

Read all the following information and instructions prior to installing and operating the equipment.
Failure to comply with these instructions could result in bodily injury or property damage.



TABLE OF CONTENTS

Introduction	1
Receiving, Handling, and Inspection	2
Installation.....	2
Start Up	3
Operation	3
Switching Flow.....	3
Basket Removal and Cleaning	4
Basket Replacement	4
Shut Down	4
Recommended Spare Parts	5

INTRODUCTION

The Eaton Model 53BTX duplex strainer easily installs in pipelines to remove sediment and debris from fluids. Fluid flows uninterrupted while the basket is removed for cleaning. These strainers are designed for pressure or suction applications.

Straining on the Model 53BTX is accomplished by directing the fluid through sized openings in the basket. Once sediment and debris is collected in the basket, the fluid flow is directed by manually turning the handle over to the other basket for continuous operation. At this time the debris filled basket can be removed for cleaning.

For additional information regarding Model 53BTX Duplex Strainers visit our website at www.eaton.com/filtration

RECEIVING, HANDLING, AND INSPECTION

1. Unpack the strainer and inspect for damage occurring during transit. Report damage to the carrier. If the strainer is not installed immediately, see “**Storage**” instructions.
2. Remove any preservatives with solvent-dampened cloths. Exercise care when using solvent and follow solvent manufacturer’s instructions.
3. Verify that the rating of the strainer is greater than or equal to the maximum pressure and temperature of the installation.
4. Open each basket well cover by turning the eye nut counterclockwise to end of studs. Lift cover up by the tabs until cover is free of basket well and rotate cover counterclockwise, clearing the basket well.
5. Remove all flange or nozzle protectors. Check the inside of the body for any foreign or loose material that could be carried downstream when fluid is introduced into the strainer. Install the strainer baskets. Reset the covers by reversing procedure above. To tighten, turn eye nuts clockwise until the cover is seated and secured at the top of the basket well.
6. The cover to basket handle contact holds the baskets in place. If the basket handle is not in contact with the cover, bend the handle to a higher position to insure greater compressions when cover is seated.

STORAGE

Replace protective wrap, flange protectors etc. that may have been removed during receiving, handling and inspection. Store the strainer in a clean, dry environment.

INSTALLATION



CAUTION: Before installation, review the application and chemical compatibility of the process fluid to all the materials of construction and components of the strainer.

INSTALLATION (CONTINUED)

1. Remove protective wraps, caps, plugs etc. before installing the strainer. Be sure to inspect cover gasket or O-ring for possible damage and replace as required. Position the strainer in the pipeline so that the fluid enters the connection marked “IN” or “INLET.”



CAUTION: To lift flanged duplex strainers, put slings under the inlet and outlet connections and secure above strainer. To lift duplex strainers with threaded connections, put slings under the center body section and secure above strainer.

2. Be sure sufficient clearance is provided for easy opening of the cover and removal of the basket. Refer to the Sales Drawing for removal clearances. Support the strainer to a firm foundation by using the footpads. Refer to sales drawing for footpad layout.
3. Connect the strainer to the pipeline. On flanged strainers, be sure to use the same type of flange faces. **Do not bolt a raised face flange to a flat face flange.** Be sure flange gaskets are in place and fasteners are tight.
4. On threaded strainers with other line connections, use standard piping practice when installing the strainer.



CAUTION: Duplex strainers are not designed to be anchor supports in the piping line. Be sure to properly support process piping on both sides of the strainer. Use care to prevent piping forces and movements from acting on the strainer connections. Damage may occur to the strainer if improperly connected.

INSTALLATION (CONTINUED)

Eaton recommends that basket well drain plugs be removed and pressure equalizer valves with a drain valve be installed (standard on 4" size) see Figure 1.



Figure 1

Eaton also recommends replacing each cover plug with a vent valve and piping to a safe area. See Figure 2.



Figure 2

Pressure gauges near the strainer inlet and outlet are required to determine differential pressure across the strainer and cleaning frequency. Pressure gauges are essential for the safe operation of the strainer.



CAUTION: To protect the operator during draining and venting, the fluid must be piped to a safe area. This requirement is for all fluids and water with temperatures above 120° F.

The operator should wear appropriate protective equipment (goggles, gloves, vests, clothing etc.) consistent with the process fluid for strainer operation and servicing.

