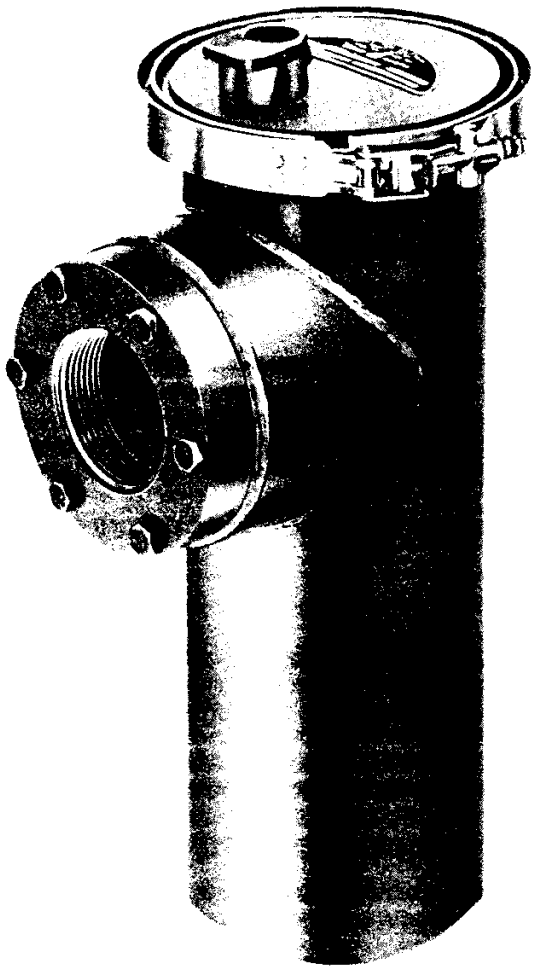
Parker Filtration

Service and Maintenance Instructions

2307 S-M-I May, 1988

CF/RF Filters For Pipeless Installations



CONTENTS

Types 31, 41/42, 51/52, 71/72 CF and RF

OBSOLESCENCE NOTICE

The 31, 41 and 51 Series filters are no longer available; the 71 Series is the only filter in this manual still in production. Replacement parts and elements for the other filters will be available indefinitely.

WHERE PARKER CF/RF SERIES FILTERS ARE USED (FIG. 1)

The CF/RF Series filters are pipeless filters designed to be welded directly into the tank or piped into the system for applications up to 300 psi.

The CF/RF Series is compatible with most hydraulic fluids. With proper media selection, these filters can be used with synthetic fire-resistant fluids as well as with water glycol, and oil and water emulsions. Filter media is available in wire mesh, synthetic, cellulose (paper), or multilayer (composite) material.

