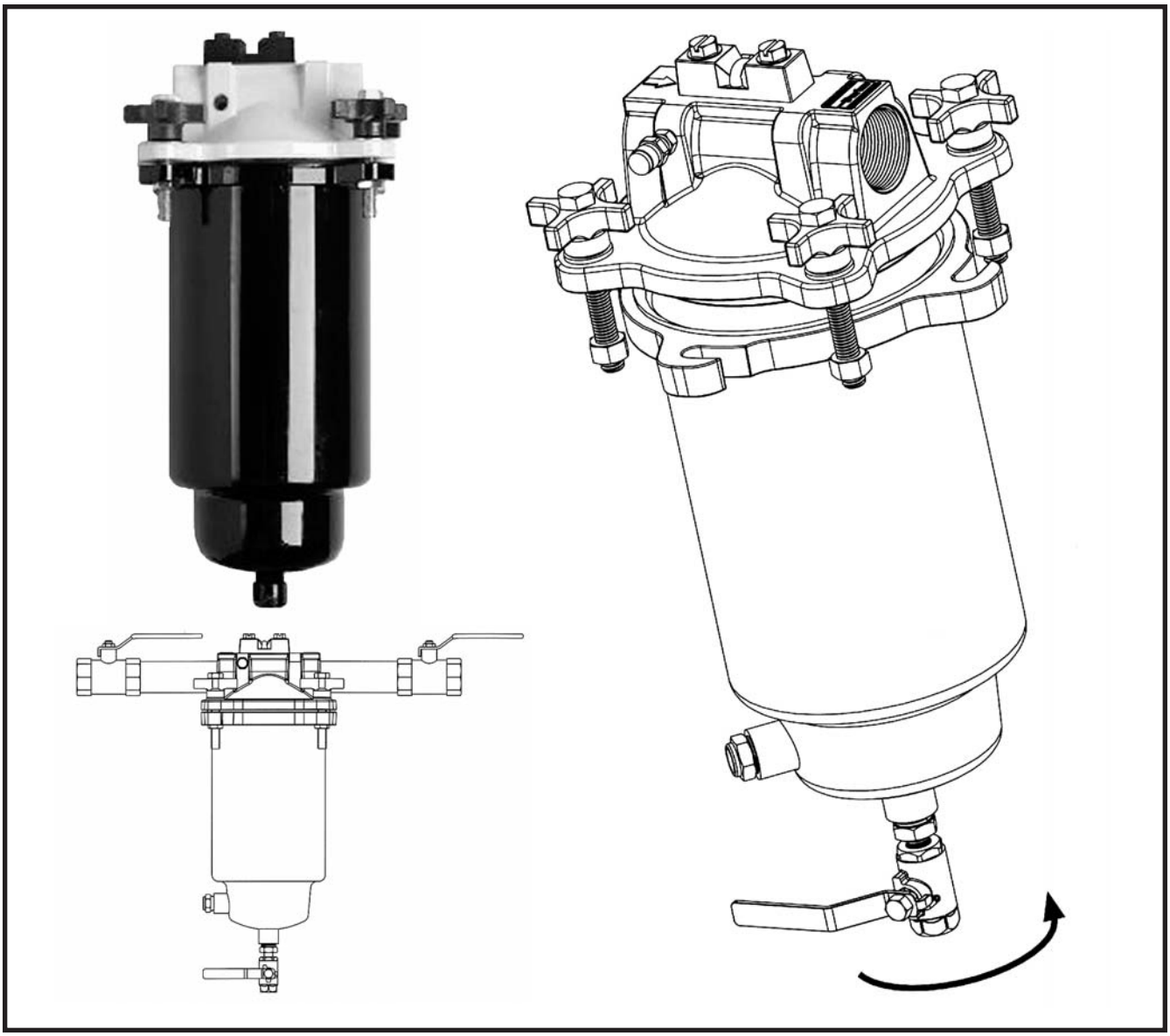
RACOR®

Racor FBO Filter Vessel Installation, Operation and Service

- Aviation Fuel Trucks
- Aviation Fuel Cabinets
- Diesel Fuel Dispensing
- Marine Fuel Docks
- High-Flow Diesel Engine Filtration



Parker

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6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer, or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part of Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carries or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

