Installation & Parts Manual

F-7, FA-7, F-15, F-30 & Steel Series Strainers

LIQUID CONTROLS
A Unit of IDEX Corporation
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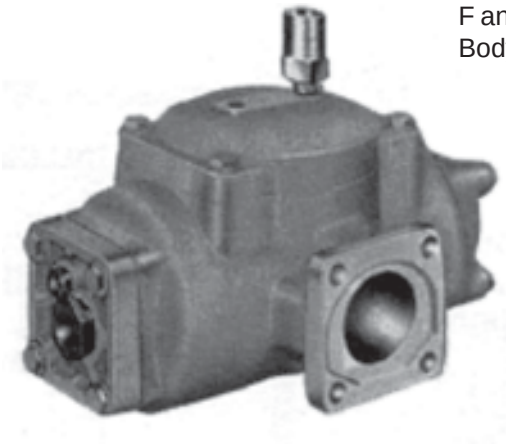
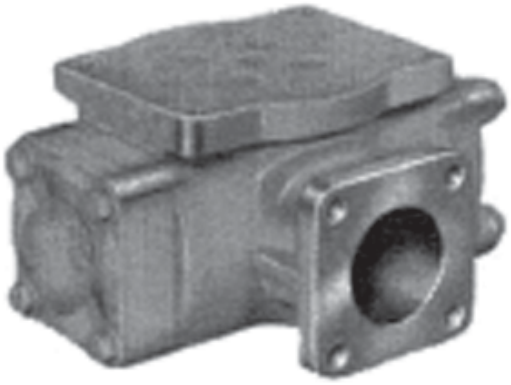
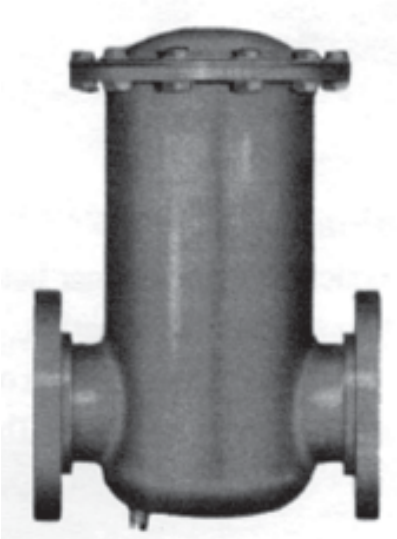


F and FA Series Aluminum Body Strainers



F Series Cast Iron, Stainless Steel and Brass Body Strainers



FS, FSA and FSAA Steel Body Strainers

Installation: M200-10

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Publication Updates and Translations

The most current English versions of all Liquid Controls publications are available on our website, **www.lcmeter.com**. It is the responsibility of the Local Distributor to provide the most current version of LC Manuals, Instructions, and Specification Sheets in the required language of the country, or the language of the end user to which the products are shipping . If there are questions about the language of any LC Manuals, Instructions, or Specification Sheets, please contact your Local Distributor.

! NOTE

- Before using this product, read and understand the instructions.
- Save these instructions for future reference.
- All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of equipment and/or systems in accordance with all applicable codes and ordinances.

Introduction

What LC Strainers Do

Strainers help to protect meters from serious damage caused by burrs dislodged from new piping, pipe scale or foreign material.

The strainer's initial cost is good insurance against the cost of down time and replacement parts incurred from a damaged meter.

A meter strainer installed on the inlet side is necessary even when a coarse strainer on the upstream side of the pump is included in the system.

Strainers are not meant to be used as a system filter but as limited protection for the meter element itself.

How LC Strainers Work

As a liquid product enters the strainer housing from the supply line, it is routed through the strainer basket. The strainer basket is a two-ply screen. The inner screen is made of fine mesh of either 20, 40, 80, 100, or 200 squares per inch. The outer screen works as a backing. It gives reinforcement and support to the fine mesh inner screen.

Liquid passes through the strainer and into the inlet of the meter. Any debris that is larger than the mesh in the basket is trapped in the basket. **THE STRAINER IS NOT A FILTER,** and the size of the mesh in the basket selected will determine the particle size that can pass through the strainer. Basket mesh selection is generally based on maximum fluid viscosity at minimum ambient operating temperature.

Features
LC markets a wide variety of strainers to fit most meters in terms of capacity, pipe size, working pressure and metallurgical compatibility. The design advantages of a Liquid Controls strainer include:

- Strainer baskets with an unusually high open basket area to pipe area ratio, resulting in minimum restriction of flow and low pressure loss.
- Choice of 20, 40, 80, 100 or 200 mesh cadmium plated steel or stainless steel strainer baskets.
- Installation in a variety of positions, that simplify piping. Note: When an air eliminator is used with the strainer, it must be installed vertically on the strainer.
- Optional 45 accessory elbows for indexing strainer inlet positions other than right angle flow. (Avilable for 2" F-7 Aluminum strainers only.)

DISCLAIMER

Liquid Controls disclaims all liability for damage to meter or accessories because of corrosion, salting out of product, or separation of chemicals whether occurring during periods of use or storage.

! NOTE

This manual provides warnings and procedures that are intended to inform the owner and/or operator of the hazards present when using the Liquid Controls Meter on LP-Gas and other products. The reading of these warnings and the avoidance of such hazards is strictly in the hands of the owner-operators of the equipment. Neglect of that responsibility is not within the control of the manufacturer of the meter.

Caution
Remember to relieve internal pressure before disassembly or inspection of the strainers, air eliminators, any valves in the system, the packing gland, and the front or rear covers. See "Meter Maintenance" for the steps to safely relieve the internal pressure in your system.

Be Prepared
Make sure that all necessary safety precautions have been taken. Provide for proper ventilation, temperature control, fire prevention, evacuation and fire management.

Provide easy access to the appropriate fire extinguishers for your product. Consult with your local fire department and state and local codes to make sure that you are adequately prepared.

Read this manual as well as all the literature in your owner's packet. If you have any questions, consult with your full-service distributor or call the Service Department at Liquid Controls.

In the Event of a Gas Leak
In the event of a large gas leak:
Evacuate the area and notify the fire department.

In the event of a small, contained gas leak:
1. Stop the leak.
2. Prevent accidental ignition.
3. Prevent the entrance of gas into the other portions of the buildings. Some gases, such as LPG, seek lower levels, while other gases seek higher levels.
4. Evacuate all people from the danger zone.
5. See that the gas is dispensed befored resuming business and operating motors. If in doubt, notify your local fire department.

In the Event of a Gas Fire
In the event of large fires or fires that are spreading:
Evacuate the building and notify your local fire department. Stop the leakage only if you can safely reach the equipment.

