



**Parker Hannifin
Filtration Group
Racor Division**

DUAL FBO
OPERATION AND MAINTENANCE INSTRUCTIONS
SPARE PARTS

DFBO-10-IN/DFBO-14-IN



DFBO-14-MA





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Operation and Maintenance Instructions

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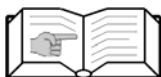
Operation and Maintenance Instructions



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1. PREFACE

This operation manual is intended to acquaint the user with the structure, maintenance and safe use of the DFBO filter. The manual provides instruction for operation and maintenance personnel. Through correct use and maintenance the system can be kept in trouble-free, effective and economic working condition over its entire life span. These operating and maintenance instructions shall be complemented with relevant instructions set forth in local acts and statutes, and in requirements by local authorities.

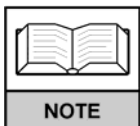


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2. TO THE USER



Before attempting to install, use or maintain the filter you should acquaint yourself with the contents of this manual paying special attention to Chapter 3, “SAFETY INSTRUCTIONS”.

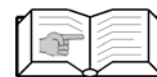
- This manual shall always be kept readily available.
- DFBO filter may only be used and serviced by a properly trained person who knows how the device works.
- When ordering spare parts or making arrangements for maintenance, always quote the name of the device and its serial number as indicated on the type plate.
- Any parts replaced for maintenance or prepare purposes shall be original Parker Hannifin spare parts.
- The manufacturer reserves the right to change the device or its operation and maintenance instructions without prior notice.
- This operation and maintenance manual may not be copied, displayed in public, or given to a third party.

Important Notice:

Only the DFBO-14-MA (Marine) and DFBO-10-CAT (Caterpillar) versions are certified for Marine use. The DFBO-14-IN (Industrial) version is not certified for Marine use.

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3. SAFETY INSTRUCTIONS

3.1. Instruction symbols

The following safety instruction symbols are used in this manual.

PERSON SAFETY RISK



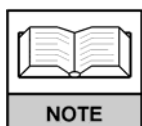
Neglect of safety precaution may cause serious injury or death.

EQUIPMENT OR ENVIRONMENT RISK



Incorrect use or maintenance of the device may cause danger to environment or the device itself

READ OPERATION AND MAINTENANCE INSTRUCTIONS



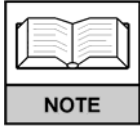
Prior to operating the device you shall read and fully understand the operation and maintenance instructions.



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3.2. Operator safety instructions



The operator shall acquaint himself with the manuals provided by the manufacturer and act according to the instructions they contain. You shall read and fully understand all warnings and safety instructions contained in this manual.

The system shall not be operated if:

- User's or maintainer's training in the operation of the system is insufficient.
- System is not in working order due to unfinished maintenance work or some other reason
- Safety system is out of order.
- Operator or maintainer is tired, sick, or intoxicated



Always use personal safety equipment required in the work or by law, such as safety goggles, earmuffs, hard hat, protective gloves, safety boots, and other necessary safety equipments.



Always have a first-aid kit at hand. Check its contents regularly and complement as necessary.



Before taking the system into use or starting, make sure that it will not cause any danger to persons or the environment. Safety systems may never be bypassed or removed in order to make work easier. Keep warning labels clean and replace them if unintelligible.



Danger of burns. The outer surfaces of the device may come very hot during operation. Do not touch the device without proper protective gloves.



Danger of slipping. Keep the maintenance area clean of oils or other substances that may cause slipping.



Poisoning or allergy risk. None of the fluids used in the device may be swallowed. Avoid skin contact with fluid.

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Risk of fire. Smoking, naked flames, or sparks near of the system cause a risk of fire.



Always have a fire extinguisher at hand and keep it properly serviced.



In case of fire:

- Put out the fire with a fire extinguisher.
- Prevent the fire from spreading.
- Call for help.

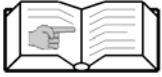


Always aim to protect the environment. Observe the local environment laws when disposing of filters, hoses, fuel, oils, or other waste material.

All detected leaks shall be remedied without delay.

4. TECHNICAL SPECIFICATIONS

Operating pressure:	Max 7 bar (102 psi)
By-pass valve's opening pressure	No by-pass
Operating temperature (min-max):	0 – 60 °C (32-140°F)
Material:	EN-GJS-400-15 / S355J0 / CR03 for all pressurized components
Weight:	40 kg (90#)
Volume:	20 liters (5.3 gal)
Dimensions (WxHxD):	550 mm, 690 mm, 225 mm (22", 27", 9.0")
Filtering element:	5-10-25 µm filter / separator

