

HYDAD INTERNATIONAL

Filters

Hydraulic & Lube Oil





Components, Systems and Service. All from one Company.

Our fluid engineering solutions are defined by the scope and complexity of our customers' requirements. Our products range from individually designed components in the fields of fluid engineering, hydraulics and electronics right up to complete systems for specific functions.

All components and systems are conceived and designed in-house. Experienced industrial and product specialists develop innovative products and efficient solutions for high-quality, cost-effective production. Throughout the globe, our production facilities share one common goal: quality. We take great pride in both our products and solutions.

Industries and Applications



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*For specific details on each filter assembly, please refer to the "Quick Reference Guide" - Section A.

SÁÉ Code 61 & 62 - JŽ; SAE - DN - J3; ANSI - J4; DN Flange DIM PN 16 - J5; DN Flange DIM PN 25 - J6; DN Flange DIM PN 40 - J7



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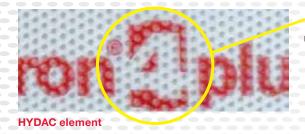
Appendix – Flange Details

NOTE

Information and related materials are subject to change without notice. This catalog, and all information and related materials it contains, are provided "as is." HYDAC makes no representation or warranty whatsoever regarding the completeness, accuracy, "up-to-dateness", or adequacy of, the HYDAC-NA domain and this catalog.



Can You Spot The Difference?



The frame of the "4" in the replica element is rectangular, whereas in the wrap which is used by HYDAC, the frame of the "4" is designed in the form of a filter element.



Buy Only Genuine





HYDAC multi-layer mesh-pack design with ultrasonic welded seam.

How to Spot the Difference

Here, notice the difference in the outer wrap: the perforation pattern and the red border around the "4". Not visible, the pirated element had less filtration layers of lower quality and a glued seam (a HYDAC seam is typically welded). In addition, the end cap identification was inkjet printed (a genuine HYDAC element is laser etched) and the dates on the end cap and its packaging did not match. Last, subtle misspellings were noticed (Betarnicron instead of Betamicron and designed instead of designed).

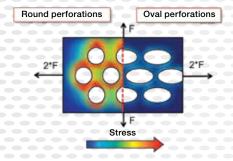
It seems that everyone is in the replacement element business, but "Buyer Beware!". There are suppliers—pirates—who have no concern for quality. Their mission is simply to capitalize on a brand's reputation for quality engineering. Pirates will offer rock bottom prices, but remember: design differences result in performance differences. Keep in mind that "you get what you pay for". Don't end up paying the ultimate price – component failure, production down time and costly repair - by using a cheap, imitation, low-performing element.

The housing pictured right shows evidence of competitor element failure—bypass springs and pieces of the end cap in the outlet side. Application—gearbox. Using Genuine HYDAC products is imperative for optimal performance.

Winning the War

HYDAC has introduced a new outer wrap design to further differentiate our elements. This exclusive outer wrap both improves performance and provides you quality protection. It features a unique oval-shaped perforation that improves diffusion flow. This is a one-of-a-kind design, so if your element includes this feature, you are assured it is a HYDAC quality original and not an imitation. It is standard on all HYDAC elements.







HYDAC could mean the difference between Success and Failure!





Quick Reference Guide

Quick Reference is an easy one-stop general selection guide. Broken down by operating pressure (low, medium, high), filter type (inside-tank, in-tank, inline, duplex, manifold-mount, etc.), maximum flow rate, port size, and flow path; Quick Reference narrows down the selection into one or more filter series suitable for the application. Catalog page numbers are also provided so that the desired filter series data sheet can be found with ease.

Low Pressure Filters

Filter Type	Maximum Pressure psi (bar)	Maximum Flow gpm (I/min)	Port Size Range (in)	Flow Path	Indicator D = Diff. S = Static	Filter Model Page	Features
	145 (10)	43 (165)	2 (outlet)	→	S	RFMS*** page H2	Unique design places entire filter inside of the reservoir tank. Consult Factory.
Inside Tank	145 (10)	132 (500)	1.26 (outlet)		S	RFMSet*** page H2	Unique design places entire filter inside of the reservoir tank plenum. Consult Factory. Ideal for low tank top clearances and multiple inlets to reservoir.
inside fank	145 (10)	317 (1200)	shroud	-	S	RKT*** page H12	Optimized system size and performance through air separation technology and versatile return flow options.
	145 (10)	317 (1200)	shroud		S	RKB*** page H24	Optimized system size and performance in large return flow applications, through air separation technology and versatile return flow options.
	360 (25)	343 (1300)	1/2 - 4		S D-size 660 & up with DE option	RF page D2	HYDAC standard in-tank/in-line filters. Threaded or flanged outlets and one piece casting enable in-line use. Robust design.
	360 (25)	450 (1700)	4	un un	S (in-tank; 1.x) D (in-line; 2.x)	NF** page D72	Configurable for in-tank or in-line applications. Low weight, water tolerant aluminum alloy-high flow capability.
	145 (10)	300 (1100)	3/4 - 2 1/2		S	RFM_ page D20	In-tank low cost high performance mobile filters – Sizes 75, 90, 150, 165, & 185 have a built-in breather option. All sizes allow oil filling through element.
	100 (7)	26 (100)	1" hose barb			RFMP*** page H8	In-tank return filter made of polyamide- housing and plastic lid-low cost.
In-Tank	100 (7)	100 (378)	1 1/2		S	HF4R page D36	Meets HF4 automotive specs and uses industry standard-size HF4 spec elements. Threaded outlet permits inline use.
	145 (10)	211 (800)	3/4 - 2 1/2	→ S rum	S & Vac.	RKM page D40	Single filter functions as return line and charge pump filter in single housing. (up to two charge pumps)
	145 (10)	634 (2400)	1 1/2 - 4 (inlet)	→ 	S	RFT*** page H30	Top-tank filtration with air separation technology, designed for small and large return flow applications.
	145 (10)	158 (600)	1 3/8 (inlet)	<u> </u>	S	RFB*** page H46	Optimized system size and performance through air separation technology and versatile return flow options.
	145 (10)	69 (260)	1 3/8 (inlet)	1 1	_	RFB Compact*** page H54	Low Cost in tank filter solution to Optimize system size and performance through air separation technology.
In-Tank	360 (25)	343 (1300)	3/4 - 4		S	RFD page D12	For return lines in continuously operating systems; tank mounting or in-line due to one piece casting.
Duplex	360 (25)	450 (1700)	4	—	S (1.x) D (2.x)	NFD page D86	For return lines in continuously operating systems; tank mounting (1.x) and in-line (2.x).

^{**}For a Set version of this filter, refer to Set Series section of the catalog. ***Special Order Filter. Refer to catalog information for details.

Low Pressure Filters (cont.)

Filter Type	Maximum Pressure psi (bar)	Maximum Flow gpm (I/min)	Port Size Range (in)	Flow Path	Indicator D = Diff. S = Static	Filter Model Page	Features
	360 (25)	350 (1325)	3, 4		D	RFL Cast page D145	Back Mount single filter with metric threads.
In-Line	145 / 232 (10 / 16)	3963 (15000)	2 - 12	→ IIII	D	RFL Welded page D155	Floor mounted. Holds up to ten 2600 high capacity elements. ASME and CRN versions available. For High flow applications.
in-Line	360 (25)	105 (400)	1 1/4		D	FLN (DIN) page D64	HYDAC standard DIN low pressure filter. Low weight, water-tolerant aluminum alloy.
	500 (34.5)	450 (1700)	4	→	D	NFH (modular) page D94	Filters can be manifolded for high viscosity applications. Housings designed for high flow up to 450 gpm, and/or high viscosity fluid (e.g. in lube systems).
In-Line	360 (25)	300 (1136)	2 - 4	-	D	NFUHE page D110	Ultra-high efficiency staged filter combinations to increase separation efficiencies far above levels achieved by single elements, for cleaning fluids and transferring.
Staged	360 (25)	300 (1136)	4		D	NFDUHE page D125	Ultra-high efficiency staged filter combinations to increase separation efficiencies far above levels achieved by single elements, for cleaning fluids and transferring.
In-Line Modular Manifold- Parallel	360 (25)	1350 (5110)	4	-	D	NF MMP page D133	In-line manifolded modular parallel filter assemblies for high flow and high viscosity applications particularly in primary metals and pulp and paper applications. Fully isolatable in maintenance mode-element changeout.
	(360 / 580) (25 / 40)	343 (1300)	1 - 4		D	RFLD Cast page D149	Back mounted duplex filter with metric threads. Ball valve changeover.
	145 / 232 (10 / 16)	3900 (14,763)	2 - 8		D	RFLD Welded page D165	Floor mounted. Holds up to ten 2600 high capacity elements per side. ASME and CRN versions available. For high flow applications. Large ball valve changeovers available.
In-Line Duplex	145 (10)	793 (3000)	2 - 6		D	RFLDH Welded*** page H62	Floor mounted. Holds up to 5 high cap. elements/side. ASME standard; Ball valve changeover. Carbon & stainless steel.
	232 (16)	634 (2400)	1 - 6		D	AFLD (API)*** page H72	In-line duplex filter series which are API 614 compliant. These filters are available with CRN, AS1210 and GOST certifications. Material certificate is standard.
	360 (25)	105 (400)	1 1/4 - 1 1/2	-	D	FLND (DIN) page D68	Integrated equalization valve with transfer valve. Light weight. CRN available. Water tolerant aluminum alloy.
	500 (34.5)	450 (1700)	4	ļo.	D	NFHD (modular) page D102	Filters can be manifolded for high flow/ viscosity applications in continuously operating systems.
In-Tank Suction	360 (25)	30 (114)	3/4 - 2		Mechanical Bypass In Element	<u>SF***</u> page H82	Mounts in-tank. Modified vacuum gauge indicators are available.
Tank System	100 (7)	75 (284)	1 - 1 1/2		S	TNK*** page H109	Complete rotomolded hydraulic reservoir solution.

^{**}For a Set version of this filter, refer to Set Series section of the catalog. ***Special Order Filter. Refer to catalog information for details.



QUICK REFERENCE

Spin-on Filters

Filter Type	Maximum Pressure psi (bar)	Maximum Flow gpm (I/min)	Port Size Range (in)	Flow Path	Indicator D = Diff. S = Static	Filter Model Page	Features
	120 (8.3)	7 (26.5)	3/8	→	N/A	MF 40 page D54	Standard length element. Not available with 3 µm Betamicron elements.
	120 (8.3)	15 (57)	3/4 - 1	→	S	MF 80 page D54	Standard length element. Not available with 3 µm Betamicron elements.
	120 (8.3)	25 (95)	3/4 - 1		S	MF 85 page D54	Extended length element. Same head as size 80. 10 µm paper elements only. 25 psid bypass standard.
	120 (8.3)	30 (113)	1 1/4 - 1 1/2	→	S	MF 160 page D54	Standard length element.
Spin-On Single	120 (8.3)	60 (227)	1 1/4 - 1 1/2		S	MF 180 page D54	Extended length element. Same head as size 160.
Element (available in BSPP ports)	120 (8.3)	30 (113)	1 1/4 - 1 1/2	7	D	MF 190 page D54	Standard length element. ΔP Sensing Indicators for applications where tank not vented to atmosphere.
	120 (8.3)	60 (227)	1 1/4 - 1 1/2	-	D	MF 195 page D54	Extended length element. Same head as size 190. ΔP Sensing Indicators for applications where tank not vented to atmosphere.
	250 (17)	15 (57)	3/4 - 1	→	D	MF 90 page D54	Standard length element. 250 psi rating minimizes leakage in case of flow surges. ΔP sensing indicators. Not available in 3 μ m or 25 μ m paper elements.
	250 (17)	25 (95)	3/4 - 1		D	MF 95 page D54	Extended length element. 250 psi rating minimizes leakage in case of flow surges. Same head as size 90. ΔP sensing indicators. 20 μm Betamicron or 25 μm paper elements not available.
	120 (8.3)	60 (227)	1 1/2		S	MFD 160 page D54	Parallel flow through two standard length elements mounted end to end.
Spin-On	120 (8.3)	60 (227)	1 1/2 - 2	Ti	S	MFDS 160 page D54	Parallel flow through two standard length elements mounted side by side.
Dual Elements	120 (8.3)	120 (454)	1 1/2		S	MFD 180 page D54	Parallel flow through two extended length elements mounted end to end. Same head as MFD 160.
	120 (8.3)	120 (454)	1 1/2 - 2		S	MFDS 180 page D54	Parallel flow through two extended length elements mounted side by side. Same head as MFDS 160.

Medium Pressure Filters

Filter Type	Maximum Pressure psi (bar)	Maximum Flow gpm (I/min)	Port Size Range (in)	Flow Path	Indicator D = Diff. S = Static	Filter Model Page	Features
	750 (52)	90 (341)	1 1/2		D	HF4RL page E2	In -line top loaded simplex filter which meets HF4 automotive, specification requirements and performance.
	725 (50)	74 (280)	1/2 - 1 1/4	—	D	LPF** page E6	Multiple uses: pressure lines, returns, off-line loops, and lube lines. Aluminum for low weight and water tolerance.
In-Line	1450 (100)	174 (660)	1/2 - 1 1/2		D	<u>LF</u> ** page E12	HYDAC standard filter. Aluminum for low weight and water tolerance.
	500 (34)	112 (425)	1 1/2		D	LPFH** page E16	Cost effective, high performance alternative to spin-on filters with integrated retrofit protection.
	725 (50)	35 (130)	3/4 - 1	+	D	MFX** page E20	ECO-friendly, cost effective high performance alternative to spin-on filters.

^{**}For a Set version of this filter, refer to Set Series section of the catalog. ***Special Order Filter. Refer to catalog information for details.

High Pressure Filters

Filter Type	Maximum Pressure psi (bar)	Maximum Flow gpm (I/min)	Port Size Range (in)	Flow Path	Indicator D = Diff. S = Static	Filter Model Page	Features
	6090 (420)	200 (757)	1/2 - 2	—	D	DF/DFF** page F2	HYDAC standard high pressure filter. Wide choice of models and elements, and optional features.
	6090* / 4060 (420/ 280)	250 (946)	2	—	D	DF/DFF 1500 page F10	HYDAC high pressure filter, available in bi-directional and single-flow configurations.
	6090 (420)	160 (606)	2	=======================================	D	DFFX*** page H88	In-line high flow ΔP optimized forward and reverse flow high pressure filter. High Flow and low differential pressure are prominent features.
	4060 (280)	100 (378.5)	1 - 1 1/2	-	D	HDF/HDFE*** page H96	In-line forward and reverse flow capable "L" ported, high pressure filter which utilizes competitive "9600" geometry filter elements. Available with and without bypass valves. Low and high collapse elements available.
In-Line	4000 (276)	25 (95)	3/4	+	D	HF2P page F18	Meets HF2 automotive specifications and uses industry standard-size elements. In-line configuration.
	6090 (420)	120 (454)	1 - 2	+	D	HF3P page F24	Meets HF3 automotive specifications and uses industry standard-size elements. In-line configuration.
	5000 (345)	120 (454)	1 1/2	<u> </u>	D	HF4P page F28	Meets HF4 automotive specifications and uses industry standard-size elements. Top loading in-line configuration.
	4060 (280)	25 (95)	3/4		D	MFM** page F34	Low cost in-line high pressure filter (efficient design and construction).
	5800 (400)	37 (140)	1	1	D	HFM page F40	In-line high pressure filter.
	4568 (315)	110 (416.4)	0.551 - 1.181	11	D	DFQE page F56	Side mount to manifold; upper inlet, lower outlet. Size (30-280). Lower inlet, upper outlet sizes ≥ 330.
Manifold	4568 (315)	125 (473)	0.689 - 1.181		D	DFP page F62	HYDAC standard manifold filter. Ports at top.
Mount	4000 (276)	25 (95)	0.689	<i></i>	D	HF2-P page F18	Meets HF2 automotive specifications and uses industry standard-size elements. Manifold configuration.
	5000 (345)	120 (454)	1.25		D	HF4-P page F28	Meets HF4 automotive specifications and uses industry standard-size elements. Manifold configuration.
	3000 (207)	25 (95)	(1) SAE-16, (1 1/4) SAE-20	1	NA	CF page F82	Disposable, high pressure manifold cartridge filter. Low weight, water-tolerant aluminum alloy.
Manifold Cartridge	3000 (207)	12 (45)	(1) SAE-16		NA	CP-C16 page F86	Circuit protector, high pressure manifold cartridge filter. Back-up protection for upstream pressure filters. Fits into standard C16-2 manifold port.
	6090 (420)	30 (113)	(5/8) SAE-10, (1) SAE-16, (1 1/2) SAE-24	11 11 11 11 11 11 11 11 11 11 11 11 11	NA	CP-SAE page F90	Circuit protector, high pressure manifold cartridge filter. Back-up protection for upstream pressure filters. Fits into standard SAE o-ring port.
Modular Stacking In-line	4568 (315)	10 (38)	D03/D05 Patterns (0.25 / 0.44)	†	D	DFZ page F68	Cartridge valve sandwich mount. Bowl on right side (standard) or left (optional).

^{*}Good to 300,000 cycles. **For a Set version of this filter, refer to Set Series section of the catalog. ***Special Order Filter. Refer to catalog information for details.

QUICK REFERENCE

High Pressure (cont.)

Filter Type	Maximum Pressure psi (bar)	Maximum Flow gpm (I/min)	Port Size Range (in)	Flow Path	Indicator D = Diff. S = Static	Filter Model Page	Features
	3045 (210)	106 (400)	1 1/4 - 1 1/2	-	D	FMND page F44	HYDAC standard DIN duplex high pressure filter. Right to left flow option available.
Duploy	4568 (315)	90 (340)	3/4 - 2		D	DFDK page F48	HYDAC standard industrial duplex for continuously operating systems.
Duplex	4568 (315)	90 (340)	2	-	D	HFDK4P*** page H100	Meets automotive specifications and uses HF4 standard-size elements. Top loading duplex configuration.
	4568 (315)	90 (340)	2		D	HFDK3P*** page H104	Specifically designed for the Pulp and Paper market.

^{**}For a Set version of this filter, refer to Set Series section of the catalog. ***Special Order Filter. Refer to catalog information for details.

Betterfit® Elements

Description
HYDAC supplies a wide range of elements that are dimensionally
interchangeable with elements of other manufacturers. Elements are
of the same media and quality construction as HYDAC proprietary
elements. A list of available interchanges can be found under "Betterfit
Element Selector" at www.hydac-na.com.

Types of Elements

- High efficiency depth filtration, pressure and return
- Surface filtration (wire mesh or paper) nominal, low pressure
- Tank air-breather filters
- Suction Strainers



FILTER ASSEMBLIES

Note to the Reader

The objective of our catalog is to provide the information and guidance you'll need to make informed and appropriate choices for your filtration needs.

Illustrated and easy to understand, Section 1 - Contamination Control Fundamentals serves as an effective "primer" on contamination control. In the following sections, we also provide filtration information and guidance for selecting the optimal filter and element media for your application.

Section 1 explains recent changes in industry standards regarding how fluid cleanliness is defined and measured. Recent technological advancements in the measurement of microscopic particles, coupled with the establishment of a new standard test dust for calibration purposes, necessitated these changes. Although the new standards may seem confusing at first, they enable more accurate sizing of dirt particles and reduce variability in output among different automatic particle counters. The end result is more reliable data for the user.

Section 2 details element technical data and selection criteria. Performance and element testing is described. Element selection to fit the application is addressed.

Section 3 details filter selection considerations and provides procedures for selecting and sizing filters for system applications.

Section 4 provides a detailed overview of HYDAC elements and their performance specifications.

Section 5 you'll find extensive technical data on HYDAC's comprehensive collection of high efficiency depth (absolute) filter medias, which combine high efficiency performance with low pressure drop and exceptional dirt holding capacity. HYDAC's design engineers have also given special attention to developing more environmentally friendly products, such as Ecomicron® elements. These elements contain little or no metal and are made of fully recyclable materials for environmentally safe disposal.

Visit Us Online...

HYDAC's web site, *www.hydac-na.com*, now offers our Online Cross-Reference Guide to Betterfit® replacement elements titled **Betterfit Element Selector**. With this user-friendly guide you can match filter elements from many other manufacturers with appropriate HYDAC Betafit® replacements.





ISO Certification

HYDAC is a worldwide leader in hydraulics. We have earned that role by emphasizing quality, innovation, and excellence in everything we manufacture. As an ISO 9001:2008 registered company, HYDAC is committed to maintaining high standards of quality and services.





WARNING!

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.



This document and other information from HYDAC, its subsidiaries and authorized distributors provide product and/ or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

HYDAC does not assume the risk of and shall not be liable for failure due to fire. HYDAC offers fire safety devices and recommends their use.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by HYDAC Corporation and its subsidiaries at any time without notice.

Corporate Overview

HYDAC focuses on the filtration needs of our customers in the fluid power industry and is proud of our proven track record of providing quality filtration products over the last thirty years. The designs you see in this catalog are the result of thousands of hours of field testing, laboratory research and decades of experience.

HYDAC is a leader in filtration and fluid conditioning and the proof of our expertise lies in our broad mix of quality products.

HYDAC's goal is to be your filtration partner. Our expertise in filtration technology, our superior filter and element manufacturing capabilities, and our dedication to customer service and product support are the reasons we are leaders in the Filtration Supply Industry.

We are committed to providing the best available filter products to meet system and component mandatory cleanliness levels at a competitive price. As a cost-effective quality producer, we can work with your applicable department to supply contamination control technology or develop long-range supply and pricing programs that can improve your company's bottom line.

HYDAC's products, technical expertise, commitment to research and development, and ongoing improvements in manufacturing enable us to provide products and services that improve performance and efficiency in many major industries, including:



Agricultural



Automotive



Construction



Gearboxes



Industrial

Pulp & Paper



Offshore

Railways



Commercial Municipal



Shipbuilding



Capabilities

HYDAC has in place a strategically positioned international distribution network, supported by our professional and experienced sales and marketing team. Distributor personnel are trained in the important aspects of filter application by HYDAC in training sessions held at our factory and around the globe. The effectiveness of our product and service support is multiplied by utilizing HYDAC's extensive distributor network.

Products

HYDAC's products are continually tested using the latest ISO, ANSI and NFPA test procedures in our contamination control lab. Our dynamic test stands are in constant operation, subjecting our filter housings to cyclic pressure to verify their rated fatigue pressures per NFPA Standard T2.6.1 or other international standards. Statistically sampled elements are tested to ensure fabrication integrity in the manufacturing process. They are also tested for efficiency, stability and dirt-holding capacity in a multi-pass test facility, equipped with characterization instruments with in-line particle counting capabilities, which are calibrated to ANSI standards. In addition, a flat media multi-pass test is used in our ongoing filter media development program.

Extensive testing is conducted to ensure compatibility with various hydraulic fluids, including the newest fire-resistant fluids, per ISO 2943 Standard. Flow fatigue tests are run to evaluate the structural strength of elements, per ISO 3724 Standard.

HYDAC Standard Tests Design and Testing Standards of HYDAC Filter Housings

Description	Standard
Burst Pressure Test	NFPA/T-2.6.1
Fatigue Testing	NFPA/T-2.6.1
Pressure Drop vs. Flow	NFPA/T-3.10.14

Design and Testing Standards of HYDAC High Efficiency Elements

Description	Standard
Element Collapse (Burst)	ISO 2941
Fabrication Integrity	ISO 2942
Material Compatibility	ISO 2943
Element Flow Fatigue	ISO 3724
Pressure Drop/Flow Rate	ISO 3968
Multi-Pass	ISO 16889

All HYDAC element manufacturing facilities have newly upgraded multi-pass test facilities capable of dynamic element performance testing to better simulate actual application cyclic flow variations.



Section 1: Contamination Control Fundamentals

Why Filter?

Seventy to ninety percent of all hydraulic system failures are caused by contaminants in the fluid. Even when no immediate failures occur, high contamination levels can sharply decrease operating efficiency.

Contamination is defined as any substance which is foreign to a fluid system and degrades its optimum performance. Contamination can exist as a gas, liquid or solid. Solid contamination, generally referred to as particulate contamination, comes in all sizes and shapes and is normally abrasive.

High contaminant levels accelerate component wear and decrease service life. Worn components, in turn, contribute to inefficient system operation, seizure of parts, higher fluid temperatures, leakage, and loss of control. All of these phenomena are the result of direct mechanical action between the contaminants and the system components. Contamination can also act as a catalyst to accelerate oxidation of the fluid and spur the chemical breakdown of its constituents.

Filtering a system's fluid can remove many of these contaminants and extend the life of system components.

Filtration = System Protection / Management

Size of Solid Contaminants

The size of solid particle contaminants is commonly measured in micrometers, µm, (usually referred to as microns, µm). A micron is a unit of length equal to one millionth of a meter or about 0.00004 inch. Particles that are less than 40 µm cannot be detected by the human

Figure 2 shows the sizes of some common substances. To gain some perspective, consider the diameters of the following substances:

Substance	Microns	Inches
Grain of table salt	100 µm	0.0039"
Human hair	80 µm	0.0027"
Talcum powder	10 µm	0.00039"
Bacteria (average)	2 um	0.000078"

A micron rating identifies the size of particles that a particular filtration media is designed to remove. For instance, HYDAC 3 µm Betamicron® filter media is rated at β3 ≥ 1000 (also equivalent to the filter media average pore size), meaning that it can remove particles of 3 µm and greater at 99.9% efficiency.

How a System Gets Contaminated

Contaminants come from two basic sources: they either enter the system from outside (ingression) or are generated from within. New systems often have contaminants left behind from manufacturing and assembly operations. Unless they are filtered as they enter the circuit, both the original fluid and make-up fluid are likely to contain more contaminants than the system can tolerate. Most systems ingest contaminants through such components as inefficient air breathers and worn cylinder rod seals during normal operation. Airborne contaminants are likely to gain admittance during routine servicing or maintenance. Also, friction and heat can produce internally generated contamination.

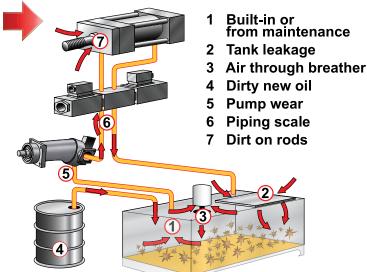


Figure 1. Typical Examples of Wear Due to Contamination



Heavy Wear



Some Wear



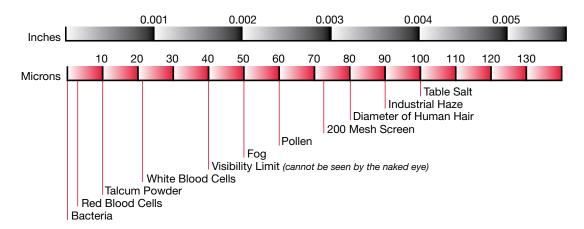
No Wear



Heavy Wear

No Wear

Figure 2. Sizes of known Particles in Inches and Microns



How Contaminants are Measured and Reported - Changes in the Industry

In hydraulic fluid power systems, power is transmitted and contained through a liquid under pressure within an enclosed circuit. These fluids all contain a certain amount of solid particle contaminants. The amount of particulate contaminants present in a hydraulic or lubrication system's fluid is commonly referred to as its cleanliness level.

In 1999, the International Standards Organization (ISO) introduced a series of new fluid cleanliness standards that reflect changes in measuring and defining the cleanliness of fluid systems and the way the size and amount of solid contaminants are reported. These standards are summarized in Table 1.

Table 1. Changes in Industry Standards

Previous	Current 1999	Description
ISO 4406	ISO 4406:1999	ISO Range Code
ISO 4402	ISO 11171	Automatic Particle Counter (APC) calibration procedures (ACFTD to ISO MTD)
ISO 4572	ISO 16889	Multi-pass test reports

The change in calibration procedures (ISO 4402 to ISO 11171) occurred for two reasons. First, the industry developed a new standard test dust for calibration fluid. This new ISO Medium Test Dust (ISO MTD) replaced the previously used AC Fine Test Dust (ACFTD), which is no longer available. Secondly, there has been a change in how particle sizes are measured. By way of newer technologies, particles are now measured in two dimensions, whereas in the past they had been measured using the largest dimension (chord). Older technology was not as precise as it is today, and particle sizes reported were less accurate. Table 2 shows that what used to be classified as a 2 μ particle is now classified as a 4.6 μ (c) particle. The (c) denotes that particle size measurements are certified using an Automatic Particle Counter (APC) which has been calibrated in accordance with ISO 11171.

ISO 11171 calls for the use of ISO MTD dust and changes the way we report the number of particles based on the new distribution of particles in the new standard reference material (SRM2806). Today, the ISO Medium Test Dust and the new calibration standard (11171) are used to synchronize all APC's. This change was made in an effort to reduce variability in tests conducted in different laboratories around the world.

How will these changes affect you?

In comparing the old standards to the new, the following have not changed:

- The amount and the size of solid contamination in your system is still the same!
- · The filters still work the same way!

What has changed:

The way particle size is specified has changed.

The new standards and reporting methods "move the measuring stick" to correct for the inaccurate calibration assumptions made.



Particle Size Definitions -ISO 4402 vs. ISO 11171

This change in the way contaminants are measured had the net effect of changing the classification of the size of the particle.

Table 2. A Comparison of Particle Size Classification

ISO 4402 (ACFTD)	ISO 11171 (ISO MTD)
< 1.0 μm	4.0 μm(c)
1.0 µm	4.2 μm(c)
2 μm	4.6 μm(c)
3 µm	5.1 μm(c)
5 μm	6.4 μm(c)
10 μm	9.8 μm(c)
15 μm	13.6 μm(c)
20 μm	17.5 μm(c)
25 μm	21.2 μm(c)
Previous Size per ISO 4402	Current Size per ISO 11171

Note that the size of the particles is reported differently; i.e., a particle 1.0 μ m in size under ISO 4402 is now considered to be 4.2 μ m(c) in size. Keep in mind that the particles are actually the same size they have always been; we are just using a different ruler.

ISO Scale Numbers -ISO 4406 vs. ISO 4406:1999

ISO 4406:1999 provides guidelines for defining the level of contamination present in a fluid sample in terms of an ISO rating. Due to the change in the specification of particle sizes shown in Table 2, the definition of the ISO scale (or range) numbers needed to be redefined. Tables 3(a) and 3(b) provide a comparison of ISO scale numbers under ISO 4406 and 4406:1999, respectively.

Another change involved the addition of a third scale number to define an ISO rating. Under the old ISO 4406, the ISO scale numbers represented the number of particles greater than or equal to $5 \, \mu m$ and 15 µm in size. The new ISO 4406:1999 uses three scale numbers, representing the number of particles greater than or equal to 4 µm(c), 6 μm(c), and 14 μm(c) in size.

Figure 3(a) shows the graph used to plot particle counts per ISO 4406. When the count of particles ≥5 µm and ≥15 µm in size are plotted, the corresponding ISO rating can be determined graphically. Two micron (2 µm) levels are optional, as they are not a required part of the old ISO 4406 standard.

Similarly, Figure 3(b) shows the graph used to plot particle counts per ISO 4406:1999. This figure shows how 4406:1999 is different from the old ISO 4406 in that it plots the cleanliness level based on the number of particles at the 4 μ m(c)/6 μ m(c)/14 μ m(c) sizes per 1 mL of fluid.

Also, filter companies previously measured the number of particles per 100 mL of sample fluid. Under ISO 4406:1999, we now report the number of particles per 1 mL of sample fluid.

It is important to note that net effect of all these changes keeps the ISO rating relatively unchanged.

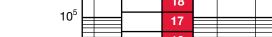


Figure 3(a). Graphing Particle Counts per ISO 4406

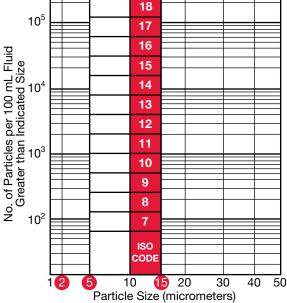
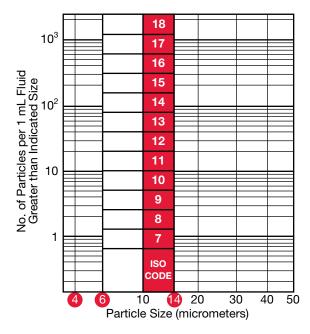


Figure 3(b). Graphing Particle Counts per ISO 4406:1999



Particle Size Diameter Comparison

 $1 \mu m = 0.001 mm = 0.000039 in.$

The human eye can only see particles sized down to 40 microns.

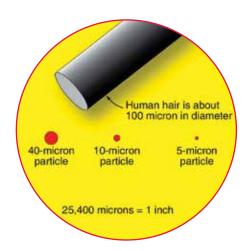


Table 3(a). ISO Code 4406 Hydraulic Fluid Power– Solid Contamination Code

Number of Particle	Scale Number	
More Than	Up to and Including	Scale Number
8,000,000	16,000,000	24
4,000,000	8,000,000	23
2,000,000	4,000,000	22
1,000,000	2,000,000	21
500,000	1,000,000	20
250,000	500,000	19
130,000	250,000	18
64,000	130,000	17
32,000	64,000	16
16,000	32,000	15
8,000	16,000	14
4,000	8,000	13
2,000	4,000	12
1,000	2,000	11
500	1,000	10
250	500	9
130	250	8
64	130	7
32	64	6
16	32	5
8	16	4
4	8	3
2	4	2
1	2	1

Previous ISO codes are commonly made up of 2 scale numbers representing the number of particles ${\ge}5~\mu m$ and ${\ge}15~\mu m$. Showing a third scale number, ${\ge}2~\mu m$ is optional. The left number will always be larger. The scale numbers are defined such that each successive scale is generally a doubling of the previous scale. The particle count can be expressed as the number of particles per mL or per 100 mL, but the ISO range numbers and the ISO codes do not change.

What types of wear are there?

- 1. **Abrasion** caused by particles between reciprocating surfaces.
- 2. **Erosion** caused by particles and high fluid velocity.
- 3. **Adhesion** caused by metal-to-metal friction (loss of fluid).
- 4. **Surface fatigue** surfaces damaged by particles are subjected to repeated stress.
- 5. **Corrosion** caused by water or chemicals.

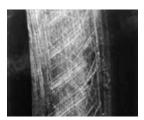
Table 3(b). ISO 4406:1999 Hydraulic Fluid Power– Solid Contamination Code (New)

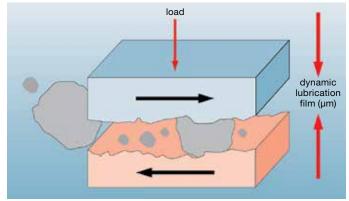
Number of Particle	Caala Namalaa	
More Than	Up to and Including	Scale Number
1,300,000	2,500,000	28
640,000	1,300,000	27
320,000	640,000	26
160,000	320,000	25
80,000	160,000	24
40,000	80,000	23
20,000	40,000	22
10,000	20,000	21
5,000	10,000	20
2,500	5,000	19
1,300	2,500	18
640	1,300	17
320	640	16
160	320	15
80	160	14
40	80	13
20	40	12
10	20	11
5	10	10
2.5	5	9
1.3	2.5	8
0.64	1.3	7
0.32	0.64	6
0.16	0.32	5
0.08	0.16	4
0.04	0.08	3
0.02	0.04	2
0.01	0.02	1
0.00	0.01	0

Current ISO codes are made up of 3 numbers representing the number of particles $\ge 4 \ \mu m(c)$, $\ge 6 \ \mu m(c)$ and $\ge 14 \ \mu m(c)$. The particle count is expressed as the number of particles per mL.

Example Effects of Abrasion:

- Changes to tolerances
- Leakage
- Reduced efficiency
- Particles produced in the system create more wear!





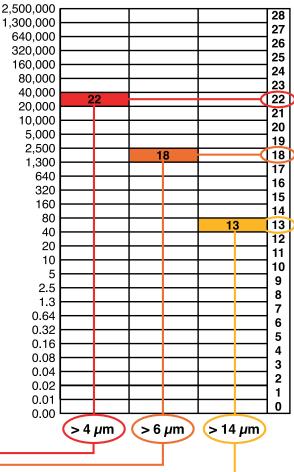
ISO 4406 Code

Cleanliness levels are defined by three numbers divided by slashes (/.) These numbers correspond to 4, 6, and 14 micron, in that order. Each number refers to an ISO Range Code, which is determined by the number of particles for that size (4,6, & 14 μ m) and larger present in 1 ml of fluid. Each range is double the range below. Refer to the chart below to see the actual ranges.

Example:

larger than $4\mu m = 22,340$ larger than $6\mu m = 1,950$ larger than $14\mu m = 43$

ISO Code = $\frac{22}{18} / \frac{13}{13}$



Achieving the appropriate cleanliness level in a system

The only way to achieve and maintain the appropriate cleanliness level in a hydraulic or lubrication system, is to implement a comprehensive filtration program. HYDAC offers all of the products that are needed to monitor and control component and system cleanliness—they include:

Solid Contamination

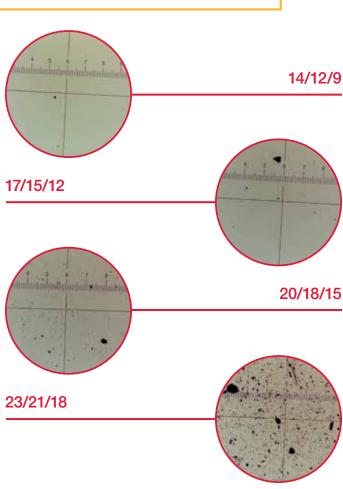
- pressure filters
- return line filters
- offline filtration loops
- oil transfer units for precleaning new oil
- portable and online contamination monitors
- reservoir breathers and filler/breathers

Water Content

- water content sensors
- reservoir breathers with silica gel desiccant
- vacuum dehydration water removal units
- water removal elements

Fluid Analysis

- bottle sampling kits
- complete analysis kits



Cleanliness Levels - ISO 4406 vs. ISO 4406:1999

The following example shown in Figures 4(a) and 4(b) compares the cleanliness level, or ISO rating, of a typical petroleum-based fluid sample using both the previous ISO Code 4406 and the current ISO Code 4406:1999 rating systems.

The fluid sample contains a certain amount of solid particle contaminants, in various shapes and sizes. Figure 4(a) shows a 100 mL sample that contains 300,000 particles greater than 2 μm in size, 20,000 particles greater than 5 μm in size, and 1,500 particles greater than 15 μm in size.

Since the particle count for contaminants size 2 μm and greater falls between 250,000 and 500,000, the first (optional) ISO range (or scale) number is 19 using Table 3(a). The particle count falls between 16,000 and 32,000 for particles greater than 5 μm , so the second ISO range number is 15. The particle count falls between 1,000 and 2,000 for particles greater than 15 μm , so the third ISO range number is 11. Thus, the cleanliness level for the fluid sample shown in Figure 4(a) per ISO 4406 is ISO 19/15/11.

In Figure 4(b), note that 1 mL of fluid (not per 100 mL) is measured per ISO 4406:1999. Also, the amount of particles at the 4 μ m(c)/6 μ m(c)/14 μ m(c) levels are measured instead of at the 2 μ m/5 μ m/15 μ m levels.

The number of 4 μ m(c) particles falls between 2500 and 5000, so the first ISO range number is 19 using Table 3(b). The count for 6 μ m(c) particles falls between 160 and 320 particles, so the second ISO range number is 15. The 14 μ m(c) particle counts falls between 10 and 20, so the third range number is 11. Therefore, the cleanliness level for the fluid sample shown in Figure 4(b) per ISO 4406:1999 is 19/15/11.

Although the ranges for the scale numbers have changed, the resulting ISO Code has not changed.

Figure 4(a). Determining the ISO Rating of a Fluid Using ISO 4406 **Previous**

Sample Fluid 100 mL

Particle Size	Number of Particles		If Particle Count Falls Between	Scale Number is*
≥ 2 µm	300,000 —	—	250,000-500,000	19
≥ 5 µm	20,000 —	—	16,000-32,000	15
≥ 10 µm	4,000		1,000-2,000	11
≥ 15 µm	1,500		*Source: ISO/DIS 44	106
≥ 20 µm	1,000		The Sample Fluid is	ISO 19/15/11.
≥ 30 µm	0.3			optional

Figure 4(b). Determining the ISO Rating of a Fluid Using ISO 4406:1999 **Current 1999**

Sample Fluid 1 mL

Particle Size	Number Particle			If Particle Count Falls Between	Scale Number is*	
≥ 4 µm(c)	3,000	3,000		2,500-5,000	19	
≥ 5 µm(c)	700		7	160-320	15	
≥ 6 µm(c)	200	\		10-20	11	
≥ 10 µm(c)				*Source: ISO 4406:1999		
≥ 14 µm(c)	15			The Sample Fluid is ISO 19/15/11.		
≥ 15 µm(c)						
≥ 20 µm(c)	10					
≥ 30 µm(c)	3					

Required Cleanliness Levels

The pressure of a hydraulic system provides the starting point for determining the cleanliness level required for efficient operation. Table 4 provides general guidelines for recommended cleanliness levels based on pressure.

Low pressure: 0-500 psi (35 bar)
Medium pressure: 500-1500 psi (35-100 bar)
High pressure: 1500 psi (100 bar) and above

Table 4. Cleanliness Level Guidelines Based on Pressure

System Type	Recommended Cleanliness Levels (ISO Code)
Low pressure – manual control	20/18/15 or better
Low to medium pressure – electro-hydraulic controls	19/17/14 or better
High pressure – servo controlled	16/14/11 or better

A second consideration is the type of components present in the hydraulic system. The amount of contamination that any given component can tolerate is a function of many factors, such as clearance between moving parts, frequency and speed of operation, operating pressure, and materials of construction. Tolerances for contamination range from that of low pressure gear pumps, which normally will give satisfactory performance with cleanliness levels typically found in new fluid (ISO 19/17/14), to the more stringent requirements for servo-control valves, which need oil that is eight times cleaner (ISO 16/14/11).

For your convenience, Table 5 provides a cross reference showing the approximate correlation between several different scales or levels used in the marketplace to quantify contamination. The table shows the code levels used for National Aerospace Standard (NAS)1638 and Military Standard 1246A, as well as the new SAE AS4059 standard.

Table 5. ISO Cleanliness Level Correlation

ISO Code 4 μ(c)/6 μ(c)/14 μ(c)NAS 1638 (1967)Mil Std. 1246A (1967)ACFTD Gravimetric Level-mg/LSAE AS4059 Standard21/19/16101120/18/1591019/17/148300918/16/1371817/15/126716/14/12200716/14/115615/13/1040.1514/12/93413/11/82312/10/8100111/10/712	Table 5. 150 Cleanin	ICSS LEV	ei Correi	211011	
20/18/15 9 10 19/17/14 8 300 9 18/16/13 7 1 8 17/15/12 6 7 7 16/14/12 200 7 6 15/13/10 4 0.1 5 14/12/9 3 4 4 13/11/8 2 3 3 12/10/8 100		1638	1246A	Gravimetric	
19/17/14 8 300 9 18/16/13 7 1 8 17/15/12 6 7 16/14/12 200 16/14/11 5 6 15/13/10 4 0.1 5 14/12/9 3 4 13/11/8 2 3 12/10/8	21/19/16	10			11
18/16/13 7 1 8 17/15/12 6 7 16/14/12 200 16/14/11 5 6 15/13/10 4 0.1 5 14/12/9 3 4 13/11/8 2 3 12/10/8 100	20/18/15	9			10
17/15/12 6 7 16/14/12 200 16/14/11 5 6 15/13/10 4 0.1 5 14/12/9 3 4 13/11/8 2 3 12/10/8 100	19/17/14	8	300		9
16/14/12 200 16/14/11 5 6 15/13/10 4 0.1 5 14/12/9 3 4 13/11/8 2 3 12/10/8 100	18/16/13	7		1	8
16/14/11 5 6 15/13/10 4 0.1 5 14/12/9 3 4 13/11/8 2 3 12/10/8 100	17/15/12	6			7
15/13/10 4 0.1 5 14/12/9 3 4 13/11/8 2 3 12/10/8 100	16/14/12		200		
14/12/9 3 4 13/11/8 2 3 12/10/8 100	16/14/11	5			6
13/11/8 2 3 12/10/8 100	15/13/10	4		0.1	5
12/10/8 100	14/12/9	3			4
	13/11/8	2			3
11/10/7 1 2	12/10/8		100		
	11/10/7	1			2

FILTER ASSEMBLIES

Finding the cleanliness level required by a system

Today, many fluid power component manufacturers are providing cleanliness level (ISO code) recommendations for their components. They are often listed in the manufacturer's component product catalog or can be obtained by contacting the manufacturer directly. Their recommendations may be expressed in desired filter element ratings or in system cleanliness levels (ISO codes or other codes). Some typically recommended cleanliness levels for components are provided in table below.

- 1. Starting at the left hand column, select the most sensitive component used in the system.
- 2. Move to the right to the column that describes the system pressure and conditions.
- 3. Here you will find the recommended ISO class level, and recommended element micron rating.

Table 6. Cleanliness Level Required by a System

	Low/Mediun Under 20 (moderate c	000 psi	High Pressure 2000 to 2999 psi (low/medium with severe conditions')		Very High Pressure 3000 psi and over (high pressure with severe conditions')	
	ISO Target Levels	Micron Ratings	ISO Target Levels	Micron Ratings	ISO Target Levels	Micron Ratings
Pumps						
Fixed Gear or Fixed Vane	20/18/15	20	19/17/14	10	18/16/13	5
Fixed Piston	19/17/14	10	18/16/13	5	17/15/12	3
Variable Vane	18/16/13	5	17/15/12	3	not applicable	not applicable
Variable Piston	18/16/13	5	17/15/12	3	16/14/11	3(2
Valves						
Check Valve	20/18/15	20	20/18/15	20	19/17/14	10
Directional (solenoid)	20/18/15	20	19/17/14	10	18/16/13	5
Standard Flow Control	20/18/15	20	19/17/14	10	18/16/13	5
Cartridge Valve	19/17/14	10	18/16/13	5	17/15/12	3
Proportional Valve	17/15/12	3	17/15/12	3	16/14/11	3(2
Servo Valve	16/14/11	3 ⁽²	16/14/11	3 ⁽²	15/13/10	3(2
Actuators						
Cylinders, Vane Motors, Gear Motors	20/18/15	20	19/17/14	10	18/16/13	5
Piston Motors, Swash Plate Motors	19/17/14	10	18/16/13	5	17/15/12	3
Hydrostatic Drives	16/15/12	3	16/14/11	3 ⁽²	15/13/10	3(2
Test Stands	15/13/10	3 ⁽²	15/13/10	3 ⁽²	15/13/10	3(2
Bearings						
Journal Bearings	17/15/12	3	not applicable	not applicable	not applicable	not applicable
Industrial Gearboxes	17/15/12	3	not applicable	not applicable	not applicable	not applicable
Ball Bearings	15/13/10	3(2	not applicable	not applicable	not applicable	not applicable
Roller Bearings	16/14/11	3 ⁽²	not applicable	not applicable	not applicable	not applicable

^{1.} Severe conditions may include high flow surges, pressure spikes, frequent cold starts, extremely heavy duty use, or the presence of water

B10 **HYDAC**

^{2.} Two or more system filters of the recommended rating may be required to achieve and maintain the desired Target Cleanliness Level.

Section 2: Element Technical Data

Performance Specifications / Filtration Rating

HYDAC filter elements meet a wide variety of requirements in today's workplace, from the simplest to the most sophisticated fluid power systems. Established industry standards enable users to select the optimal filter element for any application.

Filter elements are rated on the basis of their ability to remove contaminants of specific targeted sizes from a fluid, under specific operating conditions. Filtration ratings can be measured by analyzing three areas of performance:

- (1) efficiency or filter element Beta rating and resulting percent efficiency,
- (2) dirt holding capacity (DHC), and
- (3) the pressure drop across the element over a range of flow conditions (PQ).

The Multi-Pass Test

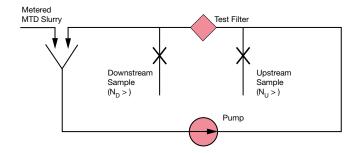
Filter element efficiency ratings and capacities are determined by conducting a multi-pass test under controlled laboratory conditions. This is a standard industry test with procedure published by the International Standards Organization (ISO), the American National Standards Institute (ANSI), and the National Fluid Power Association (NFPA). The multi-pass test yields reproducible test data for appraising the filtration performance of a filter element including its particle removal efficiency under ideal conditions. These test results enable the user to: (1) compare the Beta efficiency, dirt holding capacity, and Beta stability characteristics of elements offered by various filter element suppliers and (2) helps one to select the proper filter element when also evaluating the structural integrity and pleat support system designed to obtain the optimal contamination control level for any particular system under dynamic operating conditions.

Hydraulic fluid (Mil. Spec. 5606) is circulated through a system containing the filter element to be tested. Additional fluid contaminated with ISO MTD Test Dust is introduced upstream of the element being tested. The fluid is monitored upstream and downstream of the test element to determine the element contamination removal efficiency.

$$\beta_{x(c)}$$
 = number of particles upstream/
number of particles downstream

Dirt holding capacity is defined as the total grams of ISO MTD Test Dust added to the system to bring the test filter element to terminal pressure drop. (Alarm Trip Point)

Figure 5. Multi-Pass Test Schematic



Filtration Ratio (Beta) ISO 4572 vs. ISO 16889

Due to the changes in the way particles are measured and the fact that a new test dust (ISO MTD) is now utilized, a new standard for multi-pass testing was necessary. This now current standard, ISO 16889, replaces the old Multi-Pass Test Standard, ISO 4572.

The filtration ratio (more commonly referred to as the Beta ratio) is, in fact, a measure of the particle capture efficiency of a filter element.

ISO 4572 (Old)

 $\beta_x =$ number of particles upstream $\ge x$ microns / number of particles downstream $\ge x$ microns

where x is a specified particle size (in microns).

ISO 16889 (Current 1999)

 $\beta_{x(c)} =$ number of particles upstream $\geq x(c)$ microns / number of particles downstream $\geq x(c)$ microns

where x(c) is a specified particle size (in microns).

Example:
$$\beta_{10(c)} = \frac{7500}{100} = 75$$

This particle capture efficiency can also be expressed as a percent by subtracting the number 1 from the Beta value, dividing by Beta value and multiplying the result by 100:

Beta_{10(c)} efficiency =
$$75 = \frac{(\beta - 1)}{\beta} \times 100$$

Beta_{10(c)} efficiency =
$$\frac{(75-1)}{75}$$
 x 100 = 98.667%

The example is read as "Beta ten is equal to 75, where 7500 particles, 10 microns and larger, were counted upstream of the test filter (before) and 100 particles, 10 microns and larger, were counted downstream of the test filter (after)."

The filter element tested was 98.667% efficient in removing particles 10 microns and larger.

Percent Efficiency

To calculate a filter element's percent efficiency, subtract 1 from the Beta, divide that answer by the Beta, then multiply by 100.

Table 7. Filter Element Percent Efficiency

Example Per ISO	e 4572 (old):	Example Per ISO 16889 (new):
Step 1:	$\beta_{10} \geq 75$	$B_{10(c)} \ge 75$
Step 2:	75 -1 = 74	75 -1 = 74
Step 3:	74 ÷ 75 = 0.987	$74 \div 75 = 0.987$
Step 4:	0.987 x 100 = 98.7%	0.987 x 100 = 98.7%

Using a calculator with a % key, you can use the shortcut version.

Example	e Per ISO 4572 (old):	Example Per ISO 16889 (new):
Step 1:	$\boldsymbol{\beta}_{10} \geq 200$	$\beta_{10(c)} \ge 200$
Step 2:	200 -1 = 199	200 -1 = 199
Step 3:	199 ÷ 200 = 99.5%	199 ÷ 200 = 99.5%

Filter Beta Rating

ISO 16889 replaces ISO 4572 as the International Standard for Multi-pass Testing. It provides a common testing format for filter manufacturers to rate filter element performance. For convenience, Betas are shown in this catalog for both old and new Multi-pass standards (ISO 4572 and 16889, respectively.)

According to ISO 16889, each filter manufacturer can test a given filter element at a variety of flow rates and terminal pressure drop ratings that fit the application, system configuration and filter element size. Results may vary depending on the configuration of the filter element tested and the test conditions.

Currently, there is no accepted ISO, ANSI, or NFPA standard regarding "absolute" ratings. Filter manufacturers have generally adopted an industry standard using $\beta_{x(c)} \ge 75$ (98.7% efficiency) as a minimum efficiency to rate an element as a high efficiency depth filter media. Filter manufacturers generally rate their high efficiency elements as $\beta_{x(c)} \ge 100$ (99.0% efficiency), $\beta_{x(c)} \ge 200$ (99.5% efficiency), or $\beta_{x(c)} \ge 1000$ (99.9% efficiency). Performance of HYDAC elements is typically a minimum rating of $\beta_{x(c)} \geq 1000,$ with high dirt holding capacities and lower pressure drops in optimum balance to meet the dynamics and stresses of all applications.

Dirt Holding Capacity

Dirt holding capacity (DHC) is the amount of contaminant (expressed in grams) the element will retain before it goes into alarm (terminal pressure). All other factors being equal, an element's DHC can provide indication of how long the element will last until full. This characteristic, taken into context with a structural and pleat support evaluation will provide good indication of what element should last longer in system operation.

Dirt holding capacity, sometimes called "apparent capacity," is a very important and often overlooked factor in selecting the right element for the application. The dirt holding capacity of an element is measured in grams of ISO medium test dust contaminant as determined from the multi-pass test (ISO 16889), and measured at the terminal ΔP (alarm point). When selecting filter elements, it is beneficial to compare the dirt holding capacities of elements with similar particle removal efficiencies and good structural and pleat support characteristics.

Pressure Drop

When sizing a filter, it is important to consider the initial differential pressure (ΔP) across the element and the housing. Elements offering a lower pressure drop at a high Beta efficiency are better than elements with a high ΔP at the same efficiency. At every level of filtration, HYDAC Betamicron® media elements offer a superior combination of high efficiency, high dirt holding capacity, and low pressure drop with the media support design that provides the highest levels of performance under dynamic fluid conditions.

Collapse Rating

The collapse rating of a filter (determined by ISO 2941/ANSI B93.25) represents the differential pressure across the element that causes the media to fail. The collapse rating of an element should be on the order of 3 times higher than the filter bypass setting. The collapse rating for filter elements used in filter housings with no bypass valve should be at least the same as the setting of the system relief valve upstream of the high collapse element. When a collapsed element becomes clogged with contamination all functions downstream of the filter will become inoperative due to the release of high levels of contamination to the critical hydraulic components -Loss of Protection.

Element Selection

The Right Media for the Right Application = Job Matched Filtration

Filtration Application Guidelines

Selecting the proper HYDAC media for your application is easy if you follow these simple guidelines.

- Step 1. Remember that the key to cost effective contamination control is to maintain the system's cleanliness at the tolerance level of the system's most sensitive component. So, the first step is to identify the most sensitive component.
- **Step 2.** Determine the desired cleanliness level (ISO Code) for that component by referring to Table 5 (in this Overview) by reference to the customer's component manuals or by contacting the component manufacturer directly.
- Step 3. Referring to Table 8 identify the HYDAC filter medium that will meet or exceed the desired cleanliness level.
- **Step 4.** Remember to regularly check the effectiveness of the selected media through the use of contamination monitoring tools and equipment.

Table 8. HYDAC Element Media Recommendations Oil cleanliness to ISO 4406 Filtration rating x ($\beta_{x(c)} >= 200$)

Desired Cleanliness Levels (ISO Code 4406)	HYDAC Media
19/16/13 to 22/19/16	25 μm
18/15/12 to 21/18/15	20 μm
17/14/11 to 20/17/14	15 μm
15/12/9 to 19/16/13	10 μm
12/9/6 to 17/14/11	5 μm
10/7/4 to 13/10/7	3 μm

Effect of Dirt Ingression

Filter element life varies with the true dirt holding capacity of the element under dynamic flow conditions and the amount of dirt introduced into the circuit. The rate of this dirt ingression in combination with the desired cleanliness level should be considered when selecting the media to be used for a particular application.

The amount of dirt introduced can vary from day to day and hour to hour, generally making it difficult to predict when an element will become fully loaded. This is why we recommend specifying a filter indicator.

Filter indicators provide a vital measure of protection for your system by indicating when the filter element needs to be changed or cleaned. HYDAC filters are available with visual, electrical and electrical-visual combination filter indicators. These indicators may also be purchased as separate items.

Amount of Fluid Filtered

To obtain the desired cleanliness level (ISO Code) using the suggested HYDAC filter medium, it is recommended that a minimum of one-third of the total fluid volume in the system pass through the filter per minute. If fluid is filtered at a higher flow rate, better results may be achieved. If only a lesser flow rate can be filtered, a more efficient media may be required.

Systems operating in a clean environment, with efficient air-breather filters and effective cylinder rod wiper seals, may achieve the desired results at a lower turnover rate. Systems operating in a severe environment or under minimal maintenance conditions should have a higher turnover. Turnover must be considered when selecting the location of the system's filter(s).

Sizing a Filter Element

Since the pressure drop versus flow data contained in our filter catalog is for fluids with a viscosity of 141 SUS (30 cSt), and a specific gravity of 0.86, we are often asked how to size a filter with a viscosity other than 141 SUS (30 cSt) or a specific gravity other than 0.86. In those instances where the viscosity or specific gravity is significantly higher, it may be necessary to use a larger element. To make this determination, we need to calculate the life of the element, using the following equation:

$$EL = IA - (H + E)$$

Where:

EL = Element Life (expressed in psi)
H = Housing pressure drop
IA = Indicator Alarm trip point
E = Element pressure drop

- The housing pressure drop can be read directly from a graph. This
 value is not significantly affected by viscosity or the number of
 elements in the housing, since housing flow is turbulent.
- 2. The element pressure drop is directly proportional to viscosity, influenced by high pressure since element flow is laminar.

A "rule of thumb" for element life, as calculated from the above equation, is to work towards a filter assembly differential pressure drop that is typically no greater than 20% of alarm trip setting.

Table 9. Typical Pressure Drop Maximum Targets for Filter sizing:

Max. Pressure Drop	Туре
10 – 15 psid	Pressure Filters
4 – 8 psid	Return Filters
2 – 6 psid	Lube Systems

Filter assembly differential pressure should never exceed 50% alarm trip point even in most demanding applications.

The interval between element change-outs can be extended by increasing the total filter element area. Many HYDAC filters can be furnished with one, two, or three elements or with larger elements. By selecting a filter with additional element area, the time between servicing can be extended for minimal additional cost.

FILTER ASSEMBLIES

Fluid Compatibility: Fire Resistant Fluids

HYDAC filters have been used successfully to filter a variety of fire resistant fluids. Filtering these fluids requires careful attention to filter selection and application. Your fluid supplier should be the final source of information when using these fluids. The supplier should be consulted for recommendations regarding limits of operating conditions, material and seal compatibility, and other requirements peculiar to the fluid being used within the conditions specified by the fluid supplier.

High Water Content Fluids

High water base fluids consist primarily of two types: water and soluble mineral base oil, and water with soluble synthetic oil. The oil proportion is usually 5%, but may vary from as low as 2% to as high as 10%.

Standard HYDAC US manufactured Betamicron® elements are compatible with both (HFA & HFC) types of high water content fluids. Filter sizing is accomplished the same as it is done with other mineral based hydraulic fluids. Some special factors that need to be considered in the selection process include the following:

- All aluminum in the filter housing should be high water based tolerant or anodized.
- Buna N or Viton seals are recommended, subject to manufacturer stated compatibility.
- The high specific gravity and low vapor pressure of these fluids create a potential for severe cavitation problems. Suction filters or strainers should not be used with these fluids.

Invert Emulsions

Invert emulsions consist of a mixture of petroleum based oil and water. Typical proportions are 60% oil to 40% water. Standard HYDAC filters with 10 µm and 25 µm media elements are satisfactory for use with these fluids. Filters should be sized conservatively for invert emulsions. These fluids are non-Newtonian - their viscosity is a function of shear. We recommend up to twice the normal element area be used as space and other conditions permit.

Some special factors that need to be considered in the selection process include the following:

- Potential exists for cavitation problems with invert emulsions similar to high water based fluids.
- Buna N or Viton seals are recommended, subject to manufacturer stated compatibility.

Water Glycols

Water glycols consist of a mixture of water, glycol, and various additives. HYDAC Betamicron® filter elements are compatible for use with these fluids. Some special factors that need to be considered in the selection process include the following:

- All aluminum in the filter should be water tolerant or anodized.
- Potential exists for cavitation problems with water glycols similar to high water based fluids.
- Buna N or Viton seals are recommended, subject to manufacturer stated compatibility.

Phosphate Esters

Phosphate esters are classified as synthetic fluids. All HYDAC filters and elements can be used with most of these fluids. Sizing should be the same as with mineral based oils of similar viscosity. Some special factors that need to be considered in the selection process include the following:

- Use any Betamicron® media with EPR or Viton seals if required by fluid manufacturer for phosphate esters.
- Use S0103H (low collapse) or S0155H (high collapse).

Pressure Drop Correction for Specific Gravity (filter housing)

Filter housing pressure drop curves shown in this catalog are predicated on the use of petroleum based fluid with a specific gravity of 0.860. The various fire resistant fluids discussed in this section have a specific gravity higher than 0.860, which affects pressure drop. Use the following formula to compute the correct pressure drop for the higher specific gravity:

Corrected pressure drop =

Fluid specific gravity x Catalog pressure drop

Section 3: Filter Selection Considerations

Filter Location

Pressure filtration: Pressure filters usually produce the lowest system contamination levels to assure clean fluid for sensitive high-pressure components and provide protection of downstream components in the event of catastrophic failures. Systems with high intermittent return line flows may need only be sized to match the output of the pump, where the return line may require a much larger filter for the higher intermittent flows. See Figure 6(a).

Return line filtration: Return line filters are often considered when initial cost is a major concern. A special concern in applying return line filters is sizing for flow. Large rod cylinders and other components can cause return line flows to be much greater than pump output. Return lines can have substantial pressure surges, which need to be taken into consideration when selecting filters and their locations. See Figure 6(b).

Re-circulating (kidney loop) filtration: While usually not utilized as a system's primary filtration, re-circulating, or off-line, filtration is often used to supplement in-line filters when adequate turnover cannot be obtained with the inline filter. It is also often an ideal location in which to use a water removal filter. See Figure 6(c).

Suction filtration: High efficiency suction filters are not recommended for open-loop circuits. The cavitation these filters can cause far outweighs any advantage obtained by attempting to clean the fluid in this part of the system.

Breather filtration: Efficient filter breathers are required for effective contamination control on nonpressurized reservoirs and should complement the liquid filtration component.

Multiple filtration: For systems incorporating large total fluid volumes, it may be necessary to employ filters in more than one location. Multiple pressure filters, pressure and return line filters, and recirculating filters are examples of multiple filtration applications.

Figure 6(a). Pressure Filtration Circuit

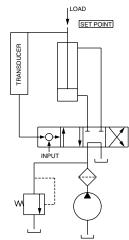


Figure 6(b). Return Line Filtration Circuit

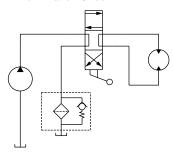
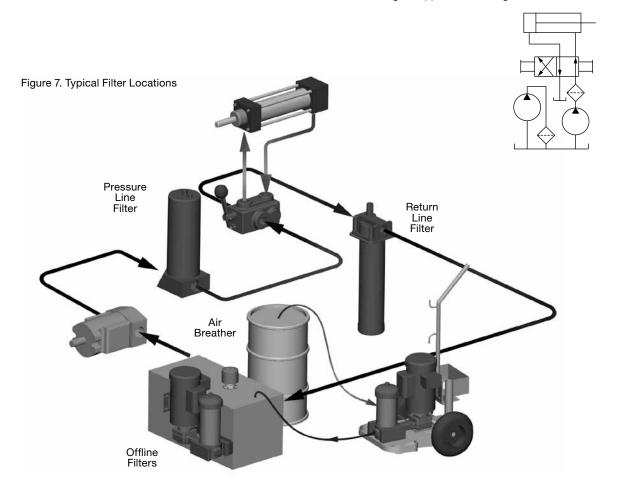


Figure 6(c). Re-circulating Filtration Circuit



FILTER ASSEMBLIES

Seven Steps to Selecting a Filter

It is important to keep in mind that all system components have some tolerance for contamination. The key to cost effective contamination control is to maintain the system's cleanliness level at the tolerance level of the most sensitive component. Once the desired cleanliness level (ISO code) is determined, designing and selecting a cost effective filtration system can be readily accomplished.

1. Determining desired cleanliness level Step 1. Determine the most sensitive component in the system. Then, determine the desired

cleanliness level (ISO code) by using Tables 4 and 5 (in this Overview), review of component manuals or

by contacting the component manufacturer directly.

Operating pressure levels and system environmental conditions also have a bearing on cleanliness

requirements.

2. Selecting correct medium Step 2. Using Table 9 (in this Overview, respectively), identify the proper HYDAC filter media rating to

3. Where to filter Step 3. Determine where to locate the filters, using the information on "Filter Location" (Section 3, in

this Overview).

4. Selecting filter housing Step 4. Refer to Filter Products in the Table of Contents or the Quick Reference Guide and the

individual filter catalog pages to select the specific filter housing that will meet the requirements set forth in Steps 2 and 3 above, as well as the pressure and flow parameters where the particular filter

will be located.

Consideration should also be given to installation convenience for your particular application. Use

the filter selection charts shown on the catalog pages to determine the specific filter model number

for the desired media rating at the required flow rate.

Step 5. For nonpressurized reservoirs, refer to the HYDAC Accessories Catalog to select the 5. Selecting filter breather

appropriate filter breather.

6. Contamination control practices Step 6. Implement the appropriate manufacturing, assembly, and maintenance contamination

control procedures. Effective contamination control is achieved through the conscientious use of sound manufacturing and maintenance practices. Some examples are: filtering make-up oil; controlling contamination ingestion during manufacturing, assembly, maintenance, and repair

processes; and properly maintaining cylinder wiper seals.

Step 7. Check all filtration systems to determine if the results expected are obtained and maintained 7. Verifying results

during system operation, as operating conditions and maintenance practices may not remain constant. Take periodic fluid samples on a regular basis to monitor cleanliness, water content and variations on amounts of wear metals. HYDAC distributors and field representatives have access to contamination monitoring equipment that can determine the exact cleanliness level (ISO code) of your system on the spot. Contact your HYDAC distributor or phone us for complete details.

Rated Fatique Pressure

The application of individual filters should take fatigue ratings into consideration when there are flow or pressure variations creating pressure peaks and shock loads.

Typical hydraulic systems that use highly repetitive operations include plastic injection molding machines, die-cast machines, and forging and stamping press systems. In these and other similar applications, rated fatigue pressure should be considered when selecting a filter.

The National Fluid Power Association has introduced a method (NFPA T2.6.1) for verifying the fatigue pressure rating of the pressure-containing envelope of a metal fluid power component. In this method, components are cycled from 0 to test pressure for 1 million cycles (10 million cycles is optional). The rated fatigue pressure (RFP) is verified by testing. We establish the desired RFP from design, then we calculate the cycle testing pressure (CTP), and then conduct tests at CTP per 1,000,000 cycles.

The T2.6.1 Pressure Rating document is available from the National Fluid Power Association, 3333 N. Mayfair Road, Milwaukee, WI 53222-3219.

The NFPA has established that the maximum allowable Work Pressure is equal to the Rated Fatigue Pressure (RFP).

Sizing HYDAC Filter Assemblies

To properly size and calculate the pressure drop across a filter for a particular application the following procedures should be strictly followed: Assembly pressure drop (ΔP) is the sum of the ΔP across the filter housing plus the ΔP across the filter element. This simple formula is shown below:

 ΔP Filter Assembly = ΔP Housing + ΔP Clean Element

To calculate a filter assembly ΔP we must first know the specifics of the application.

To calculate the ΔP across the housing we must know the flow rate and specific gravity of the fluid we wish to filter. A chart is provided in each of the product pages that provides a curve outlining the pressure drop across the housing based upon the flow in GPM (gallons per minute). This data must then be adjusted if the specific gravity is at a lower or higher point than the test Hydraulic Fluid (0.86). The formula for calculation of the housing ΔP is shown as follows:

 ΔP Housing = ΔP (From Curve in catalog) x Actual Specific Gravity

To calculate the ΔP across the element additional information is required. This will include the **viscosity** of the fluid (at operating temperature), required **filtration rating in \mu m** (microns), **type of element** (High collapse -BH or Low collapse -BN), and **K** (coefficient) factor from the attached conversion tables. With this information the following formula is used to calculate ΔP across the element. Again the specific gravity and viscosity (standard hydraulic fluid figured at a viscosity of 141 SSU - Saybolt Universal Seconds - 30 centistrokes) will change the ΔP .

 $\triangle P$ Clean Element = $\frac{Flow \ Rate \ GPM \ X \ Element \ K \ factor}{or \ (\triangle P \ from \ element \ curve)} x \frac{Actual \ Specific \ Gravity}{0.86} x \frac{Actual \ Viscosity \ in \ SSU}{141}$

EXAMPLE - an application with the following criteria would be sized as shown.

Conditions: Fluid – Hydraulic Oil (ISO-32) Flow Rate – 30 GPM

Specific Gravity – 0.86Max. Operating Pressure – 4,500 psiViscosity – 141 SSUNormal Operating Pressure – 4,000 psiMicron Rating - 10μmBypass - YES (Low collapse element)

Fluid Temperature - 104°F normal Viscosity = 141 SUS @ 104°F

Filter Type Selected - Pressure Filter

HYDAC Model No. DF ON 240 TE 10 D 1.0 / 12 V -B6

HOUSING

 Δ P Housing = Δ P Calculation (From Curve in catalog) x Actual Specific Gravity 0.86

 ΔP Housing = 1.5 psid x $\frac{0.86}{0.86}$ = 1.5 psid

ELEMENT

ΔP Clean Element = ΔP Calculation x Actual Specific Gravity x Actual Viscosity 0.86 x 141 SSU

 Δ P Clean Element = 30 GPM x 0.175 x $\frac{0.86}{0.86}$ x $\frac{141 \text{ SSU}}{141 \text{ SSU}}$

 Δ P Clean Element = 5.25 x 1 x 1 = 5.25 psid

FILTER ASSEMBLY

 Δ P Filter Assembly = Δ P Housing + Δ P Clean Element 1.5 psid + 5.25 psid = 6.75 psid on Table 9 (in this Overview)

NOTE:

A change in the fluid can make a significant difference in the pressure drop across a filter assembly. A second calculation for the element (ΔP) should be done at the lowest temperature condition (cold start) to determine how the filter will operate under these severe conditions with significantly higher viscosity.

See the next page for Cold Start Calculation.

FILTER ASSEMBLIES

EXAMPLE - an application with the following criteria would be sized as shown. (Cold Start Condition)

Conditions: Fluid – Hydraulic Oil (ISO 32) Flow Rate – 30 GPM

Specific Gravity - 0.86Max. Operating Pressure - 4,500 psiViscosity - 400 SSUNormal Operating Pressure - 4,000 psi

Micron Rating - 10μm Bypass - YES (Low collapse element)

Fluid Temperature - 32°F cold Viscosity @ Cold Start = 1350 SUS @32°F

Filter Type Selected

HYDAC Model No. DF ON 240 TE 10 D 1.0 / 12 V - B6

HOUSING

ΔP Housing = ΔP Calculation (From Curve in catalog) x Actual Specific Gravity 0.86

 ΔP Housing = 1.5 psid x $\frac{0.86}{0.86}$ or (1.0) = 1.5 psid

ELEMENT

 ΔP Clean Element = ΔP Calculation x $\frac{Actual Specific Gravity}{0.86}$ x $\frac{Actual Viscosity}{141 SSU}$

 Δ P Clean Element = 30 GPM x 0.175 x $\frac{0.86}{0.86}$ x $\frac{1350}{141}$ SSU

 ΔP Clean Element = 5.25 x 1.0 x 9.6 = 50.40 psid

FILTER ASSEMBLY

 ΔP Filter Assembly = ΔP Housing + ΔP Clean Element

1.5 psid + 50.40 psid = 51.90 psid (Almost 8 times normal clean assembly ΔP)

NOTE

When the element is partially loaded with some contamination and the system is cold started, the indicator may trip or possibly go into bypass, until the fluids in the system warm up. This information is relative and important for our customers to understand as they operate their systems under diverse conditions. This additional performance data helps our customers to define their system operating procedures, assist in component selection and finalize design.

Additional Filter Sizing Considerations for Industrial Machines by Flow Rate

1. Initial filter assembly clean differential pressure drop <20 - 30% of indicator trip pressure at average flow

EXAMPLE - DF 330: Indicator Trip Pressure is 72 psid

Yomax assembly pressure drop with clean element: 72 psid x 0.25 = 18 psid

2. Check pressure drop at maximum flow (especially when cylinders used)

If pressure drop at maximum flow is >50% of indicator trip pressure use one size larger. Check again if pressure drop is now <50%.

3. Check behavior under cold start conditions

If you have a lot of cold starts or work with cold oil chose one size larger.

4. Make sure that the port size is large enough to handle the flow

Suction	Return	Pressure	Pressure	Pressure
	Line	<1,500 psi	<4000 psi	<6000 psi
15 ft/sec	15 ft/sec	15 ft/sec	26 ft/sec	40 ft/sec

5. Always contact Product Management to double check

Additional Filter Sizing Considerations for Mobile Machines by Flow Rate

1. Initial filter assembly clean differential pressure drop <20-30% of indicator trip pressure at average flow

EXAMPLE - RFM 270: Indicator Trip Pressure is 29 psi
%max assembly pressure drop with clean element: 29 psi x 0.25 = 7.25 psi

2. Check pressure drop at maximum flow (especially when cylinders are used)

If pressure drop at maximum flow is >50% of indicator trip pressure use one size larger. Check again if pressure drop is now <50%.

3. Check behavior under cold start conditions

If you have a lot of cold starts or work with cold oil choose one size larger.

4. Make sure that the port size is large enough to handle the flow

Return	Pressure	Pressure	Pressure
Line	<1,500 psi	<4000 psi	<6000 psi
15 ft/sec	15 ft/sec	26 ft/sec	

5. Always contact Product Management to double check

FILTER ASSEMBLIES

Filter Applications Worksheet

Name:		*Title:	
Company:		*Email:	
Address:		State: Zip:	
Phone:	Mobile:	Fax:	
End User System App	olication	*Special Operating Requirements (reverse flow, bidirectional flow duplex, or other special requirements)	
*System Critical Com	nononte	Mounting Orientation & Port Configuration	
(i.e. Servo's, Proportional Valves)	ponents	Inlet	
		Outlet	
		Inlet/Outlet Configuration (i.e. inline, side inlet/bottom outlet)	
*Fluid Operating Tem	perature Range		
From:	°F	Filter Changeout Access # 1 1 1 1	
То:	°F	Filter Changeout Access (i.e. top or bottom)	
*Ingested Dirt Levels	(check one)		
Heavy Medium Light			
*Clean Filter Different	ial Pressure Limit		
	psid (typically 40%-50% Indicator trip setting)	Bypass Requirements 87 43 25 15 3 (psid) Non Bypass KB	
*ISO/NAS Cleanliness	Target Level	*Indicator Requirements (check one)	
	_	□ B □ BM □ C □ D □ E/ES □ F □ G □ GC □ GW □ H □ J □ J4 □ K □ LE □ LZ □ UE □ UF □ UG □ V □ Other	
*Maximum Operating		Supply Voltage (LED for D Indicators):	
***	psi	☐ Diff. Pressure ☐ Static ☐ Vacuum	
*Nominal Operating F	ressure	(check one) Indication	
	psi	*Filtration Rating Requirements	
*Filter Flow Rate Nom	ninal / Maximum	Micron Rating	
	gpm nominal	Depth / Surface	
	gpm maximum	Element Media	
*Hydraulic Fluid		ISO Cleanliness Target	
Manufacturer	Туре	System Maintenance Comments	
Designation		(Sampling/changeout frequency, maintenance practices)	
Viscosity @ nominal SUS	Cs		
Viscosity @ cold start SUS	Cs		
Specific Gravity			

*Required Information to properly quote.



Overview of Elements

FILTER ELEMENTS

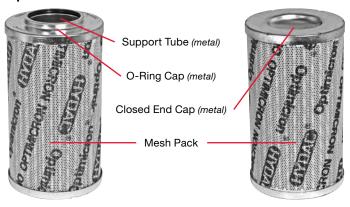
Overview of Elements

Optimicron® Elements

- ON code designation
- Glass fiber, multi-layered with support
- Collapse rating 290 psid (20 bar)
- 1, 3, 5, 10, 15, 20 micron
- Filtration Rating β_{x(c)} ≥ 1000
- Depth Filtration
- Pressure and Return elements available
- Disposable single use element
- Plastic outerwrap

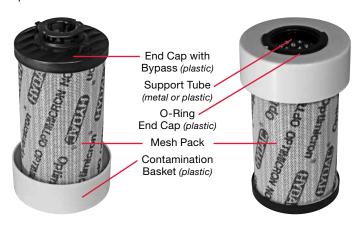


Optimicron® Pressure Element



Optimicron® Return Element

Return filters include Bypass in the endcap - insures proper bypass operation at all times.



Optimicron® Power Elements

• ON/PO - code designation

Element Construction

- Synthetic Fiber, multi-layered with support
- All Plastic Construction
- Collapse Rating 145 psid
- 3, 5, 10, 20 micron
- Stat-Free Technology included
- Depth Filtration
- Disposable single use element
- Plastic outerwrap
- API 614 Approved



1. Wire mesh

2. Integrated

3. Downstream

4. Main filter

5. Pre-filter

6. Upstream

protective layer

7. Optimized element drainage

8. Multi-Protection

cover

drainage layer

protective layer

Optimicron®





Stat- X® Elements

- XSX- code designation
- Electrostatic charge and discharge protection
- Hybrid fiber construction, multi-layered support
- Suitable for cold start applications
- 3, 5, 10, 20 μm
- Critical systems applications i.e.
 Conductivity <100 pS/m, Hydraulic Load > 0.01 L/min/cm2
- Depth Filtration
- Disposable





Betamicron® Elements

- BN4HC Low Collapse (290 psid)
- BH4HC High Collapse (3045 psid)
- Fiberglass, Non-Woven
- 1, 3, 5, 10, & 20 micron
- Filtration Rating $\beta_{x(c)} \ge 1000$
- High Beta Stability
- Structurally Designed for Dynamic Flow Conditions
- Collapse Rating 290 psid
- Depth Filtration
- Disposable



Betamicron® / Aquamicron® Combination Elements

- BN4AM code designation
- Collapse Rating 145 psid
- Undissolved (free) Water Removal ONLY!
- 3 & 10 micron
- Filtration Rating β_{x(c)} > 200
- Depth Filtration
- Disposable



ECOmicron® Elements

- · ECON2 code designation
- Fiberglass
- All Plastic Construction
- Collapse Rating 145 psid
- 3, 5, 10, & 20 micron
- Filtration Rating β_{x(c)} ≥ 1000
- Depth Filtration
- Disposable



Aquamicron® Elements

- AM code designation
- · Collapse Rating 145 psid
- Undissolved (free) Water Removal ONLY!
- 40 micron
- Surface filtration
- Disposable



Wire Mesh Elements

- W/HC code designation
- Wire Mesh
- · Collapse Rating 290 psid
- 25, 50, 100, 200 micron
- Surface Filtration
- Cleanable
- Corrosion protection Stainless Steel filter media and Tin/Nickel plated hardware



Polyester Elements

- P/HC code designation
- Polyester media plastic coating eliminates swelling
- Collapse Rating 145 psid
- 10 & 20 micron
- Surface Filtration
- Disposable
- Higher contamination retention than cellulose
- Low flow resistance = low ΔP/Q
- Media supported by wire mesh



Metal Fiber Elements

- V code designation
- Stainless Steel media;
 Tin plated steel hardware
- · Collapse Rating 3045 psid
- 3, 5, 10, & 20 micron
- High Efficiency Rated available on request 1, 3, 5, 10, & 20 micron (Depth filtration optional)
- Surface Filtration (standard)
- Cleanable
- High filtration efficiency curve even under extreme dynamic loads
- Low flow resistance = low ΔP/Q



Mobilemicron Elements

- MM code designation
- Melt blown Fiberglass
- Extremely low clean element ΔP / flow rate for cold start applications
- Filtration Efficiency Rating β_{y(c)} ≥ 200
- 8, 10, 15 micron
- Good Beta Stability
- Good Dirt Holding Capacity
- Collapse Rating 145 psid
- Depth Filtration
- Disposable





Optimicron® Series

Energy efficient filtration







Description

The Optimicron filter elements have been optimized with respect to filtration performance and energy efficiency. These elements offer the best optimization of separation efficiency, service life and differential pressure versus flow rate.

As a complete element package, the innovative characteristics of the HYDAC technology has a very positive impact on the differential pressure of the elements and high degree of filtration efficiency and performance.

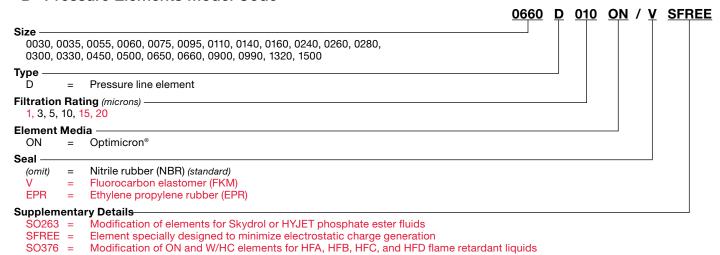
Features

- Unique HELIOS pleat geometry optimizes media area open to flow to calm the flow in areas between pleats reducing ΔP.
- Outer wrap perforations insure optimized flow onto the filter pleats and help to minimize pressure losses.
- Outer wrap perforations also help to distribute the fluid incidence stresses evenly in the axial and radial directions and thus increase tear resistance.

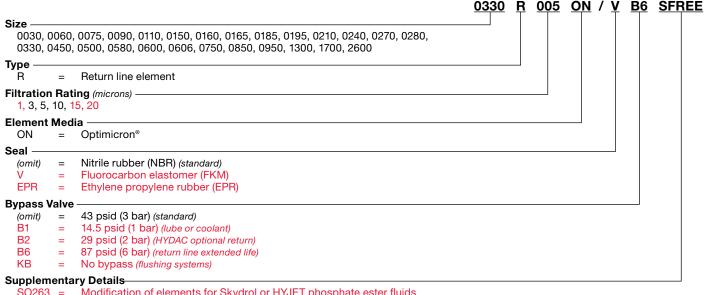
Technical Specifications

Collapse Rating	290 psid (20 bar)			
Temperature range	-22°F to 212°F (-30°C to 100°C)			
Flow direction	outside to inside			
Category	Disposable - single use			
Bypass Cracking Pressure				
R (only) = 43 psid (3 bar) (standard, others available)				

"D" Pressure Elements Model Code



"R" Return Elements Model Code

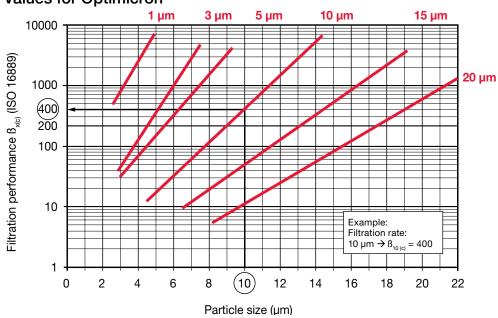


Modification of elements for Skydrol or HYJET phosphate ester fluids SO263 = SFREE = Element specially designed to minimize electrostatic charge generation

SO376 =Modification of ON and W/HC elements for HFA, HFB, HFC, and HFD flame retardant liquids

Model Codes Containing Red are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Beta Ratio (B) Values for Optimicron



Optimicron® Power Series

Optimized Elements in Power Stations







Description

Optimicron Power elements have been developed to both meet the heavy demands of power plant applications and comply with API-614 specifications. The elements are designed to meet stringent requirements of applications such as turbine lubrication, hydraulic turbine lift systems, and rotary compressors. Key considerations for this type of filtration are low resistance to flow (low differential pressures through the elements) and safety with regard to electrostatic discharge. This element incorporates Stat-Free® technology which safeguards and inhibits the dangerous generation of static electricity (ESD) which can cause fires and destroy sensitive electronic components and sensors.

As a complete element package, the innovative characteristics of this new technology provide low energy losses, and the compact nature of the element assures better conditioning of the flow. This homogenous flow results in better access to the contaminates and more efficient usage of the surface areas to better filter the contamination.

Features

- API 614 compliant
- Glass fiber media, single-layer with support
- Innovative outer wrap with increased strength & better diffuser effect = homogenous flow
- Integrated Stat-Free® technology
- Low collapse only 145 psid (10 bar)

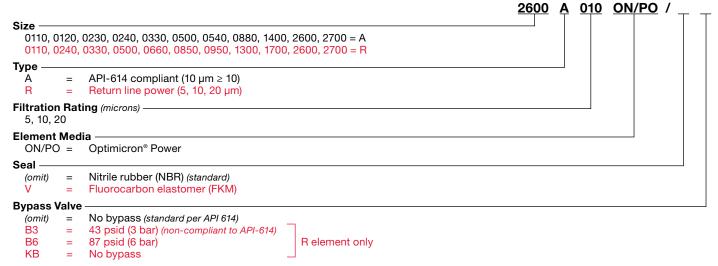
Technical Specifications

Collapse Rating	145 psi (10 bar)			
Temperature range	-22°F to 212°F (-30°C to 100°C)			
Flow direction	outside to inside			
Filtration Rating	5, 10, 20 μm			
Category	Disposable - single use			
Compatibility with hydraulic fluids Mineral oils: Test criteria to ISO 2943 Lubricating oils: Test criteria to ISO 2943				
Bypass Cracking Pressure				

No bypass (standard per API 614)

43 psid (3 bar) (optional) - Others available for non-API applications

Model Code



Supplementary Details

Optimicron® Power was developed including integrated Stat-Free® technology. It will replace all elements labeled with G/HC/-SFREE. This change also applies to filter housings currently using G/HC/-SFREE elements.

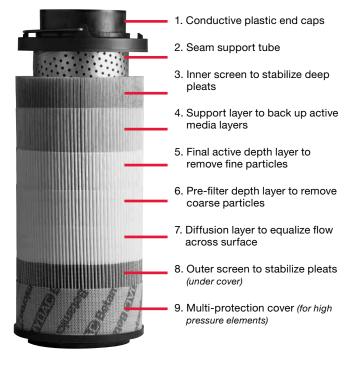
Model Codes Containing Red are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Betamicron® Series

High Pressure and Return Filter Elements



Element Construction



Description

Betamicron® filter elements have been optimized with respect to filtration performance, in fluid cleanliness, lower $\Delta P/Q$, pleat and element protection while handling and operating, and high stability level throughout its life. These elements offer a superior level of optimization of separation efficiency, service life and differential pressure versus flow rate.

As a complete element package, the innovative characteristics of this technology have a very positive impact on the differential pressure of the elements and a high degree of filtration efficiency and performance.

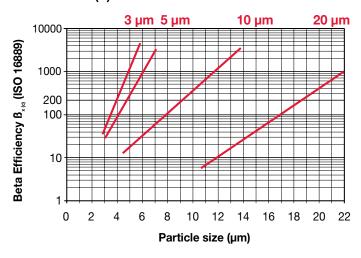
Features

- Optimized mesh pack structure maximizes the media area available to capture dirt particles and minimizes resistance to fluid flow. Optional SFREE mesh pack insures that static electricity will not be generated to dangerous levels where arcing can result.
- Improved performance (optimized Beta efficiency, contamination retention, ΔP/Q characteristics and Beta stability) and lowered weight due to plastic spiral lock seam support tubes.
- All plastic end caps and support tubes are carbon impregnated to conduct electricity, which ensures that static electricity will not be generated to levels high enough to arc.
- Element outer wraps are made of plastic (polyester) to reduce environment a impact and improve fatigue resistance.
- Zinc-free construction prevents zinc soaping.

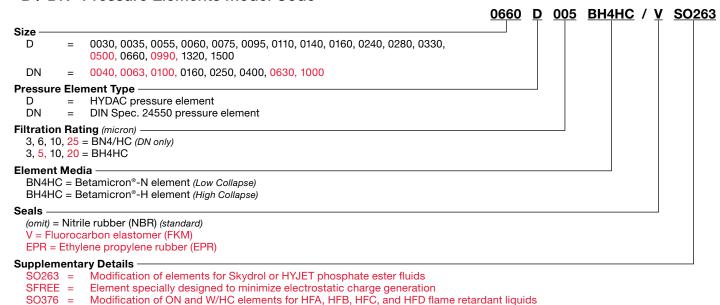
Technical Specifications

recrifical Spe	cilications				
Collapse Rating	290 psid (20 bar) (R/RN, BN4HC, D/DN, BN4HC) 3045 psid (210 bar) (D, BH/HC)				
Temp. range	-22°F to 212°F (-30°C to 100°C)				
Flow direction	outside to inside				
Filtration Rating	3, 5, 10, 20 μm				
Category	Disposable - single use				
Bypass Cracking Pressure					
R (only) = 43 psid (3 bar) (standard, others available)					
DBN = 87 psid (6 bar) (standard, others available)					
DBH = No bypas	ss (standard)				

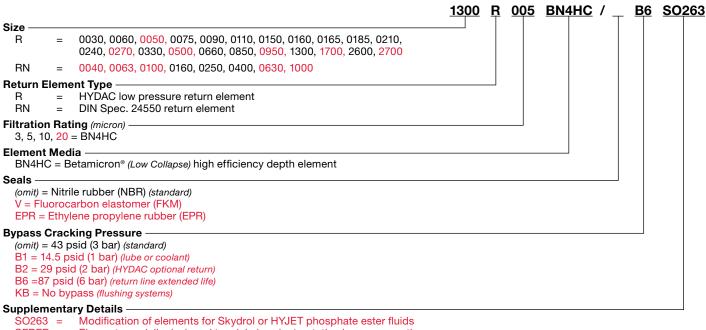
Beta Ratio (B) Values for Betamicron



"D / DN" Pressure Elements Model Code



"R / RN" Return Elements Model Code



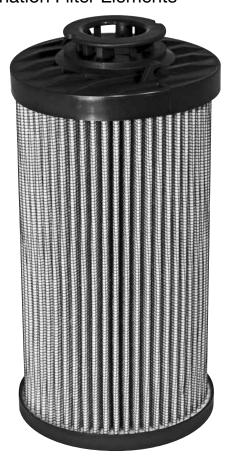
SFREE = Element specially designed to minimize electrostatic charge generation

Modification of ON and W/HC elements for HFA, HFB, HFC, and HFD flame retardant liquids SO376 =



Betamicron® / Aquamicron® Series

Combination Filter Elements



Description

BN/AM filter elements are specifically designed to absorb water and achieve high efficiency filtration of solid particles from mineral oils, HFD-R oils, and rapidly biodegradable oils. A super absorber reacts with the water present in the fluid and expands to form a gel from which the water can no longer be extracted, even by increasing the system pressure. These filter elements do not remove dissolved water below the saturation level of the hydraulic fluid. Solid particle filtration (3 μ m, 10 μ m absolute) is achieved due to the Betamicron® element construction.

Features

- High water retention capacity
- High dirt holding capacity
- Filtration rating $\beta_{x(c)} \ge 200$
- Stable β_x values over a wide differential pressure range (high Beta stability)

General

The presence of water in a hydraulic system causes many problems, such as the jamming of valves and rod components in fluid power systems. These problems are often incorrectly attributed to excessive levels of solid particle contamination. Sometimes these problems are caused by the build-up of rust and the reduction of the lubrication required for proper operation of bearings and slides. This can cause considerable degradation in the functioning of fluid power systems. In other words, along with solid particles, water is a serious "contaminant" in hydraulic systems.

Since methods usually employed to extract water often prove to be uneconomical when compared to the purchase price of a water removal system, HYDAC BN4AM technology has been developed to provide an economically sound and effective method of separating free water from hydraulic fluid. At the same time, these elements provide absolute filtration of solid particles down to 3 or 10 micron levels.

Technical Specifications

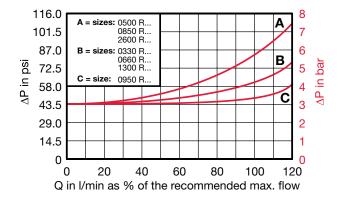
Collapse Pressure Rating	145 psid/10 bar
Temperature range:	32°F to 160°F (0°C to 71°C)
Compatibility with hydraulic media	Test criteria to ISO 2943
Flow fatigue resistance to ISO 3724	High fatigue resistance due to solid filter material supports on both sides and high inherent stability of the filter materials.
Opening pressure of bypass valve	ΔP0 = 43 psid + 10% (3 bar + 10%)

Principles of the BN4AM combined filter elements.

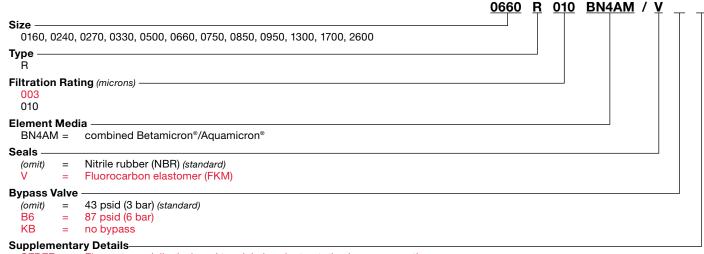
- BN4AM disposable elements are designed with inorganic and water-absorbent fibers
- Highly efficient absorption of free water from mineral oils with the aid of a "super absorber" embedded in the filter material
- Excellent adsorption of fine contamination particles over a wide differential pressure range (3 µm, 10 µm absolute)
- Excellent Beta stability over a wide differential pressure range
- High balanced dirt holding and water retention capacities
- Excellent fluid compatibility due to the use of epoxy resins for impregnation and bonding
- Dynamic Element integrity as a result of a high burst pressure resistance design (e.g. during cold starts and dynamic differential pressure surges)

Bypass Valve Curves

The bypass valve curves apply to mineral oils with a specific gravity of 0.86. The differential pressure of the valve changes proportionally with the specific gravity.



Model Code



SFREE = Element specially designed to minimize electrostatic charge generation

Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Water retention - Quick sizing table

Size	Recommended Filter flow rate in gpm / lpm	Water retention capacity* cm3 / qt
0330	3.4 / 13	190 / 0.2008
0660	7.4 / 28	400 / 0.4227
0950	10.3 / 39	560 / 0.5918
1300	14.3 / 54	790 / 0.8349
2600	28.8 / 109	1570 / 1.6592

^{*}in cm3/qt when Δp = 2.5 bar / 36 psid and viscosity = 30 mm2 /s / 141 SUS

Filtration rating	Specification	Typical measured results (when $\Delta p = 2.5 \text{ bar } / 36 \text{ psid}$)		
3 μm	ß3(c) ≥ 100	ß3(c) ≥ 500		
10 μm	β10(c) ≥ 100	β10(c) ≥ 500		

FILTER ELEMENTS

ECOmicron® Series

Environmentally Compatible



Features

- All plastic construction Note: Bypass valve in the end cap contains a metal spring for efficient operation. The spring can be removed if the element is crushed.
- Standard HYDAC elements sizes 1300R and 2600R with absolute ratings of 3 and 10 micron are available
- (Light weight) for ease of handling during shipment and maintenance
- 43 psi (3 bar) bypass valve setting
- 145 psi (10 bar) element collapse rating

Benefits

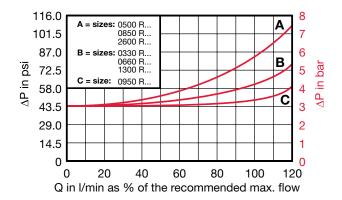
- Compatible with most hydraulic and lubrication fluids. Please consult factory for synthetic fluid use.
- Compatible for high water based fluid application use.
- Media seam welded with patented HYDAC ultrasonic welding process, which prevents media migration.
- $B_{x(c)} \ge 1000$ absolute filtration rating

Technical Specifications

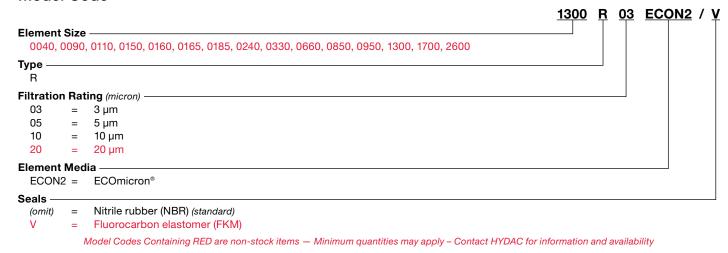
Collapse Pressure Rating	145 psid (10 bar)
Temperature Range	-22°F to 212°F (-30°C to 100°C)
Flow fatigue stability to ISO 3724/76	High fatigue resistance due to solid filter material supports on both sides and high inherent stability of filter materials.
Opening Pressure of Bypass Valve	$\Delta P0 = 43 \text{ psid} \pm 7 \text{ psi (3 bar} \pm 0.5 \text{ bar)}$

Bypass Valve Curves

The by-pass valve curves apply to mineral oils with a specific gravity of 0.86. The differential pressure of the valve changes proportionally with the specific gravity.



Model Code



Element Construction



FILTER ELEMENTS

Aquamicron® Series

Water Removal Elements



Description

Aquamicron® filter elements are specially designed to separate free water from mineral oils. They are only supplied in the dimensions of HYDAC return line filter elements from size 330 and larger. This means that they can be installed in all HYDAC filter housings from size 330 which are fitted with return line filter elements.

The increasing pressure drop in a filter element which is being saturated with water indicates, by means of standard clogging indicators, that it is time to change the element. When the Aquamicron® technique is employed, particle contaminants are also separated from the hydraulic medium as a by-product. This means that the Aquamicron® element doubles as a safety filter.

In order to guarantee the greatest efficiency, it is recommended that these elements be installed in an off-line recirculation loop configuration.

Note: All Aquamicron® elements are disposable.

How Water Damages Systems and Components

The presence of water in hydraulic systems causes many problems. Examples would be the saturation of very fine filters or the jamming of valves and rod components. These problems are often wrongly attributed to high levels of particle contamination. Added to this, the build-up of rust and the reduction in lubricating properties on bearings and slides can lead to considerable impairment in the effective functioning of a system. This shows that water, too, represents a serious "contaminant" in a hydraulic system.

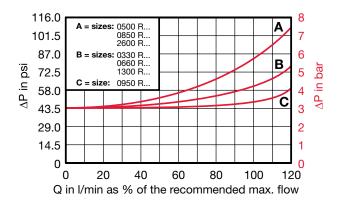
Previously, methods commonly used for extraction of water have proven to be uneconomical in relation to the purchase price of a water removal system. The HYDAC Aquamicron® technique offers an economically sound and yet an effective method of separating free water from hydraulic fluids.

Technical Specifications

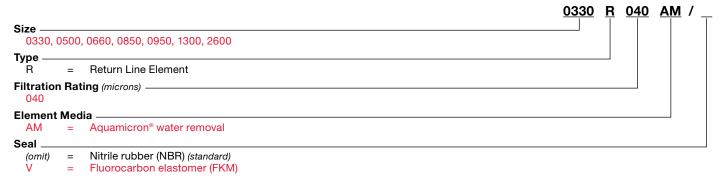
Collapse Rating	145 psid (10 bar)
Temperature range	32°F to 212°F (0°C to 100°C)
Compatibility with hydraulic media	Mineral oils: Test criteria to ISO 2943 Lubricating oils: Test criteria to ISO 2943 Other media available on request
Opening pressure of by-pass valves	Δ P0 = 43 psid ±7 psi (3 bar ±0.5 bar)
Bypass valve curves	The bypass valve curves apply to mineral oils with a specific gravity of 0.86. The differential pressure of the valve changes proportionally with the specific gravity.

Bypass Valve Curves

The bypass valve curves apply to mineral oils with a specific gravity of 0.86. The differential pressure of the valve changes proportionally with the specific gravity.



Model Code



Model Codes Containing Red are non-stock items-Minimum quantities may apply-Contact HYDAC for information and availability

Aquamicron® Element Size Recommendations

Size	Water retention capacity Recommended Flow rate $Cw \text{ at } \Delta P = 36 \text{ psi } (2.5 \text{ bar}) \text{ with}$ an oil viscosity of 141 SUS (30mm2/sec)		Part No.
0330	3.4 gpm (13 l/min) advised 26.4 gpm (100 l/min) max.	0.27 quarts (260cm³) 0.19 quarts (180cm³)	00315268
0500	5 gpm (19 l/min) advised 40.9 gpm (155 l/min) max.	0.42 quarts (400cm³) 0.30 quarts (280cm³)	00315355
0660	7.4 gpm (28 l/min) advised 67.4 gpm (255 l/min) max.	0.60 quarts (570cm³) 0.42 quarts (400cm³)	00315356
0850	9.2 gpm (35 l/min) advised 75.6 gpm (286 l/min) max.	0.77 quarts (730cm³) 0.55 quarts (520cm³)	00315357
0950	10.3 gpm (39 l/min) advised 83 gpm (314 l/min) max.	0.85 quarts (800cm³) 0.60 quarts (570cm³)	00315358
1300	14.3 gpm (54 l/min) advised 115.4 gpm (437 l/min) max.	1.18 quarts (1120cm³) 0.83 quarts (790cm³)	00315269
2600	28.2 gpm (109 l/min) advised 229.9 gpm (870 l/min) max.	2.36 quarts (2230cm³) 1.66 quarts (1570cm³)	00316102

FILTER ELEMENTS

Mobilemicron® Series

Mobile filtration - low cold start ΔP



Description

The HYDAC Mobilemicron® filter elements are designed to efficiently handle applications in the demanding mobile industry. Applications utilizing these elements will experience safe, reliable operation of the mobile device.

The Mobilemicron® is characterized by an especially low pressure drop which makes them particularly suitable for use wherever high viscosity fluids are employed, especially at low temperatures producing cold start behavior. Under these conditions, this element exhibits far lower pressure drops then competitive depth elements resulting in lower energy requirements to operate the hydraulic systems.

This filter element is also a prime candidate for gear lubrication systems using high viscosity oils with high temperature variations during operations.

Features

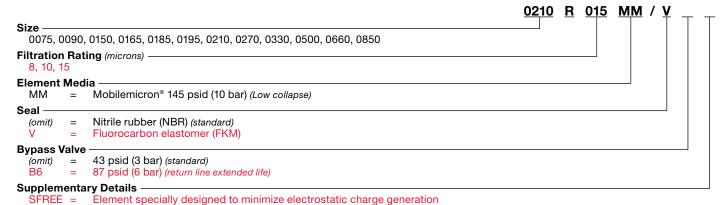
- Unique filter media has a very low resistance to fluid flow thus, reducing element ΔP .
- Synthetic fiber media, multi-layered with support
- Low collapse 10 bar (145 psid)
- For use in HYDAC RF, RFD, RFL, RFLD, RFM, RKM, MFX Filters

Technical Specifications

Collapse Rating	145 psid (10 bar) (RMM)
Temperature range	-22°F to 212°F (-30°C to 100°C)
Flow direction	outside to inside
Filtration Rating	8, 10, 15 μm
Category Disposable - single use	
Bypass Cracking Pressure R = 43 psid (3 bar) (standard) RK = 50.75 psid (3.5 bar)	

MX = 50.75 psid (3.5 bar)

"R" Return Elements Model Code

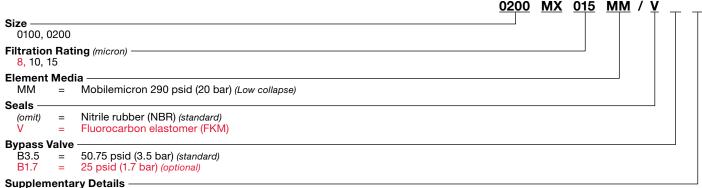


"RK" RKM Element Model Code

```
0300 RK 015 MM / V
Size
  0080, 0100, 0120, 0151, 0201, 0251, 0300, 0350, 0400, 0800
Filtration Rating (micron) -
  8, 10, 15
Element Media
  MM
              Mobilemicron 145 psid (10 bar) (Low collapse)
Seals
  (omit)
              Nitrile rubber (NBR) (standard)
              Fluorocarbon elastomer (FKM)
Supplementary Details
```

Element specially designed to minimize electrostatic charge generation SFREE =

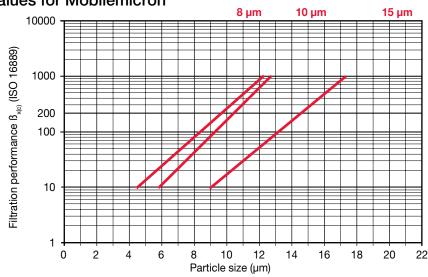
"MX" Element Model Code



SFREE = Element specially designed to minimize electrostatic charge generation

Model Codes Containing Red are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Beta Ratio (ß) Values for Mobilemicron



MA & MG Series

Spin-On Elements

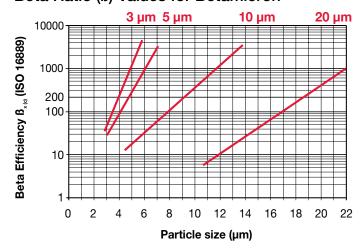




Features

- HYDAC Betamicron® elements are available with Multi-Layer Betamicron® media with absolute ratings of 3, 5, 10, and 20
- Proper support of the filter media provides high Beta Ratio values (particle removal efficiency) even at high differential pressures. The efficiency of many competitive elements drastically deteriorates as the element clogs and differential pressure increases.
- Betamicron® filter media is firmly supported to achieve flow fatigue resistance during significant pressure flow pulsations.
- High quality adhesive is used to bond the seam of the media and the endcaps to the media.
- Heavy gauge perforated support tubes are used to provide proper flow distribution and protection against element collapse.

Beta Ratio (B) Values for Betamicron



Technical Specifications					
Construction Materials	Steel				
Flow Capacity					
40	7 gpm (26 lpm)				
80	15 gpm (57 lpm)				
85	25 gpm (95 lpm)				
90	15 gpm (57 lpm)				
95	25 gpm (95 lpm)				
160/190	30 gpm (114 lpm)				
180/195	60 gpm (227 lpm)				
Housing Pressure Rating					
Max. Operating Pressure	120 psi (8 bar)/250 psi (17 bar) (MF90/95)				
Proof Pressure	180 psi (12.4 bar)/375 psi (25.8 bar) (MF90/95)				
Fatigue Pressure	Contact HYDAC				
Burst Pressure	Contact HYDAC				
Element Collapse Pressure I	Rating				
BN, P, AM	80 psid (5.5 bar)				
Fluid Temperature Range	-22°F to 212°F (-30°C to 100°C)				
Consult HYDAC for applications be	elow 14°F (-10°C)				
Fluid Compatibility					
Compatible with all petroleum oils rated for use with Nitrile rubber (NBR) seals.					
Bypass Valve Cracking Pressure					
$\Delta P = 3 \text{ psid } (0.2 \text{ bar}) + 10\% \text{ (for suction applications)}$					

 $\Delta P = 25 \text{ psid } (1.7 \text{ bar}) + 10\% \text{ (standard for nominal filters)}$

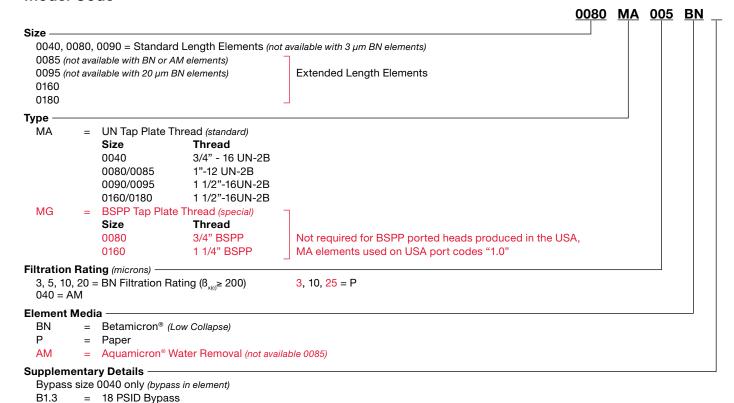
MF 90/95/190/195)

 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (standard for absolute [BN] filters)}$ $\Delta P = 50 \text{ psid } (3.4 \text{ bar}) + 10\% \text{ (standard for absolute [BN] filters,}$

Model Code

B1.7

= 25 PSID Bypass



Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Element K-Factors
Optimicron® "D...ON" Pressure Elements

K-Factors (gradient coefficients) for Filter Elements: These K-factors in (psi/gpm) apply to hydraulic and lubricating fluids with kinematic viscosity of 141 SSU/(30mm2/S). The pressure drop changes proportionally to the change in viscosity.



Optimicron	DON (Pressure Element)						
Size	1 µm	3 µm	5 μm	10 μm	15 µm	20 µm	Wgt. (lbs.)
0030 D XXX ON	4.27	3.507	2.376	1.251	0.768	0.62	0.19
0035 D XXX ON	2.755	1.169	0.938	0.752	0.549	0.408	0.26
0055 D XXX ON	1.427	0.675	0.543	0.434	0.284	0.211	0.37
0060 D XXX ON	2.936	1.427	1.004	0.664	0.537	0.347	0.23
0075 D XXX ON	0.916	0.461	0.37	0.296	0.183	0.136	0.49
0095 D XXX ON	0.724	0.37	0.296	0.238	0.144	0.105	0.59
0110 D XXX ON	1.416	0.735	0.527	0.333	0.254	0.164	0.54
0140 D XXX ON	1.092	0.631	0.406	0.24	0.194	0.126	0.44
0160 D XXX ON	1.015	0.604	0.423	0.225	0.204	0.175	0.58
0240 D XXX ON	0.631	0.379	0.293	0.175	0.134	0.115	0.78
0260 D XXX ON	0.449	0.272	0.212	0.127	0.1	0.079	0.71
0280 D XXX ON	0.304	0.185	0.15	0.082	0.075	0.064	1.75
0300 D XXX ON	0.801	0.488	0.391	0.268	0.154	0.143	0.66
0330 D XXX ON	0.452	0.23	0.185	0.135	0.085	0.067	1.13
0450 D XXX ON	0.401	0.244	0.193	0.131	0.077	0.069	1.36
0500 D XXX ON	0.277	0.141	0.114	0.068	0.052	0.041	1.50
0650 D XXX ON	0.245	0.148	0.121	0.081	0.047	0.044	2.04
0660 D XXX ON	0.207	0.106	0.086	0.051	0.039	0.031	2.53
0900 D XXX ON	0.185	0.115	0.092	0.06	0.036	0.035	2.56
0990 D XXX ON	0.138	0.07	0.057	0.033	0.026	0.02	3.29
1320 D XXX ON	0.102	0.053	0.042	0.025	0.019	0.015	8.39
1500 D XXX ON	0.09	0.053	0.038	0.026	0.02	0.015	10.44

Optimicron® "R...ON" Return Elements



Optimicron	RON (Return Element - Low Pressure)							
Size	1 μm	3 µm	5 μm	10 µm	15 µm	20 μm	Wgt. (lbs.)	
0030 R XXX ON	4.928	3.754	2.409	1.471	0.922	0.807	0.142	
0060 R XXX ON	2.59	1.295	0.944	0.539	0.494	0.376	0.286	
0075 R XXX ON	1.405	1.065	0.735	0.401	0.263	0.241	0.508	
0090 R XXX ON	1.235	0.719	0.521	0.333	0.236	0.176	0.364	
0110 R XXX ON	1.224	0.719	0.487	0.296	0.234	0.178	0.46	
0150 R XXX ON	0.735	0.428	0.31	0.198	0.14	0.105	0.502	
0160 R XXX ON	0.878	0.439	0.312	0.177	0.148	0.182	0.682	
0165 R XXX ON	0.774	0.518	0.404	0.221	0.123	0.133	0.77	
0185 R XXX ON	0.571	0.408	0.315	0.161	0.091	0.077	0.873	
0195 R XXX ON	0.42	0.301	0.232	0.119	0.067	0.057	1.115	
0210 R XXX ON	0.311	0.18	0.14	0.084	0.055	0.048	1.684	
0240 R XXX ON	0.571	0.284	0.201	0.125	0.101	0.077	0.848	
0270 R XXX ON	0.201	0.116	0.091	0.054	0.036	0.031	2.358	
0280 R XXX ON	0.28	0.141	0.114	0.078	0.058	0.044	1.763	
0330 R XXX ON	0.444	0.204	0.15	0.081	0.07	0.056	1.54	
0450 R XXX ON	0.347	0.174	0.126	0.077	0.055	0.047	1.798	
0500 R XXX ON	0.289	0.143	0.104	0.06	0.046	0.038	2.28	
0580 R XXX ON	0.137	0.068	0.049	0.029	0.022	0.019	3.975	
0600 R XXX ON	0.129	0.068	0.06	0.033	0.023	0.019	3.321	
0660 R XXX ON	0.196	0.093	0.066	0.037	0.031	0.025	3.488	
0750 R XXX ON	0.116	0.061	0.05	0.029	0.019	0.018	4.764	
0850 R XXX ON	0.152	0.072	0.055	0.032	0.024	0.020	4.328	
0950 R XXX ON	0.131	0.057	0.043	0.026	0.021	0.017	5.076	
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012	9.188	
1700 R XXX ON	0.074	0.035	0.029	0.015	0.014	0.010	7.564	
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006	11.964	

Optimicron® Power "ON/PO" Elements



Optimicron Power	AON					
Size	5 μm	10 µm	20 µm	Wgt. (lbs.)		
0110 R XXX ON/PO	0.199	0.169	0.111	0.562		
0240 R XXX ON/PO	0.072	0.061	0.040	0.873		
0330 R XXX ON/PO	0.044	0.038	0.024	2.12		
0500 R XXX ON/PO	0.029	0.025	0.016	2.372		
0660 R XXX ON/PO	0.019	0.016	0.010	3.697		
0850 R XXX ON/PO	0.015	0.013	0.009	5.357		
0950 R XXX ON/PO	0.010	0.012	0.008	7.317		
1300 R XXX ON/PO	0.010	0.008	0.005	7.848		
1700 R XXX ON/PO	0.007	0.006	0.004	10.02		
2600 R XXX ON/PO	0.004	0.004	0.003	15.18		
2700 R XXX ON/PO	0.004	0.004	0.003	21.94		

Optimicron Power	API Complient		
Size	10 µm	Wgt. (lbs.)	
0110 A XXX ON/PO	0.169	0.259	
0120 A XXX ON/PO	0.075	0.937	
0230 A XXX ON/PO	0.037	2.731	
0240 A XXX ON/PO	0.061	1.011	
0330 A XXX ON/PO	0.038	1.671	
0500 A XXX ON/PO	0.025	2.447	
0540 A XXX ON/PO	0.018	6.15	
0880 A XXX ON/PO	0.008	9.034	
1400 A XXX ON/PO	0.005	16.18	
2600 R XXX ON/PO	0.004	16.73	
2700 A XXX ON/PO	0.004	20.61	

Element K-Factors Betamicron® "D...BN4HC" Pressure Elements



Betamicron	DBN4HC (Low Collapse)					
Size	3 µm	5 μm	10 μm	20 μm	Wgt. (lbs.)	
0030 D XXX BN4HC	3.507	2.376	1.251	0.620	0.19	
0035 D XXX BN4HC	1.295	1.043	0.812	0.510	0.26	
0055 D XXX BN4HC	0.752	0.604	0.444	0.263	0.37	
0060 D XXX BN4HC	1.586	1.119	0.724	0.433	0.23	
0075 D XXX BN4HC	0.510	0.411	0.290	0.170	0.49	
0095 D XXX BN4HC	0.411	0.329	0.225	0.132	0.59	
0110 D XXX BN4HC	0.818	0.587	0.362	0.203	0.54	
0140 D XXX BN4HC	0.702	0.450	0.263	0.159	0.44	
0160 D XXX BN4HC	0.719	0.483	0.252	0.192	0.58	
0240 D XXX BN4HC	0.450	0.335	0.198	0.126	0.78	
0280 D XXX BN4HC	0.220	0.170	0.093	0.071	1.75	
0300 D XXX BN4HC	0.582	0.445	0.291	0.159	0.66	
1.11.04DXXBN	0.562					
0330 D XXX BN4HC	0.296	0.214	0.165	0.093	1.13	
0450 D XXX BN4HC	0.291	0.220	0.143	0.077	1.36	
1.11.08DXXBN	0.291	0.220	0.143	0.077	1.30	
0500 D XXX BN4HC	0.181	0.132	0.082	0.060	1.50	
0650 D XXX BN4HC	0.176	0.137	0.088	0.049	2.04	
1.11.13DXXBN	0.176	0.137	0.066	0.049	2.04	
0660 D XXX BN4HC	0.137	0.099	0.060	0.044	2.53	
0900 D XXX BN4HC	0.137	0.104	0.066	0.020	2.56	
1.11.16DXXBN	0.137	0.104	0.066	0.038	2.56	
0990 D XXX BN4HC	0.088	0.066	0.038	0.027	3.29	
1320 D XXX BN4HC	0.066	0.049	0.027	0.022	8.39	
1500 D XXX BN4HC	0.060	0.044	0.033	0.022	10.44	

Betamicron® "D...BH4HC" Pressure Elements

Betamicron	DBH4HC (High Collapse)					
Size	3 μm	5 μm	10 µm	20 µm	Wgt. (lbs.)	
0030 D XXX BH4HC	5.005	2.782	1.992	1.043	0.30	
0060 D XXX BH4HC	3.216	1.789	0.993	0.670	0.58	
0110 D XXX BH4HC	1.394	0.818	0.489	0.307	0.76	
0140 D XXX BH4HC	1.092	0.620	0.445	0.236	0.79	
0160 D XXX BH4HC	0.922	0.571	0.324	0.241	1.23	
0240 D XXX BH4HC	0.582	0.373	0.214	0.159	1.82	
0280 D XXX BH4HC	0.313	0.187	0.099	0.088	2.55	
0300 D XXX BH4HC	0.878	0.488	0.390	0.181	1.83	
1.11.04DXXBH	0.676	0.466	0.390	0.101	1.00	
0330 D XXX BH4HC	0.423	0.247	0.154	0.110	2.26	
0450 D XXX BH4HC	0.428	0.236	0.187	0.088	2.61	
1.11.08DXXBH	0.420	0.230	0.107	0.000	2.01	
0500 D XXX BH4HC	0.230	0.143	0.082	0.066	3.60	
0650 D XXX BH4HC	0.258	0.143	0.115	0.055	3.64	
1.11.13DXXBH	0.230	0.140	0.113	0.033	3.04	
0660 D XXX BH4HC	0.181	0.104	0.055	0.049	4.05	
0900 D XXX BH4HC	0.192	0.110	0.088	0.038	4.66	
1.11.16DXXBH	0.192	0.110	0.000	0.036	4.00	
0990 D XXX BH4HC	0.120	0.071	0.044	0.033	7.38	
1320 D XXX BH4HC	0.088	0.055	0.033	0.022	9.82	
1500 D XXX BH4HC	0.077	0.044	0.033	0.027	11.56	

Indicates PALL 9600 geometry element.



Element K-Factors "D...W/HC" Pressure Elements



Wire Mesh	DW/HC	
Size	25, 50, 100, 200 μm	Wgt. (lbs.)
0030 D XXX W/HC	0.166	0.32
0060 D XXX W/HC	0.042	0.53
0110 D XXX W/HC	0.023	0.83
0140 D XXX W/HC	0.018	0.69
0160 D XXX W/HC	0.016	1.22
0240 D XXX W/HC	0.010	1.17
0280 D XXX W/HC	0.005	2.37
0330 D XXX W/HC	0.008	2.40
0500 D XXX W/HC	0.005	2.20
0660 D XXX W/HC	0.004	3.50
0990 D XXX W/HC	0.003	5.19
1320 D XXX W/HC	0.002	6.03

"D...V" Pressure Elements



Metal Fiber	DV					
Size	3 μm	5 μm	10 µm	20 μm	Wgt. (lbs.)	
0030 D XXX V	1.011	0.740	0.411	0.200	0.18	
0060 D XXX V	0.877	0.511	0.296	0.183	0.25	
0110 D XXX V	0.452	0.304	0.182	0.118	0.40	
0140 D XXX V	0.320	0.261	0.172	0.126	1.08	
0160 D XXX V	0.251	0.177	0.123	0.079	0.73	
0240 D XXX V	0.169	0.137	0.093	0.062	1.16	
0280 D XXX V	0.126	0.093	0.064	0.041	1.65	
0330 D XXX V	0.121	0.097	0.065	0.043	2.37	
0500 D XXX V	0.081	0.065	0.044	0.028	4.38	
0660 D XXX V	0.063	0.050	0.034	0.021	4.69	
0990 D XXX V	0.043	0.034	0.023	0.015	8.81	
1320 D XXX V	0.032	0.026	0.018	0.012	6.77	
1500 D XXX V	0.016	0.011	0.011	0.005	7.97	

Element K-Factors

"DN" Pressure Elements



Betamicron	DNBN/HC (Low Collapse)				
Size	3 µm	6 μm	10 µm	25 µm	Wgt. (lbs.)
0040 DN XXX BN4HC	1.312	0.818	0.472	0.362	2.161
0063 DN XXX BN4HC	0.895	0.543	0.330	0.252	0.331
0100 DN XXX BN4HC	0.653	0.362	0.220	0.176	0.507
0160 DN XXX BN4HC	0.434	0.280	0.187	0.143	N/A*
0250 DN XXX BN4HC	0.280	0.176	0.115	0.099	1.411
0400 DN XXX BN4HC	0.176	0.110	0.071	0.055	2.161

Wire Mesh	DNW/HC (Low Collapse)					
Size	25μm	50 μm	100 µm	200 μm	Wgt. (lbs.)	
0160 DN XXX W/HC	0.009	0.009	0.009	0.009	1.26	
0250 DN XXX W/HC	0.006	0.006	0.006	0.006	1.41	
0400 DN XXX W/HC	0.004	0.004	0.004	0.004	2.16	

Betamicron	DNBH/HC (High Collapse)						
Size	3 μm	6 μm	10 µm	25 µm	Wgt. (lbs.)		
0040 DN XXX BH4HC	2.217	1.361	0.900	0.598	0.57		
0063 DN XXX BH4HC	1.591	0.999	0.642	0.417	0.84		
0100 DN XXX BH4HC	1.043	0.642	0.423	0.291	1.01		
0160 DN XXX BH4HC	0.439	0.280	0.209	0.137	1.86		
0250 DN XXX BH4HC	0.296	0.187	0.154	0.104	2.90		
0400 DN XXX BH4HC	0.187	0.115	0.093	0.060	4.28		

Pressure Elements for the Automotive Industry

Autospec HF4	5	5.03.XXDXXBN (Low Collapse)			
Size	3 µm	5 μm	10 µm	20 µm	Wgt. (lbs.)
5.03.09DXXBN	0.168	0.141	0.079	0.044	1.67
5.03.18DXXBN	0.080	0.067	0.038	0.021	3.03
5.03.27DXXBN	0.052	0.043	0.024	0.014	4.50

Autospec HF4	5.03.XXDXXBH (High Collapse)				
Size	3 µm	5 µm	10 µm	20 µm	Wgt. (lbs.)
5.03.09DXXBH	0.207	0.146	0.089	0.047	4.57
5.03.18DXXBH	0.097	0.068	0.041	0.022	8.19
5.03.27DXXBH	0.063	0.044	0.027	0.014	12.16

Autospec HF4 Wire Mesh	5.03.XXDXXW			
Size	25, 50, 100, 200 μm	Wgt. (lbs.)		
5.03.09DXXW	0.007	1.71		
5.03.18DXXW	0.004	3.29		
5.03.27DXXW	0.002	N/A*		

Autospec HF3	1.11.08DXXBN (Low Collapse)				
Size	3 µm	5 µm	10 µm	20 µm	Wgt. (lbs.)
1.11.04DXXBN	0.590	0.500	0.266	0.153	0.69
1.11.08DXXBN	0.289	0.241	0.135	0.076	1.02
1.11.13DXXBN	0.175	0.146	0.082	0.046	1.51
1.11.16DXXBN	0.132	0.110	0.062	0.035	1.89

Autospec HF3	1.11.08DXXBH (High Collapse)				
Size	3 µm	5 μm	10 µm	20 µm	Wgt. (lbs.)
1.11.04DXXBH	0.937	0.660	0.401	0.210	1.83
1.11.08DXXBH	0.460	0.321	0.195	0.102	2.61
1.11.13DXXBH	0.274	0.193	0.117	0.615	3.64
1.11.16DXXBH	0.206	0.145	0.089	0.046	4.66

Autospec HF2	1.07.08DXXBN (Low Collapse)				
Size	3 µm	5 µm	10 µm	20 µm	Wgt. (lbs.)
1.07.04DXXBN	2.046	1.735	0.925	0.531	0.26
1.07.08DXXBN	0.975	0.815	0.457	0.257	0.39

Autospec HF2	1.07.08DXXBH (High Collapse)				
Size	3 µm	5 μm	10 µm	20 µm	Wgt. (lbs.)
1.07.04DXXBH	2.400	1.690	1.027	0.538	0.51
1.07.08DXXBH	1.165	0.820	0.499	0.262	0.85

 $^{^{\}star}$ Not Available at the time of publication. Please contact HYDAC for latest information. All Element K Factors in psi / gpm.

Element K-Factors Betamicron® "R...BN4HC" Return Elements



Betamicron	RBN4HC (Low Collapse)				
Size	3 µm	5 μm	10 µm	20 μm	Wgt. (lbs.)
0030 R XXX BN4HC	3.754	2.409	1.471	0.807	0.142
0060 R XXX BN4HC	1.471	1.004	0.598	0.379	0.286
0075 R XXX BN4HC	1.207	0.779	0.445	0.241	0.508
0110 R XXX BN4HC	0.818	0.516	3.293	0.176	0.46
0150 R XXX BN4HC	0.489	0.329	0.220	0.104	0.68
0160 R XXX BN4HC	0.521	0.324	0.209	0.159	0.682
0165 R XXX BN4HC	0.615	0.428	0.247	0.132	0.77
0185 R XXX BN4HC	0.488	0.335	0.181	0.099	0.882
0210 R XXX BN4HC	0.214	0.143	0.099	0.060	1.684
0240 R XXX BN4HC	0.340	0.209	0.143	0.099	0.848
0270 R XXX BN4HC	0.137	0.093	0.060	0.038	2.358
0280 R XXX BN4HC	0.170	0.121	0.088	0.055	1.76
0330 R XXX BN4HC	0.232	0.150	0.093	0.066	1.54
0500 R XXX BN4HC	0.164	0.104	0.071	0.044	2.28
0660 R XXX BN4HC	0.104	0.066	0.044	0.027	3.488
0750 R XXX BN4HC	0.071	0.049	0.033	0.022	4.764
0850 R XXX BN4HC	0.082	0.055	0.038	0.022	4.328
0950 R XXX BN4HC	0.066	0.044	0.027	0.022	5.076
1300 R XXX BN4HC	0.044	0.033	0.022	0.016	9.188
1700 R XXX BN4HC	0.038	0.027	0.016	0.011	7.564
2600 R XXX BN4HC	0.022	0.016	0.011	0.005	11.964
2700 R XXX BN4HC	0.022	0.016	0.011	0.005	16.5

Betamicron®/Aquamicron® "R...BN4AM"



Betamicron/ Aquamicron	RBN4AM			
Size	3 µm	10 µm	Wgt. (lbs.)	
0330 R XXX BN4AM	0.477	0.165	1.596	
0500 R XXX BN4AM	0.313	0.11	2.266	
0660 R XXX BN4AM	0.192	0.066	1.991	
0750 R XXX BN4AM	0.126	0.044	4.760	
0850 R XXX BN4AM	0.154	0.049	5.225	
0950 R XXX BN4AM	0.132	0.044	5.85	
1300 R XXX BN4AM	0.088	0.033	6.946	
1700 R XXX BN4AM	0.071	0.027	7.452	
2600 R XXX BN4AM	0.055	0.016	10.211	
2700 R XXX BN4AM	0.055	0.016	16.445	

Aquamicron "AM"



Aquamicron	AM		
Size	40 μm	Wgt. (lbs.)	
0330 R XXX AM	0.115	0.740	
0500 R XXX AM	0.076	1.023	
0660 R XXX AM	0.051	1.580	
0750 R XXX AM	0.030	1.855	
0850 R XXX AM	0.040	1.990	
0950 R XXX AM	0.036	2.900	
1300 R XXX AM	0.026	3.550	
1700 R XXX AM	0.020	5.661	
2600 R XXX AM	0.013	6.210	
2700 R XXX AM	0.014	6.356	

Element K-Factors ECOmicron® "R...ECON2" Return Elements



ECOmicron			RECON2		
Size	3 μm	5 μm	10 µm	20 μm	Wgt. (lbs.)
0075 R XXX ECON2	1.207	0.779	0.445	0.241	0.115
0090 R XXX ECON2	0.818	0.554	0.368	0.176	0.126
0110 R XXX ECON2	0.818	0.516	0.329	0.176	0.332
0150 R XXX ECON2	0.488	0.329	0.220	0.104	0.385
0160 R XXX ECON2	0.521	0.324	0.209	0.159	0.398
0165 R XXX ECON2	0.615	0.428	0.247	0.132	0.422
0185 R XXX ECON2	0.488	0.335	0.181	0.099	0.586
0195 R XXX ECON2	0.362	0.247	0.132	0.071	0.702
0240 R XXX ECON2	0.340	0.209	0.143	0.099	0.711
0280 R XXX ECON2	0.170	0.121	0.088	0.055	0.954
0330 R XXX ECON2	0.230	0.148	0.093	0.066	1.069
0500 R XXX ECON2	0.165	0.104	0.071	0.044	2.118
0660 R XXX ECON2	0.104	0.066	0.044	0.027	4.389
0750 R XXX ECON2	0.071	0.049	0.033	0.022	4.855
0850 R XXX ECON2	0.082	0.055	0.038	0.022	5.211
0950 R XXX ECON2	0.066	0.044	0.027	0.022	4.400
1300 R XXX ECON2	0.044	0.033	0.022	0.016	5.290
1700 R XXX ECON2	0.038	0.027	0.016	0.011	11.31
2600 R XXX ECON2	0.022	0.016	0.011	0.005	9.544

ECOmicron Fit	1.14.XXDXXECO/N				
SIZE	3 µm	6 µm	12 µm	25 μm	
1.14.16DXXECO/N	0.046	0.041	0.022	0.015	
1.14.39DXXECO/N	0.017	0.016	0.008	0.006	

Wire Mesh "R...W/HC" Return Elements



Wire Mesh	RW/HC		
Size	25, 50, 100, 200 μm	Wgt. (lbs.)	
0030 R XXX W/HC	0.110	0.08	
0060 R XXX W/HC	0.055	0.328	
0075 R XXX W/HC	0.043	0.687	
0110 R XXX W/HC	0.030	0.588	
0160 R XXX W/HC	0.021	0.86	
0165 R XXX W/HC	0.020	0.52	
0240 R XXX W/HC	0.015	1.174	
0330 R XXX W/HC	0.010	1.844	
0500 R XXX W/HC	0.007	1.876	
0660 R XXX W/HC	0.005	4.138	
0850 R XXX W/HC	0.004	2.535	
0950 R XXX W/HC	0.003	5.674	
1300 R XXX W/HC	0.003	4.61	
1700 R XXX W/HC	0.002	11	
2600 R XXX W/HC	0.001	8.3	

Polyester "R...P/HC" Return Elements



Polyester	RP/HC		
Size	10 µm	20 µm	Wgt. (lbs.)
0030 R XXX P/HC	0.458	0.458	0.154
0060 R XXX P/HC	0.255	0.255	0.308
0075 R XXX P/HC	0.156	0.156	0.701
0110 R XXX P/HC	0.128	0.128	0.488
0160 R XXX P/HC	0.077	0.077	0.692
0165 R XXX P/HC	0.086	0.086	0.816
0240 R XXX P/HC	0.049	0.049	0.978
0330 R XXX P/HC	0.037	0.037	1.536
0500 R XXX P/HC	0.024	0.024	2.142
0660 R XXX P/HC	0.016	0.016	3.278
0850 R XXX P/HC	0.012	0.012	4.320
0950 R XXX P/HC	0.010	0.010	5.838
1300 R XXX P/HC	0.007	0.007	6.944
1700 R XXX P/HC	0.006	0.006	8.721
2600 R XXX P/HC	0.003	0.003	12.166

FILTER ELEMENTS

Element K-Factors Mobilemicron® "R...MM" Return Elements



Mobilemicron R	RK	СММ
Size	10 μm	Wgt. (lbs.)
0060 R XXX MM	0.420	N/A*
0075 R XXX MM	0.265	N/A*
0090 R XXX MM	0.252	N/A*
0110 R XXX MM	0.199	N/A*
0150 R XXX MM	0.114	N/A*
0160 R XXX MM	0.149	N/A*
0165 R XXX MM	0.146	N/A*
0185 R XXX MM	0.108	N/A*
0210 R XXX MM	0.052	N/A*
0240 R XXX MM	0.095	N/A*
0270 R XXX MM	0.032	N/A*
0330 R XXX MM	0.078	N/A*
0500 R XXX MM	0.052	N/A*
0660 R XXX MM	0.030	N/A*
0850 R XXX MM	0.023	N/A*
0950 R XXX MM	0.023	N/A*
1300 R XXX MM	0.016	N/A*
1700 R XXX MM	0.010	N/A*
2600 R XXX MM	0.008	N/A*

Mobilemicron® "RK" Return Elements



Mobilemicron RK	RKMM				
Size	8 µm	10 μm	15 µm	Wgt. (lbs.)	
0080 RK XXX MM	0.136	0.136	0.087	0.588	
0100 RK XXX MM	0.095	0.095	0.061	0.624	
0120 RK XXX MM	0.077	0.077	0.049	0.658	
0151 RK XXX MM	0.054	0.054	0.036	0.892	
0201 RK XXX MM	0.041	0.041	0.026	1.820	
0251 RK XXX MM	0.032	0.032	0.020	1.986	
0300 RK XXX MM	0.034	0.034	0.021	2.020	
0350 RK XXX MM	0.016	0.016	0.011	2.211	
0400 RK XXX MM	0.031	0.031	0.019	2.496	
0800 RK XXX MM	0.024	0.024	0.015	4.122	

 $^{^{\}star}$ Not Available at the time of publication. Please contact HYDAC for latest information. All Element K Factors in psi / gpm.



Element K-Factors Stainless Steel Wire Mesh "R...V"



SS Wire Mesh			R V		
Size	3 μm	5 μm	10 µm	20 μm	Wgt. (lbs.)
0030 R XXX V	1.065	0.779	0.434	0.209	N/A*
0060 R XXX V	0.873	0.510	0.296	0.181	N/A*
0110 R XXX V	0.417	0.280	0.165	0.110	N/A*
0160 R XXX V	0.269	0.192	0.132	0.082	N/A*
0240 R XXX V	0.176	0.143	0.093	0.066	N/A*
0280 R XXX V	0.077	0.060	0.038	0.027	N/A*
0330 R XXX V	0.115	0.093	0.060	0.044	N/A*
0450 R XXX V	0.093	0.071	0.049	0.033	N/A*
0500 R XXX V	0.082	0.066	0.044	0.027	N/A*
0580 R XXX V	0.038	0.027	0.016	0.016	N/A*
0660 R XXX V	0.055	0.044	0.033	0.022	N/A*
0750 R XXX V	0.033	0.027	0.016	0.011	N/A*
0850 R XXX V	0.044	0.033	0.022	0.016	N/A*
0950 R XXX V	0.038	0.033	0.022	0.011	N/A*
1300 R XXX V	0.027	0.022	0.016	0.011	N/A*
1700 R XXX V	0.022	0.016	0.011	0.005	N/A*
2600 R XXX V	0.016	0.011	0.005	0.005	N/A*
2700 R XXX V	0.011	0.005	0.005	0.005	N/A*

Suction "RS...W" Elements

Suction		RSW	
Size	75 µm	125 µm	Wgt. (lbs.)
0060 RS XXX W	0.057	0.030	N/A*
0110 RS XXX W	0.029	0.014	N/A*
0160 RS XXX W	0.020	0.010	N/A*
0240 RS XXX W	0.014	0.007	N/A*
0330 RS XXX W	0.010	0.005	N/A*
0400 RS XXX W	0.011	0.009	N/A*
0500 RS XXX W	0.011	0.009	N/A*
0950 RS XXX W	0.003	0.002	N/A*
1300 RS XXX W	0.003	0.002	N/A*

"RN" Return Elements



Betamicron			RNBN4HC		
Size	3 μm	5 μm	10 µm	20 μm	Wgt. (lbs.)
0040 RN XXX BN4HC	0.779	0.428	0.263	0.143	0.298
0063 RN XXX BN4HC	0.521	0.285	0.187	0.099	0.398
0100 RN XXX BN4HC	0.373	0.181	0.126	0.066	0.606
0160 RN XXX BN4HC	0.198	0.099	0.066	0.027	0.895
0250 RN XXX BN4HC	0.154	0.077	0.049	0.022	2.085
0400 RN XXX BN4HC	0.121	0.088	0.071	0.055	3.122
0630 RN XXX BN4HC	0.115	0.066	0.049	0.038	3.728
1000 RN XXX BN4HC	0.038	0.027	0.022	0.016	6.104

 $^{^{\}star}$ Not Available at the time of publication. Please contact HYDAC for latest information. All Element K Factors in psi / gpm.

Element K-Factors ECOmicron®-fit "R...ECO/N"



ECOmicron-fit	1.14.XXDXXECO/N					
Size	1µm	3 μm	6 μm	12 µm	25 μm	Wgt. (lbs.)
1.14.16DXXECO/N	0.084	0.046	0.041	0.022	0.015	N/A*
1.14.39DXXECO/N	0.032	0.017	0.016	0.008	0.006	N/A*

"MA" Spin-on Elements



Spin-on			MABN		
Size	3 μm	5 μm	10 μm	20 µm	Wgt. (lbs.)
0040 MA XXX BN	1.391	1.780	0.629	0.361	0.73
0080 MA XXX BN	0.522	0.442	0.236	0.135	1.35
0085 MA XXX BN	N/A*	N/A*	N/A*	N/A*	N/A*
0090 MA XXX BN	0.484	0.37	0.345	0.191	1.5
0095 MA XXX BN	0.276	0.211	0.197	0.109	2.04
0160 MA XXX BN	0.237	0.198	0.111	0.063	2.56
0180 MA XXX BN	0.123	0.103	0.058	0.033	3.69

Spin-on		MA	.P	
Size	3 μm	10 μm	25 µm	Wgt. (lbs.)
0040 MA XXX P	7.763	2.348	1.516	0.6
0080 MA XXX P	1.606	0.486	0.314	1.08
0085 MA XXX P	1.161	0.351	0.227	1.42
0090 MA XXX P	1.594	0.482	0.311	1.29
0095 MA XXX P	0.894	0.270	0.174	1.47
0160 MA XXX P	0.839	0.192	0.145	2.15
0180 MA XXX P	0.443	0.134	0.087	2.68

Spin-on		MAAM	
Size	10 µm	40 µm	Wgt. (lbs.)
0080 MA XXX AM	0.513	N/A*	1.35
0085 MA XXX AM	N/A*	N/A*	N/A*
0090 MA XXX AM	0.507	N/A*	1.50
0095 MA XXX AM	0.284	N/A*	2.00
0160 MA XXX AM	N/A*	0.233	2.50
0180 MA XXX AM	N/A*	0.136	3.60

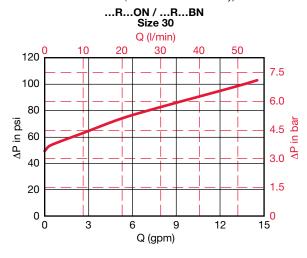
 $^{^{\}star}$ Not Available at the time of publication. Please contact HYDAC for latest information. All Element K Factors in psi / gpm.

Element Hydraulic Data

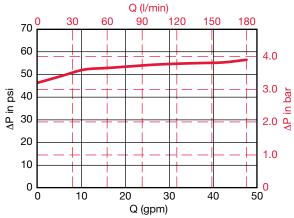
Permissible ΔP across element

- Optimicron® (ON) 290 psid (20 bar)
- Optimicron® Power (ON/PO) 145 psid (10 bar)
- Betamicron®-H (high collapse) (BH4HC) 3045 psid (210 bar)
- Betamicron®-N (low collapse) (BN4HC) 290 psid (20 bar)
- Betamicron®/Aquamicron® (BN4AM) 145 psid (10 bar)
- ECOmicron® (ECON2) 145 psid (10 bar)
- Aquamicron® (AM) 145 psid (10 bar) Wire Mesh (W/HC) 290 psid (20 bar)
- Polyester (P/HC) 145 psid (10 bar)
- Metal Fiber (V) return (R...V) 435 psid (30 bar); pressure (D...V) - 3045 psid (210 bar)
- Mobilemicron (MM/RK) 145 psid (10 bar)

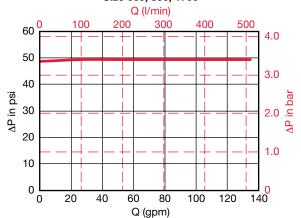
Bypass Valve Curves (...R...ON / ...R...BN only)



.R...ON / ...R...BN Size 75, 160, 165, 185, 240, 280



...R...ON / ...R...BN Size 660, 850, 1700



Temperature Range

-22°F to 212°F (-30°C to 100°C) Note: Consult HYDAC for applications below 14°F (-10°C)

Compatibility with Hydraulic Media

Suitable for use with mineral oils, lubrication oils, non-flammable fluids, synthetic and rapidly biodegradable oils. Note: For use with water, please contact HYDAC.

Flow Fatigue Stability to ISO 3724

High fatigue resistance due to solid filter media supports on upstream and downstream sides and high inherent stability of filter elements.

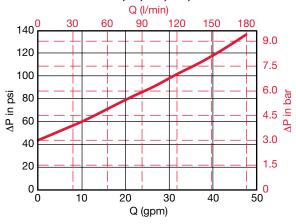
Cracking Pressure of Bypass Valve (...R only)

 $\Delta P = 3 \text{ bar} + 0.5 \text{ bar}$

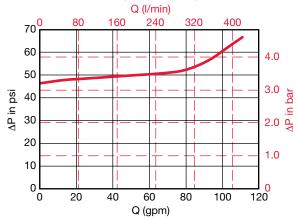
Bypass Valve Curves (...R...ON / ...R...BN only)

The bypass valve graphs apply to mineral oils with a density of 0.86 kg/dm³. The differential pressure of the valves changes proportionally to the density. See graphs below.

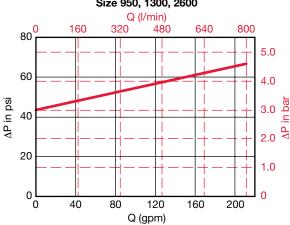
...R...ON / ...R...BN Size 60, 90, 110, 140, 150



...R...ON / ...R...BN Size 210, 270, 330, 500, 750

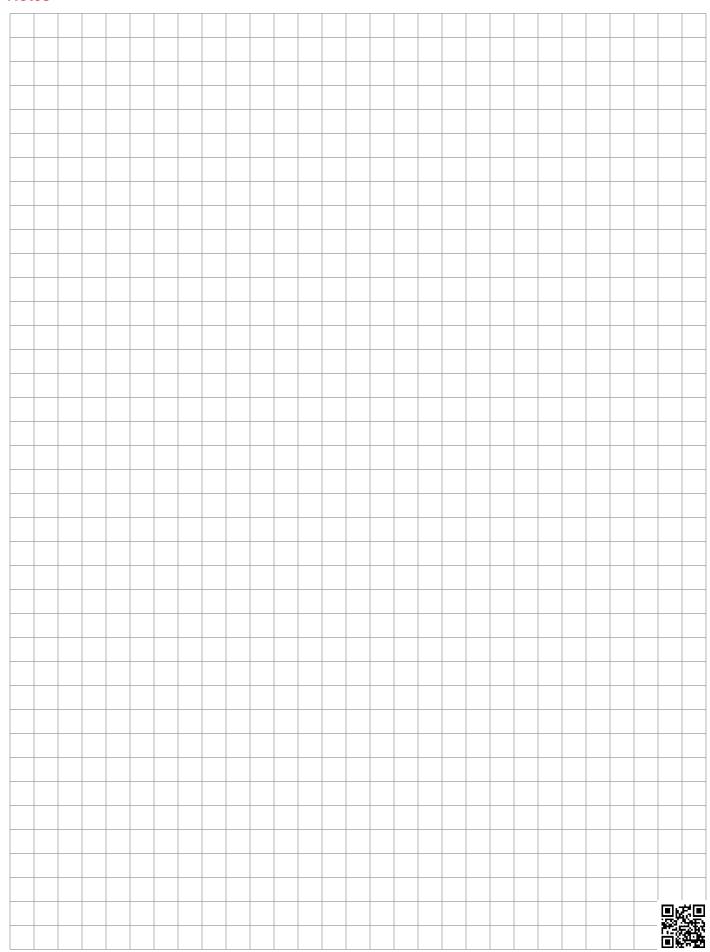


...R...ON / ...R...BN Size 950, 1300, 2600



FILTER ELEMENTS

Notes





Low Pressure (Return) Filters

100-600 psi

In-tank, inline, and duplex configurations provide flexibility for use in mobile, industrial, and lube applications. Light weight construction and low ΔP (cold start) options make these filters ideal for agriculture and construction vehicles. Duplex filters allow for uninterrupted operation during element change-out. Modular versions accommodate high flow requirements.

LOW PRESSURE FILTERS

RF Series

In-tank / Inline Filters 360 psi • up to 400 gpm



Features

- RF 30 filters are constructed of polyamide plastic.
- RF 60 330 filters are constructed of aluminum material. Aluminum alloy is water tolerant - anodization is not required for high water based fluids (HWBF).
- RF 660 1300 filters are constructed of ductile iron.
- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- Inlet/outlet port options include NPT, SAE straight thread O-ring boss, and SAE 4-bolt flange to allow easy installation without costly adapters.
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, ethylene propylene rubber) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water base fluids.
- Bolt-on lid requires minimal clearance for removal.
- Reusable contamination basket prevents loss of retained contaminants into the reservoir during element replacement.
- Single piece casting provides rigidity for inline or in-tank

Note: This filter is configured with an R type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Applications



Agricultural



Industrial



Construction



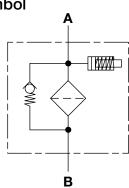
Gearboxes



Automotive







Technical Specifications

reeninear epeemeanerie				
Mounting Method	4 Mounting holes - filter housing			
Port Connections	Inlet / Outlet			
30 60/110 160/240	1/2" Threaded / 0.71" Dia Smooth SAE-12 / SAE-12; 3/4" NPT / SAE-12 SAE-20 / SAE-20; 1 1/4" NPT			
330	(with adapter) / SAE-20 SAE-20 / 2" NPT (with flange port adapter) 2" Threaded (NPT/BSPP/SAE) / same as inlet			
660	2" SAE Flange, Code 61 / 2" NPT 3" SAE Flange, Code 61 / 3" NPT 3" SAE Flange, Code 61 /			
950	3" SAE Flange, Code 61 3-1/2" SAE Flange, Code 61 / 3-1/2" SAE Flange, Code 61			
1300	4" SAE Flange, Code 61 / 4" SAE Flange, Code 61 /			
Direction of Flow	Inlet: Side Outlet: bottom			

Direction of Flow	Inlet: Side	Outlet: bottom

Materials of Construction

O		
660-1300	Ductile Iron	Ductile Iron
60-330	Aluminum	Aluminum
30	Polyamide	Polyamide
	Housing	Lia

Flow Capacity

30	8 gpm (30 lpm)
60	16 gpm (60 lpm)
110	29 gpm (110 lpm)
160	42 gpm (160 lpm)
240	63 gpm (240 lpm)
330	87 gpm (330 lpm)
660	174 gpm (660 lpm)
950	251 gpm (950 lpm)
1300	343 gpm (1300 lpm)

Housing Pressure Rating

Max. Allowable Working Pressure* Fatigue Pressure		ar); (size 30 - 145 psi, 10 bar) ar) @ 700,000 cycles;
Burst Pressure	30 60/110 160/240 330 660-1300	580 psi (40 bar) 1080 psi (75 bar) 1230 psi (85 bar) 1440 psi (100 bar) 3045 psi (210 bar)

Element Collapse Pressure Rating

ON, W/HC,	290 psid (20 bar)
ECON2, BN4AM, P/HC, AM	145 psid (10 bar)
V	435 psid (30 bar)

Fluid Temp. Range 14°F to 212°F (-10°C to 100°C)

Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

P = 29 psi (2 bar) -10% (standard) P = 72 psi (5 bar) -10% (optional)

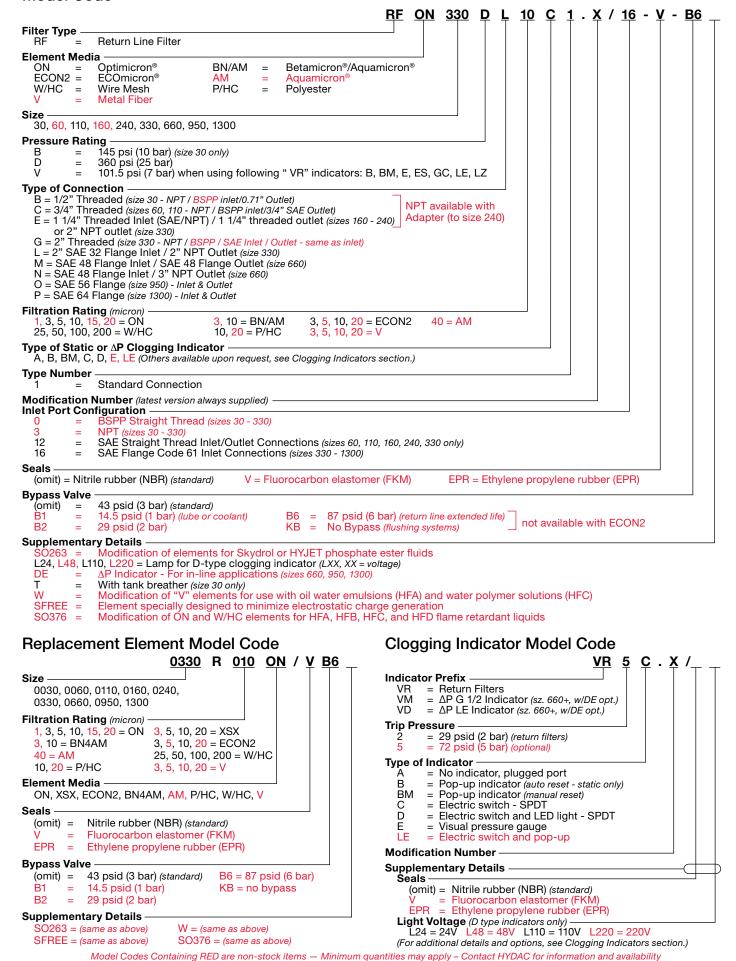
Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid } (3 \text{ bar}) + 10\% \text{ (standard)}$ $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (optional)}$



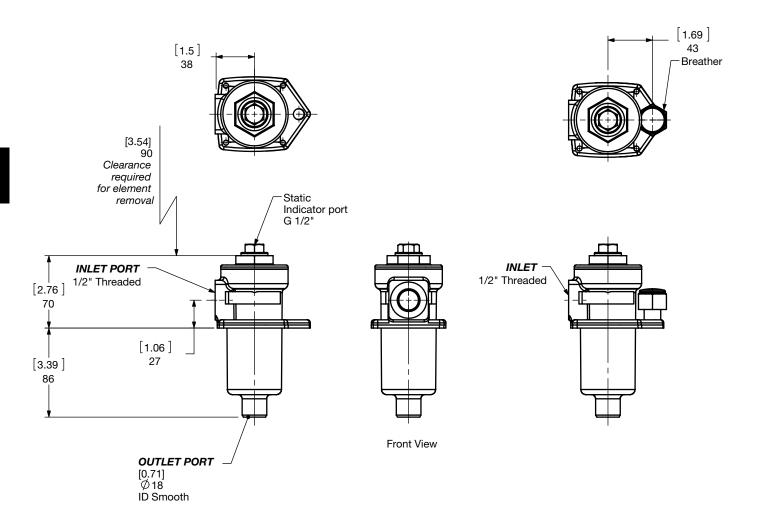
^{*}Note: All RF Filters MAWP reduce to 7 bar (101.5 psi) when using the following "VMF" and "VR" indicators: B, BM, E, ES, GC, LE, LZ.

