

# LANCASTER<sup>®</sup> WATER TREATMENT

## INSTALLATION, OPERATION AND SERVICE MANUAL

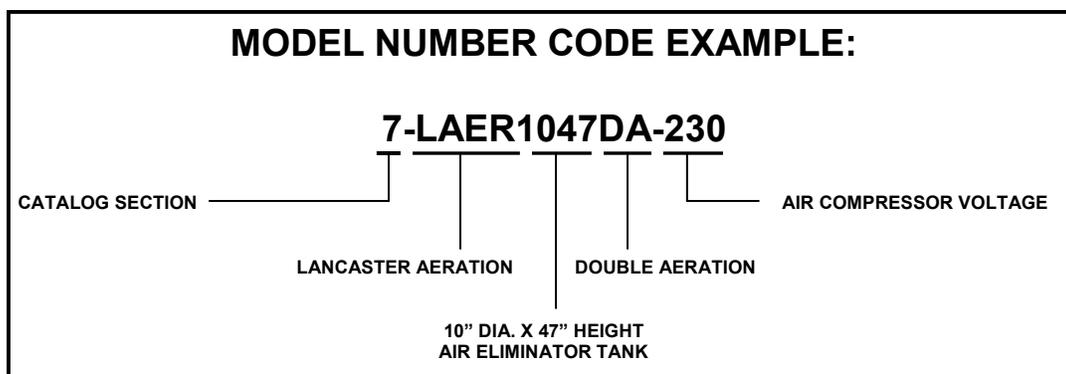
### AERATION SYSTEMS FEATURING AIR COMPRESSOR AND AIR ELIMINATOR TANK

FOR USE WITH 1 CU. FT. AUTOMATIC BACKWASHING FILTERS

- 7-LAER1047-115 AERATION SYSTEM
- 7-LAER1047DA-115 DOUBLE AERATION SYSTEM
- 7-LAER1047-230 AERATION SYSTEM
- 7-LAER1047DA-230 DOUBLE AERATION SYSTEM

FOR USE WITH 2 & 3 CU. FT. AUTOMATIC BACKWASHING FILTERS

- 7-LAER1248-115 AERATION SYSTEM
- 7-LAER1248DA-115 DOUBLE AERATION SYSTEM
- 7-LAER1248-230 AERATION SYSTEM
- 7-LAER1248DA-230 DOUBLE AERATION SYSTEM



**Congratulations on purchasing your new LANCASTER AERATION SYSTEM. When installed with a properly selected automatic backwashing filter, this system will provide a chemical-free method to reduce iron and hydrogen sulfide levels in your well water. For servicing and future inspection purposes, please file this booklet with your important documents.**

LANCASTER<sup>®</sup>  
WATER TREATMENT

A DIVISION OF C-B TOOL CO.

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**CAREFULLY READ ALL THE LITERATURE PROVIDED BEFORE INSTALLATION.  
CONSULT LOCAL PLUMBING AND ELECTRICAL CODES.**

**WARNING– HAZARDOUS PRESSURE.** Never work on water systems without relieving the internal pressure.

**WARNING– HAZARDOUS VOLTAGE.** Disconnect electrical power supply before installing or servicing equipment.

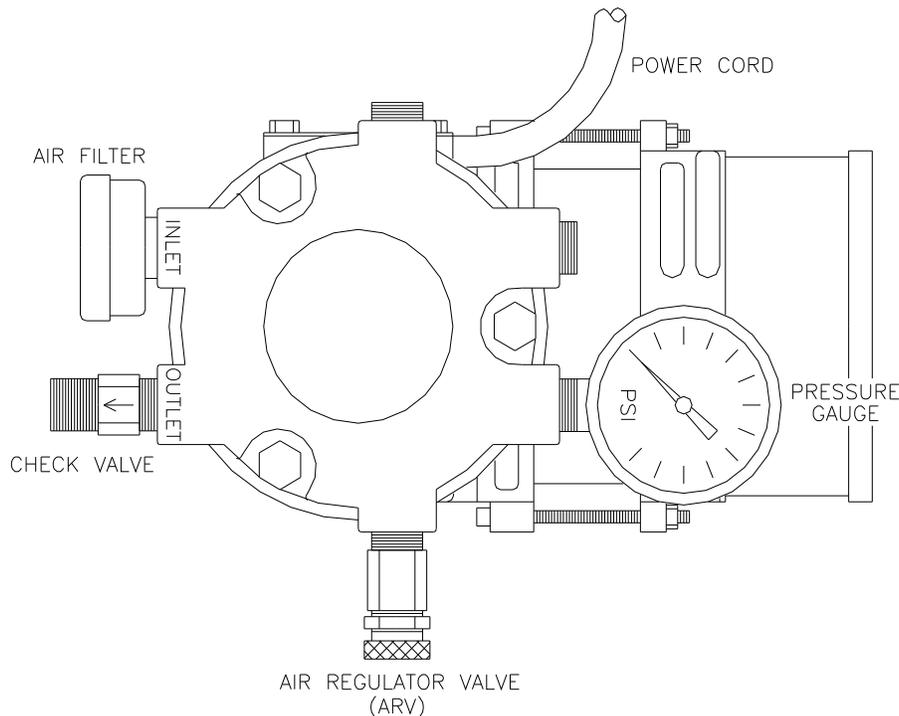
The **LANCASTER “LAER”** Aeration System features two major components, the air compressor and the air eliminator tank. **This manual provides detailed instructions regarding the air compressor assembly, pressure setting, connection to the air eliminator tank and switch.**