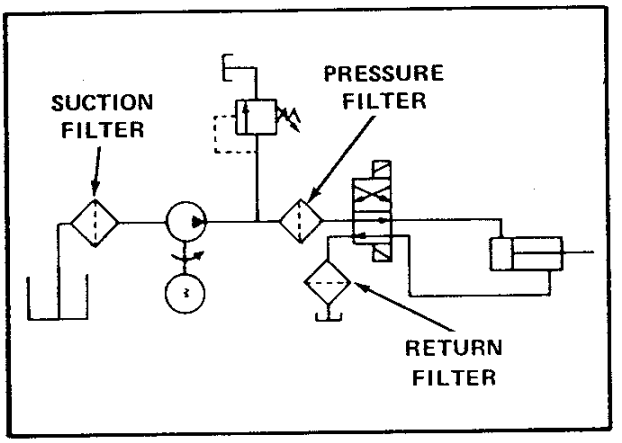


Figure 1. Typical Filter Locations

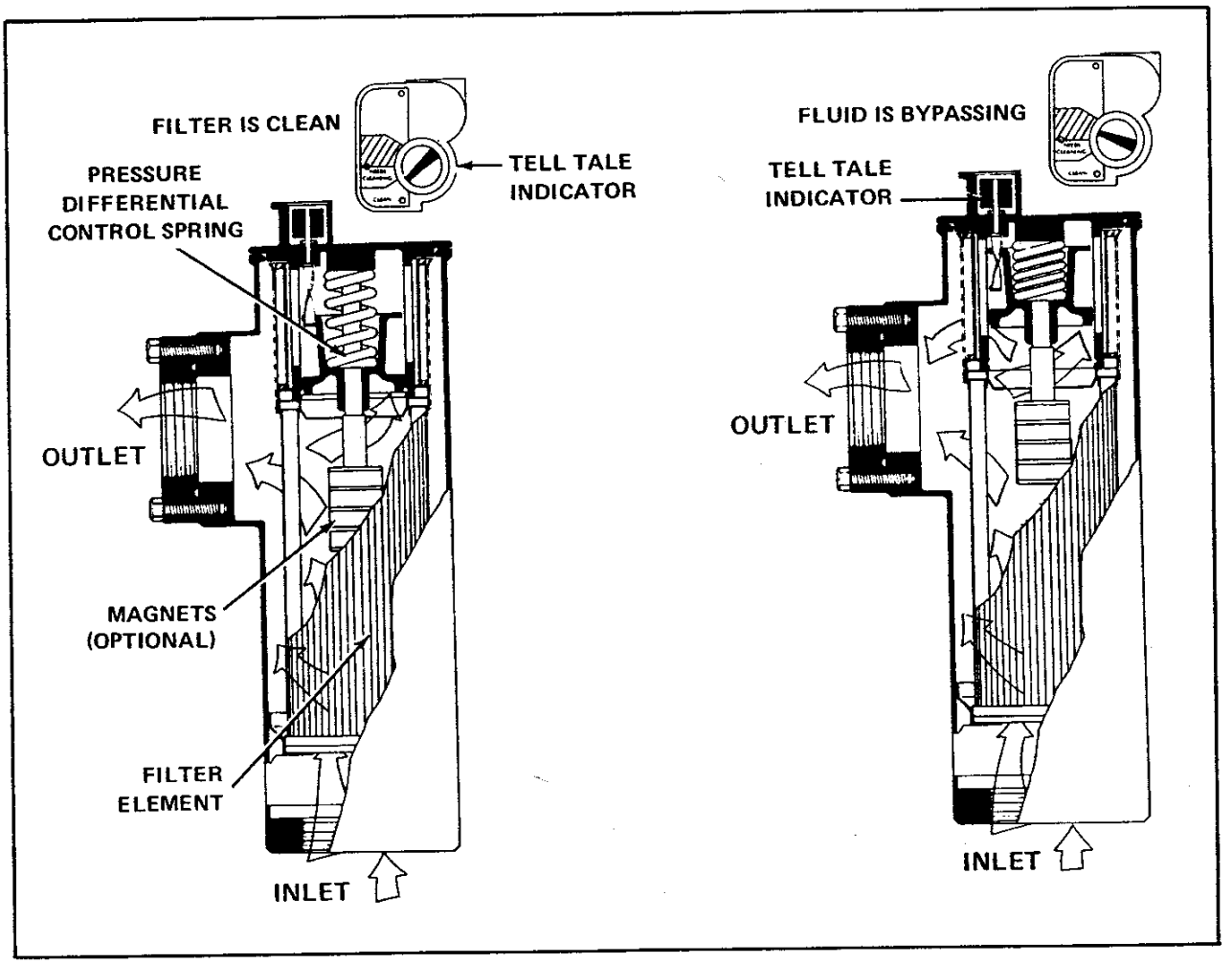


Figure 2. CF Filter Assembly Sectional View

HOW THE CF FILTER WORKS (FIG. 2)

The CF Series is generally used in suction applications. The fluid enters the inlet port at the bottom of the bowl, passes from the inside of the element to the outside, and exits the side outlet port. The inlet and outlet ports for the 31CF/RF are 1-1/2 inch NPTF. The 41/42, 51/52 and 71/72 Series have six-bolt flange circles on their side ports with a variety of port sizes. Socket weld flanges are also available. (Refer to catalog and parts lists.) The 71/72 Series has a bolt circle tapped into the bottom also to accept an optional flange connection. Otherwise, bottom ports are tapped with NPTF threads selected by the user.

As the element becomes contaminated with dirt, the differential pressure across it increases. When the pressure builds enough to unseat the bypass spring, the bypass piston starts to rise. This causes the indicator dial to turn, eventually pointing it in the "NEEDS CLEANING" area. When the pressure has finally approached the bypass setting, the piston rises enough to allow the fluid to start bypassing the element. The pressure differential at this point is equal to, or slightly above the bypass valve spring rating. If the no-bypass option is selected, operation of the indicator is the same, but the piston is modified so it will not allow bypass flow to occur.