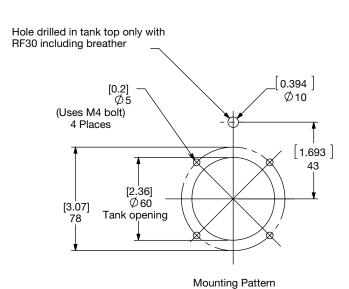
Model Code



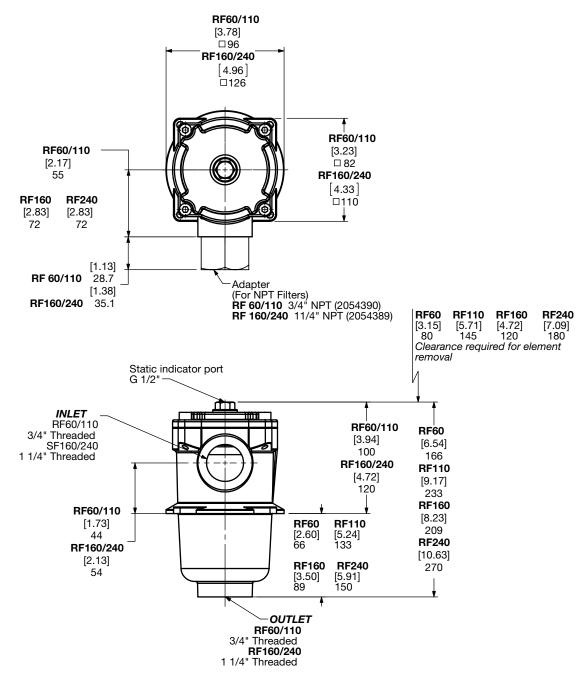
Dimensions RF 30 (No Breather)

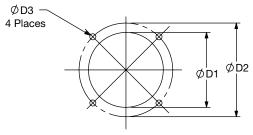
RF 30...T (With Breather)





Size	30
Weight (lbs.)	0.9





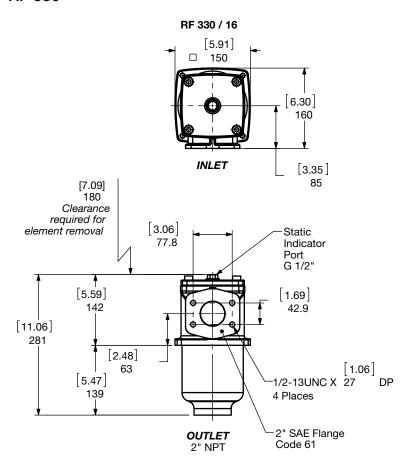
Mounting Pattern

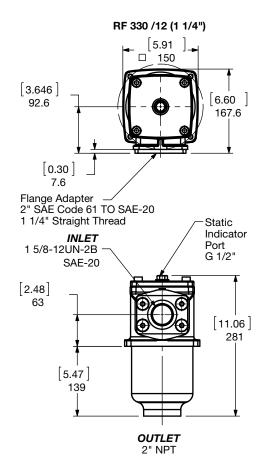
Size	øD1	øD2	øD3	Bolts
60 / 110	3.15" (80mm)	3.94" (100mm)	0.26" (6.5mm)	M5
160 / 240	4.17" (106mm)	5.32" (135mm)	0.30" (7.5mm)	M6

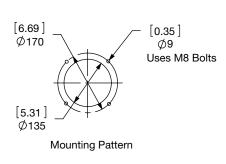
Size	60	110	160	240
Weight (lbs.)	2.0	2.5	4.0	5.0

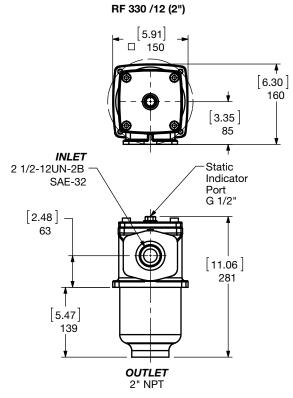
LOW PRESSURE FILTERS

Dimensions RF 330



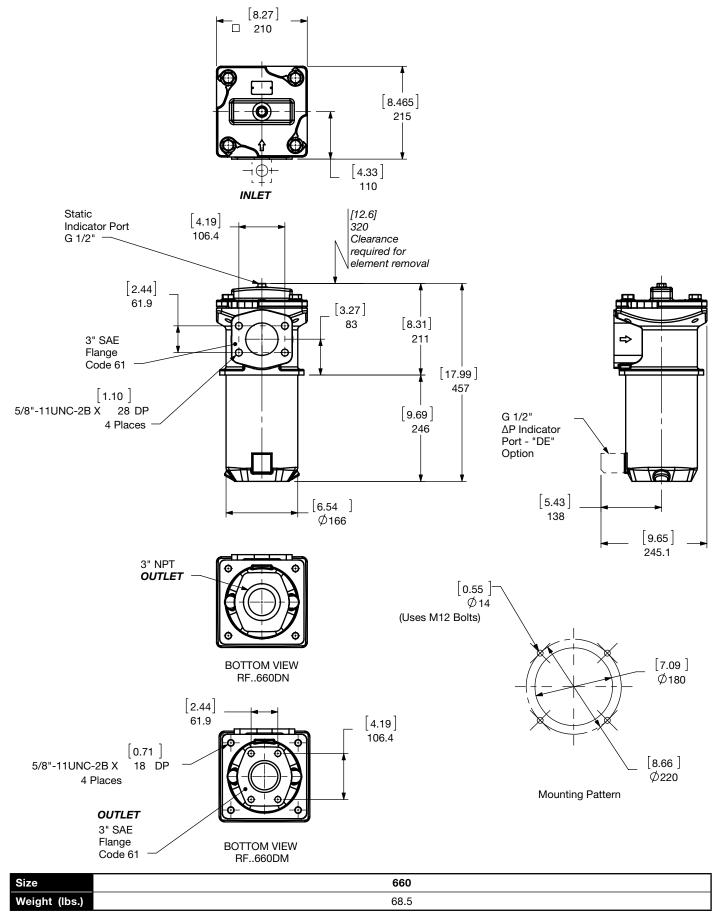






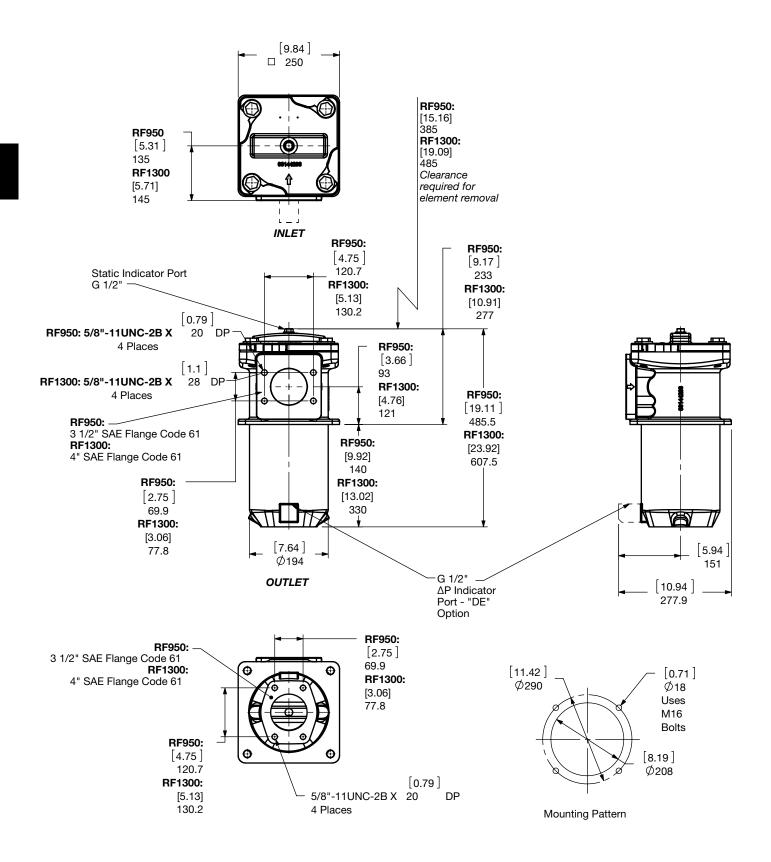
Size	330
Weight (lbs.)	9.0

Dimensions RF 660



LOW PRESSURE FILTERS

Dimensions RF 950 - 1300



Size	950	1300
Weight (lbs.)	98.1	115.7

Sizing Information

Total pressure loss through the filter is as follows:

Assembly P = Housing P + Element P

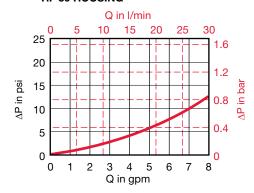
Housing Curve:

Pressure loss through housing is as follows:

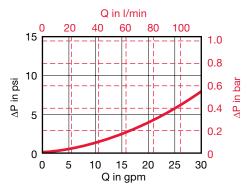
Housing P = Housing Curve P x Actual Specific Gravity

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

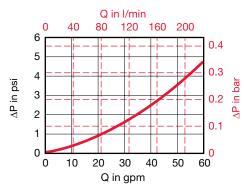
RF 30 HOUSING



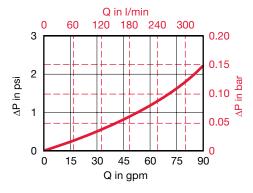
RF 60/110 HOUSING



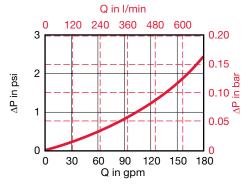
RF 160/240 HOUSING



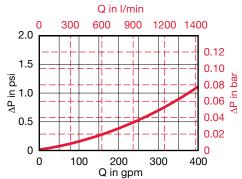
RF 330 HOUSING



RF 660 HOUSING



RF 950/1300 HOUSING



LOW PRESSURE FILTERS

Element K Factors

 ΔP Elements = Elements (K) Flow Factor x Flow Rate (gpm) x $\frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}}$ x $\frac{\text{Actual Specific Gravity}}{0.86}$

Optimicron			R.	ON		
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm
0030 R XXX ON	4.928	3.754	2.409	1.471	0.922	0.807
0060 R XXX ON	2.59	1.295	0.944	0.539	0.494	0.376
0110 R XXX ON	1.224	0.719	0.487	0.296	0.234	0.178
0160 R XXX ON	0.878	0.439	0.312	0.177	0.148	0.182
0240 R XXX ON	0.571	0.284	0.201	0.125	0.101	0.077
0330 R XXX ON	0.444	0.204	0.15	0.081	0.07	0.056
0660 R XXX ON	0.196	0.093	0.066	0.037	0.031	0.025
0950 R XXX ON	0.131	0.057	0.043	0.026	0.021	0.017
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012

Stat-X	RXSX			
Size	3 µm	5 μm	10 μm	20 μm
0030 R XXX XSX	3.754	2.409	1.471	0.807
0060 R XXX XSX	1.295	0.944	0.539	0.376
0110 R XXX XSX	0.719	0.487	0.296	0.178
0160 R XXX XSX	0.439	0.312	0.177	0.182
0240 R XXX XSX	0.284	0.201	0.125	0.077
0330 R XXX XSX	0.204	0.15	0.081	0.056
0660 R XXX XSX	0.093	0.066	0.037	0.025
0950 R XXX XSX	0.057	0.043	0.026	0.017
1300 R XXX XSX	0.04	0.032	0.019	0.012

ECOmicron	RECON2			
Size	3 µm	5 μm	10 μm	20 μm
0160 R XXX ECON2	0.521	0.324	0.209	0.159
0240 R XXX ECON2	0.340	0.209	0.143	0.099
0330 R XXX ECON2	0.230	0.148	0.093	0.066
0660 R XXX ECON2	0.104	0.066	0.044	0.027
0950 R XXX ECON2	0.066	0.044	0.027	0.022
1300 R XXX ECON2	0.044	0.033	0.022	0.016

Betamicron/Aquamicron	RE	BN4AM
Size	3 μm	10 µm
0330 R XXX BN4AM	0.477	0.165
0660 R XXX BN4AM	0.192	0.066
0950 R XXX BN4AM	0.132	0.044
1300 R XXX BN4AM	0.088	0.033

Aquamicron	RAM
Size	40 μm
0330 R 040 AM	0.115
0660 R 040 AM	0.051
0950 R 040 AM	0.036
1300 R 040 AM	0.026

Wire Mesh	RW/HC
Size	25, 50, 100, 200 μm
0030 R XXX W/HC	0.067
0060 R XXX W/HC	0.034
0110 R XXX W/HC	0.016
0160 R XXX W/HC	0.011
0240 R XXX W/HC	0.007
0330 R XXX W/HC	0.011
0660 R XXX W/HC	0.004
0950 R XXX W/HC	0.003
1300 R XXX W/HC	0.002

Polyester	RP/HC	
Size	10 µm	20 μm
0030 R XXX P/HC	0.181	0.092
0060 R XXX P/HC	0.092	0.046
0110 R XXX P/HC	0.050	0.025
0160 R XXX P/HC	0.035	0.017
0240 R XXX W/HC	0.023	0.012
0330 R XXX W/HC	0.016	0.008
0660 R XXX W/HC	0.008	0.004
0950 R XXX W/HC	0.006	0.003
1300 R XXX W/HC	0.004	0.002

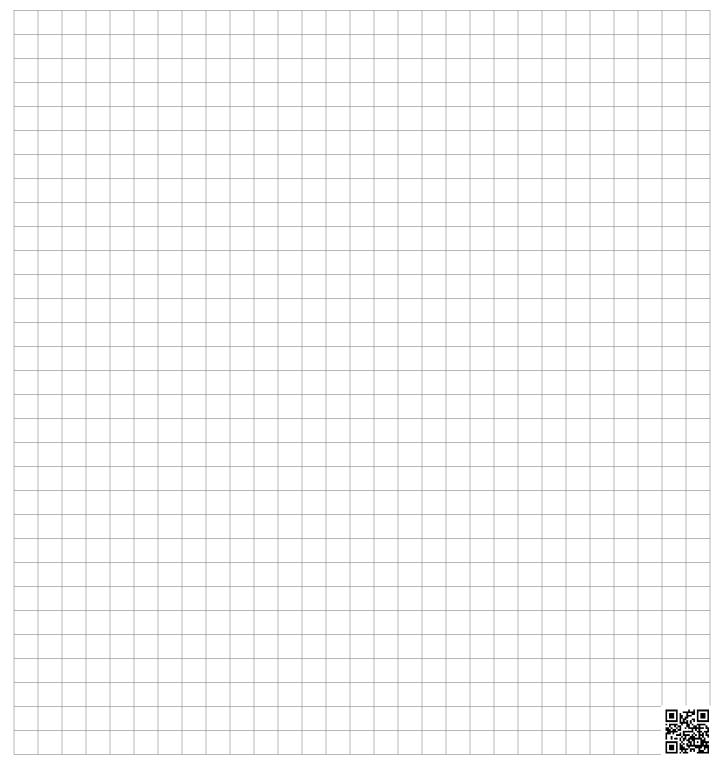
All Element K Factors in psi / gpm.



LOW PRESSURE FILTERS

S.S. Wire Mesh "R"	RV US UNITS			
Size	3 µm	5 μm	10 μm	20 μm
0030 R XXX V	1.065	0.779	0.434	0.209
0060 R XXX V	0.873	0.510	0.296	0.181
0110 R XXX V	0.417	0.280	0.165	0.110
0160 R XXX V	0.269	0.192	0.132	0.082
0240 R XXX V	0.176	0.143	0.093	0.066
0330 R XXX V	0.115	0.093	0.060	0.044
0660 R XXX V	0.055	0.044	0.033	0.022
0950 R XXX V	0.038	0.033	0.022	0.011
1300 R XXX V	0.027	0.022	0.016	0.011

Notes

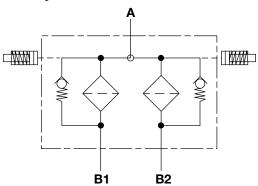


RFD Series

In-Tank / Inline Duplex Filters 360 psi • up to 400 gpm







Features

- RFD 110 330 filters are constructed of aluminum.
- Aluminum alloy is water tolerant anodization is not required for water based fluids (HWBF).
- RFD 660 1300 filters are constructed of ductile iron.
- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- Inlet/outlet port options include NPT (RFD 110-240 inlet only), SAE straight thread O-ring boss, and SAE 4-bolt flange to allow easy installation without costly adapters.
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, ethylene propylene rubber) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water base fluids.
- Bolt-on lid requires minimal clearance for removal.
- Reusable contamination basket prevents loss of retained contaminants into the reservoir during element replacement.
- All RFD duplex filters have a ball-type selector valve to provide continuous filtration without system shut-down to change clogged elements.
- Single piece housing castings provide strength and rigidity for in-line or in-tank mounting
- Flange connection bolts included for inlet connection only. Bolts are suitable for use with split flange halves, per ISO6162-1 / SAE J518-1.

Note: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Sizes 60 and 160 have been discontinued. Replacement elements, seal kits and lid assemblies are still available.

Technical Specifications

Mounting Method	4 Mounting holes in the filter housing
Port Connections	Inlet / Outlet
110	SAE-12 / SAE-12; 3/4"NPT (adapter) / SAE-12
240	SAE-16 (adapter) / G-1-1/4" female; 1"NPT
	(adapter) / G-1-1/4" female
330	G2" / G2"; SAE DN 51 Code 61 Flange / G2"
660	SAE DN 76 Code 61 / SAE DN 76 Code 61
	SAE DN 76 Code 61 / SAE DN 89 Code 61
950	SAE DN 102 Code 61/ SAE DN 89 Code 61
1300	SAE DN 102 Code 61/ SAE DN 102 Code 61

Direction of Flow Side Inlet and Bottom Outlet

Materials of Construction

110 - 240 330 660-1300	Aluminum Aluminum Ductile Iron	Aluminum Aluminum Ductile Iron	Steel Aluminum Ductile Iron
Flow Capacity			
110	29 gpm (110 lp	om)	

110	29 gpm (110 lpm)
240	63 gpm (240 lpm)
330	87 gpm (330 lpm)
660	174 gpm (660 lpm)
950	251 gpm (950 lpm)
1300	343 gpm (1300 lpm)

Housing Pressure Rating

Max. Allowable

360 psi (25 bar) Working Pressure*

360 psi (25 bar) @ 700,000 cycles Fatigue Pressure **Burst Pressure** 110 1080 psi (75 bar) 240 1230 psi (85 bar) 330 1440 psi (100 bar) 660-1300 >1440 psi (100 bar)

Element Collapse Pressure Rating

ON, W/HC 290 psid (20 bar) ECON2, BN4AM, P/HC, AM 145 psid (10 bar) 435 psid (30 bar)

14°F to 212°F (-10°C to 100°C) Fluid Temperature Range

Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

P = 29 psi (2 bar) -10% (standard) P = 72 psi (5 bar) -10% (optional)

Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar)} +10\% \text{ (standard)}$ $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (optional)}$

*Note: All RFD Filters MAWP reduce to 7 bar (101.5 psi) when using the following "VMF" and "VR" indicators: B, BM, E, ES, GC, LE, LZ.

Applications



Agricultural

Industrial







Power Generation





Pulp & Paper



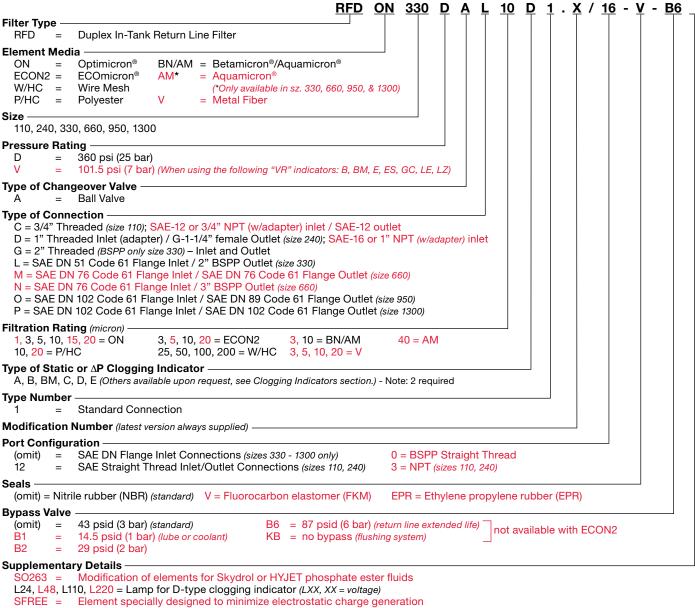
Gearboxes

Steel / Heavy Industry



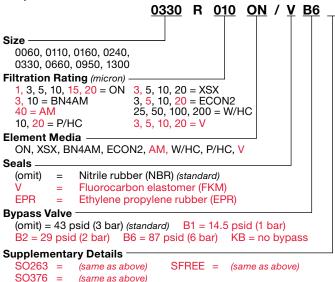
Transfer Value

Model Code

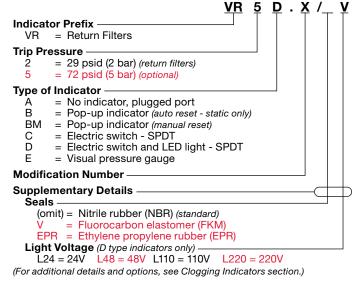


Modification of ON and W/HC elements for HFA, HFB, HFC, and HFD flame retardant liquids

Replacement Element Model Code

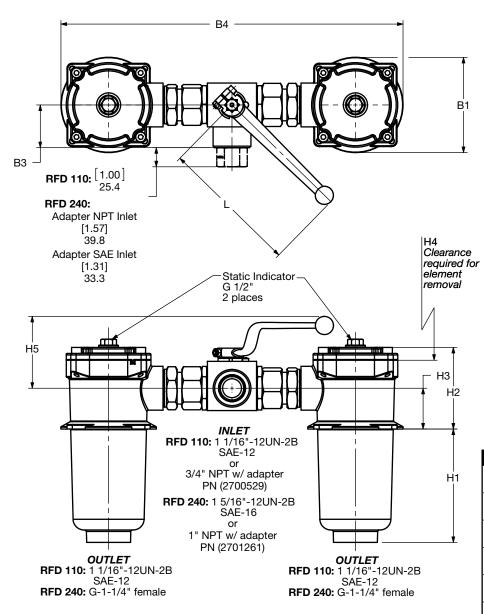


Clogging Indicator Model Code



Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

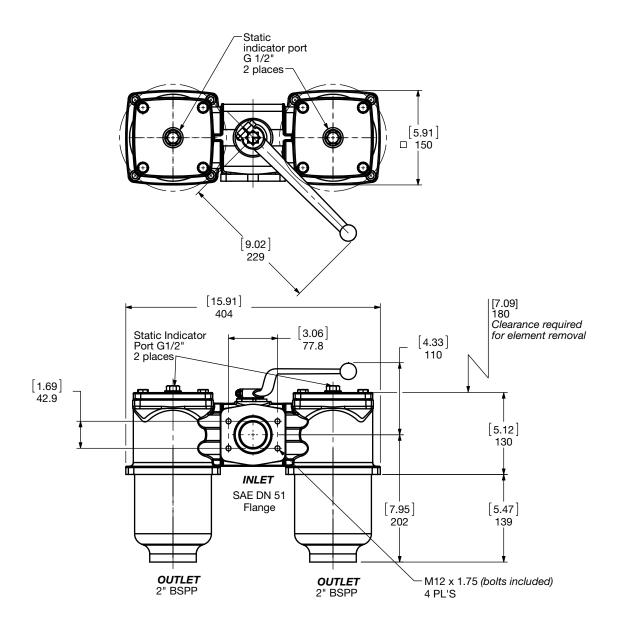
Dimensions RFD 110 - 240

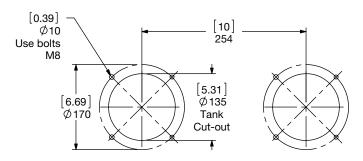


₫ ₽ 0	← B2 −	-
Ø D3 ▲		
Ø D2	ØD1 Tank Cut-out	
	Mounting P	attern

Size	110	240
B1	[3.77] 96	[4.96] 126
B2	[10.26] 260.5	[13.2] 335.5
В3	[1.87] 47.5	[2.22] 56.5
В4	[14] 357	[18.14] 461
D1	[3.15] 80	[4.17] 106
D2	[3.9] 100	[5.3] 135
D3	[0.315] 8	[0.374] 9.5
H1	[5.24] 133	[5.91] 150
H2	[3.46] 88	[4.25] 108
НЗ	[1.73] 44	[2.13] 54
H4	[5.71] 145	[7.1] 180
H5	[3.62] 92	[3.74] 95
L	[6.81] 173	[6.81] 173
Reservoir bolts	M5	M6

Size	110	240
Weight (lbs.)	8.2	17.2

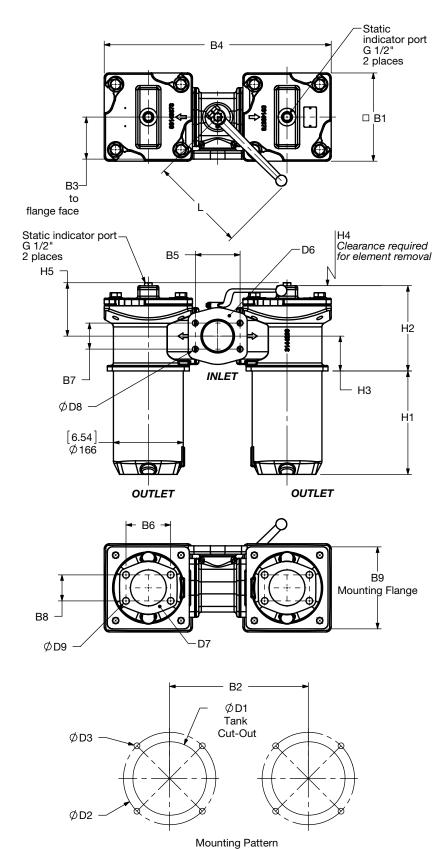




Mounting Pattern

Size	330
Weight (lbs.)	29.6

Dimensions RFD 660 - 1300



Size	660	950	1300
B1	[8.27] 210	[9.61] 244	[9.61] 244
B2	[12.99] 330	[15.35] 390	[16.14] 410
B3	[3.9] 100	[5.51] 140	[5.51] 140
B4	[21.26] 540	[25.2] 640	[25.98] 660
B5	[4.19] 106.5	[5.13] 130.2	[5.13] 130.2
В6	[4.19] 106.4	[4.75] 120.7	[5.13] 130.2
B7	[2.43] 61.9	[3.06] 77.8	[3.06] 77.8
B8	[2.43] 61.9	[2.75] 69.9	[3.06] 77.8
В9	[7.68] 195	[9.84] 250	[9.84] 250
D1	[7.1] 180	[8.19] 208	[8.19] 208
D2	[8.66] 220	[11.42] 290	[11.42] 290
D3	[0.55] 14	[0.71] 18	[0.63] 16
D6	SAE DN 76	SAE DN 102	SAE DN 102
	Flange	Flange	Flange
D7	3" BSPP or SAE DN 76	SAE DN 89	SAE DN 102
<i>D</i> ,	Flange	O/ IL DIV 00	6/ (L B) (102
D8	M16 x 2*	M16 x 2*	M16 x 2*
D9	M16 X 2,	M16 X 2,	M16 X 2,
	18 mm deep	20 mm deep	20 mm deep
H1	[9.68] 246	[9.94] 252.5	[13.01] 330.5
H2	[7.99] 203	[8.85] 225	[10.6] 269
H3	[3.27] 83	[[3.66] 93	[4.76] 121
H4	[12.6] 320	[15.16] 385	[19.09] 485
H5	[4.48] 114	[6.69] 170	[6.69] 170
L	[9.02] 229	[12.52] 318	[12.52] 318
Bolts**	M12 x 1.75	M16 x 2	M16 x 2
*Dalta inal			

^{*}Bolts included

^{**} Recommended reservoir mounting bolts

Size	660	950	1300
Weight (lbs.)	158.8	231.5	260.2

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

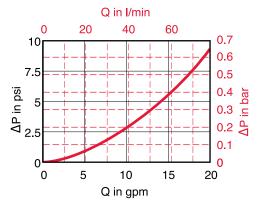
Housing Curve:

Pressure loss through housing is as follows:

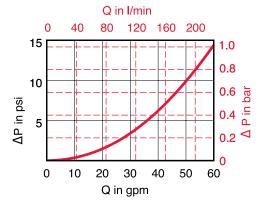
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

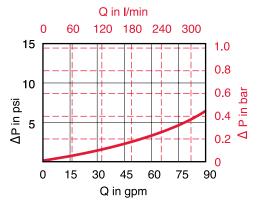
RFD 110 HOUSING & TRANSFER VALVE



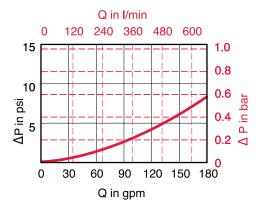
RFD 240 HOUSING & TRANSFER VALVE



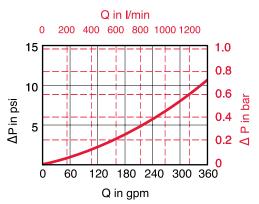
RFD 330 HOUSING & TRANSFER VALVE



RFD 660 HOUSING & TRANSFER VALVE



RFD 950/1300 HOUSING & TRANSFER VALVE



Element K Factors

 $\Delta P \; \text{Elements} = \text{Elements} \; (\text{K}) \; \text{Flow Factor} \; x \; \text{Flow Rate (gpm)} \; x \; \\ \frac{\text{Actual Viscosity (SUS)}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{0.86} \; x \; \\ \frac{\text{Actual Viscosity (SUS)}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{0.86} \; x \; \\ \frac{\text{Actual New Factor}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{0.86} \; x \; \\ \frac{\text{Actual New Factor}}{0.86} \; x \; \\ \frac$

Optimicron			R.	ON		
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm
0110 R XXX ON	1.224	0.719	0.487	0.296	0.234	0.178
0240 R XXX ON	0.571	0.284	0.201	0.125	0.101	0.077
0330 R XXX ON	0.444	0.204	0.15	0.081	0.07	0.056
0660 R XXX ON	0.196	0.093	0.066	0.037	0.031	0.025
0950 R XXX ON	0.131	0.057	0.043	0.026	0.021	0.017
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012

Stat-X		RXSX				
Size	3 μm	5 μm	10 μm	20 μm		
0110 R XXX XSX	0.719	0.487	0.296	0.178		
0240 R XXX XSX	0.284	0.201	0.125	0.077		
0330 R XXX XSX	0.204	0.15	0.081	0.056		
0660 R XXX XSX	0.093	0.066	0.037	0.025		
0950 R XXX XSX	0.057	0.043	0.026	0.017		
1300 R XXX XSX	0.04	0.032	0.019	0.012		

ECOmicron	RECON2				
Size	3 µm	5 μm	10 μm	20 μm	
0240 R XXX ECON2	0.340	0.209	0.143	0.099	
0330 R XXX ECON2	0.230	0.148	0.093	0.066	
0660 R XXX ECON2	0.104	0.066	0.044	0.027	
0950 R XXX ECON2	0.066	0.044	0.027	0.022	
1300 R XXX ECON2	0.044	0.033	0.022	0.016	

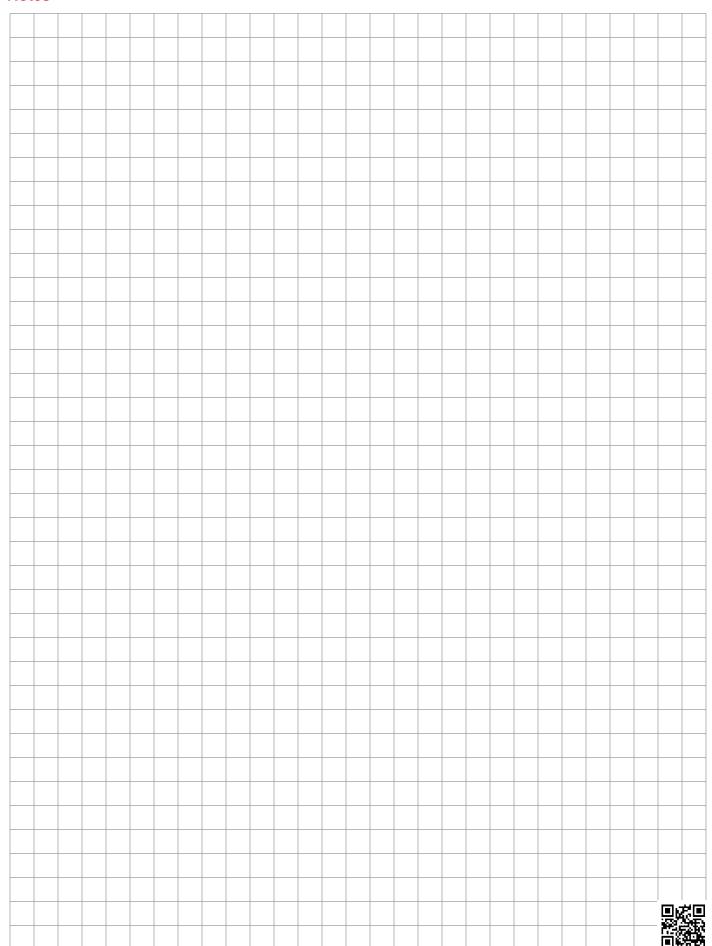
Betamicron/Aquamicron	RBN4AM		
Size	3 µm	10 µm	
0330 R XXX BN4AM	0.477	0.165	
0660 R XXX BN4AM	0.192	0.066	
0950 R XXX BN4AM	0.132	0.044	
1300 R XXX BN4AM	0.088	0.033	

Aquamicron	RAM
Size	40 μm
0330 R 040 AM	0.115
0660 R 040 AM	0.051
0950 R 040 AM	0.036
1300 R 040 AM	0.026

Wire Mesh	RW/HC
Size	25, 50, 100, 200 μm
0110 R XXX W/HC	0.016
0240 R XXX W/HC	0.007
0330 R XXX W/HC	0.011
0660 R XXX W/HC	0.004
0950 R XXX W/HC	0.003
1300 R XXX W/HC	0.002

Polyester	RP/HC	
Size	10 μm	20 μm
0110 R XXX P/HC	0.050	0.025
0240 R XXX W/HC	0.023	0.012
0330 R XXX W/HC	0.016	0.008
0660 R XXX W/HC	0.008	0.004
0950 R XXX W/HC	0.006	0.003
1300 R XXX W/HC	0.004	0.002

Notes



RFM Series

In-Tank Return Line Filters 145 psi • up to 224 gpm



Features

- The compact and lightweight design make RFM filters especially suitable for mobile applications.
- RFM filters are constructed of polyamide plastic housing and lid.
- RFM 90/150/210/270 drop in replacement for "Tank Topper" filters.
- Sizes 50 851 aluminum alloy is water tolerant anodization is not required for water based fluids (HWBF).
- The filter bowl on models 50 270 also serves as a contamination basket - removed to change element.
- Models 330, 500, 661, and 851 have filter elements equipped with separate, reusable contamination baskets.
- Sizes 75/90/150/165/185 available with 4- or 2-bolt tank flange.
- Second inlet optional port available for sizes 75, 165, 185 only with 4-bolt mounting head.
- Sizes 975 & 1100 added for increased flow capacities
- Sizes 50, 975 and 1100 utilize separate bypass assemblies
- Size 50 only available with BN4HC elements

Note: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element. (Exception - sizes 50, 975, 1100)

Consult HYDAC for applications using RFM50. RFM50 is not a standard offering.

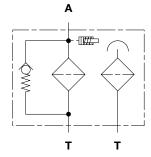
Applications

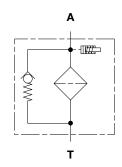






Hydraulic Symbol





Tochnical Specifications

Technical Specificat	ions		
Mounting Method			
75/90/150/165/185		2 mounting housing	holes - filter
50/75/90/150/165/185/210/27 330/500/661/851/975/1100	0/	4 mounting housing	holes - filter
Port Connections	Inlet / Outle	t	
50 90/150 75/165/185 210/270 330/500 661/851 975/1100	SAE-20 / O SAE-24 / 2" 1 1/2" SAE 2 1/2" SAE 1/2" BSPP 2" SAE Stra 2 1/2" NPT	26" Smooth F pen Bottom ' NPT	e 61 / 2" NPT e 61 / G 2 / 2" NPT " NPT M
Direction of Flow	Side inlet a	nd bottom ou	ıtlet.
Mat. of Construc.	Head	Bowl	Lid
50/90/150/75/165/185 210/270 330/500/661/851 975/1100	Aluminum Aluminum Aluminum Aluminum	Polyamide Steel Polyamide Steel	Polyamide
Flow Capacity			
50 - 13 gpm (50 lpm) 75 - 20 gpm (75 lpm) 90 - 24 gpm (90 lpm) 150 - 40 gpm (150 lpm) 165 - 43 gpm (165 lpm) 185 - 49 gpm (185 lpm) 210 - 55 gpm (210 lpm)	270 - 71 gpm (270 lpm) 330 - 87 gpm (330 lpm) 500 - 132 gpm (500 lpm) 661 - 174 gpm (660 lpm) 851 - 225 gpm (850 lpm) 975 - 258 gpm (950 lpm) 1100 - 300 gpm (1100 lpm)		
Housing Pressure Rating			
Max. Allowable Working Pressure* Fatigue Pressure Burst Pressure		bar) <i>(Size</i> s 97 bar) @ 1 millio >580 ps 536 ps	

Element Collapse Pressure Rating

BN4HC (size 50, 975 & 1100 only) 145 psid (10 bar) ON (size 50-851 only), W/HC 290 psid (20 bar) 145 psid (10 bar) ECON2, BN4AM, AM, P/HC, MM 435 psid (30 bar)

Fluid Temperature Range -22°F to 212°F (-30°C to 100°C)

Consult HYDAC for applications below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

P = 20 psi (1.4 bar) - 10%

P = 29 psi (2 bar) -10% (standard)

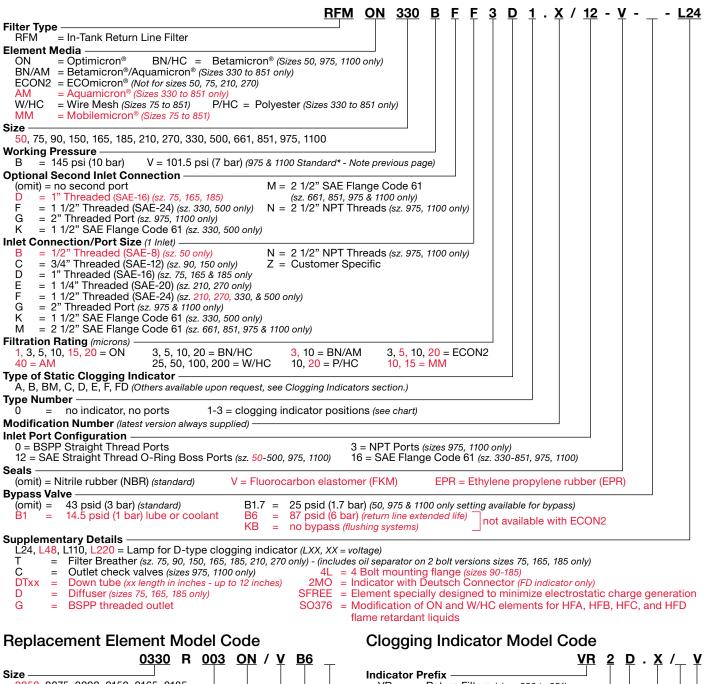
P = 72 psi (5 bar) -10% (optional)

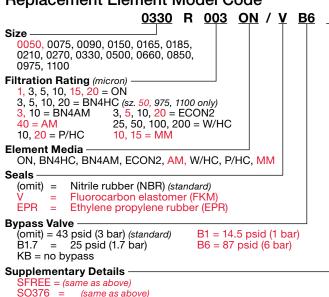
Bypass Valve Cracking Pressure

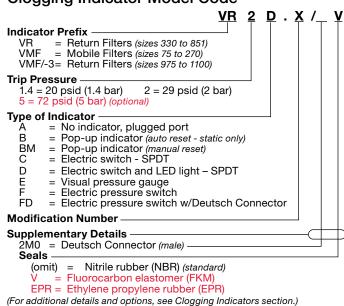
 $\Delta P = 43 \text{ psid } (3 \text{ bar}) + 10\% \text{ (Standard - All sizes except 50, 975, 1100)}$ $\Delta P = 87$ psid (6 bar) +10% (Optional - Sizes 50, 975 & 1100 not available) $\Delta P = 25 \text{ psid } (1.7 \text{ bar}) + 10\% \text{ (Standard for Sizes 50, 975 & 1100)}$

*Note: All RFM Filters MAWP reduce to 7 bar (101.5 psi) when using the following "VMF" and "VR" indicators: B, BM, E, ES, GC, LE, LZ.

Model Code



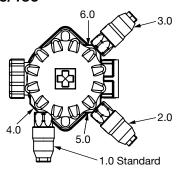




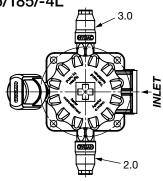
Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

D21

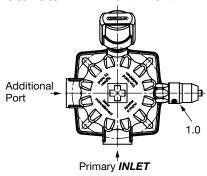
Clogging Indicator Locations RFM 75/165/185

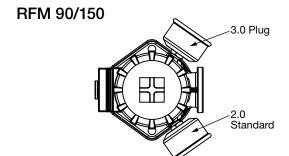


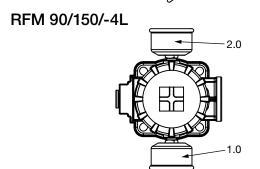
RFM 75/165/185/-4L



RFM 75/165/185/-4L - Multi-Port







RFM 75/165/185 (2 Bolt Mount)

Type No.	Location of Clogging Indicator	Indicator Model
1.X	Clogging Indicator left back 90° to Inlet	VMF
2.X	Clogging Indicator left front 45° to Inlet VMF	
3.X	Clogging Indicator right front 45° to Inlet	VMF
4.X	Clogging Indicator left back 135° to Inlet	VMF
5.X	Clogging Indicator left front 90° to Inlet	VMF
6.X	Clogging Indicator right front 90° to Inlet	VMF

RFM 75/165/185 - Single Port (4 Bolt Mount)

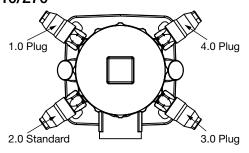
Type No.	Location of Clogging Indicator	Indicator Model
2.X	Clogging Indicator left front 90° to Inlet	VMF
3.X	Clogging Indicator right front 90° to Inlet	VMF

RFM 75/165/185 - Multi-Port (4 Bolt Mount)

Type No. Location of Clogging Indicator		Indicator Model
1.X	Clogging Indicator right of primary Inlet, 90° to Inlet	VMF

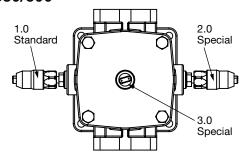
Type No. Location of Clogging Indicator		Indicator Model
2.X	Clogging Indicator left front 45° to Inlet	VMF
3.X	Clogging Indicator right front 45° to Inlet	VMF

Clogging Indicator Locations (cont'd) RFM 210/270



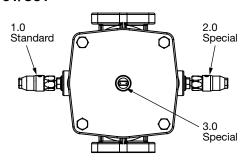
Type No.	Location of Clogging Indicator	Indicator Model
1.X	Clogging Indicator left back 45° to Inlet	VMF
2.X	Clogging Indicator left front 45° to Inlet	VMF
3.X	Clogging Indicator right front 45° to Inlet	VMF
4.X	Clogging Indicator right back 45° to Inlet	VMF

RFM 330/500



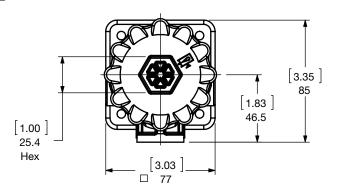
Type No.	Location of Clogging Indicator	Indicator Model
1.X	Clogging Indicator left 90° to Inlet	VR
2.X	Clogging Indicator right 90° to Inlet	VR
3.X	Clogging Indicator on Top	VR

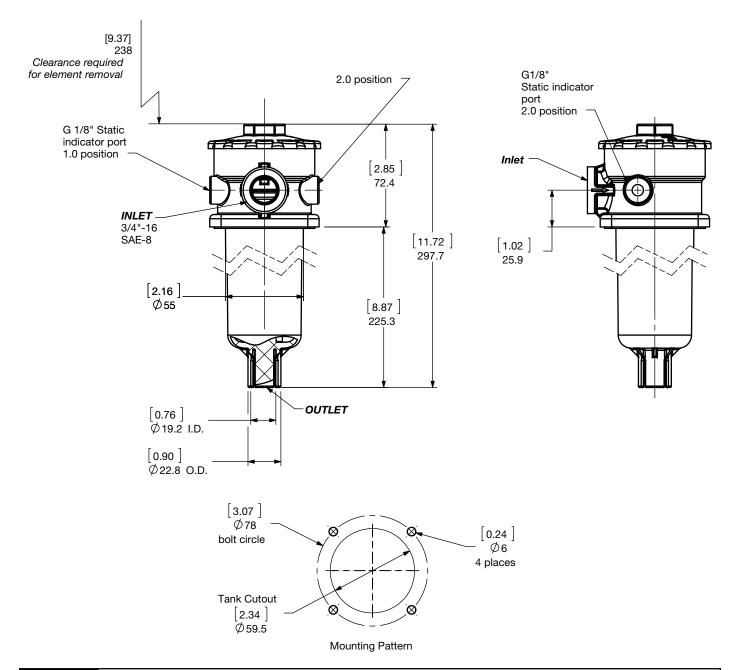
RFM 661/851



Type No.	Location of Clogging Indicator	Indicator Model
1.X	Clogging Indicator left 90° to Inlet	VR
2.X	Clogging Indicator right 90° to Inlet	VR
3.X	Clogging Indicator on Top	VR

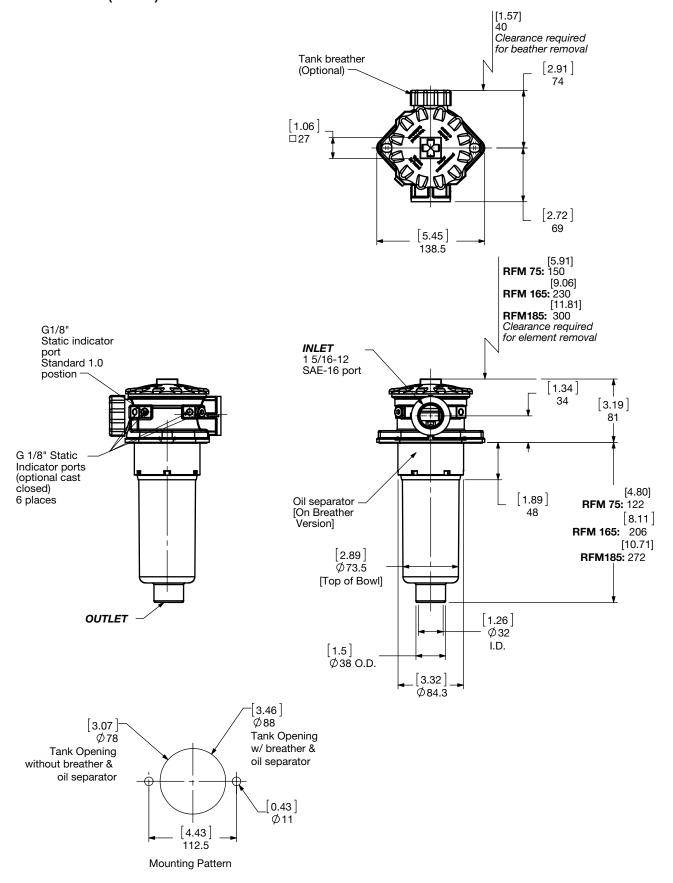
Dimensions RFM 50 - 4L





Size	50
Weight (lbs.)	1.5

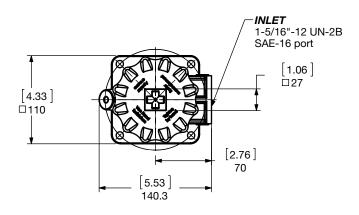
Dimensions RFM 75/165/185 (2 Bolt)

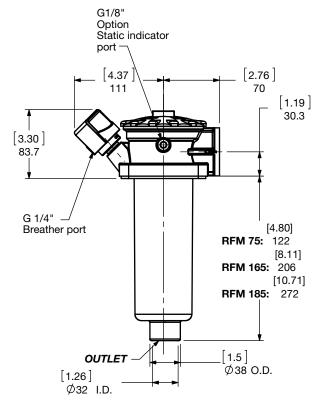


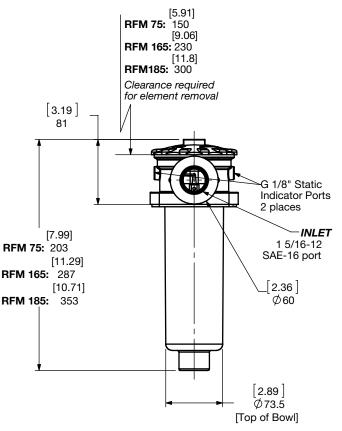
Size	75	165	185
Weight (lbs.)	2.0	2.5	2.6

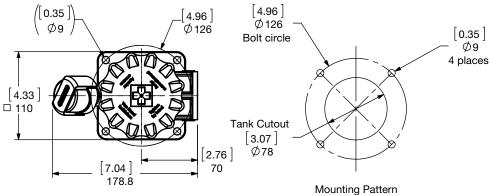
Dimensions

RFM 75/165/185 - 4L Single Port (4 Bolt)







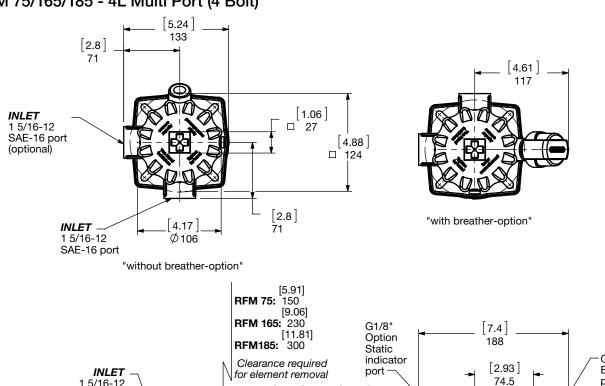


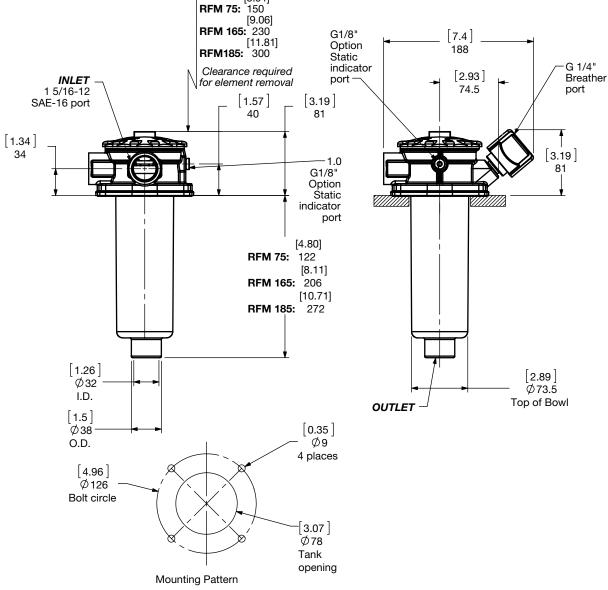
Note: Breather (BF10 With Anti Splash)

Size	75	165	185
Weight (lbs.)	2.0	2.5	2.6

Dimensions

RFM 75/165/185 - 4L Multi Port (4 Bolt)

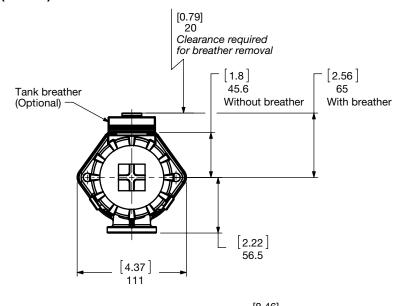


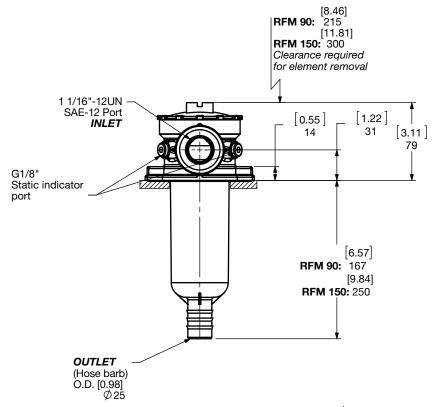


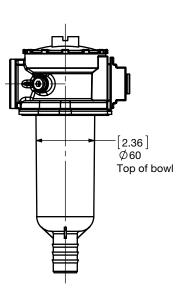
Size	75	165	185
Weight (lbs.)	2.0	2.5	2.6

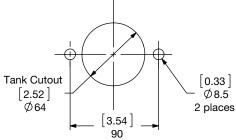
Dimensions

RFM 90-150 (2 Bolt)







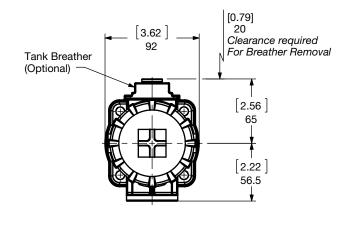


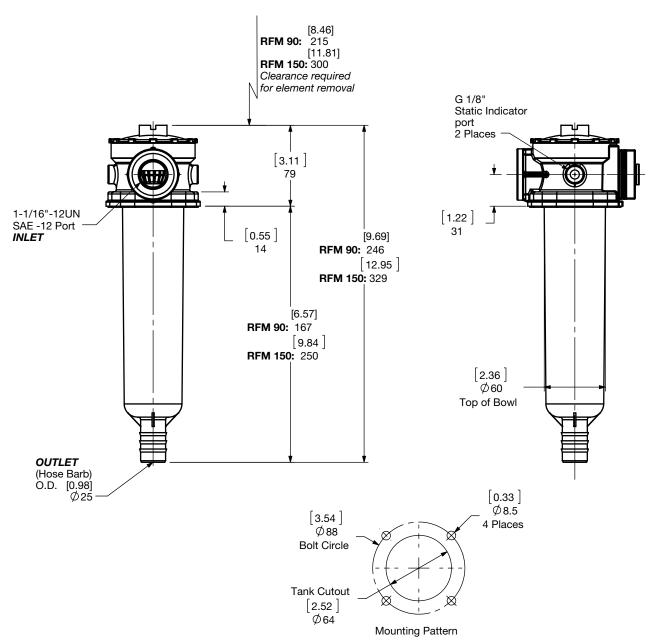
Mounting Pattern

Size	90	150
Weight (lbs.)	1.2	1.7

Dimensions

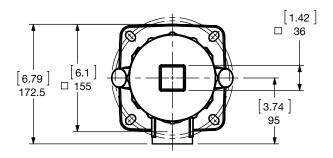
RFM 90-150 - 4L (4 Bolt)

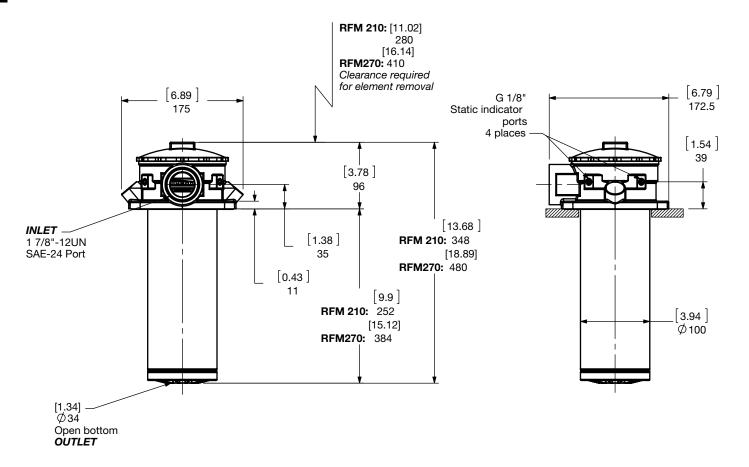


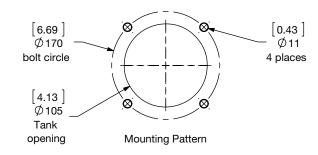


Size	90	150
Weight (lbs.)	1.2	1.7

Dimensions RFM 210/270

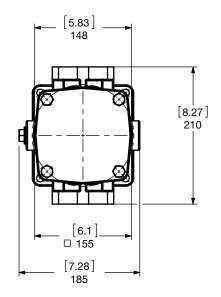


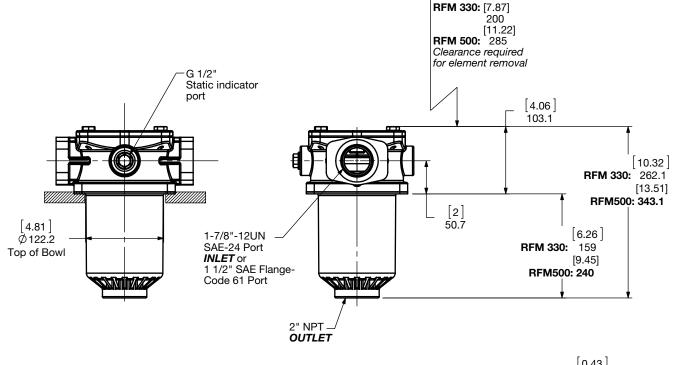


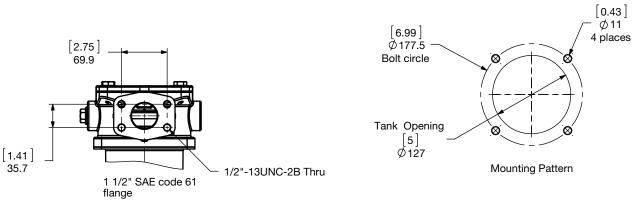


Size	210	270
Weight (lbs.)	7	9.5

Dimensions RFM 330/500

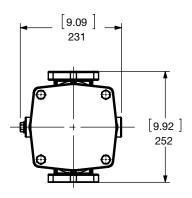


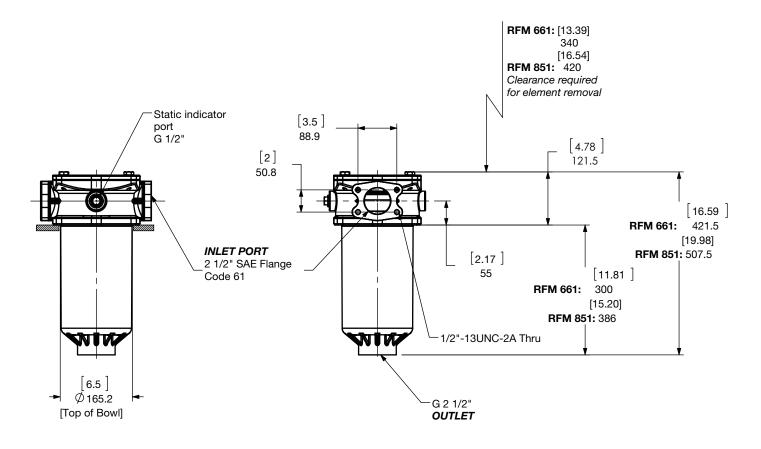


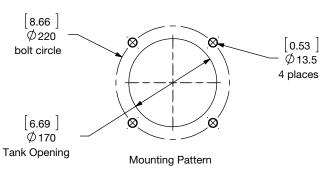


Size	330	500
Weight (lbs.)	8.6	10

Dimensions RFM 661/851

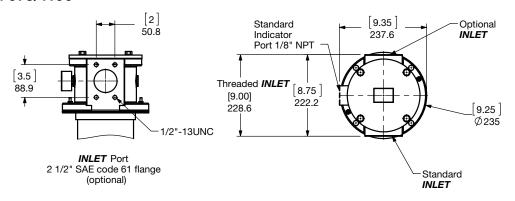


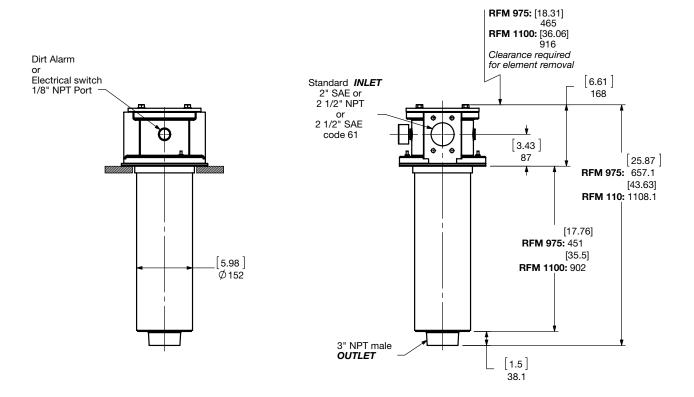


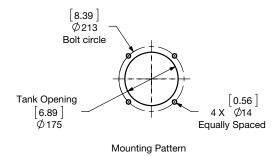


Size	661	851
Weight (lbs.)	19.9	23.2

Dimensions RFM 975/1100







Size	975	1100
Weight (lbs.)	37	52

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

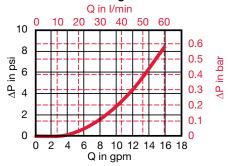
Housing Curve:

Pressure loss through housing is as follows:

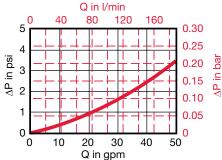
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

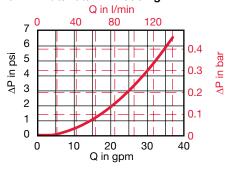
RFM 50/-4L Housing



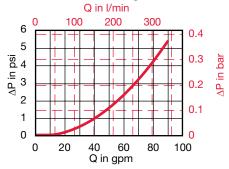
RFM 75/165/185 & RFM 75/165/185/-4L Housing



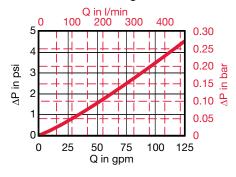
RFM 90/150 & RFM 90/150/-4L Housing



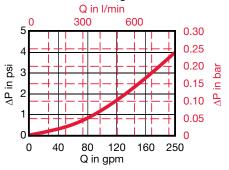
RFM 210 / 270 Housing



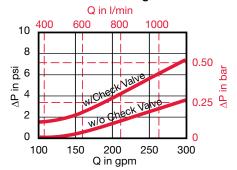
RFM 330/500 Housing



RFM 661/851Housing



RFM 975 / 1100 Housing



Element K Factors

 $\Delta P \; \text{Elements} = \text{Elements} \; (\text{K)} \; \text{Flow} \; \text{Factor} \; x \; \text{Flow} \; \text{Rate} \; (\text{gpm}) \; x \; \frac{\text{Actual Viscosity} \; (\text{SUS})}{141 \; \text{SUS}} \; x \; \frac{\text{Actual Specific Gravity}}{0.86}$

Betamicron	RBN4HC			
Size	3 µm	5 μm	10 μm	20 μm
0975 R XXX BN4HC	0.050	0.040	0.030	0.020
1100 R XXX BN4HC	0.030	0.020	0.020	0.010

Optimicron	RON					
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm
0050 R XXX ON	N.A.	N.A	N.A.	0.296	N.A.	N.A.
0075 R XXX ON	1.405	1.065	0.735	0.401	0.263	0.241
0090 R XXX ON	1.235	0.719	0.521	0.333	0.236	0.176
0165 R XXX ON	0.774	0.518	0.404	0.221	0.123	0.133
0185 R XXX ON	0.571	0.408	0.315	0.161	0.091	0.077
0210 R XXX ON	0.311	0.18	0.14	0.084	0.055	0.048
0270 R XXX ON	0.201	0.116	0.091	0.054	0.036	0.031
0330 R XXX ON	0.444	0.204	0.15	0.081	0.07	0.056
0500 R XXX ON	0.289	0.143	0.104	0.06	0.046	0.038
0660 R XXX ON	0.196	0.093	0.066	0.037	0.031	0.025
0850 R XXX ON	0.152	0.072	0.055	0.032	0.024	0.02

ECOmicron	RECON2			
Size	3 µm	5 μm	10 µm	20 µm
0090 R XXX ECON2	0.818	0.554	0.368	0.176
0150 R XXX ECON2	0.488	0.329	0.220	0.104
0165 R XXX ECON2	0.615	0.428	0.247	0.132
0185 R XXX ECON2	0.488	0.335	0.181	0.099
0195 R XXX ECON2	0.362	0.247	0.132	0.071
0330 R XXX ECON2	0.230	0.148	0.093	0.066
0500 R XXX ECON2	0.165	0.104	0.071	0.044
0660 R XXX ECON2	0.104	0.066	0.044	0.027
0850 R XXX ECON2	0.082	0.055	0.038	0.022

Mobilemicron	RMM		
Size	8 µm	10 µm	15 µm
0075 R XXX MM	0.265	0.265	0.166
0090 R XXX MM	0.252	0.252	
0150 R XXX MM	0.114	0.114	0.071
0165 R XXX MM	0.146	0.146	0.091
0185 R XXX MM	0.108	0.108	0.068
0210 R XXX MM	0.052	0.052	0.032
0270 R XXX MM	0.032	0.032	0.020
0330 R XXX MM	0.078	0.078	0.049
0500 R XXX MM	0.052	0.052	0.032
0660 R XXX MM	0.030	0.030	0.019
0850 R XXX MM	0.023	0.023	0.014

Betamicron/Aquamicron	RE	BN4AM
Size	3 µm	10 µm
0330 R XXX BN4AM	0.477	0.165
0500 R XXX BN4AM	0.313	0.11
0660 R XXX BN4AM	0.192	0.066
0850 R XXX BN4AM	0.154	0.049

Aquamicron	RAM
Size	40 μm
0330 R 040 AM	0.115
0500 R 040 AM	0.076
0660 R 040 AM	0.051
0850 R 040 AM	0.040

Wire Mesh	RW/HC
Size	25, 50, 100, 200 μm
0075 R XXX W/HC	0.020
0090 R XXX W/HC	0.017
0150 R XXX W/HC	0.010
0165 R XXX W/HC	0.011
0185 R XXX W/HC	0.050
0195 R XXX W/HC	0.037
0210 R XXX W/HC	0.004
0270 R XXX W/HC	0.002
0330 R XXX W/HC	0.011
0500 R XXX W/HC	0.007
0660 R XXX W/HC	0.004
0850 R XXX W/HC	0.003

Polyester	RP/HC	
Size	10 μm	20 μm
0075 R XXX P/HC	0.071	0.036
0090 R XXX P/HC	0.058	0.029
0150 R XXX P/HC	0.040	0.017
0165 R XXX P/HC	0.033	0.016
0185 R XXX P/HC	0.029	0.016
0195 R XXX P/HC	0.018	0.009
0210 R XXX P/HC	0.018	0.010
0270 R XXX P/HC	0.009	0.004
0330 R XXX P/HC	0.016	0.008
0500 R XXX P/HC	0.011	0.005
0660 R XXX P/HC	0.008	0.004
0850 R XXX P/HC	0.007	0.003

S.S. Wire Mesh "R"	RV US UNITS			
Size	3 µm	5 μm	10 μm	20 μm
0330 R XXX V	0.115	0.093	0.060	0.044
0500 R XXX V	0.082	0.066	0.044	0.027
0660 R XXX V	0.055	0.044	0.033	0.022
0850 R XXX V	0.044	0.033	0.022	0.016

All Element K Factors in psi / gpm.

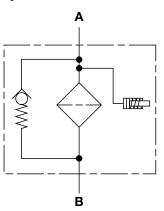
HF4R Series

In-Tank Return Line Filters 100 psi • up to 100 gpm





Hydraulic Symbol



Features

- Designed to meet and comply with HF4 Automotive standard and SAE J2066 standard.
- Inlet port options include SAE straight thread O-ring boss, SAE Flange, BSPP and NPT ports to allow easy installation without costly adapters.
- O-ring seals are used to provide positive, reliable sealing. Choice of Nitrile rubber (NBR), or Fluorocarbon elastomer (FKM) O-ring material provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and water based fluids.
- In-tank design requires minimal space for installation.
- Provision is made for an additional inlet port to allow two return lines to be connected to the same filter.

Construction

Gearboxes

Filters include 1 1/2" threaded NPT outlet connection.

Tachnical Chacifications

4 mounting holes - filter housing	
SAE-24, 1 1/2" NPT, 1 1/2" BSPP, 1 1/2" Flange, Code 61	
NPT male	
Outlet	
Bottom	
um	
n Steel	
n (189 lpm)	
n (378 lpm)	
m (454 lpm)	
100 psi (7 bar)	
Contact HYDAC	

Burst Pressure Contact HYDAC

Element Collapse Pressure Rating

BN, BN4AM, AM, W, P/HC 145 psid (10 bar)

14°F to 212°F (-10°C to 100°C) Fluid Temperature Range

Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

All Other Indicators	Gauges (E / ES)
P = 14.5 psi (1 bar) -10%	P = 11.6 psi (0.8 bar)
P = 29 psi (2 bar) -10%	P = 20 psi (1.4 bar)
P = 36 psi (2.5 bar) -10%	P = 29 psi (2 bar)

Bypass Valve Cracking Pressure

 $\Delta P = 25 \text{ psid } (1.7 \text{ bar}) + 10\% \text{ (optional)}$

 $\Delta P = 40 \text{ psid } (2.7 \text{ bar}) + 10\% \text{ (standard)}$ $\Delta P = 50 \text{ psid } (3.4 \text{ bar}) + 10\% \text{ (contact factory)}$

*Note: All HF4R Filters MAWP reduce to 101.5 psi (7 bar) when using the following "VR" indicators: B, BM, E, ES, GC, LE, LZ. Any filters incorporating a VMFXE.X/3 or VMFXES.X/3 static gauge indicator (1/8" NPT thread) will be de-rated to an MAWP of 60 psi (4 bar).

Applications



Agricultural

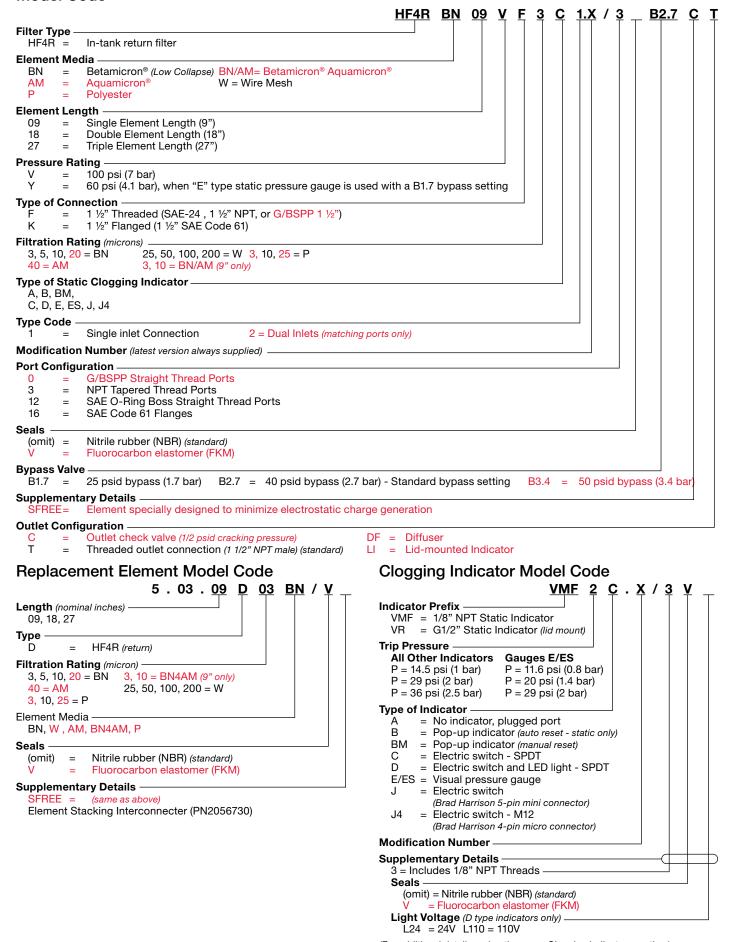


Industrial



Steel / Heavy

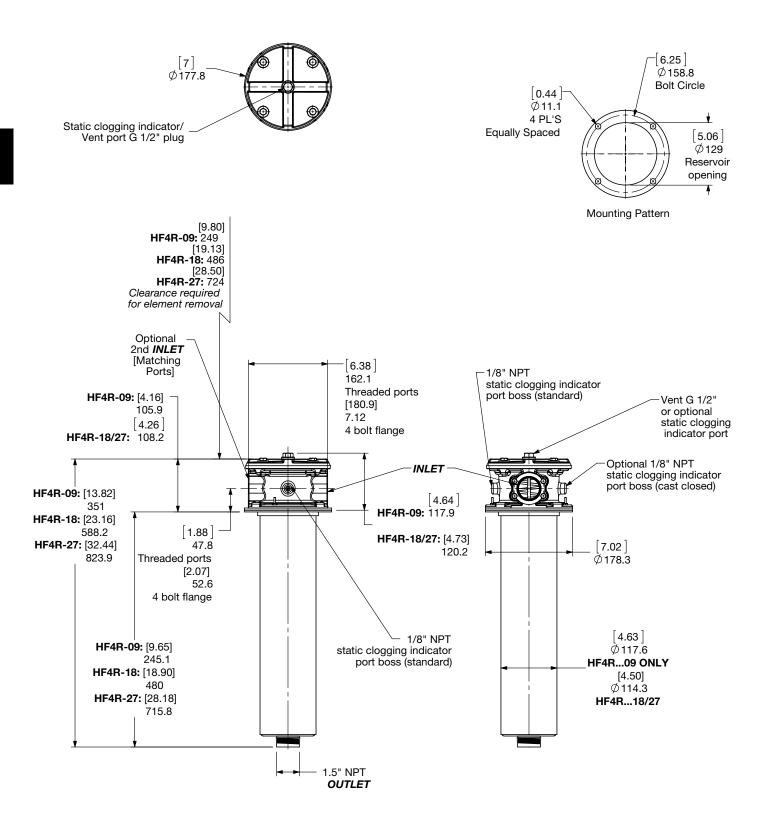
Model Code



(For additional details and options, see Clogging Indicators section.)

D37

Dimensions HF4R



Size	09	18	27
Weight (lbs.)	13	17.5	23.2

Sizing Information

Total pressure loss through the filter is as follows:

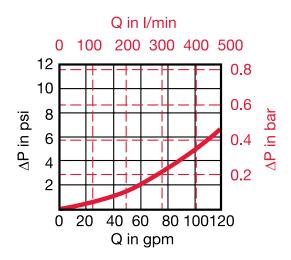
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \times \frac{Actual \ Specific \ Gravity}{0.86}$

Autospec HF4 Depth	5.03.XXDXXBN Low Collapse			
Size	3 µm	5 μm	10 μm	20 μm
5.03.09DXXBN	0.168	0.141	0.079	0.044
5.03.18DXXBN	0.080	0.067	0.038	0.021
5.03.27DXXBN	0.052	0.043	0.024	0.014

Autospec HF4 Paper	5.03.XXDXXP Low Collapse		
Size	3 µm	10 μm	25 μm
5.03.09DXXP	0.250	0.120	0.080
5.03.18DXXP	0.090	0.050	0.030
5.03.27DXXP	0.020	0.010	0.010

Autospec HF4 Water	5.03.09DXXAM & BN/AM		
Size	3 µm	10 µm	40 µm
5.03.09DXXAM	N/A	N/A	0.125
5.03.09DXXBN/AM	0.320	0.230	N/A

Notes: Requires stacking for 18" and 27" configurations. Water retention (per 9" section) 500ml at 2 gpm; 150 ml at 20 gpm

Autospec HF4 Wire Mesh	5.03.XXDXXW
Size	25, 50, 100, 200 μm
5.03.09DXXW	0.007
5.03.18DXXW	0.004
5.03.27DXXW	0.002

All Element K Factors in psi / gpm.



RKM Series

Multi-functional Filters 145 psi • up to 210 gpm





Features

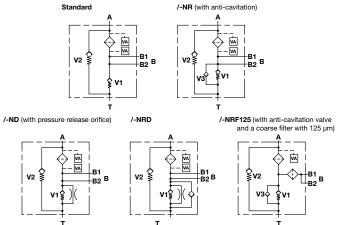
- RKM is a combination open loop return and closed loop suction boost filter in one housing.
- The return line flow of the operating hydraulics is fed to the filter via port A (inlet) and is cleaned by the filter element (full flow return line filtration). A pressure (standard = 7 psi) is applied by the back-pressure valve V1. This insures that the filtered, precharged return line flow is available to the hydrostatic feed pump via ports B (full flow suction boost filtration). Excess fluid is drained via the back-pressure valve to the tank (port T).
- A bypass valve V2 (standard = 36 psi) is incorporated in the filter housing to relieve excessive back-pressures in the element (important on cold starts). Flow from the tank can be drawn via the anti-cavitation valve V3 to the suction side for a short time (emergency function).
- Full flow finest filtration (10 μ m, 15 μ m absolute) of the return line and hydrostatic feed pump extends the service life of your
- Outstanding cold start characteristics due to the precharge via the back pressure valve (standard = 7 psi).
- Due to the advanced RKM element technology and specially developed bypass valves, the lowest back-pressures can be achieved across the filter even at very low temperatures.
- One tank cutout for up to 6 suction and 3 return lines.
- Aluminum alloy is water tolerant anodization is not required for water based fluids (HWBF).
- RKM elements do not incorporate bypass in the end cap -the bypass is located in the RKM housing.

Applications





Hydraulic Symbol



Technical Specifications			
Mounting Method	100	2 mounting holes	
	201 - 800	4 mounting holes	
Port Connection	Return / Suction	on	
100	SAE-8 / SAE-8		
	SAE-12 / SAE-1	12	
	SAE-16 / SAE-	16	
201/251	SAE-20 / 2 x S	· · - · · ·	
300	SAE 1 1/2" CS, Code 61-Split Flange (SF)		
	/ 2 x SAE 1 1/4" CS, Code 61-Split Flange (SF)		
350	SAE-24 / SAE-16		
400/800	R1-2" SAE flange / Cust. specified or		
	R1-2 1/2" SAE flange / Cust. specified		
Flow Direction	Inlet: Side	Outlet: Side & bottom	
Construction Materials			
Head	Aluminum		
Housing/Bowl	Steel (100/201/251/350/400/800)		
	Polyamide (300)		
Lid	Polyamide (100/201/251/350)		

Aluminum (300/400/800)

100 26 gpm (100 lpm) 201 52 gpm (200 lpm) 251 66 gpm (250 lpm) 300 79 gpm (300 lpm) 92 gpm (350 lpm) 350 400 105 gpm (400 lpm) 211 gpm (800 lpm) 800

Housing Pressure Rating

Flow Capacity

Max. Allowable Working Pressure* 145 psi (10 bar) Fatique Pressure Contact HYDAC **Burst Pressure** Contact HYDAC

Element Collapse Pressure Rating 145 psid (10 bar)

Fluid Temp. Range 14°F to 212°F (-10°C to 100°C) Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

P = 29 psi (2 bar) -10% (standard) P = 72 psi (5 bar) -10% (optional)

Bypass Valve Cracking Pressure

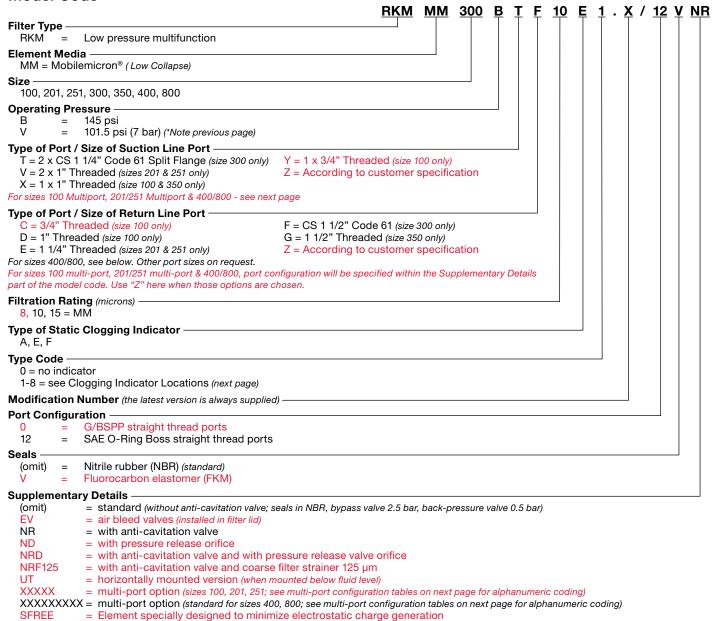
 $\Delta P = 36 \text{ psid } (2.5 \text{ bar}) + 10\% \text{ (standard)}$ $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (optional)}$

Back Pressure Valve Cracking Pressure

 $\Delta P = 7 \text{ psid } (0.5 \text{ bar}) + 10\% \text{ (standard)}$ $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (optional)}$

*Note: All RKM Filters MAWP reduce to 7 bar (101.5 psi) when using the following "VR" and "VMF" indicators: B, BM, E, ÈS, GC, LÉ, LZ

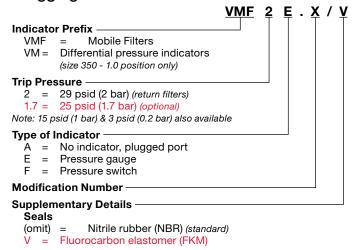
Model Code



Replacement Element Model Code

(Same as above)

Clogging Indicator Model Code



(For additional details and options, see Clogging Indicators section.)

Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

SFREE =

Port Configuration - RKM 100, 201, 251 Multiport Head and RKM 400 / 800

Since there are numerous options for machining the ports on the multiport head and the head of the RKM 400 / 800, the general code BZZ is selected here. In order to determine the position and size of the ports, a 5-digit or a 9-digit code is added as a Supplementary Detail. This is determined using the table below. Unused ports are indicated by a "0".

R = Return line port; S = Suction port

Port Configuration RKM 100 Multiport

Position in code	1	2	3	4	5
Connection	R1	R2	R3	S1	S2
SAE-8		B	B	В	В
SAE-12	0	С	С	(C)	0
SAE-16	D				
Port plugged	0	0	0	0	0
Special port	Z	Z	Z	Z	Ζ

Example: RKM MM 100 BZZ 15 W 1.0 /-CBBCC



Port Configuration RKM 201 / 251 Multiport

Position in code	1	2	3	4	5
Connection	R1	R2	R3	S1	S2
SAE-12		(C)	(C)	С	С
SAE-16	D	D	D	D	D
SAE-20	E				
Port plugged	0	0	0	0	0
Special port	Z	Z	Z	Z	Z

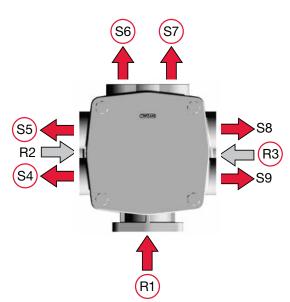
Example: RKM MM 201 BZZ 15 W 1.0 /-ECCDD



Port Configuration RKM 400 / 800

ort comigaration main 4007 000									
Position in code	1	2	3	4	5	6	7	8	9
Connection	R1	R2	R3	S4	S5	S6	S7	S8	S9
SAE 2" FLG	1								
SAE 2 1/2" FLG	2								
SAE-16		1	1	Α	Α	1	1	Α	Α
SAE-20		2	2	В	В	2	2	В	В
SAE-24		3	3	0	0	3	3	С	О
Port plugged		0	0	0	0	0	0	0	0
Special port		Z	Z	Z	Z	Z	Z	Z	Z

Example: RKM MM 400 BZZ 15 A 1.0 /-102CC2200



Clogging Indicator Locations Size 100

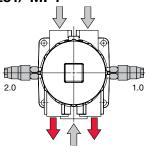
2.0, 4.0

Type Code	Mounting Position of the Clogging Indicator	Type of Clogging Indicator	Measuring
1.0	on the filter inlet – right-hand side, bottom	return line	before the filter element
2.0	on the filter inlet – left-hand side, bottom	return line	before the filter element
3.0	on the filter outlet – right-hand side, top	vacuum	after the filter element
4.0	on the filter outlet – left-hand side, top	vacuum	after the filter element

Size 201/251	1.0
2.0	
3.0	

Type Code	Mounting Position of the Clogging Indicator		Measuring
1.0	on the filter inlet – opposite side	return line	before the filter element
2.0	on the filter inlet – left-hand side	return line	before the filter element
3.0	on the filter outlet – right-hand side	vacuum	after the filter element

Size 201/251/-MP1



Type Code	Mounting Position of the Clogging Indicator		Measuring
1.0	on the filter outlet – right-hand side	return line	before the filter element
2.0	on the filter outlet – left-hand side	return line	before the filter element

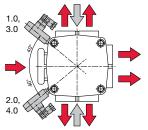
Size 300 3.0 4.0

Type Code	Mounting Position of the Clogging Indicator		Measuring
1.0	on the filter inlet – left-hand side	return line	before the filter element
2.0	on the filter inlet – right-hand side	return line	before the filter element
3.0	on the filter outlet – left-hand side	vacuum	after the filter element
4.0	on the filter outlet – right-hand side	vacuum	after the filter element

Size 350	
2.0	1.0

		Measuring
on the filter inlet – right-hand side	differential pressure	before and after element
on the filter inlet – left-hand side	return line	before and after element
	the Clogging Indicator on the filter inlet – right-hand side on the filter inlet –	right-hand side on the filter inlet –

Size 400 / 800



Code	the Clogging Indicator	Indicator	Measuring
1.0	on the filter inlet – left-hand side, bottom	return line	before the filter element
2.0	on the filter inlet – right-hand side, bottom	return line	before the filter element
3.0	on the filter inlet – left-hand side, top	vacuum	after the filter element
4.0	on the filter inlet – right-hand side, top	vacuum	after the filter element

Mounting Position of Type of Clogging

For other configurations, please contact HYDAC

HYDAC RKM: Two Filters in One.

A design that saves money.

By using a HYDAC Return Line & Suction Boost Filter RKM you will benefit from:

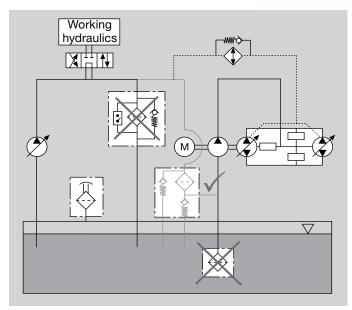
- Space saving Just one filter required instead of two
- Easy maintenance Half the time required for installation and maintenance
- Cost saving Lower investment, storage and service costs
- Increased operating safety Cavitation at the pump is reliably prevented and finely filtered oil is supplied even in the suction line.

One filter. Two functions. All the advantages.

The RKM combines the advantages of a return line filter with those of a suction filter in a single product!

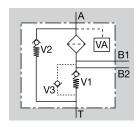
Return line & suction boost filters are particularly suitable for use in machines with two or more circuits, such as mobile working machines with hydrostatic traction drives (wheel loaders, forklifts).

Return line Suction **RKM** filter filter



Application example for the RKM in mobile machines.

Function.

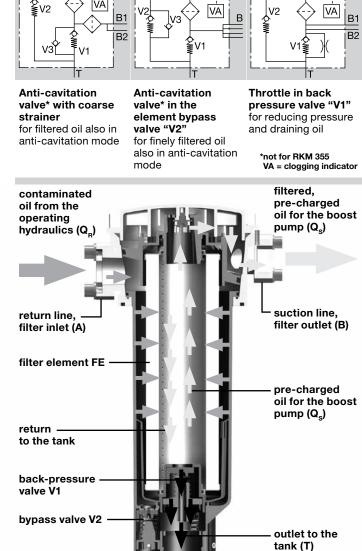


The return line flow QR is supplied to the element via one or more inlets "A". Once the element has been subjected to flow from the outside to the inside, the back-pressure valve "V1" in the element builds 0.5 bar positive pressure. Particularly in cold start conditions this positive pressure supports the suction characteristics of the pump(s) connected to "B" (e.g. boost pumps).

This considerably reduces the risk of cavitation.

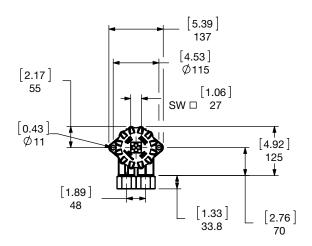
To ensure that the return line volume in operating conditions is always greater than the volume which is supplied on the suction side the surplus volume drains to tank via "T". The bypass valve "V2" is fitted to relieve excessive backpressure. Part of the flow then drains directly to tank, bypassing the element. This configuration of valves ensures that only finely filtered oil reaches the suction port during operation*. The gradual increase of the valve characteristics contributes to keeping the back pressure in the return lines sufficiently low, even with high viscosity levels. With optional valve "V3", oil can be drawn from the tank for short periods*, e.g. for initial filling and for venting.

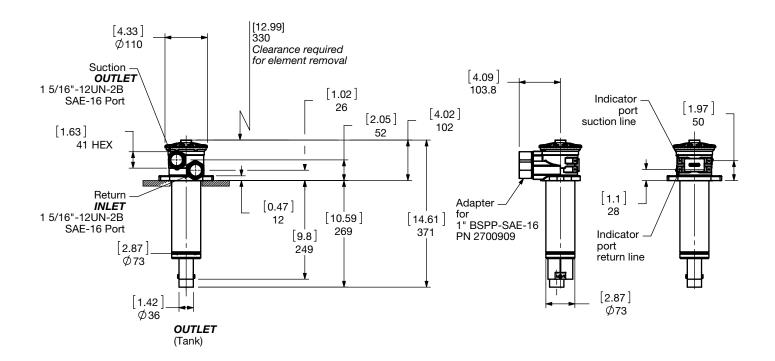
Further options:

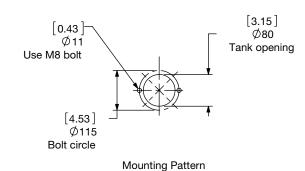


Function of the RKM.

Dimensions RKM 100





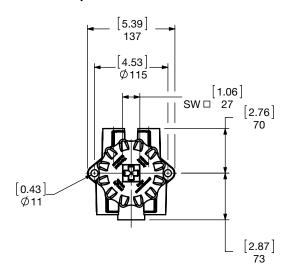


Size	100
Weight (lbs.)	3.8

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

D45

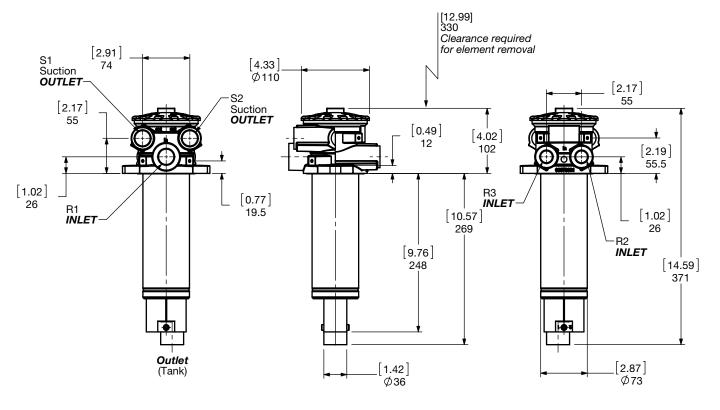
Dimensions RKM 100 Multiport

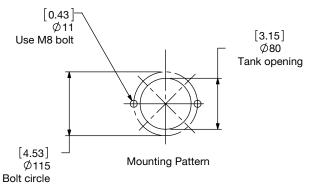


Port Configuration RKM 100 Multiport

Position in code	1	2	3	4	5
Connection	R1	R2	R3	S1	S2
SAE-8		B	B	В	В
SAE-12	(C)	С	С	(C)	0
SAE-16	D				
Port plugged	0	0	0	0	0
Special port	Z	Z	Z	Z	Z

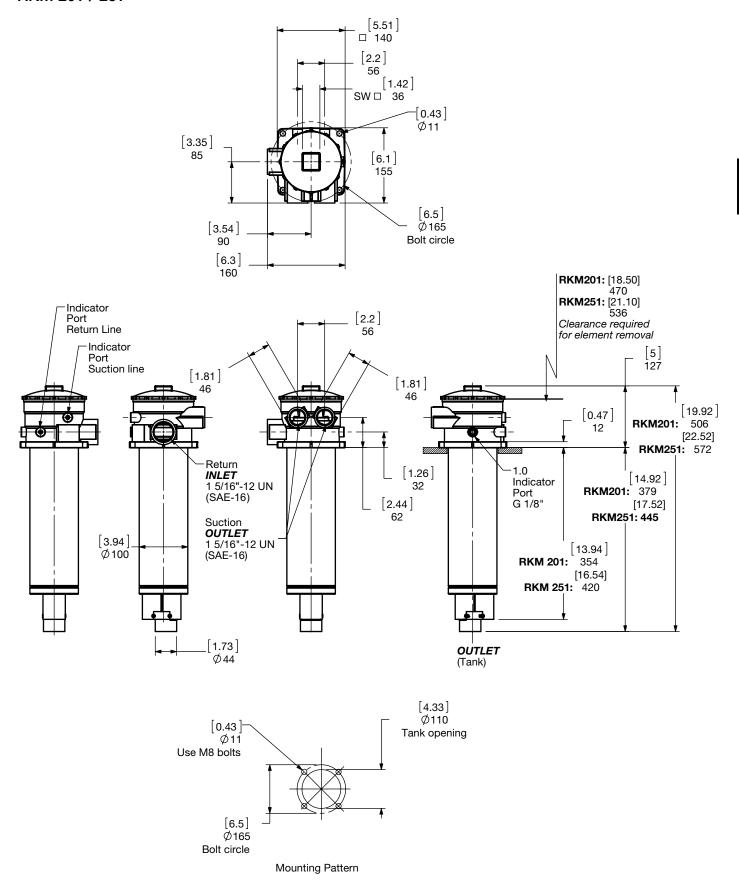
Example: RKM MM 100 BZZ 15 W 1.0 /-CBBCC





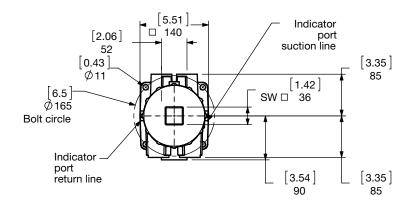
Size	100
Weight (lbs.)	4.5

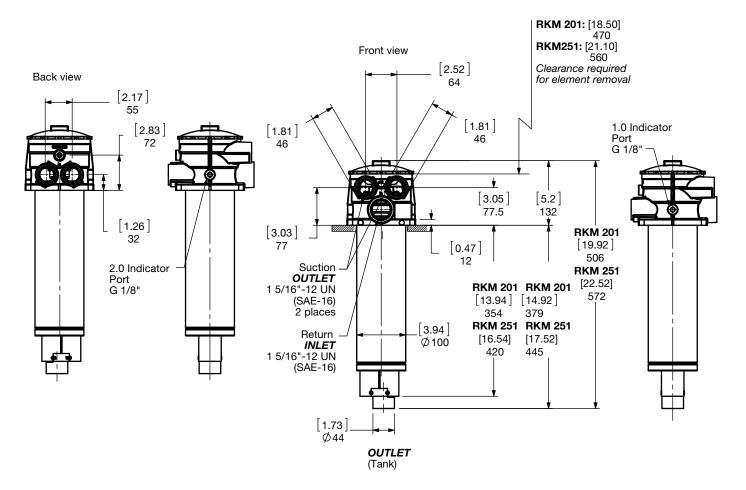
Dimensions RKM 201 / 251

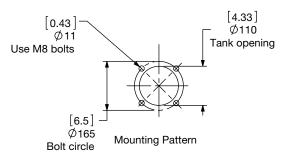


Size	201	251
Weight (lbs.)	8.2	9

Dimensions RKM 201 / 251 Multiport





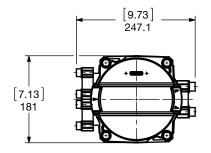


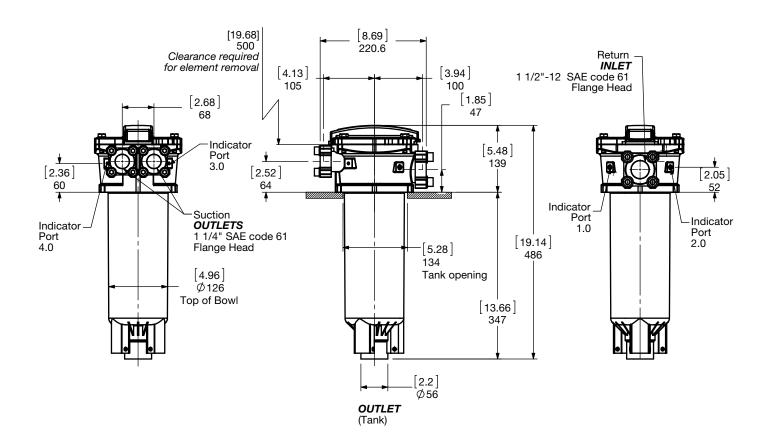
Port Configuration RKM 201 / 251 Multiport

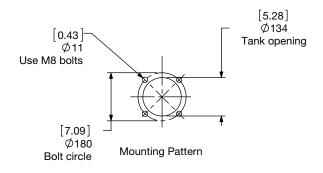
Position in code	1	2	3	4	5
Connection	R1	R2	R3	S1	S2
SAE-12		(C)	(C)	С	С
SAE-16	D	D	D	D	0
SAE-20	E				
Port plugged	0	0	0	0	0
Special port	Z	Z	Z	Z	Z

Size	201	251
Weight (lbs.)	9.3	10

Dimensions RKM 300

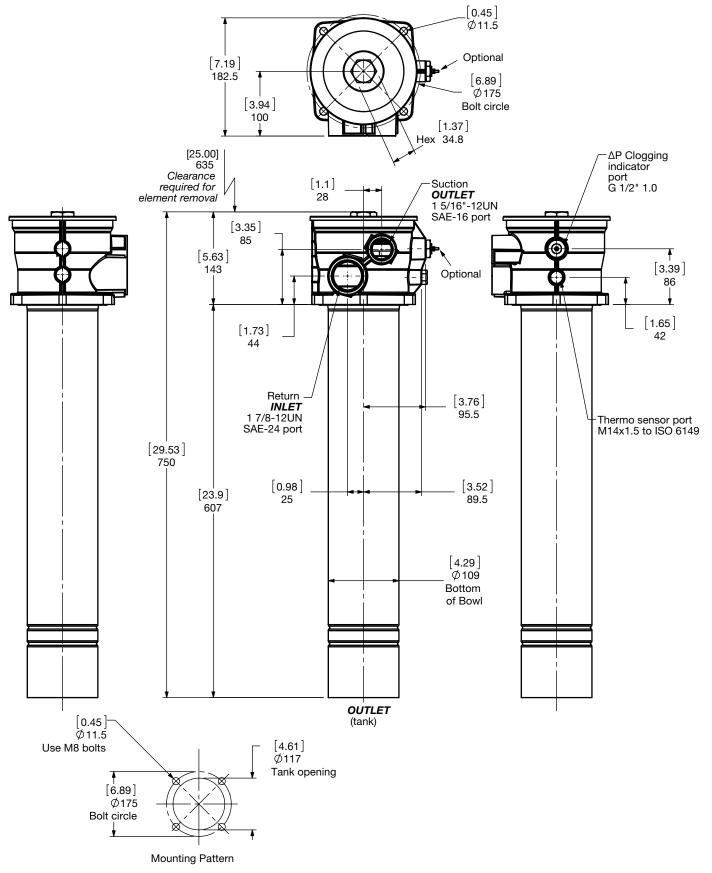






Size	300
Weight (lbs.)	10.2

Dimensions RKM 350

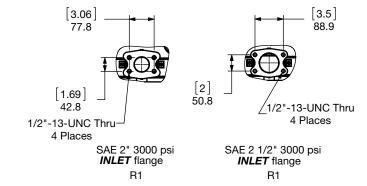


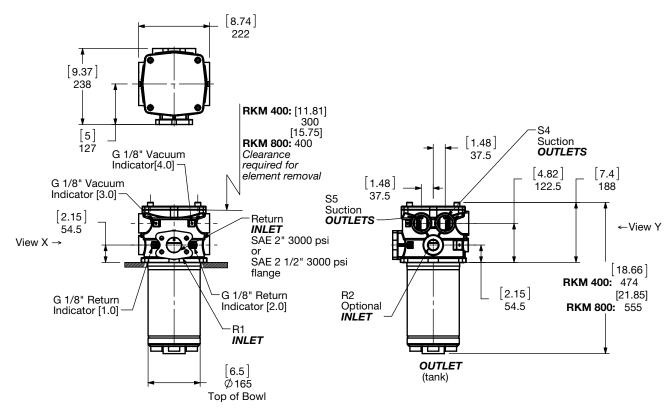
Size	350
Weight (lbs.)	13.9

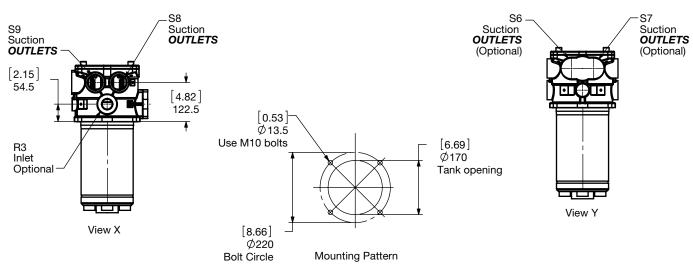
Dimensions RKM 400 / 800

Port Configuration RKM 400 / 800

Position in code	1	2	3	4	5	6	7	8	9
Connection	R1	R2	R3	S4	S5	S6	S7	S8	S9
SAE 2" FLG	1								
SAE 2 1/2" FLG	2								
SAE-16		1	1	Α	Α	1	1	Α	Α
SAE-20		2	2	В	В	2	2	В	В
SAE-24		3	3	(C)	(C)	3	3	С	С
Port plugged		0	0	0	0	0	0	0	0
Special port		Z	Z	Z	Z	Z	Z	Z	Z







Size	400	800
Weight (lbs.)	14.4	16.6

Sizing Information

Total pressure loss through the filter is as follows:

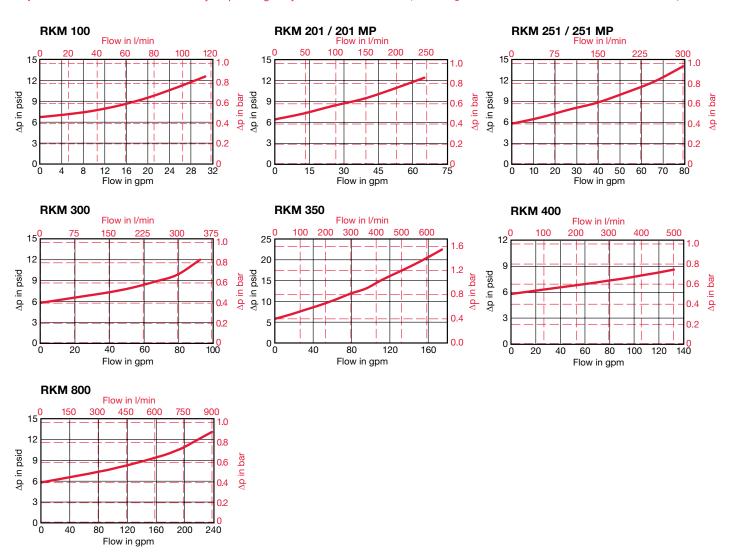
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



Element K Factors

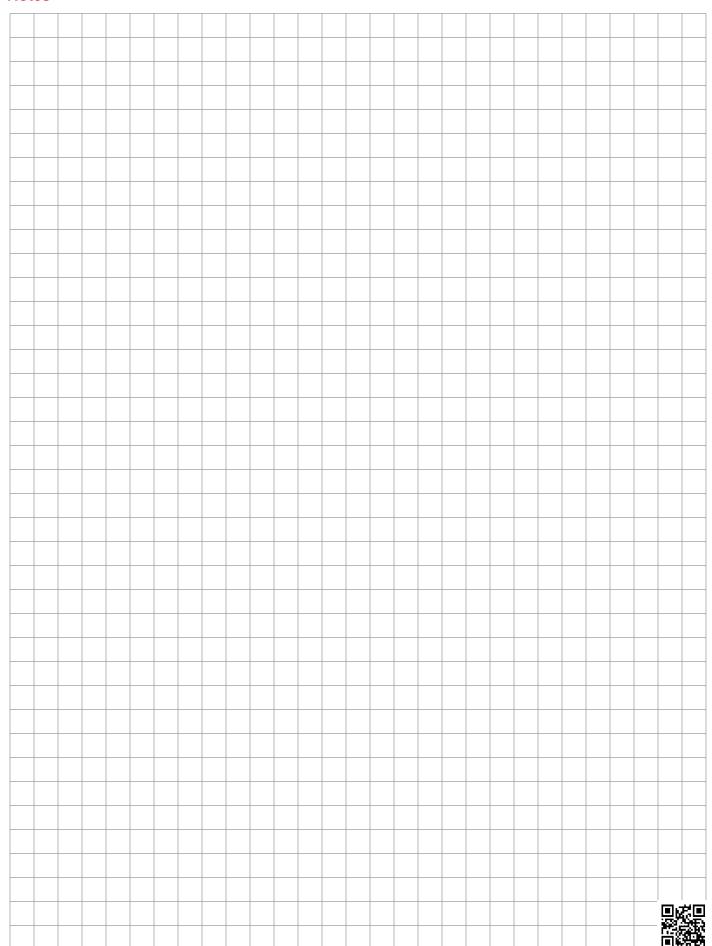
 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Mobilemicron RK		RKMM		
Size	8 µm	10 μm	15 µm	
0100 RK XXX MM	0.095	0.095	0.061	
0201 RK XXX MM	0.041	0.041	0.026	
0251 RK XXX MM	0.032	0.032	0.020	
0300 RK XXX MM	0.034	0.034	0.021	
0350 RK XXX MM	0.016	0.016	0.011	
0400 RK XXX MM	0.031	0.031	0.019	
0800 RK XXX MM	0.024	0.024	0.015	

All Element K Factors in psi / gpm.



Notes



MF, MFD, MFDS Series

Spin-On Filters 250 PSI • up to 120 GPM



Features

- MF Filters are manufactured with an aluminum head.
- Choice of NPT, SAE straight thread O-ring boss, and SAE 4-bolt flange porting to allow easy installation without costly adapters.
- Quick easy element changeouts.
- MF Filters are designed to be used with hydrocarbon based fluids only - (not suitable for use with high water based fluids or phosphate esters)
- MF Filters are available in static and differential pressure sensing configurations.
- Static Indication for Mobile/Return Applications Sizes 40/80/85/160/180
- Differential Indication for Inline Applications Sizes 90/95/190/195

Applications



Agricultural



Industrial Pulp & Paper

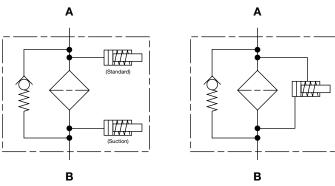


Construction





Hydraulic Symbol MF 80/85/160/180 MF 90/95/190/195



Technical Specifications

Mounting Method	
MF40/80/85	2 mounting holes
MF90/95	3 mounting holes
MF160/180	2 or 4 mounting holes
MF190/195	2 or 3 mounting holes
MFD	2 mounting holes
MFDS	4 mounting holes

Port Connection

MF40 SAE-6

MF80/85 3/4" NPT, SAE-12, 1" NPT, SAE-16 MF90/95 3/4" NPT, SAE-12, 1" NPT, SAE-16 MF160/180/190/195 1 1/4" NPT, SAE-20, 1 1/2" NPT, SAE-24

MFD160/180 1 1/2" NPT, SAE-24

MFDS160/180* 2" SAE Flange Code 61, 1 1/2" NPT Comb. Port MFDS190/195* 2" SAE Flange Code 61, 1 1/2" NPT Comb. Port *Note: Max. allowable torque for flanged ports is 26 ft-lbs (1/2" - 13 UNC bolts)

Flow Direction	Inlet: Side	Outlet: Side
Construc. Materials	Head: Aluminum	Can: Steel
Flow Capacity		
40	7 gpm (26 lpm)	
80	15 gpm (57 lpm)	
85	25 gpm (95 lpm)	
90	15 gpm (57 lpm)	
95	25 gpm (95 lpm)	
160,190	30 gpm (114 lpm) per can	
180,195	60 gpm (227 lpm)	per can
Housing Pressure Rating	MF40/80/85/160/ 180/190/195	MF90/95
Max. Allowable Working Pressure** Fatigue Pressure Burst Pressure	120 psi (8 bar) Contact HYDAC Contact HYDAC	250 psi (17 bar)

Element Collapse Pressure Rating

BN, P, AM 80 psid (5.5 bar)

Fluid Temp. Range 14°F to 212°F (-10°C to 100°C) Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility

Compatible with all petroleum oils and synthetic fluids rated for use with Nitrile rubber (NBR) seals and aluminum and steel metals

Indicator Trip Pressure △P Units (Differential) 20 psid (1.4 bar) -10% ΔP 14.5 psid (1 bar) - 10% 25 psid (1.7 bar) -10% ΔP 22 psid (1.5 bar) - 10% 40 psid (2.7 bar) (B3.4 Bypass) ΔP 44 psid (3 bar) - 10% Vacuum = 2 psid (0.1 bar) (Suction)

Bypass Valve Cracking Pressure

 $\Delta P = 3 \text{ psid } (0.2 \text{ bar}) + 10\% \text{ (for suction applications)}$

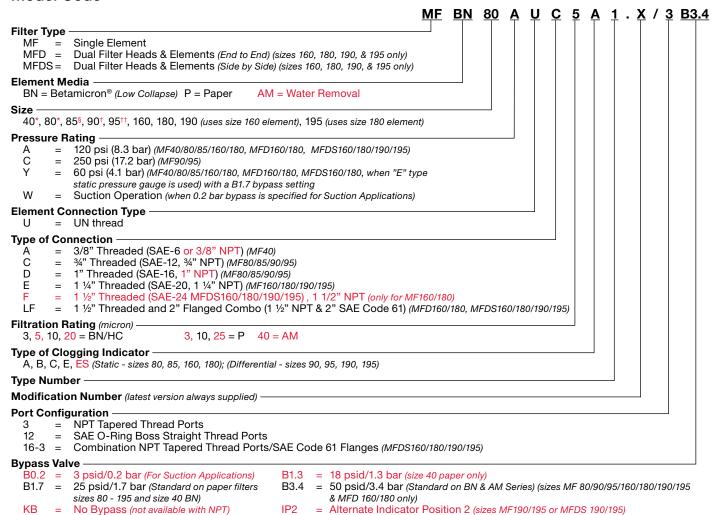
 $\Delta P = 25 \text{ psid } (1.7 \text{ bar}) + 10\% \text{ (standard for nominal/surface type filters)}$

 $\Delta P = 50 \text{ psid } (3.4 \text{ bar}) + 10\% \text{ (standard for absolute/depth filters)}$ (standard for absolute/depth type BN filters, MF

80/90/95/160/180/190/195, MFD 160/180, MFDS 160/180)

^{*}Note: All MF, MFD, MFDS MAWP reduce to 60 psi (4 bar) when using the following "VMF" indicators: B, BM, E, ES, GC, LE, LZ.

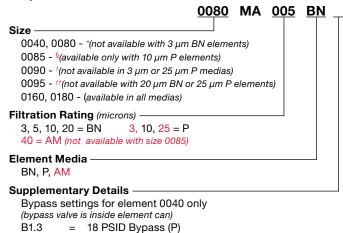
Model Code



Replacement Element Model Code

25 PSID Bypass (BN)

(Spin-on elements available with NBR seals only)



Indicator Prefix VMF = Static (sizes 80/85/160/180) В Differential (sizes 90/95/190/195) **Trip Pressure** 1.4 20 psid (1.4 bar) standard 1.7 25 psid (1.7 bar) (optional) Static 29 psid (2 bar) (optional) Differential - Consult HYDAC Type of Indicator No indicator - all available with plugged port **BMF** Pop-up indicator (auto reset) (ΔP sz. MF 90/95,190/195, MFDS 190/195) C MF Single terminal electric switch (ΔP - sz. MF 90/95,190/195, MFDS 190/195) C 2 terminal electric switch (Static - sz. MF 80/85, 160/180) F Visual Pressure Gauge (Static - sz. MF 80/85, 160/180) Visual Pressure Gauge (port bottom) (Static - sz. MF 80/85, 160/180) **Modification Number Supplementary Details**

VMF 2

E . X /

Clogging Indicator Model Code

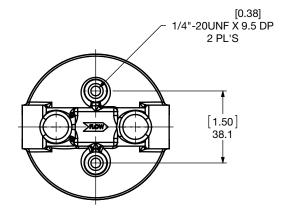
(omit) = Nitrile rubber (NBR) (standard)

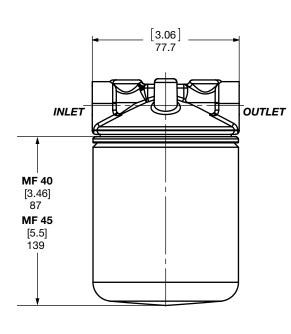


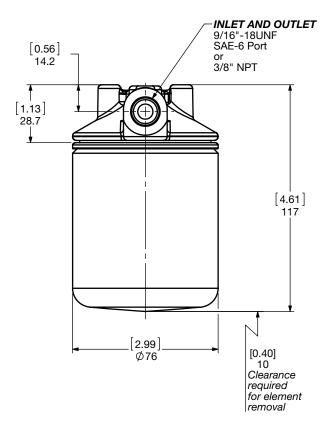
D55

Seals

B1.7

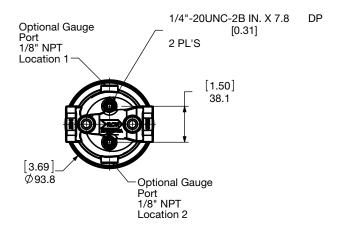


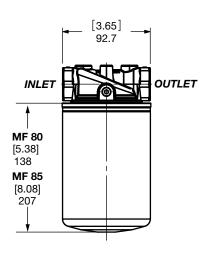


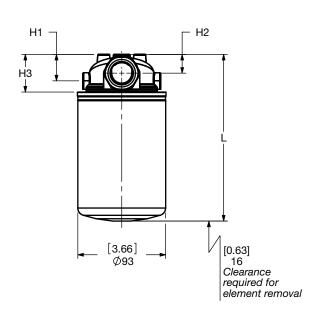


Size	40	45
Weight (lbs.)	1	1.5

Dimensions MF 80 / 85



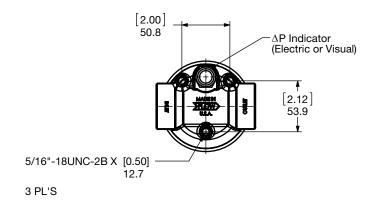


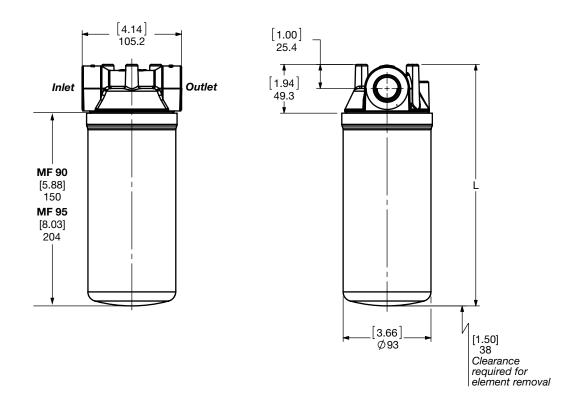


SIZE	PORT SIZE (INLET & OUTLET)	H1	H2	Н3	L
	3/4" NPT	[1.12] 28.4	[0.79]	[1.52] 38.6	[6.89] 175
MF80	SAE-12	28.4	20.1	38.6	175
WIFOU	1" NPT	[1.42] 36.1	[1.91]	[1.83] 46.5	[7.20] 182.9
	SAE-16	36.1	23.1		182.9
	3/4" NPT	[1.12]	[0.79] 20.1	[1.52] 38.6	[9.61] 244.1
MF85	SAE-12	[1.12] 28.4	20.1	38.6	244.1
WIFOS	1" NPT [1.42]	[0.91]	[1.83] 46.5	[9.92] 252	
	SAE-16	36.1	23.1	46.5	252

Size	80	85
Weight (lbs.)	1.8	2.2

Dimensions MF 90 / 95



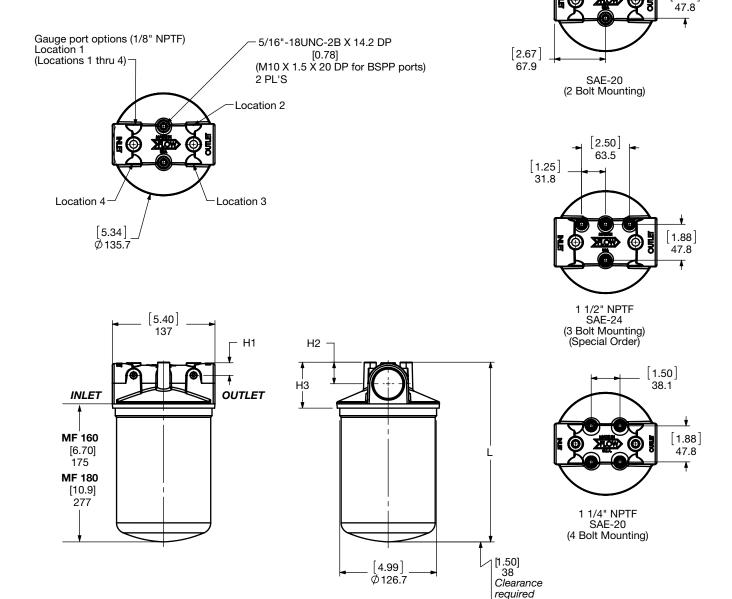


SIZE	PORT SIZE (INLET & OUTLET)	L
	3/4" NPT	
MF90	SAE-12	[5.88]
WF90	1" NPT	150
	SAE-16	
	3/4" NPT	
MF95	SAE-12	[8.03] 204
WIF95	1" NPT	204
	SAE-16	

Size	90	95
Weight (lbs.)	2.7	3.2

[1.88]

Dimensions MF 160 / 180

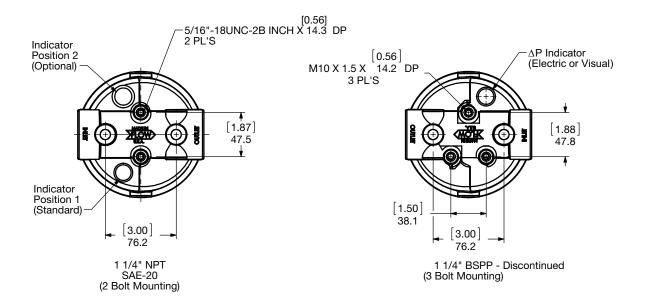


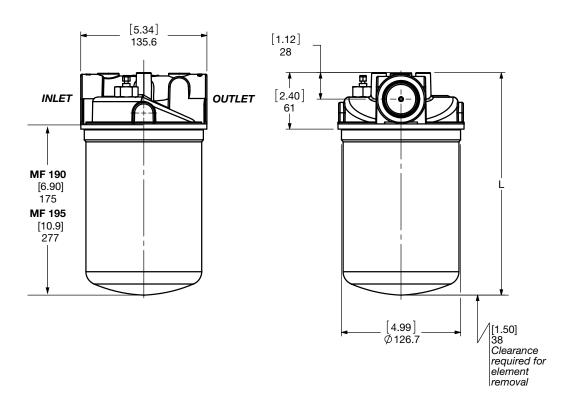
SIZE	PORT SIZE (INLET & OUTLET)	H1	H2	Н3	L
	1 1/4" NPT	[0.79] 20.1	[1.08]	[2.35] 59.7	[9.35] 237.5
MF160	SAE-20	20.1	27.4		
WIF 160	1 1/2" NPT	[1.10]	1.10] [1.30] 27.9 33	[2.80] 71.1	[9.80] 248.9
	SAE-24	27.9			
MF180	1 1/4" NPT	[0.79]	[0.79] [1.08]	[2.35]	[13.35]
	SAE-20	[0.79] 20.1	27.4	[2.35] 59.7	339.1
	1 1/2" NPT	[1.10]	[1.30]	[2.80]	[13.80]
	SAE-24	[1.10] 27.9	33 1	71.1	350.5

for element removal

Size	160	180	
Weight (lbs.)	5.1	7.3	

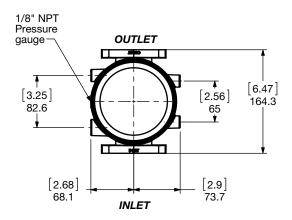
Dimensions MF 190 / 195

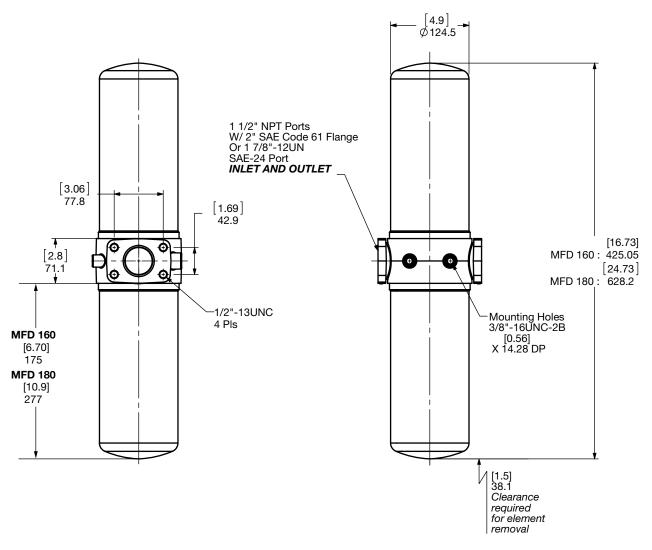




Size	190	195
Weight (lbs.)	4.3	5.4

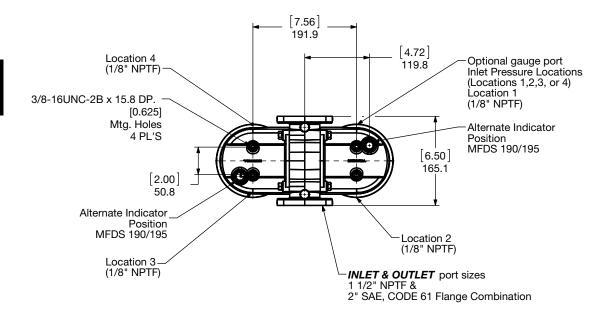
Dimensions MFD 160 / 180

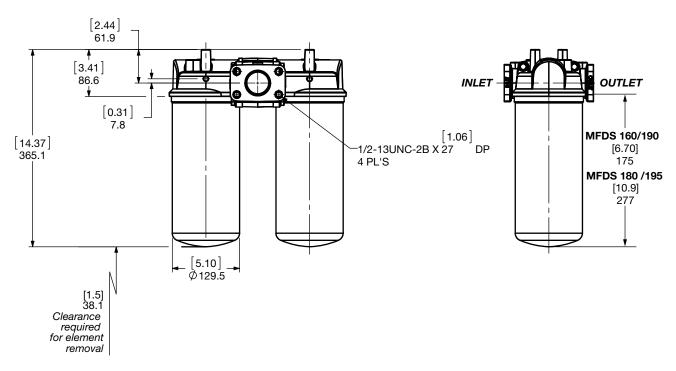




Size	160	180	
Weight (lbs.)	8.8	11	

Dimensions MFDS 160 / 180 / 190 / 195





Size - MFD	160	180	190	195
Weight (lbs.)	11.6	13.8	8.8	11

Sizing Information

Total pressure loss through the filter is as follows:

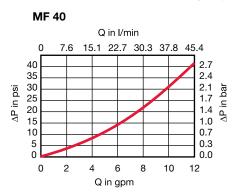
Assembly ΔP = Housing ΔP + Element ΔP

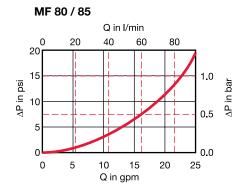
Housing Curve:

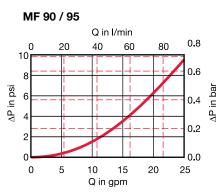
Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

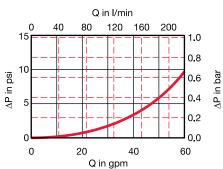
Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



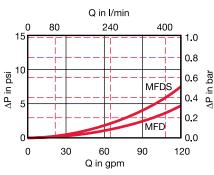




MF 160 / 180 / 190 / 195



MFD / MFDS 160 / 180 / 190 / 195



Aquamicron Water Removal Element Capacity vs. Flow

Spin-On	Optimum Flow Rate		Maximum Flow Rate	
Element	Flow (gpm)	Capacity (quarts)	Flow (gpm)	Capacity (quarts)
0080MA010AM	2	0.12	6	0.08
0090MA010AM	2	0.12	6	0.08
0095MA010AM	4	0.17	8	0.11
0160MA040AM	4	0.23	8	0.16
0180MA040AM	6	0.45	15	0.32

Spin-on Connection Chart

Size	Can Connection Thread			
Size	MA	MG	MU	
0040	3/4" - 16 UN - 2B	_	_	
0080	_	3/4" BSPP	_	
0080/0085	1" - 12 UN -2B	_	_	
0090/0095	1-1/2" - 16 UN - 2B	_	_	
0160	_	1-1/4" BSPP	_	
0160/0180	1-1/2" - 16 UN - 2B	_	_	

MA = UN Tap Plate Thread (standard); MG = BSPP Tap Plate Thread (special); MU = Metric Tap Plate Thread (special - consult HYDAC)

Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Size	MABN				
Size	3 µm	5 μm	10 µm	20 µm	
0040	_	1.1799	0.6289	0.3613	
0080	_	0.4423	0.2357	0.1354	
0090	0.4841	0.3702	0.3451	0.1911	
0095	0.2762	0.2112	0.1969		
0160	0.2372	0.1983	0.1113	0.0625	
0180	0.1231	0.1029	0.0577	0.0325	

Size	MAP				
Size	3 µm	10 µm	25 µm		
0040	7.763	2.348	1.516		
0080	1.606	0.486	0.314		
0085	_	0.351	_		
0090	_	0.482	_		
0095	0.894	0.270	_		
0160	0.839	0.192	0.145		
0180	0.443	0.134	0.087		

Size	MAAM		
Size	010 µm	040 µm	
0800	0.513	_	
0085	_	_	
0090	0.507	_	
0095	0.284	_	
0160	_	0.233	
0180	_	0.136	

All Element K Factors in psi / gpm.

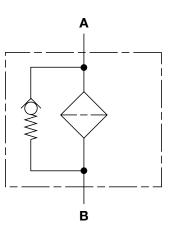
FLN Series

Inline Filters 360 psi • up to 100 gpm





Hydraulic Symbol



Features

- Aluminum alloy is water tolerant anodization is not required for high water based fluids (HWBF).
- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- SAE straight thread O-ring boss porting to allow easy installation without costly adapters.
- O-ring axial seals are used to provide positive, reliable sealing.
- Screw-in bowl mounted below the filter head requires minimal clearance to remove the element for replacement, and contaminated fluid cannot be washed downstream when element is serviced.
- Differential Pressure Indicators. HYDAC indicators have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- A poppet-type bypass valve (optional) is mounted in-line between the inlet and outlet ports to provide positive sealing during normal operation and fast opening during cold starts and flow surges.
- This filter can be modified to meet the requirements of DIN 24550* as follows:
 - Filter size 0160 with G 1-1/4" port selection
 - Filter size 0250 with G 1-1/2" port selection
 - Filter size 0400 with SAE-DN 38 1-1/2" Flange
- Bypass versions of FLN filters have the bypass valve located in the filter head.

*Note - QPD design does not meet DIN 24550.

Technical Specifications

Mounting Method	2 mounting holes in the filter head		
Port Connection	Inlet / Outlet 1-1/4" Threaded – SAE 20, 1-1/4" BSPP 1-1/2" Threaded – SAE 24, 1-1/2" BSPP 1-1/2" Flange-SAE-DN 38 Code 61		
Flow Direction	Inlet: Side Outlet: Opposite Side		
Construction Materials			
Head, Bowl	Aluminum		
Flow Capacity			
160	43 gpm (160 lpm)		
250	66 gpm (250 lpm)		
400	105 gpm (400 lpm)		
Housing Pressure Rating			

Max. Allowable Working

360 psi (25 bar) Pressure: Fatique Pressure 360 psi (25 bar) **Burst Pressure** 1450 psi (100 bar)

Element Collapse Pressure Rating

BN4HC, W/HC 290 psid (20 bar) BH4HC 3045 psid (210 bar)

Fluid Temperature Range -22°F to 212°F (-30°C to 100°C)

Consult HYDAC for applications below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 36.25 \text{ psid } (2.5 \text{ bar}) -10\% \text{ (standard)}$

 $\Delta P = 72 \text{ psid } (5 \text{ bar}) -10\%$

 $\Delta P = 116 \text{ psid } (8 \text{ bar}) -10\%$

Bypass Valve Cracking Pressure

 $\Delta P = 50.75 \text{ psid } (3.5 \text{ bar}) + 10\% \text{ (standard)}$

 $\Delta P = 102 \text{ psid } (7 \text{ bar}) + 10\%$

Applications



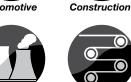
Agricultural



Industrial



Automotive



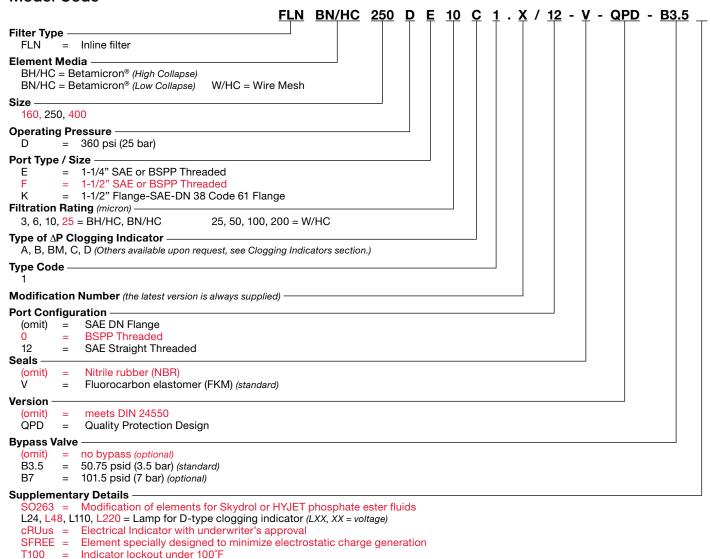
Power



Gearboxes

Pulp & Paper

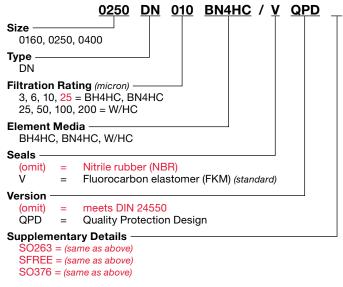
Model Code



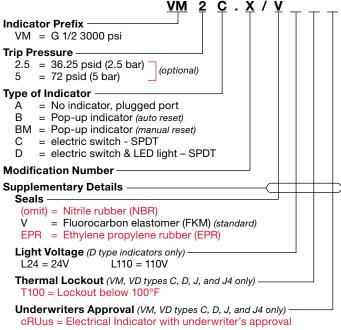
Modification of ON and W/HC elements for HFA, HFB, HFC, and HFD flame retardant liquids

Replacement Element Model Code

SO376 =



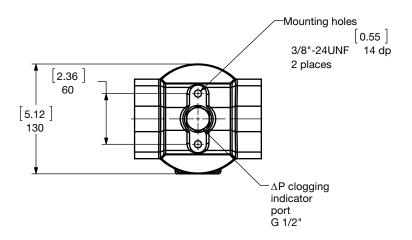
Clogging Indicator Model Code

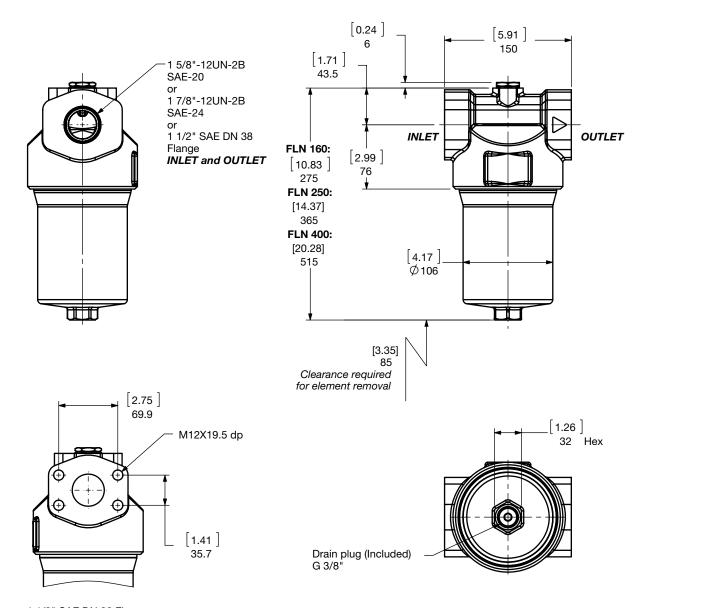


(For additional details and options, see Clogging Indicators section.)

Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Dimensions FLN 160 / 250 / 400





1 1/2" SAE DN 38 Flange

Size	160	250	400
Weight (lbs.)	9.5	10.9	13.1

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

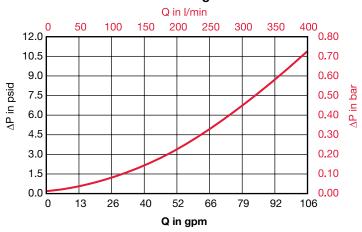
Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

FLN 160 / 250 / 400 Housing



Element K Factors

 $\Delta \text{P Elements} = \text{Elements (K) Flow Factor x Flow Rate (gpm) x} \\ \frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \\ \frac{\text{Actual Specific Gravity}}{0.86}$

BN4HC		DNBN4HC (Betan	nicron Low Collapse)	
Size	3 µm	6 μm	10 μm	25 μm
0160 DN XXX BN4HC	0.434	0.280	0.187	0.143
0250 DN XXX BN4HC	0.280	0.176	0.115	0.099
0400 DN XXX BN4HC	0.176	0.110	0.071	0.055

ВН4НС	DNBH/HC (Betamicron High Collapse)			
Size	3 μm	6 μm	10 μm	25 μm
0160 DN XXX BH4HC	0.439	0.280	0.209	0.137
0250 DN XXX BH4HC	0.296	0.187	0.154	0.104
0400 DN XXX BH4HC	0.187	0.115	0.093	0.060

W/HC	DNW/HC (Betamicron Low Collapse)			
Size	25 μm	50 μm	100 μm	200 μm
0160 DN XXX W/HC	0.009	0.009	0.009	0.009
0250 DN XXX W/HC	0.006	0.006	0.006	0.006
0400 DN XXX W/HC	0.004	0.004	0.004	0.004

All Element K Factors in psi / gpm.

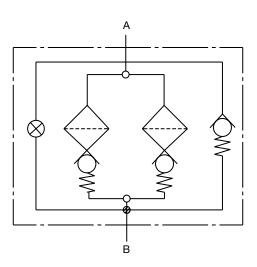


FLND Series

Inline Duplex Filters 360 psi • up to 100 gpm



Hydraulic Symbol



Features

- Lightweight duplex filter constructed of aluminum.
- Aluminum alloy is water tolerant anodization is not required for high water based fluids (HWBF).
- The filter housings are designed to withstand pressure surges as well as high static pressure loads.
- The screw-in bowl allows the filter element to be easily removed for replacement or cleaning.
- A visual (pop-up), electrical, electrical/visual (lamp), or electronic differential type clogging indicator are possible.
- The standard model is supplied with vent and drain plugs, and also a connection for differential clogging indicator.
- The pressure is equalized between chambers by raising the change-over lever prior to switching it to the relevant filter side. Thus, the filter contains an integrated equalization valve.
- CRN Approval Available. (Canadian Registration Number)
- Bypass versions of FLND filters have the bypass valve located in the filter head.
- This filter can be modified to meet the requirements of DIN 24550* as follows:
 - Filter size 0160 with G 1-1/4" port selection
 - Filter size 0250 with G 1-1/2" port selection
 - Filter size 0400 with SAE-DN 38 1-1/2" Flange

Technical Specifications

recillical opecifica	ations
Mounting Method	4 mounting holes - filter head
Port Connection	Inlet / Outlet
	1-1/4" Threaded - SAE 20, 1-1/4" BSPP
	1-1/2" Threaded – SAE 24, 1-1/2" BSPP
	1-1/2" Flange-SAE-DN 38 Code 61
Flow Direction	Inlet: Side Outlet: Opposite Side
Construction Materials	
Head, Bowl	Aluminum
Flow Capacity	
160	42 gpm (160 lpm)
250	66 gpm (250 lpm)
400	105 gpm (400 lpm)
Housing Pressure Rating	
Max. Operating Pressure	360 psi (25 bar)
Fatigue Pressure	360 psi (25 bar)
Burst Pressure	1450 psi (100 bar)
Element Collapse Pressur	e Rating
BN4HC, W/HC	290 psid (20 bar)
Fluid Temperature Range	14°F to 212°F (-10°C to 100°C)
Consult HYDAC for application	ns below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 36 \text{ psid } (2.5 \text{ bar}) -10\%$

 $\Delta P = 72 \text{ psid } (5 \text{ bar}) -10\%$

 $\Delta P = 116 \text{ psid (8 bar)} - 10\% (non-bypass)$

Bypass Valve Cracking Pressure

 $\Delta P = 50.75 \text{ psid } (3.5 \text{ bar}) + 10\%$

 $\Delta P = 102 \text{ psid } (7 \text{ bar}) + 10\%$

Applications



Automotive







Generation





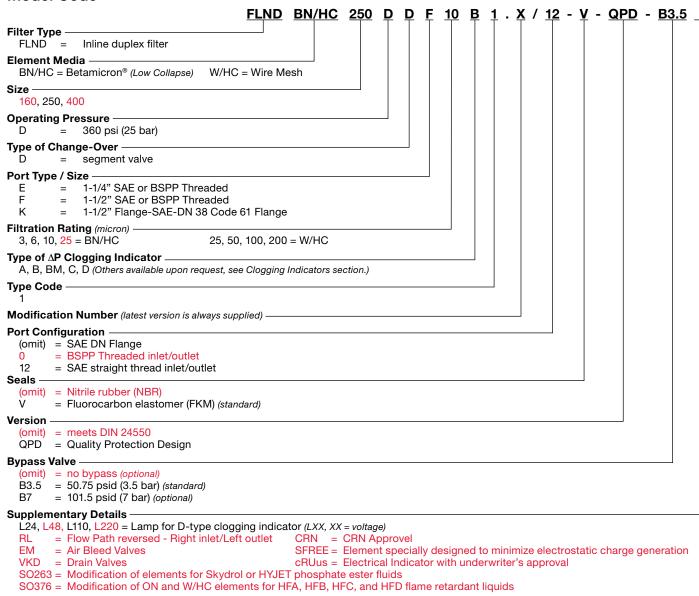




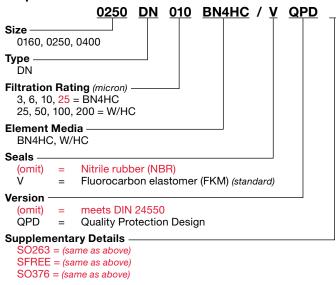


^{*}Note - QPD design does not meet DIN 24550.

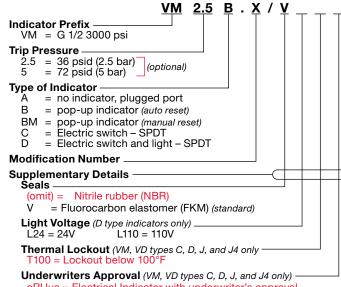
Model Code



Replacement Element Model Code



Clogging Indicator Model Code

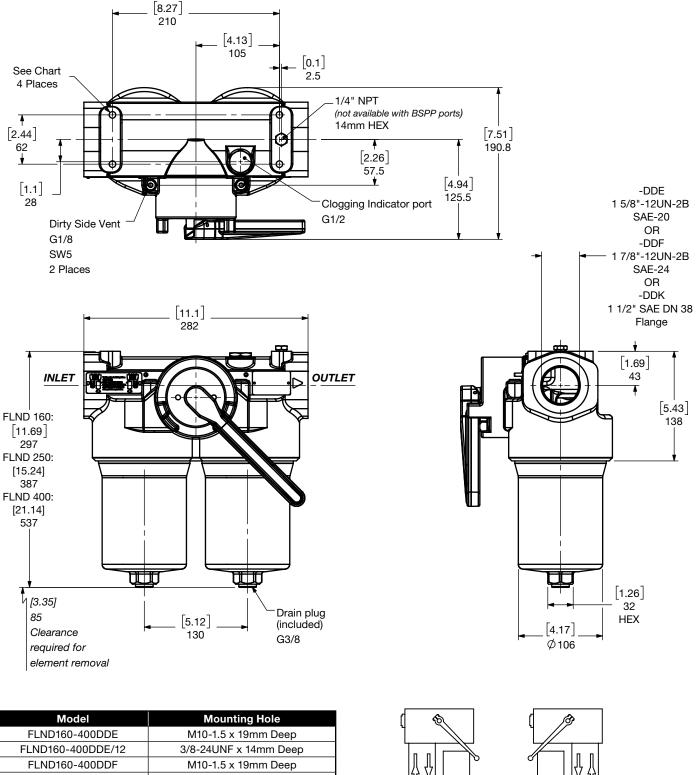


cRUus = Electrical Indicator with underwriter's approval

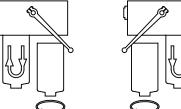
(For additional details and options, see Clogging Indicators section.)

D69

Dimensions FLND







Before changing the element, relieve pressure in the filter housing.

Size	160	250	400
Weight (lbs.)	20.1	21.2	26.5

Sizing Information

Total pressure loss through the filter is as follows:

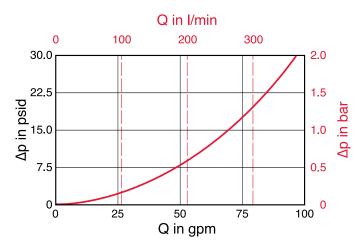
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



Element K Factors

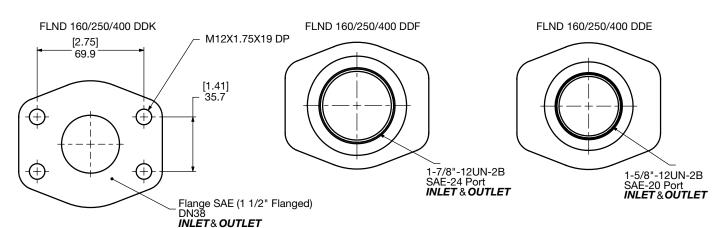
 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

BN4HC	DNBN4HC (Betamicron Low Collapse)			
Size	3 µm	6 μm	10 μm	25 μm
0160 DN XXX BN4HC	0.434	0.280	0.187	0.143
0250 DN XXX BN4HC	0.280	0.176	0.115	0.099
0400 DN XXX BN4HC	0.176	0.110	0.071	0.055

W/HC	DNW/HC (Betamicron Low Collapse)			
Size	25 μm	50 μm	100 μm	200 μm
0160 DN XXX W/HC	0.009	0.009	0.009	0.009
0250 DN XXX W/HC	0.006	0.006	0.006	0.006
0400 DN XXX W/HC	0.004	0.004	0.004	0.004

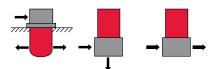
All Element K Factors in psi / gpm.

FLND 160/250/400



NF Series

In-Tank / Inline Filters 360 psi • up to 450 gpm (4" piping) up to 1350 gpm (6" piping)









2.0 Version 1.0 Version

1350 / 2650

Features

- NF Filters have an extremely large filtration area and flow capacity of 450 gpm (4" pipe size limitation)
- NF Filters can be configured for in-tank or in-line applications
- Vent and drain ports are standard
- Aluminum alloy is water tolerant anodizing is not required for high water based fluids (HWBF)
- Screw-on lid provides easy access to filter element for replacement
- Reusable contamination basket prevents re-entry of retained contaminants into the reservoir during element replacement (1.0 Version only)
- Filters can be fitted with clogging indicators to monitor the contamination level of the element
- Flange connection bolts included for all SAE-DIN flange ports Note: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Applications











Generation

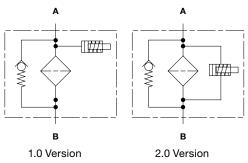
Gearboxes

Pulp & Paper Shipbuilding

Steel / Heavy

Industry

Hydraulic Symbol



Mounting Method	See drawings
Port Connection	
330 / 500 / 750	SAE DN 38 (1 1/2") Code 61
1310 / 2610 1340 / 2640	4" SAE DN 102 Flange Code 6 (with M16 bolts included) - other options available
1350 / 2650	SAE DN 51 (2") Code 61 SAE DN (2 1/2") Code 61 SAE DN 76 (3") Code 61
Flow Direction	
1.0 version 2.0 version 1350 / 2650	Inlet: Side Outlet: Bottom Outlet: Bottom Inlet: Side Outlet: Side
Construction Materials	
Head, Housing, Lid Elbows, Manifolds	Aluminum Ductile Iron
Flow Capacity	4" Headers
330 500 750 1310, 1340, 1350 2610, 2640, 2650, 5240, 7840, 10440	80 gpm (303 lpm) 132 gpm (500 lpm) 200 gpm (757 lpm) 343 gpm (1300 lpm) 450 gpm (1700 lpm)
	6" Headers
5210D7/D8 7810 D7/D8 10410 D7/D8	900 gpm (3407 lpm) 1350 gpm (5110 lpm) 1350 gpm (5110 lpm)
Housing Pressure Rating	
Max. Allowable Working Pressure* Fatigue Pressure Burst Pressure	360 psi (25 bar) 360 psi (25 bar) 1754 psi (121 bar)
Element Collapse Pressure Rating	g
ON, W/HC ECON2, BN4AM, P/HC, AM	290 psid (20 bar) 145 psid (10 bar)

ON, W/HC	290 psid (20 bar)
ECON2, BN4AM, P/HC, AM	145 psid (10 bar)
V	435 psid (30 bar)

Fluid Temperature Range -22°F to 212°F (-30°C to 100°C)

Consult HYDAC for applications below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar) -10\%}$ 1.0 - Static $\Delta P = 72 \text{ psid (5 bar) -10\%}$ 2.0 - Differential

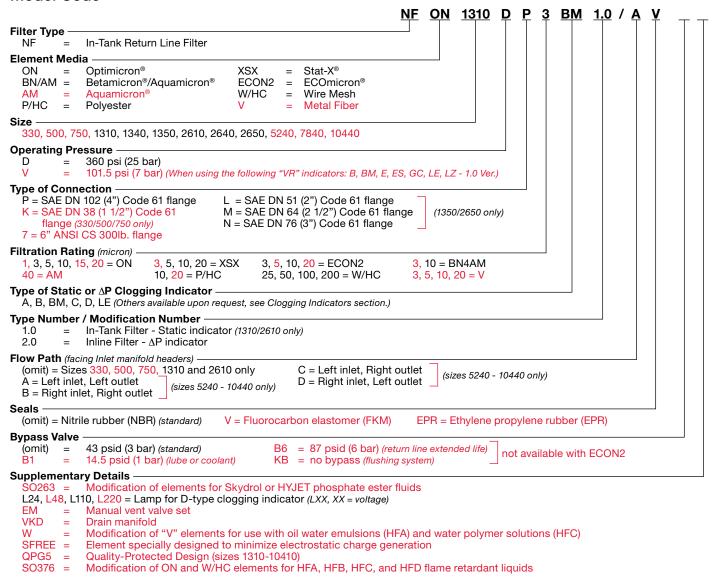
Bypass Valve Cracking Pressure

 $\Delta P = 14.5 \text{ psid (1 bar)} + 10\%$

 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (standard)}$

 $\Delta P = 87 \text{ psid (6 bar)} + 10\%$

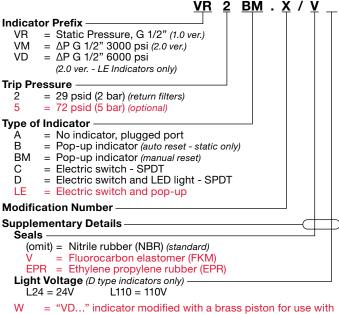
Model Code



Replacement Element Model Code

```
1300 R 003 ON / V
Size -
  330, 500, 750,
  1300 - for housings: 1310, 1340, 1350
  2600 - for housings: 2610, 2640, 2650,
         5240, 7840, 10440
Filtration Rating (micron)
  1, 3, 5, 10, 15, 20 = ON
                              3, 5, 10, 20 = XSX
  3, 5, 10, 20 = ECON2
                              3.10 = BN4AM
  40 = AM
                              10.20 = P/HC
  25, 50, 100, 200 = W/HC
                             3, 5, 10, 20 = V
Element Media
  ON, XSX, ECON2, BN4AM, AM, P/HC, W/HC, V
Seals
               Nitrile rubber (NBR) (standard)
  (omit)
               Fluorocarbon elastomer (FKM)
  EPR
               Ethylene propylene rubber (EPR)
Bypass Valve
  (omit) = 43 psid (3 bar) (standard)
                                        B1 = 14.5 \text{ psid } (1 \text{ bar})
  B6 = 87 \text{ psid } (6 \text{ bar})
                                        KB = no bypass
Supplementary Details
    O263 = (same as above) W = (same as above)
  SFREE = (same as above)
  QPG5 = Quality-Protected Design (sizes 1300-2600)
```

Clogging Indicator Model Code



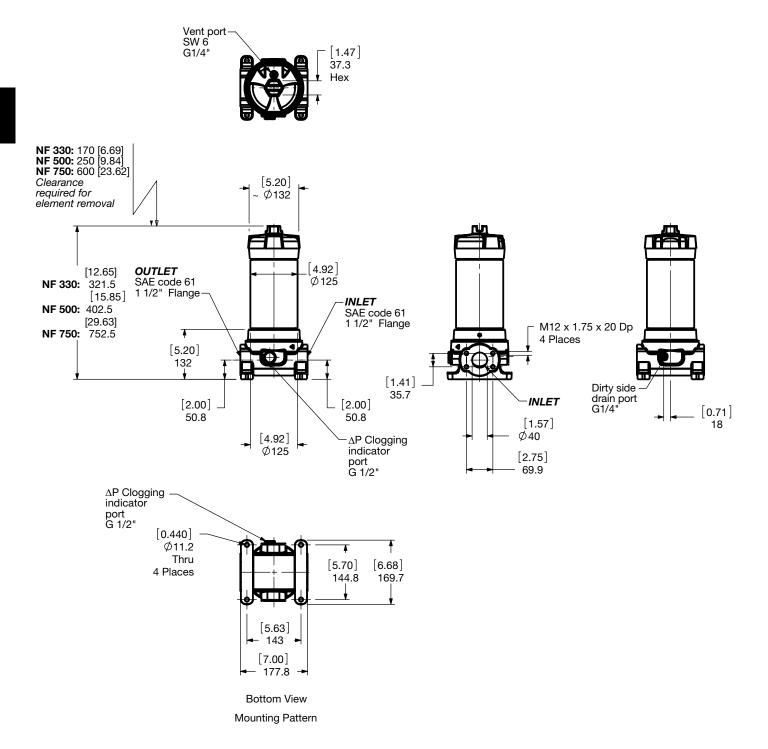
high water based emulsions/solutions (HFA) & (HFC)

(For additional details and options, see Clogging Indicators Section.)

