

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 ingress 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.

Type	Description
B	Visual Indicator with pop-up button or display that automatically resets after filter ΔP drops below trip-point
BM	Visual Indicator with pop-up button that must be manually reset after the indicator trips
C, F, G, H, J, J4	Electric Switch that provides a contact operation to control a warning device or indication at a remote control station. Several models offer differing electrical ratings, contact configurations, and types of connections
D	Electric Switch and Light that provides a contact operation for control or indication to a remote location and a light energizes locally at the filter to indicate 100% Clogged
E, ES	Pressure Gauges with dial faces for local clogging indication
UE	Vacuum Gauge on suction filter for local indication
UF, UG	Vacuum Switch on suction filter that provides a contact operation for control or indication to a warning device or remote control station
LE	Electrical Switch with visual pop-up button
LZ	Electrical Switch with 75% and 100% contact operations, and local visual pop-up button at 100% clogged - optional LED's
GC	Electrical Analog (4 - 20 ma)/ Electrical switch with 75% and 100% warning points - optional LED's
K	Vacuum / Pressure Gauge for Filler / Breather

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 $100^{\circ}\text{F} \pm 5^{\circ}$ (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.

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.

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.

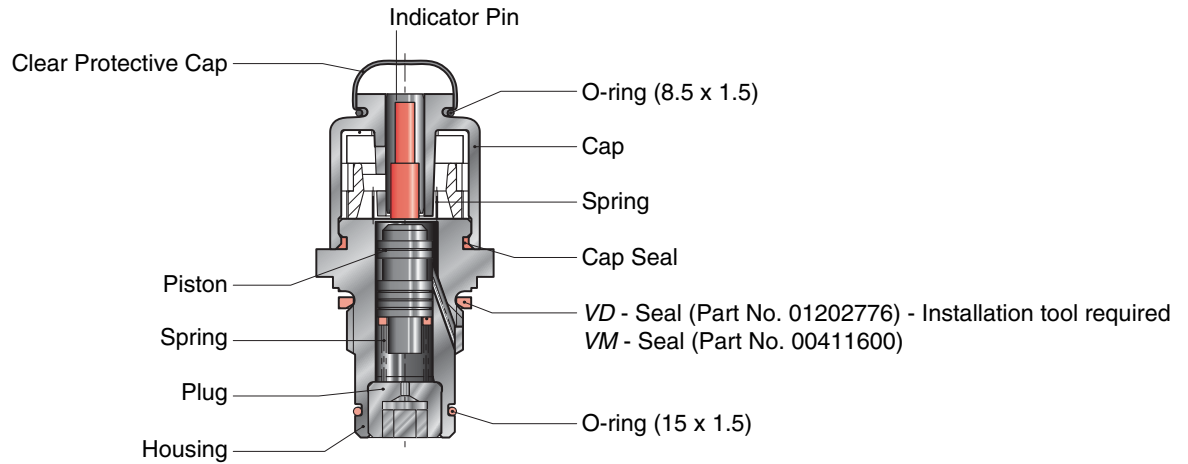
With a visual indicator, the pop-up indicator pin may then respond in one of two ways: (1) With Manual Reset (*type BM*) the pin remains extended, even after the system is shut down, and must be physically pushed down to reset (2) With Automatic Reset (*type B*) the indicator pin retracts to its original 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

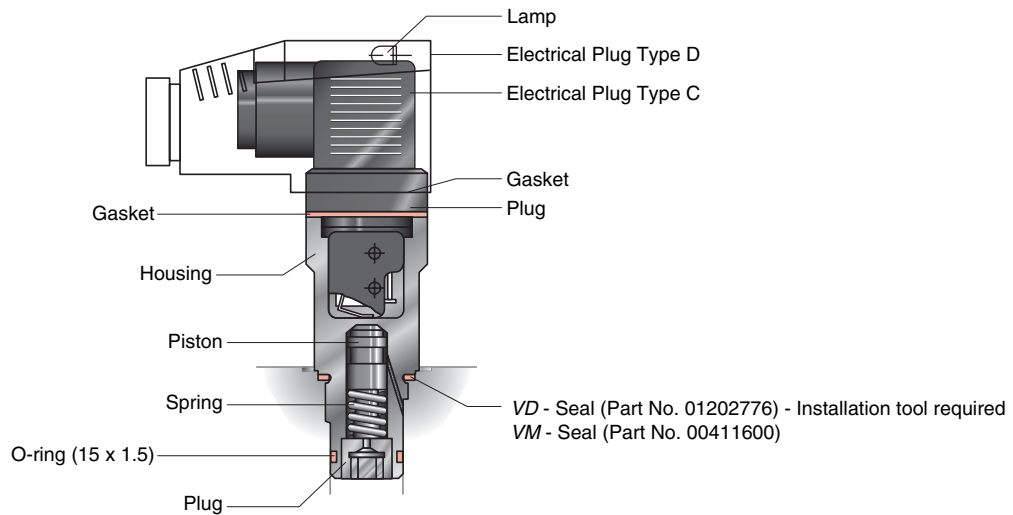
Increasing pressure upstream of the filter acts upon a diaphragm in the indicator (*Type 3*) and causes the indicator pin to overcome an opposing spring force until it trips at a pre-set pressure. The indicator pin automatically resets once pressure is reduced below the trip pressure. (*Note: certain indicators have a red/ yellow/ green display in addition to, or instead of, the pop-up indicator pin*). Electric static pressure indicators, which also operate mechanically, are available as well. These, too, reset automatically.

General Indicator Type Drawings:

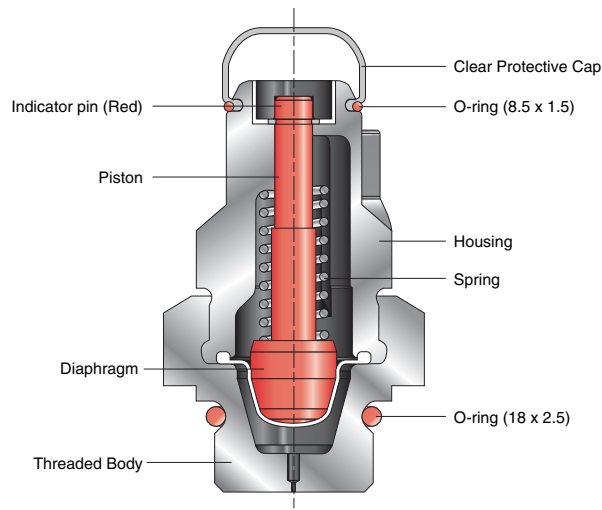
TYPE 1 Visual Indicator Differential Pressure



TYPE 2 Electric Indicator Differential Pressure



TYPE 3 Visual Indicator Static Pressure



Summary of Static Pressure Indicators for Return Filters and Vacuum Indicators for Suction Filters

Model	Type	Applicable Filters
VR2B.1	B = Visual with automatic reset	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
VR2BM.1	BM = Visual with manual reset	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
VR2D.0/L...	D = Electric switch & light	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
VR2E.0	E = Gauge	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
VR2ES.0	E = Gauge	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
VR2F.0	F = Electric switches	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
VR2GC.0	GC = Electronic (Analog) / Electric Switch (2 contacts 100%, 75%)	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
VR2H.0	H = Electric switches	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
VR2LE.1	LE = Visual button & Electrical switch	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
VR2LZ.1	LZ = Visual button, 2 switches 100%, 75% & Optional LED's	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
VMF2B.1	B = Visual with automatic reset	RFM 75-270
VMF2D.0/L...	D = Electric switch & light	RFM 75-270
VMF2F.0	F = Electric switches	RFM 75-270, RKM
VMF2H.0	H = Electric switches	RFM 75-270, HF4R...G
VMF0.2UF.0	UF = Vacuum switch	RKM, HF4S
VMF2E.0	E = Gauge	RFM 75-270, HF4R...G, MF/MFD/MFDSBN 160/180
VMF0.8E.0	E = Gauge	MF 80/85, MF/MFD/MFDS 160/180, MFBN 80/85
VMF1.4E.0	E = Gauge	HF4R...G, MF 80/85, MF/MFD/MFDS 160/180, MFBN 80/85
VMF1.4G.0	G = Electric switches	HF4R...G, MF 80/85, MF/MFD/MFDS 160/180, MFBN 80/85
VMF1.7G.0	G = Electric switches	MF/MFD/MFDSBN 160/180
VMF0.2UE.0	UE = Vacuum gauge	RKM, MF 80/85, MF/MFD/MFDS 160/180, MFBN 80/85, MF/MFD/MFDSBN 160/180, HF4S
BSF0.2C.0	C = Electric switch	SF
BSF0.2D.0/L...	D = Electric switch & light	SF
VR0.2UE.0	UE = Vacuum gauge	SF
VR0.2UF.0	UF = Vacuum switch	SF
VMF0.6K.0	K = Gauge	BF7, ELF7