In the event of small, contained fires that you can safely control:
Stop the leakage if you can safely reach the equipment. Then use the appropriate extinguisher: Class B fire extinguisher, water, fog, etc., depending on the materials. If in doubt, call your local fire department.

1. **Flush All New Systems**
   Flushing the system before the meter has been installed is the preferred first step. Thoroughly flush the lines until the system is purged of all foreign materials. (See "Strainer Maintenance" for disassembly and reassembly instructions.)

2. **Plan a location for the strainer in the system providing for the following requirements:**
   Make sure there is no pipe strain imposed upon the strainer or any other component part of the meter assembly. This means that the meter and its accessories must not support the weight of the piping.

   Plan for enough space to allow clearance so that the strainer basket cover and strainer basket can be easily removed.

3. **Install the strainer** on the inlet side of the meter (1). Bolt the strainer outlet to the inlet flanged connection of the meter (2). Then bolt the inlet piping to the inlet flanged connection of the strainer (3).

4. **New or repaired piping** can be the source of welding slag or other foreign material that will block or rupture the strainer screen. **The strainer should be checked daily during the first 100 hours of operation** or until no more debris is found in the strainer.

5. **Frequent strainer basket inspection** and cleaning is required to insure proper operation.

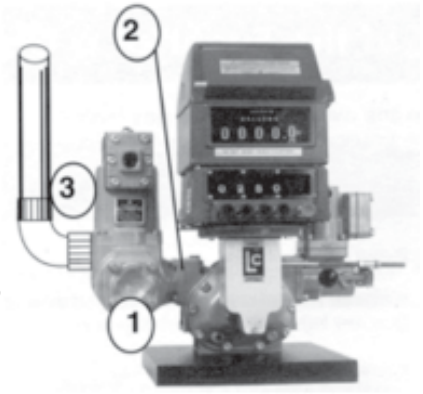
6. **Follow the steps** outlined in the "Strainer Maintenance" section of this manual.

! WARNING

Before disassembly and inspection of any meter or accessory all internal pressure must be relieved. Pressure must be at zero PSI. Refer to your Meter Installation, Operation and Maintenance Manual for instructions. Personal Injury or death may result from working on a system under pressure.

Maintenance

It is very important to follow the strainer preventive maintenance procedures to protect the strainer as well as the metering system. Foreign matter that builds up inside the strainer, including ice, can cause damage to the strainer and the metering system. When foreign matter builds up inside the strainer, it can cause pressure to build up inside the strainer. This pressure can cause the strainer screen to rupture. Foreign matter can then enter the metering chamber. This can cause serious damage to the meter resulting in failure of the meter.



Meter inlet side

The following strainer preventive maintenance precedures will keep your strainer functioning properly, keep strainer repair costs to a minimum, and insure the protection of your metering system.

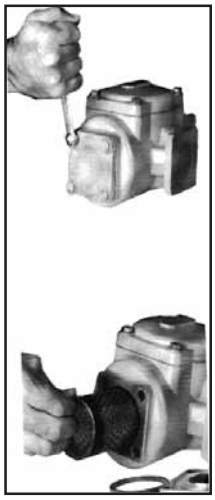
Newly installed or repaired systems:

- Check the strainer daily during the first 100 hours of operation or until no more debris is found in the strainer.
- New or repaired piping can be the source of welding slag or other foreign particles that can block or rupture the strainer screen.
- Once a system is cleaned out, the strainer should be checked several times every season. The frequency depends on the specific service conditions, through put and product cleanliness.

Disassembling the Strainer

1. Carefully clean strainer basket cover plate to remove all foreign matter, and remove the four bolts and washers from the end cover plate.

2. Remove the end cover plate and o-ring from the strainer housing.



3. Remove the strainer basket. This may dislodge dirt and particles into the strainer housing. Check inside the strainer housing for any foreign material. Be sure to wipe the housing clean, using a soft cloth.

4. Clean the strainer basket by flushing the basket with a liquid cleaning agent suited for your application. A soft brush may be used to dislodge imbedded particles. If the imbedded particles cannot be removed, replace the basket. **Never** tap the basket ends on a hard surface to dislodge particles. This may dent the basket and make reassembly difficult or cause improper sealing.

5. Clean the inner face of cover plate, mating face of the strainer body, and seal ring with a clean, soft, cloth.

6. Make sure the o-rings are cleaned of all dirt and grime. Check the o-rings for damage. If the o-rings cannot be cleaned or are damaged or frayed, replace them. **Never** reuse Teflon o-rings. Always replace them even if they appear to be in good condition.

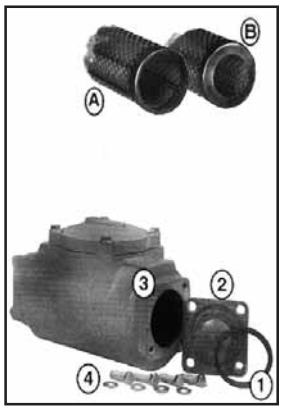
Reassembling the F Series Strainers

1. Replace the strainer basket (A) or (B) into the housing.

2. Place the end cover o-ring (1) in the groove in the end cover (2).

3. Place the end cover (2) with the o-ring installed, on the strainer housing end (3).

4. Fasten the end cover with the 4 washers and screws (4). Evenly tighten all screws*.



Reassembling the FS/FSAA/FSA Strainers

1. Strainer baskets have an extended collar, or lip on the bottom end of the basket (C). Insert this end into the strainer housing first.

2. Place the o-ring (1) in the groove on top of the strainer housing (2).

3. Place the center hole of the basket cover plate (3) over the basket rod (4) that extends from the center of the housing. The plate should now rest on top of the basket.

4. Install the washer (5) and the wing-nut (6) on the basket rod (4).

5. Place the cotter pin (7) through the hole at the top of the basket rod (4).

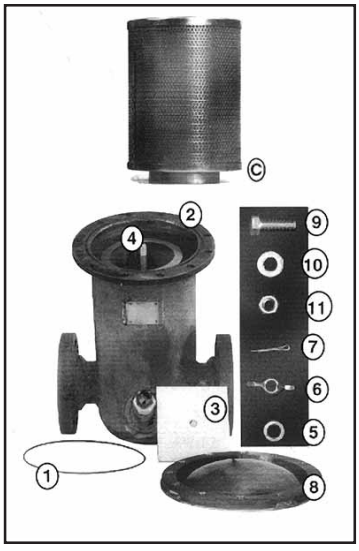
6. Place the cover (8) on top of the strainer housing.