D73

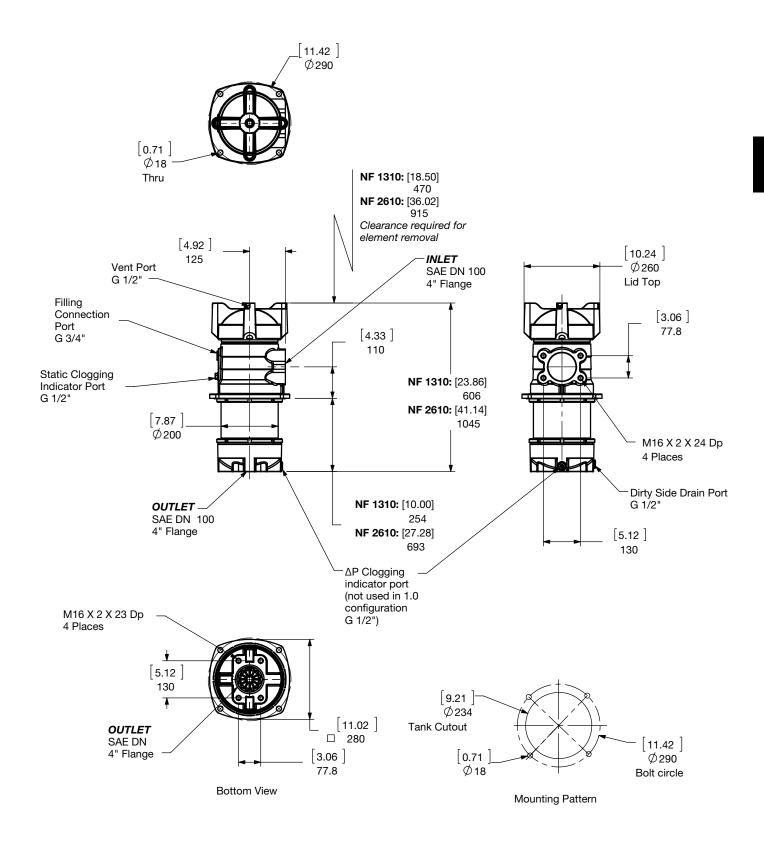
SO376 = (same as above)

Dimensions NF 330 - 750 2.0 Version (In-line)



Size	330	500	750
Weight (lbs.)	17.2	19.9	31.1

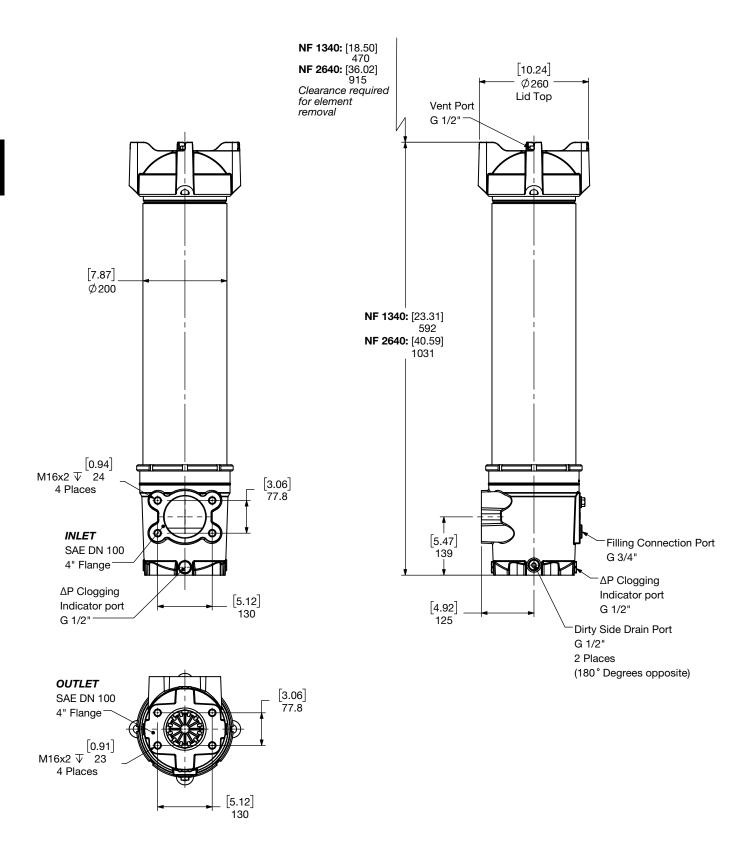
Dimensions: NF 1310 / 2610 1.0 Version (In-Tank)



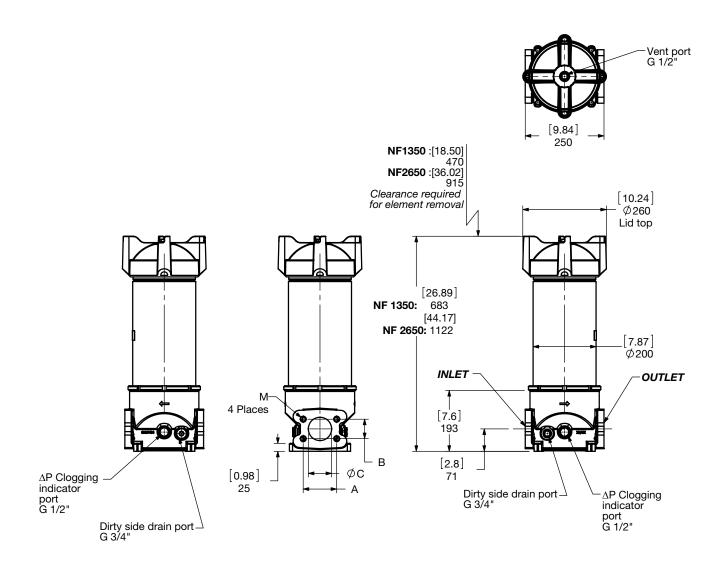
Size	1310	2610
Weight (lbs.)	37.5	50.7

Dimensions:

NF 1340 / 2640 2.0 Version (In-line)

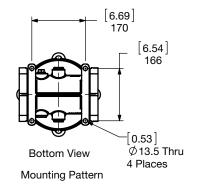


Size	1340	2640
Weight (lbs.)	37.5	50.7



Port Connections

Flange	Α	В	øC	М
2" SAE-DN 50	77.8	42.9	50	M12 x 1.75 x 19 DP
2 1/2" SAE-DN 65	88.9	50.8	65	M12 x 1.75 x 19 DP
3" SAE-DN 80	106.4	62.9	75	M16 x 2.0 x 24 DP
4" SAE-DN 100	130.2	77.8	100	M16 x 2.0 thru

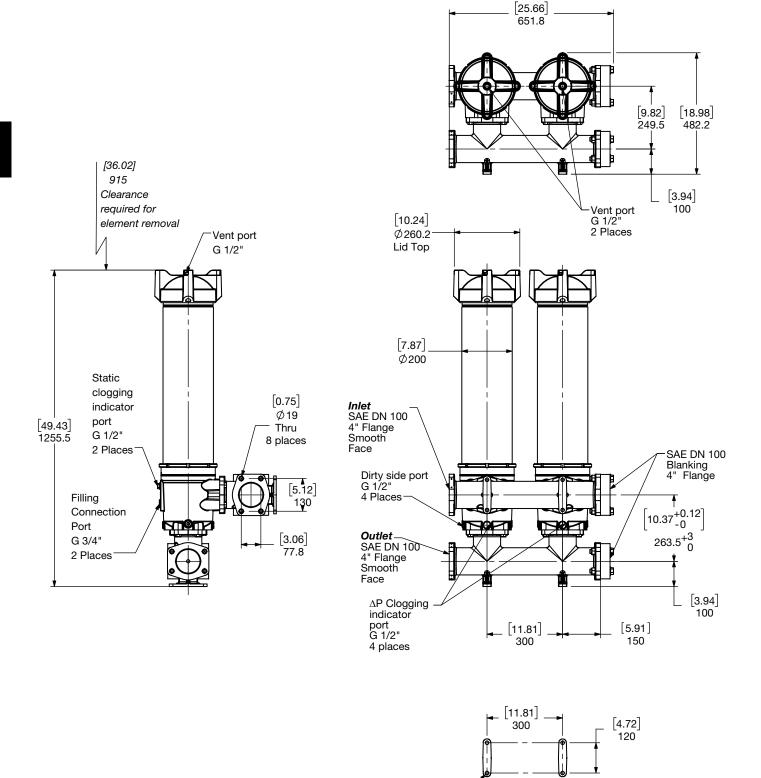


Size	1350	2650
Weight (lbs.)	39.7	55.2

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include elements. For complete dimensions please contact HYDAC to request a certified print.

D77

Dimensions: NF 5240 2.0 Version



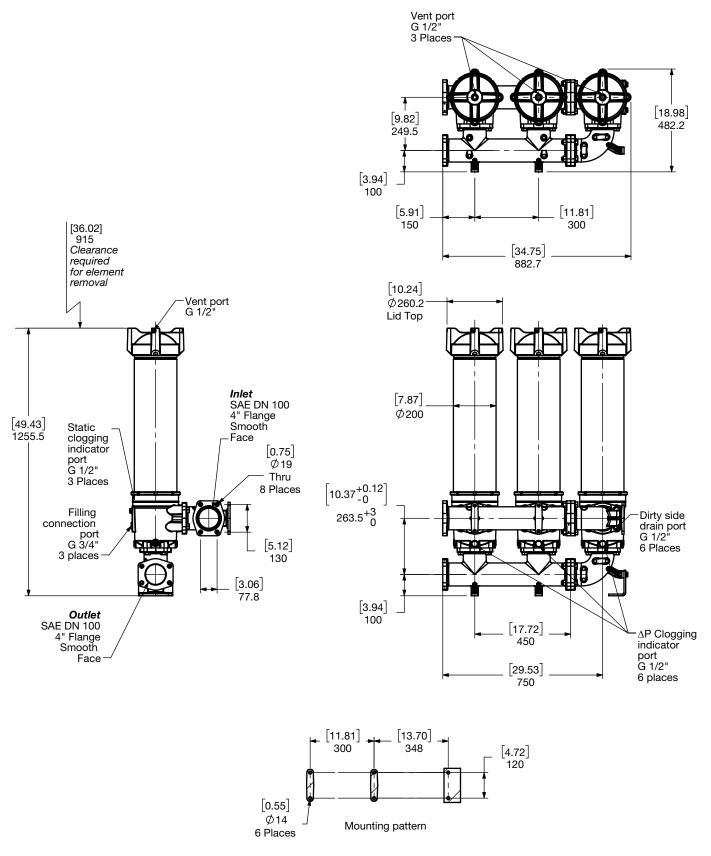
Size	5240
Weight (lbs.)	198.5

[0.55] Ø14 Thru

4 Places

Mounting Pattern

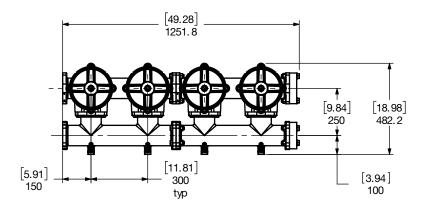
Dimensions: NF 7840 2.0 Version

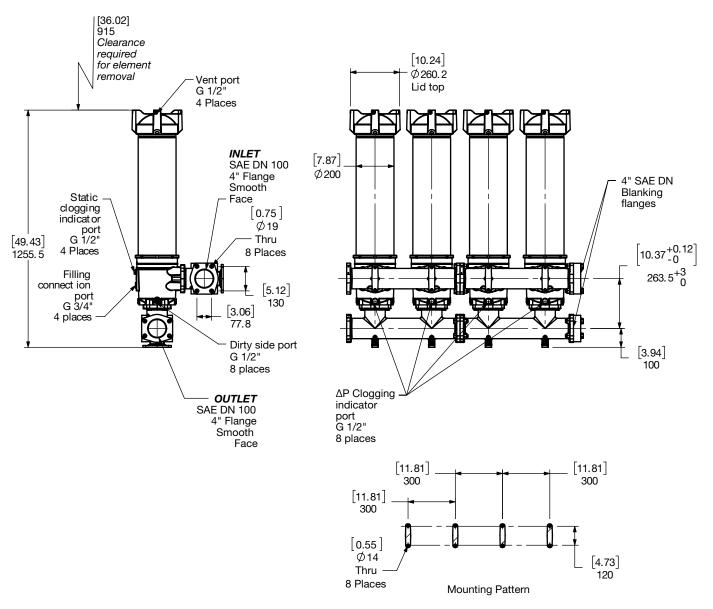


Size	7840
Weight (lbs.)	275.6

Dimensions:

NF 10440 2.0 Version

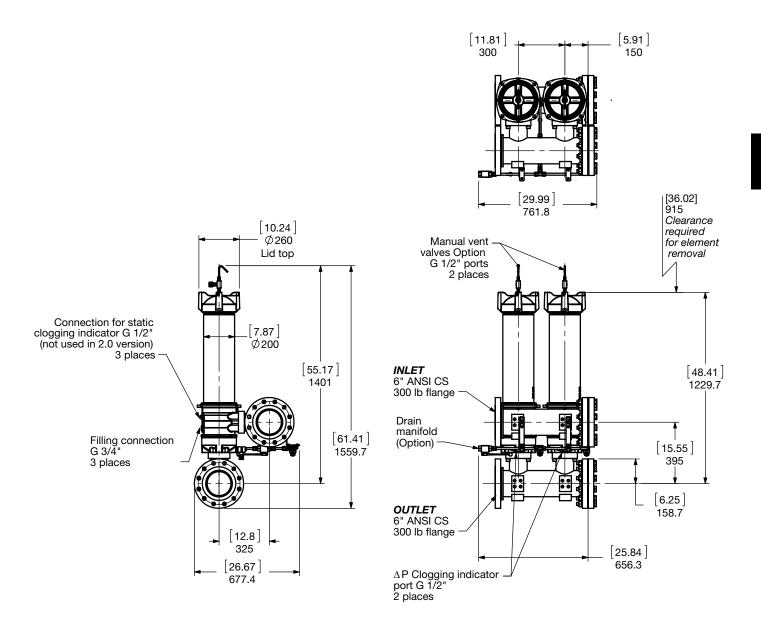


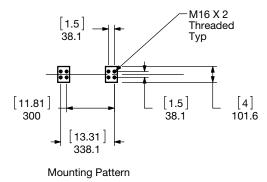


Size	10440
Weight (lbs.)	397

Dimensions:

NF 5210DC7XX2.0/A EM-VKD (Modular Parallel High Flow)

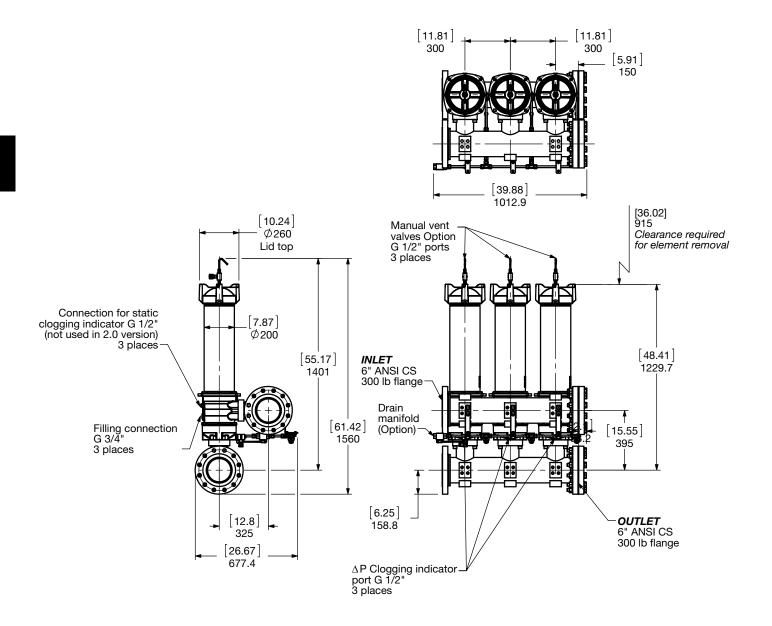


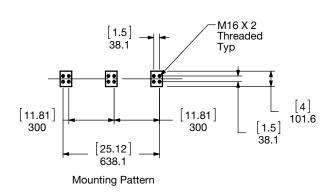


Size	5210DC7XX2.0/A EM-VKD
Weight (lbs.)	485

Dimensions

NF 7810DC7XX2.0/A EM-VKD (Modular Parallel High Flow)





Size	7810DC7XX2.0/C EM-VKD
Weight (lbs.)	520



Sizing Information

Total pressure loss through the filter is as follows:

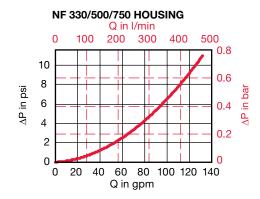
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

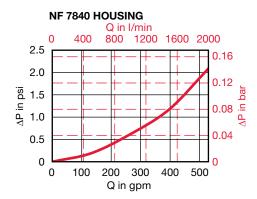
Pressure loss through housing is as follows:

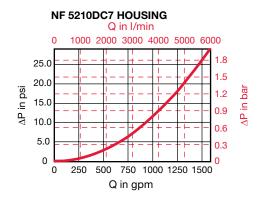
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

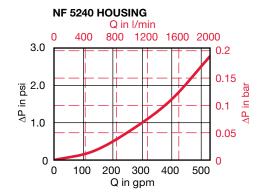
Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

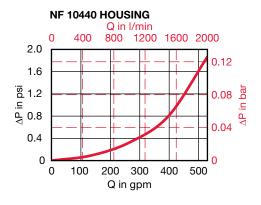


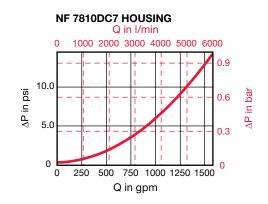
NF 1310-2650 HOUSING Q in I/min 0 400 1200 1600 2000 800 0.3 4.0 ∆P in psi 0.2 3.0 2.0 0.1 1.0 0 100 200 300 400 500 0 Q in gpm











Element K Factors

 ΔP Elements = Elements (K) Flow Factor x Flow Rate (gpm) x $\frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}}$ x $\frac{\text{Actual Specific Gravity}}{0.86}$

Optimicron	RON					
Size	1 μm	3 μm	5 μm	10 μm	15 µm	20 μm
0330 R XXX ON	0.444	0.204	0.15	0.081	0.07	0.056
0500 R XXX ON	0.289	0.143	0.104	0.06	0.046	0.038
0750 R XXX ON	0.116	0.061	0.05	0.029	0.019	0.018
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006

Stat-X	RXSX			
Size	3 μm	5 μm	10 μm	20 μm
0330 R XXX XSX	0.204	0.15	0.081	0.056
0500 R XXX XSX	0.143	0.104	0.06	0.038
0750 R XXX XSX	0.061	0.05	0.029	0.018
1300 R XXX XSX	0.04	0.032	0.019	0.012
2600 R XXX XSX	0.02	0.016	0.01	0.006

ECOmicron	RECON2			
Size	3 µm	5 μm	10 μm	20 μm
0330 R XXX ECON2	0.230	0.148	0.093	0.066
0500 R XXX ECON2	0.165	0.104	0.071	0.044
0750 R XXX ECON2	0.071	0.049	0.033	0.022
1300 R XXX ECON2	0.044	0.033	0.022	0.016
2600 R XXX ECON2	0.022	0.016	0.011	0.005

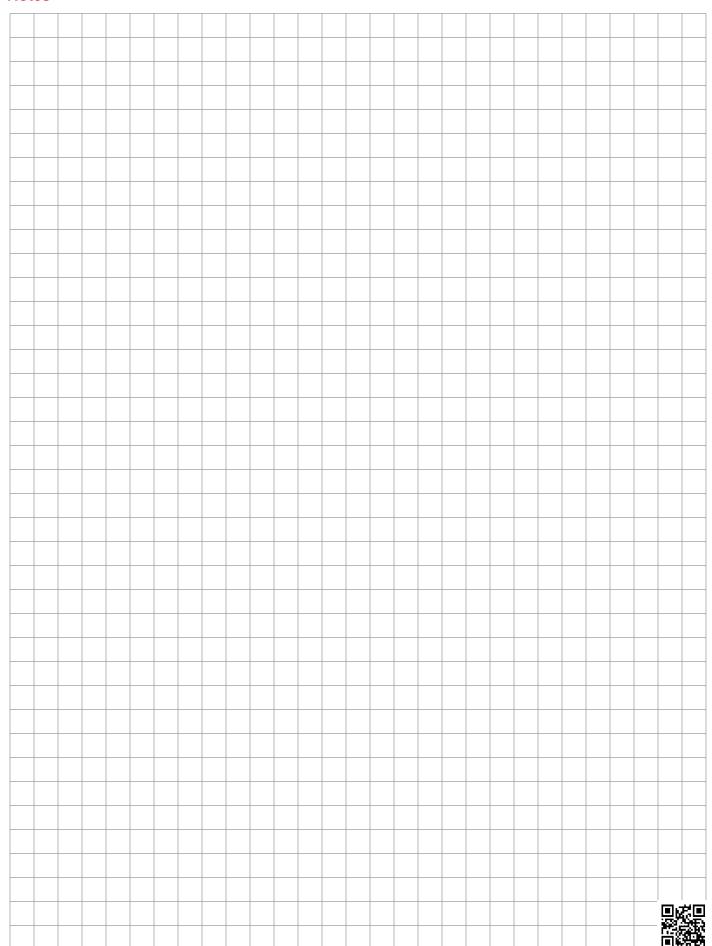
Betamicron/Aquamicron	RBN4AM		
Size	3 μm	10 µm	
0330 R XXX BN4AM	0.477	0.165	
0500 R XXX BN4AM	0.313	0.11	
0750 R XXX BN4AM	0.126	0.044	
1300 R XXX BN4AM	0.088	0.033	
2600 R XXX BN4AM	0.055	0.016	

Aquamicron	RAM
Size	40 μm
0330 R 040 AM	0.115
0500 R 040 AM	0.076
0750 R 040 AM	0.030
1300 R 040 AM	0.026
2600 R 040 AM	0.013

Wire Mesh	RW/HC	
Size	25, 50, 100, 200 μm	
0330 R XXX W/HC	0.011	
0500 R XXX W/HC	0.007	
0750 R XXX W/HC	0.003	
1300 R XXX W/HC	0.002	
2600 R XXX W/HC	0.001	

Polyester	RP/HC	
Size	10 μm	20 μm
0330 R XXX P/HC	0.016	0.008
0500 R XXX P/HC	0.011	0.005
0750 R XXX P/HC	0.004	0.002
1300 R XXX P/HC	0.004	0.002
2600 R XXX P/HC	0.002	0.001

Notes



NFD Series

Inline Duplex Filters 360 psi • up to 450 gpm





Features

- NFD Filters have an extremely large filtration area and flow capacity of 450 gpm (4" pipe size limitation).
- Vent and drain ports are standard
- Aluminum alloy is water tolerant anodization is not required for high water based fluids (HWBF)
- Screw-on lid provides easy access to filter element for replacement
- Filters can be fitted with clogging indicators to monitor the contamination level of the element
- NFD duplex filters have a ball-type diverter valve to provide continuous filtration and eliminate the need to shut-down the system during element changeout
- Flange connection bolts included for all SAE-DIN flange ports

Note: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Applications













Industrial

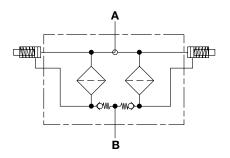




Generation



Hydraulic Symbol



Version 2.0

Inlet / Outlet Port Location Configurator

NFD1340/2640 2.X Inlet/Outlet Available Configurations

03	09
33	39
93	99

NFD5240/7840/10440 2.X Inlet/Outlet Available Configurations

00	03	09
30	33	39
60		69
	93	99



0 = Pointed to Top 3 = Pointed to Front 6 = Pointed to Bottom

(33)= Stand Configuration (not given as supplementary details)

9 = Pointed to Back

First Number = Inlet Orientation Second Number = Outlet Orientation

Technical Specifications

Mounting Method	See drawings
Port Connection	SAE DN 102 Flange Code 61
Flow Direction	
2.0 version	Inlet: Side Outlet: Side
Construction Materials	
Head, Housing, Lid Elbows, Manifolds	Aluminum Ductile Iron
Flow Capacity	
1340 2640, 5240, 7840, 10440	343 gpm (1300 lpm) 450 gpm (1700 lpm)
Housing Pressure Rating	
Max. Allowable Working Pressure* Fatigue Pressure Burst Pressure	360 psi (25 bar) 360 psi (25 bar) Contact HYDAC office
Flement Collanse Pressure Ratin	α

FL. C. T. T	00051-04005 / 0000
V	435 psid (30 bar)
ECON2, BN4AM, P/HC, AM	145 psid (10 bar)
ON, W/HC	290 psid (20 bar)

-22°F to 212°F (-30°C to 100°C) Fluid Temperature Range

Consult HYDAC for applications below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid } (2 \text{ bar}) -10\%$ 2.X - Differential $\Delta P = 72 \text{ psid (5 bar)} - 10\%$

Bypass Valve Cracking Pressure

 $\Delta P = 14.5 \text{ psid (1 bar)} + 10\%$

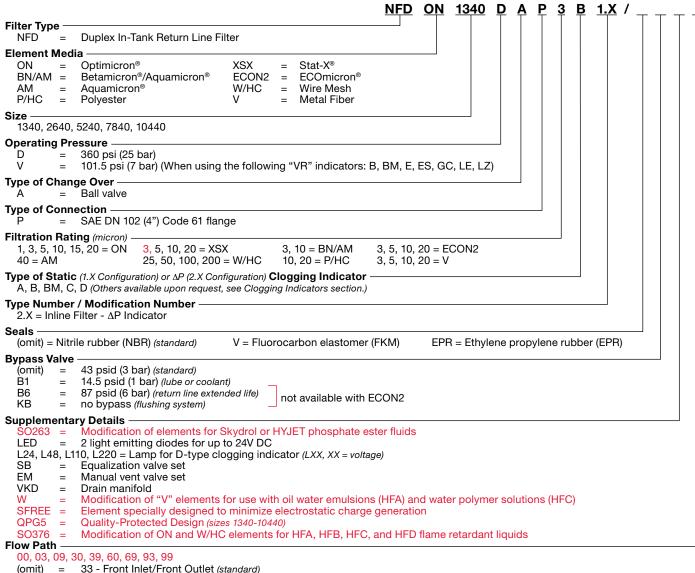
 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (standard)}$

 $\Delta P = 87 \text{ psid (6 bar)} + 10\%$

*Note: All NFD...1.0 Filters MAWP reduce to 7 bar (101.5 psi) when using the following "VMF" and "VR" indicators: B, BM, E, ES, GC, LE, LZ.

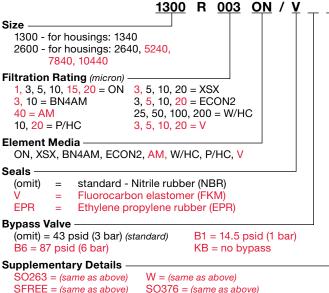


Model Code



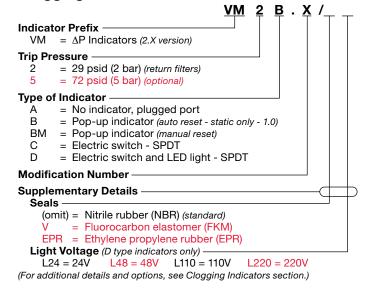
Note: See previous page of "Inlet / Outlet Port Configurator" for flow path positions.

Replacement Element Model Code



= Quality-Protected Design (sizes 1340-2640)

Clogging Indicator Model Code

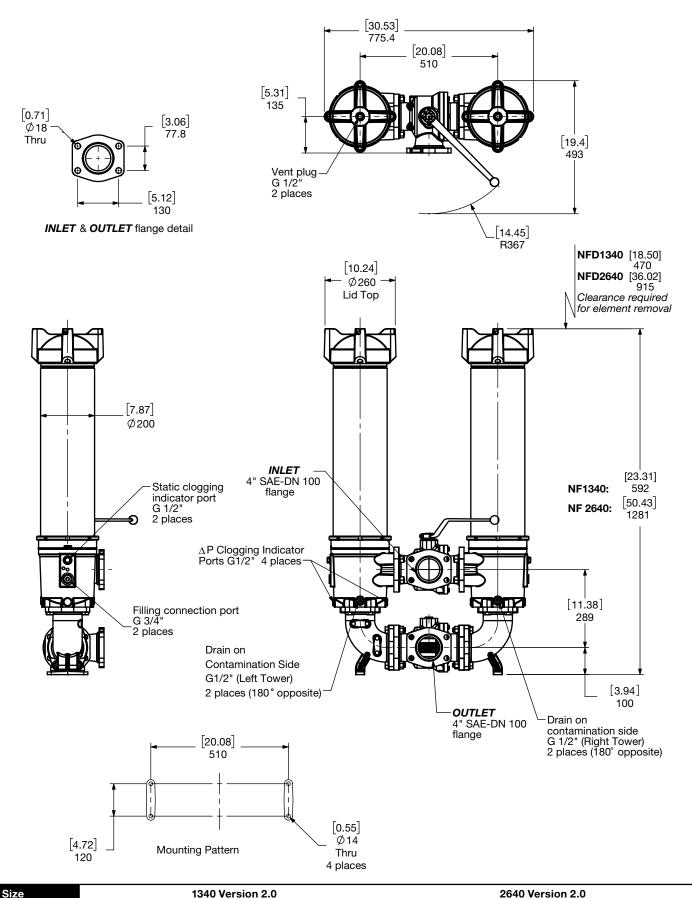


Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

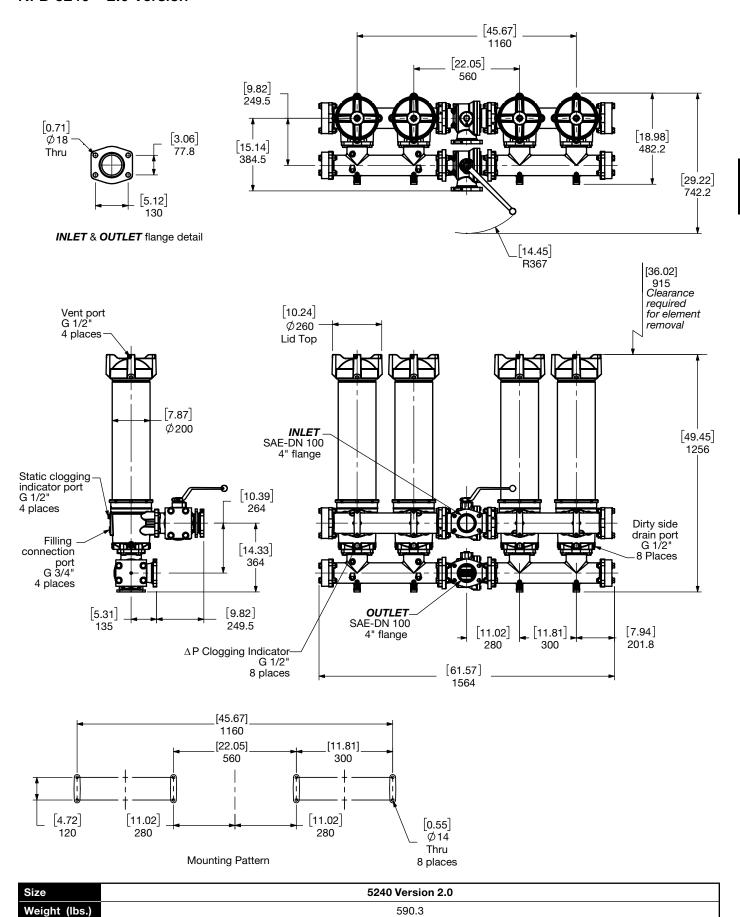
D87

Note: Element contamination retainer = P/N 01204141

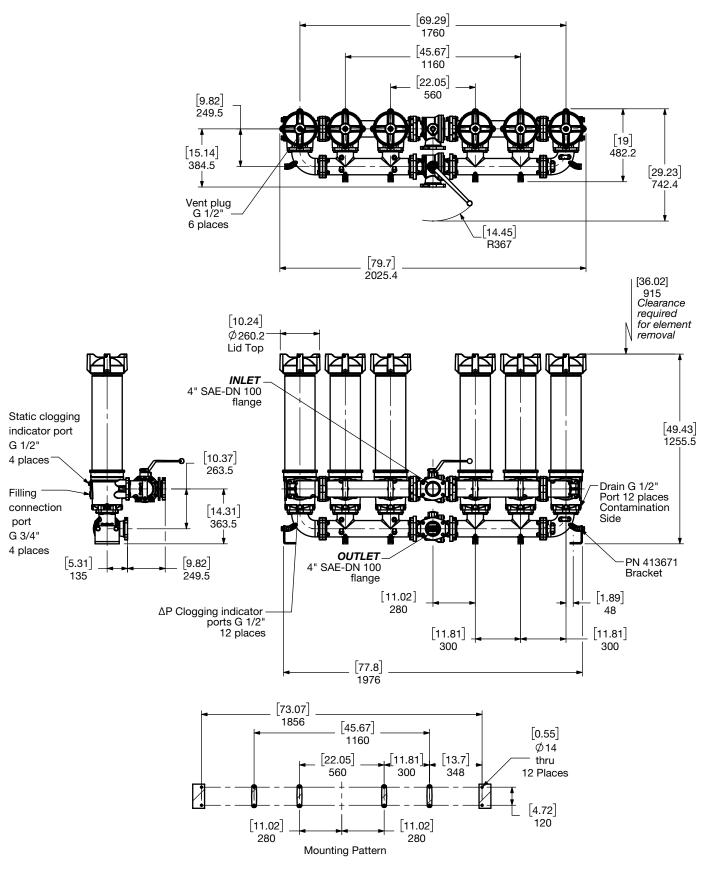
Dimensions NFD 1340 / 2640 – 2.0 Version



Dimensions: NFD 5240 – 2.0 Version



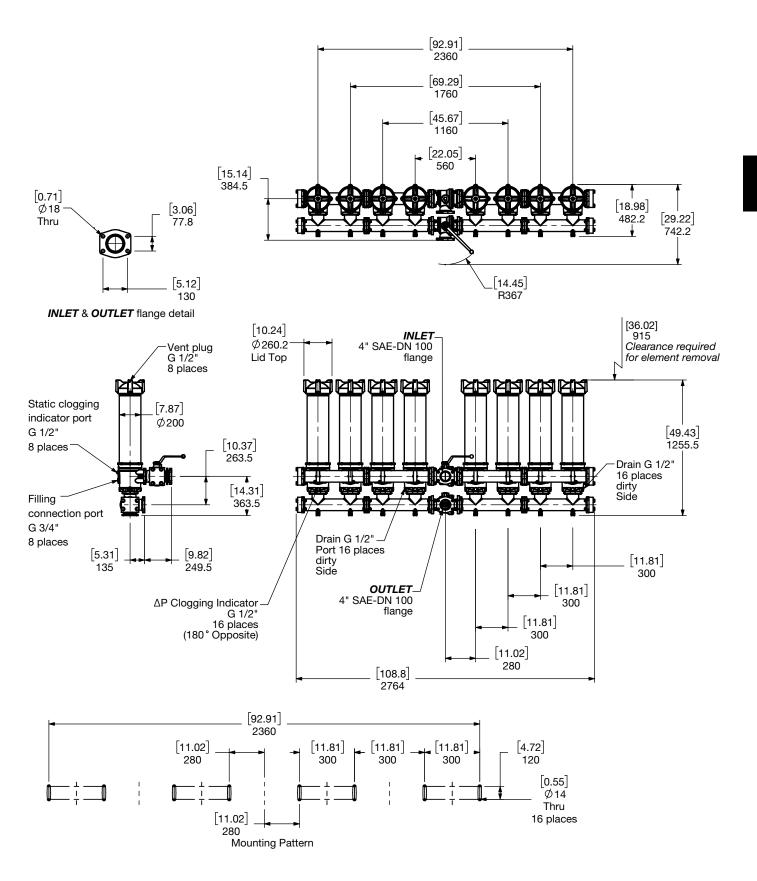
Dimensions: NFD 7840 – 2.0 Version



Size	7840 Version 2.0
Weight (lbs.)	833.4



Dimensions: NFD 10440 - 2.0 Version



Size	10440 Version 2.0
Weight (lbs.)	1085.3

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

D91

Sizing Information

Total pressure loss through the filter is as follows:

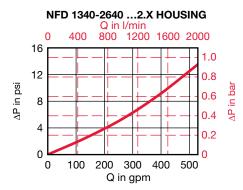
Assembly ΔP = Housing ΔP + Element ΔP

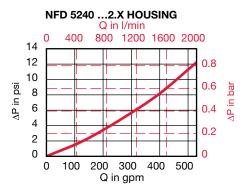
Housing Curve:

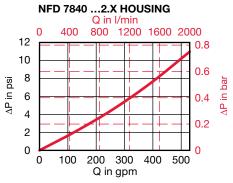
Pressure loss through housing is as follows:

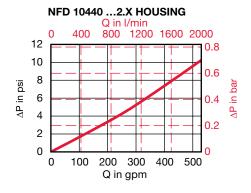
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{\Delta P}$ 0.86

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)









Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Optimicron	RON					
Size	1 µm	3 μm	5 μm	10 µm	15 µm	20 μm
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006

Stat-X	RXSX			
Size	3 µm	5 μm	10 μm	20 μm
1300 R XXX XSX	0.04	0.032	0.019	0.012
2600 R XXX XSX	0.02	0.016	0.01	0.006

ECOmicron	RECON2			
Size	3 µm	5 μm	10 μm	20 μm
1300 R XXX ECON2	0.044	0.033	0.022	0.016
2600 R XXX ECON2	0.022	0.016	0.011	0.005

Betamicron/Aquamicron	RE	BN4AM
Size	3 µm	10 μm
1300 R XXX BN4AM	0.088	0.033
2600 R XXX BN4AM	0.055	0.016

Aquamicron	RAM
Size	40 μm
1300 R 040 AM	0.026
2600 R 040 AM	0.013
·	

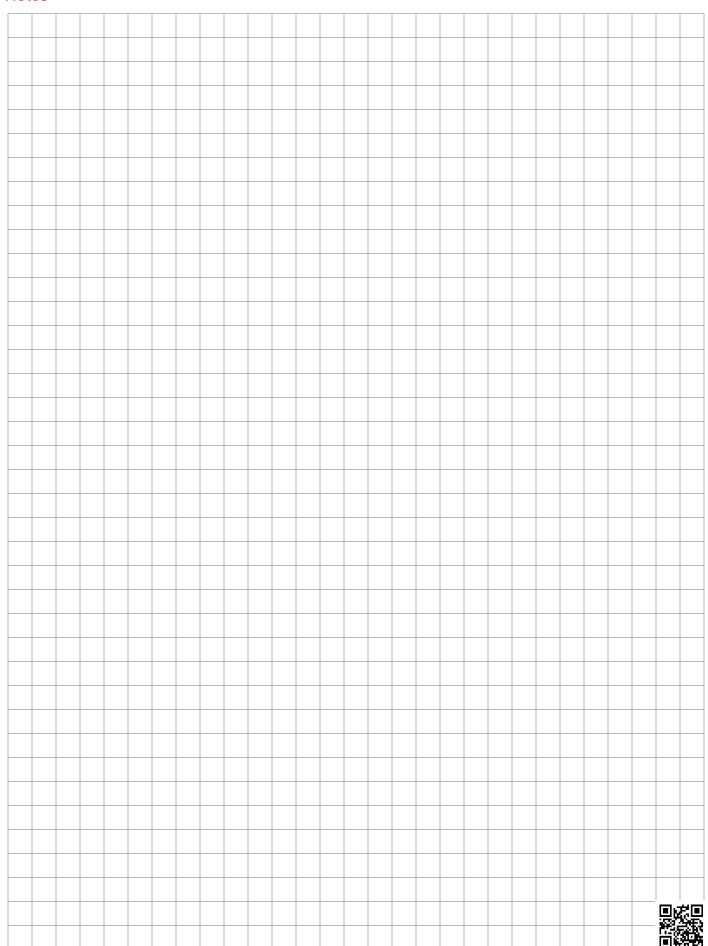
Wire Mesh	RW/HC
Size	25, 50, 100, 200 μm
1300 R XXX W/HC	0.002
2600 R XXX W/HC	0.001

Polyester	RP/HC		
Size	10 µm	20 μm	
1300 R XXX P/HC	0.004	0.002	
2600 R XXX P/HC	0.002	0.001	

All Element K Factors in psi / gpm.



Notes

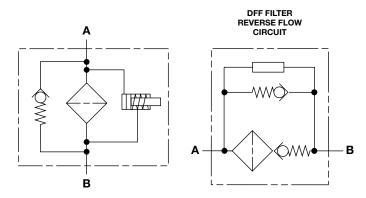


NFH Series

Modular Inline Return Line Filters 500 psi • up to 450 gpm



Hydraulic Symbol



Features

- Top access for easy element changeout.
- All models have an air bleed valve (vent) installed in the lid.
- Single large element with no leak points for highest efficiency and dirt capacity
- Lid with swing bolts for fast servicing without tools
- Drain port (right side of Inlet Port) SAE 12 (3/4")
- Clogging Indicator for local and/or remote signals
- Easily banked in parallel (manifolded) for high viscosity applications.

Notes: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Applications



Automotive



Gearboxes



Industrial



Power Generation



Pulp & Paper



Shipbuilding



Steel / Heavy Industry

Technical Specifications

Mounting Method			
NFH NFH Manifold	2 mounting holes - filter head Floor mounting brackets		
Port Connection	SAE DN 102 Flange Code 61 (single tower) SAE DN 102 (multi-tower)		
Flow Direction	Inlet: Side Outlet: Bottom		
Construction Materials	-		
Head, Lid, Elbows, Manifolds Housing	Ductile Iron Steel		
Flow Capacity			
1300 2600, 5200, 7800, 10400	343 gpm (1300 lpm) 450 gpm (1700 lpm) (Flow limited by 4" pipe size)		
Housing Pressure Rating	j		
Max Allowable Working			

Max. Allowable Working

Pressure 500 psi (34.5 bar) Fatigue Pressure 500 psi (34.5 bar) > 1440 psi (100 bar) **Burst Pressure**

Element Collapse Pressure Rating

ON. W/HC 290 psid (20 bar) ECON2, BN4AM, AM, 145 psid (10 bar) P/HC

Fluid Temperature 14°F to 212°F (-10°C to 100°C) Range

Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

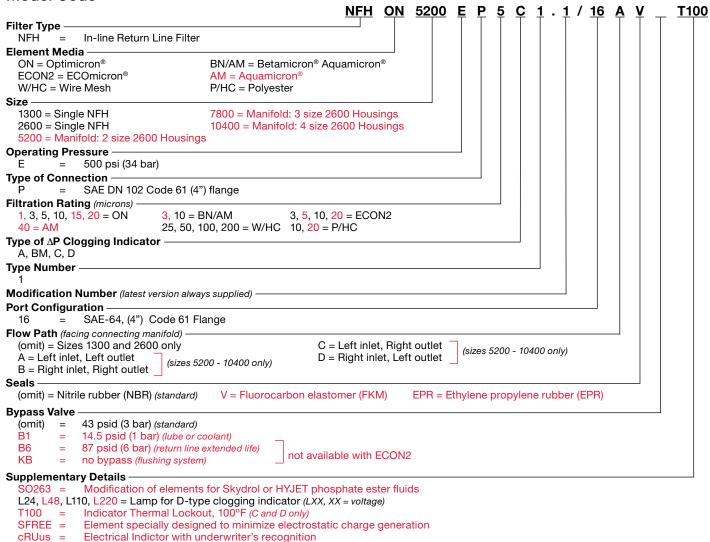
 $\Delta P = 29 \text{ psid } (2 \text{ bar}) -10\% \text{ (standard)}$ $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (optional)}$

Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar) } +10\%$

 $\Delta P = 87 \text{ psid (6 bar)} + 10\%$

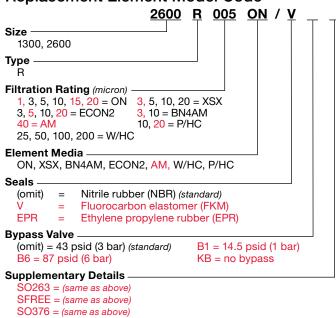
Model Code



Modification of ON and W/HC elements for HFA, HFB, HFC, and HFD flame retardant liquids

Replacement Element Model Code

SO376 =



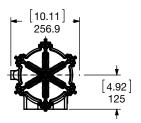
Clogging Indicator Model Code **Indicator Prefix** VM = G 1/2 3000 psi**Trip Pressure** = 29 psid (2 bar) (optional) = 72 psid (5 bar) Type of Indicator = No indicator, plugged port BM = Pop-up indicator (manual reset) = Electric switch - SPDT = Electric switch and LED light - SPDT **Modification Number Supplementary Details** Seals (omit) = Nitrile rubber (NBR) (standard) = Fluorocarbon elastomer (FKM) EPR = Ethylene Propylene rubber (EPR) Light Voltage (D type indicators only) L110 = 110VThermal Lockout (VM, VD types C, D, J, and J4 only) T100 = Lockout below 100°F Underwriters Approval (VM, VD types C, D, J, and J4 only)

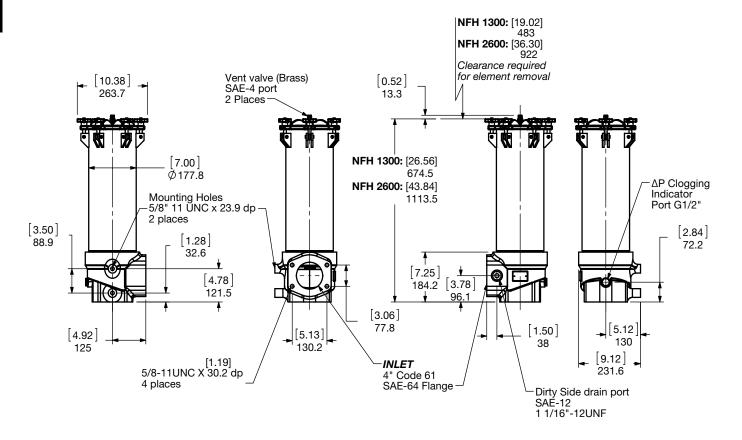
cRUus = Electrical Indictor with underwriter's recognition

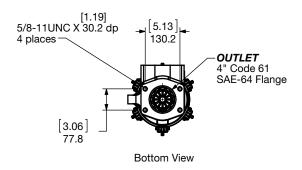
(For additional details and options, see Clogging Indicators section.)

D95

Dimensions NFH 1300 / 2600

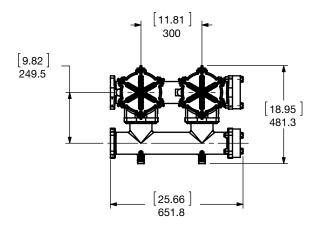


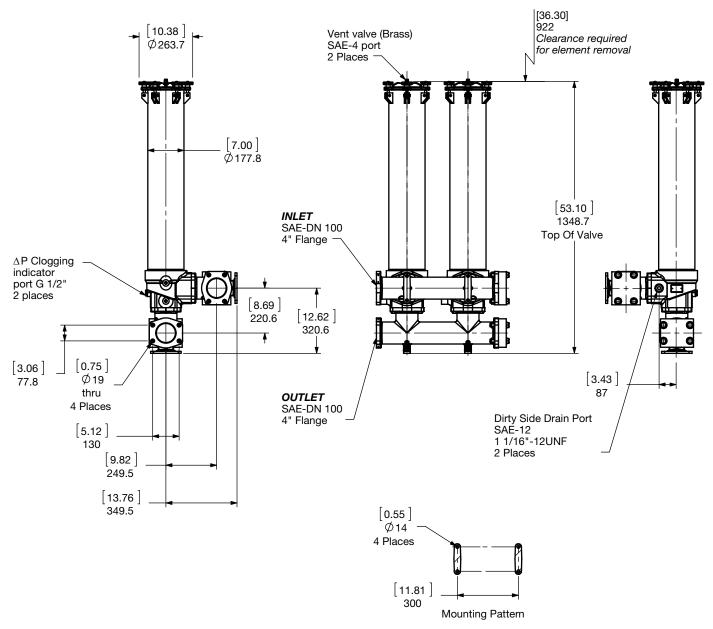




Size	1300	2600
Weight (lbs.)	87.1	115.5

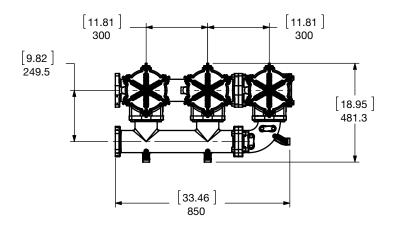
Dimensions NFH 5200

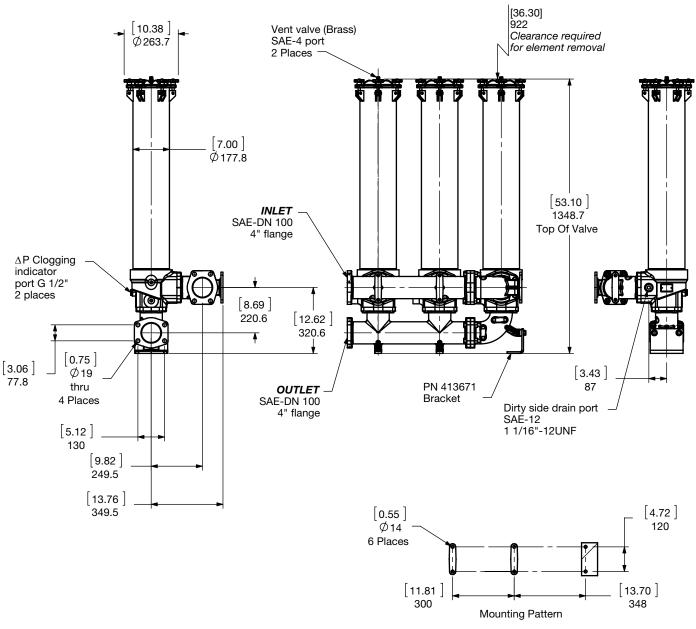




Size	5200
Weight (lbs.)	356

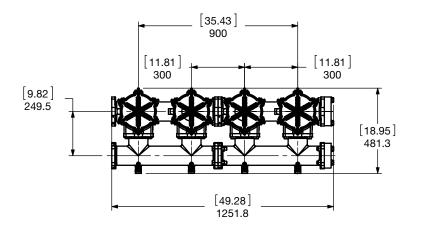
Dimensions NFH 7800

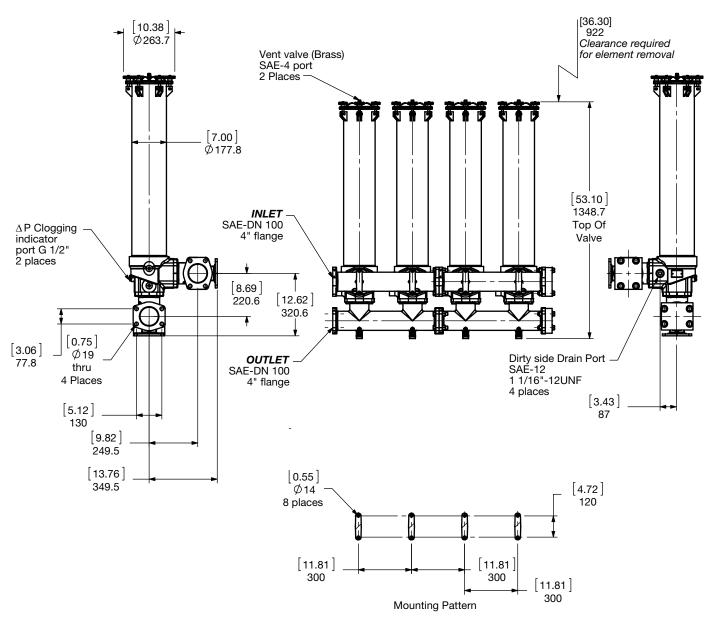




Size	7800
Weight (lbs.)	477.5

Dimensions NFH 10400





Size	10400
Weight (lbs.)	684

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

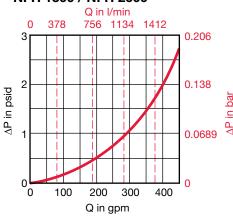
Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

The curve below shows the clean ΔP through the housing for a single filter. To determine clean housing ΔP for manifolds with multiple housings, multiply the clean ΔP curve value by the percentage values in the table.

△P Housing

NFH 1300 / NFH 2600



NFH System	Multiplier
5200	73%
7800	61%
10400	48%

Example

Conditions
400 gpm flow
NFH 5200 manifold specified
ΔP Curve = 2 psid
$\Delta P 5200 = 2 \text{ psid X } 0.73$
= 1.5 psid Piping & Housing
ΔP Total System = 1.5 psid + ΔP Element

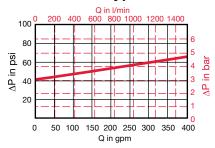
Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

Bypass Valve Curve:

Curves shown are applicable for mineral oil with a specific gravity of 0.86. Differential pressure increases in proportion to the specific gravity of the fluid.

 ΔP Valve = ΔP Curve x $\frac{Actual Specific Gravity}{0.86}$

1300 / 2600 Bypass Valve



Element ΔP Calculations:

Sizing (K) Flow Factors below show the pressure drops across clean elements (excluding housings and piping). (K) Factors are calculated from mineral based fluid at viscosity of 141 SUS and specific gravity of 0.86. To determine clean ΔP for NFH manifolds with more than one housing, use the appropriate sized single element (K) factor and multiply (total assembly flow rate divided by the number of housings in the manifold), then correct for viscosity.

Example 1: Lube System

Conditions

Viscosity = 500 SUS @ 120°F Specific gravity = 0.86

Flow = 75 gpm

Low pressure drop essential

K Factor = 10 µm Optimicron® filter element

Selection - NFH 2600 Filter

An NFH 2600 filter gives an Adjusted Clean Element ΔP as follows: Clean $\Delta P = 75$ gpm x 0.01 = 0.75 psid

Clean $\Delta P_{\text{adj.}} = 0.75 \times \frac{500}{141} \times \frac{0.86}{0.86} = 2.7 \text{ psid}$

Housing $\Delta P = "0"$ (negligible)

Example 2: System Return Filter

Conditions

Viscosity = ISO 68 Fluid 220 SUS @ 120°F

Specific gravity = 0.86

Flow = 350 gpm

3μm Filtration (depth) β (beta) = 1000

K Factor = 3 µm Optimicron® filter element = 0.04

Selection - NFH 7800 Filte

Element $\Delta P = (350 \div 3 \text{ housings}) \times 0.04 \times \frac{220}{141} \times \frac{0.86}{0.86} = 7.28 \text{ psid}$

Housing $\Delta P = 1.05$ (curve) $\times 0.61 \times \frac{0.86}{0.86} \times = 0.64$ psid

Assembly $\Delta P = 7.28 \text{ psid} + 0.64 \text{ psid} = 7.92 \text{ psid}$

Element K Factors

 $\Delta \text{P Elements} = \text{Elements (K) Flow Factor x Flow Rate (gpm) x} \\ \frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \\ \frac{\text{Actual Specific Gravity}}{0.86}$

Optimicron	RON					
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006

Stat-X	RXSX			
Size	3 µm	5 μm	10 μm	20 μm
1300 R XXX XSX	0.04	0.032	0.019	0.012
2600 R XXX XSX	0.02	0.016	0.01	0.006

ECOmicron	RECON2			
Size	3 µm	5 μm	10 μm	20 μm
1300 R XXX ECON2	0.044	0.033	0.022	0.016
2600 R XXX ECON2	0.022	0.016	0.011	0.005

Betamicron/Aquamicron	RBN4AM	
Size	3 µm	10 µm
1300 R XXX BN4AM	0.088	0.033
2600 R XXX BN4AM	0.055	0.016

Aquamicron	RAM
Size	40 μm
1300 R 040 AM	0.026
2600 R 040 AM	0.013

Wire Mesh	RW/HC
Size	25, 50, 100, 200 μm
1300 R XXX W/HC	0.002
2600 R XXX W/HC	0.001

Polyester	R	P/HC
Size	10 µm	20 μm
1300 R XXX P/HC	0.004	0.002
2600 R XXX P/HC	0.002	0.001

All Element K Factors in psi / gpm.

Notes



NFHD Series

Modular Inline Duplex Filters 500 psi • up to 450 gpm





Features

- Top access for easy element changeout.
- All models have an air bleed valve (vent) installed in the lid.
- Single large element with no leak points for highest efficiency and dirt capacity
- Lid with swing bolts for fast servicing without tools
- Drain port dirty side (right side of Inlet Port) SAE 12 (3/4")
- Clogging Indicator for local and remote signals
- Easily banked in parallel (manifolded) for high viscosity applications.
- Available with Betterfit elements consult HYDAC.

Notes: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Applications



Automotive



Pulp & Paper



Gearboxes



Shipbuilding



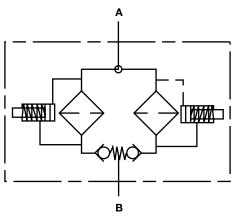
Industrial

Steel / Heavy Industry



Power Generation

Hydraulic Symbol



Inlet / Outlet Port Location Configurator

NFHD1300/2600 Inlet/Outlet Available Configurations

03		09
33		39
93		99
 	_	

NFHD5200/7800/10400 2.X Inlet/ Outlet Available Configurations

00	03	Joinigan	09
30	33		39
60			69
	93		99



- 0 = Pointed to Top
- 3 = Pointed to Front
- 6 = Pointed to Bottom
- = Pointed to Back

First Number = Inlet Orientation Second Number = Outlet Orientation

abaical Cacaifications

recnnical Specifications	<u> </u>	
Mounting Method	Floor mounting brad	ckets
Port Connection	SAE DN 102 Flange	Code 61
Flow Direction (Standard)	Inlet: Side Out	let: Side
Construction Materials		
Head, Lid, Elbows, Manifolds Housing	Ductile Iron Steel	
Flow Capacity		
1300 2600, 5200, 7800, 10400	343 gpm (1300 lpm) 450 gpm (1700 lpm) (Flow limited by 4" pipe	
Housing Pressure Rating		
Max. Allowable Working Pressure Fatigue Pressure Burst Pressure	500 psi (34 bar) 500 psi (34 bar) > 1440 psi (100 bar)	ı
Element Collapse Pressure Ratin	g	
ON, W/HC	290 psid (20 bar)	

ECON2, BN4AM, AM, P/HC 145 psid (10 bar) 14°F to 212°F (-10°C to 100°C) Fluid Temp. Range

Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

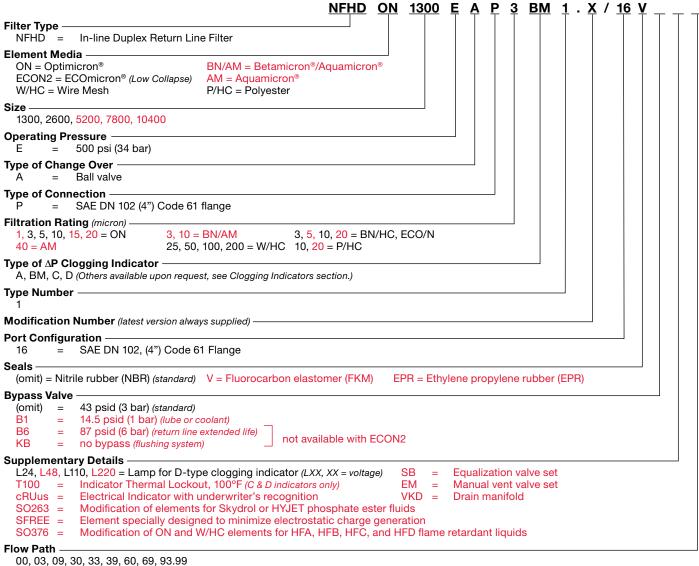
 $\Delta P = 29 \text{ psid (2 bar) -10\% (standard)}$ $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (optional)}$

Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid } (3 \text{ bar}) + 10\%$

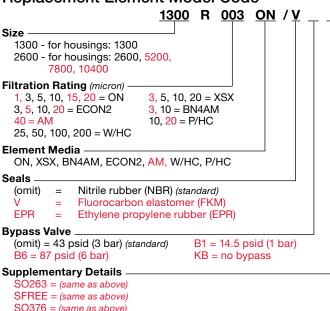
 $\Delta P = 87 \text{ psid (6 bar)} + 10\%$

Model Code



Note: For Alternate Connection Flow Path (i.e. 39 - Inlet Front / Outlet Back) - See previous page for "Inlet / Outlet Port Configurator."

Replacement Element Model Code



Indicator Prefix VM = G 1/2 3000 psi**Trip Pressure** = 29 psid (2 bar) (optional) = 72 psid (5 bar) Type of Indicator = No indicator, plugged port BM = Pop-up indicator (manual reset) = Electric switch - SPDT = Electric switch and LED light - SPDT **Modification Number Supplementary Details** Seals (omit) = Nitrile rubber (NBR) (standard) = Fluorocarbon elastomer (FKM) EPR = Ethylene propylene rubber (EPR) Light Voltage (D type indicators only) L24 = 24VL110 = 110VThermal Lockout (VM, VD types C, D, J, and J4 only) T100 = Lockout below 100°F

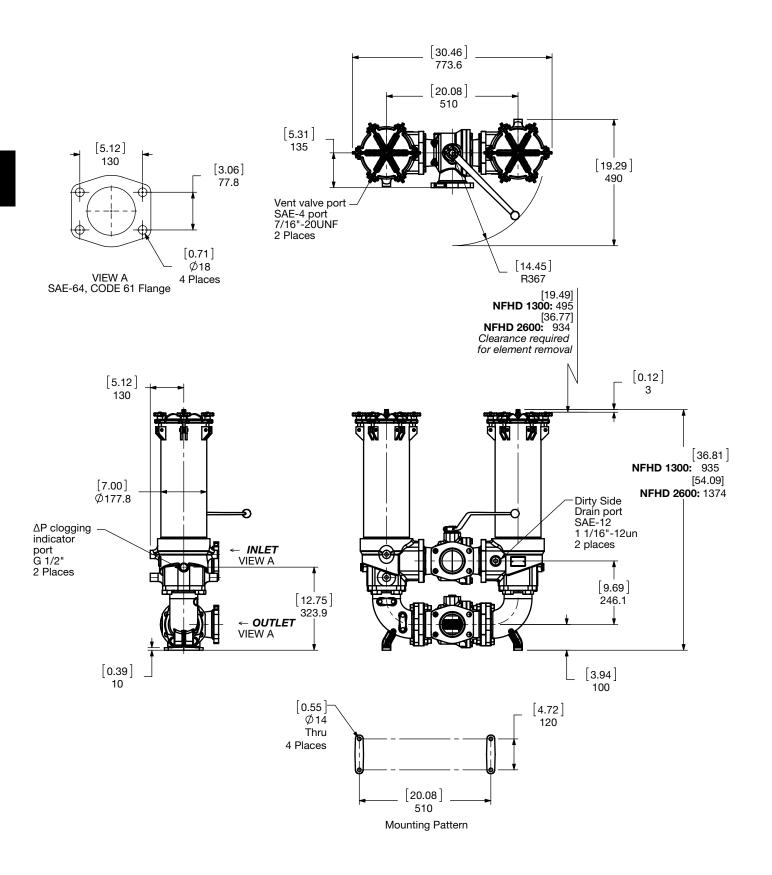
Clogging Indicator Model Code

Underwriters Approval (VM, VD types C, D, J, and J4 only) — cRUus = Electrical Indicator with underwriter's recognition

(For additional details and options, see Clogging Indicators section.)

Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

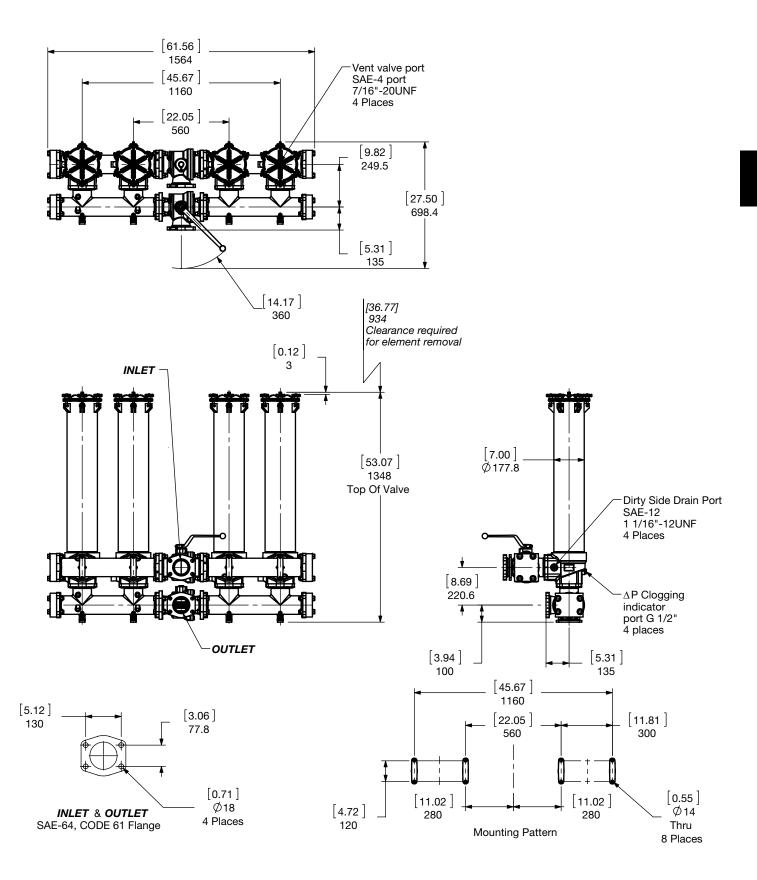
Dimensions NFHD 1300 / 2600



Size	1300	2600
Weight (lbs.)	302.1	357

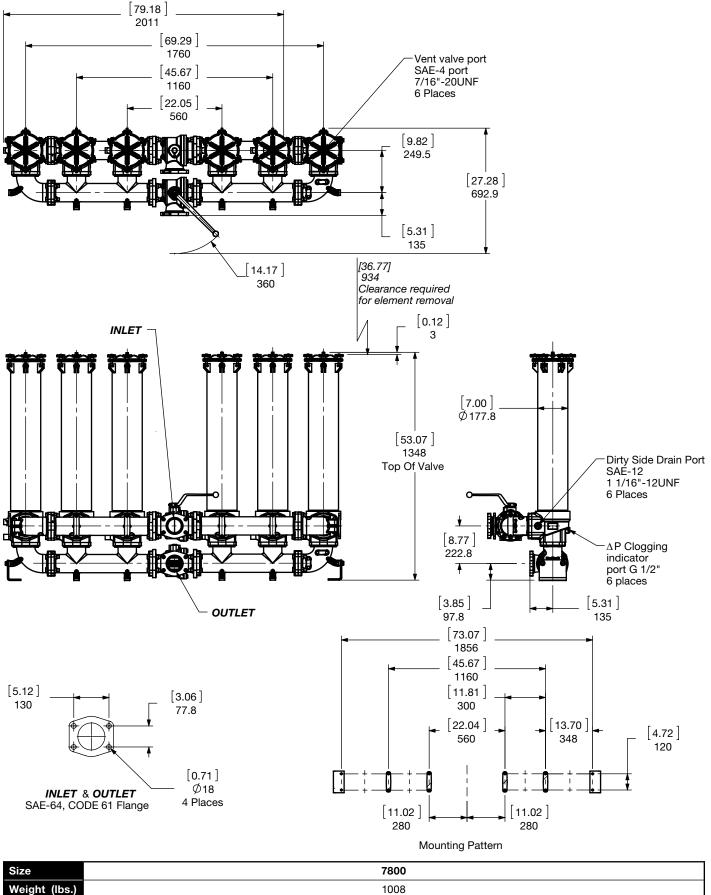


Dimensions: NFHD 5200

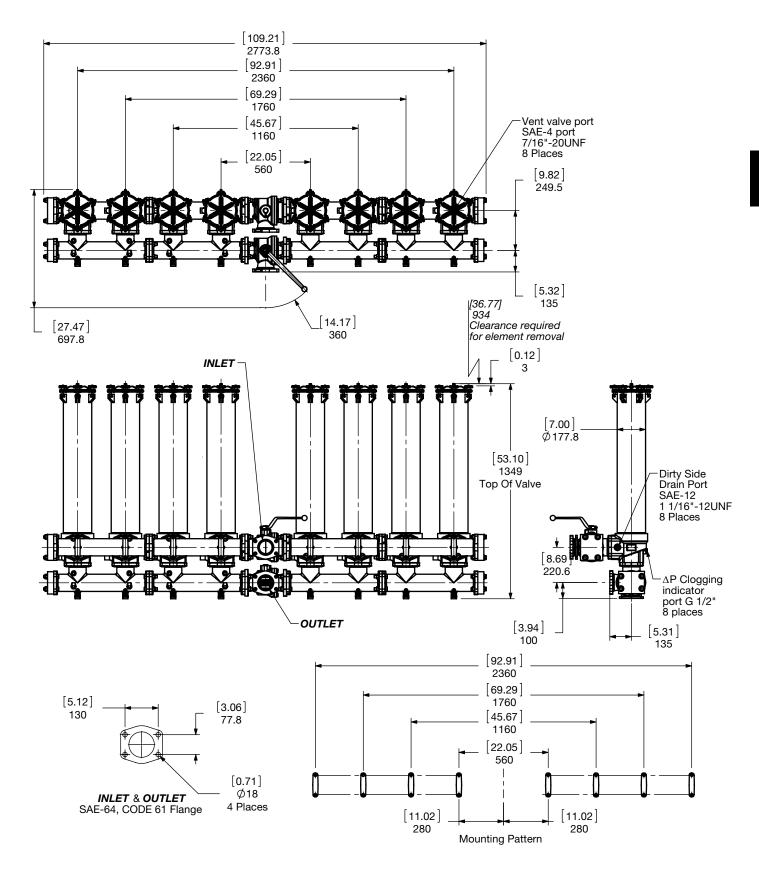


Size	5200
Weight (lbs.)	803

Dimensions: NFHD 7800



Dimensions: NFHD 10400



Size	10400
Weight (lbs.)	1459

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

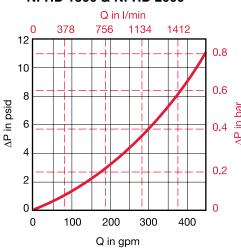
Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

The curve below shows the clean ΔP through the Housing for a single filter. To determine Clean ΔP for manifolds with multiple housings, multiply the Clean ΔP curve value by the percentage value in the table.

△P Housing

NFHD 1300 & NFHD 2600



NFHD System	Multiplier
5200	93%
7800	83%
10400	74%

Example

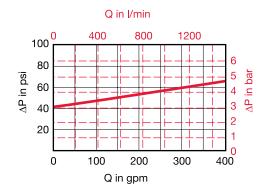
Conditions	
400 gpm flow	
NFHD 10400 manifold	
specified	= 9 psid
ΔP Curve	= 9 psid X 0.74
ΔP 10400	= 6.7 psid Piping & Housing
Fluid Specific Gr	= .86 psid
ΔP Total System = 6.7 psid ΔP Housing + ΔP Element	

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

Bypass Valve Curve:

Curves shown are applicable for mineral oil with a specific gravity of 0.86. Differential pressure increases in proportion to the specific gravity of the fluid.

$$\Delta P \text{ Valve} = \Delta P \text{ Curve x } \frac{\text{Actual Specific Gravity}}{0.86}$$



Element ΔP Calculations:

Sizing (K) Flow Factors below show the pressure drops across clean elements (excluding housings and piping). (K) Factors are calculated from mineral based fluid at viscosity of 141 SUS and specific gravity of 0.86. To determine clean ΔP for NFH manifolds with more than one housing, use the (K) factors below and divide total flow rate by # towers per side.

Element ΔP = Elements (k) flow Factor x $\frac{\text{total flow}}{\text{filter towers (on one side)}} x \frac{\text{Actual Viscosity (SUS)}}{141} x \frac{\text{Actual Sp Gravity}}{0.86} = 7.09 \text{ psid}$

Example

Conditions	Selection - NFDH 10400 Filter
Lube system	An NFHD 10400 filter (with 4 towers) gives an Adjusted Clean element ΔP as
Viscosity of 1,000 SUS	follows:
Specific gravity 0.86	Clean Assembly $\Delta P = \Delta P$ Housing & ΔP Element
400 gpm flow	Clean $\Delta P = 400 \text{ gpm} \times 0.01 = 1.0 \text{ psid}$
Low pressure drop essential	4 towers
10 μm Optimicron® filter element	Clean $\Delta P_{adi} = 1.0 \text{ x } \underline{1000} \text{ x } \underline{0.86} = 7.09 \text{ psid}$
	141 0.86
	Clean Assembly $\Delta P = 6.7$ psid + 7.09 psid = 13.8 psid
	housing elements

Element K Factors

 $\Delta \text{P Elements} = \text{Elements (K) Flow Factor x Flow Rate (gpm) x} \\ \frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \\ \frac{\text{Actual Specific Gravity}}{0.86}$

Optimicron			R.	ON		
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006

Stat-X	RXSX			
Size	3 μm	5 μm	10 μm	20 μm
1300 R XXX XSX	0.04	0.032	0.019	0.012
2600 R XXX XSX	0.02	0.016	0.01	0.006

ECOmicron	RECON2			
Size	3 µm	5 μm	10 μm	20 μm
1300 R XXX ECON2	0.044	0.033	0.022	0.016
2600 R XXX ECON2	0.022	0.016	0.011	0.005

Betamicron/Aquamicron	RBN4AM	
Size	3 μm	10 µm
1300 R XXX BN4AM	0.088	0.033
2600 R XXX BN4AM	0.055	0.016

Aquamicron	RAM
Size	40 μm
1300 R 040 AM	0.026
2600 R 040 AM	0.013

Wire Mesh	RW/HC
Size	25, 50, 100, 200 μm
1300 R XXX W/HC	0.002
2600 R XXX W/HC	0.001

Polyester	RP/HC	
Size	10 µm	20 μm
1300 R XXX P/HC	0.004	0.002
2600 R XXX P/HC	0.002	0.001

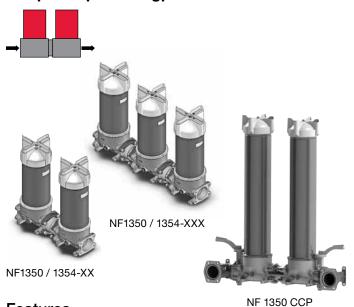
All Element K Factors in psi / gpm.

Notes



NF UHE Series

Ultra High Efficiency Inline Simplex Filters 360 psi • up to 450 gpm



Features

- Multi-pass filtration in a single pass!
- Beta efficiency values > 5000 single pass possible
- Conventional NF housings are piped in series to achieve multi-levels of filtration in one pass.

Note: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Configurations

NF Size 1350, 1354, 2650, 2654, 5250, 5254 - Two Stage

- Fine-Fine Filtration Arrangement
- Coarse-Fine Filtration Arrangement
- Medium-Fine Filtration Arrangement
- Fine Filtration with Water Removal Arrangement
- **Customer Defined Arrangement**

NF Size 1350, 1354, 2650, 2654, 5250, 5254 - Three Stage

- Fine-Fine Fine Filtration Arrangement
- Coarse-Fine Fine Filtration Arrangement
- Coarse-Medium Fine Filtration Arrangement
- Coarse-Fine with Water Removal Arrangement
- Medium-Fine Fine Filtration Arrangement
- **Customer Defined Arrangement**

NF Size 1350, 1354, 2650, 2654, 5250, 5254 - with Butterfly valve(s), with filtration options as above

Pulp+Paper Design Option

NF Size 1354, 2654, 5254 - with Butterfly valves(s), Ecomicronfit elements, with filtration options as above

Applications



Agricultural



Gearboxes



Industrial



Generation

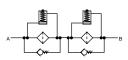




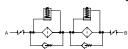
Industry

Hydraulic Symbol

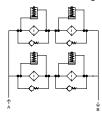
NF 1350/2650 UHE 2 Stage



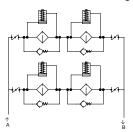
NF 1354/2654 UHE 2 Stage



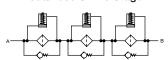
NF 5250 UHE 2 Stage



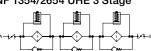
NF 5254/2654 UHE 2 Stage



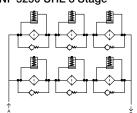
NF 1350/2650 UHE 3 Stage



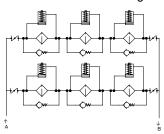
NF 1354/2654 UHE 3 Stage



NF 5250 UHE 3 Stage



NF 5254/2654 UHE 3 Stage



Technical Specifications

recrimical Specifications		
Mounting Method	See drawings	
Port Connection	4" SAE-DN 102 Code 61 Flange (with M16 flange connection bolts included)	
Flow Direction		
1350, 1354, 2650, 2654, 5250, 5254	Inlet: Side Outlet: Side (opp.)	
Construction Materials		
Head, Housing, Lid Filter Stage Connectors Elbows, Manifolds	Aluminum Carbon Steel Ductile Iron	
Flow Capacity		
1350, 1354 2650, 2654, 5250, 5254	343 gpm (1300 lpm) 450 gpm (1700 lpm) <i>(4" pipe limit)</i>	
Housing Pressure Rating		
Max. Allowable Working Pressure Fatigue Pressure Burst Pressure	360 psi (25 bar) 360 psi (25 bar) Contact HYDAC	
Element Collapse Pressure Ratin	g	
ON	290 psid (20 bar)	

Fluid Temperature Range	14°F to 212°F (-10°C to 100°C)
ECON2, BN4AM, AM	145 psid (10 bar)
ON	290 psid (20 bar)

Fluid Temperature Range Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid } (2 \text{ bar}) -10\%$ $\Delta P = 72 \text{ psid (5 bar) -10}\%$

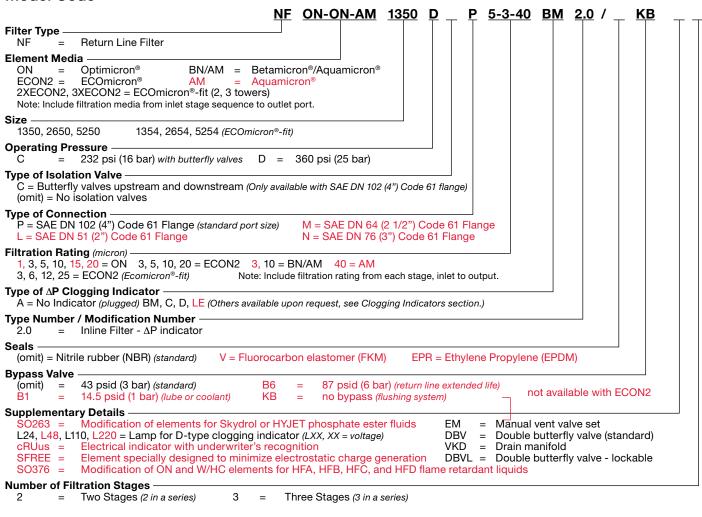
Bypass Valve Cracking Pressure

 $\Delta P = 15 \text{ psid (1 bar)} + 10\%$ $\Delta P = 87 \text{ psid (6 bar) } +10\%$ $\Delta P = 43 \text{ psid } (3 \text{ bar}) + 10\%$

*Note: All NF...1.0 Filters MAWP reduce to 7 bar (101.5 psi) when using the following "VR" indicators: B, BM, E, ES, GC, LE, LZ

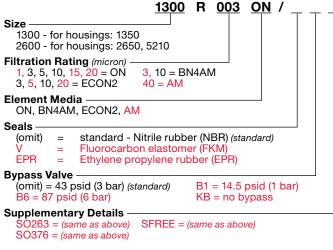


Model Code

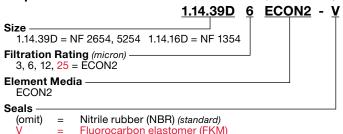


Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

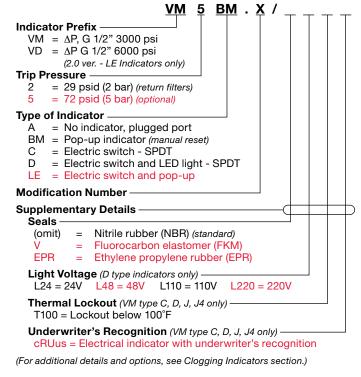
Replacement Element Model Code



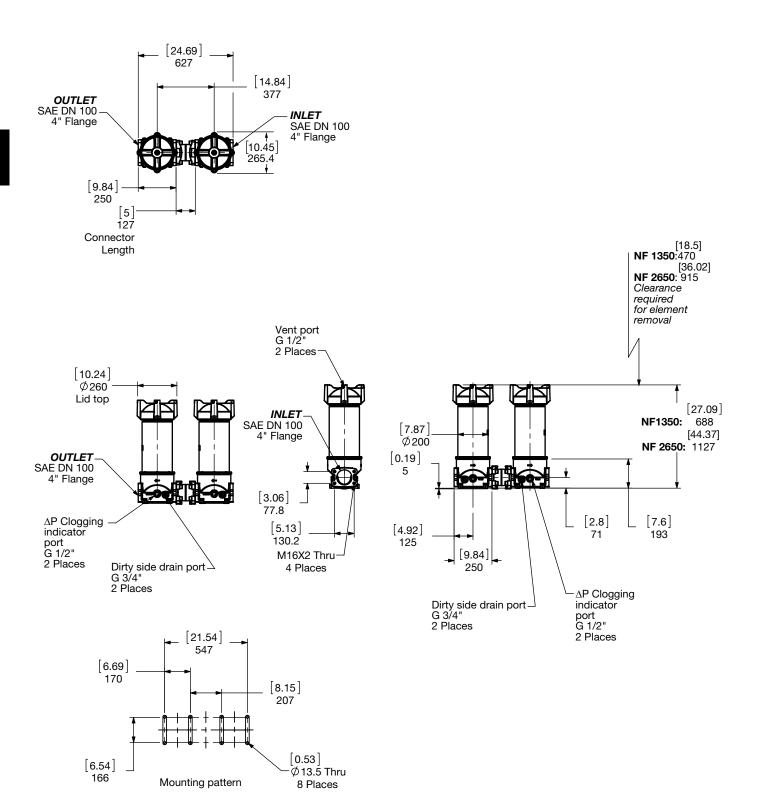
Replacement Element Model Code (ECOmicron®-fit)



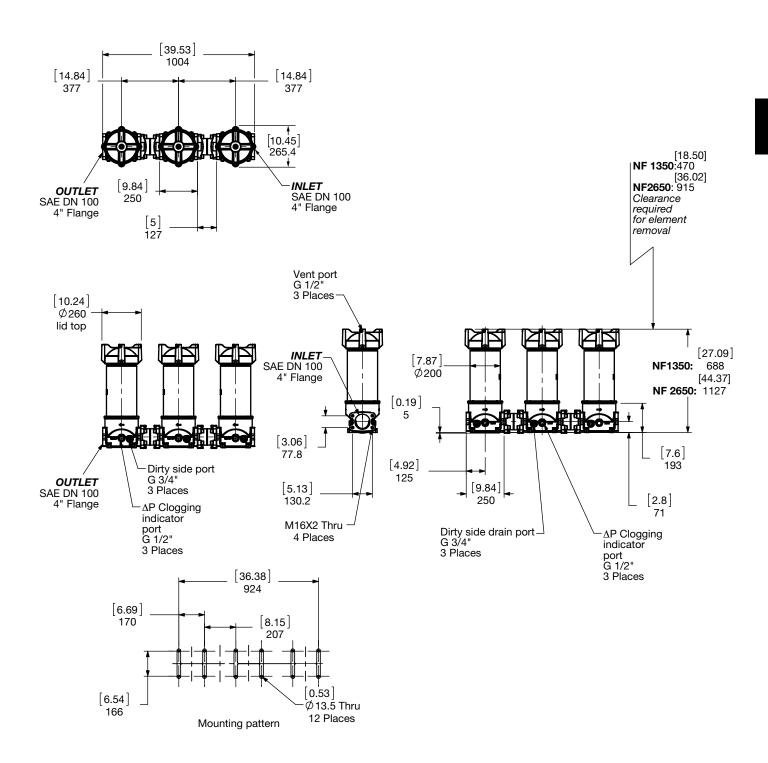
Clogging Indicator Model Code



Dimensions NF 1350 / 2650 - 2 Stage UHE

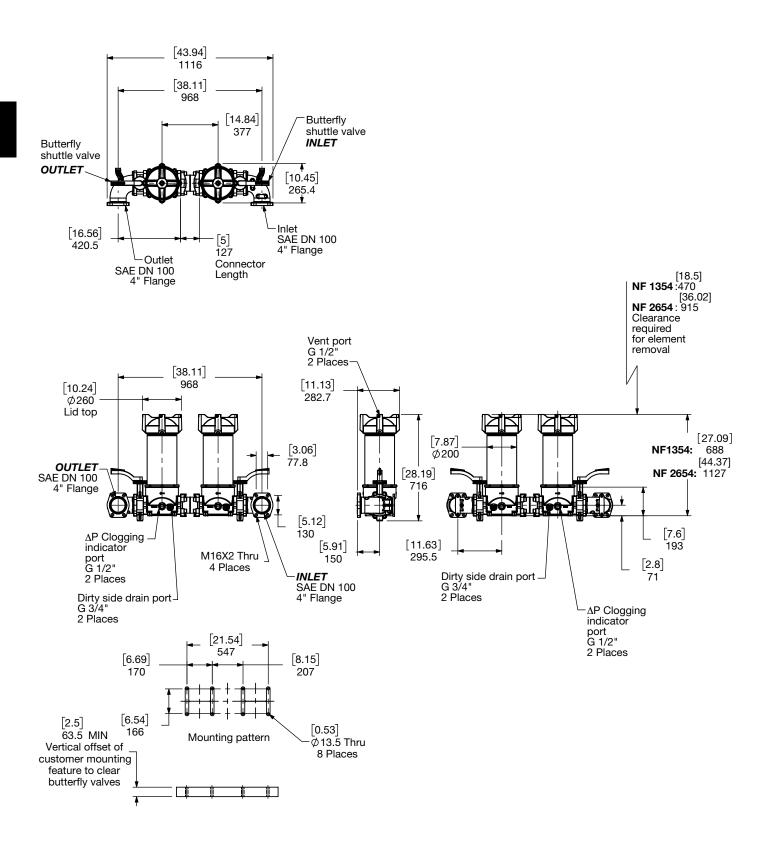


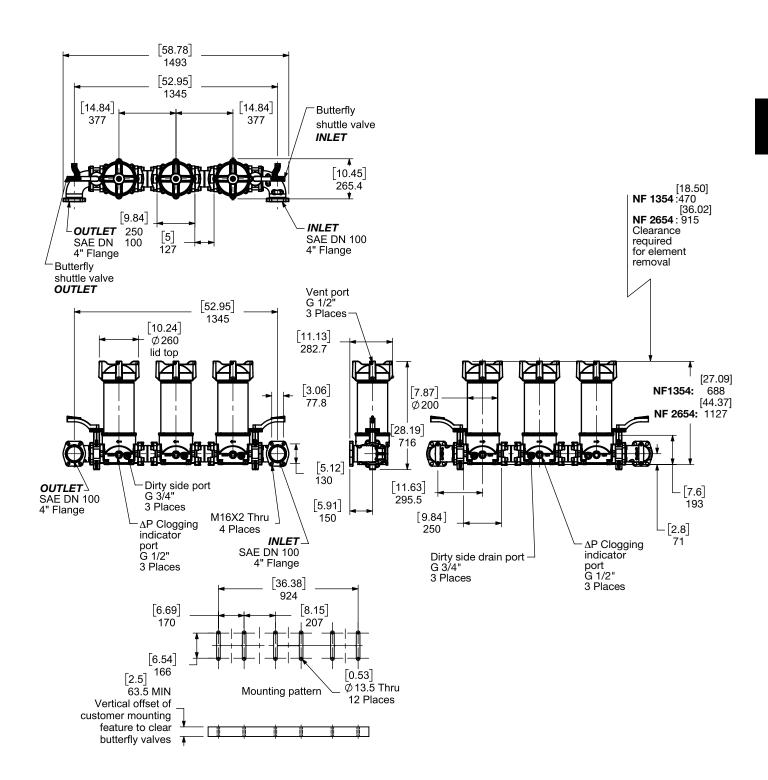
Size	1350 2 Stage	2650 2 Stage
Weight (lbs.)	90.6	121.6



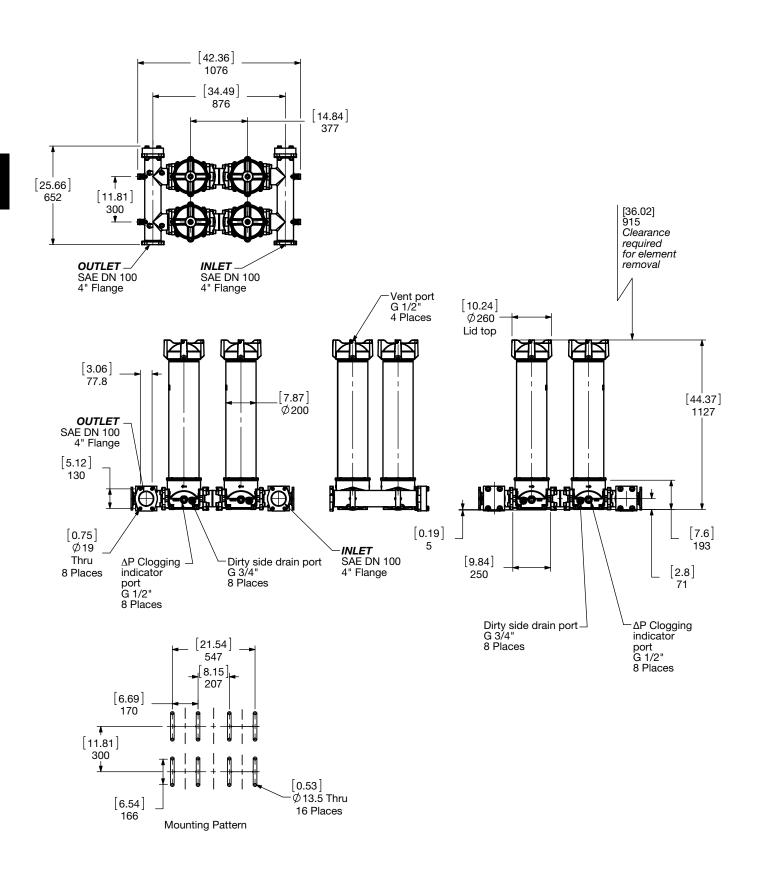
Size	1350 3 Stage	2650 3 Stage	
Weight (lbs.)	139.3	185.8	

Dimensions NF 1354 / 2654 - 2 Stage UHE



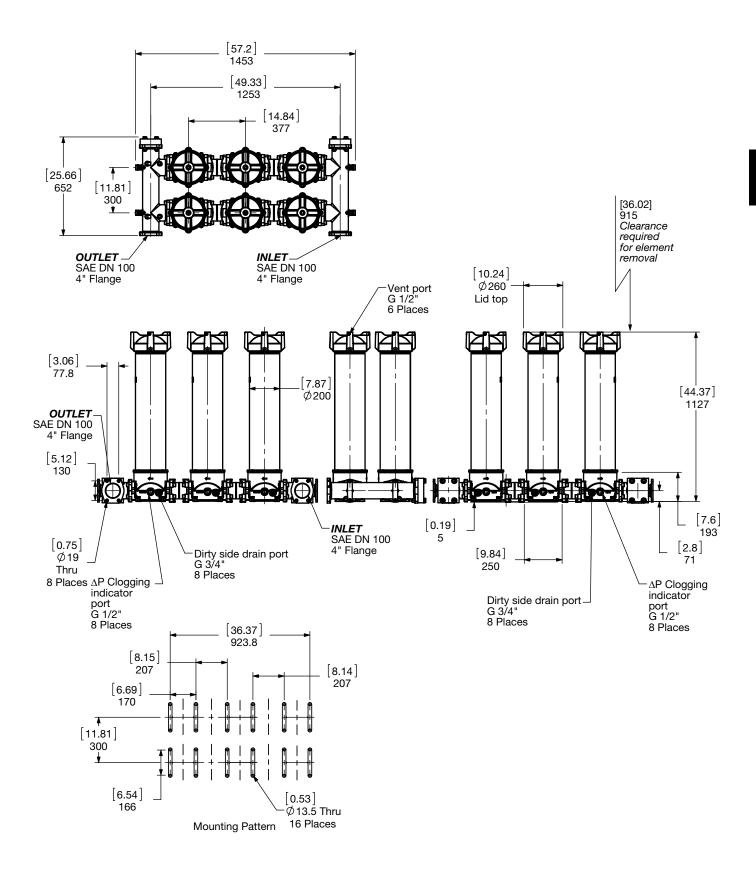


Dimensions: NF 5250 - 2 Stage UHE



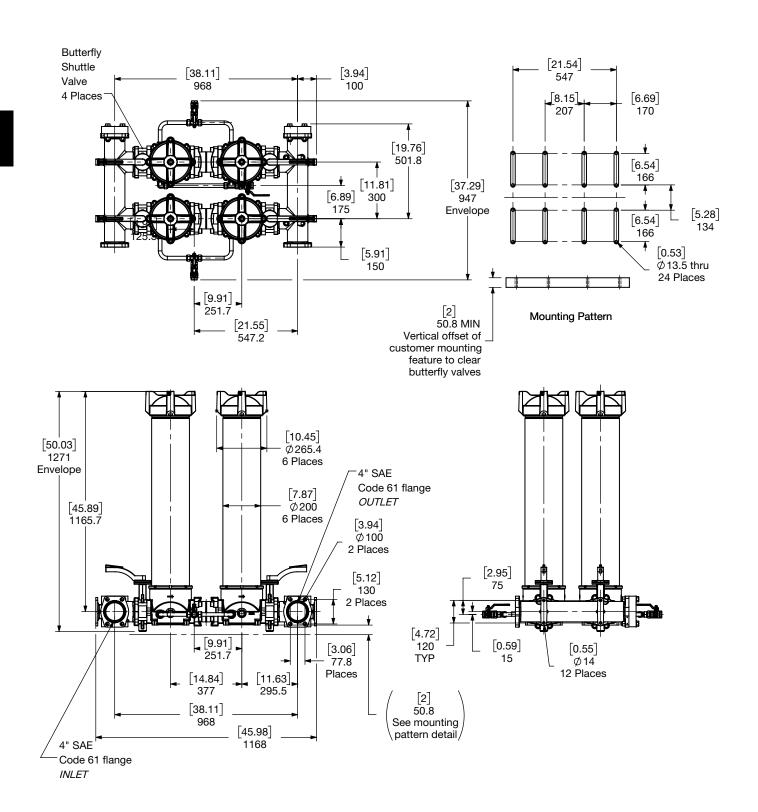
Size	5250 2 Stage
Weight (lbs.)	329

Dimensions: NF 5250 - 3 Stage UHE



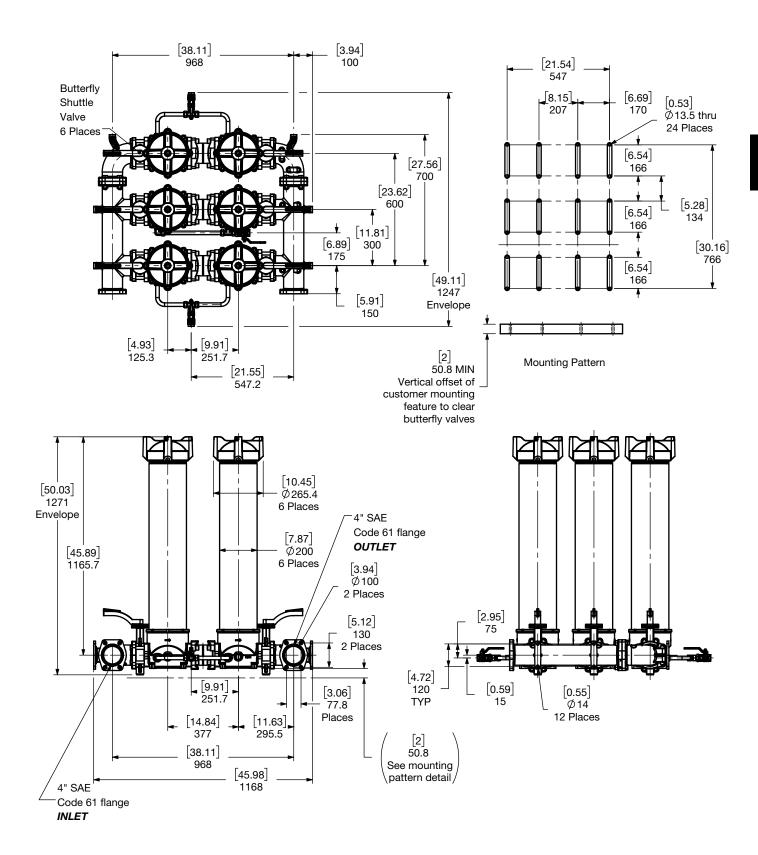
Size	5250 3 Stage
Weight (lbs.)	459.6

Dimensions: NF 5254 - 2 Stage UHE



Size	5254 2 Stage
Weight (lbs.)	315

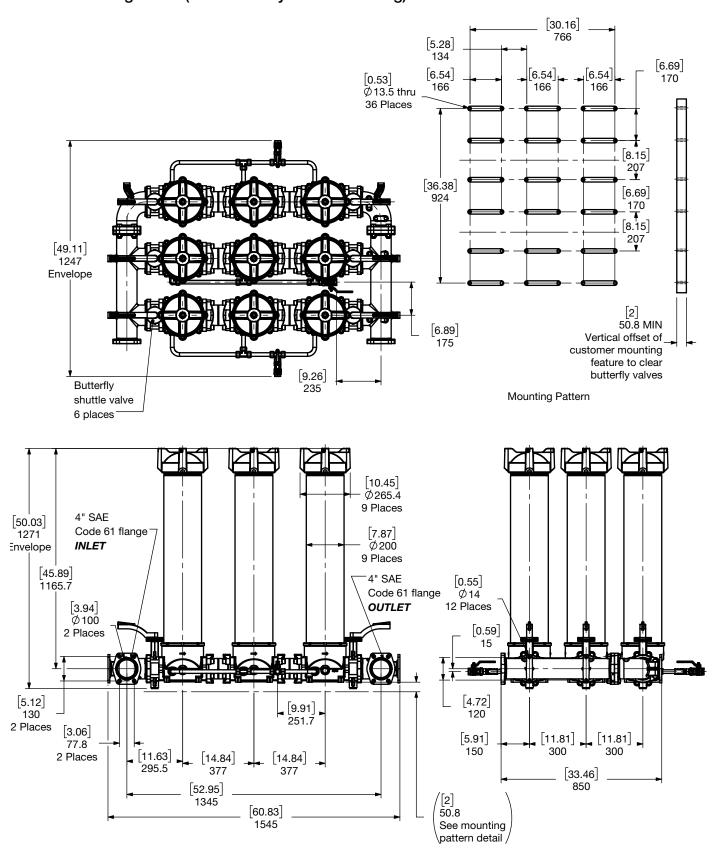
Dimensions: NF 7854 - 2 Stage UHE (with butterfly valves showing)



Size	7854 2 Stage
Weight (lbs.)	567

Dimensions:

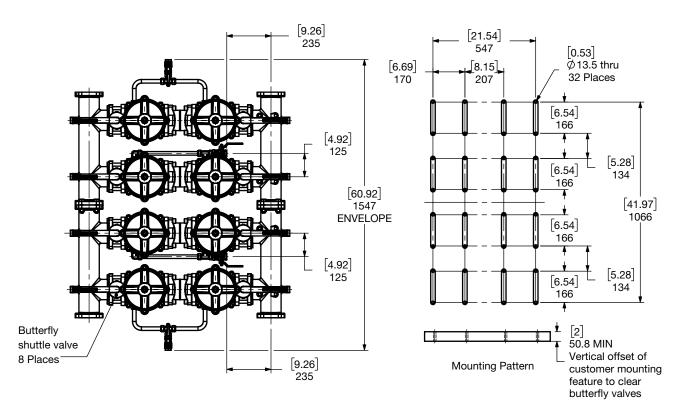
NF 7854 - 3 Stage UHE (with butterfly valves showing)

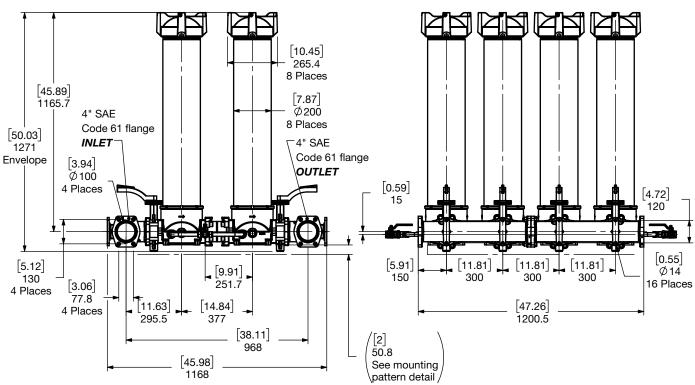


Size	7854 3 Stage
Weight (lbs.)	840

Dimensions:

NF 10454 - 2 Stage UHE (with butterfly valves showing)

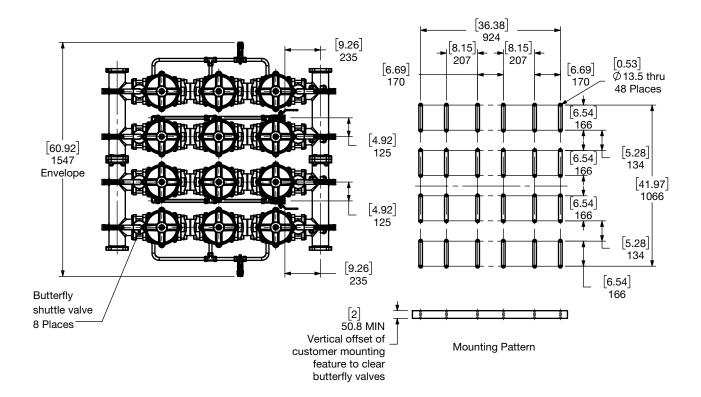


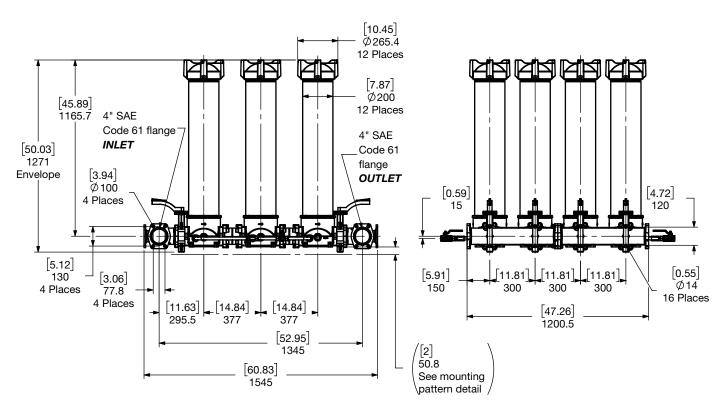


Size	10454 2 Stage
Weight (lbs.)	796

Dimensions:

NF 10454 - 3 Stage UHE (with butterfly valves showing)





Size	10454 3 Stage
Weight (lbs.)	1143

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

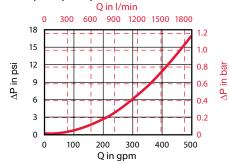
Housing Curve:

Pressure loss through housing is as follows:

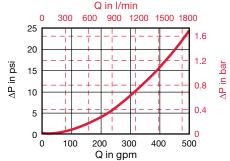
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

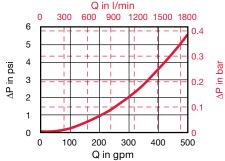
NF 1350, 1354, 2650, 2654 UHE - 2 STAGE HOUSING



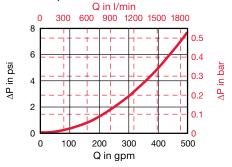
NF 1350, 1354, 2650, 2654 UHE - 3 STAGE HOUSING



NF 5250, 5254 UHE - 2 STAGE HOUSING



NF 5250, 5254 UHE - 3 STAGE HOUSING



Element K Factors

 $\Delta P \; Elements = Elements \; (K) \; Flow \; Factor \; x \; Flow \; Rate \; (gpm) \; x \; \frac{Actual \; Viscosity \; (SUS)}{141 \; SUS} \; \times \; \frac{Actual \; Specific \; Gravity}{0.86} \; \times \; \frac{Actual \; Specific \; Gra$

Optimicron			R.	ON		
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 µm
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006

ECOmicron		RE	CON2	
Size	3 µm	5 μm	10 μm	20 μm
1300 R XXX ECON2	0.044	0.033	0.022	0.016
2600 R XXX ECON2	0.022	0.016	0.011	0.005

ECOmicron fit		1.14.XXD	XXECO/N	
Size	3 µm	6 µm	12 µm	25 μm
1.14.16DXXECO/N	0.046	0.041	0.022	0.015
1.14.39DXXECO/N	0.017	0.016	0.008	0.006

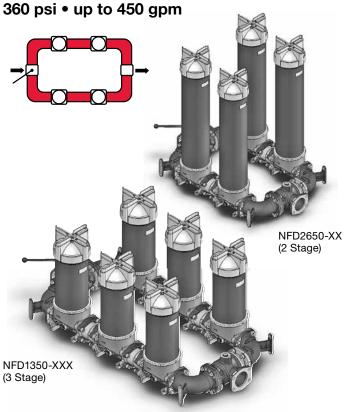
Betamicron/Aquamicron	RBN4AM		
Size	3 µm	10 µm	
1300 R XXX BN4AM	0.088	0.033	
2600 R XXX BN4AM	0.055	0.016	

Aquamicron	RAM
Size	40 μm
1300 R 040 AM	0.026
2600 R 040 AM	0.013

All Element K Factors in psi / gpm.

NFD UHE Series

Ultra High Efficiency Inline Duplex Filters



Features

- Multi-pass filtration in a single pass!
- Beta efficiency values > 5000 in a single pass are possible
- Conventional NF housings are piped in a series to achieve multi-levels of filtration in one pass.

Note: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Configurations

NFD Size 1350, 2650, 5250 - Two Stage

- Fine-Fine Filtration in Duplex Arrangement
- Coarse-Fine Filtration in Duplex Arrangement
- Medium-Fine Filtration in a Duplex Arrangement
- Fine Filtration with Water Removal in a Duplex Arrangement
- **Customer Defined Arrangement**

NFD Size 1350, 2650, 5250 - Three Stage

- Fine-Fine Fine Filtration Arrangement
- Coarse-Medium Fine Filtration Arrangement
- Coarse-Fine with Water Removal Arrangement
- Medium-Fine Fine Filtration Arrangement
- **Customer Defined Arrangement**

Applications



Agricultural



Gearboxes





Industrial



Generation



Pulp & Paper

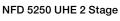


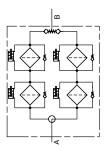
Shipbuilding

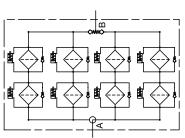


Hydraulic Symbol

NFD 1350-2650 UHE 2 Stage

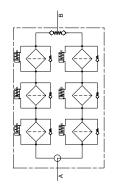


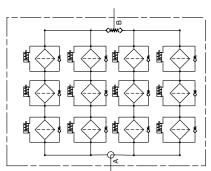




NFD 1350-2650 UHE 3 Stage

NFD 5250 UHE 3 Stage





chnical Specifications

8		
See drawings		
4" SAE DN 102 Flange Code 6' (with M16 bolts included)		
Inlet: Side Outlet: Side (opp.)		
Aluminum Carbon Steel Ductile Iron		
343 gpm (1300 lpm) 450 gpm (1700 lpm) <i>(4" pipe limit)</i>		
360 psi (25 bar) 360 psi (25 bar) Contact HYDAC		
g		
290 psid (20 bar) 145 psid (10 bar)		
14°F to 212°F (-10°C to 100°C)		

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

∆P Indicator Trip Pressure

 $\Delta P = 29 \text{ psid } (2 \text{ bar}) -10\%$ $\Delta P = 72 \text{ psid (5 bar)} - 10\%$

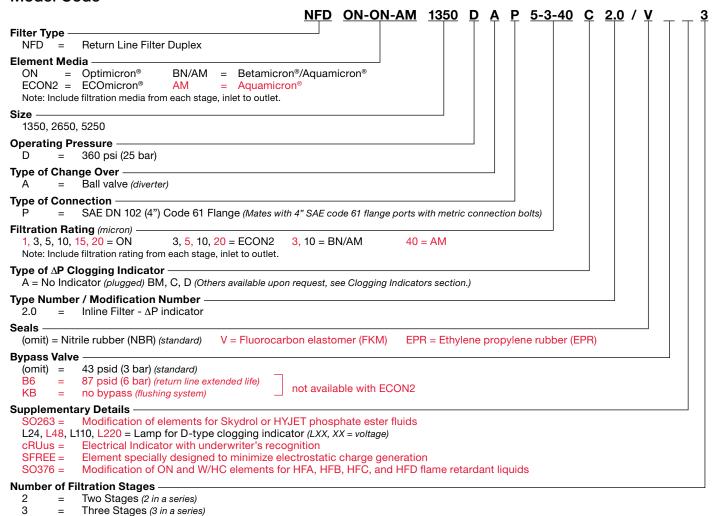
Bypass Valve Cracking Pressure

Consult HYDAC for applications below 14°F (-10°C)

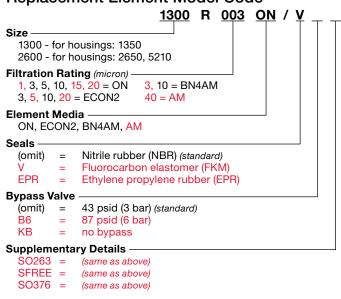
 $\Delta P = 43 \text{ psid (3 bar) } +10\%$

 $\Delta P = 87 \text{ psid (6 bar)} + 10\%$

Model Code



Replacement Element Model Code



Indicator Prefix -VM = ΔP , G 1/2" 3000 psi Trip Pressure = 29 psid (2 bar) (return filters) = 72 psid (5 bar) (optional) Type of Indicator BM = Pop-up indicator (manual reset) = Electric switch - SPDT D = Electric switch and LED light - SPDT **Modification Number Supplementary Details** Seals (omit) Nitrile rubber (NBR) (standard) Fluorocarbon elastomer (FKM) = _ Ethylene propylene rubber (EPR) Light Voltage (D type indicators only) -

<u>C.X/V</u>

1220 = 220V

Clogging Indicator Model Code

(For additional details and options, see Clogging Indicators section.)

cRUus = Electrical Indicator with underwriter's recognition

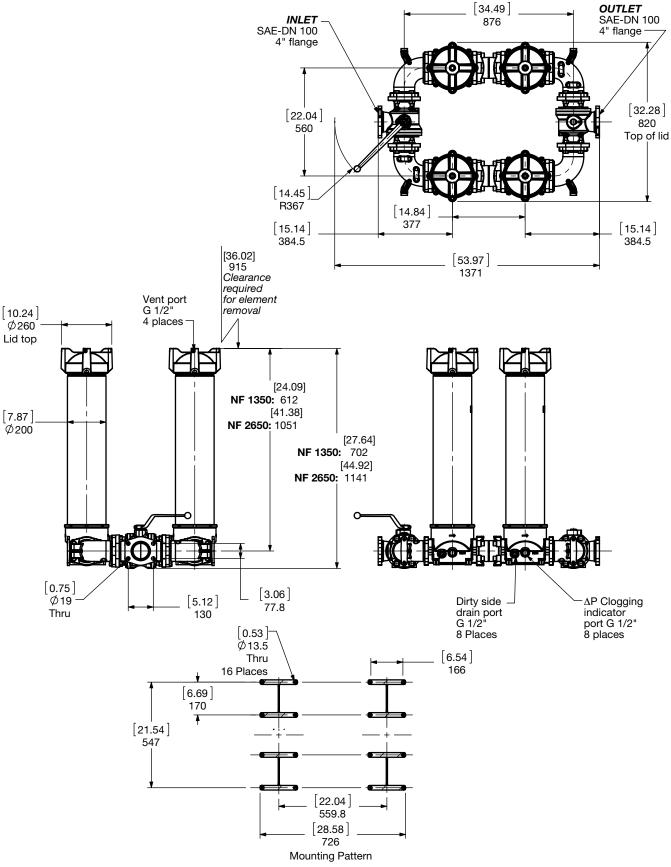
Underwriter's Recognition (VM type C, D, J, J4 only) -

Thermal Lockout (VM type C, D, J, J4 only) -

= Lockout below 100°F

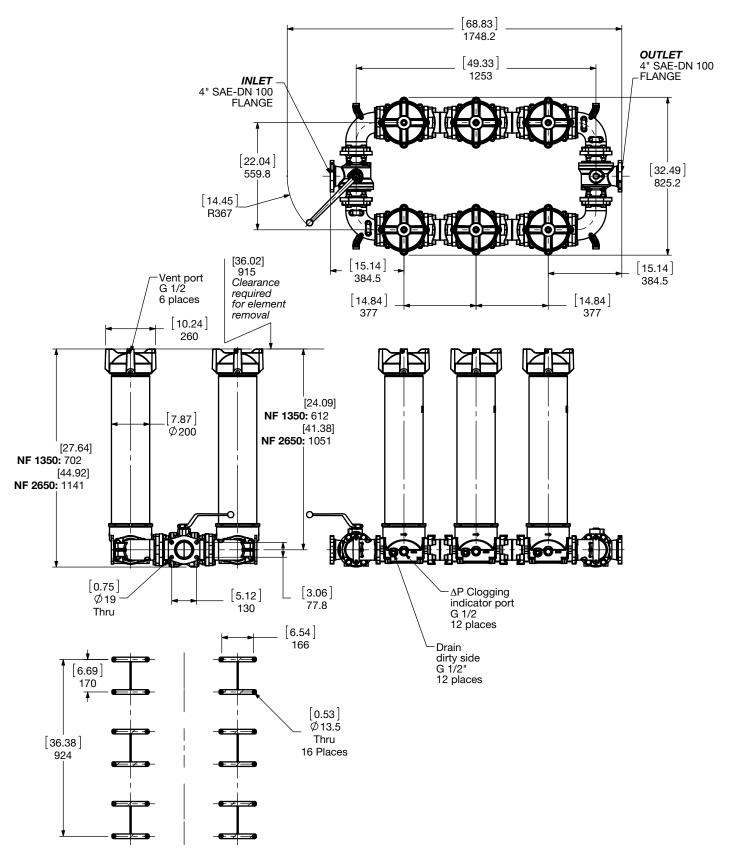
T100

Dimensions NFD 1350 / 2650 - 2 Stage Duplex UHE



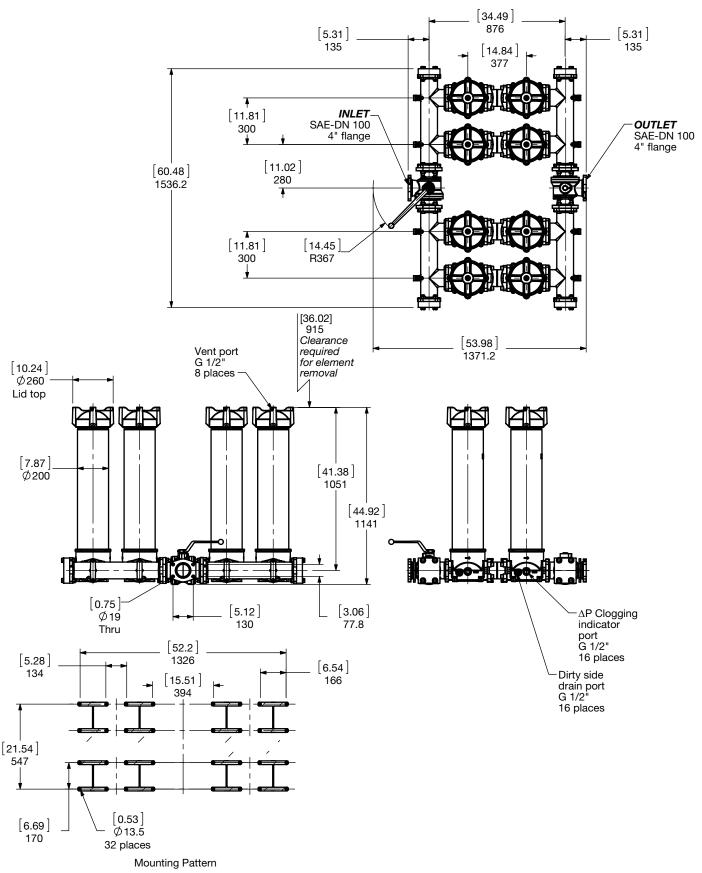
Size	1350	2650
Weight (lbs.)	323.2	433.8

Dimensions: NFD 1350 / 2650 - 3 Stage Duplex UHE



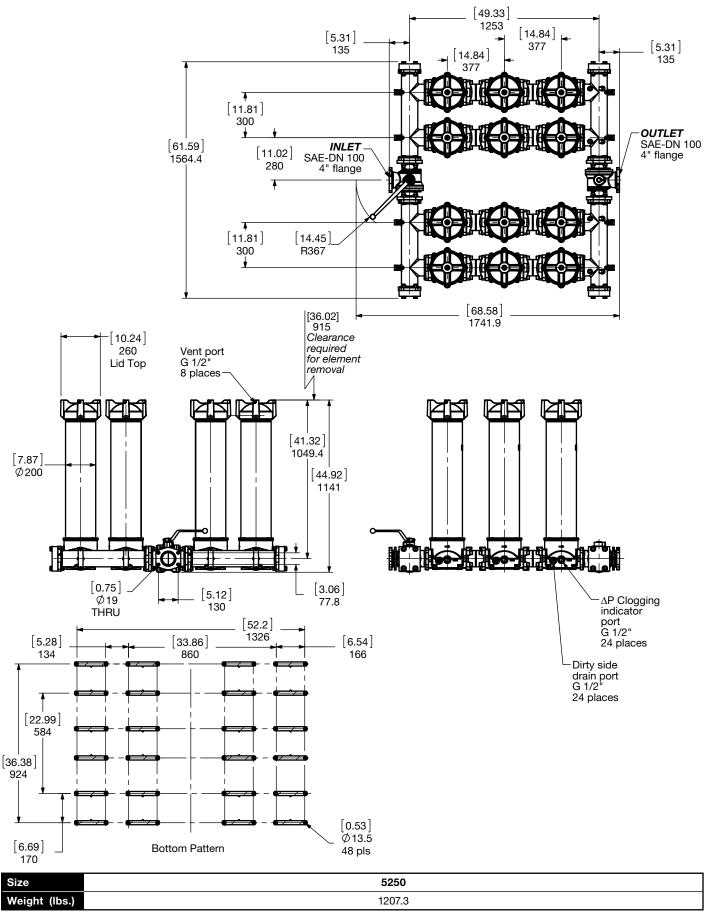
Size	1350	2650
Weight (lbs.)	435.2	584.1

Dimensions: NFD 5250 - 2 Stage UHE



Size	5250
Weight (lbs.)	906.7

Dimensions: NFD 5250 - 3 Stage UHE



Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

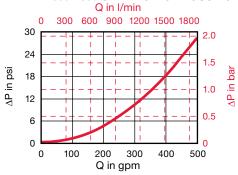
Housing Curve:

Pressure loss through housing is as follows:

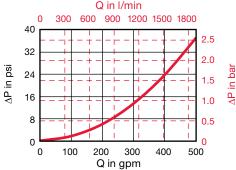
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

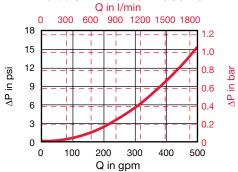
NFD 1350-2650 UHE - 2 STAGE HOUSING



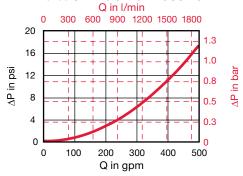
NFD 1350-2650 UHE - 3 STAGE HOUSING



NFD 5250 UHE - 2 STAGE HOUSING



NFD 5250 UHE - 3 STAGE HOUSING



Element K Factors

ΔP Elements = Elements (K) Flow Factor x Flow Rate (gpm) x $\frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \frac{\text{Actual Specific Gravity}}{0.86}$

Optimicron			R.	ON		
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006

ECOmicron	RECON2									
Size	3 µm	5 μm	10 μm	20 μm						
1300 R XXX ECON2	0.044	0.033	0.022	0.016						
2600 R XXX ECON2	0.022	0.016	0.011	0.005						

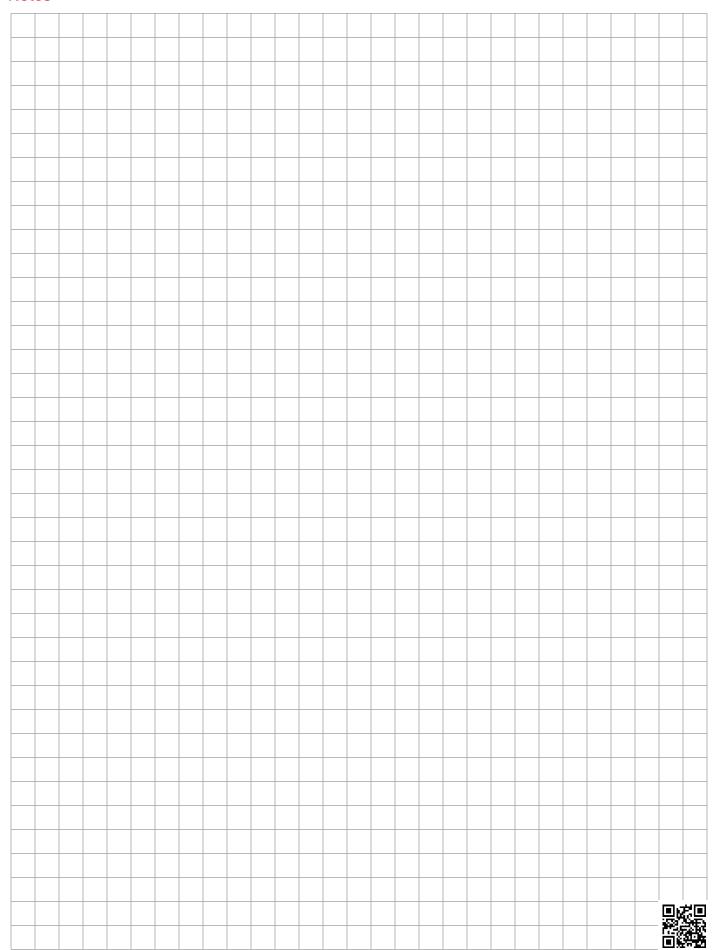
Betamicron/Aquamicron	RBN4AM						
Size	3 μm	10 μm					
1300 R XXX BN4AM	0.088	0.033					
2600 R XXX BN4AM	0.055	0.016					

Aquamicron	RAM
Size	40 μm
1300 R 040 AM	0.026
2600 R 040 AM	0.013

All Element K Factors in psi / gpm.

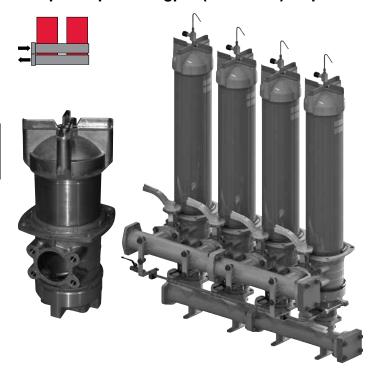


Notes



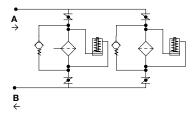
NF MMP Series

Manifold Modular Parallel Inline Filters - with ECOmicron®-fit option 232 psi • up to 450 gpm (4" header) • up to 1350 gpm (6" header)

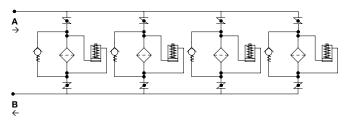


Hydraulic Symbol

NF 52XX Manifold Modular



NF 104XX Manifold Modular



Features

- · Less weight/handling reducing shipping costs
- Towers isolated individually (versus NFD 5210 and up, duty-standby arrangement)
- Lower Clean ΔP (less filters, elements, and piping)
- Significant Cost Reduction (less components, smaller footprint)
- Ease of Operation/Maintenance (less leakage points)
- Uses NF Series proven housing and element technology
- Replacement Elements Optimicron®, ECOmicron®-fit, ECOmicron® (environmentally friendly, incinerable)

Configurations

NF Optimicron®, ECOmicron® Size 5210, 7810, 10410

- Bypass located in element endcap
- NF ECOmicron®-fit Size 5214, 7814, 10414
- Bypass separate, replaceable component

Applications







Pulp & Paper Steel / Heav

Industrial

Technical Specifications

Mounting Method See drawings								
Port Connection	4" SAE DN 102 Flange Code 6 (with M16 bolts included)							
Flow Direction								
2.0 version	Inlet: Side	Outlet: Side						
Construction Materials								
Head, Housing, Lid 6" Piping headers Elbows, Manifolds	Aluminum Carbon Steel Ductile Iron							
Flow Capacity	DCP 4" Head	der Piping						
5210, 5214, 7810, 7814, 10410, 10414	450 gpm (1700 lpm)							
	CC7 6" Head	der Piping						
5210, 5214 7810, 7810, 10410, 10414	900 gpm (3406 lpm) 1350 gpm (5110 lpm)							
Housing Pressure Rating								
Max. Allowable Working Pressure Fatigue Pressure Burst Pressure	232 psi (16 bar) 232 psi (16 bar) Contact HYDAC							
Element Collapse Pressure Ratin	g							
ON, ECON2	290 psid (20 bar) 145 psid (10 bar)							
Fluid Temperature Range 14°F to 212°F (-10°C to 100°C								
Consult HYDAC for applications below 1	4°F (-10°C)							
Fluid Compatibility								
Compatible with all hydrocarbon b oil/water emulsion, and high water appropriate seals are selected.								

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar) -10\%}$

 $\Delta P = 72 \text{ psid (5 bar)} -10\%$ 2.0 - Differential

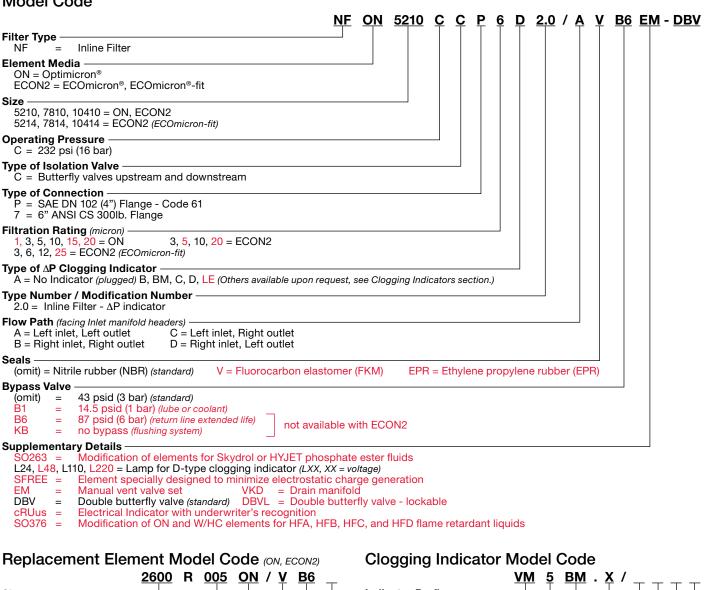
Bypass Valve Cracking Pressure

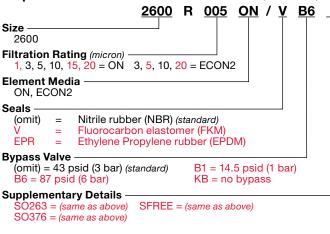
 $\Delta P = 14.5 \text{ psid (1 bar)} + 10\%$

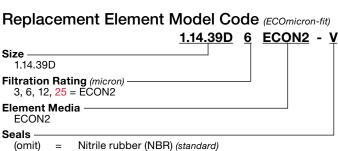
 $\Delta P = 43 \text{ psid (3 bar)} +10\% \text{ (standard)}$

 $\Delta P = 87 \text{ psid (6 bar) } +10\%$

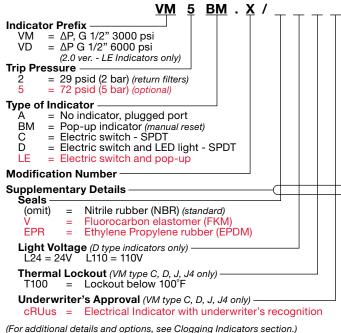
Model Code





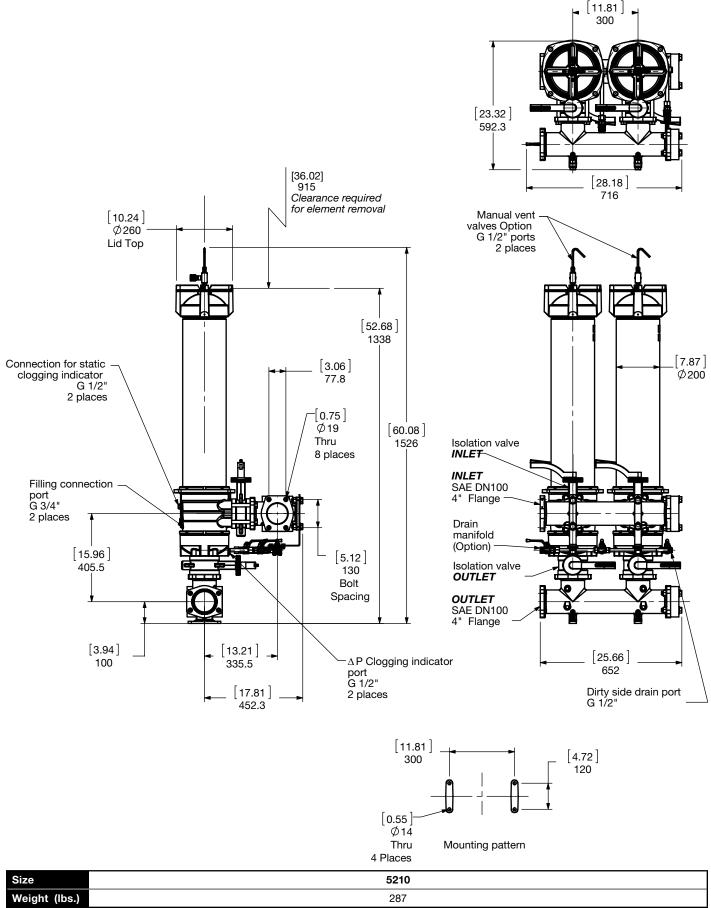


Fluorocarbon elastomer (FKM)

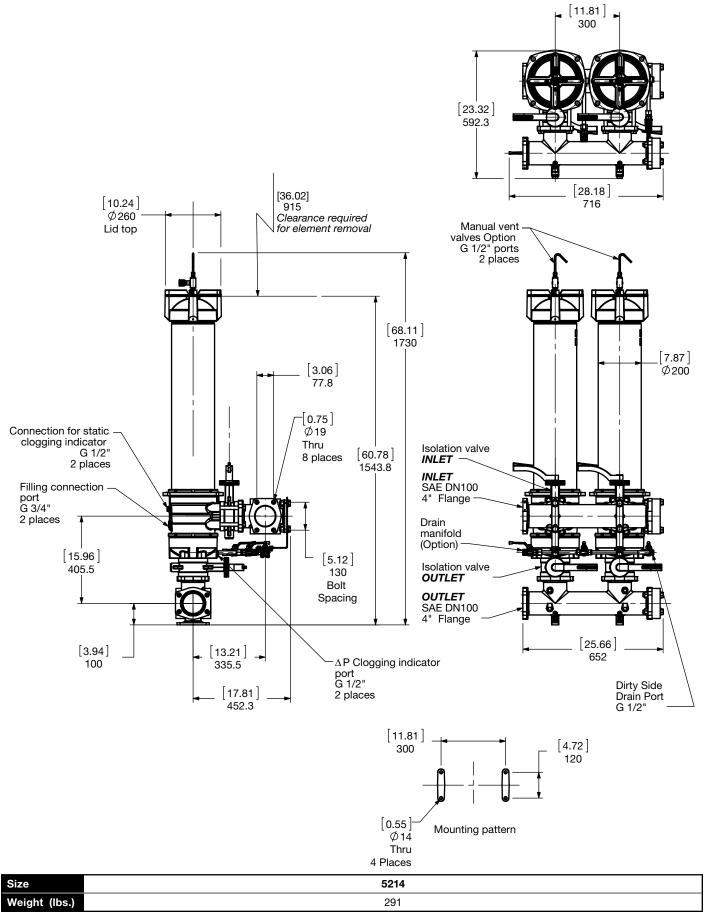


Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Dimensions NF 5210 2.0 Version (Modular Parallel)

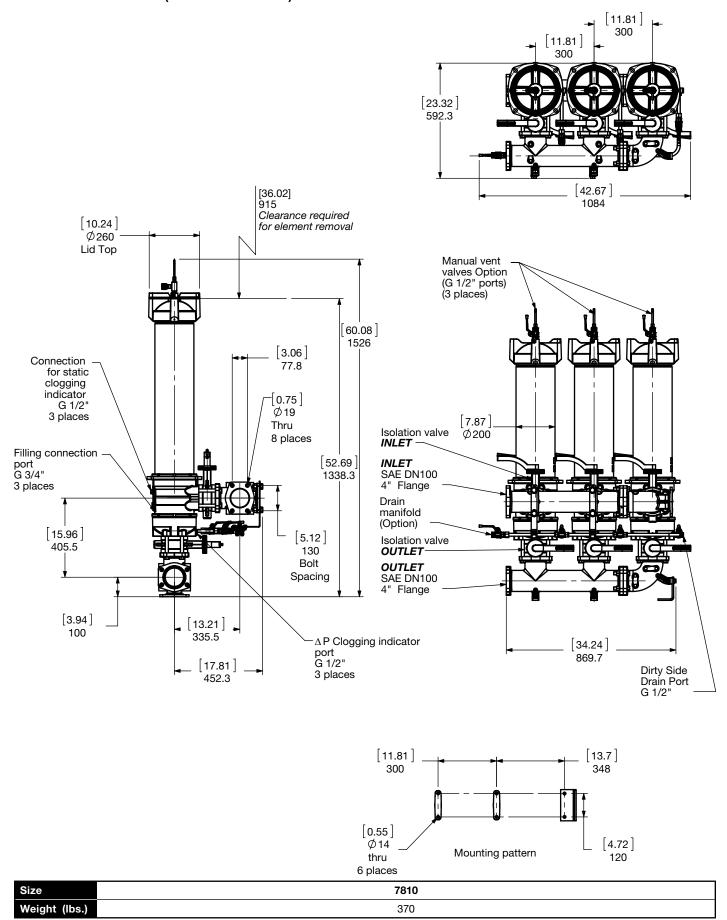


Dimensions: NF 5214 2.0 Version (Modular Parallel)



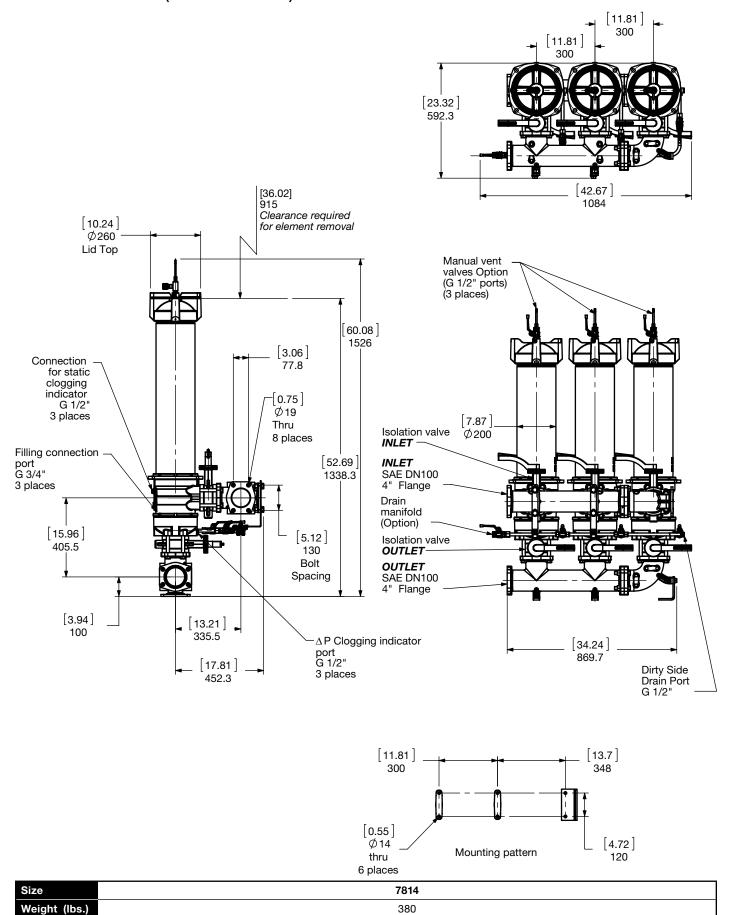
Dimensions:

NF 7810 2.0 Version (Modular Parallel)



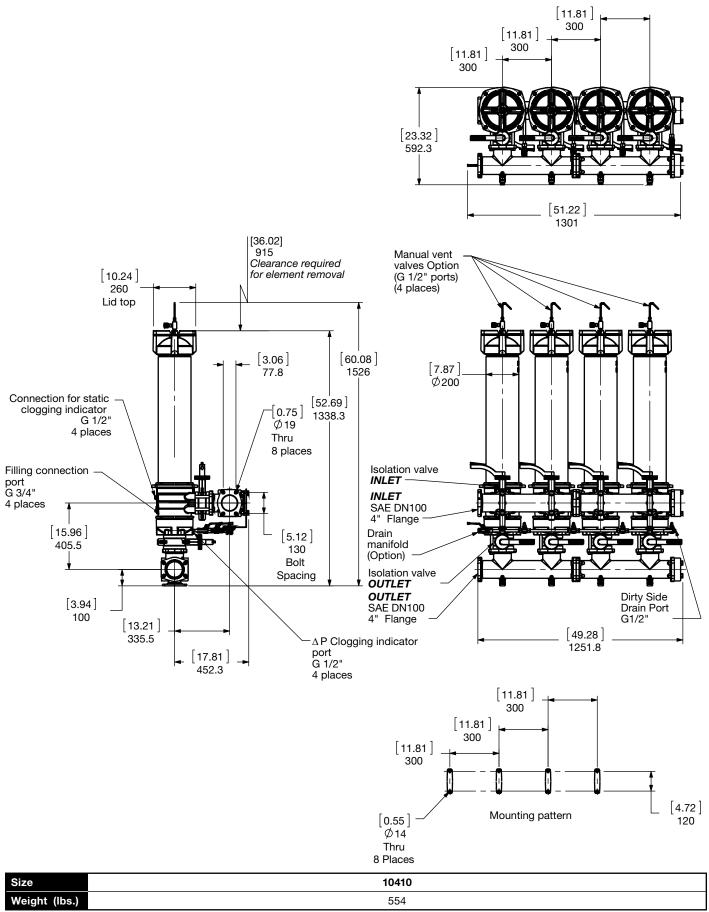
Dimensions:

NF 7814 2.0 Version (Modular Parallel)



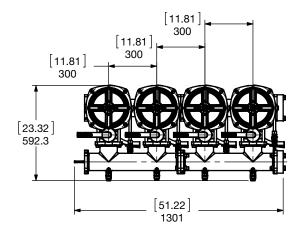
Dimensions:

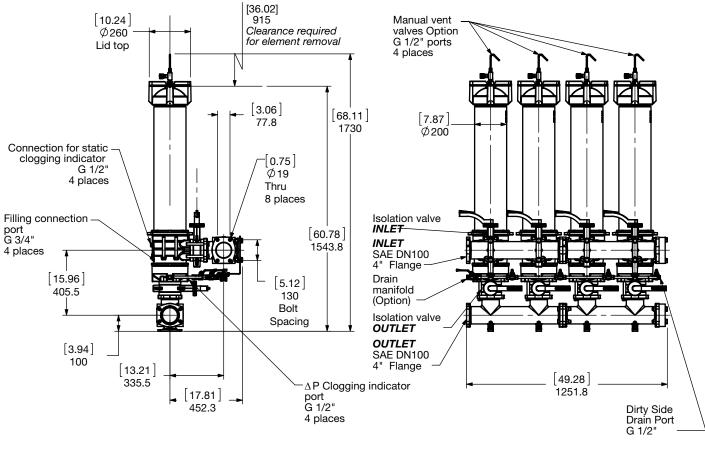
NF 10410 2.0 Version (Modular Parallel)

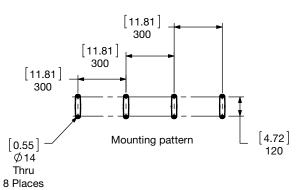


Dimensions:

NF 10414 2.0 Version (Modular Parallel)



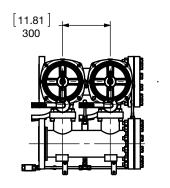


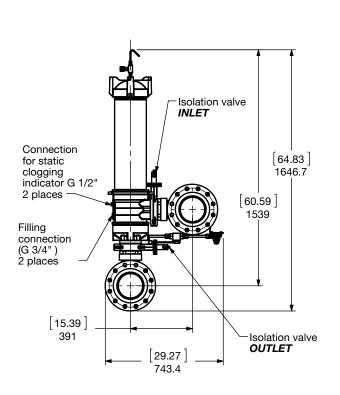


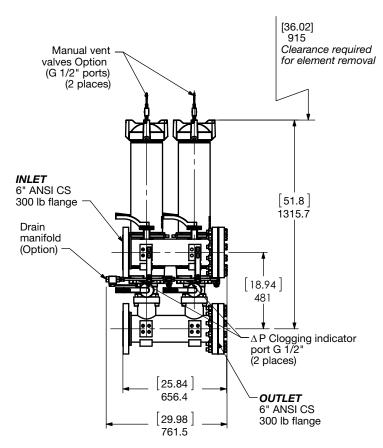
Size	10414
Weight (lbs.)	562

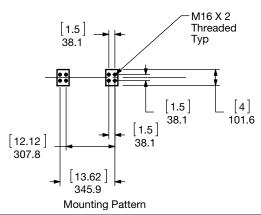
Dimensions:

NF 5210DC7 2.0 Version (Modular Parallel High Flow)





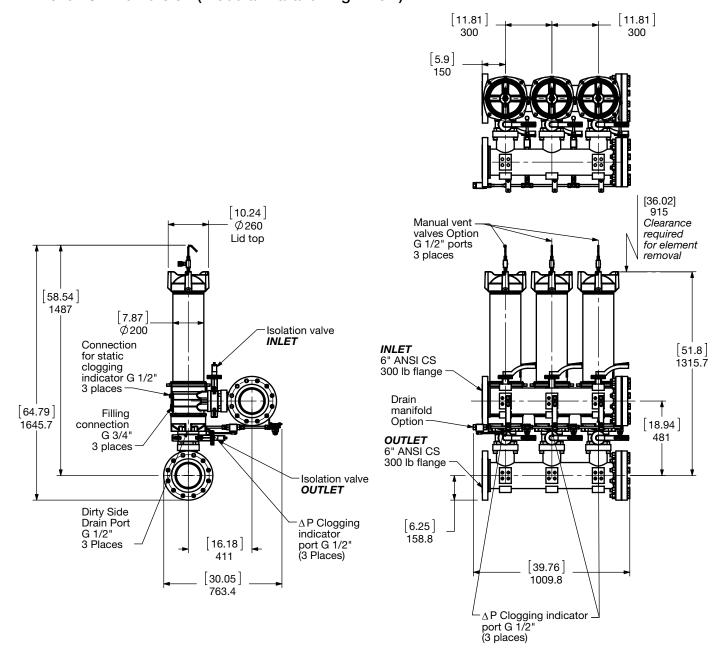


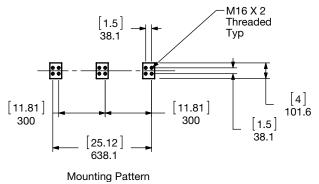


Size	5210DC7	
Weight (lbs.)	530	

Dimensions:

NF 7810DC7 2.0 Version (Modular Parallel High Flow)





Size	7810DC7
Weight (lbs.)	679

Sizing Information

Total pressure loss through the filter is as follows:

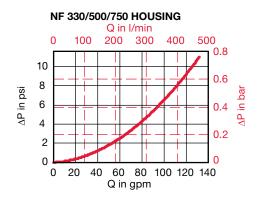
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

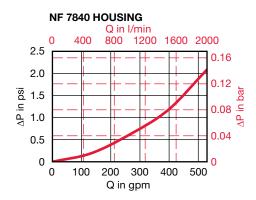
Pressure loss through housing is as follows:

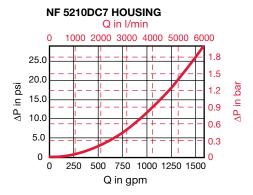
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

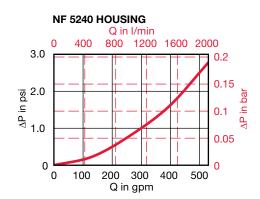
Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

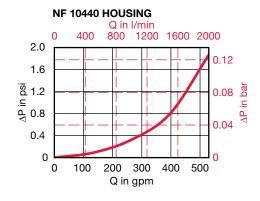


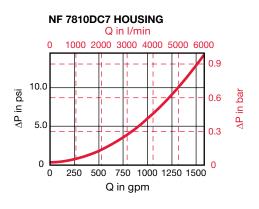
NF 1310-2650 HOUSING Q in I/min 0 1200 1600 2000 0.3 isd ui d∨ 2.0 0.2 in bar 0.1 1.0 0 0 100 200 300 400 500 Q in gpm











All Element K Factors in psi / gpm.

Element K Factors

 $\Delta \text{P Elements} = \text{Elements (K) Flow Factor x Flow Rate (gpm) x} \\ \frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \\ \frac{\text{Actual Specific Gravity}}{0.86}$

Optimicron	RON											
Size	1 µm	3 µm	5 μm	10 µm	15 µm	20 μm						
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012						
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006						

ECOmicron	RECON2										
Size	3 µm	5 μm	10 μm	20 μm							
1300 R XXX ECON2	0.044	0.033	0.022	0.016							
2600 R XXX ECON2	0.022	0.016	0.011	0.005							

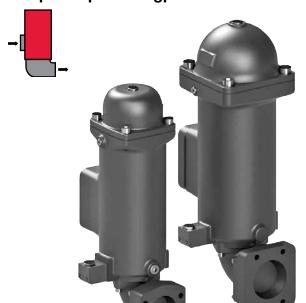
ECOmicron fit	1.14.XXDXXECO/N										
Size	3 µm	6 µm	12 μm	25 μm							
1.14.16DXXECO/N	0.046	0.041	0.022	0.015							
1.14.39DXXECO/N	0.017	0.016	0.008	0.006							

Notes

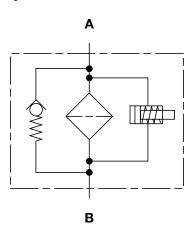
														黑
														4

RFL Cast Series

Inline Filters
360 psi • up to 350 gpm



Hydraulic Symbol



Features

- Models 851 and 1301 are made of ductile cast iron and consist
 of a two part filter housing with bolt-on cast iron lid. The two part
 construction makes it possible to arrange the inlet and outlet
 either one above the other on one side or, by turning the base
 part 180°, on opposite sides of the housing.
- Inlet/outlet ports for models 851 and 1301 comply with SAE 4-bolt flange Code 61 configuration.
- Clogging indicators have no external dynamic seal. High reliability is achieved and magnetic actuation eliminates a leak point.

Note: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Technical Specifications

recrimical opecifications	-							
Mounting Method	Support by means of pipe clamps							
Port Connection								
851 1301	3" SAE DN 76 Code 61 Flange 4" SAE DN 102 Code 61 Flange							
Flow Direction	Inlet: Side Outlet: Side							
Construction Materials								
Head, Lid, Elbow	Ductile iron							
Flow Capacity								
851 1301	225 gpm (850 lpm) 343 gpm (1300 lpm)							
Housing Pressure Rating								
Max. Allowable Working Pressure Fatigue Pressure Burst Pressure	360 psi (25 bar) 360 psi (25 bar) > 1440 psi (100 bar)							
Element Collapse Pressure Ratin	ng							
ON, W/HC BN4AM, ECON2, AM, P/HC	290 psid (20 bar) 145 psid (10 bar)							
Fluid Temperature Range	14°F to 212°F (-10°C to 100°C)							
Consult HYDAC for applications below 1	I4°F (-10°C)							
Fluid Compatibility								
Compatible with all hydrocarbon b	pased, synthetic, water glycol.							

Applications



Automotive



Pulp & Paper



Gearboxes



Shipbuilding



Industrial

Steel / Heavy Industry



Power Generation

oil/water e

Compatible with all hydrocarbon based, synthetic, water glycol oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

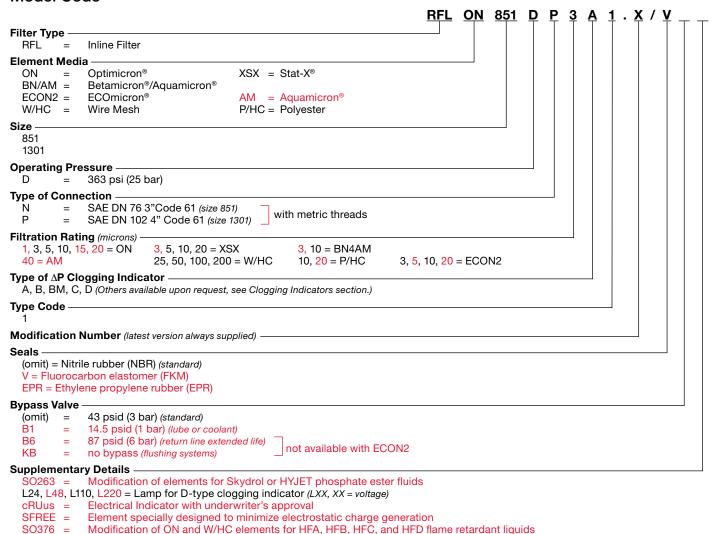
 $\Delta P = 29 \text{ psid (2 bar) -10\%}$ $\Delta P = 72 \text{ psid (5 bar) -10\%}$

Bypass Valve Cracking Pressure

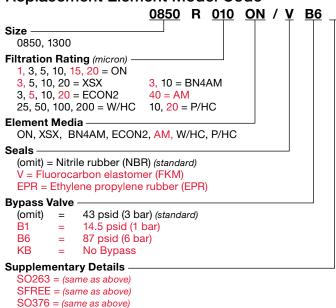
 $\Delta P = 43 \text{ psid (3 bar)} + 10\%$

 $\Delta P = 87 \text{ psid (6 bar)} + 10\%$

Model Code



Replacement Element Model Code

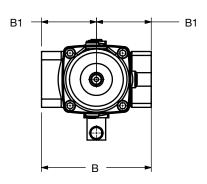


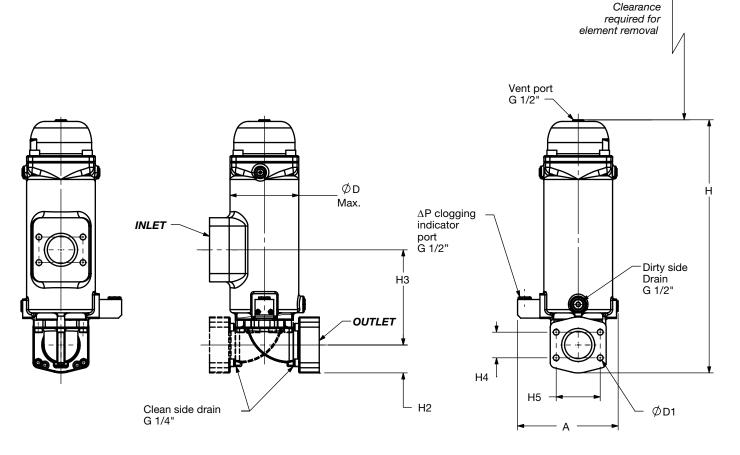
Clogging Indicator Model Code **Indicator Prefix** -VM = G 1/2 3000 psi**Trip Pressure** = 29 psid (2 bar) (optional) = 72 psid (5 bar) Type of Indicator = No indicator, plugged port = Pop-up indicator (auto reset) BM = Pop-up indicator (manual reset) = electric switch - SPDT = electric switch & LED light - SPDT **Modification Number Supplementary Details** Seals (omit) Nitrile (NBR) (standard) Fluorocarbon elastomer (FKM) Ethylene propylene rubber (EPR) **Light Voltage** (D type indicators only) L24 = 24V L110 = 110V Thermal Lockout (VM type C, D, J, J4 only) T100 = Lockout below 100°F Underwriter's Approval (VM type C, D, J, J4 only) cRUus = Electrical Indicator with underwriter's approval

(For additional details and options, see Clogging Indicators section.)

(HYDAC) D145

Dimensions RFL Cast 851-1301





Size	Α	В	В1	н	H1	H2	НЗ	H4	Н5	D	D1	Weight (lbs)
RFL 851	[7.56] 192	[8.78] 266	[5.23] 133	[24.09] 612	[16.54] 420	[2.66] 67.5	[9.05] 230	[2.44] 61.9	[4.19] 106.4	[6.77] 172	M16	84.9
RFL 1301	[8.78] 223	[11.26] 286	[5.63] 143	[27.99] 711	[19.69] 500	[3.05] 77.5	[9.84] 250	[3.06] 77.8	[5.13] 130.2	[8.66] 220	M16	122.4

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.



H1

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

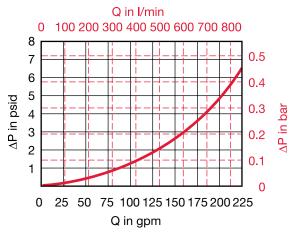
Housing Curve:

Pressure loss through housing is as follows:

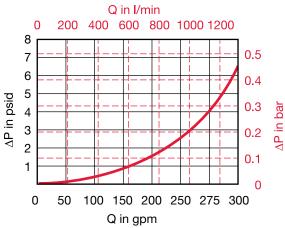
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

RFL 851 HOUSING



RFL 1301 HOUSING



Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Optimicron	RON							
Size	1 µm	3 μm	5 μm	10 µm	15 µm	20 μm		
0850 R XXX ON	0.152	0.072	0.055	0.032	0.024	0.02		
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012		

Stat-X		R	.XSX	
Size	3 µm	5 μm	10 μm	20 μm
0850 R XXX XSX	0.072	0.055	0.032	0.02
1300 R XXX XSX	0.04	0.032	0.019	0.012

ECOmicron	RECON2						
Size	3 µm	5 μm	10 μm	20 μm			
0850 R XXX ECON2	0.082	0.055	0.038	0.022			
1300 R XXX ECON2	0.044	0.033	0.022	0.016			

Betamicron/Aquamicron	RBN4AM			
Size	3 µm	10 µm		
0850 R XXX BN4AM	0.154	0.049		
1300 R XXX BN4AM	0.088	0.033		

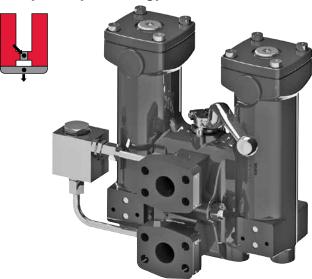
Aquamicron	RAM
Size	40 μm
0850 R 040 AM	0.040
1300 R 040 AM	0.026

Wire Screen	RW/HC
Size	25, 50, 100, 200 μm
0850 R XXX W/HC	0.003
1300 R XXX W/HC	0.002

Polyester	RP/HC				
Size	10 μm	20 μm			
0850 R XXX P/HC	0.007	0.003			
1300 R XXX P/HC	0.004	0.002			

RFLD Cast Series

Inline Duplex Filters 580 psi • up to 340 gpm



Features

- Inlet and outlet connections are located on the same side of the transfer valve. Inlet on top and the outlet on bottom.
- Transfer valve and pressure equalization line allows easy changeover between filter housings without costly system shutdown. (standard with 851, 951 & 1301)
- Clogging indicators have no external dynamic seal. High reliability is achieved and magnetic actuation eliminates a leak point.