START UP

1. Open cover vent valves and cartridge vent. Close pressure equalizer valves and drain valve. Rotate the handle 90° clockwise, so that the handle is over the strainer inlet.
2. **Slowly** allow fluid to enter the strainer. First, **slowly** open the downstream valve nearest to strainer outlet. Then **slowly** open the upstream valve nearest to the strainer inlet.
3. Close cover vent valves and cartridge vent when air is expelled. Rotate the handle 90° counterclockwise over the right side basket well. See Figure 3.

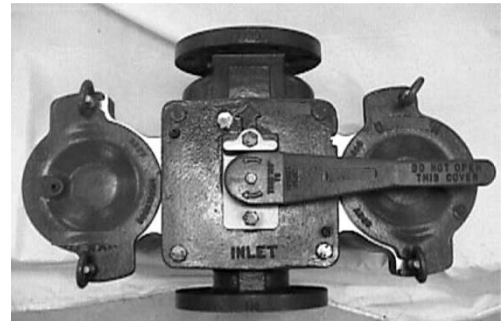


Figure 3

OPERATION

The strainer handle's position indicates which basket well is in operation. The handle in the 3 o'clock position over the cover indicates the right basket operation. This **prevents** access to the basket underneath the handle. See Figure 3. The handle in the 9 o'clock position indicates the left basket operation **Note:** Above references are with the strainer inlet in the 6 o'clock position.

SWITCHING FLOW

Open both pressure equalizer valve to insure that both basket wells are pressurized and rotate the strainer handle 180° (traveling over the strainer inlet) until the handle is over the opposite basket cover from where the handle started. Close both pressure equalizer valves.

BASKET REMOVAL AND CLEANING

A differential pressure increase of **5 psi** across the strainer indicates that the basket in operation is full of debris and needs to be removed and cleaned.



CAUTION: To prevent damage to the baskets, **DO NOT** permit the differential pressure across the strainer to exceed 20 psi.

1. Transfer flow from the basket well in operation to the opposite basket well. Refer to **Switching Flow**. Open the drain valve.
2. To service the basket well, slowly open the cover vent and drain or pressure equalizer valve (if installed). This relieves the pressure and drains the fluid in that basket well.
3. When pressure is relieved and fluid drained, open the basket well cover by turning the eye nuts counterclockwise to end of studs. Lift cover up by the tabs until cover is free of basket well and rotate cover counterclockwise, clearing the basket well.
4. Remove the debris-laden basket. Invert the basket and wash out the debris. Direct a stream of air or water from the exterior of the basket to the interior. Note: Do not permit the basket debris to dry, as it would be difficult to remove and clean the basket. Inspect basket at each cleaning for holes or tears. Replace as needed with genuine Eaton strainer baskets.

BASKET REPLACEMENT

1. Place the cleaned or new basket into the basket well. Be sure basket handle is sufficiently high to be compressed by the cover. Refer to **Receiving, Handling, and Inspection**. Inspect cover O-ring and sealing surface. Clean sealing surface and replace O-ring as necessary. Reseat the cover. Refer to **Receiving, Handling and Inspection**.
2. Close drain valve and open pressure equalizer and cover vent valves of basket well just serviced. Open the pressure-equalizing valve of the basket well in operation filling the serviced basket well with fluid. Then close cover vent valve when air is expelled. Next, close both pressure equalizing valves.

SHUT DOWN

1. Slowly close the pipeline valves upstream and downstream from the duplex strainer. Make sure these valves are tightly closed.
2. To relieve fluid pressure in the strainer, first open the drain valve. Then slowly open the pressure equalizer and cover vent valves.
3. Proceed to clean and inspect each basket. Inspect the strainer to insure there is no standing fluid.

RECOMMENDED SPARE PARTS

- | | |
|---|---------------------|
| 2 | Strainer Baskets |
| 2 | Cover O-rings |
| 4 | Stem O-rings ** |
| 2 | Cartridge O-rings** |
| 4 | Seals** |
| 4 | Seats ** |

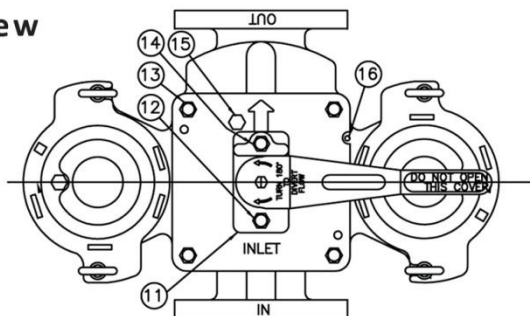
** Only supplied in a “#53 sealing kit”

When ordering spare parts, be sure to specify all nameplate data as well as description and quantity of parts.

