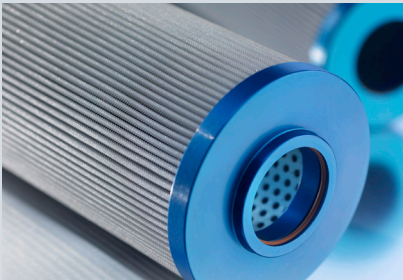
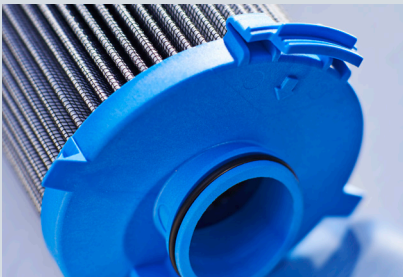




Hydraulic Filtration Product Guide

Spin-ons • Cartridges • In-tank • Low Pressure • Medium Pressure • High Pressure • Duplex • Accessories



Donaldson Delivers Performance Under Any Pressure!

Clean, dry oil is essential for your equipment. Donaldson Company, a leader in filtration for over 100 years, has proven performance in thousands of applications – offering the industry's largest selection of replacement hydraulic, lube and gear oil filtration products for contamination control.

Distributed by:

How Donaldson Displays Filter Flow versus Pressure Loss Data

Pressure Drop (ΔP) Correction Formulae

To properly calculate pressure loss for viscosity and/or specific gravity, use the filter and housing formulae below to determine the clean filter assembly pressure drop.

Filter Correction Calculation

$$\Delta P \text{ Filter} = \Delta P \text{ from graph} \times \frac{\text{New Saybolt Seconds Universal Viscosity (SSU)}}{150} \times \frac{\text{New Specific Gravity (S.G.)}}{.90}$$

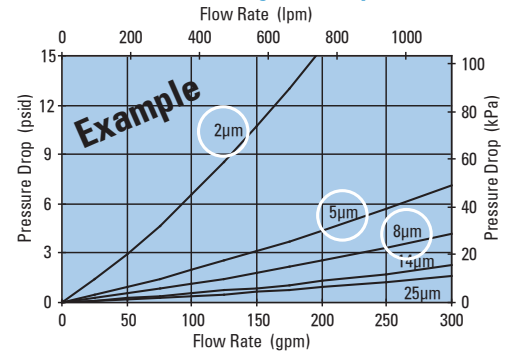
- or -

$$\Delta P \text{ Filter} = \Delta P \text{ from graph} \times \frac{\text{New Centistokes Viscosity (cSt)}}{32} \times \frac{\text{New Specific Gravity (S.G.)}}{.90}$$

Clean Filter Assembly Pressure Drop (ΔP) Calculation

$$\Delta P \text{ Clean Filter Assembly} = \Delta P \text{ head} + \Delta P \text{ filter}$$

Filter, Head or Housing/Assembly Reference



Performance Curve Notes

- All flow measurements were made with 32cSt [150 SSU] hydraulic oil at 100°F (37.7°C), fluid specific gravity of 0.9.
- The performance curves displayed are for the filter, head or housing assembly.
- Filter performance curves will either list media numbers or beta ratings (see circled areas on chart above). These labels correspond with the filter choice tables.

The Importance of Temperature in Determining Pressure Drop

Fluid viscosity plays an important role in restricting the flow through filters. It's crucial to select the proper filter to maintain adequate flow and avoid excessive pressure drops. Measured in centiStokes (cSt) or Saybolt Seconds Universal (SSU or SUS), fluid viscosity is the resistance of a fluid to flow (thickness of fluid). Low viscosity fluids pass through filters with less resistance than high viscosity fluids. Higher fluid viscosities have higher pressure drops due to higher resistance passing through the media. The colder the fluid, the higher the viscosity, so the lowest potential temperature of the fluid is the best measure for calculating pressure drop.

Use the chart below to determine the viscosity of the fluid to be filtered at its lowest potential temperature.

Oil Kinematic Viscosity Combined With Temperature in Centistokes cSt

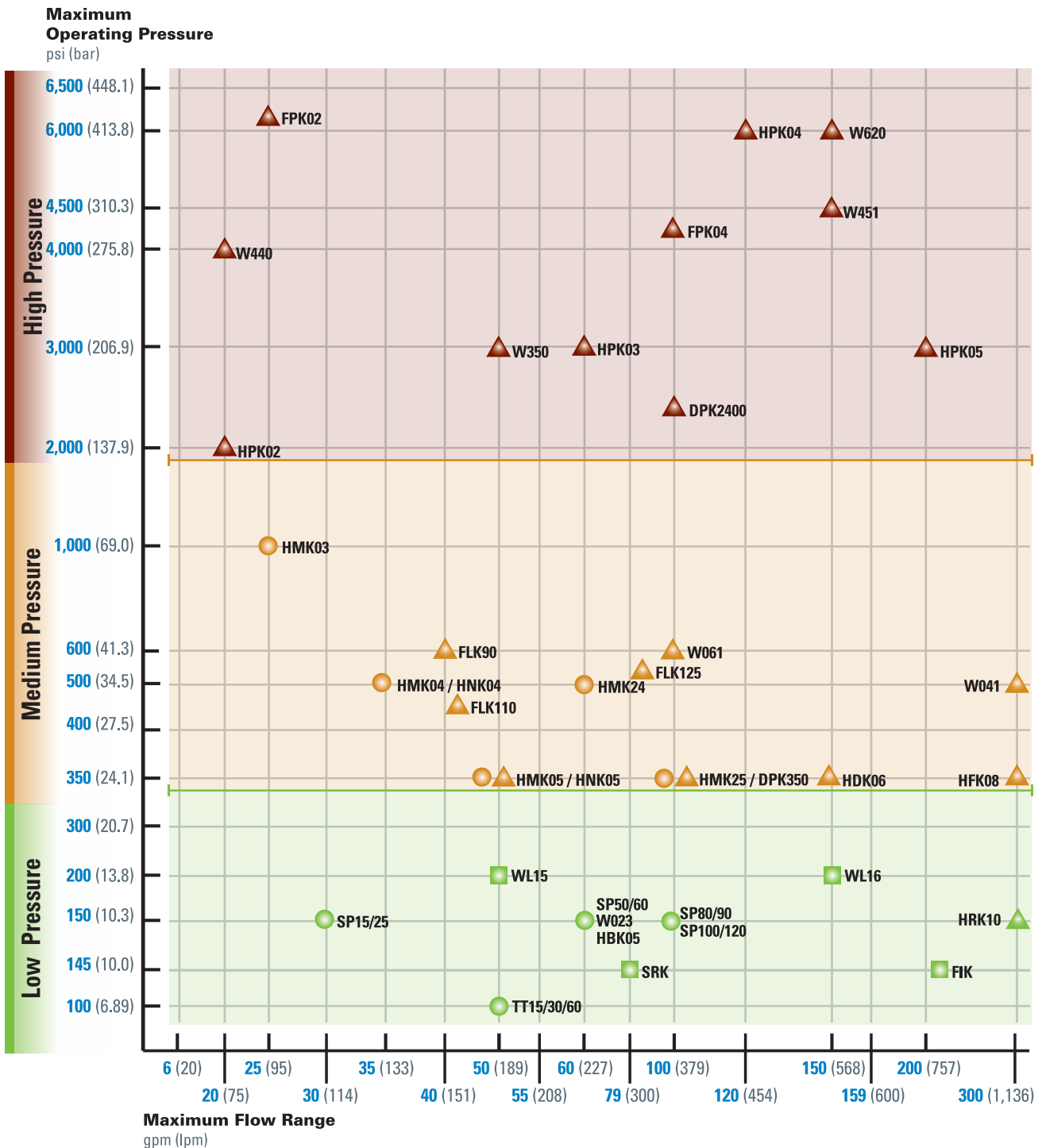
SAE Gear Oil			75W			80W		85W	90			140	
SAE Engine Oil			5W	10W	20		30	40	50				
ISO Grade			15	22	32	46	68	100	150	220	320	460	680
°F	°C	Diesel											
248	120				4	4	6	7	9	12	13	18	23
230	110				4	6	7	9	12	15	19	24	30
212	100		1	5	5	7	9	11	15	19	25	32	41
194	90		3	5	7	9	11	15	20	26	34	44	58
176	80		5	7	9	11	15	20	27	36	48	63	85
158	70		6	9	11	15	20	28	39	52	71	95	130
140	60		8	12	15	21	29	40	57	80	110	151	211
122	50		11	15	22	30	43	62	99	128	181	254	365
104	40	1	15	22	32	46	68	100	150	220	320	460	680
86	30	2	21	32	51	76	116	175	271	409	613	907	1,380
68	20	3	33	51	87	135	214	334	536	838	1,290	1,980	3,130
50	10	4	52	87	162	264	438	711	1,190	1,920	3,070	4,870	8,020
32	0	5	85	180	340	585	1,020	1,720	2,990	5,060	8,400	13,900	23,900
14	-10	9	185	375	820	1,500	2,770	4,880	8,890	15,700	27,200	47,000	85,000
-4	-20	15	400	800	2,350	4,650	91,20	16,800	32,300	60,000			

Hydraulic Filter Housing Selection Guide

Locate the Donaldson model closest to the intersection of the maximum operating pressure and maximum flow rate. If there is not a model at the exact intersection, select the nearest series to the right or above the intersection to ensure a filter that is adequate to handle the maximum operating pressure and flow rate has been selected.

Pressure families are color coded in the selection chart for low, medium and high model series. Filter housing styles are identified by their shape.

Filter Housing Style Code



Selecting the Proper Hydraulic Filter

Sensitive hydraulic circuits are vulnerable to a variety of contaminants that result in inefficiency, downtime and excessive repair costs. It is important to remember that protecting and maintaining the most sensitive components within a circuit will result in effective contamination control.

With the broad range of housing styles and filters available from Donaldson, how do you choose the right filter to reliably protect your systems and equipment? Follow these recommended steps to identify the correct Donaldson filter and parts required for efficient contamination control.

1 Determine the system operating pressure and flow rate

Start by identifying two key factors in the hydraulic system operating environment for the most critical component being protected, such as pumps and motors.

- nominal and maximum operating pressure
- nominal and maximum flow rate

2 Select the filter housing model

Refer to the *Hydraulic Filter Model Series Selection Guide* on the left to select the filter housing that meets your requirements.

- Pressure families are color coded for low, medium and high models.
- Housing styles are identified by their shape code: spin-on, in-tank and in-line
- Porting type options – see page 3 for model series details.

3 Consider application factors when selecting the filter

After the appropriate housing is identified, other application factors must be considered when selecting the appropriate filter. Use the filter choice tables to determine a specific part number.

- components being protected
- ISO Code desired
- fluid type and material compatibility
- oil viscosity (SUS/cSt) & temperature
- vibration/cyclic flow surges
- media type
- flow rate (GPM/LPM)
- maximum allowable pressure drop
- efficiency / beta rating
- seal options
- standard vs. high-performance filters
- servicing and installation convenience

4 Choose the appropriate line and reservoir accessories

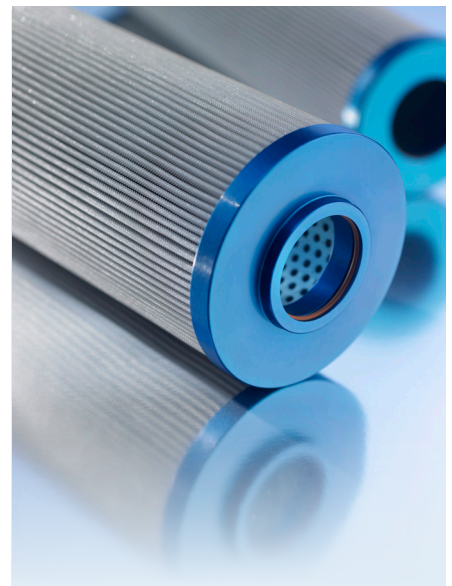
Items such as breathers, suction strainers, and gauges are important parts of an overall hydraulic system.

Refer to the Accessories Section for more information.

5 On-going contamination control practices

To optimize system performance and lengthen component life, new oil should be filtered before being transferred into a reservoir or gearbox. Monitor the condition of fluids and identify wear and contamination with regular fluid analysis.

Refer to the Off-Line Filtration and Fluid Analysis Sections for more information.



Looking for a replacement filter? Finding your Donaldson filter online has never been easier.

catalog.donaldson.com

Application/Cross-Reference/Attribute Search

You told us what you need – and we listened. We've built the ALL NEW **Donaldson DYNAMIC™ Search** to make finding your filter MUCH easier...faster...smarter... MORE flexible...powerful... DYNAMIC!



This publication contains a wide selection of standard and custom hydraulic filtration assemblies for equipment manufacturers – and replacement filters for both Donaldson housings and those produced by other manufacturers. Donaldson assemblies and filters can be used in both mobile and stationary equipment applications. For custom hydraulic filtration systems, please contact your Donaldson supplier.

Overview	2
Product Line Overview	2
Common Fluid Power Symbols and Circuit Diagrams	8
Hydraulic Filter Locations	9
Media Technology	10
Filtration Trends and Evolution	11
Filtration Design and Manufacturing Experience	11
Global Design and Logistic Capabilities	12
Performance Under Any Pressure	14
Shoptalk	15
Tech-tips and Simple Facts	15
YouTube® Filter Servicing Videos	24
Filter Servicing Steps	24
Low Pressure Filters	29
Max Operating Pressure < 350 psi (24 bar)	
Spin-on Filters	30
In-tank Filters	56
In-line Cartridge Filters	76
Medium Pressure Filters	81
Max Operating Pressure < 2000 psi (138 bar)	
Spin-on Filters	82
In-line Cartridge Filters	98
High Pressure Filters	129
Max Operating Pressure < 6500 psi (450 bar)	
In-line Cartridge Filters	130
Replacement Cartridge Filters	189
Accessories	195
Fluid Analysis	249
Off-Line Filtration	259
Clean Fuel & Lubricant Solutions	269
Technical Reference Guide	273
Part Number Index	301

Product Line Overview

Comprehensive Hydraulic Filtration Solutions

Low Pressure Filtration

Max operating pressure < 350 psi (24 bar)



Low pressure filters are the most commonly used type of filter in hydraulic circuits, used most often in return line applications.

Donaldson low pressure filters are rated for working pressures up to 350 psi (2400 kPa). In-tank and in-line configurations are available to accommodate virtually any application.

Medium Pressure Filtration

Max operating pressure < 2,000 psi (138 bar)



Medium pressure filters can be used in applications up to 2000 psi (13790 kPa). Donaldson offers both spin-on and in-line cartridge-style filters.

Donaldson Duramax® filters are the highest rated medium pressure spin-on filters available. Duramax filters are proven, reliable, long-lived and easy to install.

High Pressure Filtration

Max operating pressure < 6,500 psi (450 bar)



High pressure filters are positioned between pumps and critical components such as cylinders, motors and valves. They help protect these critical components from catastrophic failure.

Donaldson heavy-duty high pressure filters are rated for working pressures up to 6500 psi (44818 kPa). Various porting sizes and types, including manifold style, are available for a wide range of applications.

	Model Series	Max Flow gpm (lpm)	Max Pressure psi (kPa) / bar	Porting Size Options	Page No.
Low Pressure Filtration Pages 29-80	Spin-on Filters				
	SP15/25	30 (114)	150 (1035) / 10.3	½", ¾" NPT, SAE-8, -12 O-ring	30
	W023	60 (227)	150 (1035) / 10.3	1¼" NPT, SAE-20 O-ring	34
	HBK05	60 (227)	150 (1035) / 10.3	1¼" NPT, SAE-20 O-ring	38
	SP50/60	60 (227)	150 (1035) / 10.3	1¼" NPT, SAE-20 O-ring	42
	SP80/90	100 (379)	150 (1035) / 10.3	1½" NPT, SAE-24 O-ring, 2" SAE 4-Bolt Flange Code 61	46
	SP100/120	100 (379)	150 (1035) / 10.3	1½" NPT	50
	TT15/30/60	50 (189)	100 (689) / 6.89	¾", 1½" NPT	54
	In-tank Filters				
	WL15	50 (189)	200 (1379) / 13.8	SAE-24 O-ring, 1½" SAE 4-Bolt Flange Code 61	56
	WL16	150 (568)	200 (1379) / 13.8	1½" NPT, SAE-24 O-ring, 1½" SAE 4-Bolt Flange Code 61	60
	FIK	170 (639)	145 (1000) / 10.0	½" NPT, ¾" NPT, 1" NPT, SAE-8,-12,-16,-20,-24 O-ring, 2" SAE 4-Bolt Flange Code 61	64
	SRK Combo	79 (300)	145 (1000) / 10.0	Inlet: SAE-16, -20 O-ring, Outlet: SAE-16 O-ring	74
	In-line Cartridge Filters				
	HRK10	300 (1136)	150 (1035) / 10.3	4" ANSI Flange, 8-bolt 150#	76
Medium Pressure Filtration Pages 81-124	Spin-on Filters				
	HMK03	25 (95)	1000 (6895) / 69.0	SAE-12 O-ring	82
	HMK04	35 (133)	500 (3450) / 34.5	¾", 1" NPT, SAE-12, -16 O-ring	86
	HNK04	35 (133)	500 (3450) / 34.5	SAE-12, -16 O-ring	94
	HMK05	50 (189)	350 (2415) / 24.2	1¼" NPT, SAE-20 O-ring	90
	HNK05	50 (189)	350 (2415) / 24.2	SAE-20 O-ring	94
	HMK24	60 (227)	500 (3450) / 34.5	SAE-20 O-ring, 1¼" SAE 4-Bolt Flange Code 61	86
	HMK25	100 (379)	350 (2415) / 24.2	1½" NPT, SAE-24 O-ring, 1½" SAE 4-Bolt Flange Code 61	90
	In-line Cartridge Filters				
	FLK90	40 (151)	580 (4002) / 40.0	SAE-12, -16 O-ring	99
	FLK110	42 (159)	435 (3001) / 30.0	SAE-20 O-ring	102
	FLK125	85 (320)	508 (3505) / 35.1	2" SAE 4-Bolt Flange Code 61	105
	DPK350	100 (379)	350 (2415) / 24.2	1½" SAE 4-Bolt Flange Code 61	108
	W061	100 (379)	600 (4140) / 41.4	SAE-12, -16, -20 O-ring	112
	HDK06	150 (568)	350 (2415) / 24.1	2½" NPT	116
W041	300 (1136)	500 (3450) / 34.5	SAE-24 O-ring, 2" or 2½" SAE 4-Bolt Flange Code 61	120	
HFK08	300 (1136)	350 (2415) / 24.1	3" NPT, SAE-20 O-ring	124	
High Pressure Filtration Pages 129-188	In-line Cartridge Filters				
	HPK02	20 (76)	2000 (13790) / 137.9	SAE-12 O-ring	130
	DPK2400	100 (379)	2400 (16547) / 165.4	1½" SAE 4-Bolt Flange Code 61	136
	W440	20 (76)	4000 (27580) / 275.8	SAE-12 O-ring or Manifold Mounting	140
	FPK02	25 (95)	6090 (42021) / 420.0	SAE-12 O-ring	144
	W350	50 (189)	3000 (20685) / 206.9	SAE-12, -16 O-ring	150
	HPK03	60 (227)	3000 (20685) / 206.9	SAE-12, -16 O-ring	154
	FPK04	100 (379)	4350 (30015) / 300.1	SAE-20 O-ring	160
	HPK04	120 (454)	6000 (41380) / 413.8	SAE-20 O-ring, 1¼" or 1½" SAE 4-Bolt Flange Code 61 or 62	166
	W451	150 (568)	4500 (31027) / 310.3	SAE-24 O-ring, 1½" SAE 4-Bolt Flange Code 61 or 62, Manifold Mounting	174
	W620	150 (568)	6000 (41380) / 413.8	SAE-16,-20, -24 O-ring, 1¼" SAE 4-Bolt Flange Code 62, 1½" SAE 4-Bolt Flange Code 61	178
	HPK05	200 (757)	3000 (20685) / 206.9	2" SAE 4-Bolt Flange Code 61	183

Product Line Overview

Comprehensive Hydraulic Filtration Solutions

Off-Line Filtration

The Donaldson Filter Cart, Filter Panel and Filter Buddy™ offer convenient off-line filtration, flushing and fluid transfer. Use them with your industrial and mobile equipment to achieve and maintain proper ISO cleanliness levels.

Filter Cart

Designed with performance, convenience and safety in mind. Includes value-added features to protect your machinery and equipment from breakdowns caused by contamination.

Filter Panel

Provides fixed/mounted offline filtration and a turn-key approach to supplemental filtration.

Filter Buddy™

This handheld portable system provides the capability to kidney loop reservoirs that you normally cannot reach with larger filter carts. Its small size and light weight allow for carrying up and down stairs and access into tight or confined spaces.



Replacement Filters

The Industry's Largest Selection of In-Stock Replacement Filters!

Donaldson offers a complete line of hydraulic filter heads and housings for low, medium, and high pressure applications. Spin-ons and cartridges are available in a wide range of filter medias.

When replacing another filter brand, our comprehensive and up-to-date cross-reference guide, available at catalog.donaldson.com, can guide you through performance improvement possibilities.

Our worldwide network of authorized distributors is ready to serve you with their extensive experience with hydraulic circuits and with Donaldson filters. Most distributors stock our filters and we have quick-ship programs so you can get the filter you need, when you need it.

To find a distributor near you, visit www.buydonaldson.com.



Product Line Overview

Comprehensive Hydraulic Filtration Solutions

Accessories

Accessories for hydraulic circuits, lines and reservoirs that will help you maintain proper ISO cleanliness levels.

Filter Service Indicators

- Service indicators to maximize filter life

Hydraulic Line Accessories

- Pressure gauges for monitoring system pressure
- Hoses and test points for sampling oil and determining ISO cleanliness levels
- Flanges to connect components
- Valves for system control

Reservoir Accessories

- Suction strainers help protect pumps from damage
- Diffusers for reducing aeration, foaming, turbulence and noise caused by return lines
- Sight and level gauges available, including plastic or steel screw-in styles for use in a variety of applications
- Plugs, caps and vents for small power units and gearboxes
- Filler breathers and caps come in chrome, zinc, epoxy-coated weatherproof finishes, and corrosion-resistance techno polymer – lockable, dipsticks and side-mount versions available



T.R.A.P.™ Breather Technology (Thermally Reactive Advanced Protection)

T.R.A.P. breathers provide fast-acting protection against airborne moisture and particulate contamination. They stop solid particulate down to 3 μm at 97% efficiency and prevent moisture from entering the reservoir. Water-holding capacity is regenerated with every oil return phase. This self-regenerating capability enables extended breather life.

Hydraulic Filtration Solutions

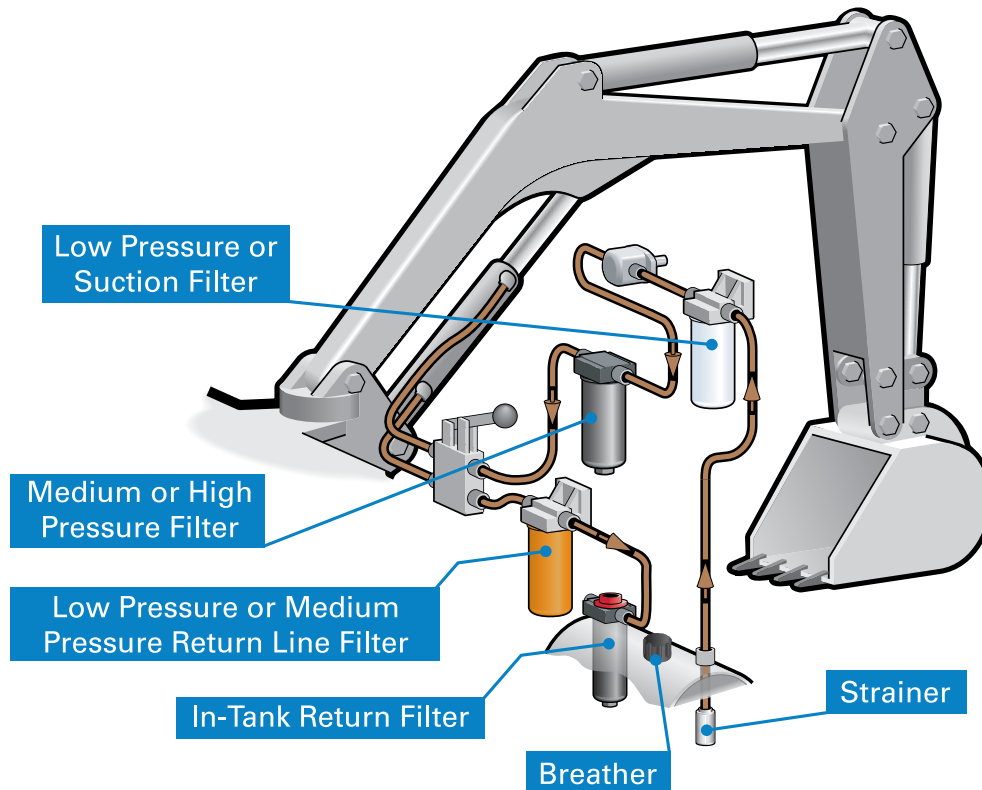
Engineered for Today's Industrial & Mobile Equipment



The best solutions for clean, dry oil.

Count on Donaldson to have the right filters, contamination control products and services to protect critical components in hundreds of applications – in the factory and on heavy-duty mobile equipment.

When you need hydraulic filtration, Donaldson delivers.



Full-Product Range

The industry's largest selection of in-stock filters and accessories – manufactured with consistent, high-quality performance.

Expert Technical Support

Prompt, accessible and knowledgeable customer service experts.

High-Performance Filtration

Increase dirt-holding capacity and lower pressure drop (ΔP) with Donaldson high-performance DT filters.

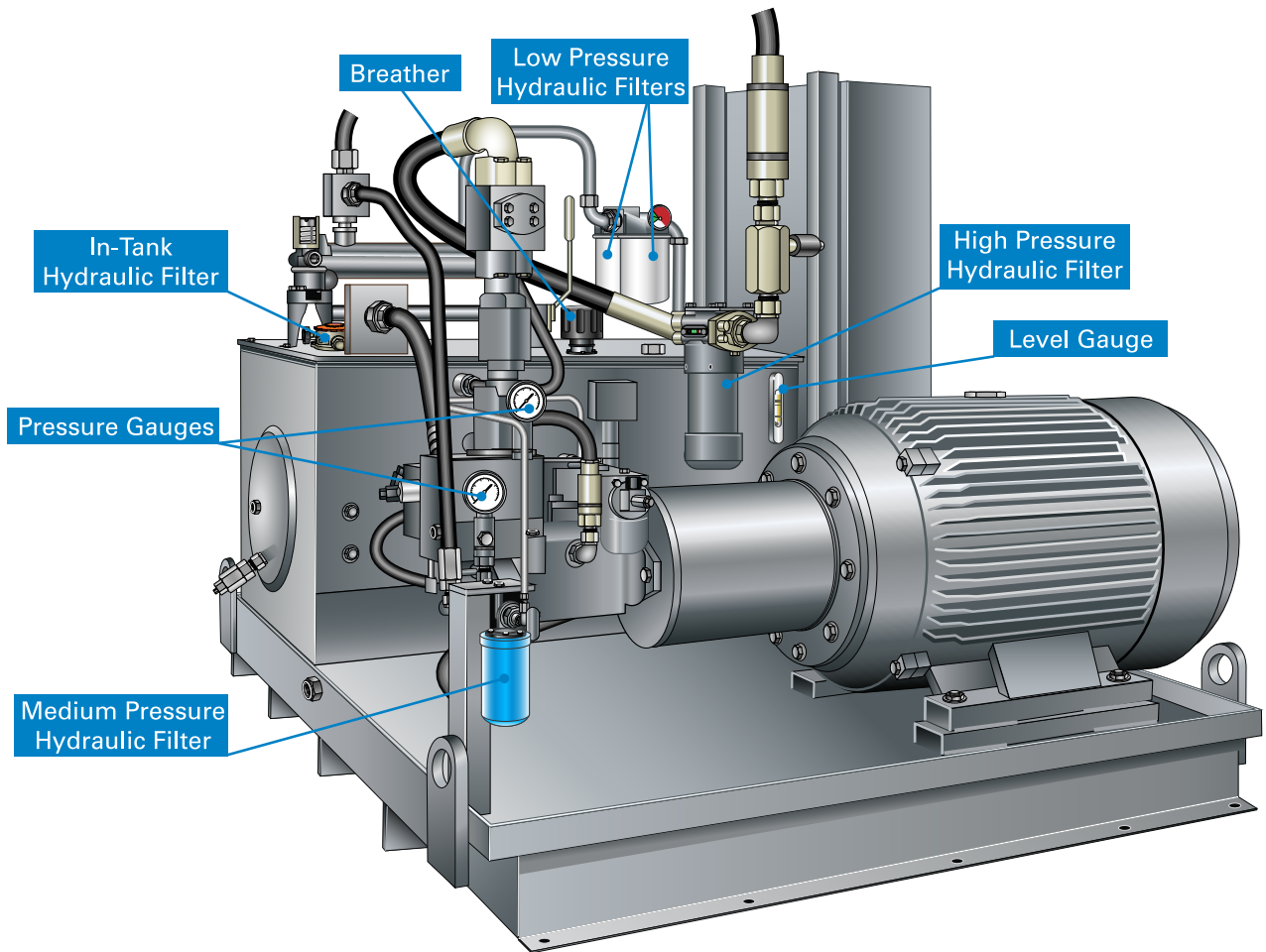
Hydraulic Filtration Solutions

Engineered for Today's Industrial & Mobile Equipment



any Performance Under Pressure

- Low, medium and high pressure filtration
- Spin-on, cartridge and in-tank style filters
- Hydraulic line and reservoir accessories
- T.R.A.P.™ reservoir breather technology



Off-Line Filtration

Filter carts, filter panels and Filter Buddy™ handheld filtration.

Water Removal

Systems and products designed to prevent water ingress and remove entrained water.


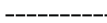
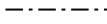

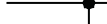
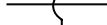
Vacuum Dehydrators & Coalescers

Quick removal of free water, dissolved water, particles and gases.




Common Fluid Power Symbols and Circuit Diagrams

Instrumentation and Pipeline Components

Lines

-  Continuous Line: Flow Line, Symbol Enclosure
-  Dashed Line: Pilot Line, Drain Line
-  System Enclosure: Long and Short Dashes around Two or More Component Symbols
-  Flexible Hose
-  Lines Connecting
-  Lines Crossing



Circular

-  Large Circle: Pump, Motor
-  Small Circle: Measuring Devices
-  Semi-Circle: Rotary Actuator



Square

-  One Square: Pressure Control Function
-  Two or Three Adjacent Squares: Directional Control







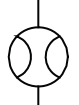
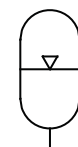
Diamond

-  Diamond: Fluid Conditioner (filter, separator, lubricator, heat exchanger)
-  Diamond with Dashed Line: Filter







Triangle

-  Solid: Direction of Hydraulic Fluid Flow
-  Open: Direction of Pneumatic Flow


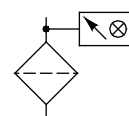
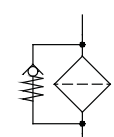
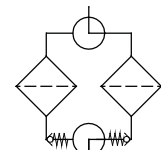
Miscellaneous Symbols

-  Spring
-  Flow Restriction
-  Connections to Tank
-  Temperature Gauge
-  Pressure Gauge
-  Test Point
-  Flow Meter
-  Gas Loaded Accumulator

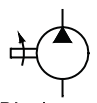

Isolation and Flow Control Valves

-  Isolator (Open)
-  Isolator (Closed)
-  Diverter Valve
-  Orifice (Jet)
-  Throttle Valve
-  Check Valve

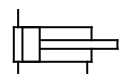

Filters

-  Basic Filter
-  Filter with Visual Clogging Indicator
-  Filter with Bypass Valve
-  Duplex Filter with Check Valve

Pumps and Motors

-  Fixed Displacement Pump
Uni-directional Flow
Anti-clockwise Rotation
-  Fixed Displacement Motor
Anti-clockwise Rotation

Cylinders and Semi-rotary Actuators

-  Double Acting Cylinder
-  Bi-directional
Semi-rotary Actuator

Hydraulic Filter Locations

Comprehensive Selection of Filtration Solutions

Typical Hydraulic Circuit and Filter Locations



Filter in a Circuit Symbol



Pressure Line Filter

Protects high-pressure side components. Helps prevent component wear or failure brought about by debris in the system.



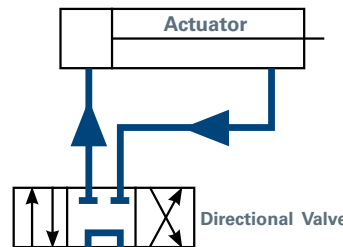
In-Line Accessories

Pressure gauges for monitoring system pressure. Hoses and test points for sampling oil and determining ISO cleanliness levels. Flanges and valves for system control.



Suction Line Filter

Designed to remove particles in the 5 to 150 micron range. Easy to service and less expensive than other types of filters. Low by-pass valve use recommended to prevent pump starvation.



Return Line Filter

Captures debris from component wear or ingestion before it travels into the reservoir.



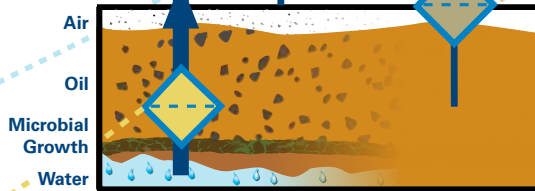
In-tank Return Line Filter

Space-saving in-tank return and suction line filters.



Reservoir Air Breather

Prevents ingress of airborne contaminants from entering the reservoir tank.



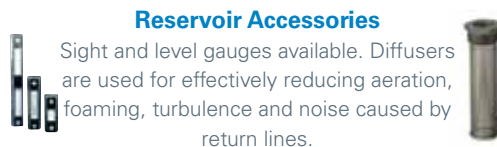
Reservoir Tank

Water in reservoir tanks is a serious threat to hydraulic systems. Dirt, particles and microbial growth are also common contaminants existing in tanks.



Suction Strainer

Removes large particles or objects built into the system during assembly or introduced during standard maintenance. Prevents catastrophic failure. Also known as a safety filter.



Reservoir Accessories

Sight and level gauges available. Diffusers are used for effectively reducing aeration, foaming, turbulence and noise caused by return lines.



Kidney Loop Filters

Off-line filtration supplements system cleanliness. Use with industrial and mobile equipment to achieve and maintain proper ISO cleanliness levels.

Industry Shaping Technology

Advanced Media Technology for Optimal Filtration Performance

Donaldson Media Formulations Set the Standard for Filtration Performance!

Donaldson offers extensive filter media technology choices for hydraulic filters – over 35 different formulations. These multiple formulations enable our engineers to develop filtration systems that meet or exceed a wide variety of customer specifications.



Synthetic media captures more and smaller contaminants than cellulose media. When an application requires higher efficiency filtration than what cellulose filter media can deliver, Donaldson uses Synteq™ synthetic media technology.

We use a variety of techniques to enhance filter media so it can withstand the high differential pressures found in typical hydraulic systems. Oven-curing, wire backing and multiple layers all contribute to our media integrity.

More detailed information on filtration media is available in the technical reference guide.

Synteq XP™ Filtration Technology

Synteq XP™ is a breakthrough in synthetic filter media technology that takes hydraulic filtration to the next level. It is the next generation of Donaldson Synteq media, designed to increase filter dirt holding capacity and reduce pressure drop.

Synteq XP is the first filter media that delivers high filtration efficiency, high dirt holding capacity and low pressure drop in a single filter for hydraulic filtration applications.