HYDAC Clogging Indicators

Static Pressure Indicators for Return Filters and Vacuum Indicators for Suction Filters



General Information

Model Code	VR2B.0 & VR2BM.0	VR2D.0/L...	VR2E.0 & VR2ES.0
Applicable Filters	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
Method of Indication	Visual: Red pin pops up to signal clogged element. Type B: Automatic Reset Type BM: Manual Reset	Visual: LED energizes for local 100% Clogged Indication. Electrical Contact: N/O or N/C Contact at 100%	Green Range: 0-29 psi Yellow Range: 29-43 psi Red Range: 43-145 psi
Port Connection	G1/2 (ISO 228)	G1/2 (ISO 228)	G1/2 (ISO 228)
Adapter	not applicable	not applicable	not applicable
Housing Material	aluminum	aluminum	brass
Seals	nitrile (NBR) - standard fluoro-rubber (FKM)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)
Weight	0.18 lbs (80 grams)	0.84 lbs (380 grams)	0.26 lbs (120 grams)
Torque Rating	11 Lbf-ft	11 Lbf-ft	11 Lbf-ft
Other Characteristics		Trip Pressure factory adjustable from 10 psi to 130 psi	

Hydraulic Data

Operating Pressure	100 psi (7 bar)	580 psi (40 bar)	145 psi (10 bar)
Trip Pressure (or Indication Range)	29 psi (2 bar) -10% <i>(contact HYDAC for special settings from 15 psi to 120 psi)</i>	29 psi (2 bar) -10% <i>(contact HYDAC for special settings from 15 psi to 120 psi)</i>	0 to 145 psi (0 - 10 bar)
Thermal Lockout	not available	not available	not applicable
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)

Electrical Data

Contact Voltage max.	—	220 VAC or 24 VDC	—
Maximum Induction-free Power Rating	—	6 A at 220 VAC 6 A at 24 VDC	—
Lamp / LED Supply Voltage	—	—	—
Electrical Connection	—	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)	—
Switching Type	—	Normally Open and Normally Closed Contacts (SPDT)	—
Insulation	—	IP65	—
Other Electrical Data	—	Optional voltages for indicator light: 24V or 115V See Type D schematic on page 211	

Clogging Indicators **HYDAC**

Static Pressure Indicators for Return Filters and Vacuum Indicators for Suction Filters



General Information

Model Code	VR2F.0	VR2GC.0	VR2H.0
Applicable Filters	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
Method of Indication	Electric: Electric switch activates to indicate 100% clogged element.	Electric: Electronic-analog (4-20 ma) and two electrical switches at 75% and 100% clogged.	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	G1/2 (ISO 228)	G1/2 (ISO 228)	G1/2 (ISO 228)
Adapter	not applicable	not applicable	not applicable
Housing Material	steel		steel
Seals	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)
Weight	0.18 lbs (80 grams)	0.75 lbs (340 grams)	0.31 lbs (140 grams)
Torque Rating	11 Lbf-ft	11 Lbf-ft	11 Lbf-ft
Other Characteristics	Trip Pressure adjustable from 15 psi to 145 psi		Trip Pressure adjustable from 15 psi to 145 psi

Hydraulic Data

Operating Pressure	580 psi (40 bar)	100 psi (7 bar)	580 psi (40 bar)
Trip Pressure (or Indication Range)	29 psi (2 bar) -20%	29 psi (2 bar) -20%	29 psi (2 bar) -15%
Thermal Lockout	not available	optional	not applicable
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)

Electrical Data

Contact Voltage max.	42 VAC or DC	20-30 VDC	250 VAC or 24 VDC
Maximum Induction-free Power Rating	—	6 A at 220 VAC 6 A at 24 VDC	—
Lamp / LED Supply Voltage	—	20-30 VDC	—
Electrical Connection	Screw terminal 0.156 in. (4 mm)	7 pin plug connector to DIN 43651	PG 9 (steel conduit thread \varnothing 15.2 mm x 18 threads/in.)
Switching Type	Normally Open Contacts (SPST)	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)
Insulation	IP52	IP65	IP65, Terminal IP00
Other Electrical Data	for low voltage, high amperage See Type F schematic on page 212	See Type GC schematic on page 211	for high voltage, low amperage See Type H schematic on page 211

HYDAC Clogging Indicators

Static Pressure Indicators for Return Filters and Vacuum Indicators for Suction Filters



General Information

Model Code	VR2LE.0	VR2LZ.0
Applicable Filters	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB	RF/RFD, RFM 330-851, RFN, NF/NFD, VAB
Method of Indication	Electric: Electric switch activates to indicate 100% clogged element. Visual: Red pin pops up to indicate 100% clogged element.	Electric: 2 electric switches activate to indicate 75% & 100% clogged element. Visual: Red pin pops up to indicate 100% clogged element.
Port Connection	G1/2 (ISO 228)	G1/2 (ISO 228)
Adapter	not applicable	not applicable
Housing Material	steel	steel
Seals	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)
Weight	0.54 lbs (245 grams)	0.67 lbs (305 grams)
Torque Rating	11 Lbf-ft	11 Lbf-ft
Other Characteristics	—	—

Hydraulic Data

Operating Pressure	100 psi (7 bar)	100 psi (7 bar)
Trip Pressure (or Indication Range)	29 psi (2 bar) -20%	29 psi (2 bar) -15%
Thermal Lockout	not available	not available
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)

Electrical Data

Contact Voltage max.	115 VAC	24 VDC
Maximum Induction-free Power Rating	1 A at 15 VAC	1 A at 15 VAC
Lamp / LED Supply Voltage	—	24 VDC
Electrical Connection	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)
Switching Type	Normally Open and Normally Closed Contacts (SPDT) reed contacts	Normally Open (75% alarm) (SPST) Normally Closed (100% alarm) (SPST) reed contacts
Insulation	IP65	IP65
Other Electrical Data	for low voltage, high amperage See Type LE schematic on page 212	for low voltage, high amperage See Type LZ schematic on page 212

Clogging Indicators **HYDAC**

Static Pressure Indicators for Return Filters and Vacuum Indicators for Suction Filters