Please review the additional manual packaged with the air eliminator tank for detailed instructions regarding the air eliminator tank’s float installation, piping, vent tubing, operation and service.

## PRE-INSTALLATION

**AIR COMPRESSOR ASSEMBLY–** The following parts are included with the system; identify these parts before assembling them onto the air compressor.

QTY.	DESCRIPTION
1	AIR COMPRESSOR WITH AIR FILTER
1	PRESSURE GAUGE
2	¼ NPT CHECK VALVE
1	AIR REGULATOR VALVE (ARV)
1	POLY TUBING
2	TUBING CONNECTOR
3	RUBBER VIBRATION MOUNTING FOOT
1	MOUNTING SHELF



## AIR COMPRESSOR TOP VIEW

Referring to the diagram "air compressor top view"

1. **Use only Teflon tape on male thread connections. DO NOT over-tighten fittings. Air compressor head will crack.**
  2. Remove side plug and back plug on outlet side of air compressor. Use a ¼" Allen wrench or channel locks.
  3. Install pressure gauge in back port (opposite outlet).
  4. Install air regulator valve (ARV) into side port.
  5. Install first check valve into outlet port. Arrow and flow should point away from air compressor toward injection point. Reserve second check valve and tube connectors for system installation, explained later in this manual.
  6. Air compressor assembly can now be tested for head pressure.
- NOTE-Thread the three rubber vibration mounting feet into the base of the air compressor when ready to mount and install.

#### **CHECKING HEAD PRESSURE– Air compressor must be assembled before continuing.**

1. Loosen lock nut (counter-clockwise) on the air regulator valve (ARV).
2. Now turn adjustment nut counter-clockwise. Back out at least half way. This will relieve the tension on the ball and spring allowing air to flow freely out the ARV. This will prevent excess pressure from building up when you close off outlet port. **DO NOT LET PSI EXCEED 100 PSI.**
3. Plug air compressor into an appropriate voltage outlet.
4. Slowly close off outlet port (this will simulate water line pressure) using:
  - A. ¼" ball valve threaded on check valve.
  - B. ¼" cap threaded on check valve
  - C. Temporarily remove check valve and use extra plug.
  - D. For lower PSI settings, hold thumb over check valve.
5. Continue to gradually seal off outlet port. Air should be free flowing from ARV and the pressure gauge should read zero. If not, continue to turn adjustment nut counter-clockwise to release pressure.
6. With air compressor on, outlet port completely closed, and pressure gauge reading at 0 PSI, air should be flowing from ARV.
7. You are now ready to test the ability of the air compressor to build head pressure.
8. To build head pressure, gradually rotate clockwise the adjustment nut on the ARV. The pressure will begin to rise as you increase the tension on the ball and spring. **DO NOT EXCEED 100 PSI.**

#### **SETTING AND SECURING ARV SETTING-**

1. Estimate the head pressure required to introduce air into the water line (when pressure at head meets water line pressure, air will be pushed into water line). When the estimated pressure is reached and air is releasing out the ARV, the air compressor is set. **DO NOT SET ABOVE 75 PSI** because, after installed, this could cause the standard water pressure relief valve (usually located on the pressure tank) to possibly discharge water.
2. After using the adjustment nut to reach the estimated pressure, thread the lock nut clockwise and secure it against the ARV body. Snug lock nut with wrench. This will lock adjustment at the estimated pressure setting.
3. If pressure does not build while turning in adjustment nut, check the three ports on the outlet side of air compressor for leaks (pressure gauge, ARV and outlet port). If there are no leaks, the air compressor may be damaged or seals are worn to the point where no head pressure can be created. Repair kits are available.
4. After the estimated pressure is reached and the ARV is secured, the air compressor is now ready for installation.