Synteq XP media technology uses a resin-free bonding technique to provide improved filtration characteristics, including:

- Enhanced hydraulic system component protection
- Lower operating pressure drop
- Longer filter life – 2 to 3 times that of traditional cellulose filter media
- Higher filtration efficiency
- Versatile packaging



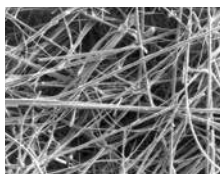
DT Synteq™ Synthetic Media (High-Performance)

DT grades of Synteq media utilize a blend of borosilicate glass fiber whose matrix is bonded together with an epoxy-based resin system. Donaldson filter media scientists found this to provide the best available chemical resistance for the broadest array of hydraulic applications. DT Synteq is ideal for use with phosphate ester and water glycol fluids.



Synteq™ Synthetic Media

This media's uniform synthetic fiber structure delivers higher filtration efficiency and longer filter life. Synteq filter media technology is ideal for synthetic fluids, water glycols, water/oil emulsions, HWCF (high water content fluids) and petroleum -based fluids. The smooth rounded fibers provide low resistance to fluid flow.



Cellulose Media

This media often has lower beta ratings, providing effective filtration for a wide variety of petroleum-based fluids. The smaller pores result in greater flow resistance, in turn causing higher pressure drop.

Water Absorbing Media

This media is formulated with absorbents and resins to remove moisture and condensation from petroleum-based fluids.

Wire Mesh Media

Wire mesh media consists of stainless steel, epoxy-coated wire mesh. This media is used to catch very large, harsh particulate that would rip up a normal filter. This media is also useful as a coarse filter in viscous fluid applications.

Filter Media Design & Development

From traditional cellulose to synthetic – the development of proprietary filtration substrates is at the heart of every Donaldson filtration system. If one of our existing media formulations does not meet our customer's specifications, our scientists use our in-house media development laboratory to develop new formulations that meet or exceed your requirements.

Media Characterization Testing

- Permeability
- Tensile strength
- Mullen burst
- Basis weight
- Pore size
- Thickness
- Gurley stiffness
- LEFS bench
- 3-Point bend

In-House Media Mill

- For application development
- Trial media production runs
- Development of proprietary formulations



Filtration Performance Testing

- Particle counting
- Multi-pass testing
- Water removal efficiency

Industry Shaping Technology

Hydraulic Filtration Trends and Evolution

Hydraulic Filtration System Trends

Today's hydraulic systems are intolerant of corrosion, require higher cleanliness standards, and demand increased filtration performance. Hydraulic-powered vehicles and equipment owners desire the assumption of lower operation and ownership costs – a unique challenge that Donaldson understands.

Unique Filtration Systems

Donaldson continually strives to introduce new and effective filtration technologies that work within your engineering specifications and add customer value.

Low Pressure Systems

- Sensors, valves, and switches in a variety of styles and port sizes
- Unique filtration performance options
- Integrated mounting brackets
- Broad range of package sizes
- Custom design options

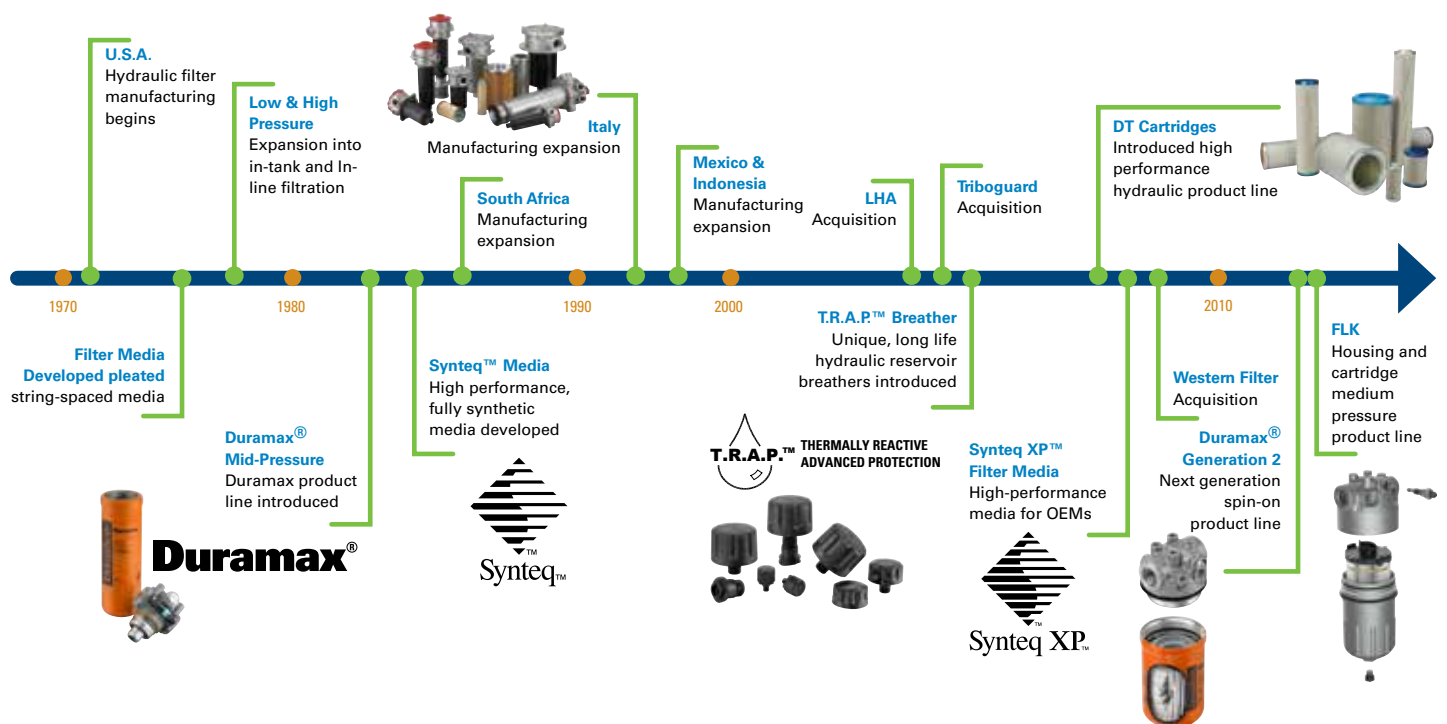
Medium Pressure Systems

- Die-cast and sand-cast custom head assemblies integrated into systems
- Enhanced system component protection
- Customized to existing filter interface – no system modification required

High Pressure Systems

- High-performance media options
- Synteq™ Filtration Media
- Material options - metal or plastic
- Multiple head interfaces

Hydraulic Filtration Design & Manufacturing Experience



Industry Shaping Technology Global Design & Logistic Capabilities

Donaldson has pioneered the use of a wide range of engineering, design and testing tools used during the product development and validation process.

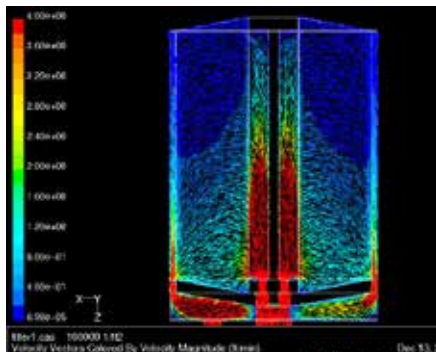
OVERVIEW

Engineering Capabilities Test & Evaluation Tools

- Design centers in three key regions – United States, Asia and Europe

Prediction and Simulation

- CAD
- Media modeling
- Fluid mechanics
- Structural analysis
- Thermal analysis



Structural Analysis

- Per SAE, ISO, and NFPA standards
- Burst
- Collapse
- Pressure impulse and fatigue

Tensile Compression

- Used to test material, component and assembly properties

Environmental Chambers

- Allows testing at hot or cold temperature, with humidity control

Flow Test Benches

- Allows measurement of static and dynamic flow and restriction for a device
- Allows calculation of device restriction at varying flows and temperatures
- System simulation

Filtration Performance Testing

- ISO, SAE, NFPA
- Customer standards
- Contaminant (particle or water) removal efficiency
- Contaminant capacity



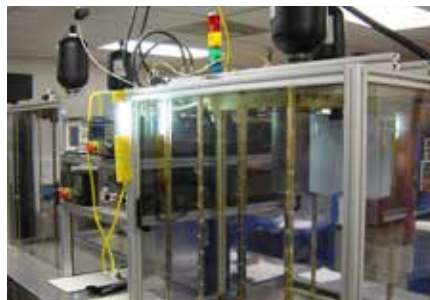
Development and Validation

Filter Durability

- Filtration performance testing per applicable SAE and ISO standards
- Fabrication integrity
- Environmental conditions
 - Salt spray and thermal cycling
- Pressure fatigue
- Flow fatigue
- Hydrostatic burst
- Flow benches
- Vibration benches
- Gravimetric analysis

Rapid Prototyping

- SLA, SLS
- Investment casting
- RTV molding



Analytical Chemistry Laboratory

- Optical microscopy
- Scanning electron microscopy (SEM)
- Chemical analysis
- Fourier transform infrared (FTIR)
- Gas chromatography (GC/MS)
- Thermal analysis (DSC, TGA)
- Liquid chromatography



Design Validation

- Test cell locations in three key regions
 - United States, Asia and Europe
- High viscosity ΔP (pressure drop)
- High temperature
- Flow fatigue
- Used oil analysis
- Component durability
- 24/7 durability testing
- Web-based test cell monitoring access
- Fluid compatibility



Vibration/Shaker

- Multiple benches
- Performance vibration with flow test
- Can apply random, shock or custom variable vibration profiles
- Capable of hot or cold tests

Field Testing

- On and off highway
- Heavy-duty
- Tests conducted on both end user and OEM applications

Field Data Acquisition

- Real time measurements
- Remote communications
- On-line collection tools
- Review daily, weekly and monthly reports to analyze operational trends

Quality Certified

- All facilities are ISO/TS certified

Quality Controls

- Consistent, reliable product
- On-site verification test units and equipment
- Part number specific PLC controls
- Manufacturing dates for tracking and warranty

Manufacturing

Locations for Liquid Filtration

- United States, Canada, Mexico, Europe and Asia-Pacific
- Located strategically with global partners



Base Component Materials

- Built for long-life, durability, corrosion resistance and liquid compatibility
- Metal and non-metal materials
- Methods to enhance media durability include oven-curing, wire backing and multiple layered media



Packaging Options

- Returnable packaging
- Heavy-duty packaging
- Pallets ISPM-15 compliant for international routing

Logistics / Distribution

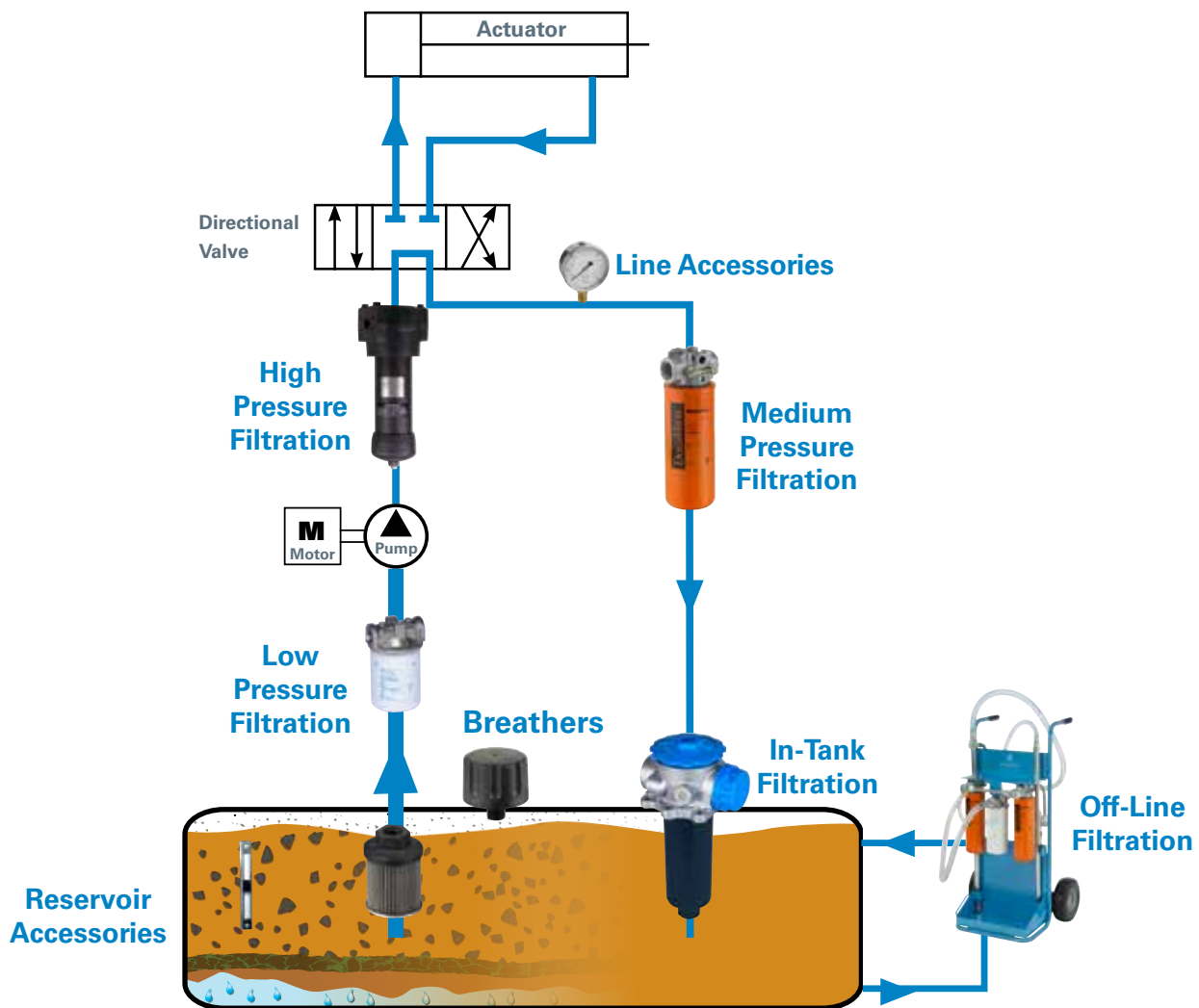
Donaldson has established a global distribution network to serve our customers locally and around the world. We operate as a global company with a network of primary distribution locations that support a mature hub of regional distribution centers and warehouses.

Donaldson distribution centers are strategically located around the globe to quickly and accurately deliver filtration and exhaust products wherever replacement products are needed. We work with a network of transportation, third party logistics companies, consolidators and cross-docking facilities to meet or exceed our customers' requirements.

Customers around the world benefit from our umbrella of distribution centers. We focus our efforts on local support and the capabilities of our staff. We continue to make significant investments in facilities, systems, supply chain relationships and staffing to offer the best order fulfillment options available.

Performance Under ^{any} Pressure

Donaldson hydraulic filters and accessories reduce a broad range of contaminants to keep sophisticated equipment running smoothly, resulting in efficient systems with superior performance. Whether it's located outdoors on equipment or inside a crowded manufacturing plant, hydraulic components need clean hydraulic and lubrication oil for maximum life and optimal productivity.



Tech-Tips for Hydraulic-Powered Vehicles and Equipment Owners

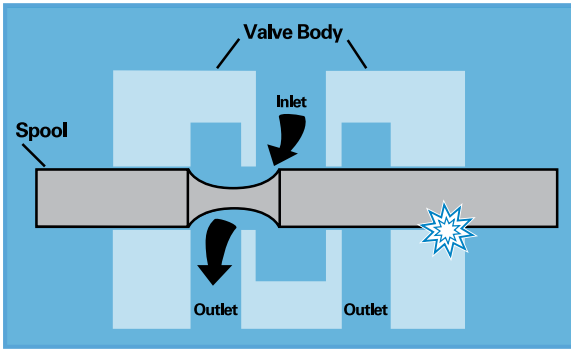
Catch-up on the latest information!

The Shoptalk section contains maintenance tips, cost reduction ideas, product features and benefits.



Hydraulic Components Need Protection ..	16
Where does Hydraulic System Contamination Come From?.....	16
Understanding the Beta Rating System ...	17
How Big is a Micron?.....	17
Hydraulic Oil Test Kits	18
Watch Out for Dents on Liquid Filters.....	18
Watch Out for Old Compression Gaskets .	19
How Clean is Your Oil?.....	19
DT Cartridges Deliver Uptime Protection .	20
T.R.A.P. Moisture Vapor with Breathers.....	20
Filter Recycling.....	21
Industry Resource: The Filter Manufacturers Council.....	21
Success Stories.....	22
Aftermarket Warranty	24
Filter Installation and Service Icons	24
YouTube® Service Videos	24
Filter Servicing Steps	25
Spin-on Filters.....	25
In-line Cartridge Filters.....	26
In-tank Filters	27

Hydraulic Components Need Protection



This illustration of a simple hydraulic valve shows how particles damage components. If a particle lodges between the spool and valve body, it will erode small flakes from the metal surfaces. As these flakes are moved back and forth by the action of the spool, they can roll into a burr that jams the spool and disables the valve.

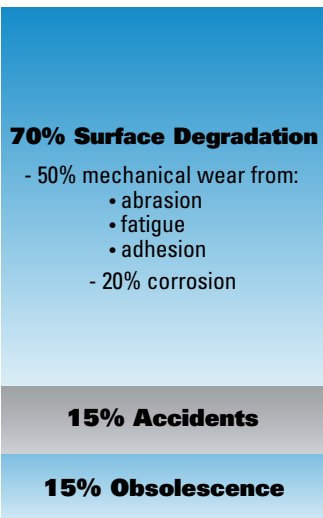
Protect Precision Parts from Contamination Damage and Hydraulic Failures

Good filtration needs to be an integral part of the hydraulic circuit to ensure long life and the proper operation of pumps, valves and motors. Hydraulic circuits are designed in all shapes and sizes, both simple and complex in design, and they all need protection from damaging contamination. Abrasive particles enter the system and, if unfiltered, damage sensitive components like pumps, valves and motors. It is the job of the hydraulic filter to remove these particles from the oil flow to help prevent premature component wear and system failure. As the sophistication of hydraulic systems increases, the need for reliable filtration protection becomes ever more critical.

Typical Factors in Component Life

Studies show that most (typically 70%) of hydraulic component replacement is necessary because of surface degradation, and most of that (50%) is due to mechanical wear.

Proper filtration of hydraulic fluids can lengthen component life. Don't cut costs by eliminating hydraulic filters. It could cost you more in the long run in major component repair!



Ref: Shoptalk Card F115306

Where does Hydraulic System Contamination Come From?

Sources of Hydraulic System Contamination

New oil out of shipping containers is usually contaminated to a level above what is acceptable for most hydraulic systems. Never assume your oil is clean until it has been filtered. There are a surprising number of different sources of system contamination in hydraulic filtration.

New Fluid – most new fluid is not acceptable for use in hydraulic systems and must be filtered first. Learn how in the off-line filtration section-

Built-In – contamination introduced into the system during the manufacture, assembly and testing of components

Ingressed – external ingress of atmospheric contamination; air condenses and water is released into the reservoir

Induced – particles introduced during normal maintenance or system operation

In-Operation – wear generation contamination caused by the pump, actuators, cylinder or the hydraulic motor

Rubber and Elastomers – degradation of rubber compounds and elastomers products

High Water Based Fluids – supports biological growth

Replacement of Failed Components – failure to thoroughly clean conductor lines after replacing a failed pump

Types of Contaminant

Many different types of contamination may be present in hydraulic fluid. Contaminants grind and wear at the surface of moving parts, introducing even more particles into the system. These surface degradation contaminants cause more than 70% of all hydraulic system downtime.

- particulate – ingressed and built-in (dust, dirt, sand, rust, fibers, elastomers, paint chips)
- wear metals, silicon, and excessive additives (aluminum, chromium, copper, iron, lead, tin, silicon, sodium, zinc, barium, phosphorous)
- water
- sealant (tape, pastes)
- sludge, oxidation, and other corrosion products
- acids and other chemicals
- biological and microbial



Scratches along the inside surface of a hydraulic cylinder reveal component damage caused by contaminants.

Ref: Shoptalk Card F115305

Understanding the Beta Rating System

This information is provided as an aid to understanding fluid filter efficiency terminology based on current ISO, ANSI and NFPA test standards. It is not proprietary and may be reproduced or distributed in any manner for educational purposes.

What Is Beta Ratio?

Beta ratio (symbolized by β) is a formula used to calculate the filtration efficiency of a particular fluid filter using base data obtained from multi-pass testing.

In a multi-pass test, fluid is continuously injected with a uniform amount of contaminant (i.e., ISO medium test dust) then pumped through the filter unit being tested. Filter efficiency is determined by monitoring fluid contamination levels upstream and downstream of the test filter at specific times. An automatic particle counter is used to determine the contamination level. Through this process an upstream to downstream particle count ratio is developed, known as the beta ratio.

The formula used to calculate the beta ratio is:

$$\text{Beta ratio}_{(x)} = \frac{\text{particle count in upstream fluid}}{\text{particle count in downstream fluid}}$$

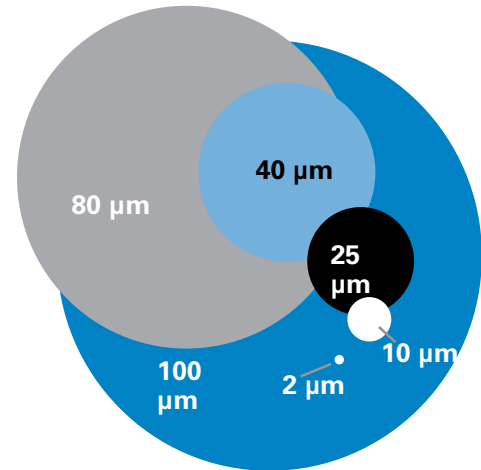
where (x) is a given particle size

Indicates that testing was done with APC's calibrated with NIST fluid

$$\beta_{10(c)} = 1000$$

1000 times more particles upstream than downstream that are 10 μm and larger

How Big is a Micron?



Micron Sizes of Familiar Particles

Grain of table salt	100 μm
Human hair	80 μm
Lower limit of visibility	40 μm
White blood cell	25 μm
Talcum powder	10 μm
Red blood cell	8 μm
Bacteria	2 μm
Silt	<5 μm

Hydraulic Oil Test Kits

The Advanced Fluid Analysis Kit is designed to monitor component wear, contamination and fluid condition.

Advanced Hydraulic Oil Test Kit

Kit X009330

24 Metals by ICP
Water by Karl Fischer, ppm
Viscosity at 40°C or 100°C
Oxidation/Nitration by FTIR
Total Acid Number
ISO Particle Count/Particle Quantifier
Sample Extraction Pump Part #P176431
Sample Extraction Tubing Part #P176433

Our basic hydraulic oil kit reports TAN (total acid number), water in PPM and ISO particle count.

Basic Hydraulic Oil Test Kits

- 1- Basic Use Kit X007374
- 2- Correct Drain and ISO use Kit X007377

	1	2
Metals, ppm by wt	◆	◆
Viscosity, cSt.	◆	◆
Water %	◆	
TAN (Total Acid #)	◆	
Water, ppm		◆
ISO Particle Count		◆



Kit X007377 for basic hydraulic oil analysis

Recommended Sampling Interval

Industrial / Stationary

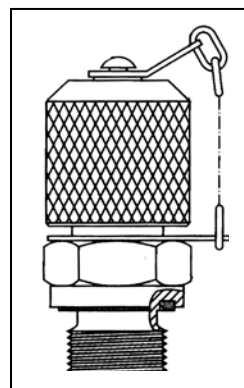
Transmissions	500 hours / monthly
Geared Drives	500 hours / monthly
Bearings	500 hours / monthly
Hydraulics	500 hours /monthly

Oil Sampling Accessories

These accessories can simplify your oil analysis during normal maintenance routines.



Sampling Pump (P176431) & Plastic Tubing (P176433) sold separately in 100 ft. rolls



Quick Sampling Metal Valve for test point. 1/8" NPT (P563212)
Working Pressure
5800 psi / 400 bar

Ref: Shoptalk Card F11523

Watch Out for Dents on Liquid Filters!



Dents in a steel filter canister create a concentration of stress—making the canister more susceptible to fatigue.

Dents May Cause Cracks

Cracked filters can be caused by dents made during improper installation. Filters that are dented prior to or during installation should not be used. Filters dented after installation should be replaced immediately. The cost of replacing a dented filter is much less than the cost of the damages that could result from a dented filter that fails during service.

Filter fatigue results from pressure pulses within the system. Pressure is regulated by a pressure regulating valve. This valve is spring operated and intermittently opens and closes to regulate pressure. Once pressure exceeds the setting of the spring in the regulating valve, the valve will open and relieve pressure until the spring can expand and close the valve. This function is repeated continuously during operation of the system, creating a pulsing effect. Filter canisters are subjected to the same pulsation. However, unlike the spring in the pressure regulating valve, canister material is susceptible to failure after such fatigue.

Filters are designed with a low carbon steel to resist fatigue and are formed so the stress created by the pulses in the system are equalized over the surface area of the canister. A dent provides an area of stress concentration where pressure pulses can greatly shorten the fatigue life of the canister.

If you receive filters that were dented prior to your receipt, you should contact Donaldson customer support for corrective action.

Ref: Shoptalk Card F115275

Watch Out for Old Compression Gaskets!



When changing any filter that has a gasket — use caution as old gaskets may stick!

A compression seal is a means of preventing migration of liquids, gases or solid contaminants across a joint or opening in an assembly or housing. A seal not only prevents the escape of fluid from inside and foreign material from entering the system from outside, but it must provide for easy installation and removal. A new gasket is critical for proper filter function.

Remember ...

- Remove used gaskets and clean the sealing area thoroughly
- Always use a new gasket with a replacement filter
- Over-tightening the filter may damage the head
- Dispose of used filters properly

Ref: Shoptalk Card F115233

How Clean is Your New Oil?

Amount of contaminant in 100 gallons hydraulic oil

Donaldson Hydraulic Filter
Synteq™ Media

Standard Hydraulic Filter
Cellulose Filter Media

New, Unfiltered Hydraulic Oil



ISO 14/9/3
.004 gram dust



ISO 19/17/14
.363 gram dust



ISO 22/21/18
4.73 grams dust

Contamination Levels of Different ISO 4406 Codes Vary Dramatically.*

New, unfiltered hydraulic oil can contain 1,000 times more contaminant than oil that has passed through filter media.

Protect your hydraulic system from costly repairs and downtime with Donaldson hydraulic products with Synteq™ filter media technology – designed to meet equipment filtration requirements and strength needs!

Prevent Catastrophic Damage to Your Expensive Equipment

Hydraulic Pump Exposure to Dirt

Synteq™ Media

Cellulose Media

New Hydraulic Oil

ISO 14/9/3

ISO 19/17/14

ISO 22/21/18

.03 lbs

2.5 lbs

32.5 lbs

12.5 grams

1,125 grams

4,750 grams

Amount of contaminant that passes through a 25 gallon hydraulic reservoir with a 25 gpm pump running for a period of 500 hours.

* Derived from the ISO 16889 test standard with NIST certified on-line automatic particle counters and ISO medium test dust (assumes spherical particle shape and lower bound diameter for test dust).

Achieved with $\beta_{4(c)} \mu\text{m} > 1000$ Synteq™ media. Actual results may vary.

Ref: Shoptalk Card F115284

High-Performance DT Cartridges Deliver Uptime Protection



Using Donaldson Synteq™ media technology, DT filters extend filter life, allow for higher initial cleanliness and provide superior system protection.

Premium Uptime Protection

Every hydraulic system has suspended particles in its fluid. Contaminants grind and wear at the surface of moving parts, introducing even more particles into the system. These contaminants cause more than 70% of all hydraulic system downtime.

Donaldson high-performance DT cartridge filters provide better protection from the particles and contaminants that reduce the effectiveness of lubricant and hydraulic fluid.

DT filters are ideally suited for a variety of demanding applications, including:

- heavy-duty mobile equipment
- in-plant hydraulics
- transmissions
- bearing lube oil systems

DT high-performance hydraulic cartridges provide 73% higher dirt-holding capacity and 47% lower initial pressure drop than traditional filters – with micron ratings down to 2 µm.

Donaldson DT filters are engineered to fit many competitive applications, including Fairey Arlon, Hydac, Pall, Parker, PTI/Mahle and Schroeder.

For a complete list of replacement part numbers, visit www.crossreference.donaldson.com.

Ref: Shoptalk Card F115304

T.R.A.P.™ Moisture Vapor with Breathers for Hydraulic Reservoirs



Water has a way of sneaking into hydraulic circuits, which can cause damage. Minimize moisture with the Donaldson Thermally Reactive Advanced Protection (T.R.A.P.™) Breather.

Features and Benefits

- Minimize water in your system – T.R.A.P. breather strips moisture from the incoming air, allowing only dry air to enter the hydraulic circuits
- Maximize system uptime – T.R.A.P. media regenerates its water holding capacity for longer service life
- Hydraulic reservoir can breathe – the T.R.A.P. doesn't restrict air flow

Fast-acting Breather Eliminates Moisture from Hydraulic Reservoirs

- Extended service life (exhales moisture and refreshes its holding capacity on each cycle)
- Reacts instantly to conditions in the hydraulic circuit, creating a moisture barrier without impeding airflow
- Reduced maintenance costs
- Thermally reactive barrier that removes moisture at relative humidity levels as low as 15%
- Superior moisture blocking and particulate filtration down to 3 µm at 97%
- Will not freeze in winter

Ref: Shoptalk Card F115241

www.donaldson.com

Filter Recycling

Donaldson encourages all individuals and businesses to recycle their used hydraulic filters. Recycling used hydraulic filters helps divert waste from landfills while providing a valuable resource for recycling. We encourage you to check your local disposal regulations for proper disposal and recycling.

Industry Resource: The Filter Manufacturers Council

Established in 1971, the Filter Manufacturers Council represents North American manufacturers of vehicular and industrial filtration products. Initially developed to monitor regulatory and technological developments that affect the industry, the Council has since expanded its activities substantially.



www.filtercouncil.org

The Council has undertaken several environmental initiatives including partnering with states to promote the proper management of used oil filters. In addition, the operation of the hotline and web site provide valuable information regarding state regulations and companies that transport, process and recycle used oil filters.

Donaldson Company is a member of the Filter Manufacturers Council.

Do You Store or Warehouse Filters On-Site?

Whether it's an empty trailer or building, it's important to practice good storage and handling techniques when it comes to filters.

Before installing any filter on a piece of equipment make sure the filter is clean, unused and free of damage.

Filter Storage Tips and Recommendations for Contamination Control

- Never store a filter on a shelf without it being in a box or totally sealed from outside contaminant.
- When you see an open box of filters on the shelf, tape it shut—unless the filters inside the box are individually sealed.
- Handle filters with care to prevent filter damage; for example, don't throw filters into the back of a truck.
- If transporting filters from one job site to another, don't let them roll around on the floorboard or in the back of a truck as it may damage the filter.
- Metal storage shelves may cause condensation to form on filters if sitting directly on metal. Over time the filter may get rusty. This is another good reason to store filters in boxes.
- If a product box has layers of contaminant, take care that the contaminant doesn't get on the new filter as you remove it from the box.
- Practice "first-in, first-out" with your inventory. When possible, always use the oldest inventory first.
- Make sure labels with product information and manufacturing dates are visible to personnel selecting from the shelves.

HRK10 at a Paper Mill



HRK10 Duplex

- Industry:** Paper
- Problem:** Collapsing Competitive Filter Elements on PMO Circuit
- Solution:** Donaldson HRK10 Duplex
Donaldson High-Performance DT Cartridges

Donaldson Company was contacted by an upper Midwestern paper mill. This paper mill called Donaldson and our Distribution Partner for assistance with filter collapse in existing competitive filter housings that resulted in contamination of the main lube circuit. In addition, the filtration system, using 8300 competitive style housings, was inefficient and didn't offer a bypass option. The mill runs a demanding 24/7 operation with minimal shutdown opportunities, but the company had a major maintenance shutdown (20 hours max) scheduled, which provided a narrow window of opportunity for Donaldson and our Distribution Partner to shine.

The mill found a solution in Donaldson's new HRK10 filter housings and Donaldson high-performance DT filters. Four HRK10 units were configured in a duplex arrangement. Donaldson DT B5(c)=1000 filter elements were installed and are currently achieving an ISO cleanliness level of 16/14/11. Routine oil samplings upstream and downstream continue to confirm great results. Through the joint efforts of Donaldson Company and our Distribution Partner, we delivered an economical solution which created a new relationship and happy customer.

T.R.A.P.™ at a Coal Plant



T.R.A.P. Reservoir Breathers

- Industry:** Power Generation
- Problem:** Short Life of Desiccant Breathers and High Maintenance
- Solution:** Donaldson T.R.A.P. Breathers

A coal-fired power plant in northeast Florida is always looking for a better way to protect its equipment and reduce downtime. The desiccant breathers that this around-the-clock operating facility was using to keep water and dirt out of its gearboxes required frequent change-outs. Gearboxes in the hot, humid air of the southeastern United States need robust and reliable protection against atmospheric moisture. The plant needed a breather that would work better and last longer than the desiccant breathers they were using. The plant's Predictive Maintenance Technician found a solution in Donaldson's T.R.A.P. breather – an advanced breather technology that provides unbeatable system protection and lasts longer.

By installing T.R.A.P. breather filters on its gearboxes, the power plant has extended breather filter life by over 50%. "We test our oil frequently, our current breathers are working well, but the T.R.A.P. breathers are working longer," says the PdM Tech. Unlike desiccant breathers that absorb and hold moisture resulting in shorter life, Donaldson's Thermally Reactive Advanced Protection (T.R.A.P.) senses and begins to remove moisture at only 15% relative humidity. Unlike desiccant breathers that require frequent changeouts, a T.R.A.P. breather exhales moisture with every flow cycle, regenerating its water-holding capacity and resulting in longer breather life.

HMK25 at a Gold Mine



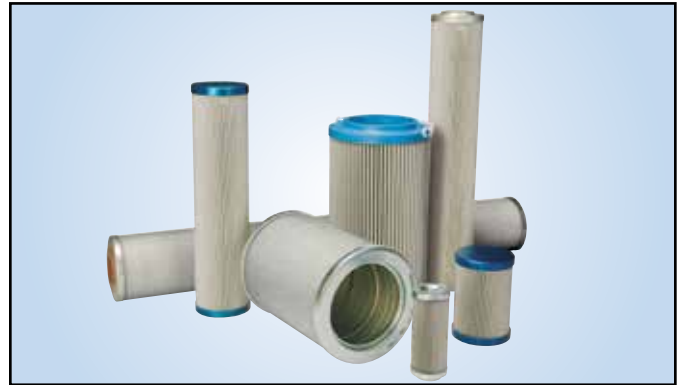
HMK25 Spin-On Filter

- Industry:** Mining
Problem: Gyro Crusher Seizure due to Oil Starvation
Solution: Donaldson HMK Duramax

The relationship between a rock crusher rebuilder and Donaldson began after a 36" Telsmith gyro crusher was reconditioned and put back into service at a South African gold mine. Within weeks of its return (and while still under warranty), the crusher seized. It happened on a cold morning shortly after start-up. There was no warning of any oil pressure problem and no obvious reason for the failure. Oil starvation was quickly identified as the cause of seizure—but what was the cause of the oil starvation? The first part of the investigation determined that a pressure switch was on the pump side of the filter instead of beyond the filter. Donaldson redesigned the entire filtration system.