General Information			
Model Code	VMF2B.0	VMF2D.0/L...	VMF2F.0
Applicable Filters	RFM 75/165	RFM 75/165	RFM 75/165 RKM
Method of Indication	Visual: Red pin pops up to indicate 100% clogged element. resets automatically.	Visual/Electric: Electric switch and light activate to indicate 100% clogged element.	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	G1/8"	G1/8"	M 10 x 1 tapered thread
Adapter	not applicable	not applicable	G1/8 male x M10x1 female
Housing Material	aluminum	aluminum	steel
Seals	nitrile (NBR) - standard fluoro-rubber (FKM)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)
Weight	0.26 lbs (120 grams)	0.77 lbs (350 grams)	0.80 lbs (365 grams)
Torque Rating	11 Lbf-ft	11 Lbf-ft	11 Lbf-ft
Other Characteristics		Trip Pressure adjustable from 10 psi to 130 psi	
Hydraulic Data			
Operating Pressure	100 psi (7 bar)	580 psi (40 bar)	580 psi (40 bar)
Trip Pressure (or Indication Range)	29 psi (2 bar) -10% <i>(contact HYDAC for special settings from 15 psi to 120 psi)</i>	29 psi (2 bar) -10% <i>(contact HYDAC for special settings from 15 psi to 120 psi)</i>	29 psi (2 bar) -20% <i>(contact HYDAC for special settings from 15 psi to 120 psi)</i>
Thermal Lockout	not available	not available	not available
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)
Electrical Data			
Contact Voltage max.	—	220 VAC or 24 VDC	42 VAC or VDC
Maximum Induction-free Power Rating	—	6 A at 220 VAC 6 A at 24 VDC	2.5 A at 24 VDC
Lamp / LED Supply Voltage	—	24 VDC 115/230 VAC	—
Electrical Connection	—	PG 11 <i>(steel conduit thread ø 18.6 mm x 18 threads/in.)</i>	Screw terminal 0.156 in. (4 mm)
Switching Type	—	Normally Open and Normally Closed Contacts (SPDT)	Normally Open Contacts (SPST)
Insulation	—	IP65	IP65, Terminal IP00
Other Electrical Data	—	Optional voltages for indicator light: 24 V or 115 V See Type F schematic on page 211	for high voltage, low amperage See Type F schematic on page 212

HYDAC Clogging Indicators

Static Pressure Indicators for Return Filters and Vacuum Indicators for Suction Filters



General Information		
Model Code	VMF2H.0	VMF0.2UF.0
Applicable Filters	RFM 75/165 HF4R...G (in-tank filter with threaded inlet)	RKM HF4S (suction filter)
Method of Indication	Electric: Electric switch activates to indicate 100% clogged element.	Electric: Electric vacuum switch activates at vacuum setting to indicate 100% clogged element.
Port Connection	M 10 x 1 tapered thread	M 10 x 1 tapered thread
Adapter	RFM G1/8 male x M10x1 female HF4R 1/8NPT male x M10x1 female	RKM G1/8 male x M10x1 female HF4S 1/8NPT male x M10x1 female
Housing Material	steel	steel
Seals	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)
Weight	0.26 lbs (120 grams)	0.34 lbs (155 grams)
Torque Rating	11 Lbf-ft	11 Lbf-ft
Other Characteristics	Trip Pressure adjustable from 3 psi to 96 psi	Indicator mounts after element to measure vacuum before pump
Hydraulic Data		
Operating Pressure	580 psi (40 bar)	300 psi (20 bar)
Trip Pressure (or Indication Range)	29 psi (2 bar) -10% (contact HYDAC for special settings from 15 psi to 120 psi)	29 psi (2 bar) -10% (contact HYDAC for special settings from 15 psi to 120 psi)
Thermal Lockout	not available	not available
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)
Electrical Data		
Contact Voltage max.	220 VAC or 24 VDC	42 VAC or VDC
Maximum Induction-free Power Rating	4 A at 250 VAC	2.5 A at 42 VAC
Lamp / LED Supply Voltage	—	—
Electrical Connection	PG 9 (steel conduit thread ø 15.2 mm x 18 threads/in.)	Screw terminal 0.156 in. (4 mm)
Switching Type	Normally Open and Normally Closed Contacts (SPDT)	Normally Open Contacts (SPST)
Insulation	IP65, terminals IP00	IP65, terminals IP00
Other Electrical Data	For high voltage, low amperage See Type H schematic on page 211 (UL certified by manufacturer of switch)	See Type UF schematic on page 212

Clogging Indicators **HYDAC**

Static Pressure Indicators for Return Filters and Vacuum Indicators for Suction Filters



General Information

Model Code	VMF2E.0	VMF...E.0/3	VMF1.4G.0/3
Applicable Filters	RKM, RFM 75/165, HF4R...G, MFBN 160/180, MFDBN/MFDSBN 160/180	MF 80/85, MF 160/180, MFD/MFDS 160/180, MFBN 80/85	MF 80/85, MF 160/180, MFD/MFDS 160/180, HF4R...G
Method of Indication	Visual: 3 color gauge Green Range: 0-29 psi Yellow Range: 29-43 psi Red Range: 43-145 psi	Visual: 3 color gauge Green Range: 0-12 / 0-20 psi Yellow Range: 12-15 / 20-25 psi Red Range: 15-60 / 25-60 psi	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	G1/8"	1/8 NPT male	1/8 NPT male
Adapter	not applicable	not applicable	not applicable
Housing Material	brass	brass	steel
Seals	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	not applicable	nitrile (NBR) - standard
Weight	0.23 lbs (105 grams)	0.23 lbs (105 grams)	0.195 lbs (88.5 grams)
Torque Rating	11 Lbf-ft	11 Lbf-ft	11 Lbf-ft
Other Characteristics			Trip Pressure adjustable from 10 psi to 24 psi
Hydraulic Data			
Operating Pressure	145 psi (10 bar)	60 psi (4 bar)	150 psi (10 bar)
Trip Pressure (or Indication Range)	29 psi (2 bar)	VMF0.8E.0: 0 to 12 psi VMF1.4E.0: 0 to 20 psi	20 psi (1.3 bar)
Thermal Lockout	not applicable	not applicable	not available
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)
Electrical Data			
Contact Voltage max.	—	—	240 VAC or 24 VDC
Maximum Induction-free Power Rating	—	—	0.5 A at 240 VAC 4 A at 24 VDC 9 mA at 24 VDC
Lamp / LED Supply Voltage	—	—	—
Electrical Connection	—	—	#8 - 32 screw terminals
Switching Type	—	—	Normally Open Contacts (SPST)
Insulation	—	—	—
Other Electrical Data	—	—	See Type G schematic on page 211

HYDAC Clogging Indicators

Static Pressure Indicators for Return Filters and Vacuum Indicators for Suction Filters



General Information		
Model Code	VMF1.7G.0/3	VMF0.2UE.0/3
Applicable Filters	Absolute Spin-On Filters MFBN 160/180, MFDBN/MFDSBN 160/180	All Spin-On Filters (MF) in suction applications HF4S
Method of Indication	Electric: Electric switch activates to indicate 100% clogged element.	Visual: Vacuum gauge
Port Connection	1/8 NPT Male	1/8 NPT Male
Adapter	not applicable	not applicable
Housing Material	steel	brass
Seals	nitrile (NBR) - standard	nitrile (NBR) - standard
Weight	0.195 lbs (88.5 grams)	0.23 lbs (105 grams)
Torque Rating	11 Lbf-ft	11 Lbf-ft
Other Characteristics		Trip Pressure factory adjustable from 10 psi to 130 psi
Hydraulic Data		
Operating Pressure	150 psi (10 bar)	0 psi (0 bar)
Trip Pressure (or Indication Range)	29 psi (2 bar) -10% <i>(contact HYDAC for special settings from 15 psi to 120 psi)</i>	-14.5 to 0 psi (-1 to 0 bar) -10%
Thermal Lockout	not available	not applicable
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)
Electrical Data		
Contact Voltage max.	240 VAC or 24 VDC	—
Maximum Induction-free Power Rating	0.5 A at 220 VAC 4 A at 24 VDC	—
Lamp / LED Supply Voltage	—	—
Electrical Connection	#8-32 Screw Terminals	—
Switching Type	Normally Open Contacts (SPST)	—
Insulation	—	—
Other Electrical Data	See Type G schematic on page 211	—

Static Pressure Indicators for Return Filters and Vacuum Indicators for Suction Filters