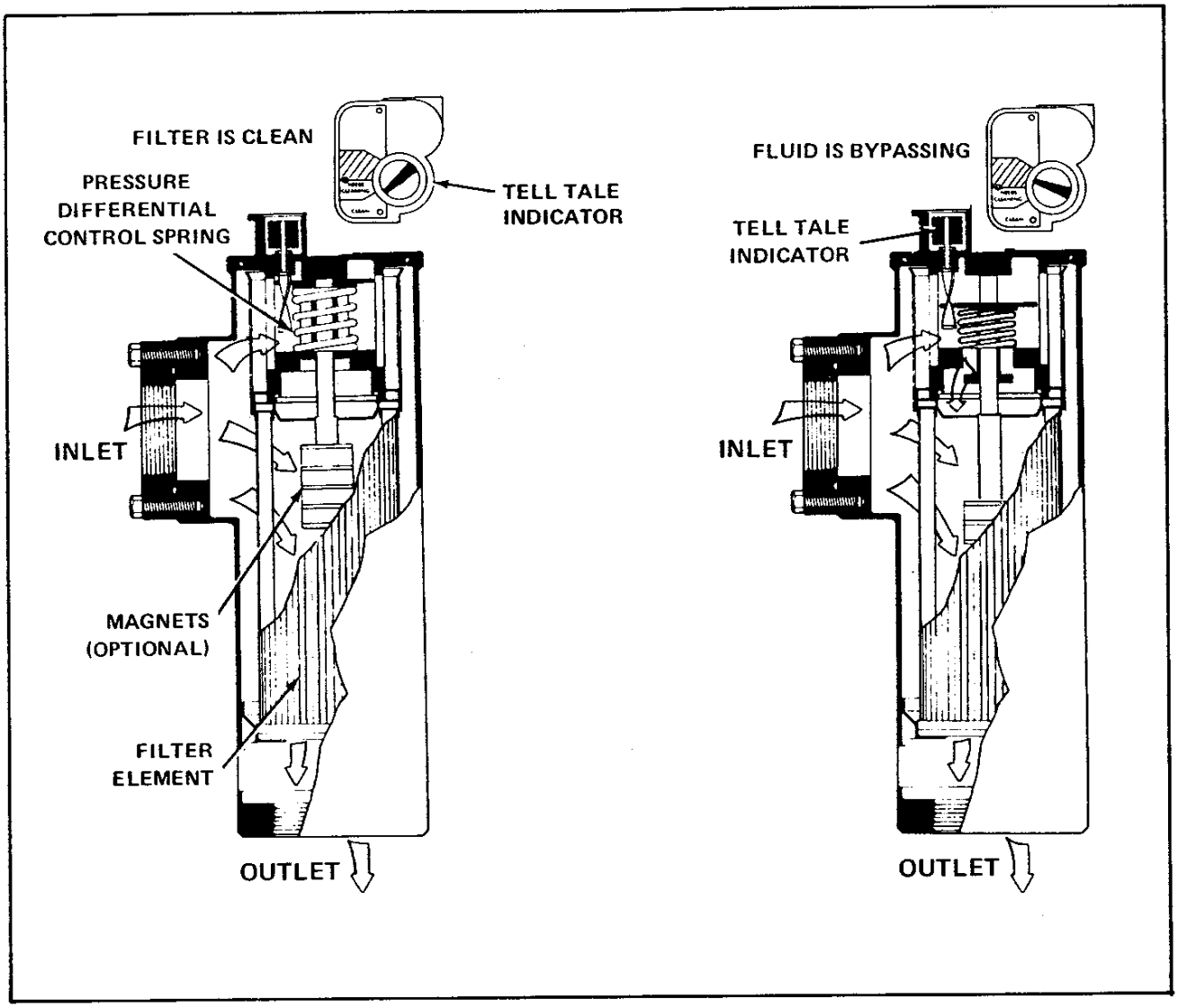


Figure 3. RF Filter Assembly Sectional View

HOW THE RF FILTER WORKS (FIG. 3)

The RF versions are generally used as return line filters. The flow enters the side port, passes from the outside of the element to the inside, and exits the bottom. The bypass and indicator mechanism for the RF Series operates similarly to the CF filters. As the pressure differential increases across the element, the bypass piston is pushed down until bypass occurs if the element is not cleaned or replaced.

As mentioned earlier, these filters can be welded directly in the reservoir, saving space and pipe connections. They can also be externally plumbed directly in the line.

WARNING

To prevent possible damage due to heat, remove cover, element and all seals before welding.

Suction Line (See Figure 4.)

Several precautions should be taken when using a suction filter. A low spring rate should be selected for the bypass control spring (2 or 3 psi) to minimize the maximum pressure drop across the filter. When sizing a suction filter, the clean flow pressure drop should be approximately one-third that of the bypass spring setting. This allows a relatively long element replacement life. (See example.)

All external piping should be kept to a minimum to prevent any added pressure loss. The pipe leading to the filter inlet should not be smaller than the inlet port; do not reduce the inlet port with a bushing.

Example:

If the maximum flow through a 71CF-40W is 150 gpm with 200 SUS oil, the clean flow pressure drop is approximately 1 psid. Therefore, a 3 psid bypass spring is the one to pick (being sure the pump can tolerate this much pressure drop at its inlet).

Return Line (See Figure 5.)

A return line filter is positioned in the circuit just before the reservoir. Being one of the last restrictive devices in a system, pressures are usually below 300 psi MAOP. Caution should be taken when sizing a return line filter. Due to discharging components (cylinders, actuators, etc.) in a system, flow rates through a return line filter can vary. When sizing a return line filter, consider the maximum flow through the filter and size for a clean flow pressure drop of approximately one-third of the bypass spring rate. This allows a relatively long element replacement life.

Example:

If the maximum flow through a 71RF-10C is 170 gpm with 100 SUS oil, the clean flow pressure drop is 5 psid. Therefore, the standard 15 psid bypass spring is satisfactory.