Hydrocarbon Filtration FBO-10 and FBO-14 Series Housing and Cartridges

INDEX

MAXIMUM FLOW RATES

	Maximum Flow Rates				Clean Dry	Change
FBO-10	**Flow Range**	**Diesel**	**Jet Fuel**	**Gasoline**	**Delta P**	**Delta P**
Prefilter	5-40 GPM	20	40	50	**	20 PSID
Filter Separator	5-35 GPM	18	35	45	**	15 PSID
Absorber	5-25 GPM	18	35	45	**	30 PSID
FB0-14	**Flow Range**	**Diesel**	**Jet Fuel**	**Gasoline**	**Delta P**	**Delta P**
Prefilter	10-60 GPM	30	60	75	**	20 PSID
Filter Separator	10-50 GPM	25	50	65	**	15 PSID
Absorber	10-37 GPM	26	55	70	**	30 PSID

**** Varies With Fluid and Flow Rate**

ELEMENT APPLICATIONS

	Micron Rating	FBO-10	FBO-14
		6 X 10 Element	6 X 14 Element
Filter Separator	1	FBO-60327	FBO-60336
	5	FBO-60328	FBO-60337
	10	FBO-60353	FBO-60356
	25	FBO-60329	FBO-60338
Prefilter	1	FBO-60330	FBO-60339
	5	FBO-60331	FBO-60340
	10	FBO-60356	FBO-60357
	25	FBO-60332	FBO-60341
Absorptive Filter	1	FBO-60333	FBO-60342
	5	FBO-60334	FBO-60343
	10	FBO-60355	FBO-60358
	25	FBO-60335	FBO-60344

Product Description, Installation, Operation and Service Instructions For Parker Hannifin Racor Division, Hydrocarbon Filtration FBO-10 & FBO-14 Series Housings and Cartridges

FBO SERIES PRODUCT DESCRIPTION

Racor Hydrocarbon Filtration's new FBO-10 and FBO-14 filter assemblies are designed to meet the toughest hydrocarbon refueling conditions and give maintenance personnel ease of filter changeouts.

The FBO assembly can flow 25 gpm/95 lpm or up to 60 gpm/230 lpm depending on the unit, cartridges installed and the fuels being filtered.

FBO SERIES APPLICATIONS

The FBO assembly can be used on mobile refuelers or installed in refueling cabinets.

The unit can also be used for diesel fuel dispensing pumps or as an engine primary fuel filter/water separator.

FBO FEATURES

The assembly features a *"locking ring collar,"* that attaches the filter housing to the aluminum die-cast filter head with four bolts.

The slotted *"locking ring collar"* allows maintenance personnel to hand loosen the four collar bolts, rotate and lower the bowl assembly for cartridge changeouts.

With a new cartridge installed, simply raise the bowl and rotate into position on the locking ring and hand tighten evenly.

CLOSURE HARDWARE

The closure hardware consists of stainless steel nuts, bolts and washers with metal hand knobs for ease of maintenance.

No V-Band Clamps are used. This allows one person to easily change the filter cartridge.

APPLICATIONS

Jet Fuel
Aviation Gas
Diesel Fuel
Gasoline
Kerosene
JP4, JP5, JP8

INSTALLATIONS

Aviation Fuel Trucks
Aviation Fueling Cabinets
Diesel Fuel Dispensing System
Marine Fuel Docks
Fuel Systems on Large Diesel Engines

STANDARD DESIGN FEATURES

Die-cast Aluminum Head
Steel Filter Bowl Assembly
Powder Coated Components
"Locking Ring Collar," No Clamps
1 1/2" NPT Inlet and Outlet
150 psi @ 240° F Maximum Design Pressure
Manual Drain Valve
Manual Vent Valve

OPTIONAL ACCESSORIES

Water Sight Glass or Electronic Water Probe
Delta P Indicator.

Cartridge Options

(1, 5, 10, 25 micron)

FP Prefilters
OCP Coalescers
FW Water Absorbing

Installation, Operation and Service Instructions

INSTALLATION

1. Remove the housing protectors from the inlet and outlet connections.

2. Make certain that connections are free of any debris.

> **CAUTION:**
> **Be sure to correctly identify the inlet and outlet connections to avoid piping the unit backwards.** ***The unit will not perform properly if connections are reversed.***

3. Provide shut-off valves in the inlet and outlet piping as close to the unit as possible. *This is necessary for isolating the unit from the system when cartridge replacement is necessary. (See Illustration on page 4).*

4. Connect the housing into the piping system with a minimum number of turns and fittings, especially on the inlet side.

5. For installations on fuel dispensing pump, connect the fuel delivery hose directly to the outlet connection.

6. Provide room for the housing to clear the cartridge during change-out. (*A 2 inch base clearance is required).*

7. We recommend installation of a differential pressure gauge so the differential pressure across the housing can be monitored. This allows accurate determination of when the cartridge should be changed.

