

INSTALLATION AND OPERATING INSTRUCTIONS

AQUA-PURE® APPM SERIES IRON REDUCTION SYSTEMS

MODELS:

APPM100

APPM150

APPM200

APPM100M

APPM150M

APPM200M

Installer, please leave with homeowner.
Homeowner, retain for future reference.

IN336 0609



3M

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SAFETY INFORMATION



Read, understand, and follow all safety information contained in these instructions prior to installation and use of the Aqua-Pure APPM Series Iron Reduction Systems. Retain these instructions for future reference.

This product includes a GAST® component. Refer to the GAST instruction and operation manual (included with product) for detailed instructions and safety information related to Model # SOA Oil-less Compressor.

Intended use:

The Aqua-Pure APPM Series Iron Reduction Systems are intended for use in reducing iron from water in homes and have not been evaluated for other uses. The system is intended for indoor installations near the entry point of a home water line, and must be installed by qualified professional installers according to these installation instructions.

EXPLANATION OF SIGNAL WORD CONSEQUENCES

 WARNING	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury and/or property damage.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or property damage.
CAUTION	Indicates a potentially hazardous situation, which, if not avoided, may result in property damage.

WARNING

To reduce the risk associated with choking:

- **Do not** allow children under 3 years of age to have access to small parts during the installation of this product.

To reduce the risk associated with ingestion of contaminants:

- **Do not** use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

To reduce the risk of physical injury:

- Shut off inlet water supply and depressurize system as shown in manual prior to service.

To reduce the risk associated with a hazardous voltage:

- If the home electrical system requires use of the cold water system as an electrical safety ground, a jumper must be used to ensure a sufficient ground connection across the filter installation piping — refer installation to **qualified** personnel.
- Do not use the system if the power cord is damaged — contact qualified service **personnel** for repair.
- Disconnect line circuit power before wiring the switch and compressor. Consult a licensed electrician for correct and safe connection of the flow switch and air compressor to the home electrical system.

To reduce the risk associated with back strain due to the heavy weight of the various system components:

- Follow safe lifting procedures.

CAUTION

To reduce the risk associated with skin, eye, and respiratory tract irritation from dust from filter media during installation:

- Gravel and several types of filter media may be used in this product, depending upon the application. During installation, dust may cause irritation to skin, eyes, and respiratory tract, and may affect lungs.
- Utilize a NIOSH-approved dust filter mask and appropriate eye protection when handling and pouring gravel and filter media.
- For further safety information, refer to MSDS document (23-9639-8) available at 203-238-8965 or http://solutions.3m.com/wps/portal/3M/en_US/MSDS (click MSDS search). For emergencies contact CHEMTREC at 1-800-262-8200.

CAUTION

To reduce the risk associated with property damage due to water leakage:

- **Read and follow** Use instructions before installation and use of this water treatment system.
- Installation and use **MUST** comply with existing state or local plumbing codes.
- **Protect from freezing**, remove filter cartridge when temperatures are expected to drop below 40° F (4.4° C).
- **Do not** install on hot water supply lines. The maximum operating water temperature of this filter system is 110°F (43.3°C).
- **Do not** install if water pressure exceeds 50 psi. If your water pressure exceeds 50 psi (345 kPa), you must install a pressure limiting valve. Contact a plumbing professional if you are uncertain how to check your water pressure.
- **Do not** install where water hammer conditions may occur. If water hammer conditions exist you must install a water hammer arrester. Contact a plumbing professional if you are uncertain how to check for this condition.
- **Do not** use a torch or other high temperature sources near filter system, cartridges, plastic fittings or plastic plumbing.
- On plastic fittings, never use pipe sealant or pipe dope. **Use PTFE thread tape only**, pipe dope properties may deteriorate plastic.
- Take care when using pliers or pipe wrenches to tighten plastic fittings, as damage may occur if over tightening occurs.
- **Do not** install in direct sunlight or outdoors.
- Mount system in such a position as to prevent it from being struck by other items used in the area of installation.
- Ensure all tubing and fittings are secure and free of leaks.
- **SHUT OFF FUEL OR ELECTRIC POWER SUPPLY TO WATER HEATER** after water is shut off.
- **Do not** install system where water lines could be subjected to vacuum conditions without appropriate measures for vacuum prevention.
- **Do not** apply heat to any fitting connected to Bypass or Control Valve as damage may result to internal parts or connecting adapters.
- Install on a flat/level surface. It is also advisable to sweep the floor to eliminate objects that could pierce the brine tank.

CAUTION

To reduce the risk associated with property damage due to plugged water lines:

- Pay particular attention to correct orientation of control valve. Water flow should match arrow on control valve. The Inlet and Outlet of other water treatment equipment products will vary depending on the control valve brand used.

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SECTION 1: GENERAL INFORMATION

Congratulations on your purchase of an Aqua-Pure® APPM Series Iron Reduction System! This Aqua-Pure APPM Series Iron Reduction System reduces dissolved, precipitated and bacterial iron from your water supply. Contrary to conventional methods, your Aqua-Pure APPM Series Iron Reduction System requires NO chemicals (either added to the water supply or the filter). The unique process requires ONLY periodic backwashing for a few minutes to flush out entrapped iron that has accumulated in the filter tank.

The Aqua-Pure APPM Series Iron Reduction System was designed to be used primarily on jet pump applications where the operating pressures do not exceed 50 psi. The MAXIMUM PRESSURE for proper operation of the aeration tank is 50 psi.

CAUTION

To reduce the risk associated with property damage due to water leakage:

- Do not install if water pressure exceeds 50 psi (344.7 kPa). If the system water pressure exceeds 50 psi, the installation must use a pressure limiting valve. Contact a licensed plumbing professional if you are uncertain how to check your water pressure.

If you have a private water system, refer to page 2-2 to determine your system's capability. If your system produces the required flow rate at 50 psi or higher, contact your dealer for alternate treatment equipment.

When properly installed, the Aqua-Pure APPM Series Iron Reduction System will provide years of dependable service. Read this manual all the way through first, and then follow the instruction steps in the proper sequence.

DESCRIPTION AND OPERATION OF THE SYSTEM:

The Aqua-Pure APPM Series Iron Reduction System consists of two major components which are:

- 1) An aeration tank, with compressor, installed after the existing pressure tank. Every time the well pump runs, the compressor injects air into the iron laden water.
- 2) A backwashing type filter containing a special media that causes the iron to precipitate throughout the filter bed (rather than on the surface as in chemical oxidizing filters). This process produces an iron reduction capacity of from 30,000 to 50,000 parts per million (ppm) compared to 6,000 to 8,000 ppm for chemical oxidation processes. The media DOES NOT require a chemical regenerant (such as potassium permanganate) for oxygen enrichment, salt, chlorine or any other chemicals.

Your Aqua-Pure APPM Series Iron Reduction System automatically adjusts the pH to neutral or higher on acid water WITHOUT an acid neutralizer (a required piece of equipment with chemical oxidation filters whenever the pH is less than 6.7). The ability to raise pH when it is below neutral (7 or less) greatly enhances the filter's ability to reduce iron efficiently.

IMPORTANT NOTE

Replenishment of the component of the filter media that adjusts pH, "MpH Adder", may be required periodically, the frequency of which is dependent on the raw water pH, the manganese (Mn) concentration in the water (if any) and the water consumption rate.

Periodic backwashing of the filter bed flushes the precipitated iron to the drain and readies the filter for use again. The duration of the backwash procedure is approximately 30 minutes. The frequency of backwashing depends on iron concentration and water usage, and ranges from daily to once every 12 days. The volume of water consumed during the entire backwashing procedure is approximately 50 gallons (models APPM100/APPM100M).

IMPORTANT NOTE

Due to the aeration process, the water will probably appear milky when drawn from the tap. Allow the water to stand and the milkiness will dissipate.

SECTION 2: BEFORE INSTALLATION

INSPECTING AND HANDLING YOUR FILTER:

Inspect the equipment for shipping damage. If damaged, notify the transportation company and request a damage inspection.

Handle the filter unit with care. Damage can result if dropped or if set on sharp, uneven projections on the floor. Do not turn the filter unit upside down.

MAKE SURE YOUR WATER HAS BEEN THOROUGHLY TESTED:

An analysis of your water should be made prior to the selection of your water conditioning equipment. Your dealer will generally perform this service for you, and may send a sample to the factory for analysis and recommendations. Enter your analysis below for a permanent record.

IMPORTANT NOTE

Hydrogen sulfide (H₂S) must be tested for at the well site. For accuracy, the sample must be drawn with the pump RUNNING, and the test be completed within ONE minute after the sample is drawn.

Analysis Of Your Water

CONTAMINANT	YOUR WATER
Iron (Fe)	_____ppm
Manganese (Mn)	_____ppm
pH	_____
Tannins (Humic Acid)	_____ppm
Hydrogen Sulfide (H ₂ S)	_____ppm
Hardness	_____gpg
Other_____	_____ppm
Other_____	_____ppm

WARNING

To reduce the risk associated with ingestion of contaminants:

- Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

IRON (Fe)

Iron concentrations as low as 0.3 ppm (0.1 ppm under some conditions) will cause staining. The iron concentration, together with the flow rate demand and the consumption rate of the water determines the basic size filter system. The higher these factors are, the larger the required system. The Aqua-Pure APPM Series Iron Reduction System is capable of reducing the three main types of iron found in water supplies; Soluble iron (also known as “clear water” or ferrous iron), precipitated iron (also known as “red water” or ferric iron) and bacterial iron (also known as iron bacteria). Special care must be taken when selecting a filter model if your water has a combination of high iron, very low pH and/or manganese levels above 0.2 ppm. The MAXIMUM CONCENTRATION of iron which can be treated with this system is 10 ppm or less. If your water contains higher concentrations, contact your dealer for alternate forms of treatment.

The Aqua-Pure APPM Series Iron Reduction System is not bactericidal, i.e. it does not remove or kill “bacterial iron”. It reduces the iron and slime deposits in your plumbing line and fixtures upon which the bacteria may live, thus minimizing its effects.

MANGANESE (Mn)

The presence of manganese can be bothersome, even for an Aqua-Pure APPM Series Iron Reduction System. As little as 0.05 ppm of manganese can produce a brownish or black stain. The ability of the filter to reduce manganese depends on its concentration and the pH of the water.

Although not specifically designed for the reduction of manganese, the oxidation of manganese is very similar to that of iron. Its oxidation is more pH dependent than that of iron, therefore, a pH of 8.2 or higher must be obtained. When this pH level is achieved, the precipitation of manganese may more readily occur. To accomplish this, models are available where the media contains additional quantities of MpH Adder, the pH raising component (model designations with “M” suffix). In any application involving manganese, a larger model filter is generally recommended (but only if the pumping rate is sufficient to backwash the larger size).

If, however, the manganese concentration is low (0.1 ppm or less) and the pH is 6.5 or higher, an Aqua-Pure APPM Series Iron Reduction System containing standard filter media will generally perform satisfactorily, although backwashing should be performed at more frequent intervals. Under more severe conditions where the pH is very low and/or the manganese concentration is high, an acid neutralizer installed ahead of the filter will maintain the required 8.2 pH level longer than the Aqua-Pure APPM Series Iron Reduction System will between replenishments with MpH Adder.

pH

The pH of water measures its acidity. Water with a pH of less than 7.0 is acidic, above 7.0 it is alkaline, and a pH of 7.0 is neutral. The lower the pH value the greater the acidity, and the higher the pH value the more alkaline. Acidic water (pH less than 7.0) is corrosive to pipes, appliances, etc. A pH of 7.0 or higher facilitates iron reduction – which is why the Aqua-Pure APPM Series Iron Reduction System is designed to increase the pH when it is less than 7.0.

The pH increasing component of the media is “sacrificial,” that is, it slowly dissolves during the process of increasing pH. The rate this occurs is proportional to the degree of the pH increase and the water consumption rate (i.e., the greater the pH increase and water consumption, the greater the sacrificial rate). Thus, when the pH is increased to 8.2 or more, as is necessary when manganese is present, the sacrificial rate is even greater. Under the most severe conditions, the MpH component of the media may have to be replenished two to four times per year. On the other hand, if the raw water pH is 7.0 or above and no manganese is present, the sacrificial rate is very slight.

IMPORTANT NOTE

Replenishment of the component of the filter media that adjusts pH, “MpH Adder”, may be required periodically, the frequency of which is dependent on the raw water pH, the manganese (Mn) concentration in the water (if any) and the water consumption rate.

TANNINS (Humic Acid)

Tannins (a humic acid), which may be present in some water supplies, are the result of various forms of decaying vegetation (the test for tannins can be performed by your dealer). Tannins can cause problems in the operation of the Aqua-Pure APPM Series Iron Reduction System by forming a sticky coating on the media, thus rendering it incapable of reducing the iron. Generally with tannin concentrations of 0.5 ppm or less, more frequent backwashing will prevent the sticky coating from forming. It does appear, however, that the level of tannin concentration affects the operation of the Aqua-Pure APPM Series Iron Reduction System differently in different geographical areas (in some areas the Aqua-Pure APPM Series Iron Reduction System will perform satisfactorily when tannin concentration is considerably greater than 0.5 ppm). It is therefore recommended that if the tannin concentration is 0.5 ppm or more, contact your dealer BEFORE installing the system.

HYDROGEN SULFIDE (H₂S)

Hydrogen sulfide (often referred to as “sulfur”), is easily detectable by its objectionable “rotten egg” odor. Sulfur corrodes iron, brass, copper and silver. While the APPM Iron Reduction System is not intended to be used as a sulfur filter, it is capable of reducing sulfur in concentrations of up to 2 or 3 ppm. Whenever hydrogen sulfide is present, backwashing must be performed at more frequent intervals.

CHECK YOUR WATER PRESSURE AND PUMPING RATE:

To avoid unsatisfactory operation or equipment damage, the following system condition must be carefully checked.

WATER PRESSURE

Low _____ psi High _____ psi

The pumping rate of your well pump must be sufficient to BACKWASH the filter. For models APPM100 and APPM100M the required rate is 5 gpm (refer to SPECIFICATIONS AND OPERATING DATA for the backwash requirement for other models). To measure the pumping rate of your pump, follow these instructions:

1. Make certain no water is being drawn. Open spigot nearest pressure tank. When pump starts, close spigot and measure time (in seconds) to refill pressure tank (when pump shuts off). This figure represents CYCLE TIME.
2. With the pressure tank full, draw water into a container of known volume, measure the number of gallons drawn until the pump starts again. This is DRAW-DOWN. Divide this figure by CYCLE TIME and multiply the result by 60 to arrive at the PUMPING RATE in gallons per minute (gpm). To aid in your calculation, insert the data in the following formula:

$$\begin{array}{ccccc} \text{DRAW-DOWN} & \div & \text{CYCLE TIME} & \times 60 = & \text{PUMPING RATE} \\ \text{(gals.)} & & \text{(secs.)} & & \text{(gpm)} \end{array}$$

EXAMPLE: CYCLE TIME is 63 secs.; DRAW-DOWN is 8 gals.; then PUMPING RATE equals: 8 gals. ÷ 63 secs. x 60 = 7.6 gpm

IMPORTANT NOTE

The addition of other water treatment devices (such as an acid neutralizer) may reduce the flow rate at the filter drain to an inadequate level to properly backwash the filter. If you are uncertain whether your flow rate is adequate, contact your dealer BEFORE installing your Aqua-Pure APPM Series Iron Reduction System, so that corrective action, if required, may be taken.