**NOTE– The air compressor will require "fine tuning" after installation, regulating air flow. This procedure is explained in detail further ahead in this manual (see OPERATION section).**

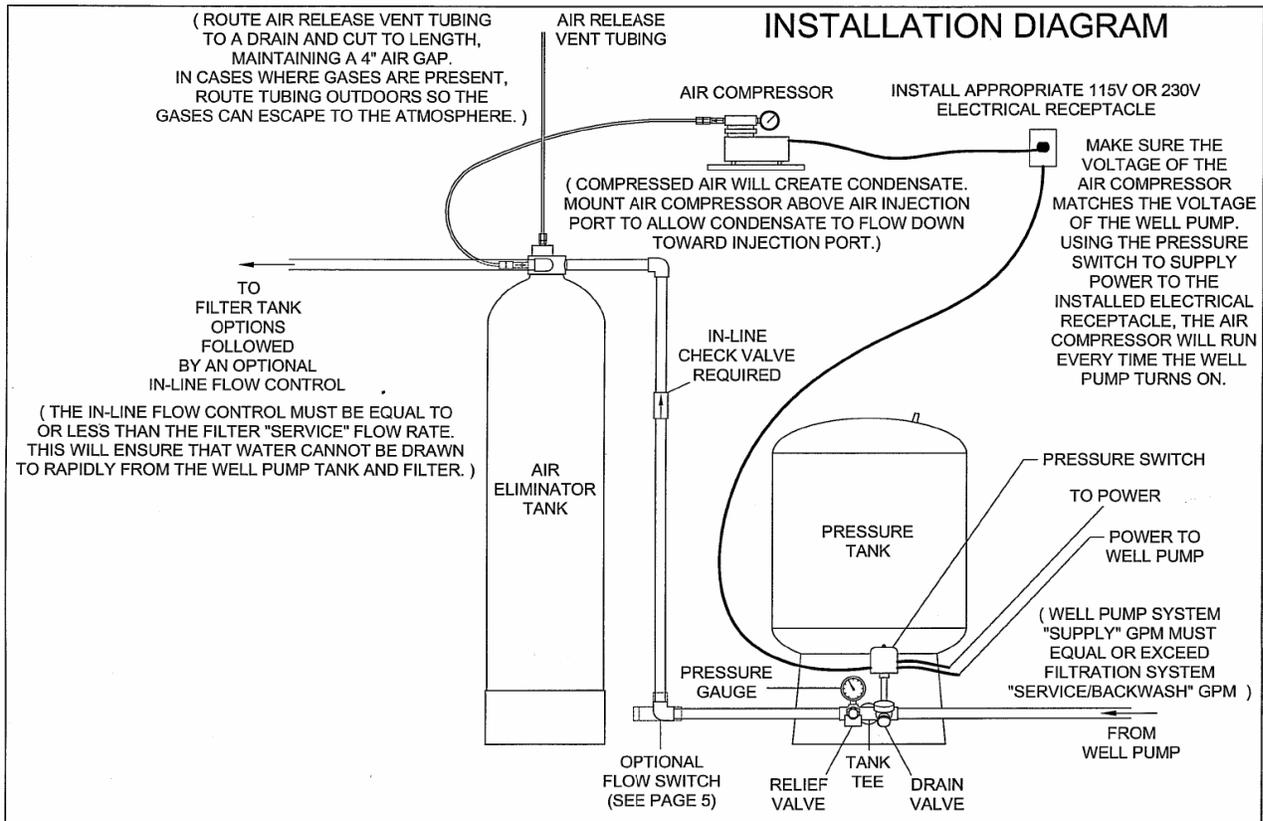
# INSTALLATION

**LOCATION**– The air compressor is water resistant, NOT water proof. The air compressor can operate with some room moisture, but should not be exposed to rain or very wet conditions. The air compressor should not be used outdoors. The air compressor can withstand temperatures from 40 to 100 degrees F as long as there is not a great amount of moisture. Humid locations should use air dryers to prevent moisture accumulation in air compressor.