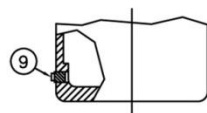
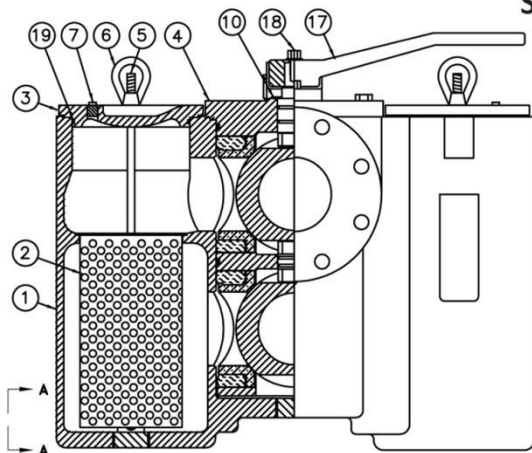
Always use genuine Eaton replacement parts for guaranteed fit and performance.

Visit our web site, filtration.eaton.com for information about the different types of Eaton Duplex Basket Strainers.

Top View

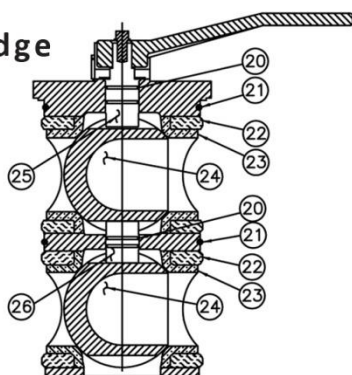


Side View

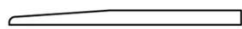


VIEW A-A

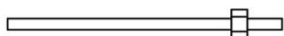
Diverter Cartridge Assembly



VIEW B-B



Seal Too



Extractor Tool I

PARTS LIST FOR EATON MODEL 53BTX

Item Description

1. Duplex Strainer Body
2. Strainer Basket (2) *
3. Basket Cover (2)
4. Cartridge
5. Stud (4)
6. Eye Nut (4)
7. Pipe Plug (2)
9. Pipe Plug (2)
10. Washer
11. Stem Retainer
12. Cap Screw
13. Cap Screw (4)
14. Cap Screw
15. Vent Valve
16. Pin
17. Handle
18. Cap Screw
19. O-Ring, Cover
20. O-Ring, Stem (4) *
21. O-Ring, Cartridge (2) *
22. Seal (4) *
23. Seat (4) *
24. Ball (2)
25. Stem, Top
26. Stem, Middle

* Recommended Spare Parts List

Item	Description
2	Strainer Basket (2)
19	O-Ring, Cover (2)
20**	O-Ring, Stem (4)
21**	O-Ring, Cartridge (2)
22**	Seal (4)
23**	Seat (4)

** Only supplied in a "#53 sealing kit"

Diverter Cartridge Maintenance

The Diverter Cartridge assembly is maintenance free. No initial or operational servicing is required. In the event that the cartridge O-rings, stem O-rings, seats, or seals need replacement, Sealing Kits are available for strainer sizes: ¾" – 1", 1¼" – 1½", 2" – 2½", 3" and 4."

Eaton
North America — HQ
44 Apple Street
Tinton Falls, NJ 07724

Toll Free: (800) 656-3344
(North America only)

Voice: (732) 212-4700
Fax: (952) 906-3706

Eaton
Europe/Africa/Middle East
Auf der Heide 2
53947 Nettersheim
Germany

Voice: +49-2486-809-0
Fax: +49-2486-809-800

Eaton
Brazil
Av. Julia Gaioli, 474 –
Bonsucesso
07251-500 – Guarulhos
Brazil

Voice: +55 (11) 2465-8822
Fax: +55 (11) 2465-8884

Eaton
China
No.3, Lane 280, Linhong Road
Changning District, 200335
Shanghai, P.R. China