7. Insert the 12 or 16 screws (9) into the cover holes (8). Attach the flat washer (10) and nuts (11) to the screws (9) from below. Evenly tighten all nuts and screws.*

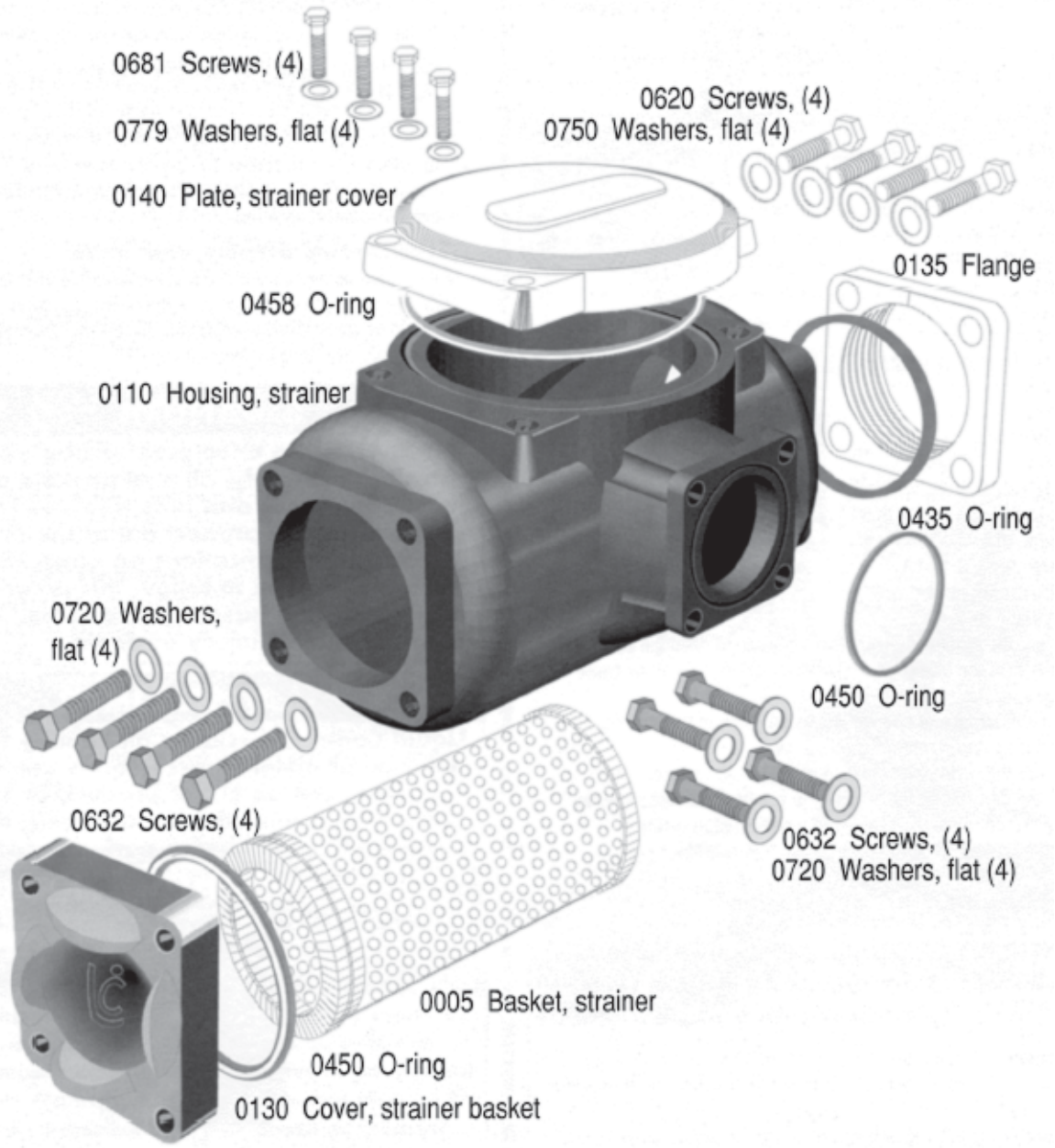
***Tightening Screws and Nuts**: Leakage that occurs after tightening the fasteners indicates a damaged seal, or distortion to the surface of the cover. In either case, the seals or cover must be replaced. Excessive tightening will not stop the leakage.