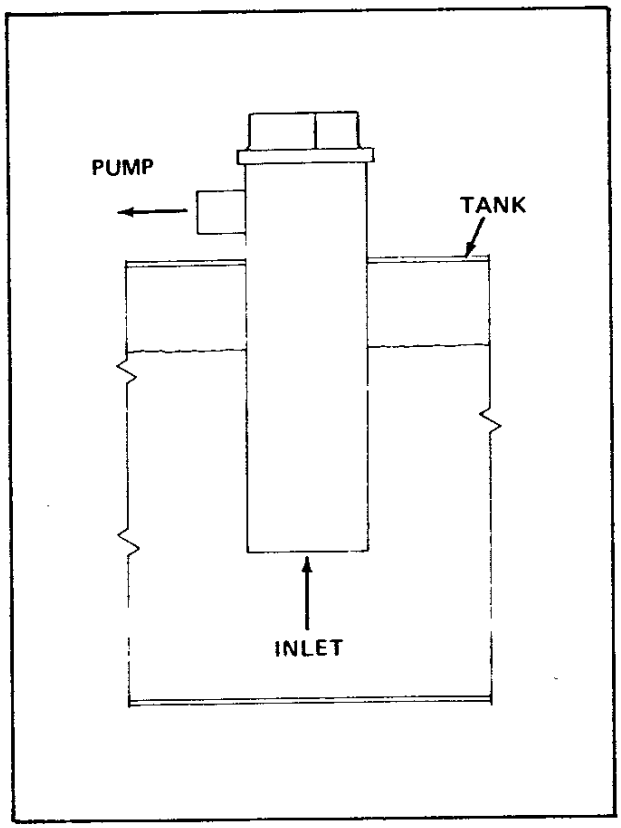


Figure 4. Filter Assembly Used for a Suction Application

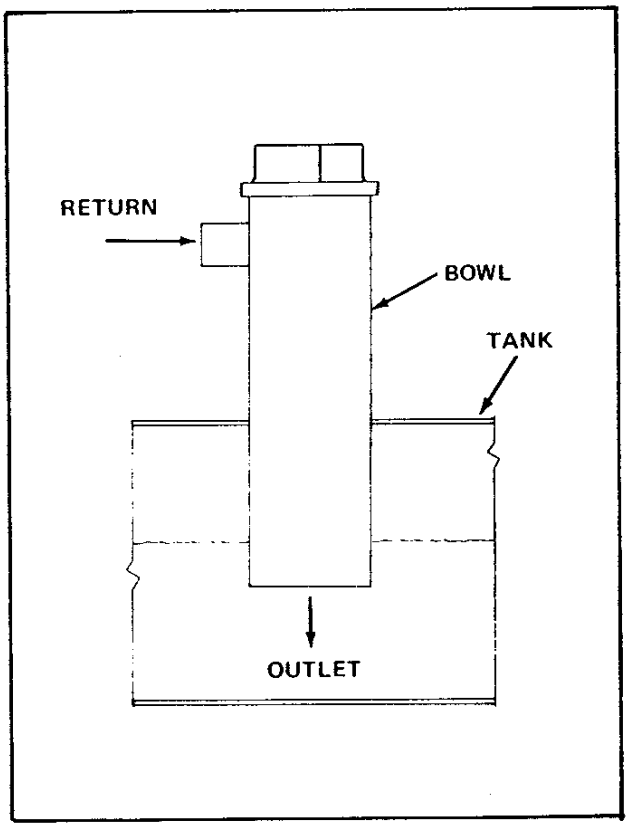


Figure 5. Filter Assembly Used for a Return Line Application

FILTER ELEMENTS AND MEDIA

Table 1. Hydraulic Filter Element Classifications

Element Model Code	Element Type	Filter Media	Time Averaged + Beta X/Y/Z = 2/20/75 Where X/Y/Z is:	Dirt Capacity (Grams)
149W	Surface	Woven Wire	*	*
74W	Surface	Woven Wire	*	*
40W	Surface	Woven Wire	*	*
25W	Surface	Woven Wire	*	*
40SA	Depth	Synthetic	40 micron nominal *	*
20C	Depth	Paper	20 micron nominal *	*
10C	Depth	Paper	10/21/26	45
03C	Depth	Paper	4/8/10	50
10B	Depth	Composite	4/8/10	90
03B	Depth	Composite	<2/3.8/4.7	60

*Not multipass tested + multipass test run @ 100 gpm to 25 psid w/50 ppm anti-static additive.

Tested According to ANSI B93.31-1973 (ISO 4572)

Paper media consists of cellulose fibers impregnated with resin. This media, with the exception of the 10C, is not presently recommended for water base fluids. All disposable media elements are affected by heat, time and humidity. To avoid fatigue failure, temperature should not exceed 250°F and shelf time should not exceed two years. (See Table 1 for Micron Rating.)