Note: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Applications



Automotive



Pulp & Paper Railways





Industrial

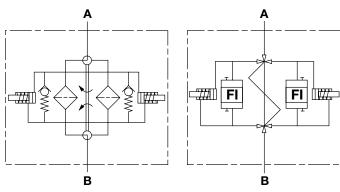
Shipbuilding



Power Generation



Hydraulic Symbol



haical Specifications

Technical Specifications						
Mounting Method	Mounting holes on o port faces	ppposite side from Inlet/Outlet				
Port Connection	Flange ports with me	etric threads				
111	1" SAE DN 25 Code					
241	1 1/2" SAE DN 38 Co					
331		ode 61, 2" SAE DN 51 Code 61				
501		ode 61, 2" SAE DN 51 Code 61				
661	2" SAE DN 51 Code 3" SAE/DIN DN 76 C	61, 2 1/2" SAE DN 64 Code 61				
851		61, 2 1/2" SAE DN 64 Code 61				
001	3" SAE/DIN DN 76 C					
951		Code 61, 4" SAE/DIN DN 102				
1301	Code 61	7000 01, 1 07 (2, 2, 11 2, 11 152				
""		Code 61, 4" SAE/DIN DN 102				
	Code 61					
Flow	Inlat: Front Top	Outlet: Front Bottom				
Direction	Inlet: Front Top	Outlet: From Bottom				
Construction N	/laterials					
Head, Lid,	Ductile iron					
Elbow						
Flow Capacity						
111	29 gpm (110 lpm)					
241	63 gpm (240 lpm)					
331	87 gpm (330 lpm)					
501	132 gpm (500 lpm)					
661	174 gpm (660 lpm)					
851	225 gpm (850 lpm)					
951 1301	251 gpm (950 lpm)					
-	343 gpm (1300 lpm)					
Housing Press. Rating	111 - 241	501 - 1301				
Max. Allowable						
Working						
Pressure	580 psi (40 bar) 360 psi (25 bar)					
Fatigue	580 psi (40 bar) 360 psi (25 bar)					
Pressure	>2320 psi (160 bar)	>1440 psi (100 bar)				
Burst Pressure						
	ose Pressure Rating					
ON, W/HC		290 psid (20 bar)				

=	-
ON, W/HC	290 psid (20 bar)
ECON2, BN4AM, AM, P/HC	145 psid (10 bar)

Fluid Temp. 14°F to 212°F (-10°C to 100°C) Range Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar)} -10\% \text{ (standard)}$

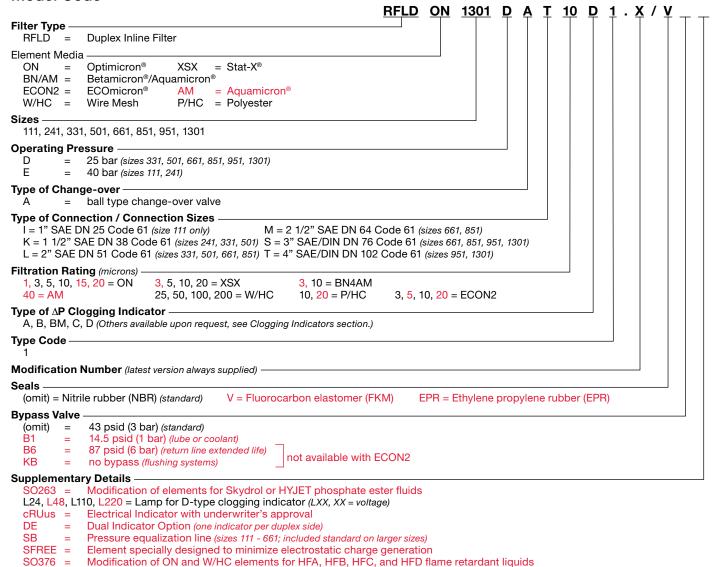
 $\Delta P = 72 \text{ psid (5 bar)} -10\%$

Bypass Valve Cracking Pressure

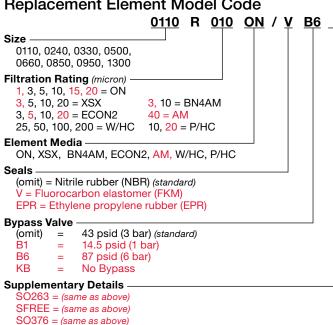
 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (standard)}$

 $\Delta P = 87 \text{ psid (6 bar)} + 10\%$

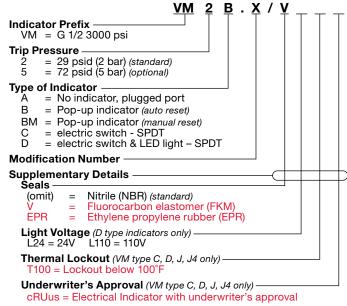
Model Code



Replacement Element Model Code

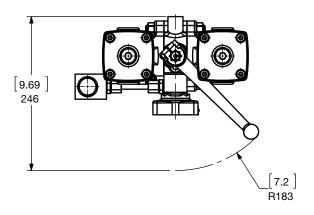


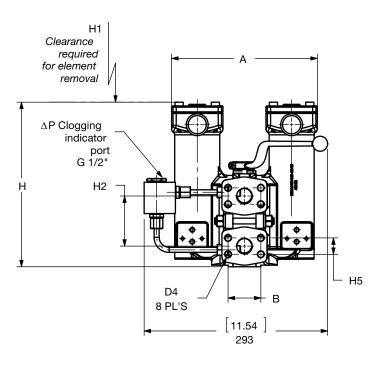
Clogging Indicator Model Code

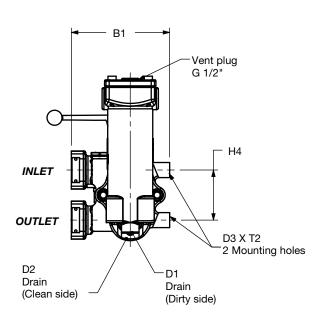


(For additional details and options, see Clogging Indicators section.)

Dimensions RFLD 111 - 1301







Size	Α	В	B1	н	H1	H2	H4	Н5	D1	D2	D3	D4	T2	Wt. (lbs)
RFLD 111 EAI (DN 25)	[9.17] 233	[2.06] 52.4	[6.18] 157	[10.35] 263	[6.89] 175	[3.15] 80	[3.15] 80	[1.03] 26.2	G 1/4	G 1/4	M12	M10	[0.98] 25	37.4
RFLD 241 EAK (DN 40)	[11.89] 302	[2.75] 69.8	[6.57] 167	[12.28] 312	[8.27] 210	[3.74] 95	[5.51] 140	[1.41] 35.7	G 1/4	G 1/4	M12	M12	[0.71] 18	59.4
RFLD 331 DAL (DN 50)	[14.96] 380	[3.06] 77.8	[7.36] 187	[12.72] 323	[7.87] 200	[4.33] 110	[6.50] 165	[1.69] 42.9	G 1/2	G 1/4	M12	M12	[0.71] 18	81.4
RFLD 501 DAL (DN 50)	[14.96] 380	[3.06] 77.8	[7.36] 187	[15.75] 400	[11.02] 280	[4.33] 110	[6.50] 165	[1.69] 42.9	G 1/2	G 1/4	M12	M12	[0.71] 18	85.8
RFLD 661 DAM (DN 65)	[19.52] 496	[3.50] 88.9	[9.92] 252	[18.58] 472	[13.39] 340	[4.33] 110	[6.50] 165	[2.00] 50.8	G 1/2	G 1/4	M12	M12	[0.71] 18	162.8
RFLD 851 DAS (DN 80)	[19.52] 496	[4.19] 106.4	[8.74] 222	[25.59] 650	[16.54] 420	[9.06] 230	[9.06] 230	[2.44] 61.9	G 1/2	G 1/4	M12	M16	[0.91] 23	193.6
RFLD 951 DAS (DN 80)	[21.57] 548	[4.19] 106.4	[8.74] 222	[23.43] 595	[14.57] 370	[9.06] 230	[9.06] 230	[2.44] 61.9	G 1/2	G 1/4	M12	M16	[0.91] 23	231
RFLD 1301 DAT (DN 100)	[21.85] 555	[5.13] 130.2	[9.76] 248	[29.37] 746	[19.29] 490	[9.84] 250	[9.84] 250	[3.06] 77.8	G 1/2	G 1/4	M16	M16	[0.91] 23	275

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

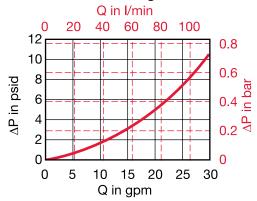
Housing Curve:

Pressure loss through housing is as follows:

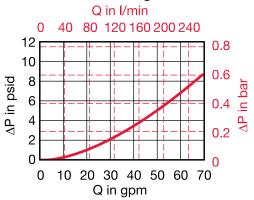
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

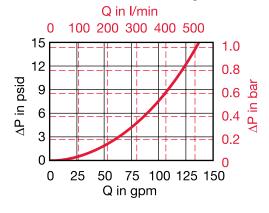
RFLD 111 Housing



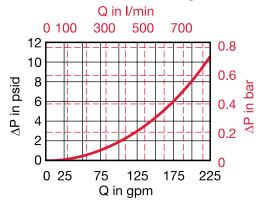
RFLD 241 Housing



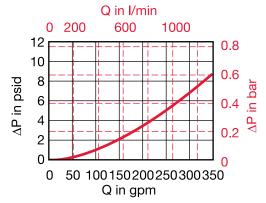
RFLD 331 / 501 Housing



RFLD 661 / 851 Housing



RFLD 951 / 1301 Housing



Required Element Per Housing

Housing Size	Element Size	Elements per Side
111	0110	1
241	0240	1
331	0330	1
501	0500	1
661	0660	1
851	0850	1
951	0950	1
1301	1300	1

Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Optimicron	RON					
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm
0110 R XXX ON	1.224	0.719	0.487	0.296	0.234	0.178
0240 R XXX ON	0.571	0.284	0.201	0.125	0.101	0.077
0330 R XXX ON	0.444	0.204	0.15	0.081	0.07	0.056
0500 R XXX ON	0.289	0.143	0.104	0.06	0.046	0.038
0660 R XXX ON	0.196	0.093	0.066	0.037	0.031	0.025
0850 R XXX ON	0.152	0.072	0.055	0.032	0.024	0.02
0950 R XXX ON	0.131	0.057	0.043	0.026	0.021	0.017
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012

Stat-X		R	.XSX	
Size	3 μm	5 μm	10 μm	20 μm
0110 R XXX XSX	0.719	0.487	0.296	0.178
0240 R XXX XSX	0.284	0.201	0.125	0.077
0330 R XXX XSX	0.204	0.15	0.081	0.056
0500 R XXX XSX	0.143	0.104	0.06	0.038
0660 R XXX XSX	0.093	0.066	0.037	0.025
0850 R XXX XSX	0.072	0.055	0.032	0.02
0950 R XXX XSX	0.057	0.043	0.026	0.017
1300 R XXX XSX	0.04	0.032	0.019	0.012

ECOmicron	RECON2			
Size	3 µm	5 μm	10 μm	20 μm
0240 R XXX ECON2	0.340	0.209	0.143	0.099
0330 R XXX ECON2	0.230	0.148	0.093	0.066
0500 R XXX ECON2	0.165	0.104	0.071	0.044
0660 R XXX ECON2	0.104	0.066	0.044	0.027
0850 R XXX ECON2	0.082	0.055	0.038	0.022
0950 R XXX ECON2	0.066	0.044	0.027	0.022
1300 R XXX ECON2	0.044	0.033	0.022	0.016

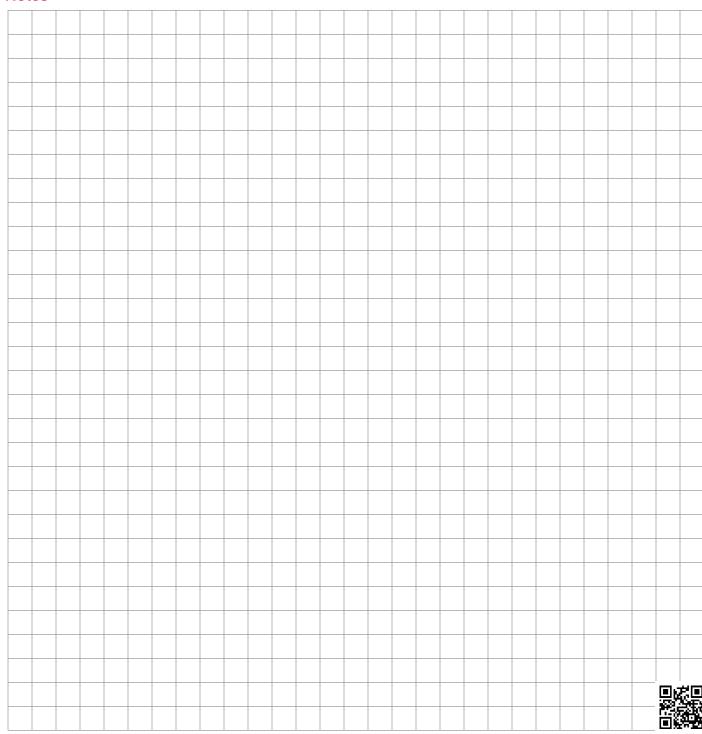
Betamicron/Aquamicron	RBN4AM		
Size	3 μm	10 µm	
0330 R XXX BN4AM	0.477	0.165	
0500 R XXX BN4AM	0.313	0.11	
0660 R XXX BN4AM	0.192	0.066	
0850 R XXX BN4AM	0.154	0.049	
0950 R XXX BN4AM	0.132	0.044	
1300 R XXX BN4AM	0.088	0.033	

Aquamicron	RAM
Size	40 μm
0330 R 040 AM	0.115
0500 R 040 AM	0.076
0660 R 040 AM	0.051
0850 R 040 AM	0.040
0950 R 040 AM	0.036
1300 R 040 AM	0.026

Wire Screen	RW/HC
Size	25, 50, 100, 200 μm
0110 R XXX W/HC	0.016
0240 R XXX W/HC	0.007
0330 R XXX W/HC	0.011
0500 R XXX W/HC	0.007
0660 R XXX W/HC	0.004
0850 R XXX W/HC	0.003
0950 R XXX W/HC	0.003
1300 R XXX W/HC	0.002

Polyester	R	P/HC
Size	10 μm	20 μm
0110 R XXX P/HC	0.050	0.025
0240 R XXX P/HC	0.023	0.012
0330 R XXX P/HC	0.016	0.008
0500 R XXX P/HC	0.011	0.005
0660 R XXX P/HC	0.008	0.004
0850 R XXX P/HC	0.007	0.003
0950 R XXX P/HC	0.006	0.003
1300 R XXX P/HC	0.004	0.002

Notes

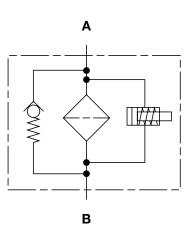


RFL Welded Series

Inline Filters 230 psi • up to 3900 gpm



Hydraulic Symbol



Features

- Models 1300 to 15000 are made of rolled steel housings with bolt-on steel lids; Stainless steel models are available.
- ANSI flange connections for each filter size provide maximum connection flexibility eliminating additional adapters and intermediate flanges.
- Inlet and outlet connections are located on opposite sides of the housings.
- Clogging indicators have no external dynamic seal. High reliability is achieved and magnetic actuation eliminates a leak point.

Notes: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Most states and local jurisdictions in the United States require pressure vessels to be ASME stamped. It is the responsibility of the end customer to research and fully understand the ASME code requirements of the jurisdiction this filter will ultimately be installed in, and to fully communicate these requirements to HYDAC.

Technical Specifications

Mounting Method

mounting mounds	1 1001 THOURING 1090		
Port Connection	Typical Connections		
1300/1320	4" ANSI 150# Flange		
2500/2520	6" ANSI 150# Flange		
4000/4020	8" ANSI 150# Flange		
5200 - 7820	10" ANSI 150# Flange		
15000/15020	12" ANSI 150# Flange		
Flow Direction	Inlet & Outlet: Side		
Construction Materials			
Housing, Lid	Steel		
Note: Please contact HYDAC for available stainless steel models.			
Flow Capacity			
1300/1320	350 gpm (1300 lpm)		
2500/2520	650 gpm (2500 lpm)		
4000/4020	1050 gpm (4000 lpm)		
5200/5220	1400 gpm (5200 lpm)		
6500/6520	1700 gpm (6500 lpm)		
7800/7820	2050 gpm (7800 lpm)		
15000/15020	4000 gpm (15000 lpm)		
Housing Pressure Rating			
Max. Allowable Working Pressure	150 psi (10 bar) (standard)		
_	232 psi (16 bar) (optional)		
Fatigue Pressure	Contact HYDAC		
Burst Pressure	Contact HYDAC		
Element Collapse Pressure Rating			
ON. W/HC	290 psid (20 bar)		

Floor mounted legs

Applications



Gearboxes



Industrial



Generation



Pulp & Paper



Shipbuilding



Steel / Heavy

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

ECON2, BN4AM, AM, P/HC

Fluid Temperature Range

 $\Delta P = 29 \text{ psid (2 bar)} -10\% \text{ (standard)}$ $\Delta P = 72 \text{ psid (5 bar) -10\% (optional)}$

Consult HYDAC for applications below 14°F (-10°C)

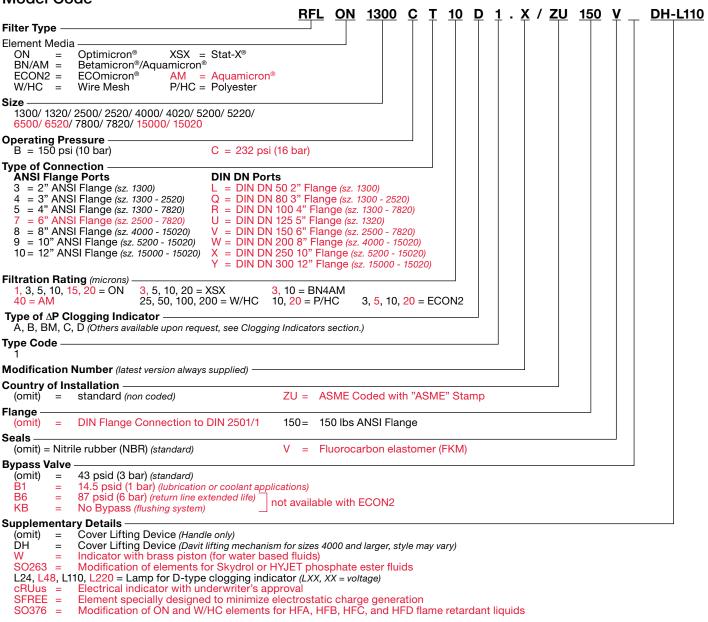
Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar)} +10\% \text{ (standard)}$ $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (optional)}$

145 psid (10 bar)

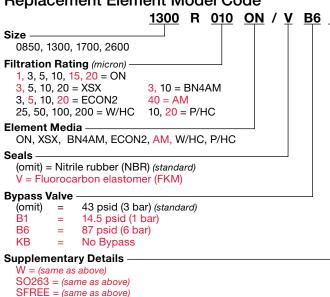
14°F to 212°F (-10°C to 100°C)

Model Code

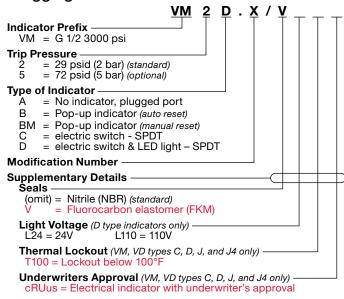


Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Replacement Element Model Code



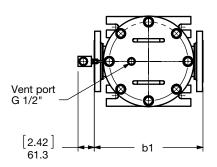
Clogging Indicator Model Code

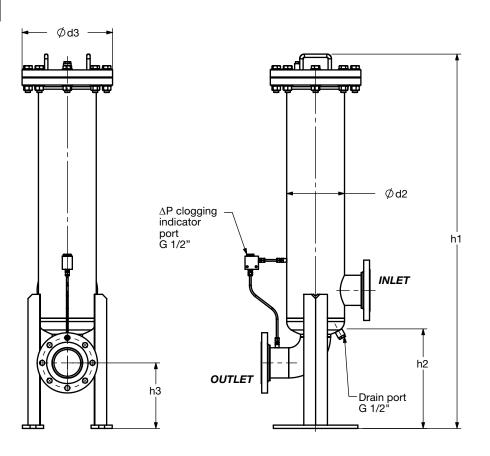


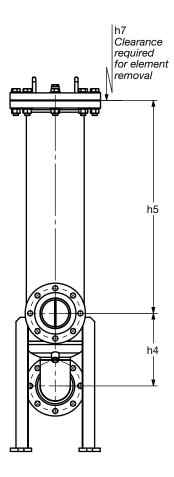
(For additional details and options, see Clogging Indicators section.)

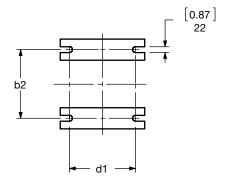
SO376 = (same as above)

Dimensions RFL 1300 - 2520







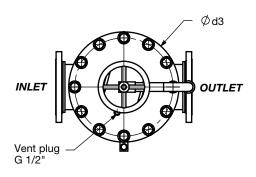


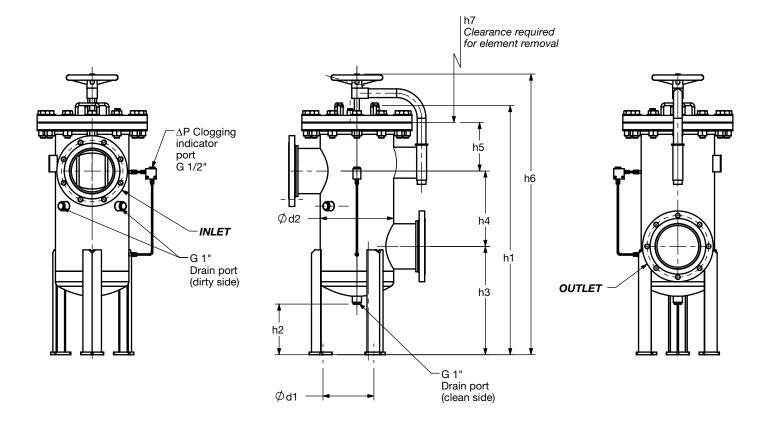


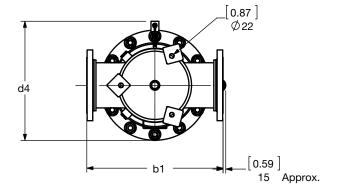
Dimensions RFL 1300 - 2520

Size	Flange Port	b1	b2	d1	d2	d3	h1	h2	h3	h4	h5	h7	Wt. (lbs)	Use Bolt
RFL 1300	2" ANSI 150 lb RF	[16.22] 412	[10.24] 260	[9.84] 250	[8.63] 219.1	[13.39] 340	[38.72] 972	[14.57] 370	[10.47] 266	[9.45] 240	[15.12] 384	[19.69] 500	141/172	5/8"-11 UNC HEAVY HEX
	DIN DN 50	[16.22] 412	[10.24] 260	[9.84] 250	[8.63] 219.1	[13.39] 340	[38.72] 972	[14.57] 370	[10.47] 266	[9.45] 240	[15.12] 384	[19.69] 500	141/172	M16X2
	3" ANSI 150 lb RF	[16.22] 412	[10.24] 260	[9.84] 250	[8.63] 219.1	[13.39] 340	[38.72] 972 [55.75] 1416	[14.57] 370	[10.47] 266	[9.45] 240	[15.12] 384 [32.44] 824	[19.69] 500 [37.01] 940	148/178	5/8"-11 UNC HEAVY HEX
RFL	DIN DN 80	[16.22] 412	[10.24] 260	[9.84] 250	[8.63] 219.1	[13.39] 340	[38.72] 972 [55.75] 1416	[14.57] 370	[10.47] 266	[9.45] 240	[15.12] 384 [32.44] 824	[19.69] 500 [37.01] 940	148/178	M16X2
1300/1320	4" ANSI 150 lb RF	[16.22] 412	[10.24] 260	[9.84] 250	[8.63] 219.1	[13.39] 340	[38.72] 972 [55.75] 1416	[14.57] 370	[9.96] 253	[10.83] 275	[14.25] 362 [31.57] 802	[19.69] 500 [37.01] 940	152/183	5/8"-11 UNC HEAVY HEX
	DIN DN 100	[16.22] 412	[10.24] 260	[9.84] 250	[8.63] 219.1	[13.39] 340	[38.72] 972 [55.75] 1416	[14.57] 370	[9.96] 253	[10.83] 275	[14.25] 362 [31.57] 802	[19.69] 500 [37.01] 940	152/183	M16X2
RFL 1320	DIN DN 125	[18.90] 480	[10.24] 260	[9.84] 250	[8.63] 219.1	[13.39] 340	[55.75] 1416	[14.57] 370	[8.46] 215	[11.46] 291	[32.44] 824	[37.01] 940	192	M16X2
	3" ANSI 150 lb RF	[18.35] 466	[12.28] 312	[9.84] 250	[10.50] 273	[14.17] 360	[38.98] 990 [54.33] 1380	[8.66] 220	[15.28] 388	[16.14 410	[4.72] 120 [20.08] 510	[16.54] 420 [31.89] 810	160/192	5/8"-11 UNC HEAVY HEX
	DIN DN 80	[18.35] 466	[12.28] 312	[9.84] 250	[10.50] 273	[14.17] 360	[38.98] 990 [54.33] 1380	[8.66] 220	[15.28] 388	[16.14] 410	[4.72] 120 [20.08] 510	[16.54] 420 [31.89] 810	160/192	M16X2
	4" ANSI 150 lb RF	[18.35] 466	[12.28] 312	[9.84] 250	[10.50] 273	[14.17] 360	[41.34] 1050 [56.69] 1440	[8.66] 220	[17.24] 438	[11.97] 304	[9.29] 236 [24.65] 626	[16.54] 420 [31.89] 810	167/199	5/8"-11 UNC HEAVY HEX
RFL 2500/2520	DIN DN 100	[18.35] 466	[12.28] 312	[9.84] 250	[10.50] 273	[14.17] 360	[41.34] 1050 [56.69] 1440	[8.66] 220	[17.24] 438	[11.97] 304	[9.29] 236 [24.65] 626	[16.54] 420 [31.89] 810	167/199	M16X2
	DIN DN 125	[18.35] 466	[12.28] 312	[9.84] 250	[10.50] 273	[14.17] 360	[41.34] 1050 [56.69] 1440	[8.66] 220	[17.24] 438	[14.96] 380	[6.30] 160 [21.65] 550	[16.54] 420 [31.89] 810	176/208	M16X2
	6" ANSI 150 lb RF	[18.35] 466	[12.28] 312	[9.84] 250	[10.50] 273	[14.17] 360	[41.34] 1050 [56.69] 1440	[8.66] 220	[17.24] 438	[14.37] 365	[6.89] 175 [22.24] 565	[16.54] 420 [31.89] 810	185/217	3/4"-10 UNC HEAVY HEX
	DIN DN 150	[18.35] 466	[12.28] 312	[9.84] 250	[10.50] 273	[14.17] 360	[41.34] 1050 [56.69] 1440	[8.66] 220	[17.24] 438	[14.37] 365	[6.89] 175 [22.24] 565	[16.54] 420 [31.89] 810	185/217	M20X2.5

Dimensions RFL 4000 - 15020









Dimensions RFL 4000 - 15020

Size	Flange Port	b1	d1	d2	d3	d4	h1	h2	h3	h4	h5	h6	h7	Wt. (lbs.)	Use Bolt
	DIN DN 100	[23.62] 600	[12.99] 330	[14.00] 355.6	[18.11] 460	[21.40] 543	[42.48] 1079 [57.83] 1469	[10.47] 266	[18.7] 475	[11.97] 304	[8.70] 221 [26.02] 661	[48.03] 1220 [65.35] 1660	[16.54] 420 [31.89] 810	267 /323	M16X2
	4" ANSI 150 LB RF	[23.62] 600	[12.99] 330	[14.00] 355.6	[18.11] 460	[21.37] 543	[42.48] 1079 [57.83] 1469	[10.47] 266	[18.7] 475	[11.97] 304	[8.70] 221 [26.02] 661	[48.03] 1220 [65.35] 1660	[16.54] 420 [31.89] 810	267 /323	5/8"-11 UNC HEAVY HEX
	DIN DN 125	[23.62] 600	[12.99] 330	[14.00] 355.6	[18.11] 460	[21.37] 543	[46.02] 1169 [57.44] 1459	[10.47] 266	[20.67] 525	[14.96] 380	[7.28] 185 [22.64] 575	[51.57] 1310 [66.93] 1700	[16.54] 420 [31.89] 810	281 /337	M16X2
RFL 4000/4020	6" ANSI 150 LB RF	[23.62] 600	[12.99] 330	[14.00] 355.6	[18.11] 460	[21.37] 543	[46.02] 1169 [61.38] 1559	[10.47] 266	[20.67] 525	[14.96] 380	[7.87] 200 [23.23] 590	[52.17] 1325 [67.52] 1715	[16.54] 420 [31.89] 810	294 /350	3/4"-10 UNC HEAVY HEX
	DIN DN 150	[23.62] 600	[12.99] 330	[14.00] 355.6	[18.11] 460	[21.37] 543	[46.02] 1169 [61.38] 1559	[10.47] 266	[20.67] 525	[14.96] 380	[7.87] 200 [23.23] 590	[52.17] 1325 [67.52] 1715	[16.54] 420 [31.89] 810	294 /350	M20X2.5
	8" ANSI 150 LB RF	[23.62] 600	[12.99] 330	[14.00] 355.6	[18.11] 460	[21.37] 543	[47.4] 1204 [62.76] 1594	[10.47] 266	[20.67] 525	[14.37] 365	[9.25] 235 [24.61] 625	[52.95] 1345 [68.31] 1735	[16.54] 420 [31.89] 810	309 /365	3/4"-10 UNC HEAVY HEX
	DIN DN 200	[23.62] 600	[12.99] 330	[14.00] 355.6	[18.11] 460	[21.37] 543	[47.4] 1204 [62.76] 1594	[10.47] 266	[20.67] 525	[14.37] 365	[9.25] 235 [24.61] 625	[52.95] 1345 [68.31] 1735	[16.54] 420 [31.89] 810	309 /365	M20X2.5
	DIN DN 100	[23.62] 600	[14.90] 380	[16.00] 406.4	[20.08] 510	[23.35] 593	[45.04] 1144 [62.36] 1584	[9.61] 244	[18.31] 465	[11.97] 304	[11.69] 297 [29.02] 737	[50.63] 1286 [67.95] 1726	[19.69] 500 [37.01] 940	353 /450	M16X2
	4" ANSI 150 LB RF	[23.62] 600	[14.90] 380	[16.00] 406.4	[20.08] 510	[23.35] 593	[45.04] 1144 [62.36] 1584	[9.61] 244	[18.31] 465	[11.97] 304	[11.69] 297 [29.02] 737	[50.63] 1286 [67.95] 1726	[19.69] 500 [37.01] 940	353 /450	5/8"-11 UNC HEAVY HEX
	DIN DN 125	[23.62] 600	[14.90] 380	[16.00] 406.4	[20.08] 510	[23.35] 593	[49.45] 1256 [66.77] 1696	[9.61] 244	[20.67] 525	[14.96] 380	[10.67] 271 [27.99] 711	[54.96] 1396 [72.28] 1836	[19.69] 500 [37.01] 940	375 /472	M16X2
	DIN DN 150	[23.62] 600	[14.90] 380	[16.00] 406.4	[20.08] 510	[23.35] 593	[49.45] 1256 [66.77] 1696	[9.61] 244	[20.67] 525	[14.37] 365	[11.26] 286 [28.58] 726	[54.96] 1396 [72.28] 1836	[19.69] 500 [37.01] 940	386 /483	M20X2.5
RFL 5200/5220	6" ANSI 150 LB RF	[23.62] 600	[14.90] 380	[16.00] 406.4	[20.08] 510	[23.35] 593	[49.45] 1256 [66.77] 1696	[9.61] 244	[20.67] 525	[14.37] 365	[11.26] 286 [28.58] 726	[54.96] 1396 [72.28] 1836	[19.69] 500 [37.01] 940	386 /483	3/4"-10 UNC HEAVY HEX
	DIN DN 200	(25.20) 640	[14.90] 380	[16.00] 406.4	[20.08] 510	[23.35] 593	[49.45] 1256 [66.77] 1696	[9.61] 244	[20.67] 525	[14.37] 365	[11.26] 286 [28.58] 726	[54.96] 1396 [72.28] 1836	[19.69] 500 [37.01] 940	395 /492	M20X2.5
	8" ANSI 150 LB RF	(25.20) 640	[14.90] 380	[16.00] 406.4	[20.08] 510	[23.35] 593	[49.45] 1256 [66.77] 1696	[9.61] 244	[20.67] 525	[14.37] 365	[11.26] 286 [28.58] 726	[54.96] 1396 [72.28] 1836	[19.69] 500 [37.01] 940	395 /492	3/4"-10 UNC HEAVY HEX
	DIN DN 250	(25.98) 660	[14.90] 380	[16.00] 406.4	[20.08] 510	[23.35] 593	[52.13] 1324 [69.45] 1764	[9.61] 244	[22.05] 560	[17.72] 450	[9.29] 236 [26.61] 676	[57.72] 1466 [75.04] 1906	[19.69] 500 [37.01] 940	428 /525	M24X3
	10" ANSI 150 LB RF	(25.98) 660	[14.90] 380	[16.00] 406.4	[20.08] 510	[23.35] 593	[52.13] 1324 [69.45] 1764	[9.61] 244	[22.05] 560	[17.72] 450	[9.29] 236 [26.61] 676	[57.72] 1466 [75.04] 1906	[19.69] 500 [37.01] 940	428 /525	7/8"- 9UNC HEAVY HEX



Dimensions RFL 4000 - 15020

Size	Flange Port	b1	d1	d2	d3	d4	h1	h2	h3	h4	h5	h6	h7	Wt. (lbs.)	Use Bolt
	DIN DN 100	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[49.61] 1260 [66.93] 1700	[10.04] 255	[21.26] 540	[11.97] 304	[13.23] 336 [30.55] 776	[55.31] 1405 [72.64] 1845	[19.69] 500 [37.01] 940	487/604	M16X2
	4" ANSI 150 LB RF	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[49.61] 1260 [66.93] 1700	[10.04] 255	[21.26] 540	[11.97] 304	[13.23] 336 [30.55] 776	[55.31] 1405 [72.64] 1845	[19.69] 500 [37.01] 940	487/604	5/8"- 11UNC HEAVY HEX
	DIN DN 125	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[49.61] 1260 [66.93] 1700	[10.04] 255	[21.26] 540	[14.96] 380	[10.24] 260 [27.56] 700	[55.31] 1405 [72.64] 1845	[19.69] 500 [37.01] 940	496/613	M16X2
	DIN DN 150	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[49.61] 1260 [66.93] 1700	[10.04] 255	[21.26] 540	[14.37] 365	[10.83] 275 [28.15] 715	[55.31] 1405 [72.64] 1845	[19.69] 500 [37.01] 940	507/624	M20X2.5
RFL 6500/6520	6" ANSI 150 LB RF	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[49.61] 1260 [66.93] 1700	[10.04] 255	[21.26] 540	[14.37] 365	[10.83] 275 [28.15] 715	[55.31] 1405 [72.64] 1845	[19.69] 500 [37.01] 940	507/ 624	3/4"- 10UNC HEAVY HEX
	DIN DN 200	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[54.33] 1380 [71.65] 1820	[10.04] 255	[23.62] 600	[18.11] 460	[9.45] 240 [26.77] 680	[60.04] 1525 [77.36] 1965	[19.69] 500 [37.01] 940	540/657	M20X2.5
	8" ANSI 150 LB RF	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[54.33] 1380 [71.65] 1820	[10.04] 255	[23.62] 600	[18.11] 460	[9.45] 240 [26.77] 680	[60.04] 1525 [77.36] 1965	[19.69] 500 [37.01] 940	540/657	3/4"- 10UNC HEAVY HEX
	DIN DN 250	[30.71] 780	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[54.33] 1380 [71.65] 1820	[10.04] 255	[23.62] 600	[17.72] 450	[9.84] 250 [27.17] 690	[60.04] 1525 [77.36] 1965	[19.69] 500 [37.01] 940	562/679	M24X3
	10" ANSI 150 LB RF	[30.71] 780	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[54.33] 1380 [71.65] 1820	[10.04] 255	[23.62] 600	[17.72] 450	[9.84] 250 [27.17] 690	[60.04] 1525 [77.36] 1965	[19.69] 500 [37.01] 940	562/679	7/8"- 9UNC HEAVY HEX
	DIN DN 100	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[49.61] 1260 [66.93] 1700	[10.04] 255	[21.26] 540	[11.97] 304	[13.23] 336 [30.55] 776	[55.31] 1405 [72.64] 1845	[19.69] 500 [37.01] 940	496/622	M16X2
	4" ANSI 150 LB RF	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[49.61] 1260 [66.93] 1700	[10.04] 255	[21.26] 540	[11.97] 304	[13.23] 336 [30.55] 776	[55.31] 1405 [72.64] 1845	[19.69] 500 [37.01] 940	496/622	5/8"- 11UNC HEAVY HEX
	DIN DN 125	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[49.61] 1260 [66.93] 1700	[10.04] 255	[21.26] 540	[14.96] 380	[10.24] 260 [27.56] 700	[55.31] 1405 [72.64] 1845	[19.69] 500 [37.01] 940	505/631	M16X2
	6" ANSI 150 LB RF	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[49.61] 1260 [66.93] 1700	[10.04] 255	[21.26] 540	[14.37] 365	[10.24] 260 [27.56] 700	[54.72] 1390 [72.05] 1830	[19.69] 500 [37.01] 940	505/631	5/8"- 11UNC HEAVY HEX
RFL 7800/7820	DIN DN 150	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[49.61] 1260 [66.93] 1700	[10.04] 255	[21.26] 540	[14.37] 365	[10.83] 275 [28.15] 715	[54.72] 1390 [72.05] 1830	[19.69] 500 [37.01] 940	516/642	M20X2.5
	DIN DN 200	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[54.33] 1380 [71.65] 1820	[10.04] 255	[23.62] 600	[18.11] 460	[9.45] 240 [26.77] 680	[60.04] 1525 [77.36] 1965	[19.69] 500 [37.01] 940	549/675	M20X2.5
	8" ANSI 150 LB RF	[29.13] 740	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[54.33] 1380 [71.65] 1820	[10.04] 255	[23.62] 600	[18.11] 460	[9.45] 240 [26.77] 680	[60.04] 1525 [77.36] 1965	[19.69] 500 [37.01] 940	549/675	3/4"- 10UNC HEAVY HEX
	DIN DN 250	[30.71] 780	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[54.33] 1380 [71.65] 1820	[10.04] 255	[23.62] 600	[17.72] 450	[9.84] 250 [27.17] 690	[60.04] 1525 [77.36] 1965	[19.69] 500 [37.01] 940	571/697	M24X3
	10" ANSI 150 LB RF	[30.71] 780	[18.90] 480	[20.00] 508	[24.41] 620	[27.51] 699	[54.33] 1380 [71.65] 1820	[10.04] 255	[23.62] 600	[17.72] 450	[9.84] 250 [27.17] 690	[60.04] 1525 [77.36] 1965	[19.69] 500 [37.01] 940	571/697	7/8"- 9UNC HEAVY HEX



Dimensions RFL 4000 - 15020

Size	Flange Port	b1	d1	d2	d3	d4	h1	h2	h3	h4	h5	h6	h7	Wt. (lbs.)	Use Bolt
	DIN DN 200	[39.37] 1000	[27.17] 690	[27.99] 711	[32.68] 830	[35.66] 906	[56.1] 1425 [73.43] 1865	[10.35] 263	[25.79] 655	[14.37] 365	[12.99] 330 [30.31] 770	[64.17] 1630 [81.50] 2070	[19.69] 500 [37.01] 940	1047/1254	M20X2.5
	8" ANSI 150 LB RF	[39.37] 1000	[27.17] 690	[27.99] 711	[32.68] 830	[35.66] 906	[56.1] 1425 [73.43] 1865	[10.35] 263	[25.79] 655	[14.37] 365	[12.99] 330 [30.31] 770	[63.98] 1625 [81.50] 2070	[19.69] 500 [37.01] 940	1047/1254	3/4"- 10UNC HEAVY HEX
RFL 15000/	DIN DN 250	[39.37] 1000	[27.17] 690	[27.99] 711	[32.68] 830	[35.66] 906	[56.1] 1425 [73.43] 1865	[10.35] 263	[25.79] 655	[17.72] 450	[9.65] 245 [26.97] 685	[63.98] 1625 [81.50] 2070	[19.69] 500 [37.01] 940	1074/1280	M24X3
15020	10" ANSI 150 LB RF	[39.37] 1000	[27.17] 690	[27.99] 711	[32.68] 830	[35.66] 906	[56.1] 1425 [73.43] 1865	[10.35] 263	[25.79] 655	[17.72] 450	[9.65] 245 [26.97] 685	[63.98] 1625 [81.50] 2070	[19.69] 500 [37.01] 940	1074/1280	7/8"- 9UNC HEAVY HEX
	DIN DN 300	[39.37] 1000	[27.17] 690	[27.99] 711	[32.68] 830	[35.66] 906	[58.86] 1495 [76.18] 1935	[10.35] 263	[26.38] 670	[20.28] 515	[9.25] 235 [26.57] 675	[66.93] 1700 [84.25] 2140	[19.69] 500 [37.01] 940	1129/1335	M24X3
	12" ANSI 150 LB RF	[39.37] 1000	[27.17] 690	[27.99] 711	[32.68] 830	[35.66] 906	[58.86] 1495 [76.18] 1935	[10.35] 263	[26.38] 670	[20.28] 515	[9.25] 235 [26.57] 675	[66.93] 1700 [84.25] 2140	[19.69] 500 [37.01] 940	1129/1335	7/8"- 9UNC HEAVY HEX

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

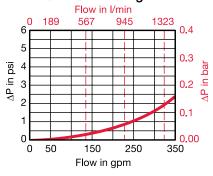
Housing Curve:

Pressure loss through housing is as follows:

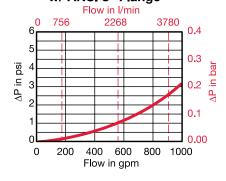
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

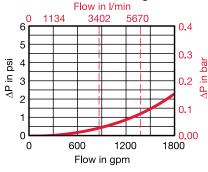
RFL 1300/1320 Housing w/ ANSI 4" Flange



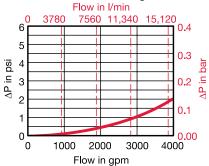
RFL 4000/4020 Housing w/ ANSI 8" Flange



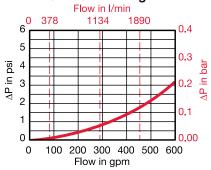
RFL 6500/6520 Housing w/ ANSI 10" Flange



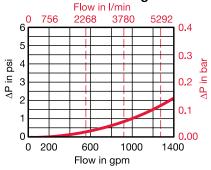
RFL 15000/15020 Housing w/ ANSI 12" Flange



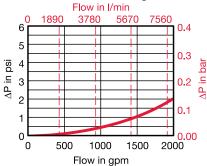
RFL 2500/2520 Housing w/ ANSI 6" Flange



RFL 5200/5220 Housing w/ ANSI 10" Flange



RFL 7800/7820 Housing w/ ANSI 10" Flange



Required Element Per Housing

Housing Size	Element Size	Elements per Side
1300 / 1320	1300 / 2600	1/1
2500 / 2520	0850 / 1700	3/3
4000 / 4020	0850 / 1700	5/5
5200 / 5220	1300 / 2600	4 / 4
6500 / 6520	1300 / 2600	5/5
7800 / 7820	1300 / 2600	6/6
15000 / 15020	1300 / 2600	10 / 10

Element K Factors

 ΔP Elements = Elements (K) Flow Factor x Flow Rate (gpm) x $\frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \frac{\text{Actual Specific Gravity}}{0.86}$

Optimicron	RON							
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm		
0850 R XXX ON	0.152	0.072	0.055	0.032	0.024	0.02		
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012		
1700 R XXX ON	0.074	0.035	0.029	0.015	0.014	0.01		
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006		

Stat-X		R	.xsx	
Size	3 µm	5 μm	10 μm	20 μm
0850 R XXX XSX	0.072	0.055	0.032	0.02
1300 R XXX XSX	0.04	0.032	0.019	0.012
1700 R XXX XSX	0.035	0.029	0.015	0.01
2600 R XXX XSX	0.02	0.016	0.01	0.006

ECOmicron	RECON2						
Size	3 µm	5 μm	10 μm	20 μm			
0850 R XXX ECON2	0.082	0.055	0.038	0.022			
1300 R XXX ECON2	0.044	0.033	0.022	0.016			
1700 R XXX ECON2	0.038	0.027	0.016	0.011			
2600 R XXX ECON2	0.022	0.016	0.011	0.005			

Betamicron/Aquamicron	RBN4AM				
Size	3 µm	10 µm			
0850 R XXX BN4AM	0.154	0.049			
1300 R XXX BN4AM	0.088	0.033			
1700 R XXX BN4AM	0.071	0.027			
2600 R XXX BN4AM	0.055	0.016			

Aquamicron	RAM
Size	40 μm
0850 R 040 AM	0.040
1300 R 040 AM	0.026
1700 R 040 AM	0.020
2600 R 040 AM	0.013

Wire Screen	RW/HC
Size	25, 50, 100, 200 μm
0850 R XXX W/HC	0.003
1300 R XXX W/HC	0.002
1700 R XXX W/HC	0.001
2600 R XXX W/HC	0.001

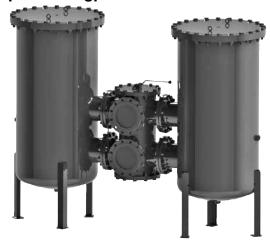
Polyester	R	P/HC
Size	10 μm	20 μm
0850 R XXX P/HC	0.007	0.003
1300 R XXX P/HC	0.004	0.002
1700 R XXX P/HC	0.003	0.002
2600 R XXX P/HC	0.002	0.001

All Element K Factors in psi / gpm.

RFLD Welded Series

Inline Duplex Filters 230 psi • up to 3900 gpm





Features

- Models 1300 to 15020 are made of steel housings with bolt-on steel lids; Stainless steel models are available.
- ANSI flange connections for each filter size provide maximum connection flexibility eliminating additional adapters and intermediate flanges.
- Inlet and outlet connections are located on the same side of the transfer valve.
- Transfer valve and pressure equalization line allow easy changeover between filter housings without costly system shutdown.
- Models 5200 to 15020 use the same filter element size (1300 R) allowing maximum standardization in multiple filter element housings.
- Clogging indicators have no external dynamic seal. High reliability is achieved and magnetic actuation eliminates a leak point.

Notes: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Most states and local jurisdictions in the United States require pressure vessels to be ASME stamped. It is the responsibility of the end customer to research and fully understand the ASME code requirements of the jurisdiction this filter will ultimately be installed in, and to fully communicate these requirements to HYDAC.

Applications



Pulp & Paper







Generation

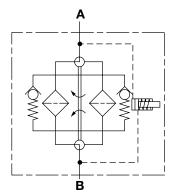
Gearboxes

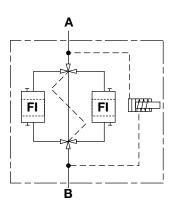
Shipbuilding

Steel / Heavy

Industry

Hydraulic Symbol





Technical Specifications

Mounting Method	Floor mounted I (Filters must not b	egs e used as pipe support)
Port Connection	Inlet / Outlet - To See chart below for	
Flow Direction	Inlet: Front top	Outlet: Front Bottom
Construction Materials		
Head, Lid	Steel	

Note: Please inquire to the factory for available stainless steel models. Flow Capacity

1300/1320	350 gpm (1300 lpm)
2500/2520	650 gpm (2500 lpm)
4000/4020	1050 gpm (4000 lpm)
5200/5220	1400 gpm (5200 lpm)
6500/6520	1700 gpm (6500 lpm)
7800/7820	2050 gpm (7800 lpm)
15000/15020	3900 gpm (15000 lpm)

Housing Pressure Rating

Max. Allowable Working 150 psi (10 bar) (standard) Pressure 232 psi (16 bar) (optional) Fatique Pressure Contact HYDAC **Burst Pressure** Contact HYDAC

Element Collapse Pressure Rating

ON, W/HC 290 psid (20 bar) ECON2, BN4AM, AM, P/HC 145 psid (10 bar)

Fluid Temperature Range 14°F to 212°F (-10°C to 100°C)

Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol. oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar) -10\% (standard)}$ $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (standard)}$

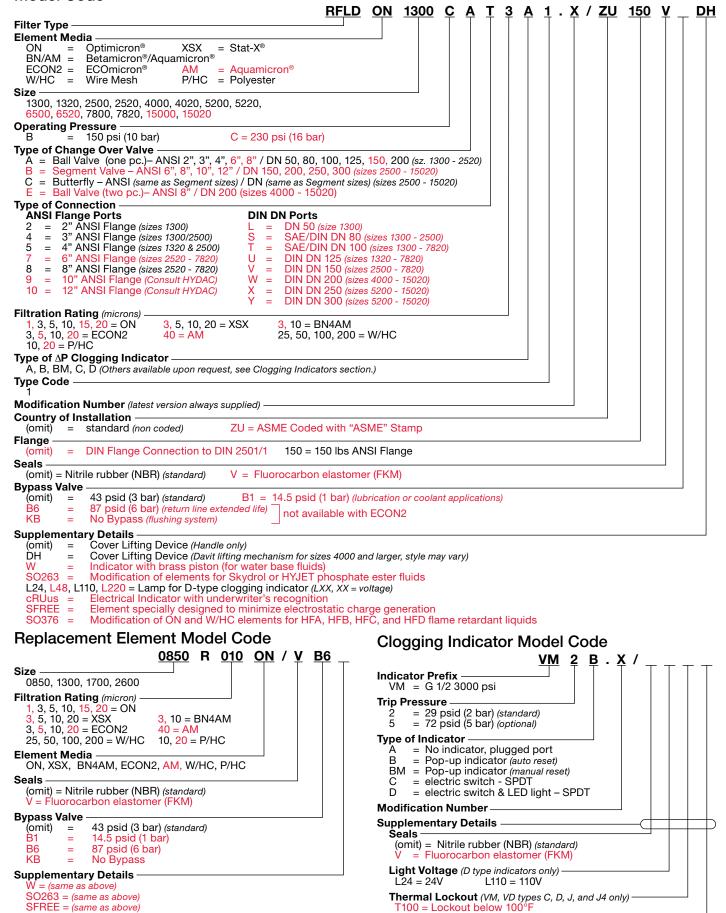
Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar) } +10\%$ $\Delta P = 87 \text{ psid (6 bar)} + 10\%$

Port Connections

Filter		Ball '	V alve		Segment / Butterfly Valve
Size	ANSI	SAE DN	DIN DN	SAE/DIN DN	DN
1300	2"	50	_	_	_
1320	3", 4"	Ι	125	80, 100	_
2500	3", 4"	Ι	125, 150	80, 100	150
2520	5", 6"	ı	125, 150, 200	80, 100	150
4000/4020	4", 6", 8	-	125, 150, 200	100	150, 200
5200/5220	4", 6", 8	_	125, 150, 200	100	150, 200, 250
6500/6520	4", 6", 8	_	125, 150, 200	100	150, 200, 250
7800/7820	4", 6", 8	_	125, 150, 200	100	150, 200, 250
15000/15020	_	-	_	-	150, 200, 250

Model Code

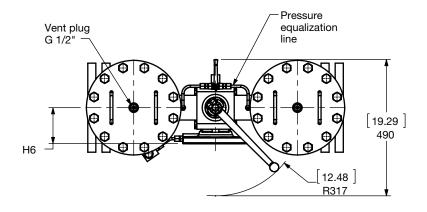


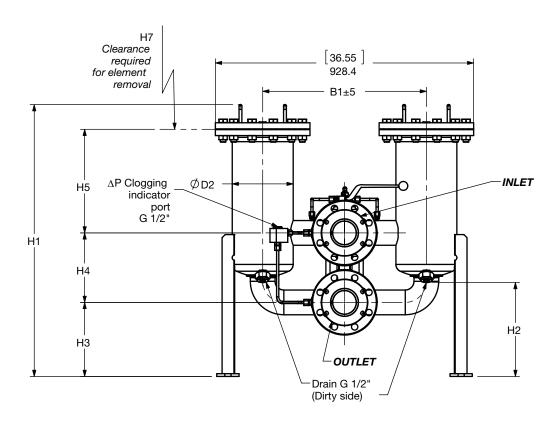
Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

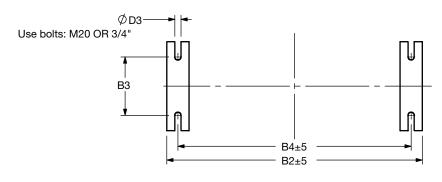
Underwriters Approval (VM, VD types C, D, J, and J4 only)—
cRUus = Electrical Indicator with underwriter's recognition
(For additional details and options, see Clogging Indicators section.)

SO376 = (same as above)

Dimensions RFLD 1300 / 1320







Foot Pattern

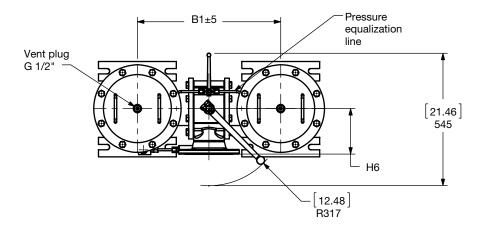
Size	1300	1320
Weight (lbs.)	330.7	460.8

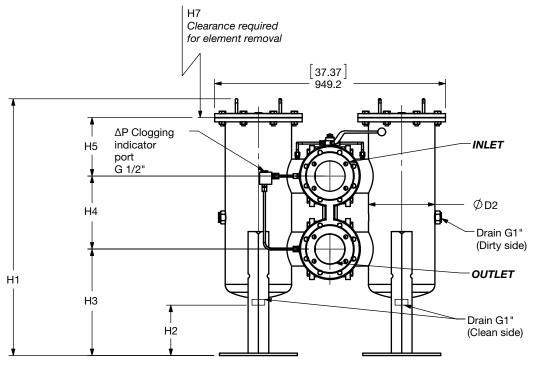
Size	Flange Port	B1	B2	В3	B4	D2	D3	H1	H2	Н3	H4	H5	Н6	Н7	Use Bolt
RFLD	2" ANSI	[19.92] 506	[33.31] 846	[9.84] 250	[30.16] 766	[8.63] 219.1	[0.87] 22	[38.18] 970 [55.51] 1410	[8.27] 210	[12.91] 328	[4.33] 110	[17.79] 452 [35.11] 892	[4.02] 102	[19.68] 500 [37.01] 940	5/8"-11 HEAVY HEX
1300	SAE DN 50	[19.92] 506	[33.31] 846	[9.84] 250	[30.16] 766	[8.63] 219.1	[0.87] 22	[38.18] 970 [55.51] 1410	[8.27] 210	[12.91] 328	[4.33] 110	[17.79] 452 [35.11] 892	[4.02] 102	[19.68] 500 [37.01] 940	M12
	SAE/DIN DN 80	[20.87] 530	[34.25] 870	[9.84] 250	[31.10] 790	[8.63] 219.1	[0.87] 22	[38.18] 970 [55.51] 1410	[14.57] 370	[10.24] 260	[9.06] 230	[15.75] 400 [33.07] 840	[4.72] 120	[19.68] 500 [37.01] 940	M16/ M16
RFLD 1300 /	3" ANSI	[20.87] 530	[34.25] 870	[9.84] 250	[31.10] 790	[8.63] 219.1	[0.87] 22	[38.18] 970 [55.51] 1410	[14.57] 370	[10.24] 260	[9.06] 230	[15.75] 400 [33.07] 840	[4.72] 120	[19.68] 500 [37.01] 940	5/8"-11 HEAVY HEX
1320	SAE/DIN DN 100	[23.15] 588	[36.46] 926	[9.84] 250	[33.31] 846	[8.63] 219.1	[0.87] 22	[38.18] 970 [55.51] 1410	[14.76] 375	[10.47] 266	[9.84] 250	[14.72] 374 [32.4] 814	[5.12] 130	[19.68] 500 [37.01] 940	M16 / M20
	4" ANSI	[23.15] 588	[36.46] 926	[9.84] 250	[33.31] 846	[8.63] 219.1	[0.87] 22	[38.18] 970 [55.51] 1410	[14.76] 375	[10.47] 266	[9.84] 250	[14.72] 374 [32.4] 814	[5.12] 130	[19.68] 500 [37.01] 940	5/8"-11 HEAVY HEX
RFLD 1320	DIN DN 125	[23.74] 603	[37.13] 943	[9.84] 250	[33.98] 863	[8.63] 219.1	[0.87] 22	[60.47] 1536	[7.48] 190	[15.16] 385	[11.81] 300	[30.12] 765	[7.4] 188	[19.68] 500 [37.01] 940	M16

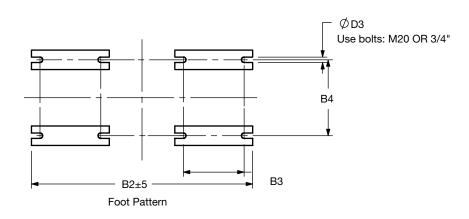
Notes



Dimensions RFLD 2500 / 2520







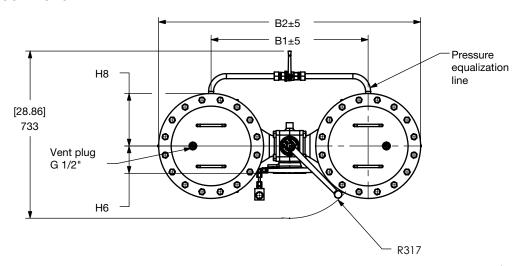
Size	2500	2520
Weight (lbs.)	632.8	721

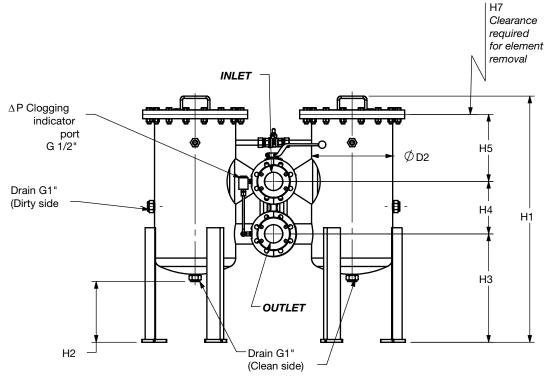
Size	Flange Port	В1	B2	В3	В4	D2	D3	H1	H2	Н3	H4	Н5	Н6	H7	Use Bolt
RFLD	3" ANSI	(22.52) 572	(36.69) 932	(9.84) 250	(12.28) 312	(10.75) 273	(0.87) 22	(38.98) 990 (54.33) 1380	(8.66) 220	(16.06) 408	(9.06) 230	(11.00) 280 (26.38) 670	(4.72) 120	(16.78) 420 (31.89) 810	5/8" - 11 UNC HEAVY HEX
2500	4" ANSI	(23.15) 588	(37.32) 948	(9.84) 250	(12.28) 312	(10.75) 273	(0.87) 22	(38.98) 990 (54.33) 1380	(8.66) 220	(16.06) 408	(9.84) 250	(11.00) 280 (26.38) 670	(5.12) 130	(16.78) 420 (31.89) 810	5/8" - 11 UNC HEAVY HEX
	SAE / DIN DN 80	(21.57) 548	(35.75) 908	(9.84) 250	(12.28) 312	(10.75) 273	(0.87) 22	(38.98) 990 (54.33) 1380	(8.66) 220	(15.08) 383	(4.33) 110	(11.00) 280 (26.38) 670	(4.02) 102	(16.78) 420 (31.89) 810	M16 / M16
	SAE / DIN DN 100	(21.57) 548	(35.75) 908	(9.84) 250	(12.28) 312	(10.75) 273	(0.87) 22	(38.98) 990 (54.33) 1380	(8.66) 220	(15.08) 383	(9.06) 230	(10.24) 260 (25.59) 650	(6.57) 167	(16.78) 420 (31.89) 810	M16 / M20
RFLD 2500 / 2520	DIN DN 125	(22.52) 572	(36.69) 932	(9.84) 250	(12.28) 312	(10.75) 273	(0.87) 22	(41.34) 1050 (56.69) 1440	(8.66) 220	(16.06) 408	(9.06) 230	(10.24) 260 (25.59) 650	(4.72) 120	(16.78) 420 (31.89) 810	M16
	DIN DN 150	(23.15) 588	(37.32) 948	(9.84) 250	(12.28) 312	(10.75) 273	(0.87) 22	(41.34) 1050 (56.69) 1440	(8.66) 220	(16.06) 408	(9.84) 250	(9.44) 240 (24.80) 630	(5.12) 130	(16.78) 420 (31.89) 810	M20
	6" ANSI	(23.19) 589	(37.36) 949	(9.84) 250	(12.28) 312	(10.75) 273	(0.87) 22	(41.34) 1050 (56.69) 1440	(8.66) 220	(17.24) 438	(11.81) 300	(9.44) 240 (24.80) 630	(7.40) 188	(16.78) 420 (31.89) 810	3/4" - 10 UNC HEAVY HEX

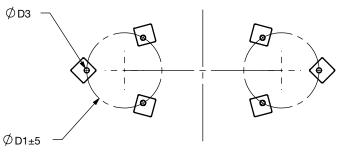
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Dimensions RFLD 4000 - 7820







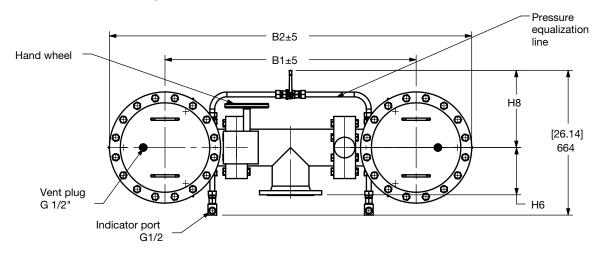
Foot Pattern

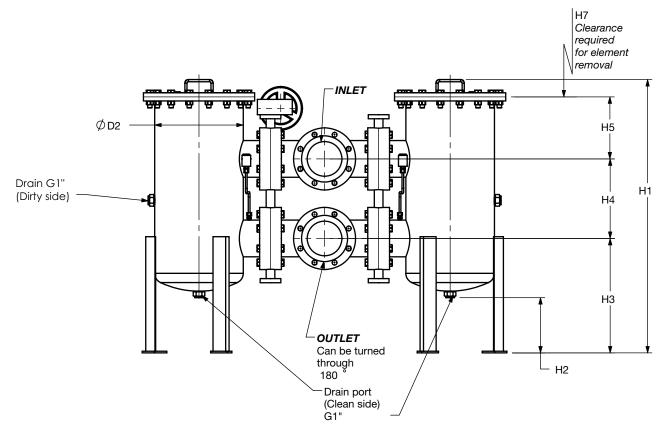
Size	4000	4020	5200	5220	6500	6520	7800	7820
Weight (lbs.)	866.5	1111.2	2107.7	2464.8	2471.4	2826.4	2489.1	2861.6

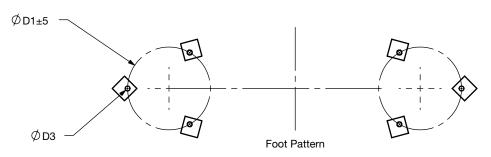


Size	Flange Port	B1	B2	D 1	D2	D3	H1	H2	НЗ	H4	Н5	Н6	Н7	Н8	Use Bolts
	4" ANSI 150 LB	[07.70]	[45 02]	[40,00]	[14,00]	[0.07]	[42.52] 1080	[40 04]	[40.70]	[0.04]	[11.61] 295	[5 10]	[16.54] 420	[0.06]	5/8"-11 UNC Heavy Hex
	SAE / DIN DN 100	[27.72] 704	[45.83] 1164	[12.99] 330	[14.02] 356	[0.87] 22	[57.87] 1470	[10.24] 260	[18.70] 475	[9.84] 250	[26.97] 685	[5.12] 130	[31.89] 810	[9.06] 230	M16 - 4 Bolt Flange / M20 - Din Flange
RFLD 4000 /	DIN DN 125	[28.46] 723	[46.57] 1183	[12.99] 330	[14.02] 356	[0.87] 22	[46.06] 1170 [61.42] 1560	[10.24] 260	[20.67] 525	[11.81] 300	[10.43] 265 [25.79] 655	[7.40] 188	[16.54] 420 [31.89] 810	[9.06] 230	M16
4020	DIN DN 150 6" ANSI	[30.51] 775	[48.82] 1240	[12.99] 330	[14.02] 356	[0.87] 22	[46.06] 1170 [61.42]	[10.24] 260	[20.67] 525	[11.81] 300	[10.43] 265 [25.79]	[7.48] 190	[16.54] 420 [31.89]	[9.06] 230	M20 3/4"-10 UNC
	150 LB DIN DN	773	1240	000	000		1560	200	323	000	655	150	810	200	Heavy HEX
	200 8" ANSI 150 LB	[34.80] 884	[53.11] 1349	[12.99] 330	[14.02] 356	[0.87] 22	1170 [61.42] 1560	[10.24] 260	[20.67] 525	[19.69] 500	[2.56] 65 [13.98] 355	[10.63] 270	[16.54] 420 [31.89] 810	[9.06] 230	M20 3/4"-10 UNC Heavy HEX
	4" ANSI 150 LB	[29.29]	[49.61]	[14.96]	[15.98]	[0.87]	[45.04] 1144	[9.84]	[18.31]	[9.84]	[13.82] 351	[5.12]	[19.69] 500	[10.04]	5/8"-11UNC HEAVY HEX
	SAE / DIN DN 100	744	1260	380	406	22	[62.36] 1584	250	465	250	[31.14] 791	130	[37.01] 940	255	M16 - 4 Bolt Flange / M20 - DIN Flange
RFLD 5200 /	DIN DN 125	[30.04] 763	[50.19] 1275	[14.96] 380	[15.98] 406	[0.87] 22	[49.45] 1256 [66.77] 1696	[9.84] 250	[20.67] 525	[11.81] 300	[13.82] 351 [31.14] 791	[7.40] 188	[19.69] 500 [37.01] 940	[10.04] 255	M16
5220	DIN DN 150	[32.09]	[52.36]			[0.87]	[49.45] 1256	[9.84]	[20.67]		[13.82] 351	[7.48]	[19.69] 500	[10.04]	M20
	6" ANSI 150 LB	815	1330	380	406	22	[66.77] 1696	250	525	300	[31.14] 791	190	[37.01] 940	255	3/4"-10 UNC Heavy HEX
	DIN DN 200	[36.38]	[56.61]			[0.87]	[55.63] 1413	[9.84]	[20.67]		[5.94] 151	[10.63]	[19.69] 500	[10.04]	M20
	8" ANSI 150 LB	924	1438	380	406	22	[72.95] 1853	250	525	500	[23.27] 591	270	[37.01] 940	255	3/4"-10 UNC Heavy HEX
	4" ANSI 150 LB SAE / DIN	[40.31] 1024	[64.72] 1644	[18.89] 480	[20.00] 508	[0.87] 22	[49.61] 1260 [66.93]	[10.24] 260	[21.26] 540	[9.84] 250	[15.35] 390 [32.68]	[5.12] 130	[19.69] 500 [37.01]	[12.20] 310	5/8"-11 UNC Heavy HEX M16 - 4 Bolt
	DN 100						1700				830		940		Flange / M20 - DIN Flange
RFLD 6500 /	DIN DN 125	[33.98] 863	[58.39] 1483	[18.89] 480	[20.00] 508	[0.87] 22	[49.61] 1260 [66.93] 1700	[10.24] 260	[21.26] 540	[11.81] 300	[13.39] 340 [30.71] 780	[7.40] 188	[19.69] 500 [37.01] 940	[12.20] 310	M16
6520	DIN DN 150	[36.02]	[60.43]	[18.89]	[20.00]	[0.87]	[49.61] 1260	[10.24]	[21.26]		[13.39] 340	[7.48]	[19.69] 500	[12.20]	M20
	6" ANSI 150 LB	915	1535	480	508	22	[66.93] 1700	260	540	300	[30.71] 780	190	[37.01] 940	310	3/4"-10 UNC Heavy HEX
	DIN DN 200 8" ANSI	[40.31] 1024	[64.72] 1644	[18.89] 480	[20.00] 508	[0.87] 22	[55.63] 1413 [72.95]	[10.43] 265	[23.62] 600	[19.69] 500	[9.06] 230 [26.38]	[10.63] 270	[19.69] 500 [37.01]	[12.20] 310	M20 3/4"-10 UNC
	150 LB 4" ANSI						1853				670		940		Heavy HEX 3/4"-10 UNC
	150 LB SAE / DIN	[40.31] 1024	[64.72] 1644	[18.89] 480	[20.00] 508	[0.87] 22	[49.61] 1260 [66.93]	[10.24] 260	[21.26] 540	[9.84] 250	[15.35] 390 [32.68]	[5.12] 130	[19.69] 500 [37.01]	[12.20] 310	Heavy HEX M16 - 4 Bolt
	DN 100	1024	1044	400	000		1700	200	040	200	830	100	940	010	Flange / M20 - DIN Flange
RFLD 7800 /	DIN DN 125	[33.98] 863	[58.39] 1483	[18.89] 480	[20.00] 508	[0.87] 22	[49.61] 1260 [66.93] 1700	[10.24] 260	[21.26] 540	[11.81] 300	[13.39] 340 [30.71] 780	[7.40] 188	[19.69] 500 [37.01] 940	[12.20] 310	M16
7820	DIN DN 150	[36.02]	[60.43]	[18.89]		[0.87]	[49.61] 1260	[10.24]	[21.26]	[11.81]	[13.39] 340	[7.48]	[19.69] 500	[12.20]	M20
	6" ANSI 150 LB	915	1535	480	508	22	[66.93] 1700	260	540	300	[30.71] 780	190	[37.01] 940	310	5/8"-11 UNC Heavy HEX
	DIN DN 200 8" ANSI 150 LB	[40.31] 1024	[64.72] 1644	[18.89] 480	[19.69] 500	[0.87] 22	[55.63] 1413 [72.95] 1853	[10.43] 265	[23.62] 600	[19.69] 500	[13.39] 340 [30.71] 780	[10.63] 270	[19.69] 500 [37.01] 940	[12.20] 310	M20 3/4"-10 UNC Heavy HEX

Dimensions RFLD 250X - 1502X Butterfly Version



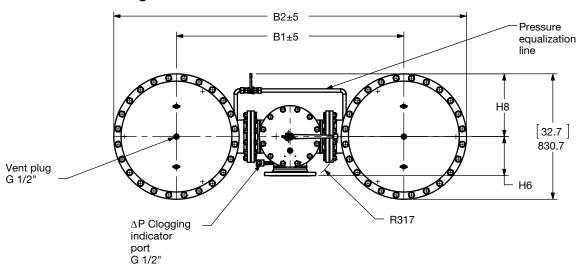


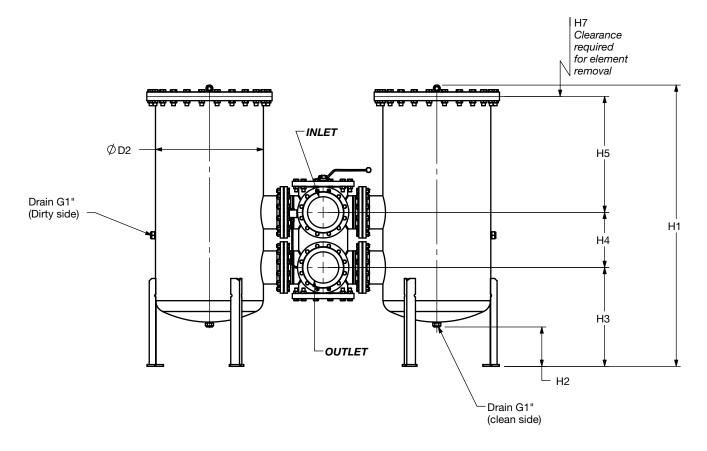


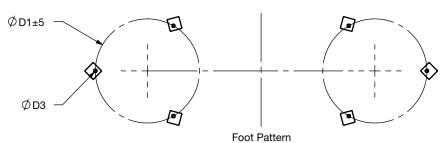
Size	2500	2520	4000	4020	5200	5220	6500	6520	7800	7820	15000	15020
Weight (lbs.)	632.8	721	866.5	1111.2	2107.7	2464.8	2471.4	2826.4	2489.1	2861.6	3278.3	3578.2

Size	Flange Port	B1	B2	D1	D2	D3	H1	H2	НЗ	H4	H5	Н6	Н7	Н8
RFLD 2500 / 2520	DN 150	[40.08] 1018	[54.25] 1378	[12.99] 330	[10.75] 273	[0.87] 22	[43.62] 1108 [58.98] 1498	[8.66] 220	[18.11] 460	[14.37] 365	[8.31] 211 [23.66] 601	[8.66] 220	[16.54] 420 [31.89] 810	[12.99] 330
RFLD	DN 150	[45.35] 1152	[63.62] 1616	[12.99] 330	[14.02] 356	[0.87] 22	[46.06] 1170 [61.42] 1560	[10.24] 260	[20.67] 525	[14.37] 365	[7.87] 200 [23.23] 590	[8.66] 220	[16.54] 420 [31.89] 810	[13.78] 350
4000 / 4020	DN 200	[48.82] 1240	[67.87] 1724	[12.99] 330	[14.02] 356	[0.87] 22	[47.44] 1205 [62.79] 1595	[9.84] 250	[20.67] 525	[14.37] 365	[9.25] 235 [24.61] 625	[10.24] 260	[19.69] 500 [37.01] 940	[14.57] 370
	DN 150	[45.35] 1152	[65.59] 1666	[14.96] 380	[15.98] 406	[0.87] 22	[6.14] 156 [66.77] 1696	[9.84] 250	[20.67] 525	[14.37] 365	[11.26] 286 [28.58] 726	[8.66] 220	[19.69] 500 [37.01] 940	[13.78] 350
RFLD 5200 / 5220	DN 200	[50.39] 1280	[70.63] 1794	[14.96] 380	[15.98] 406	[0.87] 22	[49.45] 1256 [66.77] 1696	[9.84] 250	[20.67] 525	[14.37] 365	[11.26] 286 [28.58] 726	[10.24] 260	[19.69] 500 [37.01] 940	[14.57] 370
	DN 250	[58.89] 1496	[79.13] 2010	[14.96] 380	[15.98] 406	[0.87] 22	[52.20] 1326 [69.53] 1766	[10.24] 260	[22.05] 560	[17.72] 450	[9.29] 236 [26.61] 676	[13.78] 350	[19.69] 500 [37.01] 940	[15.75] 400
	DN 150	[50.87] 1292	[75.43] 1916	[18.89] 480	[20.00] 508	[0.87] 22	[49.61] 1260 [66.93] 1700	[10.24] 260	[21.26] 540	[14.37] 365	[10.83] 275 [28.15] 715	[8.66] 220	[19.69] 500 [37.01] 940	[13.78] 350
RFLD 6500 / 6520	DN 200	[54.33] 1380	[78.89] 2004	[18.89] 480	[20.00] 508	[0.87] 22	[54.33] 1380 [71.65] 1820	[10.24] 260	[23.62] 600	[14.37] 365	[13.19] 335 [30.51] 775	[10.24] 260	[19.69] 500 [37.01] 940	[14.57] 370
	DN 250	[62.44] 1586	[87.01] 2210	[18.89] 480	[20.00] 508	[0.87] 22	[54.33] 1380 [71.65] 1820	[10.24] 260	[23.62] 600	[17.72] 450	[9.84] 250 [27.17] 690	[13.78] 350	[19.69] 500 [37.01] 940	[15.75] 400
	DN 150	[50.87] 1292	[75.43] 1916	[18.89] 480	[20.00] 508	[0.87] 22	[49.61] 1260 [66.93] 1700	[10.24] 260	[21.26] 540	[14.37] 365	[10.83] 275 [28.15] 715	[8.66] 220	[19.69] 500 [37.01] 940	[13.78] 350
RFLD 7800 / 7820	DN 200	[54.33] 1380	[78.89] 2004	[18.89] 480	[20.00] 508	[0.87] 22	[54.33] 1380 [71.65] 1820	[10.24] 260	[23.62] 600	[14.37] 365	[13.19] 335 [30.51] 775	[10.24] 260	[19.69] 500 [37.01] 940	[14.57] 370
	DN 250	[62.44] 1586	[87.01] 2210	[18.89] 480	[20.00] 508	[0.87] 22	[54.33] 1380 [71.65] 1820	[10.24] 260	[23.62] 600	[17.72] 450	[9.84] 250 [27.17] 690	[13.78] 350	[19.69] 500 [37.01] 940	[15.75] 400
	DN 200	[63.78] 1620	[96.46] 2450	[27.17] 690	[27.99] 711	[0.87] 22	[56.10] 1425 [73.43] 1865	[10.24] 260	[25.79] 655	[14.37] 365	[12.99] 330 [30.31] 770	[10.24] 260	[19.69] 500 [37.01] 940	[14.57] 370
RFLD 15000 / 15020	DN 250	[71.50] 1816	[104.17] 2646	[27.17] 690	[27.99] 711	[0.87] 22	[56.10] 1425 [73.43] 1865	[10.24] 260	[25.79] 655	[17.72] 450	[9.84] 250 [27.17] 690	[13.78] 350	[19.69] 500 [37.01] 940	[15.75] 400
	DN 300	[77.01] 1956	[109.69] 2786	[27.17] 690	[27.99] 711	[0.87] 22	[59.06] 1500 [76.38] 1940	[10.24] 260	[26.38] 670	[20.28] 515	[9.25] 235 [26.57] 675	[15.75] 400	[19.69] 500 [37.01] 940	[16.93] 430

Dimensions RFLD 4000 - 15020 Segment Version



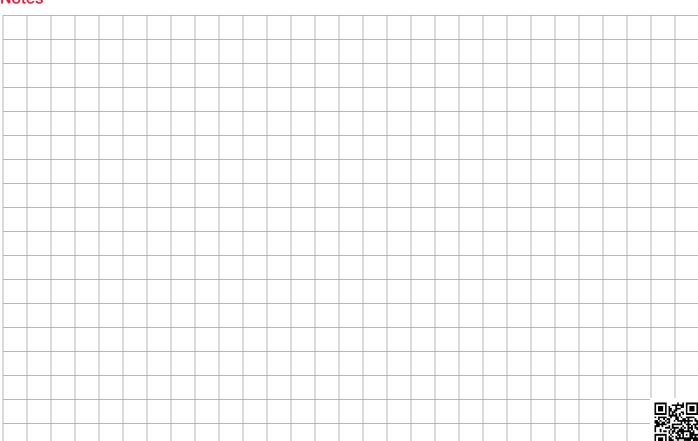




Size	4000	4020	5200	5220	6500	6520	7800	7820	15000	15020
Weight (lbs.)	866.5	1111.2	2107.7	2464.8	2471.4	2826.4	2489.1	2861.6	3278.3	3578.2

Size	Flange Port	B1	B2	D1	D2	D3	H1	H2	Н3	H4	H5	Н6	Н7	Н8	Use Bolts
RFLD 4000 / 4020	DN 200	[44.25] 1124	[62.59] 1590	[12.99] 330	[14.02] 356	[0.87] 22	[49.21] 1250 [62.79] 1595	[10.24] 260	[20.67] 525	[14.37] 365	[9.25] 235 [24.61] 625	[10.28] 261	[16.54] 420 [31.89] 810	[14.57] 370	M20
RFLD 5200 /	DN 200	[45.91] 1166	[66.14] 1680	[14.96] 380	[15.98] 406	[0.87] 22	[49.80] 1265 [67.13] 1705	[9.84] 250	[20.67] 525	[14.37] 365	[11.26] 286 [28.58] 726	[10.28] 261	[19.69] 500 [37.01] 940	[14.57] 370	M20
52007	DN 250	[51.65] 1312	[71.85] 1825	[14.96] 380	[15.98] 406	[0.87] 22	[52.13] 1324 [69.45] 1764	[9.84] 250	[22.05] 560	[17.72] 450	[9.29] 236 [26.61] 676	[12.68] 322	[19.69] 500 [37.01] 940	[15.75] 400	M24
RFLD 6500 /	DN 200	[49.84] 1266	[74.25] 1886	[18.89] 480	[20.00] 508	[0.87] 22	[54.33] 1380 [71.65] 1820	[10.24] 260	[23.62] 600	[14.37] 365	[13.19] 335 [30.51] 775	[10.28] 261	[19.69] 500 [37.01] 940	[14.57] 370	M20
6520	DN 250	[55.2] 1402	[79.61] 2022	[18.89] 480	[20.00] 508	[0.87] 22	[54.33] 1380 [71.65] 1820	[9.84] 250	[23.62] 600	[17.72] 450	[9.84] 250 [27.17] 690	[12.68] 322	[19.69] 500 [37.01] 940	[15.75] 400	M24
RFLD	DN 200	[49.84] 1266	[74.25] 1886	[18.89] 480	[20.00] 508	[0.87] 22	[54.33] 1380 [71.65] 1820	[10.24] 260	[23.62] 600	[14.37] 365	[13.19] 335 [30.51] 775	[10.28] 261	[19.69] 500 [37.01] 940	[14.57] 370	M20
7800 / 7820	DN 250	[55.2] 1402	[79.61] 2022	[18.89] 480	[20.00] 508	[0.87] 22	[54.33] 1380 [71.65] 1820	[10.24] 260	[23.62] 600	[17.72] 450	[9.84] 250 [27.17] 690	[12.68] 322	[19.69] 500 [37.01] 940	[15.75] 400	M24
RFLD	DN 200	[59.29] 1506	[91.97] 2336	[27.17] 690	[27.99] 711	[0.87] 22	[56.10] 1425 [73.43] 1865	[10.35] 263	[25.79] 655	[14.37] 365	[12.99] 330 [30.31] 770	[10.28] 261	[19.69] 500 [37.01] 940	[16.34] 415	M20
15000 / 15020	DN 250	[64.09] 1628	[96.77] 2458	[27.17] 690	[27.99] 711	[0.87] 22	[56.10] 1425 [73.43] 1865	[10.35] 263	[25.19] 640	[17.72] 450	[10.24] 260 [27.56] 700	[12.68] 322	[19.69] 500 [37.01] 940	[16.34] 415	M24

Notes



Sizing Information

Total pressure loss through the filter is as follows:

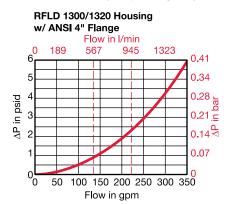
Assembly $\Delta P = \text{Housing } \Delta P + \text{Element } \Delta P$

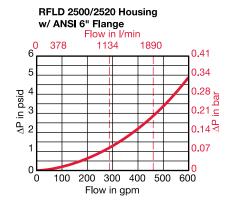
Housing Curve:

Pressure loss through housing is as follows:

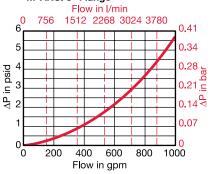
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

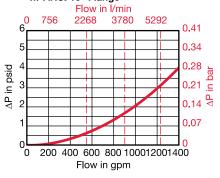




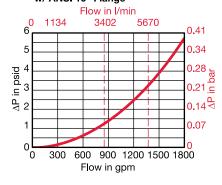
RFLD 4000/4020 Housing w/ ANSI 8" Flange



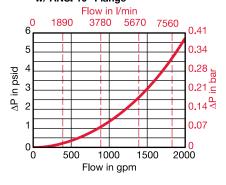
RFLD 5200/5220 Housing w/ ANSI 10" Flange



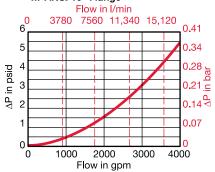
RFLD 6500/6520 Housing w/ ANSI 10" Flange



RFLD 7800/7820 Housing w/ ANSI 10" Flange



RFLD 15000/15020 Housing w/ ANSI 10" Flange



Required Element Per Housing

Housing Size	Element Size	Elements per Side
1300 / 1320	1300 / 2600	1/1
2500 / 2520	0850 / 1700	3/3
4000 / 4020	0850 / 1700	5/5
5200 / 5220	1300 / 2600	4 / 4
6500 / 6520	1300 / 2600	5/5
7800 / 7820	1300 / 2600	6/6
15000 / 15020	1300 / 2600	10 / 10

Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Optimicron		RON				
Size	1 µm	3 μm	5 μm	10 µm	15 µm	20 µm
0850 R XXX ON	0.152	0.072	0.055	0.032	0.024	0.02
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012
1700 R XXX ON	0.074	0.035	0.029	0.015	0.014	0.01
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006

Stat-X	RXSX				
Size	3 μm	5 μm	10 μm	20 μm	
0850 R XXX XSX	0.072	0.055	0.032	0.02	
1300 R XXX XSX	0.04	0.032	0.019	0.012	
1700 R XXX XSX	0.035	0.029	0.015	0.01	
2600 R XXX XSX	0.02	0.016	0.01	0.006	

ECOmicron	RECON2					
Size	3 µm	5 μm	10 μm	20 μm		
0850 R XXX ECON2	0.082	0.055	0.038	0.022		
1300 R XXX ECON2	0.044	0.033	0.022	0.016		
1700 R XXX ECON2	0.038	0.027	0.016	0.011		
2600 R XXX ECON2	0.022	0.016	0.011	0.005		

Betamicron/Aquamicron	RBN4AM			
Size	3 μm	10 µm		
0850 R XXX BN4AM	0.154	0.049		
1300 R XXX BN4AM	0.088	0.033		
1700 R XXX BN4AM	0.071	0.027		
2600 R XXX BN4AM	0.055	0.016		

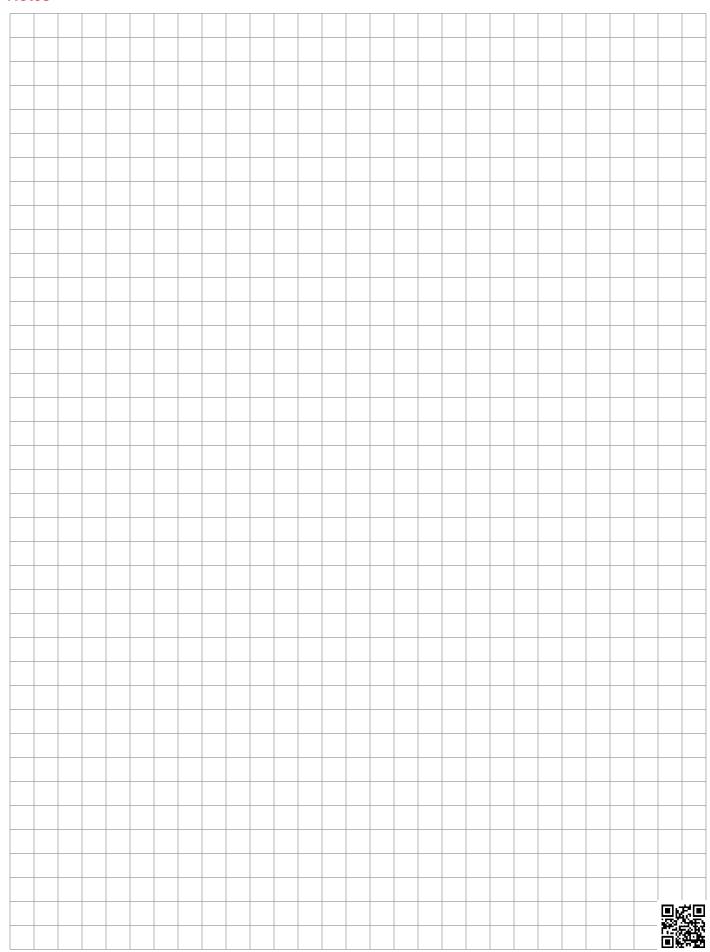
Aquamicron	RAM
Size	40 μm
0850 R 040 AM	0.040
1300 R 040 AM	0.026
1700 R 040 AM	0.020
2600 R 040 AM	0.013

Wire Mesh	RW/HC
Size	25, 50, 100, 200 μm
0850 R XXX W/HC	0.003
1300 R XXX W/HC	0.002
1700 R XXX W/HC	0.001
2600 R XXX W/HC	0.001

Polyester	RP/HC		
Size	10 µm	20 μm	
0850 R XXX P/HC	0.007	0.003	
1300 R XXX P/HC	0.004	0.002	
1700 R XXX P/HC	0.003	0.002	
2600 R XXX P/HC	0.002	0.001	

All Element K Factors in psi / gpm.

Notes





Medium Pressure Filters

601–2999 psi
Low-cost aluminum construction inline filters, provide flexibility for use in the mobile and industrial applications. Durable and light weight, these filters are ideal for light industrial and demanding agriculture and construction applications. Duplex filters allow for uninterrupted operation during element change-out.

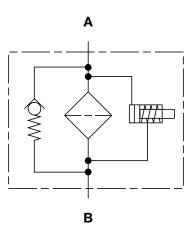
HF4RL Series

Inline Filters 750 psi • up to 90 gpm





Hydraulic Symbol



Features

- Inlet/outlet port options include SAE straight thread O-ring boss, and 1 1/2" SAE 4-bolt flange to allow easy installation without costly adapters.
- Choice of Nitrile rubber or Fluorocarbon elastomer seal material provides compatibility with petroleum oils, and most synthetic fluids, water-glycols, oil/water emulsions, and water based fluids.
- Screw-in cap mounted on top of the filter bowl allows quick and easy element changeout.
- To allow fluid to be drained from the filter before changing the element, a vent plug and a drain plug are provided. Element changes can be made with no mess and minimal loss of fluid.
- Clogging indicators, with and without thermal lockout, are magnetically actuated and have no external dynamic seal. High reliability is achieved and magnetic actuation eliminates leakage.
- A cartridge type bypass valve (optional) is mounted in-line in the filter head between the inlet and outlet port to provide positive sealing during normal operation and fast response during cold starts and flow surges.

Industrial

Pulp & Paper

Applications













Shipbuilding

Technical Specifications

Mounting Method	4 mounting holes		
Port Connection	SAE-24, 1 1/2" BSPP,		
	SAE-DN 38 Flange Code 61		
Flow Direction			
Inlet / Outlet	Side		
Construction Materials			
Head, Cap	Cast Aluminum		
Housing	Steel		
Flow Capacity			
09	50 gpm (190 lpm)		
18	70 gpm (265 lpm)		
27	90 gpm (341 lpm)		
Housing Pressure Rating			

Max. Allowable Working

Pressure 750 psi (52 bar)

750 psi (52 bar) @ 750,000 cycles Fatique Pressure

Burst Pressure 3200 psi (221 bar)

Element Collapse Pressure Rating

ВН 3045 psid (210 bar) BN. W 145 psid (10 bar)

Fluid Temperature Range 14°F to 212°F (-10°C to 100°C)

Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar) -10\% (optional)}$

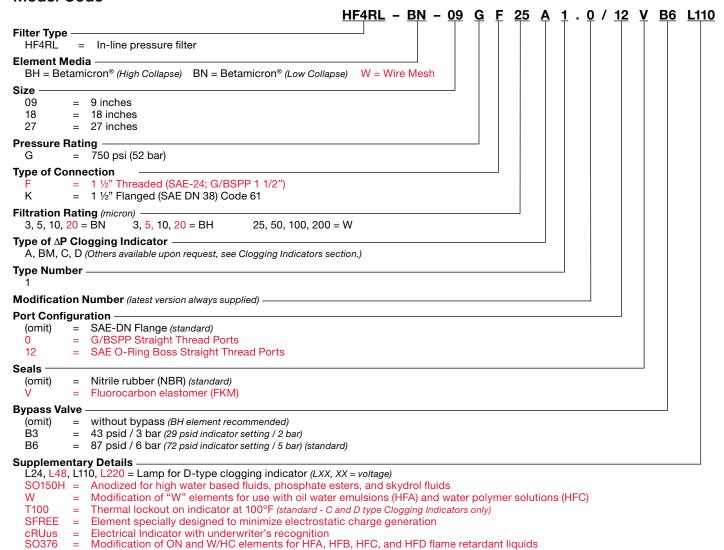
 $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (standard)}$

Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (optional)}$

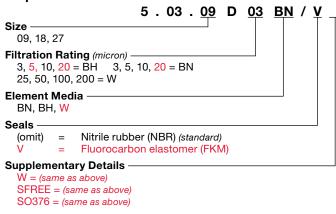
 $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (standard)}$

Model Code

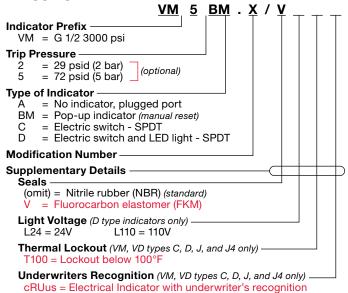


Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Replacement Element Model Code



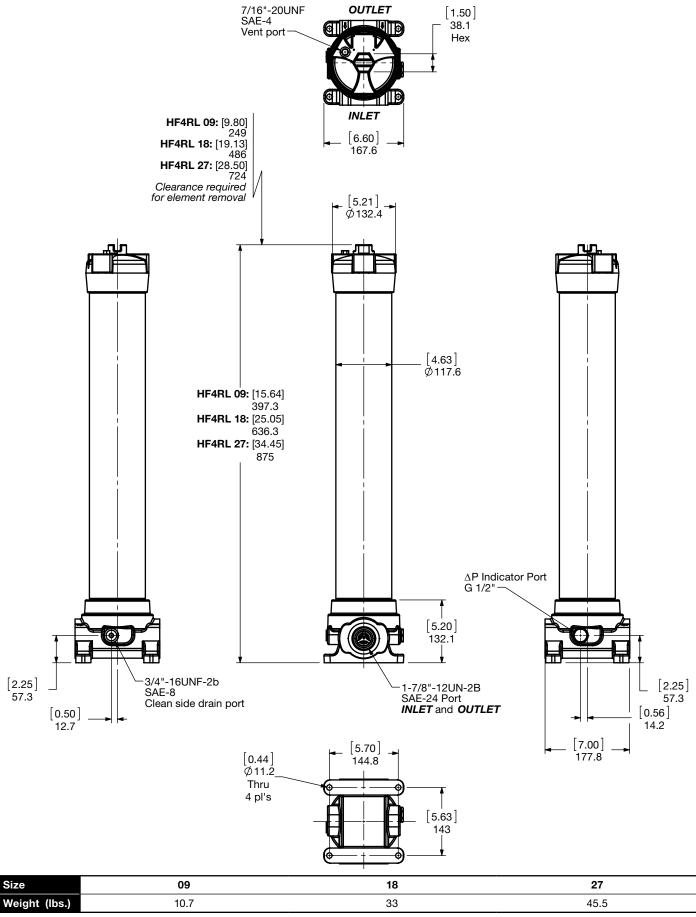
Clogging Indicator Model Code



(For additional details and options, see Clogging Indicators section.)

E3

Dimensions HF4RL



Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

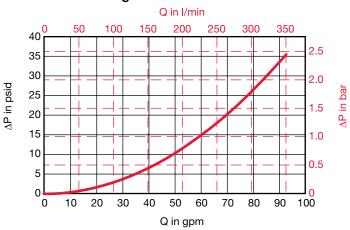
Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)





Element K Factors

 $\Delta \text{P Elements} = \text{Elements (K) Flow Factor x Flow Rate (gpm) x} \\ \frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \\ \frac{\text{Actual Specific Gravity}}{0.86}$

Autospec HF4 Depth	5.03.XXDXXBN Low Collapse					
Size	3 μm	5 μm	10 μm	20 μm		
5.03.09DXXBN	0.168	0.141	0.079	0.044		
5.03.18DXXBN	0.080	0.067	0.038	0.021		
5.03.27DXXBN	0.052	0.043	0.024	0.014		

Autospec HF4 Depth	5.03.XXDXXBH High Collapse								
Size	3 µm	5 μm	10 μm	20 μm					
5.03.09DXXBH	0.207	0.146	0.089	0.047					
5.03.18DXXBH	0.097	0.068	0.041	0.022					
5.03.27DXXBH	0.063	0.044	0.027	0.014					

Autospec HF4 Wire Mesh	5.03.XXDXXW
Size	25, 50, 100, 200 μm
5.03.09DXXW	0.007
5.03.18DXXW	0.004
5.03.27DXXW	0.002

All Element K Factors in psi / gpm.

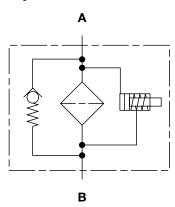


LPF Series

Inline Filters 725 psi • up to 74 gpm



Hydraulic Symbol



Features

- LPF filters are manufactured with cast aluminum head and aluminum cold formed bowls.
- Aluminum alloy is water tolerant anodization is not required for water based fluids (HWBF).
- LPF filters are a desirable substitute for spin-on filters when dynamic fluid conditions call for the superior durability and leakproof quality of a well-constructed cartridge filter.
- Quick-response, bypass valves, located in the filter head, protect against high differential pressures caused by cold start-ups, flow surges and pressure spikes. Filters can also be supplied without bypasses.
- The simple inline design minimizes pressure drop and provides the significant benefit of compactness. The use of lightweight materials, makes these filters ideal for mobile equipment applications.

Applications











Automotive

Steel / Heavy Industry

Technical Specifications

Mounting Method	35 - 55: 3 mounting holes				
	160 - 280: 2 r	nounting holes			
Port Connection					
35 - 55	SAE-8, 1/2" E				
160 - 280	SAE-20, 1 1/4	1" BSPP			
Flow Direction	Inlet: Side	Outlet: Side			
Construction Materials					
Head	Cast Aluminu	ım			
Bowl	Aluminum Ex	trusion			
Flow Capacity					
35	9 gpm (35 lpr	n)			
55	15 gpm (55 lp	om)			
160	42 gpm (160 lpm)				
240	63 gpm (240 lpm)				
280	74 gpm (280 lpm)				
Housing Pressure Rating	g				
Max. Allowable Working	35 - 55	580 psi (40 bar)			
Pressure	160 - 280	725 psi (50 bar)*			
	*Note: 580 psi	(40 bar) when using BF indicator			
Fatigue Pressure	35 - 55	580 psi (40 bar) (10 ⁷ cycles)			
	160 - 280	725 psi (50 bar) (10 ⁶ cycles)			
	35 - 55	Contact HYDAC			
Burst Pressure	160 - 280	> 3625 psi (200 bar)			
Element Collapse Press	ure Rating				
BH4HC, V		3045 psid (210 bar)			
ON, W/HC		290 psid (20 bar)			
Fluid Temp. Range	-22°F to 212°	F (-30°C to 100°C)			
Consult HYDAC for applicati	ons operating b	elow -22°F (-30°C)			

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/ water emulsion, and high water based fluids when the appropriate seals are selected

∆P Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar) -10\% (optional)}$

 $\Delta P = 36.25 \text{ psid } (2.5 \text{ bar}) \text{ (BF indicator)}$

 $\Delta P = 72 \text{ psid (5 bar)} - 10\% \text{ (standard)}$

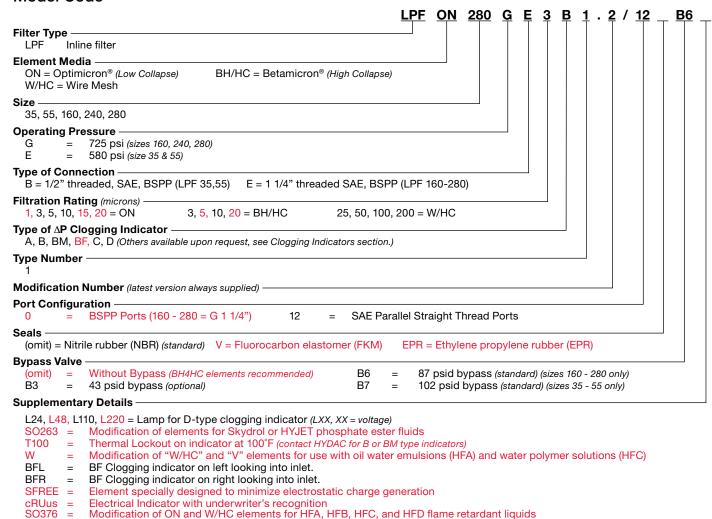
Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (optional)}$

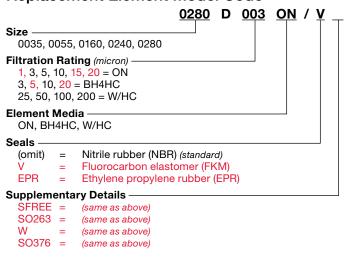
 $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (standard sizes 160 - 660)}$

 $\Delta P = 100 \text{ psid } (7 \text{ bar}) + 10\% \text{ (standard sizes 35 / 55)}$

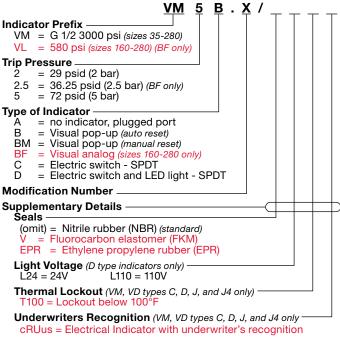
Model Code



Replacement Element Model Code

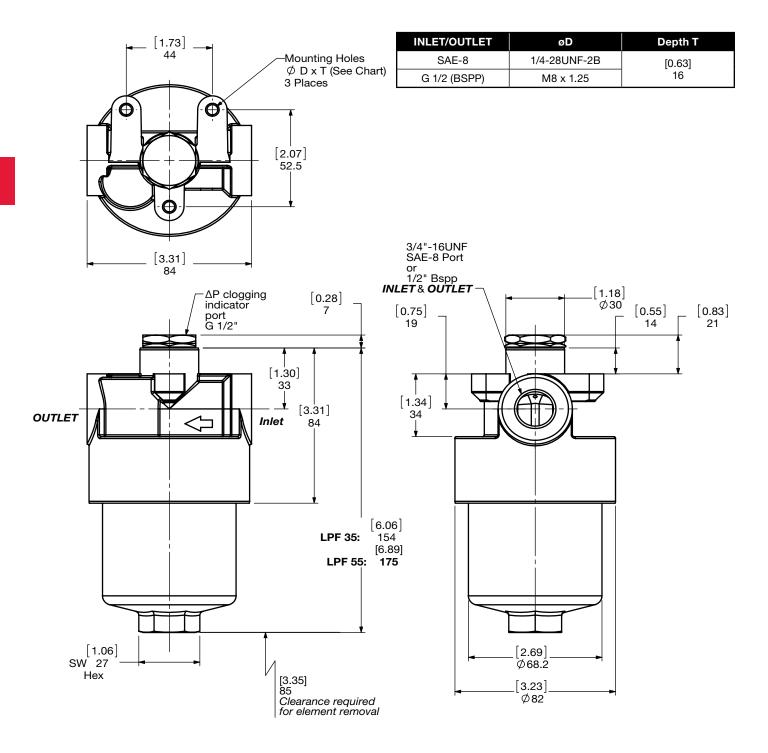


Clogging Indicator Model Codes



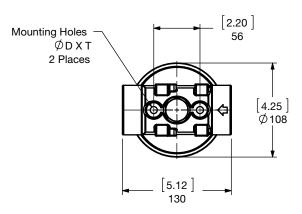
(For additional details and options, see Clogging Indicators section.)

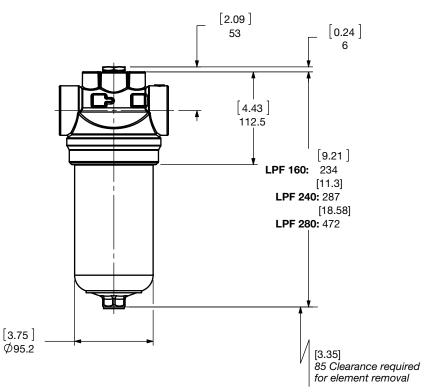


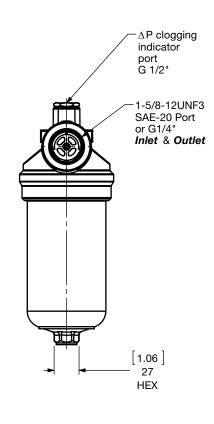


Size	35	55
Weight (lbs.)	2.3	2.6

INLET/OUTLET	øD	Depth T		
SAE-20	3/8-24 UNF-2B	[0.551]		
G 1-1/4 (BSPP)	M10 x 1.50	14		







Size	160	240	280
Weight (lbs.)	4.5	5.1	7.3

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

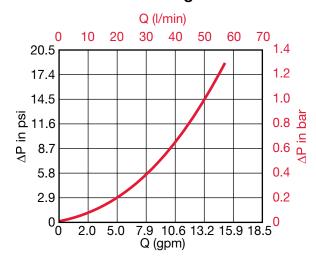
Housing Curve:

Pressure loss through housing is as follows:

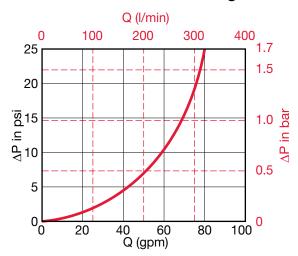
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{\Delta P}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

LPF 35 / 55 Housing



LPF 160 / 240 / 280 Housing



Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

"ON" Pressure Elements	DON (Optimicron Pressure Elements)								
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 µm			
0035 D XXX ON	2.755	1.169	0.938	0.752	0.549	0.408			
0055 D XXX ON	1.427	0.675	0.543	0.434	0.284	0.211			
0160 D XXX ON	1.015	0.604	0.423	0.225	0.204	0.175			
0240 D XXX ON	0.631	0.379	0.293	0.175	0.134	0.115			
0280 D XXX ON	0.304	0.185	0.15	0.082	0.075	0.064			

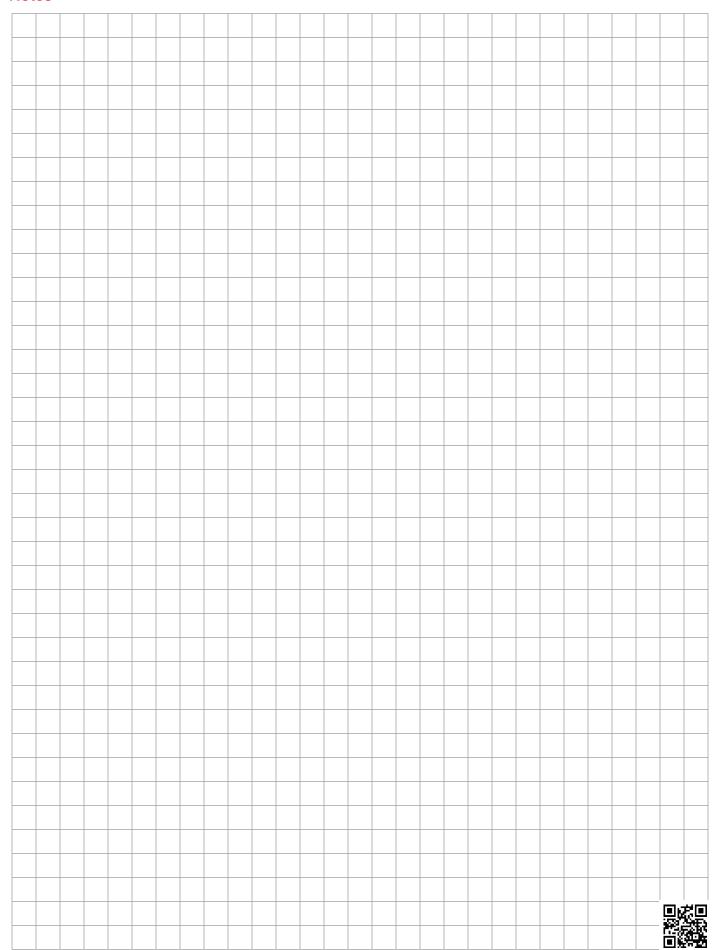
"D" Pressure Elements	DBH4HC (Betamicron High Collapse)							
Size	3 µm	5 μm	10 µm	20 μm				
0035 D XXX BH4HC	2.623	1.542	0.922	0.576				
0055 D XXX BH4HC	1.328	0.779	0.466	0.291				
0160 D XXX BH4HC	0.922	0.571	0.324	0.241				
0240 D XXX BH4HC	0.582	0.373	0.214	0.159				
0280 D XXX BH4HC	0.313	0.187	0.099	0.088				

Wire Mesh	DW/HC Elements (Low Collapse)
Size	DW/HC Elements 25, 50, 100, 200 μm
0160 D XXX W/HC	0.016
0240 D XXX W/HC	0.010
0280 D XXX W/HC	0.005

All Element K Factors in psi / gpm.



Notes



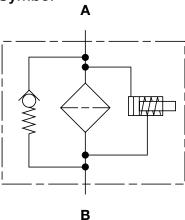
LF Series

Inline Filters 1500 psi • up to 180 gpm





Hydraulic Symbol



Features

- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- Aluminum alloy is water tolerant anodization is not required for water based fluids (HWBF).
- Inlet & outlet port options include NPT, BSPP and SAE straight thread O-ring boss to allow easy installation with maximum flexibility.
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, ethylene propylene rubber) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based fluids.
- Screw-in bowl mounted below the filter head requires minimal clearance to remove the element for replacement, and contaminated fluid cannot be washed downstream when element is serviced.
- HYDAC differential Pressure Indicators have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- A poppet-type bypass valve (optional) is separate from the main flow path, in the filter head, to provide positive sealing during normal operation and fast opening during cold starts and flow
- For special finishes and coatings consult HYDAC for minimum quantities, availability and pricing.

Applications







Automotive



Construction



Railways

Industry

Technical Specifica	tions
Mounting Method	4 mounting holes
Port Connection	
30	SAE-8, 1/2" NPT, 1/2" BSPP
60/110	SAE-12, 3/4" NPT, 3/4" BSPP
160/240/280	SAE-20, 1 1/4" NPT, 1 1/4" BSPP
330/660	SAE-24, 1 1/2" NPT, 1 1/2" BSPP
Flow Direction	Inlet: Side Outlet: Side
Construction Materials	
Head	Cast Aluminum
Bowl	Aluminum Extrusion (sizes 30 - 660)
	Steel (size 280)
Flow Capacity	
30	8 gpm (30 lpm)
60	16 gpm (60 lpm)
110	29 gpm (110 lpm)
160	42 gpm (160 lpm)
240	63 gpm (240 lpm)
280	74 gpm (280 lpm)
330	84 gpm (330 lpm)
660	174 gpm (660 lpm)
Housing Pressure Rating	
Max. Operating Pressure	1500 psi (100 bar)
Fatigue Pressure	1500 psi (100 bar)
Burst Pressure	size 30 5510 psi (380bar)
	sizes 60 - 660 > 6090 psi (420 bar)
Element Collapse Pressure	Rating
BH4HC, V	3045 psid (210 bar)

ON, W/HC 290 psid (20 bar)

-22°F to 212°F (-30°C to 100°C) Fluid Temperature Range

Consult HYDAC for applications operating below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/ water emulsion, and high water based fluids when the appropriate seals are selected

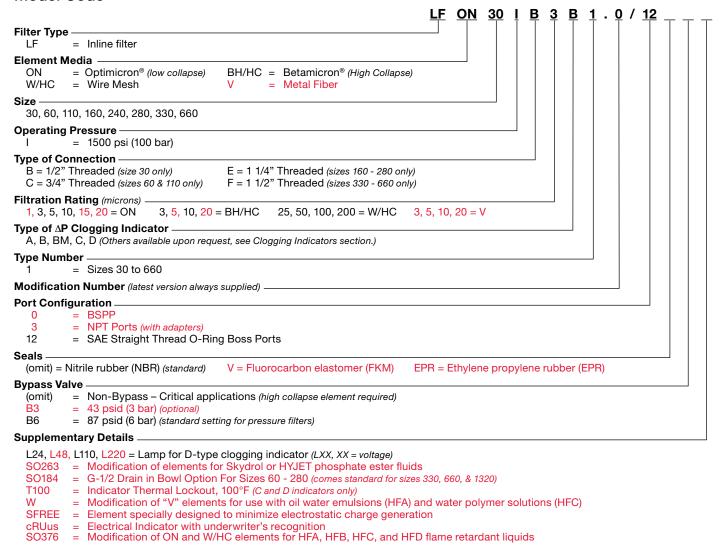
∆P Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar) -10\% (optional)}$ $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (standard)}$

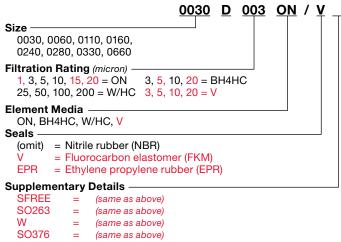
Bypass Valve Cracking Pressure

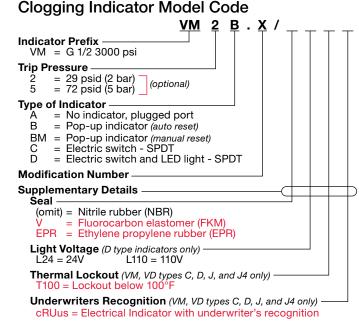
 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (optional)}$ $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (standard)}$

Model Code



Replacement Element Model Code



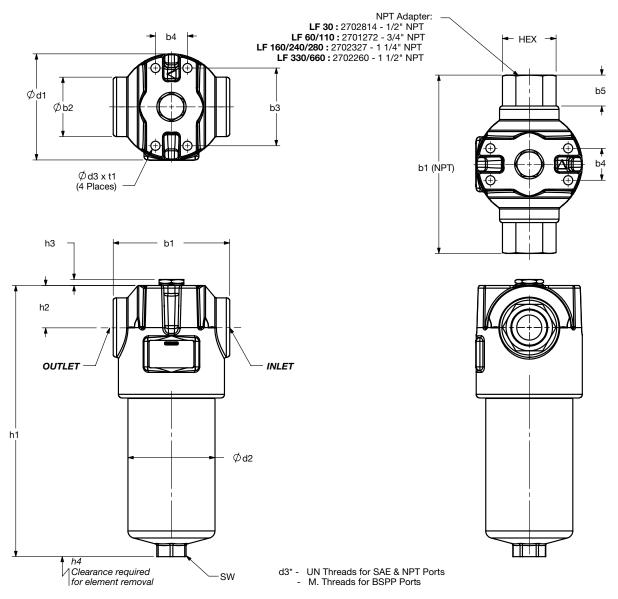


(For additional details and options, see Clogging Indicators section.)



E13

Dimensions LF 30 - 660



Size	b1	b1 (NPT)	b2	b3	b4	b5	d1	d2	d3*	h1	h2	h3	h4	sw	t1	HEX
30	(2.72) 69	(4.84) 123	(1.42) 36	(1.77) 45	(1.18) 30	(1.062) 27	(2.64) 67	(2.05) 52	10-32UNF-2B M5 X 0.8	(6.16) 156	(1.22) 31	(0.28) 7	(2.95) 75	(0.94) 24	(0.24) 6	(1.125) 28.6
60	(3.54) 90	(5.80) 147.2	(1.89) 48	(2.20) 56	(1.26) 32	(1.126) 28.6	(3.31) 84	(2.68) 68	1/4-28UNF-2B M6 X 1.0	(6.95) 176.5	(1.54) 39	(0.24) 6	(2.95) 75	(1.06) 27	(0.35) 9	(1.38) 34.93
110	(3.54) 90	(5.80) 147.2	(1.89) 48	(2.20) 56	(1.26) 32	(1.126) 28.6	(3.31) 84	(2.68) 68	1/4-28UNF-2B M6 X 1.0	(9.68) 246	(1.54) 39	(0.24) 6	(2.95) 75	(1.06) 27	(0.35) 9	(1.38) 34.93
160	(4.92) 125	(7.67) 194.9	(2.56) 65	(3.35) 85	(1.38) 35	(1.376) 34.95	(4.57) 116	(3.74) 95	3/8-24UNF-2B M10 X 1.5	(9.29) 236	(1.81) 46	(0.24) 6	(3.74) 95	(1.26) 32	(0.55) 14	(2.00) 50.8
240	(4.92) 125	(7.67) 194.9	(2.56) 65	(3.35) 85	(1.38) 35	(1.376) 34.95	(4.57) 116	(3.74) 95	3/8-24UNF-2B M10 X 1.5	(11.67) 296.5	(1.81) 46	(0.24) 6	(3.74) 95	(1.26) 32	(0.55) 14	(2.00) 50.8
280	(4.92) 125	(7.67) 194.9	(2.56) 65	(3.35) 85	(1.38) 35	(1.376) 34.95	(4.57) 116	(3.74) 95	3/8-24UNF-2B M10 X 1.5	(18.98) 482	(1.81) 46	(0.24) 6	(3.74) 95	(1.26) 32	(0.55) 14	(2.00) 50.8
330	(6.26) 159	(9.07) 230.4	(3.35) 85	(4.53) 115	(2.36) 60	(1.406) 35.71	(6.3) 160	(5.12) 130	1/2-20UNF-2B M12 X 1.75	(11.90) 302.5	(1.97) 50	(0.24) 6	(4.13) 105	(1.42) 36	(0.67) 17	(2.25) 57.15
660	(6.26) 159	(9.07) 230.4	(3.35) 85	(4.53) 115	(2.36) 60	(1.406) 35.71	(6.3) 160	(5.12) 130	1/2-20UNF-2B M12 X 1.75	(18.40) 467.5	(1.97) 50	(0.24) 6	(4.13) 105	(1.42) 36	(0.67) 17	(2.25) 57.15

Size	30	50	110	160	240	330	660
Weight (lbs.)	1.8	3.4	4	8.2	9.5	17.7	24.3

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

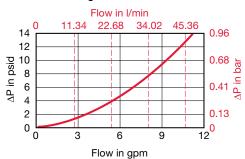
Housing Curve:

Pressure loss through housing is as follows:

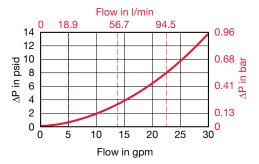
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

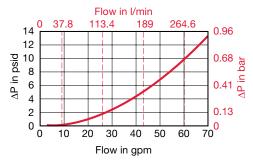
LF 30 Housing



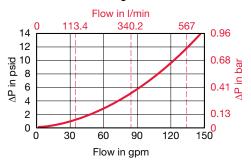
LF 60 / 110 Housing



LF 160 / 240 / 280 Housing



LF 330 / 660 Housing



Element K Factors

 $\Delta P \; Elements = Elements \; (K) \; Flow \; Factor \; x \; Flow \; Rate \; (gpm) \; x \; \frac{Actual \; Viscosity \; (SUS)}{141 \; SUS} \; x \; \frac{Actual \; Specific \; Gravity}{0.86} \; (From \; Tables \; Below)$

"ON" Pressure Elements:	DON (Optimicron Pressure Elements)					
Size	1 μm	3 µm	5 μm	10 µm	15 µm	20 μm
0030 D XXX ON	4.27	3.507	2.376	1.251	0.768	0.62
0060 D XXX ON	2.936	1.427	1.004	0.664	0.537	0.347
0110 D XXX ON	1.416	0.735	0.527	0.333	0.254	0.164
0160 D XXX ON	1.015	0.604	0.423	0.225	0.204	0.175
0240 D XXX ON	0.631	0.379	0.293	0.175	0.134	0.115
0280 D XXX ON	0.304	0.185	0.15	0.082	0.075	0.064
0330 D XXX ON	0.452	0.23	0.185	0.135	0.085	0.067
0660 D XXX ON	0.207	0.106	0.086	0.051	0.039	0.031

"D" Pressure Elements	DBH4HC (Betamicron High Collapse				
Size	3 µm	5 μm	10 μm	20 µm	
0030 D XXX BH4HC	5.005	2.782	1.992	1.043	
0060 D XXX BH4HC	3.216	1.789	0.993	0.670	
0110 D XXX BH4HC	1.394	0.818	0.489	0.307	
0160 D XXX BH4HC	0.922	0.571	0.324	0.241	
0240 D XXX BH4HC	0.582	0.373	0.214	0.159	
0280 D XXX BH4HC	0.313	0.187	0.099	0.088	
0330 D XXX BH4HC	0.423	0.247	0.154	0.110	
0660 D XXX BH4HC	0.181	0.104	0.055	0.049	

Wire Mesh	DW/HC Elements (Low Collapse)
Size	25, 50, 100, 200 μm
0030 D XXX W/HC	0.166
0060 D XXX W/HC	0.042
0110 D XXX W/HC	0.023
0160 D XXX W/HC	0.016
0240 D XXX W/HC	0.010
0280 D XXX W/HC	0.005
0330 D XXX W/HC	0.008
0660 D XXX W/HC	0.004

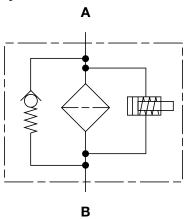
All Element K Factors in psi / gpm.

LPFH Series

Inline Filters 500 psi • up to 112 gpm



Hydraulic Symbol



Features

- · LPFH filters are manufactured with cast aluminum head and aluminum cold formed bowls.
- Aluminum alloy is water tolerant anodization is not required for water based fluids (HWBF).
- LPFH filters are a desirable substitute for spin-on filters when dynamic fluid conditions call for the superior durability and leakproof quality of a well-constructed cartridge filter.
- Quick-response, bypass valves, located in the filter head, protect against high differential pressures caused by cold start-ups, flow surges and pressure spikes. Filters can also be supplied without bypasses.
- The simple inline design minimizes pressure drop and provides the significant benefit of compactness. The use of lightweight materials, makes these filters ideal for mobile equipment applications.
- Integrated retrofit protection.

Applications







Automotive



Construction



Technical Specifications

Mounting Method	325 - 425: 5	325 - 425: 5 mounting hole options			
Port Connection					
325 - 425	SAE-24, 1 1	/2" BSPP			
Flow Direction	Inlet: Side	Outlet: Side			
Construction Material	S				
Head	Cast Alumin	ium			
Bowl	Aluminum E	xtrusion			
Flow Capacity					
325	87 gpm (325	5 lpm)			
425	112 gpm (42	5 lpm)			
Housing Pressure Rat	ing				
Max. Allowable Workin	g				
Pressure	325 - 425	500 psi (34 bar)			
Fatigue Pressure	325 - 425	500 psi (34 bar) (106 cycles)			
Burst Pressure	325 - 425	> 2700 psi (186 bar)			
Element Collapse Pres	ssure Rating				
ON, W/HC		290 psid (20 bar)			
Fluid Temp. Range	-22°F to 212	2°F (-30°C to 100°C)			
Consult HYDAC for applic	ations operating	below -22°F (-30°C)			

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycwol, oil/water emulsion, and high water based fluids when the appropriate seals are selected

ΔP Indicator Trip Pressure

 $\Delta P = 29 \text{ psid } (2 \text{ bar}) -10\% \text{ (optional)}$ $\Delta P = 36.25 \text{ psid } (2.5 \text{ bar}) \text{ (BF indicator)}$ $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (standard)}$

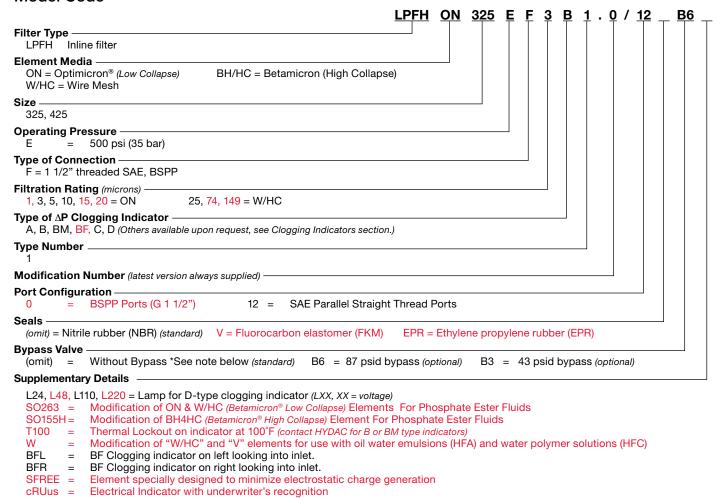
Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (optional)}$ $\Delta P = 72 \text{ psid (5 bar)} + 10\% \text{ (optional)}$ $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (optional)}$



Industry

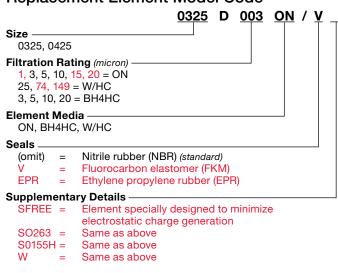
Model Code



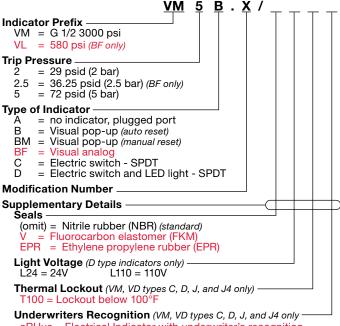
Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

*Note: Use 5 bar indicator when filter has no bypass. Replace element when indicator trips.

Replacement Element Model Code



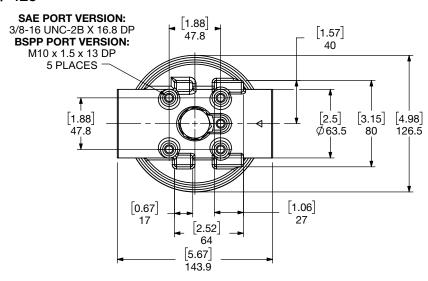
Clogging Indicator Model Codes

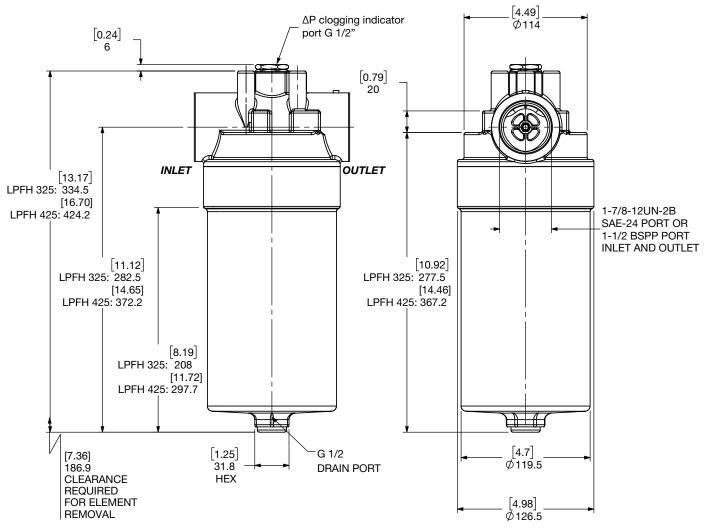


cRUus = Electrical Indicator with underwriter's recognition

(For additional details and options, see Clogging Indicators section.)

Dimensions LPFH 325 / 425





Dimensions are [inches] Millimeters

Size	325	425
Weight (lbs.)	8.0	10.0

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

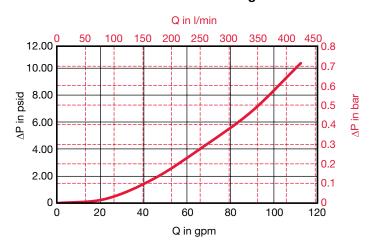
Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

LPFH 325 / 425 Housing



Element K Factors

 $\Delta \text{P Elements} = \text{Elements (K) Flow Factor x Flow Rate (gpm) x} \\ \frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \\ \frac{\text{Actual Specific Gravity}}{0.86}$

Optimicron	DON					
Size	1 µm	3 μm	5 μm	10 µm	15 µm	20 μm
0325 D XXX ON	0.444	0.204	0.150	0.081	0.070	0.056
0425 D XXX ON	0.289	0.143	0.104	0.06	0.046	0.038

Wire Mesh	DW/HC			
Size	DW/HC Elements 25, 50, 74, 100, 149, 200 μm			
0325 D XXX W/HC	0.011			
0425 D XXX W/HC	0.007			

Betamicron	DBH/HC					
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm
0325 D XXX BH/HC		Consult forton was a second				
0425 D XXX BH/HC	Consult factory upon request					

All Element K Factors in psi / gpm.

MFX Series

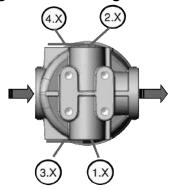
Inline Filters 725 psi • up to 35 gpm



Features

- Eco-friendly, cost-effective alternative to spin-on filters
- Integrated retrofit protection
- Longer service life of the filter bowl because of fatigue resistant up to 725 psi
- High level of operational safety Bowl seal and bypass valve are integrated in the filter element and therefore replaced at every element change
- "Missing Element Protection" cannot operate without element installed.
- Many choices of clogging indicators available
- Various port connection types (SAE-12, G ¾, SAE-16, G 1, M33x2)

Clogging Indicator Assignment



Applications

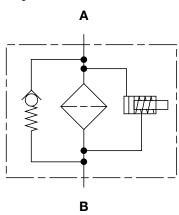








Hydraulic Symbol



Technical Specifications

roommour opcomo				
Mounting Method	4 Mounting holes (3/8-16UNC) or (M10-13) Ref. Drawing			
Port Connection	SAE-12, G 3/4 SAE-16, G 1, M33x2			
Flow Direction	Inlet: Side Outlet: Side			
	(opposite each other)			
Construction Materials				
Head	Die Cast Aluminun	n		
Bowl	Extruded Aluminum			
Flow Capacity				
100	26 gpm (100 lpm)			
200	35 gpm (130 lpm)			
Housing Pressure Rating				

Max. Allowable Working

725 psi (50 bar) Pressure

725 psi (50 bar) @ 1 million cycles Fatigue Pressure

Burst Pressure 2600 psi (183 bar)

Element Collapse Pressure Rating

BN4HC 290 psid (20 bar) ECON2, MM 145 psid (10 bar)

Fluid Temperature Range -22°F to 212°F (-30°C to 100°C)

Consult HYDAC for applications below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, and high water based fluids compatible with Nitrile Rubber (NBR) seals

∆P Indicator Trip Pressure

 $\Delta P = 36.25 \text{ psid } (2.5 \text{ bar}) -10\% \text{ (standard)}.$

 $\Delta P = 14.5 \text{ psid (1 bar) -10\% (optional)}$

Bypass Valve Cracking Pressure

 $\Delta P = 50.75 \text{ psid } (3.5 \text{ bar}) + 10\% \text{ (standard)}$

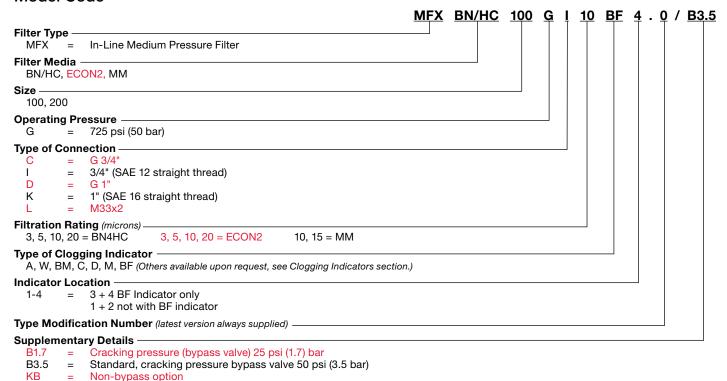
 $\Delta P = 25 \text{ psid } (1.7 \text{ bar}) + 10\% \text{ (optional)}$



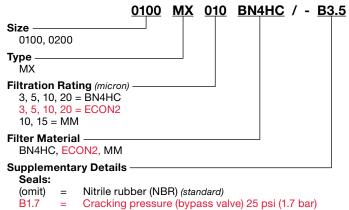
Model Code

LED

cRUus =



Replacement Element Model Code



Standard, cracking pressure

(bypass valve) 50 psi (3.5 bar)

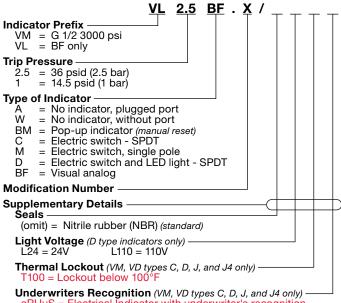
Non-bypass option

Lamp for relevant voltage (24V, 48V, 110V, 220V)

Electrical Indicator with underwriter's recognition

2 LEDs up to a voltage of 24 Volt

Clogging Indicator Model Code



cRUuS = Electrical Indicator with underwriter's recognition

(For additional details and options, see Clogging Indicators section.)

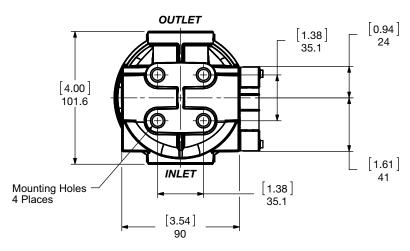


E21

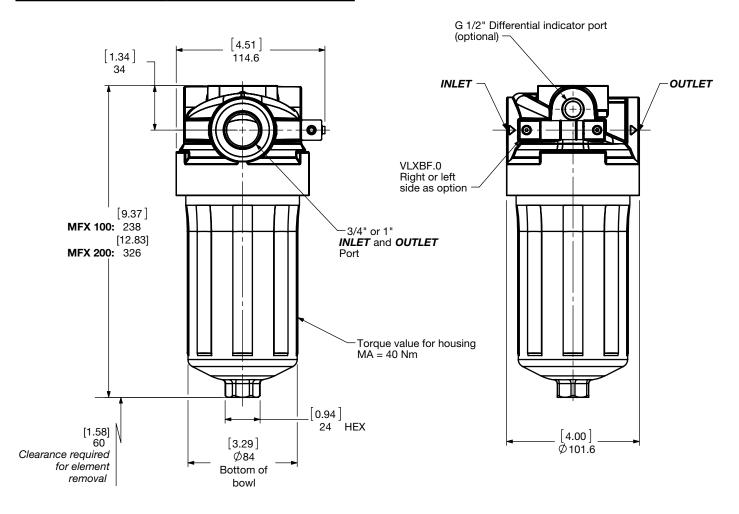
B3.5

KB

Dimensions MFX 100 / 200



MFX 100/200	Mounting x		
G C	M10-13 [0.5] Deep		
G D	M10-13 [0.5] Deep		
G I	3/- 16UNC. 13 [0.5] Deep		
G K	3/8-16UNC. 13 [0.5] Deep		
G L	M10-13 [0.5] Deep		



Size	100	200
Weight (lbs.)	3.3	3.9

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

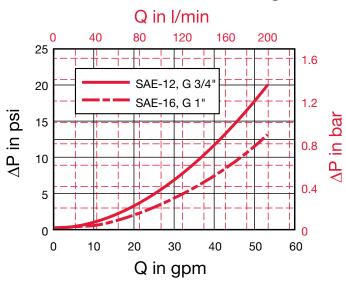
Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

MFX 100/200 Housing



Element K Factors

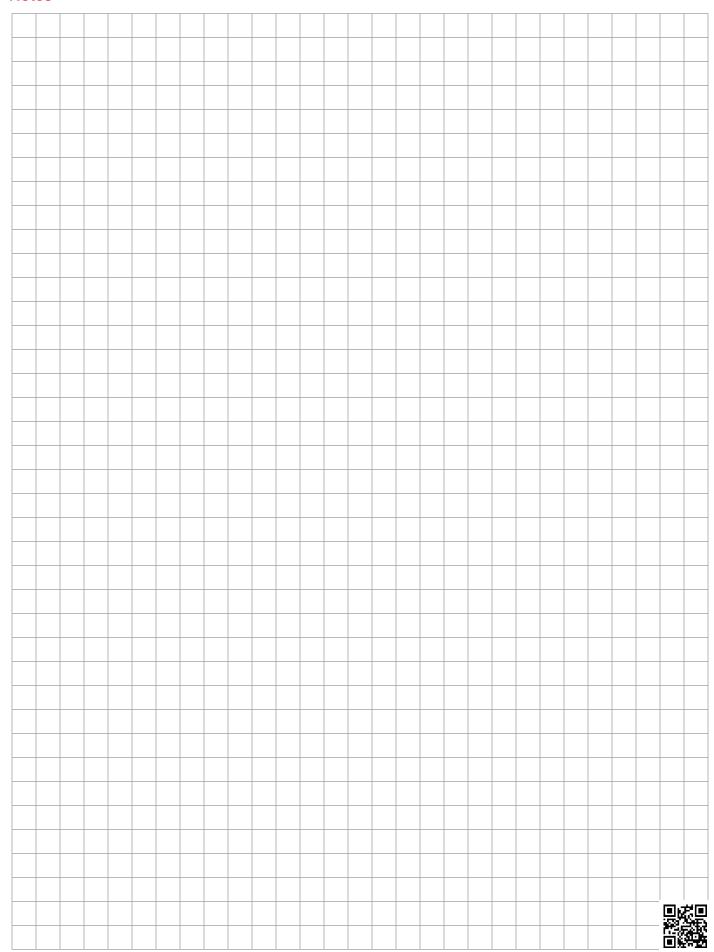
 $\Delta P \; \text{Elements} = \\ \text{Elements} \; (\text{K)} \; \text{Flow} \; \\ \text{Factor} \; x \; \\ \text{Flow} \; \\ \text{Rate} \; (\text{gpm}) \; x \; \\ \frac{\text{Actual Viscosity} \; (\text{SUS})}{141 \; \text{SUS}} \; \\ \frac{\text{Actual Specific Gravity}}{0.86} \; \\ \frac{\text{Constant Specific Gravity}}{141 \; \text{SUS}} \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; \\ \frac{\text{Constant Specific Gravity}}{141 \; \text{$

Betamicron	MXBN4HC (Betamicron® Low Collapse)				
Size	3 μm	5 μm	10 μm	20 μm	
0100 MX XXX BN4HC	0.659	0.494	0.252	0.187	
0200 MX XXX BN4HC	0.384	0.291	0.148	0.110	

ECOmicron	MXECON2							
Size	3 μm	5 μm	10 μm	20 μm				
0100 MX XXX ECON2	0.713	0.549	0.357	0.263				
0200 MX XXX ECON2	0.439	0.324	0.209	0.154				

Mobilemicron	MXMM							
Size	8 μm	10 μm	15 µm					
0100 MX XXX MM	0.148	0.148	0.121					
0200 MX XXX MM	0.088	0.088	0.071					

Notes





High Pressure Filters

3000-6000 psi
Robust carbon steel/ductile iron construction filters, provide reliability in demanding industrial applications. Inline, manifold-mount, reverse-flow, bi-directional-flow configurations provide flexibility to accommodate any application. Duplex filters allow for uninterrupted operation during element change-out.

DF/DFF Series

Inline Filters 6090 psi • up to 200 gpm





Features

- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- Choice of NPT, BSPP, SAE straight thread O-ring boss, and SAE 4-bolt flange porting (sizes 60 - 1320) to allow easy installation with maximum flexibility.
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, and ethylene propylene rubber) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based fluids.
- Screw-in bowl or lid (on 2-pc. bowls) mounted below the filter head requires minimal clearance to remove the element for replacement and contaminated fluid cannot be washed downstream when element is serviced.
- HYDAC Differential Pressure Indicators have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- A poppet-type bypass valve located in the filter head provides positive sealing during normal operation and fast opening during cold starts and flow surges. (Optional non-bypass available)
- For special finishes and coatings consult HYDAC for minimum quantities, availability and pricing.
- Fatigue pressure ratings equal maximum allowable working pressure rating.
- DFF filters are suitable for flow in both directions.

Note: QPD is available in sizes 160-1320 only.

Applications







Automotive





Construction Gearboxes



Industrial

Pulp & Paper







Railways



Commercial Municipal



Shipbuilding

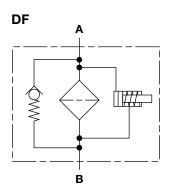


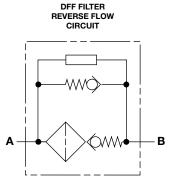
Generation



Industry

Hydraulic Symbol





Technical Specifications

Mounting Method	4 mounting holes
Port Connection	
30	SAE-8, 1/2" NPT, 1/2" BSPP
60/110	SAE-12, 3/4" NPT, 3/4" BSPP
	3/4" SAE, Code 62
160/240/280	SAE-20, 1 1/4" NPT, 1 1/4" BSPP
	1 1/4" SAE, Code 62
330/660/1320	SAE-24, 1 1/2" NPT, 1 1/2" BSPP
	2" SAE Flange Code 62
Flow Direction	Inlet: Side Outlet: Side
Construction Materials	
Head	Ductile iron
Bowl (30-660)	Steel
Housing/Bowl (660-1320 - 2.0)	Steel
Cap/Lid (660-1320 type)	Steel
Flow Capacity	
30	8 gpm (30 lpm)
60	16 gpm (60 lpm)
110	29 gpm (110 lpm)
160	42 gpm (160 lpm)
240	63 gpm (240 lpm)
280	74 gpm (280 lpm)
330	87 gpm (330 lpm)
660	174 gpm (660 lpm)
1320	200 gpm (757 lpm)

Housing Pressure Rating

Max. Allowable Working		
Pressure	6090 psi (420 l	oar)
Fatigue Pressure	6090 psi (420 l	oar) @ 1 million cycles
Burst Pressure	30	15950 psi (1100 bar)
	60/110	17400 psi (1200 bar)
	160/240/280	17110 psi (1180 bar)
	330/660/1320	15080 psi (1040 bar

Element Collapse Pressure Rating

Fluid Temp. Range	14°F to 212°F (-10°C to 100°C)
ON, W/HC	290 psid (20 bar)
BH4HC, V	3045 psid (210 bar)

Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

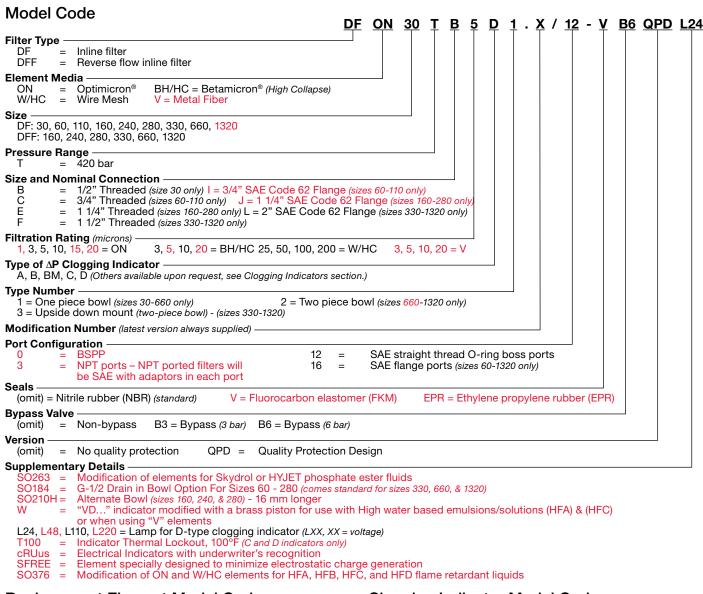
Indicator Trip Pressure

 $\Delta P = 29$ psid (2 bar) -10% (optional) $\Delta P = 72$ psid (5 bar) -10% (standard) $\Delta P = 116 \text{ psid } (8 \text{ bar}) -10\% \text{ (optional non bypass)}$

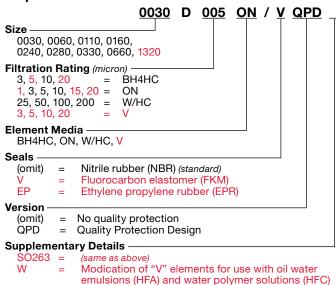
Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (optional)}$ $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (standard)}$

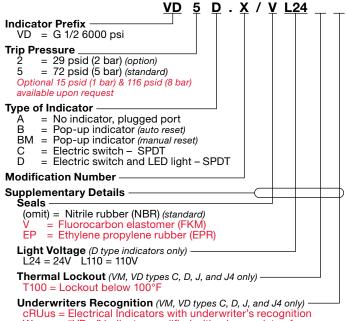
Non Bypass Available



Replacement Element Model Code



Clogging Indicator Model Code



W = "VD..." indicator modified with a brass piston for use with High water based emulsions/solutions (HFA) & (HFC)

(For additional details and options, see Clogging Indicators section.)

Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

SFREE =

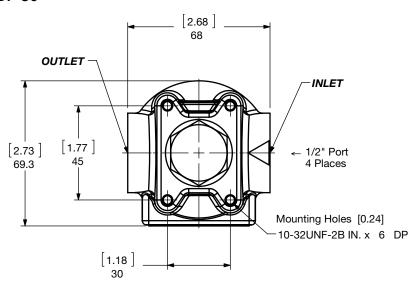
SO376 =

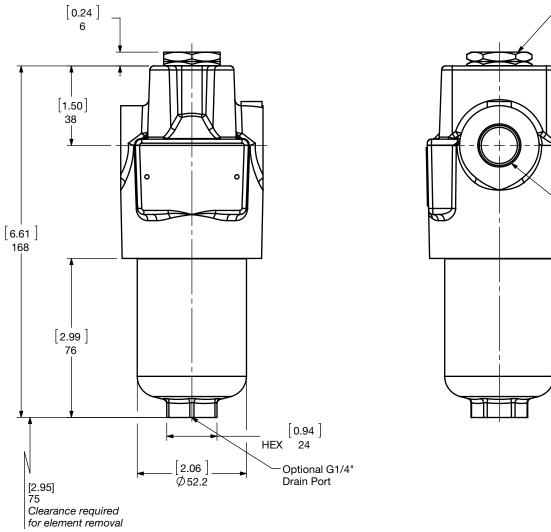
usually polyglycol

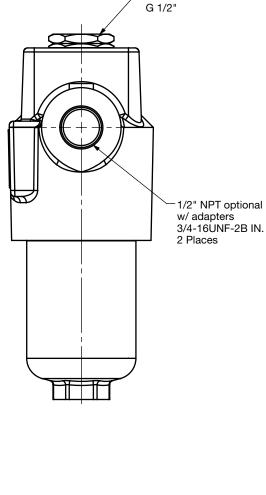
(same as above)

(same as above)

Dimensions DF 30



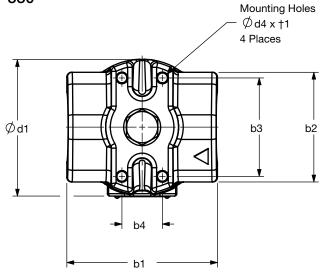


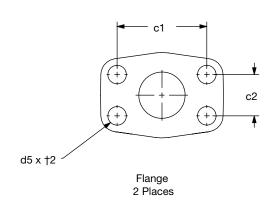


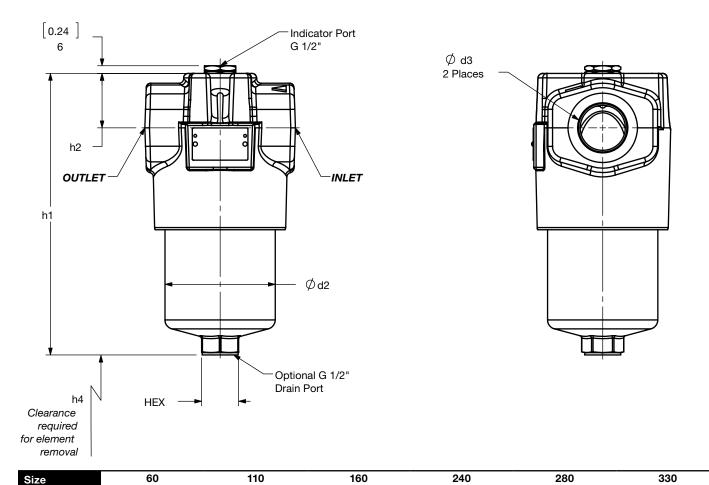
Indicator Port

Size	30
Weight (lbs.)	5.1

Dimensions DF 60-330 DFF 160-330







22.8

26.1

36

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

12

54.1

Weight (lbs.)