"We went for a double head HMK25 filter system, 380 lpm at 24 bar. We also dropped the filter media from 60 µm down to 20 µm." The oil used was a non-foaming 150 cSt gear oil. However, at 0°C the viscosity is 2990 cSt. "The viscosity goes up exponentially. On a cold morning, if the guys start up their crusher straight away, that oil is not going through the filters easily." The Donaldson-modified system was implemented and the crusher was successfully put back into service. "It has worked 100% for a year now. They are changing the Donaldson filters at 1000 hour intervals on restriction. Changing the filtering system and the filtering points made all the difference."

DT Filters at an Injection Molder



Donaldson High-Performance DT Filters

- Industry:** Injection Molding
Problem: Short Servo Valve Life
Solution: Donaldson DT High-Performance Filter

Donaldson DT elements were recently installed on injection molding equipment at a Midwestern molder's facility. This molder was running nine machines that make plastic components for the product security industry. Their normal operating procedure included regularly sampling and analyzing their hydraulic oil (ISO VG 46), and they were not satisfied with their ISO cleanliness codes or their short servo valve life. Servo valve life (lasting only a few months) led to a drastic change to their maintenance procedures, including: new oil, moisture removal breathers, side-loop cleanup systems, and Donaldson DT pressure line filters.

In side-by-side tests the injection molder compared their existing supplier's hydraulic pressure line elements with Donaldson DT <4 µm(c) rated filters. Oil analysis proved that by using the Donaldson DT filters, they could regularly achieve as much as a one to two ISO code improvement in particulate cleanliness over the filters they had used in the past. With a target of 17/14/11, they were regularly able to achieve 14/12/9. At the time of this writing, the injection molder's maintenance manager reported, "we have not had to replace servo valves in over one year." As a result of the change in pressure line filters and their other improved practices, they are expecting extended servo valve life and greater uptime.

Will Using Aftermarket Filters Void My Warranty?

Answer:

Good News! No need to worry about voiding your warranty – you can use aftermarket products! You still need to follow your manufacturer’s recommended maintenance practices, but your warranty is protected under the Magnuson-Moss Warranty Act. Information on the Magnuson-Moss Warranty Act is available at www.ftc.gov/bcp/edu/pubs/business/adv/bus01.shtm#Magnuson-Moss.

In addition, Donaldson warrants its aftermarket products against failure due to defects in materials and workmanship for the period specified under the Terms and Conditions for the particular product. More information is available at www.donaldson.com/en/engine/support/datalibrary/000194.pdf.

Filtration Service Videos now on YouTube®!

www.youtube.com/user/donaldsonengine

Thirty Donaldson Academy filter servicing videos are now available as a resource for understanding filtration selection and maintenance. They cover detailed hydraulic filter service steps and best practices. Air, lube, fuel and coolant training modules are also available.

These videos are easily accessible from smart phones – making them a great tool for mobile training!

YouTube® is a registered trademark of Google Inc.



SERVICE TRAINING VIDEOS

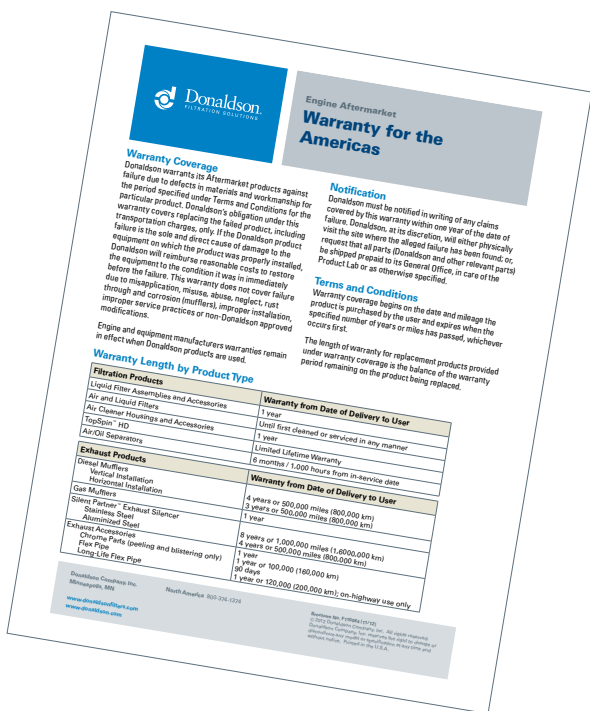


youtube.com/user/donaldsonengine

Filter Installation and Servicing Icons



Donaldson spin-on filters have pictograms on the sides to define the proper servicing steps.



Maintenance Practices for Contamination Control

Here are recommended practices from Donaldson about hydraulic filter servicing and handling. These steps are universal to many hydraulic systems. This servicing information is provided as a best practices guide. Donaldson recommends that where possible, follow the filter service instructions supplied by your original equipment manufacturer. It is not however intended to replace or supersede the service instructions supplied by your equipment or vehicle manufacturer.

Spin-On Filter Servicing



Check the filter service indicator.

- Check to see that the OEM specified service interval has been reached or that the service indicator shows that the filter is due for servicing.



Turn system off and release pressure.

- Ensure that the hydraulic system is turned off.
- Check that there is no pressure present.



Unscrew and remove old filter and gasket.

- Properly dispose of the filter as may be required by local regulations or recycle it.



Wipe filter head with clean cloth.

- Clean the filter head or cover surfaces
- When performing a hydraulic oil change, it is best to use a clean cloth.



Inspect the new filter for damage.

- Check the new filter you will be installing for any shipping and handling damage.
- Do not install a dented filter since the canister has been weakened.



Lubricate the threads.

- Lubricate threads of filter head.
Failure to do this could result in thread galling



Apply thin film of clean motor oil to gasket.

- Lubricate seal(s) with clean system oil.



Align threads. Spin filter until gasket contacts.

- Spin the new filter on until the top of the gasket first contacts the sealing surface.



+ (number of turns) Hand tighten the filter.

- Tighten per the guidance of the icons which appear on the filter housing. Do not over-tighten.



Bleed the system and check for leaks.

Cartridge Filter Servicing

Check the filter service indicator.

- Check to see that the OEM specified service interval has been reached or that the service indicator shows that the filter is due for servicing.

Turn system off and release pressure.

- Ensure that the hydraulic system is turned off.
- Check that there is no pressure present.

Unscrew the cartridge housing.



Remove the used filter and gasket, if applicable.



Clean out the housing seal area and cap.

- Clean out any sediment from the inside of the filter housing.
- Properly dispose of the cartridge according to local regulations.

Inspect the new filter cartridge for damage.

- Check the new filter you will be installing for any shipping and handling damage.

Lubricate seals, gaskets and threads. Install new cartridge.

- Lubricate the o-rings, gaskets, housing seals and threads with clean system oil.



- Install filter into the housing.



Align threads. Spin filter until gasket contacts.

- Fit the housing to the filter head as instructions on the housing.

Hand tighten the filter.

- Tighten per the guidance of the icons which appear on the filter housing.
- Do not over-tighten.



Bleed the system and check for leaks.

In-tank Filter Servicing



Check the filter service indicator.

- Check to see that the OEM specified service interval has been reached or that the service indicator shows that the filter is due for servicing.

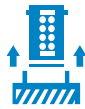


Turn system off and release pressure.

- Ensure that the hydraulic system is turned off.
- Check that there is no pressure present.



Remove the housing cover.



Remove the used filter, gasket and spring, if applicable.

- Remove the filter as gently as possible.
- Avoid contaminant dropping into the clean side of the housing.
- Properly dispose of the cartridge, seal and spring.



Clean the filter mount, cap, inside of the housing and cover.

- Clean out any sediment from the inside of the filter housing.



- Wipe away any sediment on the outside of the filter cover.



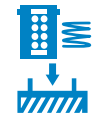
Inspect the new filter cartridge for damage.

- Check the new filter you will be installing for any shipping and handling damage.



Lubricate the filter gasket and cover seal.

- Lubricate the new filter cartridge O-ring and cover seal with clean system oil.



Install new filter and spring, if applicable.



Reinstall the housing cover.

- Refit the cover following any instructions given.



Bleed the system and check for leaks.

Donaldson's Commitment to Quality & Continuous Improvement

Donaldson Quality Commitment

Our employees are committed to providing our Customers with products and services that consistently meet or exceed their expectations.

We will work towards:

- Continuous improvement of products, processes, and services for the benefit of our Customers;
- Complete Customer satisfaction;
- Elimination of waste and variation;
- World-class standards and benchmarks.

We believe in:

- The development and empowerment of our people;
- Standardization of processes and measurement of progress;
- Simplicity, visibility and capability of all activities;
- Continuous improvement in our management and quality systems.

For the long-term success of our company, our first operating priority is the satisfaction of our Customers. Understanding their needs and serving them will benefit both our shareholders and our employees. Our management is responsible for ensuring that this policy is understood, implemented and maintained at all levels of our organization.

Tod Carpenter
Chief Executive Officer (CEO)





Low Pressure Filters

Low pressure filters are the most common type of filter found in hydraulic circuits – used most often in return line applications.

Donaldson low pressure filters are rated for working pressures up to 350 psi (2400 kPa). In-tank and in-line configurations are available to accommodate virtually any application.



Section Index

Max Operating Pressure < 350 psi (24 bar)

Models arranged from low to maximum flow rates

Spin-on Filters

SP15/25	30
W023	34
HBK05	38
SP50/60	42
SP80/90	46
SP100/120	50
TT15/30/60	54

In-tank Filters

WL15	56
WL16	60
FIK	64
SRK Combo	74

In-line Cartridge Filters

HRK10	76
-------------	----



SP15/25
Max Flow: 30 gpm (114 lpm)



SP15/25 Spin-On Filters

Maximum Working Pressures to: 150 psi
1035 kPa
10.3 bar

Rated Static Burst to: 375 psi
2590 kPa
25.9 bar

Flow Range To: 30 gpm
114 lpm



Features

The SP15/25 series are economical, low pressure filters with spin-on convenience and a wide range of cleanliness ratings. Filters are available with the bypass ratings of your choice – 25 psi, 15 psi, 5 psi or no bypass. Take advantage of our mix and match system of in-stock heads and filters, so you can get exactly what you need. Choose the media type and configuration that's best for your application. Options include Donaldson's exclusive Synteq™, natural fiber cellulose, stainless steel wire-mesh or water absorbing media.

Beta Rating

- Performance to $\beta_{6(c)} = 1000$

Porting Size Options

- 1/2", 3/4" NPT
- SAE-8, SAE-12 O-ring

Replacement Filter Lengths

- Synteq™ 5.35" / 136 mm
- Synteq™ 7.87" / 200 mm
- Cellulose 5.35" / 136 mm
- Cellulose 7.87" / 200 mm
- Wire Mesh 5.35" / 136 mm
- Water Absorbing 5.35" / 136 mm

Standard Bypass Ratings

- 25 psi / 172.5 kPa / 1.7 bar
- 15 psi / 97 kPa / .97 bar
- 5 psi / 34.5 kPa / .34 bar
- No Bypass

Assembly Weight

- 5.35": 1.6 lbs / .7 kg (approximately)
- 7.87": 2.2 lbs / 1 kg (approximately)

Operating Temperatures

- -22°F to 225°F / -30°C to 107°C

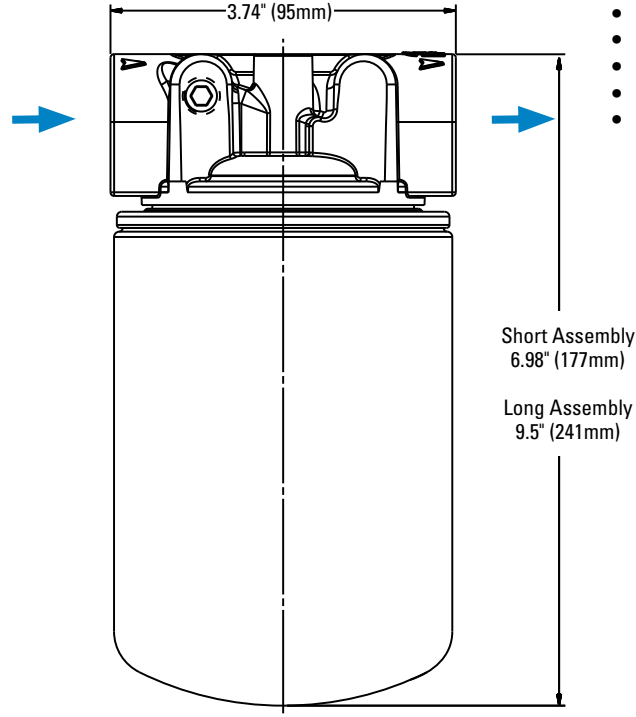
Filter Collapse Ratings

- 100 psid / 690 kPa / 6.9 bar (standard)



SP15/25 Specification Illustrations

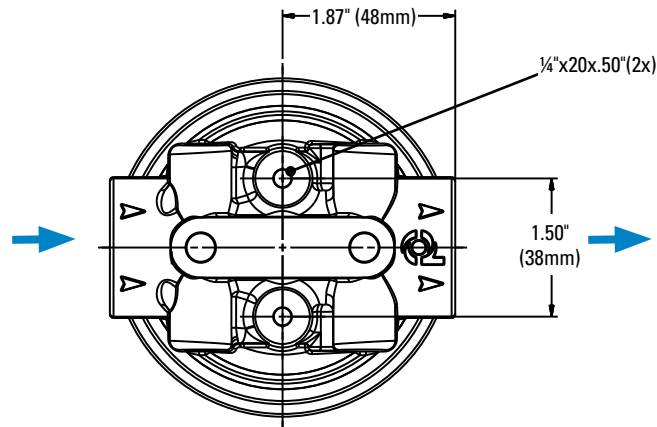
Assembly - Side View



Applications

- Fluid Conditioning Systems
- In-Plant Systems
- Mobile Equipment
- Power Transmissions
- Process Systems

Head - Top View





SP15/25

Max Flow: 30 gpm (114 lpm)



SP15/25 Components

Filter Choices

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(c)} = 1000$	Length in	mm	Donaldson Part No.	Comments
Synteq Synthetic	6 μm	5.35	136	P564967		
	6 μm	7.87	200	P564357		
	11 μm	7.87	200	P179089		
	11 μm	5.35	136	P560693		
	23 μm	5.35	136	P560694		
Cellulose	5 μm	5.35	136	P565061		
	7 μm	5.35	136	P551551		
	7 μm	7.87	200	P565059		
	17 μm	5.35	136	P551553		
	17 μm	7.87	200	P565060		
Water Absorbing	10 μm	5.35	136	P565062	Absorbs approximately 6 oz/170 ml of water @ 20 psid/1.4 bar	
Wire Mesh	150 μm	5.35	136	P550274	100 mesh	

Filter Notes

* Thread size 1"-12 UNF



Head Choices

Port Size	Bypass Range	Gauge ports (drill, tap, plug)	Gauge Port Location	Donaldson Part No.
1/2" NPT	15 psi / 103.4 kPa / 1.34 bar	(2) 1/8" NPT	upstream side	P563288
3/4" NPT	25 psi / 172.5 kPa / 1.72 bar	(2) 1/8" NPT	upstream side	P561131
3/4" NPT	5 psi / 34.5 kPa / .34 bar	(2) 1/8" NPT	downstream side	P561132
3/4" NPT	25 psi / 172.5 kPa / 1.72 bar	none	na	P561134
3/4" NPT	5 psi / 34.5 kPa / .34 bar	none	na	P561135
3/4" NPT	none	none	na	P561136
3/4" NPT	15 psi / 103.4 kPa / 1.34 bar	none	na	P563278
SAE-12	none	none	na	P561133
SAE-12	none	(1) SAE-4	upstream side, LH	P561137
SAE-12	5 psi / 34.5 kPa / .34 bar	none	na	P561140
SAE-12	25 psi / 172.5 kPa / 1.72 bar	none	na	P561141
SAE-12	15 psi / 103.4 kPa / 1.34 bar	none	na	P563279
SAE-12	25 psi / 172.5 kPa / 1.72 bar	(2) 1/8" NPT	upstream side	P563280
SAE-8	25 psi / 172.5 kPa / 1.72 bar	none	na	P561138

Note:

On a return line system the gauge port should be on the upstream side. We suggest a 25 psi bypass. If head is used on a suction line, the gauge port should be on the downstream side very low bypass.

Mix and Match

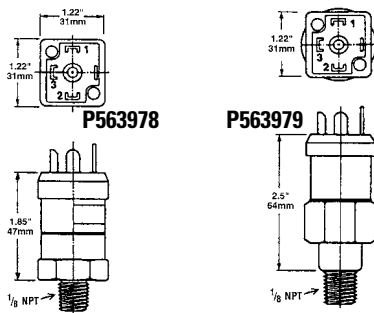
Donaldson's mix and match system provides the great performance and functional advantages of custom engineered filters with the convenience and speedy delivery of in-stock parts. Choose your options and build a filter model to suit your specifications.

Filter Service Gauges - Visual Indicators

Donaldson Part No.	Pressure Range	Use With Bypass Valve Rating	Type
P563978	5 to 30 psi field adj.*	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, electrical
P563979	-5 to 15 in	5 psi / 34.5 kPa / .34 bar Hg field adj.* or No Bypass	Suction indicator, electrical
P563296	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, numeric scale
P563297	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar Bypass	Return indicator, color coded
P563298	0 to 100 psi	25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, color-coded
P563299	0 to -30 Hg	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, numeric scale



Notes
* NOT PRESET:
Setting adjustable for desired application



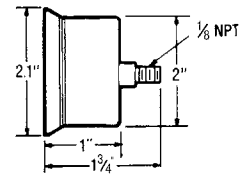
#1 Common; #2 Normally Closed;
#3 Normally Open

Instructions

1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC

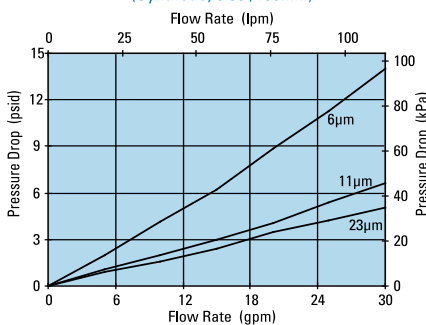
Adjustment screw located in center of electric prongs

P563296 - P563299

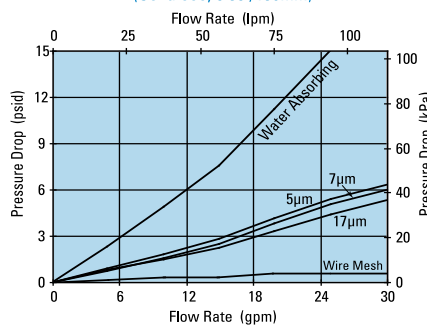


Performance Data

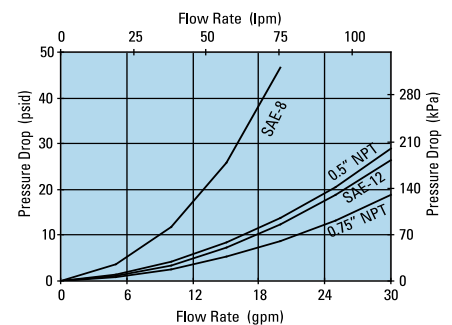
SP15 Filter Only
(Synthetic, 5.35"/136mm)



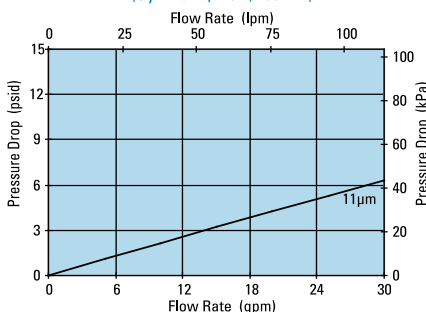
SP15 Filter Only
(Cellulose, 5.35"/136mm)



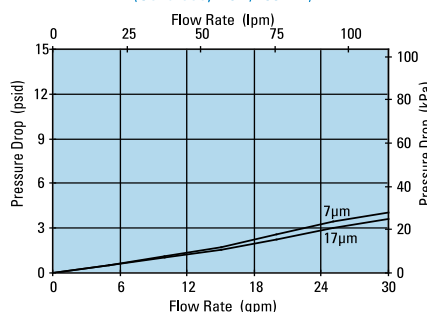
SP15/25 Head Only



SP25 Filter Only
(Synthetic, 7.87"/200mm)



SP25 Filter Only
(Cellulose, 7.87"/200mm)





W023

Max Flow: 60 gpm (227 lpm)

W023 Spin-On Filters

Working Pressures to: 150 psi
1035 kPa
10.3 bar

Rated Static Burst to: 250 psi
1725 kPa
17.2 bar

Flow Range to: 60 gpm
227 lpm

Features

This versatile spin-on series is an excellent choice for use in high corrosion environments. The gray iron head construction can be ordered with a differential pressure indicator port. Take advantage of our mix and match system of heads and filters, so you get exactly what you need. You can choose the media type and configurations that's best for your application.

Applications

- Fluid Conditioning Systems
- In-Plant Systems
- Mobile Equipment
- Power Transmissions
- Process Systems



Beta Rating

- Performance to $\beta_{<4(c)} = 1000$

Porting Size Options

- 1 $\frac{1}{4}$ " NPT
- SAE-20 O-ring

Replacement Filter Lengths

- 6.7" / 170 mm
- 10.7" / 271 mm

Standard Bypass Ratings

- 50 psi / 345 kPa / 3.5 bar
- No bypass

Assembly Weight

- 7.0lbs / 3.2 kg (short)
- 8.0 lbs / 3.6 kg (long)

Operating Temperatures

- -22°F to 225°F / -30°C to 107°C

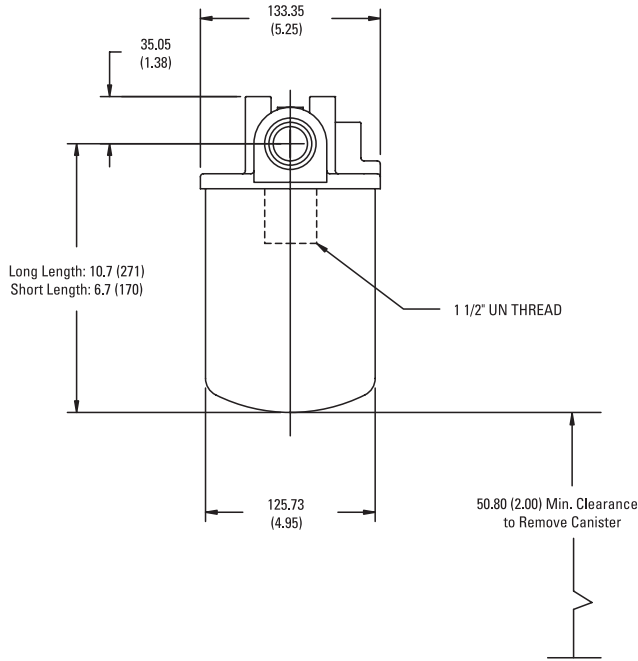
Filter Collapse Ratings

- 100 psid / 690 kPa / 6.9 bar

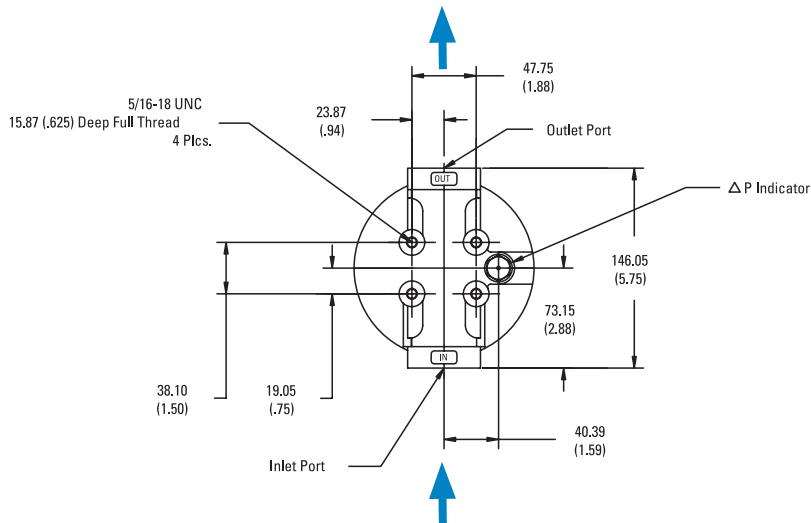
W023 Specification Illustrations

All dimensions are shown in millimeters [inches].

Assembly - Side View



Head - Top View





W023

Max Flow: 60 gpm (227 lpm)

W023 Components

Filter Choices

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(e)} = 1000$	Length		Donaldson Part No.	Comments
			in	mm		
Synteq Synthetic	<4 μm		10.7	271	P167796	Viton® O-ring & square seal kit
	6 μm		6.7	170	P167162	3-seal kit
	6 μm		10.7	271	P165762	3-seal kit
	11 μm		6.7	170	P165875	3-seal kit
	11 μm		10.7	271	P165876	3-seal kit
	13 μm		6.7	170	P167944	Viton O-ring & square seal kit
	13 μm		10.7	271	P167945	Viton O-ring & square seal kit
	23 μm		6.7	170	P165877	3-seal kit
	23 μm		10.7	271	P165878	3-seal kit
	50 μm		6.7	170	P165879	3-seal kit
Cellulose	5 μm		6.7	170	P550386	3-seal kit
	5 μm		10.7	271	P550250	3-seal kit
	7 μm		6.7	170	P550388	3-seal kit
	7 μm		10.7	271	P550251	3-seal kit
	17 μm		6.7	170	P550387	3-seal kit
	17 μm		10.7	271	P550252	3-seal kit
Water Absorbing	10 μm		10.7	271	P561183	Cellulose media, 3-seal kit. Absorbs 350 ml water.
Wire Mesh	150 μm		6.7	170	P550275	Stainless steel wire mesh, 3-seal kit
	150 μm		10.7	271	P550276	Stainless steel wire mesh, 3-seal kit

Filter Notes

* All models have 1½-16 UNF threads except where otherwise noted. All models measure 5.0"/127 mm outer diameter.

Head Assembly Choices

Port Size	Bypass Rating	Seal Material	Indicator Style & Location	Donaldson Part No.
SAE-20 O-Ring	50 psi / 3.45 bar	Buna-N	Port Machined & Plugged	P574241
1-1/4" NPT	None	Buna-N	Port Machined & Plugged	P575930

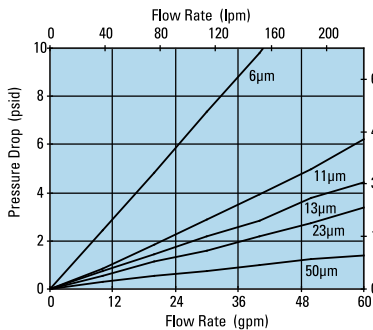


Indicator Choices

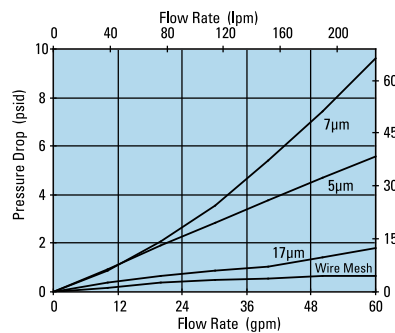
Indicator	Connector	Seal	Donaldson	Thermal	Surge	Reset
Pressure Setting	Style	Material	Part No.	Lockout	Control	
Visual Pop-up Models						
15 psi / 103 kPa	N/A	Buna-N	P572345	No	No	Auto
35 psi / 241 kPa	N/A	Buna-N	P572347	No	No	Auto
35 psi / 241 kPa	N/A	Buna-N	P572348	Yes	Yes	Manual
35 psi / 241 kPa	N/A	Viton	P567456	Yes	Yes	Manual
Electrical / Visual Models						
15 psi / 103 kPa	Hirschmann	Buna-N	P572323	No	No	Auto
15 psi / 103 kPa	3-wire flying leads	Buna-N	P572342	No	No	Auto
35 psi / 241 kPa	Hirschmann	Buna-N	P572327	No	No	Auto
35 psi / 241 kPa	Brad Harrison	Buna-N	P572329	No	No	Auto
35 psi / 241 kPa	Hirschmann	Buna-N	P572384	Yes	Yes	Manual
35 psi / 241 kPa	Hirschmann	Viton	P567458	Yes	Yes	Manual
35 psi / 241 kPa	3-wire flying leads	Buna-N	P572349	No	No	Auto
Electrical Models						
15 psi / 103 kPa	Hirschmann	Buna-N	P572355	No	No	Auto
35 psi / 241 kPa	Hirschmann	Buna-N	P572359	No	No	Auto
35 psi / 241 kPa	Brad Harrison	Buna-N	P572361	No	No	Auto

Performance Data

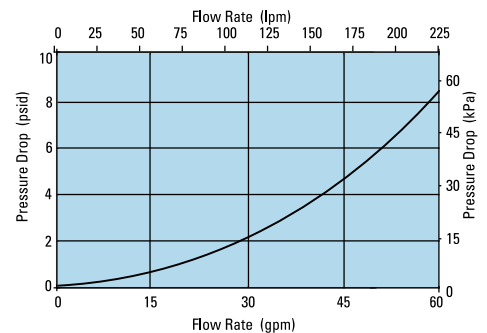
W023 Filter Only
(Synthetic, 6.7"/170mm)



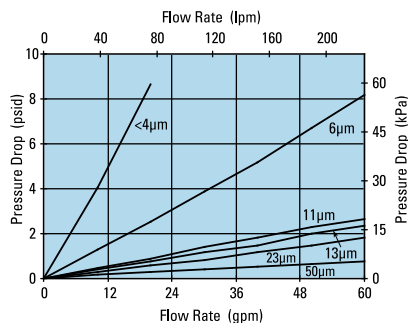
W023 Filter Only
(Cellulose, 6.7"/170mm)



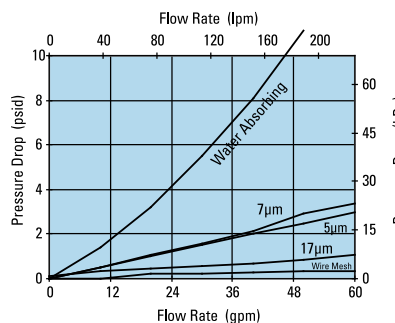
W023 Head Only



W023 Filter Only
(Synthetic, 10.7"/271mm)



W023 Filter Only
(Cellulose, 10.7"/271mm)



Brad Harrison® is a registered trademark of Woodhead Industries, Inc.
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.
Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Co.



HBK05

Max Flow: 60 gpm (227 lpm)

HBK05 Spin-On Filters

Working Pressures to: 150 psi
1035 kPa
10.3 bar

Rated Static Burst to: 250 psi
1725 kPa
17.2 bar

Flow Range to: 60 gpm
227 lpm



Features

HBK05 is a strong and durable low pressure filter with a spin-on design that simplifies servicing and reduces maintenance costs. Its heavy-duty steel canister has a rigid steel attachment plate for added strength. The head-to-canister O-ring seal is designed to ensure seal integrity beyond 250 psi/17 bar. The head is made of die-cast aluminum.

Take advantage of our mix and match system of in-stock heads and filters—so you can get exactly what you need, HBK05 is available with your choice of visual or electrical service indicators, and bypass ratings of 50 psi, 25 psi, or 5 psi. The filter media is Synteq™, our proprietary synthetic media specifically designed for liquid filtration.

HBK05 filters ship with "L", square, and O-ring gaskets (unless noted with Viton® seals, then with square and o-ring gaskets). All HBK05 filters are interchangeable with SP50/60, SP80/90 and SP100/120 spin-ons, and have 1½" - 16 UN threads.

Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

Beta Rating

- Performance to $\beta_{<4(c)}=1000$

Porting Size Options

- 1¼" NPT
- SAE-20 O-ring

Replacement Filter Lengths

- 6.7" / 170 mm (short)
- 10.7" / 271 mm (long)

Filter Collapse Ratings

- 125 psid / 863 kPa / 8.6 bar

Standard Bypass Ratings

- 50 psi / 345 kPa / 3.4 bar
- 25 psi / 172.5 kPa / 1.7 bar
- 5 psi / 34.5 kPa / .34 bar

Assembly Weight

- 6.9 lbs / 3.1 kg (long)
- 5.7 lbs / 2.6 kg (short)

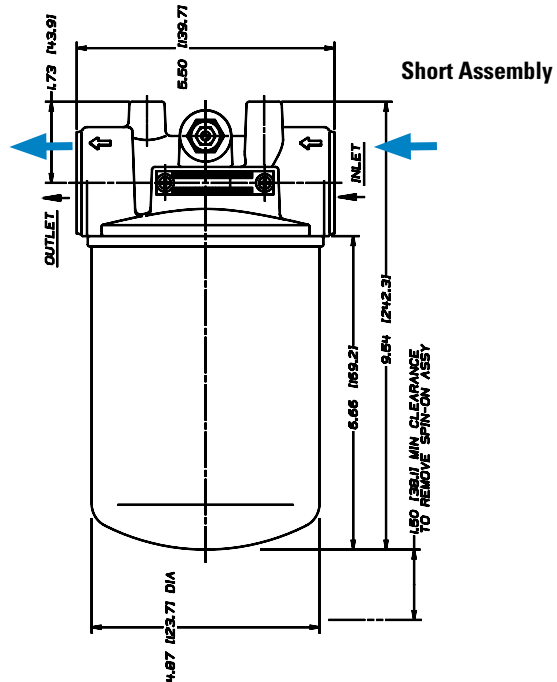
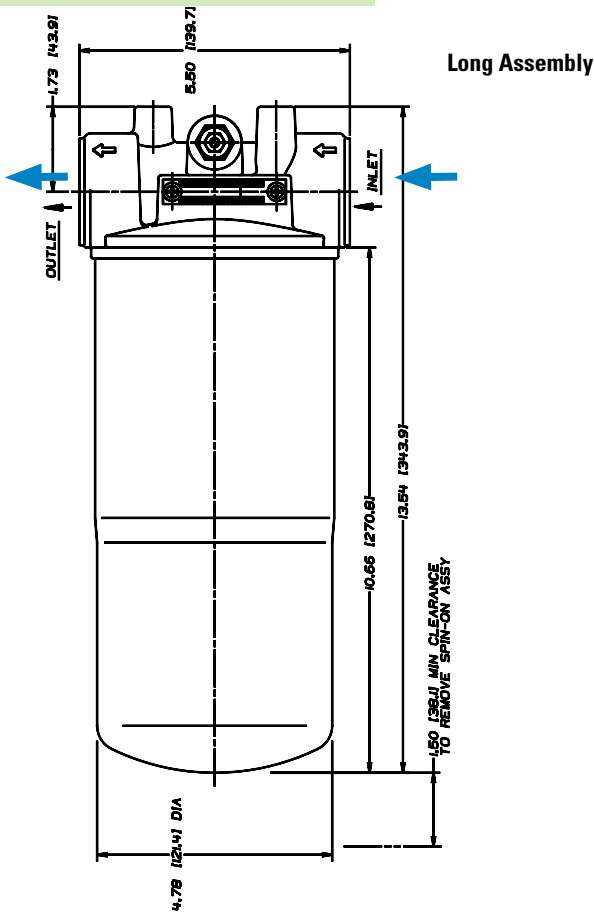
Operating Temperatures

- -22°F to 225°F / -30°C to 107°C

HBK05 Specification Illustrations

All dimensions are shown in inches [millimeters].