LOCATE WATER CONDITIONING EQUIPMENT CORRECTLY:

Select the location of your filter tank with care. Various conditions which contribute to proper location are as follows:

- 1) Locate as close as possible to water supply source.
- 2) Locate as close as possible to a floor or laundry tub drain.
- 3) Locate in correct relationship to other water conditioning equipment (See Figure 1, in Section 3).
- 4) Filters and softeners should be located in the supply line BEFORE the water heater. Temperatures above 110°F (43.3°C) damage filters and softeners and will void the factory warranty.
- 5) Do NOT install a filter or softener in a location where freezing temperatures occur. Freezing may cause permanent damage to this type of equipment and will also void the factory warranty.
- 6) Allow sufficient space around the unit for easy servicing.
- 7) If your water source is a community water supply, a public water supply, OR you wish to bypass water used for a geothermal heat pump, lawn sprinkling, out buildings or other high demand applications, the purchase of an FS1 Flow Switch is suggested. Instructions accompanying the flow switch will describe the proper installation for these types of applications.

THE IMPORTANCE OF YOUR PRESSURE TANK:

The Aqua-Pure APPM Series Iron Reduction System will perform satisfactorily with either a captive-air (“bladder”) type pressure tank or a standard air-to-water type with an air volume control (air-relief valve).

A PROPERLY SIZED PRESSURE TANK OF EITHER STYLE WILL REQUIRE A MINIMUM PUMP CYCLE OF 60 SECONDS TO REFILL FROM THE WELL PUMP ON-TO-OFF PRESSURE SETTINGS.

IMPORTANT NOTE

If your pressure tank (or any part of your water system) is not functioning properly, corrective action MUST be taken BEFORE installation of your Aqua-Pure APPM Series Iron Reduction System.

FACTS TO REMEMBER WHILE PLANNING YOUR INSTALLATION:

WARNING

To reduce the risk associated with a hazardous voltage:

- If the home electrical system requires use of the cold water system as an electrical safety ground, a jumper must be used to ensure a sufficient ground connection across the filter installation piping — refer installation to qualified personnel.
- Do not use the system if the power cord is damaged — contact qualified service personnel for repair.

CAUTION

To reduce the risk associated with property damage due to water leakage:

- **Installation must comply** with existing state or local plumbing codes.
- **Do not install** if water pressure exceeds 50 psi. If your water pressure exceeds 50 psi (345 kPa), you must install a pressure limiting valve. Contact a plumbing professional if you are uncertain how to check your water pressure.
- Do not install system where water lines could be subjected to vacuum conditions without appropriate measures for vacuum prevention.
- **Do not** use torches or other heat sources near plastic plumbing, as damage may occur.
- Take care when using pliers or pipe wrenches to tighten plastic fittings, as damage may occur.
- On plastic fittings, use thread sealing tape only. Never use pipe sealant or pipe dope on plastic fittings, as damage may occur.

To reduce the risk associated with property damage due to plugged water lines:

- Pay particular attention to correct orientation of control valve. Water flow should match arrow on control valve. The Inlet and Outlet of other water treatment equipment products will vary depending on the control valve brand used.

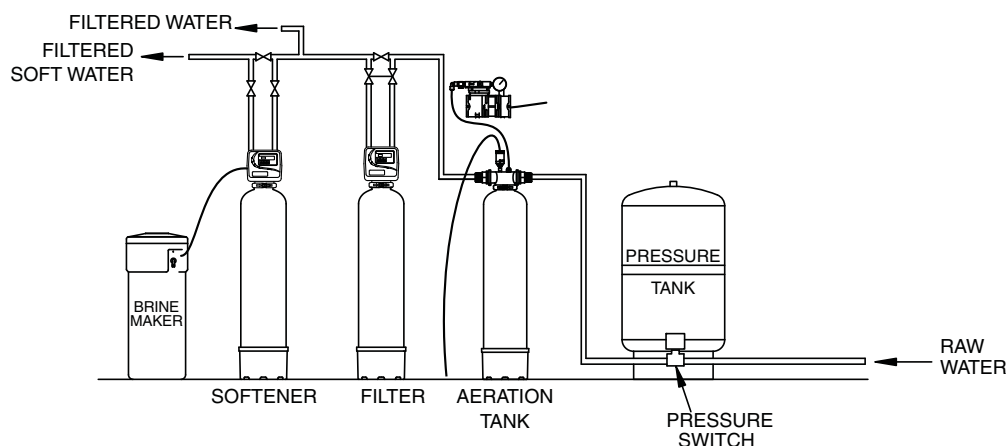
If lawn sprinkling, a swimming pool, geothermal heating/cooling or water for other devices/activities are to be treated by the filter, a larger model filter MUST be selected to accommodate the higher demands of these items. The pumping rate of the well pump must be sufficient to accommodate these items plus the backwashing requirement of the softener. Consult your dealer for alternative instructions if the pumping rate is insufficient.

Remember that the filter **INLET** is attached to the pipe that supplies water (i.e. runs to the pump) and **OUTLET** is the line that runs toward the water heater or other water treatment equipment device.

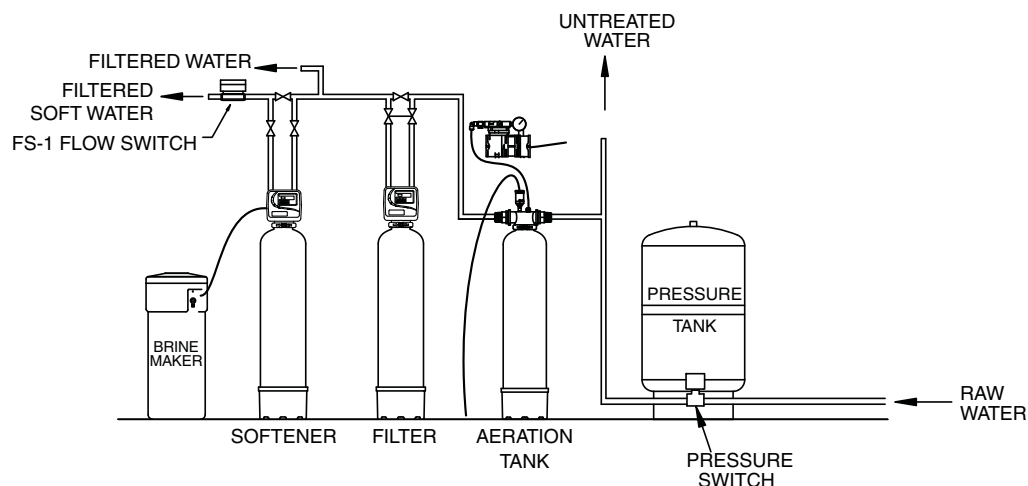
Before commencing the installation, it is advisable to study the existing piping system and to determine the size, number and type of fittings required. Typical system schematics shown in Figure 1 will be of assistance.

SECTION 3: INSTALLATION

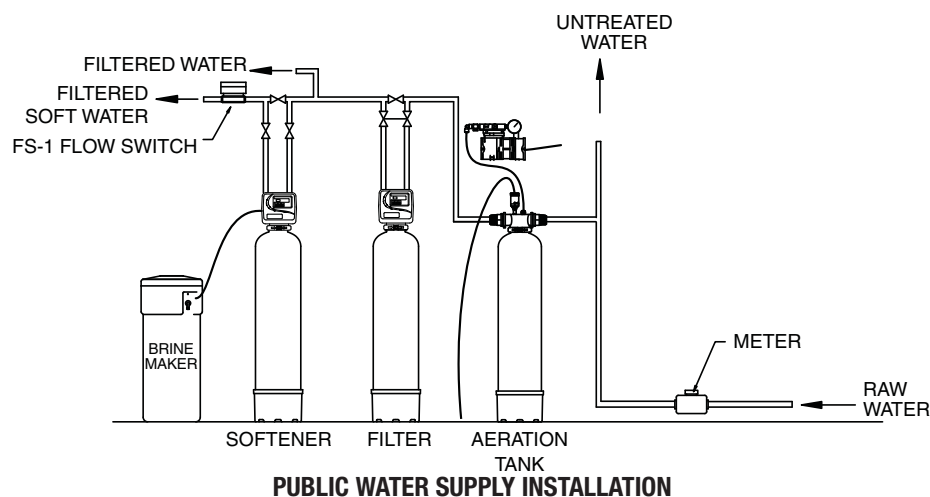
Proper installation sequence of water conditioning equipment is very important.
Refer to the diagram following for your particular water supply.



STANDARD INSTALLATION



SPLIT STREAM INSTALLATION



PUBLIC WATER SUPPLY INSTALLATION

FIGURE 1

CAUTION

To reduce the risk associated with property damage due to plugged water lines:

- Pay particular attention to correct orientation of control valve. Water flow should match arrow on control valve. The Inlet and Outlet of other water treatment equipment products will vary depending on the control valve brand used.

MOUNTING & SET-UP INSTRUCTIONS FOR COMPRESSOR UNIT

Prior to using the system, some assembly and adjustments are required. Please locate these parts and ensure all items are present. These items are required to mount and set-up the Compressor assembly as well as to connect the tubing to the Compressor and air release tank.

- Compressor/Bracket Assembly
- RETROFIT KIT
- 1/4" Polyethylene Tubing (10 feet)
- A4FE4-MG (1/4" NPT x 1/4" Quick Connect Elbow)
- Quick Connect Plug (Plug00007)

IMPORTANT NOTE

This product includes a GAST® component. Refer to the GAST instruction and operation manual (included with product) for detailed instructions and safety information related to Model # SOA Oil-less Compressor.

How It Works:

When the Compressor is running, it injects air into the water which causes iron to precipitate. The precipitated iron is then filtered out as it passes through the APPM Iron Reduction System. There are two ways to turn the Compressor on.

1. **For Well Systems** – the Compressor is wired to the existing pump pressure switch. When the pump is turned on by the pressure switch, it also turns on the Compressor.
2. **For Split Stream or Public Water Supply** – An FS1 Flow Switch (sold separately – available through your dealer) is installed in the service line and turns on the Compressor when water flow exceeds 0.5 gpm. See Page 3-1 for installation diagram.

Compressor Mounting Instructions:

1. Locate the Compressor/Bracket Assembly within 6 feet of the air release tank.
2. Thread on A4FE4-MG onto the brass check valve located on the compressor. The quick connect end of the elbow should already be plugged with a Plug00007.
3. The mounting bracket should be mounted on a surface that will support vibration, preferably to studs or a concrete wall. The installer must choose and supply the appropriate fastener for mounting the bracket to the wall.
4. When using the FS1 Flow Switch, the power supply must be connected to a dedicated 120 VAC, 10 amps, 60 Hz. Power supply. Follow NEC and/or all relevant codes for your area.
5. Insert the Plug00007 plug found in the RETROFIT KIT into the quick connect fitting on top of the air release tank head. This is the only component of the RETROFIT KIT you will use.

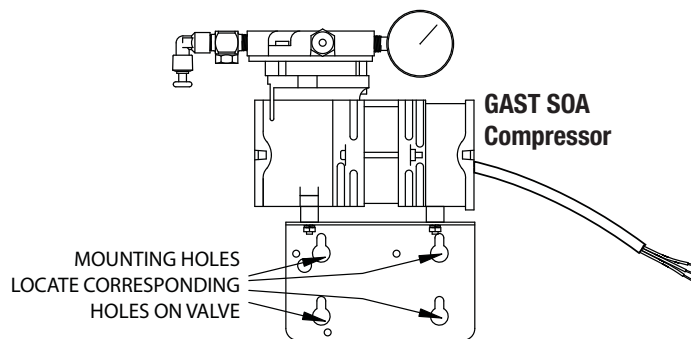


Figure 2

Wiring Instructions:

WARNING

To reduce the risk associated with hazardous voltage:

- Disconnect line circuit power before wiring the switch and compressor. Consult a licensed electrician for correct and safe connection of the flow switch and air compressor to the home electrical system.

1. **For Well Systems** – The air compressor must be wired to run in parallel to the well pump pressure switch. The leads of the air compressor must be made on the well pump motor contacts. All contacts must be made in accordance with NEC and local codes and standards. We suggest the use of a licensed electrician to perform this task to ensure safety and correctness.
2. **For Use With A Flow Switch** – An FS1 Flow Switch should be installed in the service line after all water treatment equipment (e.g. APPM Iron Reduction System, water softener, etc.). The FS1 plumbing connection is 1" PVC socket (solvent weld) and must be installed horizontally and the top in an upright position or it will not function correctly. Make sure the direction of water flow matches the arrows on FS1.

The FS1 comes with a power cord installed, but the Air Compressor power cord must be connected to the flow switch in order to operate.

The compressor must be wired to run when water flow is detected in the treated water line. The electrical leads must be fed through the strain relief on the flow switch and attached to the wire leads provided on the micro switch under the cover of the flow switch. Follow the instructions provided by the manufacturer of the flow switch. The flow switched power cord must be plugged into a 120 volt, 60 hertz circuit with a minimum 15 amp rating on a non-switched electrical outlet. It is suggested that a licensed electrician perform the wiring needs for this application to ensure the electrical connections are made in accordance to the NEC and local codes and standards.

IMPORTANT NOTE

It is suggested that a licensed electrician perform the wiring needs for this application to ensure the electrical connections are made in accordance to the NEC and local codes and standards.

FS1 Specifications:

- a. 120VAC
- b. 10 Amp Max
- c. 0.5 gpm minimum actuation flow
- d. 110° F maximum Temperature

Set-Up of Compressor:

1. Thread the ARVTA-1X assembly (located in a box in the aeration tank shipping carton) into the 1/4" tapped hole on the top of the air release tank head. Remove the red cap from the top of the air release valve of the ARVTA-1X and attach the 3/8" polyethylene. If it is difficult to attach, warm the end of the polyethylene tubing before attaching. Keeping the tube as short as possible, run the tubing to a waste drain. Water from venting cycles will be discarded here. Make sure the air release is closed as demonstrated in the figure.
2. To adjust the air release fitting, determine the operating pressure range of your system by observing the pressure gage on your pressure tank when the well pump turns on and turns off. For municipal, community or constant pressure/variable speed pumps observe the pressure in the water system water line.
3. If using an FS1 Flow Switch, plug it in to an unswitched 120 VAC power source. If using the system pressure switch, turn on the power. Open a faucet or other outlet downstream from the pressure tank (well pump applications) or FS1 Flow Switch (flow switch applications). The Compressor should come on. Open the brass air release on the side of the Compressor slowly so that it releases air while the Compressor is running. Adjust the air release so that the pressure gage on the Compressor maintains a pressure 10-15 psi less than the shut-off pressure of the system. Lock the setting by tightening the second nut on the air release.
4. Shut off the power so the Compressor is not running. Remove the plug from the elbow that was attached to the Compressor in Mounting Instructions Step 2. To remove the plug, push the collar toward the body.
5. Relieve the pressure on the air release tank by opening the air release valve. Remove the Plug00007 plug installed in the quick release fitting in Mounting Instructions Step 5.
6. Connect the 1/4" polyethylene tubing between the two quick connect fittings, assuring the tubing is properly seated in the fittings.
7. Pressurize the water system and check for leaks. Correct as necessary.