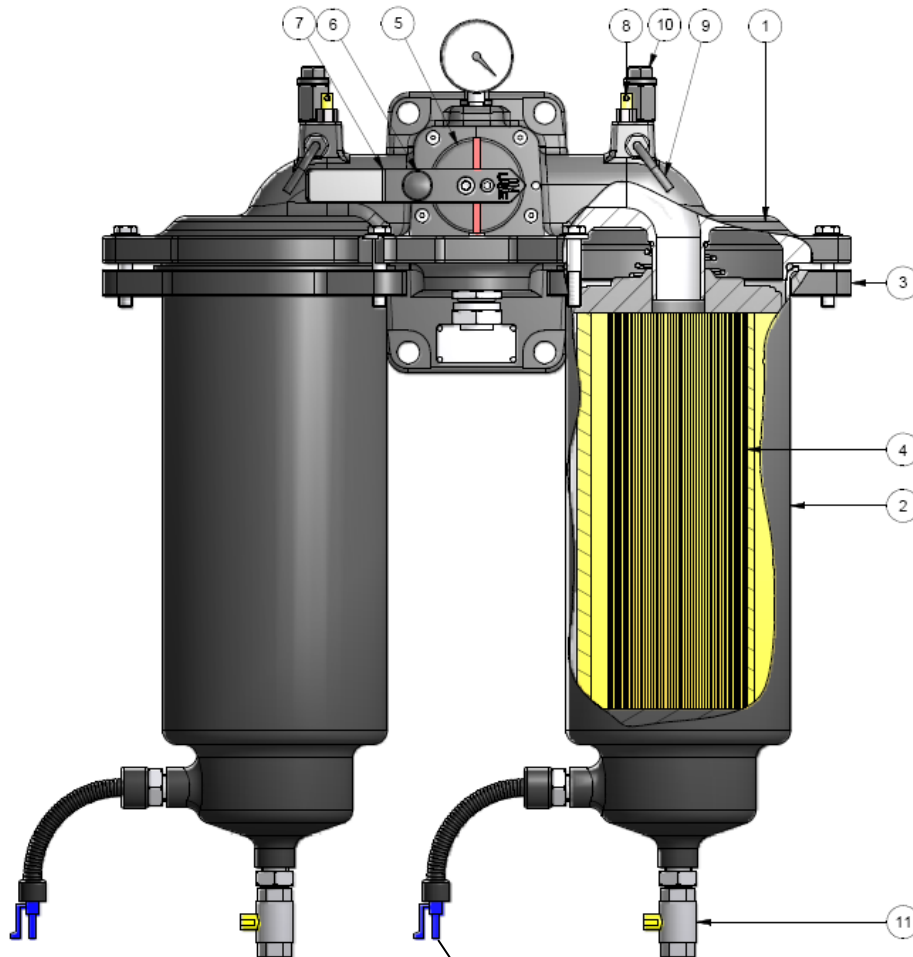


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5. MAIN COMPONENTS



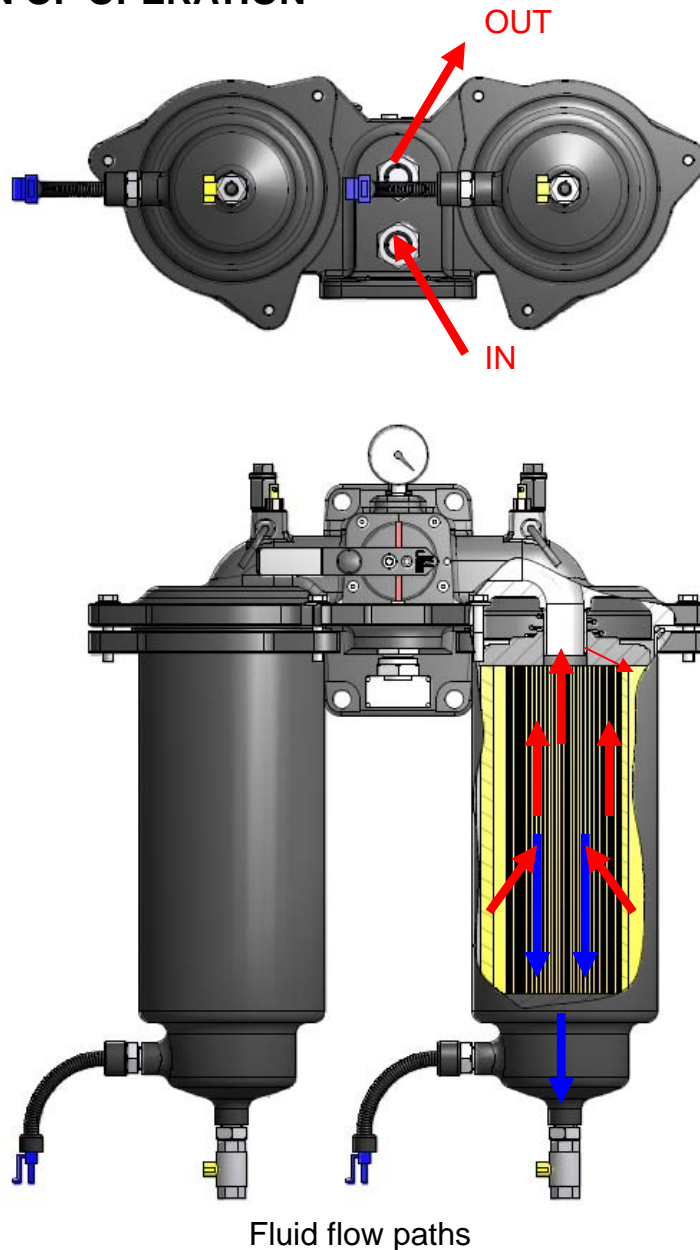
1. Filter housing
2. Filter bowl
3. Clamp
4. Filter element
5. Valve spool
6. Spool locator
7. Spool handle
8. Venting valve
9. Air exhaust port
10. Filling connection
11. Water / oil draining valve