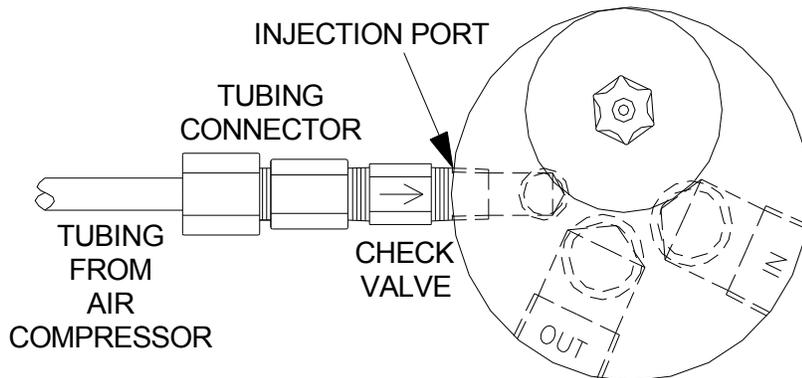
The air compressor can be mounted on the shelf provided, using the three rubber vibration mounting feet. Thread the three mounting feet into the base of the air compressor. Attach shelf to wall. Place air compressor on shelf and secure with lock washers and nuts. Position close to electric source. **Air Compressor must be installed ABOVE the injection port located on the air eliminator tank.**

**See INSTALLATION DIAGRAM.**

**compressed air will create condensate.** Mounting above the injection port allows condensate to flow down toward injection port. This will help reduce moisture build-up from back flowing into air compressor.



## AIR ELIMINATOR TANK TOP VIEW



**INSTALLING AIR ELIMINATOR TANK**– Follow the instructions provided with the air eliminator tank for its installation, but include these additional steps...

1. If there is any instruction or diagram regarding use of an inline air injector with air eliminator tank, **disregard**. An in-line air injector is **not** used for this system. The air compressor will be the source for air injection.
2. **An in-line check valve is required, but not supplied with this system.** The check valve needs to be installed in a vertical position prior to the air eliminator tank but after any untreated lines, if any. It is best to have a vertical column of water at least 12 inches on top of the check valve before the air eliminator tank.

**CONNECTING AIR COMPRESSOR TO AIR ELIMINATOR TANK**– Referring to the diagram “Air Eliminator Tank Top View”...

1. Remove brass plug if installed in air eliminator tank injection port.
2. Using Teflon tape on male threads, install second ¼” check valve into injection port. Be sure the arrow and flow are pointing into the injection port and away from air compressor.
3. Install a tubing connector on each check valve (at air eliminator tank injection port and air compressor).
4. Connect tubing from air compressor to air eliminator tank injection port.
5. **Tighten all fittings making sure not to over-tighten.**

**ELECTRICAL CONNECTION**– The air compressor can be activated by the well pump pressure switch **OR** a flow switch (**sold separately**).

**The flow switch offered by LANCASTER may only be used with 115V air compressors.** Flow switch activation provides maximum air input for water containing high hydrogen sulfide or for high volume water usage. If using the flow switch to activate the air compressor, follow installation instructions provided with the flow switch. See **INSTALLATION DIAGRAM** for location.

**Using the well pump pressure switch as the power source**, the air compressor will be activated every time the well pump turns on. **Be sure to match air compressor voltage to well pump voltage.** Air compressors are available as 115 volt or 230 volt single phase. Both are rated 1/16 HP. Most well pump pressure switches should be capable of this extra load (1/16 HP). To be sure, verify the well pump HP and the pressure switch HP rating, usually located inside the pressure switch cover.

**To connect air compressor to well pump pressure switch, using pressure switch as the power source...**

1. **Make sure the power supply breaker or disconnect is OFF before working with pressure switch.**
2. Install appropriate 115 volt or 230 volt receptacle, connecting wire from this receptacle to the pump (load) terminals of the pressure switch. These load terminals are usually marked M1, M2 or T1, T2. This will allow the air compressor to turn on with the well pump.
3. **Do not** plug the air compressor into this installed receptacle yet.

## OPERATION

**START UP**– An **automatic filter** is generally selected and located after the air eliminator tank. See **INSTALLATION DIAGRAM**. Follow the start-up procedure in the filter’s installation manual. This will require power supply to be turned **ON**.

The **air eliminator tank** operates without electricity or water loss through the vent tubing. The only moving part is the float. The float will open and close the air release port with water level fluctuations.