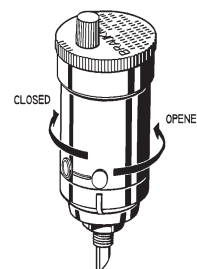


Figure 3

SYSTEM AND PLUMBING SET-UP INSTRUCTIONS

CAUTION

To reduce the risk associated with property damage due to water leakage:

- **Installation must comply** with existing state or local plumbing codes, even if they are contrary to our instructions.
- **Do not** use a torch or other high temperature sources near filter system, cartridges, plastic fittings or plastic plumbing.
- On plastic fittings, never use pipe sealant or pipe dope. Use PTFE thread tape only, pipe dope properties may deteriorate plastic.
- Take care when using pliers or pipe wrenches to tighten plastic fittings, as damage may occur if over tightening occurs.

IMPORTANT NOTES

- Damage due to heat is not covered under the manufacturers warranty and will void the warranty.
- The use of flexible drain lines are prohibited in some states, check with your local code officer for requirements. Distance and height affects the performance of the drain line to discharge at the proper rate to effectively backwash the filter media. The following are guidelines for drain line size installation. Do not bend the drain line too sharply if using flexible tubing. Secure the drain line over the discharge line to prevent splashing or blow out during regeneration. Do not use garden hose or vinyl tubing as a drain line as this may cause a failure to regenerate properly.
- Read Section 4, PLUMBING SYSTEM CLEANUP, for instructions on some procedures that MAY need to be performed first.

Step 1

Inspect and open factory sealed box to ensure all components required for installation are present. If media was ordered, verify the amount and type of filter media (ordered separately) is correct.

Step 2

Remove filter system from shipping carton and inspect to ensure there is no damage to product from shipping. Inspect any packing for components that have been attached for shipping before discarding. If any items intended for installation are missing at this time contact your wholesaler to notify them of this situation. Provide the model number and serial number before contacting our technical support services department @ 1-800-222-7880.

Step 3

Follow the steps to load the filter media into the filter vessel to ensure the successful installation of your Iron Reduction System.

- Remove the latch and clamp assembly from around the control valve and mineral tank.
- Remove the control valve from the mineral tank and set aside for future use.
- Remove the distributor tube from the mineral tank and place the red plastic cap on the distributor tube that is provided in the parts bag.
- Pour out the filter gravel in the mineral tank into a clean pail for future use.
- Place the distributor tube back into the mineral tank, ensuring the slotted basket assembly is installed in the dimple on the bottom of the mineral tank. This is important as the tube was precut to the proper height.
- Locate and place into the mineral tank opening the fill funnel (Part Number U1006) provided with the Iron Reduction System.
- Pour the filter gravel into the mineral tank, holding the distributor tube in place; gently shake the mineral tank to equally distribute the gravel in the mineral tank. Verify that the distributor tube has not moved when the gravel was loaded.
- Locate the filter media that will be used in the filter and load into the mineral tank. Note: fill only to the labeled line on the outside of the mineral tank. Refer to the Specification page for the correct quantity for your filter system. Use a clean rag to wipe the opening of the mineral tank to remove any dust or sediment before moving to the next step.



CAUTION

To reduce the risk associated with skin, eye, and respiratory tract irritation from dust from filter media during installation:

- Gravel and several types of filter media may be used in this product, depending upon the application. During installation, dust may cause irritation to skin, eyes, and respiratory tract, and may affect lungs.
- Utilize a NIOSH-approved dust filter mask and appropriate eye protection when handling and pouring gravel and filter media.
- For further safety information, refer to MSDS document (23-9639-8) available at 203-238-8965 or http://solutions.3m.com/wps/portal/3M/en_US/MSDS (click MSDS search). For emergencies contact CHEMTREC at 1-800-262-8200.

Step 4

Once the filter media has been loaded, fill the mineral vessel with water using a pail or water hose to saturate the media and expel any air out of the filter vessel.

Step 5

Secure the control valve onto the mineral tank; you may use a silicone lubricant on the mineral tank opening, distributor tube, control valve O-ring and pilot tube O-ring to aid in attaching the control valve to the mineral tank. Insert the distributor tube into the pilot tube adapter and slide the control valve down until the valve rest on the flanged opening of the mineral tank. Then with one downward and swift movement push the control valve into the opening of the mineral tank to seat the control valve properly. Rocking the control valve to seat on the mineral tank may roll or pinch the O-ring and will cause a leak. If pinching or rolling of the O-ring occurs remove the control valve and try again. Be sure to orient the latch correctly and secure the control valve to the mineral tank with the clamp assembly as shown in Figure 3.

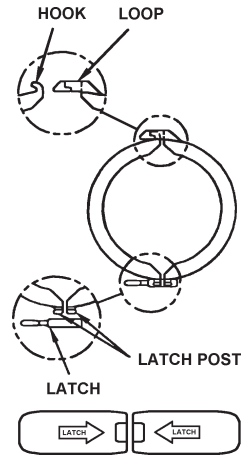


Figure 3

Step 6

Locate the installation assembly packet and assemble as the enclosed instructions dictate, refer to Figure 4. Attach the bypass assembly and connection fitting to the control valve and hand-tighten only. Study the installation drawings provided (Figure 1) to determine the proper location of the filter in relation to the other components of the water system (i.e. Water Softener, Ultra Violet Lamp System or Water Heater, if present) and install appropriately.

Step 7

Shut off all water at main supply. On a PRIVATE WELL SYSTEM, turn off power to pump and drain pressure tank. Make certain pressure is relieved from complete system by opening nearest faucet to drain system. SHUT OFF FUEL SUPPLY TO HOT WATER HEATER.

- 7a) Cut main supply line as required to fit plumbing to the INLET and OUTLET of the AERATION TANK. Hold nipples with a wrench while tightening. Use only thread tape on all plastic pipe threads as most pipe dope compounds can deteriorate plastics. DO NOT apply heat to any plumbing attached to the AERATION TANK as damage may result.
- 7b) Compressor must be wired to be powered whenever the well pump runs. Suggest a qualified electrician be contacted if there is any doubt about this procedure. Voltage requirements are 120V/60 Hz. Connecting improper voltage may result in damage to the compressor.
- 7c) Run air vent line from AERATION TANK to a drain. This is done so any entrained moisture will go to drain when the air release vents.
- 7d) Cut main supply line as required to fit plumbing to filter INLET and OUTLET, you may consider installing a 3-valve bypass.

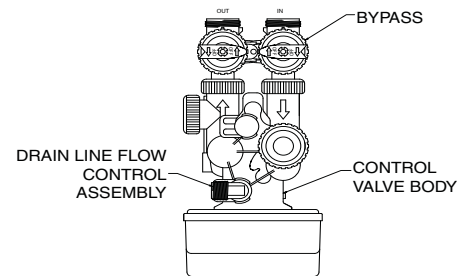


Figure 4

CAUTION

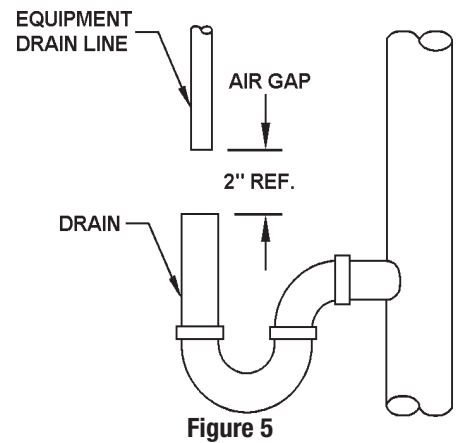
To reduce the risk associated with property damage due to water leakage:

- Do not install system where water lines could be subjected to vacuum conditions without appropriate measures for vacuum prevention;
- **SHUT OFF FUEL OR ELECTRIC POWER SUPPLY TO WATER HEATER** after water is shut off.
- **Do not** use a torch or other high temperature sources near filter system, cartridges, plastic fittings or plastic plumbing.
- On plastic fittings, never use pipe sealant or pipe dope. Use PTFE thread tape only, pipe dope properties may deteriorate plastic.
- Take care when using pliers or pipe wrenches to tighten plastic fittings, as damage may occur if over tightening occurs.
- **Do not** apply heat to any fitting connected to Bypass or Control Valve as damage may result to internal parts or connecting adapters;

Step 8

The drain line connection can utilize either a 3/4" NPT or a 5/8" COMPRESSION connection. To utilize the 5/8" connection use the provided nut and insert sleeve with a 5/8" OD rigid or semi-rigid material. Slide the nut over the tubing or piping first, and then insert the sleeve into the piping or tubing until flush. Finally insert piping or tubing in the drain elbow and thread the nut onto the elbow and hand tighten only. To utilize the 3/4" NPT feature for a drain line connection, remove the 5/8" nut from the elbow and provide your own connection device and piping for a drain line. Ensure the retaining clip is securely in place before moving on. The discharge end of the drain line requires an air gap to prevent a cross connection between grey water (sewage) and potable water (domestic). Refer to Figure 5 to help in the installation.

- a. 5/8" ID lengths up to 15 feet and heights lower or slightly higher than the control valve.
- b. 3/4" ID length up to 25 feet in length and up to 4 feet above the control valve.
- c. For distances higher or longer than previously stated, relocate the filter closer to the desired discharge point or consult factory for advice. Avoid overhead drain lines as it may prevent desirable performance.



Step 9

Connect the transformer to a suitable power supply that is non-switched to plug the transformer into that meets the local electrical code. The required power source is 110 – 120 volt 60 Hz.

Step 10

Set the time clock for the correct time of day and set the frequency for regeneration appropriately. See "HOW TO SET TIME OF DAY" on page 3-5 for setting the time of day correctly.

Step 11

Determine proper backwashing frequency (See Section 5: Backwashing Instructions). To change the number of days between regenerations see "HOW TO CHANGE DAYS BETWEEN REGENERATION" on page 3-9.

Step 12

Check for leaks, correct as required. Locate the regeneration button on the control valve and initiate a manual regeneration (see "HOW TO MANUALLY INITIATE IMMEDIATE REGENERATION", shown on page 3-5), ensure the bypass valve is in the bypass position. Once the control valve stops in the first position, unplug control valve so the valve will not stage to another position to ensure proper start up and media classification. Open the INLET side of bypass 1/4 turn to allow water to run slowly to the waste drain until no air is heard in the drain line. Then slowly open the inlet side of bypass fully and let run until the waste water is clear, it should take about 10 minutes. Then open the OUTLET side of the bypass into the fully open position. During the initial backwash cycle it is normal for a small amount of "fines" to appear at the drain for proper preparation of media bed. It will subside within a few regeneration cycles and should not alarm you.

Step 13

Plug the control valve into the 120v 60Hz power source once again and ensure the time clock is properly set for time and frequency of regeneration. The control valve will stage by itself and back to the service position.

Installation is complete and system is ready for use.

HOW TO SET TIME OF DAY



STEP 1 - Press **SET HOUR** and release.



STEP 2 - Set the clock display to the closest hour by pressing the Δ or ∇ . An arrow will appear in the display pointing to PM during PM hours.



STEP 3 - Press **SET HOUR** to return to the display mode.



Note: After an extended power outage the time of day may need to be reset.

HOW TO MANUALLY INITIATE IMMEDIATE REGENERATION



STEP 1 - Press and hold Δ and ∇ buttons simultaneously until valve motor starts (usually about three (3) seconds).



Note: Once a manual regeneration has been initiated, it cannot be stopped.



STEP 2 - Once the valve display is in **C1**, it is in **Backwash mode**. To advance to **Rapid Rinse** press and hold Δ and ∇ buttons simultaneously until valve motor starts (usually about three (3) seconds).



STEP 3 - Once the valve display is in **C4**, it is in **Rapid Rinse**. To advance to the display mode press and hold Δ and ∇ buttons simultaneously until valve motor starts (usually about three (3) seconds).

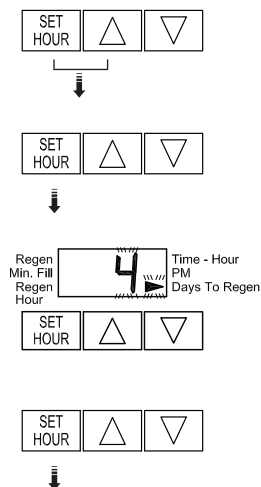
HOW TO MANUALLY INITIATE DELAYED REGENERATION



STEP 1 - Press and release the Δ and ∇ buttons simultaneously.

Note: An arrow will appear in the display pointing to **Regen** indicating regeneration will occur at the programmed time.

HOW TO CHANGE DAYS BETWEEN REGENERATION



STEP 1 - Press and hold **SET HOUR** and Δ buttons simultaneously for three (3) seconds and release.

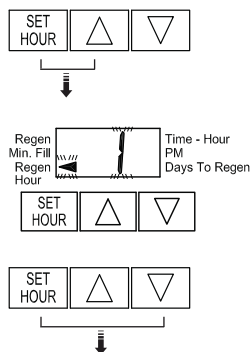
STEP 2 - Press **SET HOUR** button.

STEP 3 - Press Δ or ∇ buttons to change the number of days between regenerations.

STEP 4 - Press **SET HOUR** to return to the display mode.

Note: Your Iron Reduction System is factory preset for 4 days between regenerations.

HOW TO CHANGE TIME OF REGENERATION



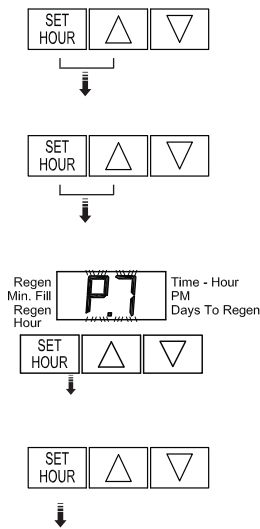
STEP 1 - Press and hold **SET HOUR** and Δ buttons simultaneously until the display begins flashing (usually about three (3) seconds).

STEP 2 - Set the clock display to the desired hour of regeneration by pressing Δ or ∇ button. An arrow will appear in the display pointing to **PM** during PM hours.

STEP 3 - Press and release **SET HOUR** and Δ buttons simultaneously to return to the display mode.

Note: Your Iron Reduction System is factory set to regenerate at 1:00 AM.

HOW TO CHANGE THE REGENERATION PROGRAM SETTINGS



STEP 1 - Press and hold **SET HOUR** and Δ buttons simultaneously until the display begins flashing (usually about three (3) seconds).

STEP 2 - Press and hold **SET HOUR** and Δ buttons simultaneously until the display begins flashing (usually about three (3) seconds).

STEP 3 - Press the button to change the display to **P8** or **P9**.

STEP 4 - Press the **SET HOUR** button five (5) times to return to the display mode. The time of day should be in the display.

Control Valve Function and Cycles of Operation

The AC adapter comes with a 15 foot power cord that is designed for use with the control valve. **The AC adapter is for dry location use only.** If the power goes out, only the time of day needs to be reset. All other settings are permanently stored in the non-volatile memory.

The following chart shows the time for the backwash and rapid rinse cycles for the three available programming options.

Regeneration Cycles and Times for Different Programs

Program Number	Length of Cycle Times (Minutes)	
	BACKWASH (C1)	RAPID RINSE (C4)
P7	6	4
P8	10	6
P9	14	8

Note: Your Iron Reduction System is factory preset to program number P7, changing the setting to P8 or P9 is rarely needed. But if a change is desired, please refer to **“How to Change the Regeneration Program Settings”** on page 3-9.