Voice: +86-21-5200-0099
Fax: +86-21-5200-0400

Eaton
Singapore
4 Loyang Lane #04-01/02
Singapore 508914

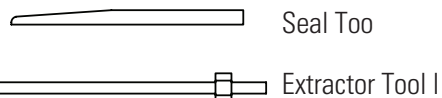
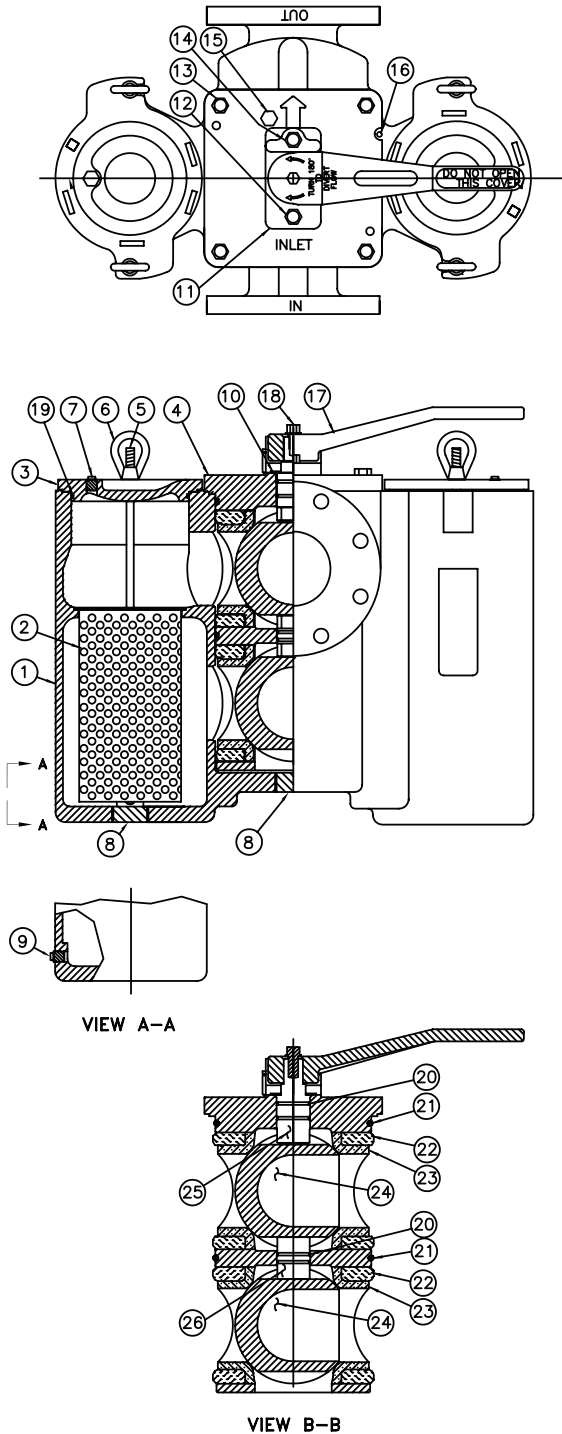
Voice: +65-6825-1668
Fax: +65-6825-1639

For more information, please
e-mail us at
filtrationinfo@eaton.com
or call 732-767-4200.

WARRANTY

All products manufactured by Seller are warranted against defects in material and workmanship under normal use and service for which such products were designed for a period of eighteen (18) months after shipment from our factory or twelve (12) months after start-up, whichever comes first. OUR SOLE OBLIGATION UNDER THIS WARRANTY IS TO REPAIR OR REPLACE, AT OUR OPTION, ANY PRODUCT OR ANY PART OR PARTS THEREOF FOUND TO BE DEFECTIVE. SELLER MAKES NO OTHER REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WE SHALL NOT BE LIABLE FOR CARGO, LABOR, CONSEQUENTIAL DAMAGES OR CONTINGENT LIABILITIES. OUR MAXIMUM LIABILITY SHALL NOT IN ANY EVENT EXCEED THE CONTRACT PRICE FOR THE PRODUCT.

Read all the following information and instructions prior to installing & operating the Strainer. Failure to comply with these instructions could result in bodily injury or property damage.