General Information		
Model Code	BSF0.2C.0	BSF0.2D.0/L...
Applicable Filters	SF	SF
Method of Indication	Electric: Electric switch activates to indicate that filter is in bypass	Visual/Electric: Electric switch and light activate to indicate that filter is in bypass
Port Connection	G1/2 (ISO 228)	G1/2 (ISO 228)
Adapter	not applicable	not applicable
Housing Material	aluminum	aluminum
Seals	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)
Weight	0.31 lbs (140.6 grams)	0.365lbs (165.6 grams)
Torque Rating	11 Lbf-ft	11 Lbf-ft
Other Characteristics		
Hydraulic Data		
Operating Pressure	3000 psi (210 bar)	3000 psi (210 bar)
Trip Pressure (or Indication Range)	3 psi (0.2 bar)	3 psi (0.2 bar)
Thermal Lockout	not available	not available
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)
Electrical Data		
Contact Voltage max.	250 VAC	250 VAC
Maximum Induction-free Power Rating	5 A at 250 VAC	5 A at 250 VAC
Lamp / LED Supply Voltage	—	—
Electrical Connection	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)
Switching Type	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)
Insulation	IP65	IP65
Other Electrical Data	See Type C schematic on page 211	Optional voltages for indicator light: 24V or 115 V See Type D schematic on page 211

HYDAC Clogging Indicators

Static Pressure Indicators for Return Filters and Vacuum Indicators for Suction Filters



General Information			
Model Code	VR0.2UE.0	VR0.2UF.0	VMF0.6K.0
Applicable Filters	SF	SF	BF7, ELF7 Reservoir Breather Filters
Method of Indication	Visual: Vacuum gauge including graduated scale	Electric: Electric switch activates to indicate 100% clogged element	Visual: Gauge includes graduated scale
Port Connection	G1/2 (ISO 228)	G1/2 (ISO 228)	G1/8"
Adapter	not applicable	not applicable	not applicable
Housing Material	brass	brass	aluminum
Seals	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard
Weight	0.23 lbs (105 grams)	0.34 lbs (155 grams)	0.21 lbs (100 grams)
Torque Rating	11 Lbf-ft	11 Lbf-ft	11 Lbf-ft
Other Characteristics			
Hydraulic Data			
Operating Pressure	0 psi (0 bar)	0 psi (0 bar)	8.7 psi (0.6 bar)
Trip Pressure (or Indication Range)	-14.5 to 0 psi (-1 to 0 bar) <i>(contact HYDAC for special settings from 15 psi to 120 psi)</i>	-3 psi (-0.2 bar) <i>(contact HYDAC for special settings from 15 psi to 120 psi)</i>	-15 psi to +8.7 psi (-1 bar to + 0.6 bar)
Thermal Lockout	not applicable	not applicable	not applicable
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)
Electrical Data			
Contact Voltage max.	—	42 VAC or VDC	—
Maximum Induction-free Power Rating	—	2.5 A at 42 V	—
Lamp / LED Supply Voltage	—	—	—
Electrical Connection	—	Screw Terminal 0.156 in. (4mm)	—
Switching Type	—	Normally Open Contacts (SPST)	—
Insulation	—	IP65, terminals IP00	—
Other Electrical Data	—	For low voltage, high amperage See Type UF schematic on page 212	—

Model Code: Static Vacuum

Indicator Prefix	VR	= Clogging Indicator for Return Filters	VR	0.2	B	.	X	/
Trip Pressure / Gauge Indication Range	0.2	= 3 psi (0.2 bar) (standard for UE vacuum gauge and UF vacuum switch for suction filters)						
	2	= 29 psid (2 bar) (standard for VR and VMF indicators on return filters except spin-ons)						
	5	= 72 psid (5 bar) (optional on VR and VMF indicators)(types B,D,F, & H only)						
Type of Indicator	B	= Visual pop-up with automatic reset						
	BM	= Visual pop-up with manual reset						
	D	= Electric switch and light						
	E/ES	= Horizontal gauge / Vertical gauge						
	F	= Electric pressure switch						
	GC	= Electronic Analog (4 - 20ma or 1 - 10V) / pressure switch 75% and 100% trips						
	H	= Electric pressure switch						
	LE	= Electric pressure switch / Visual pop-up button						
	LZ	= Electric pressure switch at 75% and 100% / visual pop-up button						
	UE	= Vacuum gauge						
	UF	= Vacuum switch						
Modification Number (the latest version always supplied)								
Supplementary Details								
Light Voltage (D type indicators only)	L24	= 24V						
	L115	= 115V						
Seals	(omit)	= Nitrile (NBR) (standard)						
	V	= Fluoro Rubber (FKM)						
	EPR	= Ethylene Propylene (EPDM) (not available on VR2B or VR2BM)						
"LZ" type details (for type LZ only - omit for all other types)	CN	= electrical connection, 1 plug connector to DIN 43651 with 3 LED's (to CNOMO standard)						
	DB	= electrical connection, 1 plug connector to DIN 43651 with 3 LED's (to Daimler-Benz standard)						
"GC" type details (for type GC only - omit for all other types)	SP	= analogue signal: voltage output 1-10V						if SP or SQ not specified
	SQ	= analogue signal: voltage output 4-20mA (current source)						"current sink" model supplied
	13	= N/O function						pressure peak suppression up to 10 sec. cold start suppression
	123	= N/C function						of switching outputs (PNP technique, positive switching)
	LED	= 3 LED's (red, green, yellow) in cable box						
	PF	= floating switching outputs (due to relay in the plug)						
	30C	= cold start suppression of switching outputs up to 30°C (other temperatures on request)						

Indicator Prefix	VMF	= Clogging Indicator for Mobile Filters	VMF	0.2	B	.	X	/
	BSF	= Clogging Indicator for Suction Filters						
Trip Pressure / Gauge Indication Range	0.2	= 3 psi (0.2 bar) (standard for VMF UF & UE and BSF indicators used on suction filters)						
	0.6	= 9 psid (0.6 bar) (applies to K gauge only)						
	0.8	= 12 psid (.8 bar) (applies to VMF0.8E gauge only)						
	1	= 15 psid (1 bar) (non-standard)						
	1.4	= 20 psid (1.4 bar) (standard for VMF1.4E gauges and VMF1.4G switches on nominal spin-on filters) ¹						
	1.6	= 23 psid (1.6 bar) (applies to VMF1.6E gauge only)						
	1.7	= 25 psid (1.7 bar) (standard for VMF1.7G switch for absolute spin-ons)						
	2	= 29 psid (2 bar) (standard for VR and VMF indicators on return filters except spin-ons)						
	5	= 72 psid (5 bar) (optional on VR and VMF indicators)(types B,D,F, & H only)						
Type of Indicator ²	B	= Visual pop-up with automatic reset (VMF only)						
	C	= Electric switch						
	D	= Electric switch and light						
	E	= Horizontal gauge						
	ES	= Vertical gauge						
	F,G,& H	= Electric pressure switches (VMF only)						
	UE	= Vacuum gauge						
	UF	= Vacuum switch						
	K	= Gauge (for reservoir breathers) ³						
Modification Number (the latest version always supplied)								
Supplementary Details								
Light Voltage (D type indicators only)	L24	= 24V						
	L115	= 115V						
Seals	(omit)	= Nitrile (NBR) (standard)						
	V	= Fluoro Rubber (FKM)						
	EPR	= Ethylene Propylene (EPDM) ³						

1) MFBN 80/85 absolute rated spin-ons use VMF1.4G.0 indicators
 2) VMF indicators are available in all types except types C and K. BSF indicators are available only on types C and D
 3) EPR seals are not available with VMF2B indicators. Model K gauges are available only with nitrile (NBR) seals

Summary of Differential Pressure Indicators for Pressure Filters and Inline Return Filters