NOTE: WATER SENSORS
ARE OPTIONAL

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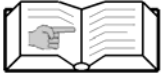
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**6. DESCRIPTION OF OPERATION**

Fluid flow paths

Fluid enters the filter through the inlet connection into the valve by the means of the machine system pressure. The valve directs the flow to one of the reservoirs, according to the user set position. First, the oil is pushed from outside to in through a filter element, which collect the dirt particles. After that, the oil is pushed through a water separation element, which separates water from the oil. The oil (red arrows) exits the filter through the outlet connection. The water (blue arrows) trickles from the surface of the separation element to the bottom of the filter bowl.



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7. INSTALLING AND COMMISSIONING



Before installation, make sure that all components are in proper condition and that all required parts are at the installation site.

7.1. Transporting and storing

Follow these guidelines for transporting and storing:

- Keep the device away from excessive temperature variations and corrosive chemicals.
- Keep the device and accessories dry.
- The device must be kept safe from mechanical effects, hits, excessive static loads and their transport must be performed without deforming or damaging the device/packaging.
- When transported the device/packaging must be secured in a fixed position and should not be transported together with sharp objects.

7.2. Precautions

When installing the system, pay special attention to the following:

- Installation base shall be level and even.
- Supporting bracket or piping may not cause any stresses on the filter (twisting, pulling, etc.).
- Sufficient space is available for installation work (Cf. Installation Drawing).
- Uncoupled accessories like sensors, gauges, etc. are properly connected
- All screws and connections are properly tightened.