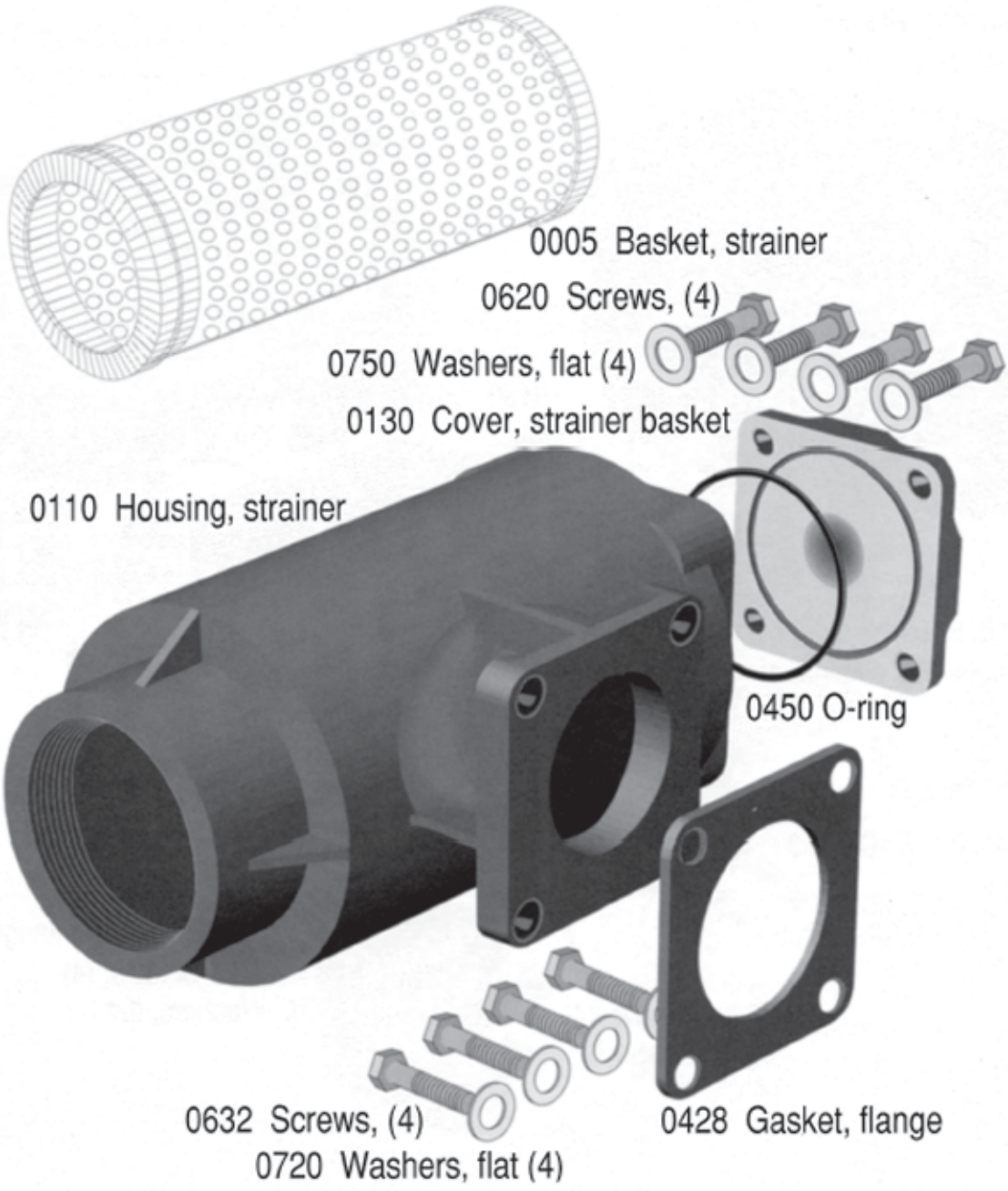
! WARNING

Before re-filling or re-pressurizing your meter / strainer assembly, all seal gaskets and bolts must be in place and fully tightened to prevent leakage of product out of the system (see torque specifications on page 15 of this manual). Failure to follow this procedure may result in a hazardous condition and possible serious injury or death.