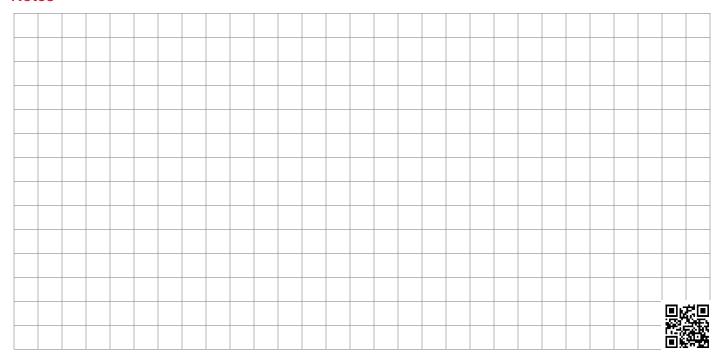
10

Dimensions DF 60-330 (cont'd) DFF 160-330 (cont'd)

Size	b1	b2	b3	b4	c1	c2	d1	d2	d3 NOM	d4*	d5	h1	h2	h4	HEX	†1	†2
60C 1.X	(3.54) 90	(2.8) 71	(2.2) 56	(1.26) 32	-	-	(3.39) 86	(2.68) 68		1/4-	-	(7.22) 183.5	(1.57) 40	(3.35) 85	(1.06) 27	(0.35) 9	-
60I 1.X	(3.50) 89	(2.8) 71	(2.2) 56	(1.26) 32	(2.00) 50.8	(0.94) 23.8	(3.39) 86	(2.68) 68	3/4"	28UNF- 2B M6x1.0	3/8- 16UNC- 2B M10 X 1.5	(7.22) 183.5	(1.57) 40	(3.35) 85	(1.06) 27	(0.35) 9	(0.59) 15
110C 1.X	(3.54) 90	(2.8) 71	(2.2) 56	(1.26) 32	-	-	(3.39) 86	(2.68) 68		1/4-	-	(9.88) 251	(1.57) 40	(3.35) 85	(1.06) 27	(0.35) 9	-
110l 1.X	(3.50) 89	(2.8) 71	(2.2) 56	(1.26) 32	(2.00) 50.8	(0.94) 23.8	(3.39) 86	(2.68) 68	3/4"	28UNF- 2B M6x1.0	3/8- 16UNC- 2B M10 X 1.5	(9.88) 251	(1.57) 40	(3.35) 85	(1.06) 27	(0.35) 9	(0.59) 15
160E 1.X	(4.92) 125	(3.74) 95	(3.35) 85	(1.38) 35	ı	ı	(4.69) 119	(3.74) 95	4	3/8-	-	(9.57) 243	(1.85) 47	(4.13) 105	(1.26) 32	(0.55) 14	-
160J 1.X	(4.92) 125	(3.74) 95	(3.35) 85	(1.38) 35	(2.63) 66.7	(1.25) 31.8	(4.69) 119	(3.74) 95	1/4"	1- 1/4" 24UNF- 2B M10x1.5	1/2- 13UNC- 2B M14 X 2	(9.57) 243	(1.85) 47	(4.13) 105	(1.26) 32	(0.55) 14	(0.75) 19
240E 1.X	(4.92) 125	(3.74) 95	(3.35) 85	(1.38) 35	ı	ı	(4.69) 119	(3.74) 95	1-	3/8-	-	(11.91) 302.5	(1.85) 47	(4.13) 105	(1.26) 32	(0.55) 14	-
240J 1.X	(4.92) 125	(3.74) 95	(3.35) 85	(1.38) 35	(2.63) 66.7	(1.25) 31.8	(4.69) 119	(3.74) 95	1/4"	24UNF- 2B M10x1.5	1/2- 13UNC- 2B M14 X 2	(11.91) 302.5	(1.85) 47	(4.13) 105	(1.26) 32	(0.55) 14	(0.75) 19
280E 1.X	(4.92) 125	(3.74) 95	(3.35) 85	(1.38) 35	ı	ı	(4.69) 119	(3.74) 95	1-	3/8-	-	(19.06) 484	(1.85) 47	(4.13) 105	(1.26) 32	(0.55) 14	-
280J 1.X	(4.92) 125	(3.74) 95	(3.35) 85	(1.38) 35	(2.63) 66.7	(1.25) 31.8	(4.69) 119	(3.74) 95	1/4"	24UNF- 2B M10x1.5	1/2- 13UNC- 2B M14 X 2	(19.06) 484	(1.85) 47	(4.13) 105	(1.26) 32	(0.55) 14	(0.75) 19
330F 1.X	(6.30) 160	(5.24) 133	(4.53) 115	(2.36) 60	-	-	(6.42) 163	(5.12) 130		1/2-	-	(12.16) 309	(2.05) 52	(4.53) 115	(1.42) 36	(0.67) 17	-
330L 1.X	(6.30) 160	(5.24) 133	(4.53) 115	(2.36) 60	(3.81) 96.8	(1.75) 44.5	(6.42) 163	(5.12) 130	2"	20UNF- 2B M12x1.75	3/4- 10UNC- 2B M2O X 2.5	(12.16) 309	(2.05) 52	(4.53) 115	(1.42) 36	(0.67) 17	(0.98) 25
330F 2.X	(6.30) 160	(5.24) 133	(4.53) 115	(2.36) 60	-	-	(6.42) 163	(5.12) 130		1/2-	-	(12.16) 309	(2.05) 52	(7.09) 180	(1.42) 36	(0.67) 17	-
330L 2.X	(6.30) 160	(5.24) 133	(4.53) 115	(2.36) 60	(3.81) 96.8	(1.75) 44.5	(6.42) 163	(5.12) 130	2"	20UNF- 2B M12x1.75	3/4- 10UNC- 2B M2O X 2.5	(12.16) 309	(2.05) 52	(7.09) 180	(1.42) 36	(0.67) 17	(0.98) 25

^{*}d4 - UN Threads for SAE (/12) & Flanged (/16) ports - M Threads for BSPP ports & Flanged metric ports

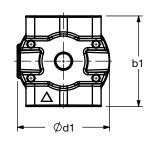
Notes

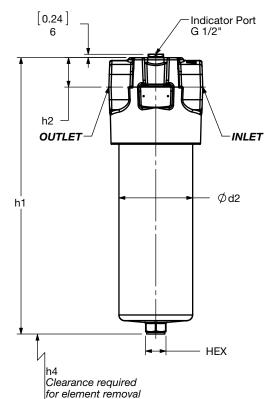


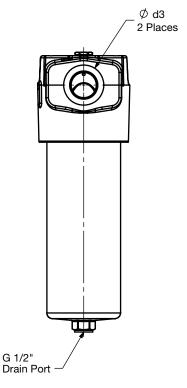
Dimensions DF 660-1320 DFF 660-1320

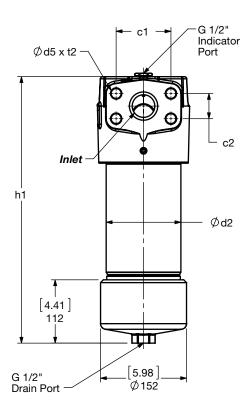
660-1320 2.0 Version

Note - See 1.X Version for mounting





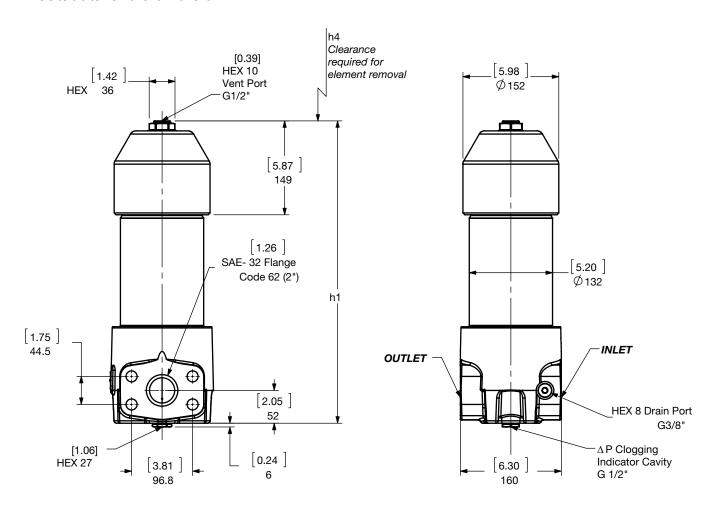


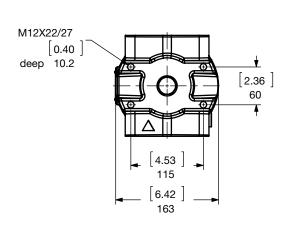


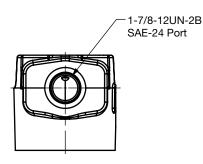
Size	b1	b2	b3	b4	c1	c2	d1	d2	d3 NOM	d4*	d5	h1	h2	h4	HEX	†1	†2
660F 1.X	(6.3) 160	(5.24) 133	(4.53) 115	(2.36) 60	-	-	(6.42) 163	(5.12) 130	1- 1/2"	1/2-	-	(18.93) 481	(2.05) 52	(4.53) 115	(1.42) 36	(0.67) 17	-
660L 1.X	(6.3) 160	(5.24) 133	(4.53) 115	(2.36) 60	(3.81) 96.8	(1.75) 44.5	(6.42) 163	(5.12) 130	2"	20UNF- 2B M12x1.75	3/4- 10UNC- 2B M20x2.5	(18.93) 481	(2.05) 52	(4.53) 115	(1.42) 36	(0.67) 17	(0.98) 25
660F 2.X	(6.3) 160	(5.24) 133	(4.53) 115	(2.36) 60	ı	-	(6.42) 163	(5.12) 130	1- 1/2"	1/2-	-	(18.54) 471	(2.05) 52	(13.78) 350	(1.42) 36	(0.67) 17	-
660L 2.X	(6.3) 160	(5.24) 133	(4.53) 115	(2.36) 60	(3.81) 96.8	(1.75) 44.5	(6.42) 163	(5.12) 130	2"	20UNF- 2B M12x1.75	3/4- 10UNC- 2B M20x2.5	(18.54) 471	(2.05) 52	(13.78) 350	(1.42) 36	(0.67) 17	(0.98) 25
1320F 2.X	(6.3) 160	(5.24) 133	(4.53) 115	(2.36) 60	ı	-	(6.42) 163	(5.12) 130	1- 1/2"	1/2-	-	(29.25) 743	(2.05) 52	(26.38) 670	(1.42) 36	(0.67) 17	-
1320L 2.X	(6.3) 160	(5.24) 133	(4.53) 115	(2.36) 60	(3.81) 96.8	(1.75) 44.5	(6.42) 163	(5.12) 130	2"	20UNF- 2B M12x1.75	3/4- 10UNC- 2B M20x2.5	(29.25) 743	(2.05) 52	(26.38) 670	(1.42) 36	(0.67) 17	(0.98) 25

Size	660 1.0	660 2.0	1320 2.0
Weight (lbs.)	70	75.9	112.7

Dimensions DF 330/660/1320 3.0 Version DFF 330/660/1320 3.0 Version







Threaded Port

Size	h1	h4
330F3.X	[10.35]	[3.15]
330L3.X	263	80
660F3.x	[16.85]	[9.84]
660L3.x	428	250
1320F3.x	[29.49]	[22.44]
1320L3.x	749	570

Size	330	660	1320
Weight (lbs.)	61.5	74.8	112.0

...D...ON Elements

1.251

0.664

0.333

0.225

0.175

0.082

0.135

0.051

0.025

10 μm | 15 μm | 20 μm

0.768

0.537

0.254

0.204

0.134

0.075

0.085

0.039

0.019

0.62

0.347

0.164

0.175

0.115

0.064

0.067

0.031

0.015

5 µm

2.376

1.004

0.527

0.423

0.293

0.15

0.185

0.086

0.042

3 µm

3.507

1.427

0.735

0.604

0.379

0.185

0.23

0.106

0.053

1 µm

4.27

2.936

1.416

1.015

0.631

0.304

0.452

0.207

0.102

Sizing Information

Total pressure loss through the filter is as follows:

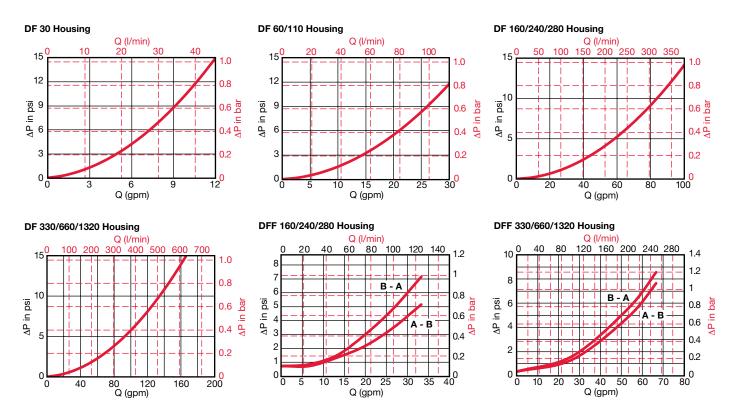
Assembly $\Delta P = \text{Housing } \Delta P + \text{Element } \Delta P$

Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{\Delta P}$ 0.86

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



Optimicron

Size

0030 D XXX ON

0060 D XXX ON

0110 D XXX ON

0160 D XXX ON

0240 D XXX ON

0280 D XXX ON

0330 D XXX ON

0660 D XXX ON

1320 D XXX ON

Element K Factors

ΔP Elements = Elements (K) Flow Factor x Flow Rate (gpm) x Actual Viscosity (SUS) x Actual Specific Gravity (From Tables Below)

Betamicron [®]	DBH	Collapse)		
Size	3 µm	5 μm	10 µm	20 µm
0030 D XXX BH4HC	5.005	2.782	1.992	1.043
0060 D XXX BH4HC	3.216	1.789	0.993	0.670
0110 D XXX BH4HC	1.394	0.818	0.489	0.307
0160 D XXX BH4HC	0.922	0.571	0.324	0.241
0240 D XXX BH4HC	0.582	0.373	0.214	0.159
0280 D XXX BH4HC	0.313	0.187	0.099	0.088
0330 D XXX BH4HC	0.423	0.247	0.154	0.110
0660 D XXX BH4HC	0.181	0.104	0.055	0.049
1320 D XXX BH4HC	0.088	0.055	0.033	0.022

Wire Mesh	DW/HC Elements
Size	25, 50, 100, 200 μm
0030 D XXX W/HC	0.166
0060 D XXX W/HC	0.042
0110 D XXX W/HC	0.023
0160 D XXX W/HC	0.016
0240 D XXX W/HC	0.010
0280 D XXX W/HC	0.005
0330 D XXX W/HC	0.008
0660 D XXX W/HC	0.004

Wire Mesh	DW/HC Elements		Metal Fiber	D	V Element	s (High Colla	ıpse)
Size	25, 50, 100, 200 μm		Size	3 µm	5 μm	10 µm	20 µm
0030 D XXX W/HC	0.166	1	0030 D XXX V	1.011	0.740	0.411	0.200
0060 D XXX W/HC	0.042	1	0060 D XXX V	0.877	0.511	0.296	0.183
0110 D XXX W/HC	0.023		0110 D XXX V	0.452	0.304	0.182	0.118
0160 D XXX W/HC	0.016		0160 D XXX V	0.251	0.177	0.123	0.079
0240 D XXX W/HC	0.010		0240 D XXX V	0.169	0.137	0.093	0.062
0280 D XXX W/HC	0.005		0280 D XXX V	0.126	0.093	0.064	0.041
0330 D XXX W/HC	0.008		0330 D XXX V	0.121	0.097	0.065	0.043
0660 D XXX W/HC	0.004		0660 D XXX V	0.063	0.050	0.034	0.021
1320 D XXX W/HC	0.002		1320 D XXX V	0.032	0.026	0.018	0.012

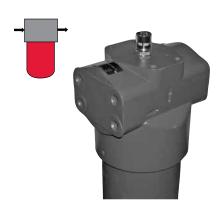
All Element K Factors in psi / gpm.



DF/DFF 1500 Series

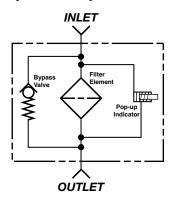
Inline Filters

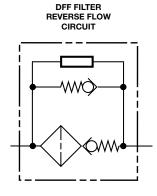
6090 psi • up to 250 gpm





Hydraulic Symbol





Features

- Available in T ported or L ported configurations
- Handles high flows to 250 GPM (pricing competitive)
- Available in bidirectional flow and single flow configurations
- Two part bowl for ease of operation and element change-out
- Filter head made of ductile iron
- Filter housing (bowl) and lid made of steel
- Can mount head on top with bottom access (2.x) or head on bottom with top access (3.x)
- Single flow version (DF) can be supplied with bypass (located in head assembly).
- Bidirectional flow version (DFF) can only be supplied with no-bypass.

Applications



Agricultural



Automotive



Construction



Gearboxes



Industrial







Railways



Commercial Municipal



Shipbuilding



Power Generation



Steel / Heavy Industry

Technical Specifications

Mounting Method	4 Mounting holes in the filter head - M-12 Threads
Port Connection	SAE-32 four bolt code 62 Flange (DN 51) with metric bolt threads (M20 x 30mm deep) 2" SAE 32 straight thread O-Ring Boss / 2" BSPP thread
Flow Direction	Side inlet and outlet - Indicator on top Side inlet and top outlet - Indicator on side
Construction Materials	Head: Ductile Iron (GGG40) Filter housing (bowl) & lid: Steel
Flow Capacity	250 gpm (950 lpm)
Housing Pressure Rating	
Max. Allowable Working Pressure	6090 psi (420 bar)

Burst Pressure Contact HYDAC **Element Collapse Pressure Rating**

ON. W/HC 290 psid (20 bar) BH4HC, V 3045 psid (210 bar)

Fluid Temperature Range 14°F to 212°F (-10°C to 100°C)

Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility

Fatigue Pressure

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar) -10}\%$

 $\Delta P = 72 \text{ psid (5 bar) -10}\%$

 $\Delta P = 116 \text{ psid (8 bar) -10\% (non-bypass)}$

Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar)} + 10\%$

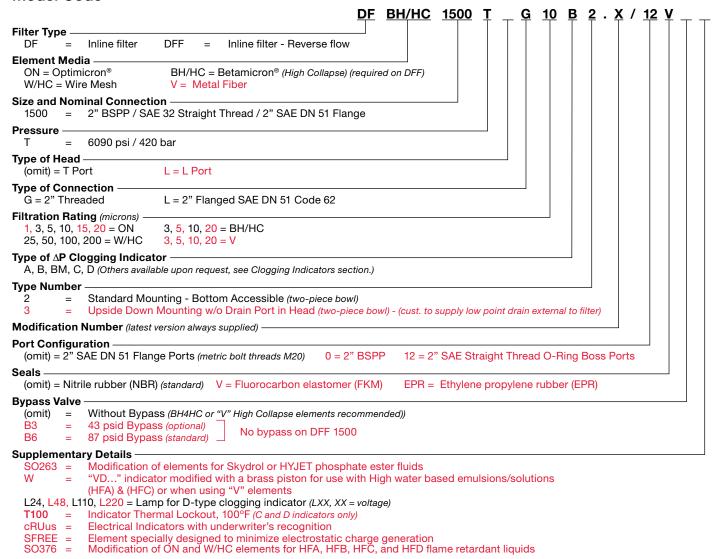
 $\Delta P = 87 \text{ psid (6 bar)} + 10\%$

Non Bypass Available

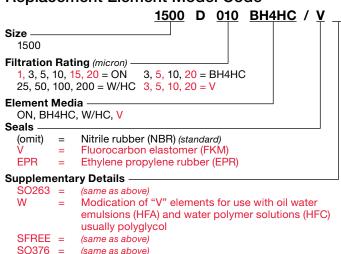
Pulp & Paper

6090 psi (420 bar) @ 300,000 cycles

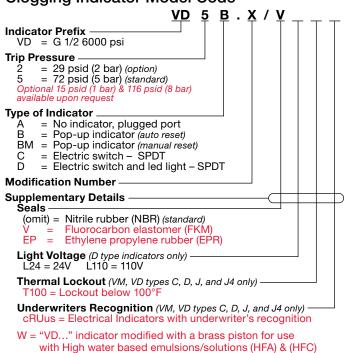
Model Code



Replacement Element Model Code



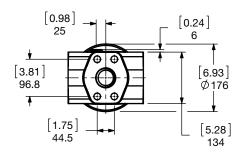
Clogging Indicator Model Code

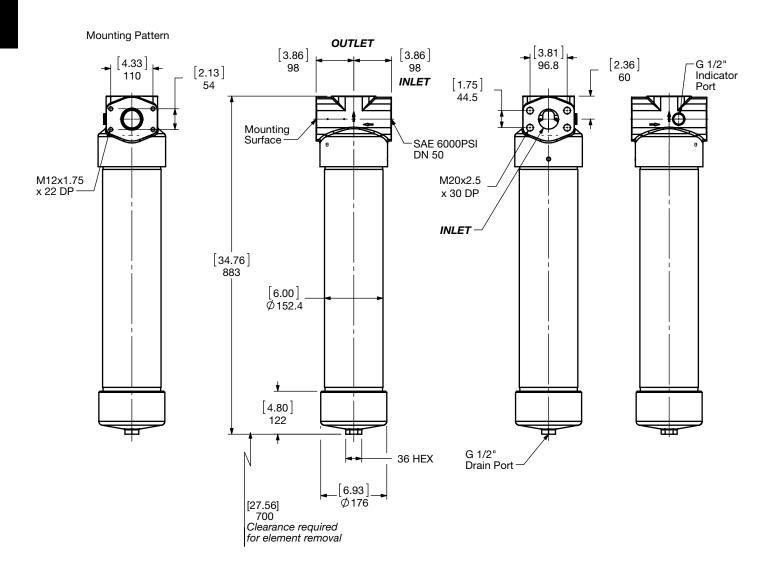


(For additional details and options, see Clogging Indicators section.)

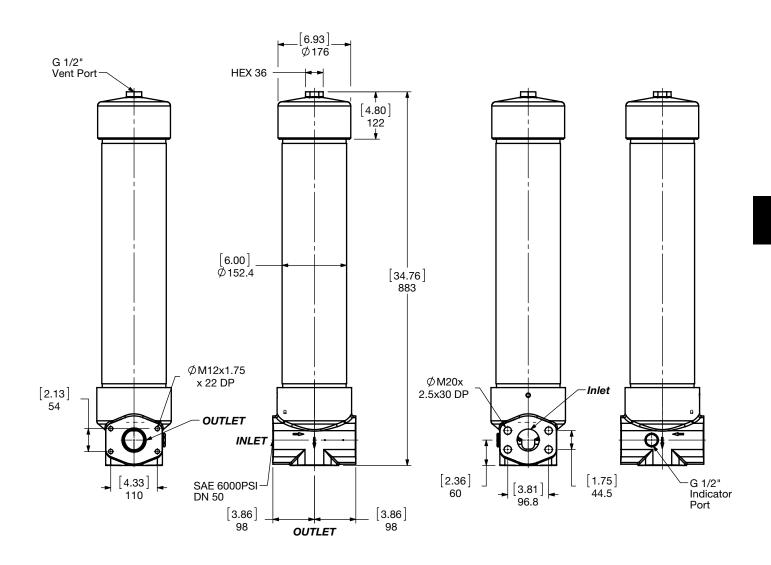
Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

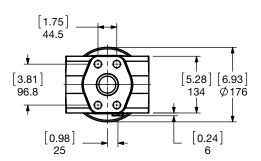
Dimensions DF/DFF 1500 2.0 L Configuration





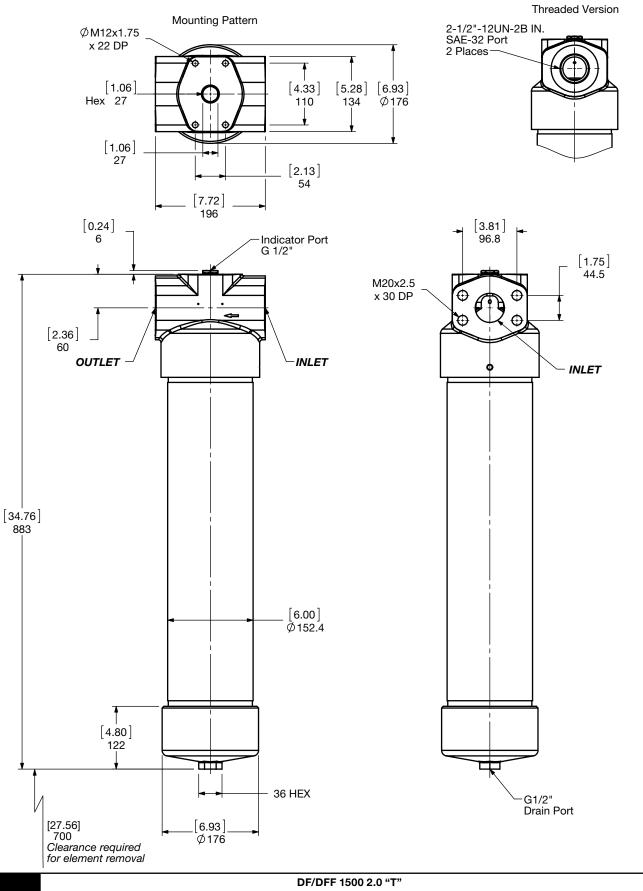
Size	DF/DFF 1500 2.0 "L"
Weight (lbs.)	152.8





Size	DF/DFF 1500 3.0 "L"
Weight (lbs.)	152.6

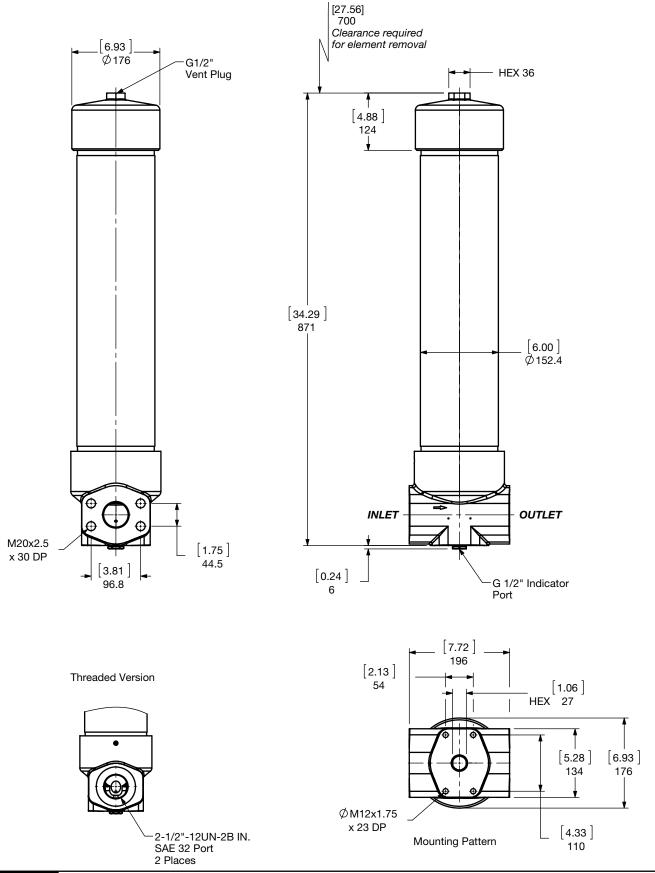
Dimensions DF/DFF 1500 2.0 T Configuration



 Size
 DF/DFF 1500 2.0 "T"

 Weight (lbs.)
 152.8

Dimensions DF/DFF 1500 3.0 T Configuration



Size	DF/DFF 1500 3.0 "T"
Weight (lbs.)	152.6

Sizing Information

Total pressure loss through the filter is as follows:

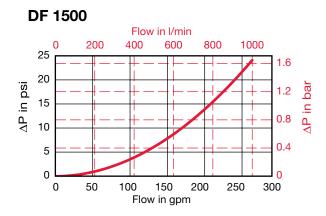
Assembly ΔP = Housing ΔP + Element ΔP

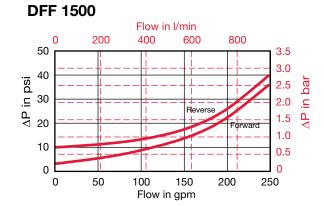
Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)





Element K Factors

 $\Delta P \; Elements = Elements \; (K) \; Flow \; Factor \; x \; Flow \; Rate \; (gpm) \; x \; \frac{Actual \; Viscosity \; (SUS)}{141 \; SUS} \; x \; \frac{Actual \; Specific \; Gravity}{0.86} \; (From \; Tables \; Below)$

Optimicron	DON (Pressure Elements)					
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 µm
1500 D XXX ON	0.09	0.053	0.038	0.026	0.02	0.015

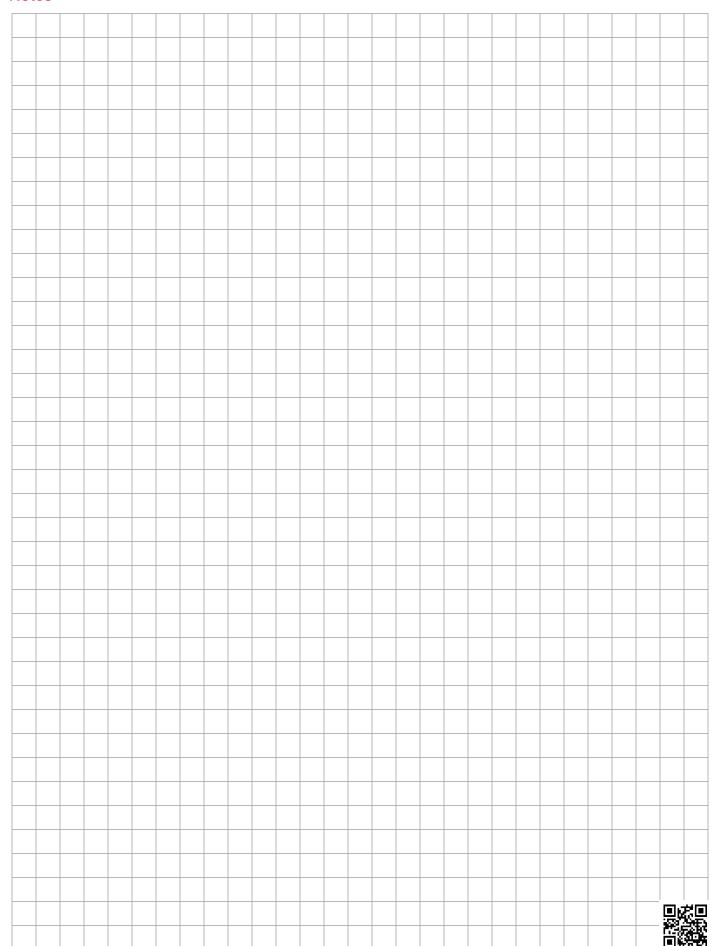
Betamicron	DBH4HC (High Collapse)			
Size	3 µm	5 μm	10 μm	20 μm
1500 D XXX BH4HC	0.077	0.044	0.033	0.027

Wire Mesh	DW/HC Elements
Size	DW/HC Elements 25, 50, 100, 200 μm
1500 D XXX W/HC	0.001

Metal Fiber	DV Elements (High Collapse)			
Size	3 µm	5 μm	10 μm	20 μm
1500 D XXX V	0.016	0.011	0.011	0.005

HYDAC

Notes

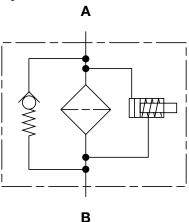


HF2P Series

Inline Filters
4000 psi • up to 25 gpm



Hydraulic Symbol



2 mounting holes

Inlet: Side

Ductile iron

16 gpm (60 lpm)

25 gpm (95 lpm)

4000 psi (276 bar)

14,680 psi (1012 bar)

3045 psid (210 bar)

290 psid (20 bar)

4000 psi (276 bar) @ 1 million cycles

14°F to 212°F (-10°C to 100°C)

SAE-12, 3/4" BSPP

Manifold Mount - (0.689")

Outlet: Side

Features

- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- Inlet/Outlet port options include SAE straight thread O-ring boss, BSPP and subplate mounting to allow easy installation without costly adapters.
- O-ring seals are used to provide positive, reliable sealing. A
 choice of O-ring materials (nitrile, fluorocarbon elastomer,
 ethylene propylene rubber) provides compatibility with petroleum
 oils, synthetic fluids, water-glycols, oil/water emulsions, and high
 water based fluids.
- Screw-in bowl mounted below the filter head requires minimal clearance to remove the element for replacement and contaminated fluid cannot be washed downstream when element is serviced.
- Clogging indicators are actuated by differential pressure and have no external dynamic seal. High reliability is achieved and magnetic indicator actuation eliminates a potential leak point.
- A poppet type bypass valve is typically mounted in the filter head out of the flow path between the inlet and outlet port to provide positive sealing during normal operation and fast response during cold starts and flow surges.
- Fatigue pressure rating equals maximum allowable working pressure rating.

Applications









Compatible wit

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility Compatible with all the

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid } (2 \text{ bar}) -10\% \text{ (optional)}$

Element Collapse Pressure Rating

Technical Specifications

Mounting Method

Construction Materials

Housing Pressure Rating

Fluid Temperature Range

Max. Allowable Working

Port Connection

Flow Direction

Flow Capacity

Pressure

BH4HC

Fatigue Pressure

Burst Pressure

Head

Bowl

 $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (standard)}$

 $\Delta P = 116 \text{ psid (8 bar) -10\% (optional on bypass)}$

Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (optional)}$

 $\Delta P = 87 \text{ psid } (6 \text{ bar}) + 10\% \text{ (standard)}$

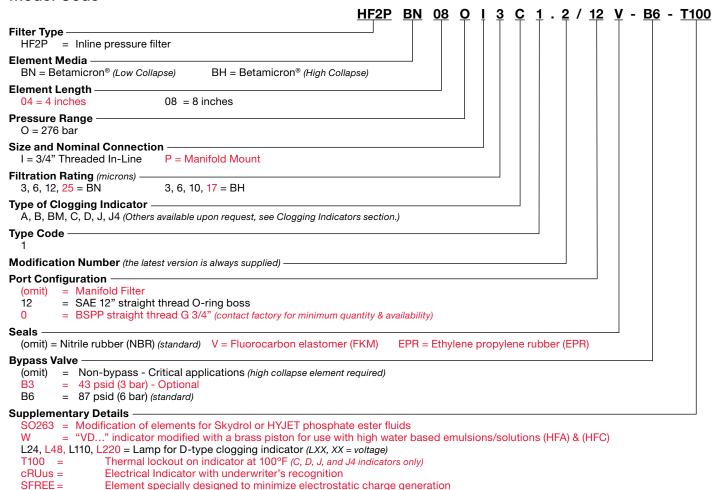
Non Bypass Available

Agricultural

Railways



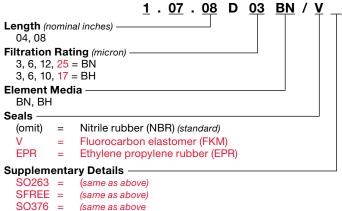
Model Code



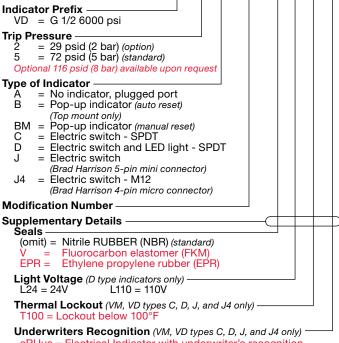
Modification of ÓN and W/HC elements for HFA, HFB, HFČ, and HFD flame retardant liquids

Replacement Element Model Code

SO376 =



Clogging Indicator Model Code



۷D

5 C.X/V

cRUus = Electrical Indicator with underwriter's recognition

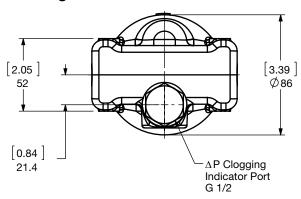
W = "VD..." indicator modified with a brass piston for use with high water based emulsions/solutions (HFA) & (HFC)

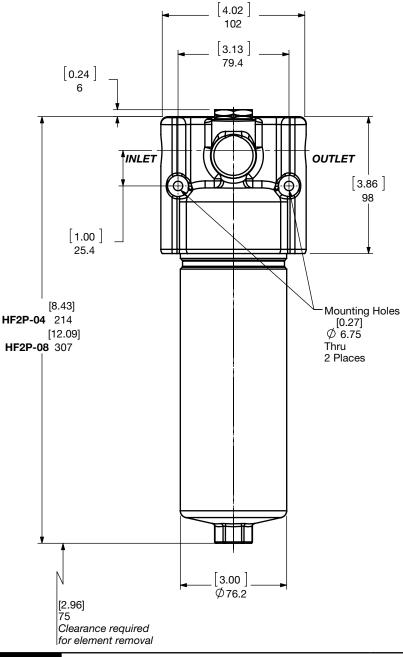
(For additional details and options, see Clogging Indicators section.)

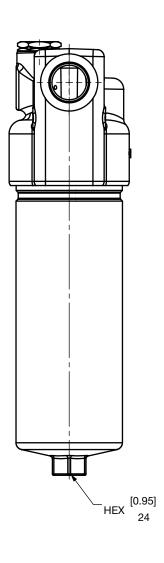
Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability



Dimensions HF2P Inline Mounting

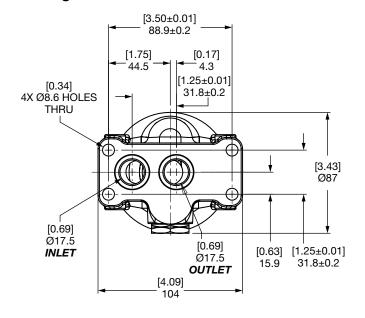


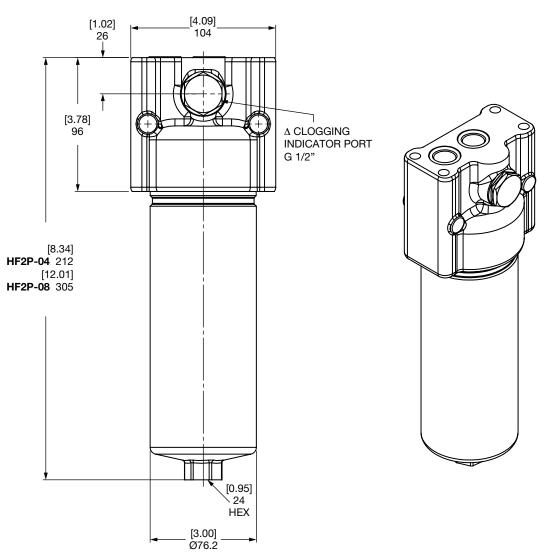




Size	04	08
Weight (lbs.)	10.7	14.3

Dimensions HF2P Subplate Mounting





Size	04	08
Weight (lbs.)	10.7	14.3

Sizing Information

Total pressure loss through the filter is as follows:

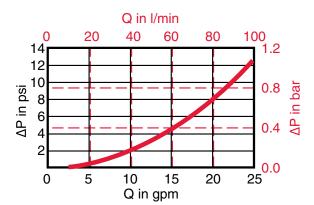
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual\ Specific\ Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

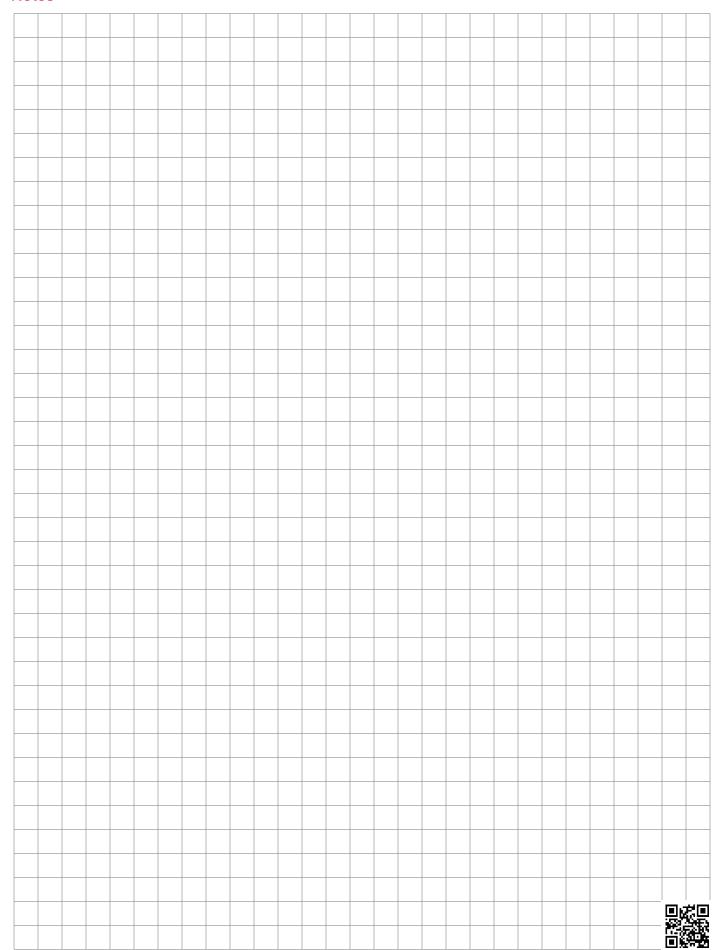
Autospec HF2 Depth	1.07.08DXXBN (Low Collapse)			
Size	3 µm	6 µm	12 µm	25μm
1.07.04DXXBN	2.046	1.735	0.925	0.531
1.07.08DXXBN	0.975	0.815	0.457	0.257

Autospec HF2 Depth	1.07.08DXXBH (High Collapse)			
Size	3 µm	6 μm	10 μm	17 µm
1.07.04DXXBH	2.400	1.690	1.027	0.538
1.07.08DXXBH	1.165	0.820	0.499	0.262

All Element K Factors in psi / gpm.



Notes



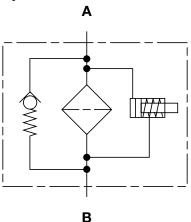
HF3P Series

Inline Filters 6090 psi • up to 120 gpm





Hydraulic Symbol



Features

- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- Inlet/Outlet port options include SAE straight thread O-ring boss, BSPP and flange mounting to allow easy installation without costly adapters.
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, ethylene propylene rubber) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based fluids.
- Screw-in bowl or lid (on 2 piece bowls), mounted below the filter head requires minimal clearance to remove the element for replacement, and contaminated fluid cannot be washed downstream when element is serviced.
- Clogging indicators are actuated by differential pressure and have no external dynamic seal. High reliability is achieved and magnetic indicator actuation eliminates a potential leak point.
- A poppet type bypass valve, located in filter head, mounted between the inlet and outlet port to provides positive sealing during normal operation and fast response during cold starts and flow surges, while additionally providing low operating ΔP .
- Fatigue pressure rating equals maximum allowable working pressure rating.

Applications









Industrial

Railways



Technical Specifications				
Mounting Method	4 mounting holes			
Port Connection	SAE-16, SAE-24, 1" BSPP, 1 1/2" BSPP, 1 1/2" SAE Flange Code 61, 2" SAE Flange Code 62			
Flow Direction	Inlet: Side Outlet: Side			
Construction Materials				
Head Bowl Housing (size 16) Cap (size 16)	Ductile iron Steel Steel Ductile iron			
Flow Capacity				
4" 8" 13" 16"	28 gpm (106 lpm) 55 gpm (208 lpm) 91 gpm (344 lpm) 120 gpm (454 lpm)			
Housing Pressure Rating				
Max. Allowable Working Pressure Fatigue Pressure Burst Pressure	6090 psi (420 bar) 6090 psi (420 bar) @ 1 million cycles 15,080 psi (1040 bar)			
Element Collapse Pressure Rating				
BH BN	3045 psid (210 bar) 290 psid (20 bar)			
Fluid Temperature Range 14°F to 212°F (-10°C to 100°C) Consult HYDAC for applications operating below 14°F (-10°C)				

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar) -10\% (optional)}$ $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (standard)}$

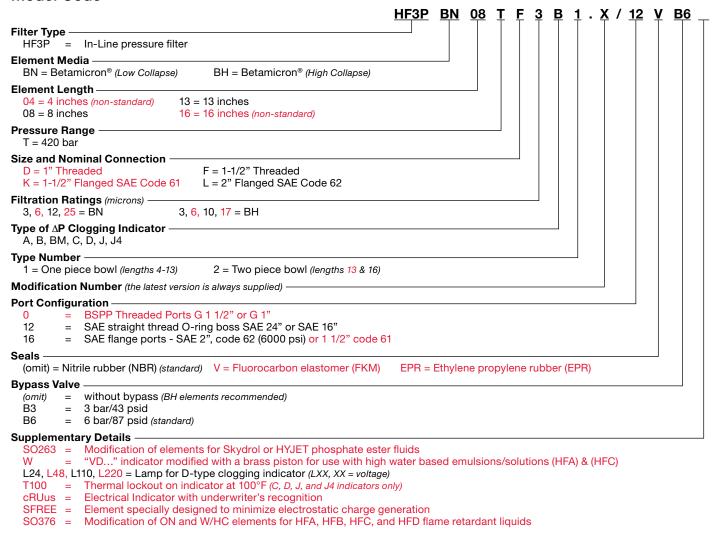
 $\Delta P = 116 \text{ psid (8 bar)} - 10\% \text{ (optional)}$ **Bypass Valve Cracking Pressure**

 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (optional)}$

 $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (standard)}$

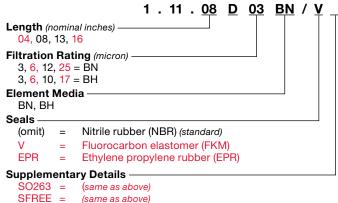
Non Bypass Available

Model Code

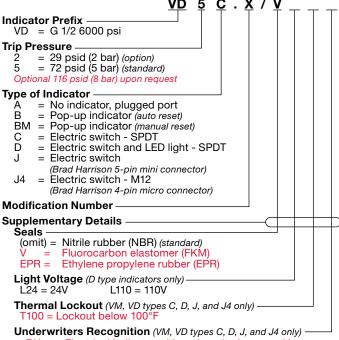


Replacement Element Model Code

(same as above)



Clogging Indicator Model Code



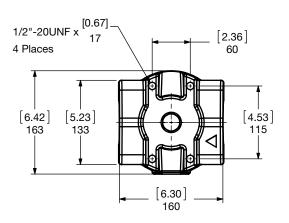
cRUus = Electrical Indicator with underwriter's recognition

W = "VD..." indicator modified with a brass piston for use with high water based emulsions/solutions (HFA) & (HFC)

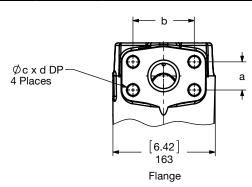
(For additional details and options, see Clogging Indicators section.) Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

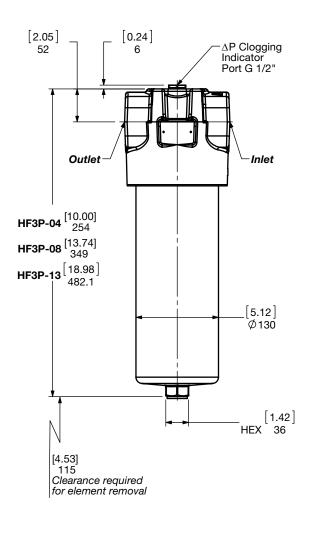
SO376 =

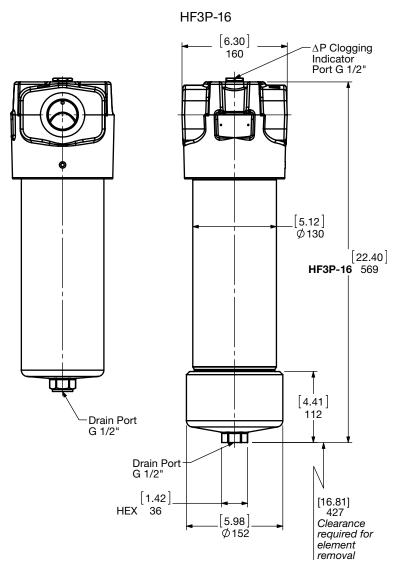
Dimensions HF3P-04/08/13/16



	а	b	С	d
1-1/2"	(1.406)	(2.750)	1/2-13UNC-2B	(0.87)
Code 61	35.71	69.85		22
2" Code	(1.750)	(3.812)	3/4-10UNC-2B	(0.98)
62	44.45	96.80		25







Size	04	08	13	16
Weight (lbs.)	49.2	56.1	72.5	107.3

Sizing Information

Total pressure loss through the filter is as follows:

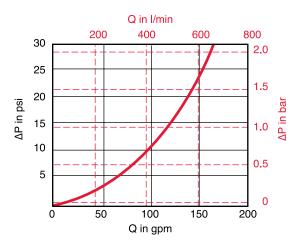
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Autospec HF3 Depth	1.11.08DXXBN (Low Collapse)					
Size	3 µm	25 μm				
1.11.04DXXBN	0.590	0.500	0.266	0.153		
1.11.08DXXBN	0.289	0.241	0.135	0.076		
1.11.13DXXBN	0.175	0.146	0.082	0.046		
1.11.16DXXBN	0.132	0.110	0.062	0.035		

Autospec HF3 Depth	1.11.08DXXBH (High Collapse)					
Size	3 μm	17 μm				
1.11.04DXXBH	0.937	0.660	0.401	0.210		
1.11.08DXXBH	0.460	0.321	0.195	0.102		
1.11.13DXXBH	0.274	0.193	0.117	0.615		
1.11.16DXXBH	0.206	0.145	0.089	0.046		

All Element K Factors in psi / gpm.



HF4P Series



Features

- Meets HF4 automotive standard
- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- Inlet/Outlet port options include SAE straight thread O-ring boss, SAE flange code 62 and code 61 (optional) BSPP and subplate mounting to allow easy installation without costly adapters.
- O-ring seals are used to provide positive, reliable sealing. A choice of O-ring materials (nitrile rubber or fluorocarbon elastomer) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based fluids.
- The element filter housing is permanently mounted above the filter head for easy top access and minimal clearance to remove elements for replacement.
- Clogging indicators are actuated by differential pressure and have no external dynamic seal. High reliability is achieved and magnetic indicator actuation eliminates a potential leak point.
- A poppet type bypass valve located in filter head base is mounted between the inlet and outlet port to provide positive sealing during normal operation and fast response during cold starts and flow surges.
- Fatigue pressure rating equals maximum allowable working pressure rating.

Applications













Generation

Automotive



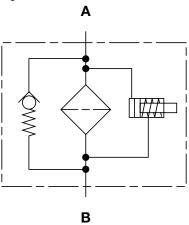




Railways

Industry

Hydraulic Symbol



Technical Specifications

Mounting Method	4 mounting holes		
Port Connection	SAE-24, 1 1/2" BSPP, 1 1/2" SAE Flange Code 61, 1 1/2" SAE Flange Code 62, Manifold Mount		
Flow Direction	Inlet: Side Outlet: Side (opposite each other)		
Construction Materials			
Head, Cap Housing	Ductile iron Steel		
Flow Capacity			
9" 18" 27"	50 gpm (189 lpm) 100 gpm (378 lpm) 120 gpm (454 lpm)		
Harrison Duaganius Dating			

Housing Pressure Rating

Max. Allowable Working

Pressure 5000 psi (345 bar)

3500 psi (241 bar) @ 1 million cycles Fatique Pressure **Burst Pressure** 14,400 psi (992 bar)

Element Collapse Pressure Rating

ВН 3045 psid (210 bar) ΒN 145 psid (10 bar)

Fluid Temperature Range 14°F to 212°F (-10°C to 100°C) Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar)} -10\% \text{ (optional)}$

 $\Delta P = 72 \text{ psid } (5 \text{ bar}) -10\% \text{ (standard)}$

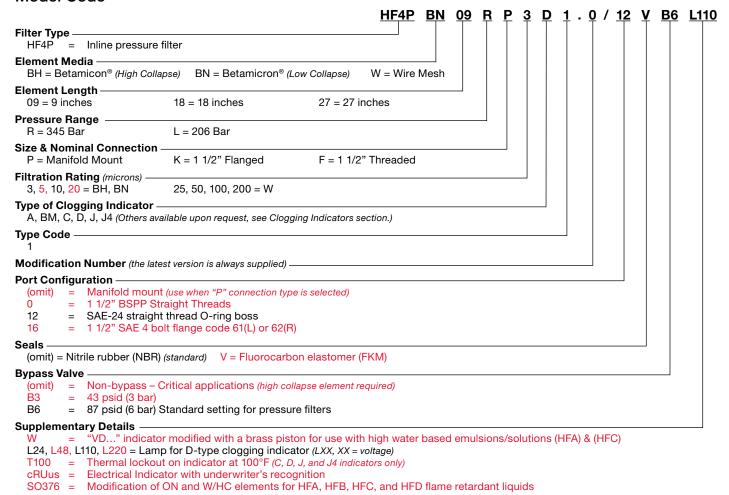
 $\Delta P = 116 \text{ psid } (8 \text{ bar}) - 10\% \text{ (optional on non-bypass filters)}$

Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid } (3 \text{ bar}) + 10\% \text{ (optional)}$ $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (standard)}$

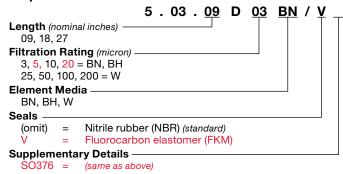
Non Bypass Available

Model Code

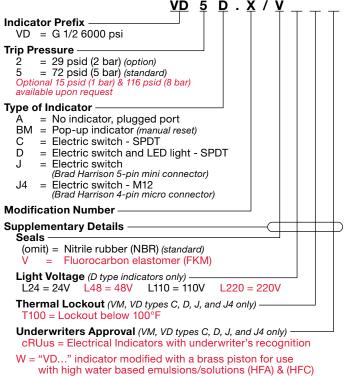


Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Replacement Element Model Code



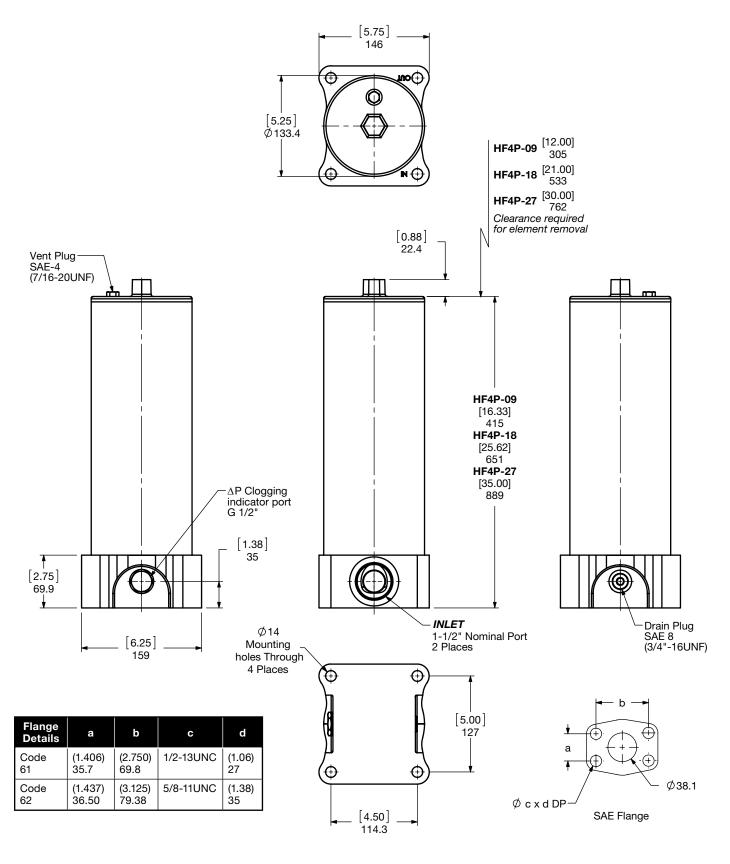
Clogging Indicator Model Code



With high Water Bacoa emalerency columns (1117) a (

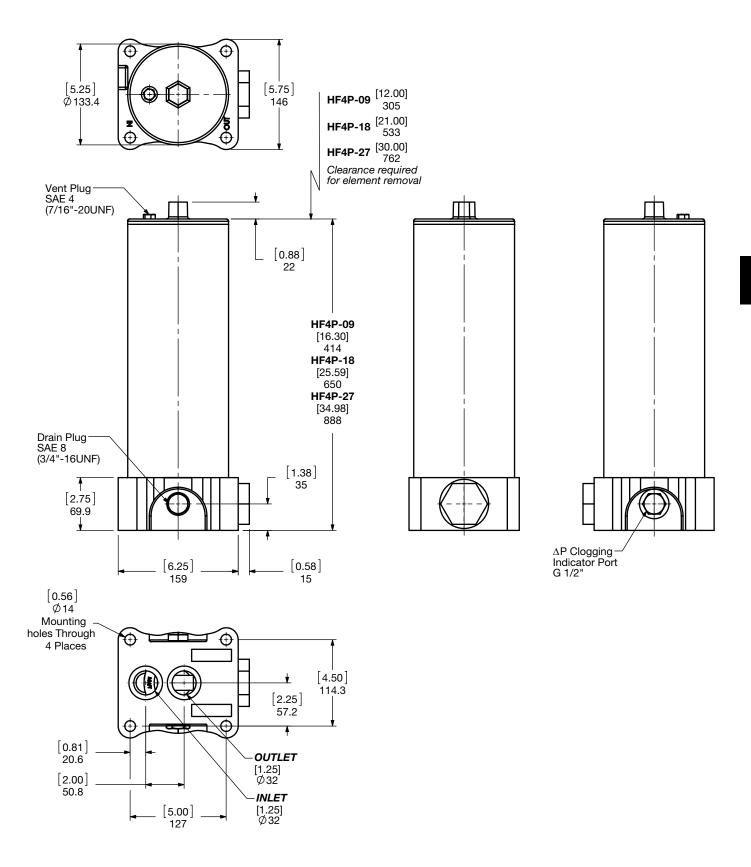
(For additional details and options, see Clogging Indicators section.)

Dimensions HF4P Inline



Size	09	18	27
Weight (lbs.)	69.9	98.4	132.8

Dimensions HF4P Manifold



Size	09	18	27
Weight (lbs.)	71.7	100.2	134.6

Sizing Information

Total pressure loss through the filter is as follows:

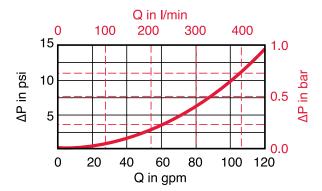
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual\ Specific\ Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Autospec HF4 Depth	5.03.XXDXXBN (Low Collapse)					
Size	3 µm 5 µm 10 µm 20 µr					
5.03.09DXXBN	0.168	0.141	0.079	0.044		
5.03.18DXXBN	0.080	0.067	0.038	0.021		
5.03.27DXXBN	0.052	0.043	0.024	0.014		

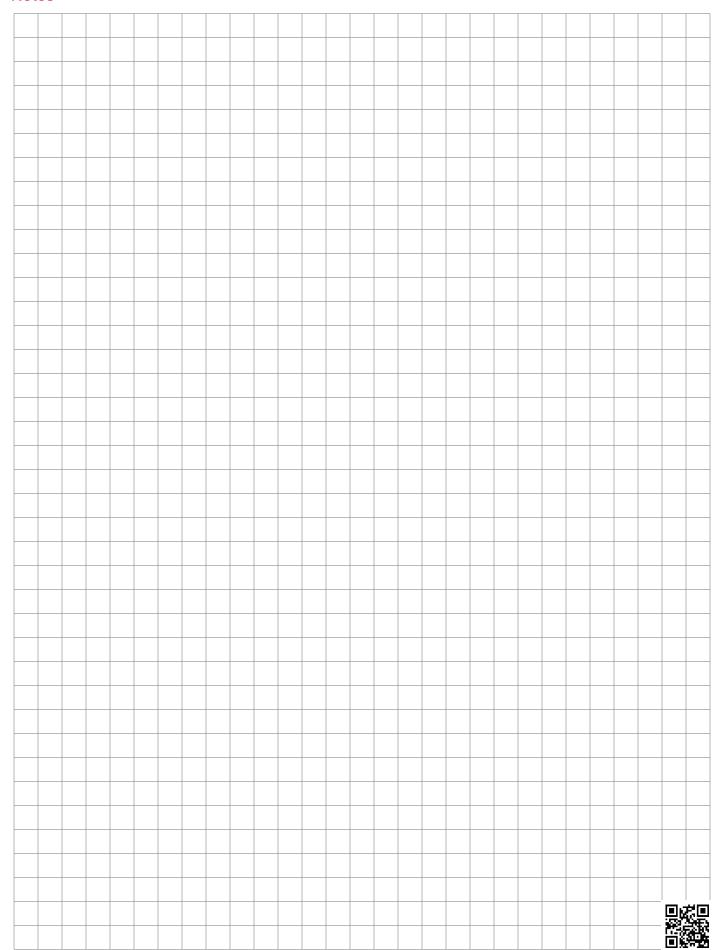
Autospec HF4 Depth	5.03.XXDXXBH (High Collapse)							
Size	3 µm	3 μm 5 μm 10 μm 20 μm						
5.03.09DXXBH	0.207	0.146	0.089	0.047				
5.03.18DXXBH	0.097	0.068	0.041	0.022				
5.03.27DXXBH	0.063	0.044	0.027	0.014				

Autospec HF4 Wire Mesh	5.03.XXDXXW
Size	25, 50, 100, 200 μm
5.03.09DXXW	0.007
5.03.18DXXW	0.004
5.03.27DXXW	0.002

All Element K Factors in psi / gpm.



Notes

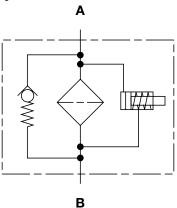


MFM Series

Inline Filters 4060 PSI • up to 25 GPM



Hydraulic Symbol



Features

- Because of their efficient design and construction, MFM filters are considered a cost effective solution for new equipment, or as a replacement for filters already specified on existing equipment.
- The MFM filter is available in 4 sizes comprised of four different bowl and element lengths. The models 35, 55, 75, and 95, provide maximum flow rates of 10, 18, 20, and 25 GPM respectively.
- A quick-response bypass valve located in filter head protects against high differential pressures caused by cold startups, flow surges and pressure spikes.
- The high bypass pressure setting (100 psid) minimizes the possibility of contamination due to premature bypassing.
- Filter materials are compatible with all mineral, lubricating oils, and commonly used fire retardant fluids per ISO 2943.
- Fatigue pressure rating equals maximum allowable working pressure rating.

Construction

Gearboxes

Applications



Agricultural



Industrial



Commercial Municipal

Technical Specifications

Mounting Method	4 mounting holes - filter head			
Port Connection	SAE-12, 3/4" BSPP			
Flow Direction	Inlet: Side	Outlet: Side		
	(opposite each other)			
Construction Materials				
Head	Ductile iron			
Bowl	Steel			
Flow Capacity				
35	10 gpm (35 lpm)			
55	18 gpm (68 lpm)			
75	20 gpm (76 lpm)			
95	25 gpm (95 lpm)			
Housing Pressure Rating				

Max. Allowable Working

4060 psi (280 bar) Pressure

4060 psi (280 bar) @ 1 million cycles Fatigue Pressure 4641 psi (320 bar) @ 100,000 cycles **Burst Pressure** 13,920 psi (960 bar)

Element Collapse Pressure Rating

290 psid (20 bar)

Fluid Temperature Range 14°F to 212°F (-10°C to 10°C consult HYDAC for applications operating below 14°F (-10°C) 14°F to 212°F (-10°C to 100°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

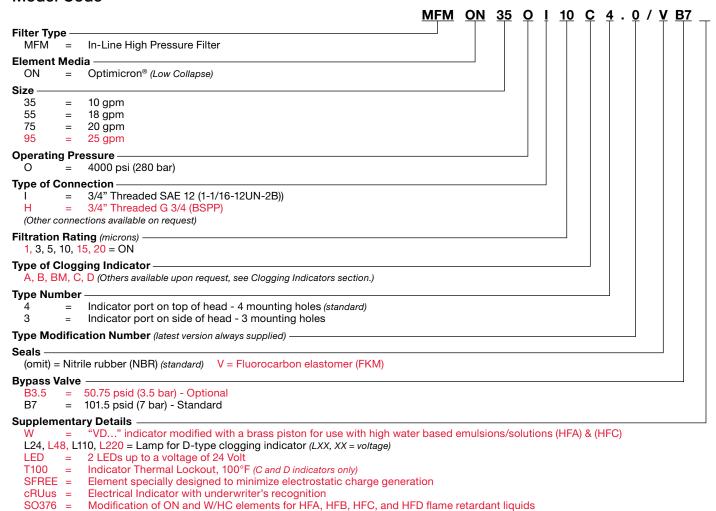
Indicator Trip Pressure

 $\Delta P = 72 \text{ psid (5 bar) -10}\%$

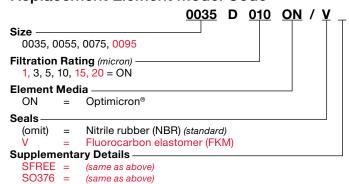
Bypass Valve Cracking Pressure

 $\Delta P = 50.75 \text{ psid } (3.5 \text{ bar}) + 10\% \text{ (optional)}$ $\Delta P = 100 \text{ psid } (7 \text{ bar}) + 10\% \text{ (standard)}$

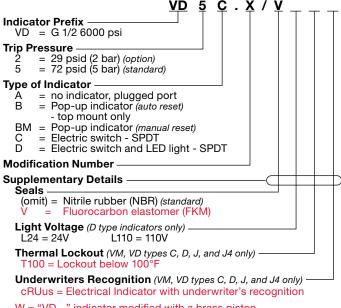
Model Code



Replacement Element Model Code



Clogging Indicator Model Code



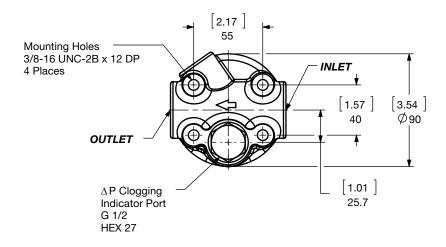
W = "VD..." indicator modified with a brass piston for use with high water based emulsions/solutions (HFA) & (HFC)

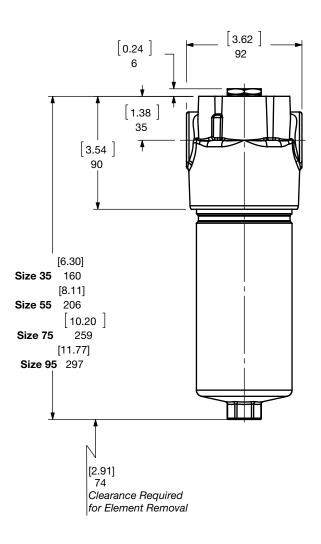
(For additional details and options, see Clogging Indicators section.)

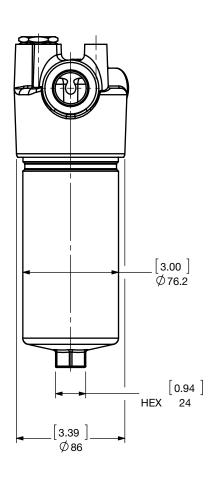


F35

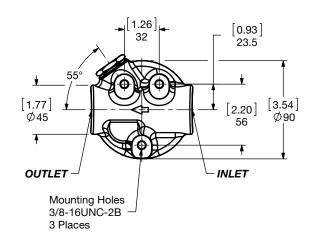
Dimensions MFM 4.X Version (Standard)

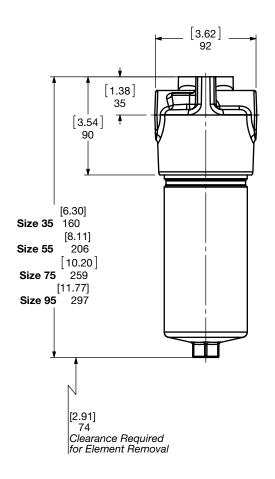


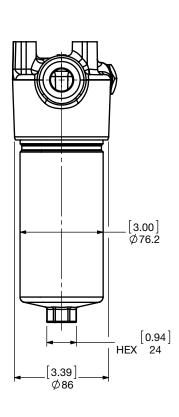


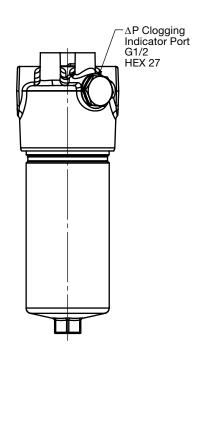


Size	35	55	75	95
Weight (lbs.)	8.2	9.3	10.4	11.3









Size	35	55	75	95
Weight (lbs.)	8.2	9.3	10.4	11.3

Sizing Information

Total pressure loss through the filter is as follows:

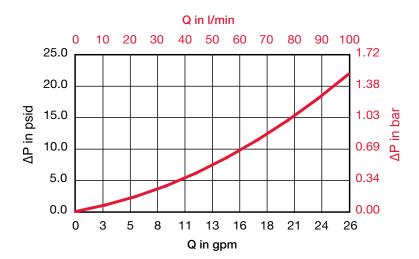
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



Element K Factors

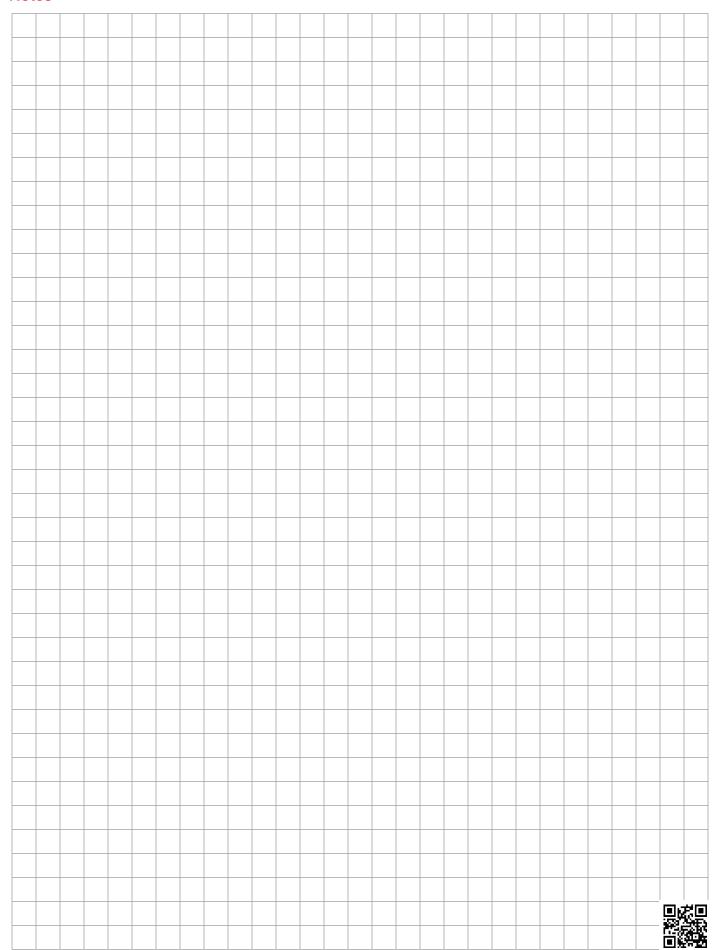
 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Optimicron	DON (Pressure Elements)					
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm
0035 D XXX ON	2.755	1.169	0.938	0.752	0.549	0.408
0055 D XXX ON	1.427	0.675	0.543	0.434	0.284	0.211
0075 D XXX ON	0.916	0.461	0.37	0.296	0.183	0.136
0095 D XXX ON	0.724	0.37	0.296	0.238	0.144	0.105

All Element K Factors in psi / gpm.



Notes



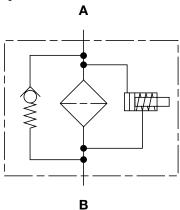
HFM Series

Inline Filters 5800 psi • up to 37 gpm





Hydraulic Symbol



Features

- The HFM filter is available in two sizes comprised of two different bowl and element lengths. The models 75 and 95 provide maximum flow rates of 29 and 37 GPM respectively.
- A quick-response by-pass valve located in the filter head, protects against high differential pressures caused by cold startups, flow surges and pressure spikes.
- The high bypass pressure setting (100 psid) minimizes the possibility of contamination due to premature bypassing.
- Filter materials are compatible with all mineral, lubricating oils, and commonly used fire retardant fluids per ISO 2943.
- Fatigue pressure rating equals maximum allowable working pressure rating.
- Wide variety of indicators available with standard setting of 72 psid (5 bar).

Applications







Industrial



Automotive



Commercial Municipal



Construction

Generation



Mounting Method

Port Connection

Technical Specifications

Flow Direction	Inlet: Side (opposite each other)	Outlet: Side
Construction Materials		
Head Bowl	Ductile iron Steel	
Flow Capacity		
75	29 gpm (110 lpm)	
95	37 gpm (140 lpm)	

3 or 4 mounting holes - filter head

SAE 16, 1" BSPP

Housing Pressure Rating

Max. Allowable Working

Pressure 5800 psi (400 bar) Fatique Pressure Contact HYDAC office **Burst Pressure** 13,920 psi (960 bar)

Element Collapse Pressure Rating

290 psid (20 bar)

14°F to 212°F (-10°C to 100°C) Fluid Temperature Range Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

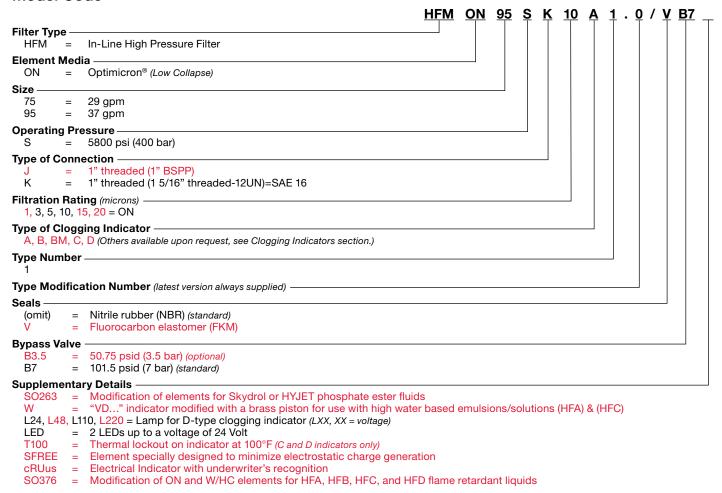
Indicator Trip Pressure

 $\Delta P = 72 \text{ psid } (5 \text{ bar}) -10\% \text{ (standard)}$

Bypass Valve Cracking Pressure

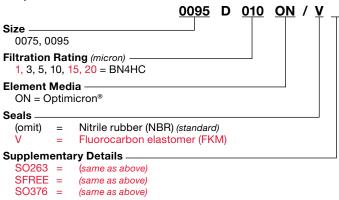
 $\Delta P = 101.5 \text{ psid } (7 \text{ bar}) + 10\% \text{ (standard)}$

Model Code

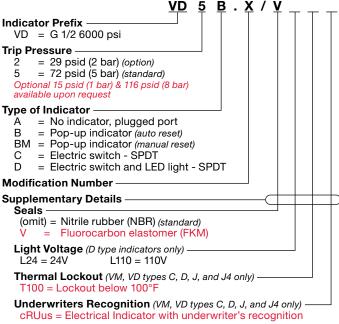


Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Replacement Element Model Code



Clogging Indicator Model Code



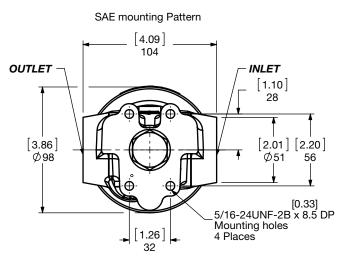
cRUus = Electrical Indicator with underwriter's recognition
W = "VD..." indicator modified with a brass piston for use

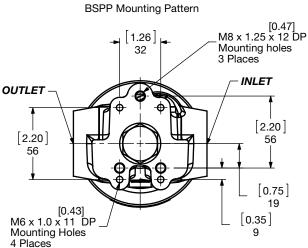
W = "VD..." Indicator modified with a brass piston for use with high water based emulsions/solutions (HFA) & (HFC)

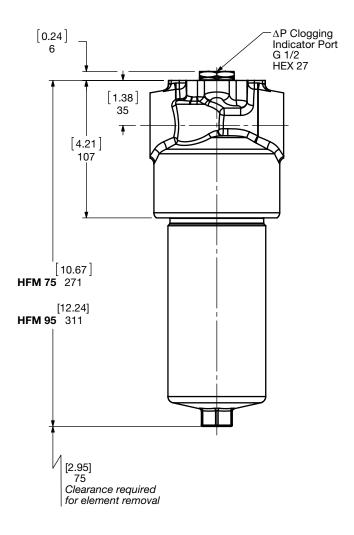
(For additional details and options, see Clogging Indicators section.)

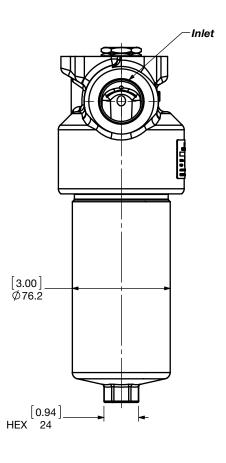
F41

Dimensions HFM 75/95









Size	75	95
Weight (lbs.)	12.4	13.5

Sizing Information

Total pressure loss through the filter is as follows:

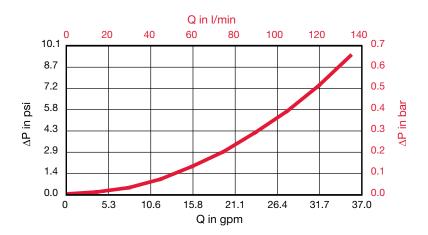
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Optimicron	DON (Pressure Elements)					
Size	1 μm 3 μm 5 μm 10 μm 15 μm 20					
0075 D XXX ON	0.916	0.461	0.37	0.296	0.183	0.136
0095 D XXX ON	0.724	0.37	0.296	0.238	0.144	0.105

All Element K Factors in psi / gpm.

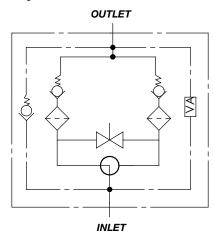
FMND Series

Inline Duplex Filters 3000 psi • up to 100 gpm





Hydraulic Symbol



Features

- The FMND filter consists of a ductile iron filter head with built-in changeover valve and three different lengths of screw-in filter
- The FMND filter can be supplied with or without bypass valve, (located in head assembly) but includes vent and drain screws, and also a connection for a differential pressure clogging indicator.
- Pressure equalization requirement is achieved by raising the changeover lever prior to switching it to the relevant filter side.
- Fatigue pressure rating = maximum allowable working pressure rating.
- Germanischer Lloyd (GL) approved
- This filter can be modified to meet the requirements of DIN 24550* as follows:

 - Filter size 0160 with G 1-1/4" port selection Filter size 0250 with G 1-1/2" port selection
 - Filter size 0400 with SAE-DN 38 1-1/2" Flange

*Note - QPD design does not meet DIN 24550.

Applications







Generation



Automotive



Railways



Construction



Industrial



Industry

Technical Specifications

roominoar opcomo			
Mounting Method	4 Mounting holes		
Port Connections	Inlet / Outlet 1-1/4" Threaded – SAE 20, 1-1/4" BSPF 1-1/2" Threaded – SAE 24, 1-1/2" BSPP 1-1/2" Flange-SAE-DN 38 Code 61		
Flow Direction	Inlet: Side Outlet: Opposite Side		
Construction Materials			
Head	Ductile iron		
Bowl	Steel		
Flow Capacity			
160	42 gpm (160 lpm)		
250	66 gpm (250 lpm)		
400	100 gpm (400 lpm)		
Housing Pressure Rating			
NA All			

Max. Allowable Working

3000 psi (207 bar) Pressure

3000 psi (210 bar) @ 1 million cycles Fatigue Pressure

Burst Pressure 10,650 psi (735 bar)

Element Collapse Pressure Rating

BH4HC 3045 psid (210 bar) BN4HC, W/HC 290 psid (20 bar)

Fluid Temperature Range 14°F to 212°F (-10°C to 100°C)

Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 36.25 \text{ psid } (2.5 \text{ bar}) -10\% \text{ (optional)}$

 $\Delta P = 50.75 \text{ psid } (3.5 \text{ bar}) + 10\% \text{ (optional)}$

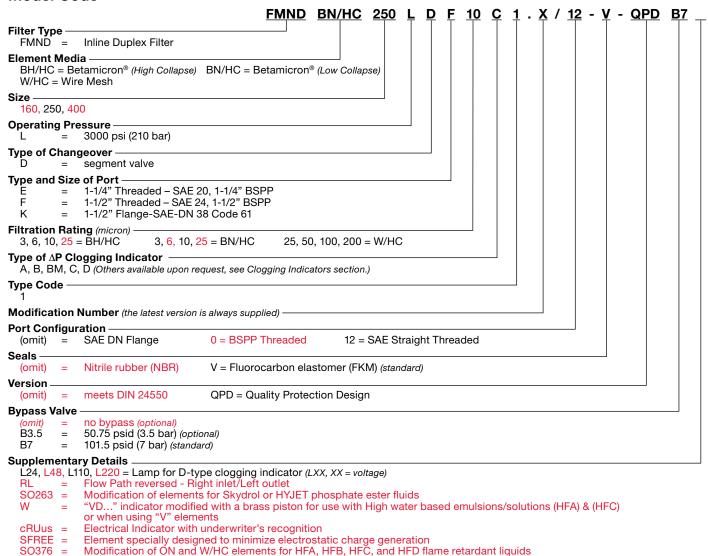
 $\Delta P = 72 \text{ psid } (5 \text{ bar}) -10\% \text{ (standard)}$

 $\Delta P = 116 \text{ psid } (8 \text{ bar}) - 10\% \text{ (optional)} \text{ [Used with non-bypass]}$

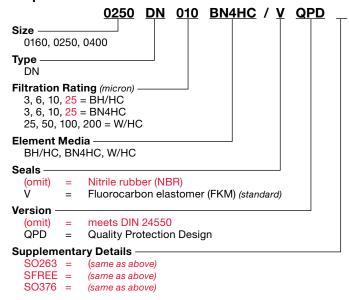
Bypass Valve Cracking Pressure

 $\Delta P = 102 \text{ psid } (7 \text{ bar}) + 10\%$

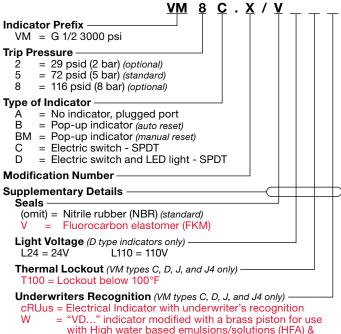
Model Code



Replacement Element Model Code



Clogging Indicator Model Code



with High water based emulsions/solutions (HFA) & (HFC) or when using "V" elements

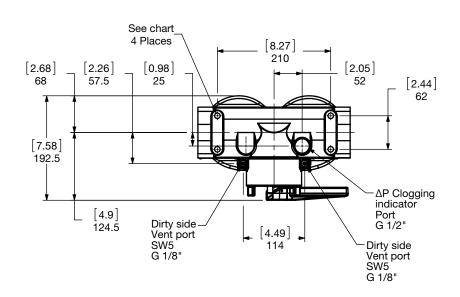
(For additional details and options, see Clogging Indicators Section.)

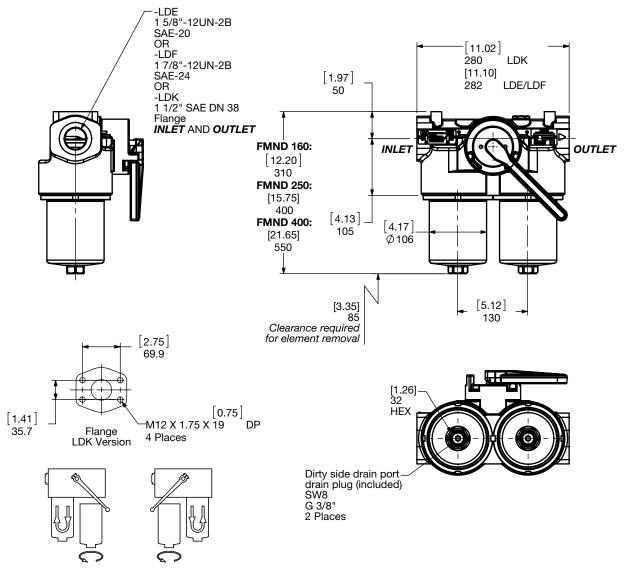
Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability



Dimensions FMND 160/250/400

Model	Mounting Hole
FMND160-400LDE	M12X1.75 x 19mm Deep
FMND160-400LDE/12	3/8-24UNF x 14mm Deep
FMND160-400LDF	M12X1.75 x 19mm Deep
FMND160-400LDF/12	3/8-24UNF x 14mm Deep
FMND160-400LDK	M12X1.75 x 19mm Deep





Before changing the element, relieve pressure in the filter housing.

Size	160	250	400
Weight (lbs.)	52.7	59.8	71.0

Sizing Information

Total pressure loss through the filter is as follows:

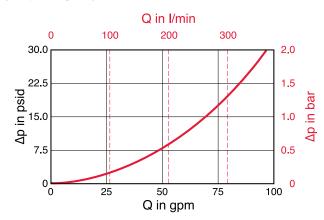
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



Element K Factors

 $\Delta P \; Elements = Elements \; (K) \; Flow \; Factor \; x \; Flow \; Rate \; (gpm) \; x \; \frac{Actual \; Viscosity \; (SUS)}{141 \; SUS} \; \times \; \frac{Actual \; Specific \; Gravity}{0.86} \; \times \; \frac{Actual \; Specific \; Gra$

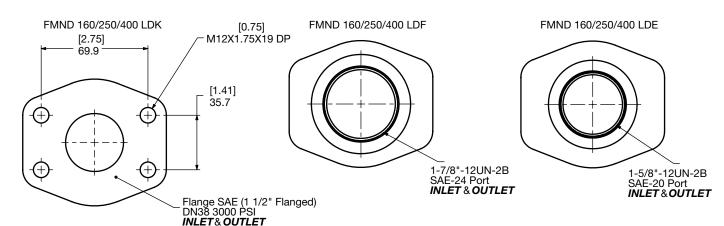
Betamicron	DNBN/HC Elements (Low Collapse)					
Size	3μm	6 μm	10 μm	25 μm		
0160 DN XXX BN4HC	0.434	0.280	0.187	0.143		
0250 DN XXX BN4HC	0.280	0.176	0.115	0.099		
0400 DN XXX BN4HC	0.176	0.110	0.071	0.055		

Wire Mesh	DNW/HC Elements					
Size	25 μm 50 μm 100 μm 200 μn					
0160 DN XXX W/HC	0.009	0.009	0.009	0.009		
0250 DN XXX W/HC	0.006	0.006	0.006	0.006		
0400 DN XXX W/HC	0.004	0.004	0.004	0.004		

Betamicron	DNBH/HC Elements (High Collapse)					
Size	3 µm	25 μm				
0160 DN XXX BH4HC	0.439	0.280	0.209	0.137		
0250 DN XXX BH4HC	0.296	0.187	0.154	0.104		
0400 DN XXX BH4HC	0.187	0.115	0.093	0.060		

All Element K Factors in psi / gpm.

FMND 160/250/400 LDK



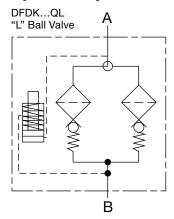
DFDK Series

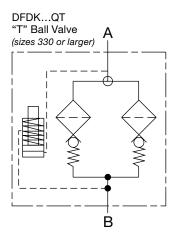
Inline Duplex Filters 4568 psi • up to 90 gpm





Hydraulic Symbol





Features

- The DFDK Filters have a filter head of ductile iron and a screw-in bowl of cold-formed steel.
- The filter housings are designed to withstand pressure surges as well as high static pressure loads.
- The screw-in bowl or lid, allows the filter element to be easily removed for replacement or cleaning.
- A visual (pop-up), electrical, electrical/visual (lamp), or other electronic differential types of clogging indicators are available to suit each application.
- DFDK filters are available only with high collapse pressure elements since no bypass is provided.
- DFDK sizes 330 and above can be ordered with a T Ball Valve which can operate in mid position with both elements fully open and online in parallel.

Note: QPD is available in sizes 160-1320 only.

Applications







Industrial



Generation



Pulp & Paper

Technical Specifications

Mounting Method	4 mounting h	noles
Port Connection		
60/110 160/240/280 330/660/1320	SAE-12 SAE-24 2" SAE-DN 5	51 Code 62 Flange
Flow Direction	60 - 280	330 - 1320
Inlet Outlet	Top Side	Top Back
Construction Materials		
Head Bowl Housing (1320) Lid/Cap (1320)	Ductile iron Steel Steel Ductile iron	
Flow Capacity	,	,
60/110 160/240/280 330/660/1320	13 gpm (50 l) 35 gpm (132 90 gpm (340	lpm)
Housing Pressure Rating		
Max Allowable Working		

Pressure 4568 psi (315 bar) Fatigue Pressure Contact HYDAC Office **Burst Pressure** > 18,270 psi (1260 bar)

Element Collapse Pressure Rating

BH4HC, V 3045 psid (210 bar)

14°F to 212°F (-10°C to 100°C) Fluid Temperature Range Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 116 \text{ psid (8 bar) -10\% (standard)}$

Non-bypass Only

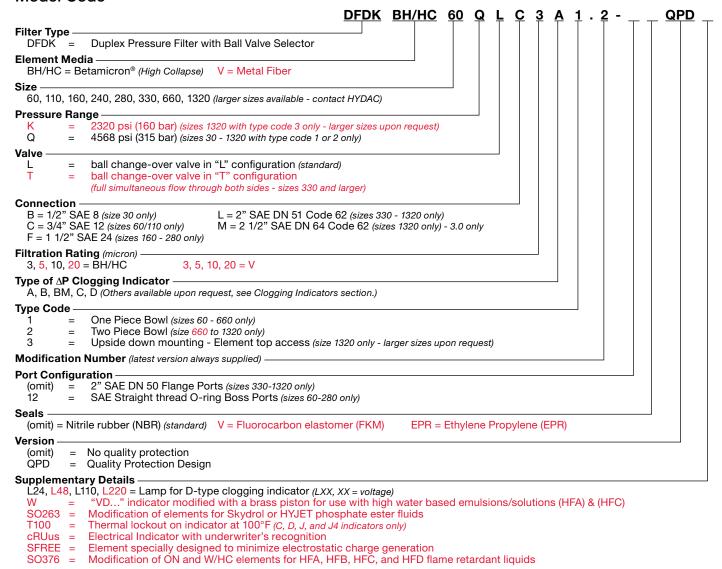


Railways

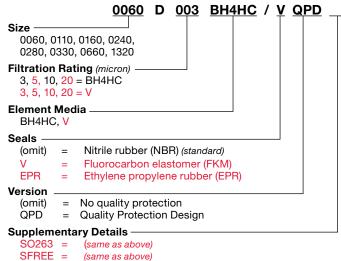




Model Code



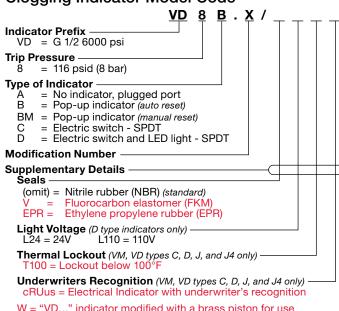
Replacement Element Model Code



Modification of "V" elements for use with oil water

emulsions (HFA) and water polymer solutions (HFC)

Clogging Indicator Model Code



W = "VD..." indicator modified with a brass piston for use

with high water based emulsions/solutions (HFA) & (HFC)

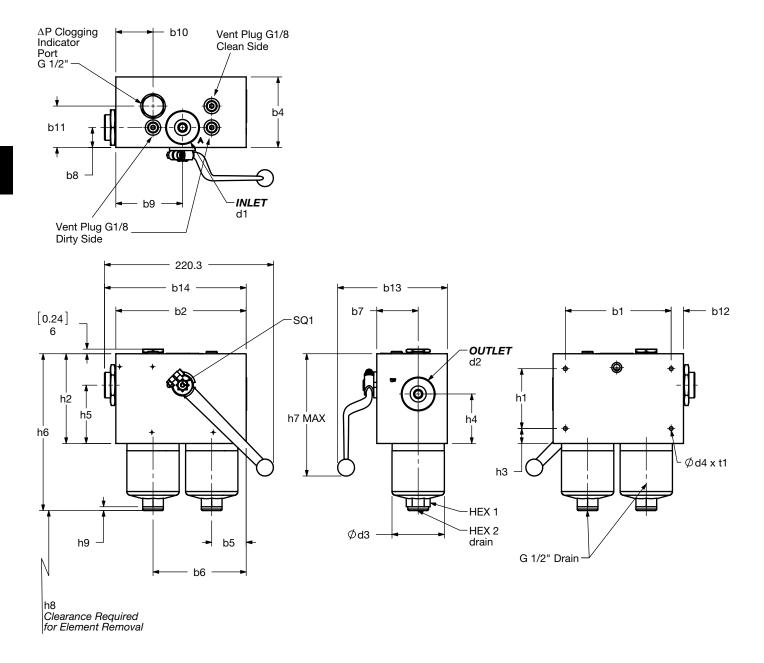
(For additional details and options, see Clogging Indicators section.)

Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

(same as above)

SO376 =

Dimensions DFDK 60 / 110 / 160 / 240 / 280

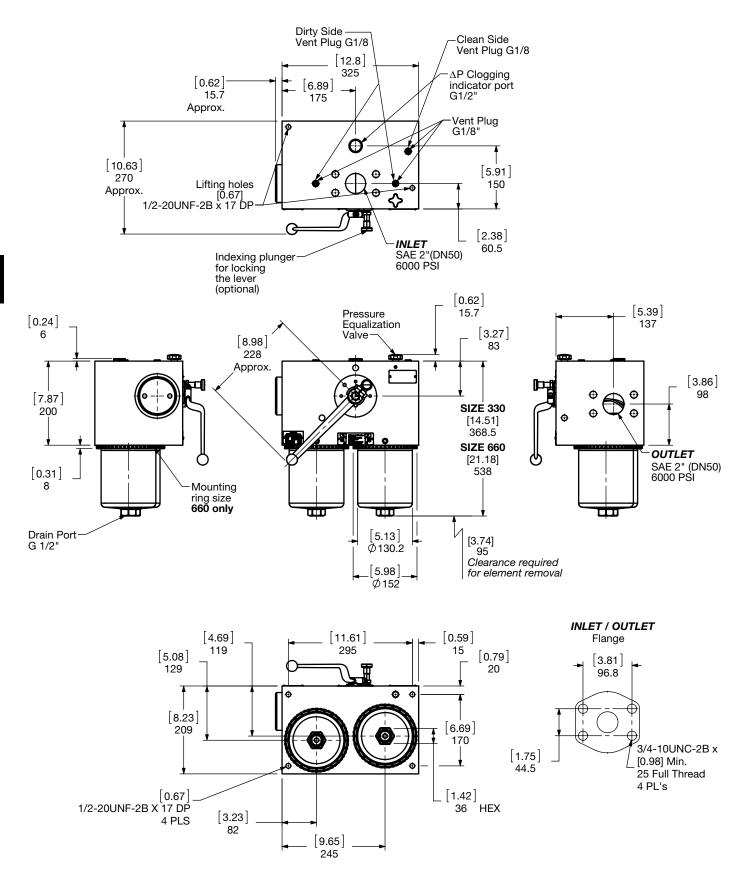


Size	60	110	160	240	280
Weight (lbs.)	33.1	37.5	72.8	79.4	99.3

DFDK	60	110	160	240	280	
b1	[5.43] 138	[5.43] 138	[7.48] 190	[7.48] 190	[7.48] 190	
b2	[6.69] 170	[6.69] 170	[8.27] 210	[8.27] 210	[8.27] 210	
b4	[3.62] 92	[3.62] 92	[5.04] 128	[5.04] 128	[5.04] 128	
b5	[1.77] 45	[1.77] 45	[2.07] 52.5	[2.07] 52.5	[2.07] 52.5	
b6	[4.78] 121.5	[4.78] 121.5	[6.20] 157.5	[6.20] 157.5	[6.20] 157.5	
b7	[2.13] 54	[2.13] 54	[2.97] 75.5	[2.97] 75.5	[2.97] 75.5	
b8	[1.02] 26	[1.02] 26	[1.40] 35.5	[1.40] 35.5	[1.40] 35.5	
b9	[3.43] 87	[3.43] 87	[4.13] 105	[4.13] 105	[4.13] 105	
b10	[1.91] 48.5	[1.91] 48.5	[2.07] 52.5	[2.07] 52.5	[2.07] 52.5	
b11	[2.13] 54	[2.13] 54	[2.97] 75.5	[2.97] 75.5	[2.97] 75.5	
b12	[0.63] 16	[0.63] 16	[0.39] 10	[0.39] 10	[0.39] 10	
b13 (≈)	[5.91] 150	[5.91] 150	[7.60] 193	[7.60] 193	[7.60] 193	
b14 (≈)	[7.13] 181	[7.13] 181	[8.70] 221	[8.70] 221	[8.70] 221	
d1*	1-1/16-12UN-2B		1-7/8-12UN-2B			
d2*	SAI	E-12	SAE-24			
d3	[2.69] 68.2	[2.69] 68.2	[3.75] 95.2	[3.75] 95.2	[3.75] 95.2	
d4	1/4-28	JNF-2B	3/8-24UNF-2B			
h1	[3.07] 78	[3.07] 78	[3.78] 96	[3.78] 96	[3.78] 96	
h2	[4.61] 117	[4.61] 117	[6.38] 162	[6.38] 162	[6.38] 162	
h3	[0.77] 19.5	[0.77] 19.5	[1.30] 33	[1.30] 33	[1.30] 33	
h4	[2.54] 64.5	[2.54] 64.5	[4.17] 106	[4.17] 106	[4.17] 106	
h5	[2.99] 76	[2.99] 76	[3.94] 100	[3.94] 100	[3.94] 100	
h6	[8.07] 205	[10.89] 276.5	[11.20] 284.5	[13.60] 345.5	[20.69] 525.5	
h7 (≈)	[8.07] 205	[8.07] 205	[9.65] 245	[9.65] 245	[9.65] 245	
h8	[2.95] 75	[2.95] 75	[3.35] 85	[3.35] 85	[3.35] 85	
h9	[0.20] 5	[0.20] 5	[0.20] 5	[0.20] 5	[0.20] 5	
t1	[0.28] 7	[0.28] 7	[0.43] 11	[0.43] 11	[0.43] 11	
HEX1	[1.06] 27	[1.06] 27	[1.26] 32	[1.26] 32	[1.26] 32	
HEX2	[0.39] 10	[0.39] 10	[0.39] 10	[0.39] 10	[0.39] 10	
SQ1	[0.47] 12	[0.47] 12	[0.55] 14	[0.55] 14	[0.55] 14	

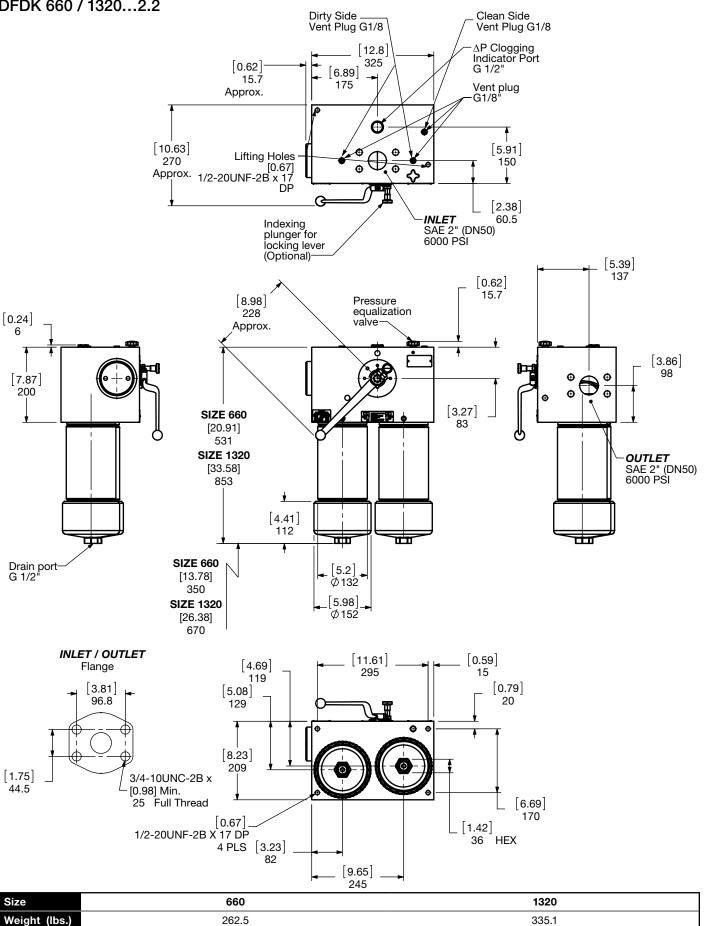
Dimensions shown are [inches] millimeters for general information and overall envelope size only.

Dimensions DFDK 330 / 660...1.2



Size	330	660
Weight (lbs.)	213.9	249

Dimensions DFDK 660 / 1320...2.2



Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

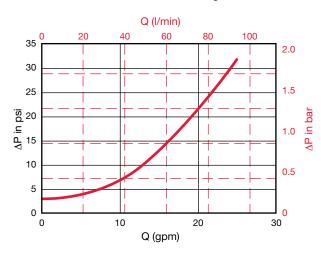
Housing Curve:

Pressure loss through housing is as follows:

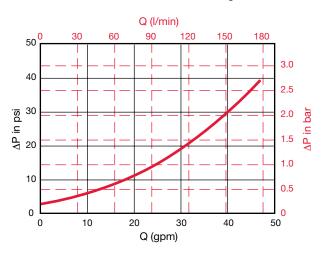
Housing ΔP = Housing Curve ΔP x $\frac{Actual\ Specific\ Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

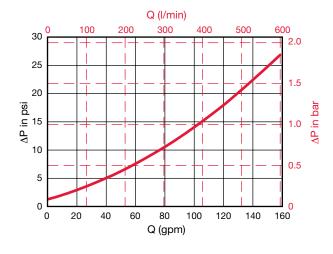
DFDK 60 / 110 Housing



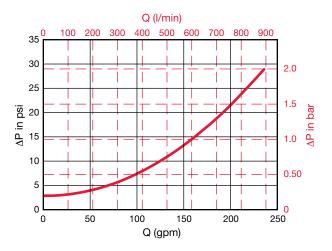
DFDK 160 / 240 / 280 Housing



DFDK 330 / 660 / 1320 QLL Housing "L" Ball Valve



DFDK 330 / 660 / 1320 QTL Housing "T" Ball Valve



Element K Factors

 $\Delta \text{P Elements} = \text{Elements (K) Flow Factor x Flow Rate (gpm) x} \\ \frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \\ \frac{\text{Actual Specific Gravity}}{0.86}$

Betamicron	DBH4HC Elements (High Collapse)			
Size	3 μm	5 μm	10 μm	20 μm
0060 D XXX BH4HC	3.216	1.789	0.993	0.670
0110 D XXX BH4HC	1.394	0.818	0.489	0.307
0160 D XXX BH4HC	0.922	0.571	0.324	0.241
0240 D XXX BH4HC	0.582	0.373	0.214	0.159
0280 D XXX BH4HC	0.313	0.187	0.099	0.088
0330 D XXX BH4HC	0.423	0.247	0.154	0.110
0660 D XXX BH4HC	0.181	0.104	0.055	0.049
1320 D XXX BH4HC	0.088	0.055	0.033	0.022

Metal Fiber	DV Elements (High Collapse)				
Size	3 µm	5 μm	10 μm	20 μm	
0060 D XXX V	0.877	0.511	0.296	0.183	
0110 D XXX V	0.452	0.304	0.182	0.118	
0160 D XXX V	0.251	0.177	0.123	0.079	
0240 D XXX V	0.169	0.137	0.093	0.062	
0280 D XXX V	0.126	0.093	0.064	0.041	
0330 D XXX V	0.121	0.097	0.065	0.043	
0660 D XXX V	0.063	0.050	0.034	0.021	
1320 D XXX V	0.032	0.026	0.018	0.012	

All Element K Factors in psi / gpm.

Notes



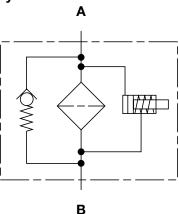
DF...QE Series

Manifold Mount Filters 4568 psi • up to 110 gpm





Hydraulic Symbol



Features

- The DF...QE Filters have a filter head of ductile iron and a screw-in bowl of cold-formed steel for high fatigue strength.
- The filter housings are designed to withstand pressure surges as well as high static pressure loads.
- The screw-in bowl or lid/cap allows the filter element to be easily removed for replacement or cleaning.
- Visual (pop-up), electrical, electrical/visual (lamp), or electronic differential type clogging indicators can be installed.
- DF...QE filters are available with or without a bypass valve located in filter head, so either high or low collapse pressure elements may be used.
- Fatigue pressure rating equals maximum allowable working pressure rating.

Technical Specifica				
Mounting Method	4 mounting holes (n	nanifold mount)		
Port Connection	Diameters			
30	0.551" (14mm)			
60/110	0.787" (20mm)			
160/240/280	1.260" (32mm)			
330/660/1320	1.181" (30mm)			
Flow Direction	Inlet: Side	Outlet: Side		
Construction Materials				
Head	Ductile iron			
Single piece bowl "1.X"				
Bowl	Steel			
Two piece bowl "2.X"				
Housing	Steel			
Lid/Cap	Steel			
Flow Capacity				
30	8 gpm (30 lpm)			
60	16 gpm (60 lpm)			
110	29 gpm (110 lpm)			
160	42 gpm (160 lpm)			
240	63 gpm (240 lpm)			
280	74 gpm (280 lpm)			
330	87 gpm (330 lpm)			
660	100 gpm (378.5 lpm			
1320	110 gpm (416.4 lpm	<u>, </u>		
Housing Pressure Rating	QE	MHE		
Max. Allowable Working				
Pressure	4568 psi (315 bar)	3625 psi (250 bar)		
Fatigue Pressure	4568 psi (315 bar)	3625 psi (250 bar)		
	@ 1 mil. cycles	@ 100 mil. cycles		
Burst Pressure	Contact HYDAC			
Element Collapse Pressur	e Rating			
BH4HC, V	3045 psid (210 bar)			
ON, W/HC	290 psid (20 bar)			
Fluid Temperature Range 14°F to 212°F (-10°C to 100°C) Consult HYDAC for applications operating below 14°F (-10°C)				
Fluid Compatibility				
Compatible with all hydroca	arbon based, synthe	tic, water glycol,		
oil/water emulsion, and hig				
appropriate seals are selec	ted.			

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar) -10\% (optional)}$ $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (standard)}$ **Bypass Valve Cracking Pressure** $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (optional)}$ $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (standard)}$

Applications



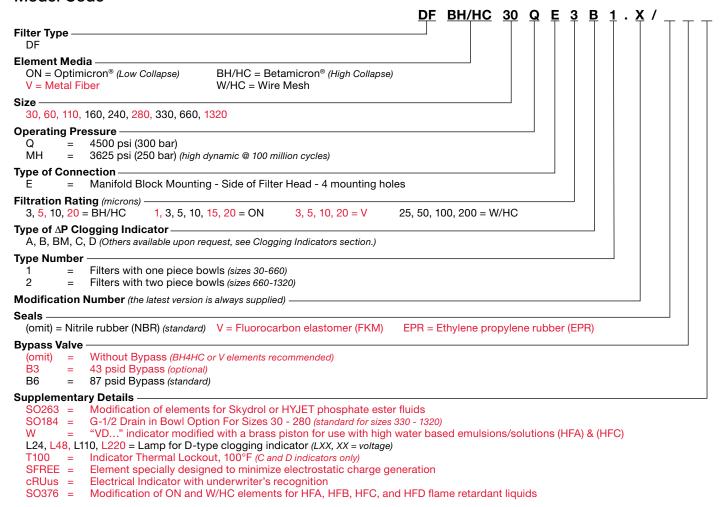




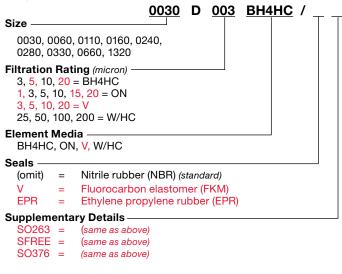
Industrial

F56

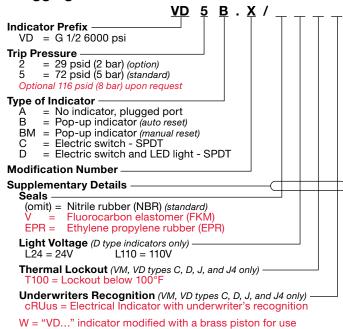
Model Code



Replacement Element Model Code



Clogging Indicator Model Code

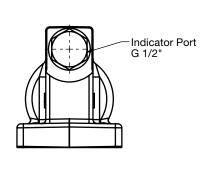


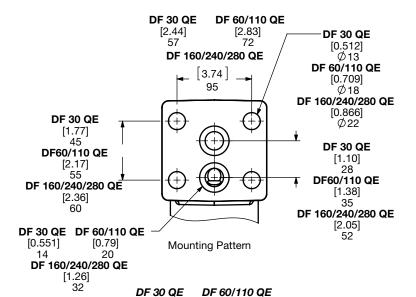
(For additional details and options, see Clogging Indicators section.)

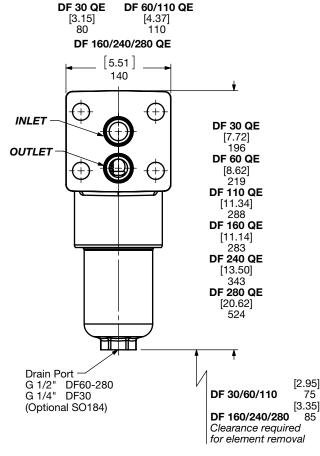
with high water based emulsions/solutions (HFA) & (HFC)

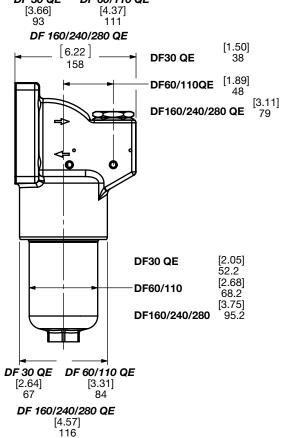
F57

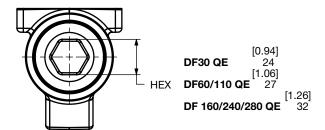
Dimensions DF 30 - 280 QE 1.X







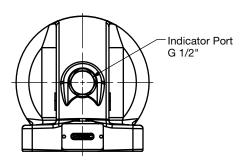


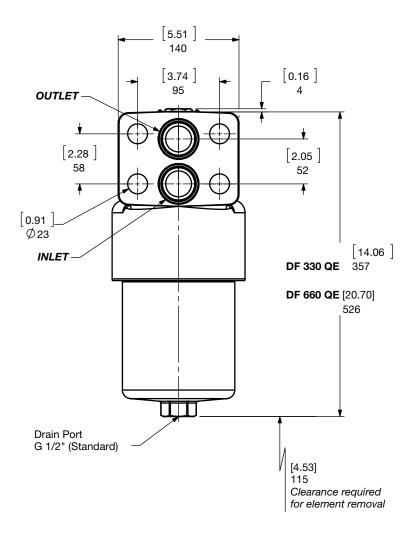


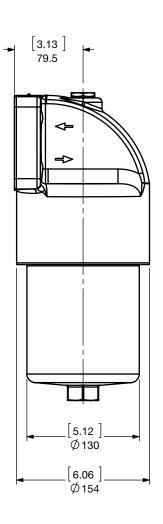
Size	30	60	110	160	240	280
Weight (lbs.)	6.4	11.5	13.5	21.2	25.6	35.1

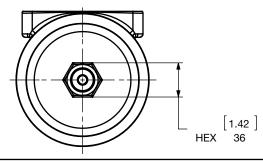
75

Dimensions DF 330 - 660 QE 1.X



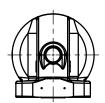


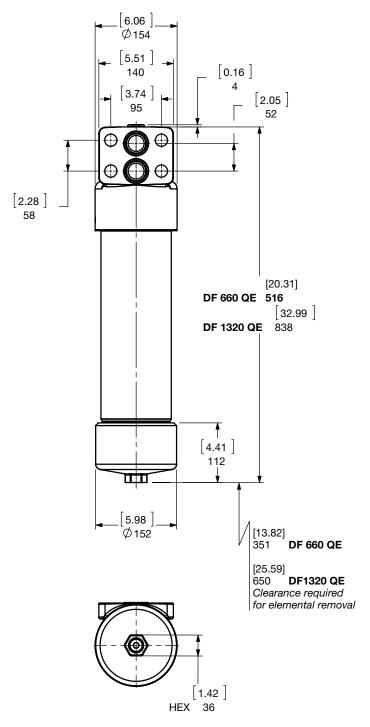


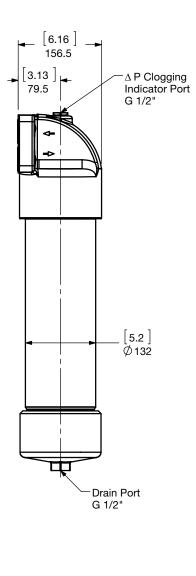


Size	330	660
Weight (lbs.)	50.5	75.2

Dimensions DF 660 - 1320 QE 2.X







Size	660	1320
Weight (lbs.)	50.5	75.2

Sizing Information

Total pressure loss through the filter is as follows:

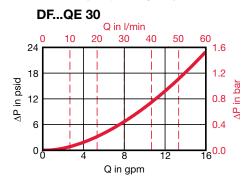
Assembly ΔP = Housing ΔP + Element ΔP

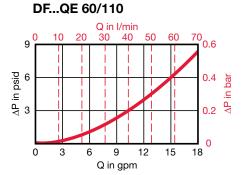
Housing Curve:

Pressure loss through housing is as follows:

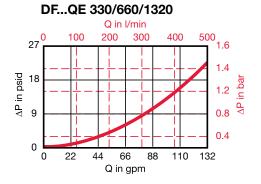
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)





DF...QE 160/240/280 Q in I/min 120 160 7.5 0.5 0.4 ∆P in psid 5.0 ∆P in bar 0.3 0.2 0.1 30 36 Q in gpm



Element K Factors

 $\Delta P \; Elements = Elements \; (K) \; Flow \; Factor \; x \; Flow \; Rate \; (gpm) \; x \; \frac{Actual \; Viscosity \; (SUS)}{141 \; SUS} \; x \; \frac{Actual \; Specific \; Gravity}{0.86} \; (From \; Tables \; Below)$

Optimicron			.DON	Element	ts	
Size	1 µm	3 µm	5 µm	10 µm	15 µm	20 µm
0030 D XXX ON	4.27	3.507	2.376	1.251	0.768	0.62
0060 D XXX ON	2.936	1.427	1.004	0.664	0.537	0.347
0110 D XXX ON	1.416	0.735	0.527	0.333	0.254	0.164
0160 D XXX ON	1.015	0.604	0.423	0.225	0.204	0.175
0240 D XXX ON	0.631	0.379	0.293	0.175	0.134	0.115
0280 D XXX ON	0.304	0.185	0.15	0.082	0.075	0.064
0330 D XXX ON	0.452	0.23	0.185	0.135	0.085	0.067
0660 D XXX ON	0.207	0.106	0.086	0.051	0.039	0.031
1320 D XXX ON	0.102	0.053	0.042	0.025	0.019	0.015

Betamicron	DBH4HC Elements (High Collapse)				
Size	3 µm	5 μm	10 µm	20 µm	
0030 D XXX BH4HC	5.005	2.782	1.992	1.043	
0060 D XXX BH4HC	3.216	1.789	0.993	0.670	
0110 D XXX BH4HC	1.394	0.818	0.489	0.307	
0160 D XXX BH4HC	0.922	0.571	0.324	0.241	
0240 D XXX BH4HC	0.582	0.373	0.214	0.159	
0280 D XXX BH4HC	0.313	0.187	0.099	0.088	
0330 D XXX BH4HC	0.423	0.247	0.154	0.110	
0660 D XXX BH4HC	0.181	0.104	0.055	0.049	
1320 D XXX BH4HC	0.088	0.055	0.033	0.022	

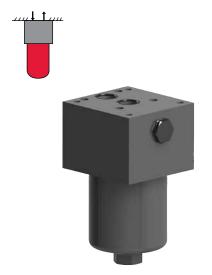
Metal Fiber	0	DV Elements (High C		ollapse)	
Size	3 µm	5 μm	10 μm	20 µm	
0030 D XXX V	1.011	0.740	0.411	0.200	
0060 D XXX V	0.877	0.511	0.296	0.183	
0110 D XXX V	0.452	0.304	0.182	0.118	
0160 D XXX V	0.251	0.177	0.123	0.079	
0240 D XXX V	0.169	0.137	0.093	0.062	
0280 D XXX V	0.126	0.093	0.064	0.041	
0330 D XXX V	0.121	0.097	0.065	0.043	
0660 D XXX V	0.063	0.050	0.034	0.021	
1320 D XXX V	0.032	0.026	0.018	0.012	

Wire Mesh	DW/HC Elements (Low Collapse)
Size	25, 50, 100, 200 μm
0030 D XXX W/HC	0.166
0060 D XXX W/HC	0.042
0110 D XXX W/HC	0.023
0160 D XXX W/HC	0.016
0240 D XXX W/HC	0.010
0280 D XXX W/HC	0.005
0330 D XXX W/HC	0.008
0660 D XXX W/HC	0.004
1320 D XXX W/HC	0.002

All Element K Factors in psi / gpm.

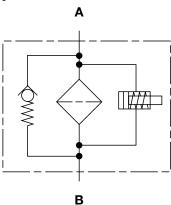
DFP Series

Manifold Mount Filters 4568 psi • up to 125 gpm





Hydraulic Symbol



Features

- The filter housings are designed to withstand pressure surges as well as high static pressure loads.
- The screw-in bowl or lid/cap allows the filter element to be easily removed for replacement or cleaning.
- A visual (pop-up), electrical, electrical/visual (lamp), or electronic differential type clogging indicator can be installed.
- DFP filters are available with or without a bypass valve (located in filter head) so either high or low collapse pressure elements may
- Multiple indicator port locations (DFP330/660/1320 only) also allow two different types of indicators to be installed into the filter. Indicators of the same type, but with different trip pressures can also be installed. (both ports machined and plugged)
- Fatigue pressure rating equals maximum allowable working pressure rating.

Technical Specifications

recrimical opecinical	au0115
Mounting Method	(manifold mount)
60 - 280	4 mounting holes
330 - 1320	6 mounting holes
Port Connection	Diameter
60/110	0.689" (17.5mm)
160/240/280	0.843" (21.4mm)
330/660/1320	1.181" (30mm)
Flow Direction	Inlet: Top Outlet: Top
Construction Materials	
Head	Ductile iron
Bowl	Steel
Housing (660-1320)	Steel
Cap/Lid (660-1320)	Low Carbon Steel
Flow Capacity	
60	16 gpm (60 lpm)
110	29 gpm (110 lpm)
160	42 gpm (160 lpm)
240	63 gpm (240 lpm)
280	74 gpm (280 lpm)
330	87 gpm (330 lpm)
660	174 gpm (660 lpm)
1320	180 gpm (680 lpm)
Housing Pressure Rating	
May Allowable Working	

Max. Allowable Working

4568 psi (315 bar) Pressure

Fatigue Pressure 4568 psi (315 bar) @ 1 million cycles 15,805 psi (1090 bar) **Burst Pressure** 60/110 160/240/280 >18,000 psi (1240 bar)

330/660/1320 15,660 psi (1080 bar)

Element Collapse Pressure Rating

BH4HC, V 3045 psid (210 bar) ON, W/HC 290 psid (17 bar)

Fluid Temperature Range 14°F to 212°F (-10°C to 100°C) Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid } (2 \text{ bar}) -10\% \text{ (optional)}$ $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (standard)}$

Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (optional)}$ $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (standard)}$

Applications



Agricultural



Construction



Industrial



Generation

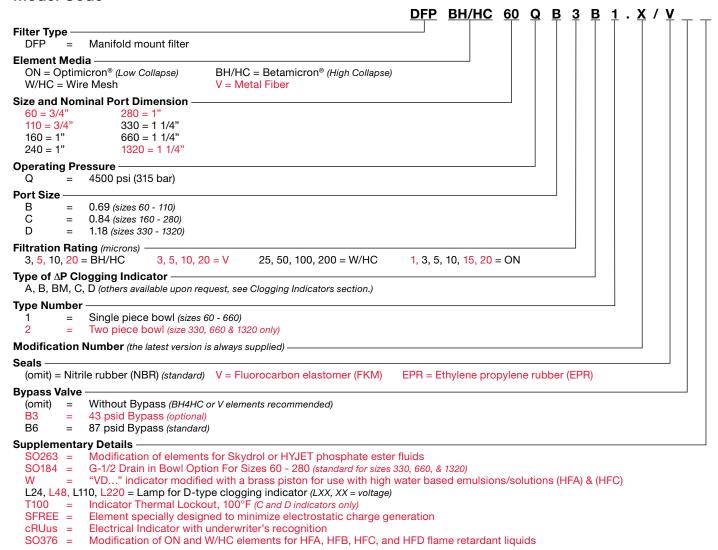


Railways

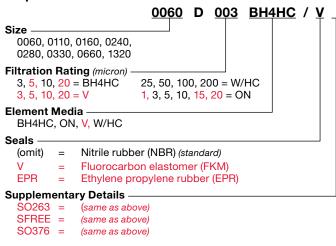


Steel / Heavy Industry

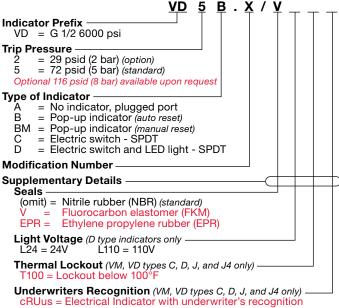
Model Code



Replacement Element Model Code



Clogging Indicator Model Code



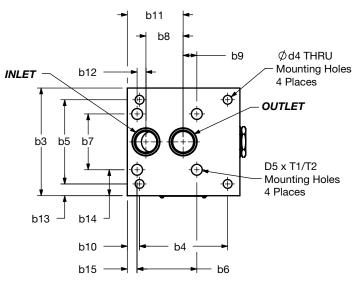
cRUus = Electrical Indicator with underwriter's recognition
W = "VD..." indicator modified with a brass piston for use

with high water based emulsions/solutions (HFA) & (HFC)

(For additional details and options, see Clogging Indicators section.)

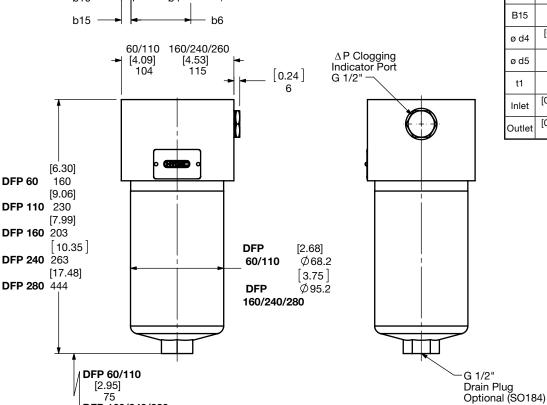
Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

Dimensions DFP 60 – 280...1.X



DFP 160/240/280 [3.35]

Clearance required for element removal



	60 / 110	160 / 240 / 280
В3	[3.15] 80	[4.33] 110
B4	[3.50] 89	[3.54] 90
B5	[1.25] 31.8	[3.39] 86
В6	-	[2.40] 61
В7	-	[2.24] 57
В8	[1.24] 31.6	[1.50] 38
B9	ı	[0.55] 14
B10	[0.30] 7.5	[0.49] 12.5
B11	[2.20] 55.9	[2.26] 57.5
B12	-	[0.35] 9
B13	[0.95] 24.1	[0.47] 12
B14	-	[1.04] 26.5
B15	ı	[0.41] 10.5
ø d4	[0.33] 8.5	[0.35] 9
ø d5	ı	7/16-14UNC-2B
t1	-	[0.51] 13
Inlet	[0.639] 17.5	0.843" 21.4
Outlet	[0.689] 17.5	[0.843] 21.4

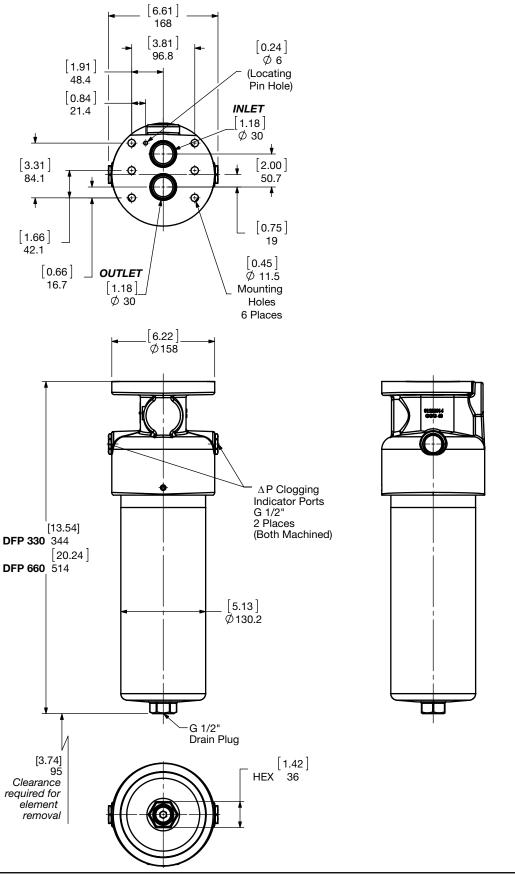
-	HEX	160/240/280	[1.26] 32
•	*		

Size	60	110	160	240	280
Weight (lbs.)	11.3	13.3	20.1	23	32.5

[1.06]

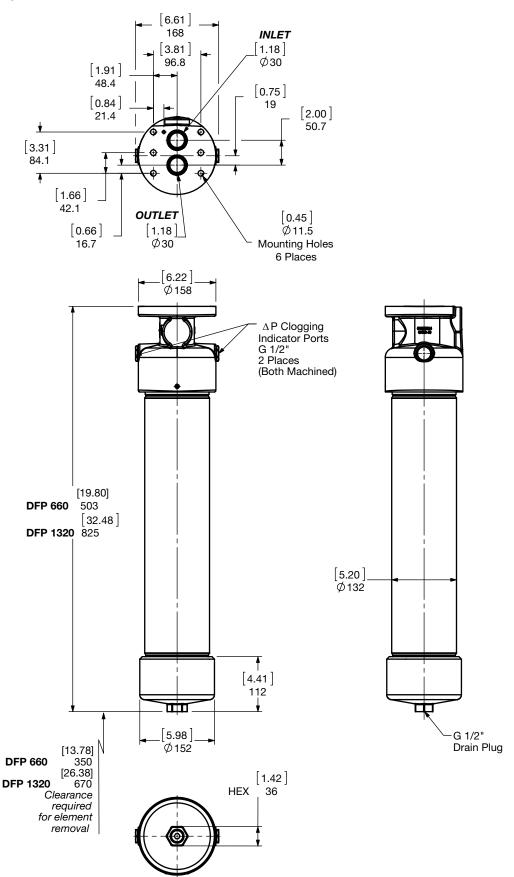


Dimensions DFP 330/660...1.X



Size	330	660
Weight (lbs.)	46.3	64

Dimensions DFP 660 & 1320...2.X



Size	660	1320
Weight (lbs.)	64	103.9

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

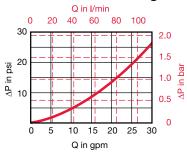
Housing Curve:

Pressure loss through housing is as follows:

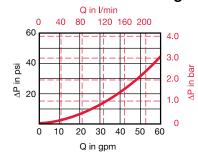
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

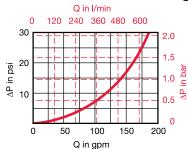
DFP 60/110 Housing



DFP 160/240/280 Housing



DFP 330/660/1320 Housing



Element K Factors

ΔP Elements = Elements (K) Flow Factor x Flow Rate (gpm) x Actual Viscosity (SUS) x Actual Specific Gravity (From Tables Below) x 411 SUS 0.86

Optimicron			.DON	Elemen	ts	
Size	1 µm	3 µm	5 µm	10 µm	15 µm	20 µm
0060 D XXX ON	2.936	1.427	1.004	0.664	0.537	0.347
0110 D XXX ON	1.416	0.735	0.527	0.333	0.254	0.164
0160 D XXX ON	1.015	0.604	0.423	0.225	0.204	0.175
0240 D XXX ON	0.631	0.379	0.293	0.175	0.134	0.115
0280 D XXX ON	0.304	0.185	0.15	0.082	0.075	0.064
0330 D XXX ON	0.452	0.23	0.185	0.135	0.085	0.067
0660 D XXX ON	0.207	0.106	0.086	0.051	0.039	0.031
1320 D XXX ON	0.102	0.053	0.042	0.025	0.019	0.015

Wire Mesh	DW/HC Elements (Low Collapse)
Size	25, 50, 100, 200 μm
0060 D XXX W/HC	0.042
0110 D XXX W/HC	0.023
0160 D XXX W/HC	0.016
0240 D XXX W/HC	0.010
0280 D XXX W/HC	0.005
0330 D XXX W/HC	0.008
0660 D XXX W/HC	0.004

0.002

Betamicron	DBl	H4HC Elem	ents (High C	Collapse)
Size	3 µm	5 μm	10 µm	20 µm
0060 D XXX BH4HC	3.216	1.789	0.993	0.670
0110 D XXX BH4HC	1.394	0.818	0.489	0.307
0160 D XXX BH4HC	0.922	0.571	0.324	0.241
0240 D XXX BH4HC	0.582	0.373	0.214	0.159
0280 D XXX BH4HC	0.313	0.187	0.099	0.088
0330 D XXX BH4HC	0.423	0.247	0.154	0.110
0660 D XXX BH4HC	0.181	0.104	0.055	0.049
1320 D XXX BH4HC	0.088	0.055	0.033	0.022

Metal Fiber	D	V Elements (High Colla		apse)
Size	3 μm	5 μm	10 µm	20 µm
0060 D XXX V	0.877	0.511	0.296	0.183
0110 D XXX V	0.452	0.304	0.182	0.118
0160 D XXX V	0.251	0.177	0.123	0.079
0240 D XXX V	0.169	0.137	0.093	0.062
0280 D XXX V	0.126	0.093	0.064	0.041
0330 D XXX V	0.121	0.097	0.065	0.043
0660 D XXX V	0.063	0.050	0.034	0.021
1320 D XXX V	0.032	0.026	0.018	0.012

All Element K Factors in psi / gpm.

1320 D XXX W/HC

DFZ Series

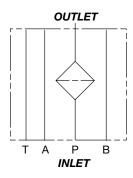
Modular Stacking Filters 4568 psi • up to 10 gpm

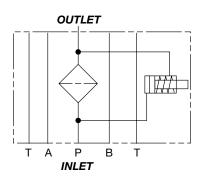






Hydraulic Symbol





Features

- A visual (pop-up), electrical, electrical/visual (lamp) differential type clogging indicator can be installed.
- The DFZ filter can be ordered with the bowl on the left or the right side for easy element changeout.
- The DFZ filter is available in two mounting patterns to fit different hydraulic manifolds: ANSI/B93.7M-D03 / Cetop R35 (was B93.7-D01) DF 30 Z ANSI/B93.7M-D05 / Cetop R35 (was V93.7-D02)* DF 60 Z or DF 110 Z *includes fifth port for optional tank connection
- Filter does not contain a bypass valve. Only available with non bypass, high collapse elements required.

Technical Specifications

Mounting Method	4 mounting holes	(manifold mount)	
Port Connection			
30 ø.25"	ANSI DO3/A6 DIN	I 24340 / Cetop R35	
60/110 ø.44"	ANSI DO5/A10 DI	N 24340 / Cetop R35	
Flow Direction	Inlet: Side	Outlet: Side	
Construction Materials			
Head, Bowl	Steel		
Flow Capacity			
30	6 gpm (23 lpm)		
60/110	10 gpm (38 lpm)		
Housing Pressure Rating			
Max. Allowable Working			
Pressure	4568 psi (315 bar)		
Fatigue Pressure	30	4568 psi (315 bar)	
	00/440	@ 250,000 cycles	
	60/110	4568 psi (315 bar) @ 1 million cycles	
Burst Pressure	> 18,270 psi (1260	,	
Element Collapse Pressure Rating		5 541)	
		arl.	
· · · · · · · · · · · · · · · · · · ·	BH4HC, V 3045 psid (210 bar)		
Fluid Temperature Range			
Consult HYDAC for application	is operating below 14	°F (-10°C)	
Fluid Compatibility			

Applications









Automotive



Railways



Construction

Steel / Heavy Industry



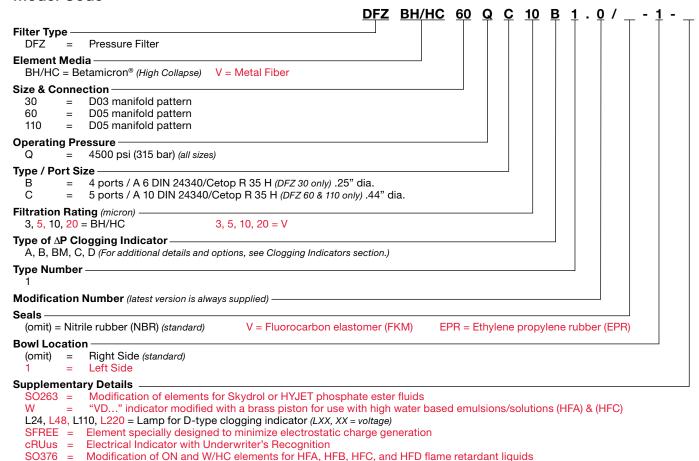
Industrial

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 116 \text{ psid } (8 \text{ bar}) - 10\% \text{ (standard)}$

Model Code



Replacement Element Model Code



Clogging Indicator Model Code 8 **Indicator Prefix** $VD = G \frac{1}{2} 6000 psi$ **Trip Pressure** = 116 psid (8 bar) Type of Indicator -= Pop-up indicator (auto reset) BM = Pop-up indicator (manual reset) = Electric switch - SPDT = Electric switch and led light - SPDT **Modification Number Supplementary Details** Seals (omit) = Nitrile rubber (NBR) (standard) = Fluorocarbon elastomer (FKM) EPR = Ethylene propylene rubber (EPR) Light Voltage (D type indicators only) L110 = 110V L48 = 48VL24 = 24VThermal Lockout (VM, VD types C, D, J, and J4 only) T100 = Lockout below 100° Underwriters Recognition (VM, VD types C, D, J, and J4 only) cRUus = Electrical Indicator with Underwriter's Recognition W = "VD..." indicator modified with a brass piston for use

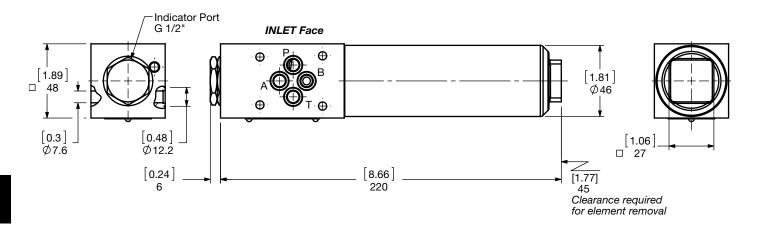
(For additional details and options, see Clogging Indicators section.)

with high water based emulsions/solutions (HFA) & (HFC)

HYDAC

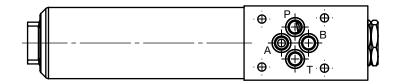
Dimensions DF 30 Z

(Right Hand Version) - (optional)



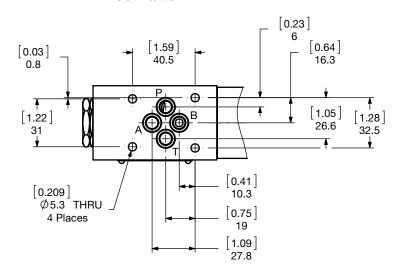
(Left Hand Version) - (optional)





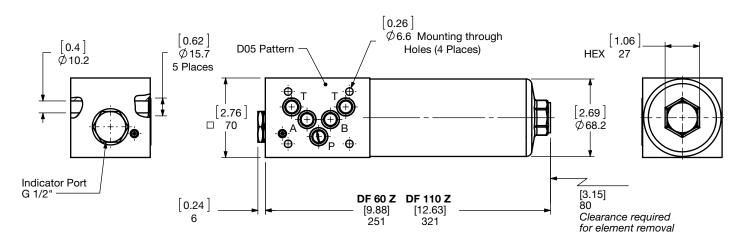


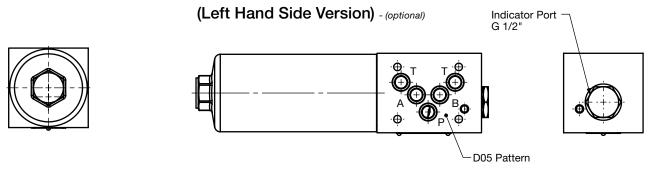
D03 Pattern

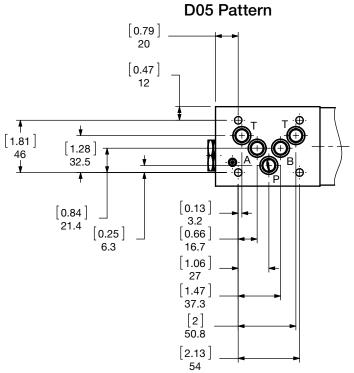


Size	30
Weight (lbs.)	5.3

(Right Hand Side Version) - (standard)







Size	60	110
Weight (lbs.)	13.1	15

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

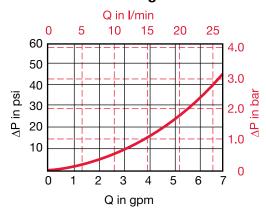
Housing Curve:

Pressure loss through housing is as follows:

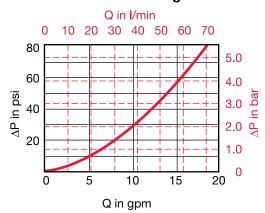
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.06}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

DFZ 30 Housing



DFZ 60 / 110 Housing



Element K Factors

 $\Delta P \; \text{Elements} = \text{Elements} \; (\text{K}) \; \text{Flow} \; \text{Factor} \; x \; \text{Flow} \; \text{Rate} \; (\text{gpm}) \; x \; \frac{\text{Actual Viscosity} \; (\text{SUS})}{141 \; \text{SUS}} \; x \; \frac{\text{Actual Specific Gravity}}{0.86} \; (\text{Sub}) \; x \; \frac{\text{Actual Specific Gravity}}{141 \; \text{Sub}} \; \frac{\text{Actual Specific Gravity}}{141 \; \text{Sub}} \; \frac{\text{Actual Specific Gravity}}{0.86} \; \frac{\text{Actual Specific Gravity}}{141 \; \text{Sub}} \; \frac$

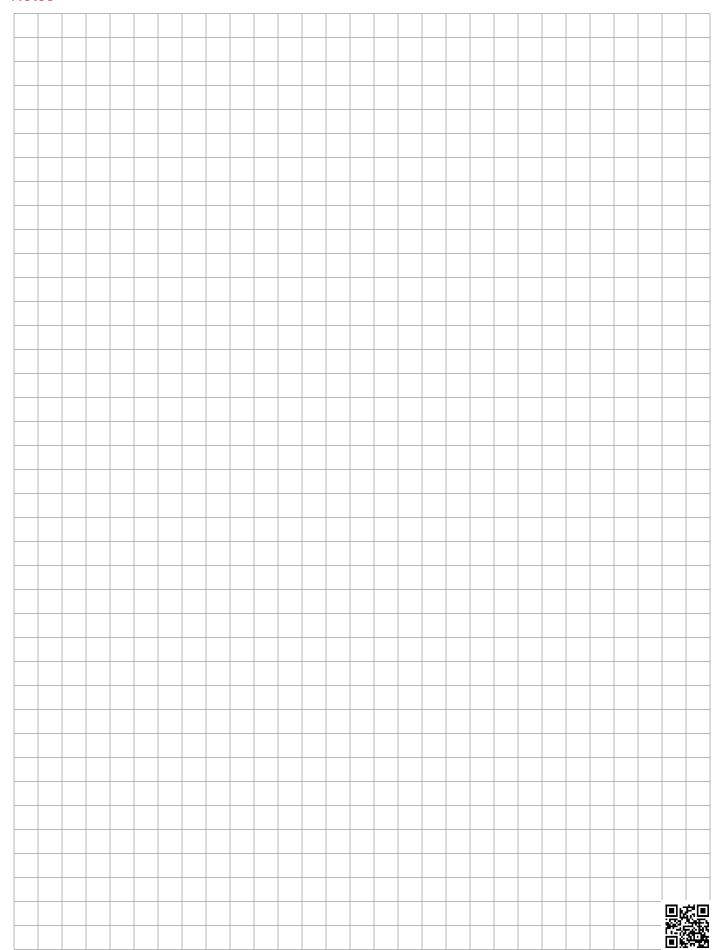
Betamicron	DBH4HC Elements (High Collapse)				
Size	3 µm	5 μm	10 μm	20 μm	
0030 D XXX BH4HC	5.005	2.782	1.992	1.043	
0060 D XXX BH4HC	3.216	1.789	0.993	0.670	
0110 D XXX BH4HC	1.394	0.818	0.489	0.307	

Metal Fiber	DV Elements (High Collapse)					
Size	3 μm 5 μm 10 μm 20 μm					
0030 D XXX V	1.011	0.740	0.411	0.200		
0060 D XXX V	0.877	0.511	0.296	0.183		
0110 D XXX V	0.452	0.304	0.182	0.118		

All Element K Factors in psi / gpm.



Notes



CF Series

Manifold Cartridge Filters 3000 psi • up to 25 gpm

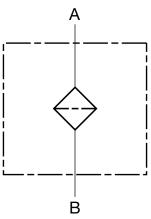




CFxx20



Hydraulic Symbol



Features

- Made of aluminum for light weight and low cost.
- Made to dispose of when fully clogged.
- Low price market competitive.

Applications







Construction



Industrial



Commercial Municipal

Technical Specifications

Port Connections	CF20	SAE-16 Modified Cavity
	CF45	SAE-20 Cavity (VC20-S3)
Direction of Flow		Outside to Inside flow
Materials of Const	ruction	Aluminum
Flow Capacity		
CF20	5 GPM	(15 micron - fiberglass media)
	2.5 GPN	I recommended design flow max
	for high	efficiency media
CF45		I (25, 149 micron - wire screen media)
	12 GPM	l (15 micron - fiberglass media)
	6 GPM	recommended design flow max for
	high eff	iciency media
	25 GPN	l (25, 149 micron - wire screen media)
l <u>–</u> .		

Housing Pressure Rating

Max. Allowable Working

3000 psi (207 bar) Pressure: **Proof Pressure:** 4500 psi (310 bar)

Element Performance Rating

MM, W 290 psid (20 bar) Fluid Temperature Range -22°F to 250°F (-30°C to 121°C)

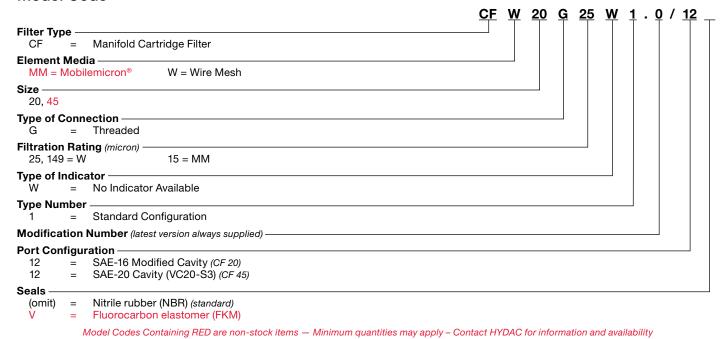
Consult HYDAC for applications operating below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

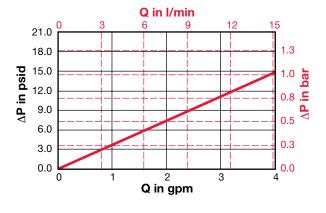


Model Code

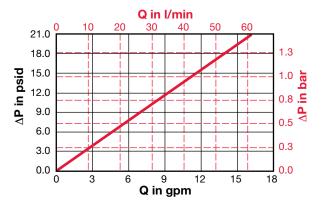


Pressure Drop Curves

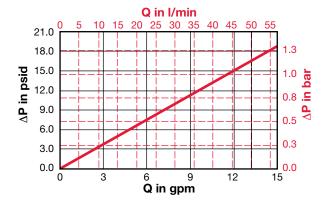
CFMM20G15W1.0/12



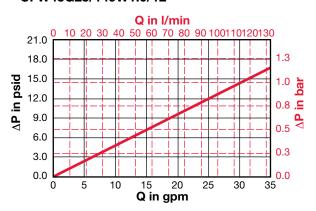
CFW20G25/149W1.0/12

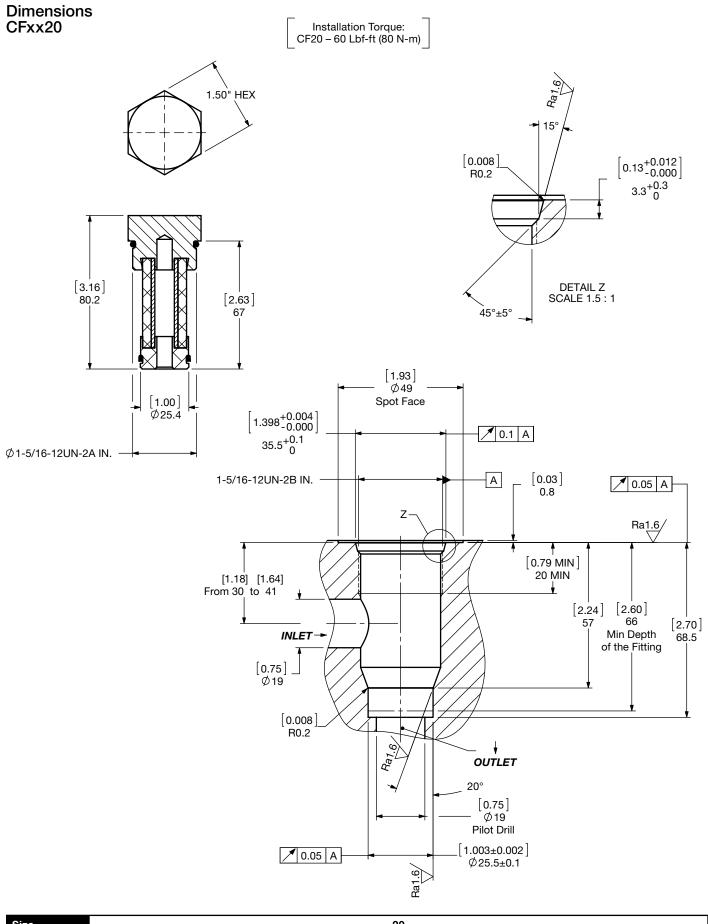


CFMM45G15W1.0/12



CFW45G25/149W1.0/12

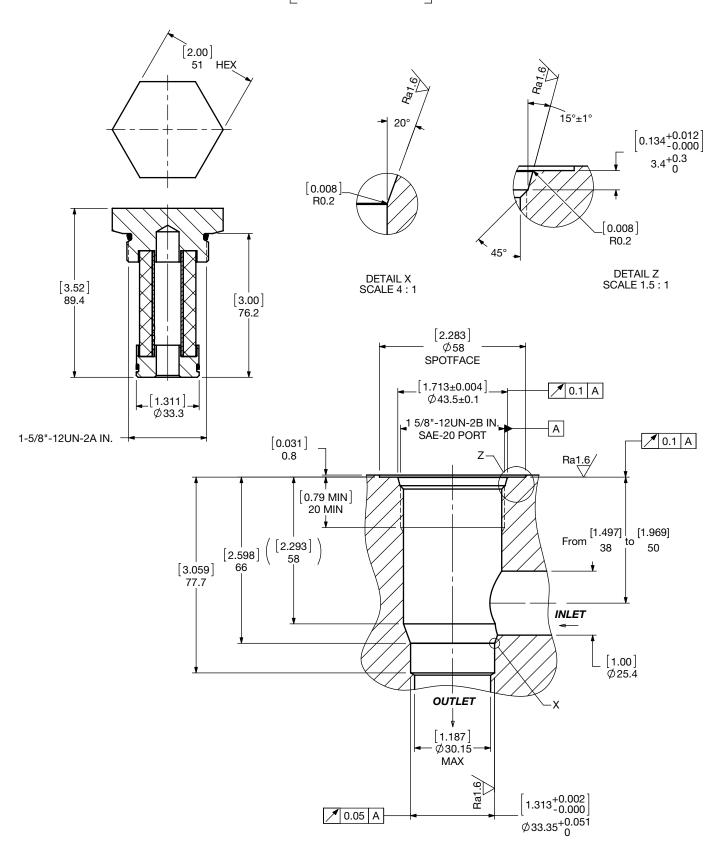




Size	20
Weight (lbs.)	0.5

Dimensions CFxx45

Installation Torque: CF45 – 90 Lbf-ft (120 N-m)



Size	45
Weight (lbs.)	0.5

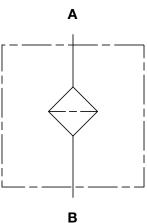
CP-C16 Series

Circuit Protector Manifold Cartridge Filters 3000 psi • up to 12 gpm





Hydraulic Symbol



Features

- Simple cost effective method of component protection with minimal space requirements, eliminating design restraints.
- Fits into a standard manifold Cavity No. C16-2 Port.
- CP Circuit Protector Filters provide backup protection when upstream pressure filters go into bypass or if element damage occurs.
- Two (2) different element options: 10 micron, and 141 micron allow filter to be tailored to individual application needs.
- Suitable for petroleum based fluids.
- Flow Path inside to outside.

Technical Specifications

Mounting Method	C16-2 Cavity (SAE-16 Threaded Port)
Flow Direction	Inlet: Bottom Outlet: Side
Construction Materials	Steel
Flow Capacity	12 gpm (45 lpm)
Housing Pressure Rating	
Max. Allowable Working Pressure Fatigue Pressure Burst Pressure	3000 psi (210 bar) Contact HYDAC Office Contact HYDAC Office
Element Collapse Pressur	e Rating
W/HC	250 psid (17 bar)
	14°F to 212°F (-10°C to 100°C) as operating below 14°F (-10°C)
Fluid Compatibility	
Compatible with all petrole (NBR) seals.	um oils rated for use with Nitrile rubber

Applications





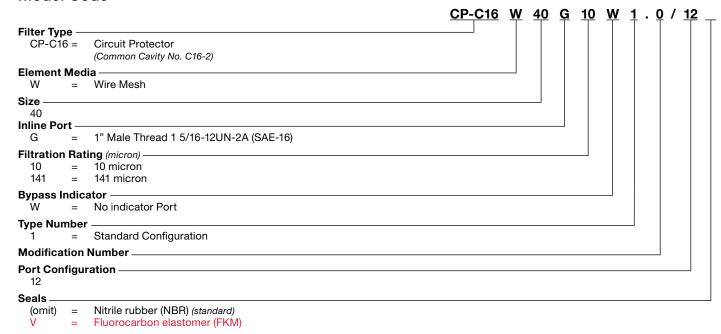


Agricultural

(HYDAC)

F86

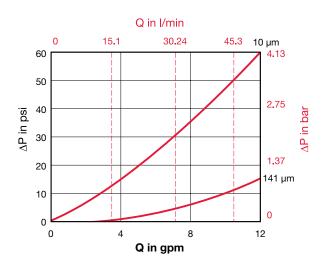
Model Code



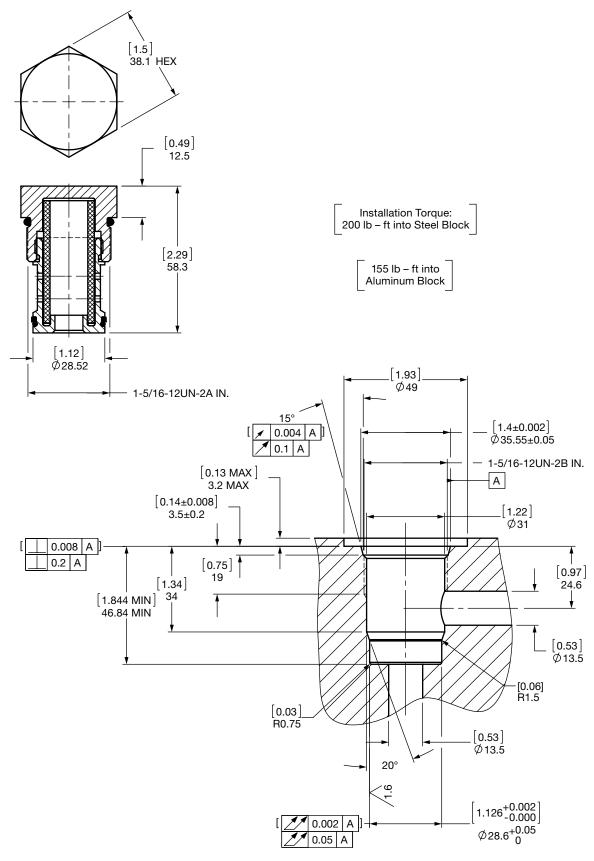
 ${\it Model Codes Containing RED are non-stock\ items-Minimum\ quantities\ may\ apply-Contact\ HYDAC\ for\ information\ and\ availability}$

Pressure Drop Curves

Based on testing conducted with 150 SUS fluid at 105°F.

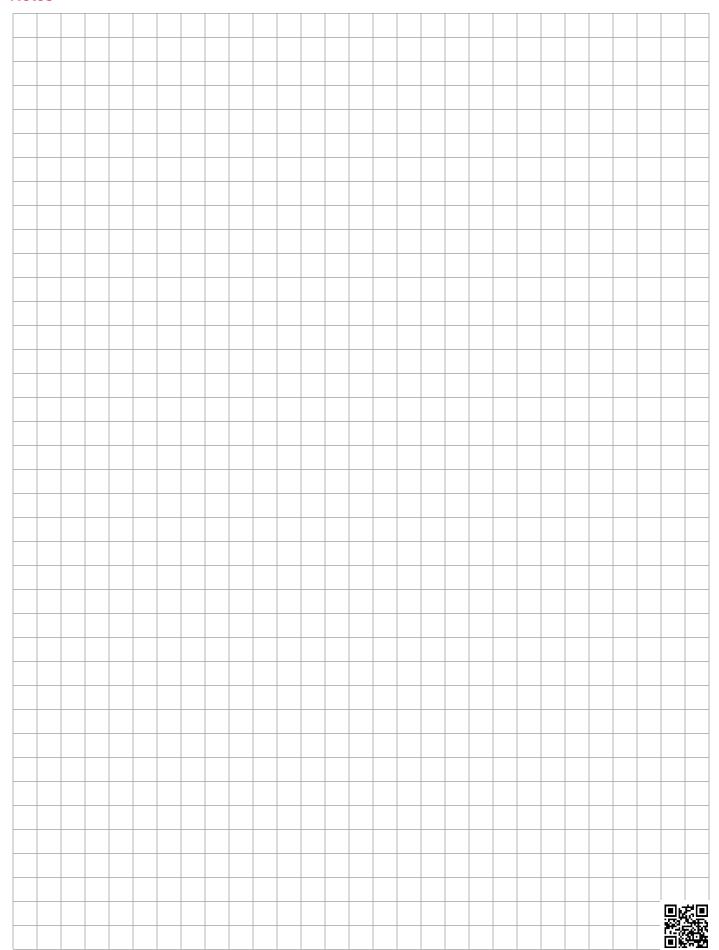


Dimensions CP-C16



Size	40
Weight (lbs.)	0.75

Notes



CP-SAE Series

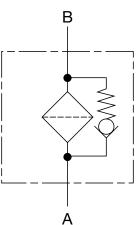
Circuit Protector Manifold Cartridge Filters 6090 psi • up to 30 gpm







Hydraulic Symbol



Features

- Simple cost effective way to provide component protection with minimal space required eliminating design restraints.
- Fits into a standard manifold SAE O-ring Port.
- CP Circuit Protector Filters provide backup protection when upstream pressure filters go into bypass or if element damage occurs.
- CP-SAE provides operations protection through supply of a bypass to assure flow to critical components if filter becomes
- Increased range of product use through three (3) different sizes available, 15 at 4 gpm, 40 at 12 gpm, and size 120 at 30 gpm.
- Suitable for petroleum based fluids.
- Flow Path inside to outside.

Applications







Technical Specifications

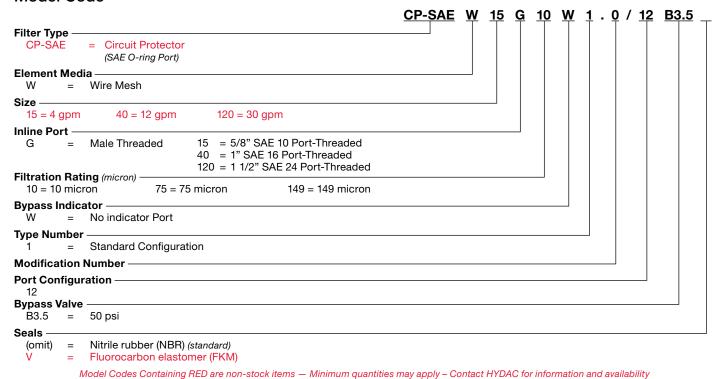
Mounting Method	
CP-SAE-15	SAE-10 Port (5/8")
CP-SAE-40	SAE-16 Port (1")
CP-SAE-120	SAE-24 Port (1 1/2")
Flow Direction	Inlet: Bottom Outlet: Side
Construction Materials	
CP-SAE-15	Carbon steel
CP-SAE-40	Carbon steel
CP-SAE-120	Carbon steel
Flow Capacity	
CP-SAE-15	4 gpm (15 lpm)
CP-SAE-40	12 gpm (45 lpm)
CP-SAE-120	30 gpm (113 lpm)
Housing Pressure Rating	
Max. Allowable Working	
Pressure	6090 psi (420 bar)
Fatigue Pressure	Contact HYDAC Office
Burst Pressure	Contact HYDAC Office
Element Collapse Pressure	Rating
W	100 psid (6.9 bar)
Fluid Temperature Range Consult HYDAC for applications	14°F to 212°F (-10°C to 100°C) operating below 14°F (-10°C)
Fluid Compatibility	
Compatible with all petroleun (NBR) seals.	n oils rated for use with Nitrile rubber

Replacement Elements

Bypass Valve Cracking Pressure $\Delta P = 50 \text{ psid } (3.4 \text{ bar}) +10\% \text{ (standard)}$

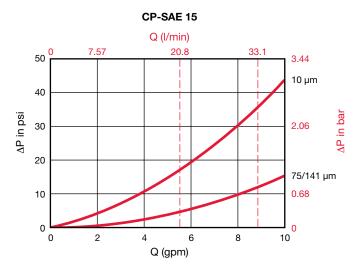
Part Number	Description	Flow Rate
02069397	0015 D 010 W	0015 - 4 gpm
02069398	0040 D 010 W	0040 - 12 gpm
02069399	0120 D 010 W	0120 - 30 gpm

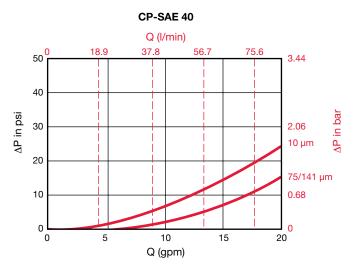
Model Code



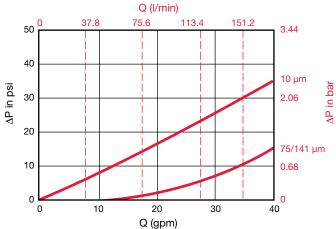
Pressure Drop Curves

Based on testing conducted with 150 SUS fluid at 105°F.