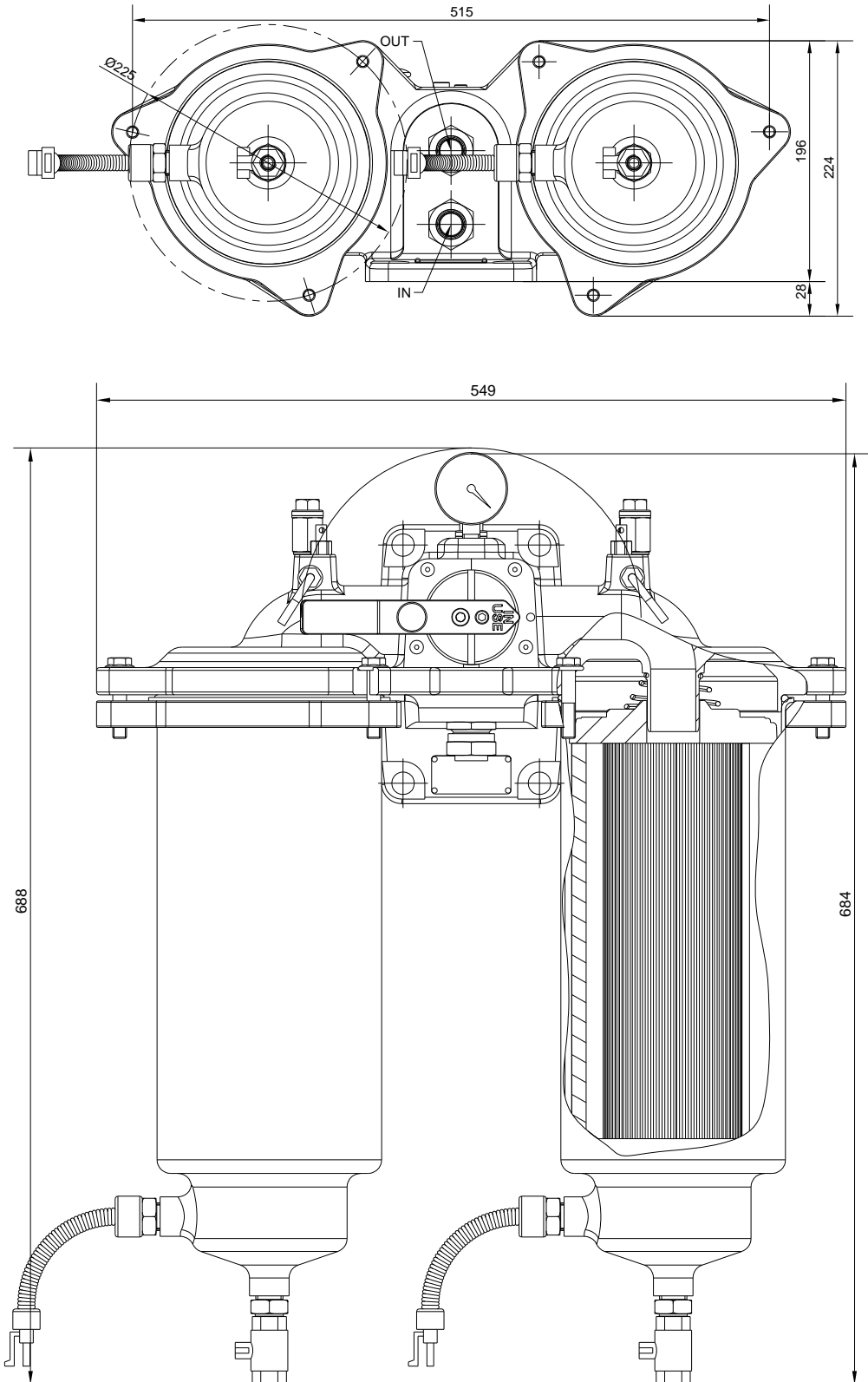
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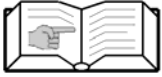
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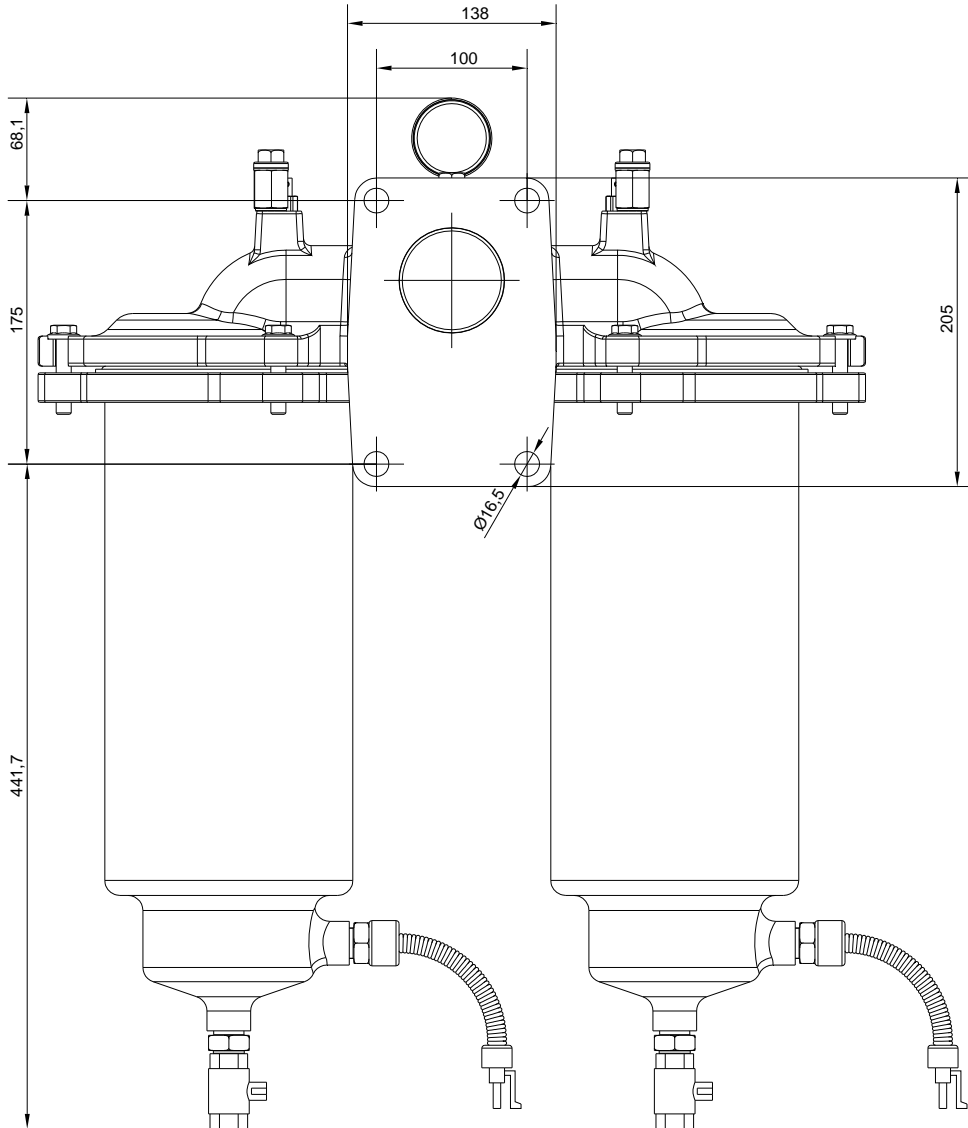
7.3. Installation drawings





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8. USE OF SYSTEM



Before using the system, make sure that it does not cause any danger to persons or the environment.

8.1. Precautions

Before using the filter, make sure that the filter bowls are properly closed and all connections tightly fastened.

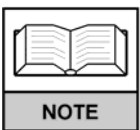
8.2. General use of the filter

Do not exceed specified pressure limits.

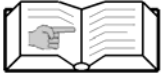
Check the differential pressure over the filter at regular intervals.

In normal operation one chamber is filtrating and the other chamber is on idle.

It is also possible to use both chambers for filtrating. In this case the spool should be in the middle position (the arrow head of the handle pointing downwards).