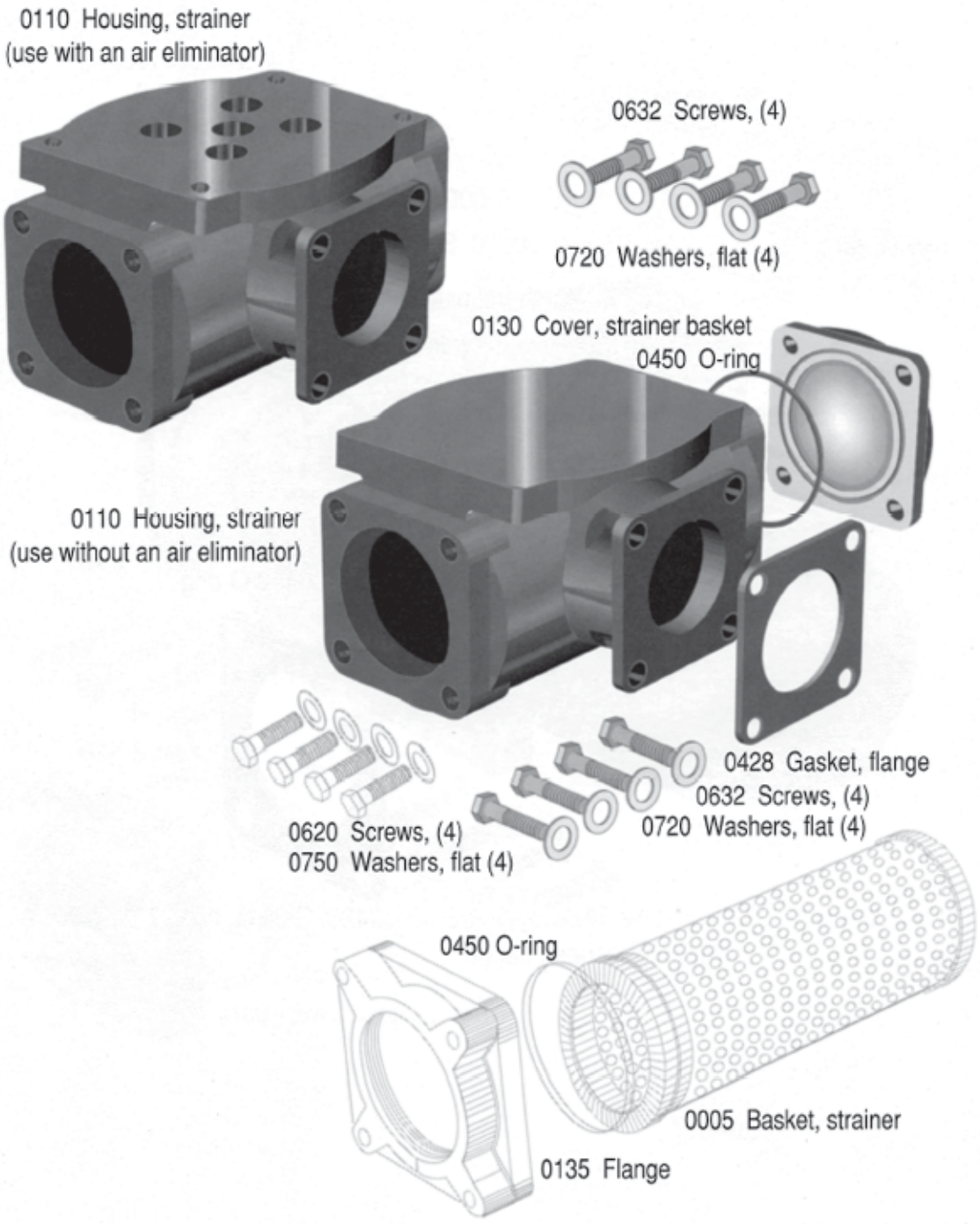


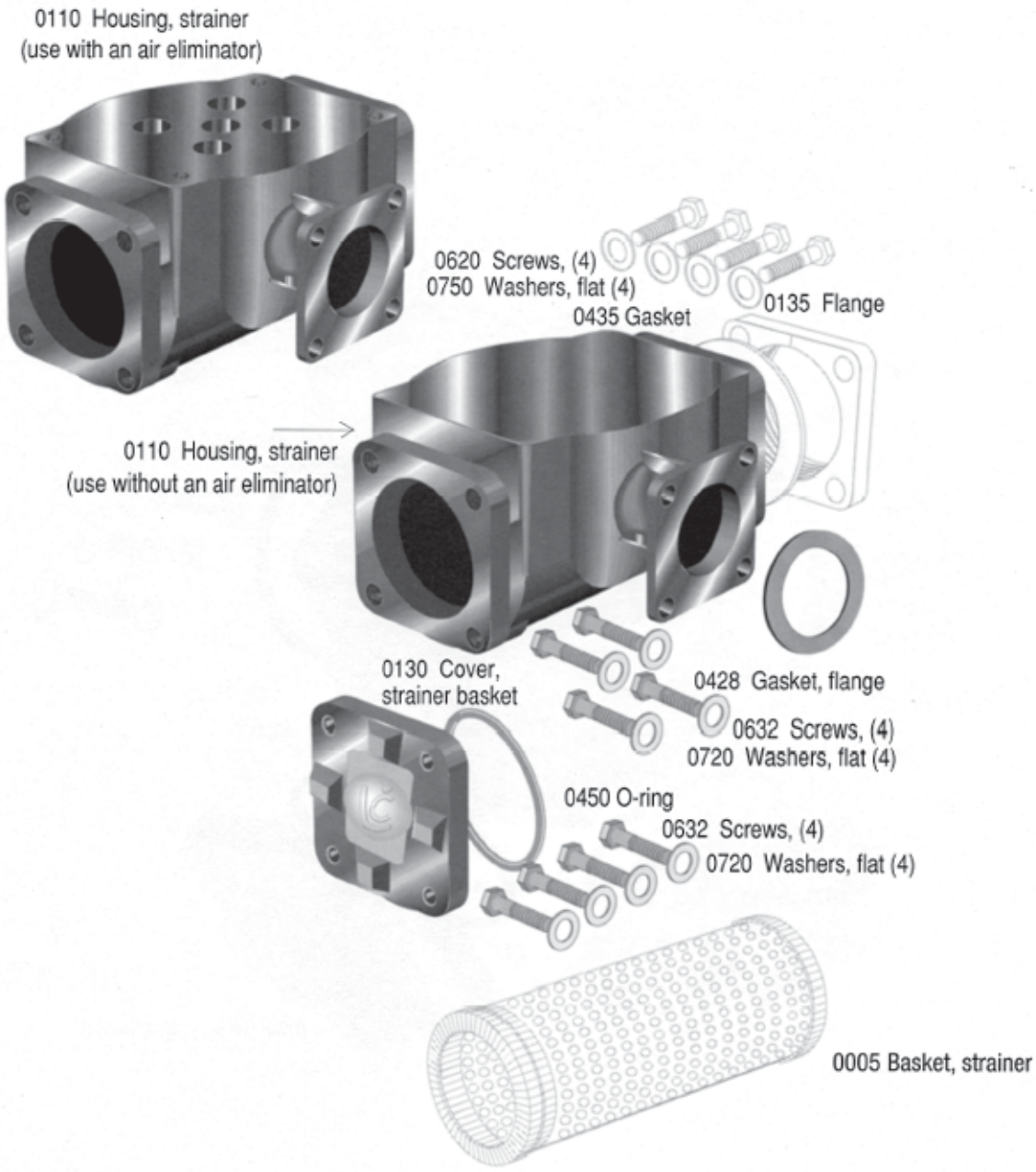
F-7 Aluminum


0681 Screws, (4)
0779 Washers, flat (4)
0620 Screws, (4)
0750 Washers, flat (4)
0140 Plate, strainer cover
0135 Flange
0458 O-ring
0110 Housing, strainer
0435 O-ring
0720 Washers, flat (4)
0450 O-ring
0632 Screws, (4)
0632 Screws, (4)
0720 Washers, flat (4)
0005 Basket, strainer
0450 O-ring
0130 Cover, strainer basket

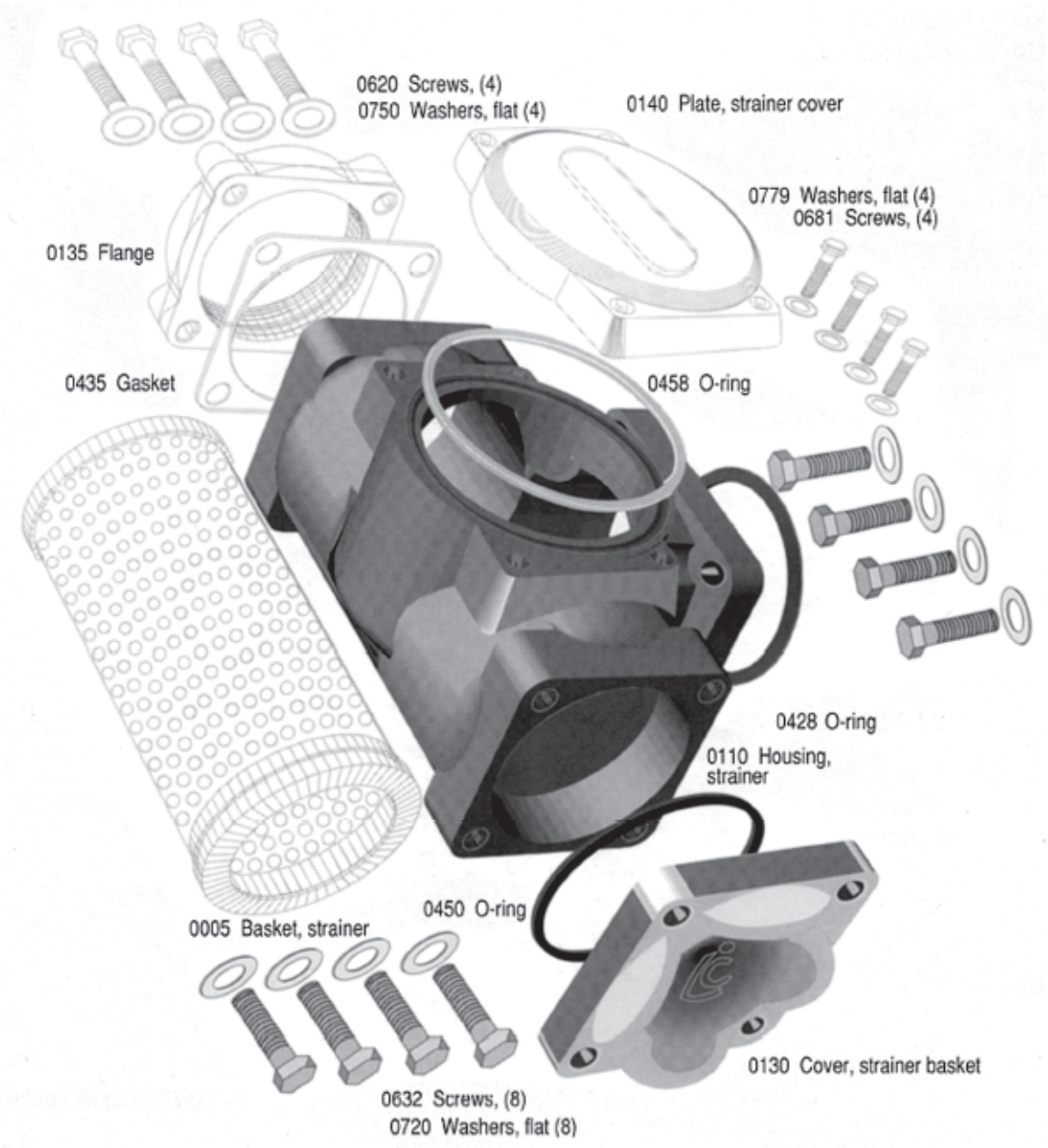

0005 Basket, strainer
0620 Screws, (4)
0750 Washers, flat (4)
0130 Cover, strainer basket
0110 Housing, strainer
0450 O-ring
0632 Screws, (4)
0720 Washers, flat (4)
0428 Gasket, flange

