problem.

Communications Jumper Unplugged If the jumper cable that connects the two boards (black cable with small white plugs on both ends) is damaged or unplugged, the unit will not operate correctly. The most obvious symptom of this will be that the numbers on the display will read upside down. If the cable is plugged in properly and the unit is displaying **E r A**, either the cable is bad or the computer has a defect. This cable tells the CCS what model of machine this is and it will not operate correctly without it.

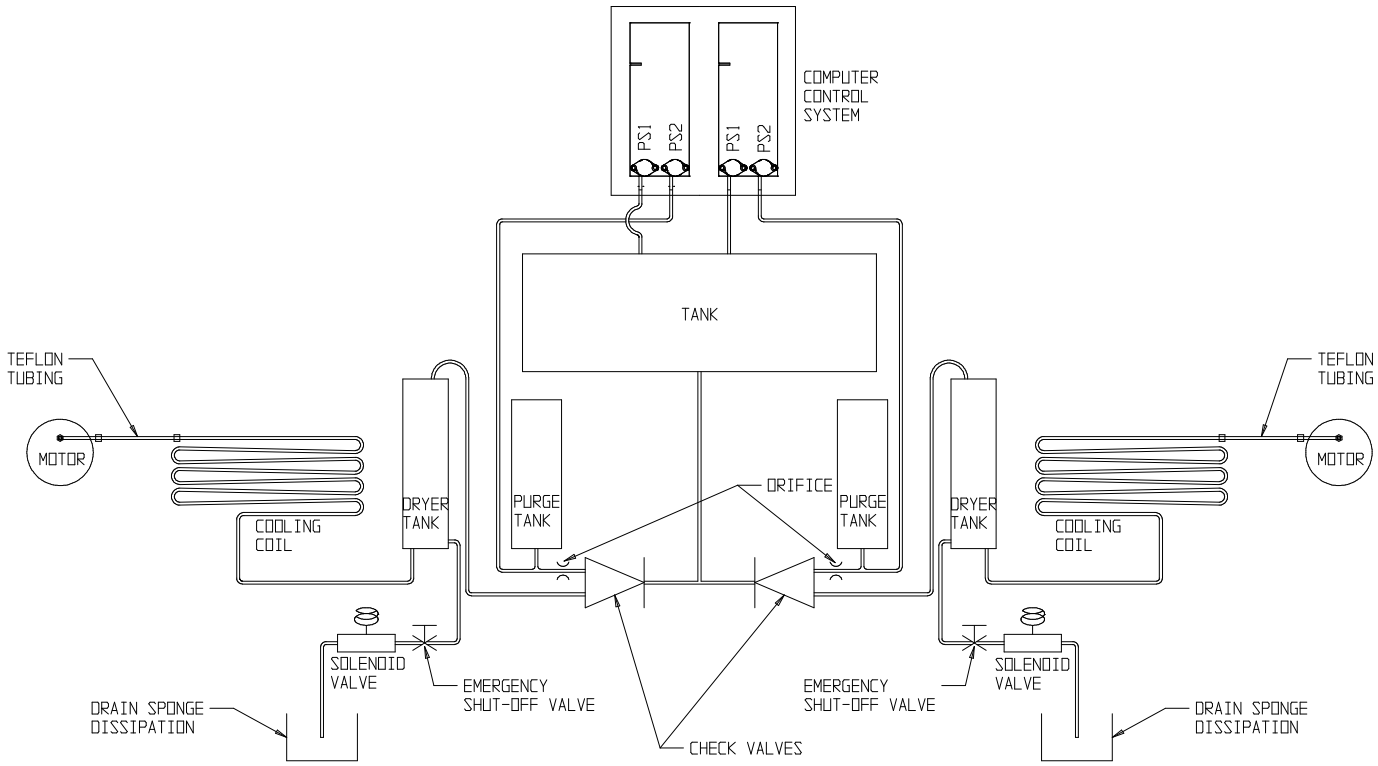
For any service problems or questions call 1-(800)-888-7009 Service

Plumbing Diagram



Note: On Rev J boards and earlier, Allen Air solenoid connects across V1 & L1. Terminal doubler 105473 is needed on one of the two boards.