Assembly - Side View

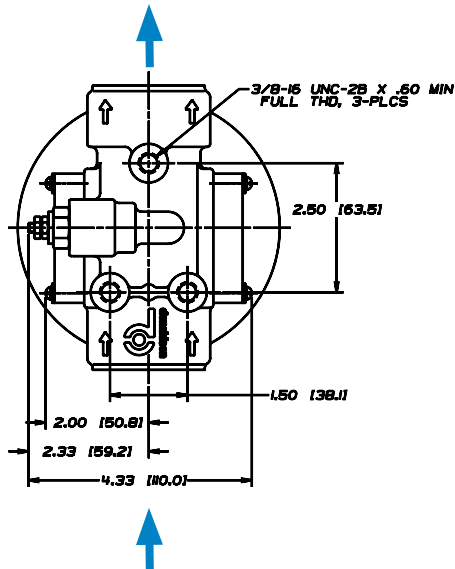


Applications

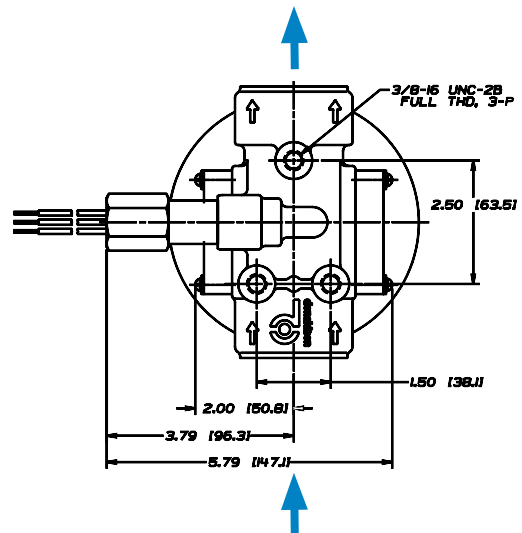
- Cooling Circuits
- Fluid Conditioning Systems
- Hydrostatic Charge Pumps
- Lube Oil Systems
- Power Transmissions
- Return Lines
- Side Loop Systems

Head - Top View

with DC Electrical Service Indicator



with AC/DC Electrical Service Indicator





HBK05
Max Flow: 60 gpm (227 lpm)



HBK05 Components

Filter Choices

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(c)} = 1000$	Length		Donaldson Part No.	Comments
			in	mm		
Synteq Synthetic	<4 μm		10.7	271	P167796	Viton® Seal
	6 μm		6.7	170	P167162	
	6 μm		10.7	271	P165762	
	11 μm		6.7	170	P165875	
	11 μm		10.7	271	P165876	
	13 μm		6.7	170	P167944	Viton Seal
	13 μm		10.7	271	P167945	Viton Seal
	23 μm		6.7	170	P165877	
	23 μm		10.7	271	P165878	
	50 μm		6.7	170	P165879	
50 μm		10.7	271	P165880		
Water Absorbing	10 μm		10.7	271	P561183	Cellulose media, 3-seal kit. Absorbs 350 ml water.

Filter Notes

* Thread size 1/2"-16 UN

Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

Head Choices

Port Size	Bypass Rating	Indicator Style & Location	Donaldson Part No.
1/4" NPT	50 psi / 345 kPa	Visual, Both Sides	P172953
1/4" NPT	25 psi / 172 kPa	Visual, Both Sides	P166418
1/4" NPT	5 psi / 34 kPa	Visual, Both Sides	P166665
SAE-20 O-Ring	25 psi / 172 kPa	Visual, Both Sides	P166439

Note

* Donaldson uses the inlet port as the reference point. "Left side," for instance, means that the indicator mounts on the side of the filter head that is on your left when you face the inlet port.



Mix and Match

Donaldson's mix and match system provides the great performance and functional advantages of custom-engineered filters with the convenience and speedy delivery of in-stock parts. Choose your options and build an HBK05 filter to suit your specifications.

Service Indicator Options

Use with Bypass Valve Pressure of:	Indicator Part No.	Style ⁽³⁾	Description
Electric Models⁽¹⁾			
5 psi / 34.5 kPa	P163642	A	Single post DC. Normally open.
15 psi / 103 kPa	P163601	A	Single post DC. Normally open.
25 psi / 172.5 kPa	P163839	A	Single post DC. Normally closed.
25 psi / 172.5 kPa	P162400	A	Single post DC. Normally open.
25 psi / 172.5 kPa	P171143	B	2-wire with Cannon connector. Normally open.
25 psi / 172.5 kPa	P173944	C	3-wire: White = normally open. Red = normally closed. Black = common
50 psi / 276 kPa	P574967	E	DC 2-wire. Normally closed. Gold contacts. Microprocessor compatible.

Service Indicator Options

Use with Bypass Valve Pressure of:	Indicator Part No.	Style ⁽³⁾
Visual Models⁽²⁾		
5 psi / 34.5 kPa	P162694	D
15 psi / 103 kPa	P162642	D
25 psi / 172.5 kPa	P162696	D
N/A	P165984	(blank plate)
25 psi / 172.5 kPa	P575334	H (Visual pop up)
50 psi / 345 kPa	P575335	H (Visual pop up)

Indicator Notes

⁽¹⁾All electric models have a maximum operating temperature of 250°F/ 121°C.

⁽²⁾All visual models have a maximum operating temperature of 180°F/ 82°C.

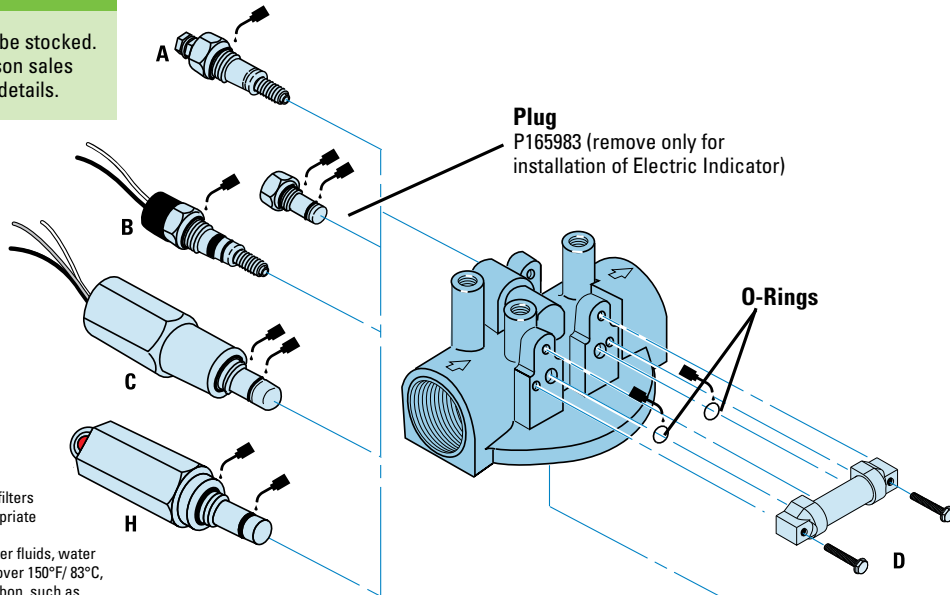
⁽³⁾See indicator illustrations on facing page.

HBK05 Service Parts

SERVICE PARTS NOTE:

Some service parts may not be stocked. Please contact your Donaldson sales representative for lead time details.

Service Indicator Styles (See table on opposite page)



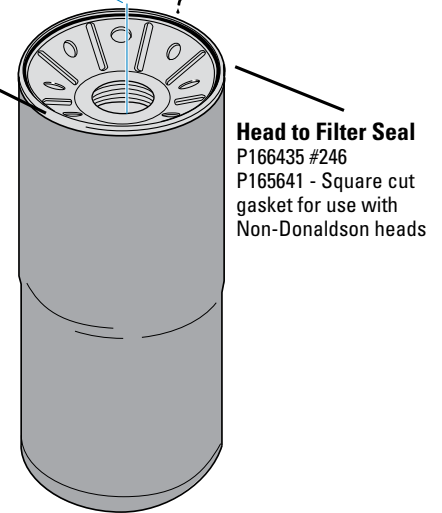
Filter Notes

- If you're filtering petroleum-based oil, filters with seals made of Buna-N® are appropriate for most applications.
 - If you're filtering diester, phosphate ester fluids, water glycol, water/oil emulsions and HWCF over 150°F/ 83°C, use filters with seals made of fluorocarbon, such as Viton® from DuPont Dow Elastomers, or Fluorel® from 3M Company.
 - Refer to the table in the Technical Reference Guide for fluid compatibility with our filter media.
- Viton® and Buna-N® are registered trademarks of E. I. DuPont de Nemours and Company.

Gaskets

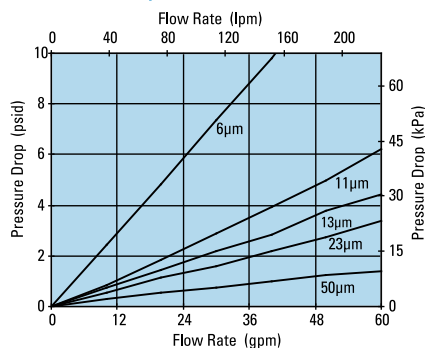
Each filter ships with a 3-seal kit, containing an "L" shaped, a square cut, and an O-ring gasket seal, unless otherwise noted. Use only one of the following seals. Installation instructions can be found in the technical reference section.

- L Shaped**
Use with filter heads with no groove or a wide groove.
- Square Cut**
Use with filter heads with a narrow groove.
- O-Ring -246**
Use with Donaldson HBK05 heads only.

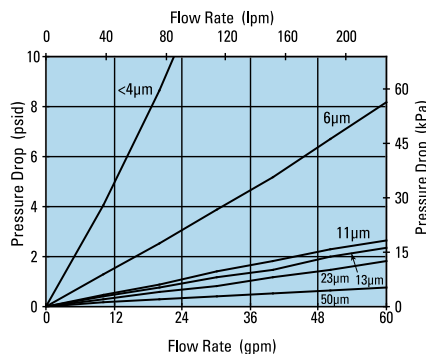


Performance Data

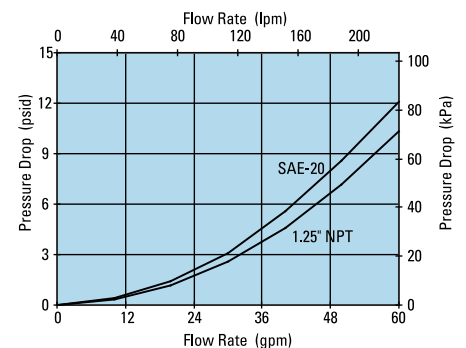
HBK05 Filter Only
(Synthetic, 6.7"/170mm)



HBK05 Filter Only
(Synthetic, 10.7"/271mm)



HBK05 Head Only





SP50/60

Max Flow: 60 gpm (227 lpm)



SP50/60 Spin-On Filters

Working Pressures to: 150 psi
1035 kPa
10.3 bar

Rated Static Burst to: 250 psi
1725 kPa
17.2 bar

Flow Range to: 60 gpm
227 lpm



Features

The SP50/60 spin-on filter is an economical, low-pressure model with a broad selection of media ratings. The die cast aluminum head and steel body ensure strength and durability—perfect for a wide variety of mobile and in-plant applications.

Take advantage of Donaldson's mix and match system of in-stock heads and filter choices—so you can get exactly what you need. Filter options include: synthetic media, natural-fiber cellulose, water-absorbing cellulose media and wire mesh media. SP50/60 spin-on filters are interchangeable with HBK05 filters.

Beta Rating

- Performance to $\beta_{<4(c)} = 1000$

Porting Size Options

- 1¼" NPT
- SAE-20 O-ring

Replacement Filter Lengths

- 6.7" / 170 mm
- 7.0" / 178 mm
- 10.7" / 271 mm

Filter Collapse Ratings

- 100 psid / 690 kPa / 6.9 bar

Standard Bypass Ratings

- 25 psi / 172.5 kPa / 1.7 bar
- 15 psi / 103.4 kPa / 1.03 bar
- 5 psi / 34.5 kPa / .34 bar
- No Bypass

Assembly Weight

- 4.7 lbs / 2.1 kg (short)
- 5.6 lbs / 2.5 kg (long)

Operating Temperatures

- -22°F to 225°F / -30°C to 107°C



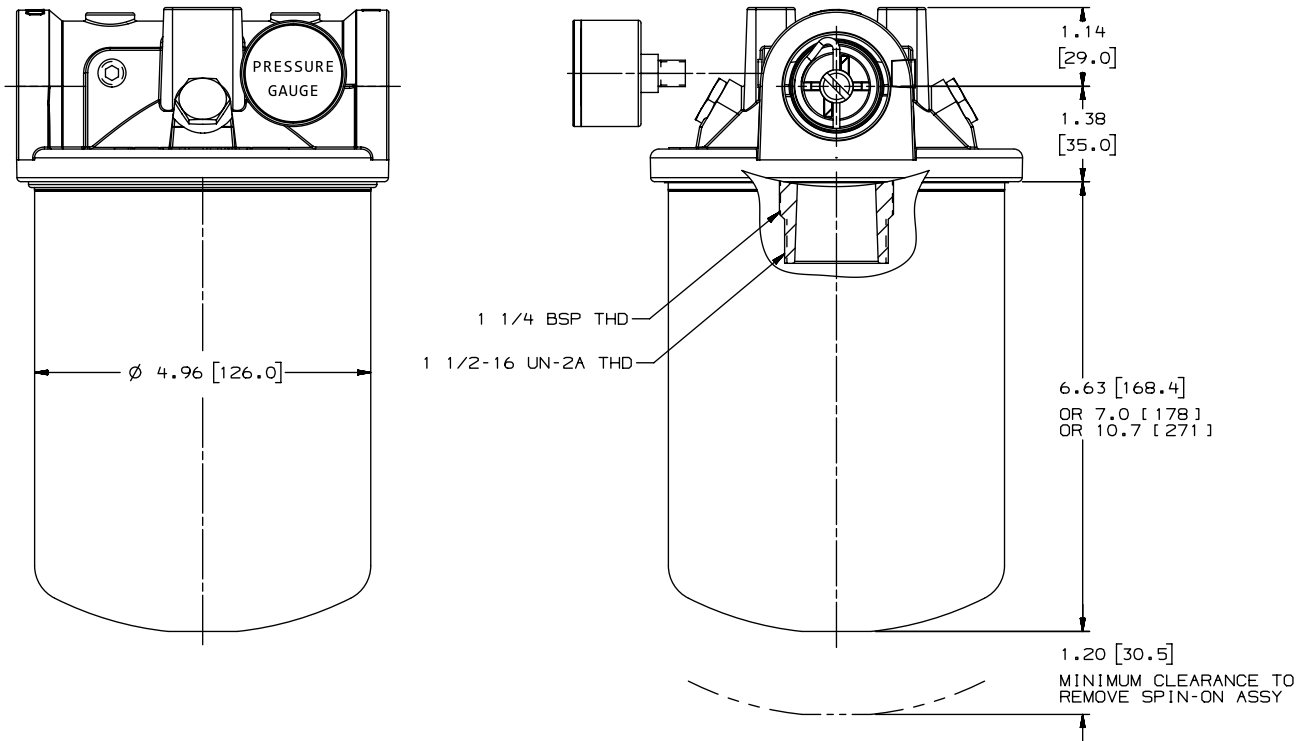
SP50/60 Specification Illustrations

All dimensions are shown in inches [millimeters].

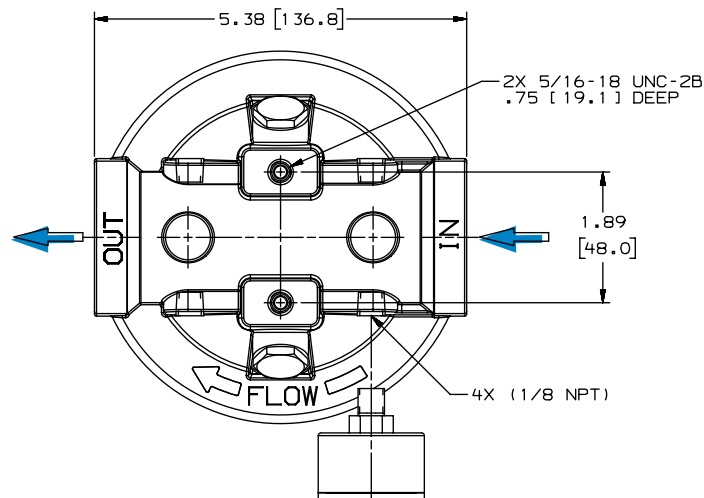
Applications

- Fluid Conditioning Systems
- In-Plant Systems
- Mobile Equipment
- Power Transmissions
- Process Systems

Assembly - Side View



Head - Top View





SP50/60

Max Flow: 60 gpm (227 lpm)



SP50/60 Components

Filter Choices

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(e)} = 1000$	Length		Donaldson Part No.	Comments
			in	mm		
Synteq Synthetic	<4 μm		10.7	271	P167796	Viton® O-ring & square seal kit
	6 μm		6.7	170	P167162	3-seal kit
	6 μm		10.7	271	P165762	3-seal kit
	11 μm		6.7	170	P165875	3-seal kit
	11 μm		10.7	271	P165876	3-seal kit
	13 μm		6.7	170	P167944	Viton O-ring & square seal kit
	13 μm		10.7	271	P167945	Viton O-ring & square seal kit
	23 μm		6.7	170	P165877	3-seal kit
	23 μm		10.7	271	P165878	3-seal kit
		50 μm		6.7	170	P165879
	50 μm		10.7	271	P165880	3-seal kit
Cellulose	5 μm		6.7	170	P550386	3-seal kit
	5 μm		10.7	271	P550250	3-seal kit
	7 μm		6.7	170	P550388	3-seal kit
	7 μm		10.7	271	P550251	3-seal kit
	7 μm		7.00	178	P565245	Square seal kit, 1/4" BSP thread
	17 μm		6.7	170	P550387	3-seal kit
	17 μm		10.7	271	P550252	3-seal kit
	27 μm		7.00	178	P171616	Square seal kit, 1/4" BSP thread
Water Absorbing	10 μm		10.7	271	P561183	Cellulose media, 3-seal kit. Absorbs 350 ml water.
Wire Mesh	150 μm		6.7	170	P550275	Stainless steel wire mesh, 3-seal kit
	150 μm		10.7	271	P550276	Stainless steel wire mesh, 3-seal kit

All models have 1½-16 UNF threads except where otherwise noted. All models measure 5.0"/127 mm outer diameter. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.


Head Choices

Port Size	Bypass Rating	Gauge Ports (drill, tap, plug)	Gauge Port Location	Donaldson Part No.
1/4" NPT	No Bypass	(4) 1/8" NPT	upstream and downstream side	P576558
1/4" NPT	5 psi / 34.5 kPa / .34 bar	(4) 1/8" NPT	upstream and downstream side	P576555
1/4" NPT	15 psi / 103.4 kPa / 1.34 bar	(4) 1/8" NPT	upstream and downstream side	P576556
1/4" NPT	25 psi / 172.5 kPa / 1.72 bar	(4) 1/8" NPT	upstream and downstream side	P576557
SAE-20	No Bypass	(4) 1/8" NPT	upstream and downstream side	P576565
SAE-20	5 psi / 34.5 kPa / .34bar	(4) 1/8" NPT	upstream and downstream side	P576562
SAE-20	15 psi / 103.4 kPa / 1.34 bar	(4) 1/8" NPT	upstream and downstream side	P576563
SAE-20	25 psi / 172.5 kPa / 1.72 bar	(4) 1/8" NPT	upstream and downstream side	P576564

Gaskets

Each filter ships with a 3-seal kit, containing an "L" shaped, a square cut, and an O-ring gasket seal, unless otherwise noted. Use only one of the following seals. Installation instructions can be found in the technical reference section.

 L Shaped
Use with filter heads with no groove or a wide groove.

 Square Cut
Use with filter heads with a narrow groove.

 O-Ring -246
Use with Donaldson HBK05 heads only.

Note:

On a return line system the gauge port should be on the upstream side. We suggest a 25 psi bypass. If head is used on a suction line, the gauge port should be on the downstream side very low bypass.

Pressure Gauges

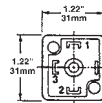
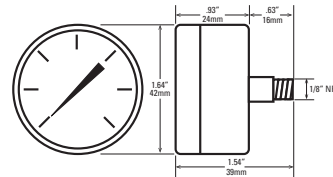
Donaldson Part No.	Pressure Range	Use With Bypass Valve Rating	Type
P563978	5 to 30 psi field adj.*	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, electrical
P563979	-5 to 15 in Hg field adj.*	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, electrical
P579714	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, numeric scale
P579715	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar Bypass	Return indicator, color coded
P579716	0 to 100 psi	25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, color-coded
P579717	0 to -30 Hg	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, numeric scale

* NOT PRESET: Setting adjustable for desired application

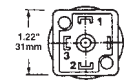
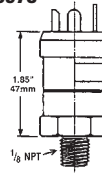
Electrical and Visual Indicators

Use With Bypass Valve Rating	Indicator Part Number	Style	Description
Electrical Models			
5 PSI / 34.5 kPa	P163642	A	Single Post DC, Normally Open
15 PSI / 103 kPa	P163601	A	Single Post DC, Normally Open
25 PSI / 172.5 kPa	P163839	A	Single Post DC, Normally Closed
25 PSI / 172.5 kPa	P162400	A	Single Post DC, Normally Open
Visual Model			
25 PSI / 172.5 kPa	P575334	H	Visual Popup, Auto Reset
15 PSI / 103 kPa	P579215	H	Visual Popup, Auto Reset

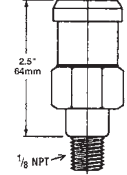
P579714 - P579717



P563978

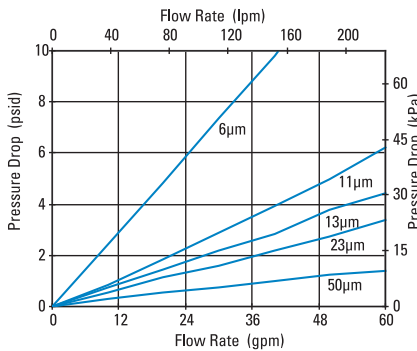


P563979

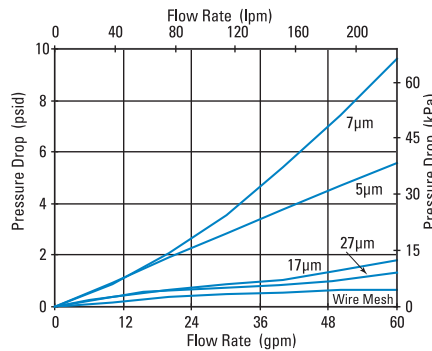


Performance Data

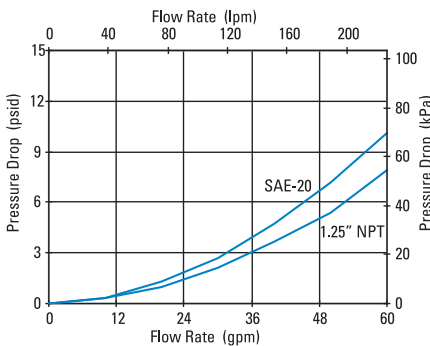
SP50 Filter Only
(Synthetic, 6.7"/170mm)



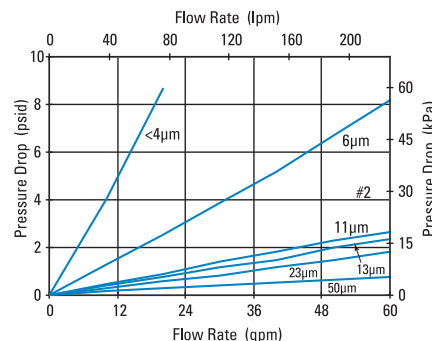
SP50 Filter Only
(Cellulose, 6.7"/170-178mm)



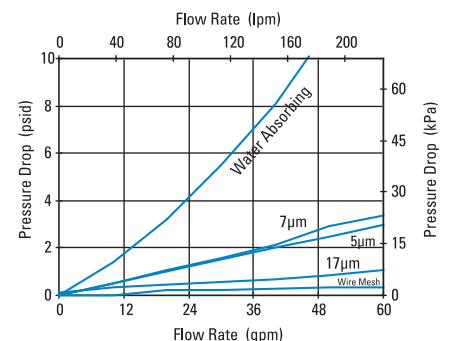
SP50/60 Head Only



SP60 Filter Only
(Synthetic, 10.7"/271mm)



SP60 Filter Only
(Cellulose, 10.7"/271mm)



#1 Common; #2 Normally Closed; #3 Normally Open

Instructions

1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC
Adjustment screw located in center of electric prongs



SP80/90

Max Flow: 100 gpm (379 lpm)



SP80/90 Spin-On Filters

Working Pressures to: 150 psi
1035 kPa
10.3 bar

Rated Static Burst to: 250 psi
1725 kPa
17.2 bar

Flow Range to: 100 gpm
379 lpm



Features

SP80/90 double filter head allows for double the flow capacity, with two filters to hold more contaminant. Aluminum casting and Buna-N® seals standard. SP80/90 filters are interchangeable with SP50/60 filters.

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.

Beta Rating

- Performance to $\beta_{<4(c)}=1000$

Porting Size Options

- 1½" NPT
- SAE-24 O-ring
- 2" SAE 4-Bolt Flange Code 61

Replacement Filter Lengths

- 6.7" / 170 mm
- 7.0" / 178 mm
- 10.7" / 271 mm

Filter Collapse Ratings

- 100 psid / 690 kPa / 6.9 bar

Standard Bypass Ratings

- 25 psi / 172.5 kPa / 1.72 bar
- 15 psi / 103.4 kPa / 1.34 bar
- 5 psi / 34.5 kPa / .34 bar
- no bypass

Assembly Weight

- 10.0 lbs / 4.5 kg (short) - approximate
- 11.8 lbs / 5.4 kg (long)

Operating Temperatures

- -22°F to 225°F / -30°C to 107°C

SP80/90 Specification Illustrations

All dimensions are shown in inches [millimeters].

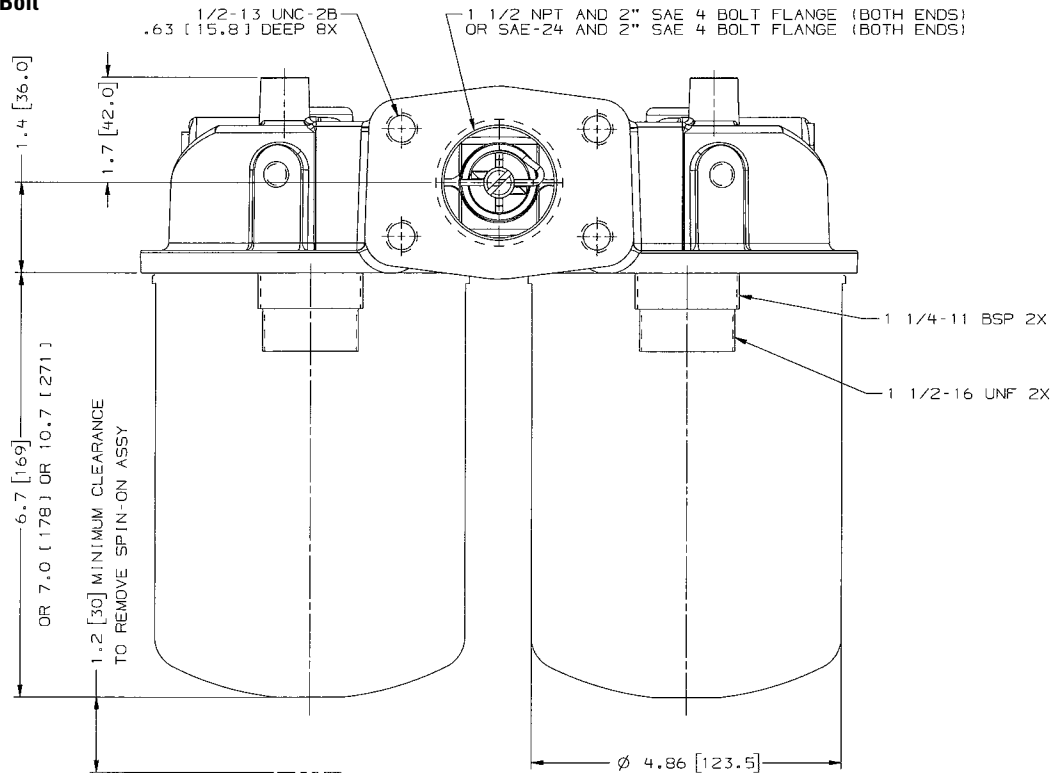
Assembly - Side View

Combination

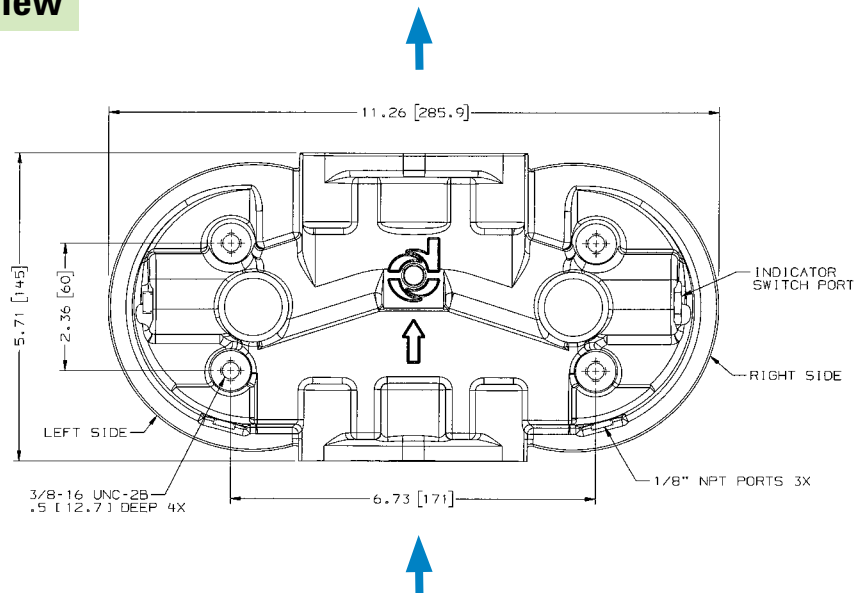
1 1/2" NPT and 2" SAE
4-Bolt Flange (Both Ends) or
SAE-24 & 2" SAE-4 Bolt

Applications

- Fluid Conditioning Systems
- In-Plant Systems
- Mobile Equipment
- Power Transmissions
- Process Systems



Head - Top View





SP80/90
Max Flow: 100 gpm (379 lpm)



SP80/90 Components

Filter Choices

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(e)} = 1000$	Length in	mm	Donaldson Part No.	Comments
Synteq Synthetic	<4 μm		10.7	271	P167796	Viton® O-ring & square seal kit
	6 μm		6.7	170	P167162	3-seal kit
	6 μm		10.7	271	P165762	3-seal kit
	11 μm		6.7	170	P165875	3-seal kit
	11 μm		10.7	271	P165876	3-seal kit
	13 μm		6.7	170	P167944	Viton O-ring & square seal kit
	13 μm		10.7	271	P167945	Viton O-ring & square seal kit
	23 μm		6.7	170	P165877	3-seal kit
	23 μm		10.7	271	P165878	3-seal kit
		50 μm		6.7	170	P165879
	50 μm		10.7	271	P165880	3-seal kit
Cellulose	5 μm		6.7	170	P550386	3-seal kit
	5 μm		10.7	271	P550250	3-seal kit
	7 μm		6.7	170	P550388	3-seal kit
	7 μm		10.7	271	P550251	3-seal kit
	7 μm		7.00	178	P565245	Square seal kit, 1/4" BSP thread
	17 μm		6.7	170	P550387	3-seal kit
	17 μm		10.7	271	P550252	3-seal kit
		27 μm		7.00	178	P171616
Water Absorbing	10 μm		10.7	271	P561183	Cellulose media, 3-seal kit. Absorbs 350 ml water.
Wire Mesh	150 μm		6.7	170	P550275	Stainless steel wire mesh, 3-seal kit
	150 μm		10.7	271	P550276	Stainless steel wire mesh, 3-seal kit

All models have 1½-16 UNF threads except where otherwise noted. All models measure 5.0"/127mm outer diameter. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

Head Choices

Port Size	Bypass Rating	Gauge Ports (drill, tap, plug)	Gauge Port Location	Donaldson Part No.
1½" NPT & 2" SAE 4 Bolt	15 psi / 103.4 kPa / 1.34 bar	(4) 1/8" NPT	upstream & downstream sides	P563273
1½" NPT & 2" SAE 4 Bolt	25 psi / 172.5 kPa / 1.72 bar	(4) 1/8" NPT	upstream & downstream sides	P563274
1½" NPT & 2" SAE 4 Bolt	No Bypass	(4) 1/8" NPT	upstream & downstream sides	P563275
1½" NPT & 2" SAE 4 Bolt	5 psi / 34.5 kPa / .34 bar	(4) 1/8" NPT	upstream & downstream sides	P563276
SAE-24 O-Ring	25 psi / 172.5 kPa / 1.72 bar	(4) 1/8" NPT	upstream & downstream sides	P564892
SAE-24	No Bypass	(4) 1/8" NPT	upstream & downstream sides	P573217

Note: On a return line system the gauge port should be on the upstream side. We suggest a 25 psi bypass. If head is used on a suction line, the gauge port should be on the downstream side very low bypass.

Gaskets

Each filter ships with a 3-seal kit, containing an "L" shaped, a square cut, and an O-ring gasket seal, unless otherwise noted. Use only one of the following seals. Installation instructions can be found in the technical reference section.

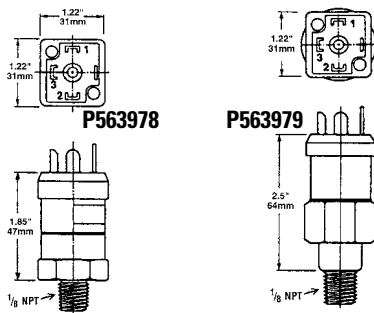
- L Shaped**
Use with filter heads with no groove or a wide groove.
- Square Cut**
Use with filter heads with a narrow groove.
- O-Ring -246**
Use with Donaldson HBK05 heads only.

Optional Filter Service Indicators for Left Side

Donaldson Part No.	Pressure Range	Use With Bypass Valve Rating	Type
P563978	5 to 30 psi field adj.*	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, electrical
P563979	-5 to 15 in Hg field adj.*	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, electrical
P563296	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, numeric scale
P563297	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar Bypass	Return indicator, color coded
P563298	0 to 100 psi	25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, color-coded
P563299	0 to -30 Hg	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, numeric scale



Notes
* NOT PRESET:
Setting adjustable for desired application



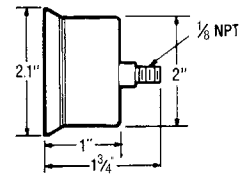
#1 Common; #2 Normally Closed;
#3 Normally Open

Instructions

1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC

Adjustment screw located in center of electric prongs

P563296 - P563299

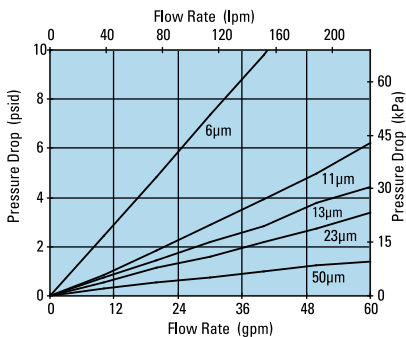


Optional Filter Service Indicators for Right Side

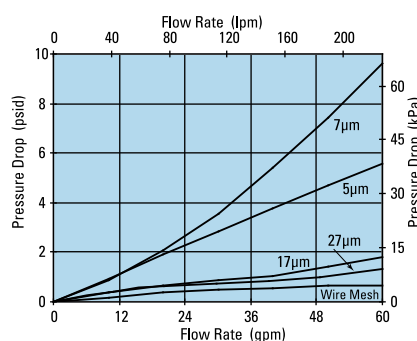
Refer to page 189 in the accessories section for right side electrical filter service indicator options.