Synthetic

Parker synthetic media is a spun-bonded polyester material. It is recommended for petroleum base hydraulic fluids where temperatures do not exceed 250°F or for water base fluids where temperatures do not exceed 150°F. It also has a shelf life of two years. (See Table 1 for Micron Rating.)

Composite

Parker's composite media is multi-layered consisting of wire mesh backing, dividing paper layers, and a bonded fiberglass inner layer. It is recommended for all hydraulic fluids and has a shelf life of 5 years. (See Table 1 for Micron Rating.)

Wire Media

This media is stainless steel suitable for application in all common fluids up to a temperature of 400°F. This media is cleanable, reusable and has absolute micron ratings. (See Table 1 for Micron Rating.)

MAINTENANCE

Key to Clean Fluids

Regular maintenance of filter elements is the key to clean fluid and long component life. Filters do not function when elements are clogged with dirt and bypassed. Therefore, it is important to do two things:

1. Check the indicator frequently to determine when the element needs servicing.

2. Make sure the filter is fitted with the correct element. The correct element or cartridge should be listed on the filter nameplate. If the nameplate is missing, contact your Parker Fluidpower Distributor or Parker Filter Division for assistance.

When to Service the Elements

The Tell Tale Indicator is very helpful and specifically indicates "NEEDS CLEANING". The filter should always be cleaned and the element replaced or cleaned when this occurs.

How to Service Elements

Single-Element Filters, Series 31, 41, 51 and 71

When servicing the filter, keep hands, tools and work area as clean as possible. The procedure for servicing the element is as follows:

1. Shut down the system and relieve the filter of any positive pressure.

2. Remove cover assembly on Series 31 and 41/42 filters by turning counterclockwise several times. The Series 51/52 cover assembly is removed by turning the T-handle. The older Series 71/72 cover assemblies are held on with cover bolts which must be removed. Newer designs of the Series 71/72 have a V-band that holds on the cover.

3. Remove cover assembly by pulling straight out of filter housing.

4. Inspect cover o-ring and replace, if necessary.

5. Remove filter element by pulling straight out of filter housing.

6. Replace element if it is the disposable paper or synthetic type. If a wire element is used, clean it by soaking it in an ultrasonic cleaner for 15 minutes. If an ultrasonic cleaner is not available, soak the element in a hot soap-water-ammonia solution for 15 minutes. Swish it around and then blow-dry it with shop air in a direction opposite normal flow through the element.

7. The optional magnet assembly on Series 31 and 41/42 filters is cleaned by wiping with a clean, lint-free cloth. The magnets on type 51/52 filters are removed by lifting the brass tube off of the rod assembly before cleaning. On Series 71/72 filters, they are taken off by removing the retainer bolt and nut.

8. Reassemble filter.

Double-Element Filters, Series 42, 52 and 72

The maintenance procedures for double-element filters are the same as single-element filters except that two elements are used. The elements are joined with a connector (Figure 6).

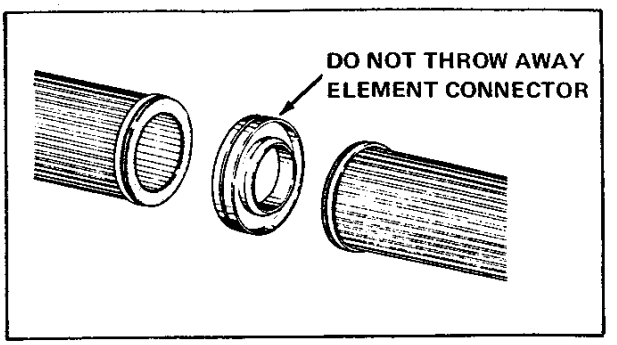


Figure 6. Double–Element Connector

Save the connector when servicing the filters. Replacement connectors are available as shown below:

Filter	Part No.
42CF/RF	921076
52CF/RF	904310
72CF/RF	904718

TROUBLESHOOTING

System Problems

Occasionally, system problems arise and it is difficult to locate the source of trouble. To help determine if the problem might be associated with the filter, Table 2 lists symptoms and solutions to hydraulic system problems.

Fluid Analysis Sample

A periodic fluid analysis is very important in maintaining an acceptable contamination level in an hydraulic system.

To take a fluid sample, select a fitting on the pressure side of the system. Clean the area with a solvent. Allow the system to reach operating temperature, and crack the fitting to allow the fluid to flush the sampling point. Fill a clean sample container with the fluid. (See NFPA Sampling Procedures.)

Fluid analysis is a good tool for monitoring possible changes or problems in an hydraulic system. Refer to ANSI B93.19-1972 for more details.

Parker Filter Division offers complete fluid analysis services. Using a five channel automatic particle counter, the concentration and distribution of contaminant in the sample will be determined. Also, specific characteristics of the fluid can be measured:

1. Specific gravity per ASTM 01298.
2. Viscosity per ASTM 088.
3. Water content per ASTM D96/95.
4. Gravimetric analysis per SAE ARP 785.
5. Neutralization number per ASTM D974.