   Part numbers 72694 or 72783 are differential pressure gauges specifically designed to be used on FBO-10 and FBO-14.

8. For ***Absorptive Cartridges*** used in aviation fuel or diesel fuel service, ***ALWAYS*** install a differential pressure gauge or other means of determining the differential pressure.

   See Maximum Flow Rates Chart for applicable flow rates on page ii, before page 1.

> **CAUTION:**
> **On systems where pressures can exceed 75 psi, a pressure bypass around the pump *must be installed* to protect the cartridge and system from a high pressure shock or sudden cartridge seal-off due to a slug of water in the product.**

OPERATION AND SERVICE

Open Vent & Drain Valves Each Day

It is recommended that the vent and drain valves be opened once each day to permit the escape of entrapped air and accumulated water.

Limited Maintenance Required

Since there are no moving parts, maintenance is limited to an occasional cartridge replacement, requiring only a 2 inch (51mm) base clearance.

Maintenance Guidelines For:

Inspection of Head Gasket and Cartridge and Seal Gasket Change-Out

1. The *head gasket* should be carefully inspected for signs of damage or deterioration each time the housing is opened.

2. Each Parker Element Replacement Kit contains a *housing seal gasket*. It is recommended that the seal gasket *be replaced at every cartridge changeout.*

3. Replace the seal gasket if it shows any signs of wear.

4. We recommend the seal gasket be lubricated with petroleum jelly or oil prior to installation.

> **CAUTION:**
> **Use only non-sparking tools when performing any maintenance or service work on this equipment.**

Cartridge Replacement Procedures

Frequency of Cartridge Element Replacement

The frequency of cartridge element replacement is dependent upon the following conditions:

For Aviation Fuel Service

Replace the cartridge when the differential pressure across the housing exceeds 15 psi; red indication on the DP gauge; after one year of service; or when there is a significant reduction in flow through the housing, whichever occurs first.

For All Other Applications

Replace the cartridge when the differential pressure exceeds 25 psi; red indication of DP gauge; after one year of service; when the flow is significantly reduced; or if the pressure has been steadily climbing then begins to decrease, whichever occurs first.

Cartridge Replacement Procedures

When any of the above noted conditions indicate that cartridge replacement is necessary, observe the following procedures.

1. Close the inlet and outlet isolation valves to isolate the filter from the system.

2. Open the drain valve on the housing bottom and allow all fluid to drain from the unit.

3. Open the vent valve on the cover of the housing and allow the unit to thoroughly vent before opening the cover.

4. Loosen the four (4) knobs attaching the head to the housing flange.

5. Remove the head gasket and discard.

6. Remove and discard the expended cartridge in a FIRE-SAFE place, in accordance with local and national regulations.

7. Flush the interior of the housing with clean, processed, filtered product or a suitable solvent. A nonmetallic bristle brush will help to remove caked-on debris. Rinse the housing and unit cover with a clean solvent and dry with soft, lint-free wiping cloths.

CAUTION:
Due to the toxic effects of some additives used in filtered fluids, care should be exercised in handling the expended cartridges and/or all internal parts that have been in contact with the filtered product.

8. Lightly lubricate new head gasket with Vaseline or Petroleum Jelly and position it on the head. If Vaseline is not available, lubricate the gasket with the fuel or oil that it will be used in.

9. Insert a new cartridge into the housing. Position housing (with cartridge) underneath filter head. Push/twist cartridge onto head spigot. The head "conical spring" will seat/seal the cartridge in the housing. *(See head/spring/cartridge installation instruction on page 5.)*

10. "Rotate" housing onto the collar bolts. Hand tighten knobs until head is "snug" to housing. *See Illustration on Page 5.*

NOTE:
A TORQUE WRENCH IS RECOMMENDED. TIGHTEN ALL COLLAR BOLTS TO 50 IN LBS.