Parts List for Eaton Model 53 BTX

Item	Description
1.	Duplex Strainer Body
2.	Strainer Basket (2) *
3.	Basket Cover (2)
4.	Cartridge
5.	Stud (4)
6.	Eye Nut (4)
7.	Pipe Plug (2)
8.	Pipe Plug (3)
9.	Pipe Plug (2)
10.	O-Ring, Cover (2) *
11.	Stem Retainer
12.	Cap Screw
13.	Cap Screw (4)
14.	Cap Screw
15.	Vent Valve
16.	Pin
17.	Handle
18.	Cap Screw
19.	Washer
20.	O-Ring, Stem (4) *
21.	O-Ring, Cartridge (2) *
22.	Seal (4) *
23.	Seat (4) *
24.	Ball (2)
25.	Stem, Top
26.	Stem, Middle

* Recommended Spare Parts List

Item	Description
2	Strainer Basket (2)
10	O-Ring, Cover (2)
20**	O-Ring, Cover (4)
21**	O-Ring, Cartridge (2)
22**	Seal (4)
23**	Seat (4)

** Only supplied in a "#53 Sealing Kit"

CARTRIDGE MAINTENANCE

IMPORTANT

For 2", 2½", 3" & 4" Strainers, it is advisable to support the cartridge assembly by external means (hoist, slings, etc.) during cartridge maintenance.

For ¾", 1", 1-¼" & 1-½" Strainers, use your own discretion to support the cartridge assembly during cartridge maintenance.

For Tools and Items, refer to Diagram & Parts List, pg. 1

CARTRIDGE REMOVAL AND INSPECTION

CAUTION

To remove cartridge assembly, first isolate the strainer (shut down your pumps, close valves, etc.). Slowly open vents, releasing strainer internal pressure and open **plugs, Item 9** at bottom of basket wells (or the drain valves if installed) to drain the fluid from the strainer.

1. Rotate the **handle, Item 17**, 90 degrees to "Inlet" on **cartridge, Item 4**.
2. Remove the four (4) **cap screws, Item 13** that secure the cartridge assembly to the strainer body.
3. Remove plastic caps from threaded holes "A" on top of cartridge. Thread the **Extractor Tool** (provided), into a threaded hole in the top of the cartridge. Use a socket or box wrench for turning. As the **Extractor Tool** turns, the cartridge rises from the strainer body.
4. As the **upper seals Item 22** and **upper seats Item 23** clear the top of body, remove the upper seals and seats.

Top ball, Item 24 cannot be removed with the handle positioned over the inlet.

Do not remove the **Top Ball** at this time.

5. Continue turning **Extractor Tool** until the **lower seals, Item 22** and **lower seats, Item 23** become visible as the cartridge assembly continues to rise.

Lower seals, seats and ball remain in place with the handle positioned over the inlet. Do not remove any of these components at this time.

6. Continue to raise the cartridge assembly until it has cleared the cartridge bore of the body.
7. Place the cartridge assembly on a clean surface. With cartridge upright & inlet towards assembler, remove **lower seats & lower seals** at this time.
8. Slowly rotate the **handle, Item 17**, 90 degrees counter clockwise until the handle makes contact with **stem retainer, Item 11**. Pay special attention to both balls as they may shift and dislodge from the cartridge at this time.
9. Remove the **lower and upper balls, Item 24**.
10. Remove the **handle screw, Item 18** (and washer if provided) and then remove **handle, Item 17**. Remove the two (2) **screws, Items 12 & 14** that hold down the **stem retainer, Item 11**. Remove the **stem retainer, Item 11** and **stem retainer washer, Item 19**.
11. Reattach **handle, Item 17** to **top stem, Item 25** with **handle screw, Item 18** and washer if provided. Pull **top stem, Item 25** out from top of cartridge. Next remove **middle stem, Item 26** by pushing downward through cartridge central hole.
12. Inspect the two (2) **cartridge O-rings, Item 21**, the four (4) **top and middle stem O-rings, Item 20** and replace. Inspect **top and bottom balls, Item 24** for scoring. Replace as necessary.

IMPORTANT

Keep used seats separate from new seats to prevent reinstalling used seats by mistake

CARTRIDGE REASSEMBLY

Note: Make sure that all parts are free from dirt.

IMPORTANT

All O-rings and mating surfaces require lubrication. Use a light film of Process Compatible lubricant.

13. Lubricate **middle stem O-rings, Item 20** and inside of the cartridge middle stem bore.
14. Insert **middle stem, Item 26** from bottom of cartridge into the cartridge middle stem bore (chamfer provided).

Ensure that the **middle stem, Item 26** is equally spaced between upper and lower ball bores of the cartridge.