Performance Data

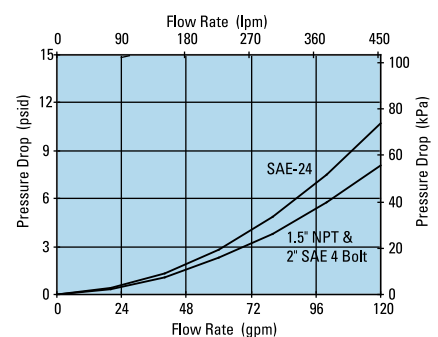
SP80 Filter Only
(Synthetic, 6.7"/170mm)



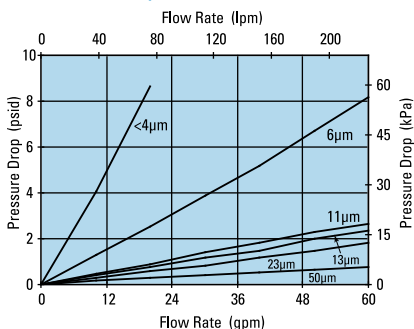
SP80 Filter Only
(Cellulose, 6.7"/170-178mm)



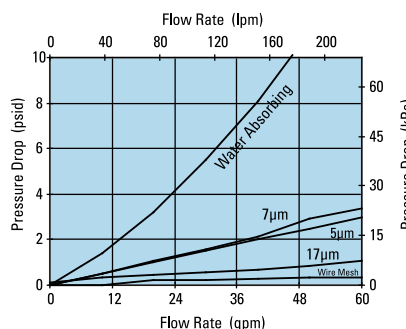
SP80/90 Head Only



SP90 Filter Only
(Synthetic, 10.7"/271mm)



SP90 Filter Only
(Cellulose, 10.7"/271mm)





SP100/120

Max Flow: 100 gpm (379 lpm)



LOW PRESSURE FILTERS

SP100/120 Spin-On Filters

Working Pressures to:	150 psi 1035 kPa 10.3 bar
------------------------------	---------------------------------

Rated Static Burst to:	250 psi 1725 kPa 17.2 bar
-------------------------------	---------------------------------

Flow Range to:	100 gpm 379 lpm
-----------------------	--------------------

Features

SP100/120 double filter head allows for double the flow capacity and a unique, space-saving configuration. Aluminum casting and Buna-N® seals standard. SP100/120 filters are interchangeable with SP50/60 filters.

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



Beta Rating

- Performance to $\beta_{<4(c)} = 1000$

Porting Size Options

- 1½" NPT

Replacement Filter Lengths

- 6.7" / 170 mm
- 7.0" / 178 mm
- 10.7" / 271 mm

Standard Bypass Ratings

- 25 psi / 172.5 kPa / 1.72 bar

Assembly Weight

- 7.0 lbs / 3.2 kg (short)
- 8.8 lbs / 4.0 kg (long)

Operating Temperatures

- -22°F to 225°F / -30°C to 107°C

Filter Collapse Ratings

- 100 psid / 690 kPa / 6.9 bar



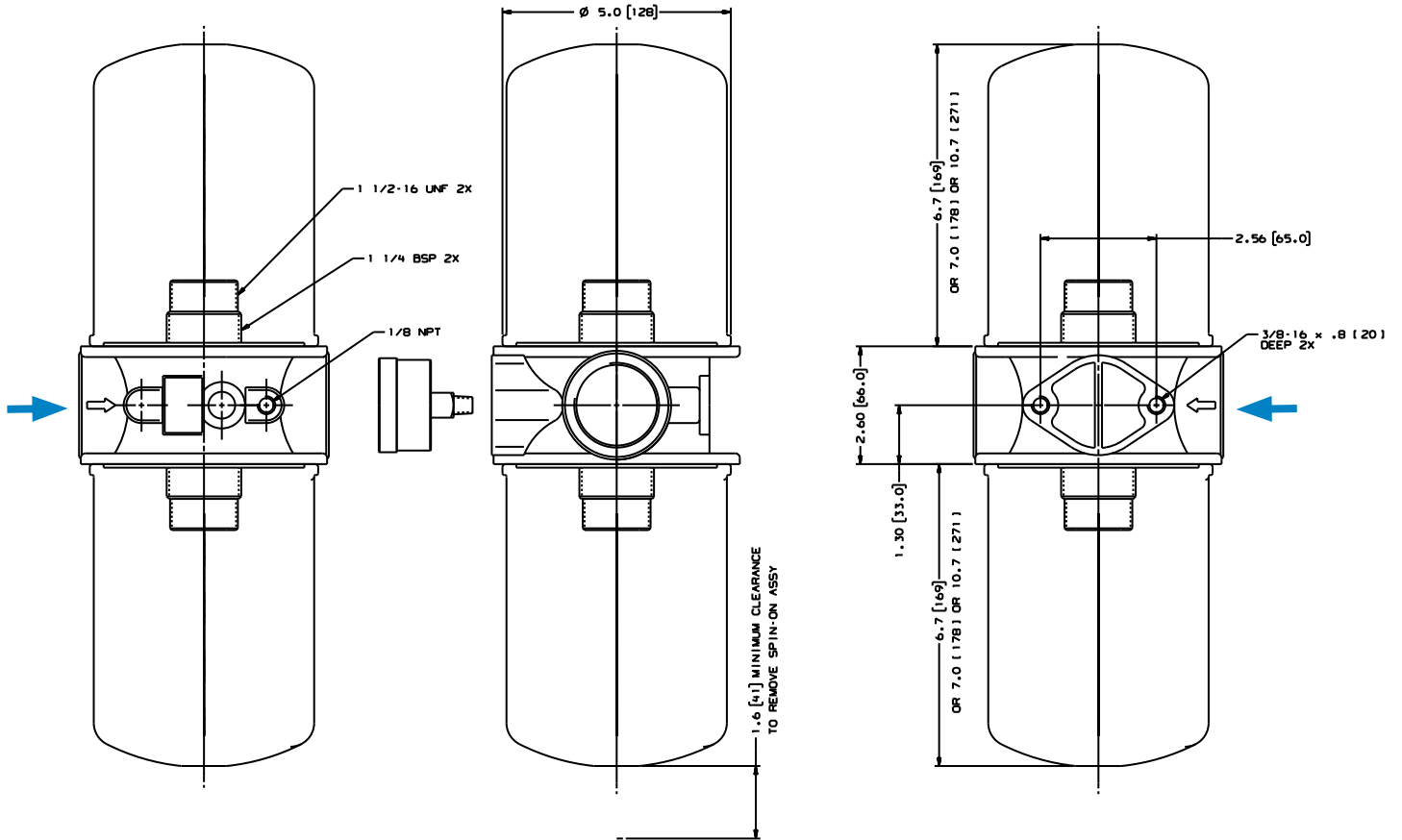
SP100/120 Specification Illustrations

All dimensions are shown in inches [millimeters].

Assembly - Side View

Applications

- Fluid Conditioning Systems
- In-Plant Systems





SP100/120

Max Flow: 100 gpm (379 lpm)



SP100/120 Components

Filter Choices

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(c)} = 1000$	Length in	mm	Donaldson Part No.	Comments
Synteq Synthetic	<4 μm		10.7	271	P167796	Viton® O-ring & square seal kit
	6 μm		6.7	170	P167162	3-seal kit
	6 μm		10.7	271	P165762	3-seal kit
	11 μm		6.7	170	P165875	3-seal kit
	11 μm		10.7	271	P165876	3-seal kit
	13 μm		6.7	170	P167944	Viton O-ring & square seal kit
	13 μm		10.7	271	P167945	Viton O-ring & square seal kit
	23 μm		6.7	170	P165877	3-seal kit
	23 μm		10.7	271	P165878	3-seal kit
		50 μm		6.7	170	P165879
	50 μm		10.7	271	P165880	3-seal kit
Cellulose	5 μm		6.7	170	P550386	3-seal kit
	5 μm		10.7	271	P550250	3-seal kit
	7 μm		6.7	170	P550388	3-seal kit
	7 μm		10.7	271	P550251	3-seal kit
	7 μm		7.00	178	P565245	Square seal kit, 1/4" BSP thread
	17 μm		6.7	170	P550387	3-seal kit
	17 μm		10.7	271	P550252	3-seal kit
	27 μm		7.00	178	P171616	Square seal kit, 1/4" BSP thread
Water Absorbing	10 μm		10.7	271	P561183	Cellulose media, 3-seal kit. Absorbs 350 ml water.
Wire Mesh	150 μm		6.7	170	P550275	Stainless steel wire mesh, 3-seal kit
	150 μm		10.7	271	P550276	Stainless steel wire mesh, 3-seal kit

All models have 1½-16 UNF threads except where otherwise noted. All models measure 5.0"/127 mm outer diameter. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

Head Choice

Port Size	Bypass Rating	Gauge Ports (drill, tap, plug)	Gauge Port Location	Donaldson Part No.
1½" NPT	25 psi / 172.5 kPa / 1.72 bar	(2) 1/8" NPT	upstream & downstream sides	P563277


Note:

On a return line system the gauge port should be on the upstream side. We suggest a 25 psi bypass. If head is used on a suction line, the gauge port should be on the downstream side very low bypass.

Gaskets

Each filter ships with a 3-seal kit, containing an "L" shaped, a square cut, and an O-ring gasket seal, unless otherwise noted. Use only one of the following seals. Installation instructions can be found in the technical reference section.

 L Shaped
Use with filter heads with no groove or a wide groove.

 Square Cut
Use with filter heads with a narrow groove.

 O-Ring -246
Use with Donaldson HBK05 heads only.

Optional Filter Service Indicators

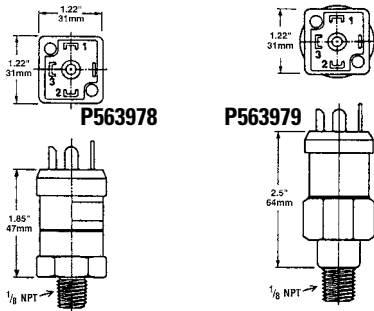
This handy pressure gauge, mounted on the side of an SP100/120 filter head, will tell you when it's time to service the filter.

Donaldson Part No.	Pressure Range	Use With Bypass Valve Rating	Type
P563978	5 to 30 psi field adj.*	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, electrical
P563979	-5 to 15 in Hg field adj.*	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, electrical
P563296	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, numeric scale
P563297	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar Bypass	Return indicator, color coded
P563298	0 to 100 psi	25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, color-coded
P563299	0 to -30 Hg	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, numeric scale



Notes

* NOT PRESET:
Setting adjustable for desired application



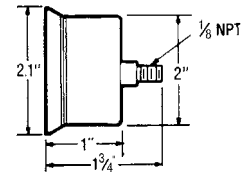
#1 Common; #2 Normally Closed;
#3 Normally Open

Instructions

1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC

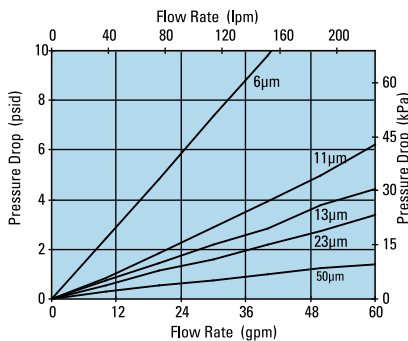
Adjustment screw located in center of electric prongs

P563296 - P563299

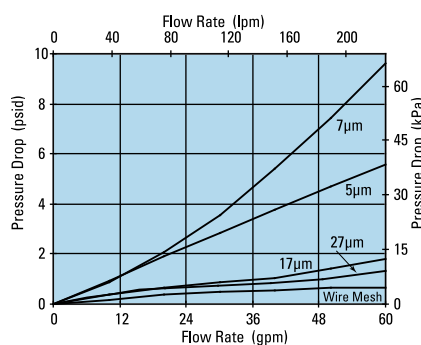


Performance Data

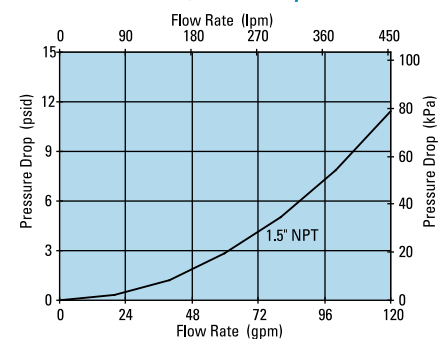
SP100 Filter Only (Synthetic, 6.7\"/>



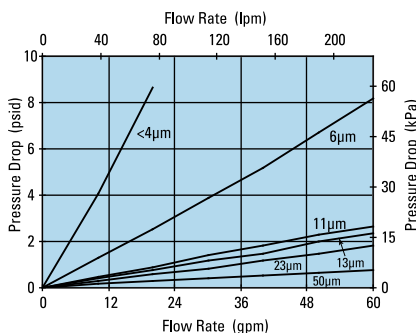
SP100 Filter Only (Cellulose, 6.7\"/>



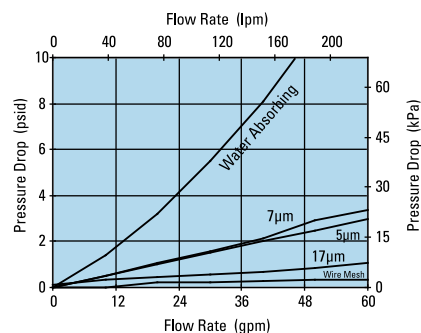
SP100/120 Head Only



SP120 Filter Only (Synthetic, 10.7\"/>



SP120 Filter Only (Cellulose, 10.7\"/>





TT15/30/60

Max Flow: 50 gpm (189 lpm)



TT15/30/60 Tank Top Return Spin-On Filters

Working Pressures to: 100 psi
690 kPa
6.9 bar

Rated Static Burst to: 250 psi
1725 kPa
17.2 bar

Flow Range to: 50 gpm
189 lpm



Applications

- In-Plant Systems
- Mobile Equipment
- Return Lines

Features

TT15/30/60 Tank Top filters are designed for industrial service. Aluminum casting and Buna-N® seals standard. Used with mineral and synthetic based fluids, these return filters conveniently mount to tank tops with four screws. Common holes are used to mount the filter head to the reservoir without welding. A down pipe is attached to a threaded port and the gasket surface provides a watertight seal. Each filter provides a new bypass valve and anti-drainback valve for easy filter change. Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.

Beta Rating

- Performance to $\beta_{7(c)}=2$

Porting Size Options

- 3/4", 1 1/2" NPT

Replacement Filter Lengths

- 5.83" / 148mm TT15
- 7.05" / 179mm TT30
- 9.29" / 236mm TT60

Filter Collapse Ratings

- 250 psid / 1725 kPa / 17.2 bar

Standard Bypass Ratings

- 22 psi / 150 kPa / 1.5 bar

Assembly Weight

- 2.0 lbs / 0.9 kg TT15
- 4.3 lbs / 2.0 kg TT30
- 5.2 lbs / 2.4 kg TT60

Operating Temperatures

- -22°F to 225°F / -30°C to 107°C

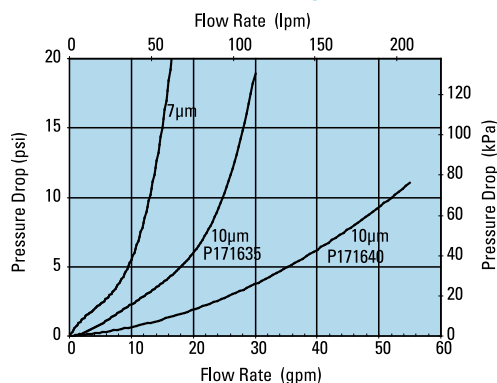
TT15/30/60 Components

Filter Choices

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	Length in mm	Donaldson Part No.	Comments
Cellulose	7µm	5.36 136	P565242	TT15 Series
	10 µm	7.05 179	P171635	TT30 Series
	10 µm	9.29 236	P171640	TT60 Series

Performance Data

TT Filters Only





Head Choices

Port Size	Bypass Rating*	Gauge Ports (drill, tap, plug)	Gauge Port Location	Donaldson Part No.	Description	Head to Tank** Seal Part No.
3/4" NPT	22 psi / 150 kPa / 1.5 bar	(2) 1/8" NPT	upstream side	P564038	TT15 Series	P563975
1 1/2" NPT	22 psi / 150 kPa / 1.5 bar	(2) 1/8" NPT	upstream side	P563973	TT30/60 Series	P563976

Note

* Bypass valve is integral part of replacement filter. ** Included with head.

On a return line system the gauge port should be on the upstream side. We suggest a 25 psi bypass. If head is used on a suction line, the gauge port should be on the downstream side very low bypass.

Optional Filter Service Indicators

Donaldson Part No.	Pressure Range	Use With Series	Type
P563300	0 to 30 psi	TT15/30/60	Return indicator, color-coded
P563978	5 to 30 psi field adj.*	TT15/30/60	Return indicator, electrical
P563298	0 to 100 psi	TT15/30/60	Return indicator, color-coded

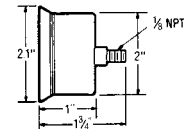
Notes

* NOT PRESET: Setting adjustable for desired application

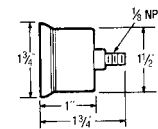
1/8" - 27 NPTF threads

- Built in snubber to minimize damage caused by pressure surges
- Compatible with petroleum and mineral-based fluids
- Anti-splash

P563298



P563300

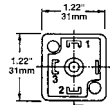


Instructions

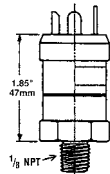
1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC



- #1 Common;
- #2 Normally Closed;
- #3 Normally Open



P563978

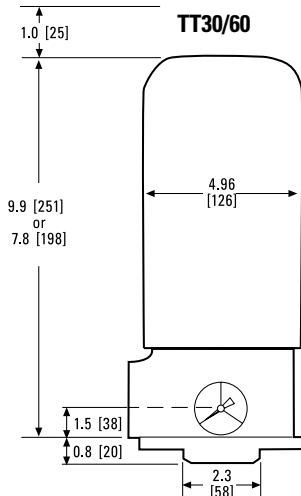
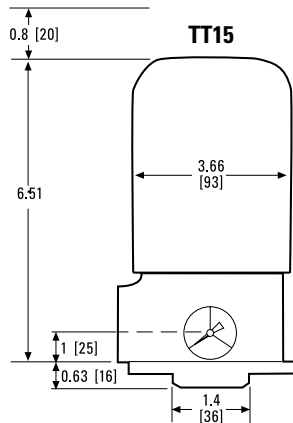


Adjustment screw located in center of electric prongs

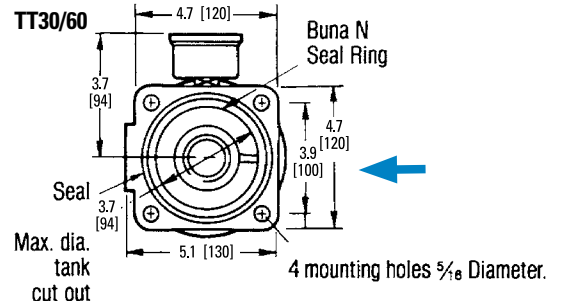
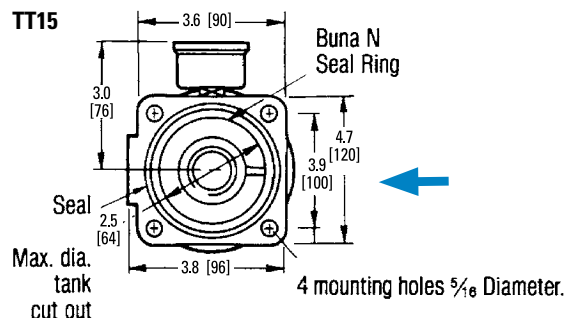
TT 15 & 30/60 Specification Illustrations

All dimensions are shown in inches [millimeters].

Assembly - Side View



Head - Top View





WL16

Max Flow: 150 gpm (568 lpm)



WL16 In-Tank Filters

Working Pressures to: 200 psi
1380 kPa
13.8 bar

Rated Static Burst to: 300 psi
2070 kPa
20.7 bar

Flow Range to: 150 gpm
568 lpm



Features

WL16 in-tank filters meet the HF4 automotive standard. The quick disconnect cover allows for easy and efficient filter change-outs. An optional secondary inlet port offers the use of a second return line. These units can be top or side reservoir mounted. Use the optional anti-backflow valve (X011053) when installing this filter assembly to the side of a reservoir. DT high-performance replacement filters are available in five different media grades to fit any application.

- Head Material: aluminum
- Housing Material: Steel

Beta Rating

- Performance to $\beta_{5(c)}=1000$

Porting Size Options

- SAE-24 O-ring
- 1½" SAE 4-Bolt Flange Code 61

Replacement Filter Lengths

- 9.04" / 230 mm
- 18.08" / 459 mm
- 27.51" / 699 mm

Standard Bypass Ratings

- 50 psi / 345 kPa / 3.5 bar
- 25 psi / 172.5 kPa / 1.72 bar

Assembly Weight

- Single Length, 5.25 lbs / 2.3 kg
- Double Length, 16 lbs / 7.3 kg
- Triple Length, 23 lbs / 10 kg

Operating Temperatures

- -45° to 250°F (-43° to 121°C)

Filter Collapse Ratings

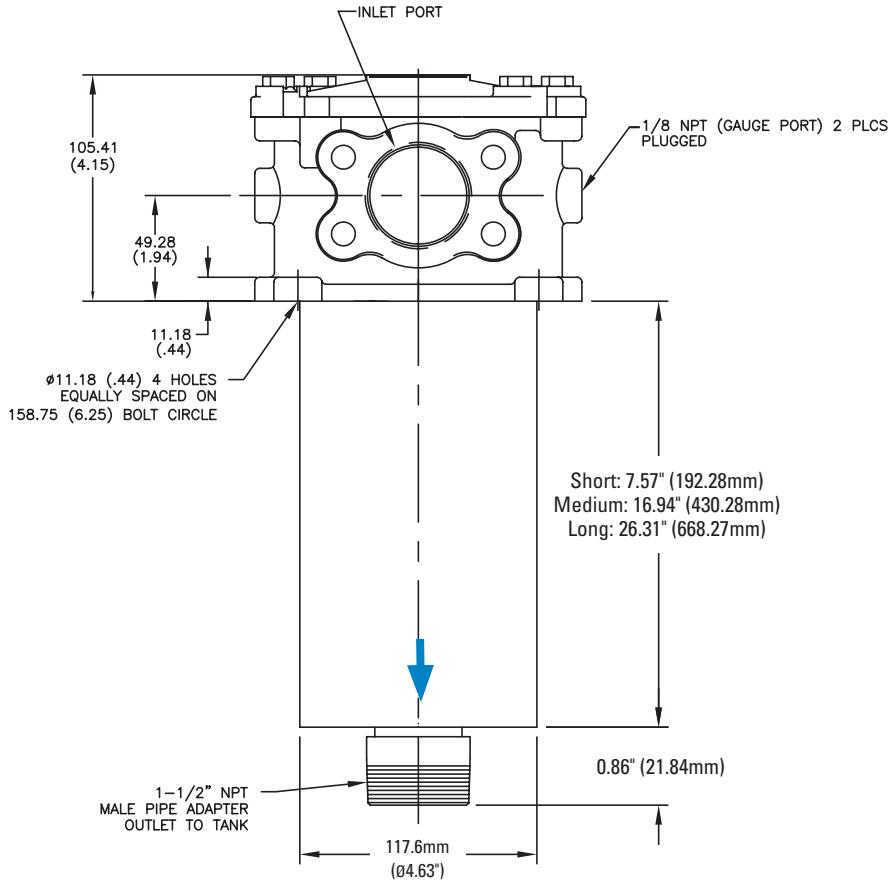
- 150 psid / 1035 kPa / 10.3 bar



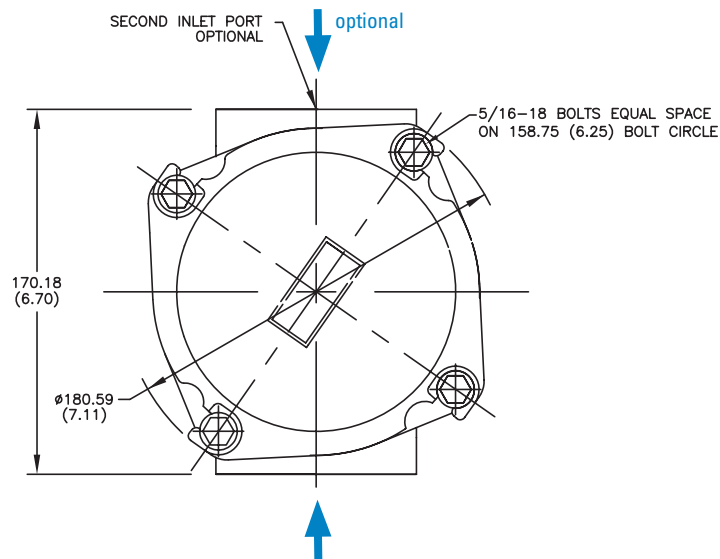
WL16 Specification Illustrations

All dimensions are shown in millimeters [inches].

Assembly - Side View



Head - Top View



Applications

- Cooling Circuits
- Fluid Conditioning Systems
- Lube Oil Systems
- Meets HF4 Specification
- Process Systems
- Return Lines
- Side Loop Systems



WL16

Max Flow: 150 gpm (568 lpm)



WL16 Components

High-Performance DT Filter Choices

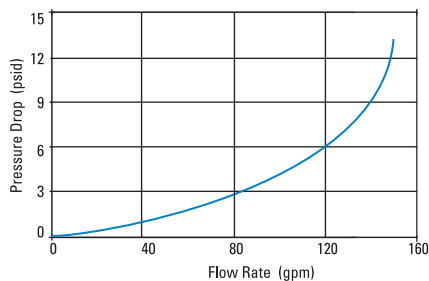
Media Type	$\beta_{x(c)} = 1000$ Rating based on ISO 16889	Length		Donaldson Part No.	Comments
		in	mm		
DT Synteq Synthetic	2 μ m	9.04	230	P568816	DT-HF4-9-2UM
	5 μ m	9.04	230	P566270	DT-HF4-9-5UM
	8 μ m	9.04	230	P566271	DT-HF4-9-8UM
	12 μ m	9.04	230	P566272	DT-HF4-9-14UM
	23 μ m	9.04	230	P566273	DT-HF4-9-25UM
	2 μ m	18.44	468	P568817	DT-HF4-18-2UM
	5 μ m	18.32	465	P566274	DT-HF4-18-5UM
	8 μ m	18.32	465	P566275	DT-HF4-18-8UM
	12 μ m	18.32	465	P566276	DT-HF4-18-14UM
	23 μ m	18.32	465	P566277	DT-HF4-18-25UM
	2 μ m	27.90	709	P568818	DT-HF4-27-2UM
	5 μ m	27.75	705	P566278	DT-HF4-27-5UM
	8 μ m	27.75	705	P566279	DT-HF4-27-8UM
	14 μ m	27.75	705	P566280	DT-HF4-27-14UM
	25 μ m	27.75	705	P566281	DT-HF4-27-25UM



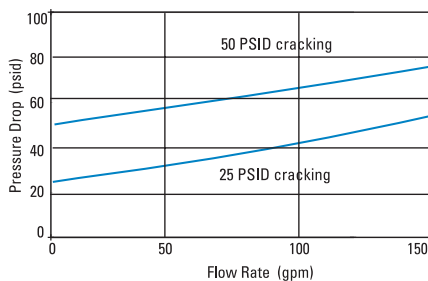
All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility. All Donaldson DT filters are potted with epoxy-based adhesives. Standard collapse designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity. Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

Performance Data

WL16 Housing Only

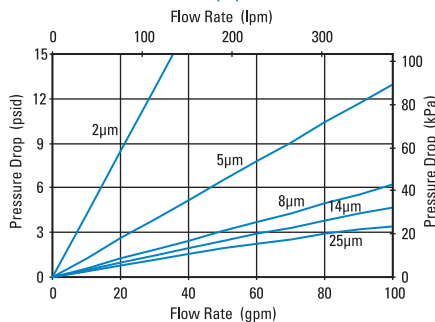


WL16 Bypass Valve



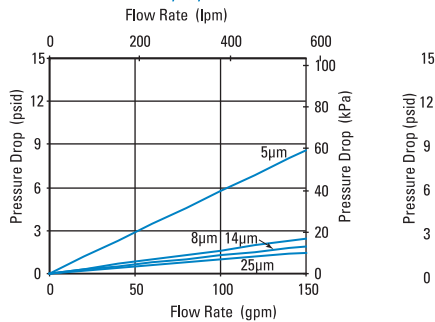
WL16 9" DT Filter Only

DT-HF4-9, 9"/229mm



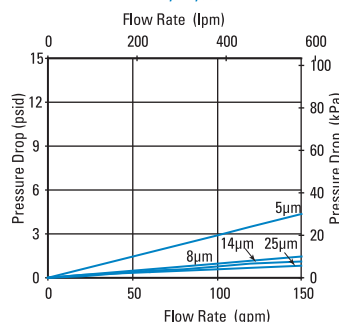
WL16 18" DT Filter Only

DT-HF4-18, 18"/457mm



WL16 27" DT Filter Only

DT-HF4-27, 27"/686mm





Filter Assembly Choices

Port Size	Bypass Rating	Seal Material	Indicator Style & Location	Housing Length	Assembly Length	Donaldson Part No.
(2) SAE-24 O-ring	25 psi / 1.72 bar	Buna-N	Port Machined & Plugged	9" (228.6mm)	12.76" (324.1mm)	P574232
(2) SAE-24 O-ring	25 psi / 1.72 bar	Buna-N	Port Machined & Plugged	18" (457.2mm)	21.09" (535.6mm)	P574233
(2) SAE-24 O-ring	25 psi / 1.72 bar	Buna-N	Port Machined & Plugged	27" (685.8mm)	30.46" (773.6mm)	P574234
(2) 1-1/2" SAE 4 Bolt Flange Code 61	25 psi / 1.72 bar	Buna-N	Port Machined & Plugged	18" (457.2mm)	21.09" (535.6mm)	P574235
(1) 1-1/2" SAE 4 Bolt Flange Code 61	50 psi / 3.45 bar	Buna-N	Port Machined & Plugged	18" (457.2mm)	21.09" (535.6mm)	P574236
(1) 1-1/2" SAE 4 Bolt Flange Code 61	50 psi / 3.45 bar	Buna-N	Port Machined & Plugged	27" (685.8mm)	30.46" (773.6mm)	P574237
(2) SAE-24 O-ring	50 psi / 3.45 bar	Buna-N	Port Machined & Plugged	18" (457.2mm)	21.09" (535.6mm)	P575922

Indicator Choices

Indicator Pressure Setting	Connector Style	Donaldson Part No.
Visual Pressure Gauges, 0-60 psi		
25 psi / 172 kPa	NA	X011059
50 psi / 345 kPa	NA	X011075
Visual Pressure Gauges, 0-200 psi		
50 psi / 345 kPa	NA	X011060
Electrical Service Indicator		
18 psi / 124 kPa	Hirschman	X011061
35 psi / 241 kPa	Hirschman	X011064
18 psi / 124 kPa	Brad Harrison	X011065
35 psi / 241 kPa	Brad Harrison	X011066

Head/Bowl/Housing Seal Kits

Donaldson Part No.	Material
X011140	Buna
X011141	Viton

Outlet Check Valve

Donaldson Part No.
X011053

Diffuser

Donaldson Part No.
X011919

Reservoir Weld Ring/Flange

Donaldson Part No.
X011058



WL16

Max Flow: 200 gpm (757 lpm)



WL16 In-Tank Filters

Working Pressures to: 200 psi
1380 kPa
13.8 bar

Rated Static Burst to: 300 psi
2070 kPa
20.7 bar

Flow Range to: 200 gpm
757 lpm



Features

WL16 in-tank filters meet the HF4 automotive standard. The quick disconnect cover allows for easy and efficient filter change-outs. An optional secondary inlet port offers the use of a second return line. These units can be top or side reservoir mounted. Use the optional anti-backflow valve (X011053) when installing this filter assembly to the side of a reservoir. DT high-performance replacement filters are available in five different media grades to fit any application.

- Head Material: aluminum
- Housing Material: Steel

Beta Rating

- Performance to $\beta_{5(c)}=1000$

Porting Size Options

- SAE-24 O-ring
- 1½" SAE 4-Bolt Flange Code 61

Replacement Filter Lengths

- 9.04" / 230 mm
- 18.08" / 459 mm
- 27.51" / 699 mm

Standard Bypass Ratings

- 50 psi / 345 kPa / 3.5 bar
- 25 psi / 172.5 kPa / 1.72 bar

Assembly Weight

- Single Length, 5.25 lbs / 2.3 kg
- Double Length, 16 lbs / 7.3 kg
- Triple Length, 23 lbs / 10 kg

Operating Temperatures

- -45° to 250°F (-43° to 121°C)

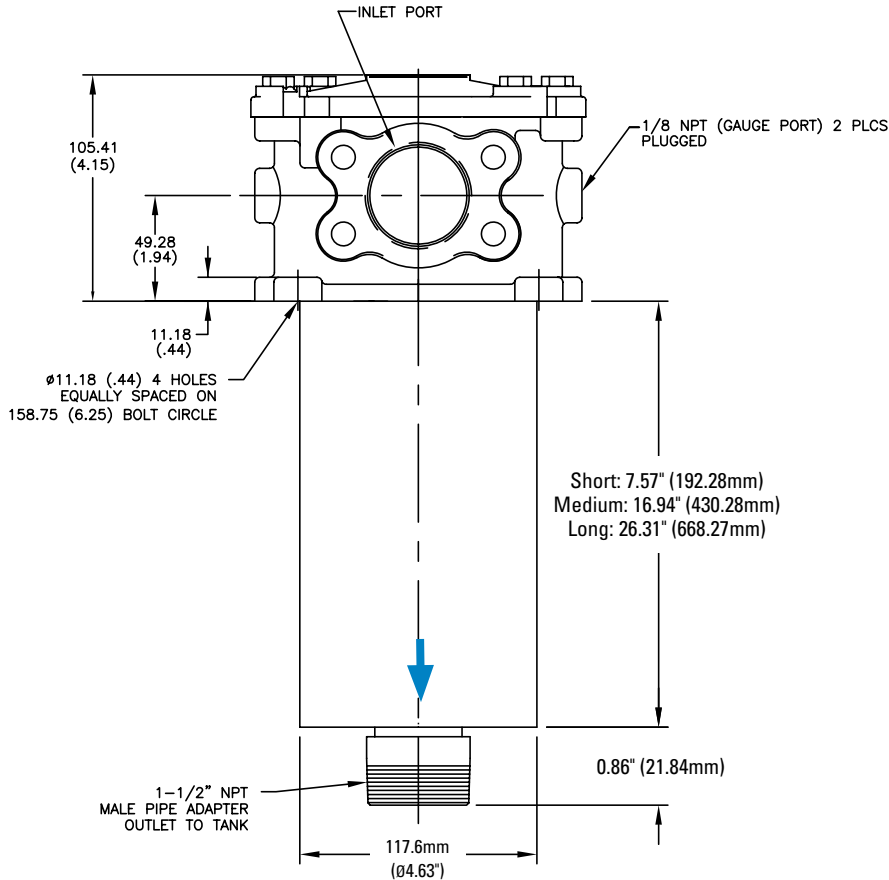
Filter Collapse Ratings

- 150 psid / 1035 kPa / 10.3 bar

WL16 Specification Illustrations

All dimensions are shown in millimeters [inches].