Any unusual fluid characteristics will be mentioned in the report. By comparing the particle count and fluid properties to contamination standards and fluid specifications, corrective actions are indicated. Precleaned sample containers will be supplied with each fluid analysis ordered from Parker Filter Division.

Table 2. Troubleshooting Chart

Problem	Cause	Solution
Suction Application CF		
Noisy Pump	Entrained air.	Tighten and seal all fittings, add oil to reservoir, check o-ring cover seal on filter.
	Cavitation.	Clean clogged inlet line. Replace dirty filter. Check pump inlet with a vacuum gage.
Excessive Pump Repriming	Entrained air (aeration).	Check o-ring cover seal on filter. Tighten up and seal all fittings.
Indicator points to "Bypass"	Oil viscosity too high.	Allow system to run for short time. Indicator should return to normal condition.
	Element dirty.	Replace disposable element or clean wire element.
Return, Low Pressure Application RF		
Indicator points to "Bypass"	Element dirty.	Replace or clean element.
	Oil viscosity too high.	Allow system to run for short time. Indicator should return to normal.
Incorrect Flow	Back pressure on flow control valve.	Reset flow control valve. Reduce spring rate in filter.
Directional Valve Jammed	Too much back pressure on spool.	Reduce spring rate in filter.
	Contamination.	Clean or replace filter element. Consider element with finer micron rating. (Take a fluid sample to determine cleanliness level; see page 6.)
Frequent Pump Failures Due to Wear	Contamination.	Clean or replace filter element. Consider element with finer micron rating. (Take a fluid sample to determine cleanliness level; see page 6.)