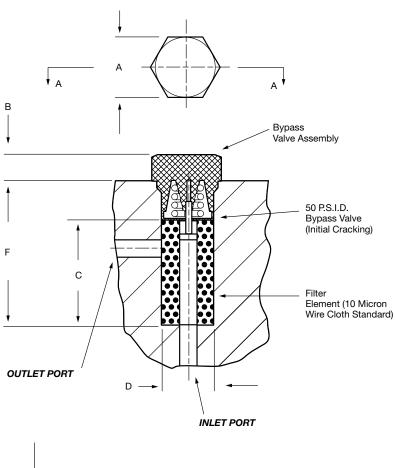


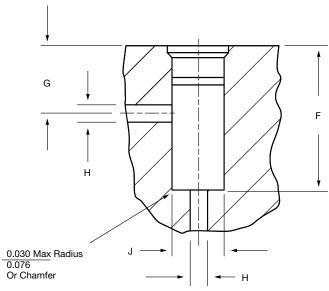






Dimensions CP-SAE





Ma	nifold	l Filter

Model	A B C D ESAE		F G	н	J	Torque					
Model	A	В		U	O-Ring Port	-	G	п	J	Alu.	Steel
CP-SAE 15	1.00/25.4	0.41/10.4	1.75/44.5	0.74/18.8	-10 (7/8-14)	2.41/61.2	1.12/28.4 min 1.87/47.5 max	0.266/6.8	0.781/19.8 min 0.814/20.7 max	65 ft-lb	85 ft-lb
CP-SAE 40	1.5/38.1	0.5/12.7	2.50/63.5	1.00/25.4	-16 (1 5/16-12)	3.34/84.8	1.49/37.8 min 2.53/64.3 max	0.531/13.5	1.140/29.0 min 1.1875/30.1 max	150 ft-lb	200 ft-lb
CP-SAE 120	2.13/54.1	0.65/16.5	4.00/101.6	1.50/38.1	-24 (1 7/8-12)	5.01/127.3	1.92/48.8 min 3.81/96.8 max	0.875/22.2	1.750/44.5 min 1.803/45.8 max	230 ft-lb	305 ft-lb

Size	15, 40, 120
Weight (lbs.)	1.5



SET Series -

Manifold Cartridge Filters

Manifold cartridge filters are installed into a threaded cavity that is machined in the customer's manifold. More than one SET may be installed in the manifold, if required for capacity. Cavity drawings are provided for easy implementation and installation. A SET filter can be provided with an element or without an element (existing installations). A differential pressure clogging indicator, to warn of high upstream pressure (element clogged), can be attached to the manifold as well (indicator cavity drawings available upon

SET SERIES FILTERS – LOW PRESSURE

NF Set Series

Manifold Cartridge Filters 360 psi • up to 450 gpm





Manifold cavity is only for representation and not HYDAC's scope of supply

Features

- Non-welded housing design reduces stress concentrations and
- prevents fatigue failure.
- Aluminum alloy is water tolerant anodization is not required for water based fluids (HWBF).
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, ethylene propylene rubber) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based fluids.
- Screw-in lid requires minimal clearance to remove the element for replacement, and contaminated fluid cannot be washed downstream when element is serviced.
- HYDAC differential Pressure Indicators (optional) have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- For special finishes and coatings consult HYDAC for minimum quantities, availability and pricing.

Applications











Generation

Agricultural







Steel / Heavy Industry

Installation

The NF Set Manifold Cartridge Filter is installed into a threaded cavity that is machined in the manifold (manifold not included - see cavity drawing). A bushing is provided for proper element installation, as well as a bowl with o-ring seal and back-up ring. An element can be provided as a option. The bushing holds the element in place during filtration operation, and facilitates easy removal for element change

More than one SET may be installed in the manifold if required for capacity. A differential pressure clogging indicator, to warn of high upstream pressure (element clogged), can be attached to the manifold as well (cavity drawings for that upon request). For additional information, contact HYDAC.

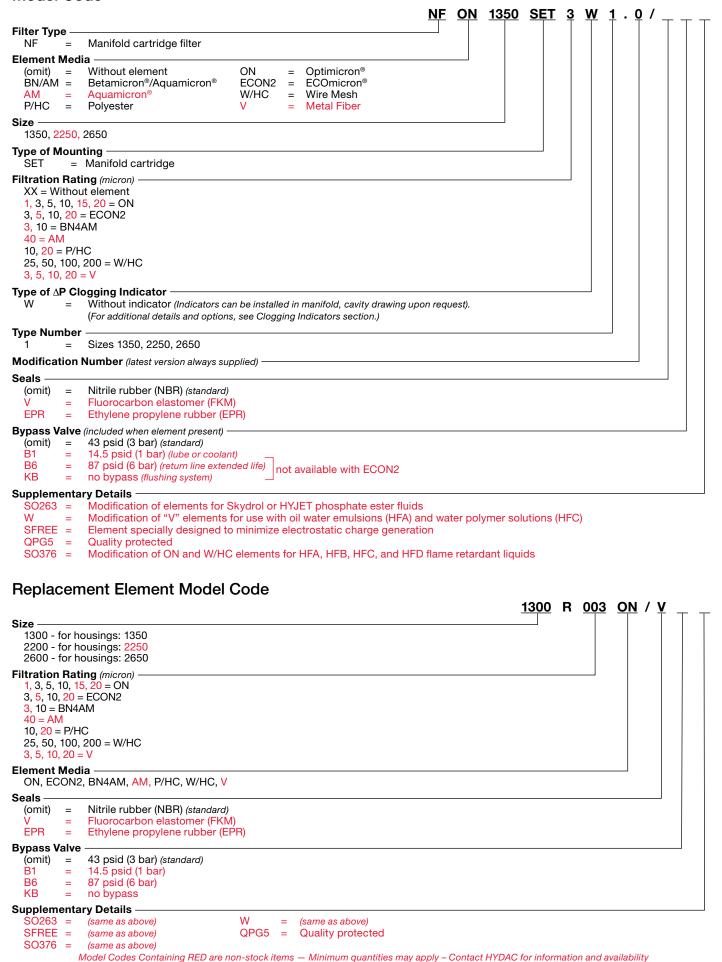
Technical Specifications

·· ·· ··	
Mounting Method	See drawings
Flow Direction	
Element	Out-to-in
Construction Materials	
Housing, Lid	Aluminum
Flow Capacity	
1350	343 gpm (1300 lpm)
2250	396 gpm (1500 lpm)
2650	450 gpm (1700 lpm)
Housing Pressure Rating	
Max. Allowable Working Pressure*	360 psi (25 bar)
Fatigue Pressure	360 psi (25 bar)
Burst Pressure	1754 psi (121 bar)
Element Collapse Pressure Rating	g (optional)
ON, W/HC	290 psid (20 bar)
ECON2, BN4AM, P/HC, AM	145 psid (10 bar)
V	435 psid (30 bar)
Fluid Temperature Range	-22°F to 212°F (-30°C to 100°C)
Consult HYDAC for applications below -2	22°F (-30°C)
Fluid Compatibility	
Compatible with all hydrocarbon ba oil/water emulsion, and high water appropriate seals are selected.	
Indicator Trip Pressure (optional)	
ΔP = 29 psid (2 bar) -10%	1.0 - Static
$\Delta P = 72 \text{ psid } (5 \text{ bar}) -10\%$	2.0 - Differential
Bypass Valve Cracking Pressure	(included when element present)
$\Delta P = 14.5 \text{ psid (1 bar) } +10\%$	

*Note: All NF...1.0 Filters MAWP reduce to 7 bar (101.5 psi) when using the following "VMF" and "VR" indicators: B, BM, E, ES, GC, LE, LZ.

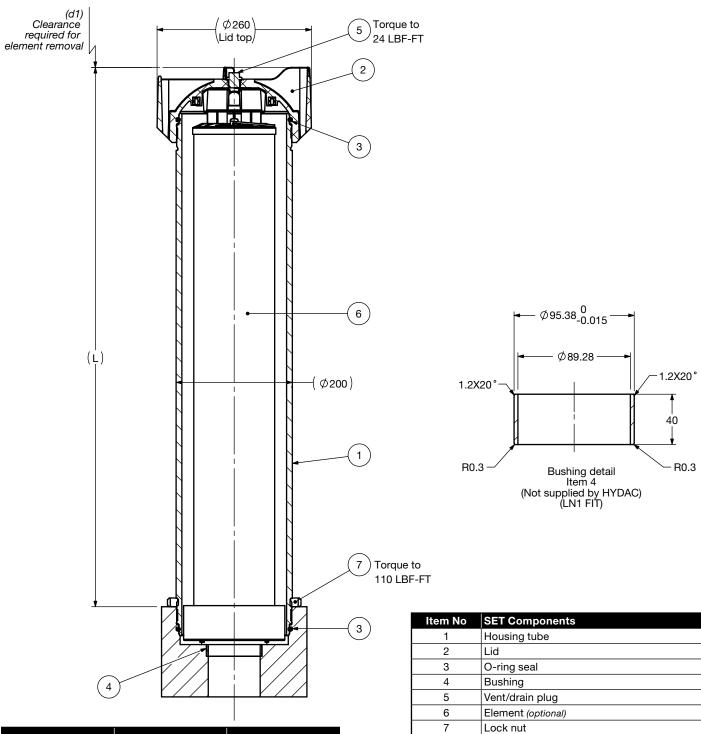
 $\Delta P = 43 \text{ psid } (3 \text{ bar}) + 10\% \text{ (standard)}$ $\Delta P = 87 \text{ psid (6 bar) } +10\%$

Model Code



SET SERIES FILTERS - LOW PRESSURE

Dimensions NF Set 1350 / 2250 / 2650

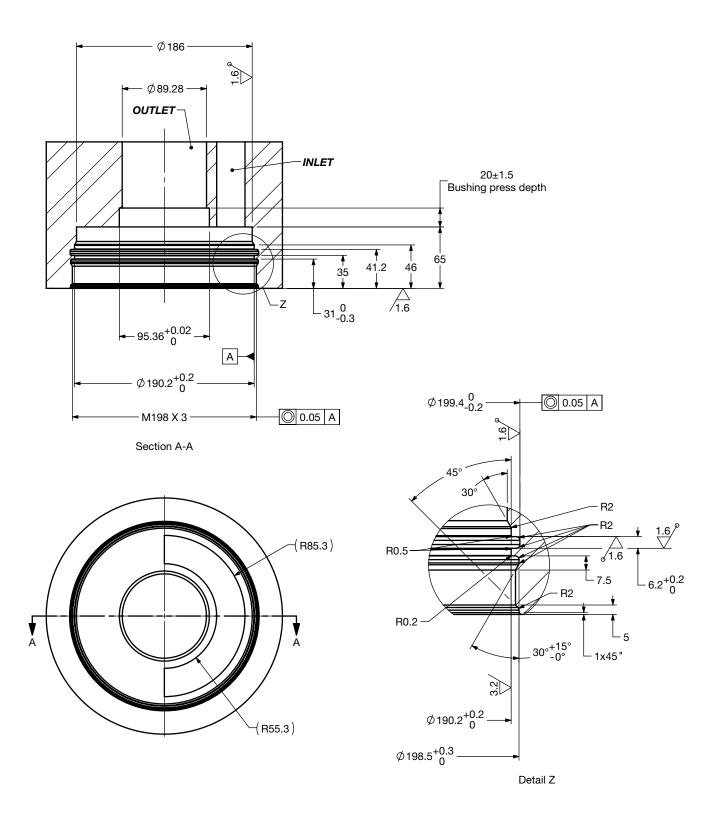


Size	L	D1
NF 1350 SET	490	470
NF 2250 SET	587	571
NF 2650 SET	931	915

Unspecified Tolerances

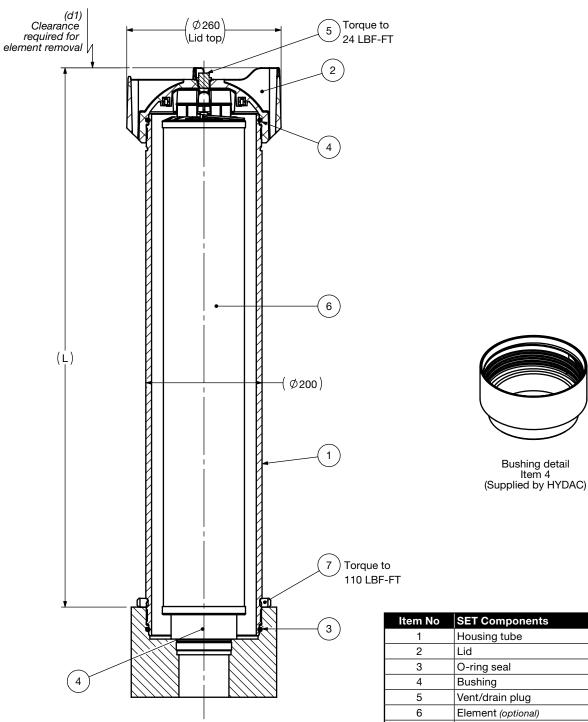
From	0.5	6	30	120	400
То	6	30	120	400	1000
	±0.1	±0.2	±0.3	±0.5	±0.8

Size	1350	2250	2650
Weight (lbs.)	33.1	47	51.4



SET SERIES FILTERS - LOW PRESSURE

Dimensions NF Set QPG5 1350 / 2250 / 2650



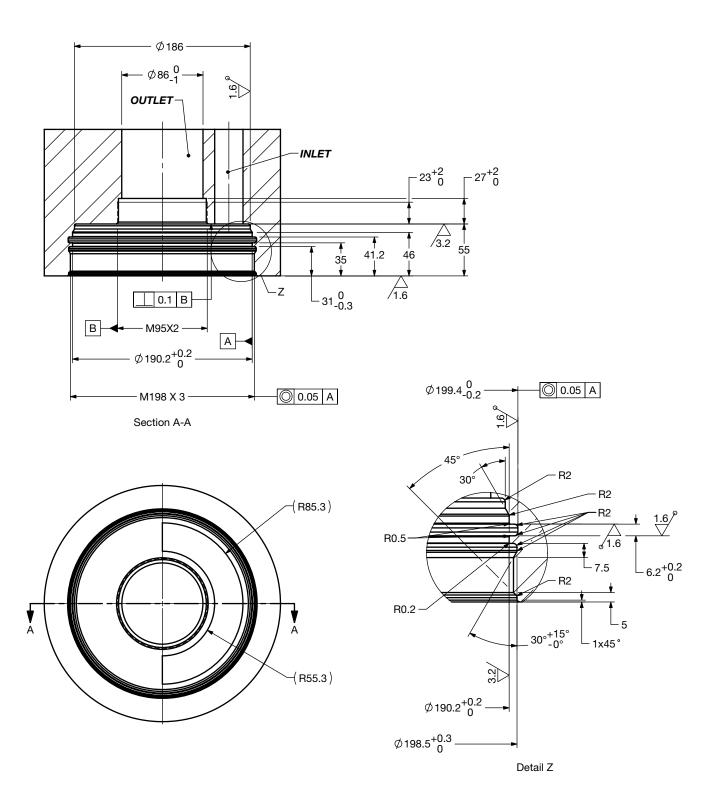
Size	L	D1
NF 1350 SET	490	470
NF 2250 SET	587	571
NF 2650 SET	931	915

1	Housing tube	
2	Lid	
3	O-ring seal	
4	Bushing	
5	Vent/drain plug	
6	Element (optional)	
7	Lock nut	

Unspecified Tolerances

From	0.5	6	30	120	400
То	6	30	120	400	1000
	±0.1	±0.2	±0.3	±0.5	±0.8

Size	1350	2250	2650
Weight (lbs.)	33.7	47.6	52



SET SERIES FILTERS – LOW PRESSURE

Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Optimicron			R.	ON		
Size	1 µm	3 μm	5 μm	10 µm	15 µm	20 μm
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012
2200 R XXX ON	0.058	0.027	0.022	0.012	0.011	0.008
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006

ECOmicron		RE	CON2	
Size	3 µm	5 μm	10 μm	20 μm
1300 R XXX ECON2	0.044	0.033	0.022	0.016
2200 R XXX ECON2	0.029	0.021	0.013	0.008
2600 R XXX ECON2	0.022	0.016	0.011	0.005

Betamicron/Aquamicron	RE	3N4AM
Size	3 μm	10 µm
1300 R XXX BN4AM	0.088	0.033
2200 R XXX BN4AM	0.062	0.021
2600 R XXX BN4AM	0.055	0.016

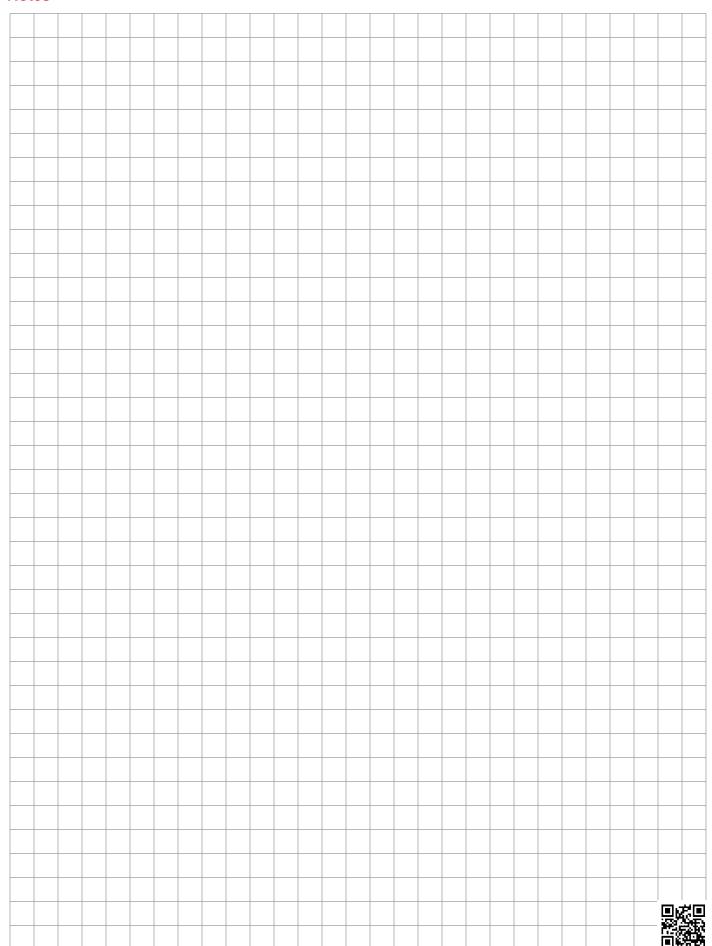
Aquamicron	RAM
Size	40 μm
1300 R 040 AM	0.026
2200 R 040 AM	0.016
2600 R 040 AM	0.013

Wire Mesh	RW/HC
Size	25, 50, 100, 200 μm
1300 R XXX W/HC	0.002
2200 R XXX W/HC	0.001
2600 R XXX W/HC	0.001

Polyester	RP/HC	
Size	10 µm	20 μm
1300 R XXX P/HC	0.004	0.002
2200 R XXX P/HC	0.004	0.004
2600 R XXX P/HC	0.002	0.001

SET SERIES FILTERS – LOW PRESSURE

Notes



SET SERIES FILTERS - MEDIUM PRESSURE

LPF Set Series

Manifold Cartridge Filters 725 psi • up to 74 gpm



Features

- Non-welded housing design reduces stress concentrations and
- prevents fatique failure.
- Aluminum alloy is water tolerant anodization is not required for water based fluids (HWBF).
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, ethylene propylene rubber) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based fluids.
- Screw-in bowl requires minimal clearance to remove the element for replacement, and contaminated fluid cannot be washed downstream when element is serviced.
- HYDAC differential Pressure Indicators (optional) have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- For special finishes and coatings consult HYDAC for minimum quantities, availability and pricing.

Applications











Steel / Heavy

Installation

The LPF Set Manifold Cartridge Filter is installed into a threaded cavity that is machined in the manifold (manifold not included - see cavity drawing). A bushing is provided for proper element installation, as well as a bowl with o-ring seal and back-up ring. An element can be provided as a option. The bushing holds the element in place during filtration operation, and facilitates easy removal for element change

More than one SET may be installed in the manifold if required for capacity. A differential pressure clogging indicator, to warn of high upstream pressure (element clogged), can be attached to the manifold as well (cavity drawings for that upon request). For additional information, contact HYDAC.

Technical Specifications

Mounting Method	Threaded bowl
Flow Direction	
Element	Out-to-in
Construction Materials	
Bowl	Aluminum Extrusion
Flow Capacity	
35	9 gpm (35 lpm)
55	15 gpm (55 lpm)
160	42 gpm (160 lpm)
240	63 gpm (240 lpm)
280	74 gpm (280 lpm)
Housing Pressure Ratin	g

Burst Pressure	160 - 280	> 3625 psi (200 bar)
	35 - 55	Contact HYDAC
	160 - 280	725 psi (50 bar) (106 cycles)
Fatigue Pressure	35 - 55	580 psi (40 bar) (107 cycles)
	*Note: 580 psi	(40 bar) when using BF indicator
Pressure	160 - 280	725 psi (50 bar)*
Max. Allowable Working	35 - 55	580 psi (40 bar)
_	-	

Element Collapse Pressure Rating (optional)

Fluid	Temp. Range	-22°F to 212°F (-30°C to 100°C)
ON,	W/HC	290 psid (20 bar)
	₽Π ∪ , V	3043 psiu (210 bar)

Consult HYDAC for applications operating below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/ water emulsion, and high water based fluids when the appropriate seals are selected

△P Indicator Trip Pressure (optional)

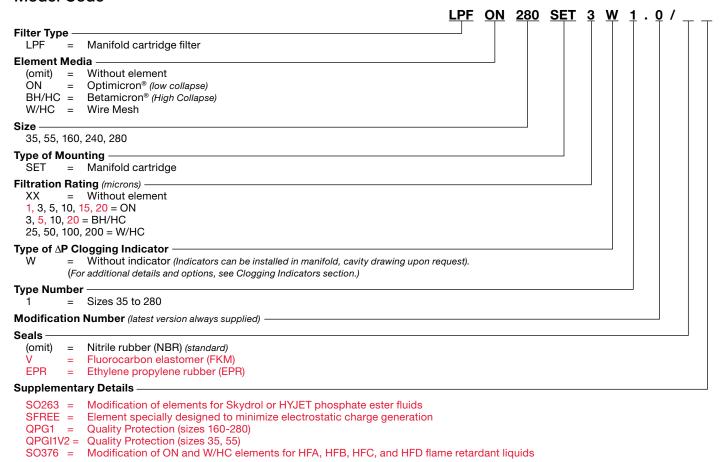
 $\Delta P = 29 \text{ psid } (2 \text{ bar}) -10\% \text{ (optional)}$

 $\Delta P = 36.25 \text{ psid } (2.5 \text{ bar}) \text{ (BF indicator)}$

 $\Delta P = 72 \text{ psid (5 bar) -10\% (standard)}$

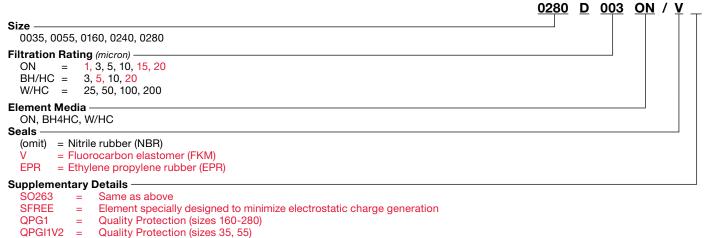
SET SERIES FILTERS – MEDIUM PRESSURE

Model Code



Replacement Element Model Code

(same as above)



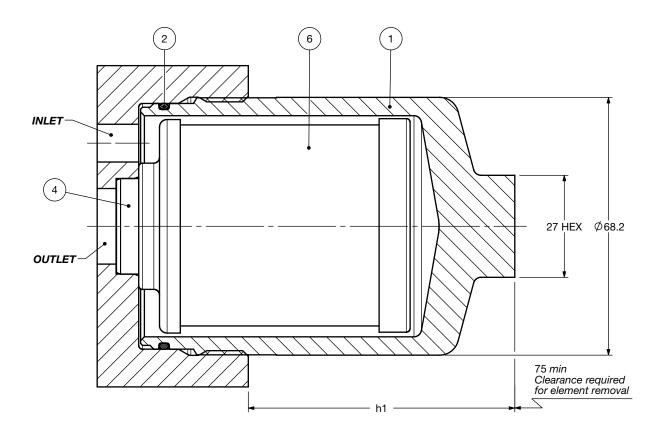
HYDAC

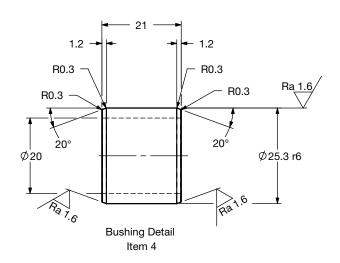
G11

SO376

SET SERIES FILTERS - MEDIUM PRESSURE

Dimensions LPF Set 35 / 55





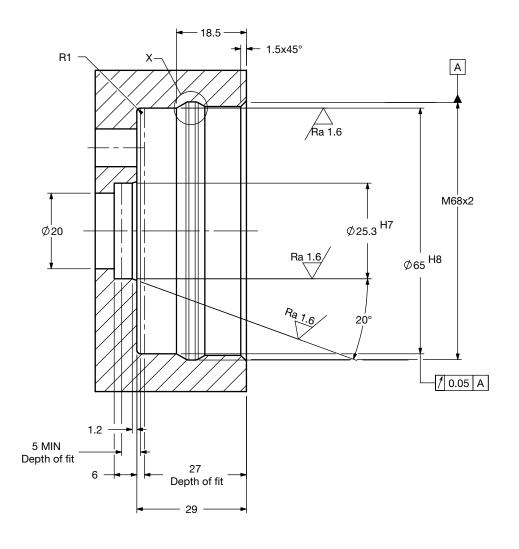
Item No	SET Components
1	Bowl
2	Bowl back-up ring
3	Bowl o-ring
4	Bushing
5	Drain plug (Std – sizes 330/660, Opt – sizes 60-280 - use code SO184)
6	Element (optional)

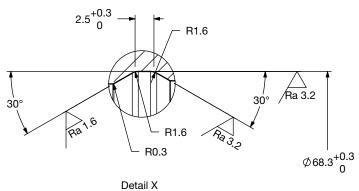
Size	h1
LPF 35 SET	70.5
LPF 55 SET	116.5

Unspecified Tolerances

From	0.5	3	6	30	120
То	3	6	30	120	400
	±0.1	±0.1	±0.2	±0.3	±0.5

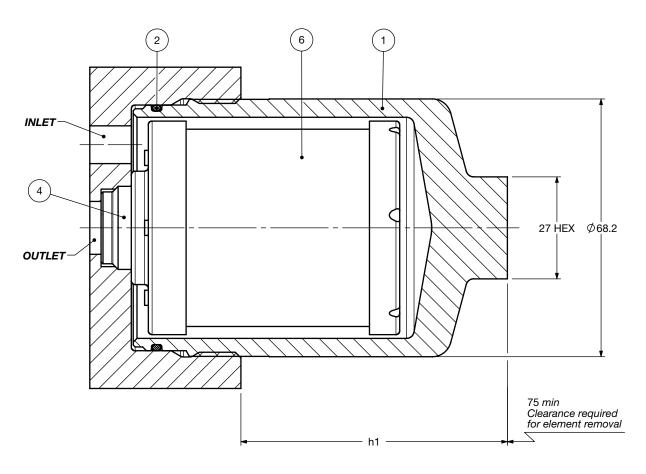
Size	35	55
Weight (lbs.)	1	1.6





SET SERIES FILTERS - MEDIUM PRESSURE

Dimensions LPF Set QPGI1V2 35 / 55





Bushing Detail Item 4 Secure with Loctite 4204 Torque to 10-2Nm

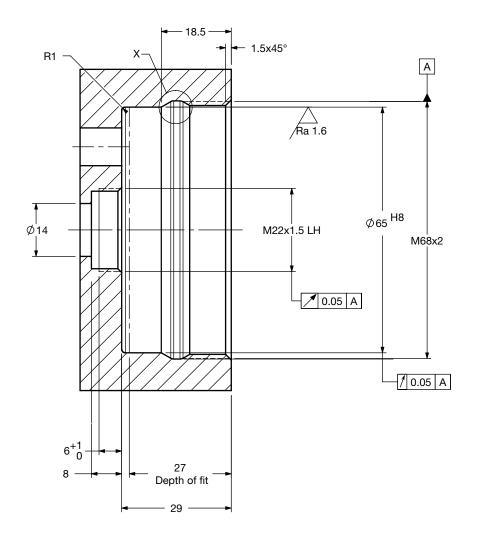
Item No	SET Components
1	Bowl
2	Bowl back-up ring
4	Bushing
6	Element (optional)

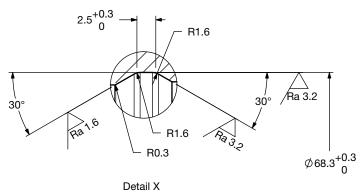
Size	h1
LPF 35 SET	70.5
LPF 55 SET	116.5

Unspecified Tolerances

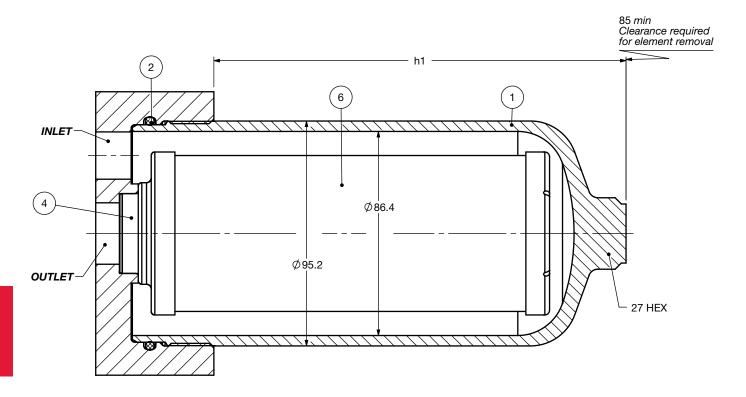
From	0.5	3	6	30
То	3	6	30	120
	±0.1	±0.1	±0.2	±0.3

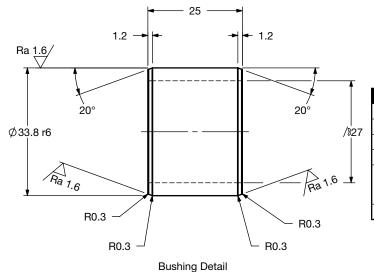
Size	35	55
Weight (lbs.)	1	1.6





Dimensions LPF Set 160 / 240 / 260 / 280





Item No	SET Components
1	Bowl
2	Bowl back-up ring
3	Bowl o-ring
4	Bushing
5	Drain plug (Std – sizes 330/660, Opt – sizes 60-280 - use code SO184)
6	Element (optional)

Size h1 LPF 160 SET 121.5 LPF 240 SET 174.5 LPF 260 SET 244.5 LPF 280 SET 359.5

Item 4

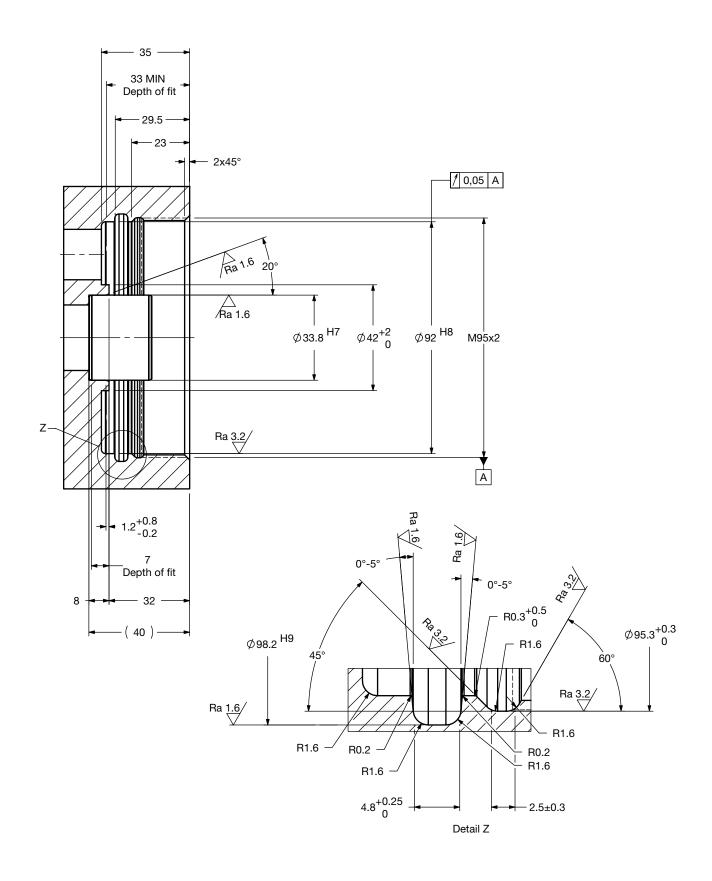
Unspecified Tolerances

From	0.5	3	6	30	120
То	3	6	30	120	400
	±0.1	±0.1	±0.2	±0.3	±0.5

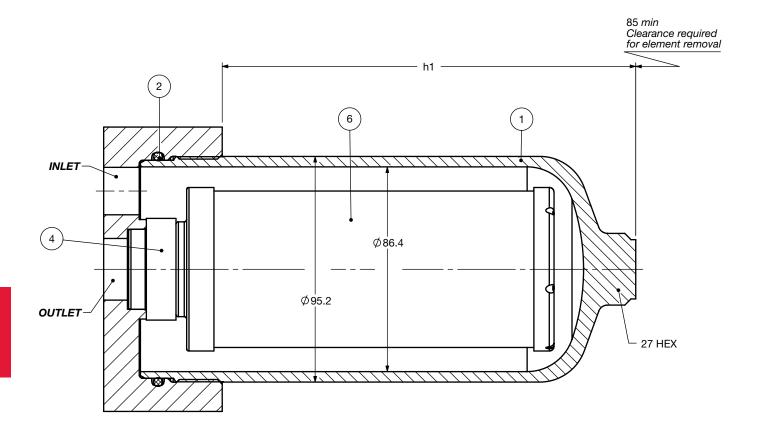
Size	160	240	260	280
Weight (lbs.)	1.9	2.5	3.2	4.7

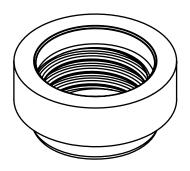
Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

Customer Manifold Machining LPF Set 160 / 240 / 260 / 280



Dimensions LPF Set QPG1 160 / 240 / 260 / 280





Bushing Detail Item 4 (Supplied by HYDAC)

Item No	SET Components
1	Bowl
2	Bowl back-up ring
4	Bushing
6	Element (optional)

Size	h1
LPF 160 SET	121.5
LPF 240 SET	174.5
LPF 260 SET	244.5
LPF 280 SET	359.5

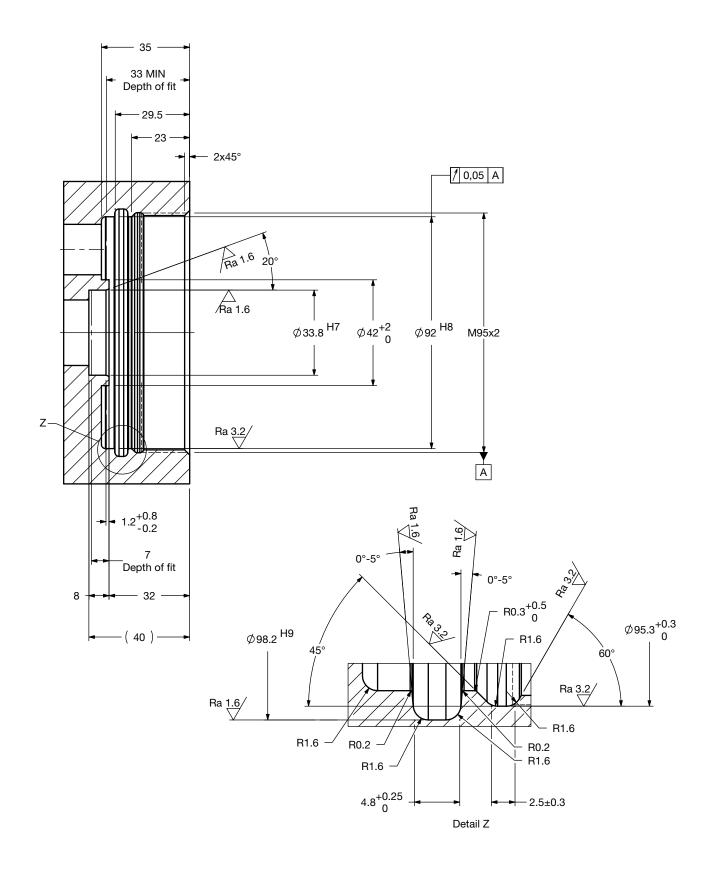
Unspecified Tolerances

From	0.5	3	6	30	120	
То	3	6	6 30		400	
	±0.1	±0.1	±0.2	±0.3	±0.5	

Size	160	240	260	280
Weight (lbs.)	2	2.6	3.3	4.8

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

Customer Manifold Machining LPF Set QPG1 160 / 240 / 260 / 280



Element K Factors

 $\Delta P \; \text{Elements} = \text{Elements} \; (\text{K}) \; \text{Flow Factor} \; x \; \text{Flow Rate (gpm)} \; x \; \\ \frac{\text{Actual Viscosity (SUS)}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{0.86} \; x \; \\ \frac{\text{Actual Viscosity (SUS)}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{141 \; \text{S$

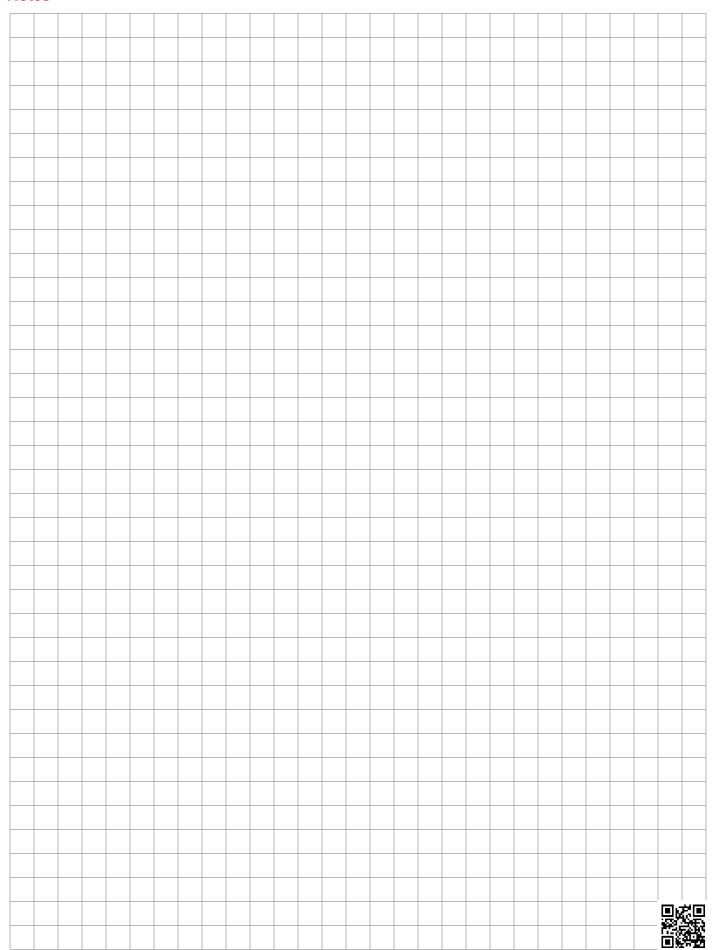
"ON" Pressure Elements		DON (Optimicron Pressure Elements)											
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm							
0035 D XXX ON	2.755	1.169	0.938	0.752	0.549	0.408							
0055 D XXX ON	1.427	0.675	0.543	0.434	0.284	0.211							
0160 D XXX ON	1.015	0.604	0.423	0.225	0.204	0.175							
0240 D XXX ON	0.631	0.379	0.293	0.175	0.134	0.115							
0280 D XXX ON	0.304	0.185	0.15	0.082	0.075	0.064							

"D" Pressure Elements		DBH4HC (Betamicron High Collapse)										
Size	3 μm	10 μm	20 μm									
0035 D XXX BH4HC	2.623	1.542	0.922	0.576								
0055 D XXX BH4HC	1.328	0.779	0.466	0.291								
0160 D XXX BH4HC	0.922	0.571	0.324	0.241								
0240 D XXX BH4HC	0.582	0.373	0.214	0.159								
0280 D XXX BH4HC	0.313	0.187	0.099	0.088								

Wire Mesh	DW/HC Elements (Low Collapse)
Size	DW/HC Elements 25, 50, 100, 200 μm
0160 D XXX W/HC	0.016
0240 D XXX W/HC	0.010
0280 D XXX W/HC	0.005

All Element K Factors in psi / gpm.

Notes



LF Set Series

Manifold Cartridge Filters 1500 psi • up to 180 gpm



Features

- Non-welded housing design reduces stress concentrations and
- prevents fatigue failure.
- Aluminum alloy is water tolerant anodization is not required for water based fluids (HWBF).
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, ethylene propylene rubber) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based fluids.
- Screw-in bowl requires minimal clearance to remove the element for replacement, and contaminated fluid cannot be washed downstream when element is serviced.
- HYDAC differential Pressure Indicators (optional) have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- For special finishes and coatings consult HYDAC for minimum quantities, availability and pricing.

Applications



Agricultural



Automotive



Construction





Railwavs



Installation

The LF Set Manifold Cartridge Filter is installed into a threaded cavity that is machined in the manifold (manifold not included - see cavity drawing). A bushing is provided for proper element installation, as well as a bowl with o-ring seal and back-up ring. An element can be provided as a option. The bushing holds the element in place during filtration operation, and facilitates easy removal for element change

More than one SET may be installed in the manifold if required for capacity. A differential pressure clogging indicator, to warn of high upstream pressure (element clogged), can be attached to the manifold as well (cavity drawings for that upon request). For additional information, contact HYDAC.

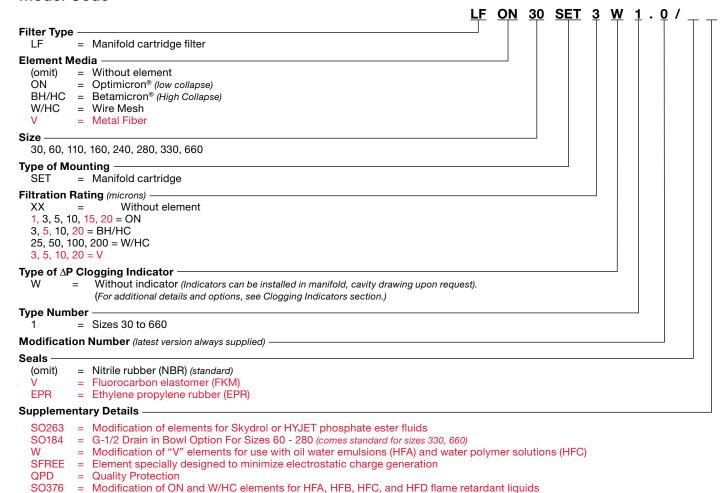
Technical Specifications

recillical Specificat	10113				
Mounting Method	Threaded bowl				
Flow Direction					
Element	Out-to-in				
Construction Materials					
Bowl	Aluminum Extrusion (sizes 30 - 660)				
	Steel (size 280)				
Flow Capacity					
30	8 gpm (30 lpm)				
60	16 gpm (60 lpm)				
110	29 gpm (110 lpm)				
160	42 gpm (160 lpm)				
240	63 gpm (240 lpm)				
280	74 gpm (280 lpm)				
330	84 gpm (330 lpm)				
660	174 gpm (660 lpm)				
Housing Pressure Rating					
Max. Operating Pressure	1500 psi (100 bar)				
Fatigue Pressure	1500 psi (100 bar)				
Burst Pressure	size 30 5510 psi (380bar)				
	sizes 60 - 660 > 6090 psi (420 bar)				
Element Collapse Pressure	Rating (optional)				
BH4HC, V	3045 psid (210 bar)				
ON, W/HC	290 psid (20 bar)				
Fluid Temperature Range	-22°F to 212°F (-30°C to 100°C)				
Consult HYDAC for applications	operating below -22°F (-30°C)				
Fluid Compatibility Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected					

△P Indicator Trip Pressure (optional)

 $\Delta P = 29 \text{ psid (2 bar) -10}\%$ $\Delta P = 72 \text{ psid } (5 \text{ bar}) -10\%$

Model Code



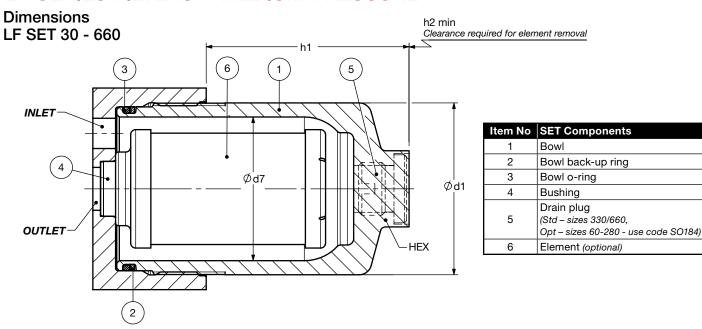
Replacement Element Model Code

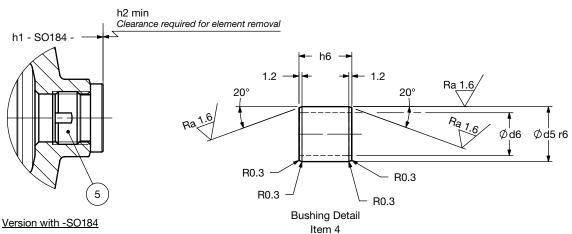
(same as above)

```
0030 D 003 ON /
Size
  0030, 0060, 0110, 0160,
  0240, 0280, 0330, 0660
Filtration Rating (micron)
  1, 3, 5, 10, 15, 20 = ON
  3, 5, 10, 20 = BH/HC
  25, 50, 100, 200 = W/HC
  3.5.10.20 = V
Element Media
  ON, BH4HC, W/HC, V
Seals
        = Nitrile rubber (NBR)
  (omit)
         = Fluorocarbon elastomer (FKM)
         = Ethylene propylene rubber (EPR)
Supplementary Details
  SO263
                 (same as above)
  W
                 (same as above)
  SFREE
                 Element specially designed to minimize electrostatic charge generation
  QPD
                 Quality Protection
```

Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

SO376





Size	d1	d2	d3	d4	d5	d6	d7	d8	d9	h1	h1 -SO184	h2	h3	h4	h5	h6	h7	h8	h9	HEX
30	52	52	M55x1.5	11.9	11.9	8	44	56	55.2	77.5	80.5	75	33	31	23	18	6	4	5	24
60	68	65	M68x2	21.8	21.8	17	57	69	68.3	82.5	86.5	75	36	34	25.5	21	6	4	5	27
110	68	65	M68x2	21.8	21.8	17	57	69	68.3	150	154	75	36	34	25.5	21	6	4	5	27
160	95	88	M95x2	33.8	33.8	26	78	96	95.3	113.5	117.5	95	47	45	35	25	8	5	7	32
240	95	88	M95x2	33.8	33.8	26	78	96	95.3	173.5	177.5	95	47	45	35	25	8	5	7	32
280	95	88	M95x2	33.8	33.8	26	78	96	95.3	358.7	362.7	95	47	45	35	25	8	5	7	32
330	130	125	M130x2	47.8	47.8	36	110	131	130.3	165.5	-	105	55	52	41.6	26	10	6	9	36
660	130	125	M130x2	47.8	47.8	36	110	131	130.3	336.5	-	105	55	52	41.6	26	10	6	9	36

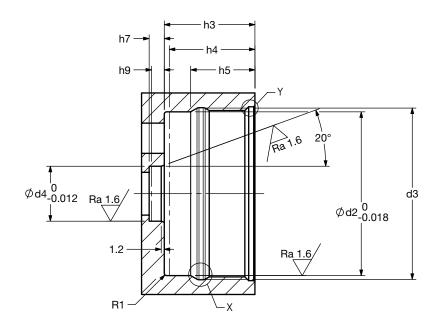
Unspecified Tolerances

10	±0.1	±0.1	±0.2	±0.3	±0.5
То	2	6	30	120	400
From	0.5	3	6	30	120

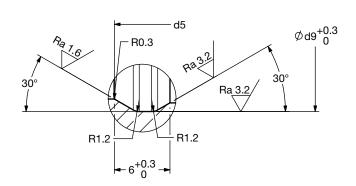
Size	30	60	110	160	240	280	330	660
Weight (lbs.)	0.7	1.2	1.8	3.2	4	21.4	7.5	13.2

Dimensions shown are millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

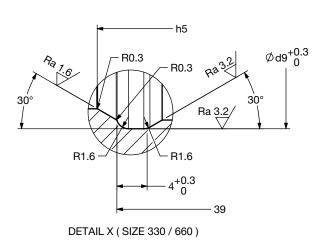
Customer Manifold Machining LF SET 30 - 660

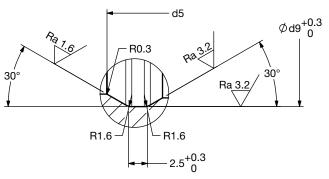


MANIFOLD MACHINING

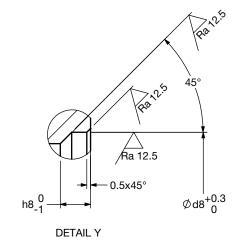


DETAIL X (SIZE 30)



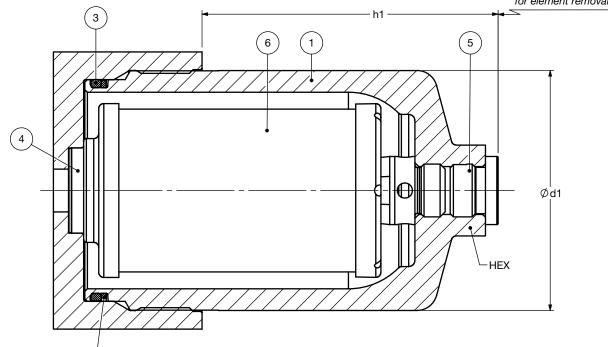


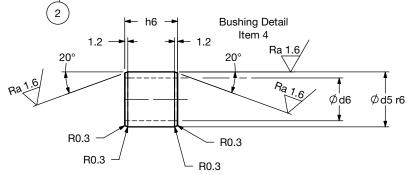
DETAIL X (SIZE 60-240)



Dimensions LF SET QPD 30 - 660

h2 min Clearance required for element removal





Item No	SET Components
1	Bowl
2	Bowl back-up ring
3	Bowl o-ring
4	Bushing
5	Drain plug (Std – sizes 330/660, Opt – sizes 60-280 - use code SO184)
6	Element (optional)

Size	d1	d2	d3	d4	d5	d6	d7	d8	d9	h1	h2	h3	h4	h5	h6	h7	h8	h9	HEX
30	52	52	M55x1.5	11.9	11.9	8	44	56	55.2	80.5	75	33	31	23	18	6	4	5	24
60	68	65	M68x2	21.8	21.8	17	57	69	68.3	86.5	75	36	34	25.5	21	6	4	5	27
110	68	65	M68x2	21.8	21.8	17	57	69	68.3	154	75	36	34	25.5	21	6	4	5	27
160	95	88	M95x2	33.8	33.8	26	78	96	95.3	117.5	95	47	45	35	25	8	5	7	32
240	95	88	M95x2	33.8	33.8	26	78	96	95.3	177.5	95	47	45	35	25	8	5	7	32
280	95	88	M95x2	33.8	33.8	26	78	96	95.3	362.7	95	47	45	35	25	8	5	7	32
330	130	125	M130x2	47.8	47.8	36	110	131	130.3	165.5	105	55	52	41.6	26	10	6	9	36
660	130	125	M130x2	47.8	47.8	36	110	131	130.3	336.5	105	55	52	41.6	26	10	6	9	36

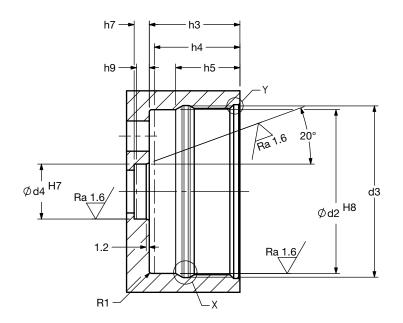
Unspecified Tolerances

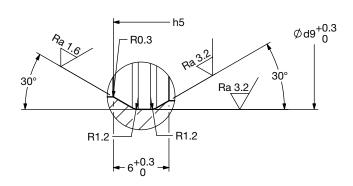
	±0.1	±0.1	±0.2	±0.3	±0.5
То	3	6	30	120	400
From	0.5	3	6	30	120

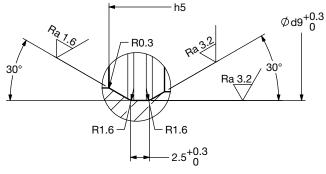
Size	30	60	110	160	240	280	330	660
Weight (lbs.)	1.9	2.4	3	3.2	4	21.4	8.8	14.5

Dimensions shown are millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

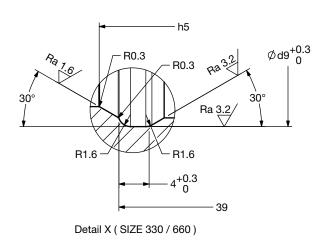
Customer Manifold Machining LF SET QPD 30 - 660

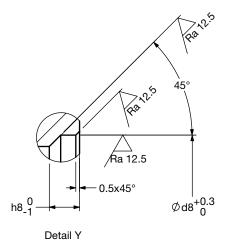






Detail X (SIZE 30)





Detail X (SIZE 60-240)

Element K Factors

 $\Delta P \; \text{Elements} = \text{Elements} \; (\text{K)} \; \text{Flow} \; \text{Factor} \; x \; \text{Flow} \; \text{Rate} \; (\text{gpm}) \; x \; \frac{\text{Actual Viscosity} \; (\text{SUS})}{141 \; \text{SUS}} \; x \; \frac{\text{Actual Specific Gravity}}{0.86} \; (\text{Substantial Substantial Substanti$

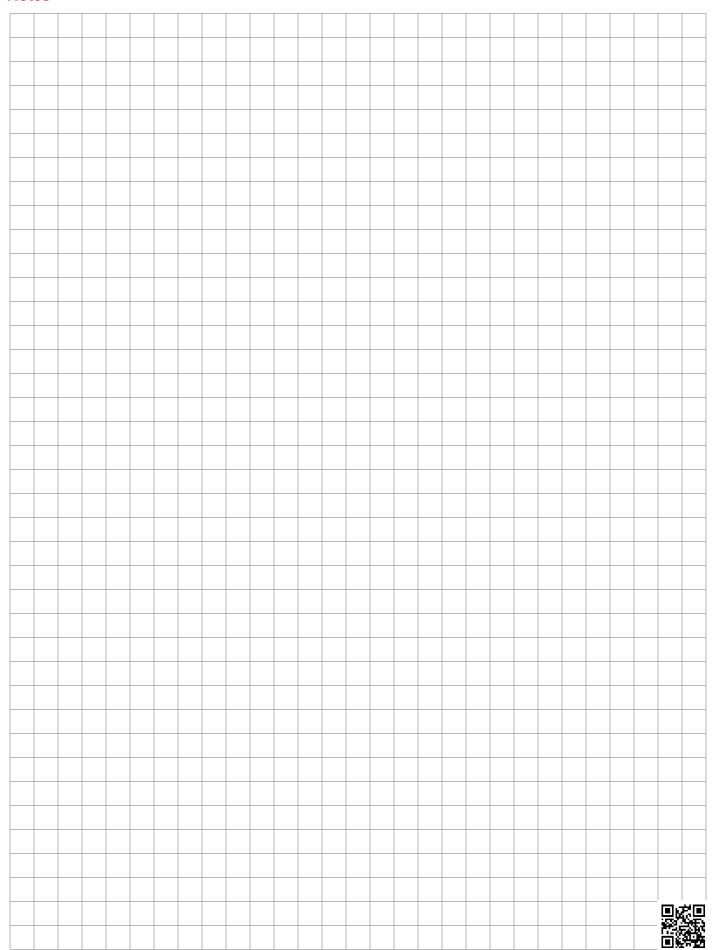
"ON" Pressure Elements:		D.	ON (Optimicror	on Pressure Elements)				
Size	1 µm	3 µm	5 μm	10 µm	15 µm	20 μm		
0030 D XXX ON	4.27	3.507	2.376	1.251	0.768	0.62		
0060 D XXX ON	2.936	1.427	1.004	0.664	0.537	0.347		
0110 D XXX ON	1.416	0.735	0.527	0.333	0.254	0.164		
0160 D XXX ON	1.015	0.604	0.423	0.225	0.204	0.175		
0240 D XXX ON	0.631	0.379	0.293	0.175	0.134	0.115		
0280 D XXX ON	0.304	0.185	0.15	0.082	0.075	0.064		
0330 D XXX ON	0.452	0.23	0.185	0.135	0.085	0.067		
0660 D XXX ON	0.207	0.106	0.086	0.051	0.039	0.031		

"D" Pressure Elements	DBH4	DBH4HC (Betamicron High Collap				
Size	3 µm	5 μm	10 µm	20 μm		
0030 D XXX BH4HC	5.005	2.782	1.992	1.043		
0060 D XXX BH4HC	3.216	1.789	0.993	0.670		
0110 D XXX BH4HC	1.394	0.818	0.489	0.307		
0160 D XXX BH4HC	0.922	0.571	0.324	0.241		
0240 D XXX BH4HC	0.582	0.373	0.214	0.159		
0280 D XXX BH4HC	0.313	0.187	0.099	0.088		
0330 D XXX BH4HC	0.423	0.247	0.154	0.110		
0660 D XXX BH4HC	0.181	0.104	0.055	0.049		

Wire Mesh	DW/HC Elements (Low Collapse)
Size	25, 50, 100, 200 μm
0030 D XXX W/HC	0.166
0060 D XXX W/HC	0.042
0110 D XXX W/HC	0.023
0160 D XXX W/HC	0.016
0240 D XXX W/HC	0.010
0280 D XXX W/HC	0.005
0330 D XXX W/HC	0.008
0660 D XXX W/HC	0.004

All Element K Factors in psi / gpm.

Notes



LPFH Set Series

Manifold Cartridge Filters 500 psi • up to 112 gpm



Features

- Integrated retrofit protection
- · Non-welded housing design reduces stress concentrations and
- · prevents fatigue failure.
- Aluminum alloy is water tolerant anodization is not required for water based fluids (HWBF).
- O-ring seals are used to provide positive, reliable sealing. Choice
 of O-ring materials (nitrile rubber, fluorocarbon elastomer, ethylene
 propylene rubber) provides compatibility with petroleum oils,
 synthetic fluids, water-glycols, oil/water emulsions, and high
 water based fluids.
- Screw-in bowl requires minimal clearance to remove the element for replacement, and contaminated fluid cannot be washed downstream when element is serviced.
- HYDAC differential Pressure Indicators (optional) have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- For special finishes and coatings consult HYDAC for minimum quantities, availability and pricing.

Applications









Agricultural

Steel / Heavy Industry

Installation
The LPEH Set Ma

The LPFH Set Manifold Cartridge Filter is installed into a threaded cavity that is machined in the manifold (manifold not included - see cavity drawing). A bushing is provided for proper element installation, as well as a bowl with o-ring seal and back-up ring. An element can be provided as a option. The bushing holds the element in place during filtration operation, and facilitates easy removal for element change out.

More than one SET may be installed in the manifold if required for capacity. A differential pressure clogging indicator, to warn of high upstream pressure (element clogged), can be attached to the manifold as well (cavity drawings for that upon request). For additional information, contact HYDAC.

Technical Specifications

Mounting Method	Threaded bowl
Flow Direction	
Element	Out-to-in
Construction Materials	;
Bowl	Aluminum Extrusion
Flow Capacity	
325	87 gpm (325 lpm)
425	112 gpm (425 lpm)
Harraina Duagarina Dati	

Housing Pressure Rating

Max. Allowable Working

Pressure 325 - 425 500 psi (34 bar)

Fatigue Pressure 325 - 425 500 psi (34 bar) (10⁶ cycles) Burst Pressure 325 - 425 > 2700 psi (186 bar)

Element Collapse Pressure Rating (optional)

ON, W/HC 290 psid (20 bar) **Fluid Temp. Range** -22°F to 212°F (-30°C to 100°C)

Consult HYDAC for applications operating below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycwol, oil/water emulsion, and high water based fluids when the appropriate seals are selected

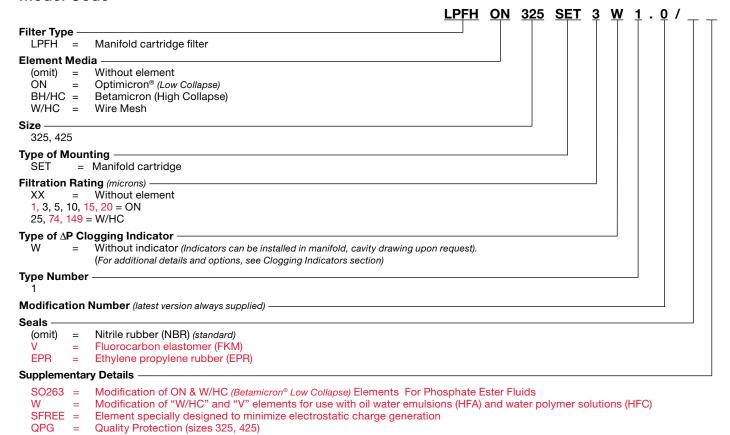
△P Indicator Trip Pressure (optional)

 $\Delta P = 29 \text{ psid } (2 \text{ bar}) -10\% \text{ (optional)}$

 $\Delta P = 36.25 \text{ psid } (2.5 \text{ bar}) \text{ (BF indicator)}$

 $\Delta P = 72 \text{ psid } (5 \text{ bar}) -10\% \text{ (standard)}$

Model Code

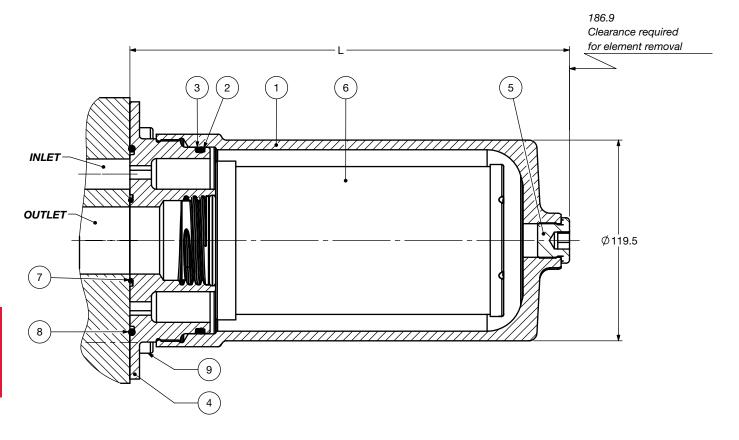


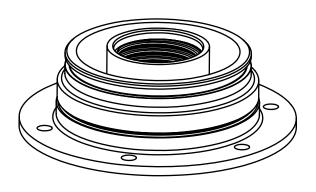
Replacement Element Model Code

```
0325
                                                                                                            D 003 ON /
Size
  0325, 0425
Filtration Rating (micron)
  1, 3, 5, 10, 15, 20 = ON
  25, 74, 149 = W/HC
  3, 5, 10, 20 = BH4HC
Element Media
  ON, BH4HC, W/HC
Seals
  (omit) = Nitrile rubber (NBR)
         = Fluorocarbon elastomer (FKM)
  FPR
         = Ethylene propylene rubber (EPR)
Supplementary Details
  SO263
                 Same as above
  SFREE
                 Element specially designed to minimize electrostatic charge generation
  QPG
                 Quality Protection (sizes 325, 425)
```

G31

Dimensions LPFH Set 325 / 425





ITEM 4 **PROVIDED**

Item No	SET Components
1	Bowl
2	Bowl back-up ring
3	Bowl o-ring
4	Bushing
5	Drain plug
6	Element (optional)
7	Inner seal
8	Outer seal
9	Set screw (not supplied by HYDAC)

Unspecified Tolerances

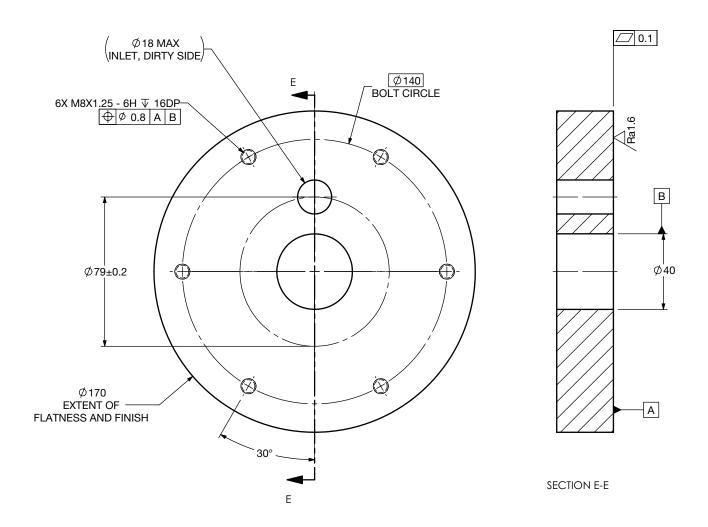
Size	L
325	262
425	352

From	0.5	3	6	30	120
То	3	6	30	120	400
	±0.1	±0.1	±0.2	±0.3	±0.5

Size	325	425
Weight (lbs.)	6.5	7.9

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

Customer Manifold Machining LPFH Set 325 / 425



Element K Factors

 $\Delta \text{P Elements} = \text{Elements (K) Flow Factor x Flow Rate (gpm) x} \\ \frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \\ \frac{\text{Actual Specific Gravity}}{0.86}$

Optimicron	DON						
Size	1 µm	3 μm	5 μm	10 µm	15 µm	20 μm	
0325 D XXX ON	0.444	0.204	0.150	0.081	0.070	0.056	
0425 D XXX ON	0.289	0.143	0.104	0.06	0.046	0.038	

Wire Mesh	DW/HC			
Size	DW/HC Elements 25, 50, 74, 100, 149, 200 μm			
0325 D XXX W/HC	0.011			
0425 D XXX W/HC	0.007			

Betamicron	DBH/HC					
Size	1 μm 3 μm 5 μm 10 μn		10 µm	15 µm	20 μm	
0325 D XXX BH/HC	Constitution of the second of					
0425 D XXX BH/HC	Consult factory upon request					

All Element K Factors in psi / gpm.

MFX Set Series

Manifold Cartridge Filters 725 psi • up to 35 gpm



Features

- Integrated retrofit (quality) protection
- High level of operational safety Bowl seal and bypass valve are integrated in the filter element and therefore replaced at every element change
- "Missing Element Protection" cannot operate without element installed.
- Non-welded housing design reduces stress concentrations and
- prevents fatigue failure.
- Aluminum alloy is water tolerant anodization is not required for water based fluids (HWBF).
- Screw-in bowl requires minimal clearance to remove the element for replacement, and contaminated fluid cannot be washed downstream when element is serviced.
- HYDAC differential Pressure Indicators (optional) have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- For special finishes and coatings consult HYDAC for minimum quantities, availability and pricing.

Applications









Agricultural

Railways

Installation

The MFX Set Manifold Cartridge Filter is installed into a threaded cavity that is machined in the manifold (manifold not included - see cavity drawing). A bushing is provided for proper element installation. The bushing holds the element in place during filtration operation, and facilitates easy removal for element change out.

More than one SET may be installed in the manifold if required for capacity. A differential pressure clogging indicator, to warn of high upstream pressure (element clogged), can be attached to the manifold as well (cavity drawings for that upon request). For additional information, contact HYDAC.

Technical Specifications

reoriinear opeemea	10113
Mounting Method	Threaded
Flow Direction	
Element	Out-to-in
Construction Materials	
Bowl	Extruded Aluminum
Flow Capacity	
100	26 gpm (100 lpm)
200	35 gpm (130 lpm)
Housing Pressure Rating	
Max. Allowable Working	
Pressure	725 psi (50 bar)
Fatigue Pressure	725 psi (50 bar) @ 1 million cycles
Burst Pressure	2600 psi (183 bar)
Element Collapse Pressure	Rating
BN4HC	290 psid (20 bar)
ECON2, MM	145 psid (10 bar)
Fluid Temperature Range	-22°F to 212°F (-30°C to 100°C)
Consult HYDAC for applications	s below -22°F (-30°C)
Fluid Compatibility	
Compatible with all hydroc	arbon based, synthetic, and high water
based fluids compatible wi	th Nitrile Rubber (NBR) seals
ΔP Indicator Trip Pressure	(optional)
AP - 36 25 psid (2.5 bar) -1	0% (standard)

 $\Delta P = 36.25 \text{ psid } (2.5 \text{ bar}) -10\% \text{ (standard)}.$ $\Delta P = 14.5 \text{ psid } (1 \text{ bar}) -10\% \text{ (optional)}$

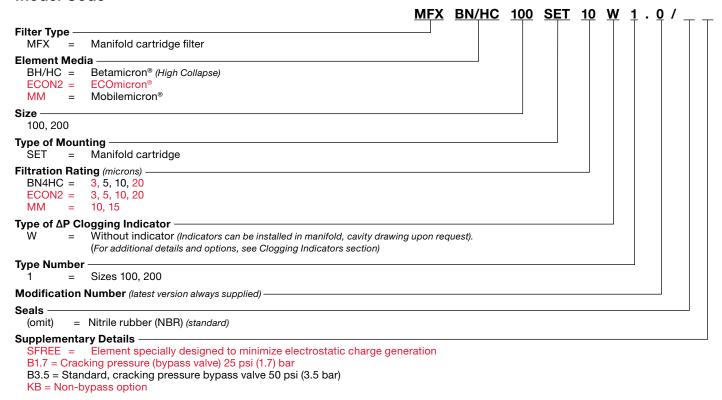
Bypass Valve Cracking Pressure

B1.7 = Cracking pressure (bypass valve) 25 psi (1.7) bar

B3.5 = Standard, cracking pressure bypass valve 50 psi (3.5 bar)

KB = Non-bypass option

Model Code



Replacement Element Model Code

Non-bypass option

Standard, cracking pressure (bypass valve) 50 psi (3.5 bar)

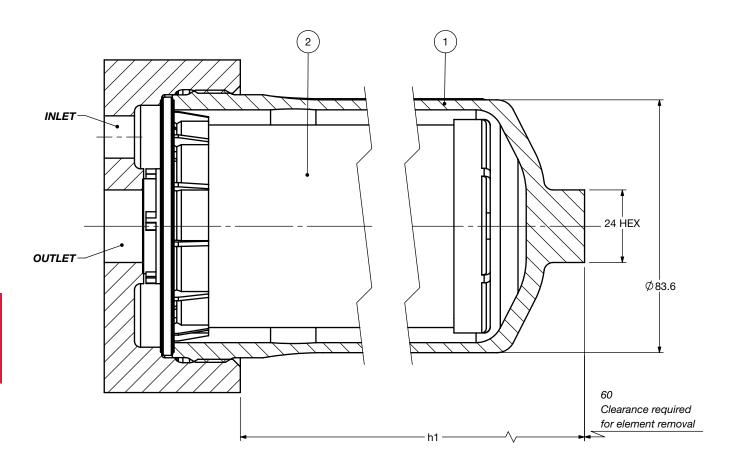
```
0100 MX 010 BN4HC / - B3.5
Size
  0100, 0200
  MX
Filtration Rating (micron)
  3, 5, 10, 20 = BN4HC
  3, 5, 10, 20 = ECON2
  10, 15 = MM
Filter Material
  BN4HC, ECON2, MM
Supplementary Details
  Seals:
  (omit)
              Nitrile rubber (NBR) (standard)
              Cracking pressure (bypass valve) 25 psi (1.7 bar)
  B1.7
```

HYDAC

B3.5

KB

Dimensions MFX Set 100 / 200



	Item No	SET Components
Γ	1	Bowl
Г	2	Element (integral bowl seal and bushing)

Size	h1
MFX 100 SET	154.5
MFX 200 SET	242.5

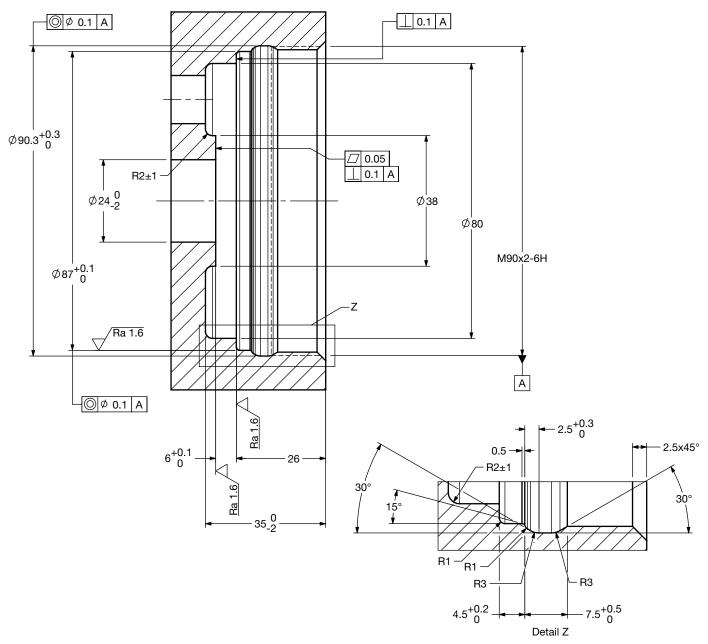
Unspecified Tolerances

From	0.5	6	30	120
То	6	30	120	400
	±0.1	±0.2	±0.3	±0.5

Size	100	200
Weight (lbs.)	2	2.9

Dimensions shown are millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

Customer Manifold Machining MFX Set 100 / 200



Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Betamicron	MXBN4HC (Betamicron® Low Collapse)			
Size	3 μm	5 μm	10 μm	20 μm
0100 MX XXX BN4HC	0.659	0.494	0.252	0.187
0200 MX XXX BN4HC	0.384	0.291	0.148	0.110

ECOmicron	MXECON2					
Size	3 μm	5 μm	10 μm	20 μm		
0100 MX XXX ECON2	0.713	0.549	0.357	0.263		
0200 MX XXX ECON2	0.439	0.324	0.209	0.154		

Mobilemicron	MXMM									
Size	8 µm	10 μm	15 µm							
0100 MX XXX MM	0.148	0.148	0.121							
0200 MX XXX MM	0.088	0.088	0.071							

All Element K Factors in psi / gpm.

G37

DF SET Series

Manifold Cartridge Filters 6090 psi • up to 200 gpm



Features

- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, ethylene propylene rubber) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based fluids.
- Screw-in bowl requires minimal clearance to remove the element for replacement, and contaminated fluid cannot be washed downstream when element is serviced.
- HYDAC differential Pressure Indicators (optional) have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- For special finishes and coatings consult HYDAC for minimum quantities, availability and pricing.

Applications







Automotive



Construction



Gearboxes



Industrial







Railwavs



Commercial Municipal



Shipbuilding



Generation



Industry

Installation

The DF Set Manifold Cartridge Filter is installed into a threaded cavity that is machined in the manifold (manifold not included - see cavity drawing). A bushing is provided for proper element installation, as well as a bowl with o-ring seal and back-up ring. An element can be provided as a option. The bushing holds the element in place during filtration operation, and facilitates easy removal for element change

More than one SET may be installed in the manifold if required for capacity. A differential pressure clogging indicator, to warn of high upstream pressure (element clogged), can be attached to the manifold as well (cavity drawings for that upon request). For additional information, contact HYDAC.

Technical Specifications

Mounting Method	Inreaded bowl
Flow Direction	
Element	Out-to-in
Construction Materials	
Bowl (30-660)	Steel
Housing/Bowl (660-1320 - 2.0)	Steel
Flow Capacity	
30	8 gpm (30 lpm)
60	16 gpm (60 lpm)
110	29 gpm (110 lpm)
160	42 gpm (160 lpm)
240	63 gpm (240 lpm)
280	74 gpm (280 lpm)
330	87 gpm (330 lpm)
660	174 gpm (660 lpm)
1320	200 gpm (757 lpm)
	-

Housing Pressure Rating

Max. Allowable Working

Pressure 6090 psi (420 bar)

6090 psi (420 bar) @ 1 million cycles **Fatigue Pressure** 15950 psi (1100 bar) **Burst Pressure** 30 17400 psi (1200 bar) 60/110 160/240/280 17110 psi (1180 bar) 330/660/1320 15080 psi (1040 bar)

Element Collapse Pressure Rating (optional)

3045 psid (210 bar) BH4HC, V ON, W/HC 290 psid (20 bar)

Fluid Temp. Range 14°F to 212°F (-10°C to 100°C)

Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure (optional)

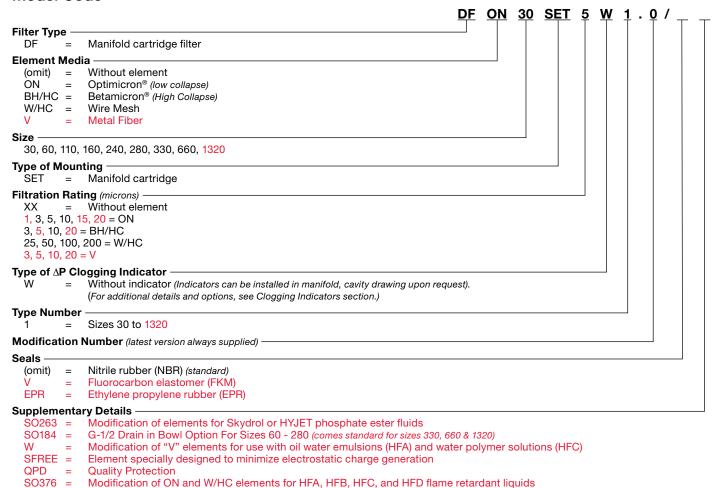
 $\Delta P = 29 \text{ psid (2 bar) -10\% (optional)}$

 $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (standard)}$

 $\Delta P = 116 \text{ psid (8 bar) -10\%}$ (optional non bypass)

Pulp & Paper

Model Code



Replacement Element Model Code

```
0030 D 003 ON /
Size
  0030, 0060, 0110, 0160,
  0240, 0280, 0330, 0660, 1320
Filtration Rating (micron)
  ON
        = 1, 3, 5, 10, 15, 20
  BH/HC =
              3, 5, 10, 20
  W/HC =
              25, 50, 100, 200
              3, 5, 10, 20
Element Media
  ON, BH4HC, W/HC, V
Seals
  (omit) = Nitrile rubber (NBR)
         = Fluorocarbon elastomer (FKM)
        = Ethylene propylene rubber (EPR)
Supplementary Details
  SO263
                 (same as above)
  W
                 (same as above)
  SFREE
                 Element specially designed to minimize electrostatic charge generation
  QPD
                 Quality Protection
```

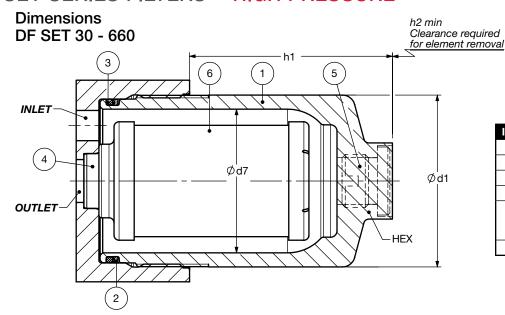
Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

HYDAC

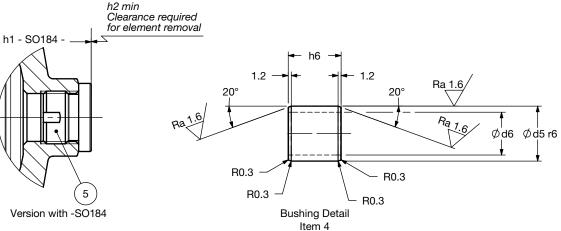
G39

(same as above)

SO376



Item No	SET Components
1	Bowl
2	Bowl back-up ring
3	Bowl o-ring
4	Bushing
5	Drain plug (Std – sizes 330/660, Opt – sizes 60-280 - use code SO184)
6	Element (optional)



	itom 4																				
Size	d1	d2	d3	d4	d5	d6	d7	d8	d9	h1	h1 -SO184	h2	h3	h4	h5	h6	h7	h8	h9	h10	HEX
030	52	52	M55x1.5	11.9	11.9	8	42	56	55.2	76	81	75	36	34	26	18	6	4	5	1.8	24
060	68	65	M68x2	21.8	21.8	17	52	69	68.3	72.5	77.5	85	45	43	34.5	21	6	6.5	5	2.5	27
110	68	65	M68x2	21.8	21.8	17	52	69	68.3	140	145	85	45	43	34.5	21	6	6.5	5	2.5	27
140	68	65	M68x2	21.8	21.8	17	52	69	68.3	183.5	188.5	85	45	43	34.5	21	6	6.5	5	2.5	27
160	95	88	M95x2	33.8	33.8	26	75	96	95.3	106	110	105	56	54	44	25	8	6.5	7	2.5	32
240	95	88	M95x2	33.8	33.8	26	75	96	95.3	166	169.5	105	56	54	44	25	8	6.5	7	2.5	32
280	95	88	M95x2	33.8	33.8	26	75	96	95.3	348	352	105	56	54	44	25	8	6.5	7	2.5	32
330	130	125	M130x2	47.8	47.8	36	102	131	130.3	156	-	115	66	64	52.6	26	10	5	9	4	36
500	130	125	M130x2	47.8	47.8	36	102	131	130.3	249	-	115	66	64	52.6	26	10	5	9	4	36
660	130	125	M130x2	47.8	47.8	36	102	131	130.3	326.5	-	115	66	64	52.6	26	10	5	9	4	36

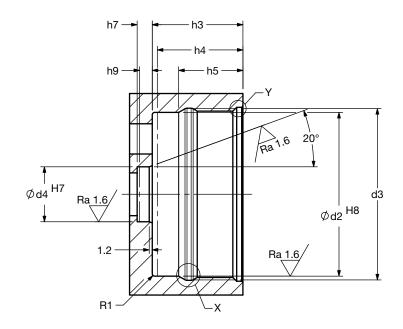
Unspecified Tolerances

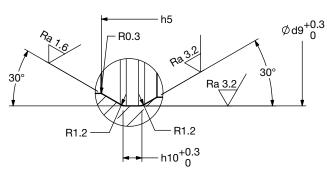
	±0.1	+0.1	+0.2	±0.3	+0.5
То	3	6	30	120	400
From	0.5	3	6	30	120

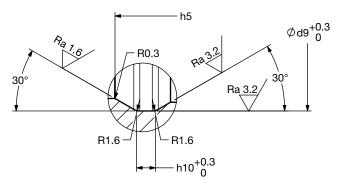
Size	30	60	110	140	160	240	280	330	500	660
Weight (lbs.)	1.9	3.6	6	7.2	8.6	11.6	21.4	22.9	32.1	39.2

Dimensions shown are millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

Customer Manifold Machining DF SET 30 - 660

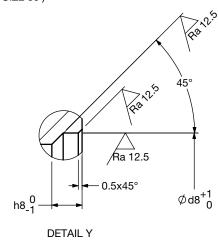




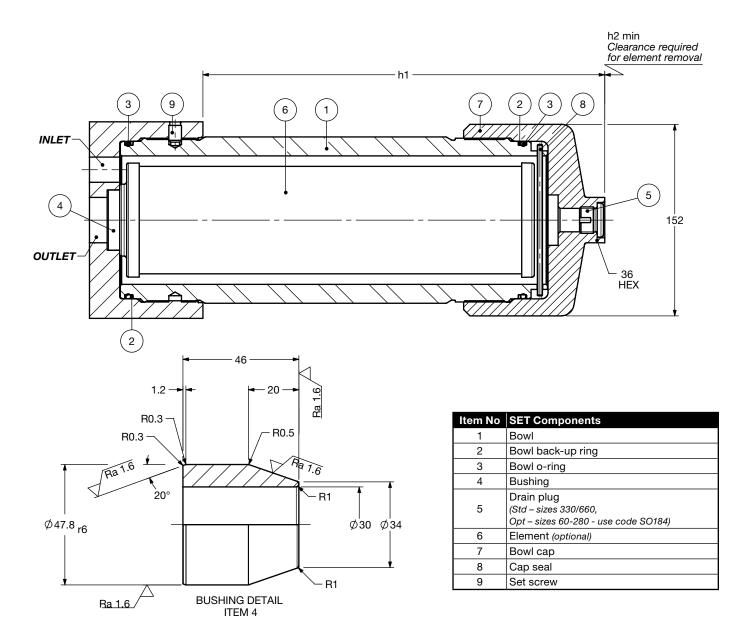


DETAIL X (SIZE 30)

DETAIL X (SIZE 60-660)



Dimensions DF SET 660 - 1320 2.X



Size	h1	h2
660 2.X	319	350
990 2.X	477	500
1320 2.X	643	670

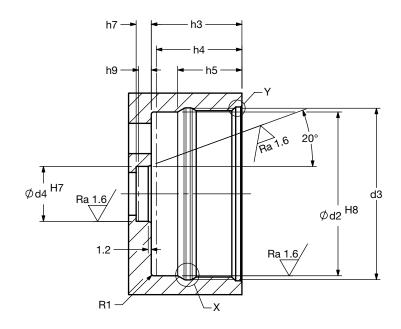
Unspecified Tolerances

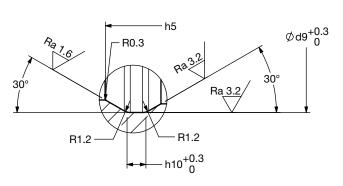
From	0.5	3	6	30	120	400
То	3	6	30	120	400	1000
	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8

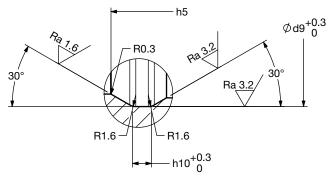
Size	660 2.X	990 2.X	1320 2.X
Weight (lbs.)	48.4	64.1	82.1

Dimensions shown are millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

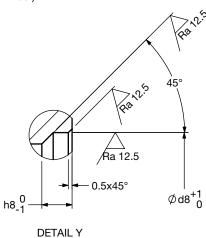
Customer Manifold Machining DF SET 660 - 1320 2.X



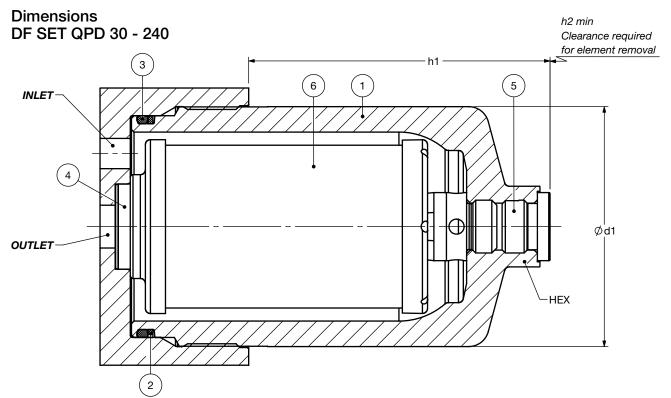


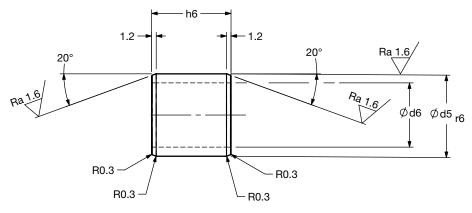


DETAIL X (SIZE 30)



DETAIL X (SIZE 60-660)





Item No	SET Components
1	Bowl
2	Bowl back-up ring
3	Bowl o-ring
4	Bushing
5	Drain plug (Std – sizes 330/660, Opt – sizes 60-280 - use code SO184)
6	Element (optional)

BUSHING DETAIL ITEM 4

Size	d1	d2	d3	d4	d5	d6	d7	d8	d9	h1	h2	h3	h4	h5	h6	h7	h8	h9	h10	HEX
030	95	88	M95x2	33.8	33.8	26	75	96	95.3	110	105	56	54	44	25	8	6.5	7	2.5	32
060	95	88	M95x2	33.8	33.8	26	75	96	95.3	169.5	105	56	54	44	25	8	6.5	7	2.5	32
110	95	88	M95x2	33.8	33.8	26	75	96	95.3	352	105	56	54	44	25	8	6.5	7	2.5	32
140	130	125	M130x2	47.8	47.8	36	102	131	130.3	156	115	66	64	52.6	26	10	5	9	4	36
160	130	125	M130x2	47.8	47.8	36	102	131	130.3	249	115	66	64	52.6	26	10	5	9	4	36
240	130	125	M130x2	47.8	47.8	36	102	131	130.3	326.5	115	66	64	52.6	26	10	5	9	4	36

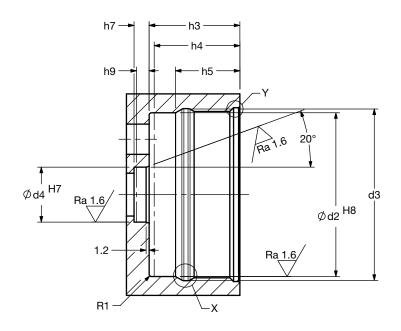
Unspecified Tolerances

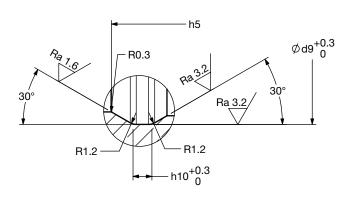
From	0.5	3	6	30	120
То	3	6	30	120	400
	±0.1	±0.1	±0.2	±0.3	±0.5

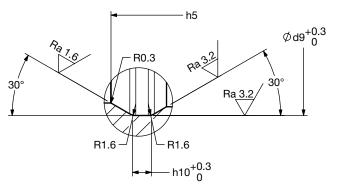
Size	30	60	110	160	240	280
Weight (lbs.)	9.3	12.8	22	24.4	33.3	41.1

Dimensions shown are millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

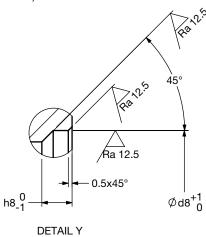
Customer Manifold Machining DF SET QPD 30 - 240







DETAIL X (SIZE 30)



DETAIL X (SIZE 60-660)

Element K Factors

 $\Delta P \; \text{Elements} = \text{Elements} \; (K) \; \text{Flow Factor} \; x \; \text{Flow Rate (gpm)} \; x \; \\ \frac{\text{Actual Viscosity (SUS)}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{0.86} \; x \; \\ \frac{\text{Actual Viscosity (SUS)}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{0.86} \; x \; \\ \frac{\text{Actual Viscosity (SUS)}}{141 \; \text{SUS}} \; x \; \\ \frac{\text{Actual Specific Gravity}}{0.86} \; x \; \\$

Betamicron [®]	DBH4HC Elements (High Collapse)				
Size	3 μm	5 μm	10 µm	20 µm	
0030 D XXX BH4HC	5.005	2.782	1.992	1.043	
0060 D XXX BH4HC	3.216	1.789	0.993	0.670	
0110 D XXX BH4HC	1.394	0.818	0.489	0.307	
0160 D XXX BH4HC	0.922	0.571	0.324	0.241	
0240 D XXX BH4HC	0.582	0.373	0.214	0.159	
0280 D XXX BH4HC	0.313	0.187	0.099	0.088	
0330 D XXX BH4HC	0.423	0.247	0.154	0.110	
0660 D XXX BH4HC	0.181	0.104	0.055	0.049	
1320 D XXX BH4HC	0.088	0.055	0.033	0.022	

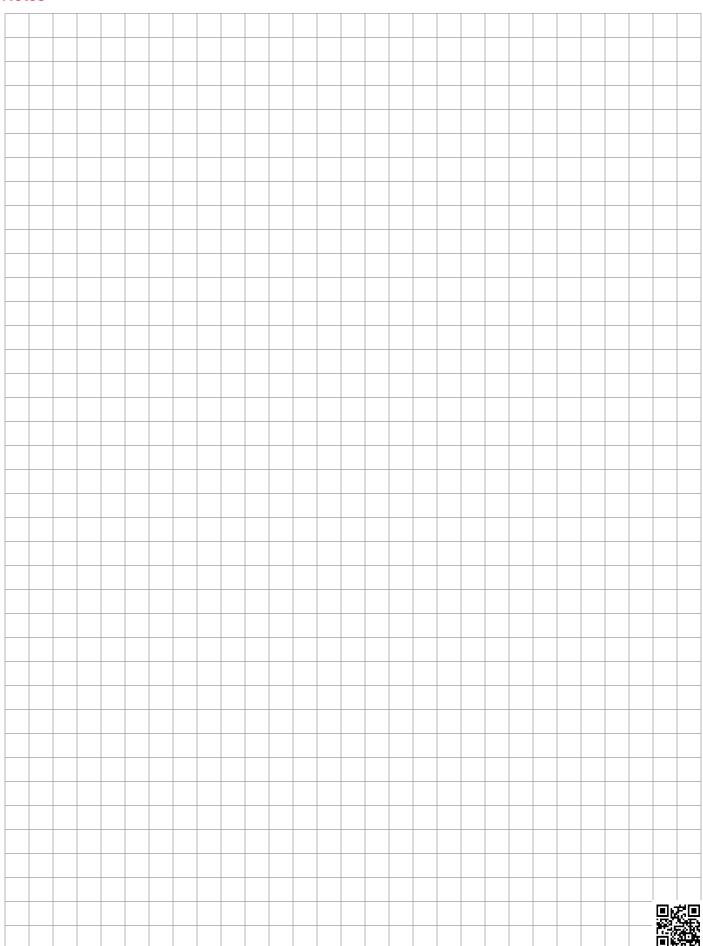
Wire Mesh	DW/HC Elements
Size	25, 50, 100, 200 μm
0030 D XXX W/HC	0.166
0060 D XXX W/HC	0.042
0110 D XXX W/HC	0.023
0160 D XXX W/HC	0.016
0240 D XXX W/HC	0.010
0280 D XXX W/HC	0.005
0330 D XXX W/HC	0.008
0660 D XXX W/HC	0.004
1320 D XXX W/HC	0.002

ΑII	Element	K	Factors	in	nsi /	/ apm
ΑII	Elellielli	\mathbf{r}	raciois	ш	DSI /	don.

Optimicron	DON Elements						
Size	1 µm	3 µm	5 μm	10 µm	15 µm	20 µm	
0030 D XXX ON	4.27	3.507	2.376	1.251	0.768	0.62	
0060 D XXX ON	2.936	1.427	1.004	0.664	0.537	0.347	
0110 D XXX ON	1.416	0.735	0.527	0.333	0.254	0.164	
0160 D XXX ON	1.015	0.604	0.423	0.225	0.204	0.175	
0240 D XXX ON	0.631	0.379	0.293	0.175	0.134	0.115	
0280 D XXX ON	0.304	0.185	0.15	0.082	0.075	0.064	
0330 D XXX ON	0.452	0.23	0.185	0.135	0.085	0.067	
0660 D XXX ON	0.207	0.106	0.086	0.051	0.039	0.031	
1320 D XXX ON	0.102	0.053	0.042	0.025	0.019	0.015	

Metal Fiber	DV Elements (High Collapse)						
Size	3 µm	5 μm	10 μm	20 μm			
0030 D XXX V	1.011	0.740	0.411	0.200			
0060 D XXX V	0.877	0.511	0.296	0.183			
0110 D XXX V	0.452	0.304	0.182	0.118			
0160 D XXX V	0.251	0.177	0.123	0.079			
0240 D XXX V	0.169	0.137	0.093	0.062			
0280 D XXX V	0.126	0.093	0.064	0.041			
0330 D XXX V	0.121	0.097	0.065	0.043			
0660 D XXX V	0.063	0.050	0.034	0.021			
1320 D XXX V	0.032	0.026	0.018	0.012			

Notes



MFM SET Series

Manifold Cartridge Filters 4060 PSI • up to 25 GPM



Features

- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, ethylene propylene rubber) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based fluids.
- Screw-in bowl requires minimal clearance to remove the element for replacement, and contaminated fluid cannot be washed downstream when element is serviced.
- HYDAC differential Pressure Indicators (optional) have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- For special finishes and coatings consult HYDAC for minimum quantities, availability and pricing.

Applications



Agricultura



Automotive



Construction



Industrial

Commercial

Installation

The MFM Set Manifold Cartridge Filter is installed into a threaded cavity that is machined in the manifold (manifold not included - see cavity drawing). A bushing is provided for proper element installation, as well as a bowl with o-ring seal and back-up ring. An element can be provided as a option. The bushing holds the element in place during filtration operation, and facilitates easy removal for element change

More than one SET may be installed in the manifold if required for capacity. A differential pressure clogging indicator, to warn of high upstream pressure (element clogged), can be attached to the manifold as well (cavity drawings for that upon request). For additional information, contact HYDAC.

Technical Specifications

Mounting Method	Threaded bowl
Flow Direction Element	Out-to-in
Construction Materials	
Bowl	Steel
Flow Capacity	
35	10 gpm (35 lpm)
55	18 gpm (68 lpm)
75	20 gpm (76 lpm)
95	25 gpm (95 lpm)
Housing Pressure Rating	
Max. Allowable Working	
Pressure	4060 psi (280 bar)
Fatigue Pressure	4060 psi (280 bar) @ 1 million cycles
	4641 psi (320 bar) @ 100,000 cycles
Burst Pressure	13,920 psi (960 bar)
Element Collapse Pressure	Rating (optional)
ON	290 psid (20 bar)
Fluid Temperature Range Consult HYDAC for applications	14°F to 212°F (-10°C to 100°C) operating below 14°F (-10°C)

Fluid Compatibility

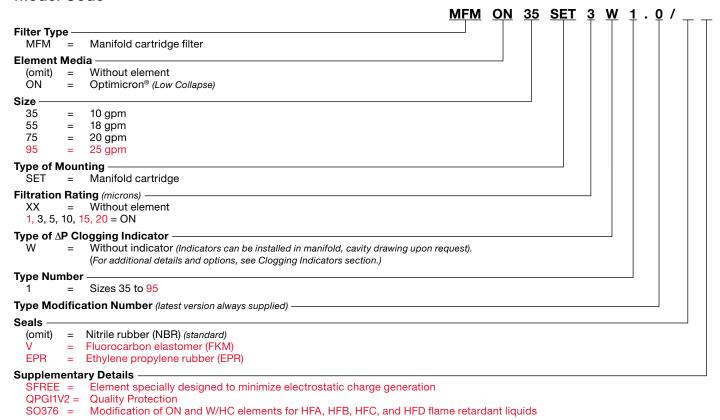
Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure (optional)

 $\Delta P = 72 \text{ psid (5 bar) -10}\%$

 $\Delta P = 100 \text{ psid} (7 \text{ bar}) + 10\% \text{ (standard)}$

Model Code



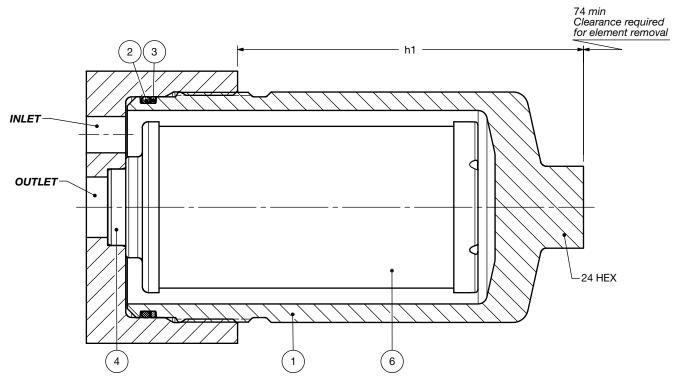
Replacement Element Model Code

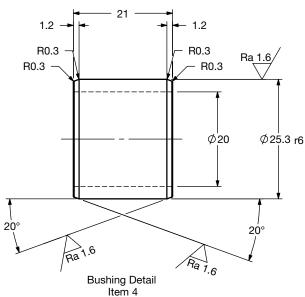
```
0035 D 010 ON / V
Size
  0035, 0055, 0075, 0095
Filtration Rating (micron)
  ON
        =
             1, 3, 5, 10, 15, 20
Element Media -
  ON
         = Optimicron®
Seals
  (omit)
             Nitrile rubber (NBR) (standard)
        =
             Fluorocarbon elastomer (FKM)
  EPR
             Ethylene propylene rubber (EPR)
Supplementary Details
  SFREE = (same as above)
  QPGI1V2 = Quality Protection
  SO376 = (same as above)
```



G49

Dimensions MFM SET 35 - 95





Item No	SET Components
1	Bowl
2	Bowl back-up ring
3	Bowl o-ring
4	Bushing
5	Drain plug (Std – sizes 330/660, Opt – sizes 60-280 - use code SO184)
6	Element (optional)

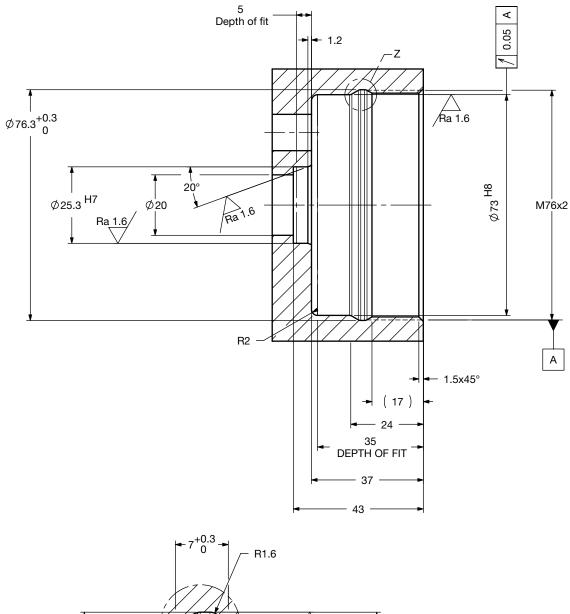
Size	h1
MFM 35 SET	~ 70
MFM 55 SET	~ 116
MFM 75 SET	~ 169
MFM 95 SET	~ 209

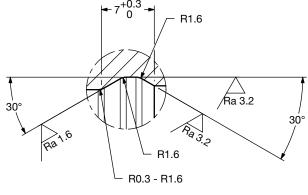
Unspecified Tolerances

From	0.5	3	6	30	120
То	3	6	30	120	400
	±0.1	±0.1	±0.2	±0.3	±0.5

Size	35	55	75	95
Weight (lbs.)	3	4.5	5.7	6.7

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

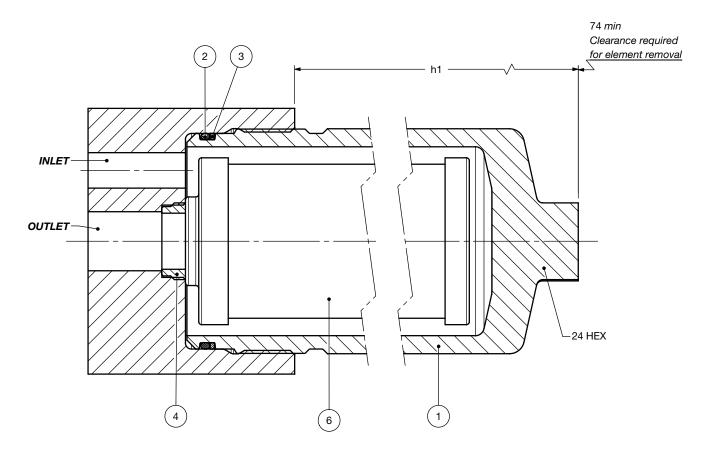




DETAIL Z

SET SERIES FILTERS – HIGH PRESSURE

Dimensions MFM SET QPGI1V2 35 - 95





Bushing Item 4 (Supplied by HYDAC)

Item No	SET Components
1	Bowl
2	Bowl back-up ring
3	Bowl o-ring
4	Bushing
5	Drain plug (Std – sizes 330/660, Opt – sizes 60-280 - use code SO184)
6	Element (optional)

Size	h1
MFM 35 QP SET	~ 70
MFM 55 QP SET	~ 116
MFM 75 QP SET	~ 169
MFM 95 QP SET	~ 209

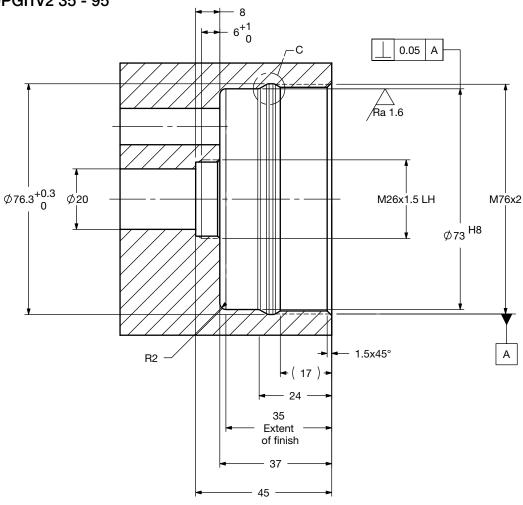
Unspecified Tolerances

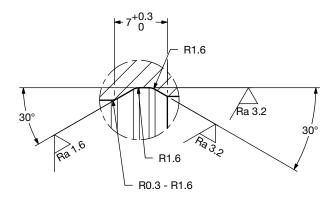
From	0.5	3	6	30	120
То	3	6	30	120	400
	±0.1	±0.1	±0.2	±0.3	±0.5

Size	35	55	75	95
Weight (lbs.)	3.2	4.7	5.9	6.9

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

Customer Manifold Machining MFM SET QPGI1V2 35 - 95





Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

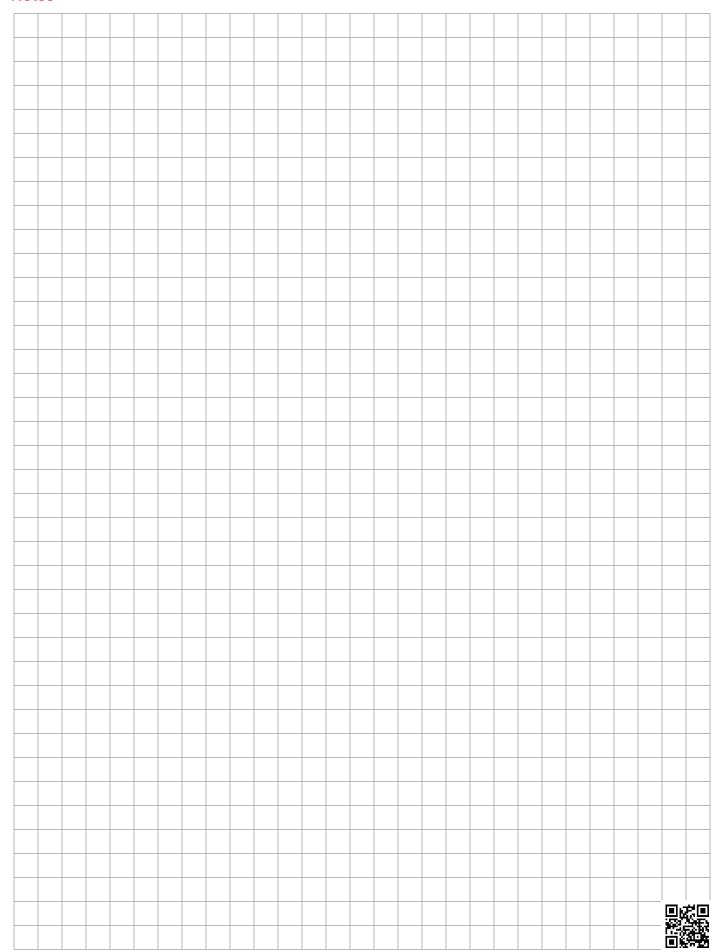
Detail C

Optimicron		DON (Pressure Elements)				
Size	1 μm	3 μm	5 μm	10 μm	15 µm	20 μm
0035 D XXX ON	2.755	1.169	0.938	0.752	0.549	0.408
0055 D XXX ON	1.427	0.675	0.543	0.434	0.284	0.211
0075 D XXX ON	0.916	0.461	0.37	0.296	0.183	0.136
0095 D XXX ON	0.724	0.37	0.296	0.238	0.144	0.105

All Element K Factors in psi / gpm.

SET SERIES FILTERS – HIGH PRESSURE

Notes



SPECIAL ORDER FILTERS

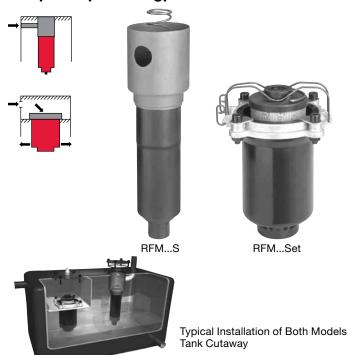


Special Order FiltersThe Special order filters in this section are application-specific engineered filters, ideal for custom solutions or large scale projects. Because they are engineered solutions, they are not stock items and minimum quantities and longer lead times can be expected. Please plan well in advance if specifying any of the filters in this section.

Note - Minimum order quantities and/or extended lead times will apply (consult HYDAC Product Management)

RFM...S & RFM...Set Series

Inside Tank Return Line Filters 145 psi • up to 132 gpm



Features

- Unique design allows filter to be installed completely inside of the reservoir tank. This saves space, protects the filter, reduces leak points and reduces overall installation cost.
- Lightweight unit requiring no filter head reduces pressure drop while decreasing cost.
- Excellent option for low overhead clearance applications.
- Allows pre-filtration of new make-up oil assuring cleanliness of system.
- Contamination Basket prevents filtered contamination from re-entering the tank during element changeout on 330 & 500 size
- Simplifies element changeout procedure in the field.
- RFM Set configuration (tank plenum) allows for multiple returns to enter plenum without manifolding.

Note: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

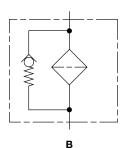
Applications







Hydraulic Symbol



Installation

RFM...SET: Inside Tank Filters are installed into a separate chamber (see tank cutaway) built into the reservoir tank via the filter ring and four bolts. More than one filter may be installed in the chamber if required for capacity. This procedure will require a hole to be cut into the top of the reservoir tank and an access cover fastened to the tank for each filter installed. The inlet piping for return should be connected through the tank wall into the separate chamber. A clip installed on the filter ring holds the element in place during filtration operations, and facilitates easy removal for element change out. A static pressure clogging indicator, to warn of high upstream pressure (element clogged), can be attached to the access cover. For additional information, contact HYDAC.

RFM...S: Inside Tank Filters are installed to the top of the tank by welding the inner chamber to the tank cover (see tank cutaway). This procedure will require a hole to be cut into the top of the reservoir tank and an access cover fastened to the tank. A smaller hole must be cut somewhere in the tank for the return line piping to pass through. The hole located in the side of the inner chamber must be directed towards the return line piping. The inlet piping for return should then be welded through the tank wall and to the inner chamber. The spring located between the element and the access cover provides force to hold element in place during filter operation. A static pressure indicator to warn of high upstream pressure, and if element is clogged can be attached to the access cover. Multiple filters can be installed in the tank. For additional installation information, contact HYDAC.

Technical Specifications

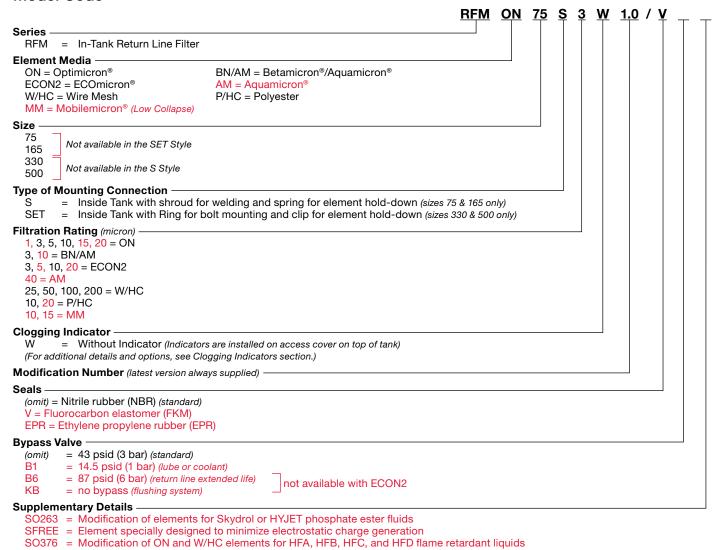
recnnical Specifications			
Mounting Method	See Installation at left		
Port Connection	Outlet		
75/165 330/500	1.26" Smooth Port 2" NPT		
Flow Direction	Inlet: Side Outlet: Bottom		
Construction Materials			
Chamber Bowl Ring	Steel (75/165/185) Plastic Aluminum (330/500)		
Flow Capacity			
75 RFM-S 165 RFM-S 330 RFM-Set 500 RFM-Set	20 gpm (75 lpm) 43 gpm (165 lpm) 87 gpm (330 lpm) 132 gpm (500 lpm)		
Housing Pressure Rating			
Max. Allowable Working Pressure: Fatigue Pressure Burst Pressure	ressure 145 psi (10 bar)		
Element Collapse Pressure Rating]		
ON, W/HC, MM, BN4AM, ECON2, AM, P/HC,	290 psid (20 bar) 145 psid (10 bar)		
Fluid Temperature Range	14°F to 212°F (-10°C to 100°C)		
Consult HYDAC for applications below 14°F (-10°C)			
Fluid Compatibility			
Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the			

appropriate seals are selected. **Bypass Valve Cracking Pressure**

 $\Delta P = 43 \text{ psid (3 bar)} + 10\%$

 $\Delta P = 87 \text{ psid (6 bar)} + 10\%$

Model Code



Replacement Element Model Code

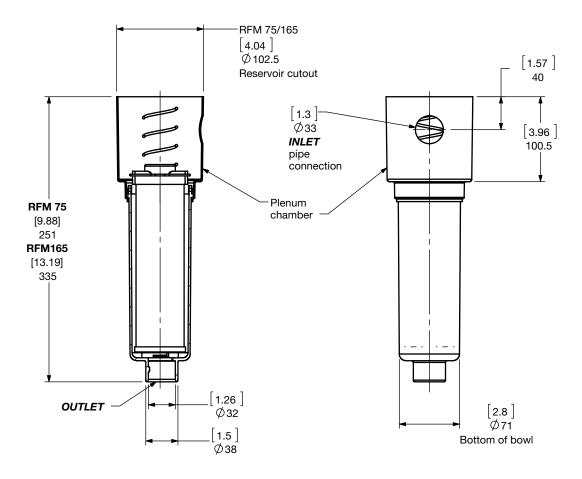
```
0330 R 003 ON /
Size
  0075, 0165, 0330, 0500
Filtration Rating (micron)
  1, 3, 5, 10, 15, 20 = ON
                                       3, 10 = BN4AM
  3. 5. 10. 20 = ECON2
                                       40 = AM
  25, 50, 100, 200 = W/HC
                                       10, 20 = P/HC
  10.15 = MM
Element Media
  ON, BN4AM, ECON2, AM, W/HC, P/HC, MM
Seals -
  (omit) = Nitrile rubber (NBR) (standard)
  V = Fluorocarbon elastomer (FKM)
  EPR = Ethylene propylene rubber (EPR)
Bypass Valve
  (omit)
         =
               43 psid (3 bar) (standard)
  B1
               14.5 psid (1 bar) (lube or coolant)
  B6
               87 psid (6 bar) (return line extended life)
                                                      not available with ECON2
  KΒ
              no bypass (flushing system
Supplementary Details
  SO263 = (same as above)
  SFREE = (same as above)
```

Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability



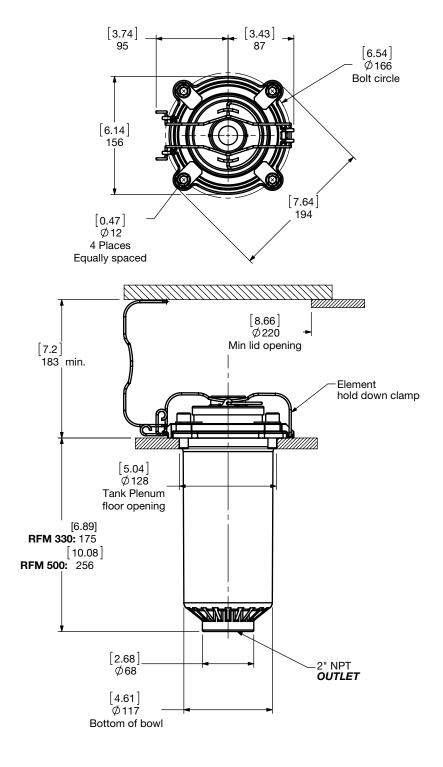
SO376 = (same as above)

Dimensions RFM...S



Size	75	165
Weight (lbs.)	2.1	2.7

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.



Size	330	500
Weight (lbs.)	5.2	6

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP = \emptyset (no housing) + Element ΔP = Element ΔP

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

Element K Factors

 ΔP Assembly = ΔP Element = Elements (K) Flow Factor x Flow Rate (gpm) x $\frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}}$ x $\frac{\text{Actual Specific Gravity}}{0.86}$

Optimicron		RON				
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm
0075 R XXX ON	1.405	1.065	0.735	0.401	0.263	0.241
0165 R XXX ON	0.774	0.518	0.404	0.221	0.123	0.133
0330 R XXX ON	0.444	0.204	0.15	0.081	0.07	0.056
0500 R XXX ON	0.289	0.143	0.104	0.06	0.046	0.038

ECOmicron	RECON2			
Size	3 µm	5 μm	10 μm	20 μm
0165 R XXX ECON2	0.615	0.428	0.247	0.132
0330 R XXX ECON2	0.230	0.148	0.093	0.066
0500 R XXX ECON2	0.165	0.104	0.071	0.044

Betamicron/Aquamicron	RE	BN4AM
Size	3 μm	10 μm
0330 R XXX BN4AM	0.477	0.165
0500 R XXX BN4AM	0.313	0.11

Aquamicron	RAM
Size	40 μm
0330 R 040 AM	0.115
0500 R 040 AM	0.076

Wire Mesh	RW/HC
Size	25, 50, 100, 200 μm
0075 R XXX W/HC	0.020
0165 R XXX W/HC	0.011
0330 R XXX W/HC	0.011
0500 R XXX W/HC	0.007

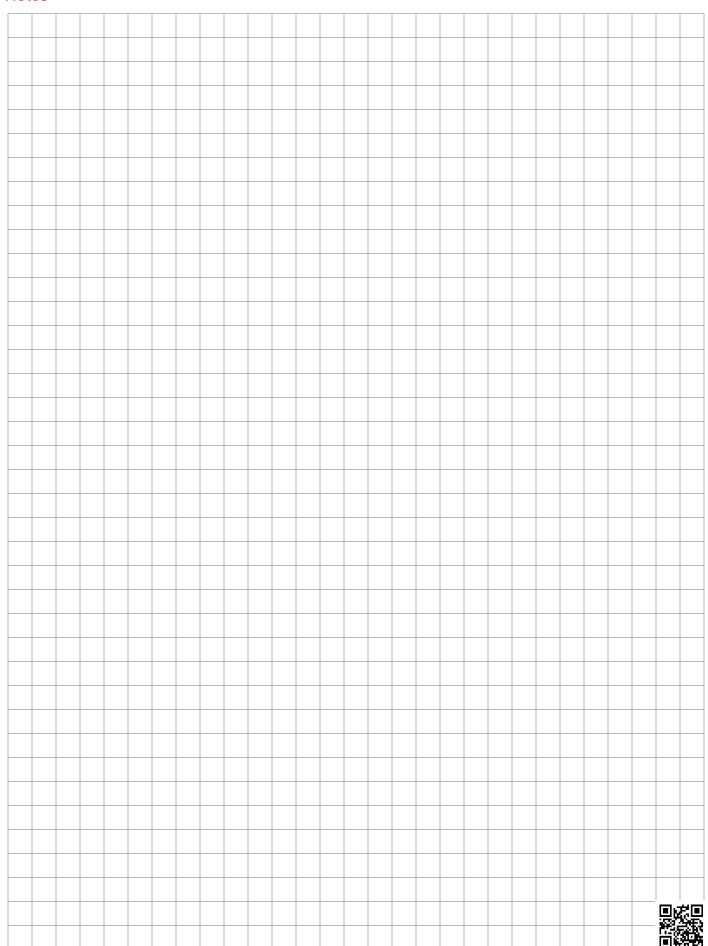
Polyester	RP/HC						
Size	10 µm	20 μm					
0075 R XXX P/HC	0.071	0.036					
0165 R XXX P/HC	0.033	0.016					
0330 R XXX P/HC	0.016	0.008					
0500 R XXX P/HC	0.011	0.005					

Mobilemicron	RMM							
Size	8 µm	10 μm	15 μm					
0075 R XXX MM	0.265	0.265	0.166					
0165 R XXX MM	0.146	0.146	0.091					
0330 R XXX MM	0.078	0.078	0.049					
0500 R XXX MM	0.052	0.052	0.032					

All Element K Factors in psi / gpm.



Notes



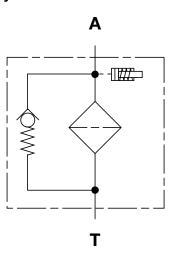
RFMP Series

In-Tank Return Line Filters 100 psi • up to 26 gpm





Hydraulic Symbol



Features

- The compact and lightweight design make RFMP filters especially suitable for mobile applications.
- RFMP filters integrate the head and bowl into a single one piece polyamide housing. This makes for a more leak-tight housing.
- The housing is designed so that a down tube can be attached to the outlet spout.

Note: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Applications





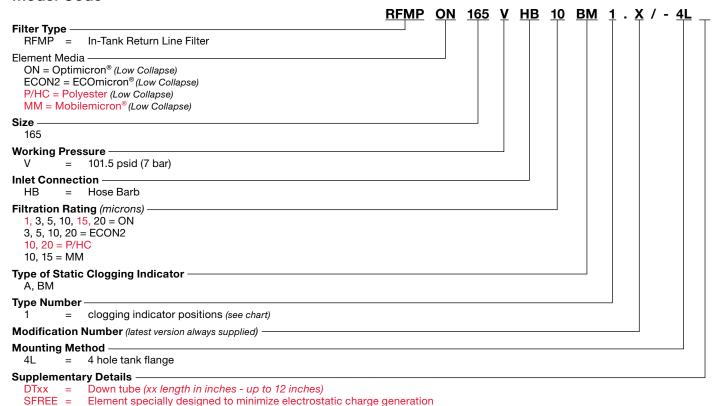
FI C fr

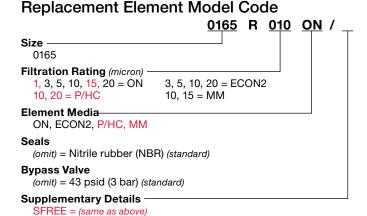
Technical Specifications

recillical opecification	<u> </u>					
Mounting Method						
165	4 mounting holes -	filter housing				
Port Connections	Inlet / Outlet					
165	1" Hose Barb/1.26"	smooth port				
Direction of Flow Side inlet and bottom outl						
Mat. of Construc.	Housing	Lid				
165	Polyamide	Plastic				
Flow Capacity						
165	26 gpm (100 lpm)					
Housing Pressure Rating						
Max. Allowable Working Pressure*	101.5 psi (7 bar)					
Element Collapse Pressure Rati	ng					
ON	290 psid (20 bar)					
ECON2, P/HC, MM	145 psid (10 bar)					
Fluid Temperature Range	-22°F to 176°F (-30°	C to 80°C)				
Consult HYDAC for applications below	-22°F (-30°C)					
Fluid Compatibility						
Compatible with all petroleum oils for use with nitrile rubber (NBR) so		rated				
Indicator Trip Pressure						
P = 29 psi (2 bar) -10% (standard)						
Bypass Valve Cracking Pressure	•					
$\Delta P = 43 \text{ psid (3 bar) } +10\% \text{ (standar)}$	rd)					
<u> </u>						

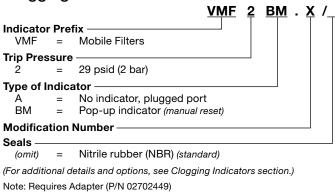
*Note: All RFMP Filters MAWP reduce to 7 bar (101.5 psi) when using the following "VMF" and "VR" indicators: B, BM, E, ES, GC, LE, LZ.

Model Code





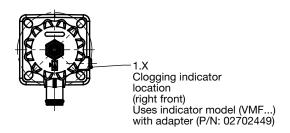
Clogging Indicator Model Code

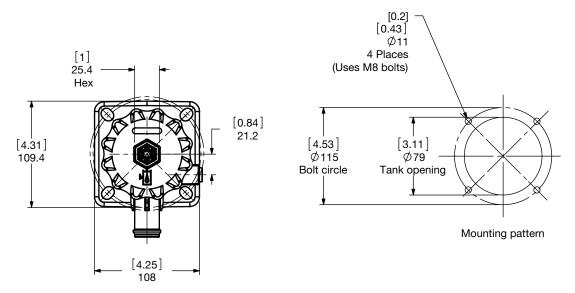


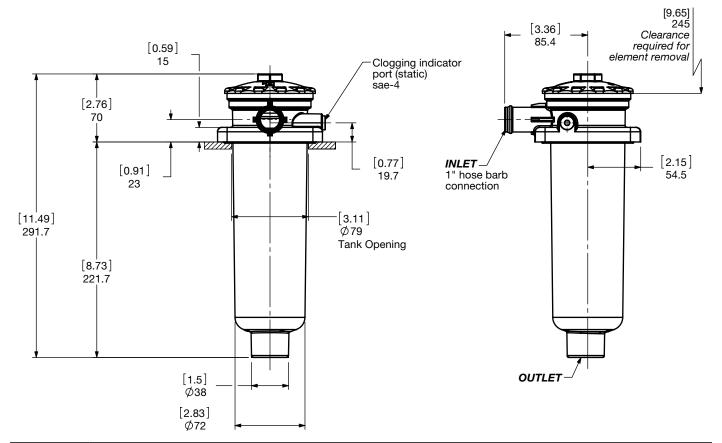
Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability



Dimensions RFMP 165







Size	165
Weight (lbs.)	2.5

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

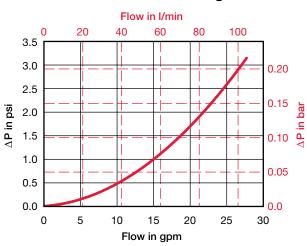
Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{\Delta P}$ 0.86

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

RFMP 165 Housing



Element K Factors

 $\Delta P \; \text{Elements} = \text{Elements} \; (\text{K)} \; \text{Flow} \; \text{Factor} \; x \; \text{Flow} \; \text{Rate} \; (\text{gpm}) \; x \; \frac{\text{Actual Viscosity} \; (\text{SUS})}{141 \; \text{SUS}} \; x \; \frac{\text{Actual Specific Gravity}}{0.86} \; (\text{Sub}) \; x \; \frac{\text{Actual Specific Gravity}}{141 \; \text{SUS}} \; \frac{\text{Actual Specific Gravity}}{0.86} \; \frac$

Optimicron	RON								
Size	1 µm	3 μm	5 μm	10 µm	15 µm	20 μm			
0165 R XXX ON	0.774	0.518	0.404	0.221	0.123	0.133			

ECOmicron	RECON2								
Size	3 μm	5 μm	10 μm	20 μm					
0165 R XXX ECON2	0.615	0.428	0.247	0.132					

Mobilemicron	RMM						
Size	8 µm	10 µm	15 µm				
0165 R XXX MM	0.146	0.146	0.091				

Polyester	RP/HC				
Size	10 µm	20 μm			
0165 R XXX P/HC	0.033	0.016			

All Element K Factors in psi / gpm.

RKT Series

Return Line Filter 145 psi • up to 317 gpm





Features

Filter Housing - Design

This filter system provides an economic solution for full-flow return line filtration for large flow rates. The filter is mounted in the intermediate chamber that is formed in the top part of the tank. This integrates the filter into the tank so any design is possible for the return port connections and several filters can be used without splitting up the return lines. The optimal flow conditions in the chamber guarantee effective magnetic pre-filtration and filter service life. The filter housings are designed in accordance with international regulations. They consist of a housing tube, filter lid and an element location nozzle.

The filter element can be removed from the top.

Standard equipment

- magnetic core integrated into clamp (only for RKT 0170 0500)
- magnetic core integrated into cover (only for RKT 0600 1200)
- with diffuser
- with element location nozzle
- with bypass valve

Filter Elements

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

ISO 2941, ISO 2942, ISO 2943, ISO 3724,ISO 3968, ISO 11170, ISO 16889

Filter elements are available with the following pressure stability values:

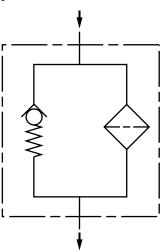
Glass fiber (ULP): 87 psi (6 bar) Glass fiber with pre-filter (UMC): 87 psi (6 bar) Wire mesh (WPI): 87 psi (6 bar)

Other filtration ratings on request.

Special Models and Accessories

- without magnetic core
- without shroud (only RKT 0170 0500)
- with shroud
- outlet grill in openings in protective tube
- seals made of FKM

Hydraulic Symbol



Technical Specifications

Mounting Method	4 Mounting holes - filter housing						
Direction of Flow	Inlet: Tank Chamber	Outlet: Shroud windows					
Materials of Construction	n						
0170, 0230, 0300, 0400, 0310, 0410, 0500, 0600, 0800, 1200	Housing Steel Steel Steel	Lid Aluminum Aluminum Aluminum					
Flow Capacity							
0170 0230 0300 0310 0400 0410 0500 0600 0800 1200	45 gpm (170 l/min) 66 gpm (250 l/min) 79 gpm (300 l/min) 92 gpm (350 l/min) 105 gpm (400 l/min) 118 gpm (450 l/min) 145 gpm (550 l/min) 158 gpm (600 l/min) 211 gpm (800 l/min)						
Housing Pressure Rating	317 gpm (1200 l) g						

Max. Allowable Working Pressure* 145 psi (10 bar)

Fluid Temp. Range -22°F to 212°F (-30°C to 100°C)

Consult HYDAC for applications below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Bypass Valve Cracking Pressure

 $\Delta P = 36 \text{ psi } (2.5 \text{ bar}) \text{ standard}$ $\Delta P = 11 \text{ psi } (0.8 \text{ bar}) \text{ optional}$

Applications



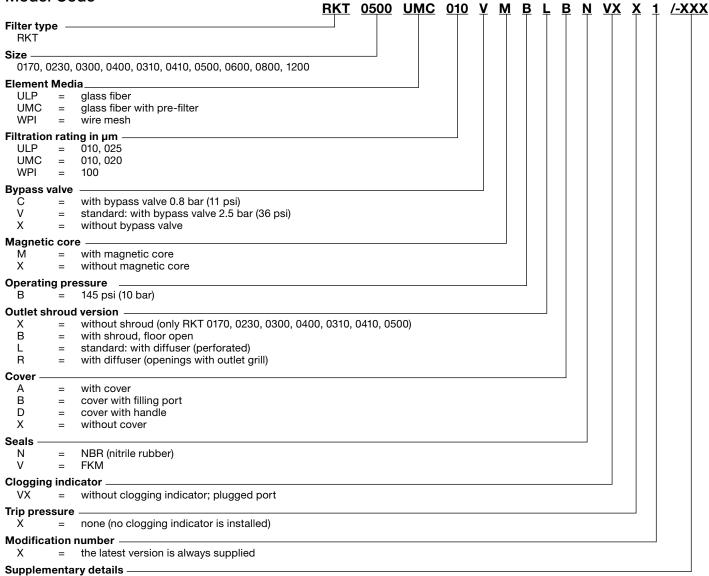




Agricultural

Industrial

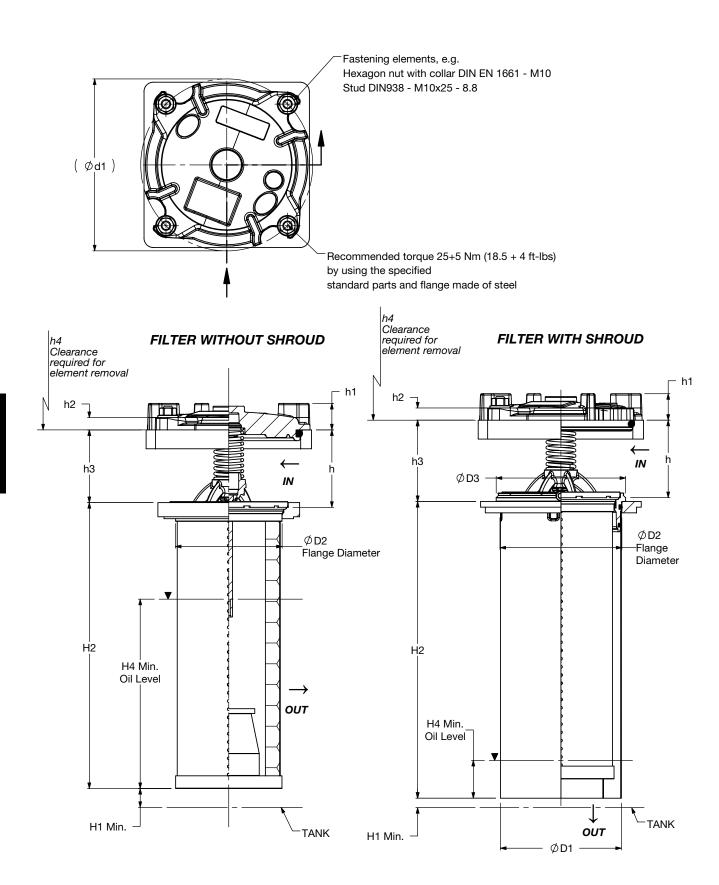
Model Code



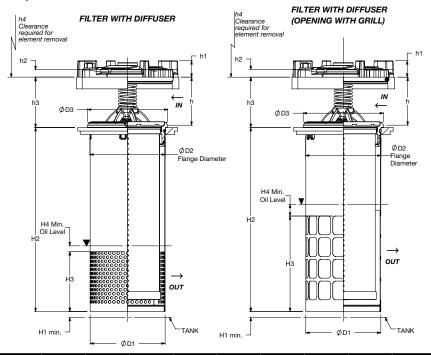
Replacement Element

```
<u>UMC</u> - <u>0010</u> - <u>117-X509-S</u> - <u>N</u> - <u>RT</u> / _
Element Media
  ULP, UMC, WPI
Filtration Rating (micron)
  10, 25 =
             ULP
  10, 20 =
             UMC
  100
             WPI
Size -
  117-X509-S =
                 RKT0170 element code
                 RKT0230 element code
  117-X512-S =
  117-X516-S =
                 RKT0300 element code
  120-XZ11-Q =
                 RKT0310 element code
  117-X520-S =
                 RKT0400 element code
  120-XZ14-Q =
                 RKT0410 element code
  120-XZ18-Q =
                 RKT0500 element code
  152-X218-S =
                 RKT0600 element code
  152-X225-S =
                 RKT0800 element code
  152-X231-S = RKT1200 element code
Seals
             Nitrile rubber (NBR)
             Fluorocarob elastomer (FKM)
Packaging -
Supplementary details
```

Dimensions RKT 0170, 0230, 0300, 0400



Dimensions RKT 0170, 0230, 0300, 0400

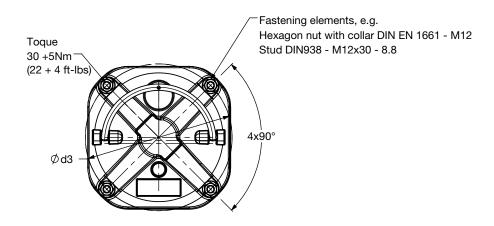


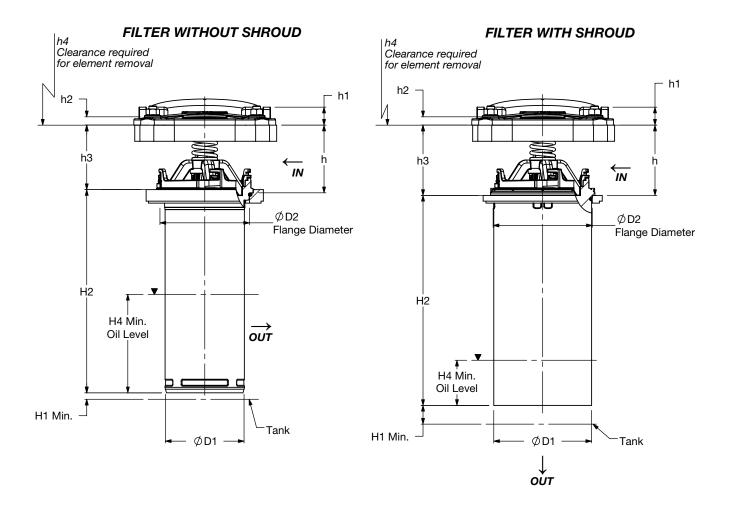
Туре	Design	Н1	H2	НЗ	H4	h	h1	h2	h3	h4	ØD1	ØD2	ØD3	Ød1	Wt (lbs)						
	Without shroud	[0.39]	[9.13] 232	-	[6.1] 155				[3.03] 77		-	[4.45] 113	-		4.4						
	With shroud	10		-	[1.57] 40										5.5						
RKT 0170	With diffuser	[0 0]	[9.57] 243	[4.02] 102	[0.39]				[3.39] 86	[10.39] 264	[5.04] 128	[5.08] 129	[5.39] 137		5.7						
	Diffuser with opening	[0.2] 5		[4.96] 126	10						,				7.7						
	Without shroud	[0.39]	[11.93] 303	-	[7.99] 203				[3.03] 77		-	[4.45] 113	-		6.0						
RKT	With shroud	10		-	[1.57] 40					[12.10]				[7.17]	5.1						
0230	With diffuser		[12.36] [0.2] 314	[4.02] 102	[0.39]				[3.39] 86	[13.19] 335	[5.04] 128		[5.39] 137		6.4						
	with opening	5		[6.42] 163	10	[3.23]		[0.51]							6.6						
	Without shroud	[0.39]	[15.71] 399	-	[10.51] 267	82	28	28 13	[3.03] 77		-	[4.45] 113	-	182	6.8						
RKT	With shroud	10		=	[1.57] 40				[16.97]					5.7							
0300	With diffuser	[0 2]	[16.14] 410	[4.02] 102	[0.39]				[3.39] 86	431	[5.04] [5.08] 128 129	[5.08] 129	[5.39] 137		8.6						
	Diffuser with opening	[0.2] 5		[7.87] 200	10										8.8						
	Without shroud	[0.39]	[20.16] 512	-	[13.23] 336				[3.03] 77		-	[4.45] 113	-		7.5						
RKT	With shroud	10		-	[1.57] 40				[04.00]					9.0							
0400	With	Diffuser [0.2] with pening	[0.2]	[0.2]	[0.2]	[0.2]	[0.2]	່ ເບ ວາ	[20.63] 524	[4.02] 102	[0.39]				[3.39] 86	[21.26] 540	[5.04] 128	[5.08] 129	[5.39] 137		9.5
* Non ~				[9.33] 237	10										9.7						

Non-machined port

^{**} Machined port

Dimensions RKT 0310, 0410, 0500

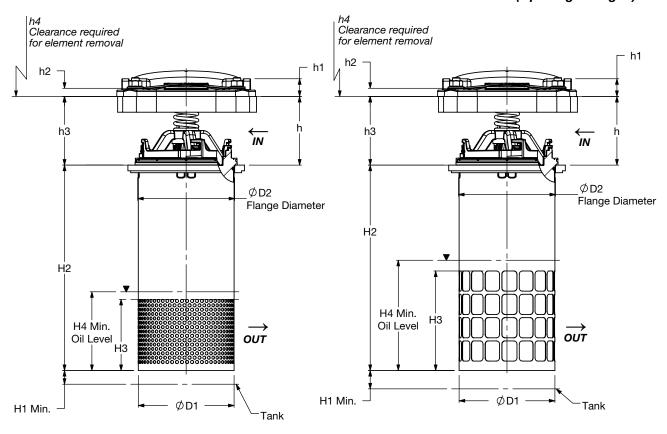




Dimensions RKT 0310, 0410, 0500

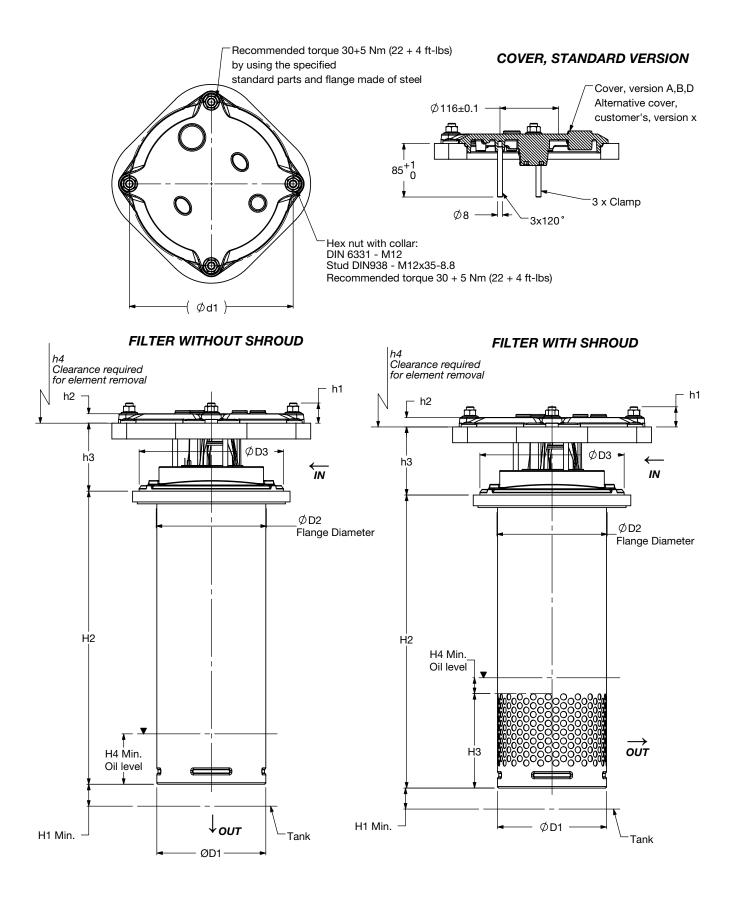
FILTER WITH DIFFUSER

FILTER WITH DIFFUSER (Opening with grill)



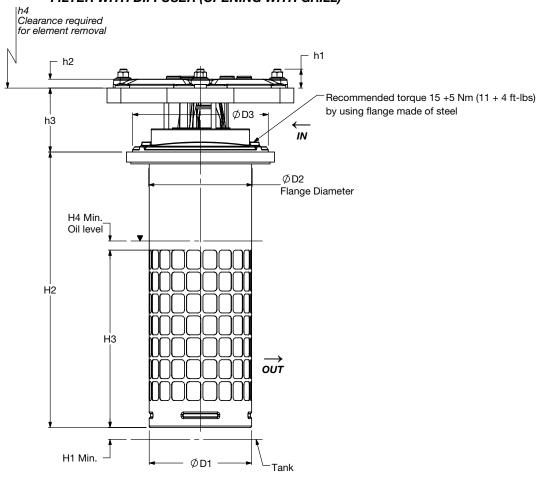
Туре	Design	H1	H2	НЗ	H4	h	h1	h2	h3	h4	ØD1	ØD2	Ød3	Wt (lbs)	
	Without shroud	[0.39]	[12.42] 315.5	-	[7.87] 200				[3.94] 100		[4.84] 123	[5.47] 139		3.7	
RKT	With shroud	10		-	[2.36] 60					[16 54]				5.3	
0310	With diffuser	[0.2]	[12.83] 326	[4.53] 115	[0.39]				[4.29] 109	[16.54] 420	[5.98] 152	[6.06] 154		5.5	
	Diffuser with opening	5		[6.22] 158	10									5.7	
	Without shroud	[0.39]	[16.36] 415.5	-	[10.63] 270			[0.51] 13	[3.94] 100	[20.47] 520	[4.84] 123	[5.47] 139		4.4	
RKT	With shroud	10		=	[2.36] 60	[4.13] 105			[4.29] 109		[5.98] 152	[6.06] 154	[8.98]	6.4	
0410	With diffuser	[0.0]	[16.77] 426	[4.53] 115									228	6.6	
	Diffuser with opening	[0.2] 5	120											102	.01
	Without shroud	[0.39]	[19.9] 505.5	-	[12.99] 330				[3.94] 100		[4.84] 123	[5.47] 139		5.5	
RKT	With shroud	10		-	[2.36] 60					[24.02]	[5.98] 152	[6.06] 154		7.7	
0500	With diffuser	[0.2]	[20.31] 516	[5.12] 130	0 [0.39] [63] 10				[4.29] 109	610				7.9	
	Diffuser with opening	5		[10.63] 270										8.2	

Dimensions RKT 0600, 0800, 1200



Dimensions RKT 0600, 0800, 1200

FILTER WITH DIFFUSER (OPENING WITH GRILL)

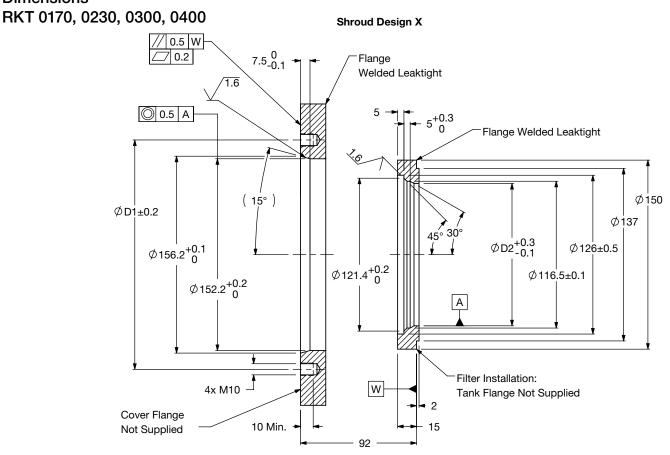


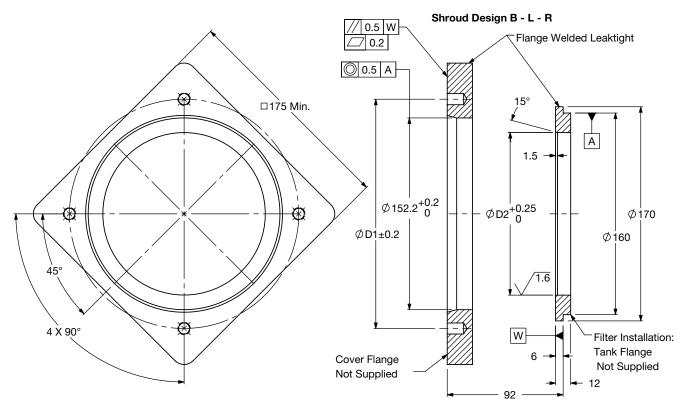
Туре	Shroud Version	Н1	H2	Н3	Н4	h1	h2	h3	h4	ØD1	ØD2	ØD3	Ød1	Wt (lbs)
	With shroud	[0.98] 25		-	[2.95] 75									
RKT 0600	With diffuser	[0.39]	[18.31] 465	[5.90] 150	[0.39]			[21.65] 550					33.1	
	Diffuser with opening	10		[11.81] 300	10									
	With shroud	[0.98] 25		-	[2.95] 75	[4 00]	[0.50]	[4.05]		10.041	[0.00]	fo 001		
RKT 0800	With diffuser	[0.39]	[25.91] 658	[5.90] 150	[0.39]	[1.38] 35	[0.59] 15	[4.25] 108	[29.53] 750	[6.81] 173	[6.89] 175	[9.02] 229	[10.24] 260	38.6
	Diffuser with opening	10		[16.18] 411	10									
	With shroud	[0.98] 25		-	[2.95] 75									
RKT 1200	With diffuser	[0.39]	[31.97] 812	[5.90] 150	[0.39]				[37.4] 950					44.1
	Diffuser with opening	10		[22.01] 559	10									

Specifications For The Tank Flange

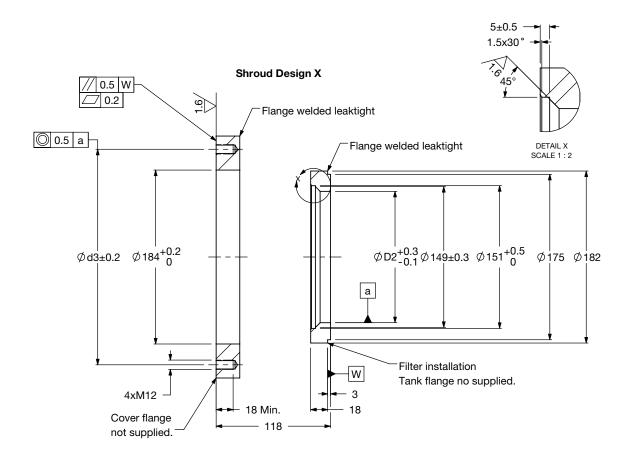
- 1. In the filter mounting interface, the tank flange should have a maximum flatness of 0.3 mm and maximum roughness of Ra 3.2 µm.
- 2. In addition, the mounting interface should be free from damage and scratches.
- 3. The mounting holes of the flange must be blind, or stud bolts. Loctite must be used to mount the filter. As an alternative, the tank flange can be continuously welded from the inside.
- 4. Both the tank sheet metal and the filter mounting flange must be sufficiently robust so that neither deform when the seal is compressed during tightening.

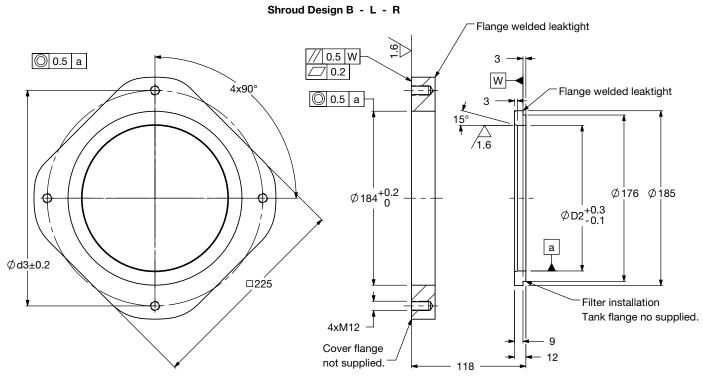
Dimensions



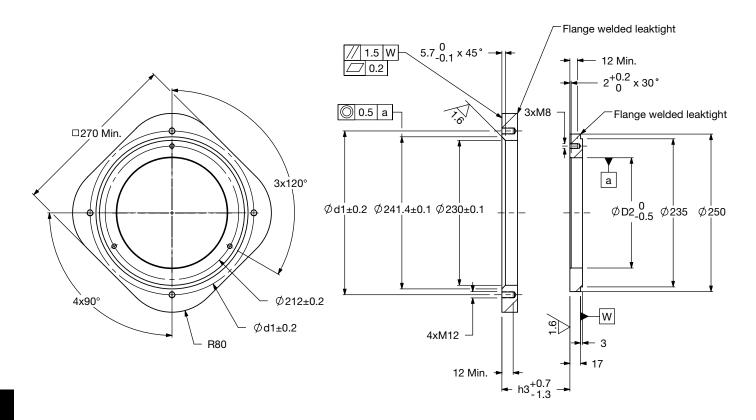


Dimensions RKT 0310, 0410, 0500





Dimensions RKT 0600, 0800, 1200



Tank flange not supplied

Sizing Information

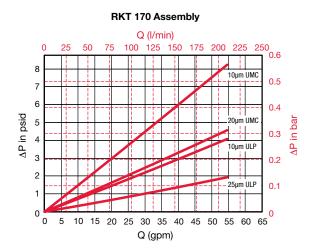
Assembly Curve:

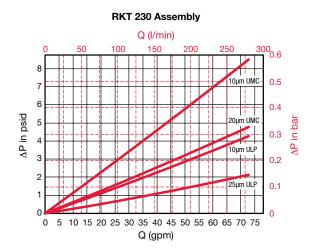
Pressure loss through housing is as follows:

Adjustments must be made for viscosity & specific gravity of the fluid to be used!

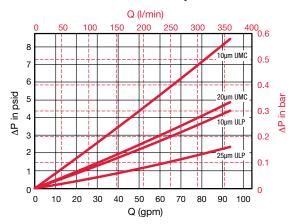
Assembly ΔP = Assembly Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Note: All curves represent 30 cSt viscosity.