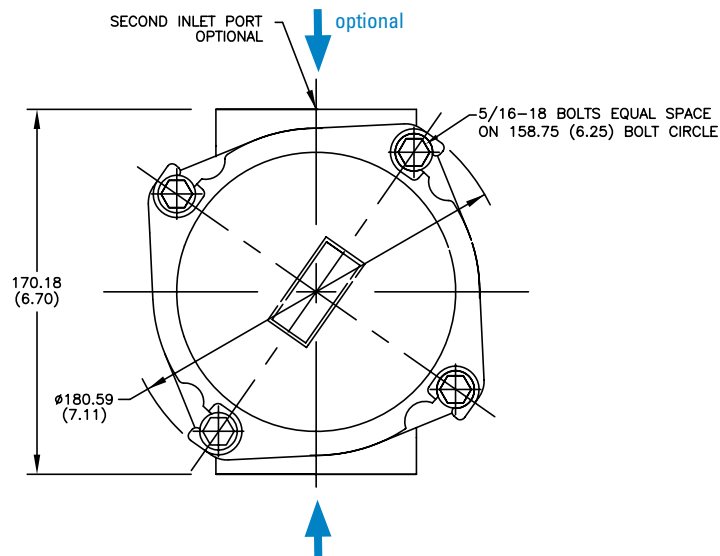
Assembly - Side View



Applications

- Cooling Circuits
- Fluid Conditioning Systems
- Lube Oil Systems
- Meets HF4 Specification
- Process Systems
- Return Lines
- Side Loop Systems

Head - Top View





WL16

Max Flow: 200 gpm (757 lpm)



WL16 Components

High-Performance DT Filter Choices

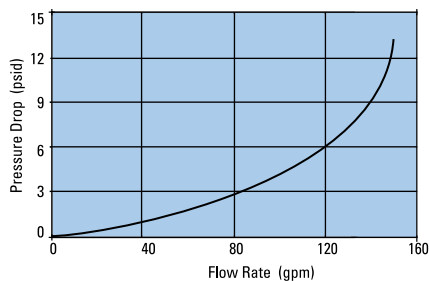
Media Type	$\beta_{x(c)} = 1000$ Rating based on ISO 16889	Length		Donaldson Part No.	Comments
		in	mm		
DT Synteq Synthetic	2 μ m	9.04	230	P568816	DT-HF4-9-2UM
	5 μ m	9.04	230	P566270	DT-HF4-9-5UM
	8 μ m	9.04	230	P566271	DT-HF4-9-8UM
	12 μ m	9.04	230	P566272	DT-HF4-9-14UM
	23 μ m	9.04	230	P566273	DT-HF4-9-25UM
	2 μ m	18.19	232	P568817	DT-HF4-18-2UM
	5 μ m	18.08	459	P566274	DT-HF4-18-5UM
	8 μ m	18.08	459	P566275	DT-HF4-18-8UM
	12 μ m	18.08	459	P566276	DT-HF4-18-14UM
	23 μ m	18.08	459	P566277	DT-HF4-18-25UM
	2 μ m	27.47	698	P568818	DT-HF4-27-2UM
	5 μ m	27.51	699	P566278	DT-HF4-27-5UM
	8 μ m	27.51	699	P566279	DT-HF4-27-8UM
	14 μ m	27.51	699	P566280	DT-HF4-27-14UM
	25 μ m	27.51	699	P566281	DT-HF4-27-25UM



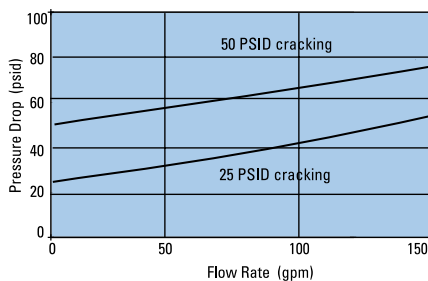
All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility. All Donaldson DT filters are potted with epoxy-based adhesives. Standard collapse designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity. Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

Performance Data

WL16 Housing Only

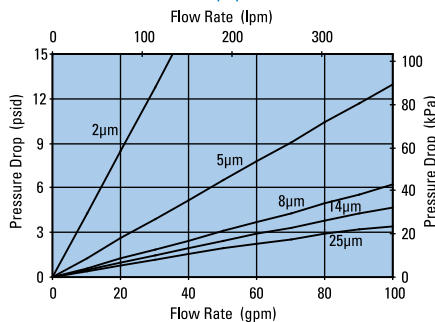


WL16 Bypass Valve



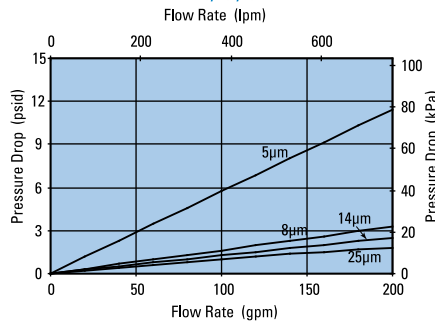
WL16 9" DT Filter Only

DT-HF4-9, 9"/229mm



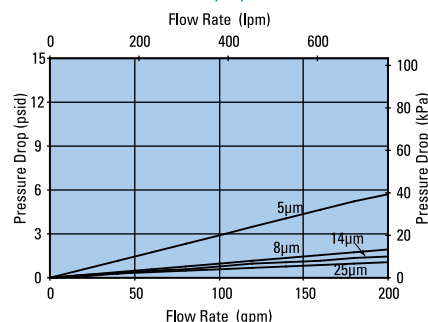
WL16 18" DT Filter Only

DT-HF4-18, 18"/457mm



WL16 27" DT Filter Only

DT-HF4-27, 27"/686mm





Filter Assembly Choices

Port Size	Bypass Rating	Seal Material	Indicator Style & Location	Housing Length	Assembly Length	Donaldson Part No.
(2) SAE-24 O-ring	25 psi / 1.72 bar	Buna-N	Port Machined & Plugged	9" (228.6mm)	12.76" (324.1mm)	P574232
(2) SAE-24 O-ring	25 psi / 1.72 bar	Buna-N	Port Machined & Plugged	18" (457.2mm)	21.09" (535.6mm)	P574233
(2) SAE-24 O-ring	25 psi / 1.72 bar	Buna-N	Port Machined & Plugged	27" (685.8mm)	30.46" (773.6mm)	P574234
(2) 1-1/2" SAE 4 Bolt Flange Code 61	25 psi / 1.72 bar	Buna-N	Port Machined & Plugged	18" (457.2mm)	21.09" (535.6mm)	P574235
(1) 1-1/2" SAE 4 Bolt Flange Code 61	50 psi / 3.45 bar	Buna-N	Port Machined & Plugged	18" (457.2mm)	21.09" (535.6mm)	P574236
(1) 1-1/2" SAE 4 Bolt Flange Code 61	50 psi / 3.45 bar	Buna-N	Port Machined & Plugged	27" (685.8mm)	30.46" (773.6mm)	P574237
(2) SAE-24 O-ring	50 psi / 3.45 bar	Buna-N	Port Machined & Plugged	18" (457.2mm)	21.09" (535.6mm)	P575922

Indicator Choices

Indicator Pressure Setting	Connector Style	Donaldson Part No.
Visual Pressure Gauges, 0-60 psi		
25 psi / 172 kPa	NA	X011059
50 psi / 345 kPa	NA	X011075
Visual Pressure Gauges, 0-200 psi		
50 psi / 345 kPa	NA	X011060
Electrical Service Indicator		
18 psi / 124 kPa	Hirschman	X011061
35 psi / 241 kPa	Hirschman	X011064
18 psi / 124 kPa	Brad Harrison	X011065
35 psi / 241 kPa	Brad Harrison	X011066

Head/Bowl/Housing Seal Kits

Donaldson Part No.	Material
X011140	Buna
X011141	Viton

Outlet Check Valve

Donaldson Part No.
X011053

Diffuser

Donaldson Part No.
X011919



FIK

Max Flow: 170 gpm (644 lpm)

FIK In-Tank Filters

Working Pressures to: 145 psi
1000 kPa
10 bar

Rated Static Burst to: 217 psi
1500 kPa
15 bar

Flow Range to: 170 gpm
644 lpm



Features

FIK in-tank filters are economical, space-saving units offering a variety of options including aluminum or plastic access covers, mounting options, and breathers. FIK filters, featuring a die-cast aluminum head and a steel or plastic canister are designed to handle heavy-duty applications. The head (and the inlet) sit above the tank, while the housing remains inside the tank, offering design-in flexibility. Optional air breather featuring T.R.A.P.™ technology are available with style A and B, designed to allow the breather to be mounted directly in the FIK filter head, thus eliminating the cost associated with an additional penetration to the hydraulic tank for breather installation. FIK filters offer three service indicators to choose from: pressure gauge, visual indicator and electrical indicator. FIK filter assemblies are shipped from the factory with cellulose or Synteq™ synthetic filter media, and replacement cartridges are offered in a range of media types and performance ratings.

Beta Rating

- Performance to $\beta_{8(c)} = 1000$

Porting Size Options

- 1/2", 3/4", 1" NPT
- SAE-8, SAE-12, SAE-16, SAE-20, SAE-24 O-ring
- 2" SAE 4-Bolt Flange Code 61

Standard Bypass Ratings

- 22 psi / 150 kPa / 1.5 bar

Operating Temperatures

- -4°F to 194°F / -20°C to 90°C

Collapse Ratings

- 145 psid / 1000 kPa / 10 bar

Redesigned with Features for Application Flexibility, Improved Servicing and Enhanced Filtration Performance

STYLE B Shown Below

Applications

- Cooling Circuits
- Fluid Conditioning Systems
- Lube Oil Systems
- Process Systems
- Return Lines
- Side Loop Systems

Multifunctional Ports (custom)

Contact your Donaldson sales representative for details

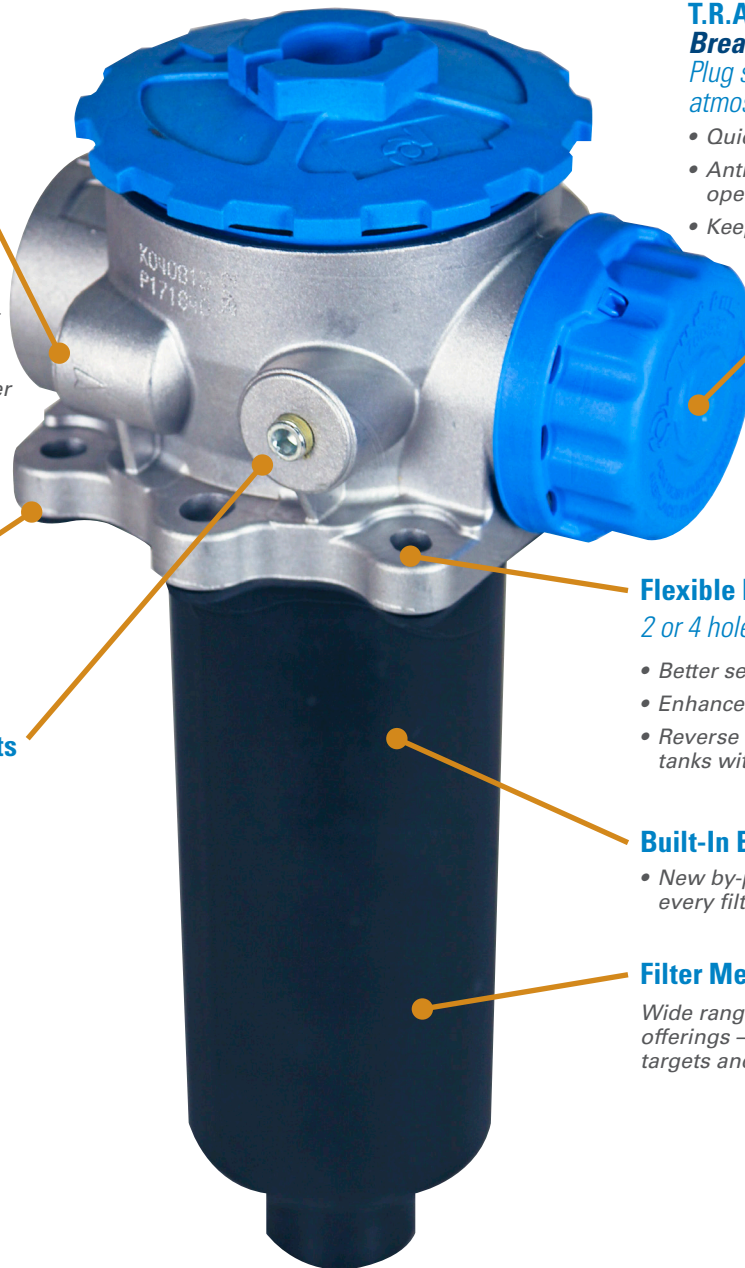
- Can be converted into auxiliary inlet ports
- The two secondary inlet ports can be used in conjunction with the main inlet port for higher flow rates

Flat Gasket Design

- For leak-tight operation

Service Indicator Ports

- Electrical, visual or pressure gauge options



T.R.A.P.™ Breather Technology Breather ordered separately Plug ships standard. Pressurized & atmospheric breathers available.

- Quick fit connection
- Anti-splash design allows smooth operation under tilt conditions
- Keeps reservoir free from condensation

Flexible Mounting Configurations

2 or 4 hole mounting option

- Better sealing and stability
- Enhanced stability on plastic tanks
- Reverse compatible – retrofit existing tanks with the new hole configuration

Built-In By-Pass Valve

- New by-pass valve installed with every filter replacement

Filter Media Technology

Wide range of Donaldson media offerings – to meet various performance targets and cleanliness standards



FIK

Max Flow: 170 gpm (644 lpm)

FIK Specification Illustrations

Low Flow Assemblies

< 32 gpm (120 lpm)

STYLE A
K030319



STYLE B
K040811
K040812
K040813
K041782



Improved Design Feature

- 2 or 4 hole mounting options
- Built-in by-pass valve in the cartridge
- Improved seal design
- Anti-splash air flow path
- Optional mini T.R.A.P. breather

Improved Design Feature

- 2 or 4 hole mounting options
- Built-in by-pass valve in the cartridge
- Improved seal design
- Anti-splash air flow path
- Optional mini T.R.A.P. breather
- Multifunctional ports for accessories

High Flow Assemblies

5 - 170 gpm (18 - 643 lpm)

STYLE C, D, E

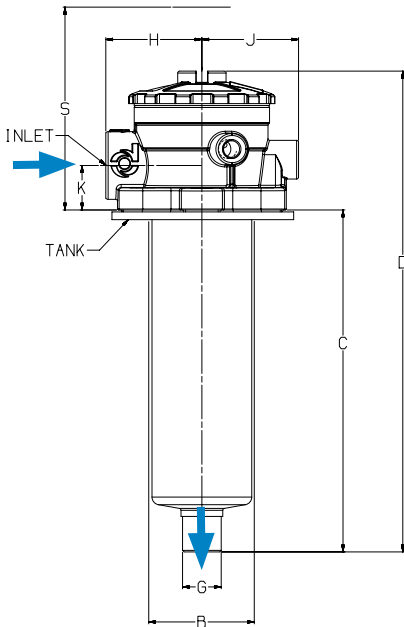
Assembly part numbers on following page

Improved Design Feature

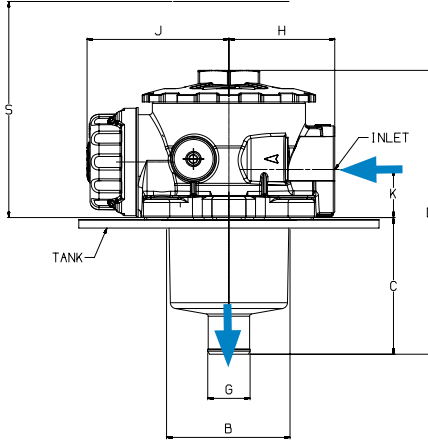
- Improved seal design
- Built-in by-pass valve in the cartridge

Assembly - Side Views

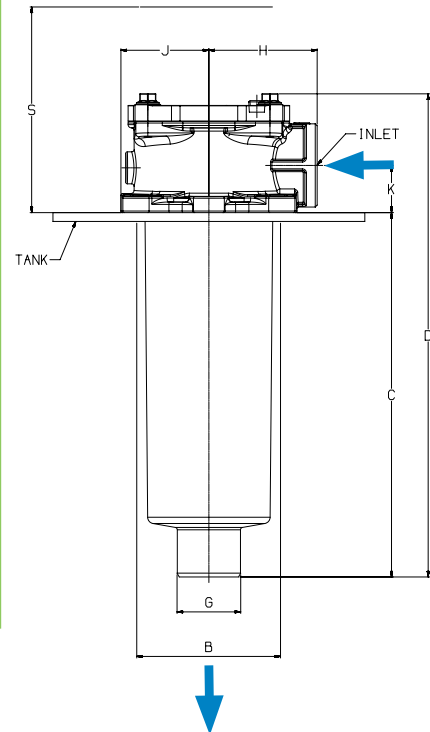
STYLE A



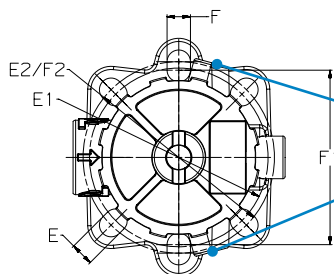
STYLE B



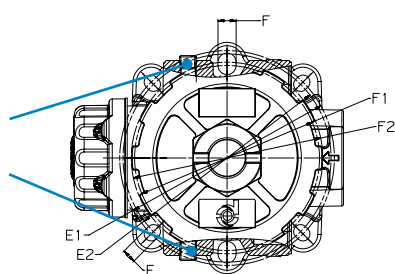
STYLE C, D, E



Head - Top Views



Ports for service indicator



High Flow Assemblies

5 - 170 gpm (18 - 643 lpm)

STYLE C

K041770 K041774
K041771 K040799
K041772 K040798
K041773
K031027 (2 point mount only)



Improved Design Feature

- 2 or 4 hole mounting options

STYLE D

K070248 K070250
K071001 K071003
K070249
K071002



Design Feature

- 4 hole mounting

STYLE E

K051204
K052053

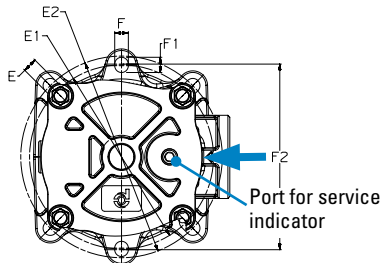


Design Feature

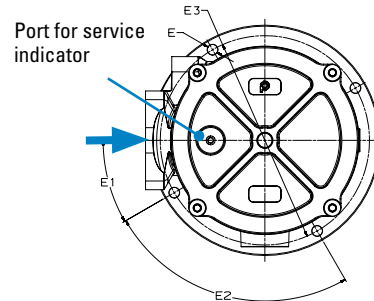
- 3 hole mounting

Head - Top Views

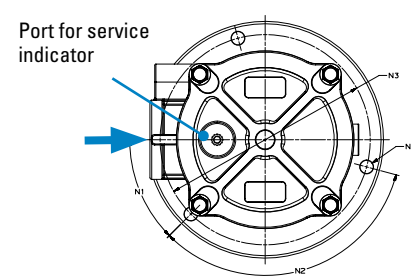
STYLE C



STYLE D



STYLE E



Dimensions

ASSEMBLY DIMENSIONS	ASSEMBLY PART NUMBER																							
	STYLE A		STYLE B				STYLE C						STYLE D				STYLE E							
	K030319	K040811	K040812	K040813 K041782	K031027 2 pt mount only	K041770	K041771 K041772 K041773 K041774 K040799	K040798	K070248 K071001	K070249 K071002	K070250 K071003	K051204 K052053												
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in			
C	176.8	6.96	91.0	3.58	141.0	5.55	218.0	8.58	78.0	3.07	99.0	3.90	149.0	5.87	227.7	8.96	242.0	9.53	290.0	11.42	434.0	17.09	224.0	8.82
D	248.6	9.79	189.0	7.44	239.0	9.41	316.0	12.44	132.0	5.20	173.3	6.82	223.2	8.79	301.9	11.89	348.0	13.70	395.5	15.57	539.5	21.24	313.8	12.35
S SERVICE CLEARANCE	220.0	8.66	180.0	7.09	220.0	8.66	305.0	12.01	149.0	5.87	170.0	6.69	220.0	8.66	299.0	11.77	320.0	12.60	365.0	14.37	515.0	20.28	305.0	12.01
G	20.0	0.79	27.6	1.09	27.6	1.09	39.6	1.56	25.2	0.99	27.6	1.09	27.6	1.09	39.5	1.56	50.0	1.97	63.5	2.50	63.5	2.50	40.0	1.57
B TANK OPENING	57.0	2.24	90.0	3.54	90.0	3.54	90.0	3.54	68.6	2.70	90.0	3.54	90.0	3.54	90.0	3.54	175.0	6.89	175.0	6.89	175.0	6.89	131.0	5.16
H	49.7	1.96	70.5	2.78	70.5	2.78	70.5	2.78	49.0	1.93	68.0	2.68	68.0	2.68	68.0	2.68	120.0	4.72	126.0	4.96	126.0	4.96	95.0	3.74
J	54.2	2.13	94.5	3.72	94.5	3.72	94.5	3.72	44.0	1.73	55.0	2.17	55.0	2.17	55.0	2.17	100.0	3.94	100.0	3.94	100.0	3.94	78.0	3.07
K	23.0	0.91	32.0	1.26	32.0	1.26	32.0	1.26	22.0	0.87	29.5	1.16	29.5	1.16	29.5	1.16	41.0	1.61	48.5	1.91	48.5	1.91	35.0	1.38
F 2 POINT MOUNT	11.0	0.43	11.0	0.43	11.0	0.43	11.0	0.43	Ø6.4	Ø0.25	8.5	0.33	8.5	0.33	8.5	0.33	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
F1	Ø82	Ø3.23	Ø112	Ø4.41	Ø112	Ø4.41	Ø112	Ø4.41	90.0	3.54	9.5	0.37	9.5	0.37	9.5	0.37	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
F2	Ø90	Ø3.54	Ø116	Ø4.57	Ø116	Ø4.57	Ø116	Ø4.57	N/A	N/A	115.0	4.53	115.0	4.53	115.0	4.53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N 3 POINT MOUNT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	45°
N2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	120°
N3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Ø175
E 4 POINT MOUNT	11.0	0.43	8.5	0.33	8.5	0.33	8.5	0.33	N/A	N/A	9.0	0.35	9.0	0.35	9.0	0.35	Ø10.5	Ø0.41	Ø11	Ø0.43	Ø11	Ø0.43	N/A	N/A
E1	Ø84	Ø3.31	Ø126	Ø4.96	Ø126	Ø4.96	Ø126	Ø4.96	N/A	N/A	Ø115	Ø4.53	Ø115	Ø4.53	Ø115	Ø4.53	30°	30°	30°	30°	30°	30°	30°	N/A
E2	Ø90	Ø3.54	Ø130	Ø5.12	Ø130	Ø5.12	Ø130	Ø5.12	N/A	N/A	Ø126	Ø4.96	Ø126	Ø4.96	Ø126	Ø4.96	90°	30°	90°	90°	90°	90°	90°	N/A
E3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Ø220	Ø8.66	Ø220	Ø8.66	Ø220	Ø8.66	Ø220	N/A
WEIGHT	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg
K	1.8	0.8	2.1	0.95	3.2	1.45	4.1	1.86	1.1	0.5	1.8	0.8	2.1	0.95	2.43	1.1	10.0	4.5	13.1	5.9	18.6	8.4	7.0	3.2

**FIK**

Max Flow: 170 gpm (644 lpm)



FIK Components

Assembly Choices

Port Size	Bypass Rating*	Assembly Part No.	$\beta_{x(c)}$ = 1000	Filter Media†	Provided with Filter	Filter Diameter (in./mm)	Filter Length (in./mm)	Flow Range (@~5 psid / 34.5 kPa)
-----------	----------------	-------------------	--------------------------	---------------	----------------------	--------------------------	------------------------	----------------------------------

additional filter choices on following pages to meet various performance requirements

Low Flow Assemblies

STYLE A

SAE-8 O-Ring	22 psi/1.5 bar	K030319	36 μ m	Cellulose	P171839	1.69 / 43	6.38 / 162	10 gpm / 38 lpm
--------------	----------------	---------	------------	-----------	---------	-----------	------------	-----------------

STYLE B

SAE-12 O-Ring	22 psi/1.5 bar	K040811	36 μ m	Cellulose	P171527	2.76 / 70	3.23 / 82	14 gpm / 53 lpm
---------------	----------------	---------	------------	-----------	---------	-----------	-----------	-----------------

SAE-16 O-Ring	22 psi/1.5 bar	K040812	36 μ m	Cellulose	P171533	2.76 / 70	5.04 / 128	23 gpm / 86 lpm
---------------	----------------	---------	------------	-----------	---------	-----------	------------	-----------------

SAE-20 O-Ring	22 psi/1.5 bar	K040813	36 μ m	Cellulose	P171840	2.76 / 70	8.27 / 210	32 gpm / 120 lpm
---------------	----------------	---------	------------	-----------	---------	-----------	------------	------------------

SAE-20 O-Ring	22 psi/1.5 bar	K041782	11 μ m	Synthetic	P171846	2.76 / 70	8.27 / 210	28 gpm / 106 lpm
---------------	----------------	---------	------------	-----------	---------	-----------	------------	------------------

High Flow Assemblies

STYLE C

1/2" NPT	22 psi/1.5 bar	K031027	36 μ m	Cellulose	P171503	2.05 / 52	2.64 / 67	5 gpm / 18 lpm
----------	----------------	---------	------------	-----------	---------	-----------	-----------	----------------

1" NPT	22 psi/1.5 bar	K041770	36 μ m	Cellulose	P171527	2.76 / 70	3.23 / 82	15 gpm / 56 lpm
--------	----------------	---------	------------	-----------	---------	-----------	-----------	-----------------

3/4" NPT	22 psi/1.5 bar	K041771	36 μ m	Cellulose	P171533	2.76 / 70	5.04 / 128	18 gpm / 68 lpm
----------	----------------	---------	------------	-----------	---------	-----------	------------	-----------------

1" NPT	22 psi/1.5 bar	K041772	36 μ m	Cellulose	P171533	2.76 / 70	5.04 / 128	21 gpm / 79 lpm
--------	----------------	---------	------------	-----------	---------	-----------	------------	-----------------

SAE-12 O-Ring	22 psi/1.5 bar	K041773	36 μ m	Cellulose	P171533	2.76 / 70	5.04 / 128	18 gpm / 68 lpm
---------------	----------------	---------	------------	-----------	---------	-----------	------------	-----------------

SAE-12 O-Ring	22 psi/1.5 bar	K041774	11 μ m	Synteq	P171531	2.76 / 70	5.04 / 128	13 gpm / 49 lpm
---------------	----------------	---------	------------	--------	---------	-----------	------------	-----------------

SAE-16 O-Ring	22 psi/1.5 bar	K040799	36 μ m	Cellulose	P171533	2.76 / 70	5.04 / 128	21 gpm / 79 lpm
---------------	----------------	---------	------------	-----------	---------	-----------	------------	-----------------

SAE-16 O-Ring	22 psi/1.5 bar	K040798	36 μ m	Cellulose	P171840	2.76 / 70	8.22 / 209	32 gpm / 120 lpm
---------------	----------------	---------	------------	-----------	---------	-----------	------------	------------------

STYLE D

SAE-24 O-Ring	22 psi/1.5 bar	K070248	36 μ m	Cellulose	P171557	5.51 / 140	7.49 / 203	66 gpm / 248 lpm
---------------	----------------	---------	------------	-----------	---------	------------	------------	------------------

SAE-24 O-Ring	22 psi/1.5 bar	K071001	11 μ m	Synteq	P171555	5.51 / 140	7.49 / 203	44 gpm / 165 lpm
---------------	----------------	---------	------------	--------	---------	------------	------------	------------------

2" SAE 4-Bolt	22 psi/1.5 bar	K070249	36 μ m	Cellulose	P171575	5.51 / 140	9.84 / 250	106 gpm / 399 lpm
---------------	----------------	---------	------------	-----------	---------	------------	------------	-------------------

2" SAE 4-Bolt	22 psi/1.5 bar	K071002	11 μ m	Synteq	P171573	5.51 / 140	9.84 / 250	74 gpm / 278 lpm
---------------	----------------	---------	------------	--------	---------	------------	------------	------------------

2" SAE 4-Bolt	22 psi/1.5 bar	K070250	36 μ m	Cellulose	P171581	5.51 / 140	15.75 / 400	170 gpm / 643 lpm
---------------	----------------	---------	------------	-----------	---------	------------	-------------	-------------------

2" SAE 4-Bolt	22 psi/1.5 bar	K071003	11 μ m	Synteq	P171579	5.51 / 140	15.75 / 400	120 gpm / 451 lpm
---------------	----------------	---------	------------	--------	---------	------------	-------------	-------------------

STYLE E

SAE-20 O-Ring	22 psi/1.5 bar	K051204	36 μ m	Cellulose	P171539	3.74 / 95	7.49 / 203	47 gpm / 177 lpm
---------------	----------------	---------	------------	-----------	---------	-----------	------------	------------------

SAE-20 O-Ring	22 psi/1.5 bar	K052053	11 μ m	Synteq	P171537	3.74 / 95	7.49 / 203	32 gpm / 120 lpm
---------------	----------------	---------	------------	--------	---------	-----------	------------	------------------

Note

*Bypass valve is an integral part of the replacement filter.
Service indicator port available for all assemblies.

Filter Notes

FIK filters utilize either glass fiber, cellulose, or wire mesh media.
All FIK filters are potted with polyurethane adhesives.





Synteq media designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
Buna-N® seals are standard on all FIK filters. Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



T.R.A.P.™ Breather Choices

For Redesigned Style A and B Assemblies with 4 Hole Mounting Configurations Only

Note: T.R.A.P. breathers are not compatible on older style assemblies with 2 hole mounting configuration

Part No.	Description	Efficiency	Fits Assembly Models:
STYLE A			
			
P567392	Mini T.R.A.P.	3 µm @ 97%	K030319
STYLE B			
	Black		
P766528	Standard plug (no air exchange)	N/A	K040811, K040812, K040813, K041782
	Blue		
P766530	Atmospheric pressure	10 µm @ 98%	K040811, K040812, K040813, K041782
	Red		
P766538	7.3 psi (½ bar) pressurized	10 µm @ 98%	K040811, K040812, K040813, K041782



STYLE A



STYLE B

Standard Breather Choices

Replacement Breathers for Older Style A and B Assemblies with 2 Hole Mounting Configuration Only

Part No.	Efficiency	Fits Assembly Models:
STYLE A		
P173330	10 µm	K030319
STYLE B		
P172434	10 µm	K040811, K040812, K040813



Service Indicators

Pressure Gauges

P171956

G 1/8"

(center back)



P171953

G 1/8"

(bottom mount)

-14.5 to 72 psi
-1 to +5 bar

DC Electrical Indicator

P171966

17 psi / 1.2 bar

(48V AC/DC)



G 1/8" →

Visual Indicator

P171958

17 psi / 1.2 bar



G 1/8" →



FIK

Max Flow: 170 gpm (644 lpm)



FIK Components

Filter Choices - Low Flow Assemblies

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(c)} = 1000$	Length		Donaldson Part No.
			in	mm	
STYLE A					
K030319					
Synteq Synthetic	6 μ m	6.38	162		P569273
	11 μ m	6.38	162		P171845
	23 μ m	6.38	162		P171842
Cellulose	7 μ m	6.38	162		P171839
	27 μ m	6.38	162		P171836
Wire Mesh	60 μ m	6.38	162		P171833
	90 μ m	6.38	162		P171830

Filter Choices - Low Flow Assemblies

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(c)} = 1000$	Length		Donaldson Part No.
			in	mm	
STYLE B					
K040811					
Synteq Synthetic	11 μ m	3.23	82		P171525
	23 μ m	3.23	82		P171526
Cellulose	7 μ m	3.23	82		P171527
	27 μ m	3.23	82		P171528
Wire Mesh	60 μ m	3.23	82		P171529
	90 μ m	3.23	82		P171524
K040812					
Synteq Synthetic	6 μ m	5.04	128		P569275
	11 μ m	5.04	128		P171531
	23 μ m	5.04	128		P171532
Cellulose	7 μ m	5.04	128		P171533
	27 μ m	5.04	128		P171534
Wire Mesh	60 μ m	5.04	128		P171535
	90 μ m	5.04	128		P171530
K040813					
Synteq Synthetic	6 μ m	8.27	210		P569276
	11 μ m	8.27	210		P171846
	23 μ m	8.27	210		P171843
Cellulose	7 μ m	8.27	210		P171840
	27 μ m	8.27	210		P171837
Wire Mesh	60 μ m	8.27	210		P171834
K041782					
Synteq Synthetic	6 μ m	8.27	210		P569276
	11 μ m	8.27	210		P171846
	23 μ m	8.27	210		P171843
Cellulose	7 μ m	8.27	210		P171840
	27 μ m	8.27	210		P171837
Wire Mesh	60 μ m	8.27	210		P171834

High Flow Assemblies

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(c)} = 1000$	Length		Donaldson Part No.
			in	mm	
STYLE C					
K031027					
Synteq Synthetic	6 μ m		2.64	67	P569277
	11 μ m		2.64	67	P171501
	23 μ m		2.64	67	P171502
Cellulose	7 μ m		2.64	67	P171503
	27 μ m		2.64	67	P171504
Wire Mesh	60 μ m		2.64	67	P171505
	90 μ m		2.64	67	P171500
K041770					
Synteq Synthetic	11 μ m		3.23	82	P171525
	23 μ m		3.23	82	P171526
Cellulose	7 μ m		3.23	82	P171527
	27 μ m		3.23	82	P171528
Wire Mesh	60 μ m		3.23	82	P171529
	90 μ m		3.23	82	P171524
K041771, K041772, K041773, K041774, K040799					
Synteq Synthetic	6 μ m		5.04	128	P569275
	11 μ m		5.04	128	P171531
	23 μ m		5.04	128	P171532
Cellulose	7 μ m		5.04	128	P171533
	27 μ m		5.04	128	P171534
Wire Mesh	60 μ m		5.04	128	P171535
	90 μ m		5.04	128	P171530
K040798					
Synteq Synthetic	6 μ m		8.22	209	P569276
	11 μ m		8.22	209	P171846
	23 μ m		8.22	209	P171843
Cellulose	7 μ m		8.22	209	P171840
	27 μ m		8.22	209	P171837
Wire Mesh	60 μ m		8.22	209	P171834

High Flow Assemblies

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(c)} = 1000$	Length		Donaldson Part No.
			in	mm	
STYLE D					
K070248, K071001					
Synteq Synthetic	6 μ m		7.49	203	P569279
	11 μ m		7.49	203	P171555
	23 μ m		7.49	203	P171556
Cellulose	7 μ m		7.49	203	P171557
	27 μ m		7.49	203	P171558
Wire Mesh	60 μ m		7.49	203	P171559
K070249, K071002					
Synteq Synthetic	6 μ m		9.84	250	P569280
	11 μ m		9.84	250	P171573
	23 μ m		9.84	250	P171574
Cellulose	7 μ m		9.84	250	P171575
	27 μ m		9.84	250	P171576
Wire Mesh	90 μ m		9.84	250	P171572
K070250, K071003					
Synteq Synthetic	6 μ m		15.75	400	P176749
	11 μ m		15.75	400	P171579
	23 μ m		15.75	400	P171580
Cellulose	7 μ m		15.75	400	P171581
	27 μ m		15.75	400	P171582
Wire Mesh	60 μ m		15.75	400	P171583
	90 μ m		15.75	400	P171578
STYLE E					
K051204, K052053					
Synteq Synthetic	6 μ m		7.49	203	P569278
	11 μ m		7.49	203	P171537
	23 μ m		7.49	203	P171538
Cellulose	7 μ m		7.49	203	P171539
	27 μ m		7.49	203	P171540
Wire Mesh	60 μ m		7.49	203	P171541
	90 μ m		7.49	203	P171536