HOW TO SET TIMER CONTROL

Power Loss

If the power goes out, current time of day will need to be reset. If the power goes out while the system is regenerating, the cycle picks up where it was when the power went out.

Error Message

If “E1” “E2” or “E3” appears on the display, contact Technical Support Services @1-800-222-7880. These are error codes and will need to be resolved before the control valve will function. These codes indicate that the control valve did not function properly.

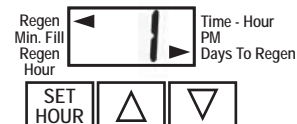
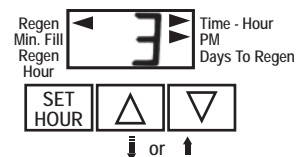


USER DISPLAYS

General Operation

When the system is operating, one of two displays will be shown. Pressing Δ or ∇ button will alternate between the displays. One of the displays is always the current time of day (to the nearest hour). The second display is the days remaining until the next regeneration. If the days remaining is equal to one, a regeneration will occur at the next preset regeneration time. The user can scroll between displays as desired.

If the system has called for a regeneration that will occur at the preset time of regeneration, the arrow will point to Regen.



Regeneration Mode

Typically system is set to regenerate at a time of low water usage. Your Iron Reduction System is factory preset to regenerate at 1:00 AM. If there is a demand for water during the regeneration period, untreated water will be used.

When the system begins to regenerate, the display will change to indicate the cycle of the regeneration process that is occurring and an arrow will also point to **REGEN**. The system will run through the steps automatically and will reset itself to provide treated water when the regeneration is completed.



CAUTION

To reduce the risk associated with property damage due to water leakage:

- Read and follow Use Instructions before installation and use of this system.
- Installation must comply with existing state or local plumbing codes.

IMPORTANT NOTES

- Failure to follow instructions may result in leakage and will void warranty.

Special Service Instructions:

Under normal circumstances removal of valve should never be required. However, if it must be removed, it can be done by disassembling the quick release clamp, by removing latch. Pressure should be relieved before attempting any disassembly. Upon reassembly, all O-rings should be lubricated with silicone grease. Reassemble clamp as shown in Figure 6. MAKE SURE ARROWS ON LATCH SIDE OF CLAMP ARE ALIGNED.

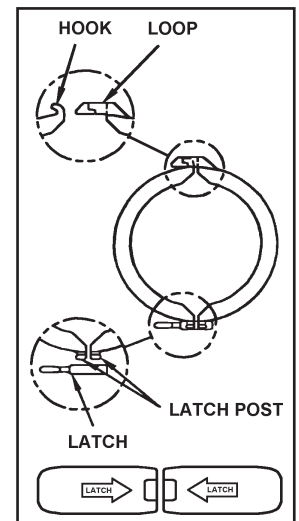


Figure 6

BYPASS VALVE OPERATION

Figure 7

NORMAL OPERATION

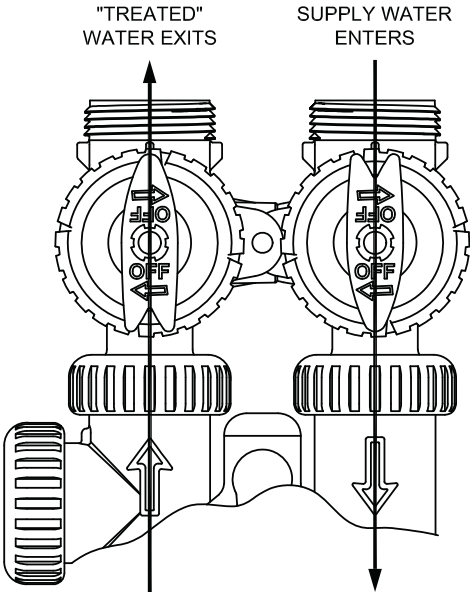


Figure 8

BYPASS OPERATION

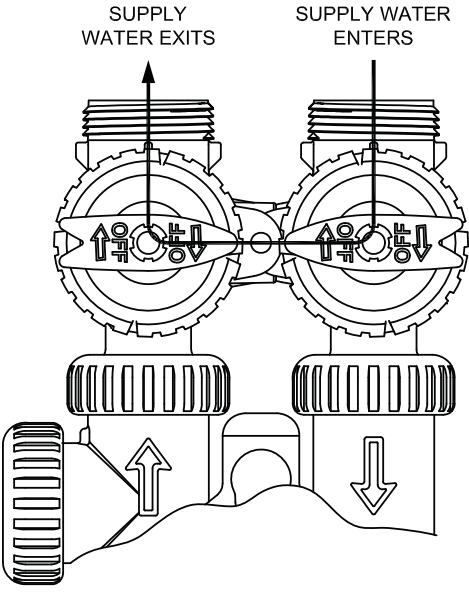


Figure 9

DIAGNOSTIC MODE

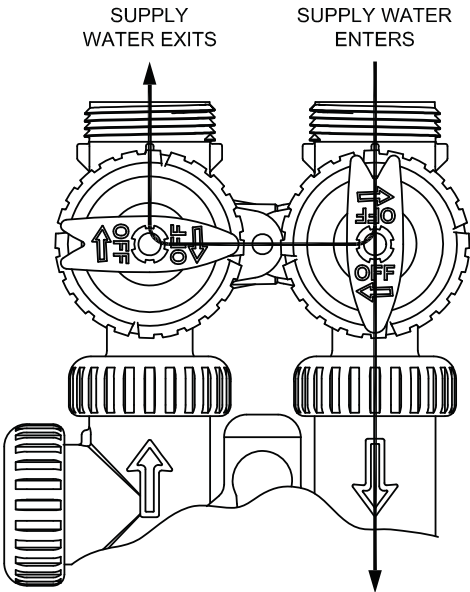
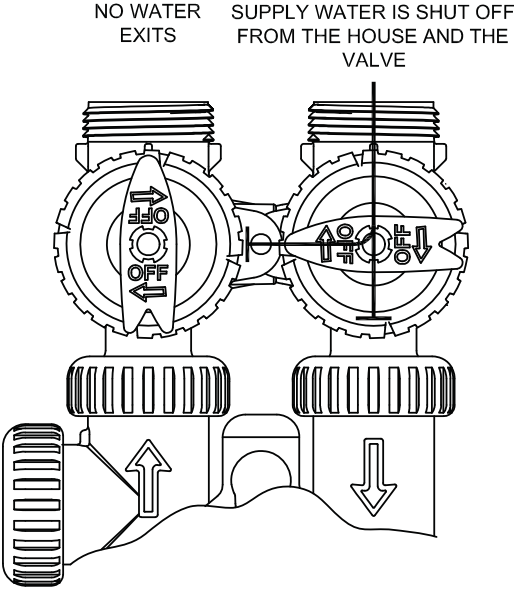


Figure 10

SHUT OFF MODE



SECTION 4: PLUMBING SYSTEM CLEAN-UP

IMPORTANT NOTE

The following procedures are guidelines only. Under no circumstances should any procedure outlined below be followed if contrary to the appliance manufacturer's instructions. Should there be any questions concerning the advisability of performing a procedure, it is strongly recommended the manufacturer's authorized service outlet be consulted prior to performing the procedure. CUNO WILL NOT BE LIABLE FOR ANY LOSS OR DAMAGE THAT RESULTS FROM ABUSE, MISUSE, ALTERATION OR DAMAGE NOT CAUSED BY CUNO OR FOR FAILURE TO PROPERLY FOLLOW APPLIANCE MANUFACTURER'S INSTRUCTIONS.

The plumbing system and water using appliances that have been exposed, even for a short time, to iron-fouled water need to be cleaned of the precipitated iron that has collected in them or iron "bleed" (staining) will continue to be a problem.

Depending on the amount of iron in the water and the length of time the water system was exposed to iron fouled water, select from the following procedures those that apply to the type of system and appliance(s) that need cleaning.

SOFTENER

It is not uncommon that the softener was installed in an effort to reduce ferrous ("clear water") iron from the water supply. Typically, a softener will reduce some ferrous iron until the resin bed becomes fouled to the extent that it will lose both hardness reduction capacity and the limited capacity for iron reduction. This is the condition to expect the softener to be in when planning a system clean-up.

Prior to closing main supply valve or turning power off to a private well system and preparatory to installing the Aqua-Pure APPM Series Iron Reduction System, do the following:

- 1) Disconnect brine draw line from brine cabinet and place the loose end into a five gallon plastic pail filled with a solution of hot water and 10 oz. of IRON-X resin mineral cleaner.
- 2) Manually advance control timer to BRINE DRAW position (refer to instructions provided with your softener), and allow all hot mineral cleaner solution to be drawn into mineral bed. Then IMMEDIATELY:
- 3) Close main water supply valve or turn power off to pump and proceed with filter installation. During time required to install filter system, iron-fouled softener resin will be chemically cleaned.
- 4) After filter installation is completed and final adjustments made with water turned on and brine draw tube reconnected, manually reposition timer on softener to BACKWASH position. Allow timer to perform an automatic, complete backwash and regeneration cycle. During backwashing of softener, all iron cleaned from the resin will be washed down drain. It is advisable after chemically cleaning softener to regenerate system twice to fully restore capacity lost due to iron-fouling.

WATER HEATER

If the water heater has been exposed to both iron and hardness for a long period of time, replacement of the heater tank may be the only practical solution to prevent continued staining originating from this source.

After completing the installation of the Aqua-Pure APPM Series Iron Reduction System, clean the water heater by following these instructions:

- 1) Shut off fuel supply to water heater and close heater inlet water valve.
- 2) Drain hot water tank completely. Open inlet water valve allowing heater tank to be refilled with iron-free water. Continue flushing until water runs clear to drain.
- 3) If after approximately 30 minutes flushing, water does NOT clear, terminate flushing operation. Refill water heater with water and pour approximately 1/2 gallon of household bleach into top of heater tank. Allow bleach solution to stand in tank for 20 to 30 minutes. Flush tank again until water is clear at drain. Turn fuel supply on.

IMPORTANT NOTE

If water does not clear in approximately 10 minutes, water heater probably should be replaced.

DISHWASHER

Consult owner's handbook and follow manufacturer's instructions.

TOILET FLUSH TANKS

Prior to commencing installation of the Aqua-Pure APPM Series Iron Reduction System, pour 4 to 6 ounces of IRON-X resin mineral cleaner or inhibited muriatic acid into flush tanks and bowls and let stand. When installation is completed, flush toilets several times with filtered water. If iron deposits or stains remain, repeat procedure until clear.

SECTION 5: BACKWASHING INSTRUCTIONS

Periodic BACKWASHING of the Aqua-Pure APPM Series Iron Reduction System bed is required to flush out the entrapped iron that has accumulated. This procedure is performed automatically at 1:00 a.m. for a period of approximately 10 minutes, and will not interfere with a softener regeneration which is usually set for 2:00 a.m.

TO SET BACKWASH FREQUENCY FOR NORMAL HOUSEHOLD APPLICATIONS:

To determine and set BACKWASH FREQUENCY, follow these instructions:

- 1) Select BACKWASHING FREQUENCY SCHEDULE corresponding to your model.
- 2) Locate box intersected by number of persons in your family and iron concentration of water (if iron concentration is between two numbers in SCHEDULE, use higher number.)
- 3) Number in box represents number of times, in 12 days, timer should be set to regenerate. Refer to HOW TO SET TIME CONTROL to set timer.

EXAMPLE: You have model APPM100, 4 in family and 8 ppm iron. Refer to SCHEDULE for model APPM100 and locate box intersected by 4 in family and 8 ppm iron. The figure "2" in box indicates a BACKWASH frequency of two times per 12 days (if a "1", "3", "4", "6", or "12" were in box, frequencies of once, three, four, six and twelve times per twelve days, respectively, would be indicated.)

IMPORTANT NOTE

The BACKWASHING FREQUENCY SCHEDULES are based on average water consumption rates and are merely guides. They are NOT intended to be used if water used by outside spigots, a swimming pool, geothermal heat pump, or other high water usage devices or activities are to be treated by your Aqua-Pure APPM Series Iron Reduction System. If your application includes any of these, and you have already determined your model Aqua-Pure APPM Series Iron Reduction System is capable of handling the flow rates involved, refer to the next paragraph for instructions on setting BACKWASH FREQUENCY.

TO SET BACKWASH FREQUENCY FOR NON-STANDARD HOUSEHOLD APPLICATIONS:

If your filter is to be used for reasons covered above, the BACKWASHING FREQUENCY SCHEDULE is not applicable, determine the backwashing frequency as follows:

- 1) Estimate DAILY IRON REDUCTION by multiplying iron concentration by estimated daily water consumption (use 75 gals. per person per day for normal household applications):

$$\begin{array}{ccccccc} \text{Est. Daily Water Usage} & & \times & & \text{Iron Concentration} & & = \text{Daily Iron Reduction} \\ \text{(gals.)} & & & & \text{(ppm)} & & \text{(ppm - gals.)} \end{array}$$

- 2) Calculate BACKWASH FREQUENCY by inserting DAILY IRON REDUCTION from above into following formula (refer to specifications for IRON REDUCTION CAPACITY of your model):

$$\begin{array}{ccccccc} \text{Iron Reduction Capacity of Your Model} & & \div & & \text{Daily Iron Reduction} & & = \text{Backwash Frequency} \\ \text{(ppm-gals)} & & & & \text{(ppm-gals.)} & & \text{(days)} \end{array}$$

The resulting number of days between backwashings should be converted to the nearest MORE FREQUENT obtainable timer setting (i.e., a calculated frequency of 3.7 days should be converted to a 3 day interval, and a 9.2 frequency to a 6 day interval). It is not possible, however, to set the timer less frequently than once every 12 days.

If your water contains a high iron concentration, manganese, tannins or hydrogen sulfide it may be advisable to increase the backwash frequency up to daily, if necessary. It should be noted, however, that increasing the frequency or duration of backwashing WILL NOT overcome an insufficient pumping rate.