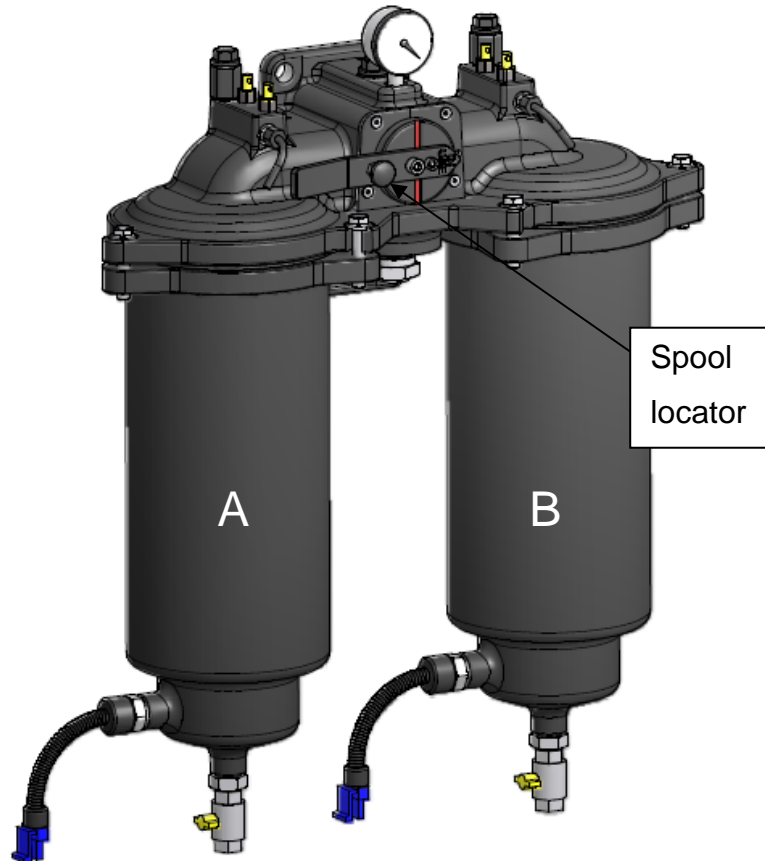
IMPORTANT NOTICE! Pressure measuring connections in the filter housing above the spool **ARE NOT WORKING** in middle position. If the middle position will be used, filter pressure drop indication have to be carried out by the means of external indication devices.



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8.3. Changing the filtering / idling chamber.



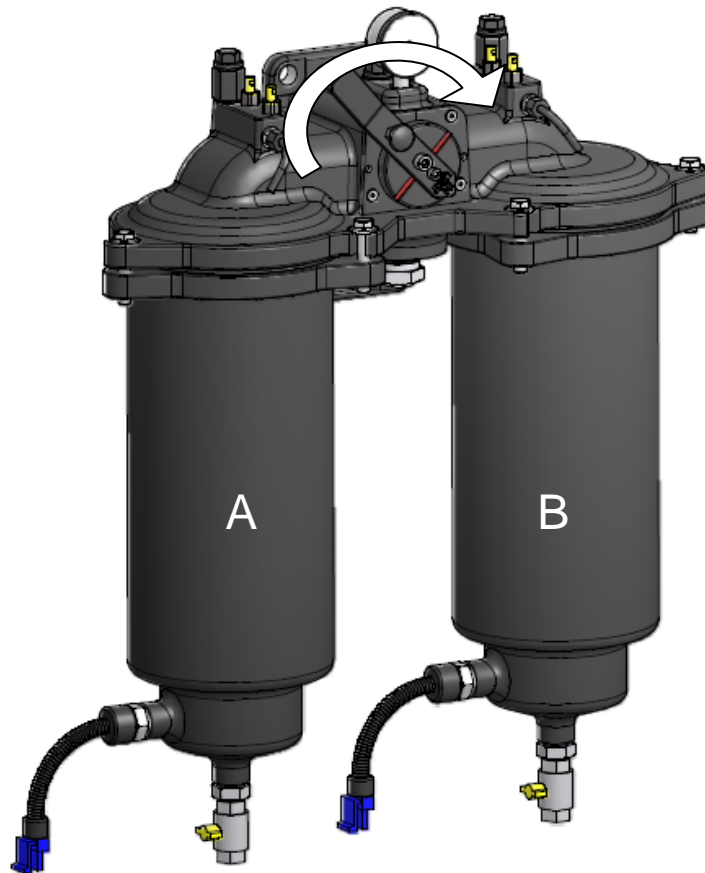
1. Chamber B is filtering according to the text in front of the handle. Pull the spool locator knob to release the spool for turning. Start turning the spool slowly using the handle.