Model Code	Type	Applicable Filters
B2420BHFV	B = Visual with automatic reset	NFH 1.0, NFHD 1.0 (current version 1.1)
B2420BMHFV	BM = Visual with manual reset	NFH 1.0, NFHD 1.0 (current version 1.1)
B2210CHFV	C = Electric switch	NFH 1.0, NFHD 1.0 (current version 1.1)
B2210DHFV	D = Electric switch & light	NFH 1.0, NFHD 1.0 (current version 1.1)
B2420JHFV	J = Electric switch with modular connectors	NFH 1.0, NFHD 1.0 (current version 1.1)
B2210J4HFV	J4 = Electric switch with modular connectors	NFH 1.0, NFHD 1.0 (current version 1.1)
B2210BHFV/S0126H	B = Visual with automatic reset	HF4R...F 2.0 (flanged)
B2210BMHFV/S0126H	BM = Visual with manual reset	HF4R...F 2.0 (flanged)
B2210CHFV/S0126H	C = Electric switch	HF4R...F 2.0 (flanged)
B2210DHFV/L...S0126H	D = Electric switch & light	HF4R...F 2.0 (flanged)
B2420JHFV/S0126H	J = Electric switch with modular connectors	HF4R...F 2.0 (flanged)
B2210J4HFV/S0126H	J4 = Electric switch with modular connectors	HF4R...F 2.0 (flanged)
B5210CHFV	C = Electric switch	LPF 660, HF2P...1.0 & 1.1
B5210DHFV	D = Electric switch & light	LPF 660, HF2P...1.0 & 1.1
B5210J4HFV	J4 = Electric switch with modular connectors	LPF 660, HF2P...1.0 & 1.1
VM2B.1	B = Visual with automatic reset	RFL/RFLD, NF/NFD 2.0, NFH/NFHD 1.1, LFM
VM2BM.1	BM = Visual with manual reset	RFL/RFLD, NF/NFD 2.0, NFH/NFHD 1.1, LFM
VM2C.0	C = Electric switch	RFL/RFLD, NF/NFD 2.0, NFH/NFHD 1.1, LFM
VM2C.1/T...	C = Electric switch	RFL/RFLD, NF/NFD 2.0, NFH/NFHD 1.1, LFM
VM2D.0/L...	D = Electric switch & light	RFL/RFLD, NF/NFD 2.0, NFH/NFHD 1.1, LFM
VMH2D.0/L...T...	D = Electric switch & light	RFL/RFLD, NF/NFD 2.0, NFH/NFHD 1.1, LFM
VD2GC.0	GC = Analog (4-20mA) and 2 electric switches at 75% & 100%, LED's optional	RFL/RFLD, NF/NFD 2.0, NFH/NFHD 1.1, LFM
VD2J.1	J = Electric switch with modular connectors	RFL/RFLD, NF/NFD 2.0, NFH/NFHD 1.1, LFM
VM2J4.1	J4 = Electric switch with modular connectors	RFL/RFLD, NF/NFD 2.0, NFH/NFHD 1.1, LFM
VD2LE.1	LE = Electric switch & Visual button	RFL/RFLD, NF/NFD 2.0, NFH/NFHD 1.1
VD2LZ.1	LZ = Visual button and 2 switches at 75% & 100%, LED's optional	RFL/RFLD, NF/NFD 2.0, NFH/NFHD 1.1
VM5B.1	B = Visual with automatic reset	LF 30-660, LPF 160-280, MDF
VM5BM.1	BM = Visual with manual reset	LF 30-660, LPF 160-280, MDF
VM5C.0	C = Electric switch	LF 30-660, LPF 160-280, MDF
VM5C.1/T...	C = Electric switch	LF 30-660, LPF 160-280, MDF
VM5D.0/L...	D = Electric switch & light	LF 30-660, LPF 160-280, MDF
VM5D.1/L...T...	D = Electric switch & light	LF 30-660, LPF 160-280, MDF
VM5GC.0	GC = Analog (4-20mA) and 2 electric switches at 75% & 100%, LED's optional	LF 30-660, LPF 160-280, MDF
VM5J4.1	J4 = Electric switch with modular connectors	LF 30-660, LPF 160-280, MDF
VD5B.1	B = Visual with automatic reset	DF, DF-P, DFFH 160-280, DFFH 330/660 1.1, DF-QE, DFN, DFZ, HF2P 1.2, HF3P 1.1, HF4P 1.1, MPSSF
VD5BM.1	BM = Visual with manual reset	DF, DF-P, DFFH 160-280, DFFH 330/660 1.1, DF-QE, DFN, DFZ, HF2P 1.2, HF3P 1.1, HF4P 1.1
VD5C.0	C = Electric switch	DF, DF-P, DFFH 160-280, DFFH 330/660 1.1, DF-QE, DFN, DFZ, HF2P 1.2, HF3P 1.1, HF4P 1.1, MPSSF
VD5D.0/L...	D = Electric switch & light	DF, DF-P, DFFH 160-280, DFFH 330/660 1.1, DF-QE, DFN, DFZ, HF2P 1.2, HF3P 1.1, HF4P 1.1
VD5GC.0	GC = Analog (4-20mA) and 2 electric switches at 75% & 100%, LED's optional	DF, DF-P, DFFH 160-280, DFFH 330/660 1.1, DF-QE, DFN, DFZ, HF2P 1.2, HF3P 1.1, HF4P 1.1
VD5J.1	J = Electric switch with modular connectors	MDF, DF, DF-P, DFFH 160-280, DFFH 330/660 1.1, DF-QE, DFN, DFZ, HF2P 1.2, HF3P 1.1, HF4P 1.1
VD5J4.1	J4 = Electric switch with modular connectors	DF, DF-P, DFFH 160-280, DFFH 330/660 1.1, DF-QE, DFN, DFZ, HF2P 1.2, HF3P 1.1, HF4P 1.1
VD5LE.1	LE = Electric switch & Visual button	LF 30-660, LPF 160-280, DF, DF-P, DFFH 160-280, DFFH 330/660 1.1, DF-QE, DFN, DFZ, HF2P 1.2, HF3P 1.1, HF4P 1.1
VD5LZ.1	LZ = Visual button and 2 switches at 75% & 100%, LED's optional	LF 30-660, LPF 160-280, DF, DF-P, DFFH 160-280, DFFH 330/660 1.1, DF-QE, DFN, DFZ, HF2P 1.2, HF3P 1.1, HF4P 1.1
VD8B.1	B = Visual with automatic reset	DFDK
VD8BM.1	BM = Visual with manual reset	DFDK
VD8C.0	C = Electric switch	DFDK
VD8D.0/L...	D = Electric switch & light	DFDK
B5420BHFV	B = Visual with automatic reset	LPF 660, HF2P...1.0 & 1.1, HF3, HF4, DFFH 330/660 1.0
B5420BMHFV	BM = Visual with manual reset	LPF 660, HF2P...1.0 & 1.1, HF3, HF4, DFFH 330/660 1.0
B5420CHFV	C = Electric switch	HF3, HF4, DFFH 330/660 1.0
B5420DHFV	D = Electric switch & light	HF3, HF4, DFFH 330/660 1.0
B5420JHFV	J = Electric switch with modular connectors	LPF 660, HF2P...1.0 & 1.1, HF3, HF4, DFFH 330/660 1.0
B5420J4HFV	J4 = Electric switch with modular connectors	HF3, HF4, DFFH 330/660 1.0
B8420BHFV	B = Visual with automatic reset	DF 30-110 Z S0104H
B8420BMHFV	BM = Visual with manual reset	DF 30-110 Z S0104H
B8420CHFV	C = Electric switch	DF 30-110 Z S0104H
B8420DHFV/L...	D = Electric switch & light	DF 30-110 Z S0104H
B8420JHFV	J = Electric switch with modular connectors	DF 30-110 Z S0104H
B8420J4HFV	J4 = Electric switch with modular connectors	DF 30-110 Z S0104H