11. Close the drain plug or valve on the bottom of the housing.

12. SLOWLY open the inlet and outlet valves; allow the unit to fill completely.

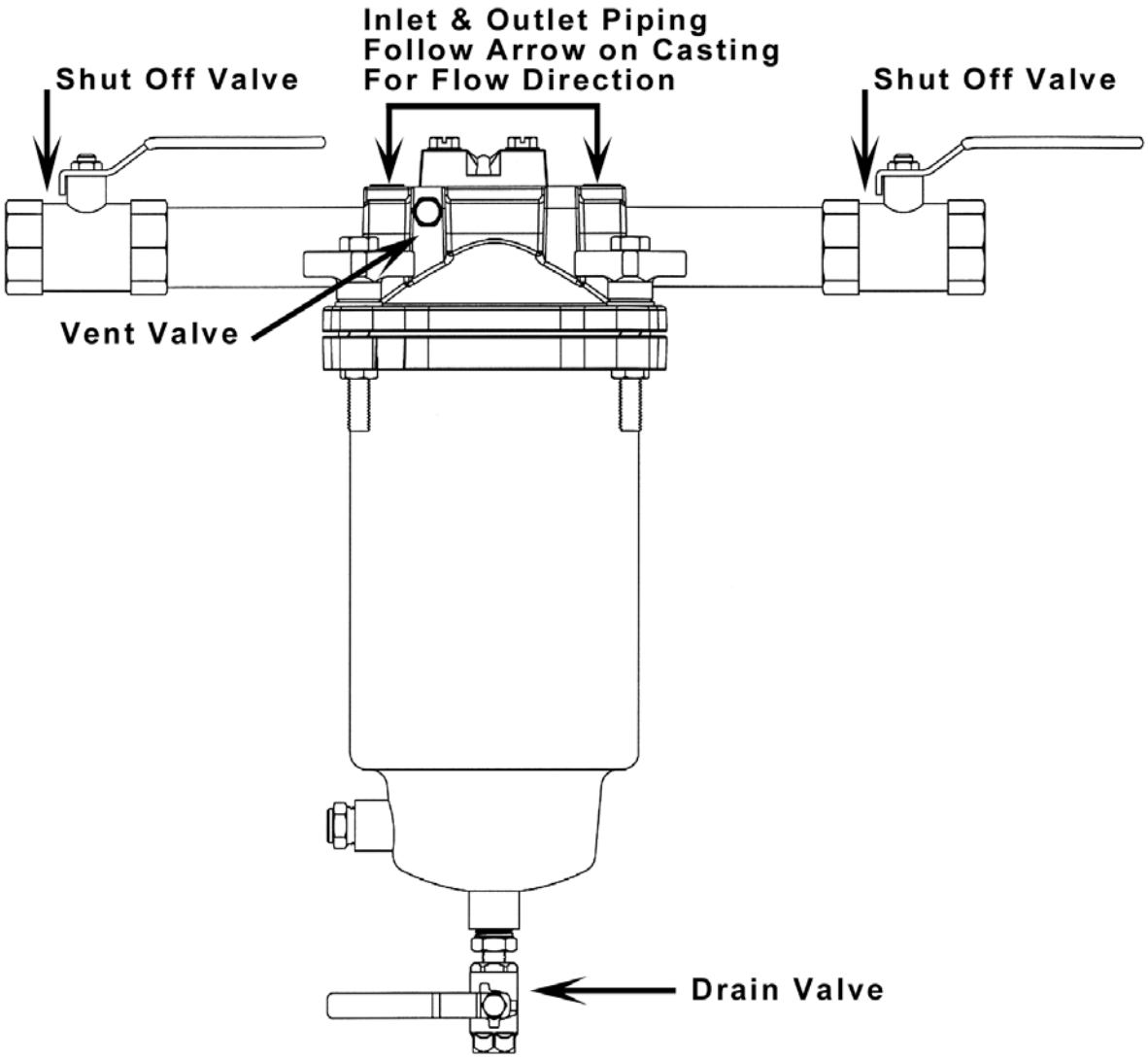
13. Leave the vent valve on top of the unit open; to allow entrapped air to escape while filling.