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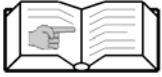
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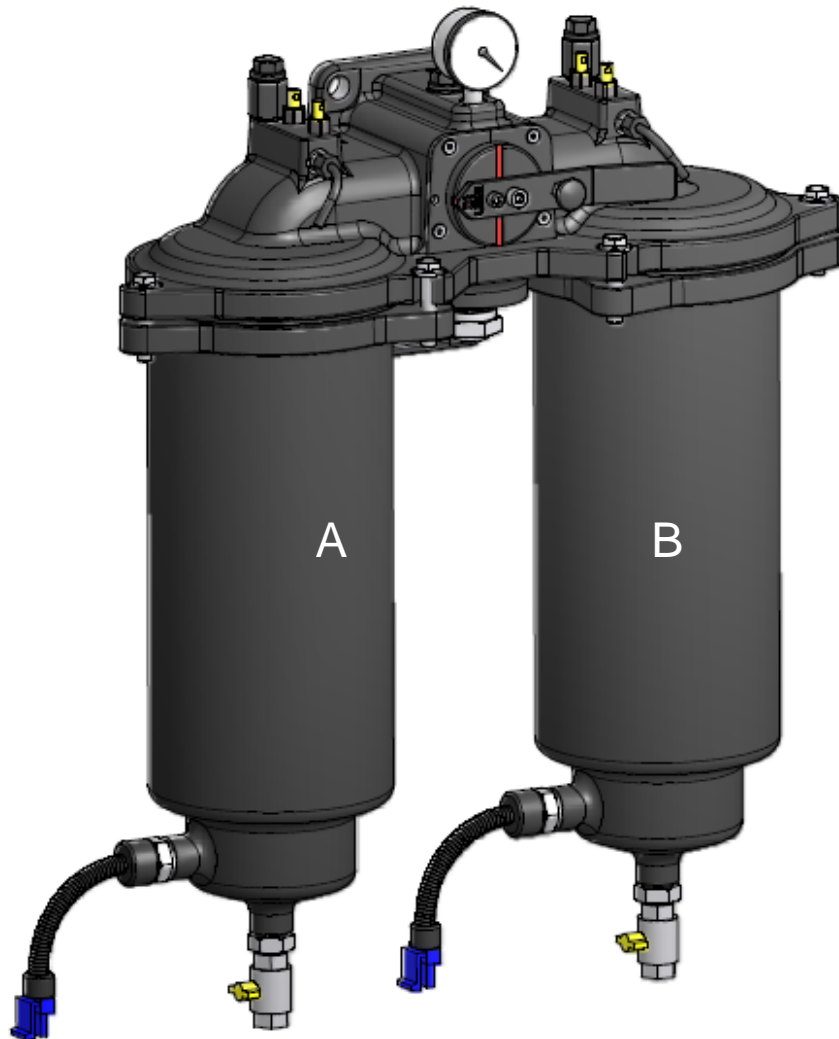


2. After $\frac{1}{4}$ rotation (90°) the spool may stop in the middle position. Release the spool again by pulling the knob and keep turning the spool.



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3. When the spool has been fully turned (180°), make sure that the spool locator locks the valve spool. Chamber A is filtering according the marking in front of the spool.

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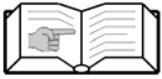
8.4. Malfunctions**Leaks**

- > Tighten joints at and around leaking point.
- > Replace the seals
- > Make sure the system pressure is within specified limits

Excessive pressure drop

- > Make sure the filters have been replaced with a correct procedure and on schedule
- > Replace the filter elements

See maintenance instructions on chapter 9.



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9. MAINTENANCE OF THE SYSTEM



Always use proper tools and lifting devices with sufficient capacity. Replace damaged or defective equipment or lifting devices without delay



There is hot fluid inside the device, and the outer surfaces of the device also become hot. Do not touch the device or attempt to open the filter without proper protection.



Do not change any settings of the system unless instructions are provided in the manual or without authorization from the manufacturer.



Never exceed any of the pressure values given by the manufacturer.



All parts replaced in conjunction with maintenance or repairs shall be original spare parts.



Remember the following notes and warnings concerning pressurized fluids:

- Components and hoses contain high-pressure oil
- High-pressure oil sprays can penetrate the skin and cause severe internal damage. In case of accident, contact a physician without delay.
- Oil is hot and will cause burns on the skin.
- High-pressure oil leaks are not necessarily visible. Do not examine the system for leaks with bare hands, use a piece of cardboard or other equivalent material.
- Before any connections are opened, the system must be made pressureless.
- Clean all connections and components in conjunction with maintenance work.
- Check all connections for tightness.

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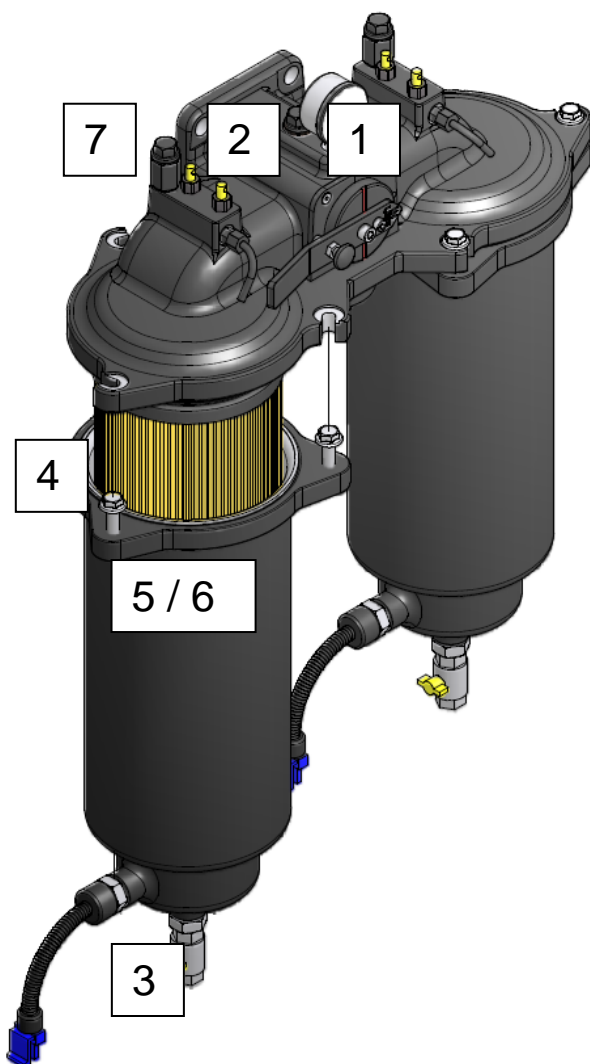


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9.1. Replacing the filter elements

Before opening the filtration chamber make sure of the system is pressureless.