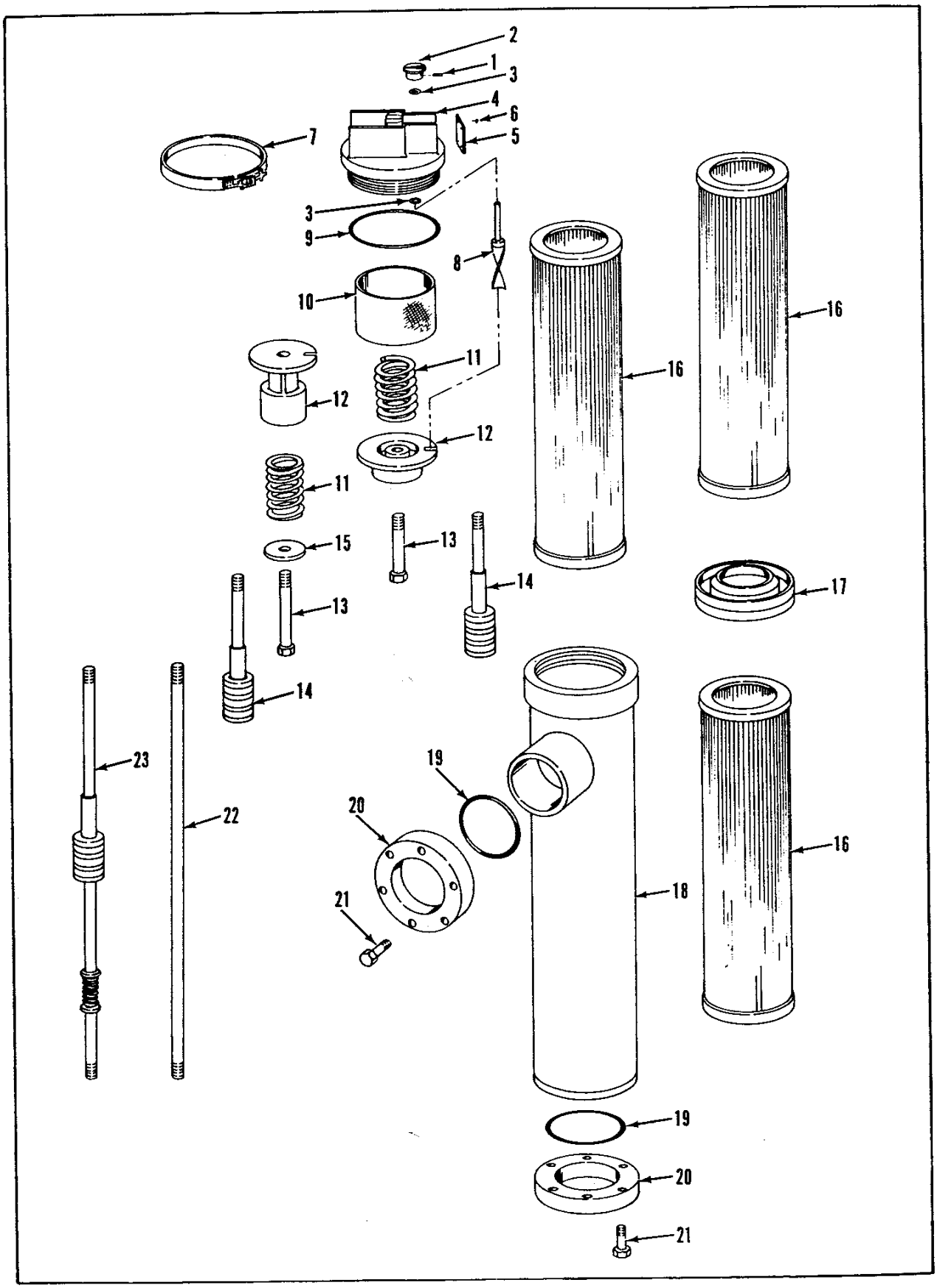


Figure 7. CF/RF Filter Assembly

Table 3. CF/RF Filter Assembly Parts List (Refer to Figure 7.)

Item No.	Description	Part Number 31	41/42	51/52	71/72	Quantity
4	COVER ASSEMBLY		(Refer to Tables 4 and 5)			
5	NAMEPLATE	920928	920928	920928	920928	1
6	SCREW DRIVE, Hex head	903199	903199	903199	903199	2
7	COUPLING, V-Retainer	—	—	—	909876	1
9	O-RING, Cover					
	Buna	N72232	N72241	N72248	N72257	1
	Viton	V72232	V72241	V72248	V72257	1
10	RETAINER ASSEMBLY, Element	920033	908940	906657	904630	1
14	MAGNET ASSEMBLY, CF	920958	—	—	—	1*
	MAGNET ASSEMBLY, RF	920637	—	—	—	1*
	MAGNET ASSEMBLY	—	905904	905904	909931	1*
16	ELEMENT ASSEMBLY		(Refer to Table 6)			
17	CONNECTOR ASSEMBLY, Double-element, (42/52/72 only)	—	921076	904310	926849 ~~904718~~	1
18	HOUSING ASSEMBLY,	920663	—	—	—	1
	41CF/RF	—	920697	—	—	1
	42CF/RF	—	920938	—	—	1
	51CF/RF	—	—	908257	—	1
	52CF/RF	—	—	908259	—	1
	71CF/RF	—	—	—	981903	1
	72CF/RF	—	—	—	981923	1
19	O-RING, Per flange					
	Buna	—	N72228	N72238	N72249	1
	Viton	—	V72228	V72238	N72249	1
20	FLANGE					
	NPTF, 1 inch 'C'	—	909664	—	—	
	NPTF, 1-1/4 inch 'D'	—	909665	—	—	
	NPTF, 1-1/2 inch 'E'	—	909666	909669	—	
	NPTF, 2 inch 'F'	—	—	909670	—	
	NPTF, 2-1/2 inch 'G'	—	—	909671	—	
	NPTF, 3 inch 'H'	—	—	909672	909659	
	NPTF, 4 inch 'K'	—	—	—	909661	
	SAE-20	—	—	909416	920455	*
	Socket weld, 1-1/2 inch	—	920447	—	—	*
	Socket weld, 2-1/2 inch	—	—	920439	—	*
	Socket weld, 3 inch	—	—	909806	920454	*
	Socket weld, 4 inch	—	—	—	909779	*

*Optional

Table 3. CF/RF Filter Assembly Parts List (Refer to Figure 7.) — Continued

Item No.	Description	Part Number 31	41/42	51/52	71/72	Quantity
21	SCREW, Hex head cap per flange	—	900218	—	—	6
21	SCREW, Hex head cap,					
	All flanges except 909672	—	—	900218	—	6
	For 909672 only	—	—	922755	—	6
21	SCREW, Hex head cap,					
	All flanges except 909661	—	—	—	900218	6
	For 909661 only	—	—	—	922755	6
22	TIE ROD ASSEMBLY,					
	51CF/RF	—	—	905769	—	1
	52CF/RF	—	—	906163	—	1
23	TIE ROD AND MAGNET ASSEMBLY,					
	51CF/RF	—	—	924621	—	1
	52CF/RF	—	—	924622	—	1
	TANK FLANGE ASSEMBLY KIT	—	909728	909730	909731	1*

*Optional

Table 4. 31 and 41/42 Series Cover Assemblies

Type	31 SERIES		41/42 SERIES	
	Standard Part Number	No Bypass Part Number	Standard Part Number	No Bypass Part Number
Mechanical				
2 PSID Bypass CF	923611	923623	923801	923807
2 PSID Bypass RF	923707	923717	923849	923855
3 PSID Bypass CF	923612	923624	923802	923808
3 PSID Bypass RF	923708	923718	923850	923856
15 PSID Bypass CF	923615	923627	923805	923811
15 PSID Bypass RF	923575	923721	923853	923859
Electrical (EC)				
2 PSID Bypass CF	923683	923695	923837	923843
2 PSID Bypass RF	923777	923789	923885	923891
3 PSID Bypass CF	923684	923696	923838	923844
3 PSID Bypass RF	923778	923790	923886	923892
15 PSID Bypass CF	923687	923699	923841	923847
15 PSID Bypass RF	923781	923793	923889	923895
Electrical (normally closed/ENC)				
2 PSID Bypass CF	923635	923647	923813	923819
2 PSID Bypass RF	923729	923741	923861	923867
3 PSID Bypass CF	923636	923648	923814	923820
3 PSID Bypass RF	923730	923742	923862	923868