Differential Pressure Indicators for Pressure Filters and Inline Return Filters



General Information			
Model Code	1) B2210CHFV 2) B2210CHFV/S0126H 3) B5210CHFV	1) B2210DHFV/L... 2) B2210DHFV/L...S0126 3) B5210DHFV/L...	1) B2210J4HF.1/V 2) B2210J4HFV/S0126 3) B5210J4HF.1/V
Applicable Filters	1) NFH/NFHD...1.0 2) HF4R...F 2.0 (with S0126H) 3) LPF 660, HF2P...1.0, 1.1	1) NFH/NFHD...1.0 2) HF4R...F 2.0 (w/ S0126 element) 3) LPF 660, HF2P...1.0, 1.1	1) NFH/NFHD...1.0 2) HF4R...F 2.0 (w/ S0126 element) 3) LPF 660, HF2P...1.0, 1.1
Method of Indication	Electric: Electric switch activates to indicate 100% clogged element.	Visual/Electric: Electric switch and light activate to indicate 100% clogged element.	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	3/4 - 16 UNF - 2A	3/4 - 16 UNF - 2A	3/4 - 16 UNF - 2A
Adapter	not applicable	not applicable	not applicable
Housing Material	aluminum	aluminum	aluminum
Seals	fluoro-rubber (FKM) - standard ethylene propylene (EPR)	fluoro-rubber (FKM) - standard ethylene propylene (EPR)	fluoro-rubber (FKM) - standard ethylene propylene (EPR)
Weight	0.080 lbs (36 grams)	0.285 lbs (129 grams)	0.205 lbs (93 grams)
Torque Rating	30 Lbf-ft	30 Lbf-ft	30 Lbf-ft
Hydraulic Data			
Operating Pressure	3000 psi (210 bar)	3000 psi (210 bar)	3000 psi (210 bar)
Trip Pressure (or Indication Range)	29 psid (2 bar) -10% (standard for NHF/NHFD and HF4R...F) 72 psi (5 bar) -10% (standard for LPF 660 and HF2)	29 psid (2 bar) -10% (standard for NHF/NHFD and HF4R...F) 72 psi (5 bar) -10% (standard for LPF 660 and HF2)	29 psid (2 bar) -10% (standard for NHF/NHFD and HF4R...F) 72 psi (5 bar) -10% (standard for LPF 660 and HF2)
Thermal Lockout	not available	Option: Below 70°F or 100°F	Option: Below 70°F or 100°F
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)
Electrical Data			
Contact Voltage max.	250 VAC	250 VAC	250 VAC
Maximum Induction-free Power Rating	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC
Electrical Connection	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)	Brad Harrison 4-pin micro (ø 18.6 mm x 18 threads/in.)
Switching Type	Normally Open and Normally Closed Contacts	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)
Insulation	IP65	IP65	not applicable
Other Electrical Data	Electrical connector can be rotated in 90° increments See Type C schematic on page 211	—	—
cRUus Rating	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current	1) Connector rotates in 90° increments 2) Optional voltage for light: 24 or 115 V See Type D schematic on page 189	See Type J4 schematic on page 190

HYDAC Clogging Indicators

Differential Pressure Indicators for Pressure Filters and Inline Return Filters



General Information

Model Code	1) VM2B.1 2) VM5B.1	1) VM2BM.1 2) VM5BM.1	1) VM2C.0 & VM2C.1/T... 2) VM5C.0 & VM5C.1/T...
Applicable Filters	1) RFL/RFLD, LFM, NF, NFH/NFHD 1.1 2) LF 30-660, LPF 160-280 DF-AFA, MDF	1) RFL/RFLD, LFM, NF, NFH/NFHD 1.1 2) LF 30-660, LPF 160-280 DF-AFA, MDF	1) RFL/RFLD, LFM, NF, NFH/NFHD 1.1 2) LF 30-660, LPF 160-280 DF-AFA, MDF
Method of Indication	Visual: Green or red display indicates when element is clean or 100% clogged	Visual: Green or red display indicates when element is clean or 100% clogged	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	G1/2	G1/2	G1/2
Adapter	not applicable	not applicable	not applicable
Housing Material	aluminum	aluminum	aluminum
Seals	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)
Weight	0.12 lbs (55 grams)	0.12 lbs (55 grams)	0.33 lbs (150 grams)
Torque Rating	22 Lbf-ft	22 Lbf-ft	22 Lbf-ft

Hydraulic Data

Operating Pressure	3000 psi (210 bar)	3000 psi (210 bar)	3000 psi (210 bar)
Trip Pressure (or Indication Range)	29 psid (2 bar) -10% (standard for RFL/RFLD & LFM) 72 psi (5 bar) -10% (standard for LF, LPF, DF-AFA, & MDF)	29 psid (2 bar) -10% (standard for RFL/RFLD & LFM) 72 psi (5 bar) -10% (standard for LF, LPF, DF-AFA, & MDF)	29 psid (2 bar) -10% (standard for RFL/RFLD & LFM) 72 psi (5 bar) -10% (standard for LF, LPF, DF-AFA, & MDF)
Thermal Lockout	not available	not available	Option: Below 70°F or 100°F
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)

Electrical Data

Contact Voltage max.	—	—	250 VAC
Maximum Induction-free Power Rating	—	—	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC
Electrical Connection	—	—	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)
Switching Type	—	—	Normally Open and Normally Closed Contacts (SPDT)
Insulation	—	—	IP65
Other Electrical Data	—	—	See Type C schematic on page 211
cRUus Rating	—	—	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current

Differential Pressure Indicators for Pressure Filters and Inline Return Filters



General Information			
Model Code	1) VM2D0/L... & VM2D.1/L...T... 2) VM5D0/L... & VM5D.1/L...T...	1) VM2J4.1 2) VM5J4.1	1) VM2J.1 2) VM5J.1
Applicable Filters	1) RFL/RFLD, LFM, NF, NFH/NFHD...1.1 2) LF 30-660, LPF 160-280 DF-AFA, MDF	1) RFL/RFLD, LFM, NF, NFH/NFHD...1.1 2) LF 30-660, LPF 160-280 DF-AFA, MDF	1) RFL/RFLD, LFM, NF, NFH/NFHD...1.1 2) LF 30-660, LPF 160-280 DF-AFA, MDF
Method of Indication	Visual/Electric: Electric switch and light activate to indicate 100% clogged element.	Electric: Electric switch activates to indicate 100% clogged element.	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	G 1/2	G 1/2	G 1/2
Adapter	not applicable	not applicable	not applicable
Housing Material	aluminum	aluminum	aluminum
Seals	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)
Weight	0.33 lbs (150 grams)	not applicable	not applicable
Torque Rating	22 Lbf-ft	22 Lbf-ft	22 Lbf-ft
Hydraulic Data			
Operating Pressure	3000 psi (210 bar)	3000 psi (210 bar)	3000 psi (210 bar)
Trip Pressure (or Indication Range)	29 psid (2 bar) -10% (standard for RFL/RFLD & LFM) 72 psi (5 bar) -10% (standard for LF, LPF, DF-AFA, & MDF)	29 psid (2 bar) -10% (standard for RFL/RFLD & LFM) 72 psi (5 bar) -10% (standard for LF, LPF, DF-AFA, & MDF)	29 psid (2 bar) -10% (standard for RFL/RFLD & LFM) 72 psi (5 bar) -10% (standard for LF, LPF, DF-AFA, & MDF)
Thermal Lockout	Option: Below 70°F or 100°F	Option: Below 70°F or 100°F	Option: Below 70°F or 100°F
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)
Electrical Data			
Contact Voltage max.	250 VAC	250 VAC	250 VAC
Maximum Induction-free Power Rating	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC
Lamp / LED Supply Voltage	24 VDC, 115/230 VAC	—	—
Electrical Connection	PG 11 (steel conduit thread \varnothing 18.6 mm x 18 threads/in.)	Brad Harrison 4-pin micro (M12)	Brad Harrison 5-pin mini (\varnothing 7/8" x 14 threads/in.)
Switching Type	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)
Insulation	IP65	not applicable	not applicable
Other Electrical Data	Optional voltages for light: 24 or 115 V See Type D schematic on page 211	See Type J4 schematic on page 212	See Type J schematic on page 212
cRUus Rating	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current