Ensure that both **middle stem O-rings, Item 20** are compressed into the cartridge middle stem bore.

Align flat tabs of the **middle stem, Item 26** to be inline to the large ports of the cartridge. This allows the flats of the **middle stem, Item 26** to be aligned with the slots of the **balls, Item 24**.

15. Lubricate the **top stem O-rings, Item 20** and inside of the cartridge top stem bore. Insert **top stem, Item 25** into top of cartridge. Push down until shoulder on tab end of **top stem, Item 25** is flush with inside of the large ports of the cartridge (cartridge ball bore).
16. Align flat tab on **top stem, Item 25** to be in-line to the large ports of the cartridge. **Top stem** tabs and **middle stem** tabs are to be in the same direction. Remove handle from **top stem**.
17. Place **stem retainer washer, Item 19**, then **stem retainer, Item 11** over **top stem, Item 25**. Centralize the hole of the **stem retainer, Item 11** around the **top stem, Item 25**. The two (2) small locating posts under **stem retainer** point towards the inlet on the cartridge. Insert and tighten the two (2) **screws, Items 12 & 14**.
18. Attach **handle, Item 17** to **top stem, Item 25** using **screw, Item 18** (and washer if provided). Move handle counter-clockwise until contact is made with the stem retainer.
19. Lay cartridge down on table with top of cartridge away from assembler and inlet facing up and the **handle, Item 17** pointing to your right.
20. Insert **upper ball, Item 24** keeping closed side of ball opposite the **handle, Item 17** (see View "B-B"). Assemble two (2) sets of **seals Item 22** and **seats, Item 23**. Match the recess groove in the **seat** to raised channel in the **seal**. Slide the **seat and seal** assemblies into the cartridge around the **upper ball, Item 24** keeping the recess groove in the **seat** and the raised channel in the **seal** to top of cartridge. **Wrap securely about the center with wire tie provided.**
21. Insert **lower ball, Item 24** keeping closed side of ball opposite the **handle, Item 17** (see View B-B). Assemble two (2) sets of **seals Item 22** and **seats Item 23**. Match the recess groove in the **seat** to raised rib on the **seal**. Slide the **seat and seal** assemblies into the cartridge around the **lower ball, Item 24** keeping the recess groove in the **seat** and the raised channel in the **seal** to top of cartridge. **Wrap securely about the center with wire tie provided.**

22. Stand the cartridge up with top up and inlet facing assembler. Check for alignment.

IMPORTANT

Inside diameters of balls are to be aligned with inside diameter of seats.

23. Lubricate the outer face of each of the **seals**, cartridge **O-rings** and inside of cartridge bore in the body with a light film of Process Compatible lubricant.

INSERTING CARTRIDGE

When inserting the cartridge into the strainer body:

Sizes $\frac{3}{4}$ " through 1": Make sure that the flow arrow on the cartridge is pointing 45 degrees to either side of the outlet on the body.

Sizes 1- $\frac{1}{4}$ " through 4": Make sure that the word "INLET" on the top of the cartridge is directly above the inlet of the body.

24. Lift cartridge and place inside the cartridge bore of the body. **Carefully start (or lead) the lower seals, Item 22 into the cartridge bore of the body.** Remove wire tie around the lower seals when **lower seals, Item 22** have been lowered halfway into cartridge bore of the body.

Sizes 1- $\frac{1}{4}$ " through 4": Make sure that the lower **seals, Item 22** smoothly pass through all of the internal openings (or ports). If the lower **seals** start to extrude into ports, gently tap bottom of the **seals** with the **Seal Tool** (provided). Thus greatly assisting the leading edges of the **lower seals** into cartridge bore of the body

25. Push cartridge down until half of the **top seals, Item 22** are in the cartridge bore of the body. Use the **Seal Tool** (provided) as required. Follow same instructions for the **upper seals** as described in #24 above for the **lower seals**.
26. **Remove wire tie around the top seals at this time.**
27. **Sizes $\frac{3}{4}$ " through 1"**: Push cartridge down until just above roll pin in body. Turn cartridge 45 degrees, so that the flow arrow (cast on the top of the cartridge) is aligned with the outlet of the strainer. Insert the four (4) **cap screws, Item 13** and turn until cartridge is all the way into body.

3/4" - 4"

IOM53CART Rev.1
June 2010