BACKWASHING FREQUENCY SCHEDULES

MODEL: APPM100/APPM100M

Persons in Family	IRON CONTENT (PPM)				
	2	4	6	8	10
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	2	2	2
4	1	1	2	2	2
5	1	1	2	2	3
6	1	2	2	3	3

MODEL: APPM150/APPM150M

Persons in Family	IRON CONTENT (PPM)				
	2	4	6	8	10
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	1	1	2
4	1	1	1	2	2
5	1	1	1	2	2
6	1	1	2	2	3

MODEL: APPM200/APPM200M

Persons in Family	IRON CONTENT (PPM)				
	2	4	6	8	10
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	1	1	1
4	1	1	1	1	1
5	1	1	1	2	2
6	1	1	2	2	2
7	1	1	2	2	2
8	1	1	2	2	2
9	1	2	2	3	3
10	1	2	2	3	3

SECTION 6: TROUBLESHOOTING - CONTROL VALVE

Problem	Cause	Solution
1. Timer does not display time of day	a. AC adapter unplugged	a. Connect power
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Defective AC adapter	c. Replace C Adapter
	d. Defective PC board	d. Replace PC board
2. Timer does not display correct time of day	a. Switched outlet	a. Use an unswitched outlet
	b. Time of day not set correctly	b. Reset time of day
3. Control Valve regeneration at wrong time of day	a. Power outages	a. Reset control valve to correct time of day
	b. Time of day not set correctly	b. Reset to correct time of day
	c. Time of regeneration incorrect	c. Reset regeneration time
4. Error followed by a code number Error code E1- Unable to recognize start of regeneration Error code E2- Unexpected stall Error code E3- Motor ran too long. Timed out trying to reach next cycle position If other codes appear contact factory	a. Control valve has just been serviced	a. Press SET HOUR and DOWN for 3 seconds or unplug power source jack (black wire) from the circuit board and plug back in to reset control valve
	b. Foreign matter is lodged in control valve	b. Check piston and spacer stack assembly for foreign matter
	c. High drive forces on piston	c. Replace piston(s) and spacer stack assembly
	d. Control valve piston not in home position	d. Press SET HOUR and DOWN for 3 seconds or unplug power source jack (black wire) from the circuit board and plug back in to reset control valve.
	e. Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure	e. Check motor and wiring. Replace motor if necessary
	f. Drive gear label dirty or damaged, missing or broken gear	f. Replace or clean drive gear
	g. Drive bracket incorrectly aligned to drive bracket	g. Reseat drive bracket properly
	h. PC board incorrectly aligned to drive bracket	h. Replace PC board
	i. PC board incorrectly aligned to drive bracket	i. Ensure PC board is correctly snapped on to drive bracket
5. Control valve stalled in regeneration	a. Motor not operating	a. Replace motor
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Defective AC adapter	c. Replace AC adapter
	d. Defective PC board	d. Replace PC board
	e. Broken drive gear or drive cap assembly	e. Replace drive gear or drive cap assembly
	f. Broken piston retainer	f. Replace piston retainer
	g. Broken main or regenerant piston	g. Replace main or regenerant piston
6. Control valve does not regenerate automatically when UP and DOWN buttons are depressed and held.	a. AC adapter unplugged	a. Connect AC adapter
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Broken drive gear or drive cap assembly	c. Replace drive gear or drive cap assembly
	d. Defective PC board	d. Replace PC board
7. Control valve does not regenerate automatically, but does when UP and DOWN buttons are depressed and held	a. Defective PC board	a. Replace PC board
	b. Set-up error	b. Check control valve set-up procedure

SECTION 6: TROUBLESHOOTING

PROBLEM		CAUSE		SOLUTION	
1)	Water CLEAR when drawn, turns RED upon standing (Stain producing).	A.	Insufficient air injection.	A.	Check for proper compressor operation.
		B.	Bypass open or leaking	B.	Close bypass valve and/or repair as necessary
		C.	Filter bed overloaded with precipitated iron due to insufficient backwash, or failure to backwash due to malfunction of control timer or unplugged control valve power cord.	C.	Upon correction of problem (increase backwash frequency if problem determined to be insufficient frequency), manually backwash until backwash water starts to clear (in more severe iron fouling cases, filter bed may need chemical cleaning- contact dealer)
		D.	Presence of manganese or tannins.	D.	Recheck water analysis.
		E.	Flow rate excessive for model.	E.	Reread section 2, FACTS TO REMEMBER WHILE PLANNING YOUR INSTALLATION.
		F.	pH of treated water too low (should be 7.0 or higher; with manganese, pH must be 8.2)	F.	Replenish MpH component in media (contact dealer)
2)	Water Red when drawn from tap.	A.	Filter bed overloaded with precipitated iron due to insufficient backwash flow rate	A1.	Recheck well pumping rate and repair or replace as required.
				A2.	Check for obstructions or kink in drain line.
				A3.	Check for improper drain line flow controller (see specs.) Upon correction of this problem, if manually backwashing does not clear bed of iron, filter bed may need chemical cleaning- contact dealer.
		B.	Filter Bed overloaded with precipitated iron due to insufficient backwash, or failure to backwash due to malfunction of control timer or unplugged control valve power cord	B.	Upon correction of problem (increase backwash frequency if problem determined to be insufficient frequency), manually backwash until backwash water starts to clear (in more severe iron fouling cases, filter bed may need chemical cleaning — contact dealer)
		C.	Aeration tank installed too far from filter tank causing iron to precipitate before filter tank.	C.	Relocate to a location closer to filter inlet.
3)	Excessive pressure loss through filter.	A.	Filter bed overloaded with precipitated iron.	A.	Refer to Section 2 above.
		B.	Control bypass valve not fully open.	B.	Open as necessary.
		C.	Sand, silt or mud collecting in filter bed.	C.	Check well for these conditions
		D.	Filter bed not properly “classified.”	D.	Manually backwash to reclassify.
		E.	“Cementing” or “channeling” of filter media.	E.	Prod (stir) filter bed to break up hardened layer. Increase backwash frequency to prevent reoccurrence.
4)	“Milky” or “bubbly” water (Appears to contain small bubbles which do not quickly dissipate).	A.	Excess gases in water (carbon dioxide, Hydrogen sulfide, methane).	A.	May require draining of water system or installation of air relief control on the fillport cap of valve adapter base, (Contact Dealer).

SECTION 7: SPECIFICATION & OPERATING DATA

ITEM	APPM100 APPM100M	APPM150 APPM150M	APPM200 APPM200M
Filter Media Volume, (Note 1) Cu ft. (Cu meters)	1 (0.03)	1.5 (0.04)	2 (0.06)
Gravel Underbed, Lbs. (kg)	13 (5.9)	13 (5.9)	18 (8.2)
Nominal Capacity, (ppm-gal)	30,000	45,000	60,000
Operating Flow Rate GPM, (Note 2) Continuous – gpm (lpm) Service – gpm (lpm)	3 (11.4) 6 (22.7)	3 (11.4) 7 (26.5)	4 (15.2) 9 (34.1)
Pressure Loss at Flow Rates Continuous – psi (kPa) Service – psi (kPa)	2 (13.9) 3 (20.68)	2 (13.9) 5 (34.47)	2 (13.9) 6 (41.37)
Backwash Rate, (Note 3), gpm (lpm)	5.3 (20.1)	5.3 (20.1)	7.5 (28.4)
Service Pipe Size, Inches (NPT)	1	1	1
Aeration Tank Diameter x Height, Inch (cm)	10 x 54 (26 x 137)	10 x 54 (26 x 137)	10 x 54 (26 x 137)
Filter Tank Diameter x Height, Inch (cm)	10 x 44 (26 x 112)	10 x 54 (26 x 137)	12 x 54 (31 x 137)
Minimum Space Required, Width Inch (cm) Depth w/Bypass Inch (cm) Height Inch (cm)	30 (76) 16 (41) 53 (135)	30 (726) 16 (41) 63 (160)	32 (81) 16 (41) 63 (160)
Approximate Ship Weight; Lbs. (kg)	143 (64.9)	186 (84.4)	257 (116.6)

Maximum Operating Temperature 110°F (43.3°C)

Electrical requirements 110V/60Hz

Operating Pressure 20-50 psi.

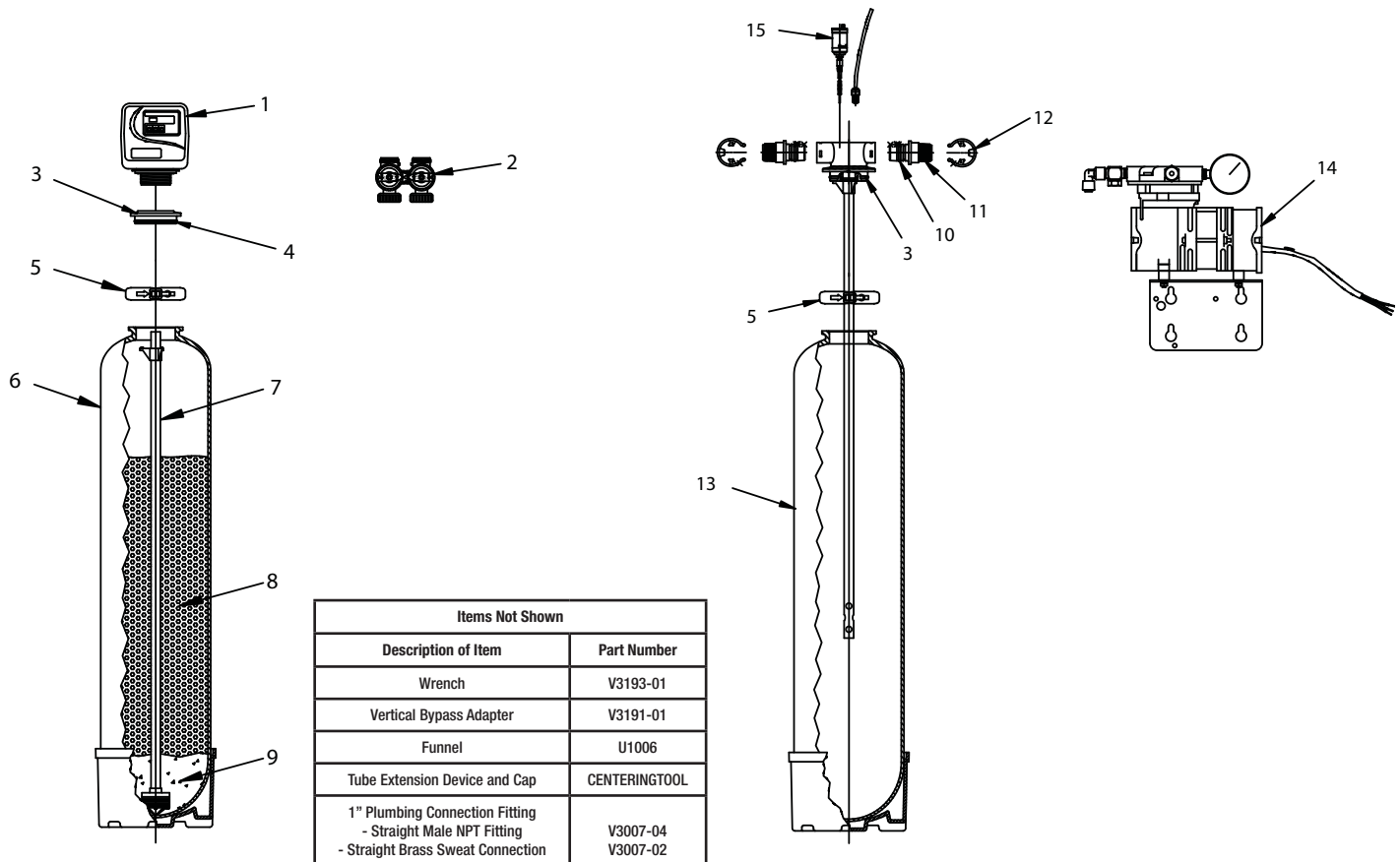
Specifications subject to change without notice.

NOTES:

- 1) Replenishment of pH adjusting component of media may be required periodically, the frequency of which is dependent on raw water pH, manganese concentration and water consumption rate. Consult dealer for more information.
- 2) For satisfactory performance, indicated durations should not be exceeded. Flow rates specified are adequate for normal residential applications. Do not use Service or Peak flow rates when sizing applications if treated water is to supply a geothermal heat pump, swimming pool, etc. (contact dealer before selecting equipment).
- 3) For system to operate properly, pumping rate of well pump MUST be sufficient to backwash unit at rate specified.

COMPONENT PARTS LIST

Ref No.	Description	APPM100 APPM100M	APPM150 APPM150M	APPM200 APPM200M
1	Control Valve Complete w/Cover less Bypass	W217530-003-0U	W217530-003-0U	W217750-003-0U
2	Bypass Valve	V3006	V3006	V3006
3	Threaded Tank Adapter	FA45TX	FA45TX	FA45TX
4	O-ring (Included with Item #3)	ORG-234	ORG-234	ORG-234
5	Clamp Assembly	FC45XX	FC45XX	FC45XX
6	Media Tank w/ Base	MTP1044FB	MTP1054FB	MTP1254FB
7	Distributor Tube	C37S-16-44	C37S-16-54	C37S-16-54
8	Filter Media Standard Models (S) Manganese Models (M)	MC-10P MC-10MP	MC-075P (2) MC-075MP (2)	MC-10P (2) MC-10MP (2)
9	Gravel Underbed	QC-15P	QC-15P	QC-18P
10	O-ring	ORG-214	ORG-214	ORG-214
11	Nipple Kit, 1" (Incl. 2 ea. Ref 10 & 12)	PKNPL100	PKNPL100	PKNPL100
12	Quick Release Clip	QRC20	QRC20	QRC20
13	Aeration Tank w/Base	MTP1054FB	MTP1054FB	MTP1054FB
14	Compressor (GAST SOA) & Bracket Assy.	MAX-COMPRSR	MAX-COMPRSR	MAX-COMPRSR
15	Air Release	ARVTA-1X	ARVTA-1X	ARVTA-1X

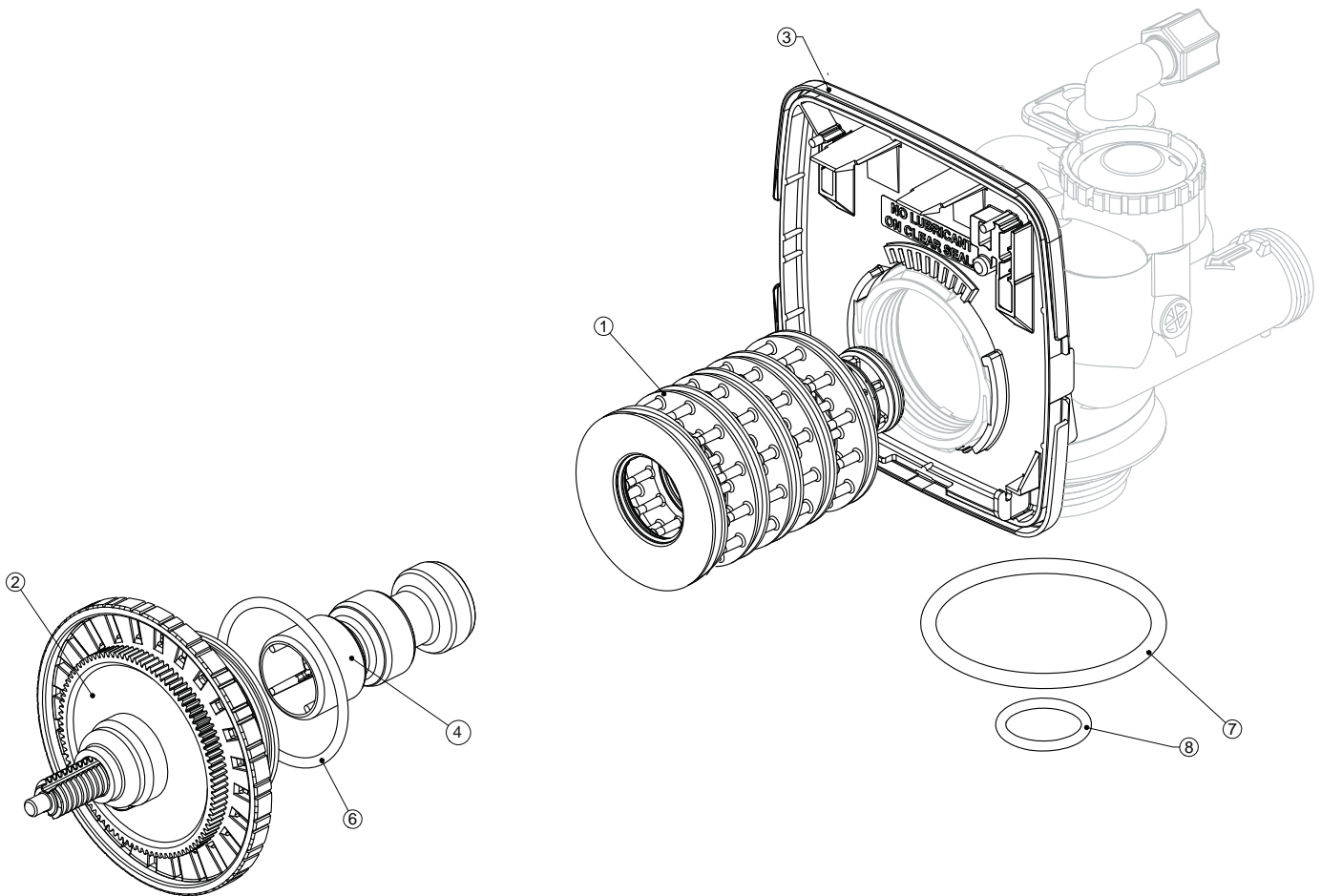


* see assembly drawings for individual components.