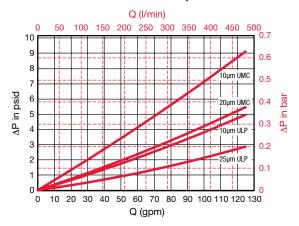




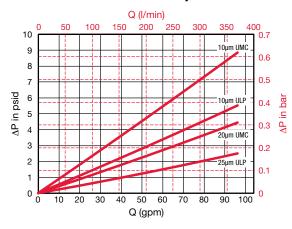
RKT 300 Assembly



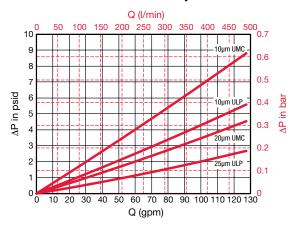
RKT 400 Assembly



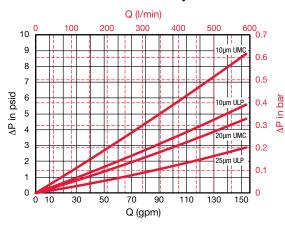
RKT 310 Assembly



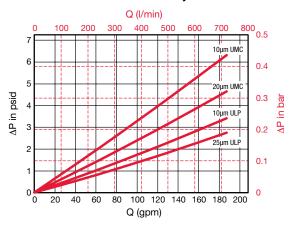
RKT 410 Assembly



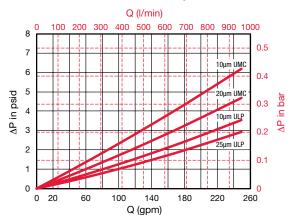
RKT 500 Assembly



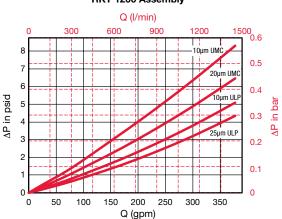
RKT 600 Assembly



RKT 800 Assembly



RKT 1200 Assembly



RKB Series

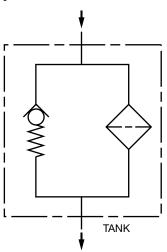
Return Line Filter 145 psi • up to 317 gpm







Hydraulic Symbol



Features

Filter Housing - Design

This filter system provides an economic solution for full-flow return line filtration for medium to large flow rates. The filter is mounted in the intermediate chamber that is formed in the bottom part of the tank. The oil flows into the filter from below and, after filtration, into the tank via the shroud. This integrates the filter into the tank so any design is possible for the return port connections and several filters can be used without splitting up the return lines. The optimal flow conditions in the chamber guarantee optimum air separation, effective magnetic pre-filtration and long filter service life.

The filter housings are designed in accordance with international regulations. They consist of a housing tube, filter head and a filter lid. The filter element can be removed from the top.

Standard equipment

- with bypass valve
- with diffuser
- with element location nozzle

Filter Flements

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

ISO 2941, ISO 2942, ISO 2943, ISO 3724, ISO 3968, ISO 11170, ISO 16889

Filter elements are available with the following pressure stability values:

87 psi (6 bar) Glass fiber (ULP): Glass fiber with pre-filter (UMC): 87 psi (6 bar) Wire mesh (WPI): 87 psi (6 bar)

Other filtration ratings on request.

Special Models and Accessories

- without element location nozzle
- outlet grill in openings in shroud
- seals made of FKM

Technical Specifications

Mounting Method	4 Mounting hole	es - filter housing								
Direction of Flow	Inlet: Bottom	Outlet: Shroud Windows								
Materials of Construction										
	Housing	Lid								
0600	Steel	Aluminum								
0800	Steel	Aluminum								
1200	Steel	Aluminum								
Flow Capacity										
0600	158 gpm (600 l/min)									
0800	211 gpm (800 l/min)									
1200	317 gpm (1200 l/min)									
Housing Pressure R	ating									
Max. Allowable										
Working Pressure*	145 psi (10 bar) MAWP									

Element Collapse Pressure Rating ULP, UMC, WPI 87 psid (6 bar)

Fluid Temp. Range -22°F to 212°F (-30°C to 100°C)

Consult HYDAC for applications below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Bypass Valve Cracking Pressure

 $\Delta P = 36 \text{ psi } (2.5 \text{ bar}) \text{ standard}$ $\Delta P = 11 \text{ psi } (0.8 \text{ bar}) \text{ optional}$

Applications



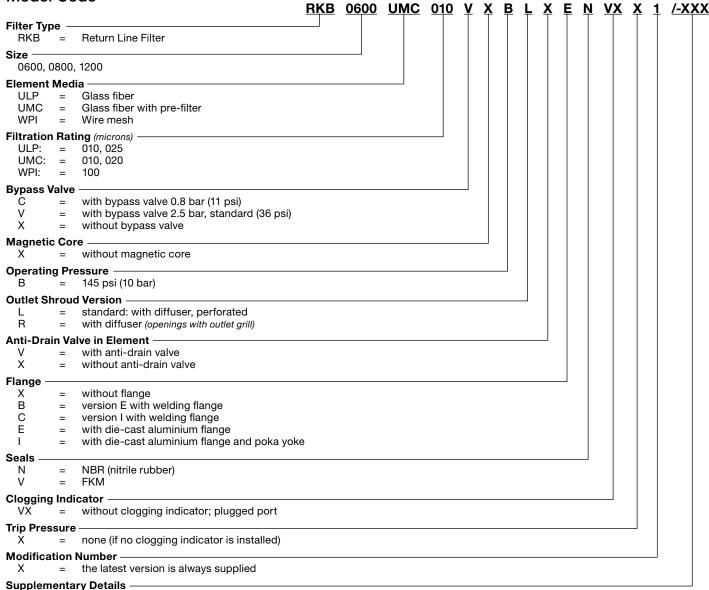




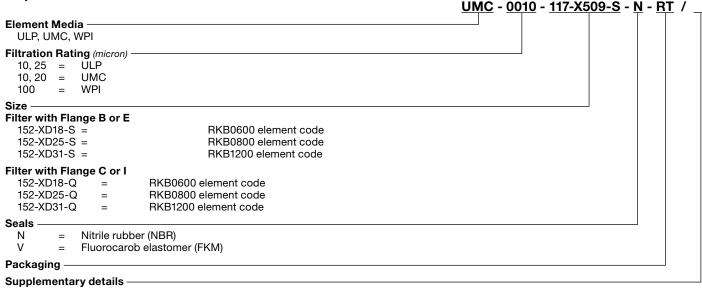
Industrial

Construction

Model Code

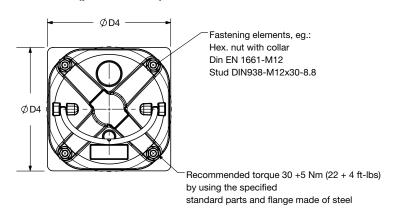


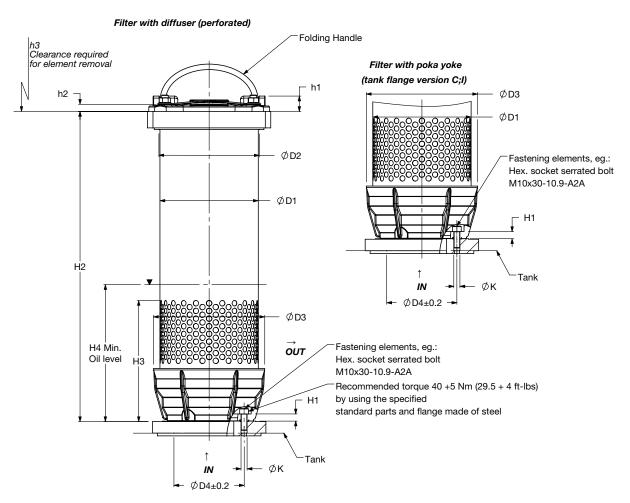
Replacement Element



Dimensions

RKB 0600-1200 with diffuser (perforated)

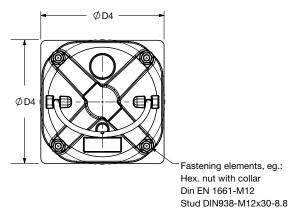


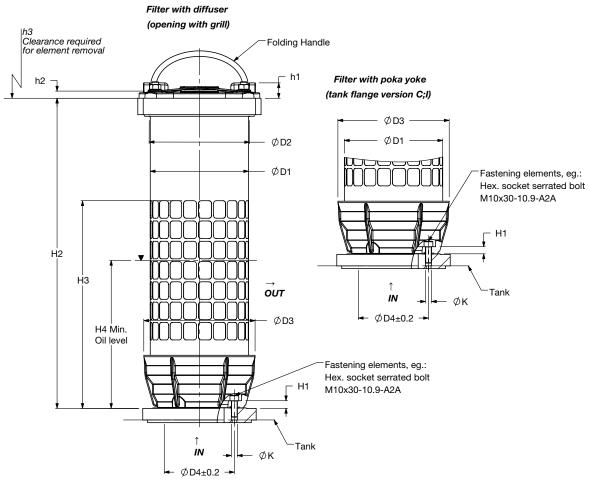


Туре	Shroud Version	Tank Flange	H1	H2	НЗ	H4	h1	h2	h3	ØD1	ØD2	ØD3	ØD4	øĸ	Ød1	Weight (lbs)
RKB		B; E		[22.24] 565		[9.13]	[1.18] 30	[0.51]	[19.09] 485			[7.99] 203		[0.41]	[8.98] 228	19
0600		C; I										[7.28] 185				18.7
RKB		B; E	[0.55]	[29.84]	[8.66]				[26.69]			[7.99] 203	[5.04] 128			24.9
0800	_	C; I	14	758 220	220	232			678			[7.28] 185				24.7
RKB	L	B; E		[35.91]					[32.76] 832			[7.99] 203				30
1200		C; I		912								[7.28] 185				29.8

Dimensions

RKB 0600-1200 with diffuser (opening with grille)





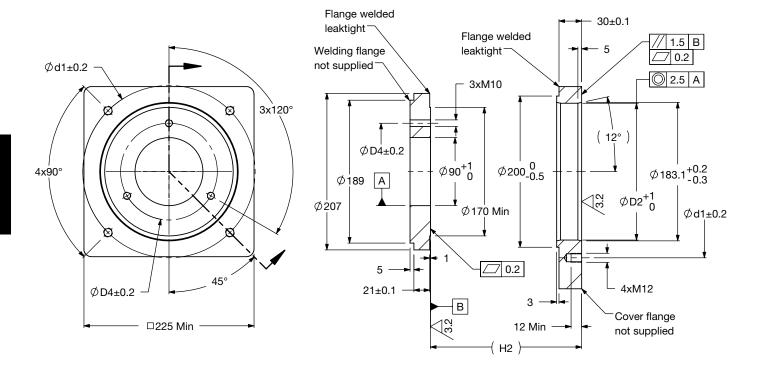
Туре	Shroud Version	Tank Flange	H1	H2	НЗ	H4	h1	h2	h3	ØD1	ØD2	ØD3	ØD4	øĸ	Ød1	Weight (lbs)
RKB	R	B; E		[22.24]	[14.88]	[9.13]	59] [1.18] [0.5 ⁻		[19.09]	485		[7.99] 203	[5.04]			19.4
0600	n	C; I		565	378	232			485			[7.28] 185				19.2
RKB	R	B; E	[0.55]	[29.84]	[17.8]	[10.59]		0 13	[26.69]			[7.99] 203		[0.41] 10.5	[8.98] 228	25.6
0800	n	C; I	14	758	452	269			678			[7.28] 185	128			25.4
RKB	R	B; E		[35.91]	[23.62]	[13.5]			[32.76]			[7.99] 203				30.9
1200	n	C; I	912 600 343		832			[7.28] 185				30.6				

Dimensions RKB 0600 - 1200

Specifications For The Tank Flange

- 1. In the filter mounting interface, the tank flange should have a maximum flatness of 0.2 mm and maximum roughness of Ra 3.2 µm.
- 2. In addition, the mounting interface should be free from damage and scratches.
- 3. The mounting holes of the tank flange must be blind, or stud bolts. Loctite must be used to mount the filter. As an alternative, the tank flange can be continuously welded from the inside.
- 4. Both the tank sheet metal and the filter mounting flange must be sufficiently robust so that neither deform when the seal is compressed during tightening.

Dimensions RKB 0600-1200



Sizing Information

Assembly Curve:

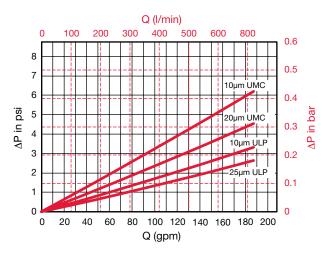
Pressure loss through housing is as follows:

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

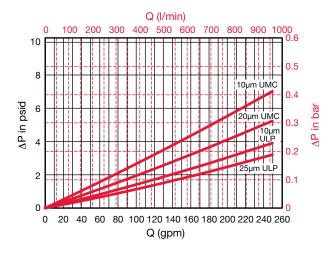
Assembly ΔP = Assembly Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Note: All curves represent 30 cSt viscosity.

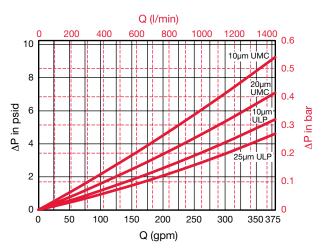
RKB 600 Assembly



RKB 800 Assembly



RKB 1200 Assembly



RFT Series

Return Line Filter 145 psi • up to 634 gpm





Hydraulic Symbol

Features

This filter system provides an economic solution for full-flow return line filtration. The filter head is mounted on the tank. The protective tube can be supplied in various optional versions. Firstly as a closed tube with the outlet opening facing downwards or with a closed base and rows of opening holes at the height of the tank's oil level. In the second version, separating air from the oil is made easier. The optional magnetic core is connected to the filter element via a bayonet fitting, guaranteeing effective magnetic pre-filtration.

The filter housings are designed in accordance with international regulations. They consist of a filter cover, filter head, shroud cover, and element location nozzle.

The element is top-removable.

Standard equipment

- Magnetic core integrated into clamp (only for RFT 0170 0500)
- Magnetic core integrated into cover (only for RFT 0600 2400)
- with protective tube
- with bypass valve

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

ISO 2941, ISO 2942, ISO 2943, ISO 3724,ISO 3968, ISO 11170, ISO

Filter elements are available with the following pressure stability values:

Glass fiber (ULP): 87 psi (6 bar) Glass fiber with pre-filter (UMC): 87 psi (6 bar) Wire mesh (WPI): 87 psi (6 bar)

Other filtration ratings on request.

Special Models and Accessories

- without magnetic core
- without shroud (only RFT 0170 500)
- with shroud
- Outlet grill in openings in shroud
- Seals made of FKM
- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG

Important Information

- Filter housings must be grounded
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector

Technical Specifications

reenmeal opermeaners									
4 Mounting ho	oles - filter housing								
Inlet: Side	Outlet: Shroud windows								
tion									
Housing Steel Steel Steel	Lid Aluminum Aluminum Aluminum								
45 gpm (170 l/ 66 gpm (250 l/ 79 gpm (300 l/ 92 gpm (350 l/ 105 gpm (450 l) 145 gpm (550 158 gpm (600 211 gpm (800 317 gpm (1800 475 gpm (1800 528 gpm 2000 634 gpm (2400	/min) /min) /min) I/min) I/min) I/min) I/min) I/min) D I/min) D I/min)								
	Inlet: Side stion Housing Steel Steel Steel 45 gpm (170 l/ 66 gpm (250 l/ 79 gpm (300 l/ 92 gpm (350 l/ 105 gpm (450 145 gpm (550 145 gpm (600 211 gpm (800 317 gpm (1800 475 gpm (1800 528 gpm 2000								

Housing Pressure Rating

Max. Allowable Working

145 psi (10 bar) MAWP Pressure*

Element Collapse Pressure Rating

ULP, UMC, WPI 87 psid (6 bar)

Fluid Temp. Range -22°F to 248°F (-30°C to 120°C)

Consult HYDAC for applications below -22°F (-30°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

P = 29 psi (2.0 bar) standard

P = 11 psi (0.8 bar) optional - consult factory

Bypass Valve Cracking Pressure

 $\Delta P = 36 \text{ psi } (2.5 \text{ bar}) \text{ standard})$

 $\Delta P = 11 \text{ psi } (0.8 \text{ bar}) \text{ optional}$

Applications



Agricultural

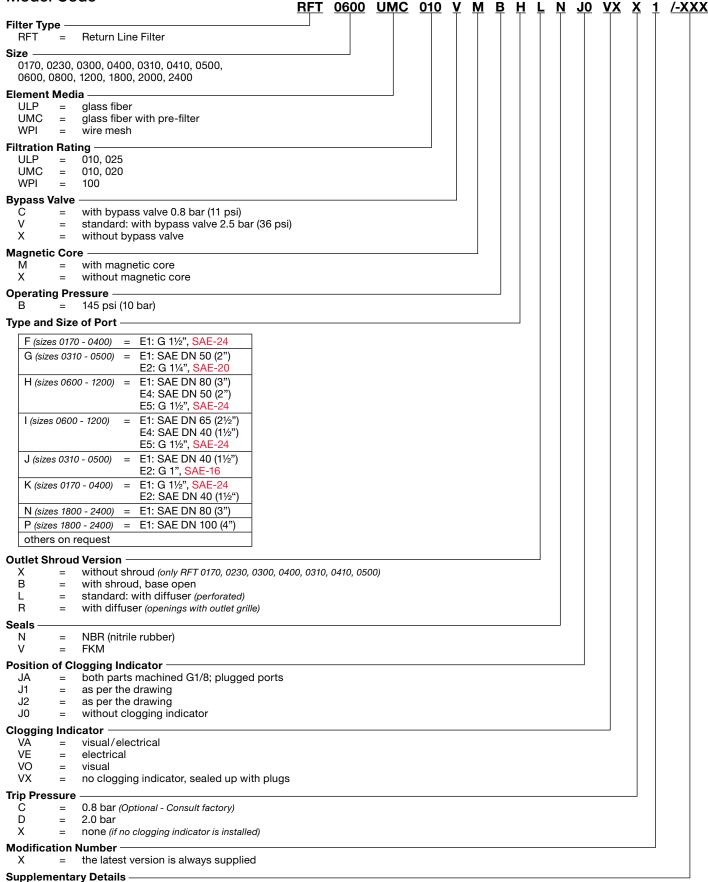


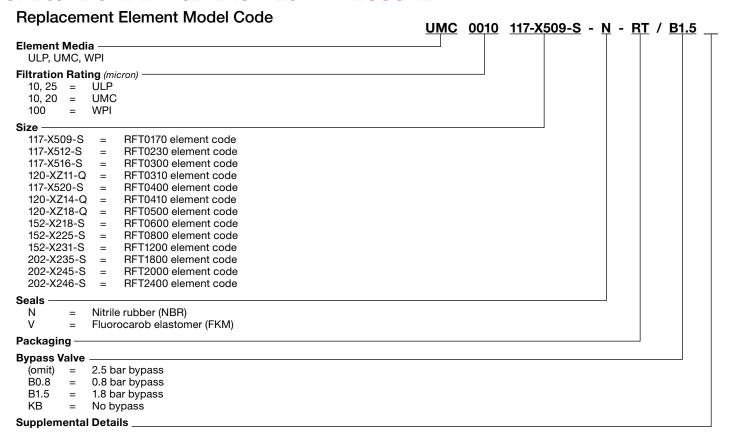


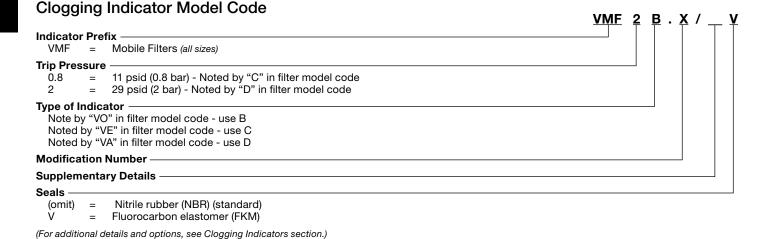
Industrial

Construction

Model Code

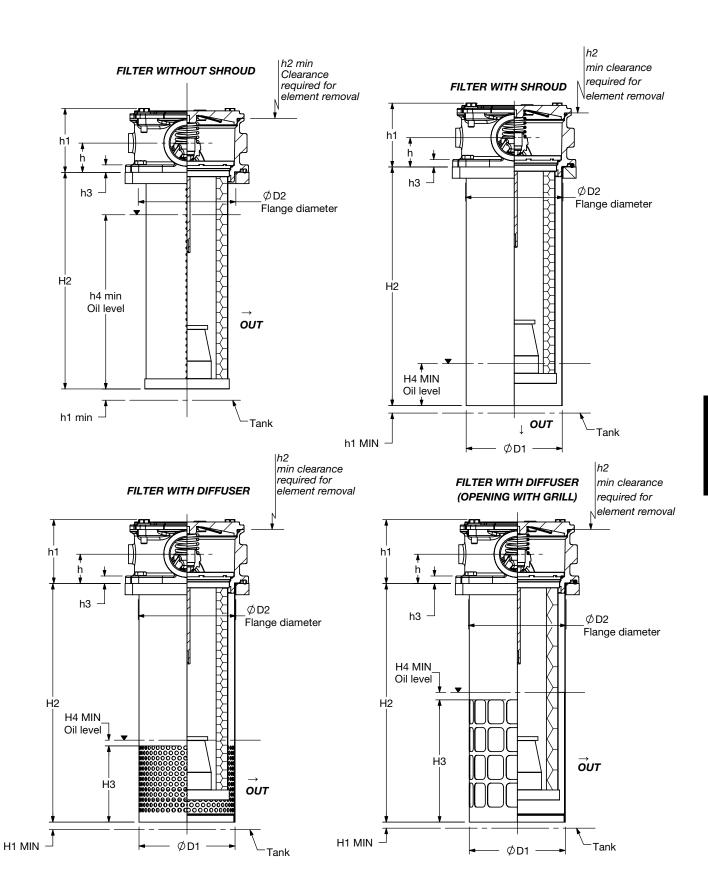


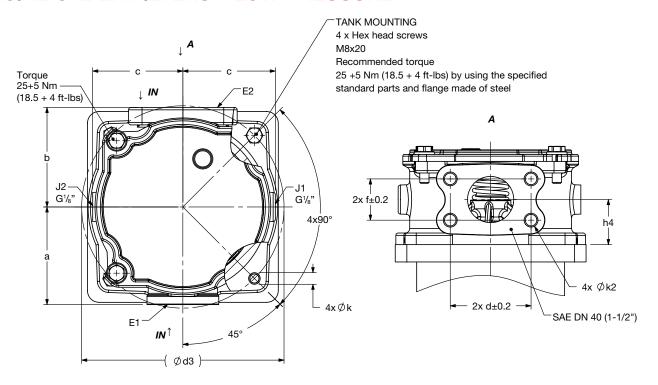




HYDAC

Dimensions RFT 0170, 0230, 0300, 0400



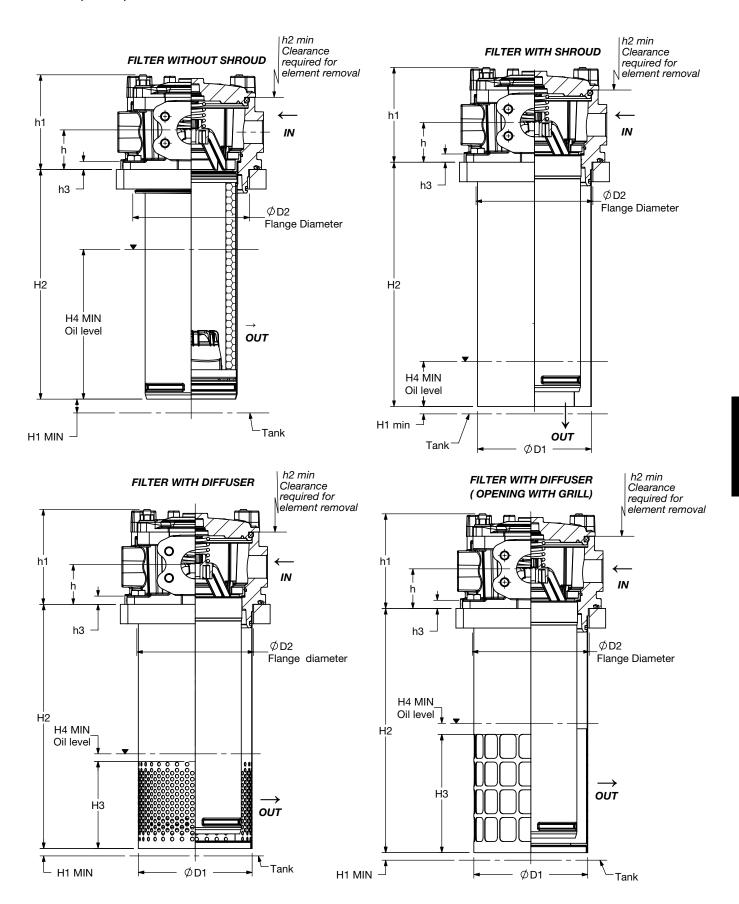


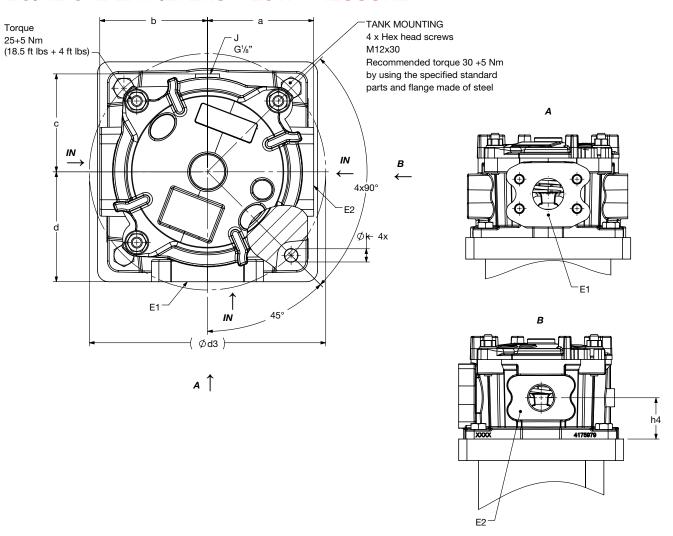
Туре	Shroud Version	Н1	H2	НЗ	H4	h	h1	h2	h3	h4	ØD1	ØD2	Ød3	а	b	С	d	f	Øk	Øk2	Wt (lbs)
	Without shroud	[0.39]	[8.58] 218	-	[6.1] 155						_										5.7
	With shroud	10		-	[1.97] 50																7.1
0170	With diffuser	[0 0]	[9.72] 247	[4.02] 102	10.001			[10.24] 260			[5.04] 128										7.5
	Diffuser with opening	[0.2] 5	241	[4.96] 126	[0.39] 10					_	120										7.7
	Without shroud	[0.39]	[11.38] 289	-	[7.99] 203					_	-										6.4
DET	With shroud	10		ı	[1.97] 50			[40,00]													7.7
RFT 0230	With diffuser	10.01	[12.52] 318	[4.02] 102	[0.00]			[12.99] 330			[5.04] 128										8.2
	Diffuser with opening	[0.2] 5	010	[6.42] 163	[0.39] 10		[3.35]		[0.39]		120	[5.31]	[6.89]	[3.33]	[3.39] 86.0*	[3.15] 80*	[2.75]	[1.48] 37.5	[0.39]	M12	8.4
	Without shroud	[0.39]	[15.16] 385	-	[10.51] 267	39	85		10		-	135	175	84.5	[3.33] 84.5**	[3.07] 78**	69.9	37.5	10	IVIIZ	6.8
RFT	With shroud	10		-	[1.97] 50			[16 00]													8.2
0300	With diffuser	[O 0]	[16.3] 414	[4.02] 102	[0.00]			[16.93] 430			[5.04] 128										8.6
	Diffuser with opening	[0.2] 5	717	[7.87] 200	[0.39] 10					[1.54]											8.8
	Without shroud	[0.39]	[19.65] 499	1	[13.23] 336					39	-										75
DET	With shroud	10		-	[1.97] 50			[04,06]													9.0
RFT 0400	With diffuser	[0.2]	[20.79] 528	[4.02] 102	[0.39]			[21.26] 540			[5.04] 128										9.5
	Diffuser with opening	5		[9.33] 237	10																9.7

^{*} Non-machined port

^{**} Machined port

Dimensions RFT 0310, 0410, 0500



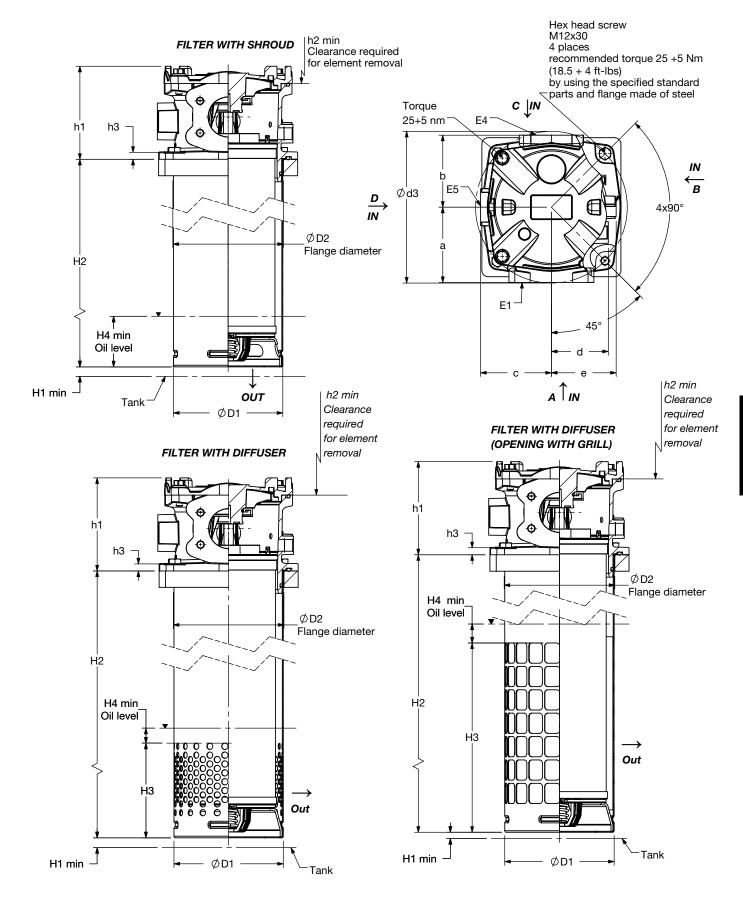


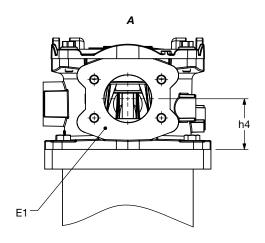
Туре	Design	H1	H2	Н3	H4	h	h1	h2	h3	h4	ØD1	ØD2	Ød3	а	b	С	d	Øk	Wt (lbs)
	Without shroud	[0.39]	[12.03] 305.5	-	[7.87] 200						-								9.3
RFT	With shroud	10		-	[2.36] 60			[16.54] 420											10.8
0310	With diffuser	[0.2]	[12.83] 326	[4.53] 115	[0.39]			720			[5.98] 152								11.0
	Diffuser with opening	5		[6.22] 158	10														11.2
	Without shroud	[0.39]	[15.96] 405.5	-	[10.63] 270						-								9.9
RFT	With shroud	10		-	[2.36] 60	[2.09]	[4.98]	[20.47]	[0.43]	[1.97]		[6.14]	[8.46]	[3.85] 98.0*	[3.85] 98.0*	[3.58] 91*	[3.94]	[0.49]	11.9
0410	With diffuser	[0.2]	[16.77] 426	[4.53] 115	[0.39]	53	126.5	520	11	50	[5.98] 152	156	215	[3.80] 96.5**	[3.80] 96.5**	[3.50] 89**	100	12.5	12.1
	Diffuser with opening	5		[7.68] 195	10														12.3
	Without shroud	[0.39]	[19.51] 495.5	-	[12.99] 330						-								11.0
RFT	With shroud	10		-	[2.36] 60			[24.02]											13.2
0500	With diffuser	[O 0] 5	[20.31] 516	[4.53] 115	[0.39]			610			[5.98] 152								13.4
	Diffuser with opening	[0.2] 5		[10.63] 270	10														13.7

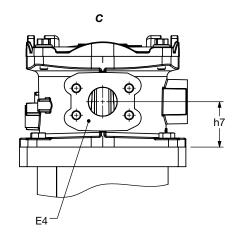
^{*} Non-machined port

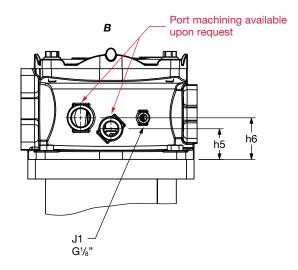
^{**} Machined port

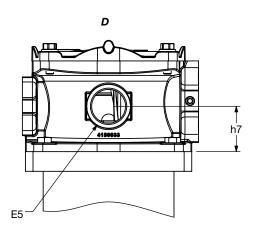
Dimensions RFT 0600, 0800, 1200









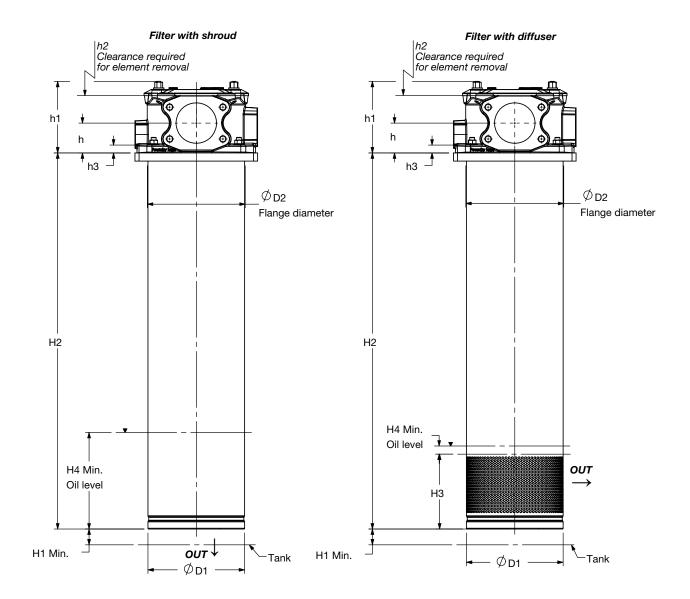


Туре	Design	H1	H2	НЗ	H4	h	h1	h2	h3	h4	ØD1	ØD2	Ød3	а	f	f2	g	g2	Øk	Øk2	Wt (lbs)
	With shroud	[0.39] 10		-	[3.15] 80																26.5
RFT 0600	With diffuser	[0.0]	[18.94] 481	[5.51] 140	[0.00]			[19.69] 500													26.9
0600	Diffuser with opening	[0.2] 5	_	[11.42] 290	[0.39] 10			300													27.1
	With shroud	[0.39] 10		-	[3.15] 80									[4 04]							28.2
RFT 0800	With diffuser	[0.2]	[26.54] 674	[5.51] 140	[0.39]		[4.41] 112	[27.56] 700	[0.51] 13	[2.01] 51	[6.81] 173	[6.89] 175	[8.66] 220	[4.21] 107* [4.17]	[2.75] 69.9	[3.06] 77.8	[1.41] 35.7	[1.69] 42.9	[0.49] 12.5	M12 18	28.7
	Diffuser with opening	5		[15.75] 400				700	.0	0.				106**	00.0				.2.0	deep	28.9
	With shroud	[0.39] 10		-	[3.15] 80																34.6
RFT	With diffuser		[32.6]	[5.51] 140	10.063			[35.43]													35.1
1200	Diffuser with opening	[0.2] 5	828	[21.65] 550	[0.39] 10			900													35.3

^{*} Non-machined port

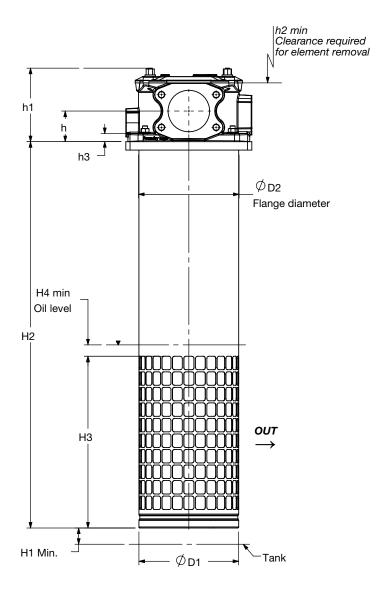
^{**} Machined port

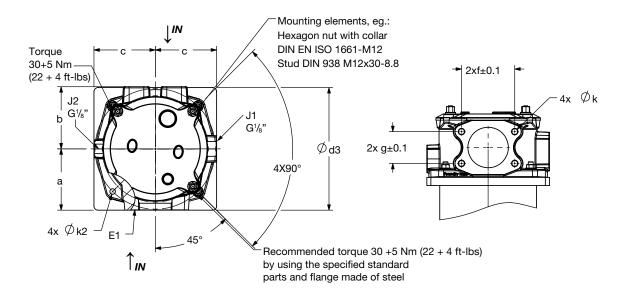
Dimensions RFT 1800, 2000, 2400



RFT 1800, 2000, 2400

Filter with diffuser (opening with grill)





Туре	Design	H1	H2	Н3	H4	h	h1	h2	h3	ØD1	ØD2	Ød3	а	b	С	f	g	Øk	Øk2	Wt (lbs)
	With shroud	[1.38] 35		-	[5.12] 130															64.6
RFT 1800	With diffuser	[0.59]	[36.22] 920	[7.09] 180	[0.39]			[35.43] 900												66.8
	Diffuser with opening	15	320	[16.14] 410	10			300								SAE	SAE			67.2
	With shroud	[1.38] 35		-	[5.12] 130								[5.98]	[5.98]	[5.98]	4" [5.13] 130.2	4" [3.06]	М		76.5
RFT 2000	With diffuser	[0 50]	[47.24] 1200	[8.07] 205	[0.00]	[2.87] 73	[6.89] 175	[45.28] 1150	[0.75] 19	[9.35]	[9.43] 239.5	[11.61]	450*	152*	152*	SAE	77.8	16x32 deep	[0.53] 13.5	78.7
2000	Diffuser with opening	[0.59] 15	1200	[21.65] 550	[0.39] 10	/3	175	1130	19	237.3	239.3	295	[5.91] 150**	[5.91] 150**	[5.91] 150**	3" [4.19] 106.4	SAE 3" [2.44]	doop	13.5	79.1
	With shroud	[1.38] 35		-	[5.12] 130												61.9			78.9
RFT 2400	With diffuser	[0 50]	[47.24] 1200	[8.07] 205	[0.00]			[46.46] 1180												81.1
	Diffuser with opening	[0.59] 15	.200	[21.65] 550	[0.39] 10															81.6

^{*} Non-machined port

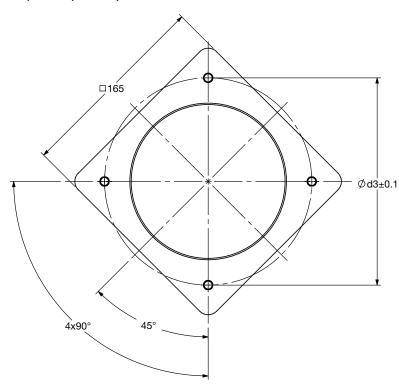
^{**} Machined port

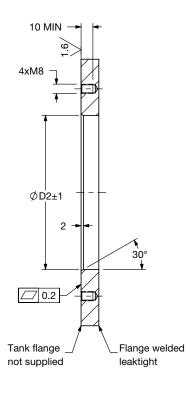
Specifications For The Tank Flange

- 1. In the filter mounting interface, the tank flange should have a maximum flatness of 0.3 mm and maximum roughness of Ra 3.2 µm.
- 2. In addition, the mounting interface should be free from damage and scratches.
- 3. The mounting holes of the flange must be blind, or stud bolts. Loctite must be used to mount the filter. As an alternative, the tank flange can be continuously welded from the inside.
- 4. Both the tank sheet metal and the filter mounting flange must be sufficiently robust so that neither deform when the seal is compressed during tightening.

Dimensions

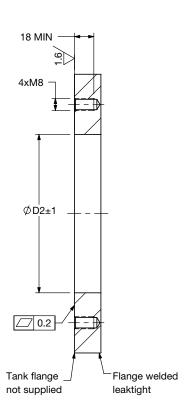
RFT 0170, 0230, 0300, 0400



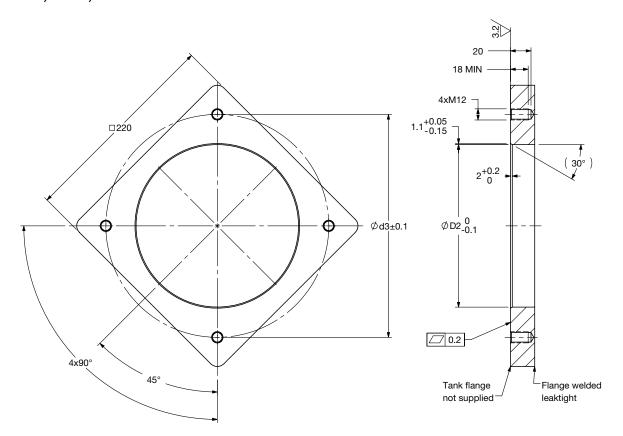


Dimensions

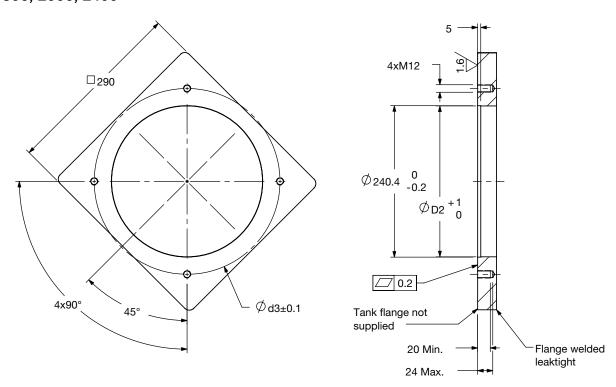
RFT 0310, 0410, 0500 □2Ó0 Ø'd3 4x90° 45°



Dimensions RFT 0600, 0800, 1200



Dimensions RFT 1800, 2000, 2400



Sizing Information

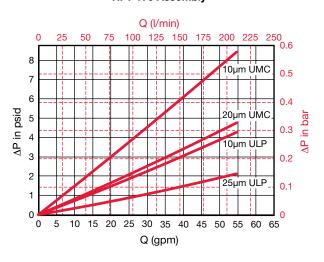
Assembly Curve:

Pressure loss through Assembly is as follows. These curves are based on a viscosity of 30 cst.

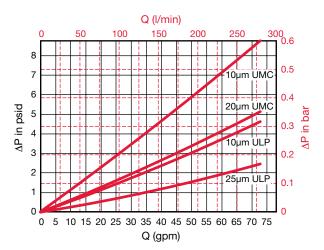
Adjustments must be made for viscosity & specific gravity of the fluid to be used!

Assembly ΔP = Assembly Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

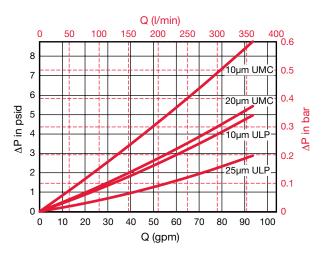
RFT 170 Assembly



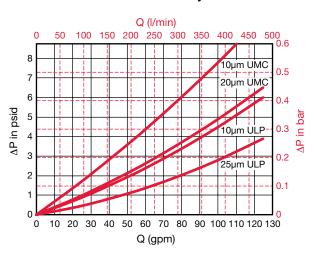
RFT 230 Assembly



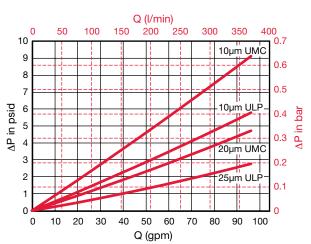
RFT 300 Assembly



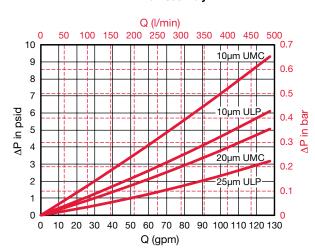
RFT 400 Assembly



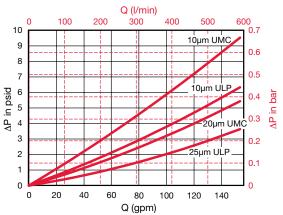
RFT 310 Assembly



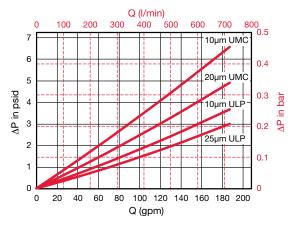
RFT 410 Assembly



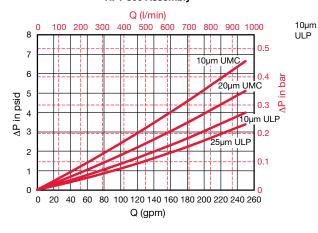




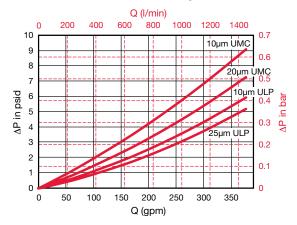
RFT 600 Assembly



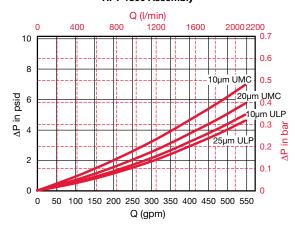
RFT 800 Assembly



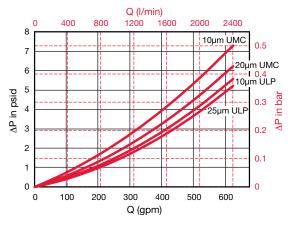
RFT 1200 Assembly



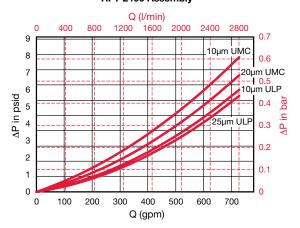
RFT 1800 Assembly



RFT 2000 Assembly



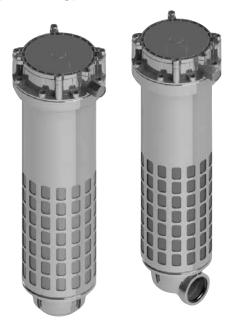
RFT 2400 Assembly

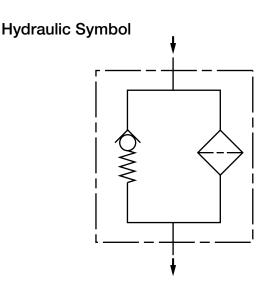


RFB Series

Return Line Filter 145 psi • up to 158 gpm







Features

Filter Housing - Design

The RFB filters are suitable for medium to large flow rates. The filter is mounted in the tank and flow passes through it through a pipe connection from below or from the side. The optimal flow conditions created by flow from beneath guarantee optimum air separation, high pulsation stability and long filter service life.

The filter housings are designed in accordance with international regulations. They consist of a housing tube, filter head and a filter lid. The element is top-removable.

Standard equipment

- mounting holes on the filter head
- with bypass valve
- inlet as easy-fit model
- outlet via diffuser (openings with outlet grill)
- multi-patented filter (including integrated housing seal and two-part bypass)
- bored, without clogging indicator
- with anti-drain valve

Filter Flements

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards: ISO 2941, ISO 2942, ISO 2943, ISO 3724, ISO 3968, ISO 11170,

Filter elements are available with the following pressure stability values:

Glass fiber (ULP): 87 psi (6 bar) Glass fiber with pre-filter (UMC): 87 psi (6 bar)

Special Models and Accessories

- integrated retrofit protection
- clogging indicator optional to measure differential pressure with element
- seals made of FKM
- without anti-drain valve

Technical Specifications

recnnical Specif	ications								
Mounting Method	4 Mounting holes	- filter housing							
Direction of Flow	Inlet: Bottom	Outlet: Shroud windows							
Materials of Construct	ion								
	Housing	Lid							
0170	Steel	Aluminum							
0300	Steel	Aluminum							
0400	Steel	Aluminum							
0600	Steel	Aluminum							
Flow Capacity									
0170	45 gpm (170 l/mir	٦)							
0300	79 gpm (300 l/mii	n)							
0400	105 gpm (400 l/m								
0600	158 gpm (600 l/m	nin)							
Housing Pressure Ratio	ng								
Max. Allowable Working									
Pressure*	145 psi (10 bar)								
Element Collapse Pres	sure Rating								
ULP, UMC	87 psid (6 bar)								
Fluid Temp. Range	-22°F to 212°F (-	30°C to 100°C)							
Consult HYDAC for applicat	Consult HYDAC for applications below -22°F (-30°C)								
Fluid Compatibility									
Compatible with all hyd									
oil/water emulsion, and		fluids when the							
appropriate seals are se	elected.								
Indicator Trip Pressure									

Applications

P = 29 psi (2.0 bar) standard

P = 11 psi (0.8 bar) optional

 $\Delta P = 36 \text{ psi } (2.5 \text{ bar}) \text{ standard})$

 $\Delta P = 11 \text{ psi } (0.8 \text{ bar}) \text{ optional}$

Bypass Valve Cracking Pressure

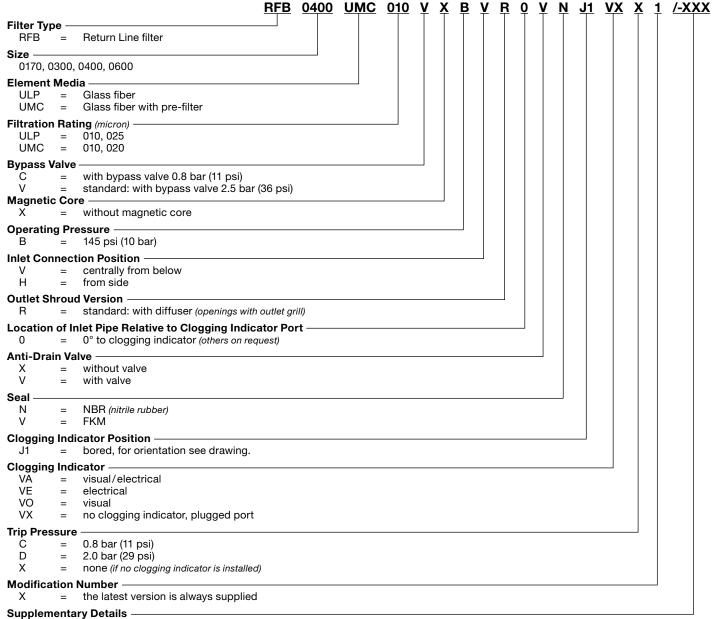




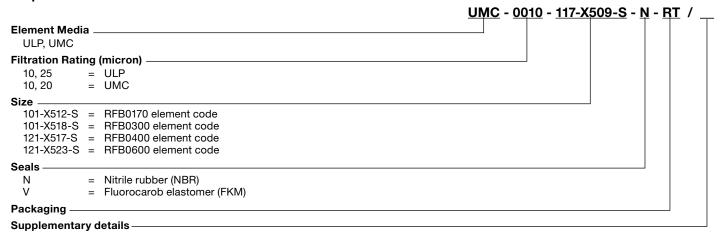


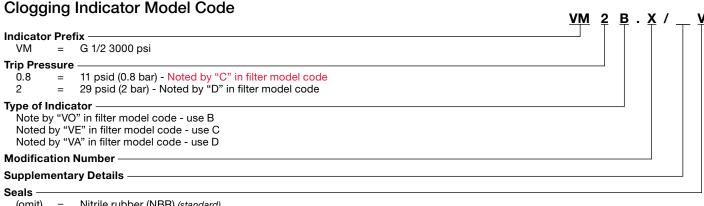
(HYDAC)

Model Code



Replacement Element

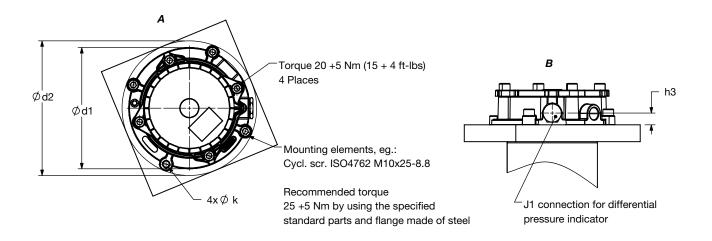




(omit) = Nitrile rubber (NBR) (standard) V = Fluorocarbon elastomer (FKM)

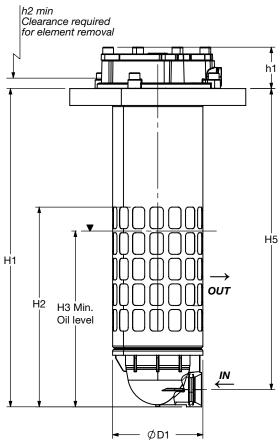
(For additional details and options, see Clogging Indicators section.)

Dimensions RFB 0170-0300



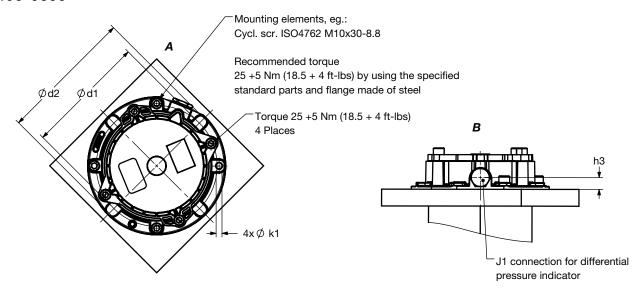
Housing closure V h2 min Clearance required for element removal A H1 H2 H3 Min. Oil level Oil level ØD1

Housing closure H



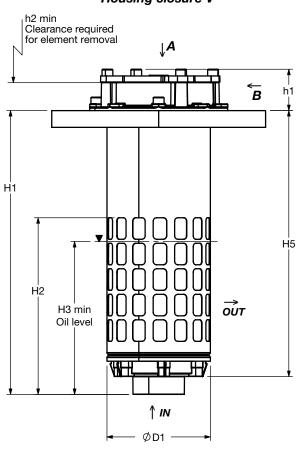
Туре	Design	Connection position	Н1	H2	НЗ	H4	Н5	h1	h2	h3	ØD1	Ød1	Ød2	Øk	Weight (lbs)			
RFB	Diffuser with opening	Н	[12.7] 322.5	[8.68] 220.5	[7.32] 186	-	[11.69] 297		[11.81]						7.3			
0170	Diffuser with opening	V	[11.99] 304.5	[7.97] 202.5	[6.61] 168	[10.61] 269.5	-	[2.42]	300	[0.69]	[5.28]	[7.09]	[7.87]	[0.41]	7.1			
RFB	Diffuser with opening	н	[18.6] 472.5	[11.67] 296.5	[10.31] 262	-	[17.6] 447	61.5	[17.72]	17.5	17.5	17.5 134	17.5	134	180	200	10.5	8.6
0300	Diffuser with opening	V	[17.89] 454.5	[10.96] 278.5	[9.61] 244	[16.52] 419.5	-		450						8.8			

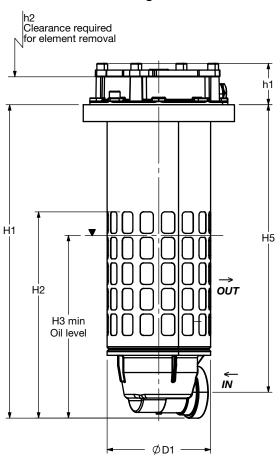
Dimensions RFB 0400-0600



Housing closure V

Housing closure H

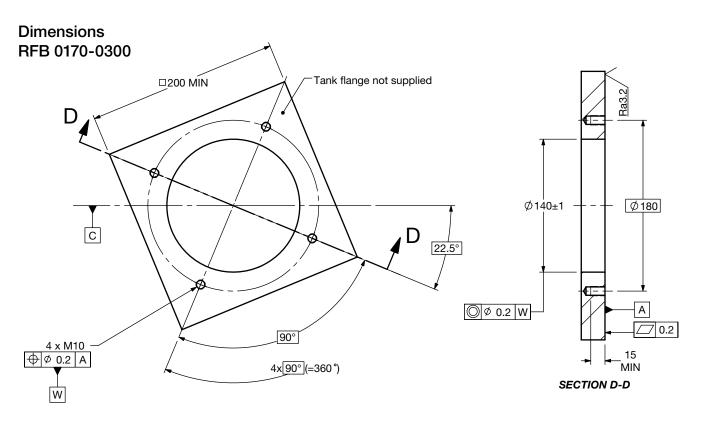


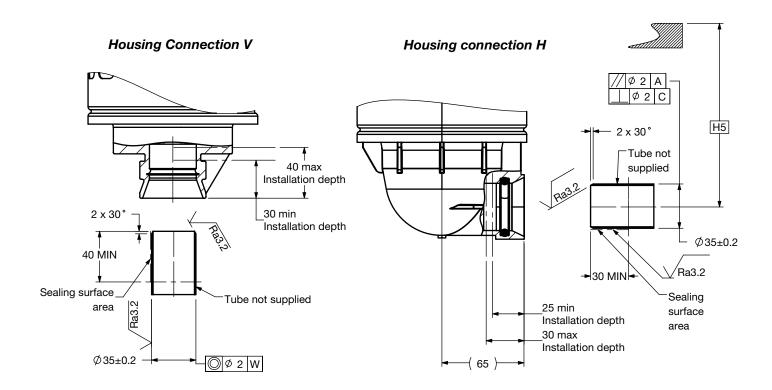


Туре	Design	Connection position	H1	H2	НЗ	H4	H5	h1	h2	h3	ØD1	Ød1	Ød2	Øk1	Weight (lbs)
RFB	Diffuser with opening	Н	[18.37] 466.5	[12.09] 307	[9.21] 234	-	[16.85] 428		[16.93]						9.9
0400	Diffuser with opening	V	[16.63] 422.4	[10.34] 262.6	[7.17] 182	[15.5] 393.8	-	[2.42]	430	[0.69]	[6.06]	[7.31]	[8.07]	[0.41]	9.5
RFB	Diffuser with opening	Н	[24.16] 613.7	[15.09] 383.2	[12.2] 310	-	[22.65] 575.2	61.5	[22.83]	17.5	154	185.7	205	10.5	12.1
0600	Diffuser with opening	V	[22.11] 561.6	[13.04] 331.1	[10.16] 258	[21.3] 541	-		580						11.7

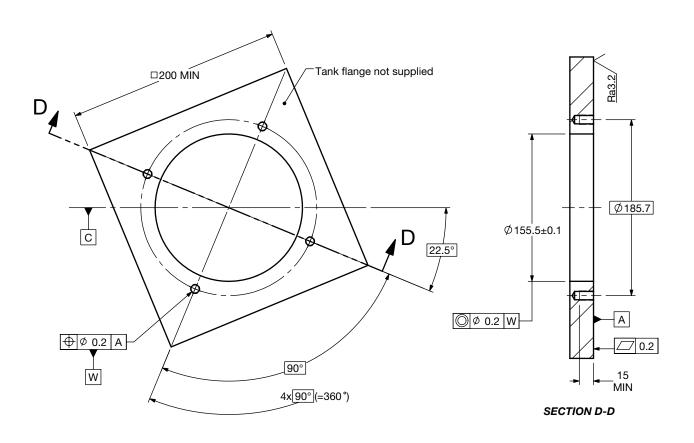
Specifications For The Tank Flange

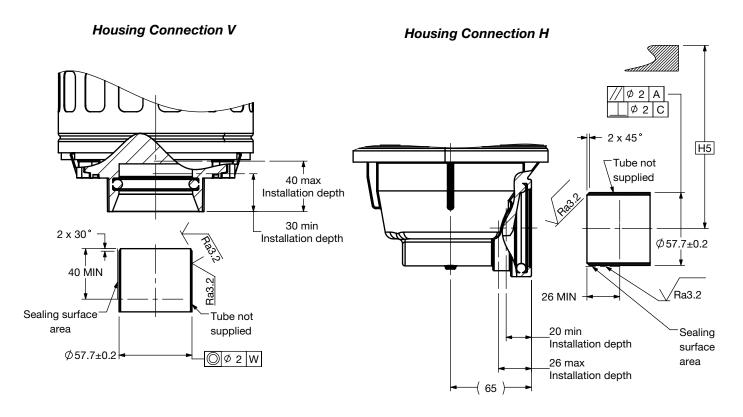
- 1. In the filter mounting interface, the tank flange should have a maximum flatness of 0.3 mm and maximum roughness of Ra 3.2 µm.
- 2. In addition, the mounting interface should be free from damage and scratches.
- 3. The mounting holes of the flange must be blind, or stud bolts. Loctite must be used to mount the filter. As an alternative, the tank flange can be continuously welded from the inside.
- 4. Both the tank sheet metal and the filter mounting flange must be sufficiently robust so that neither deform when the seal is compressed during tightening.





Dimensions RFB 0400-0600





Sizing Information

Assembly Curve:

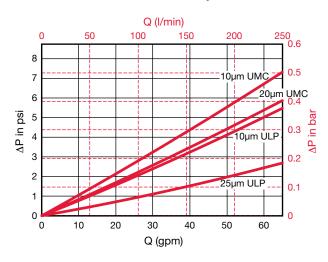
Pressure loss through housing is as follows:

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

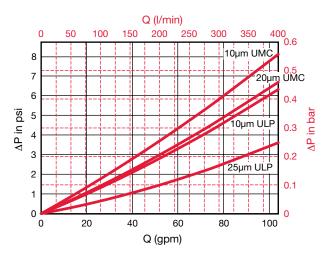
Assembly ΔP = Assembly Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Note: All curves represent 30 cSt viscosity.

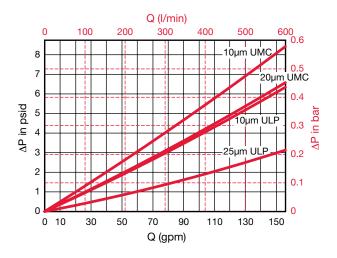
RFB 170 Assembly



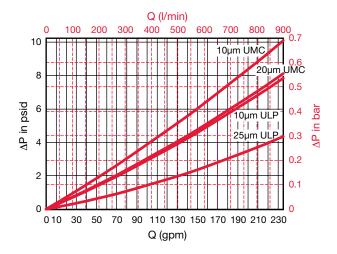
RFB 300 Assembly



RFB 400 Assembly

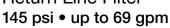


RFB 600 Assembly



RFB Compact Series

Return Line Filter

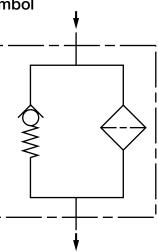








Hydraulic Symbol



Features

Filter Housing - Design

The RFB Compact filters are suitable for small to medium flow rates. The filter is mounted in the tank and flow passes through it via a pipe connection from below. The optimal flow conditions created by flow from beneath guarantee optimum air separation, high pulse stability, and long filter service life.

The filters are designed in accordace with international regulations. They consist of an integrated bypass lid and element. The element is top removable.

Standard Equipment

- Integrated lid, including bypass valve
- Patented bayonet connection between the element and lid
- Oulet via diffuser
- Anti-drain valve included in the element

Filter Elements

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

ISO 2941, ISO 2942, ISO 2943, ISO 3724, ISO 3968, ISO 11170, ISO 16889

Filter elements are available with the following pressure stability values:

Glass fiber (ULP): 87 psi (6 bar) Glass fiber with pre-filter (UMC): 87 psi (6 bar) STAT-Free: 87 psi (6 bar)

Applications







Technical Specifications

Mounting Method	Threaded lid conr	nection					
Direction of Flow	Inlet: Bottom	Outlet: Element diffuser					
Materials of Construction (all sizes)	Polyamide and glass fiber						
Flow Capacity							
0045	12 gpm (45 lpm)						
0100	26 gpm (100 lpm)						
0155	41 gpm (155 lpm)						
0210	55 gpm (210 lpm)						
0260	69 gpm (260 lpm)						

Housing Pressure Rating Max. Allowable Working

145 psi (10 bar) Pressure*

Element Collapse Pressure Rating ULP, UMC 87 psid (6 bar)

-4°F to 212°F (-20°C to 100°C) Fluid Temp. Range

Consult HYDAC for applications below -4°F (-20°C)

Fluid Compatibility

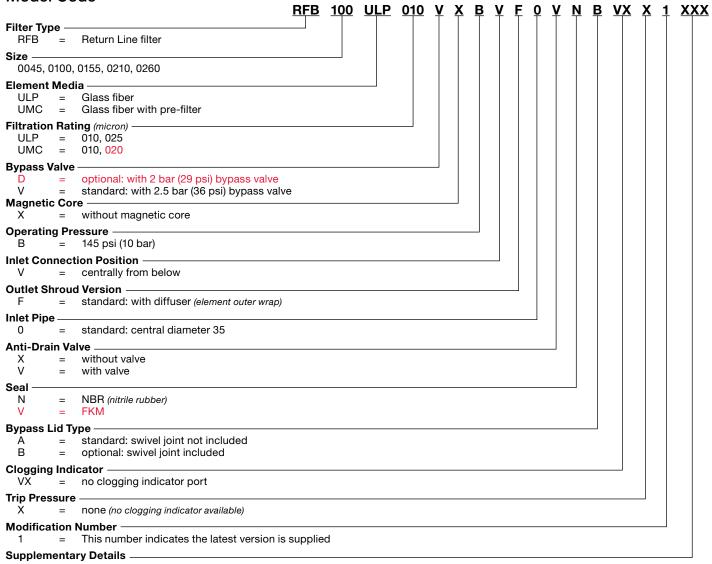
Compatible with all hydrocarbon-based, synthetic, water glycol, oil/water emulsion and high water-based fluids when the appropriate seals are selected.

Bypass Valve Cracking Pressure

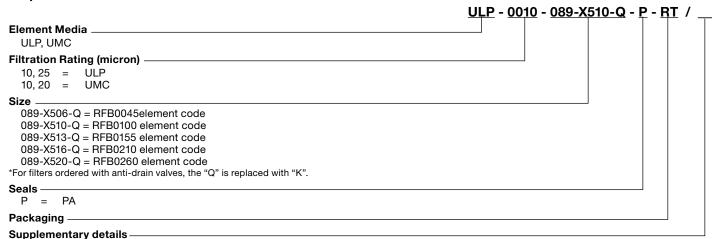
 $\Delta P = 36$ psi (2.5 bar) standard $\Delta P = 29 \text{ psi } (2 \text{ bar}) \text{ optional}$

Other settings - contact HYDAC

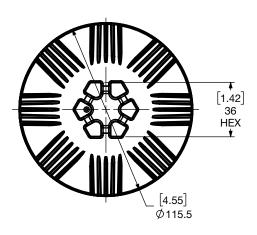
Model Code

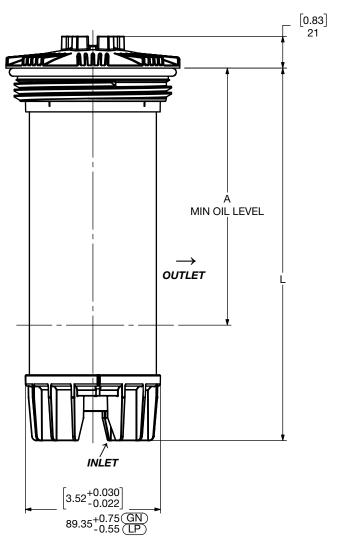


Replacement Element



Dimensions RFB 0045-0260...A

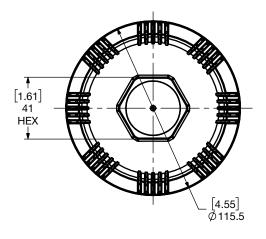


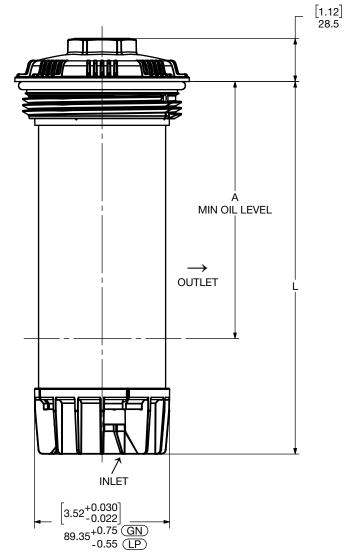


FILTER	L	Α
RFB 0045A	[6.34] 161	[4.06] 103
RFB 0100A	[9.69] 246	[6.69] 170
RFB 0155A	[13.03] 331	[9.25] 235
RFB 0210A	[16.38] 416	[11.97] 304
RFB 0260A	[19.72] 501	[14.69] 373

Dimensions are [in] mm

Dimensions RFB 0045-0260...B

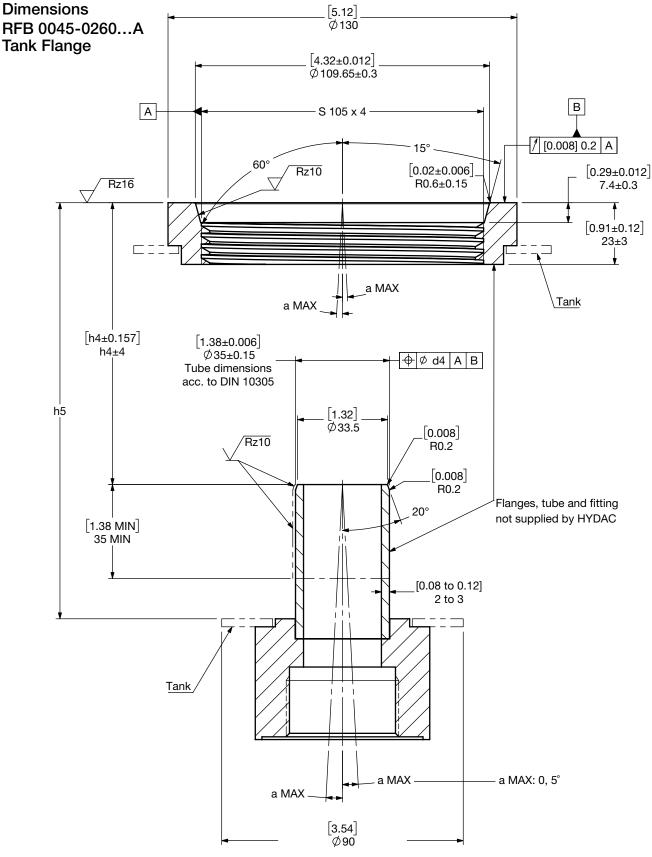




FILTER	L	Α
RFB 0045B	[6.34] 161	[4.06] 103
RFB 0100B	[9.69] 246	[6.69] 170
RFB 0155B	[13.03] 331	[9.25] 235
RFB 0210B	[16.38] 416	[11.97] 304
RFB 0260B	[19.72] 501	[14.69] 373

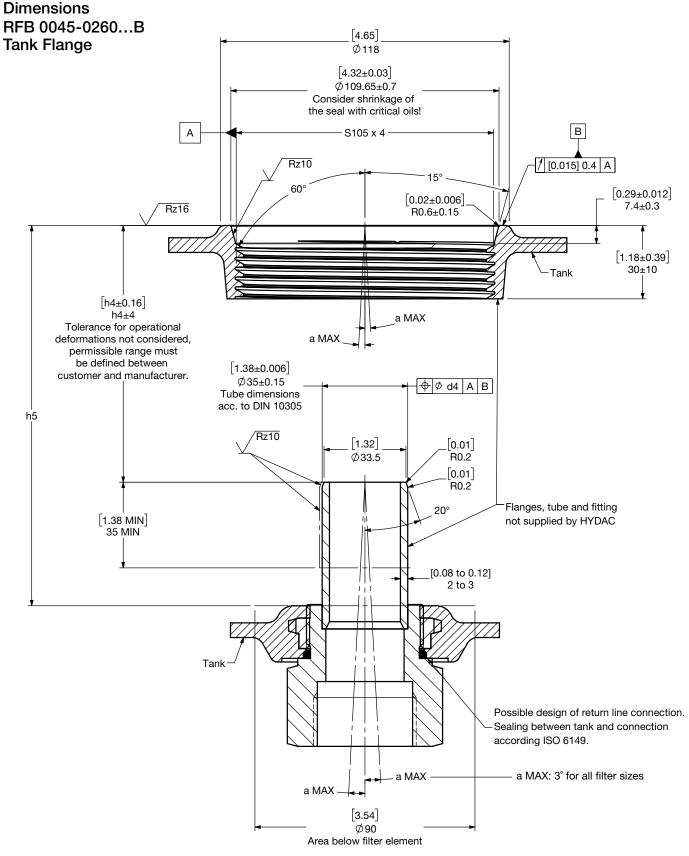
Dimensions are [in] mm

H57



	FILTER	h4	h5	d4
	RFB 0045A	[4.57] 117	[6.54] 166	[0.12] 3
FLANGE	RFB 0100A	[7.91] 202	[9.88] 251	[0.16] 4
FLANGE	RFB 0155A	[11.26] 287	[13.23] 336	[0.22] 5.5
	RFB 0210A	[14.61] 372	[16.57] 421	[0.28] 7
	RFB 0260A	[17.95] 457	[19.92] 506	[0.33] 8.5

Dimensions are [in] mm



	FILTER	h4	h5	h6
	RFB 0045B	[4.57] 117	[6.54] 166	[0.55] 14
FLANGE	RFB 0100B	[7.91] 202	[9.88] 251	[0.79] 20
FLANGE	RFB 0155B	[11.26] 287	[13.23] 336	[1.02] 26
	RFB 0210B	[14.61] 372	[16.57] 421	[1.26] 32
	RFB 0260B	[17.95] 457	[19.92] 506	[1.50] 38

Dimensions are [in] mm

Sizing Information

Assembly Curve:

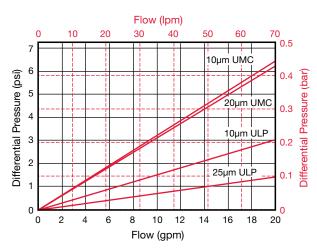
Pressure loss through housing is as follows:

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

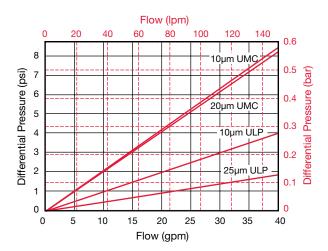
Assembly $\Delta P = Assembly Curve \Delta P \times \frac{Actual Specific Gravity}{Actual Specific Gravity}$

Note: All curves represent 30 cSt viscosity.

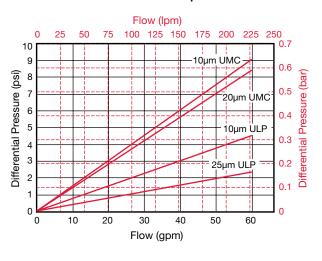
RFB 0045 Pressure Drop vs. Flow



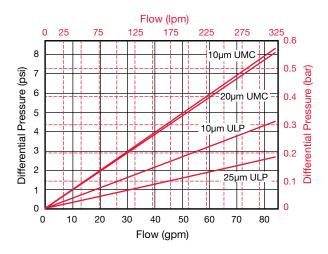
RFB 0100 Pressure Drop vs. Flow



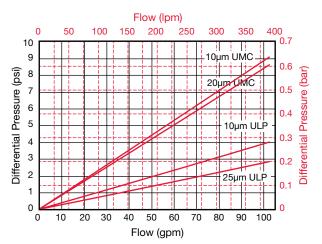
RFB 0155 Pressure Drop vs. Flow



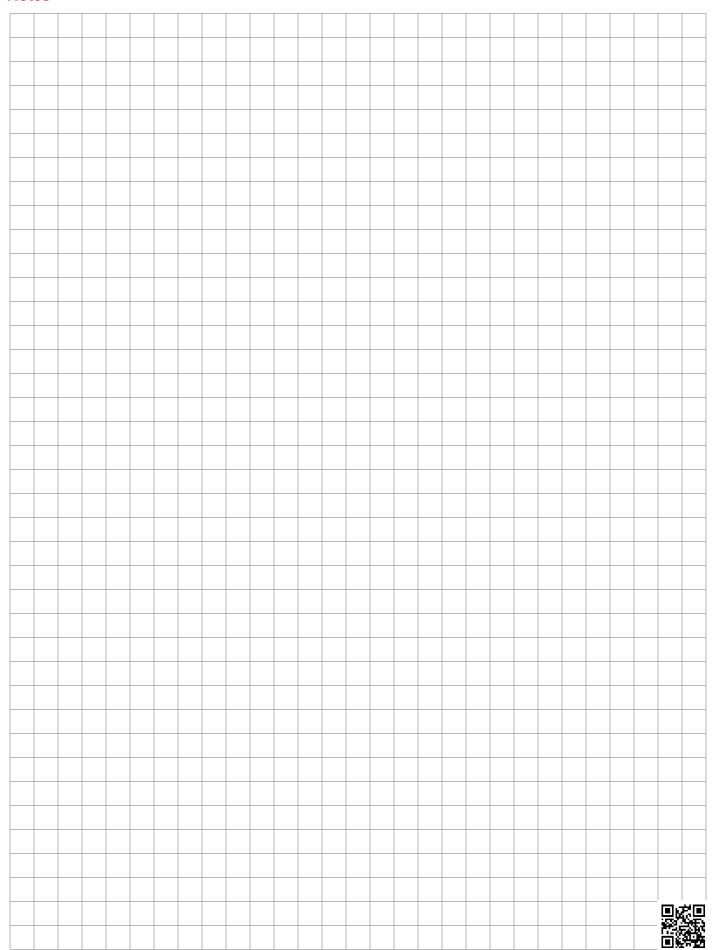
RFB 0210 Pressure Drop vs. Flow



RFB 0260 Pressure Drop vs. Flow

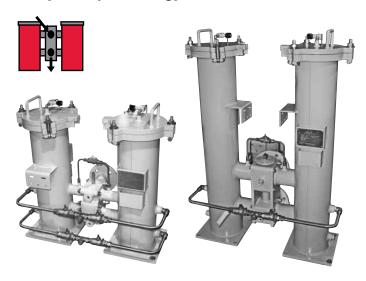


Notes

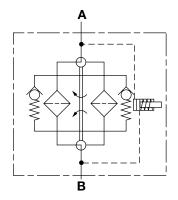


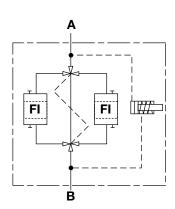
RFLDH Welded Series

Inline Duplex Filters
150 psi • up to 700 gpm



Hydraulic Symbol





Features

- Models are available in carbon and stainless steel versions. Lids are swing bolt mounted.
- ANSI flange connections
- Inlet and outlet connections are located on the same side of the transfer valve.
- Transfer valve and pressure equalization line allow easy changeover between filter housings without costly system shutdown.
- Clogging indicators have no external dynamic seal. High reliability is achieved and magnetic actuation eliminates a leak point.
- Stainless drain piping with ball valves available.
- Air bleed line available
- ASME stamp available
- Australian AS1210 approval available
- · Canadian registration approval available

Notes: This filter is configured with anR.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Most states and local jurisdictions in the United States require pressure vessels to be ASME stamped. It is the responsibility of the end customer to research and fully understand the ASME code requirements of the jurisdiction this filter will ultimately be installed in, and to fully communicate these requirements to HYDAC.

Technical Specifications

Mounting Method	Floor mounted legs
	(Filters must not be used as pipe support)
Port Connection	
1300/1303	2" ANSI 150# Flange
2500/2503	3" ANSI 150# Flange
1320/1323, 2520/2523	4" ANSI 150# Flange
2520/2523, 4020/4023	6" ANSI 150# Flange
Flow Direction	Inlet: Front Top, Outlet: Front Bottom

Construction Materials

1300, 1320, 2500, 2520, 4020 - Carbon Steel 1303, 1323, 2503, 2523, 4023 - Stainless Steel

Flow Capacity

1300/1303	170 gpm (644lpm)
1320/1323	304 gpm (1150 lpm)
2500/2503	270 gpm (1050 lpm)
2520/2523	525 gpm (2000 lpm)
4020/4023	700 gpm (2650 lpm)

Housing Pressure Rating

Max. Allowable Working

Pressure 150 psi (10 bar) standard Proof Pressure (ASME) 195 psi (13.4 bar)

Element Collapse Pressure Rating

ON, W/HC 290 psid (20 bar) ECON2, BN4AM, AM, P/HC 145 psid (10 bar)

Fluid Temperature Range 14°F to 212°F (-10°C to 100°C)

Consult HYDAC for applications below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar) -10}\%$

 $\Delta P = 72 \text{ psid (5 bar) -10}\%$

Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar) } +10\%$

 $\Delta P = 87 \text{ psid (6 bar)} + 10\%$

Applications



Automotive



Pulp & Paper



Gearboxes



Shipbuilding



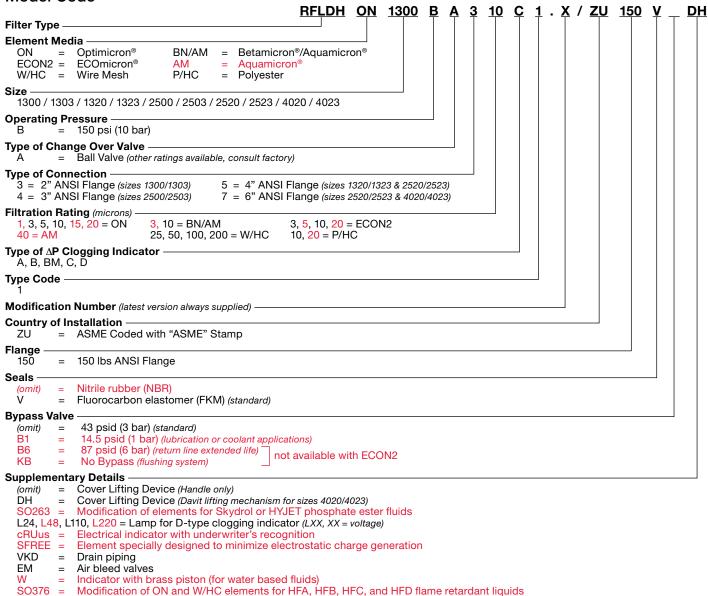
Industrial

Power

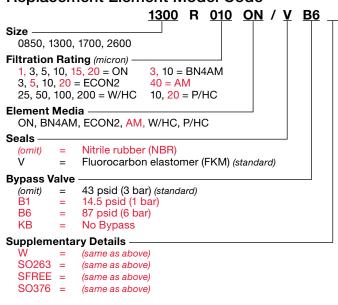


Steel / Heavy Industry

Model Code



Replacement Element Model Code



Clogging Indicator Model Code Indicator Prefix -VM = G 1/2 3000 psi= 29 psid (2 bar) (standard) = 72 psid (5 bar) (optional) Type of Indicator = No indicator, plugged port В = Pop-up indicator (auto reset) BM = Pop-up indicator (manual reset) = electric switch - SPDT = electric switch & LED light - SPDT **Modification Number Supplementary Details** Seals Nitrile (NBR) (omit) = = Fluorocarbon elastomer (FKM) (standard) Light Voltage (D type indicators only) L110 = 110VL24 = 24VThermal Lockout (VM, VD types C, D, J, and J4 only) T100 = Lockout below 100°F Underwriters Recognition (VM, VD types C, D, J, and J4 only) cRUus = Electrical indicator with underwriter's recognition

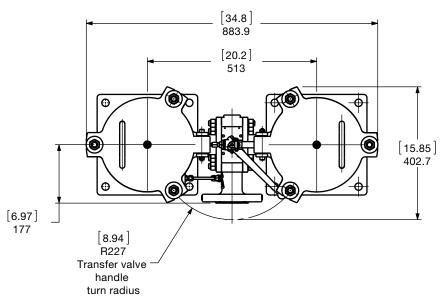
(For additional details and options, see Clogging Indicators section.)

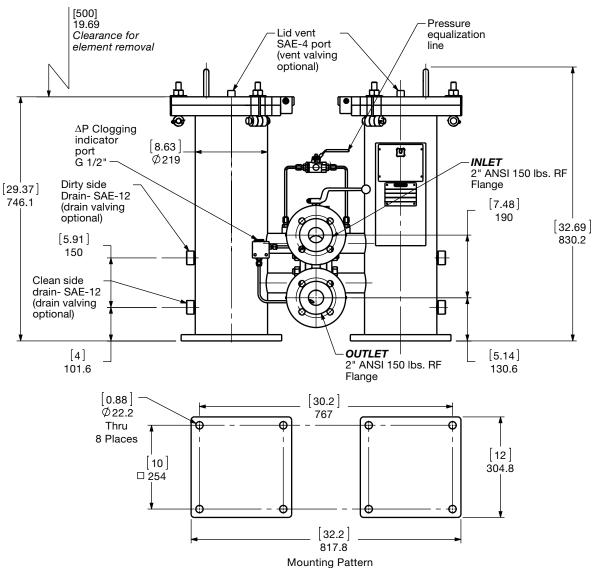
Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability



H63

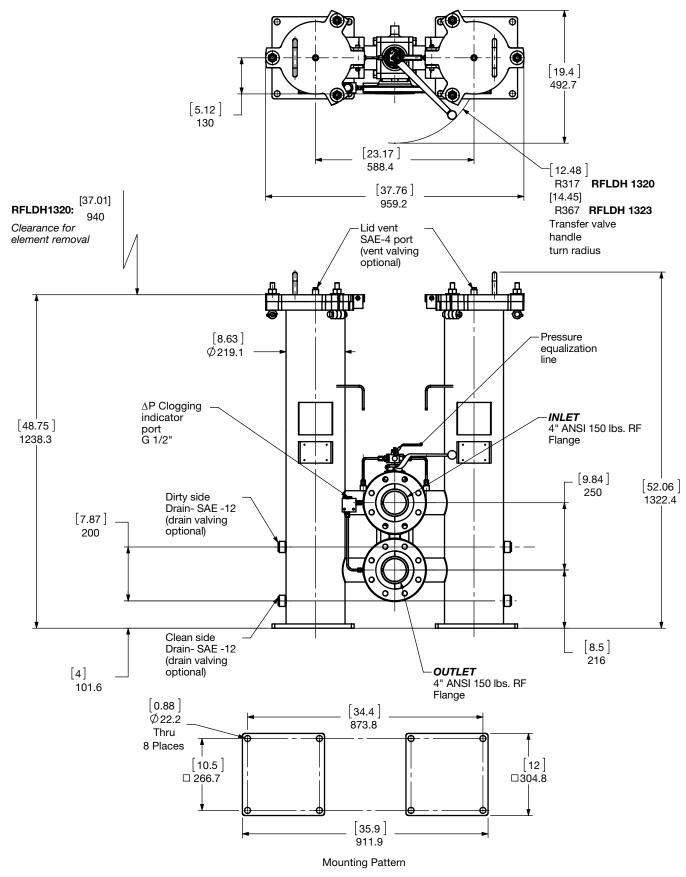
Dimensions RFLDH 1300 / 1303





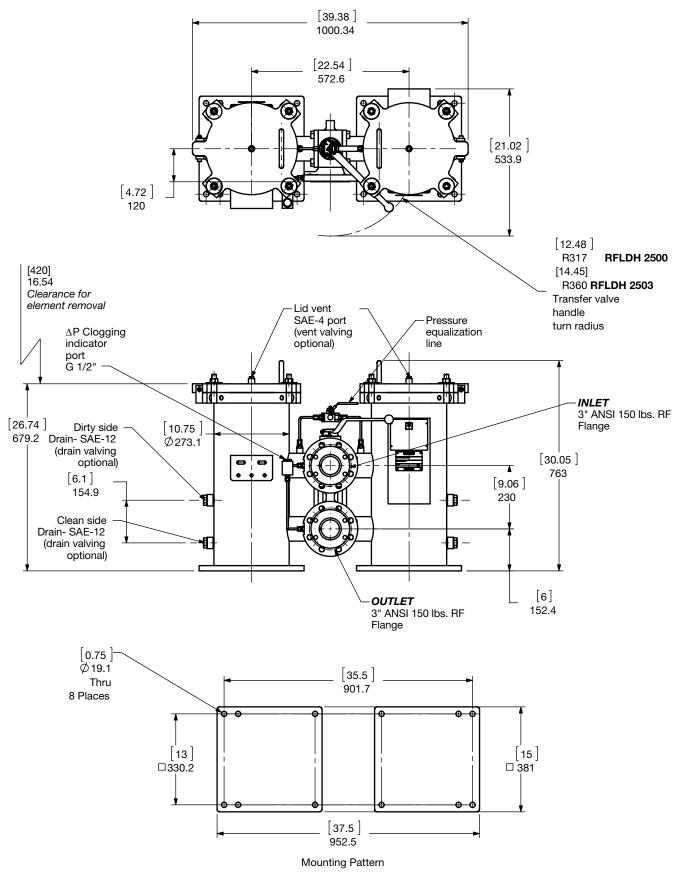
Size	1300	1303
Weight (lbs.)	475	475

Dimensions RFLDH 1320 / 1323



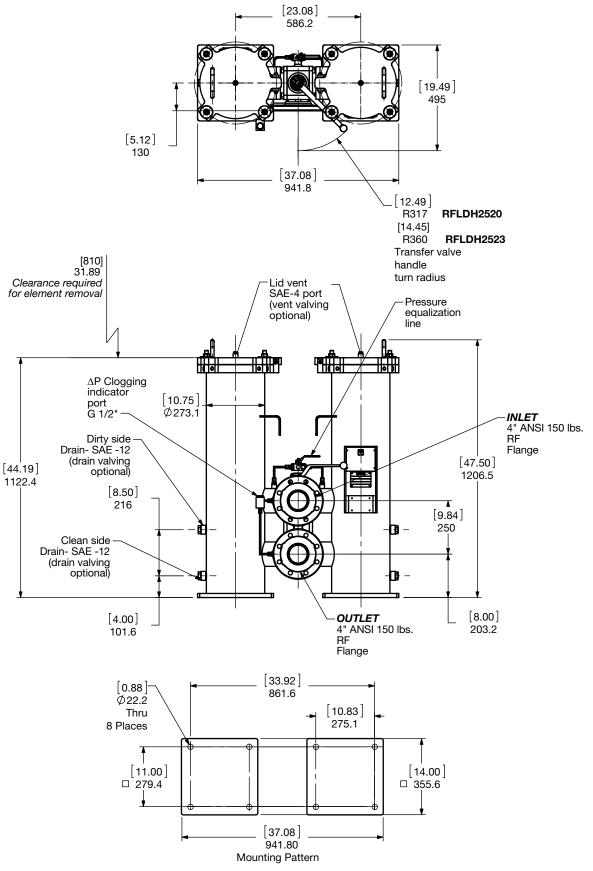
Size	1320	1323
Weight (lbs.)	575	575

Dimensions RFLDH 2500 / 2503



Size	2500	2503
Weight (lbs.)	270	270

Dimensions RFLDH 2520 / 2523 4 inch

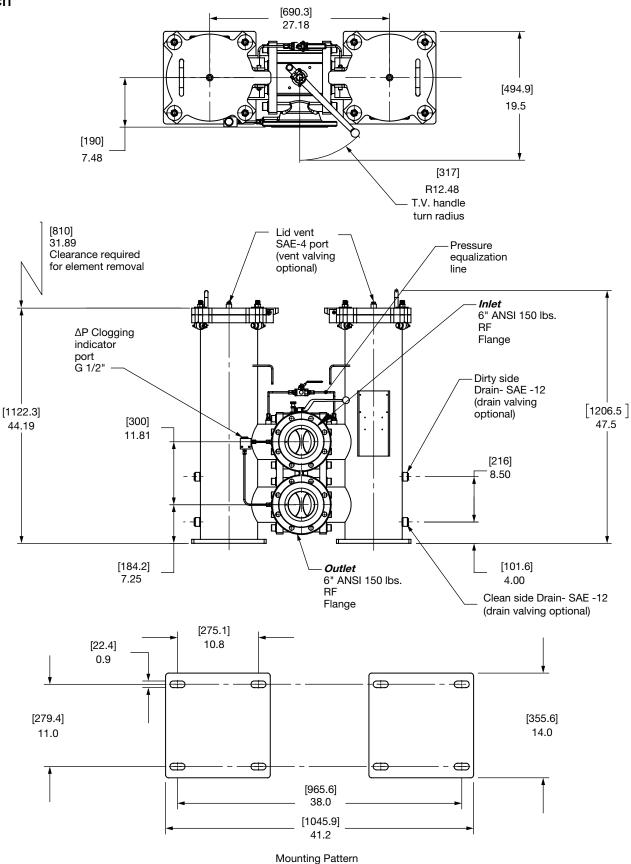


Size	2520	2523
Weight (lbs.)	700	700

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

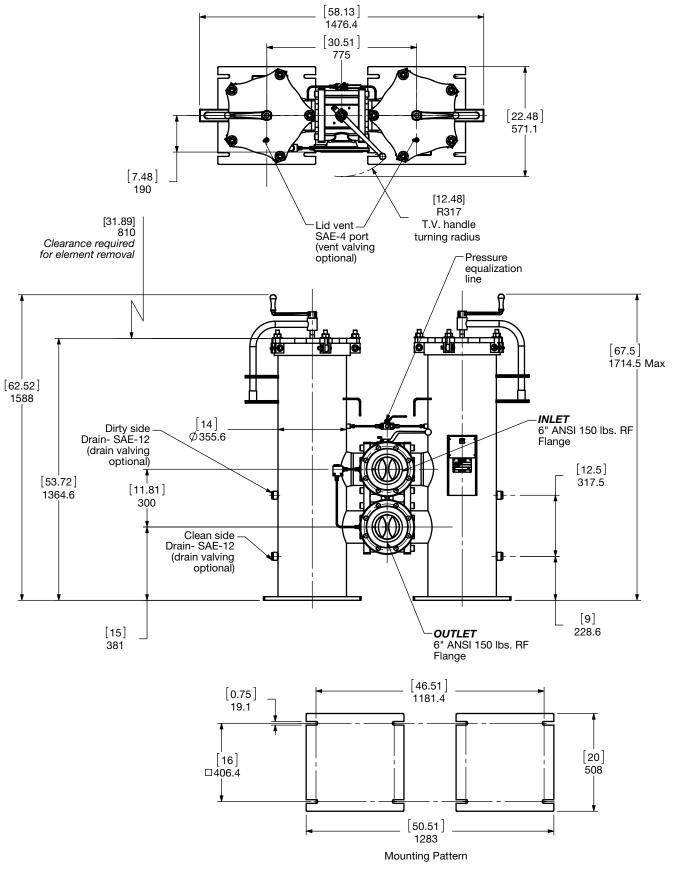
H67

Dimensions RFLDH 2520 / 2523 6 inch



Size	2520	2523
Weight (lbs.)	915	915

Dimensions RFLDH 4020



Size	4020
Weight (lbs.)	1500

Sizing Information

Total pressure loss through the filter is as follows:

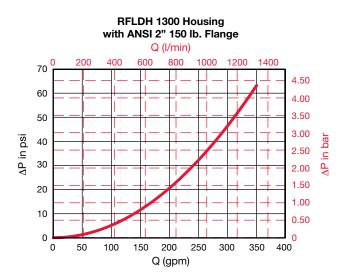
Assembly ΔP = Housing ΔP + Element ΔP

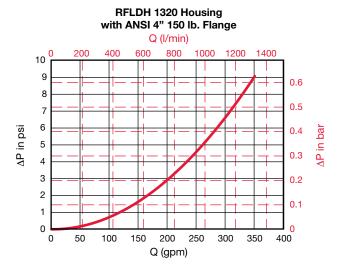
Housing Curve:

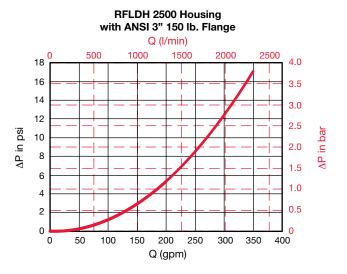
Pressure loss through housing is as follows:

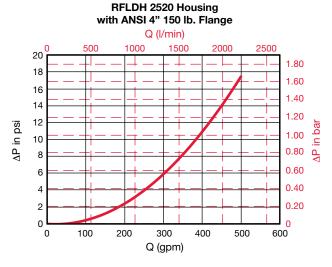
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

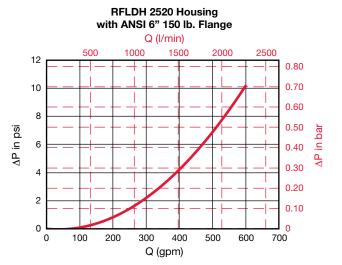
Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

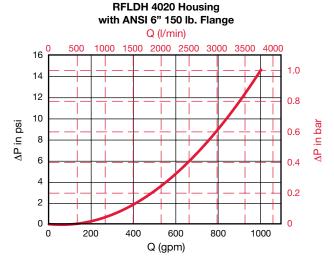












Required Element Per Housing

Housing Size	Element Size	Elements per Side
1300 / 1303	1300	1
1320 / 1323	2600	1
2500 / 2503	0850	3
2520 / 2523	1700	3
4020 / 4023	1700	5

Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Optimicron		RON									
Size	1 μm	3 μm	5 μm	10 µm	15 µm	20 μm					
0850 R XXX ON	0.152	0.072	0.055	0.032	0.024	0.02					
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012					
1700 R XXX ON	0.074	0.035	0.029	0.015	0.014	0.01					
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006					

ECOmicron	RECON2							
Size	3 µm	5 μm	10 μm	20 μm				
0850 R XXX ECON2	0.082	0.055	0.038	0.022				
1300 R XXX ECON2	0.044	0.033	0.022	0.016				
1700 R XXX ECON2	0.038	0.027	0.016	0.011				
2600 R XXX ECON2	0.022	0.016	0.011	0.005				

Betamicron/Aquamicron	RE	BN4AM
Size	3 μm	10 µm
0850 R XXX BN4AM	0.154	0.049
1300 R XXX BN4AM	0.088	0.033
1700 R XXX BN4AM	0.071	0.027
2600 R XXX BN4AM	0.055	0.016

Aquamicron	RAM
Size	40 μm
0850 R 040 AM	0.040
1300 R 040 AM	0.026
1700 R 040 AM	0.020
2600 R 040 AM	0.013

Wire Mesh	RW/HC
Size	25, 50, 100, 200 μm
0850 R XXX W/HC	0.003
1300 R XXX W/HC	0.002
1700 R XXX W/HC	0.001
2600 R XXX W/HC	0.001

Polyester	RP/HC				
Size	10 µm	20 μm			
0850 R XXX P/HC	0.007	0.003			
1300 R XXX P/HC	0.004	0.002			
1700 R XXX P/HC	0.003	0.002			
2600 R XXX P/HC	0.002	0.001			

All Element K Factors in psi / gpm.

AFLD API 614 Series

Inline Duplex Filters 232 psi • up to 630 gpm





Features

- Filter series designed to meet the requirements of API 614 for lube oil and other applications.
- Models are available in carbon and stainless steel versions.
- Transfer valve internal components of stainless steel.
- ANSI flange connections standard
- Inlet and outlet connections are located on the same side of the transfer valve.
- Transfer valve and pressure equalization line allow easy changeover between filter housings without costly system shutdown.
- Air bleed line and drain line available.
- ASME coded with ASME-stamp
- CRN available
- AS1210 available
- GOST available
- 3.1 material certificate standard
- API 614 requires compliant filters to be non-bypass

Notes: Most states and local jurisdictions in the United States require pressure vessels to be ASME stamped. It is the responsibility of the end customer to research and fully understand the ASME code requirements of the jurisdiction this filter will ultimately be installed in. and to fully communicate these requirements to HYDAC.

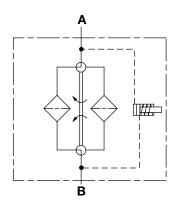
Applications



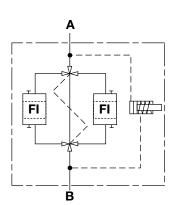




Generation



Hydraulic Symbol



Technical Specifications

Mounting Method	Floor mounted legs					
	(Filters must not be used as pipe supp					
Port Connection						
122/123	1"	ANSI 150# Flanges*				
232/233	1.5"	ANSI 150# Flanges*				
332/333	2"	ANSI 150# Flanges*				
502/503	2"	ANSI 150# Flanges*				
542/543	2"	ANSI 150# Flanges*				
882/883	3"	ANSI 150# Flanges*				
1402/1403	4"	ANSI 150# Flanges*				
2702/2703	6"	ANSI 150# Flanges				
Class Discation	Inlati Frant Ta	n Outlet Frent Bettem				

Inlet: Front Top Outlet: Front Bottom Flow Direction Construction Materials (Transfer valve balls and spindle, stainless steel)

122, 232, 332, 502, 542, 882, 1402, 2702 - Carbon Steel 123, 233, 333, 503, 543, 883, 1403, 2703 - Stainless Steel

Flow Capacity @ 32 CSt			
122/123	20 gpm	76 lpm	
232/233	45 gpm	171 lpm	
332/333	58 gpm	220 lpm	
502/503	66 gpm	250 lpm	
542/543	79 gpm	300 lpm	
882/883	211 gpm	800 lpm	
1402/1403	330 gpm	1250 lpm	
2702/2703	449 gpm	1700 lpm	

Housing Pressure Rating

Max. Allowable Working

232 psi (16 bar) standard Pressure

Fatigue Pressure Contact HYDAC Contact HYDAC* **Burst Pressure**

*(other pressures available upon request)

Element Collapse Pressure Rating

145 psid (10 bar)

14°F to 212°F (-10°C to 100°C) Fluid Temperature Range

Consult HYDAC for applications below 14°F (-10°C)

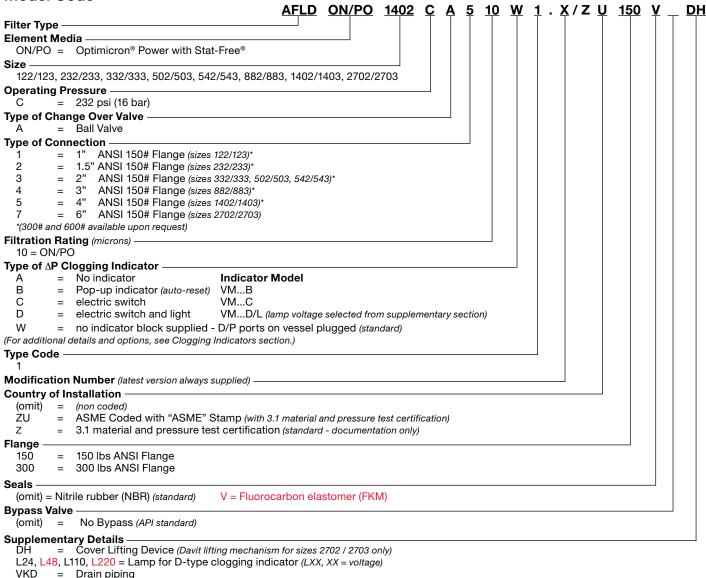
Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure (optional)

 $\Delta P = 29 \text{ psid } (2 \text{ bar}) -10\% \text{ (non-bypass per API 614)}$

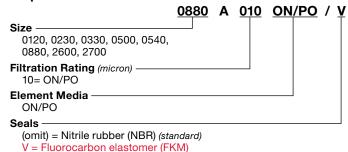
Model Code



Replacement Element Model Code

Air bleed valves

ΕM

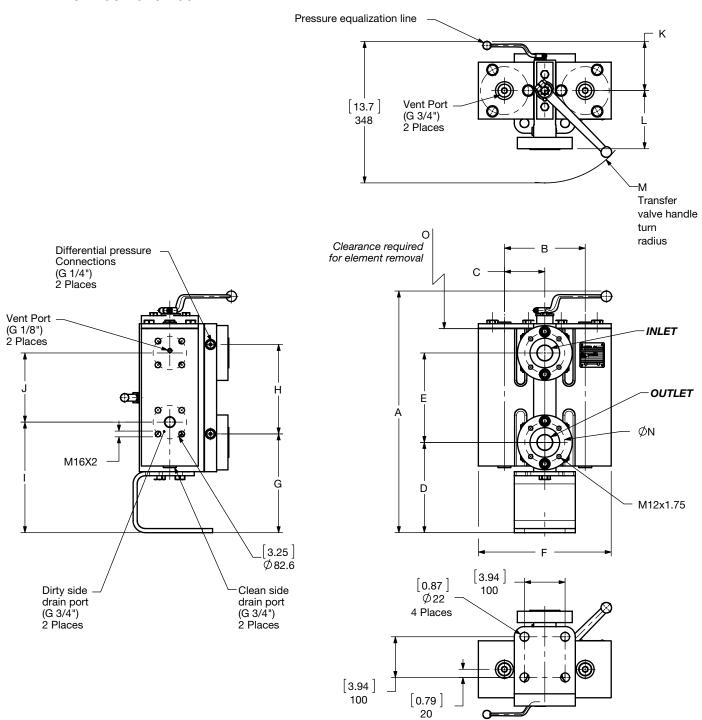


Note: Elements supplied with no bypass valve per API 614.



H73

Dimensions AFLD 122 / 123 / 232 / 233

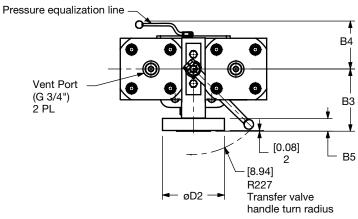


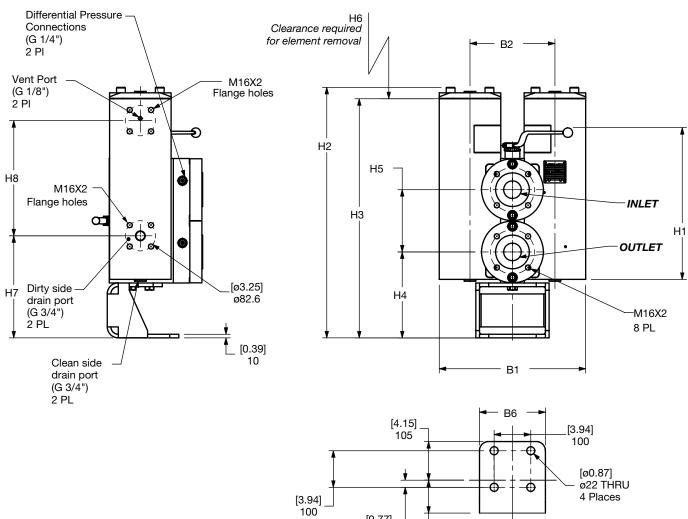
Size	Α	В	С	D	E	F	G	Н	I	J	K	L	М	N	0	Connection
AFLD	[20.24]	[4.99]	[2.49]	[7.87]	[6.10]	[9.09]	[8.50]	[6.10]	[9.02]	[6.04]	[3.78]	[4.25]	[7.20]	[3.13]	[7.68]	ANSI 150 lb
122/123	514	126. 8	63.4	200	155	230.8	216	155	229	153. 5	96	108	183	79.4	195	RF 1"
AFLD	[23.5]	[7.04]	[3.91]	[8.74]	[8.66]	[12.87]	[9.57]	[8.66]	[10.71]	[6.69]	[4.79]	[5.71]	[8.94]	[3.87]	[8.07]	ANSI 150 lb
232/233	597	178. 8	89.4	222	220	326.8	243	220	22	170	121. 7	145	227	98.4	205	RF 1.5"

Size	122 / 123	232 / 233
Weight (lbs.)	122.4	269.8



Dimensions AFLD 332 / 333 / 502 / 503 / 542 / 543





Size	Flange Size	B1	B2	В3	B4	B5	В6	D2	H1	H2	Н3	H4	H5	Н6	H7	Н8
AFLD		[15.75]	[9.13]	[6.69]	[5.16]	[1.38]	[5.91]	[6.65]	[22.56]	, ,	[19.65]	[9.25]	[6.69]	[8.07]	[11.38]	[5.91]
332/333		400	232	170	131	35	150	169	573	523	499	235	170	205	289	150
AFLD	2" 150 lb	[15.75]	[9.13]	[6.69]	[5.16]	[1.38]	[5.91]	[6.65]	[25.71]	[23.78]	[22.83]	[9.25]	[6.69]	[11.81]	[11.38]	[9.09]
502/503	2 130 15	400	232	170	131	35	150	169	653	604	580	235	170	300	289	231
AFLD		[15.75]	[9.13]	[6.69]	[5.16]	[1.38]	[5.91]	[6.65]	[22.56]	[26.69]	[25.71]	[9.25]	[6.69]	[14.57]	[12.4]	[12.4]
542/543		400	232	170	131	35	150	169	573	678	653	235	170	370	315	315

[0.77] 20

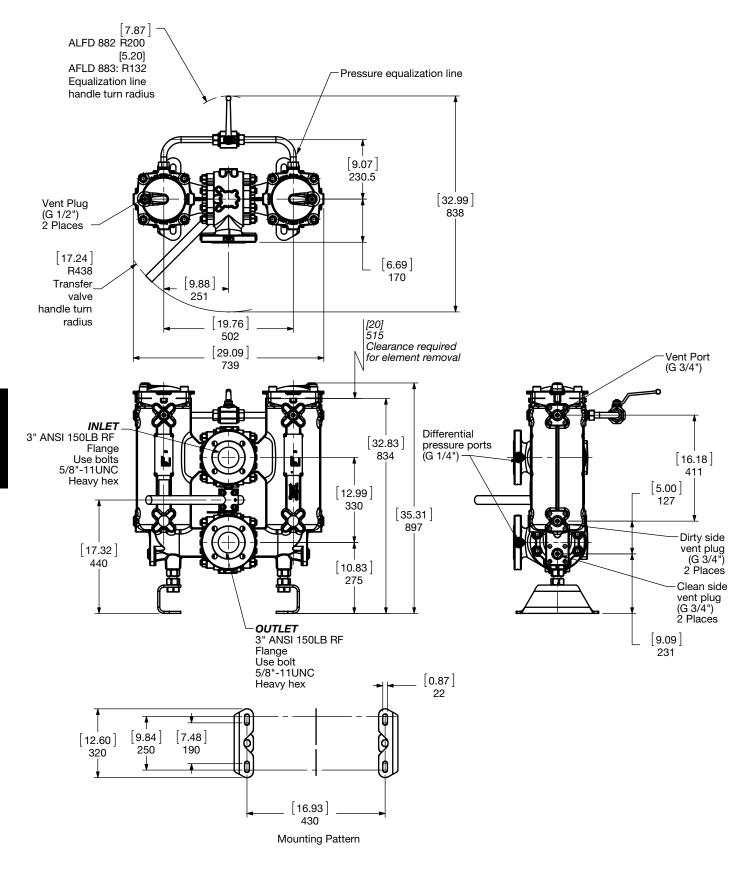
[3.54]

90

Mounting Pattern

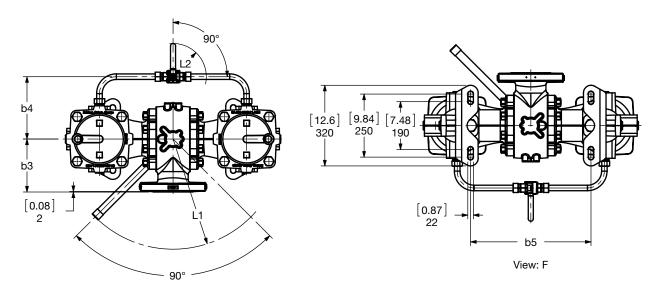
Size	332 / 333	502 / 503	542 / 543
Weight (lbs.)	440.9	496	551.1

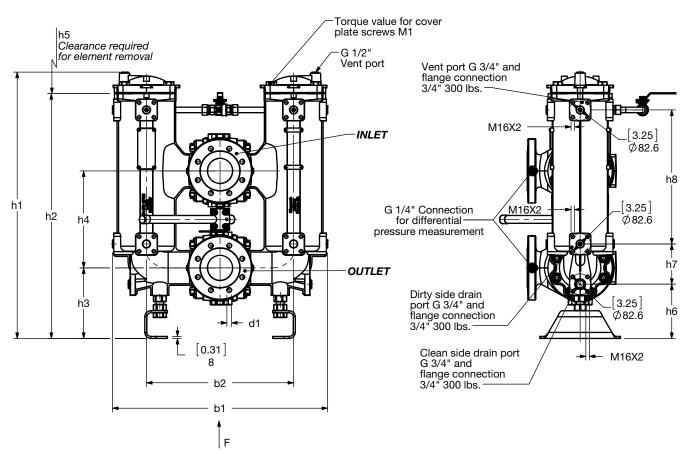
Dimensions AFLD 882 / 883



Size	882	883
Weight (lbs.)	441	441

Dimensions AFLD 1402 / 1403





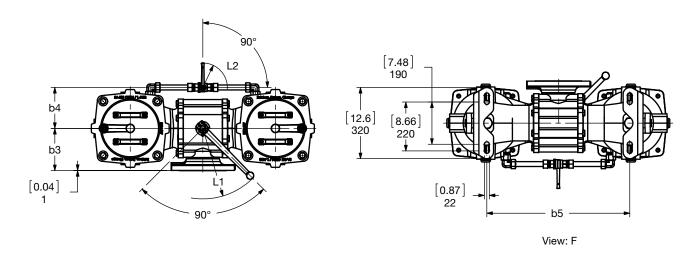
Size	Flange Size	b1	b2	b3	b4	b5	d1	h1	h2	h3	h4	h5	h6	h7	h8	Lı	L2	M1 [N/m]	Vol. of Pressure Vessel, [liters]
AFLD 1402	4" 150 lbs	[33.6]	[23]	[8.3]	[6.1] 155	[18.8]	8 x ø19	[41.6]	[38.3]	[11]	[15.2]	[25.6]	[8.5]	[6.3]	[20.9]	[17.2]	[7.9] 200	170	2 x 24
AFLD 1403	4" 300 lbs	854	584	210	[10.5] 266	478	8 x ø23	1057	972	280	385	650	216	160	532	438	[5.2] 132	110	2 X 24

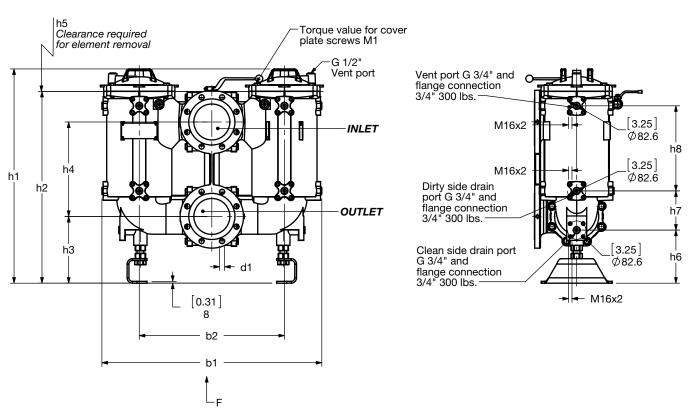
Size	1402	1403
Weight (lbs.)	639	639

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

H77

Dimensions AFLD 2702 / 2703





Size	Flange Size	b1	b2	b3	b4	b5	d1	h1	h2	h3	h4	h5	h6	h7	h8	Lı	L2	M1 [N/m]	Vol. of Pressure Vessel, liters
AFLD 2702	6"	[38.6]	[25.7]	[7.5]	[7.2] 184	[25.4]	0 ~00	[38]	[34]	[11.8]	[16.7]	[19.7]	[9.4]	[7]	[15.1]	[12.5]	[7.9] 200	110	0 07
AFLD 2703	150 lbs		653	190	[9.8] 249	645	8 x ø23	964	863	300	425	500	239	177	383	317	[5.2] 132	110	2 x 37
Size						2702									2	703			

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

794

Weight (lbs.)

794

Sizing Information

Total pressure loss through the filter is as follows:

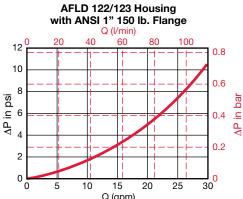
Assembly ΔP = Housing ΔP + Element ΔP

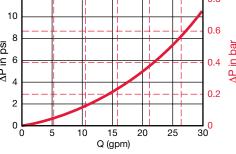
Housing Curve:

Pressure loss through housing is as follows:

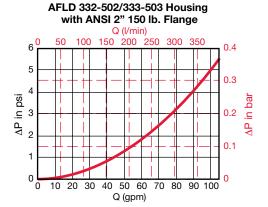
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{2}$ 0.86

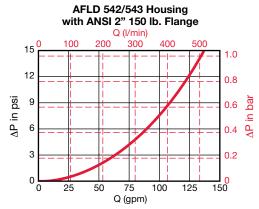
Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

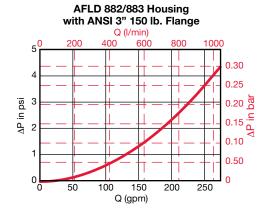


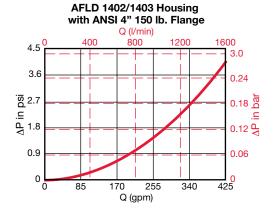


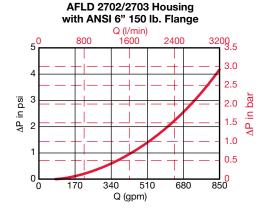












Required Element Per Housing

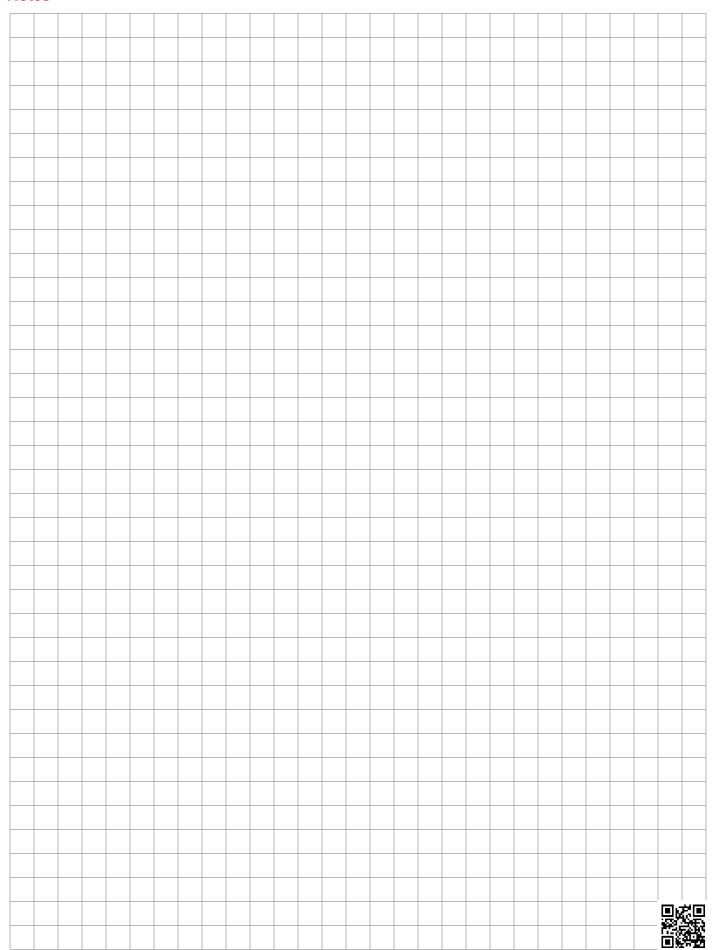
Housing Size	Element Size	Elements per Side
122 / 123	0120	1
232 / 233	0230	1
332 / 333	0330	1
502 / 503	0500	1
542 / 543	0540	1
882 / 883	0880	1
1402 / 1403	2600	1
2702 / 2703	2700	1

Element K Factors

ΔP Elements = Elements (K) Flow Factor x Flow Rate (gpm) x Actual Viscosity (SUS) x Actual Specific Gravity (From Tables Below) x 411 SUS 0.86

Optimicron Power	"ON/PO" API Compliant
Size	10 μm
0120 A XXX ON/PO	0.075
0230 A XXX ON/PO	0.037
0330 A XXX ON/PO	0.037
0500 A XXX ON/PO	0.025
0540 A XXX ON/PO	0.018
0880 A XXX ON/PO	0.008
2600 A XXX ON/PO	0.004
2700 A XXX ON/PO	0.004

Notes



SF Series

In-tank Suction Filters 360 psi • up to 30 gpm





Features

- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- Inlet/Outlet port options include NPT port or SAE 4-bolt flange to allow easy installation without costly adapters.
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, or ethylene propylene rubber) provides compatibility with oil/water emulsions, high water base fluids, and synthetic fluids.
- Bolt-on lid requires minimal clearance for removal.
- A mechanically actuated, electrical, electrical / visual (lamp), or vacuum gauge bypass indicator can be installed.
- Bypass valve, located in element end cap, with low cracking pressure prevents pump cavitation.

Applications









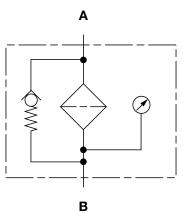


Agricultural



Steel / Heavy Industry

Hydraulic Symbol



Technical Specifications

ilications	
4 mounting holes - 1	filter head
Inlet	Outlet
3/4" SAE-12 3/4" BSPP 3/4" SAE-12	3/4" SAE-12 3/4" BSPP 3/4" NPT
1 1/4" SAE-20 1 1/4" BSPP 1 1/4" SAE-20	1 1/4" SAE-20 1 1-4" BSPPP 1 1/4" NPT
2" NPT 2" BSPP 2" NPT 2" NPT	2" SAE-32 2" BSPP 2" SAE CODE 61 1 1/4" SAE-20
Inlet: Bottom	Outlet: Side
Housing	Lid
Aluminum	Aluminum
5 gpm (20 lpm) 15 gpm (57 lpm) 30 gpm (114 lpm)	
	4 mounting holes - 1 Inlet 3/4" SAE-12 3/4" SSPP 3/4" SAE-12 1 1/4" SAE-20 1 1/4" BSPP 1 1/4" SAE-20 2" NPT 2" NPT 2" NPT 2" NPT Inlet: Bottom Housing Aluminum 5 gpm (20 lpm) 15 gpm (57 lpm)

Housing Pressure Rating

Max. allowable

360 psi (25 bar) working pressure

360 psi (25 bar) @ 700,000 cycles Fatigue Pressure **Burst Pressure** 110 1080 psi (75 bar) 1230 psi (85 bar) 240 330 1440 psi (100 bar)

Element Collapse Pressure Rating

W/HC 290 psid (20 bar)

Fluid Temp. Range 14°F to 212°F (-10°C to 100°C)

Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/ water emulsion, and high water based fluids when the appropriate seals are selected

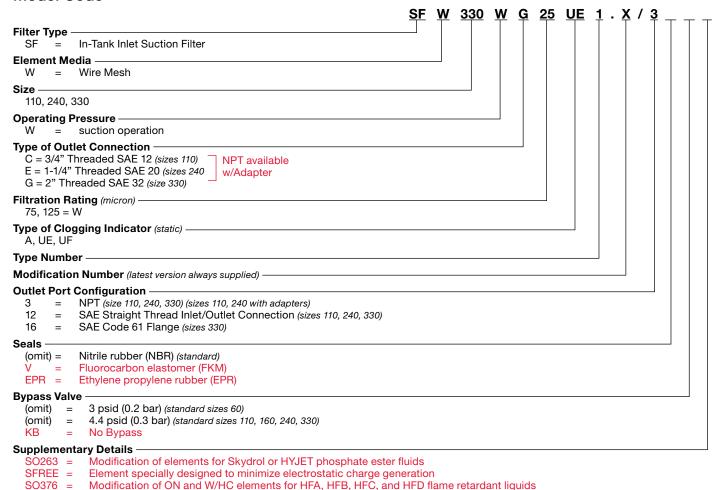
Indicator Trip Pressure

 $\Delta P = 3 \text{ psi } (0.2 \text{ bar}) -10\% \text{ (standard)}$

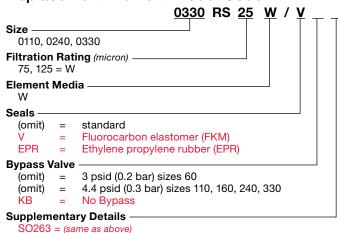
Bypass Valve Cracking Pressure

 $\Delta P = 3 \text{ psi } (0.2 \text{ bar}) + 10\% \text{ (standard - sizes 60, 950, 1300)}$ $\Delta P = 4.4 \text{ psi } (0.3 \text{ bar}) + 10\% \text{ (standard - sizes } 110,160,240,330)$

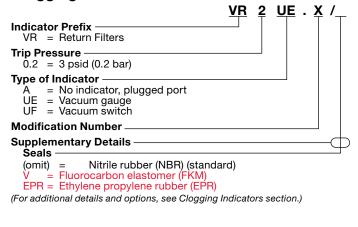
Model Code



Replacement Element Model Code



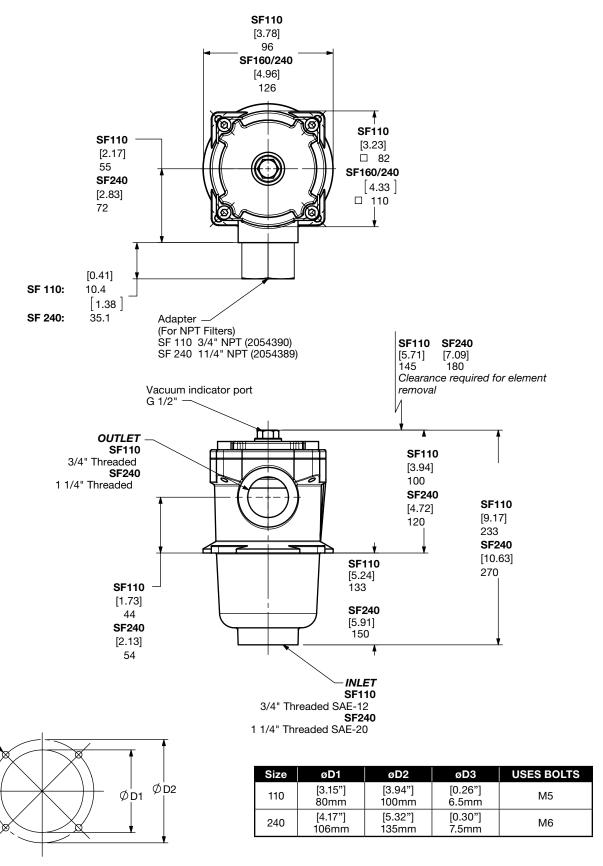
Clogging Indicator Model Code



Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

SFREE = (same as above) SO376 = (same as above)

Dimensions SF 110 / 240



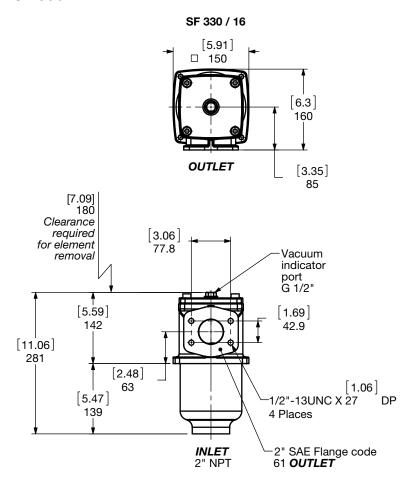
Mounting p	oattern
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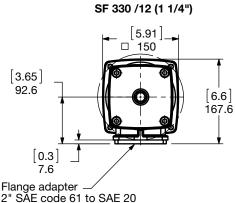
Size	SF 110	SF 240
Weight (lbs.)	2.5	5.0

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

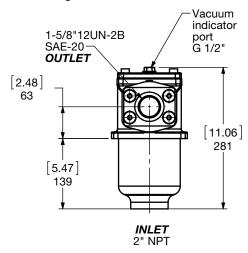
ØD3 -

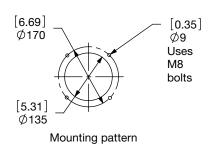
Dimensions SF 330

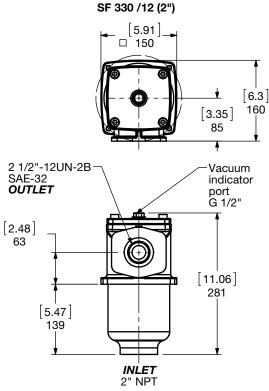




2" SAE code 61 to SAE 20 1 1/4" straight thread







Size	SF 330
Weight (lbs.)	9.1

Sizing Information

Total pressure loss through the filter is as follows:

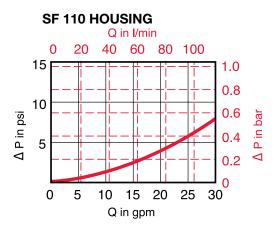
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

Pressure loss through housing is as follows:

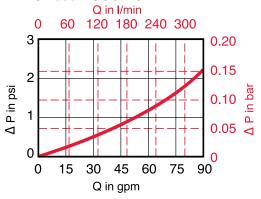
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)





SF 330 HOUSING



Element K Factors

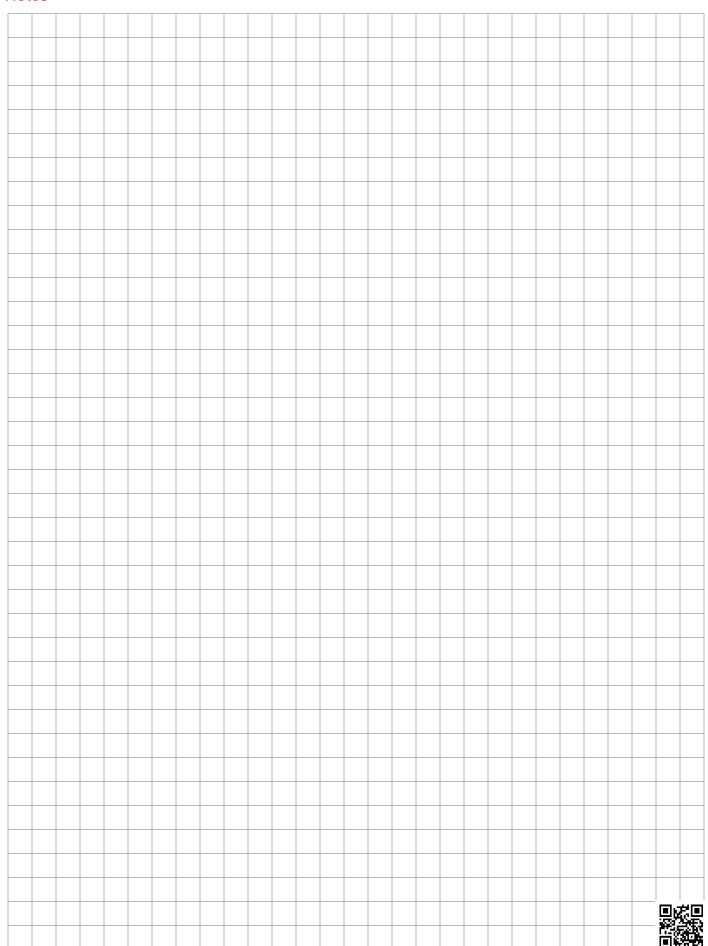
ΔP Elements = Elements (K) Flow Factor x Flow Rate (gpm) x Actual Viscosity (SUS) x Actual Specific Gravity
(From Tables Below) 141 SUS 0.86

WIRESCREEN	RSW/HC		
SIZE	74 μm	125 μm	
0110 RS XXX W/HC	0.029	0.014	
0240 RS XXX W/HC	0.014	0.007	
0330 RS XXX W/HC	0.010	0.005	

All Element K Factors in psi / gpm.



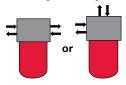
Notes



DFFX Series

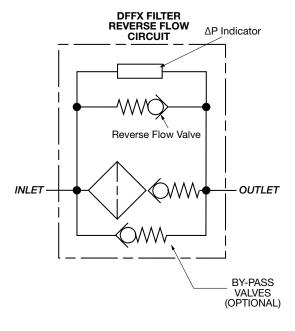
Reverse Flow Differential Pressure Optimized Filters

6090 psi • up to 160 gpm





Hydraulic Symbol



Features

- DFFX Reverse Flow models filter fluid in the forward direction and bypass the filter element when the flow direction is reversed.
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials provide compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based fluids.
- Screw-in bowl/lid mounted below the filter head requires minimal clearance to remove the element for replacement; contaminated fluid cannot be washed downstream when element is serviced.
- Clogging indicators have no external dynamic seal. This results in high reliability due to magnetic actuation which eliminates a leak point.
- A poppet-type bypass valve (optional) located in the filter head provides positive sealing during normal operation and fast opening during cold starts and flow surges.

Applications









Agricultural

Automotive

Construction

Industrial



Technical Specifications

reclinical opecinications				
Mounting Method	4 mounting holes			
Port Connection				
DFFX 330/660/1320	2" SAE Flange Co	ode 62		
Flow Direction	Inlet: Side	Outlet: Side or Top		
Construction Materials				
Head Single piece bowl "1.X"	Ductile iron			
Bowl Two piece bowl "2.X"	Steel			
Housing	Steel			
Lid/Cap	Steel			
Flow Capacity				
330	80 gpm (303 lpm)			
660/1320	100 gpm (379 lpm)/160 gpm (606 lpm)			
Housing Pressure Rating				
Max. Allowable Working				
Pressure	6090 psi (420 bar	,		
Fatigue Pressure	Contact HYDAC Office			
Burst Pressure	Contact HYDAC Office			
Element Collapse Pressure	Rating			
BH4HC, V	3045 psid (210 ba	ar)		
ON, W/HC	290 psid (20 bar)			

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Fluid Temperature Range 14°F to 212°F (-10°C to 100°C) Consult HYDAC for applications operating below 14°F (-10°C)

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar) -10\% (optional)}$

 $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (standard)}$

 $\Delta P = 116 \text{ psid (8 bar)} - 10\% \text{ (optional)}$

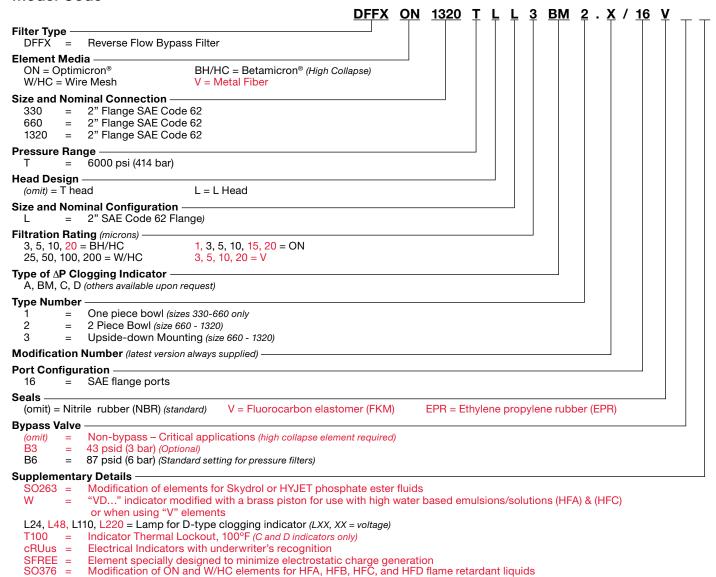
Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid (3 bar)} + 10\% \text{ (optional)}$

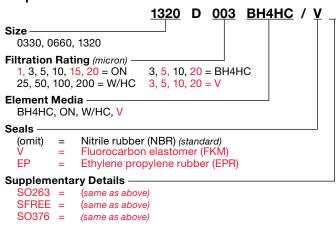
 $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (standard)}$

Non Bypass Available

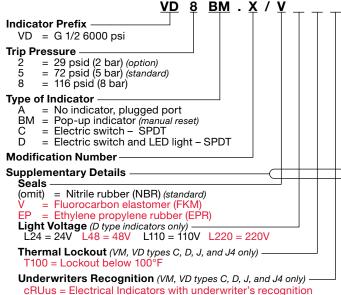
Model Code



Replacement Element Model Code



Clogging Indicator Model Code



W = "VD..." indicator modified with a brass piston for use

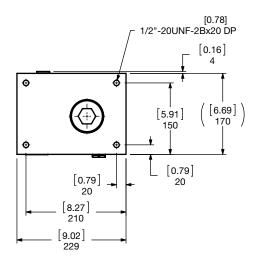
with high water based emulsions/solutions (HFA) & (HFC)

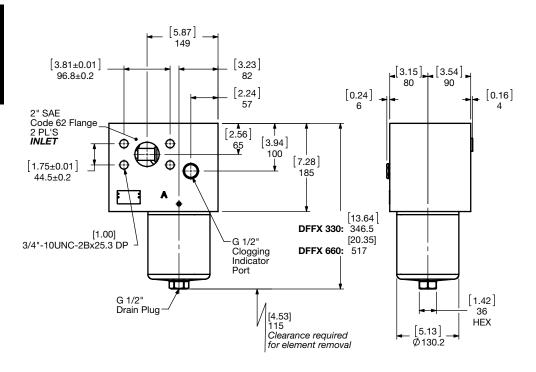
(For additional details and options, see Clogging Indicators section.)

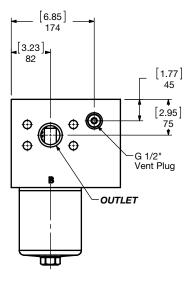
Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability



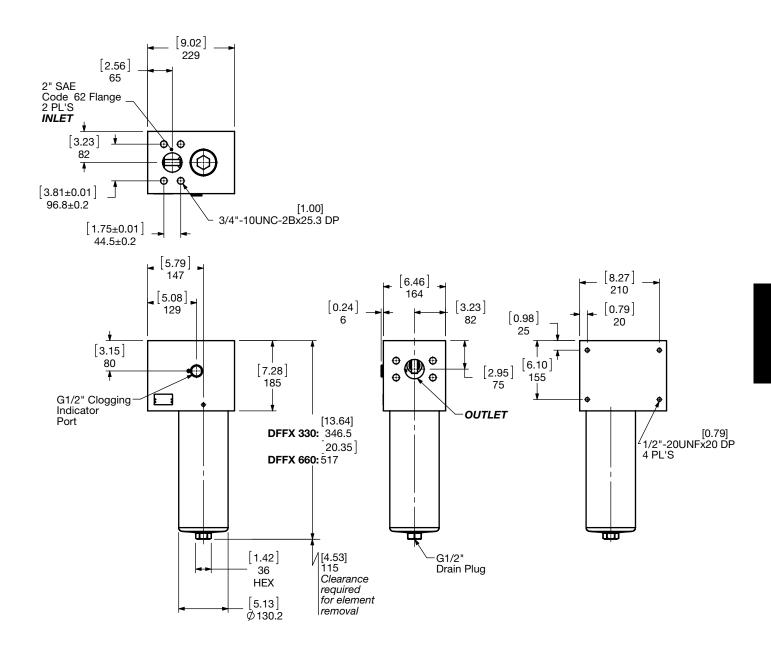
Dimensions DFFX 330 / 660 TL 1.X Version







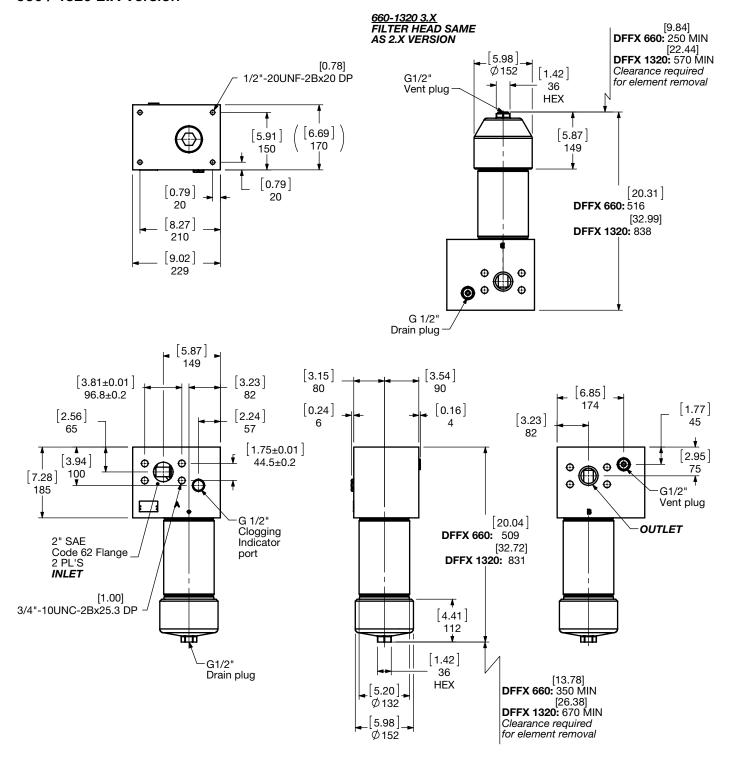
Size	330 TL1.0v	660 TL1.0v
Weight (lbs.)	109.2	124.8



Size	330 TLL1.0v	660 TLL1.0v
Weight (lbs.)	109.2	124.8

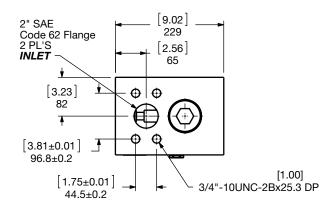
Dimensions
DFFX 660 / 1320 TL 2.X & 3.X Version

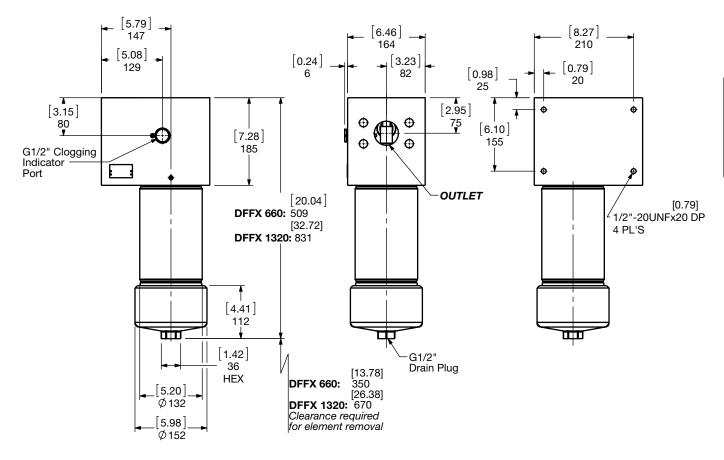
660 / 1320 2.X Version



Size	660 TL2.0_3.0v	1320 TL2.0_3.0v
Weight (lbs.)	124.8	167.8

Dimensions DFFX 660 / 1320 TLL 2.X Version





Size	660 TLL2.0v	1320 TLL2.0v	
Weight (lbs.)	124.8	167.8	

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

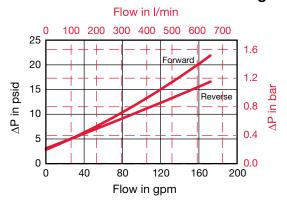
Housing Curve:

Pressure loss through housing is as follows:

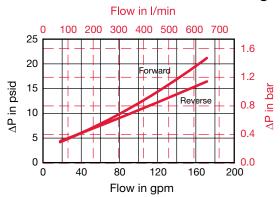
Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

DFFX 330 / 660 / 1320 TL Housing



DFFX 330 / 660 / 1320 TLL Housing



Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

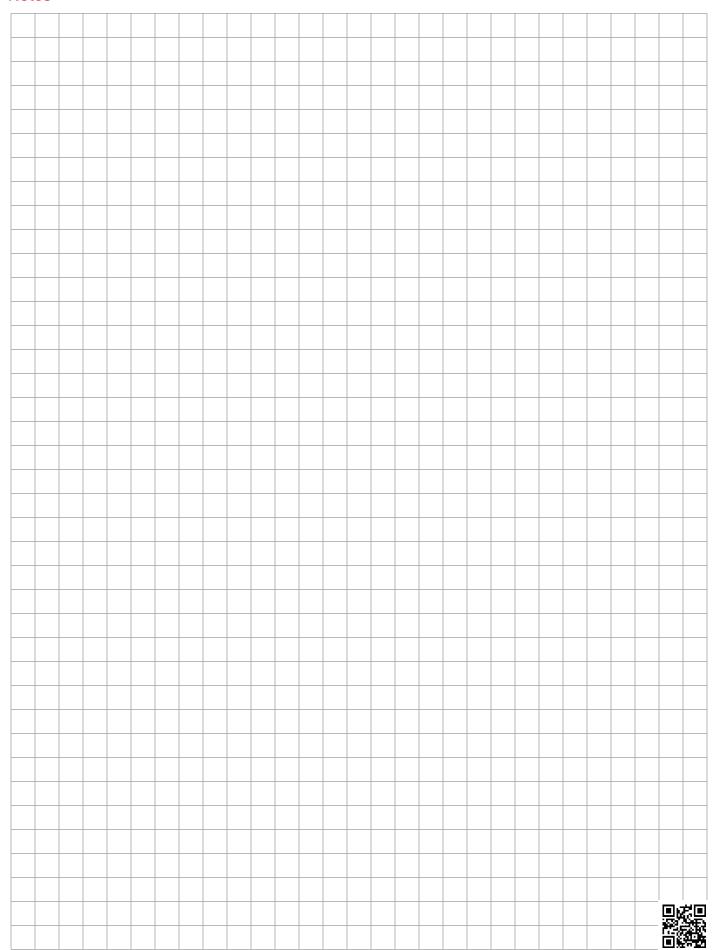
Betamicron	DBH4HC Elements (High Collapse)			
Size	3 μm 5 μm 10 μm 20			
0330 D XXX BH4HC	0.423	0.247	0.154	0.110
0660 D XXX BH4HC	0.181	0.104	0.055	0.049
1320 D XXX BH4HC	0.088	0.055	0.033	0.022

Optimicron	DON Elements					
Size	1 µm	3 µm	5 µm	10 µm	15 µm	20 µm
0330 D XXX ON	0.452	0.23	0.185	0.135	0.085	0.067
0660 D XXX ON	0.207	0.106	0.086	0.051	0.039	0.031
1320 D XXX ON	0.102	0.053	0.042	0.025	0.019	0.015

Wire Mesh	DW/HC Elements
Size	25, 50, 100, 200 μm
0330 D XXX W/HC	0.008
0660 D XXX W/HC	0.004
1320 D XXX W/HC	0.002

Metal Fiber	DV Elements (High Collapse)			
Size	3 µm	5 μm	10 μm	20 μm
0330 D XXX V	0.121	0.097	0.065	0.043
0660 D XXX V	0.063	0.050	0.034	0.021
1320 D XXX V	0.032	0.026	0.018	0.012

Notes



HDF/HDFF Series

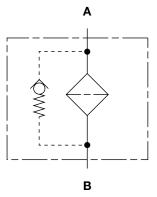
Inline Filters & Inline Filters With Reversible Flow

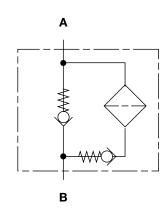
4060 psi • up to 100 gpm





Hydraulic Symbol





Features

- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- Choice of SAE straight thread O-ring boss, and straight thread BSPP (sizes 300 - 900) to allow easy installation without costly
- O-ring seals are used to provide positive, reliable sealing. We offer a choice of O-ring materials (Nitrile rubber or Fluorocarbon elastomer), to provide compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based
- Screw-in bowl mounted below the filter head requires minimal clearance to remove the element for replacement and contaminated fluid cannot be washed downstream when element is serviced.
- HYDAC Differential Pressure Indicators have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- A poppet-type bypass valve (optional) provides positive sealing during normal operation and fast opening during cold starts and flow surges.
- The HDF is available with a bypass valve. The HDFF is offered in non bypass only.
- Fatigue pressure ratings equal maximum allowable working pressure rating.
- Inlet/outlet ports in "L" configuration
- No element valve-only available with HDF in "L" configuration.

Applications





Industrial



Automotive





Construction



Offshore





Railways



Commercial Municipal



Power Generation

Industry

Technical Specifications

4 mounting holes	
1" SAE-16 parallel straight thread or 1" BSPP or	
1 1/4" SAE-20 parallel straight thread or 1 1/4" BSPP or	
1 1/2" SAE-24 parallel straight thread or 1 1/2" BSPP	
Inlet: Side Outlet: Top	
Ductile iron	
Steel	
30 gpm (114 lpm)	
60 gpm (227 lpm)	
90 gpm (340 lpm)	
100 gpm (378.5 lpm)	

Max. Allowable Working

Pressure 4060 psi (280 bar)

4060 psi (280 bar) @ 1 million cycles Fatigue Pressure 6090 psi (420 bar) @ 250,000 cycles

Burst Pressure (Consult HYDAC)

Element Collapse Pressure Rating

3045 psid (210 bar) 290 psid (20 bar) ON

Fluid Temp. Range 14°F to 212°F (-10°C to 100°C)

Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid (2 bar)} -10\% \text{ (optional)}$

 $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (standard)}$

 $\Delta P = 116 \text{ psid } (8 \text{ bar}) - 10\% \text{ (optional non bypass)}$

Bypass Valve Cracking Pressure

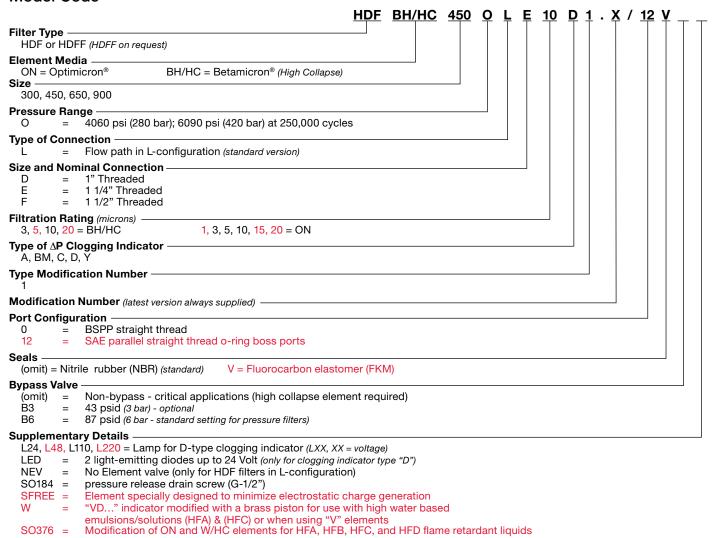
 $\Delta P = 43 \text{ psid } (3 \text{ bar}) + 10\% \text{ (optional-HDF only)}$

 $\Delta P = 87 \text{ psid (6 bar)} + 10\% \text{ (standard)}$

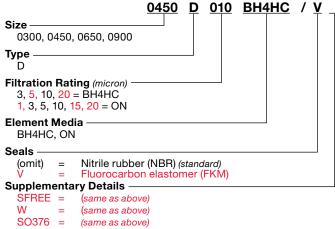
Non Bypass Available for HDF (HDFF available only with no bypass)

Pulp & Paper

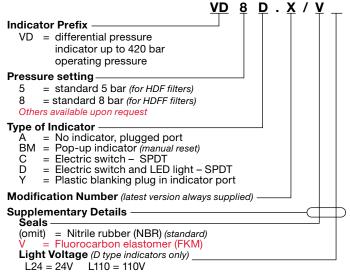
Model Code



Replacement Element Model Code



Clogging Indicator Model Code

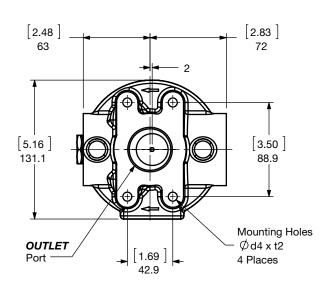


W = "VD..." indicator modified with a brass piston for use with high water based emulsions/solutions (HFA) & (HFC)

(For additional details and options, see Clogging Indicators section.)

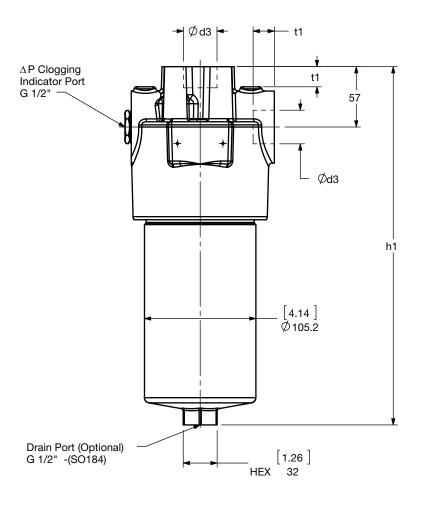
HYDAC

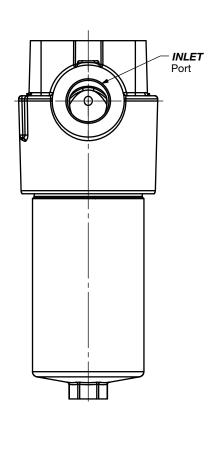
Dimensions HDF/HDFF 300-900



HDF/HDFF	h1
300	[9.680] 246
450	[13.35] 339
650	[18.11] 460
900	[22.28] 566

ød3	†1	ød4	†2	
G1	[0.71] 18			
G1-1/4	[0.79] 20			
G1-1/2	[0.87] 22			
SAE-16	[0.75] 19			
SAE-20	[0.75] 19	3/8-24UNF-2B	[0.55] 14	
SAE-24	[0.75] 19			





Size	300	450	650	900
Weight (lbs.)	24.7	28.9	35.8	47.4



Sizing Information

Total pressure loss through the filter is as follows:

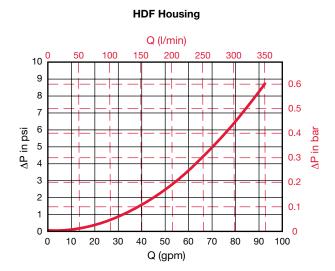
Assembly ΔP = Housing ΔP + Element ΔP

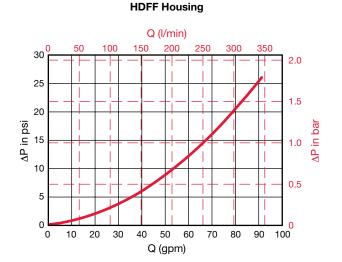
Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)





Element K Factors

 $\Delta P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Optimicron	DON Elements					
Size	1 μm	3 µm	5 μm	10 µm	15 µm	20 µm
0300 D XXX ON	0.801	0.488	0.391	0.268	0.154	0.143
0450 D XXX ON	0.401	0.244	0.193	0.131	0.077	0.069
0650 D XXX ON	0.245	0.148	0.121	0.081	0.047	0.044
0900 D XXX ON	0.185	0.115	0.092	0.06	0.036	0.035

Betamicron	DBH4HC Elements (High Collapse)			
Size	3 μm	5 μm	10 μm	20 μm
0300 D XXX BH4HC	0.878	0.488	0.390	0.181
0450 D XXX BH4HC	0.428	0.236	0.187	0.088
0650 D XXX BH4HC	0.258	0.143	0.115	0.055
0900 D XXX BH4HC	0.192	0.110	0.088	0.038

All Element K Factors in psi / gpm.