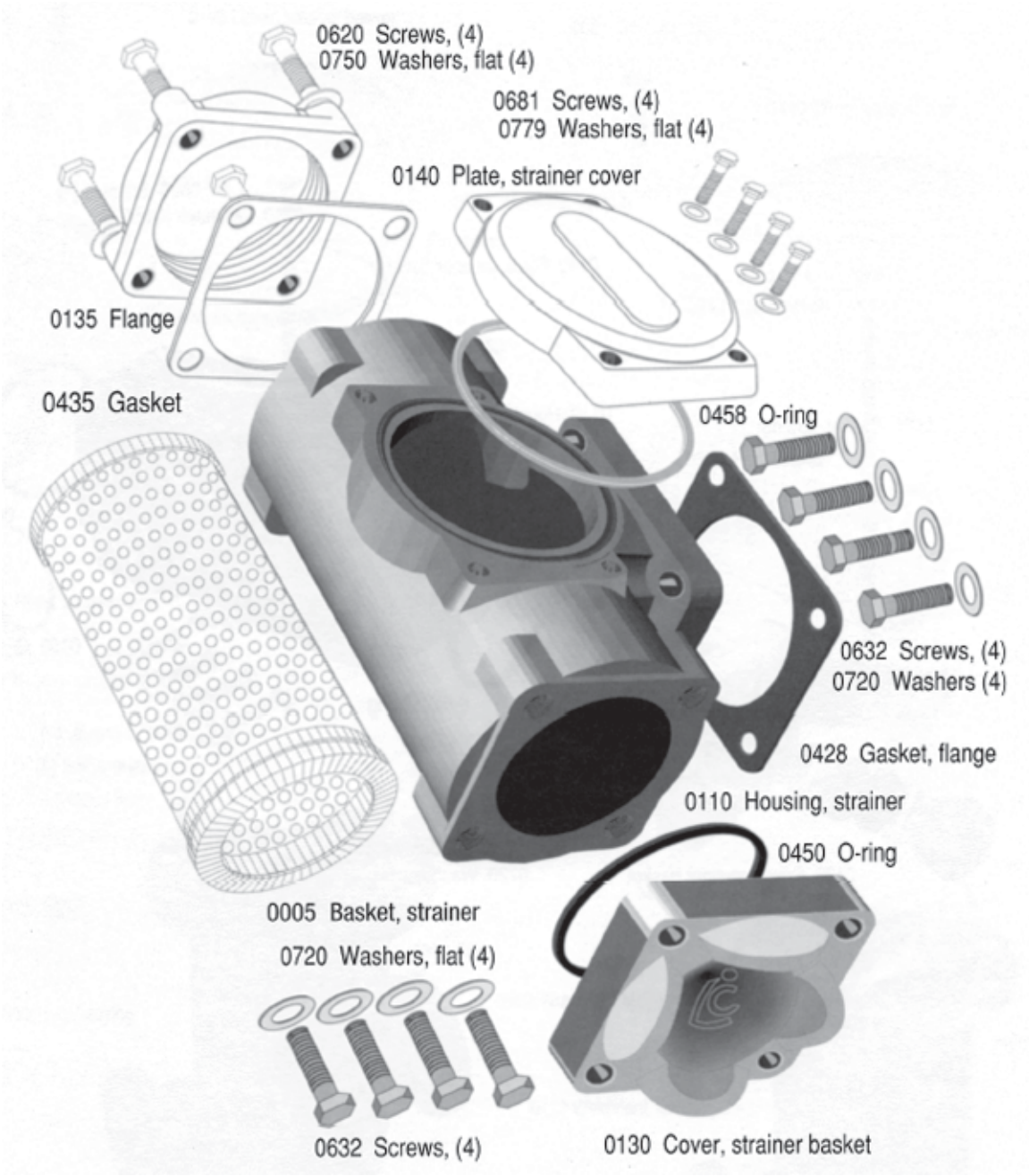
F-7 Cast Iron


0110 Housing, strainer
(use with an air eliminator)
0632 Screws, (4)
0720 Washers, flat (4)
0130 Cover, strainer basket
0450 O-ring
0110 Housing, strainer
(use without an air eliminator)
0428 Gasket, flange
0632 Screws, (4)
0720 Washers, flat (4)
0620 Screws, (4)
0750 Washers, flat (4)
0450 O-ring
0005 Basket, strainer
0135 Flange