Filter elements have to be replaced by using original Parker Hannifin filter elements.



1. Make sure that the spool is position that the chamber to be serviced is idling. Turn the spool if needed.
2. Open the venting valve carefully.
3. Drain the filter housing by opening the draining valve.
4. Loose the screws and turn the clamp.
5. Take the filter bowl and the filter element of.
6. Assemble the filter in reverse order. Make sure that the filter element is right way round and the o-ring seal is in its place. Put the element in to the bowls and lift the bowl/bowl clamp up. Tighten the screws evenly, max half round of each bolt at a time. Tightening torque 40Nm.
7. Venting

On suction side installation connect filling pump to filling connection. Open the vent valve and fill the chamber. When fluid comes out from the venting pipe, close vent valve.

On pressure side installation turn spool slightly (~30°). Open vent valve(s) carefully. When fluid comes out from the venting pipe, close vent valve(s). Return the spool to the locked position.



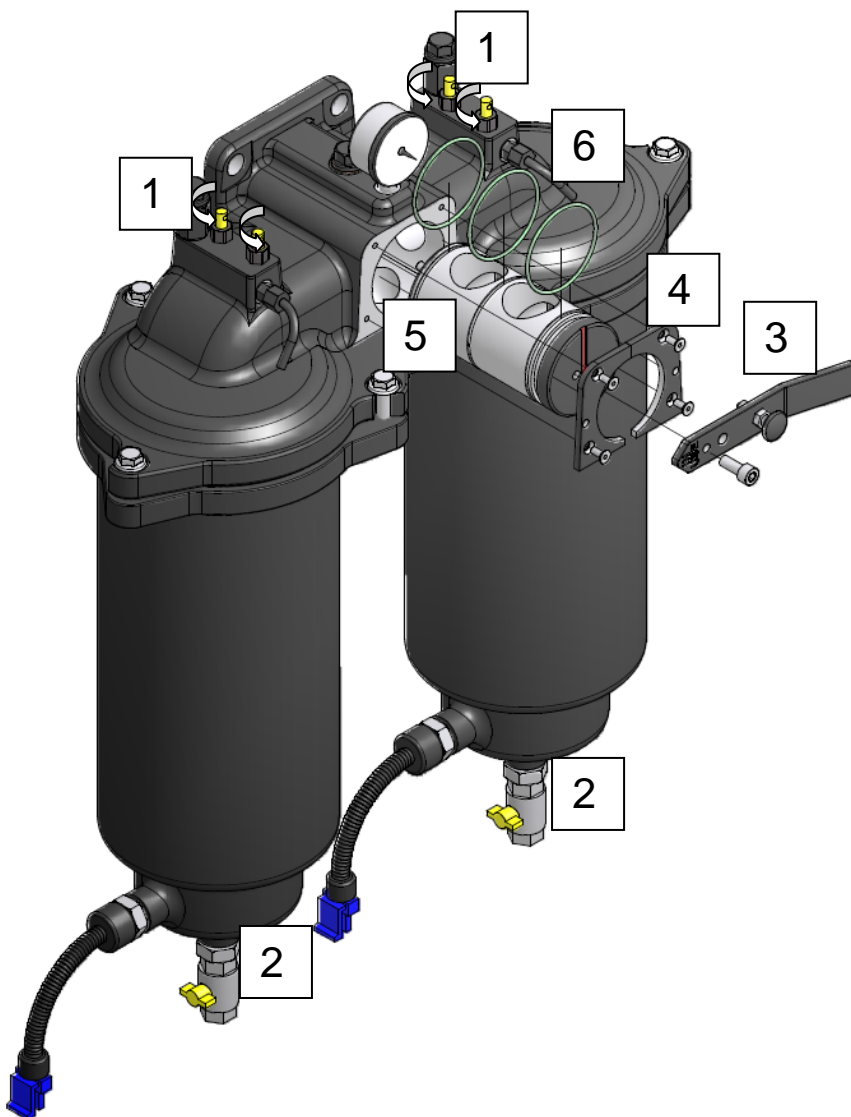
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9.2. Replacing the filter spool sealing



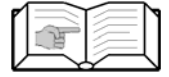
Before opening the filtration chamber make sure of the system is pressureless. Also make sure that no one may start the system during the service.