14. When a small amount of fluid flows from the vent valve, close it tightly.

15. During the initial filling and after the above maintenance, and while unit is in operation, examine housing and all connections for leaks,including head/flange junction

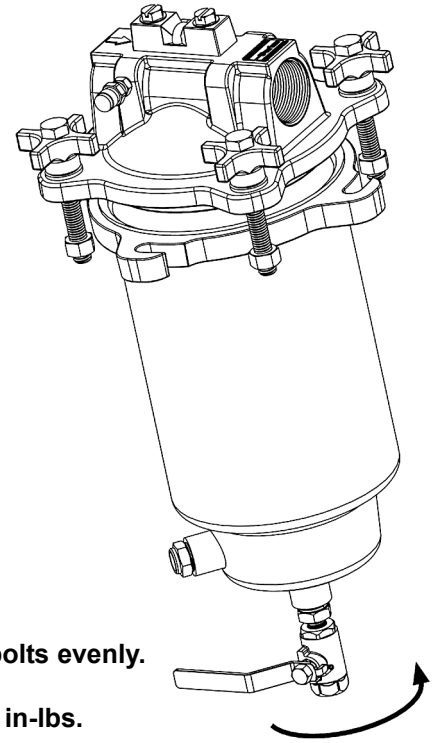
16. Assure any and all leaks are identified and repaired before allowing fuel to flow through housing.

Illustration:
Typical Isolation Valve Layout



NOTE:
Valves should be installed on each side of the filter assembly, so the fuel flow can be shut off during element changeouts or filter assembly maintenance.

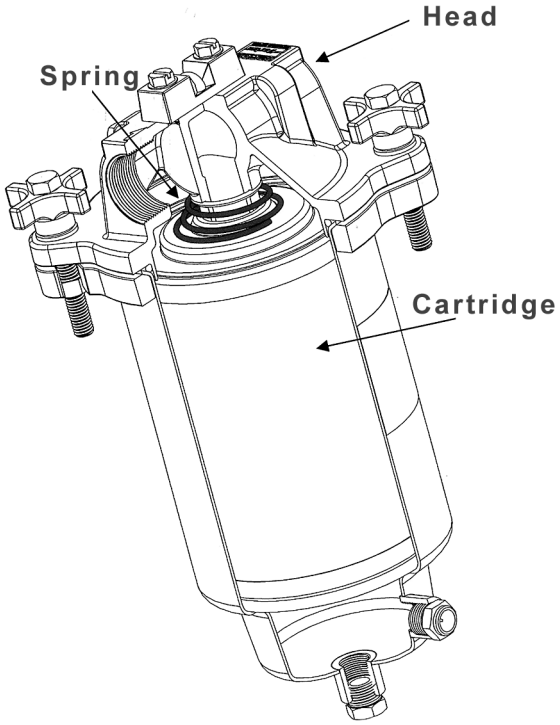
Illustration:
Housing to Head Assembly



NOTE:

1. **Hand tighten all four collar bolts evenly.**
2. **If a torque wrench is used;**
   torque each collar bolt to 50 in-lbs.