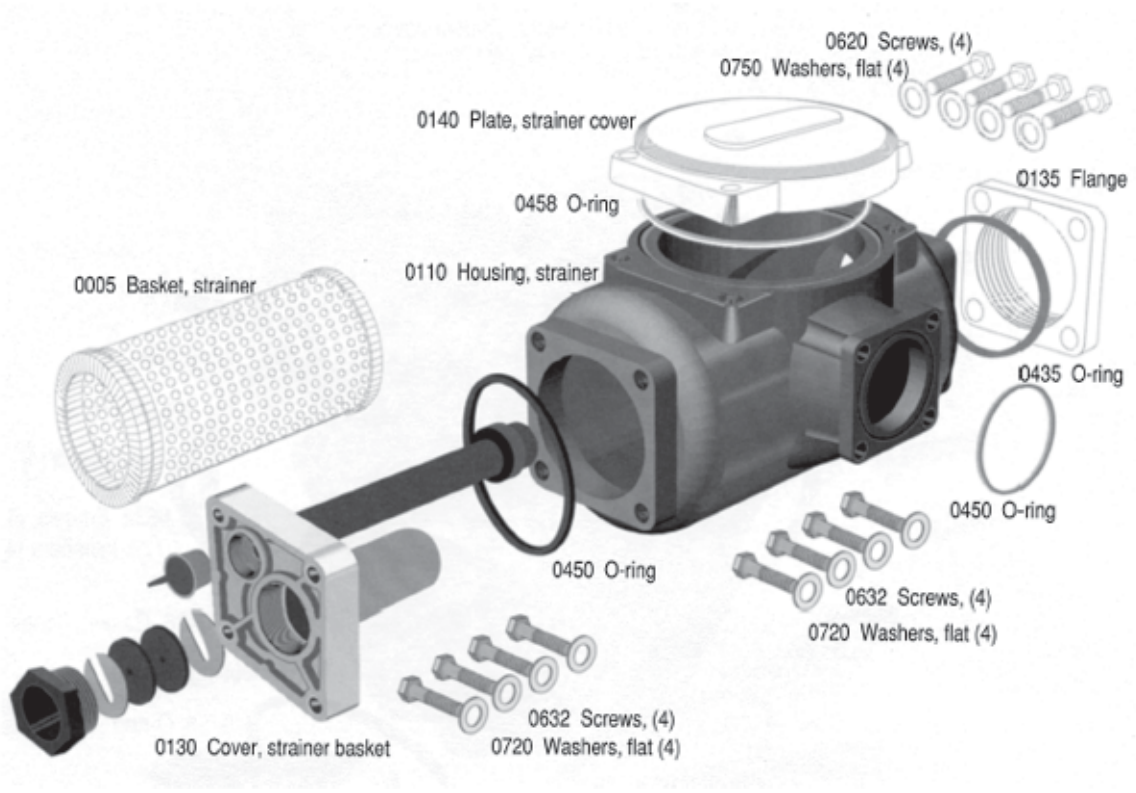

0110 Housing, strainer
(use with an air eliminator)
0620 Screws, (4)
0750 Washers, flat (4)
0435 Gasket
0135 Flange
0110 Housing, strainer
(use without an air eliminator)
0130 Cover,
strainer basket
0428 Gasket, flange
0632 Screws, (4)
0720 Washers, flat (4)
0450 O-ring
0632 Screws, (4)
0720 Washers, flat (4)
0005 Basket, strainer

F-15 Aluminum




0620 Screws, (4)
0750 Washers, flat (4)
0681 Screws, (4)
0779 Washers, flat (4)
0140 Plate, strainer cover
0135 Flange
0435 Gasket
0458 O-ring
0632 Screws, (4)
0720 Washers (4)
0428 Gasket, flange
0110 Housing, strainer
0450 O-ring
0005 Basket, strainer
0720 Washers, flat (4)
0632 Screws, (4)
0130 Cover, strainer basket

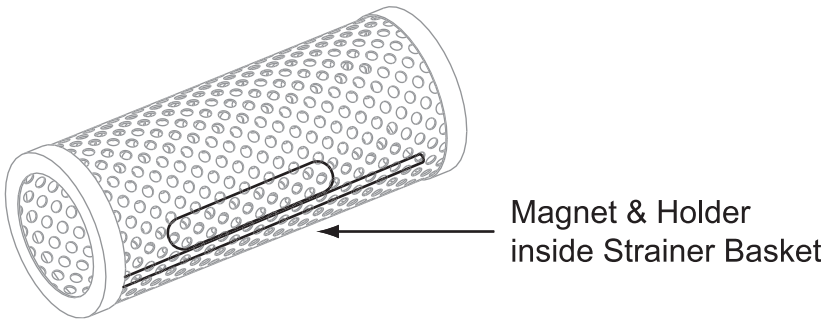
FA-7 Aluminum

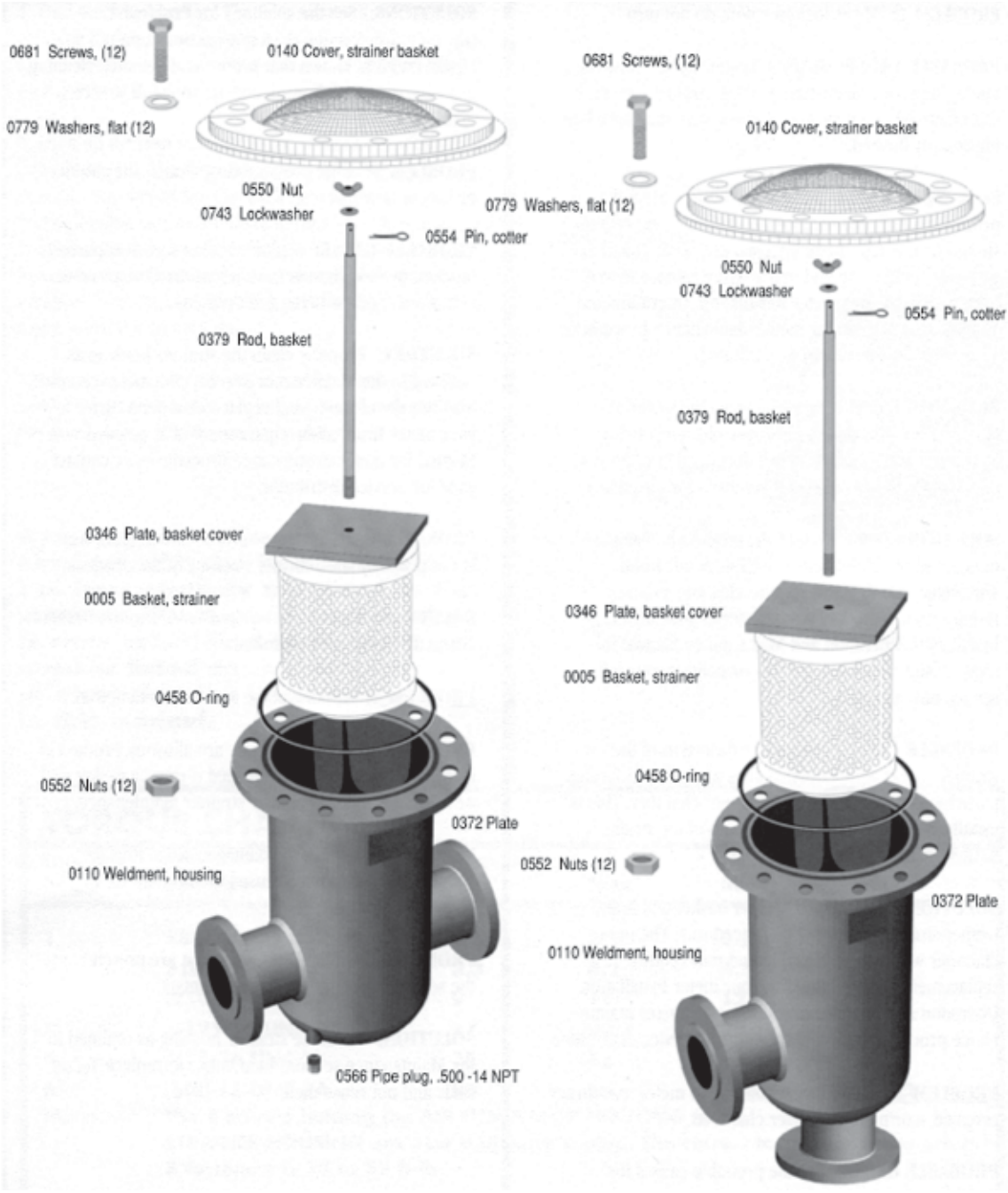


Addition of a Magnet and Holder to the FA-7 and FA-15 Strainer Assemblies

To help alleviate the problem of premature strainer plugging and to prolong the life of the measuring chamber, we have added a cylindrical magnet and magnet holder as standard in all FA-7 and FA-15 strainers supplied with MA-5, MA-7, and MA-15 Series LPG meters starting September 15, 2004.