HYDAC Clogging Indicators

Differential Pressure Indicators for Pressure Filters and Inline Return Filters



General Information

Model Code	1) VD5B.1 2) VD8B.1	1) VD5BM.1 2) VD8BM.1	1) VD5C.0 2) VD8C.0
Applicable Filters	1) DF, DFP, DF-AFE, DFN, MPSSF DFFH 160-280, HF2P 1.2, HF3P 1.1, HF4P 1.1 2) DFDK, DFZ	1) DF, DFP, DF-AFE, DFN, DFFH 160-280, HF2P 1.2, HF3P 1.1, HF4P 1.1 2) DFDK, DFZ	1) DF, DFP, DF-AFE, DFN, MPSSF DFFH 160-280, HF3P 1.1, DFFH 330/660 1.1, HF4P 1.1 2) DFDK, DFZ
Method of Indication	Visual: Green and red display indicates when element is clean or 100% clogged.	Visual: Green and red display, and pop-up pin, indicate when element is 100% clogged Pin requires manual reset.	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	G1/2	G1/2	G1/2
Adapter	not applicable	not applicable	not applicable
Housing Material	stainless steel	stainless steel	stainless steel
Seals	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)
Weight	0.24 lbs (110 grams)	0.24 lbs (110 grams)	0.55 lbs (250 grams)
Torque Rating	75 Lbf-ft	75 Lbf-ft	75 Lbf-ft

Hydraulic Data

Operating Pressure	6000 psi (420 bar)	6000 psi (420 bar)	6000 psi (420 bar)
Trip Pressure (or Indication Range)	1) 72 psid (5 bar) -10% (standard) 2) 116 psid (8 bar) -10% (standard)	1) 72 psid (5 bar) -10% (standard) 2) 116 psid (8 bar) -10% (standard)	1) 72 psid (5 bar) -10% (standard) 2) 116 psid (8 bar) -10% (standard)
Thermal Lockout	not available	not available	not available
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)

Electrical Data

Contact Voltage max.	—	—	250 VAC
Maximum Induction-free Power Rating	—	—	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC
Electrical Connection	—	—	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)
Switching Type	—	—	Normally Open and Normally Closed Contacts (SPDT)
Insulation	—	—	IP65
Other Electrical Data	—	—	See Type C schematic on page 211
cRUus Rating	—	—	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current

Differential Pressure Indicators for Pressure Filters and Inline Return Filters



General Information			
Model Code	1) VD5D.0/L... 2) VD8D.0/L...	1) VD2GC.0 2) VD5GC.0	1) VD2J.1 2) VD5J.1
Applicable Filters	1) DF, DF-P, DF-AFE, DFN, DFFH 160-280, DFFH 330/660 1.1, HF2P 1.2, HF3P 1.1, HF4P 1.1 2) DFDK, DFZ	1) RFL, RFLD, LFM 2) DF, DF-P, DF-AFE, DFN, DFFH 160-280, DFFH 330/660 1.1, HF2P 1.2, HF3P 1.1, HF4P 1.1, LF	1) RFL/RFLD, LFM 2) DF, DF-P, DF-AFE, DFN, DFFH 160-280, DFFH 330/660 1.1, HF2P 1.2, HF3P 1.1, HF4P 1.1 LF30-660 LPF160-280, DF-AFA, MDF
Method of Indication	Visual/Electric: Electric switch and light activate to indicate 100% clogged element.	Electric: Electric-analog (4-20 ma) and two electric switches activate to indicate 75% and 100% clogged	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	G1/2	G1/2	G1/2
Adapter	not applicable	not applicable	not applicable
Housing Material	stainless steel	stainless steel	stainless steel
Seals	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)
Weight	0.55 lbs (250 grams)	0.88 lbs (400 grams)	0.55 lbs (250 grams)
Torque Rating	75 Lbf-ft	75 Lbf-ft	75 Lbf-ft
Hydraulic Data			
Operating Pressure	6000 psi (420 bar)	6000 psi (420 bar)	6000 psi (420 bar)
Trip Pressure (or Indication Range)	1) 72 psid (5 bar) -10% (standard) 2) 116 psid (8 bar) -10% (standard)	1) 30 psid (2 bar) -10% (standard) 2) 72 psid (5 bar) -10% (standard)	1) 30 psid (2 bar) -10% (standard) 2) 72 psid (5 bar) -10% (standard)
Thermal Lockout	not available	optional	not available
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)
Electrical Data			
Contact Voltage max.	250 VAC	20-30 VDC	250 VAC
Maximum Induction-free Power Rating	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC	12 VA	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC
Lamp / LED Supply Voltage	—	24 VDC	—
Electrical Connection	PG 11 (steel conduit thread \varnothing 18.6 mm x 18 threads/in.)	7 pin plug connector to DIN 43651	Brad Harrison 5 pin mini (\varnothing 7/8" x 14 threads/in.)
Switching Type	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)
Insulation	IP65	IP65	not applicable
Other Electrical Data	Optional voltages for light: 24 or 115 V See Type D schematic on page 211	See Type GC schematic on page 211	See Type J schematic on page 212
cRUus Rating	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current	—	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current

HYDAC Clogging Indicators

Differential Pressure Indicators for Pressure Filters and Inline Return Filters



General Information

Model Code	1) VD5J4.1 2) VD8J4.1	1) VD2LE.1 2) VD5LE.1 3) VD8LE.1	1) VD2LZ.1 2) VD5LZ.1 3) VD8LZ.1
Applicable Filters	1) DF, DFP, DF-AFE, DFN, DFFH 160-280, DFFH 330/660 1.1 2) DFDK, DFZ	1) RFL, RFLD, LFM 2) DF, LF, MDF, DFP, DF...AF, DFFH, HF2P 1.2, HF3P 1.1, HF4P 1.1 3) DFDK, DFZ	1) RFL, RFLD, LFM 2) DF, LF, MDF, DFP, DF...AF, DFFH, HF2P 1.2, HF3P 1.1, HF4P 1.1 3) DFDK, DFZ
Method of Indication	Electric: Electric switch activates to indicate 100% clogged element.	Visual: Red pin and electrical switch activates to indicate 100% clogged element	Visual: Red pin and electrical switches activate to indicate 75% and 100% clogged conditions. LED's optional
Port Connection	G1/2	G1/2	G1/2
Adapter	not applicable	not applicable	not applicable
Housing Material	stainless steel	stainless steel	stainless steel
Seals	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoro-rubber (FKM) ethylene propylene (EPR)
Weight	0.42 lbs (190 grams)	0.72 lbs (325 grams)	0.72 lbs (325 grams)
Torque Rating	75 Lbf-ft	75 Lbf-ft	75 Lbf-ft


Hydraulic Data

Operating Pressure	6000 psi (420 bar)	6000 psi (420 bar)	6000 psi (420 bar)
Trip Pressure (or Indication Range)	1) 72 psid (5 bar) -10% (standard) 2) 116 psid (8 bar) -10% (standard)	1) 30 psid (2 bar) -10% (standard) 2) 72 psid (5 bar) -10% (standard) 3) 116 psid (8 bar) -10% (standard)	1) 30 psid (2 bar) -10% (standard) 2) 72 psid (5 bar) -10% (standard) 3) 116 psid (8 bar) -10% (standard)
Thermal Lockout	not available	not available	not available
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)

Electrical Data

Contact Voltage max.	250 VAC	115 VAC	24 VDC
Maximum Induction-free Power Rating	5 A at 250 VAC 3 A at 12, 24 VDC 1 A at 60 VDC	1 A at 15 VDC 1 A at 15 VAC	1 A at 15 VDC 1 A at 15 VAC
Lamp / LED Supply Voltage	—	—	24 VDC
Electrical Connection	Brad Harrison 4 pin micro	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)
Switching Type	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)
Insulation	not applicable	IP65	IP65
Other Electrical Data	See Type J4 schematic on page 212	See Type LE schematic on page 212	See Type LZ schematic on page 212
cRUus Rating	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current	—	—