SECTION 7: COMPONENT ASSEMBLIES

IRON Reduction System ASSEMBLIES AND COMPONENTS DRIVE CAP ASSEMBLY, DOWNFLOW PISTON, AND SPACE STACK ASSEMBLIES

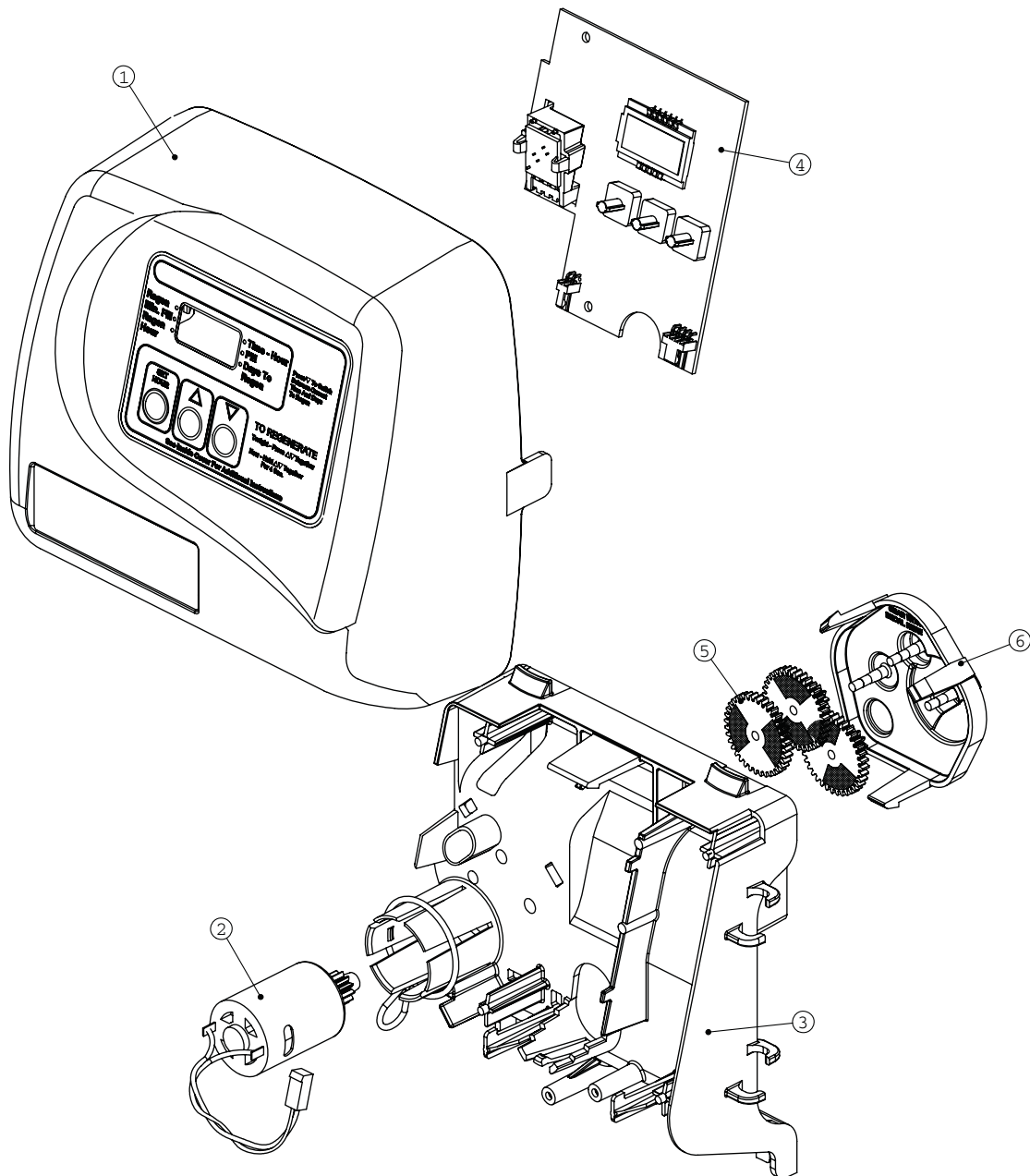
Reference No.	Part No.	Description	Quantity
1	V3005	Spacer Stack Assembly	1
2	V3004	Drive Cap Assembly	1
3	V3178	Drive Back Plate	1
4	V3001	Piston Downflow Assembly	1
6	V3135	O-ring 228	1
7	V3180	O-ring 337	1
8	V3105	O-ring 215 Pilot Tube	1
NOT SHOWN	V3001	Downflow body Assembly	1



SECTION 7: FRONT COVER AND DRIVE ASSEMBLY

Reference No.	Part No.	Description	Quantity
1	V3175TC-01	Time Clock Front Cover Assembly	1
2	V3107-01	Motor	1
3	V3106-01	Drive Bracket & Spring Clip	1
4	V3108TC	Time Clock PC Board	1
5	V3110	Drive Gear 12 x 36	1
6	V3109	Time Clock Cover	1
	V3002TC	Time Clock Drive Assembly	1
NOT SHOWN	V3186	AC Adapter 110V - 12V	1

Drawing number parts 2 through 6 may be purchased as a complete assembly, part V3202.

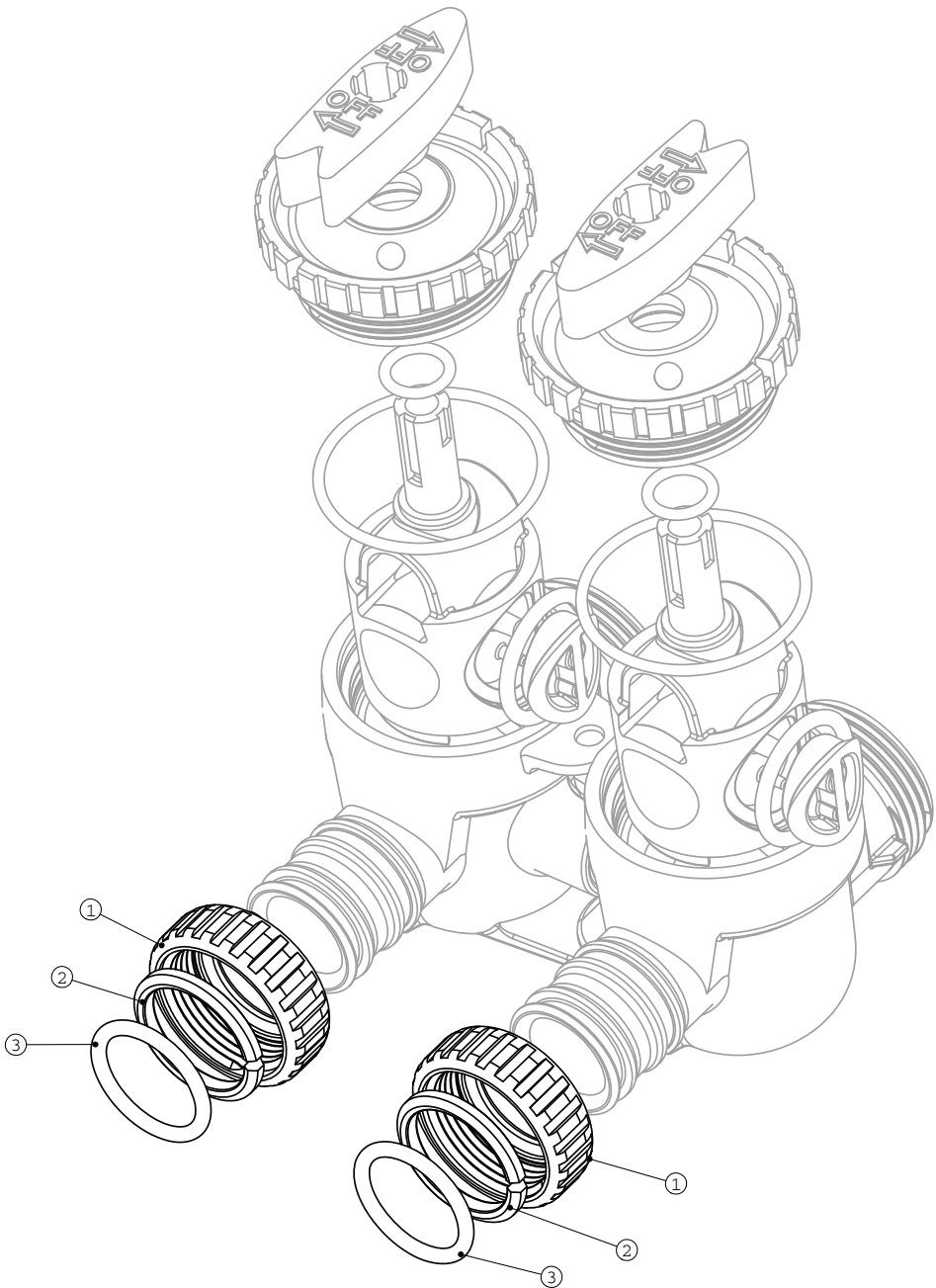


SECTION 7: QUICK CONNECT BYPASS

Part Number V3006

Reference No.	Part No.	Description	Quantity
1	V3151	Nut 1" Quick Connect	2
2	V3150	Split Ring	2
3	V3105	O-ring	2

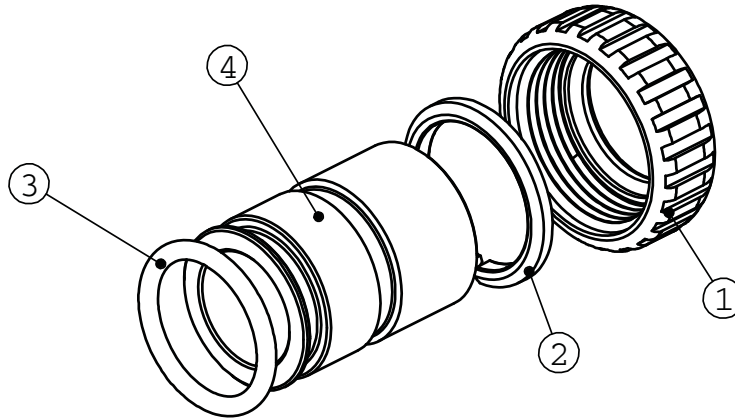
V3151	1" Quick Connect Nut	2
V3150	Split Ring	2
V3105	O-ring 215	2
V3191	Vertical Bypass Adapter	1



SECTION 7: INSTALLATION FITTING AND ASSEMBLIES

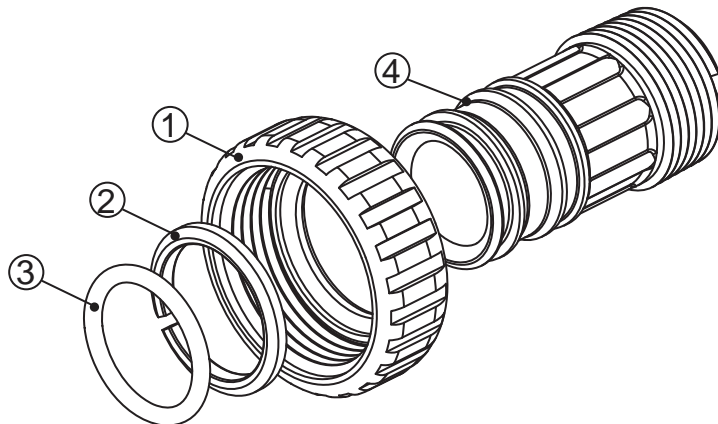
Quick Connect Assemblies Part # V3007-02 1" Copper Brass Sweat Adapter

Reference No.	Part No.	Description: 1" Brass Sweat Assembly	Quantity
1	V3151	1" Quick Connect Nut	2
2	V3150	1" Quick Connect Split Ring	2
3	V3105	1" Quick Connect O-Ring 215	2
4	V3188	1" Quick Connect Brass Sweat Assembly	2

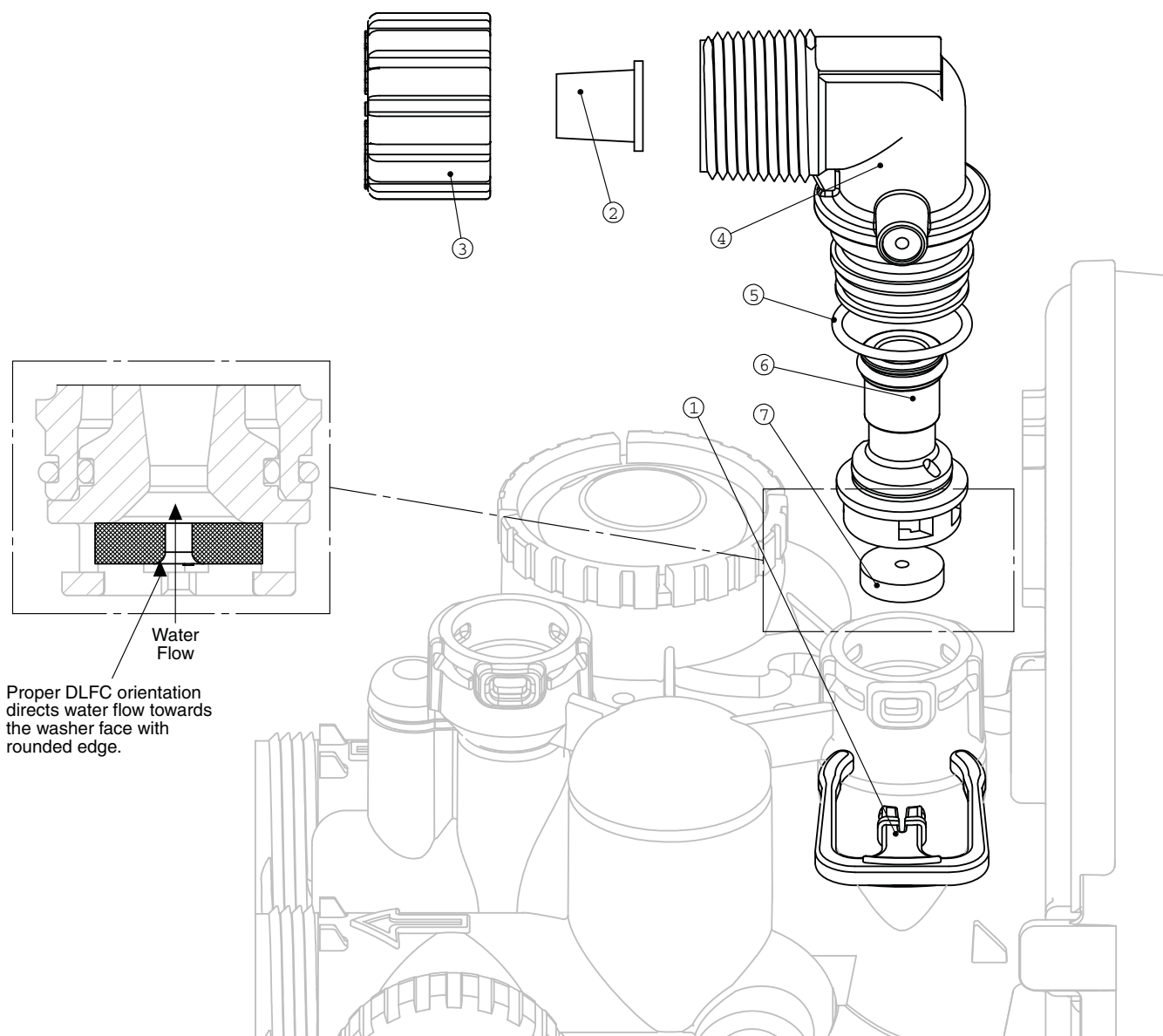


Part # V3007-04 1" Plastic Male NPT Assembly

Reference No.	Part No.	Description	Quantity
1	V3151	1" Quick Connect Nut	2
2	V3150	1" Quick Connect Ring	2
3	V3105	1" Quick Connect O-Ring 215	2
4	V3164	1" NPT Quick Connect Plastic Male Assembly	2