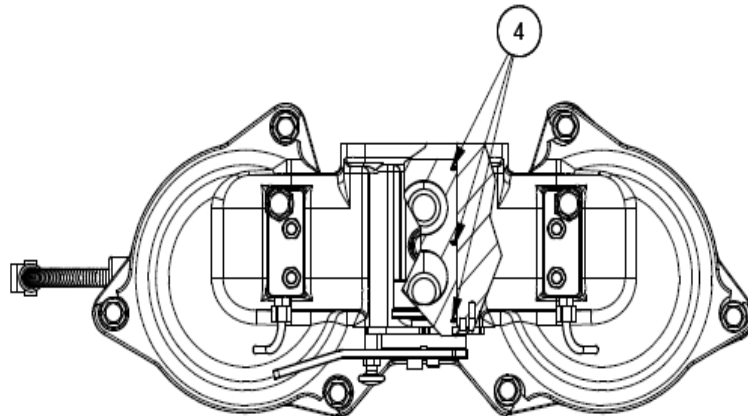
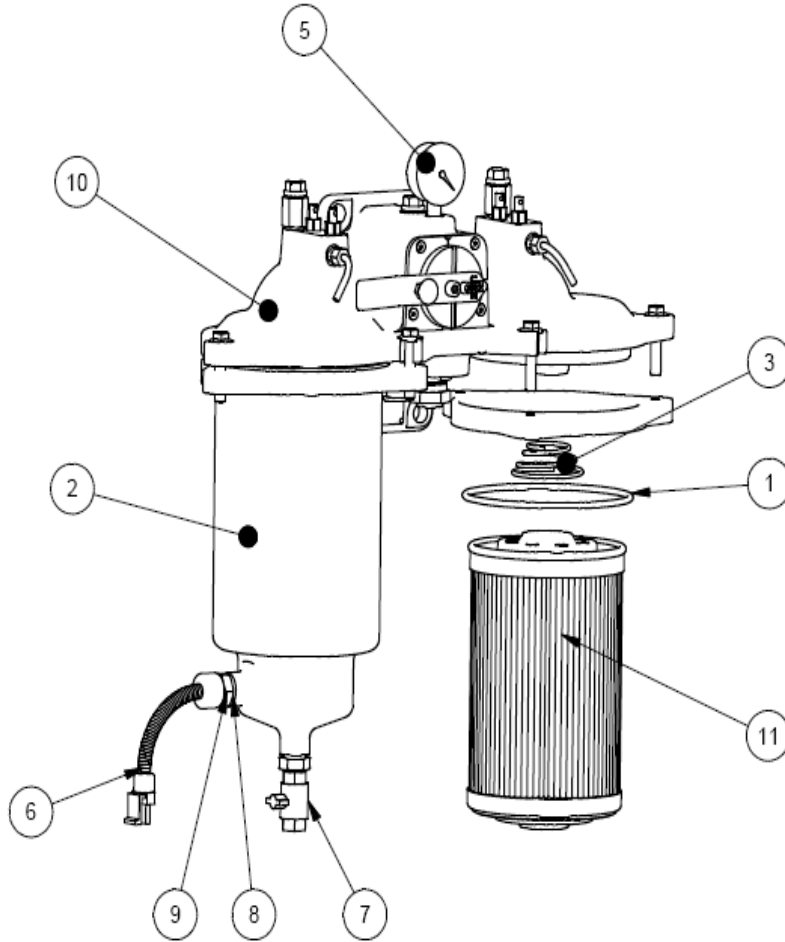
1. Open the venting valves carefully to make sure that the system is pressureless.
2. Filter can be drained from the bottom to minimize oil leakage from the housing when the spool has been removed.
3. Remove the spool locator from handle. It is not necessary to detach the handle.
4. Remove the spool holder(s).
5. Remove the spool with sealing.
6. Change the sealing.
7. Assemble the filter in reverse order.

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10. PARTS LIST & SPARE PART KITS





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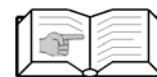
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10. PARTS LIST & SPARE PART KITS

Item#	Description	Standard designation	Order code	Qty
11	Filter element Kit	10" Element 25µ IN & MA 14" Element 25µ IN & MA	FBO 60329 FBO 60338	2
10	Housing	Casting Head/ Flange Assembly	73300000 (IN-yellow) 73301000 (MA-white)	1
9	WIF sensor adaptor		18-1656	2
9	Pipe Plug (MA)	Marine version only	23020	2
8	Sight Glass-(IN)	Industrial version only	72710	2
7	Ball Valve (MA)	Stainless steel ball valve	73350-.5	2
7	Ball Valve (IN only)	Brass ball valve	73225-.5	2
6	Water Sensor (WIF)	OPTIONAL	Racor #RK23191-01	2
5	Vacuum gauge kit (MA)	Marine version	RK11-1676E (MA)	1
5	Differential Pressure gauge kit (IN)	Industrial version only	73149	1
4	Spool O-ring Kit (not shown)	FPM 63.17 x 2.62	Racor #73316	1
3	Spring	Aluminum spring	72368	2
2	Bowl Kit	14" Bowls IN & MA	72806 (IN-black) 73161 (MA-white)	2
2	Bowl Kit	10" Bowls IN & MA	72609 (IN-black) 73154 (MA-white)	2
1	O-ring, Flange	VITON 158.1 x 5.33	OV-13	2

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11. MANUFACTURER'S CONTACT INFORMATION:

**Parker Hannifin
Filtration Group
Racor Division**

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