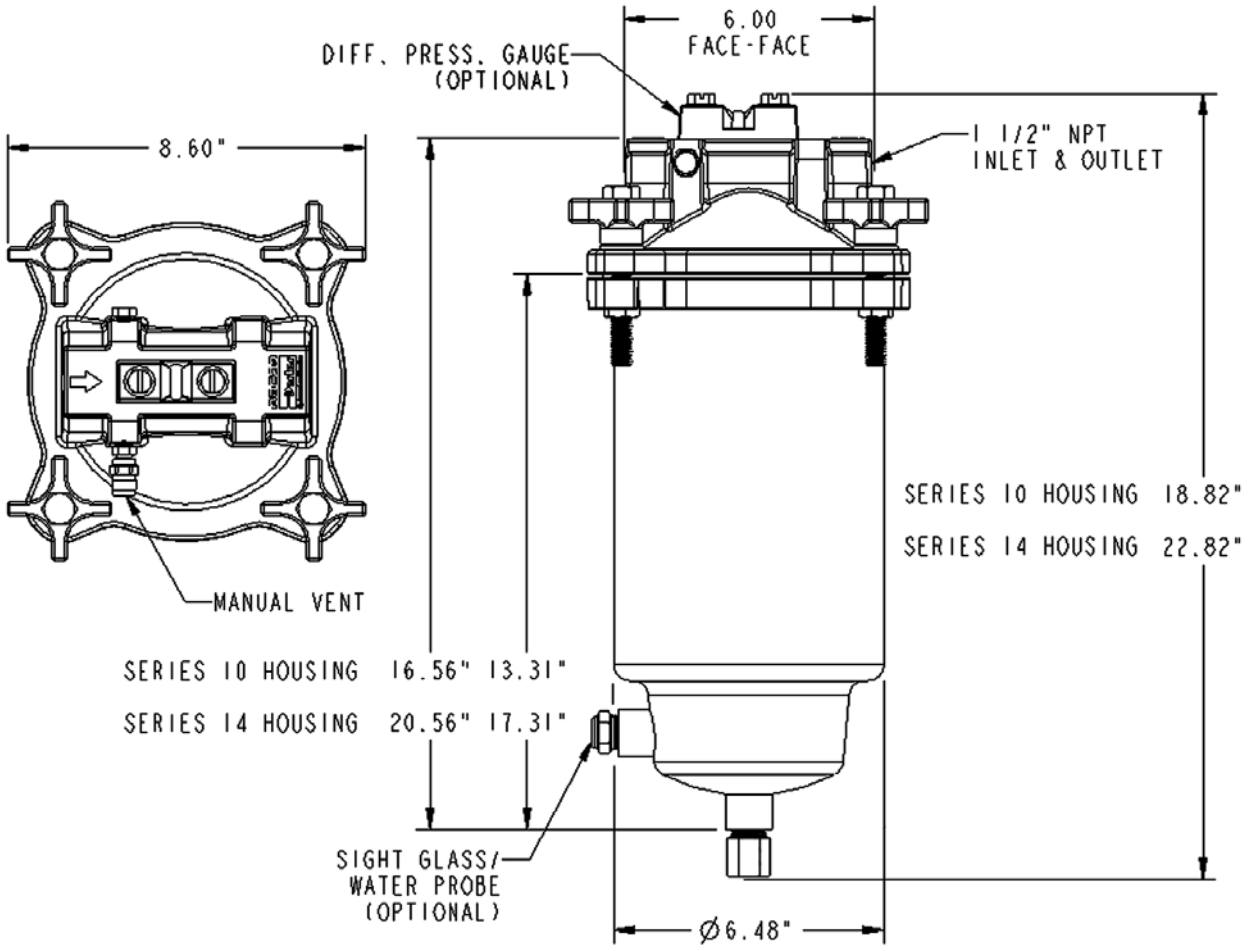
Illustration:
Head/Spring/Cartridge Installation



NOTE:

1. **Location of Spring**

Illustration and Spare Parts List



Spare Parts List

Description	Part Number	Quantity
½" Washer	71328	4
½" Hex Nut	71329	4
Spring	72368	1
Purge Valve	72695	1
O-Ring	72699	1
1/8" Pipe Plug	72700	1
½" Pipe Plug	72701	1
¼" Pet Cock	72702	1
½" – ¼" Bushing	72709	1
Handle Assembly (knob)	72712	4
Sight Glass	72710	1
DP Gauge 15 psid	72694	1
DP Gauge 30 psid	72783	1
Water Probe	RK 30880	1
Housing Assembly FBO-10	72805	1
Housing Assembly FBO-14	72806	1
Head, with DP Gauge Ports	72531	1
Head , without DP Gauge Ports	72718	1
¼" NPT Close Nipple	72812	1
¼" NPT Ball Valve	71943-.25	1

Also Available From Racor

Filter Vessels

Racor manufactures filter vessels with flow rates up to 5,000 gallons per minute. Those vessels include prefilters, vertical filter separators, horizontal filter separators, clay treaters and fuel monitors.

API/IP Qualified Elements

Racor currently produces coalescers and fuel monitors to API/IP qualifications. Qualification reports of each test are available by contacting Racor. These include applications for both vertical and horizontal filter separators and fuel monitor elements.

RVFS Filter Vessels

Racor RVFS filter vessels offer economical systems for flow rates up to 150 gallons per minute for aviation fuels and up to 75 gallons per minute for diesel fuels. RVFS units can be supplied in single units or as duplex systems, with optional electronic monitoring systems. These units are being used with high flow diesel engines as prefilters or as fuel dispensing systems for aviation fuels or diesel fuel.

Filter Elements

Racor manufactures a full range of API/IP coalescers, IP fuel monitors, prefilters, coalescers, separators, synthetic pleated media elements, clay bags and canisters, activated carbon cartridges, fuel monitors, water absorbing elements and spin-on filters, oily water separator elements, and natural gas coalescers.

For more information on Racor Hydrocarbon Filters ask for brochure #7537 or call (800) 451-7299.

Racor also offers a full line of mobile and marine fuel, oil, air and coolant filters for all gasoline, diesel fuel and natural gas powered engines.

For more information on mobile and marine products, call (800) 344-3286.

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