Reference No.	Part No.	Description	Quantity
1	H4615	Elbow Locking Clip	1
2	PKP10T58S-BLK	5/8" Insert Sleeve	1
3	V3192	Quick Connect 3/4" Drain Elbow Nut	1
4	V3158-01	Quick Connect 3/4" Drain Elbow	1
5	V3163	O-ring 019	1
6	V3159-01	Drain Line Flow Control Retainer Assembly	1
7	V3162-042	4.2 gpm Drain Line Flow Control Button	1
7	V3162-053	5.3 gpm Drain Line Flow Control Button	1
7	V3162-075	7.5 gpm Drain Line Flow Control Button	1
7	V-3262-100	10.0 GPM Drain Line Flow Control Button	1



SECTION 8: MAINTENANCE

Depending on your water quality, it may be necessary to perform maintenance on your filter system in order to ensure continued performance. This is to both low pH, high manganese and the sacrificial nature of the filter media. The severity of your pH or the amount of water used will determine how often the filter will need to be serviced. To correct this condition, it will be necessary to add MPH adder to the filter bed. The part number is MPH04, and can be purchased as a single unit or in a case of 6, which is MPH0406. Either of these items can be purchased through our wholesale chain in your area. MPH0406 is a 3 ½ pound jar of pH boosting material that replenishes the same material that was dissolved into your water to make Iron and Manganese reduction possible.

CUNO Incorporated recommends that you test your treated water pH once a quarter. When Iron is the only problem, a water pH needs to be 7.2 higher. When Manganese and Iron are present, the treated water pH needs to 8.2 or higher. The levels can be checked on location with the use of an inexpensive pH test kit that can be purchased locally or from CUNO. Our part number is "17N". When the pH falls below the recommended level and Iron or Manganese is bleeding through into the finished water, it is time to add the MPH adder component to the filter. The amount of material to add to a filter is as follows.

Standard bed filters

1- 3 ½ pound jar of MPH adder for each cubic foot of filter material

Manganese bed filters (Identified by an "M" in the model number, i.e. APPM100M)

2- 3 ½ pound jars of MPH adder for each cubic foot of filter material.

Bed Type	FILTER MODELS (NUMBER OF JARS TO ADD)		
	APPM100 (1)	APPM150 (1 ½)	APPM200 (2)
Standard Filter Media			
Manganese Filter Media	APPM100M (2)	APPM150M (3)	APPM200M (4)

Step By Step Procedure To Add MPH Adder To Your Iron Reduction System.

- 1) Turn the inlet and outlet knobs of the bypass valve located on the back side of the control valve. See figure 4 in Section 3 for proper orientation.
- 2) Manual initiate a backwash cycle to relieve water pressure from the inside of the filter.
- 3) Disconnect the drain line and set aside.
- 4) Remove the latch on the clamp assembly and separate the clamp assembly. Set aside in a secure location for reuse.
- 5) Slowly lift the control valve straight up and off the filter vessel. Do not rock the control from side to side as this might damage the controller or distributor tube.
- 6) Using the funnel and centering device supplied with the unit originally, install over the distributor tube and inside the opening of the filter vessel to aid in adding the MPH adder material.
- 7) Using a 1/2" diameter flexible tubing, siphon about 12" of water from the filter vessel to allow for adding the MPH adder.
- 8) Pour the recommended amount of MPH adder into the filter media and add water back to filter to expel any air pockets in the filter vessel.
- 9) Reinstall the control valve back on top of filter vessel. You may want to apply some silicone lubricant to the O-rings, distributor tube and the inside of the filter vessel opening to facilitate for easier installation. Allow the control valve to rest on the filter vessel flange and with one steady downward motion push the control into the vessel opening to seat properly. Manually stage control valve to the service position. Refer to "HOW TO MANUALLY INITIATE IMMEDIATE REGENERATION", page 3-5.
- 10) Reinstall the clamp assembly around both the control valve and filter vessel flange and secure the latch. See Figure 7 for proper orientation in Section 3.
- 11) Connect both the bypass and the drain line to the control valve and hand tighten only the connection nuts.
- 12) Slowly open the inlet side of the bypass and pressurize the filter, check for leaks, correct if necessary.
- 13) Slowly open the outlet side of the bypass and pressurize the dwelling.
- 14) Manually stage the control to backwash and clean the filter media of any fines that would be present until clear. Allow the control to complete regeneration cycle completely and return to service. Refer to "HOW TO MANUALLY INITIATE IMMEDIATE REGENERATION", page 3-5.

WARRANTY

For any warranty questions, please refer to the enclosed warranty card or call 1-800-222-7880 or mail your request to:

CUNO Incorporated
400 Research Parkway
Meriden, CT 06450

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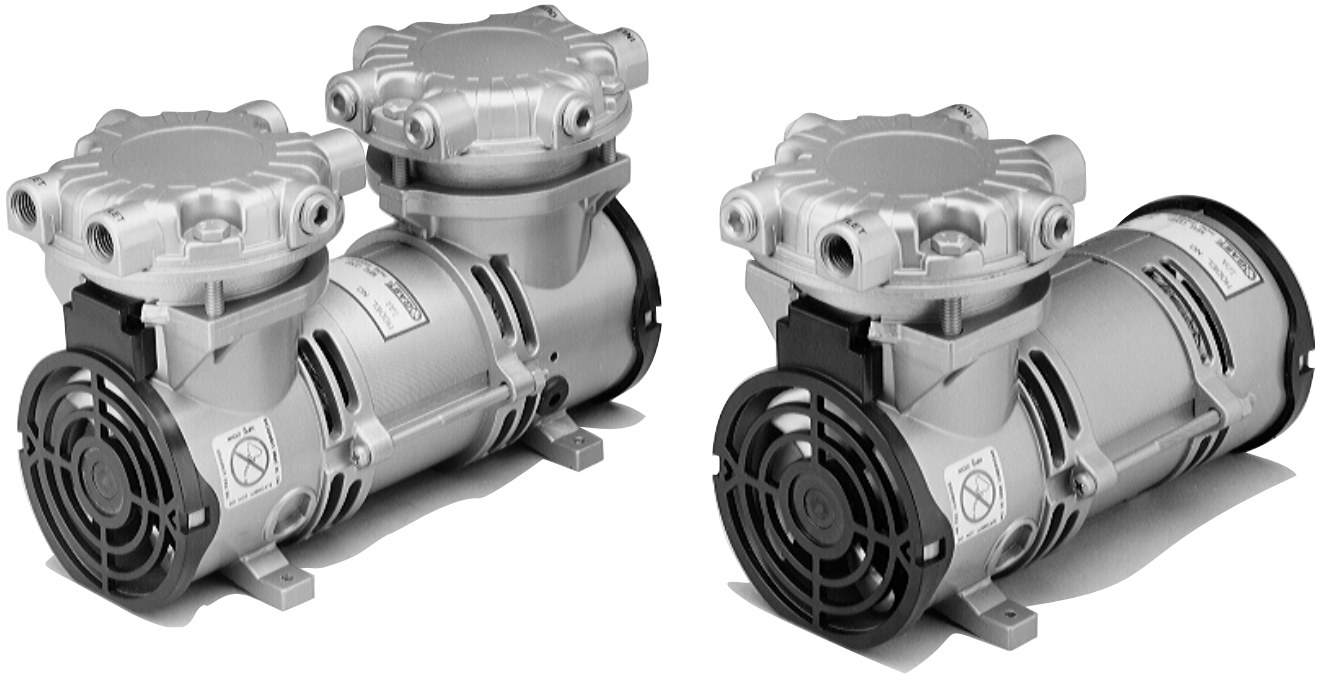
GAST

A UNIT OF IDEX CORPORATION



70-7050 G505PL (Rev. E)


SOA/SAA/LOA/LAA OIL-LESS VACUUM PUMPS & COMPRESSORS OPERATION & MAINTENANCE MANUAL




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**Visit us at our website
www.gastmfg.com**

This is the hazard alert symbol: . When you see this symbol, be aware that personal injury or property damage is possible. The hazard is explained in the text following the symbol. Read the information carefully before proceeding.

The following is an explanation of the three different types of hazards:


 **DANGER** Severe personal injury or death will occur if hazard is ignored.


 **WARNING** Severe personal injury or death can occur if hazard is ignored.


 **CAUTION** Minor injury or property damage can occur if hazard is ignored.

GENERAL INFORMATION

This unit is designed for moving air only and under no circumstances is to be used with any other gases, fluids, particles, solids, or any substance mixed with air.

 **DANGER** Pumping flammable or explosive gases or operating this unit in an atmosphere containing them can result in fire or explosion damage to unit and surrounding environment.

 **CAUTION** Do not allow corrosive gases or particulate material to enter unit. Water vapor, oil-based contaminants, or other liquids must be filtered out. Foreign materials will damage unit by gumming up parts and causing unit to fail.


 **CAUTION** This unit's exhaust air can become very hot. Hot exhaust air can damage temperature-sensitive equipment and will burn skin if exposed to air stream.

Ambient temperature should not exceed 40°C (104°F). For operation at high temperatures, consult the factory.


Performance is reduced by low atmospheric pressure found at high altitudes. Consult a Gast distributor for details.


Never lubricate this oil-less piston unit. Most components are made of aluminum and valves are stainless steel.

INSTALLATION

 **WARNING** To avoid risk of electrocution do not use this product in an area where it could come in contact with water or other liquids.


If exposed to the elements unit must be weather-protected.

 **WARNING** Beware of any exposed and/or movable parts. Proper guards should be in place to prevent personal and/or property damage.


 **CAUTION** Do not block flow of cooling air over unit in any way. This will cause unit to overheat.

Mounting

Unit may be installed in any orientation as long as flow of cool, ambient air over unit is not blocked. To reduce noise and vibration, use shock mounts and affix unit to a stable, rigid operating surface.

 **CAUTION** Remove plastic plugs in ports before starting unit to avoid flying projectile and/or lack of performance.

Wiring

 **WARNING** Incorrect wiring can result in electric shock and cause permanent damage to unit.

Wiring must conform to all required safety codes and be installed by a qualified person. Grounding is required.


All power to motor must be de-energized and disconnected when servicing.

Grounding Instructions

These instructions apply to 120-volt units and where indicated to units wired for 220-240 volts. See motor nameplate on unit for voltage requirements.

For all grounded, cord-connected products:

This product should be grounded. In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current this product is equipped with a cord having a grounding wire with an appropriate grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

 **DANGER** Improper installation of the grounding plug can result in a risk of electric shock. If repair or replacement of the cord or plug is necessary, do not connect the grounding wire to either flat blade terminal. The wire with insulation having an outer surface that is green with or without yellow stripes is the grounding wire.

Check with a qualified electrician or serviceman if the grounding instructions are not completely understood, or if in doubt as to whether the product is properly grounded. Do not modify the plug provided; if it will not fit the outlet, have the proper outlet installed by a qualified electrician.

For a grounded, cord-connected product rated less than 15 amperes and intended for use on a nominal 120 volt supply circuit:

This product is for use on a nominal 120-volt circuit and has a grounding plug that looks like the plug illustrated in Figure 1. Make sure that the product is connected to an outlet having the same configuration as the plug. No adapter should be used with this product

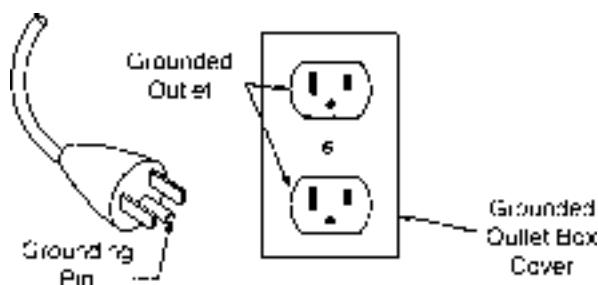


Figure 1

For all other grounded, cord-connected products:

This product is for use on a circuit having a nominal rating more than 120 volts (or 220-240 volts) ...and is factory-equipped with a specific electric cord and plug to permit connection to a proper electric circuit. Make sure that the product is connected to an outlet having the same configuration as the plug. No adapter should be used with this product if the product must be reconnected for use on a different type of electric circuit, the reconnection should be made by qualified service personnel.

For a permanently connected product:

This product should be connected to a grounded, metallic, permanent wiring system, or an equipment-grounding terminal or lead on the product

Extension Cords:

Use only a 3-wire extension cord that has a 3-blade grounding plug, and a 3-slot receptacle that will accept the plug on the product. Make sure your extension cord is in good condition.

When using an extension cord, be sure to use one heavy enough to carry the current your product will draw. For lengths less than 25 feet, No. 18 AWG extension cords should be used. An undersized cord will cause a drop in line voltage resulting in loss of power and overheating.

Exception: A 2-conductor or 3-conductor extension cord may be used for a double-insulated or 2-wire product.

Refer to wiring tag supplied with unit, for diagram and capacitor option. For any DC unit - red lead goes to positive side of power source.

Plumbing

To prevent air flow restriction, use pipe and fittings that are same size or larger than unit's threaded ports.

NOTE: Be sure to connect intake and exhaust plumbing to correct inlet and outlet ports.

Accessories

Filters and mufflers are supplied on some models. Check periodically and replace when necessary. Consult a Gast Representative for filter recommendations. For best results, install relief valves and gauges at inlet or outlet, or both, to monitor performance.