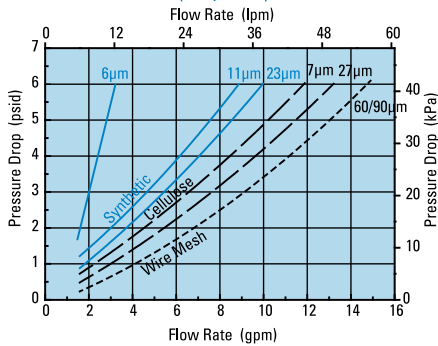
FIK
Max Flow: 170 gpm (644 lpm)



Performance Data

STYLE A

K030319 Assembly
(6.38"/162mm)



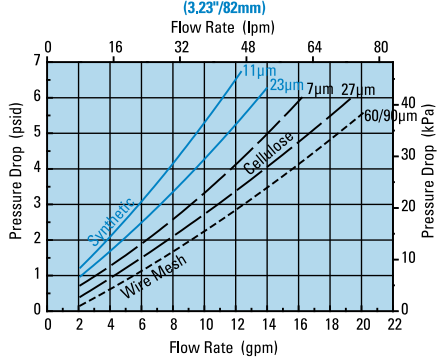
NOTE:

Please note that the line styles used represent different media types

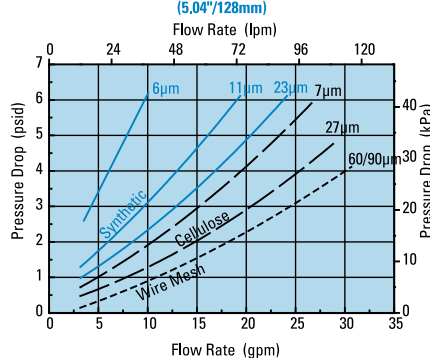
- Synteq Synthetic
- - - Cellulose
- - - Wire Mesh

STYLE B

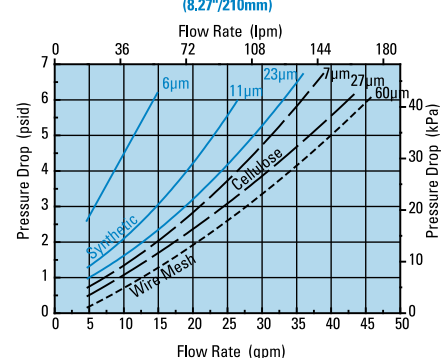
K040811 Assembly
(3.23"/82mm)



K040812 Assembly
(5.04"/128mm)

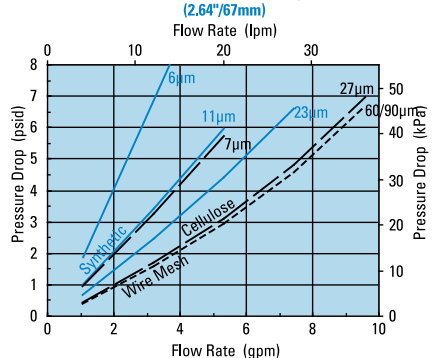


K040813 & K041782 Assemblies
(8.27"/210mm)

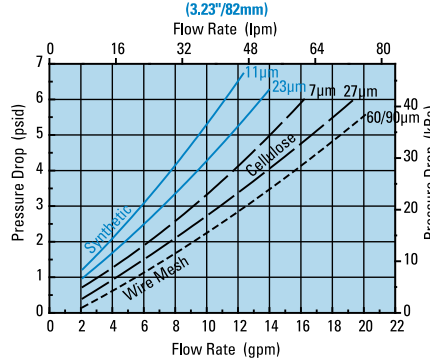


STYLE C

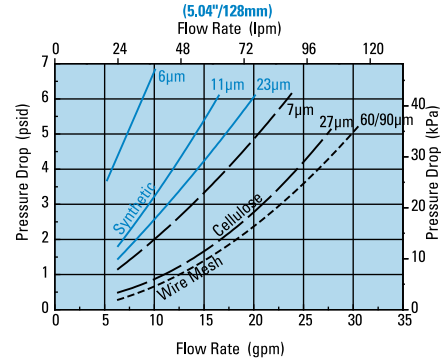
K031027 Assembly
(2.64"/67mm)



K0041770* Assembly
(3.23"/82mm)



K0041771, K041772, K041773**, K041774** & K040799 Assemblies**
(5.04"/128mm)

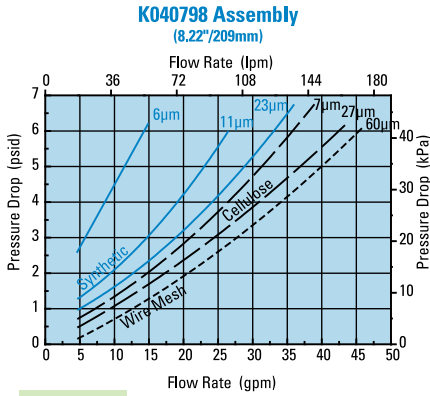


*Subtract 1/2 psi

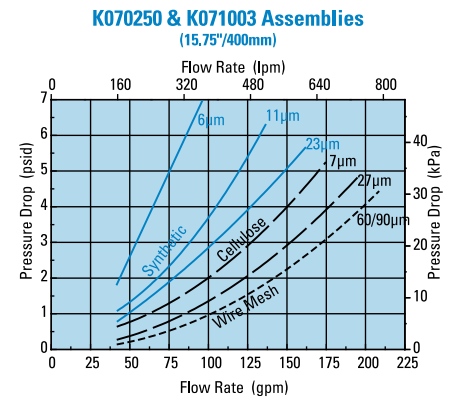
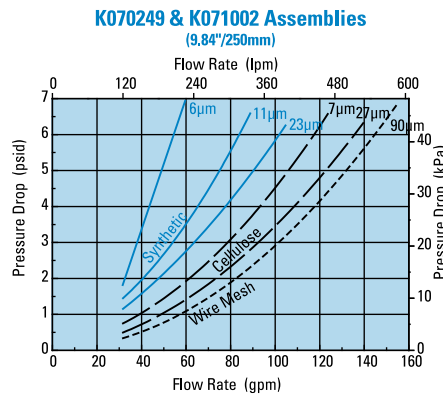
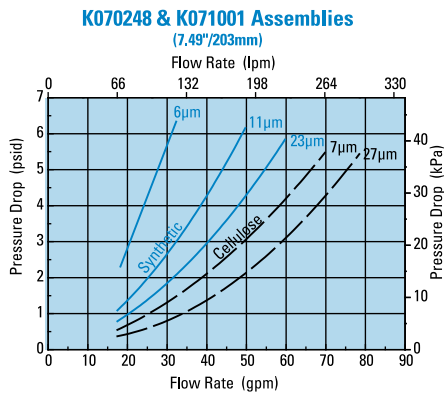
**Add 1/2 psi

Performance Data

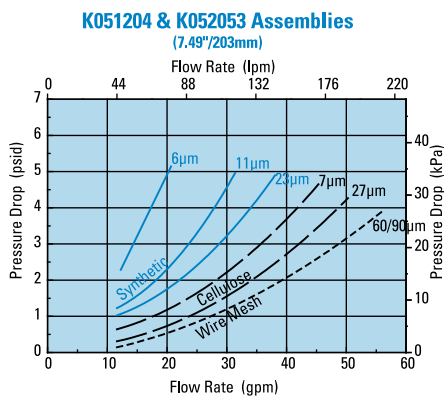
STYLE C, continued



STYLE D



STYLE E





SRK Combo

Max Flow: 79 gpm (300 lpm)



LOW PRESSURE FILTERS

SRK Suction/Return Combination In-Tank Filters

Working Pressures to: 145 psi
1000 kPa
10.0 bar

Rated Static Burst to: 217 psi
1497 kPa
15.0 bar

Flow Range to: 79 gpm
300 lpm

Applications

- Hydrostatic Transmissions
- Mobile Equipment



Features

The SRK tank-mounted suction and return filter is a popular choice for hydrostatic transmissions. The filtered flow is maintained at a slight backpressure to provide clean, pressurized oil, mainly for charge pumps in hydrostatic transmission systems. The pressurized flow is designed to reduce cavitation risks. This patented design uses an integrated main flow and bypass flow filter filter, which is capable of delivering filtered and pressurized oil, even in bypass situations. Emergency suction flow is also filtered. The SRK operates in a standard flow (outside to inside) configuration. SAE O-Ring ports are standard to meet popular application requirements.

- 4-point mounting
- Housing material: steel
- Buna-N® seals standard
- Head material: aluminum
- Cover material: glass-filled nylon
- Main filters include integrated bypass filters

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.

Beta Rating (per ISO 16889)

- Performance to $\beta_{13(c)} = 1000$

Porting Size Options

- Inlet: SAE-16, SAE-20 O-ring
- Outlet: SAE-16 O-Ring

Replacement Filter Lengths

- 18.6" / 472 mm

Standard Bypass Ratings

- 36 psi / 250 kPa / 2.5 bar

Standard Backpressure Ratings

- 7.3 psi / 50 kPa / 0.5 bar

Assembly Weight

- 10.8 lbs / 4.9 kg

Operating Temperatures

- -22°F to 212°F / -30°C to 100°C

Filter Collapse Ratings

- 145 psid / 1000 kPa / 10 bar

Return Flow Rate

- 79 gpm (300 lpm)

Emergency Suction Flow Rate

- 27 gpm (100 lpm)

SRK Filter Assemblies

Donaldson Part No.	Inlet Port Connections	Outlet Port Connections	Bypass Valve	Emergency Suction	Comments
K041634	SAE-20 & SAE-16	(2) - SAE-16	36 psi (2.5 bar)	125 µm Wire Mesh	Indicator not included

Filter Choices

Media Type	$\beta_{x(c)} = 1000$ Rating based on ISO 16889	Length in mm	Donaldson Part No.	Bypass	Comments
Synteq Synthetic	13 µm	18.6 472	P765457	125 µm Wire	For Combo 300 Assemblies

- Standard collapse designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- All SRK filters are standard flow (outside to inside).
- Buna-N seals are standard on all SRK filters.

Suction Filter Choices

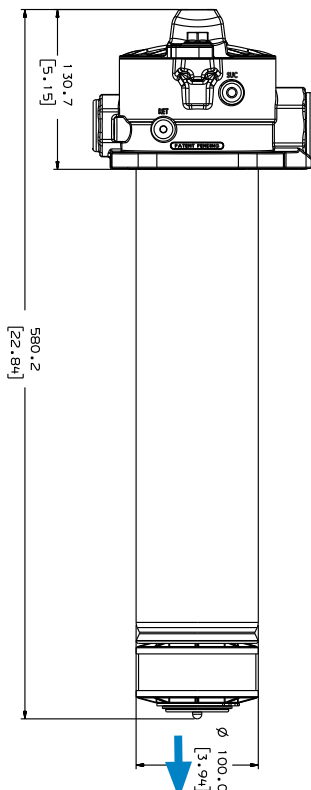
Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	Length in mm	Donaldson Part No.
Wire Mesh	125 µm	1.98 50.2	P764183

Indicator Options

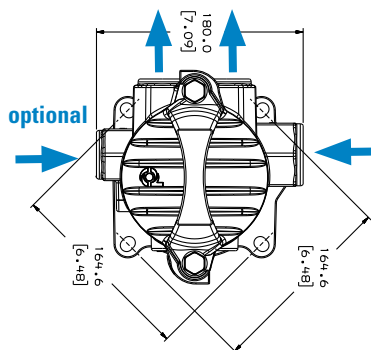
Donaldson Part No.	Set Point	Style	Connection
P764467	36 psi (2.5 bar)	30 VDC, N.O.	G1/8"
P764613	36 psi (2.5 bar)	30 VDC, N.C.	G1/8"
P764612	36 psi (2.5 bar)	Visual	G1/8"

Assembly - Side View

All dimensions are shown in millimeters [inches].

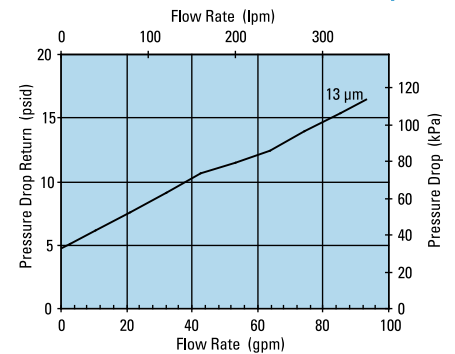


Head - Top View

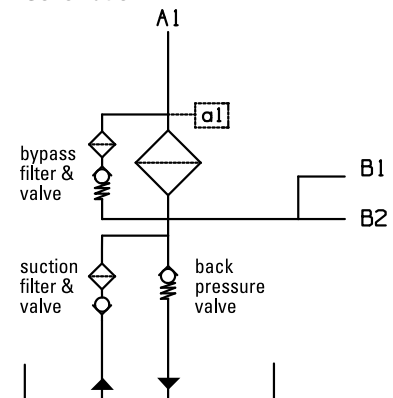


Performance Data

SRK Suction / Return Combo Assembly



Flow Schematic





HRK10

Max Flow: 300 gpm (1135 lpm)



HRK10 In-Line Cartridge Filters



Working Pressures to: 150 psi
1035 kPa
10.3 bar

Rated Static Burst to: 500 psi
3450 kPa
34.5 bar

Flow Range to: 300 gpm
1135 lpm

Features

The HRK10 high flow filter combines the best features of its predecessor, the HEK11: ANSI inlet port options, top cover filter servicing for ease of maintenance, and a selection of service indicators. The HRK10 all-steel housing design provides a strong, durable, and dependable unit. It offers standard features like deep pleat filters for higher dirt holding capacity and standard Donaldson DT 4-layer media filter construction. This technology, combined with many other standard features, is ideal for today's applications in pulp and paper, power generation and steel mill applications. Five standard grades of media are offered. A port for an electrical indicator is incorporated into the differential indicator block.

- Robust "Twist & Lift" cover for simplified servicing
- Multiple bypass valve design assures proper operation
- Wide variety of bypass valve ratings
- Reverse flow (inside to outside) filters for positive contamination containment
- Fluorocarbon seals standard
- Housing & cover material: steel
- Drain plug in bottom
- Bleed valve in cover
- Fill plug in cover

Beta Rating (per ISO 16889)

- Performance to $\beta_{<4(c)} = 1000$

Porting Size Options

- 4" ANSI Flange, 8-bolt 150#

Replacement Filter Lengths

- 21.99" / 559 mm

Filter Collapse Ratings

- 100 psid / 689 kPa / 6.9 bar

Standard Bypass Ratings

- 5 psi / 34.5 kPa / 0.34 bar
- 25 psi / 172 kPa / 1.7 bar
- 50 psi / 345 kPa / 3.4 bar
- No Bypass

Assembly Weight

- 140 lbs / 64 kg

Operating Temperatures

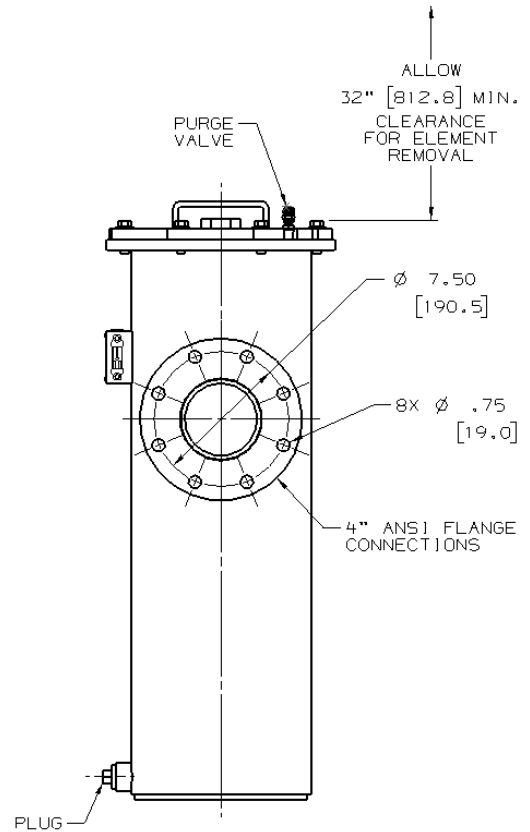
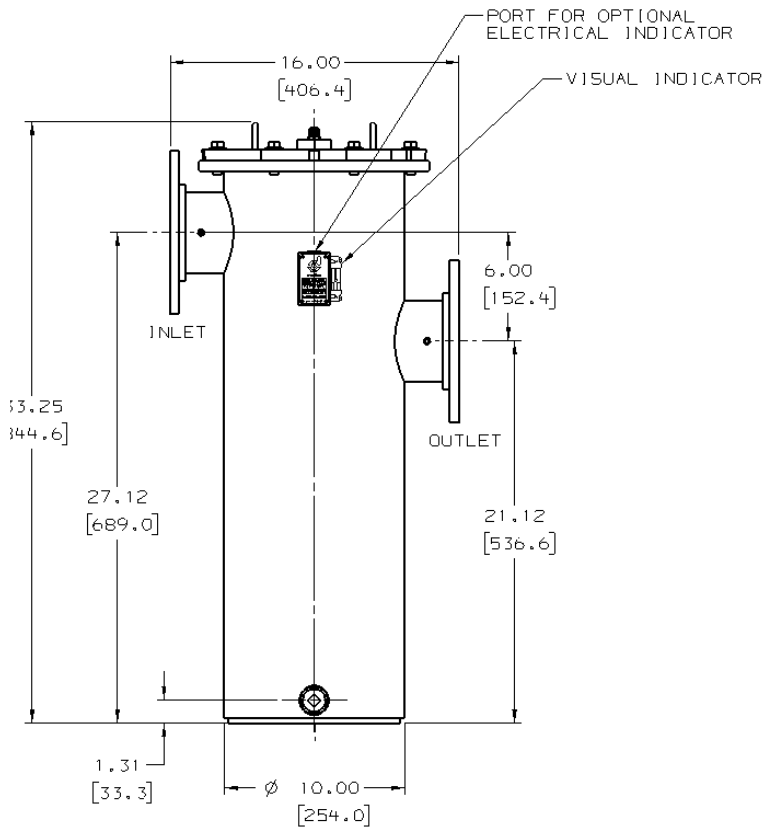
- -20°F to 250°F (-29° to 121°C)



HRK10 Specification Illustrations

All dimensions are shown in inches [millimeters].

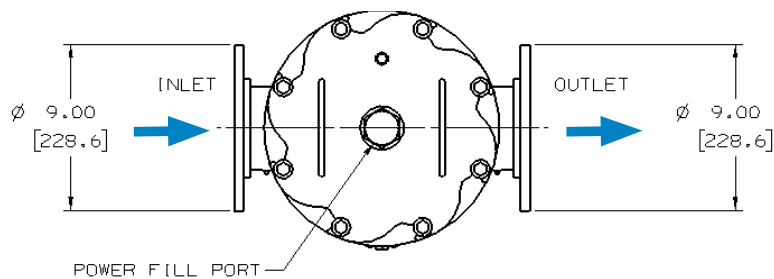
Assembly - Side View



Applications

- Fluid Conditioning Systems
- In-Plant Systems
- Lube Oil Systems
- Side Loop Systems

Head - Top View





HRK10
Max Flow: 300 gpm (1135 lpm)



HRK10 Components

Housing Choices

NOTE: FILTERS ORDERED SEPARATELY. See below for filter options.

Part No.	Port Connections	Bypass Valve	Indicator Options
K100001	4" ANSI Flange	No bypass	Visual standard, electrical optional
K100002	4" ANSI Flange	5 psi (0.34 bar) bypass	Visual standard, electrical optional
K100003	4" ANSI Flange	25 psi (1.7 bar) bypass	Visual standard, electrical optional
K100004	4" ANSI Flange	50 psi (3.4 bar) bypass	Visual standard, electrical optional

Electrical Indicator Options

Part No.	Set Point	Bypass Valve
P173944	20 psi (1.4 bar)	AC/DC, 3-wire
P174396	40 psi (2.8 bar)	AC/DC, 3-wire

Filter Choices

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(c)} = 1000$	Length in mm	Donaldson Part No.	Comments
Synteq Synthetic		<4 μm	21.99 559	P566187	Replaces old HEK11 filter P163472
		5 μm	21.99 559	P566188*	
		8 μm	21.99 559	P566189	Replaces old HEK11 filter P176417** or P176223***
		12 μm	21.99 559	P566190	Replaces old HEK11 filter P165449
		23 μm	21.99 559	P566191	Replaces old HEK11 filter P164707
Water Absorbing	10 μm		21.99 559	P569531	Absorbs approximately 60 oz/1800 ml water @ 25 psid/1.72 bar
Wire Mesh	150 μm		21.99 559	P566192	Replaces old HEK11 filter P160078

Use HRK10 in place of previous HEK11 housings.

For better performance use HRK10 filters in existing HEK11 housings.

* Utilizes DT Synteq synthetic media

** 9 μm rating

*** 10 μm rating

Filter Notes:

All $\beta=1000$ filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.

All Donaldson HRK10 filters are potted with epoxy-based adhesives.

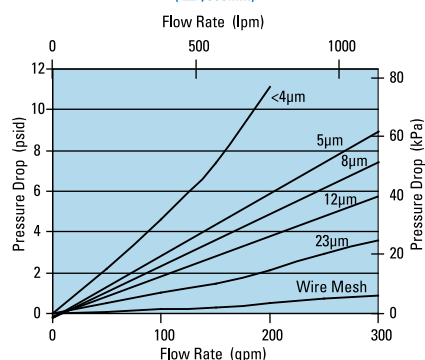
All HRK10 filters are reserve flow (inside to outside), keeping contaminants contained during servicing.

Viton® seals are standard on all HRK10 filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

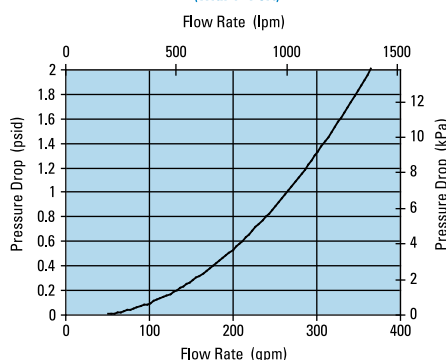


Performance Data

HRK10 Filter Only
(22"/559mm)



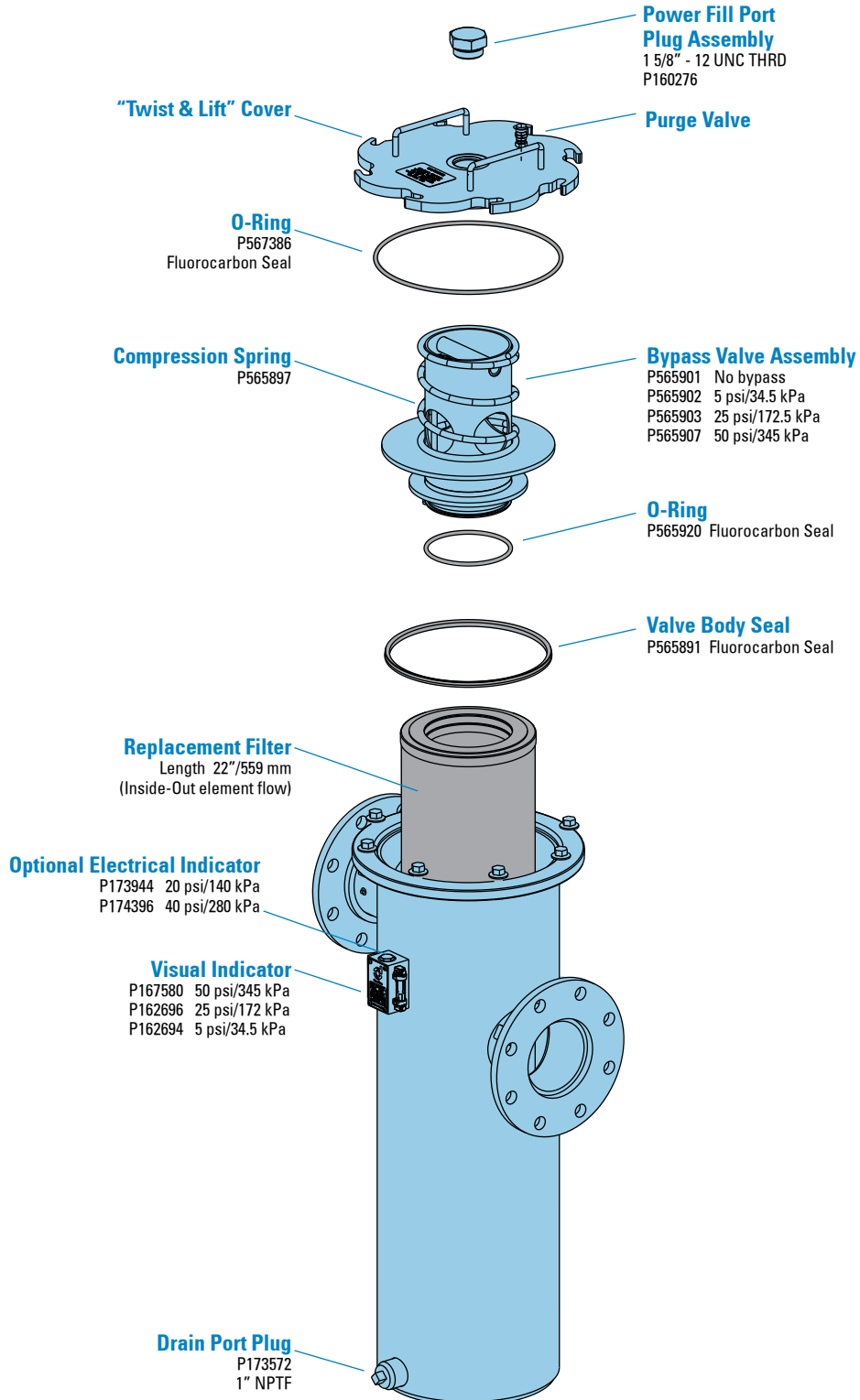
HRK10 Housing Only
(with 4" Port)



HRK10 Service Parts

SERVICE PARTS NOTE:

Some service parts may not be stocked. Please contact your Donaldson sales representative for lead time details.





Donaldson Delivers
Performance
Under **Any**
Pressure.



www.donaldsonfilters.com

PRODUCT INFORMATION



www.donaldsonfilters.com



Medium Pressure Filters

Medium pressure filters can be used in applications up to 2000 psi (13790 kPa). Donaldson offers both spin-on and in-line cartridge-style filters.

Donaldson Duramax® filters are the highest rated medium pressure spin-on filters available. Duramax filters are proven, reliable, long-lived and easy to install.



Section Index

Max Operating Pressure < 2000 psi (138 bar)

Models arranged from low to maximum flow rates

Spin-on Filters

HMK03	82
HMK04	86
HNK04	94
HMK05	90
HNK05	94
HMK24	86
HMK25	90

In-line Cartridge Filters

FLK90	99
FLK110	102
FLK125	105
DPK350	108
W061	112
HDK06	116
W041	120
HFK08	124



HMK03

Max Flow: 25 gpm (95 lpm)

HMK03 DURAMAX® Spin-On Filters

Working Pressures to: 1000 psi
6895 kPa
69 bar

Rated Static Burst to: 2000 psi
13,790 kPa
138 bar

Flow Range To: 25 gpm
95 lpm

Features

HMK03 Series Duramax® spin-on filters offer twice the capacity of competitive filters, yet they are physically smaller than traditional housing/cartridge filter assemblies. It features a die cast aluminum head and a unique radial seal O-ring gasket design that eliminates leakage.

Take advantage of Donaldson's mix and match system of in-stock heads, housings and media choices – so you can get exactly what you need. A full range of media options are available, using Donaldson's exclusive Synteq™ synthetic media designed especially for liquid filtration. You can also select the exact indicator types and bypass options to suit your application.



Beta Rating

- Performance to $\beta_{6(c)}=1000$

Porting Size Options

- SAE-12 O-ring

Replacement Filter Lengths

- 5.5" / 140mm
- 9.5" / 242mm

Standard Bypass Ratings

- 50 psi / 345 kPa / 3.5 bar
- No Bypass

Filter Collapse Ratings

- 290 psid / 20 bar

Assembly Weight

- Short: 3.3 lbs / 1.5 kg
- Long: 4.2 lbs / 1.9 kg

Operating Temperatures

- -20°F to 250°F / -29°C to 121°C

Housing Fatigue Strength Ratings*

- 100,000 Cycles:
0-1000 psi / 0-6895 kPa / 68 bar
- 300,000 Cycles:
0-800 psi / 0-5516 kPa / 55 bar
- 1,000,000 Cycles:
0-700 psi / 0-4826 kPa / 48 bar

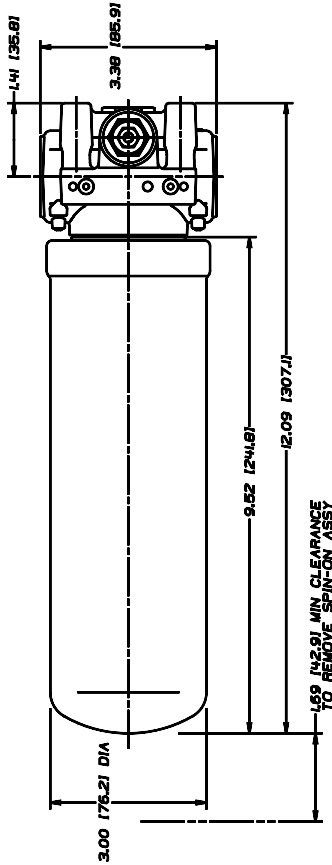


HMK03 Specification Illustrations

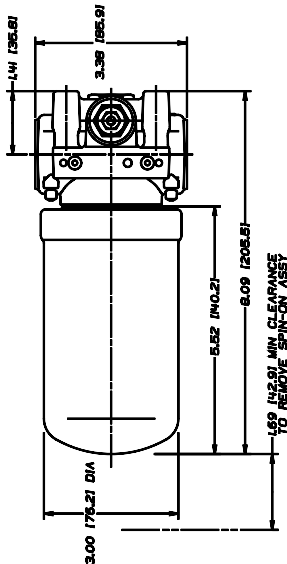
All dimensions are shown in inches [millimeters].

Assembly - Side Views

Long Assembly

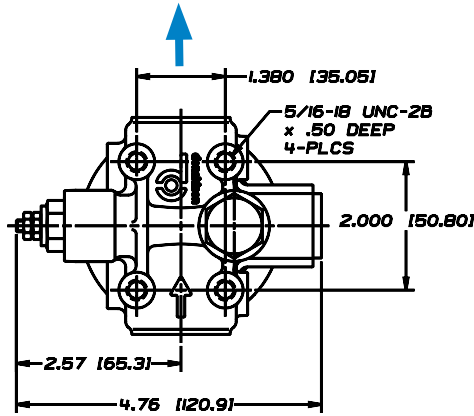


Short Assembly

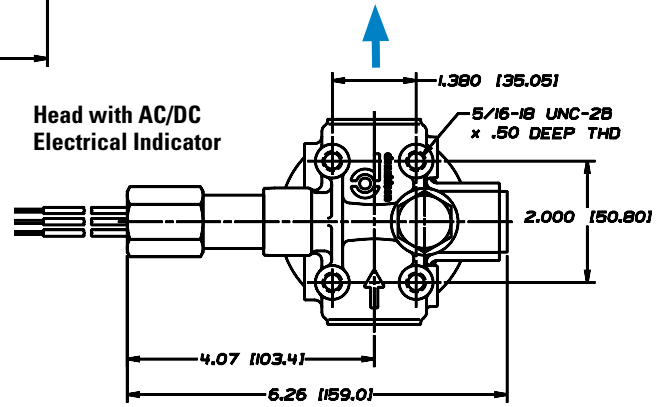


Head - Top View with Indicators

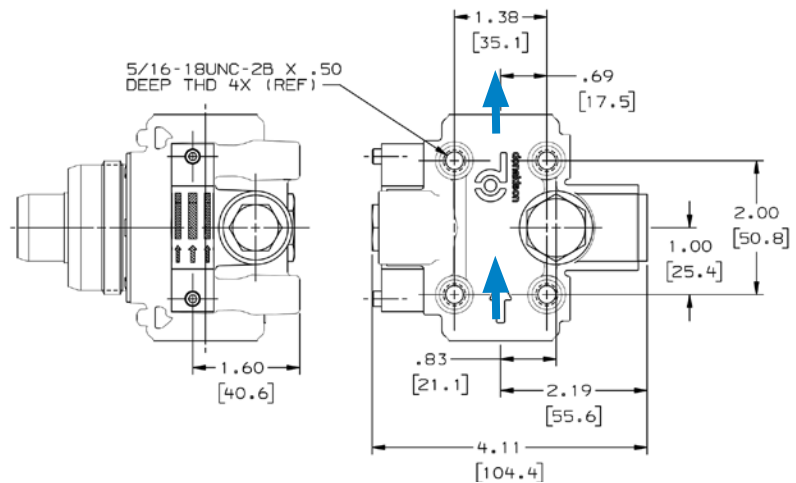
Head with DC Electrical Indicator



Head with AC/DC Electrical Indicator



Head with Visual Indicator



Applications

- Hydrostatic Charge Pumps
- Hydrostatic Transmission
- Pilot Control Circuits
- Refrigeration Compressor Circuits



HMK03

Max Flow: 25 gpm (95 lpm)



HMK03 Components

Filter Choices

Media Type	$\beta_{x(c)} = 1000$ Rating based on ISO 16889	Length		Donaldson Part No.	Comments
		in	mm		
Synteq Synthetic	6 μ m	5.5	140	P170308	Buna-N
	6 μ m	9.5	242	P170309	Buna-N
	11 μ m	5.5	140	P170310	Buna-N
	11 μ m	9.5	242	P170311	Buna-N
	23 μ m	5.5	140	P170312	Buna-N
	23 μ m	9.5	242	P170313	Buna-N

Filter Notes

- Synteq™ filter media is compatible with petroleum based fluids, most phosphate esters, water oil emulsions, and HWCF (high water content fluids)
- All models have 2"-12 threads
- Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



HMK03 Head

Port Size	Bypass Rating	Indicator	Head Part No.
3/4" SAE-12	No Bypass	None*	P170327
O-Ring	50 psi / 345 kPa	None*	P170773
	50 psi / 345 kPa	Visual*	P179460

*Head is machined to accept optional electrical indicators. See Indicator list at right for the available choices.