**CHECK FOR LEAKS.** If the air compressor’s ARV has not been preset, start with it halfway open to avoid excessive air buildup. See **PRE-INSTALLATION** section. **NOW** plug air compressor into the receptacle you installed (this receptacle is using the well pump pressure switch as the power source). Run the well pump through a few cycles, fine-tuning the air compressor as needed (see next section). Increasing the size of the holes in the air filter plastic cover can eliminate excessive noise from the air filter. **Remove cover before drilling existing holes larger.**

**REGULATING AIR FLOW**– To adjust the air regulator valve (ARV), loosen lock nut (thin nut in middle of fitting). Now the outer adjustment nut can be turned clockwise to increase pressure and air flow, or counter-clockwise to reduce pressure and air flow during the well pump cycle. If threaded out too far, air will flow freely out of regulator valve instead of injecting air into water. If adjustment nut is removed, the check-ball and spring will fall out. If this happens, simply insert ball and spring, and thread nut back in. While the well pump and air compressor are running, you can set the ARV to desired pressure. Start with ARV half way open. As you turn adjustment nut clockwise, pressure will build in compressor head. When pressure at head meets water line pressure, air will be pushed into water. To decrease or limit the air injection, set the ARV 5 to 10 psi above the “turn on” pressure of well pump. When the well pump turns on, the air compressor also turns on, injecting air during the beginning of the pump cycle. The air compressor will build air pressure equal to water line pressure. It will gradually increase as water line pressure increases up to ARV set point. When the water line pressure exceeds the setting on air compressor ARV, no more air will be injected into the water. The air compressor will continue to run during the rest of the pump cycle but excess air will be released out the ARV (you should be able to hear or feel the air escaping). If more air is desired, gradually set the ARV to a higher pressure.

**EXAMPLES**

<b>Air injection</b>	<b>Well pump setting</b>	<b>ARV setting</b>
<b>Minimum</b>	<b>30-50 psi</b>	<b>35 psi</b>
<b>Medium</b>	<b>30-50 psi</b>	<b>40 psi</b>
<b>Maximum</b>	<b>30-50 psi</b>	<b>50 psi</b>

If the air compressor is set at 60 psi and the well pump is 30-50 psi, air compressor will start at 30 psi and gradually build with water line pressure up to 50 psi. Air compressor gauge will not register 60 psi because water line pressure does not get that high. The ARV in this case will act as a pressure relief valve, i.e. if 60 psi is reached, the ARV will expel excess air. After setting ARV adjustment nut, secure locknut to the regulator body by rotating clockwise. This will lock the setting of the ARV. To re-adjust, loosen locknut, reset adjustment nut, and secure lock nut. Follow up visits may be required to fine tune ARV.

## SERVICE

**WARNING- HAZARDOUS VOLTAGE.** Disconnect electrical power supply before servicing equipment.

**WARNING- HAZARDOUS PRESSURE-** Never service equipment without relieving the internal pressure.

The following **TROUBLE SHOOTING GUIDE** is provided to help during service. Also refer to the trouble shooting sections in the **AIR ELIMINATOR TANK** instruction manual and **AUTOMATIC FILTER** instruction manual.

### TROUBLE SHOOTING GUIDE

PROBLEM	SOLUTION
1. Air in <b>untreated</b> water lines, if any (between pressure tank and air eliminator tank). Possible cause is air escaping from air eliminator tank and back flowing through the in-line check valve, which may be installed horizontally or has debris preventing check from sealing.	1. Install the in-line check valve in a vertical position so that there is a column of standing water about a foot or more before the air eliminator tank.
2. No air bubbles in water and discoloration returns. The cause may be a water logged air eliminator tank due to malfunctioning air compressor or no in-line check valve installed.	2. See solution # 1 above. Run water in house and listen for splashing in air eliminator tank. Plug air compressor in an alternate power source and observe pressure gauge on compressor. ARV may have "drifted" to a lower pressure. Reset air compressor's head pressure to the well pump cut-out (off) pressure or reset 2 to 3 psi above the cut-out pressure.

## TROUBLE SHOOTING GUIDE CONTINUED

PROBLEM	SOLUTION
<p>3. Sulfur odor is reduced, but not eliminated. Possible cause is that there is not enough turnover of air.</p>	<p>3. Set the ARV on the air compressor at the maximum cut-out level of the well pump.</p>
<p>4. Air compressor does not build up pressure. Possible causes are</p> <p>A. ) the air compressor may have been damaged during shipment,</p> <p>B. ) check valves leaked water to the air compressor,</p> <p>C. ) error performed during installation.</p>	<p>4. A.) damaged air compressor is rare. Please explore all solutions before calling for a return authorization number,</p> <p>B.) except for small droplets on the poly tubing, there should be no water present. Test the ¼ inch check valves if water is present in tubing. They may need replacement. Be sure the air compressor is mounted above the level of the injection port on the air eliminator tank,</p> <p>C.) plug off the outlet of the compressor and plug into an alternate power source and observe pressure gauge. If pressure does not come up to desired level, make certain fittings are installed in exact ports (see pre-installation section).</p>

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