Magnet Part No. 09387
Holder Part No. 501401





Inline Configuration

Bottom Inlet Configuration

Troubleshooting

PROBLEM 1: Meter lockup; rotors do not turn.

PROBABLE CAUSE: Strainer basket rupture possibly due to improper maintenance of the strainer basket. If this occurred in a new system, the system may have been improperly flushed.

SOLUTION: Replace the strainer basket and follow proper strainer maintenance procedures. New systems should be flushed. In all systems, the meter chamber will require cleaning and may require replacement of parts. Refer to your meter Installation, Operation and Maintenance Manual for meter maintenance procedures or contact your full service distributor.

PROBABLE CAUSE: Debris entered the metering chamber possibly due to improper cleaning during strainer maintenance. (i.e. dirt dislodged into the strainer housing when the basket was removed for cleaning.)

SOLUTION: Properly clean the strainer housing as outlined in the Maintenance section of this book. The meter chamber will require cleaning and may require replacement of parts. Refer to your meter Installation, Operation and Maintenance Manual for meter maintenance procedures or contact your full service distributor.

PROBABLE CAUSE: Denting or distortion of the strainer basket which opened gaps and allowed foreign particles to pass through to the meter chamber. This is usually caused by improper handling of the strainer basket during maintenance.

SOLUTION: Replace the strainer basket and follow proper strainer maintenance procedures. The meter chamber will require cleaning and may require replacement of parts. Refer to your meter Installation, Operation and Maintencance Manual for meter maintenance procedures or contact your full service distributor.

PROBLEM 2: Meter inspection due to meter inaccuracy revealed scoring of the meter chamber.

PROBABLE CAUSE: See the probable causes for Problem 1.

SOLUTIONS: See the solutions for Problem 1. However, if inspection does not reveal a ruptured strainer basket and it is known that proper maintenance cleaning procedures were followed, contact your full service distributor.

PROBLEM 3: High pressure drop across the strainer or loss of flow rate.

PROBABLE CAUSE: Strainer basket screen is partially blocked by foreign material such as dried material or salted out solid particles due to drying.

SOLUTION: Properly clean the strainer housing as outlined in the Maintenance section. The meter chamber may require cleaning and replacement parts. Refer to your meter Installation, Operation and Maintenance Manual for meter maintenance procedures or contact your full service distributor.

PROBABLE CAUSE: Inner mesh of the strainer basket is not properly sized for viscosity of the product.

SOLUTION: Replace the strainer basket with a basket correctly suited for the product.

PROBLEM 4: Leaking at the strainer basket cover.

PROBABLE CAUSE: The seals are allowing product to leak. This is caused by a damaged o-ring or gasket seal, or reusing a Teflon seal after strainer maintenance.

SOLUTION: Replace the damaged seals. Replace Teflon seals if they were reused even if they are in good condition!

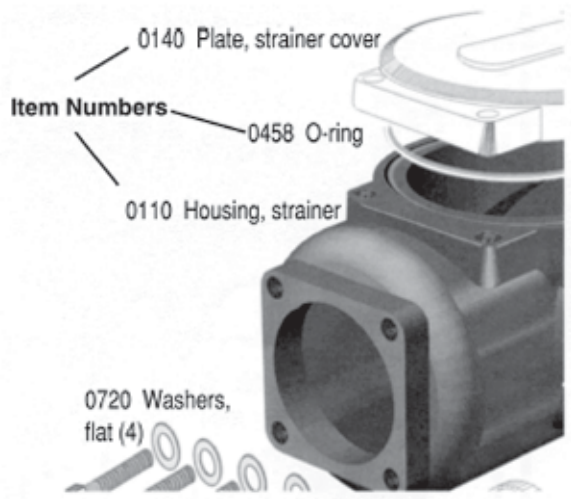
PROBABLE CAUSE: Dirty areas that are preventing the seals from making complete contact.

SOLUTION: Clean the strainer housing as outlined in the Maintenance section. Remember to replace Teflon seals and never to reuse them.

1. Find the item number. The item numbers are listed on the exploded drawings on pages 6-13 in this manual. The item numbers are listed with a word description on the exploded views.

2. Look up the item number on the computer printout titled Parts List. The Parts List has been inserted in this manual. You will notice that each item number has a corresponding part or kit number. In some cases, the individual items are available only in kits. In these instances, the kit number is listed instead of the part number. Find the corresponding part/kit number listed along side the item number.

3. Inform your distributor of the part/kit number that you need. The part/kit number is the only number that allows the distributor to find the correct part for your meter.



Do not confuse the part/kit numbers with the item numbers. The item numbers are listed in this manual. The specific item number is cross referenced to the part number listed on the computer printout that has been inserted in this manual.

Fastener Torque Chart

Bolt Size	Grade 5		Grade 8	
	Foot-Pounds	Newton-Meter	Foot-Pounds	Newton-Meter
	NOMINAL*	NOMINAL*	NOMINAL*	NOMINAL*
#8 (.164) - 32 UNC-2A	3.5	4.8		
#10 (.190) - 24 UNC-2A	5.2	7.1		
1/4" (.250) - 20 UNC-2A	7.3	9.9	12.5	16.9
5/16" (.3125) - 18 UNC-2A	15.3	20.7	26	35.3
3/8" (.375) - 16 UNC-2A	27	37	44	59.7
7/16" (.4375) - 14 UNC-2A	43	58	68.5	92.9
1/2" (.500) - 13 UNC-2A	66	90	112	152
5/8" (.625) - 11 UNC-2A	132	179	222	301
3/4" (.750) - 10 UNC-2A	233	316	395	535

**Torque tolerance is ± 10%*

Backed by our Worldwide reputation for Quality, Accuracy and Advanced Design.

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