Oil Service Indicator Choices

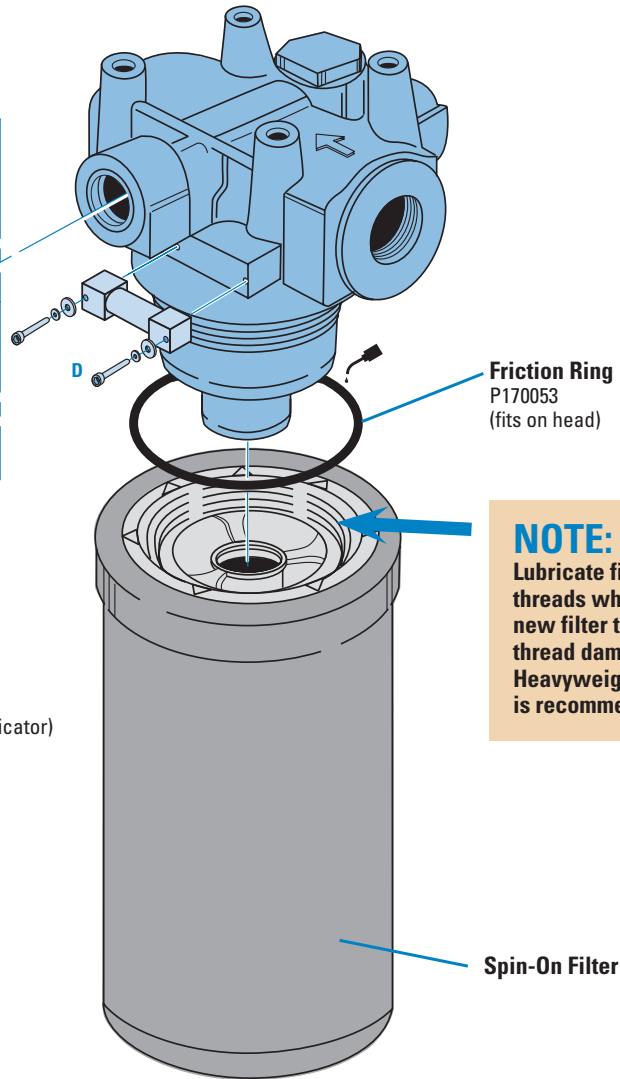
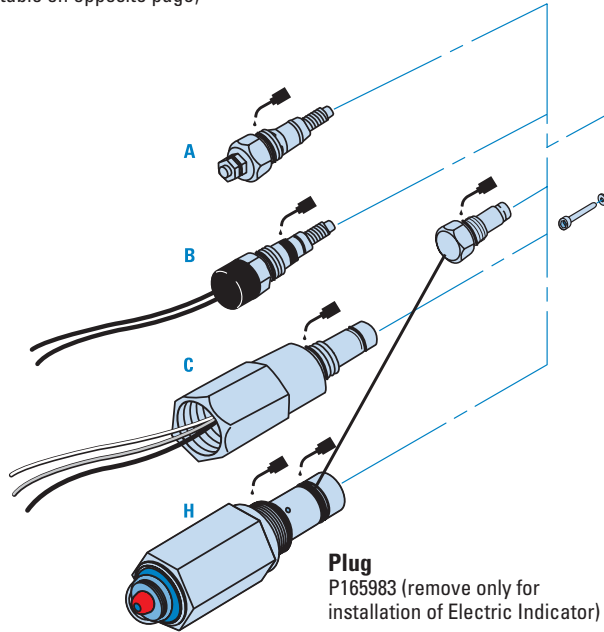
Use with Bypass Valve Pressure of:	Part No.	Style ²	Description ¹
25 psi / 172.5 kPa	P171143	B	Electric 2-wire DC
	P173944	C	Electric 3-wire AC/DC
	P165965	D	Visual
	P575334	H	Visual, pop up
50 psi / 345 kPa	P165194	A	Electric Single post DC
	P574968	B	Electric 2-wire DC
	P174396	C	Electric 3-wire AC/DC
	P575335	H	Visual, pop up
	P574967	E	DC 2-wire.

¹ All electric models have a maximum operating temperature of 250°F/121°C.

² See illustration of indicator styles on next page and complete details for all parts in the service indicators portion of the accessories section.

HMK03 Service Parts

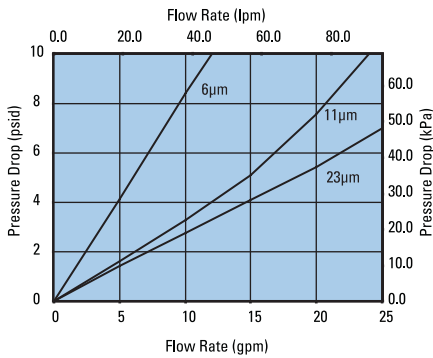
Service Indicator Styles
(See table on opposite page)



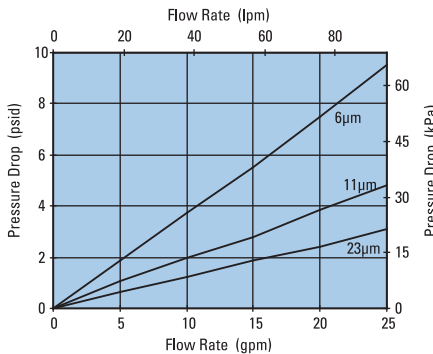
NOTE:
Lubricate filter-to-head threads when installing new filter to prevent thread damage. Heavyweight gear lube is recommended.

Performance Data

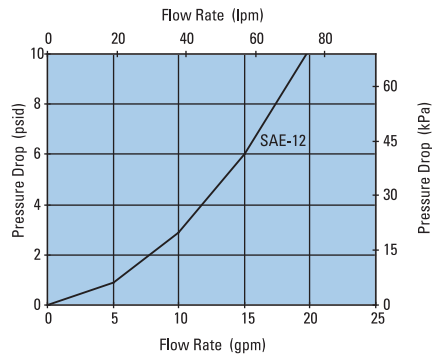
HMK03 Filter Only
(Synthetic, 5.5"/140mm)



HMK03 Filter Only
(Synthetic, 9.5"/242mm)



HMK03 Head Only



SERVICE PARTS NOTE:

Some service parts may not be stocked. Please contact your Donaldson sales representative for lead time details.



HMK04/24

Max Flow: 35 gpm (133 lpm) / 60 gpm (227 lpm)



HMK04/24 DURAMAX® Spin-On Filters

Working Pressures to:	500 psi 3450 kPa 35 bar	
Rated Static Burst to:	1000 psi 6895 kPa 69 bar	
Flow Range To:	HMK04 35 gpm 133 lpm	HMK24 60 gpm 227 lpm



Parallel Flow

Features

HMK04 (single) and HMK24 (double) Duramax® spin-on filters feature a die-cast aluminum head, heavy-duty steel body, and die-cast aluminum top plate for added strength. A special head-to-canister O-Ring seal prevents leakage. Buna-N seals are standard; Viton® seals are available on some models.

Both models use the same replacement filters and feature identical pressure ratings, but the HMK24 handles greater flow capacity. There's no need to inventory two different replacement filters. A full range of media options are available, using Donaldson's exclusive Synteq™ synthetic media. Choose the indicator types and bypass options to suit your application.

Beta Rating

- Performance to $\beta_{<4(c)} = 1000$

Porting Size Options

- HMK04 ¾", 1" NPT
- HMK04 SAE-12, SAE-16 O-ring
- HMK24 SAE-20, O-ring
- HMK24 1¼" SAE 4-Bolt Flange Code 61

Replacement Filter Lengths

- 5.97" / 152mm
- 9.4" / 240mm

Standard Bypass Ratings

- 25 psi / 173 kPa / 1.73 bar
- 50 psi / 345 kPa / 3.5 bar
- No Bypass

Assembly Weight

- HMK04 with short filter: 3.9 lbs/1.8 kg
- HMK04 with long filter: 4.8 lbs/2.2 kg
- HMK24: with short filter: 7.8 lbs/3.5 kg
- HMK24: with long filter: 9.6 lbs/4.4 kg

Operating Temperatures

- -20°F to 250°F / -29°C to 121°C (synthetic)
- -20°F to 225°F / -29°C to 107°C (cellulose)

Housing Fatigue Strength Ratings*

- 100,000 Cycles: 0-500 psi / 0-3450 kPa / 34.5 bar
- 300,000 Cycles: 0-400 psi / 0-2758 kPa / 27.6 bar
- 1,000,000 Cycles: 0-350 psi / 0-2415 kPa / 24 bar

Filter Collapse Ratings

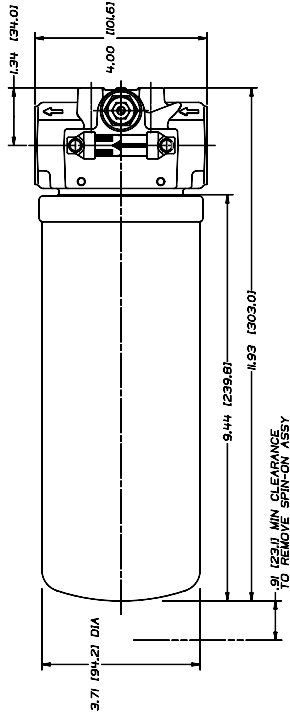
- 150 psid / 10 bar
- 300 psid / 20 bar also available

HMK04/24 Specification Illustrations

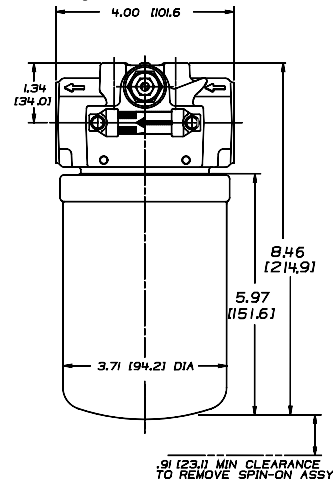
All dimensions are shown in inches [millimeters].

Assembly - Side Views

Long Assembly

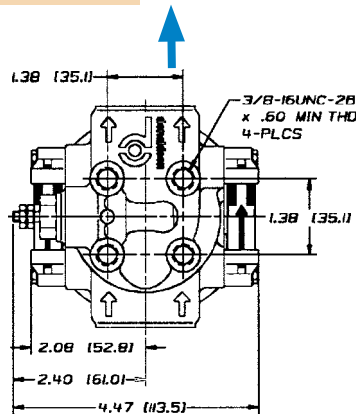


Short Assembly

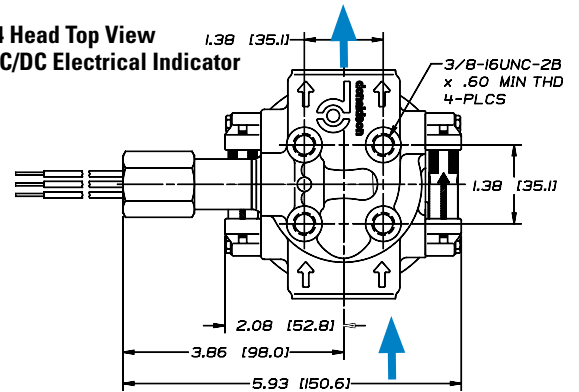


Head - Top & Side Views

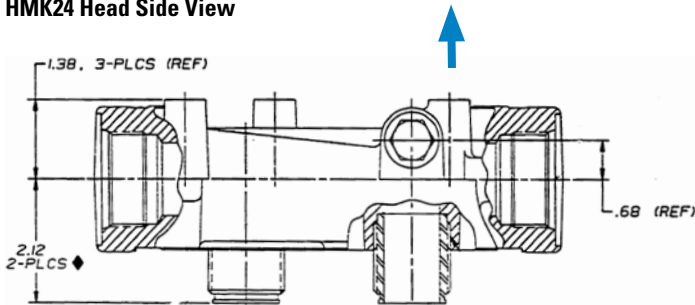
HMK04 Head Top View with DC Electrical Indicator



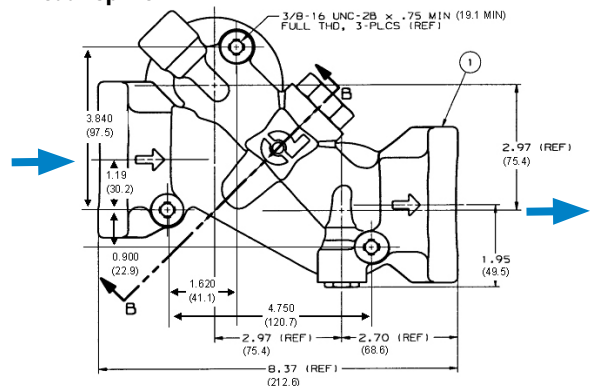
HMK04 Head Top View with AC/DC Electrical Indicator



HMK24 Head Side View



HMK24 Head Top View



Applications

- Case Drains
- Cooling Circuits
- Fluid Conditioning Systems
- Fuel Transfer
- Hydrostatic Charge Pumps
- Lube Oil Systems
- Power Transmissions
- Return Lines
- Side Loop Systems



HMK04/24

Max Flow: 35 gpm (133 lpm) / 60 gpm (227 lpm)



HMK04/24 Components

Filter Choices

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(c)} = 1000$	Length		Donaldson Part No.	Comments
			in	mm		
Syn-teq Synthetic	<4 μm	9.4	240		P165185	¹ Viton® O-ring
	6 μm	5.97	152		P165354	
	6 μm	9.4	240		P165332	
	11 μm	5.97	152		P163542	500 psi collapse
	11 μm	5.97	152		P164375	
	11 μm	9.4	240		P164378	
	13 μm	9.4	240		P164056	¹ Viton O-ring
	14 μm	9.4	240		P177047	
	22 μm	9.4	240		P164059	¹ Viton O-ring
	23 μm	9.4	240		P163567	500 psi collapse
	23 μm	5.97	152		P164381	
	23 μm	9.4	240		P164384	
	50 μm	5.97	152		P165335	
50 μm	9.4	240		P165338		
Water Absorbing	10 μm	9.4	240		P560584	
Wire Mesh	150 μm	9.4	240		P573301	



NOTE:
Lubricate filter-to-head threads when installing new filter to prevent thread damage. Heavyweight gear lube is recommended.

Filter Notes

- Refer to table in the Technical Reference Guide for fluid compatibility with our filter media.
 - Standard filter collapse rating is 150 psi, except as noted.
 - Thread size is 1 3/8"-12 UNF-2B
 - ¹ Filters with seals made of Buna-N® are appropriate for most applications involving petroleum oil. Filters with seals made of Viton® (a fluorocopolymer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions and HWCF (high water content fluids) over 150°F. Donaldson offers both types.
- Buna-N® Viton® are a registered trademarks of E. I. DuPont de Nemours and Company.

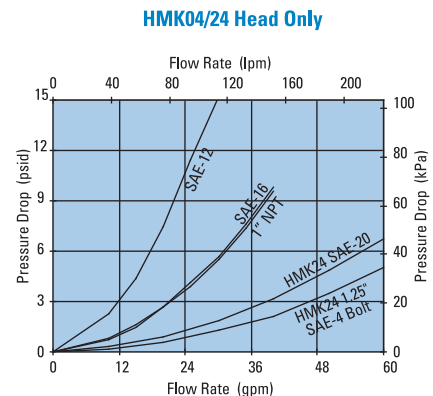
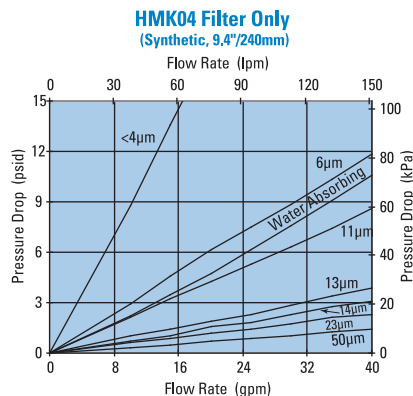
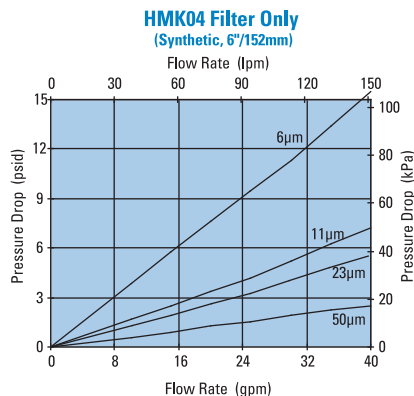
Head Choices for HMK24 (double)



Port Size	Bypass Rating	Indicator Options ¹	Part No.
SAE-20 O-Ring	None	A, B, C, E, F, H	P179609
1 1/4" SAE 4-Bolt Code 61	50 psi	A, B, C, E, F, H	P179582

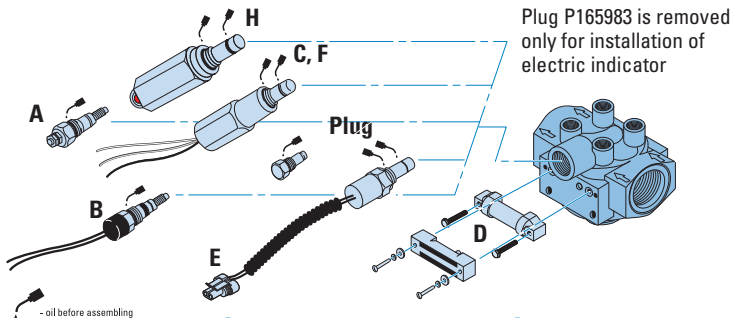
¹Reference illustration on next page for service indicator styles.

Performance Data



Head Choices for HMK04 (single)

Port Size	Bypass Rating	Standard Indicator Style & Location ^{1,2}	Indicator Options	Head Part No.	
3/4" NPT	25 psi / 172 kPa	None	None	P169317	
		D (Visual), Left Side	None	P169310	
SAE-12 O-Ring	25 psi / 172 kPa	None	None	P167473	
		D (Visual), Left Side	None	P166387	
	No Bypass	D (Visual), Left Side (25 psi)	None	P169320	
		None	None	P165434	
No Bypass	D (Visual), Left Side (50 psi)	None	P173750		
SAE-12 O-Ring (3 ports)	50 psi / 345 kPa	A (Electrical, P165194)	B, C, E, F, H	P167529	
1" NPT	25 psi / 172 kPa	D (Visual), Both Sides	A, B, C, E, F, H	P166086	
		None	None	P169309	
		D (Visual), Left Side	None	P166416	
SAE-16 O-Ring	15 psi / 100 kPa	None	A, B, C, E, F, H	P176569	
SAE-16 O-Ring	25 psi / 172 kPa	None	None	P163681	
		D (Visual), Left Side	None	P166417	
		D (Visual), Both Sides	A, B, C, H	P166088	
		E (Electrical, P177361)	None	P176568	
		A (Electrical, P162400)	B, C, H	P165537	
		No Bypass	D (Visual), Both Sides (25 psi)	A, B, C, F, H	P166664
			A (Electrical, P162400)	B, C, F, H	P166902
		50 psi / 345 kPa	D (Visual, Right Side)	All	P179381
		No Bypass	None	None	P164667
		50 psi / 345 kPa	None	None	P167201
A (Electrical, P165194)	B, C, E, H	P166862			
SAE-16 O-Ring	5 psi	D (Visual), Both Sides	All	P564850	
1" NPT	No Bypass	D (Visual), Left Side (25 psi/D)	None	P564484	
1" NPT	25 psi / 172 kPa	D (Visual), Left Side (25 psi/D)	None	P564485	



Service Indicator Choices

Use with Bypass	Indicator
Valve Pressure of:	Part No. Style ³
Visual Models (non-electric)²	
15 psi / 103 kPa	P162642 D
25 psi / 172.5 kPa	P162696 D
50 psi / 345 kPa	P167580 D
N/A	P165984 (blank plate)
25 psi / 172.5 kPa	P165965 D Heavy-Duty
50 psi / 345 kPa	P574177 D Heavy-Duty
25 psi / 172.5 kPa	P575334 H Pop up
50 psi / 345 kPa	P575335 H Pop up

Indicator Notes

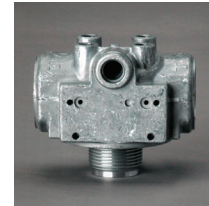
¹All electric models have a maximum operating temperature of 250°F / 121°C.

²All non-electric models have a maximum operating temperature of 180°F / 82°C.

³Complete details on all service indicators can be found in the accessories section.

NOTE:

Lubricate filter-to-head threads when installing new filter to prevent thread damage. Heavyweight gear lube is recommended.

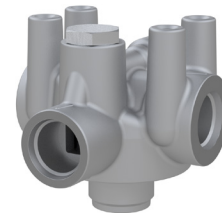


Head Notes

¹Reference illustration below for indicator styles.

²Donaldson uses the inlet port as the reference point. "Left side," for instance, means that the indicator mounts on the side of the filter head that is on your left when you face the inlet port.

3-Port Head for Charge Pumps



The **P167529** head is designed with a 50 psi / 3.45 bar third port bypass valve that diverts all bypass flow back to the reservoir, instead of going straight through the head and into the system as it does in 2-ported heads. Unfiltered fluid is NOT allowed into the system in the case of plugged filters. Designed primarily for charge pump applications.

Service Indicator Choices

Use with Bypass	Indicator
Valve Pressure of:	Part No. Style ³ Description
Electric Models¹	
5 psi / 34.5 kPa	P163642 A Single post DC.
15 psi / 103 kPa	P163601 A Single post DC.
25 psi / 172.5 kPa	P163839 A Single post DC. N.C.
25 psi / 172.5 kPa	P162400 A Single post DC. N.O.
25 psi / 172.5 kPa	P171143 B DC 2-wire.
25 psi / 172.5 kPa	P173944 C AC/DC 3-wire.
50 psi / 345 kPa	P165194 A Single post DC. N.O.
50 psi / 345 kPa	P574968 B DC 2-wire.
50 psi / 345 kPa	P574967 E DC 2-wire.
50 psi / 345 kPa	P575549 F DC 3-wire.
50 psi / 345 kPa	P174396 C AC/DC 3-wire.



HMK05/25

Max Flow: 50 gpm (189 lpm) / 100 gpm (379 lpm)



HMK05/25 DURAMAX® Spin-On Filters

Working Pressures to: 350 psi
2415 kPa
24.2 bar

Rated Static Burst to: 800 psi
5520 kPa
55.2 bar

Flow Range To:	HMK05	HMK25
		50 gpm 189 lpm



Parallel Flow

Features

HMK05 (single) and HMK25 (double) Duramax spin-on filters are perfect for high-flow applications, featuring a heavy-duty steel body and die-cast top plate for added strength. A special head-to-canister O-Ring seal prevents leakage. Buna-N® seals are standard. Fluorocarbon Viton® seals are available. Both models use the same replacement filters and have identical pressure ratings, so there's no need to inventory two different replacement filters. The HMK25 double filter head means twice the flow capability, with two filters to hold more contaminant.

Take advantage of Donaldson's mix and match system of in-stock heads, housings and media choices for exactly what you need. Media options include wire mesh and Donaldson's exclusive Synteq™ synthetic media.

Beta Rating

- Performance to $\beta_{<4(c)} = 1000$

Porting Size Options

- HMK05 1¼" NPT
- HMK05 SAE-20 O-ring
- HMK25 1½" NPT
- HMK25 SAE-24 O-ring
- HMK25 1½" SAE 4-Bolt Flange Code 61

Replacement Filter Lengths

- 7.6" / 193mm
- 11.63" / 295.4mm
- 14.2" / 361mm

Standard Bypass Ratings

- 25 psi / 173 kPa / 1.73 bar
- 50 psi / 345 kPa / 3.5 bar
- No Bypass

Assembly Weight

- 7.5 lbs / 3.4 kg (single)
- 16 lbs / 7.3 kg (double)

Operating Temperatures

- -20°F to 250°F / -29°C to 121°C (synthetic)
- -20°F to 225°F / -29°C to 107°C (cellulose)
- -20°F to 250°F / -29°C to 121°C (wire mesh)

Housing Fatigue Strength Ratings*

- 100,000 Cycles: 0-350 psi / 0-2413 kPa / 24.1 bar
- 300,000 Cycles: 0-300 psi / 0-2068 kPa / 20.7 bar
- 1,000,000 Cycles: 0-250 psi / 0-1734 kPa / 17.3 bar

Filter Collapse Ratings

- 200 psi / 13.8 bar

Filter Head Construction

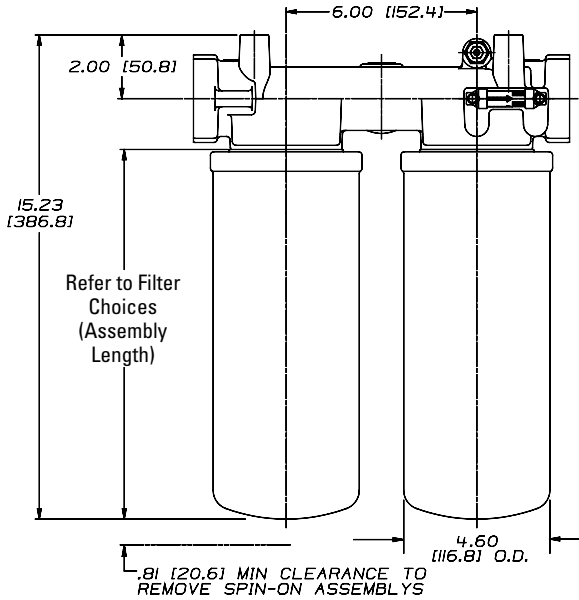
- Standard Head Cast Aluminum
- Ductile Iron Available in HMK25

HMK05/25 Specification Illustrations

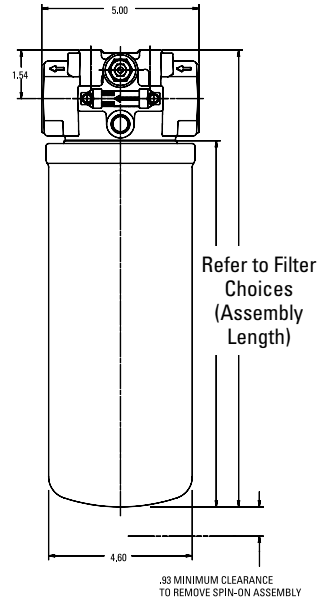
All dimensions are shown in inches [millimeters].

Assembly - Side Views

HMK25



HMK05

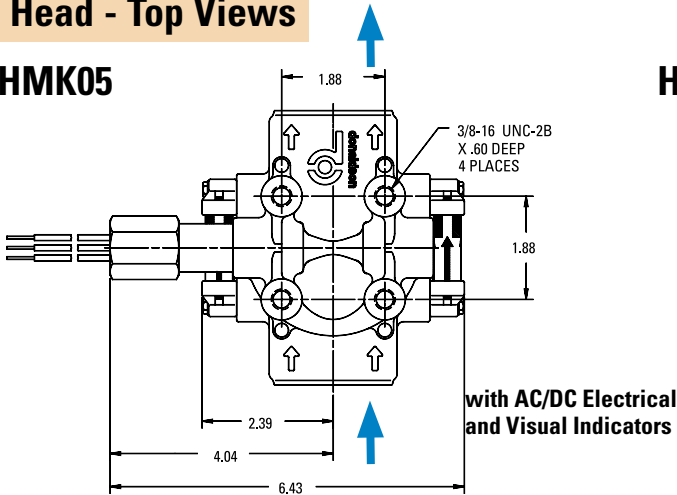


Applications

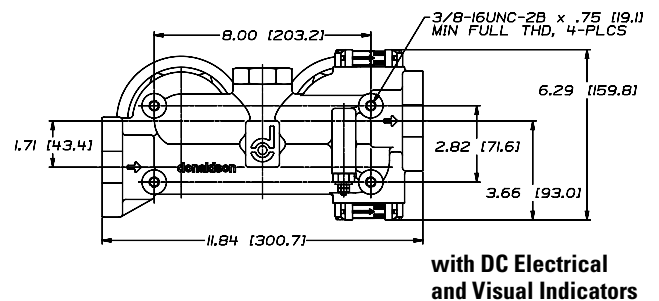
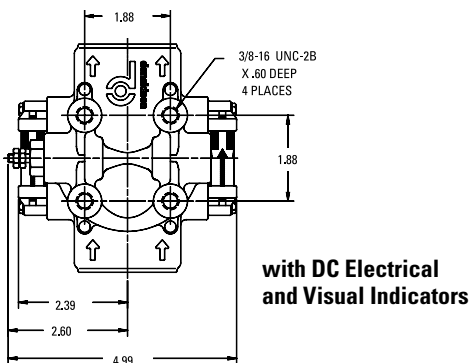
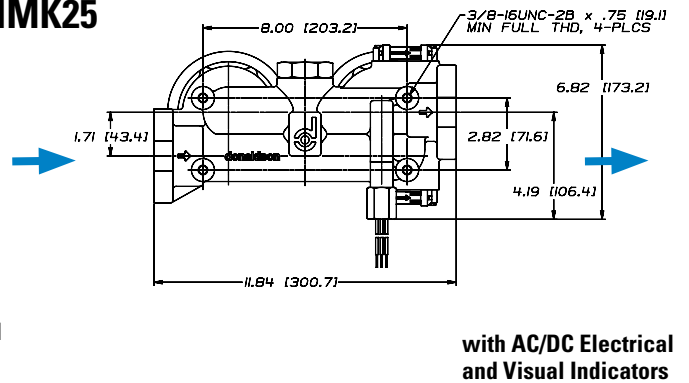
- Case Drains
- Cooling Circuits
- Fluid Conditioning Systems
- Fuel Transfer
- Hydrostatic Charge Pumps
- Lube Oil Systems
- Power Transmissions
- Return Lines
- Side Loop Systems

Head - Top Views

HMK05



HMK25





HMK05/25
Max Flow: 50 gpm (189 lpm) / 100 gpm (379 lpm)



HMK05/25 Components

Filter Choices

Media Type	$\beta_{x(c)} = 2$ Rating based on ISO 16889	$\beta_{x(c)} = 1000$	Length		Donaldson Part No.	Comments
			in	mm		
Synteq Synthetic	<4 μm		14.2	361	P564468	¹ Viton, Epoxy
	6 μm		11.6	294	P165675	
	6 μm		11.6	294	P171274	¹ Viton, Epoxy
	6 μm		14.2	361	P179763	
	11 μm		7.6	193	P176207	
	11 μm		11.6	294	P165659	
	11 μm		11.6	294	P171275	¹ Viton, Epoxy
	11 μm		14.2	361	P170949	
	23 μm		7.6	193	P176208	
	23 μm		11.6	294	P165569	
	23 μm		11.6	294	P171276	¹ Viton Epoxy
	23 μm		14.2	361	P173789	
50 μm		11.6	294	P165672		
50 μm		14.2	361	P573353		
Water Absorbing	10 μm		11.6	294	P179075	Absorbs 300 ml water
Wire Mesh	150 μm		11.6	294	P173943	

Filter Notes

- Refer to table in the Technical Reference Guide for fluid compatibility with our filter media.
- Thread size is 1 3/4"-12 UNF-2B
- Filters with seals made of Buna-N[®] are appropriate for most applications involving petroleum oil. Filters with seals made of Viton[®] (a fluor elastomer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions and HWCF (high water content fluids) over 150°F. Donaldson offers both types.

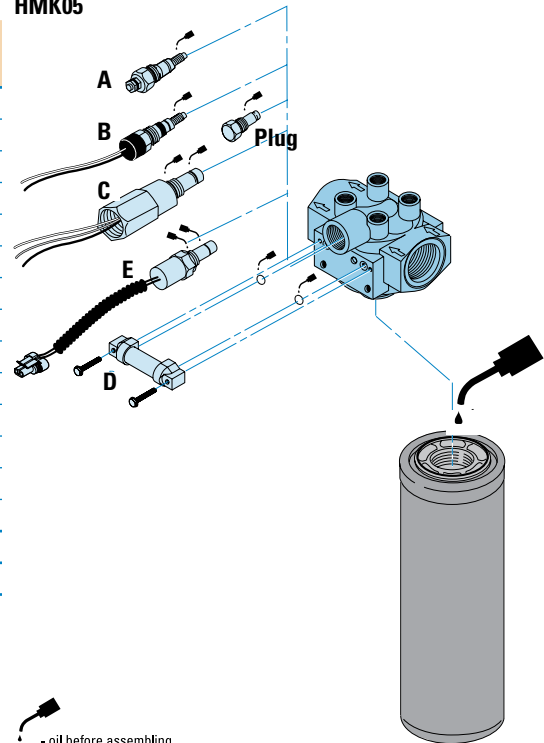
Oil Service Indicator Options

Use with Bypass Valve Pressure of:	Indicator Part No.	Style ³	Description
Electric Models¹			
5 psi / 34.5 kPa	P163642	A	Single post DC
15 psi / 103 kPa	P163601	A	Single post DC.
25 psi / 172.5 kPa	P163839	A	Single post DC. N.C.
25 psi / 172.5 kPa	P162400	A	Single post DC. N.O.
25 psi / 172.5 kPa	P171143	B	DC 2-wire
25 psi / 172.5 kPa	P173944	C	AC/DC 3-wire
50 psi / 345 kPa	P165194	A	Single post DC. N.O.
50 psi / 345 kPa	P574968	B	DC 2-wire
50 psi / 345 kPa	P574967	E	DC 2-wire
50 psi / 345 kPa	P575549	F	DC 3-wire
50 psi / 345 kPa	P174396	C	AC/DC 3-wire

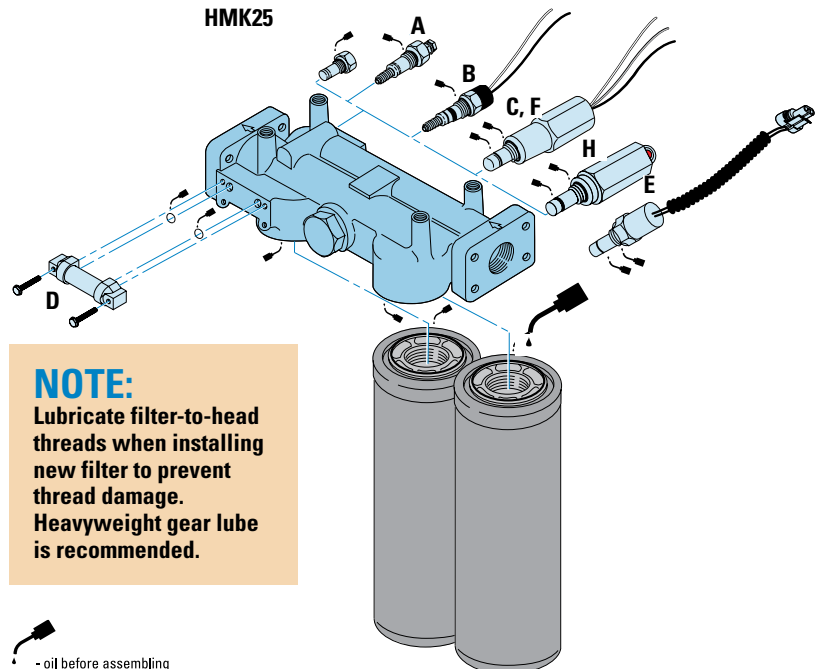
Use with Bypass Valve Pressure of:	Indicator Part No.	Style ³
Visual Models (Non-Electric)²		
15 psi / 103 kPa	P162642	D
25 psi / 172.5 kPa	P162696	D
50 psi / 345 kPa	P167580	D
N/A	P165984	(blank plate)
25 psi / 172.5 kPa	P165965	D Heavy-duty
50 psi / 345 kPa	P574177	D Heavy-duty
25 psi / 172.5 kPa	P575334	H (Pop up)
50 psi / 345 kPa	P575335	H (Pop up)

Service Parts

HMK05



HMK25



NOTE:
Lubricate filter-to-head threads when installing new filter to prevent thread damage. Heavyweight gear lube is recommended.

Indicator Notes

- ¹All electric models have a maximum operating temperature of 250°F/ 114°C.
 - ²All non-electric models have a maximum operating temperature of 180°F/ 82°C.
 - ³Complete details on all service indicators can be found in the accessories section.
- Buna-N[®] Viton[®] are a registered trademarks of E. I. DuPont de Nemours and Company.