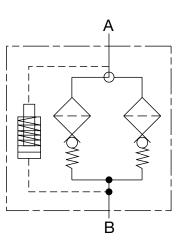
HFDK4P Series

Inline Duplex Filters 4568 psi • up to 90 gpm





Hydraulic Symbol



Features

- The HFDK4P pressure duplex filter meets HF4 automotive specification element requirements.
- The HFDK4P filters have a filter head and lid of ductile iron and a cold formed steel housing to meet high fatigue pressure requirements.
- The filter housings are designed to withstand pressure surges as well as high static pressure loads.
- The screw-in lids allow top access for the filter element to be easily removed for replacement.
- Visual (pop-up), electrical, electrical/visual (lamp), or electronic differential type clogging indicators are available.

Power

HFDK4P filters are available only with high collapse pressure elements with no bypass provided.

Applications







Shipbuilding





Mounting Method	4 mounting holes		
Port Connection	2" SAE Flange Code 62		
Flow Direction	Inlet: Bottom Outlet: Left Side		
Construction Materials			
Head, Lid	Ductile iron		
Housing	Steel		
Flow Capacity			
9"	50 gpm (189 lpm)		
18"	75 gpm (284 lpm)		
27"	90 gpm (340 lpm)		
Housing Proceure Pating			

Housing Pressure Rating

Max. Allowable Working

4568 psi (315 bar) Pressure Fatigue Pressure 4500 psi (315 bar) Burst Pressure Contact HYDAC Office

Element Collapse Pressure Rating

3045 psid (210 bar)

Fluid Temperature Range 14°F to 212°F (-10°C to 100°C) Consult HYDAC for applications operating below 14°F (-10°C)

Fluid Compatibility

Pulp & Paper

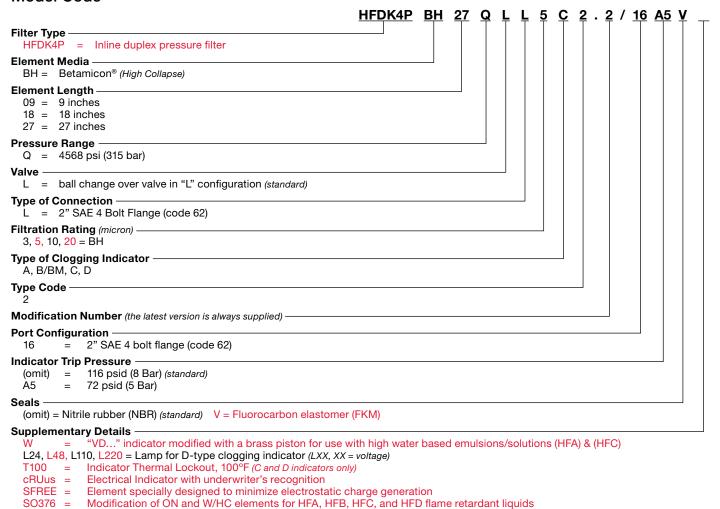
Compatible with all hydrocarbon based, synthetic, water glycol, oil/ water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

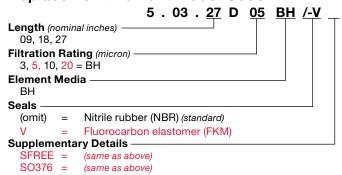
 $\Delta P = 116 \text{ psid (8 bar)} - 10\% \text{ (standard)}$ $\Delta P = 72 \text{ psid } (5 \text{ bar}) -10\% \text{ (optional)}$



Model Code



Replacement Element Model Code

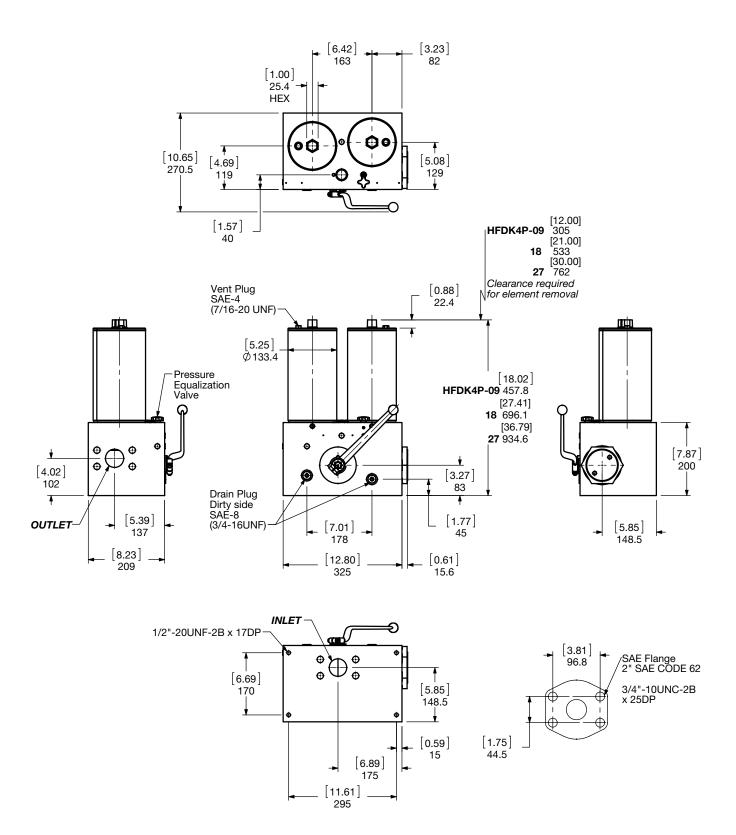


Clogging Indicator Model Code <u>VD 8 C.X</u>/ **Indicator Prefix** $VD = G \frac{1}{2} 6000 psi$ **Trip Pressure** = 72 psid (5 bar) (optional) = 116 psid (8 bar) (standard) Type of Indicator No indicator, plugged port = Pop-up indicator (auto reset) BM = Pop-up indicator (manual reset) = Electric switch - SPDT = Electric switch and led light - SPDT **Modification Number Supplementary Details** Seals (omit) = Nitrile rubber (NBR) = Fluorocarbon elastomer (FKM) Light Voltage (D type indicators only) L110 = 110VL24 = 24VThermal Lockout (VD types C, D, J, and J4 only) T100 = Lockout below 100°F Underwriters Recognition (VD types C, D, J, and J4 only) cRUus = Electrical Indicator with underwriter's recognition W = "VD..." indicator modified with a brass piston for use

(For additional details and options, see Clogging Indicators section.)

with high water based emulsions/solutions (HFA) & (HFC)

Dimensions HFDK4P 09, 18, 27...2.2



Size	09	18	27
Weight (lbs.)	233.7	270.5	306.4

Sizing Information

Total pressure loss through the filter is as follows:

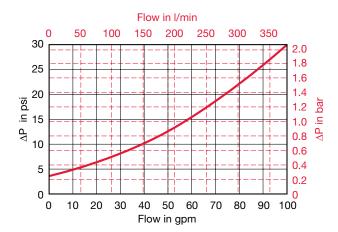
Assembly ΔP = Housing ΔP + Element ΔP

Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual Specific Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)



Element K Factors

P Elements = Elements (K) Flow Factor x Flow Rate (gpm) x Actual Viscosity (SUS) x Actual Specific Gravity (From Tables Below) x 141 SUS 0.86

Autospec HF4 Depth	5.03.XXDXXBH (High Collapse)			
Size	3 µm	5 μm	10 μm	20 μm
5.03.09DXXBH	0.207	0.146	0.089	0.047
5.03.18DXXBH	0.097	0.068	0.041	0.022
5.03.27DXXBH	0.063	0.044	0.027	0.014

All Element K Factors in psi / gpm.



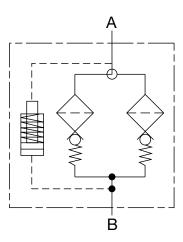
HFDK3P Series

Inline Duplex Filters 4568 psi • up to 90 gpm





Hydraulic Symbol



Features

- The HFDK3P pressure duplex filter meets HF3 automotive specification element requirements.
- The HFDK3P filters have a filter head and lid of ductile iron and a cold formed steel housing to meet high fatigue pressure requirements.
- The filter housings are designed to withstand pressure surges as well as high static pressure loads.
- Visual (pop-up), electrical, electrical/visual (lamp), or electronic differential type clogging indicators are available.
- The HFDK3P housing is non-bypass only. Therefore, a clogging indicator must be used with a low collapse element).

Applications



Automotive



Industrial



Generation



Pulp & Paper

Technical Specifications

Mounting Method	4 mounting holes	
Port Connection	2" SAE Flange Code 62	
Flow Direction	Inlet: Bottom Outlet: Left Side	
Construction Materials		
Head, Lid	Ductile iron	
Housing	Steel	
Flow Capacity		
8"	50 gpm (189 lpm)	
13"	75 gpm (284 lpm)	
16"	90 gpm (340 lpm)	
Housing Pressure Rating		

Max. Allowable Working

4568 psi (315 bar) Pressure Fatigue Pressure 4500 psi (315 bar) Burst Pressure Contact HYDAC Office

Element Collapse Pressure Rating

BN4 290 psid (20 bar) BH4 3045 psid (210 bar)

Fluid Temperature Range 14°F to 212°F (-10°C to 100°C) Consult HYDAC for applications operating below 14°F (-10°C)

Compatible with all hydrocarbon based, synthetic, water glycol, oil/ water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 116 \text{ psid (8 bar) -10\% (standard)}$ $\Delta P = 72 \text{ psid (5 bar)} -10\% \text{ (optional)}$

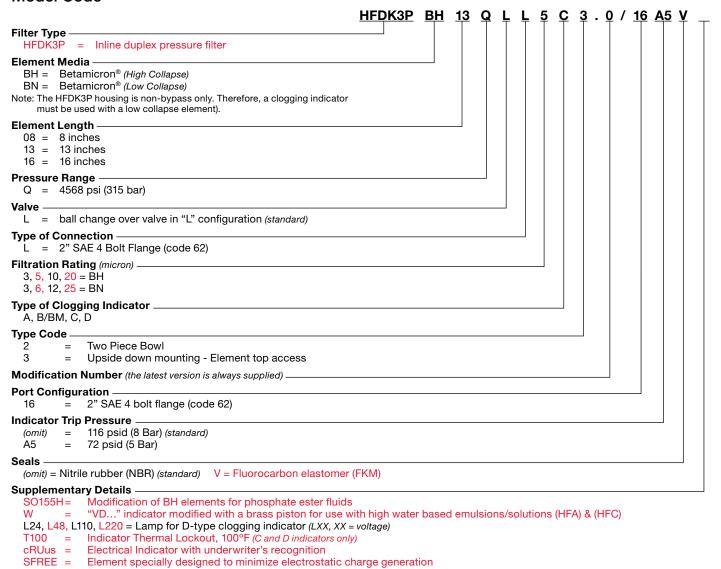


Shipbuilding

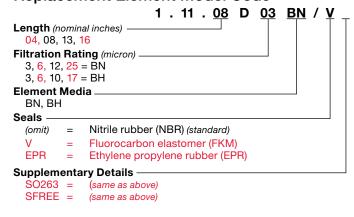


SPECIAL ORDER FILTERS - HIGH PRESSURE

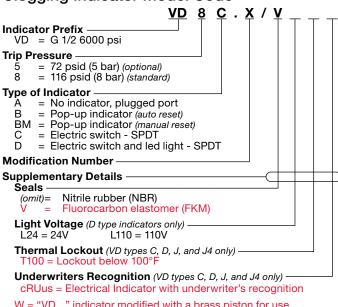
Model Code



Replacement Element Model Code



Clogging Indicator Model Code



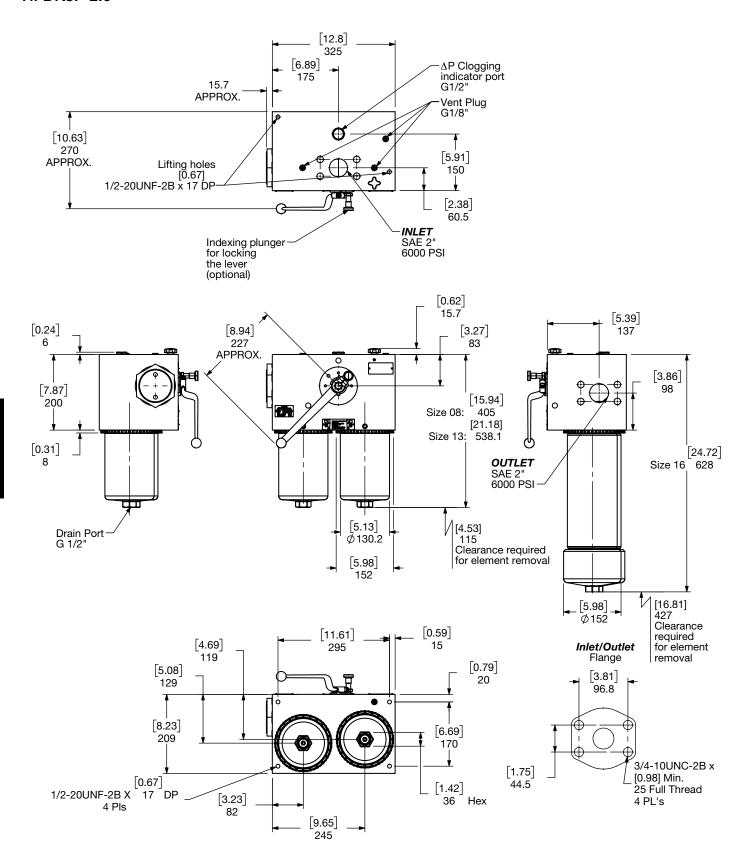
W = "VD..." indicator modified with a brass piston for use with high water based emulsions/solutions (HFA) & (HFC)

(For additional details and options, see Clogging Indicators section.)

Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

SPECIAL ORDER FILTERS - HIGH PRESSURE

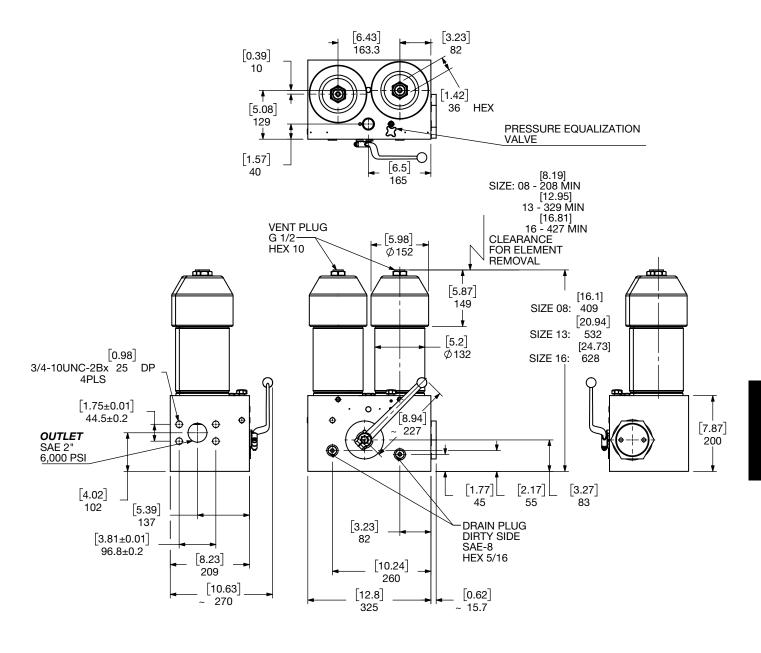
Dimensions HFDK3P 2.0

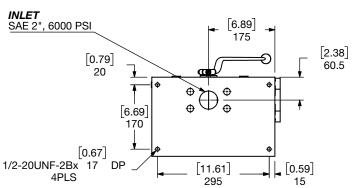


Size	08	13	16
Weight (lbs.)	225.3	250.6	284.3



Dimensions HFDK3P 3.0





Size	08	13	16	
Weight (lbs.)	239.4	266.2	297.9	

SPECIAL ORDER FILTERS - HIGH PRESSURE

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

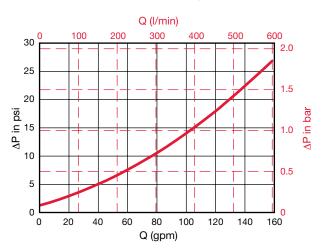
Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{Actual\ Specific\ Gravity}{0.86}$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

HFDK3P Housing



Element K Factors

 $P \ Elements = Elements \ (K) \ Flow \ Factor \ x \ Flow \ Rate \ (gpm) \ x \ \frac{Actual \ Viscosity \ (SUS)}{141 \ SUS} \ x \ \frac{Actual \ Specific \ Gravity}{0.86}$

Autospec HF3 Depth	1.11.08DXXBN (Low Collapse)			
Size	3 µm	6 µm	12 µm	25 μm
1.11.04DXXBN	0.590	0.500	0.266	0.153
1.11.08DXXBN	0.289	0.241	0.135	0.076
1.11.13DXXBN	0.175	0.146	0.082	0.046
1.11.16DXXBN	0.132	0.110	0.062	0.035

Autospec HF3 Depth	1.11.08DXXBH (High Collapse)			
Size	3 µm	6 µm	10 μm	17 µm
1.11.04DXXBH	0.937	0.660	0.401	0.210
1.11.08DXXBH	0.460	0.321	0.195	0.102
1.11.13DXXBH	0.274	0.193	0.117	0.615
1.11.16DXXBH	0.206	0.145	0.089	0.046

All Element K Factors in psi / gpm.





Features

- Complete hydraulic reservoir solution with accessories like gauges, in-tank filters, and air breathers already installed
- Patented insertion ring for filter head flange mounting prevents
- Patented integrated baffle wall creates settling zone for returning oil (degassing) with simultaneous cooling effect
- Tank is optimized for air and heat removal
- Tested for leakage (no end-user testing is required)
- Tank is certified clean, eliminating timeconsuming flushing processes and testing
- Lightweight and cost efficient
- No risk of corrosion
- Available in four (4) performance optimized sizes (7, 12, 18, & 25 gal.)
- Return-line filter options available with Quality Protected aftermarket retaining elements

Applications







Construction



Forestry



Municipal

Technical Specifications

Tank Materials	High Density Polyethylene (HDPE)
Tank Volumes	
7 gal (26L), 12 gal (45	L), 18 gal (70L) or 25 gal (100L)
Operating Temperatur	re
High Density Polyeth	ylene (HDPE): 20°F to 180°F (-29°C to 82°C)
Nylon (PA): 32°F to 24	40°F (0°C to 116°C)
Return Line Filter	
TNK7	RFM 75-185
TNK12	RFM 75-185
TNK18	RFM 75-185
TNK25	RFM 210/270
Max. Return Flow	
TNK7	35 gpm (135 L/min)
TNK12	40 gpm (150 L/min)
TNK18	40 gpm (150 L/min)
TNK25	75 gpm (284 L/min)
Breather	
3 μ phenolic resin im	pregnated paper element
	100 μ wire mesh
Suction Strainer	SAE20: 20 gpm
	SAE24: 30 gpm
Weight	
TNK7	16 lbs (7.3 kg)
TNK12	21 lbs (9.7 kg)
TNK18	33 lbs (15 kg)
TNK25	45 lbs (20 kg)
Element Change Clea	rance
•	

Filter and Element Selection

Ultra Violet Light Rating*

TNK7 TNK12

TNK18

TNK25

For proper filter and element selection, information and pressure drop calculations, please refer to the individual filters (RFM) sections in the HYDAC catalog.

5" (127mm)

10" (254mm)

10" (254mm)

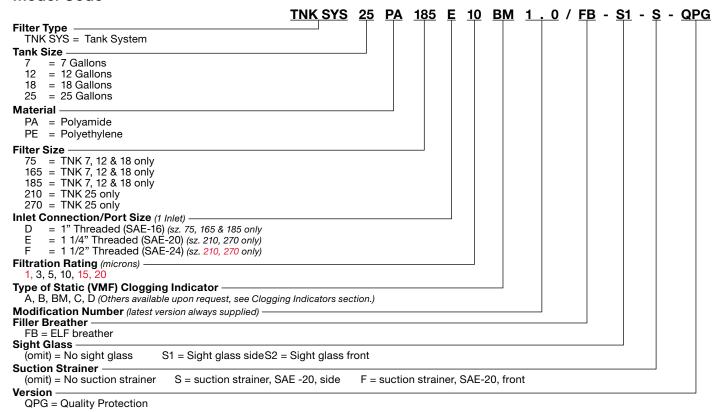
9.5" (241mm) HDPE = UV-12

Nylon = UV-10



^{*}UV Rating is determined by the number of years a material can be exposed to direct sunlight and retain a minimum of 50% of its original mechanical properties (ex. High Density Polyethylene with a UV-12 rating would be recommended to be replaced every 12 years if not painted or coated).

Model Code



Plastic Tank Strap Arrangement - Mounting Possibilities

Mobile applications have unique requirements for hydraulic components. Often, these components need to be small, compact and as lightweight as possible. Making sure these reservoirs are secure is often overlooked. HYDAC has taken the steps to ensure that customers have all the tools necessary to securely operate their mobile equipment. HYDAC's Plastic Tank (TNK) Reservoir, a

money and time-saving solution with an integrated return filter and accessories in one compact package, also includes mounting straps. These mounting straps have been developed to assure a safe and secure connection to the frame or chassis of any mobile vehicle. These straps are offered in three configurations for all four (4) sizes of the plastic tank in a rubber coated steel strap.

Vertical Overhead



Vertical Two-sided



Horizontal

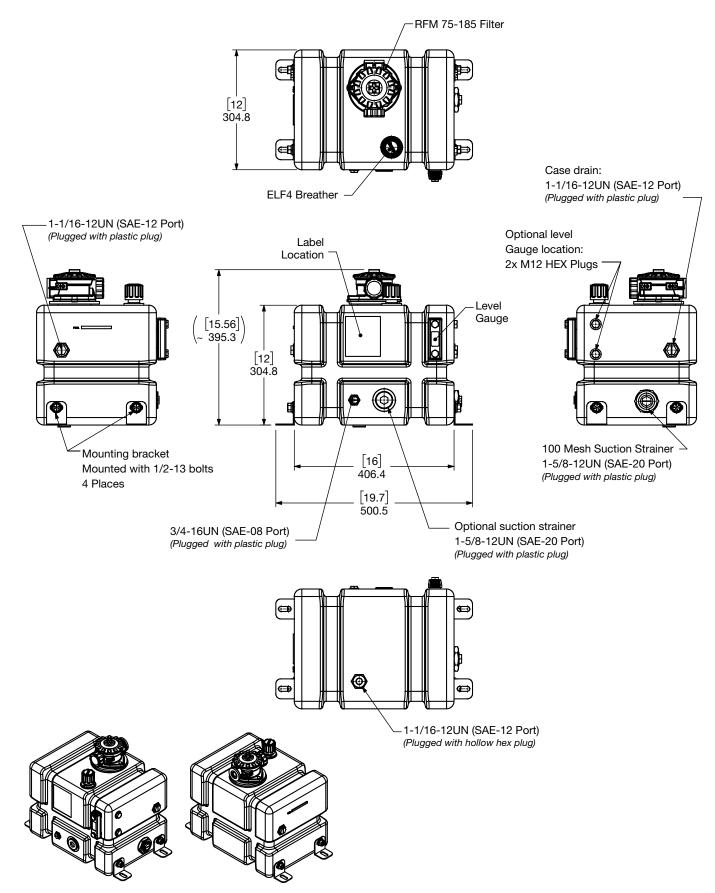


Strap Ordering Information*

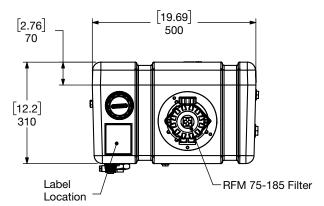
Tank Size	Vertical Overhead Part Number	Vertical Two-sided Part Number	Horizontal Upper Part Number	Horizontal Lower Part Number
TNK7	443635	_	444066	_
TNK12	443868	443889	444066	444185
TNK18	3054998	444183	444490	3521866
TNK25	4231789	444183	444490	4389641

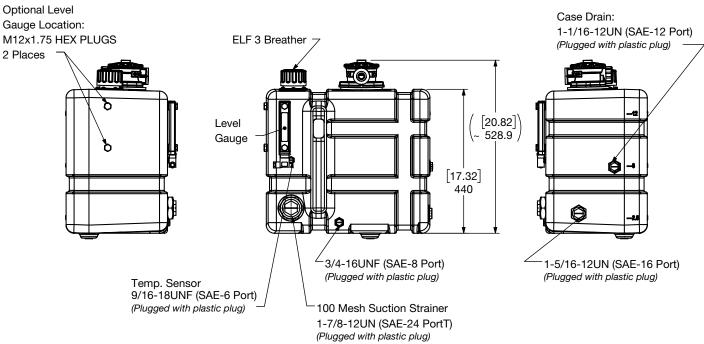
^{*}Straps are not sold in sets. Each part number designates one strap.

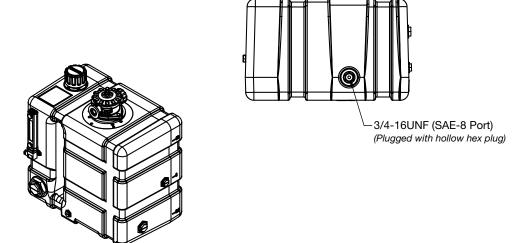
Dimensions TNK7



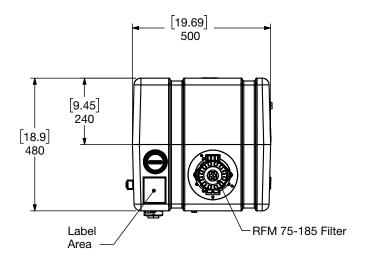
Dimensions TNK12

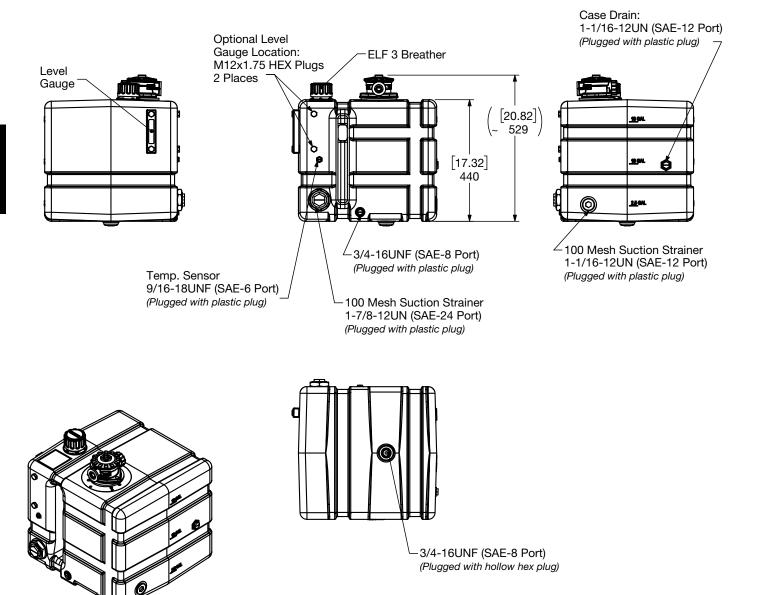




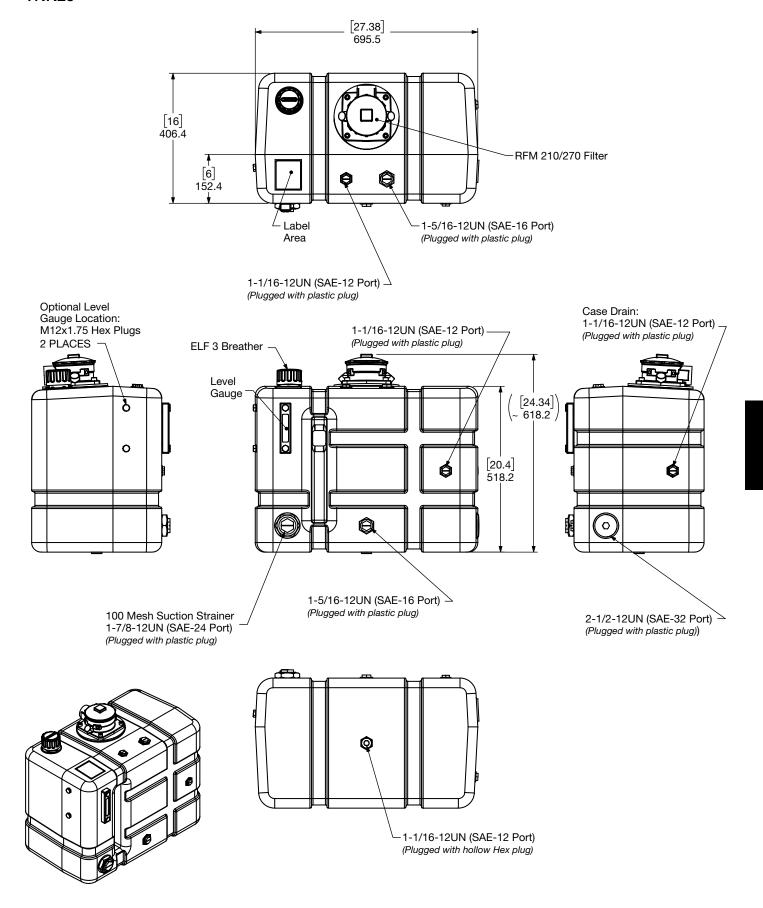


Dimensions TNK18

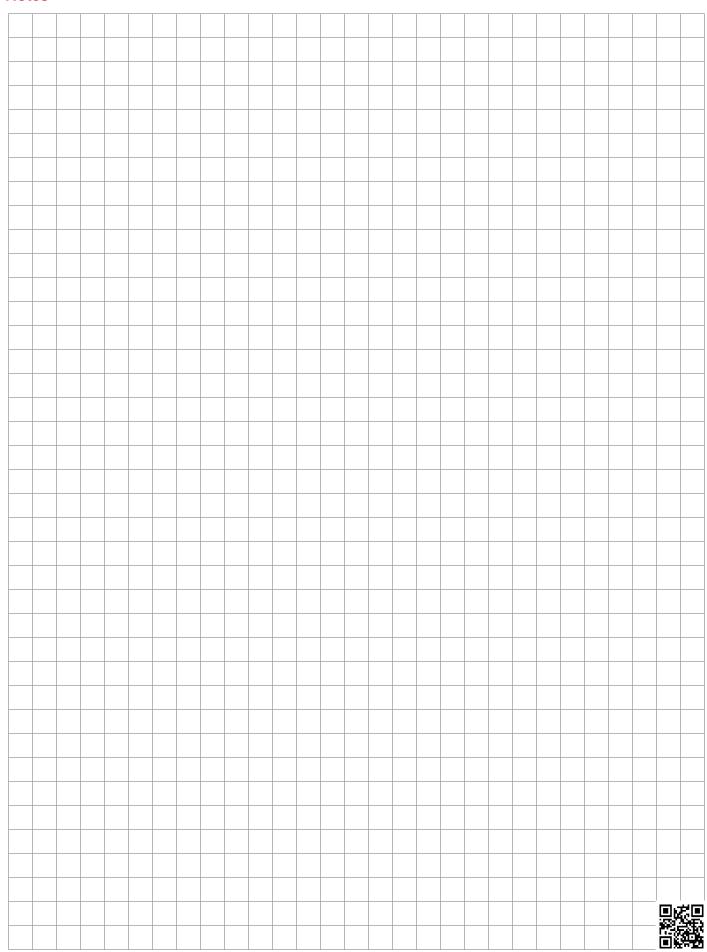




Dimensions TNK25



Notes



Clogging Indicators
Early warning pressure devices protect the hydraulic circuit from contamination, alerting the operator that the filter element is near capacity and must be changed. The clogging indicator is typically set to trip at 1-bar (14 psid) below the filter bypass setting, to allow the operator sufficient time for element change-out. Available in visual, combo electrical/visual, as well as an extensive list of other options and certifications. A comprehensive offering of clogging indicators ensures that any application can be accommodated.

Clogging Indicators Sections

Contents	Page:
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General Indicator Type Drawings	14
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Return line	18
Differential pressure	I21
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Indicator Installation Information for Filters	142

Purpose of Indicators

Clogging indicators are warning devices that signal visually and/ or electrically that the filter element is filled with contaminants and should be changed or cleaned. These devices activate (trip) when the flow of fluid causes a pressure drop across the filter element that exceeds the indicator setting. In filters that incorporate bypass valves, contaminated fluid will bypass the element if the operator does not respond to the indicator warning signal within a reasonable time. In non-bypass filters, if the indicator warning is not heeded, the pressure across the filter will build up to the point where system performance is degraded, the element fails, or the system relief valve is actuated.

The indicator is set to trip well before the element becomes fully clogged (14 psid / 1 bar lower than bypass), thereby giving the operator sufficient time to take corrective action. The indicator warning may be a visual signal at the filter site (pop-up button, light, etc.); or, some form of signal at a remote location (trouble light, sound alarm, etc.). In some critical applications, where contamination is intolerable, the signal from the indicator may be used to shut down the system so that personnel must immediately service the unit.

Some users install filters without indicators, preferring instead to change and/or clean elements according to a fixed time schedule — or based on number of hours of operation. There is some risk in utilizing this approach. It may be difficult to establish a reliable schedule for installing new elements because the rate of dirt ingression is not known, and, in fact, may vary from time-to-time and from machine-to-machine. Use of a clogging indicator has two main benefits: first, it eliminates the need to guess when the element will clog; second, it avoids the unnecessary cost of replacing elements too soon.

Indicator Settings

In a majority of applications, a HYDAC indicator is set to trip at 15 psid (1 bar) below the bypass valve cracking pressure; or, for a non-bypass filter, at 15 psid below the element design changeout pressure. Typically, a HYDAC pressure filter bypass valve begins to crack at 87 psid (6 bar), so the indicator is set to trip at 72 psid (5 bar). A HYDAC return filter ordinarily begins to bypass at 43 psid (3 bar), so the indicator is set to trip at 29 psid (2 bar). Consequently, the operator has a period of time in which to change or clean the element before the bypass valve opens and passes contaminated fluid to sensitive components downstream of the filter.

Typically, the time from indication to bypass is 5-15% of the life of the element. For instance, if the normal service life of the element is 100 days, there is a grace period of 5-15 days before the filter begins bypassing. Nevertheless, it is advisable to change the element as soon as the indicator trips.

Non-standard indicator settings are often employed for various reasons. For instance, in lubrication systems, filters may not be allowed to have a high pressure drop, therefore, the indicator may be set to trip at less than 15 psid. When the filter is installed on the suction side of a pump, it is a common practice to limit the ΔP across the filter to 3 psid, and to set the indicator at a correspondingly low amount.

Certain HYDAC non-bypass filters, such as the DFDK duplex series and DFZ series of sandwich filters, utilize indicators that are set at 116 psid (8 bar) in order to maximize the dirt retention and service life of the elements.

In most cases, HYDAC pressure and return line filters bypass at higher pressures than other commonly used filters, meaning that indicator settings also are higher than usual. This has the advantage of extending element service life.

Types of Indicators

Filter assemblies may be ordered with or without indicators. When ordered with an indicator, the assembly model code includes a letter symbol for the indicator, such as B, C, or D. When ordered separately, an indicator has its own complete model code, as described subsequently in this brochure.

A type B or BM visual indicator is suitable when only a local warning is required. When it is necessary to signal a remote warning device, control panel, or PLC, one of the electric switches should be specified. Various kinds of switches are available to provide a range of electrical configurations, contact ratings, and connections.

The D indicator incorporates a switch and built-in light for both local and remote warning signals.

Special Indicators

Mobile indicators

These indicators have been developed for special applications and are fitted with AMP, Deutsch and Junior Power Timer plugs.

ATEX indicators

These indicators are used in potentially explosive locations and are subject to the ATEX Equipment Directive 94/9/EC and the ATEX Operator Directive 1999/92/EC.



UL and CSA indicators

Indicators which are exported to the USA and Canada often require classification according to current UL and CSA standards. The UL and CSA symbols are found on many products, particularly in the field of electrical engineering.





Key Features

Automatic vs. Manual Reset

All indicators with electric switches reset automatically to their original position when the pressure across the filter drops below trip pressure. This is true, also, for the type B visual indicator. However, on the type BM visual indicator with manual reset, the signal arm extends once the trip pressure is exceeded and remains that way until physically reset. The advantage is that the indicator signals that the element is dirty even after the system is shut down, thus, simplifying maintenance.

Thermal Lockout

When mobile and other equipment is started in the cold, the hydraulic or lube fluid is likely to be highly viscous until it approaches normal operating temperature. The high pressure drop created by a highly viscous fluid can trip the indicator and falsely signify that the element is clogged. An optional thermal lockout device, available on many HYDAC electric indicators, prevents the indicator from tripping until the fluid reaches a certain specified temperature. The device consists of a switch in series in the indicator circuit, which is caused to make or break by a bi-metal strip that alters in shape according to temperature.

The thermal lockout feature may be chosen so that the indicator is deactivated at a fluid temperature less than 100° F ±5° (called T100).

Because electric indicators automatically reset once the fluid heats up, thermal lockout is necessary only when a false signal of filter condition during cold start-up poses a problem.

Single Pole, Double Throw Switches (SPDT)

HYDAC's differential pressure and most static pressure electrical indicators contain single-pole, double-throw switches. This provides the choice of normally open or normally closed contacts when the pressure differential is below trip-point.

Whether the contacts are normally open (N/O) or normally closed (N/C) is determined by the way in which the indicator is wired on site. This applies to types C, D, J, J4, LE, and LZ.

Magnetic Coupling

Most of HYDAC's indicators employ magnetic coupling, which separates the fluid from the actuating device. The benefit is that there is no need for a dynamic seal, therefore, far less chance of fluid leakage under high system pressure.

Interchangeability

HYDAC indicators are designed for use only with HYDAC filters, and should not be applied to other makes of filters.

Certain differential pressure indicators can be used in non-filter applications when mounted on special blocks. Detailed information regarding blocks of various kinds is presented subsequently in this brochure.

FILTER CLOGGING INDICATORS

Operation

In the drawings on the following page, examples of two types of differential pressure indicators and a static pressure indicator are provided.

Application Guidelines

Differential pressure indicators react to the pressure drop across the filter that is caused by the flow of fluid through the filter housing and element. These devices measure the difference in pressure upstream and downstream of the filter element, regardless of the system pressure. They are utilized in most pressure and inline return filters.

Static pressure indicators measure only the build-up of pressure upstream of the filter element (downstream pressure is ambient - tank vented to atmosphere). Consequently, if any components are located downstream of the filter, the indicator will measure the pressure drop caused by the filter and that component, thus, causing a false reading of ΔP across the filter. As a result, static indicators are recommended only on filters that discharge directly to vented tanks and have minimal back pressure.

A filter that incorporates a differential pressure indicator should be used whenever there is a significant resistance to flow in the line after the filter, even when system pressure is relatively low. For example, the filter in the feed line of a lube system requires a differential pressure indicator, although the system pressure may be low.

Differential Pressure Indicator Operation

As the differential pressure across the filter increases, the piston / magnet assembly is driven down against a spring until the attractive force between the magnet and indicator pin ($Type\ 1$) or a switch actuator lever ($Type\ 2$) is reduced sufficiently to allow the indicator to trip. In a visual indicator ($Type\ 1$), tripping results in the indicator pin rising and giving visual indication that the filter must be serviced. In an electric indicator ($Type\ 2$), tripping causes a switch to make or break, permitting a remote indication to warn of the need for servicing. When the ΔP drops below the trip pressure for any reason, (installation of a clean element, heating of the oil, etc.), the piston/ magnet assembly returns to its original position.

With a visual indicator, the pop-up indicator pin may then respond in one of two ways: (1) With Manual Reset ($type\ BM$) the pin remains extended, even after the system is shut down, and must be physically pushed down to reset (2) With Automatic Reset ($type\ B$) the indicator pin retracts to its original position along with the piston. With all electric indicators, the circuit is automatically restored to its original normally closed or normally open position once the ΔP drops below the trip setting.

Static Pressure Indicator Operation

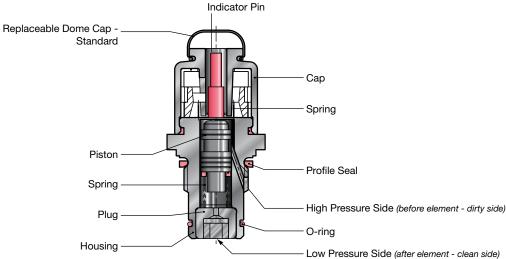
Increasing pressure upstream of the filter acts upon a diaphragm in the indicator (*Type 3*) and causes the indicator pin to overcome an opposing spring force until it trips at a pre-set pressure. The indicator pin automatically resets once pressure is reduced below the trip pressure. Electric static pressure indicators, which also operate mechanically, are available as well. These too, reset automatically.

Note: Certain indicators have a red/ yellow/ green display in addition to, or instead of, the pop-up indicator pin.

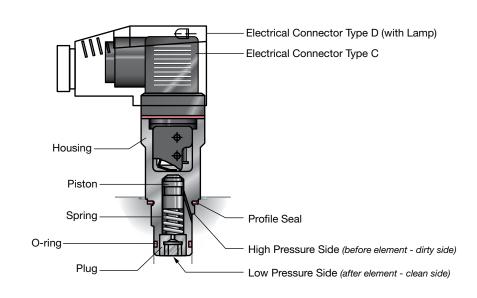


General Indicator Type Drawings:

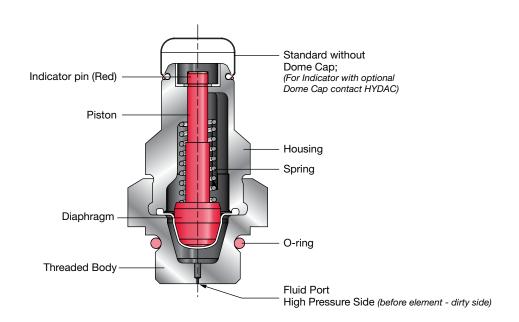
TYPE 1 Differential Pressure Visual Indicator (B/BM)



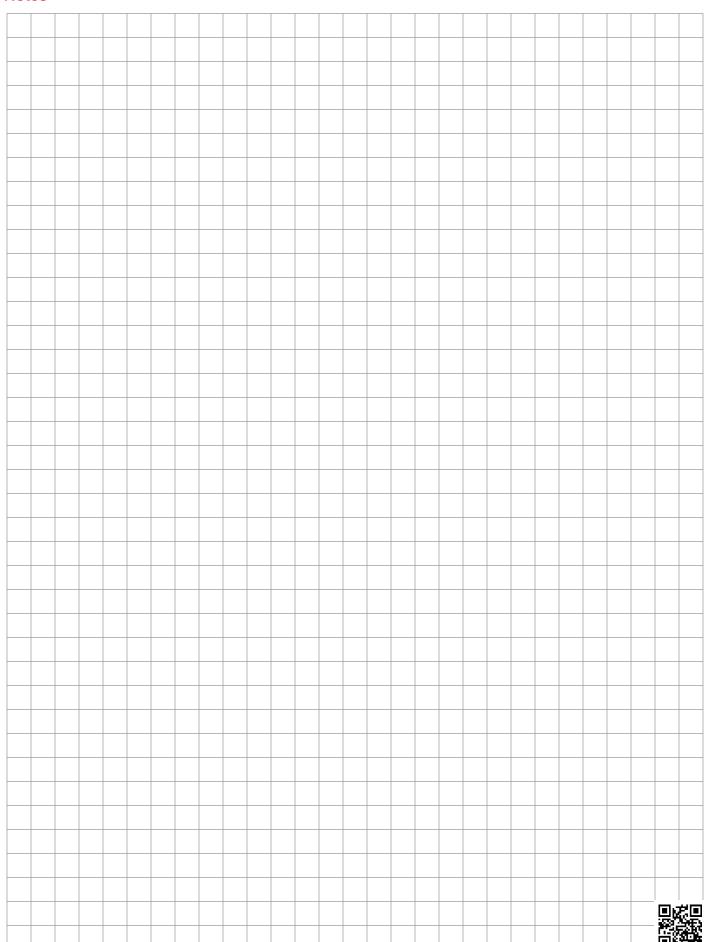
TYPE 2 Differential Pressure Electric Indicator (C or D)



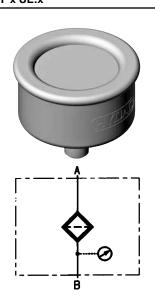
TYPE 3 Static Pressure Visual Indicator (B/BM)



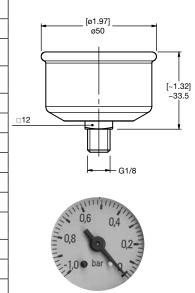
Notes



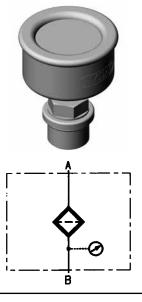
Specifications of Vacuum Indicators $_{\mbox{\scriptsize VMF}\;\mbox{\tiny X}\;\mbox{\scriptsize UE}.\mbox{\tiny X}}$



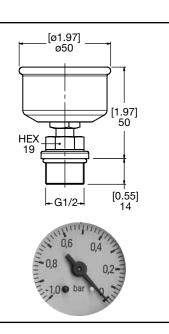
Type of indication	Visual-analog, scale indication
Weight	0.12 lbs (54 g)
Trip Pressure / Range	-14.5 psi to 0 psi (-1 bar to 0 bar)
Permitt. operating pressure	-10.2 psi to 0 psi (-0.7 to 0 bar) continuous
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	_
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VMF 1 UE.0



VR x UE.x

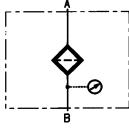


Type of indication	Visual-analog, scale indication
Weight	0.28 lbs (125 g)
Trip Pressure / Range	-14.5 psi to 0 psi (-1 bar to 0 bar)
Permitt. operating pressure	-10.2 psi to 0 psi (-0.7 to 0 bar) continuous
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 4005	50 –
Order example	VR 1 UE.0

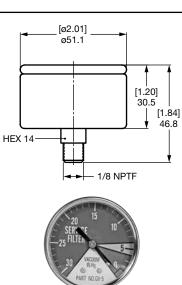


VMF 0.2 UE.x /3

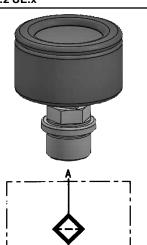




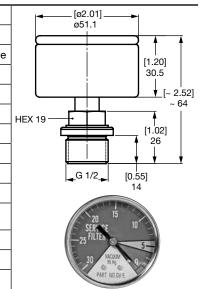
Type of indication	Visual-analog, scale indication
Weight	0.18 lbs (80 g)
Trip Pressure / Range	use w/3 psi (0.2 bar) bypass valve
Permitt. operating pressure	-30 inHg to 0 inHg
Permitt. temperature range	-40°F to 200°F (-40°C to 93°C)
Thread	1/8" NPTF
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	_
Protection class to DIN 40050	_
Order example	VMF0.2UE.0/3



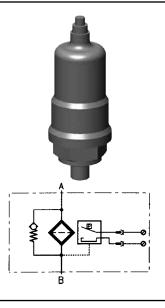
Specifications of Vacuum Indicators VR 0.2 UE.x



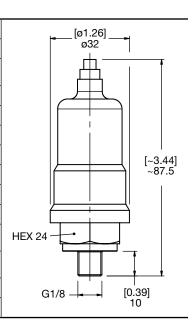
Type of indication	Visual-analog, scale indication
Weight	0.28 lbs (125 g)
Trip Pressure / Range	use w/3 psi (0.2 bar) bypass valve
Permitt. operating pressure	-30 inHg to 0 inHg
Permitt. temperature range	-22°F to 200°F (-30°C to 93°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VR 0.2 UE.0



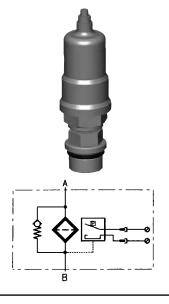
VMF x UF.x



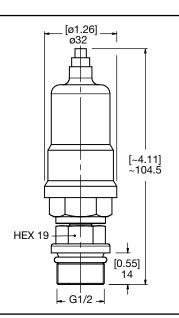
Type of indication	Electrical switch
Weight	0.37 lbs (170 g)
Trip Pressure / Range	-2.9 psi ±1.5 psi (-0.2 bar ±0.1 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/O contact
Max. switching voltage	48 V
Electrical connection	threaded connection
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	ohmic 2.5 A at 24 V = ohmic 2.5 A at 42 V ~
Protection class to DIN 40050	IP 65, terminals IP 00
Order example	VMF 0.2 UF.0



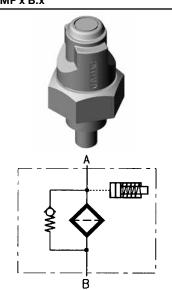
VR x UF.x



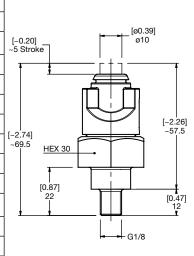
Type of indication	Electrical switch
Weight	0.37 lbs (170 g)
Trip Pressure / Range	-2.9 psi ±1.5 psi (-0.2 bar ±0.1 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/O contact
Max. switching voltage	48 V
Electrical connection	threaded connection
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	ohmic 2.5 A at 24 V = ohmic 2.5 A at 42 V ~
Protection class to DIN 40050	IP 65, terminals IP 00
Order example	VR 0.2 UF.0



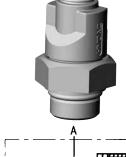
Specifications of Static Indicators VMF x B.x

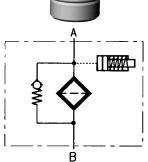


Type of indication	Visual, red pin
Weight	0.19 lbs (84 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	_
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VMF 2 B.1



VR x B.x

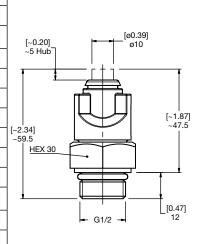




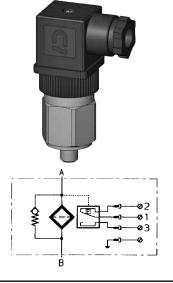
Order example

Type of indication	visual, red pin
Weight	0.10 lbs (44 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	_
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	_
Protection class to DIN 40050	-

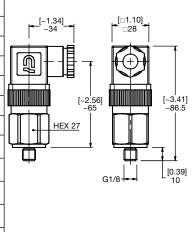
VR 2 B.1



VMF x C.x

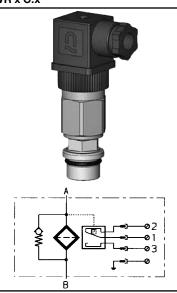


Type of indication	Electrical switch
Weight	0.60 lbs (270 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	250 W = 300 VA ~
Switching capacity	Ohmic 6 A at 24 V = Ohmic 0.03 to 6 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VMF 2 C.1

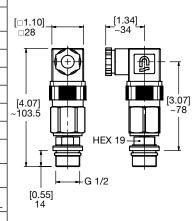


^{*}When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

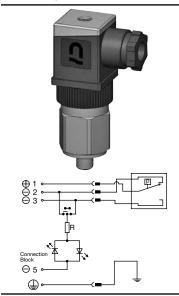
Specifications of Static Indicators VR x C.x



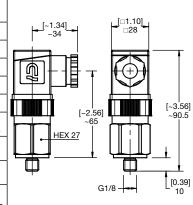
Type of indication	Electrical switch
Weight	0.75 lbs (340 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	250 W = 300 VA ~
Switching capacity	Ohmic 6 A at 24 V Ohmic 0.03 to 6 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VR 2 C.1



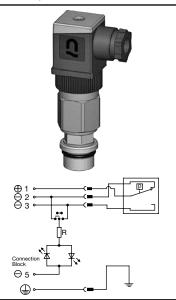
VMF x **D.**x /-L...



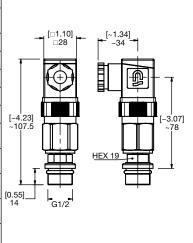
Type of indication	Visual indicator & electrical switch
Weight	0.66 lbs (300 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	24, 48, 115, 230 V (depending on the type of light insert)
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	250 W = 300 VA ~
Switching capacity	Ohmic 6 A at 230 V = Ohmic 0.03 to 6 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VMF 2 D.1 /-L24



VR x D.x /-L...



Type of indication	Visual indicator & electrical switch
Weight	0.79 lbs (360 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	24, 48, 115, 230 V (depending on the type of light insert)
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	250 W = 300 VA ~
Switching capacity	Ohmic 6 A at 24 V = Ohmic 0.03 to 6 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)



^{*}When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

VR 2 D.1 /-L110

Order example

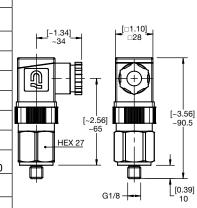
Specifications of Static Indicators VMF x D.x /-LED



Type of indication	Visual indicator & electrical switch
Weight	0.66 lbs (300 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/O contact
Max. switching voltage	24 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	250 W = 300 VA ~
Switching capacity	Ohmic 6 A at 24 V =
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VMF 2 D.1 /-LED

0.79 lbs (360 g)

73 psi -7.3 psi (5 bar -0.5 bar)



VR x D.x /-LED

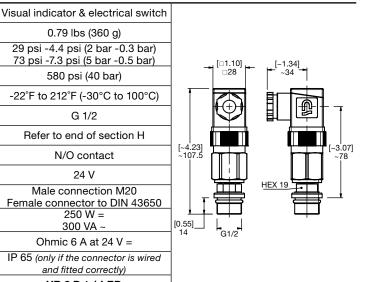


	Permitt. operating pressure	580 psi (40 bar)
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°
	Thread	G 1/2
	Max. torque	Refer to end of section H
	Switching type	N/O contact
	Max. switching voltage	24 V
	Electrical connection	Male connection M20 Female connector to DIN 436
	Max. switching voltage at resistive load	250 W = 300 VA ~
	Switching capacity	Ohmic 6 A at 24 V =
_	Protection class to DIN 40050	IP 65 (only if the connector is win
Ţ	Order example	VR 2 D.1 /-LED

Type of indication

Trip Pressure / Range*

Weight

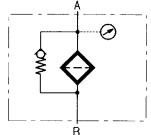


VMF x E.x

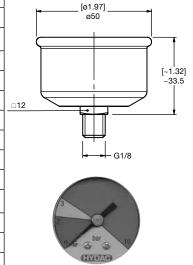
⊖ 3

4





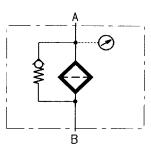
Type of indication	Visual-analog, scale indication
Weight	0.12 lbs (54 g)
Trip Pressure / Range*	0 psi to 145 psi (0 bar to 10 bar)
Permitt. operating pressure	102 psi (7 bar) continuous
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	_
Max. switching voltage at resistive load	-
Switching capacity	_
Protection class to DIN 40050	-
Order example	VMF 2 E.0



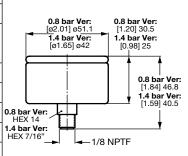
^{*}When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

Specifications of Static Indicators VMF x E.x /-3



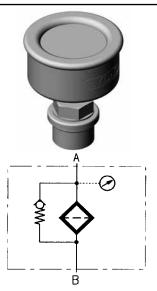


Type of indication	Visual-analog, scale indication
Weight	0.22 lbs (98 g)
Trip Pressure / Range	Green Range: 0-12 / 0-20 psi Yellow Range: 12-15 / 20-25 psi Red Range: 15-60 / 25-60 psi
Permitt. operating pressure	60 psi (4 bar)
Permitt. temperature range	-40°F to 200°F (-40°C to 93°C)
Thread	1/8" NPTF
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	_
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VMF 0.8 E.1 /-3; VMF 1.4 E.1 /-3

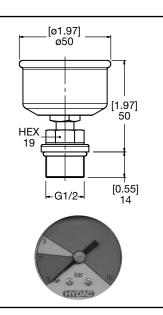




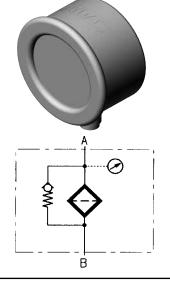
VR x E.x



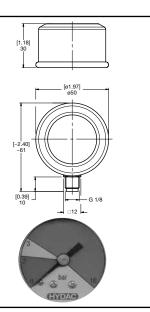
Type of indication	Visual-analog, scale indication
Weight	0.28 lbs (125 g)
Trip Pressure / Range	0 psi to 145 psi (0 bar to 10 bar)
Permitt. operating pressure	102 psi (7 bar) continuous
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	_
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	_
Protection class to DIN 40050	-
Order example	VR 2 E.0



VMF x ES.x



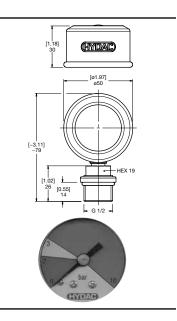
Type of indication	Visual-analog, scale indication
Weight	0.12 lbs (54 g)
Trip Pressure / Range	0 psi to 145 psi (0 bar to 10 bar)
Permitt. operating pressure	102 psi (7 bar) continuous
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	_
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	_
Protection class to DIN 40050	-
Order example	VMF 2 ES.0



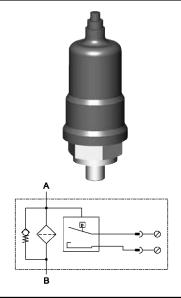
Specifications of Static Indicators VR x ES.x



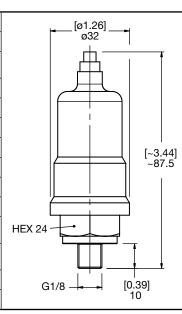
Type of indication	Visual-analog, scale indication
Weight	0.28 lbs (125 g)
Trip Pressure / Range	0 psi to 145 psi (0 bar to 10 bar)
Permitt. operating pressure	102 psi (7 bar) continuous
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VR 2 ES.0



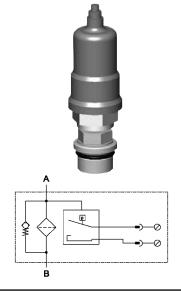
VMF x F.x



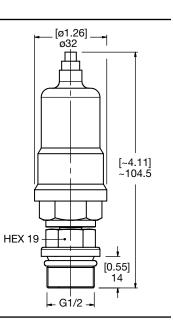
Type of indication	Electrical switch
Weight	0.15 lbs (70 g)
Trip Pressure / Range	29 psi ±4.4 psi (2 bar ±0.3 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/O contact (N/C as an option)
Max. switching voltage	42 V
Electrical connection	threaded connection
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	Ohmic 2.5 A at 24 V = Ohmic 2.5 A at 42 V ~
Protection class to DIN 40050	IP 65, terminals IP 00
Order example	VMF 2 F.0



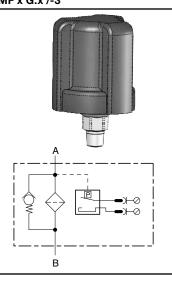
VR x F.x



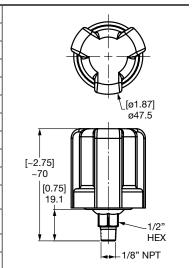
Type of indication	Electrical switch
Weight	0.29 lbs (130 g)
Trip Pressure / Range	29 psi ±4.4 psi (2 bar ±0.3 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/O contact (N/C as an option)
Max. switching voltage	42 V
Electrical connection	threaded connection
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	Ohmic 2.5 A at 24 V = Ohmic 2.5 A at 42 V ~
Protection class to DIN 40050	IP 65, terminals IP 00
Order example	VR 2 F.0



Specifications of Static Indicators $_{\text{VMF x G.x}}$ /-3



Type of indication	Electrical switch
Weight	0.18 lbs (82 g)
Trip Pressure / Range*	20 psi ±3 psi (1.4 bar ±0.2 Bar)
Permitt. operating pressure	250 psi (17 bar)
Permitt. temperature range	-40°F to 250°F (-40°C to 121°C)
Thread	1/8" NPT
Max. torque	Refer to end of section H
Switching type	N/O - SPDT
Max. switching voltage	240 VDC and 240 VAC
Electrical connection	2x #8-32 screw terminals
Max. switching voltage at resistive load	24 VDC
Switching capacity	Ohmic 4 A at 24 V = Ohmic 1 A at 120 V ~
Protection class to DIN 40050	Terminals IP 00
Order example	VMF 1.4 G.0 /3

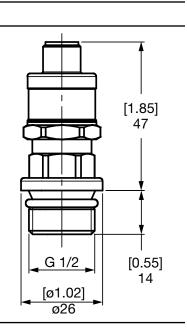


VR x GD.x

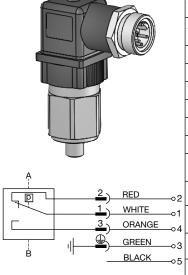


connectio 2x1, 4 pin Designation +U _B Analog 0V SP1 (alarm)	ns: 4	3 • 2 •

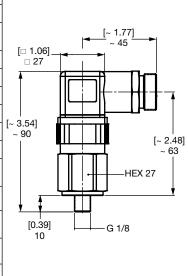
Type of indication	Electronic / Analog (4-20 mA) Analog signal up to 20% of pressure setting constant 4mA
Weight	0.20 lbs (92 g)
Trip Pressure / Range*	29 psi -10% (2 bar -10%)
Permitt. operating pressure	363 psi (25 bar)
Permitt. temperature range	-50°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	30 Nm
Switching type	N/O or N/C
Max. switching voltage	Operating voltage 9 - 35 V DC
Electrical connection	M12x1 (4-pin)
Max. switching capacity	250 mA
Switching capacity	Varies with supply voltage
Protection class to DIN EN 60529	IP 67 (with mounted mating connector in corresponding protection type)
Order example	VR 2 GD.0 /-V-123



VMF x J.x

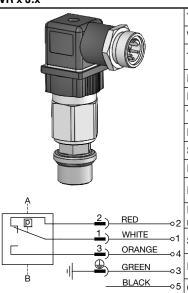


	Type of indication	Electrical switch	
	Weight	0.66 lbs (300 g)	
	Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)	
	Permitt. operating pressure	580 psi (40 bar)	
	Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)	
	Thread	G 1/8	
	Max. torque	Refer to end of section H	١.
	Switching type	N/C or N/O (change-over contacts)	l
	Max. switching voltage	230 V	
	Electrical connection	7/8" Mini connector (5 PIN); Female connector to DIN 43650	
2	Max. switching voltage at resistive load	250 W = 300 VA ~	
1	Switching capacity	Ohmic 6 A at 24 V = Ohmic 0.03 to 6 A at max. 230 V ~	
3	Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)	
5	Order example	VMF 2 J.1	

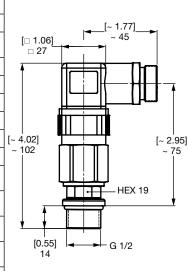


^{*}When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

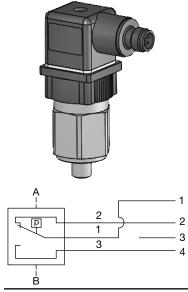
Specifications of Static Indicators



	Type of indication	Electrical switch
	Weight	0.82 lbs (370 g)
	Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
	Permitt. operating pressure	580 psi (40 bar)
	Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)
	Thread	G 1/2
	Max. torque	Refer to end of section H
	Switching type	N/C or N/O (change-over contacts)
	Max. switching voltage	230 V
	Electrical connection	7/8" Mini connector (5 PIN); Female connector to DIN 43650
2	Max. switching voltage at resistive load	250 W = 300 VA ~
1	Switching capacity	Ohmic 6 A at 24 V Ohmic 0.03 to 6 A at max. 230 V $\scriptstyle\sim$
3	Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
5	Order example	VR 2 J.1



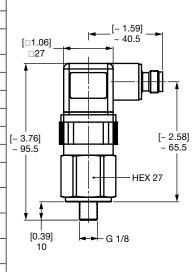
VMF x J4.x



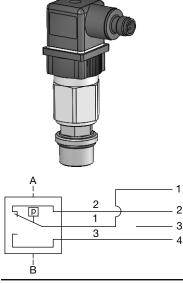
Type of indication	Electrical switch
Weight	0.60 lbs (270 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)
Thread	G1/8
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230V
Electrical connection	12mm (Micro) connector (4 PIN); Female connector to DIN 43650
Max. switching voltage at resistive load	250W= 300VA~
Switching capacity	Ohmic 6A at 24V= Ohmic 0.03 to 6A at max. 230V~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)

Order example

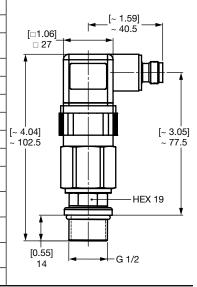
VMF 2 J4.1



VR x J4.x



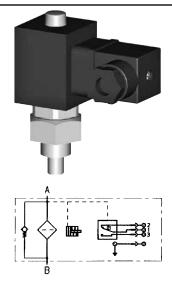
Type of indication	Electrical switch
Weight	0.75 lbs (340 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)
Thread	G1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230V
Electrical connection	12mm (Micro) connector (4 PIN); Female connector to DIN 43650
Max. switching voltage at resistive load	250W= 300VA~
Switching capacity	Ohmic 6A at 24V= Ohmic 0.03 to 6A at max. 230V~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VR 2 J4.1



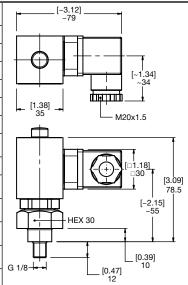
^{*}When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

Specifications of Static Indicators

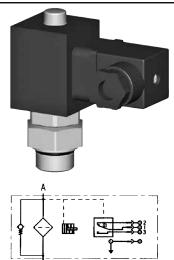
VMF x LE.x



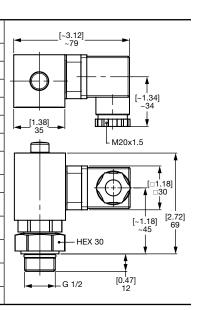
Type of indication	Visual (red pin) & electrical switch (100% activation)
Weight	0.26 lbs (120 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)
Max. switching voltage	115 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VMF 2 LE.1



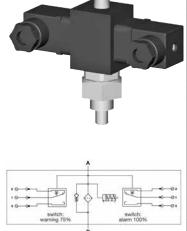
VR x LE.x



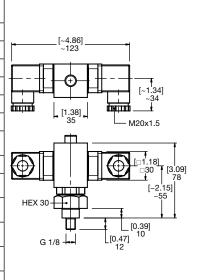
Type of indication	Visual (red pin) & electrical switch (100% activation)
Weight	0.32 lbs (143 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)
Max. switching voltage	115 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VR 2 LE.1



VMF x LZ.x



Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.51 lbs (230 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)
Max. switching voltage	115 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VMF 2 LZ.1

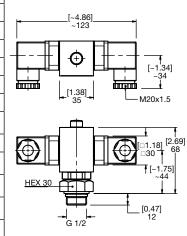


^{*}When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

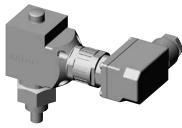
Specifications of Static Indicators VR x LZ.x

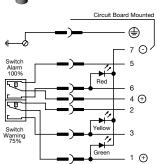


Type of indication	(75% & 100% activation)
Weight	0.42 lbs (190 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)
Max. switching voltage	115 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VR 2 LZ.1

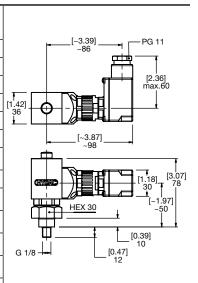


VMF x LZ.x /-DB

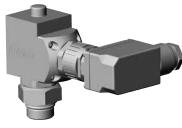


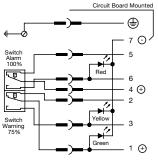


Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=power, yel=75%, red=100%)
Weight	0.37 lbs (170 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)
Max. switching voltage	24 V
Electrical connection	Male connection PG 11 Female connector to DIN 43651
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VMF 2 LZ.1 /-DB

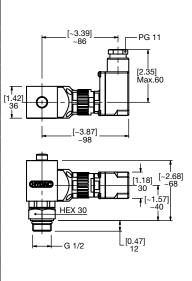


VR x LZ.x /-DB



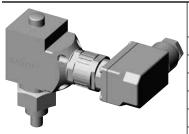


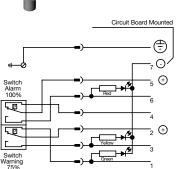
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=power, yel=75%, red=100%)
Weight	0.42 lbs (190 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)
Max. switching voltage	24 V
Electrical connection	Male connection PG 11 Female connector to DIN 43651
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VR 2 LZ.1 /-DB



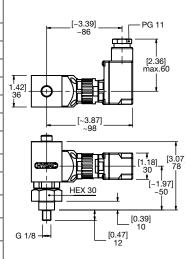
^{*}When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

Specifications of Static Indicators VMF x LZ.x /-CN

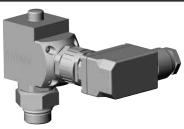


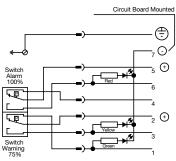


Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)
Weight	0.37 lbs (170 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)
Max. switching voltage	24 V
Electrical connection	Male connection PG 11 Female connector to DIN 43651
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VMF 2 LZ.1 /-CN

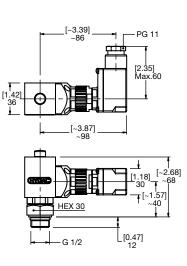


VR x LZ.x /-CN

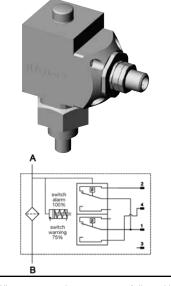




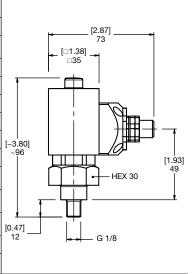
	Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)	
	Weight	0.42 lbs (190 g)	
	Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)	
	Permitt. operating pressure	102 psi (7 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)]
	Thread	G 1/2] '
i	Max. torque	Refer to end of section H	
	Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)	
J	Max. switching voltage	24 V	
	Electrical connection	Male connection PG 11 Female connector to DIN 43651	
	Max. switching voltage at resistive load	15 W = max. 15 VA ~	
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~	
	Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)	
	Order example	VR 2 LZ.1 /-CN	



VMF x LZ.x /-BO

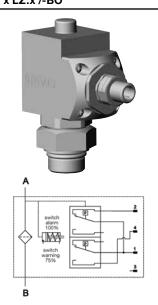


Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.26 lbs (120 g)
Trip Pressure / Range*	29 psi (or 36 psi) -10% 2 bar (or 2.5 bar) -10%
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/O (75%) N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VMF 2 LZ.1 /-BO

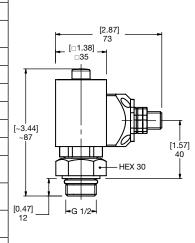


^{*}When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

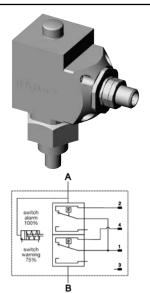
Specifications of Static Indicators $VR \times LZ.x /-BO$



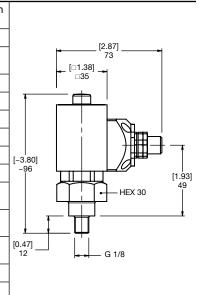
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.32 lbs (145 g)
Trip Pressure / Range	29 psi (or 36 psi) -10% 2 bar (or 2.5 bar) -10%
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/O (75%) N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VR 2 LZ.1 /-BO



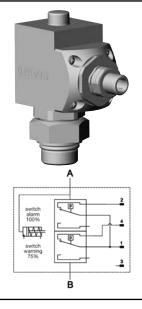
VMF x LZ.x /-AV



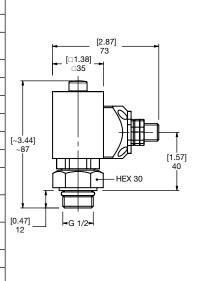
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.26 lbs (120 g)
Trip Pressure / Range	29 psi (or 36 psi) -10% 2 bar (or 2.5 bar) -10%
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/C (75% and 100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VMF 2 LZ.1 /-AV



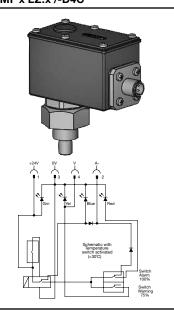
VR x LZ.x /-AV



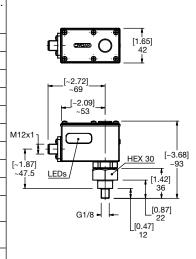
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.32 lbs (145 g)
Trip Pressure / Range	29 psi (or 36 psi) -10% 2 bar (or 2.5 bar) -10%
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C (75% and 100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VR 2 LZ.1 /-AV



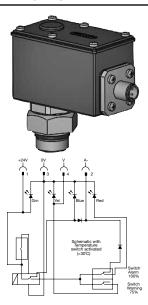
Specifications of Static Indicators VMF x LZ.x /-D4C



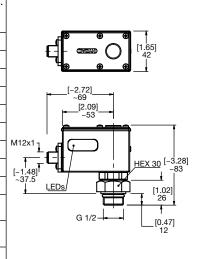
Type of indication	Electrical switch (75% & 100% activation) w/30°C thermal lockout. 4 LEDs (grn=pwr, blue= below 86°F, yel=75%, red=100%)
Weight	0.54 lbs (245 g)
Trip Pressure / Range	36 psi -10% (2.5 bar -10%)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/O (75%), N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VMF 2 LZ.1 /-D4C



VR x LZ.x /-D4C



	Type of indication	Electrical switch (75% & 100% activation) w/30°C thermal lockout. 4 LEDs (grn=pwr, blue= below 86°F, yel=75%, red=100%)
	Weight	0.45 lbs (205 g)
	Trip Pressure / Range	36 psi -10% (2.5 bar -10%)
	Permitt. operating pressure	102 psi (7 bar)
	Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
	Thread	G 1/2
	Max. torque	Refer to end of section H
	Switching type	N/O (75%), N/C (100%)
	Max. switching voltage	24 V
	Electrical connection	Male connection M12 x 1
	Max. switching voltage at resistive load	15 W = max. 15 VA ~
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
	Protection class to DIN 40050	IP 65
	Order example	VR 2 LZ.1 /-D4C

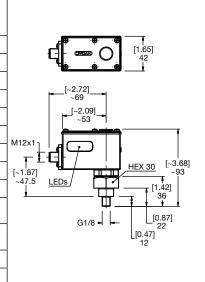


VMF x LZ.x /-BO-LED

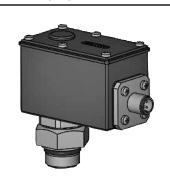


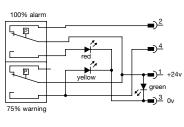
100% alarm		- 2
		<u> </u>
	red	<u> </u>
	yellow) ¹ +24
		green 3 0v
75% warning		

Type of indication	Electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)
Weight	0.54 lbs (245 g)
Trip Pressure / Range	36 psi -10% (2.5 bar -10%)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/O (75%), N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VMF 2 LZ.1 /-BO-LED

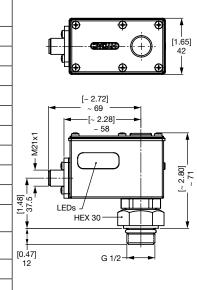


Specifications of Static Indicators VR x LZ.x /-BO-LED

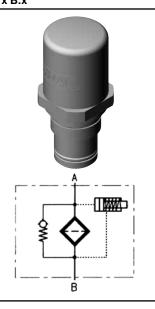




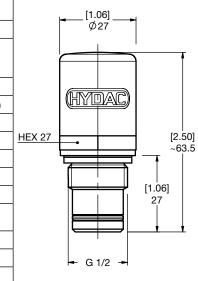
	Type of indication	Electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)
	Weight	0.45 lbs (205 g)
	Trip Pressure / Range	36 psi -10% (2.5 bar -10%)
	Permitt. operating pressure	102 psi (7 bar)
	Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
	Thread	G 1/2
	Max. torque	Refer to end of section H
	Switching type	N/O (75%), N/C (100%)
	Max. switching voltage	24 V
	Electrical connection	Male connection M12 x 1
	Max. switching voltage at resistive load	15 W = max. 15 VA ~
,	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
	Protection class to DIN 40050	IP 65
	Order example	VR 2 LZ.1 /-BO-LED



Specifications of Differential Pressure Indicators $_{\text{VM x B.x}}$



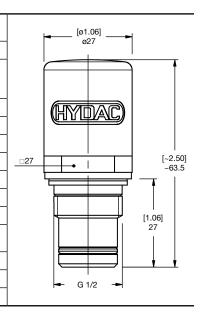
Type of indication	Visual, red/green band automatic reset
Weight	0.12 lbs (55 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VM 5 B.1



VD x B.x



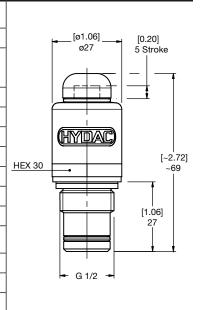
Type of indication	Visual, red/green band automatic reset
Weight	0.24 lbs (110 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi 420 bar
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VD 5 B.1



VM x BM.x



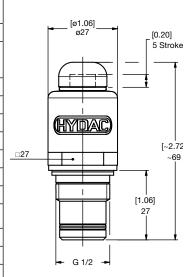
Type of indication	Visual, red/green band manual reset
Weight	0.12 lbs (55 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VM 5 BM.1



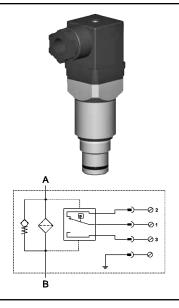
Specifications of Differential Pressure Indicators $_{\mbox{\scriptsize VD}\;\mbox{\tiny X}\;\mbox{\scriptsize BM.x}}$



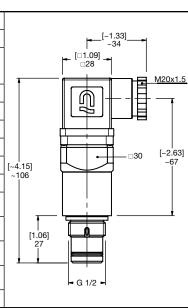
Type of indication	Visual, red/green band
Type of indication	manual reset
Weight	0.24 lbs (110 g)
	29 psi -10% (2 bar -10%)
Trip Pressure / Range	73 psi -10% (5 bar -10%)
	116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at	-
resistive load	
Switching capacity	-
Protection class to DIN 40050	-
Order example	VD 5 BM.1



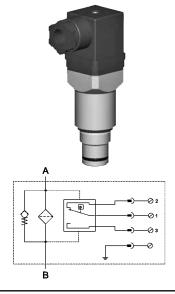
VM x C.x



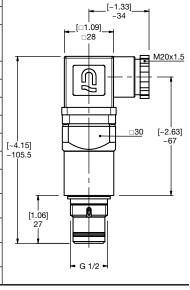
Type of indication	Electrical switch
Weight	0.26 lbs (120 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity*	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V \sim
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VM 5 C.0



VD x C.x

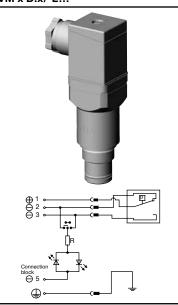


Type of indication	Electrical switch
Weight	0.49 lbs (220 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity*	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VD 5 C.0

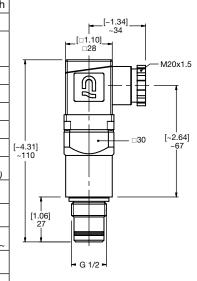


^{*}Required amperage > 20 mA; for lower amperages, order "-SO135" indicators (see Supplementary Details in the Model Code).

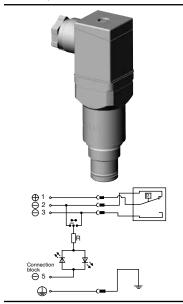
Specifications of Differential Pressure Indicators VM x D.x/-L...



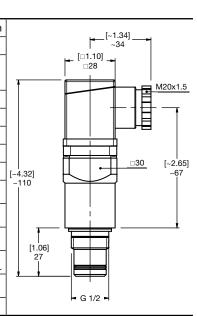
Type of indication	Visual indicator & electrical switch
Weight	0.33 lbs (150 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	24, 48, 115, 230 V (depending on the type of light insert)
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity*	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VM 5 D.0 /-L24



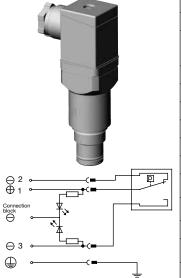
VD x D.x/-L...



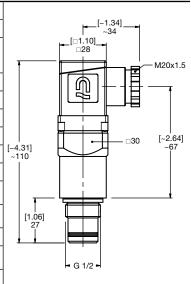
Type of indication	Visual indicator & electrical switch
Weight	0.55 lbs (250 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	24, 48, 115, 230 V (depending on the type of light insert)
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity*	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VD 5 D.0 /-L24



VM x D.x/-LED



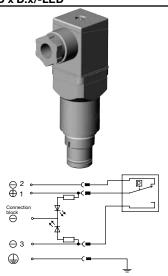
Type of indication	Visual indicator & electrical switch
Weight	0.33 lbs (150 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	24 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity*	Ohmic 3 A at 24 V =
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VM 5 D.0 /-LED



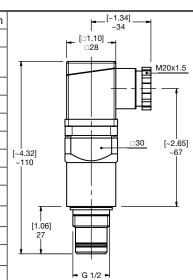
^{*}Required amperage > 20 mA; for lower amperages, order "-SO135" indicators (see Supplementary Details in the Model Code).

Specifications of Differential Pressure Indicators

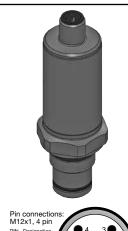
VD x D.x/-LED



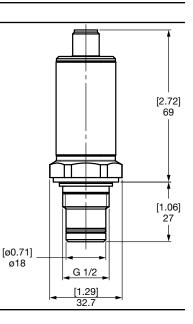
Type of indication	Visual indicator & electrical switch
Weight	0.55 lbs (250 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	24 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity*	Ohmic 3 A at 24 V =
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VD 5 D.0 /-LED



VD x GD.x



Type of indication	Electronic / Analog (4-20 mA)
Weight	0.41 lbs (184 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi -10% (8 bar -10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 185°F (-30°C to 85°C)
Thread	G 1/2 HN 28-22.1
Max. torque	100 Nm
Switching type	N/O or N/C
Max. switching voltage	Operating voltage 9-35 V DC
Electrical connection	M12x1 (4-pin)
Max. switching capacity	250 mA
Switching capacity	Varies with supply voltage
Protection class to DIN EN 60529	IP 67 (only if the connector is wired and fitted correctly)
Order example	VD 5 GD.0 /-V-123

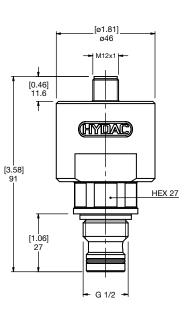


VL x GW.x



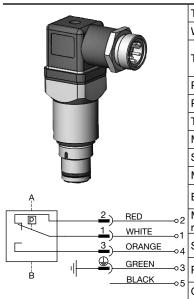
			Ub (2030 V DC)	1
A			ΔΡ _{75%}	1_3
		7	ΔΡ _{100%}	⊥ _ 6
		roller	ov.	2
₹ <->		out	p _A (420 mA)	-4
<u> </u>	P/L	9	$\Delta p = p_A - p_B$	5
		ュ	(420 mA)	7
В	i '	P.	AR-do not connect	8
	L			

Type of indication	Electronic / Analog, (4-20 mA) 1 switch contact at 75% and at 100% trip pressure		
Weight	0.35 lbs (157 g)		g)
Pressure setting (100%)	29 psi ±5% (2 bar ±5%)	44 psi ±5% (3 bar ±5%)	73 psi ±5% (5 bar ±5%)
Indication range Δp	0 - 73 psi (0 - 5 bar)	0 - 73 psi (0 - 5 bar)	0 - 116 psi (0 - 8 bar)
Indication range (p before filter)	30	63 psi (25 ba	ar)
Switching type (output Δp)		PNP positiv	
Output load	400 mA		
Max. switching operating voltage	20 - 30V DC		;
Analog outputs (p before filter & Δp)	4 - 20 mA	(max. load 600Ω)	resistance
Electrical connection	ı	V12x1/8 pol	е
Protection class to DIN 40050		IP 65	
Permitt. operating pressure		25 bar	
Permitt. temperature range	-40°F to	185°F (-40°C	to 85°C)
Thread		G 1/2	
Max. torque	Refer	o end of sec	ction H
Order example VL 5 GW.0 /-V-12		123	

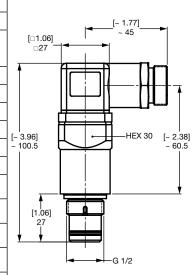


^{*}Required amperage > 20 mA; for lower amperages, order "-SO135" indicators (see Supplementary Details in the Model Code).

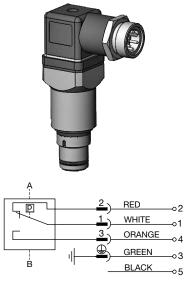
Specifications of Differential Pressure Indicators



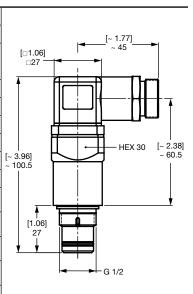
Ty	pe of indication	Electrical switch
W	/eight	0.33 lbs (150 g)
Tr	ip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Р	ermitt. operating pressure	3000 psi (210 bar)
Р	ermitt. temperature range	-13°F to 185°F (-25°C to 85°C)
TI	nread	G 1/2
M	ax. torque	Refer to end of section H
S	witching type	N/C or N/O (change-over contacts)
M	ax. switching voltage	230V
E	ectrical connection	7/8" (Mini) connector (5 PIN); Female connector to DIN 43650
'∸ re	ax. switching voltage at esistive load	60W= 100VA~
1 4	witching capacity	Ohmic 3A at 24V= Ohmic 0.03 to 5A at max. 230V~
3 P	rotection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
	rder example	VM 5 J.1



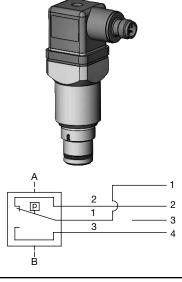
VD x J.x



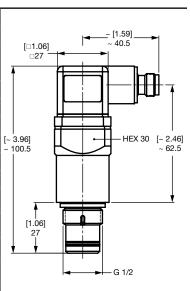
Type of indication	Electrical switch
Weight	0.55 lbs (250 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230V
Electrical connection	7/8" (Mini) connector (5 PIN); Female connector to DIN 43650
Max. switching voltage at resistive load	60W= 100VA~
Switching capacity	Ohmic 3A at 24V= Ohmic 0.03 to 5A at max. 230V~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VD 5 J.1



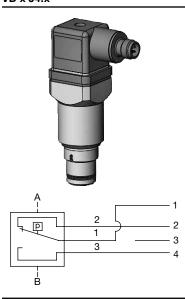
VM x J4.x



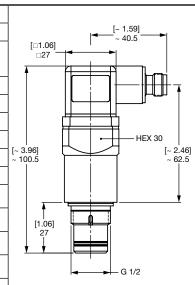
Type of indication	Electrical switch
Weight	0.26 lbs (120 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230V
Electrical connection	12mm (Micro) connector (4 PIN); Female connector to DIN 43650
Max. switching voltage at resistive load	60W= 100VA~
Switching capacity	Ohmic 3A at 24V= Ohmic 0.03 to 5A at max. 230V~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VM 5 J4.1



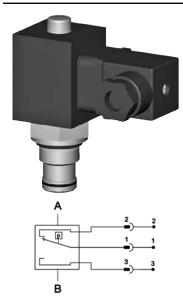
Specifications of Differential Pressure Indicators $VD \times J4.x$



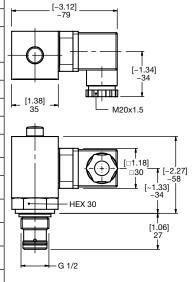
Type of indication	Electrical switch
Weight	0.49 lbs (220 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230V
Electrical connection	12mm (Micro) connector (4 PIN); Female connector to DIN 43650
Max. switching voltage at resistive load	60W= 100VA~
Switching capacity	Ohmic 3A at 24V= Ohmic 0.03 to 5A at max. 230V~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VD 5 J4.1



VD x LE.x

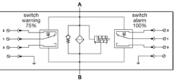


Type of indication	Visual (red pin) & electrical switch (100% activation)
Weight	0.44 lbs (198 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)
Max. switching voltage	115 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VD 5 LE.1

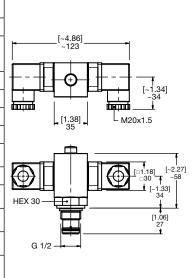


VD x LZ.x

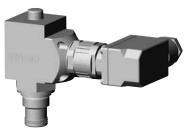


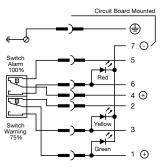


Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.53 lbs (240 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating press	sure 6000 psi (420 bar)
Permitt. temperature rar	nge 14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)
Max. switching voltage	115 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage a resistive load	at 15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN	40050 IP 65 (only if the connector is wired and fitted correctly)
Order example	VD 5 LZ.1

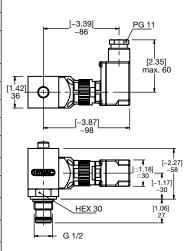


Specifications of Differential Pressure Indicators $\mbox{VD}\,\mbox{x}\,\mbox{LZ.x}\,\mbox{/-DB}$

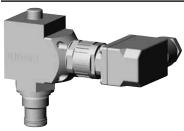


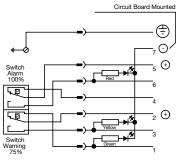


	Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)	
Λ	Weight	0.54 lbs (245 g)	
V	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC	
	Permitt. operating pressure	6000 psi (420 bar)	
	Permitt. temperature range	14°F to 212°F (-10°C to 100°C)	Ì
	Thread	G 1/2	١
	Max. torque	Refer to end of section H	Ì
	Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)	
	Max. switching voltage	24 V	
	Electrical connection	Male connection PG 11 Female connector to DIN 43651	
	Max. switching voltage at resistive load	15 W = max. 15 VA ~	
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~	
	Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)	
	Order example	VD 5 LZ.1 /-DB	

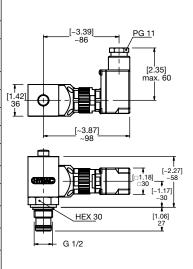


VD x LZ.x /-CN

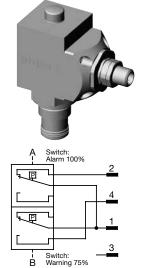




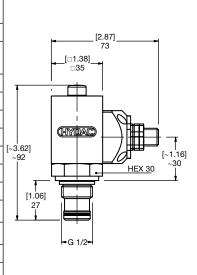
	Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)
N	Weight	0.54 lbs (245 g)
,	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
	Permitt. operating pressure	6000 psi (420 bar)
	Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
	Thread	G 1/2
d	Max. torque	Refer to end of section H
	Switching type	N/C or N/O contacts, Reed contacts (change-over contacts)
)	Max. switching voltage	24 V
	Electrical connection	Male connection PG 11 Female connector to DIN 43651
	Max. switching voltage at resistive load	15 W = max. 15 VA ~
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
	Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
	Order example	VD 5 LZ.1 /-CN



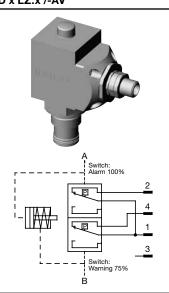
VD x LZ.x /-BO



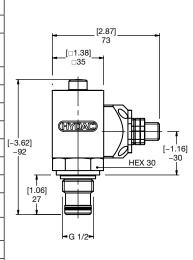
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.43 lbs (197 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/O (75%), N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VD 5 LZ.1 /-BO



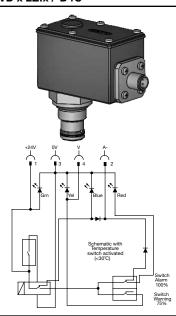
Specifications of Differential Pressure Indicators VD x LZ.x /-AV



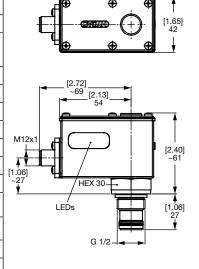
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.43 lbs (197 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C (75% and 100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VD 5 LZ.1 /-AV



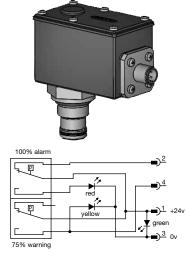
VD x LZ.x /-D4C



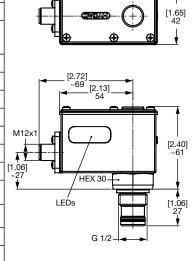
Type of indication	Electrical switch (75% & 100% activation) w/30°C thermal lockout. 4 LEDs (grn=pwr, blue= below 86°F, yel=75%, red=100%)
Weight	0.56 lbs (256 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/O (75%), N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VD 5 LZ.1 /-D4C



VD x LZ.x /-BO-LED



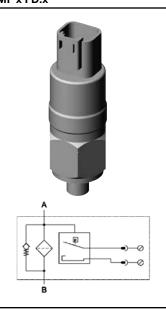
	Type of indication	Electrical switch (75% & 100% activation). 3 LEDs (grn=pwr,
	Weight	yel=75%, red=100%) 0.55 lbs (250 g)
	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
	Permitt. operating pressure	6000 psi (420 bar)
	Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
	Thread	G 1/2
	Max. torque	Refer to end of section H
	Switching type	N/O (75%), N/C (100%)
	Max. switching voltage	24 V
	Electrical connection	Male connection M12 x1
,	Max. switching voltage at resistive load	15 W = max. 15 VA ~
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
	Protection class to DIN 40050	IP 65
	Order example	VD 5 LZ.1 /-BO-LED



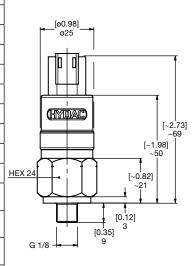
Specifications of Return Line Mobile Indicators VMF x FD.x

Type of indication

Weight



T	Type of indication	Electrical switch
١	Weight	0.15 lbs (70 g)
F	Trip Pressure / Range	29 psi ±4.4 psi (2 bar ±0.3 bar)
F	Permitt. operating pressure	160 psi (11 bar) continuous
F	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
F	Γhread	G 1/8
ľ	Max. torque	Refer to end of section H
5	Switching type	N/O or N/C
ı	Max. switching voltage	42 V
E	Electrical connection	Deutsch DT 04-2P
	Max. switching voltage at resistive load	60 W = 100 VA ~
5	Switching capacity	Ohmic 2.5 A at 24 V = Ohmic 1 A at 220 V ~
F	Protection class to DIN 40050	IP 67 (only if the connector is wired and fitted correctly)
(Order example	VMF 2 FD.0 /-2M0



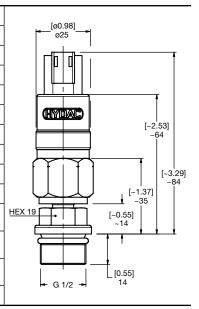
VR x FD.x



Trip Pressure / Range	29 psi ±4.4 psi (2 bar ±0.3 bar)
Permitt. operating pressure	160 psi (11 bar) continuous
Permitt. temperature range	-22°F to 212°F (-30 C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/O or N/C
Max. switching voltage	42 V
Electrical connection	Deutsch DT 04-2P
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	Ohmic 2.5 A at 24 V = Ohmic 1 A at 220 V ~
Protection class to DIN 40050	IP 67 (only if the connector is wired and fitted correctly)
Order example	VR 2 FD.0 /-2M0

Electrical switch

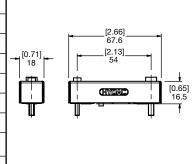
0.20 lbs (90 g)



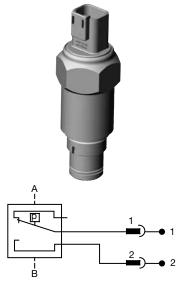
Specifications of Differential Pressure Mobile Indicators VL x BF.x



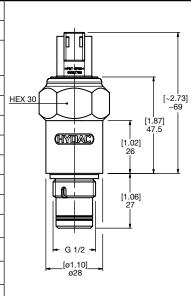
Type of indication	Visual
Weight	0.06 lbs (25 g)
Trip Pressure / Range	14.5 psi -10% (1 bar -10%) 36 psi -10% (2.5 bar -10%)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	14°F to 176°F (-10°C to 80°C)
Thread	M3; M4
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VL 2.5 BF.0



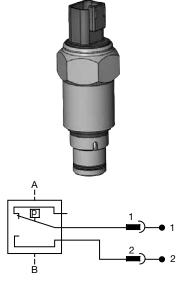
VM x CD.x



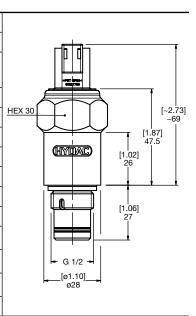
Type of indication	Electrical switch
Weight	0.22 lbs (100 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/O or N/C
Max. switching voltage	48 V
Electrical connection	-
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V ~
Protection class to DIN 40050	IP 67 (only if the connector is wired and fitted correctly)
Order example	VM 5 CD.0 /-2M0



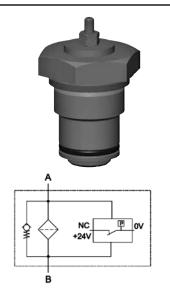
VD x CD.x



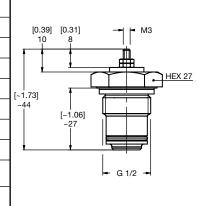
Type of indication	Electrical switch
Weight	0.43 lbs (195 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/O or N/C
Max. switching voltage	48 V
Electrical connection	-
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V ~
Protection class to DIN 40050	IP 67 (only if the connector is wired and fitted correctly)
Order example	VD 5 CD.0 /-2M0



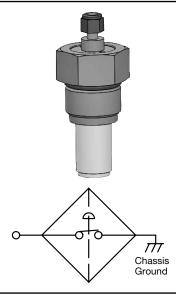
Specifications of Differential Pressure Mobile Indicators $v_{M \times M.x}$



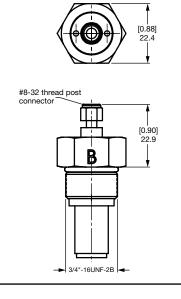
Type of indication	Single pole (ground switching)
Weight	0.07 lbs (31 g)
Trip Pressure / Range	29 psi ±15% (2 bar ±15%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/O or N/C
Max. switching voltage	24V
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	Terminals IP00
Order example	VM 2 M.0



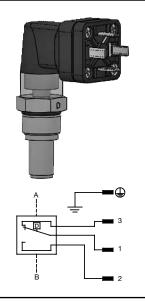
B...CMF*



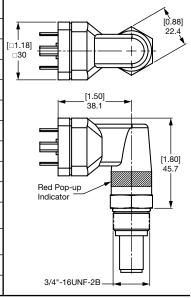
Type of indication	Single pole (ground switching)
Weight	0.05 lbs (24 g)
Trip Pressure / Range	44 psi +6 psi (3 bar +0.4 bar)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	22°F to 200°F (-30°C to 93°C)
Thread	SAE-8 differential port
Max. torque	Refer to end of section H
Switching type	N/O
Max. switching voltage	-
Electrical connection	#8 - 32 threaded post
Max. switching voltage at resistive load	-
Switching capacity	ohmic 200MA at 36VDC
Protection class to DIN 40050	Terminals IP00
Order example	B3420CMF.0



B...LEMF* Discontinued (consult HYDAC for suitable replacements)



Type of indication	Visual indicator & electric switch
Weight	0.18 lbs (80 g)
Trip Pressure / Range	44 psi +6 psi (3 bar +0.4 bar)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	22°F to 200°F (-30°C to 93°C)
Thread	SAE-8 differential port
Max. torque	Refer to end of section H
Switching type	N/O or N/C (change-over contacts)
Max. switching voltage	_
Electrical connection	Female connector to DIN 43650
Max. switching voltage at resistive load	-
Switching capacity	ohmic 5A at 125/250VAC, 5A at 24VDC
Protection class to DIN 40050	IP60
Order example	B3420LEMF.0

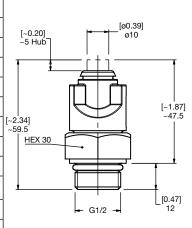


^{*}This clogging indicator is for use with the MF/MFD/MFDS Series only.

Specifications of Return Line Indicators in accordance with ATEX Directive $VR \times B.x$ (ATEX) Can be used on aluminium filters up to Zone 1



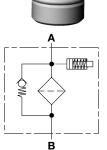
iminium filters up to Zone 1		
Type of indication	Visual, red pin	
Weight	0.10 lbs (44 g)	
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)	
Permitt. operating pressure	102 psi (7 bar)	
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
Thread	G 1/2	
Max. torque	Refer to end of section H	
Switching type	-	
Max. switching voltage	-	
Electrical connection	-	
Max. switching voltage at resistive load	-	
Switching capacity	-	
Protection class to DIN 40050	-	
Order example	VR 2 B.0 /-2GC	



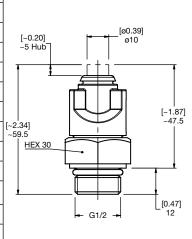
VR x B.x (ATEX) Can be used on steel/cast iron filters up to Zone 1



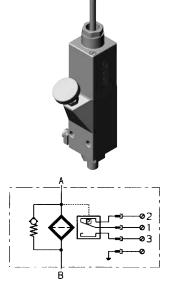
В



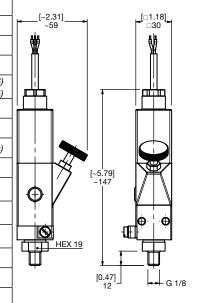
Type of indication	Visual, red pin
Weight	0.10 lbs (44 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VR 2 B.0 /-2GC-SO174



VMF x C.x /-Ex2G



Type of indication	Electrical switch
Weight	0.91 lbs (415 g)
Trip Pressure / Range*	29 psi ±7.3 psi (2 bar ±0.5 bar)
Permitt. operating pressure	2901 psi (200 bar)
Permitt. temperature range	-4°F to 158°F (-20°C to 70°C) (<i>T6</i>) -4°F to 176°F (-20°C to 80°C) (<i>T5</i>)
Thread	G 1/8
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	250 V
Electrical connection	Cable connection PG 9 Cable length 2 m
Max. switching voltage at resistive load	62.5 W = 250 VA ~
Switching capacity	Ohmic 0.25 A at 250 V = Ohmic 1 A at 250 V ~
Protection class to DIN 40050	IP 65
ATEX designation	😉 II 2G EEx d IIC T6 / T5

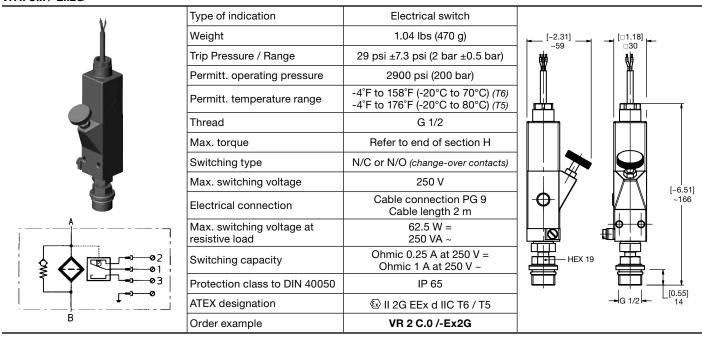


^{*}When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

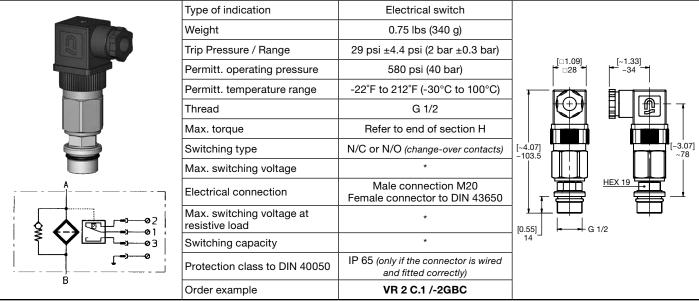
Order example

VMF 2 C.0 /-Ex2G

Specifications of Return Line Indicators in accordance with ATEX Directive VR x C.x /-Ex2G



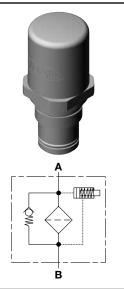
VR x C.x (ATEX) Can be used on filters up to Zone 1*



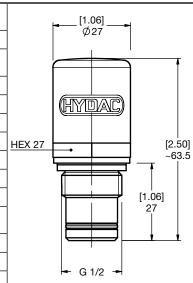
^{*}The clogging indicator is simple electrical operating equipment according to DIN EN 60079-14 and may only be used in intrinsically safe circuits (supplied with manufacturer's declaration and operating instructions).

Specifications of Differential Pressure Indicators in accordance with ATEX Directive

VM x B.x (ATEX) Can be used on aluminium filters up to Zone 1



u	uminium filters up to Zone 1		
	Type of indication	Visual, red/green band Automatic reset	
	Weight	0.24 lbs (110 g)	
	Trip Pressure / Range	73 psi - 10% (5 bar -10%) 116 psi ± 10% (8 bar ±10%)	
	Permitt. operating pressure	3000 psi (210 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/2	
	Max. torque	Refer to end of section H	
	Switching type	-	
	Max. switching voltage	-	
	Electrical connection	-	
	Max. switching voltage at resistive load	-	
	Switching capacity	-	
	Protection class to DIN 40050	-	
	Order example	VM 5 B.1 /-2GC	

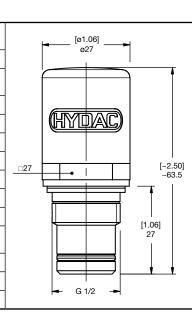


VD x B.x (ATEX) Can be used on filters up to Zone 1

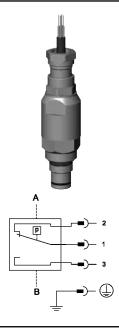


B

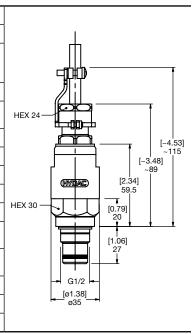
Type of indication	Visual, red/green band Automatic reset
Weight	0.24 lbs (110 g)
Trip Pressure / Range	73 psi - 10% (5 bar -10%) 116 psi ± 10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VD 5 B.1 /-2GC



VD x C.x /-2GEXDIIC

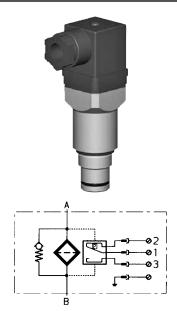


Type of indication	Electrical switch
Weight	1.32 lbs (600 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C) setting (media temp. max. 75° C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	Change-over
Max. switching voltage	250 V
Electrical connection	Cable connection
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	ohmic 3 A at 24 V = ohmic 0.03 A to 5 A at 250 V ~
Protection class to DIN 40050	IP 66
ATEX designation	II 2G Ex d IIC T6
Order example	VD 2 C.1 /-2GEXDIIC

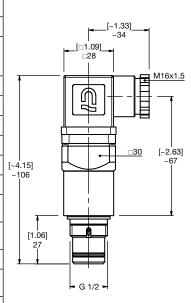


Specifications of Differential Pressure Indicators in accordance with ATEX Directive

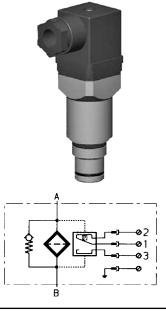
VM x C.x (ATEX) Can be used on aluminium filters up to Zone 1



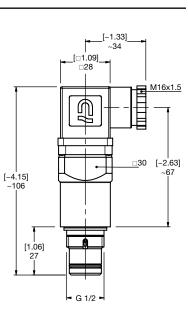
Type of indication	Electrical switch
Weight	0.26 lbs (120 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	*
Electrical connection	Male connection M16 Female connector to DIN 43650
Max. switching voltage at resistive load	*
Switching capacity	*
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VM 5 C.0 /-2GBC-SO135



VD x C.x (ATEX) Can be used on filters up to Zone 1*

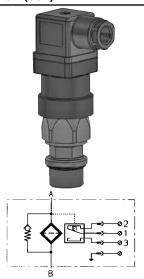


ters up to Zone 1"	
Type of indication	Electrical switch
Weight	0.49 lbs (220 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	*
Electrical connection	Male connection M16 Female connector to DIN 43650
Max. switching voltage at resistive load	*
Switching capacity	*
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VD 5 C.0 /-2GBC-SO135

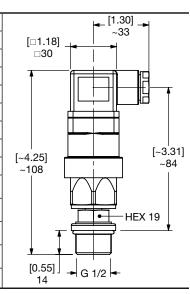


^{*}The clogging indicator is simple electrical operating equipment according to DIN EN 60079-14 and may only be used in intrinsically safe circuits (supplied with manufacturer's declaration and operating instructions).

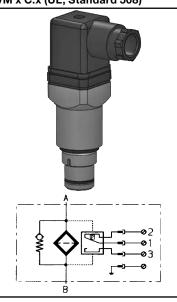
Specifications of Return Line Indicators with UL or CSA approval



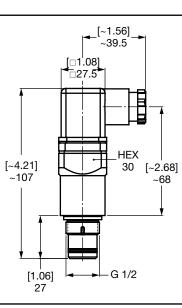
Type of indication	Electrical switch
Weight	0.75 lbs (340 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	23°F to 248°F (-5°C to 120°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230 V
Electrical connection	Male connection PG 9 Female connector to DIN 43650
Max. switching voltage at resistive load	250 W = 300 VA ~
Switching capacity	Ohmic 4 A at 24 V Ohmic 0.3 to 4 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VR 2 C.0 /-CSA



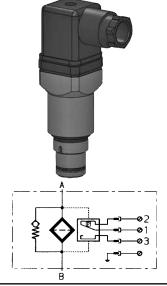
Specifications of Differential Pressure Indicators with UL or CSA approval VM x C.x (UL, Standard 508)



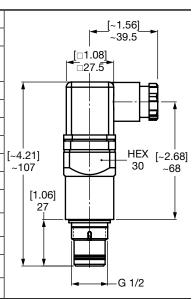
Type of indication	Electrical switch
Weight	0.26 lbs (120 g)
Trip Pressure / Range*	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 176°F (-30°C to 80°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230 V
Electrical connection	Male connection PG 11 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	ohmic 3 A at 24 V =
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VM 5 C.0 /-CRUUS



VD x C.x (UL, Standard 508)

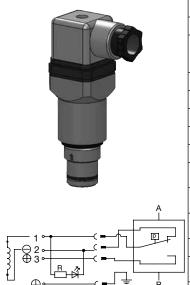


Type of indication	Electrical switch
Weight	0.55 lbs (250 g)
Trip Pressure / Range*	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 176°F (-30°C to 80°C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	230 V
Electrical connection	Male connection PG 11 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	ohmic 3 A at 24 V =
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VD 5 C.0 /-CRUUS

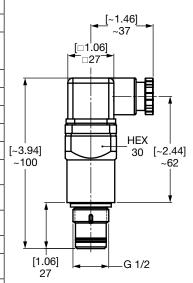


^{*}When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

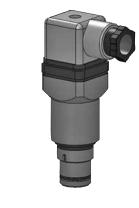
Specifications of Differential Pressure Indicators with UL or CSA approval $VM \times D.x$ /-L... (UL, Standard 508)

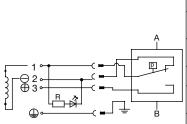


	Type of indication	Electrical switch
	Weight	0.26 lbs (120 g)
	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
	Permitt. operating pressure	3000 psi (210 bar)
	Permitt. fluid temperature	-13°F to 176°F (-25°C to 80°C)
	Thread	G 1/2
	Max. torque	Refer to end of section H
	Switching type	N/O
	Max. switching voltage	24, 110 V (depending on the type of light insert)
	Electrical connection	Male connection PG 11 Female connector to DIN 43650
1	Max. switching voltage at resistive load	60 W = 100 VA ~
	Switching capacity	ohmic 3 A at 24 V =
	Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
	Order example	VM 5 D.0 /-L24-CRUUS

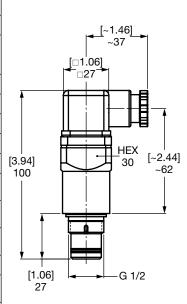


VD x D.x /-L... (UL, Standard 508)





Type of indication	Electrical switch
Weight	0.49 lbs (220 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-13° F to 176° F (-25° C to 80° C)
Thread	G 1/2
Max. torque	Refer to end of section H
Switching type	N/O
Max. switching voltage	24, 110 V (depending on the type of light insert)
Electrical connection	Male connection PG 11 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	ohmic 3 A at 24 V =
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VD 5 D.0 /-L24-CRUUS



Model Code: Standard Clogging Indicators

```
D . X /-V-L24
Category
  VMF
               Return line (static) indicator; connection G 1/8
  VR
               Return line (static) indicator; connection G 1/2
  VM
               Differential pressure indicator; up to 3000 psi (210 bar) operating pressure
                                                                                              G 1/2
  VD
               Differential pressure indicator; up to 6000 psi (420 bar) operating pressure
  ٧L
               Differential pressure indicator; up to 360 psi (25 bar) operating pressure
Pressure setting
  1 = 15 psi (1 bar) (optional, for use in lube applications) - (not available with all types- Consult HYDAC)
  2 = 29 psid (2 bar) (standard, for use on return line filters)
  5 = 72 psid (5 bar) (standard, for use on pressure filters, except DFDK & DFZ)
  8 = 116 psid (8 bar) (standard, on DFDK & DFZ filters) - (not available with all types- Consult HYDAC)
Type
               no indicator, port is drilled and plugged
  В
               Visual pop-up with automatic reset
  RF
               Visual, mobile applications
  ВМ
               Visual pop-up with manual reset
               Electrical switch
  C
  CD
               Electrical switch with Deutsch plug (DT 04-2P)
  D
               Electric switch and Visual (light - 24 VDC, 110 VAC)
  F
               Pressure gauge, horizontal (static only)
  ES
               Pressure gauge, vertical
               Pressure switch, mobile applications
  FD
               Pressure switch with Deutsch plug (DT 04-2P), mobile applications
  GD
               Electronic analog (4-20 mA) (VD & VR only)
  GW
               Electronic analog (4-20 mA or 1-10 V) / pressure switch 75% and 100% trips & bypass monitoring (VL only)
  J
               Electric switch - Brad Harrison 5-pin mini connector
               Electric switch - Brad Harrison 4-pin micro connector
  .14
  LE
               Electric pressure switch / visual pop-up button with 100% switching contact
  I FM
               Electric pressure switch / visual pop-up button with 100% switching contact and M12x1 plug,
  17
               Electric pressure switch / visual pop-up button with 75% and 100% switching contact
  M
               Electrical, ground switching
  UE
               Vacuum pressure gauge, horizontal
  UF
               Vacuum switch
  W
               no indicator, port is not drilled
Modification Number
               The latest version is always supplied
Supplementary Details
               Lockout below 100°F (VM, VD - types C, D, J and J4 only)
  T100
  30C
               Cold start suppression of switching outputs up to 30°C ±5°C
               (only for C, D, LZ indicators; DC voltage supply only - max. 24 Volt;
               C and D indicators only for VD and VM; on D and LZ indicators, contacts must be wired N/O only)
               Light with corresponding voltage (24, 48, 110, 230 Volt)
                                                                          only for
  LED
               2 LEDs up to 24 Volt
                                                                          type "D'
  OE
               N/C function
  SO135
               Indicator suitable for PLC controls (Gold-Crosspoint contacts)
          =
  W
               Suitable for oil/water emulsions (HFA, HFC)
               Fluorocarbon elastomer (FKM), suitable for phosphate esters (HFD-R) and biodegradable oils (must be specified for type "GW")
               Nitrile (NBR) is standard. Ethylene propylene (EPDM, code EPR) available upon request.
  2M0
                Two contacts (male), 2-pin Deutsch connector, no connector cable
  2M20
               Two contacts (male), 2-pin Deutsch connector, 200 mm connector cable
Supplementary Details for "GD" type
               N/O function - pressure peak suppression up to 10 sec.
                              Cold start suppression of switching outputs
                              (PNP technique, positive switching) up to 25°C
                                                                               Must be specified!
               N/C function - pressure peak suppression up to 10 sec.
  123
                                                                              Others on request
                              Cold start suppression of switching outputs
                              (PNP technique positive switching) up to 25°C
Supplementary Details to "GW" type
               N/O function - pressure peak suppression up to 10 sec.
                              Cold start suppression of switching outputs
                                                                               Must be specified!
                              (PNP technique positive switching) up to 25°C
                                                                              Others on request
  123
               N/C function - pressure peak suppression up to 10 sec.
                              Cold start suppression of switching outputs
                              (PNP technique positive switching) up to 25°C
Supplementary Details for "LZ" type
               Plug and connector to AUDI, VW specification
  ΑV
          =
  ВО
               Plug and connector to BMW, Opel, Ford specification
  BO-I FD=
               Same as BO, but with progressive LED strip
  CN
               Electrical connection, 1 connector DIN 43651 with 3 LEDs (to CNOMO specification NF E 48-700)
  DB
               Electrical connection, 1 connector to DIN 43651 with 3 LEDs (to Daimler-Benz and BMW specification)
```

Plug and connector to Daimler-Chrysler specification with cold start suppression 30 °C

HYDAC

D4C

Supplementary Details to "ATEX" type

= For visual indicator type "B" with ATEX certificate 2GC

= For electrical indicator type "C" with ATEX certificate (the switch used in the indicator is a passive component according 2GBC

to EN 50020 and can therefore be used in intrinsically safe circuits as simple apparatus in accordance with EN 60079-14)

2GEXDIIC = For electrical indicator suitable for use in Zone 1 (Category 2), gas atmosphere, Category d (Flameproof Enclosure), Explosive

subdivision IIC to ATEX directive

EX2G = Ex-protection type for the return line indicator type "C"

Supplementary Details for "UL" and "CSA" approval

= For electrical differential indicator type "C" and "D" with UL Underwriter's Recognition = For electrical return line indicator type "C" with CSA approval

CSA

Notes: 1. Old style indicators for filters HF2P / HF3P / HF4P - pre 2008 (Example Model Code: B2210BHF), contact HYDAC for further information.

2. VMF indicators of type B, LE, LZ, and C I-EX2G, must include "V" at the end of the Model Code if Fluorocarbon elastomer (FKM) seals are required. All other VMF indicators come with Fluorocarbon elastomer (FKM) seals as a standard (no Supplementary Detail required).

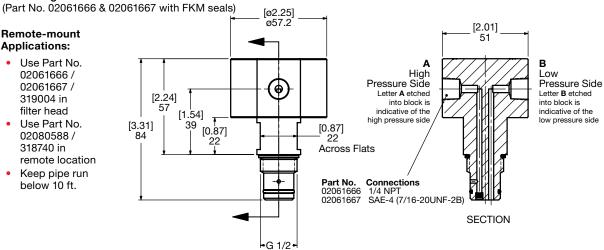


Dual Indicator / Gauge Blocks

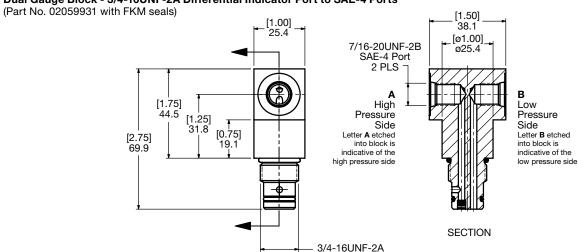
Dual Gauge Block - G 1/2 Differential Indicator Port to SAE-4 or 1/4 NPT Ports

Remote-mount Applications:

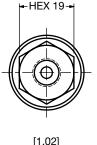
- Use Part No. 02061666 / 02061667 / 319004 in filter head
- Use Part No. 02080588/ 318740 in remote location
- Keep pipe run below 10 ft.

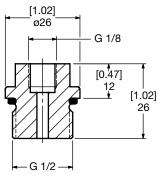


Dual Gauge Block - 3/4-16UNF-2A Differential Indicator Port to SAE-4 Ports

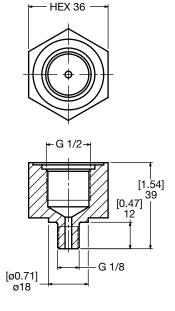


Adapter - Static - G 1/2" to G 1/8" (Part No. 319004 w/NBR seal)

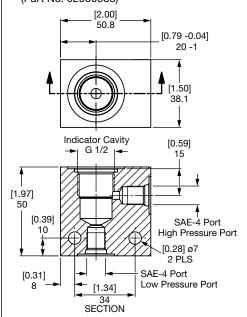




Adapter - Static - G 1/8" to G 1/2" (Part No. 318740)

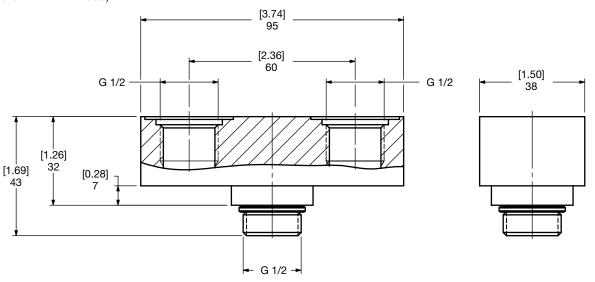


Pipe Connection Block - SAE-4 Ports to G1/2 Differential Indicator Port (Part No. 02080588)

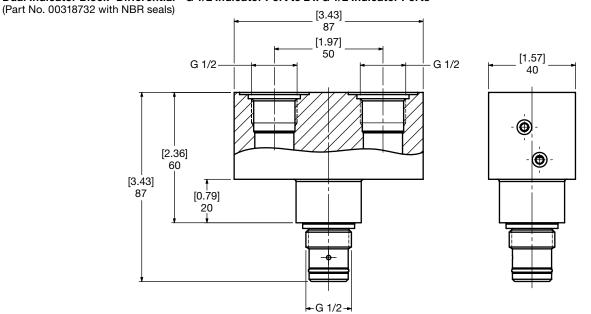


Dual Indicator Block- Static - G 1/2 port to 2 x G 1/2 ports

(Part No. 00318741 with NBR seal)



Dual Indicator Block- Differential - G 1/2 Indicator Port to 2 x G 1/2 Indicator Ports



INDICATOR INSTALLATION INFORMATION FOR FILTERS

	Indicator	Indicator Type		Tightening T	orque (lbf-ft)		Sealing
	Series		M	aterial of the Ind		art	_
			Steel	Ductile Iron	Aluminum	Plastic (Nylon)	
		A (G 1/8" VSTI PLUG) B/BM					No elastomeric seals included with
		C/CM D E/ES				NOT	indicator. When sealing indicator to static indicator port,
	VMF	F/FA/FD/FF/FJ/FM/FS K	11	11	7.5	APPLICABLE	apply Loctite 542 or equivalent thread locker and sealant
	• • • • • • • • • • • • • • • • • • • •	LE/LEC/LEM/LZ M R/RS					to indicator port threads and tighten to recommended
		UBM	1.5	1.5	1.5	1.5	torque. Allow a
38		UC/UCM UE/UED	11	11	7.5	NOT APPLICABLE	minimum of 24 hours for full curing of thread locker and
2		UF/UFJ	07	0.7	0.4		sealant.
CA.		A B/BM	37 11	37 11	24 11	-	
INDI		C/CM	!!	!!	11		
STATIC INDICATORS		D E/ES F/FA/FD/FF/FJ/FM/FS	37	37	24		Clasta manife and
0,	VR	GD LE/LEC/LEM/LZ	11	11	11	7.5	Elastomeric seal included.
-		K R/RS UC/UCM	37	37	24		
		UE/UED UF/UFJ	31	37	24		
		C/CM					
		D E/ES					
		K					Flootomonic cool
	VRD	F/FA/FD/FF/FJ/FM/FS R/RS	37	37	24	7.5	Elastomeric seal included.
		UC/UCM					
		UE/UED					
		UF/UFJ					
		A	37	37	24	7.5	
		B/BM C/CA/CC/CD/CJ/CM/CS/CW D			NOT APPLICABLE		
ORS	VD	B/BM (W Option) C/CA/CC/CD/CJ/CM/CS/CW (W Option) D (W Option)	74	74	04	- NOT APPLICABLE	Elastomeric seal included.
CATC		GD LE/LEC/LEM/LZ			24		
INDI		MB/MBM MC/MCD/MCJ	37	37		7.5	
TIAL	VL	BF	0.5	0.5	0.5	NOT APPLICABLE	Elastomeric seal
Ä		GW	24	24	24	7.5	included.
DIFFERENTIAL INDICATORS		B/BM C/CA/CC/CD/CJ/CM/CS/CW					
Q	VM	D GM	24	24	24	7.5	Elastomeric seal included.
		M MB/MBM MC/MCD/MCJ					
	BMF	B LE*	N/A	N/A	24	N/A	Elastomeric seal
		C					included.

^{*}Discontinued (consult HYDAC for suitable replacements)

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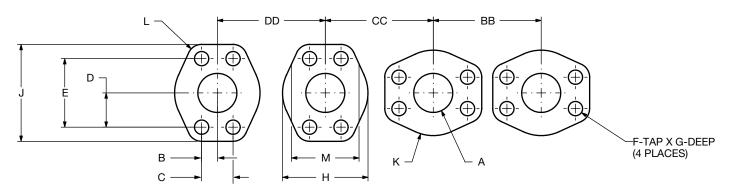
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Appendix – Flange Details

APPENDIX – FLANGE DETAILS

SAE Code 61 & 62

Flange Details



SAE 4 Bolt Flange Port Dimension: Code 61

SIZE CODE	MAX PRESS	A DIA. MAX	B ±0.01	C ±0.01	D ±0.01	E ±0.01	F UNC-2B	G MIN.	H ±0.01	J ±0.03	K RAD	L RAD	M MIN.	BB Min.	CC MIN.	DD MIN.
8	5000	0.5 12.7	9 0.34	17.48 0.688	19 0.75	38.10 1.5	5/16-18	24 0.94	46 1.81	54 2.12	23 0.91	8 0.31	33 1.31	56 2.22	52 2.06	49 1.91
12	5000	0.75 19.05	11 0.437	22.23 0.875	24 0.94	47.63 1.875	3/8-16	22 0.88	52 2.06	65 2.56	26 1.03	9 0.34	41 1.62	68 2.66	61 2.41	55 2.16
16	5000	1.00 25.4	13 0.52	26.19 1.031	26 1.03	52.37 2.062	3/8-16	22 0.88	59 2.31	70 2.75	29 1.16	9 0.34	48 1.88	72 2.84	67 2.62	61 2.41
20	4000	1.25 31.75	15 0.59	30.18 1.188	29 1.16	58.72 2.312	7/16-14	28 1.12	73 2.88	79 3.12	37 1.44	10 0.41	54 2.12	82 3.22	78 3.09	75 2.97
24	3000	1.5 38.1	18 0.70	35.71 1.406	35 1.38	69.85 2.75	1/2-13	27 1.06	83 3.25	94 3.69	41 1.62	12 0.47	64 2.50	96 3.78	90 3.56	85 3.34
32	3000	2.00 50.8	21 0.84	42.88 1.688	39 1.53	77.77 3.062	1/2-13	27 1.06	97 3.81	102 4.00	49 1.91	12 0.47	76 3.00	104 4.09	102 4.00	99 3.91
40	2500	2.5 63.5	25 1.00	50.8 2.00	44 1.75	88.90 3.50	1/2-13	30 1.19	109 4.28	114 4.500	54 2.14	13 0.50	89 3.50	117 4.59	114 4.50	111 4.38
48	2000	3.00 76.2	31 1.22	61.93 2.438	53 2.09	106.38 4.188	5/8-11	30 1.19	131 5.16	135 5.31	66 2.58	14 0.56	106 4.19	137 5.41	136 5.34	133 5.25
56	500	3.5 88.9	35 1.38	69.85 2.75	60 2.38	120.65 4.75	5/8-11	33 1.31	140 5.50	152 6.00	70 2.75	16 0.62	119 4.69	155 6.09	148 5.84	142 5.59
64	500	4.00 101.6	39 1.53	77.77 3.062	65 2.56	130.18 5.125	5/8-11	30 1.19	152 6.00	162 6.38	76 3.00	16 0.62	132 5.19	164 6.47	160 6.28	155 6.09
80	500	5.00 127	46 1.81	92.08 3.625	76.2 3.00	152.40 6.00	5/8-11	33 1.31	181 7.12	184 7.25	90 3.56	16 0.62	157 6.19	186 7.34	185 7.28	183 7.22

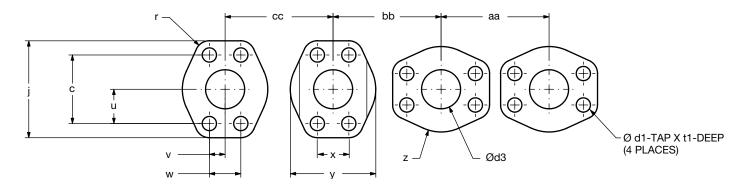
SAE 4 Bolt Flange Port Dimension: Code 62

SIZE CODE	MAX PRESS	A DIA. MAX	B ±0.01	C ±0.01	D ±0.01	E ±0.01	F UNC-2B	G MIN.	H ±0.01	J ±0.03	K RAD	L RAD	M MIN.	BB Min.	CC MIN.	DD MIN.
8	6000	0.5 12.7	9 0.359	18.24 0.718	20 0.80	40.49 1.594	5/16-18	21 0.81	48 1.88	56 2.22	24 0.94	8 0.31	38 1.50	59 2.34	56 2.22	53 2.09
12	6000	0.75 19.05	12 0.469	23.80 0.937	25 1.00	50.8 2.00	3/8-16	24 0.94	60 2.38	71 2.81	30 1.19	10 0.41	48 1.88	75 2.94	70 2.75	66 2.59
16	6000	1.00 25.4	14 0.55	27.76 1.093	28 1.12	57.15 2.250	7/16-14	27 1.06	70 2.75	81 3.19	35 1.38	12 0.47	54 2.12	84 3.31	80 3.16	75 2.97
20	6000	1.25 31.75	16 0.62	31.75 1.250	33 1.31	66.68 2.625	1/2-13	25 1.00	78 3.06	95 3.75	39 1.53	14 0.56	60 2.38	99 3.88	90 3.56	83 3.25
24	6000	1.5 38.1	18 0.72	36.50 1.437	40 1.56	79.38 3.125	5/8-11	35 1.38	95 3.75	113 4.44	48 1.88	17 0.66	70 2.75	116 4.56	108 4.25	101 3.97
32	6000	2.00 50.8	22 0.88	44.45 1.750	49 1.91	96.82 3.812	3/4-10	38 1.50	114 4.50	133 5.25	57 2.25	18 0.72	86 3.38	137 5.38	128 5.03	120 4.72
40*	6000	2.5 63.5	29.36 1.156	58.72 2.312	62 2.437	123.83 4.875	7/8-9	46 1.81	149.09 5.87	174.49 6.87	75 2.94	25 1.00	111 4.38	178 7.00	166 6.54	155 6.09
48*	6000	3.00 76.2	35.71 1.406	71.43 2.812	76 3.00	152.4 6	1 1/8-7	59 2.31	177.8 7	215.9 8.5	89 3.50	32 1.25	137 5.38	219 8.62	201 7.92	183 7.22

*Not SAE-Standard

SAE - DN

Flange Details



ISO 6162 Bolt Flange Port Dimension: 25-350 Bar Series

Size DN	Max Press. Bar (psi)	Ød3	v	w	u	С	Ød1	t1	у	j	z	r	x	aa	bb	cc
13	350	(0.50)	(0.34)	(0.69)	(0.75)	(1.50)	M8 x	(0.49)	(1.81)	(2.13)	(0.91)	(0.31)	(1.30)	(2.20)	(2.05)	(1.93)
	(5000)	12.7	8.75	17.5	19.05	38.1	1.25	12.5	46	54	23	8	33	56	52	49
19	350	(0.75)	(0.44)	(0.88)	(0.94)	(1.87)	M10 x	(0.65)	(2.05)	(2.56)	(1.02)	(0.35)	(1.61)	(2.68)	(2.40)	(2.17)
	(5000)	19.1	11.15	22.3	23.8	47.6	1.50	16.5	52	65	26	9	41	68	61	55
25	350	(0.96)	(0.52)	(1.03)	(1.03)	(2.06)	M10 x	(0.57)	(2.32)	(2.76)	(1.14)	(0.35)	(1.89)	(2.83)	(2.64)	(2.40)
	(5000)	25.4	13.1	26.2	26.2	52.4	1.50	14.5	59	70	29	9	48	72	67	61
32	250	(1.25)	(0.59)	(1.19)	(1.16)	(2.31)	M10 x	(0.65)	(2.87)	(3.11)	(1.46)	(0.39)	(2.13)	(3.23)	(3.07)	(2.95)
	(4000)	31.8	15.1	30.2	29.35	58.7	1.5	16.5	73	79	37	10	54	82	78	75
38	200	(1.50)	(0.70)	(1.41)	(1.38)	(2.75)	M12 x	(0.77)	(3.27)	(3.7)	(1.61)	(0.47)	(2.52)	(3.78)	(3.54)	(3.35)
	(3000)	38.1	17.85	35.7	34.95	69.9	1.75	19.5	83	94	41	12	64	96	90	85
51	200	(2.00)	(0.84)	(1.69)	(1.53)	(3.06)	M12 x	(0.77)	(3.82)	(4.02)	(1.93)	(0.47)	(2.99)	(4.09)	(4.02)	(3.90)
	(3000)	50.8	21.45	42.9	38.9	77.8	1.75	19.5	97	102	49	12	76	104	102	99
64	160	(2.50)	(1.00)	(2.00)	(1.75)	(3.5)	M12 x	(0.85)	(4.29)	(4.49)	(2.13)	(0.51)	(3.5)	(4.61)	(4.49)	(4.37)
	(2500)	63.5	25.4	50.8	44.45	88.9	1.75	21.5	109	114	54	13	89	117	114	111
76	100	(3.00)	(1.22)	(2.44)	(2.09)	(4.19)	M16 x	(1.12)	(5.16)	(5.31)	(2.60)	(0.55)	(4.17)	(5.39)	(5.35)	(5.24)
	(2000)	76.2	30.95	61.9	53.2	106.4	2.00	28.5	131	135	66	14	106	137	136	133
89	25	(3.50)	(1.38)	(2.75)	(2.38)	(4.75)	M16 x	(1.12)	(5.51)	(5.98)	(2.76)	(0.63)	(4.69)	(6.10)	(5.83)	(5.59)
	(500)	88.9	34.95	69.9	60.35	120.7	2.00	28.5	140	152	70	16	119	155	148	142
102	25	(4.00)	(1.53)	(3.06)	(2.56)	(5.13)	M16 x	(1)	(5.98)	(6.38)	(2.36)	(0.63)	(5.20)	(6.46)	(6.30)	(6.10)
	(500)	101.6	38.9	77.8	65.1	130.2	2.00	25.5	152	162	76	16	132	164	160	155
127	25	(5.00)	(1.81)	(3.63)	(3.00)	(6.00)	M16 x	(1.08)	(7.13)	(7.24)	(3.54)	(0.63)	(5.94)	(7.32)	(7.28)	(7.20)
	(500)	127	46.05	92.1	76.2	152.4	2.00	27.5	181	184	90	16	151	186	185	183

ISO 6162 Bolt Flange Port Dimension: 400 Bar Series

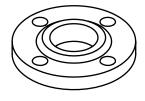
Size DN	Max Press. Bar (psi)	Ød3	v	w	u	С	Ød1	t1	у	j	z	r	x	aa	bb	cc
13	400	(0.50)	(0.36)	(0.72)	(0.80)	(1.59)	M8 X	(0.57)	(1.89)	(2.20)	(0.94)	(0.31)	(1.50)	(2.32)	(2.20)	(2.09)
	(6000)	12.7	9.1	18.2	20.25	40.5	1.25	14.5	48	56	24	8	38	59	56	53
19	400	(0.75)	(0.47)	(0.94)	(1.00)	(2.00)	M10 X	(0.65)	(2.36)	(2.80)	(1.18)	(0.39)	(1.89)	(2.95)	(2.76)	(2.6)
	(6000)	19.1	11.9	23.8	25.4	50.8	1.50	16.5	60	71	30	10	48	75	70	66
25	400	(1.00)	(0.55)	(1.09)	(1.13)	(2.25)	M12 X	(0.85)	(2.76)	(3.19)	(1.38)	(0.47)	(2.13)	(3.31)	(3.15)	(2.95)
	(6000)	25.4	13.9	27.8	28.6	57.2	1.75	21.5	70	81	35	12	54	84	80	75
32	400	(1.25)	(0.63)	(1.25)	(1.31)	(2.62)	M12 X	(0.73)	(3.07)	(3.74)	(1.54)	(0.55)	(2.36)	(3.9)	(3.54)	(3.27)
	(6000)	31.8	15.9	31.8	33.3	66.6	1.75	18.5	78	95	39	14	60	99	90	83
38	400	(1.50)	(0.72)	(1.44)	(1.56)	(3.12)	M16 X	(0.81)	(3.74)	(4.45)	(1.89)	(0.67)	(2.76)	(4.57)	(4.25)	(3.98)
	(6000)	38.1	18.25	36.5	39.65	79.3	2.00	20.55	95	113	48	17	70	116	108	101
51	400	(2.00)	(0.88)	(1.75)	(1.91)	(3.81)	M20 X	(1.32)	(4.49)	(5.24)	(2.24)	(0.71)	(3.39)	(5.39)	(5.04)	(4.72)
	(6000)	50.8	22.25	44.5	48.4	96.8	2.50	33.5	114	133	57	18	86	137	128	120

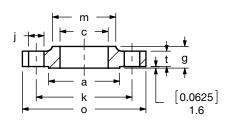
APPENDIX – FLANGE DETAILS

ANSI

Flange Details

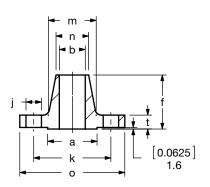
Slip On





Welding Neck

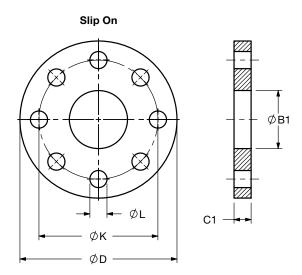


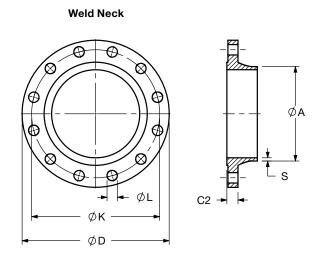


150 lb. ANSI Flange Port Dimensions

Pipe size	o	t	а	b	С	# of holes	j	k
0.5	(3.50) 88.9	(0.44) 11.1	(1.38) 34.9	(0.62) 15.7	(0.88) 22.35	4	(0.63) 15.88	(2.38) 60.3
0.75	(3.88) 98.4	(0.50) 12.7	(1.69) 42.9	(0.82) 20.8	(1.09) 27.69	4	(0.63) 15.88	(2.75) 69.85
1	(4.25) 107.9	(0.56) 14.29	(2.00) 50.8	(1.05) 26.67	(1.36) 34.5	4	(0.63) 15.88	(3.13) 79.4
1.25	(4.63) 117.5	(0.63) 15.9	(2.50) 63.5	(1.38) 35.05	(1.70) 43.2	4	(0.63) 15.88	(3.50) 88.9
1.5	(5.00) 127	(0.69) 17.5	(2.88) 73	(1.61) 40.9	(1.95) 49.5	4	(0.63) 15.88	(3.88) 98.4
2	(6.00) 152.4	(0.75) 19	(3.63) 92.1	(2.07) 52.6	(2.44) 61.98	4	(0.75) 19	(4.75) 120.6
2.5	(7.00) 177.8	(0.88) 22.2	(4.13) 104.8	(2.47) 62.7	(2.94) 74.7	4	(0.75) 19	(5.50) 139.7
3	(7.50) 190.5	(0.94) 23.8	(5.00) 127	(3.07) 78	(3.57) 90.7	4	(0.75) 19	(6.00) 152.4
3.5	(8.50) 215.9	(0.94) 23.8	(5.50) 139.7	(3.55) 90.17	(4.07) 103.4	8	(0.75) 19	(7.00) 177.8
4	(9.00) 228.6	(0.94) 23.8	(6.19) 157.2	(4.03) 102.4	(4.57) 116.1	8	(0.75) 19	(7.50) 190.5
5	(10.00) 254	(0.94) 23.8	(7.31) 185.7	(5.05) 128.3	(5.66) 143.8	8	(0.88) 22.2	(8.50) 215.9
6	(11.00) 279.4	(1.00) 25.4	(8.50) 215.9	(6.07) 154.2	(6.72) 170.7	8	(0.88) 22.2	(9.50) 241.3
8	(13.50) 342.9	(1.13) 28.6	(10.63) 269.9	(7.98) 202.7	(8.72) 221.5	8	(0.88) 22.2	(11.75) 298.5
10	(16.00) 406.4	(1.19) 30.2	(12.75) 323.8	(10.02) 254.5	(10.88) 276.4	12	(1.00) 25.4	(14.25) 362
12	(19.00) 482.6	(1.25) 31.8	(15.00) 381	(12.00) 304.8	(12.88) 327.2	12	(1.00) 25.4	(17.00) 431.8

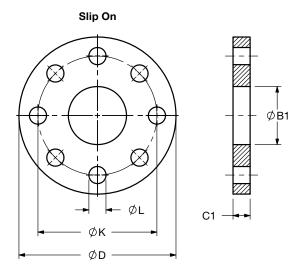
DN Flange DIM PN 16

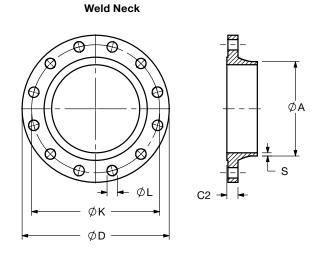




DN	D	к	L	# OF BOLTS	BOLT SIZE	Α	В1	C1	C2	s
10	(3.54) 90	(2.36) 60	(0.55) 14	4	M12	(0.68) 17.2	(0.71) 18	(0.55) 14	(0.63) 16	(0.07) 1.8
15	(3.74) 95	(2.56) 65	(0.55) 14	4	M12	(0.84) 21.3	(0.87) 22	(0.55) 14	(0.63) 16	(0.08)
20	(4.13) 105	(2.95) 75	(0.55) 14	4	M12	(1.06) 26.9	(1.08) 27.5	(0.63) 16	(0.71) 18	(0.09) 2.3
25	(4.53) 115	(3.35) 85	(0.55) 14	4	M12	(1.33) 33.7	(1.36) 34.5	(0.63) 16	(0.71) 18	(0.10) 2.6
32	(5.51) 140	(3.94) 100	(0.71) 18	4	M16	(1.67) 42.4	(1.71) 43.5	(0.71) 18	(0.71) 18	(0.10) 2.6
40	(5.91) 150	(4.33) 110	(0.71) 18	4	M16	(1.90) 48.3	(1.95) 49.5	(0.71) 18	(0.71) 18	(0.10) 2.6
50	(6.5) 165	(4.92) 125	(0.71) 18	4	M16	(2.37) 60.3	(2.42) 61.5	(0.79) 20	(0.71) 18	(0.11) 2.9
65	(7.28) 185	(5.71) 145	(0.71) 18	8	M16	(3.00) 76.1	(3.05) 77.5	(0.79) 20	(0.71) 18	(0.11) 2.9
80	(7.87) 200	(6.30) 160	(0.71) 18	8	M16	(3.50) 88.9	(3.56) 90.5	(0.79) 20	(0.79) 20	(0.13) 3.2
100	(8.66) 220	(7.09) 180	(0.71) 18	8	M16	(4.50) 114.3	(4.57) 116	(0.87) 22	(0.79) 20	(0.14) 3.6
125	(9.84) 250	(8.27) 210	(0.71) 18	8	M16	(5.50) 139.7	(5.57) 141.5	(0.87) 22	(0.87) 22	(0.16) 4
150	(11.22) 285	(9.45) 240	(0.87) 22	8	M20	(6.63) 168.3	(6.71) 170.5	(0.94) 24	(0.87) 22	(0.18) 4.5
200	(13.39) 340	(11.61) 295	(0.87) 22	12	M20	(8.63) 219.1	(8.72) 221.5	(1.02) 26	(0.94) 24	(0.25) 6.3
250	(15.94) 405	(13.98) 355	(1.02) 26	12	M24	(10.75) 273	(10.89) 276.5	(1.14) 29	(1.02) 26	(0.25) 6.3
300	(18.11) 460	(16.14) 410	(1.02) 26	12	M24	(12.75) 323.9	(12.89) 327.5	(1.26) 32	(1.10) 28	(0.28) 7.1

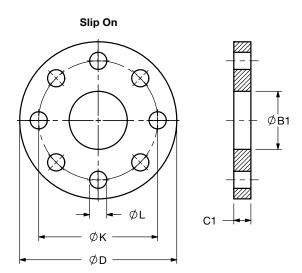
DN Flange DIM PN 25

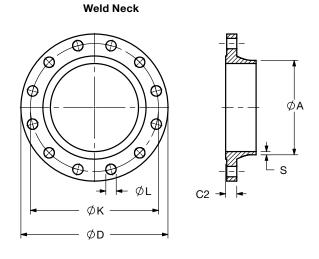




DN	D	K	L	# OF BOLTS	BOLT SIZE	Α	B1	C1	C2	S
10	(3.54) 90	(2.36) 60	(0.55) 14	4	M12	(0.68) 17.2	(0.71) 18	(0.55) 14	(0.63) 16	(0.07) 1.8
15	(3.74) 95	(2.56) 65	(0.55) 14	4	M12	(0.84) 21.3	(0.87) 22	(0.55) 14	(0.63) 16	(0.08) 2
20	(4.13) 10ww5	(2.95) 75	(0.55) 14	4	M12	(1.06) 26.9	(1.08) 27.5	(0.63) 16	(0.71) 18	(0.09) 2.3
25	(4.53) 115	(3.35) 85	(0.55) 14	4	M12	(1.33) 33.7	(1.36) 34.5	(0.63) 16	(0.71) 18	(0.10) 2.6
32	(5.51) 140	(3.94) 100	(0.71) 18	4	M16	(1.67) 42.4	(1.71) 43.5	(0.71) 18	(0.71) 18	(0.10) 2.6
40	(5.91) 150	(4.33) 110	(0.71) 18	4	M16	(1.90) 48.3	(1.95) 49.5	(0.71) 18	(0.71) 18	(0.10) 2.6
50	(6.50) 165	(4.92) 125	(0.71) 18	4	M16	(2.37) 60.3	(2.42) 61.5	(0.79) 20	(0.79) 20	(0.11) 2.9
65	(7.28) 185	(5.71) 145	(0.71) 18	8	M16	(3.00) 76.1	(3.05) 77.5	(0.87) 22	(0.87) 22	(0.11) 2.9
80	(7.87) 200	(6.3) 160	(0.71) 18	8	M16	(3.50) 88.9	(3.56) 90.5	(0.94) 24	(0.94) 24	(0.13) 3.2
100	(9.25) 235	(7.48) 190	(0.87) 22	8	M20	(4.50) 114.3	(4.57) 116	(1.02) 26	(0.94) 24	(0.14) 3.6
125	(10.63) 270	(8.66) 220	(1.02) 26	8	M24	(5.50) 139.7	(5.57) 141.5	(1.10) 28	(1.02) 26	(0.16) 4
150	(11.81) 300	(9.84) 250	(1.02) 26	8	M24	(6.63) 168.3	(6.71) 170.5	(1.18) 30	(1.10) 28	(0.18) 4.5
200	(14.17) 360	(12.2) 310	(1.02) 26	12	M24	(8.63) 219.1	(8.72) 221.5	(1.26) 32	(1.18) 30	(0.25) 6.3
250	(16.73) 425	(14.57) 370	(1.18) 30	12	M27	(10.75) 273	(10.89) 276.5	(1.38) 35	(1.26) 32	(0.28) 7.1
300	(19.09) 485	(16.93) 430	(1.18) 30	16	M27	(12.75) 323.9	(12.89) 327.5	(1.50) 38	(1.34) 34	(0.31) 8

DN Flange DIM PN 40

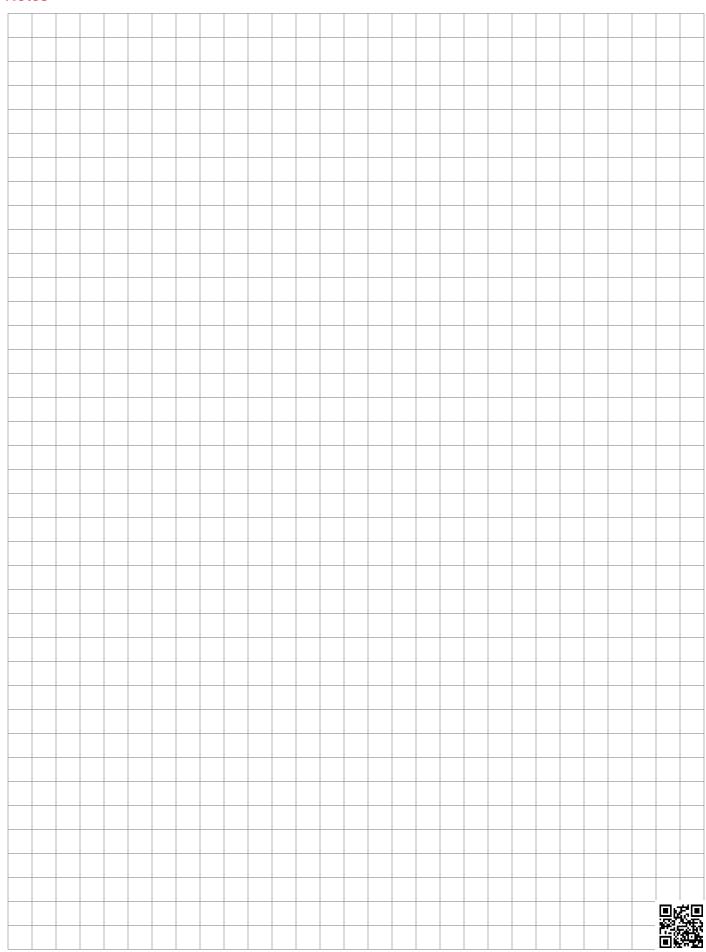




DN	D	к	L	# OF BOLTS	BOLT SIZE	Α	B1	C1	C2	s
10	(3.54) 90	(2.36) 60	(0.55) 14	4	M12	(0.68) 17.2	(0.71) 18	(0.55) 14	(0.63) 16	(0.07) 1.8
15	(3.74) 95	(2.56) 65	(0.55) 14	4	M12	(0.84) 21.3	(0.87) 22	(0.55) 14	(0.63) 16	(0.08)
20	(4.13) 105	(2.95) 75	(0.55) 14	4	M12	(1.06) 26.9	(1.08) 27.5	(0.63) 16	(0.71) 18	(0.09) 2.3
25	(4.53) 115	(3.35) 85	(0.55) 14	4	M12	(1.33) 33.7	(1.36) 34.5	(0.63) 16	(0.71) 18	(0.10) 2.6
32	(5.51) 140	(3.94) 100	(0.71) 18	4	M16	(1.67) 42.4	(1.71) 43.5	(0.71) 18	(0.71) 18	(0.10) 2.6
40	(5.91) 150	(4.33) 110	(0.71) 18	4	M16	(1.90) 48.3	(1.95) 49.5	(0.71) 18	(0.71) 18	(0.10) 2.6
50	(6.50) 165	(4.92) 125	(0.71) 18	4	M16	(2.37) 60.3	(2.42) 61.5	(0.79) 20	(0.79) 20	(0.11) 2.9
65	(7.28) 185	(5.71) 145	(0.71) 18	8	M16	(3.00) 76.1	(3.05) 77.5	(0.87) 22	(0.87) 22	(0.11) 2.9
80	(7.87) 200	(6.3) 160	(0.71) 18	8	M16	(3.50) 88.9	(3.56) 90.5	(0.94) 24	(0.94) 24	(0.13) 3.2
100	(9.25) 235	(7.48) 190	(0.87) 22	8	M20	(4.50) 114.3	(4.57) 116	(1.02) 26	(0.94) 24	(0.14) 3.6
125	(10.63) 270	(8.66) 220	(1.02) 26	8	M24	(5.50) 139.7	(5.57) 141.6	(1.10) 28	(1.02) 26	(0.16) 4
150	(11.81) 300	(9.84) 250	(1.02) 26	8	M24	(6.63) 168.3	(6.71) 170.5	(1.18) 30	(1.10) 28	(0.18) 4.5
200	(14.76) 375	(12.60) 320	(1.18) 30	12	M27	(8.63) 219.1	(8.72) 221.5	(1.42) 36	(1.34) 34	(0.25) 6.3
250	(17.72) 450	(15.16) 385	(1.30) 33	12	M30	(10.75) 273	(10.89) 276.5	(1.65) 42	(1.50) 38	(0.28) 7.1
300	(20.28) 515	(17.72) 450	(1.30) 33	16	M30	(12.75) 323.9	(12.89) 327.5	(2.05) 52	(1.65) 42	(0.31) 8

APPENDIX – FLANGE DETAILS

Notes



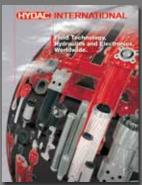
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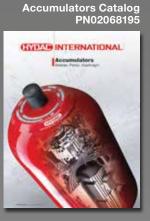




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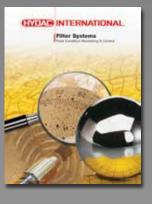
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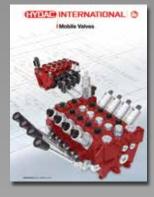


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