Electrical Diagram (New style)



PARTS LIST

ITEM NO.	QTY	PART NO.	DESCRIPTION
1	2	10-0902.33	DRYER ASSY, BLK
2	2	11-5000.60	TANK BUSHING ASSY
3	2	25-5318.33	PURGE TANK, 145 CUBIC INCHES, BLK
4	2	10-0925.33	DRYER SUPPORT, BLK
5	2	8000.00	UNION COUPLING 1/4"
6	4	10-1809.33	BRACKET -PRECOOLER, .188D, BLK
7	10	9176.00	HEX HEAD CAP SCREW, 5/16"-18 UNC X 1" , ZP
11	18	9274.00	PHSTS TF PHLPS, #6 X 3/4", BLK
12	4	9231.00	HEX JAM NUT, 3/4"-10 UNC, ZP
13	2	10-0863.00	ELBOW - INLET ASSY, 10 GAL.
14	2	10-5162.00	FOAM – MOISTURE DRAIN
15	4	9260.00	PAN HEAD MACHINE SCREW-PHILLIPS, 4-40 UNC X 1"
16	4	9364.00	INT TTH LOCK WASHER, 3/4", ZP
17	4	9236.00	HEX ELASTIC LOCK NUT, 4-40 UNC
21	12	9226.00	HEX ELASTIC LOCK NUT, 5/16"-18 UNC, ZP
22	2	10-0926.33	COMPRESSOR HANDLE, 1030, BLK
23	1	10-0924.00	TANK , 10 GAL.
24 A	2	10-0887.60	SOLENOID VALVE ASSY - 115 VAC Allen Air
	2	10-0888..60	SOLENOID VALVE ASSY - 230 VAC Allen Air
24 B	2	10-5300.62	SOLENOID VALVE - 115V MAC
	2	10-5300.63	SOLENOID VALVE - 230 VAC MAC
25	3	10-5376.00	ELBOW, 1/4" NPT X (2) 10-32
26	2	10-5373.20	CAP, 1/4" W/2 10-32 BARBS
27	2	10-5312.00	CHECK VALVE, #227 W/VITON
31	1	9988.00	STREET TEE, 1/4"
32	2	8351.00	HEX NIPPLE, 1/4"
33	4	10-5423.00	GLIDE
34	4	9279.00	HEX WASHER HEAD TFTDC, 5/16"-18 UNC X 3/4", ZP
35	1	8401.00	STREET ELBOW, 1/4" X 90°
36	1	8081.00	MALE CONNECTOR, 1/2" X 1/4"
37	1	10-5467.00	MXF BALL VALVE 200 PSI, 1/4"
41	2	10-5337.20	MUFFLER - INLET ASSY
42	1	10-5007.00	BOX – CIRCUIT BOARD
43	1	11-5372.00	LARGE KEISER DECAL
44	1	10-5321.00	PRESSURE RELIEF VALVE, 150 PSI
45 A	2	10-5372.62	COMPRESSOR. MOTOR ASSY - 115 VAC
B	2	10-5372.63	COMPRESSOR. MOTOR ASSY - 230 VAC
46	8	10-5422.00	VIBRATION ISOLATOR, 1/4"
47	4	9225.00	NUT – HEX JAM, 1/4"-20 UNC
51	2	8157.00	ADJUSTABLE ELBOW, 10-32
52	1	10-5410.21	POWER CORD ASSY, 10 GAL QU
53	2	10-5315.00	DRAIN COCK (SHUT-OFF VALVE)
55	.5 FT	95-3112.00	TEFLON CLEAR TUBING, Ø 1/4"
56	13 FT	95-3108.00	URETHANE TUBING, Ø 1/4"
57	2	11-5366.00	BARB, 1/8" X 1/8" X 90° ELBOW
61	10	9998.00	COMPRESSALIGN NUT, 1/4"
62	2	8076.00	MALE CONNECTOR, 1/4" X 1/4"
63	2	11-5000.00	TANK BUSHING
64	2	10-5062.00	COOLING COIL
65	4	9285.00	PHSTS PHIL, 10-24 UNC X 3/4", ZP
66 A	1	10-5308.80	INFORMATION DECAL - 115 VAC
B	1	10-5308.81	INFORMATION DECAL - 230 VAC
67	2	10-5058.80	PLUG – HOLE, Ø1.00, CLEAR
71	1	10-5063.00	VENT CAP
72	6	9255.00	PHILLIPS HMS, 6-32 X 1/4"
73 A	2	10-5800.20	CIRCUIT BOARD ASSY - 115 VAC
B	2	10-5800.21	CIRCUIT BOARD ASSY - 230 VAC
74	3	10-5469.00	GROMMET, 1/2" X 3/8"
75	2	10-5009.00	FLOW RESTRICTOR
76	1	10-5501.00	SERVICE MANUAL
77	2	10-0807.00	DRAIN TUBE ASSY
78	1	10-5803.00	PLUG
79	2	9050.00	SCREW F H 6-32 x 5/8”
80	8	9366.00	#6 – INTERNAL TOOTH LOCK WASHER
81	2	9248.00	#6 – HEX NUT
82	4	9263.00	PH PAN HD MACH SCREW 10-32 X 1/2 SS
83	1	10-0868.00	COMM WIRE
84	2	96-6250.00	FUSE -- .05 AMP 2 MM

KEISER SERVICE DEPARTMENT

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