Electric Motor Control

Motor must be protected against short circuit, overload and excessive temperature rise. Fuses, motor-protective switches and thermal-protective switches provide necessary protection in these circumstances. Fuses only serve as a short circuit protection of motor (wiring fault). Fuses in the incoming line should be chosen so as to be able to withstand the starting current of the motor, not as a protection against overload.

Motor starters, incorporating thermal-magnetic overload or circuit breakers protect motor from overload or reduced voltage conditions.

Selection of correct overload setting is required to provide best possible protection. Refer to motor starter manufacturer's recommendations.

OPERATION

⚠ WARNING Solid or liquid material exiting unit can cause eye or skin damage. Keep away from air stream.

⚠ WARNING Disconnect power before servicing to avoid electric shock or accidental start-up. The motor may be thermally protected and will restart automatically when it cools if the thermal protection switch is tripped.

⚠ WARNING Do not operate without grille(s), if provided, in place. Failure to do so could result in severe personal injury.

⚠ WARNING Head surface(s) can be very hot depending on unit duty and speed. Do not touch these parts during operation.

⚠ CAUTION Do not operate units above recommended pressures or vacuum duties. This will overheat unit.

Starting

If unit is extremely cold let it warm up to room temperature before starting. If unit does not operate properly, see troubleshooting guide on page 7. Do not start against a vacuum or pressure load.

NOTE: Some of these models may exceed 70 dB(A).

When in close proximity to these models hearing protection is required. Refer to Technical Data Sheet for specific model.

MAINTENANCE

Filter Inspection and Replacement

Intake filter and mufflers require periodic inspection and replacement. Initial inspection is suggested at 500 hours, then user should determine frequency thereafter. Most problems can be prevented by keeping filters and mufflers clean. Dirty filters and mufflers decrease unit performance and can decrease unit life.

⚠ WARNING Do not touch unit cylinders and heads as they become very hot during operation and will burn skin on contact. Wait until unit has been turned off and allowed to cool before touching it.

⚠ WARNING Disconnect power before servicing to avoid electric shock.

Some filter element(s) are held together by a snap fit.

Refer to exploded view during the following procedure.

1. Turn off unit.
2. Isolate from power source.
3. Release all pressure and vacuum from unit.
4. Remove filter cover.
5. Inspect filter felt.
6. Replace felt if it is completely covered with contamination or has indicated an increase in differential pressure.
7. Assemble felt and filter cover.
8. Check for any damage to external accessories such as relief valves and gauges, before putting unit back into service.

SHUTDOWN PROCEDURES

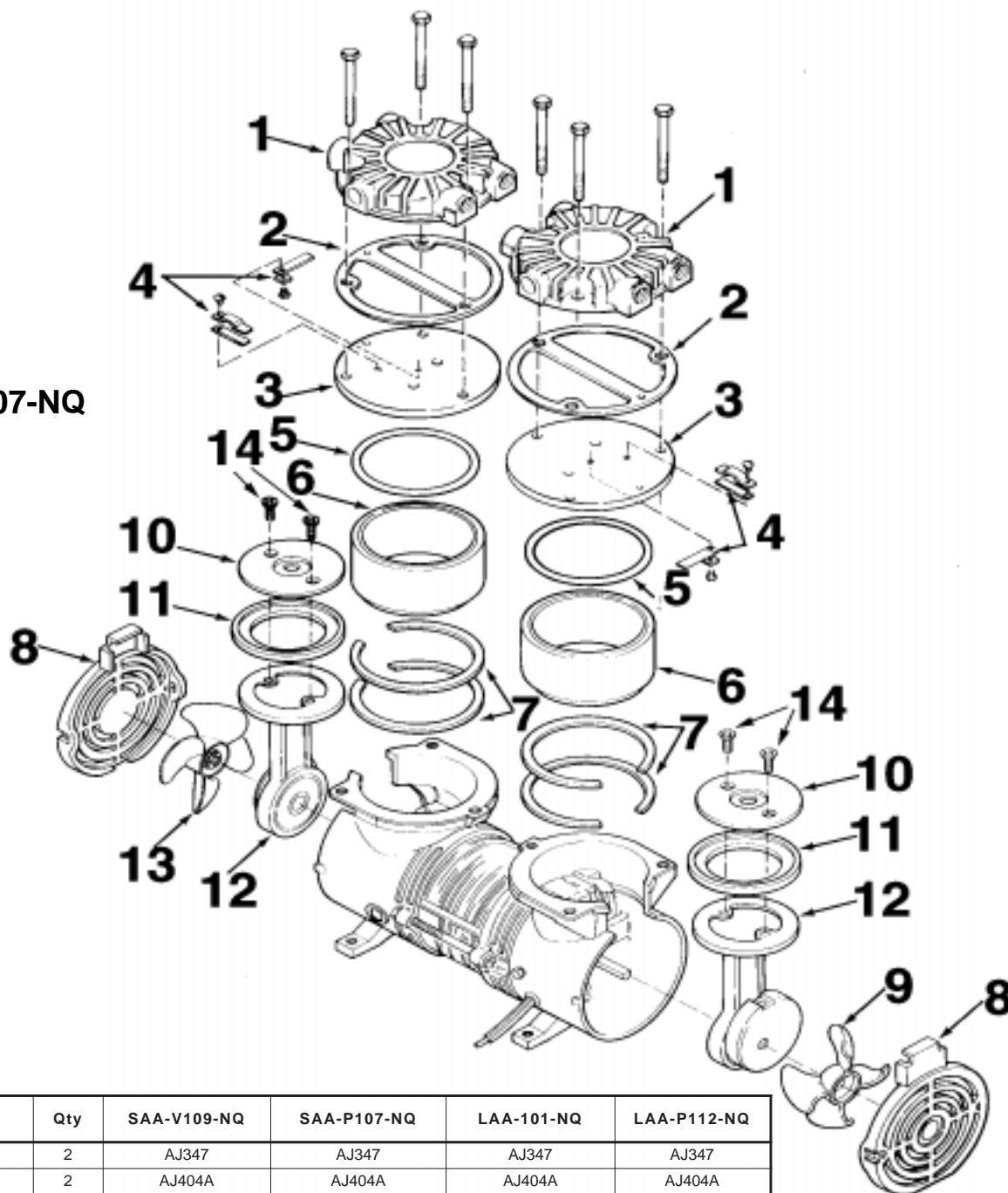
Proper shutdown procedures must be followed to prevent unit damage. Failure to do so may result in premature unit failure. Gast Manufacturing oil-less units are constructed of ferrous metals or aluminum which are subject to rust and corrosion when pumping condensable vapors such as water.

Follow steps below to assure correct storage and shutdown between use:

1. NEVER oil this oil-less unit.
2. After using this unit, disconnect plumbing and allow unit to run "open" for at least 5 minutes before shutdown.
3. Plug open ports to prevent dirt or other contaminants from entering unit.

It is now ready for shutdown or storage.

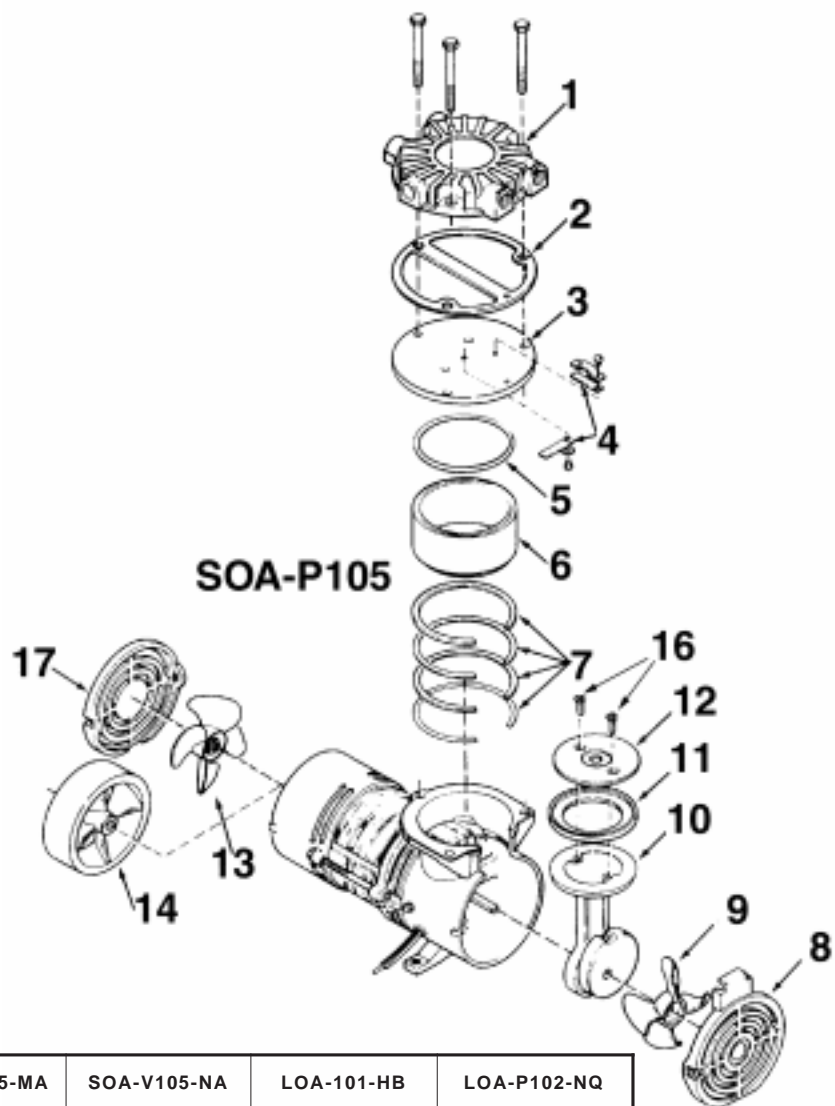
SAA-P107-NQ



Ref No	Description	Qty	SAA-V109-NQ	SAA-P107-NQ	LAA-101-NQ	LAA-P112-NQ
1	Head	2	AJ347	AJ347	AJ347	AJ347
*2	Head Gasket	2	AJ404A	AJ404A	AJ404A	AJ404A
*3	Valve Plate Assembly (valves included)	2	AJ343A	(1)AJ343 (1) AJ343A	(1)AJ793 (1) AK394	(1)AJ793 (1) AK394
4	Valves*	4	AF817	AF817	(2) AG973 (2) AJ827	(2) AG973 (2) AJ827
*5	O-ring	2	AH179	AH179	AH179	AH179
6	Cylinder	2	AJ342	AJ342	AJ375B	AJ375B
7	Shims	as req.	AJ345	AJ345	AJ345	AJ345
8	Grille	2	AG774B	AG774B	AG774B	AG774B
9	Fan	1	AJ856	AJ856	AJ856	AJ856
10	Retainer Plate	2	AH177B	AH177B	AK377	AK377
*11	Cup	2	AH175	AH175	AJ826	AJ826
12	Connecting Rod	2	AJ338A	AJ308F	AK380D	AK380D
13	Fan	1	AF785B	AF785B	AF785B	AF785B
*14	Retainer Plate Screws	4	BB557	BB557	BB557	BB557
	Service Kit	2	(2) K757	(1) K756 (1) K757	(1) K767 (1) K773	(1) K767 (1) K773

*Denotes parts included in Service Kit. Parts listed are for stock models. For specific OEM models consult the factory.
When corresponding or ordering parts, please give complete model and serial numbers.

SOA/LOA EXPLODED VIEW & PARTS ORDERING INFORMATION



Ref No	Description	Qty	SOA-P105-MA	SOA-V105-NA	LOA-101-HB	LOA-P102-NQ
1	Head	1	AJ347	AJ347	AJ347	AJ347
*2	Head Gasket	1	AJ404A	AJ404A	AJ404A	AJ404A
*3	Valve Plate Assembly (valves included)	1	AJ343H	AJ343A	AJ793	AJ793
4	Valves	2	AH693	AF817	(1) AG973 (1) AJ827	(1) AG973 (1) AJ827
*5	O-ring	1	AH179	AH179	AJ787	AJ787
6	Cylinder	1	AJ342	AJ342	AJ375B	AJ375B
7	Shims	as req.	AJ345	AJ345	AJ345	AJ345
8	Front Grille	1	AG774B	AG774B	AG774B	AG774B
9	Fan	1	AJ856	AJ856	AJ856	AJ856
10	Connecting Rod Assembly	1	AJ308D	AJ338A	AK380B	AK380
*11	Cup	1	AH175	AH175	AJ826	AJ826
12	Retainer Plate	1	AH177B	AH177B	AK377	AK377
13	Fan	1	AF785B	AF785B	AF785B	
14	Inertia Fan	1				AJ677
15	Tolerance Ring	1				AJ904
*16	Retainer Plate Screws	2	BB557	BB557	BB557	BB557
17	Grille	1	AG744	AG744	AG744	
	Dowel Pin (Not Illustrated)	1				AK487
	Service Kit	1	K760	K757	K767	K767

*Denotes parts included in Service Kit. Parts listed are for stock models. For specific OEM models consult the factory.
When corresponding or ordering parts, please give complete model and serial numbers.

SERVICE KIT INSTALLATION

NOTE: Gast will not guarantee performance of a field-rebuilt unit. Return unit to a Gast Authorized Service facility, or perform rebuild procedures described below.

Kits contain most or all of the following: Head Gasket, Valve Plate Assembly, Retainer Plate Screws, O-ring, and Cup.

Kits are used for several models and may contain extra parts not applicable for your specific model. Refer to exploded view.

Disassembly:

1. Disconnect unit from power source.

⚠ WARNING Disconnect power before servicing to avoid electric shock.

2. Vent all air lines to unit to remove pressure.

⚠ WARNING Vent all air lines to unit to remove pressure before servicing it. Failure to do so can result in severe personal injury.

3. Remove head bolts.

4. Remove gasket, head, and valve plate assembly
(*Note orientation of head assembly for re-assembly*).

5. Carefully remove cylinder and shims (*Be sure to replace all shims, as they are matched to cylinder and rod assembly height dimensions*). Remove two retainer plate screws on retainer plate (*may require heat to break adhesive on retainer screws*) and discard old cup.
6. Clean residue from cylinder walls with soft cloth using non-petroleum, non-oil-based solvent. **DO NOT** use kerosene, gasoline, or any flammable substance.

Re-assembly:

7. Replace cylinder and shims.
8. Place retainer plate in new cup and push both down into cylinder.
9. Install new retainer plate screws and torque to 35 in-lbs.
10. Install O-ring into groove of cylinder
11. Install valve plate, head gasket (*note gasket orientation*), and head, on cylinder so ports are in original orientation.
12. Install and snug all head bolts and torque to 80 in-lbs.

NOTE: Before putting unit into service, ensure that any external accessories such as relief valves and gauges attached to head have not been damaged.

TROUBLESHOOTING GUIDE

Possible Reason	Pressure		Low Vacuum	Excessive Noise	Overheating	Won't Start
	Low	High				
Dirty Filter	X				X	
Dirty Muffler			X		X	X
Dirty Valves	X		X			
Damaged Valves	X		X	X		X
Damaged/Worn Cup	X		X			
Improper Cylinder Shimming	X	X	X	X	X	X
Leaky Hose	X		X			
Leaky Check Valve						X
Plugged Vacuum or Pressure Line	X	X	X		X	X
Low Voltage	X		X		X	X
Leaky Relief Valve	X		X			

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