Table 4. 31 and 41/42 Series Cover Assemblies — Continued

Type	31 SERIES		41/42 SERIES	
	Standard Part Number	No Bypass Part Number	Standard Part Number	No Bypass Part Number
15 PSID Bypass CF	923639	923651	923817	923823
15 PSID Bypass RF	923733	923745	923865	923871
Electrical (normally open/ENO)				
2 PSID Bypass CF	923659	923671	923825	923831
2 PSID Bypass RF	923753	923765	923873	923879
3 PSID Bypass CF	923660	923672	923826	923832
3 PSID Bypass RF	923754	923766	923874	923880
15 PSID Bypass CF	923663	923675	923829	923835
15 PSID Bypass RF	923757	923769	923877	923883

NOTE: These cover assemblies do not include magnets. When replacing cover assemblies equipped with magnets, retain the old magnet assembly or order a new magnet assembly.

Table 5. 51/52 and 71/72 Series Cover Assemblies

Type	51/52 SERIES		71/72 SERIES	
	Standard Part Number	No Bypass Part Number	Standard Part Number	No Bypass Part Number
Mechanical				
2 PSI Bypass CF	923897	923903	923993	924005
2 PSI Bypass RF	923945	923951	924089	924101
3 PSI Bypass CF	923898	923904	923994	924006
3 PSI Bypass RF	923946	923952	924090	924102
15 PSI Bypass CF	923901	923907	923997	924009
15 PSI Bypass RF	923949	923955	924093	924105
Electrical (EC)				
2 PSI Bypass CF	923933	923939	924065	924077
2 PSI Bypass RF	923981	923987	924160	924172
3 PSI Bypass CF	923934	923940	924066	924078
3 PSI Bypass RF	923982	923988	924161	924173
15 PSI Bypass CF	923937	923943	924069	924081
15 PSI Bypass RF	923985	923991	924164	924176
Electrical (normally closed/ENC)				
2 PSI Bypass CF	923909	923915	924017	924029
2 PSI Bypass RF	923957	923963	924112	924124
3 PSI Bypass CF	923910	923916	924018	924030
3 PSI Bypass RF	923958	923964	924113	924125
15 PSI Bypass CF	923913	923919	924021	924033
15 PSI Bypass RF	923961	923967	924116	924128

NOTE: These cover assemblies do not include magnets. When replacing cover assemblies equipped with magnets, retain the old magnet assembly or order a new magnet assembly.

Table 5. 51/52 and 71/72 Series Cover Assemblies – Continued

Type	51/52 SERIES		71/72 SERIES	
	Standard Part Number	No Bypass Part Number	Standard Part Number	No Bypass Part Number
Electrical (normally open/ENO)				
2 PSI Bypass CF	923921	923927	924041	924053
2 PSI Bypass RF	923969	923975	924136	924148
3 PSI Bypass CF	923922	923928	924042	924054
3 PSI Bypass RF	923970	923976	924137	924149
15 PSI Bypass CF	923925	923931	924045	924057
15 PSI Bypass RF	923973	923979	924140	924152

NOTE: These cover assemblies do not include magnets. When replacing cover assemblies equipped with magnets, retain the old magnet assembly or order a new magnet assembly.

Table 6. CF and RF Filter Replacement Elements

Element*	Type	Part Number			
		31 Series	41/42 Series	51/52 Series	71/72 Series
149W					
Buna		920522	924737	909299	909309
Viton		923440	925217	923534	923548
74W					
Buna	CF	—	924739	909293	909303
Viton	CF	—	925219	923539	923553
74W					
Buna	RF	—	—	—	909308
Viton	RF	—	—	—	923554
40W					
Buna		920523	924740	909297	909307
Viton		923443	925220	923535	923549
25W					
Buna	CF	—	—	909291	909301
Viton	CF	—	—	923541	923555
25W					
Buna	RF	—	—	909296	909306
Viton	RF	—	—	923542	923556
40SA					
Buna		922783	924730	922785	922787
Viton		923439	925210	923543	923557
20C					
Buna		920468	924735	908643	908649
Viton		923438	925215	923536	923550
10C					
Buna		920002	924734	908642	908648
Viton		923437	925214	923537	923551
03C					
Buna		924458	924733	924464	924467
Viton		924459	925213	924465	924468
10B					
Buna		—	924732	987111	987141
Viton		—	925212	923538	923552

*42, 52 and 72 CF/RF Assemblies require two elements.

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