Differential Pressure Indicators for Pressure Filters and Inline Return Filters

			
General Information			
Model Code	1) B2420BHFV 2) B5420BHFV 3) B8420BHFV	1) B2420BMHFV 2) B5420BMHFV 3) B8420BMHFV	1) B5420CHFV 2) B8420CHFV
Applicable Filters	1) NFH/NFHD...1.0 2) LPF 660, HF3 1.0, HF4 1.0, DFFH 330/660 1.0, HF2P...1.0, 1.1 3) DFZ 30-110 (w/ S0104H)	1) NFH/NFHD...1.0 2) LPF 660, HF3 1.0, HF4 1.0, DFFH 330/660 1.0, HF2P...1.0, 1.1 3) DFZ 30-110 (w/ S0104H)	1) HF3 1.0, HF4 1.0, DFFH 330/660 1.0 2) DFZ 30-110 (w/ S0104H)
Method of Indication	Visual: Red pin pops up to indicate 100% clogged element. Pin resets automatically.	Visual: Red pin pops up to indicate 100% clogged element. Pin requires manual reset.	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	3/4 - 16 UNF - 2A	3/4 - 16 UNF - 2A	3/4 - 16 UNF - 2A
Adapter	not applicable	not applicable	not applicable
Housing Material	stainless steel	stainless steel	stainless steel
Seals	fluoro-rubber (FKM) - standard ethylene propylene (EPR)	fluoro-rubber (FKM) - standard ethylene propylene (EPR)	fluoro-rubber (FKM) - standard ethylene propylene (EPR)
Weight	0.18 lbs (82 grams)	0.18 lbs (82 grams)	0.38 lbs (172 grams)
Torque Rating	30 Lbf-ft	30 Lbf-ft	30 Lbf-ft
Hydraulic Data			
Operating Pressure	6000 psi (420 bar)	6000 psi (420 bar)	6000 psi (420 bar)
Trip Pressure (or Indication Range)	1) 72 psid (5 bar) -10% (standard) 2) 116 psid (8 bar) -10% (standard)	1) 72 psid (5 bar) -10% (standard) 2) 116 psid (8 bar) -10% (standard)	1) 72 psid (5 bar) -10% (standard) 2) 116 psid (8 bar) -10% (standard)
Thermal Lockout	not available	not available	Option: Below 70°F or 100°F
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)
Electrical Data			
Contact Voltage max.	—	—	250 VAC
Maximum Induction-free Power Rating	—	—	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC
Electrical Connection	—	—	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)
Switching Type	—	—	Normally Open and Normally Closed Contacts (SPDT)
Insulation	—	—	not applicable
Other Electrical Data	—	—	Electrical connector can rotate in 90° increments See Type C schematic on page 211
cRUus Rating	—	—	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current

HYDAC Clogging Indicators

Differential Pressure Indicators for Pressure Filters and Inline Return Filters



General Information

Model Code	1) B5420DHFV/L... 2) B8420DHFV/L...	1) B5420JHF.1/V 2) B8420JHF.1/V 3) B2420JHF.1/V 4) B2450JHF.1/V-S0126H	1) B5420J4HF.1/V 2) B8420J4HF.1/V
Applicable Filters	1) HF3 1.0, HF4 1.0, DFFH 330/660 1.0 2) DFZ 30-110 (w/ S0104H)	1) HF3 1.0, HF4 1.0, DFFH 330/660 1.0, LPF660, HF2 1.0 2) DFZ 30-110 (w/ S0104H) 3) NFH/NFHD 1.0 4) HF4R...F 2.0 / S0126H	1) HF3 1.0, HF4 1.0, DFFH 330/660 1.0 2) DFZ 30-110 (w/ S0104H)
Method of Indication	Visual/Electric: Electric switch and light activate to indicate 100% clogged element.	Electric: Electric switch activates to indicate 100% clogged element.	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	3/4 - 16 UNF - 2A	3/4 - 16 UNF - 2A	3/4 - 16 UNF - 2A
Adapter	not applicable	not applicable	not applicable
Housing Material	stainless steel	stainless steel	stainless steel
Seals	fluoro-rubber (FKM) - standard ethylene propylene (EPR)	fluoro-rubber (FKM) - standard ethylene propylene (EPR)	fluoro-rubber (FKM) - standard ethylene propylene (EPR)
Weight	0.45 lbs (204 grams)	0.33 lbs (150 grams)	0.33 lbs (150 grams)
Torque Rating	30 Lbf-ft	30 Lbf-ft	30 Lbf-ft

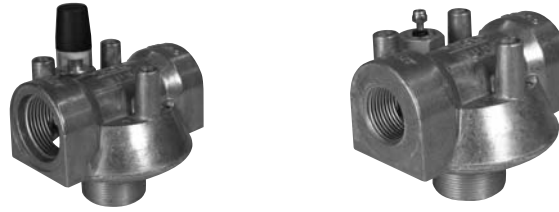
Hydraulic Data

Operating Pressure	6000 psi (420 bar)	6000 psi (420 bar)	6000 psi (420 bar)
Trip Pressure (or Indication Range)	1) 72 psid (5 bar) -10% (standard) 2) 116 psid (8 bar) -10% (standard)	1) 72 psid (5 bar) -10% (standard) 2) 116 psid (8 bar) -10% (standard)	1) 72 psid (5 bar) -10% (standard) 2) 116 psid (8 bar) -10% (standard)
Thermal Lockout	Option: Below 70°F or 100°F	Option: Below 70°F or 100°F	Option: Below 70°F or 100°F
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)

Electrical Data

Contact Voltage max.	250 VAC	250 VAC	250 VAC
Maximum Induction-free Power Rating	5 A at 250 VAC 3 A at 12.24 VDC 1 A at 60 VDC	5 A at 250 VAC 3 A at 12.24 VDC 1 A at 60 VDC	5 A at 250 VAC 3 A at 12.24 VDC 1 A at 60 VDC
Lamp / LED Supply Voltage	24 VDC, 115 / 230 VAC	—	—
Electrical Connection	PG 11 (steel conduit thread ø 18.6 mm x 18 threads/in.)	Brad Harrison 5 pin mini	Brad Harrison 4 pin micro
Switching Type	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)
Insulation	not applicable	not applicable	not applicable
Other Electrical Data	1) Connector rotates in 90° increments 2) Optional voltage for light: 24 or 115 V See Type D schematic on page 211	See Type J schematic on page 212	See Type J4 schematic on page 212
cRUus Rating	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current

Differential Pressure Indicators for Pressure Filters and Inline Return Filters



General Information		
Model Code	Type B indicator in filter head; not sold as separate item	Type C indicator built-in to filter head; not sold as separate item
Applicable Filters	Spin-On Filters: MF 90/95, 190/195 Nominal Rated MFBN 90/95, 190/195 Absolute Rated	Spin-On Filters: MF 90/95, 190/195 Nominal Rated MFBN 90/95, 190/195 Absolute Rated
Method of Indication	Visual: Red pin pops up to indicate 100% clogged element. Pin resets automatically.	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	not applicable	not applicable
Adapter	not applicable	not applicable
Housing Material	plastic	steel
Seals	nitrile (NBR)	nitrile (NBR)
Weight	not applicable	not applicable
Torque Rating	not applicable	not applicable
Hydraulic Data		
Operating Pressure	250 psi (16.5 bar)	250 psi (16.5 bar)
Trip Pressure (or Indication Range)	22 psid (1.5 bar) 44 psid (3.0 bar)	22 psid (1.5 bar) 44 psid (3.0 bar)
Thermal Lockout	not applicable	not applicable
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)
Electrical Data		
Contact Voltage max.	—	36 VDC
Maximum Induction-free Power Rating	—	200 ma at 36 VDC
Electrical Connection	—	#10 Screw Terminal
Switching Type	—	Normally Open Contacts (SPST)
Insulation	—	not applicable
Other Electrical Data	—	See Type C Spin-On schematic on page 211

HYDAC Clogging Indicators

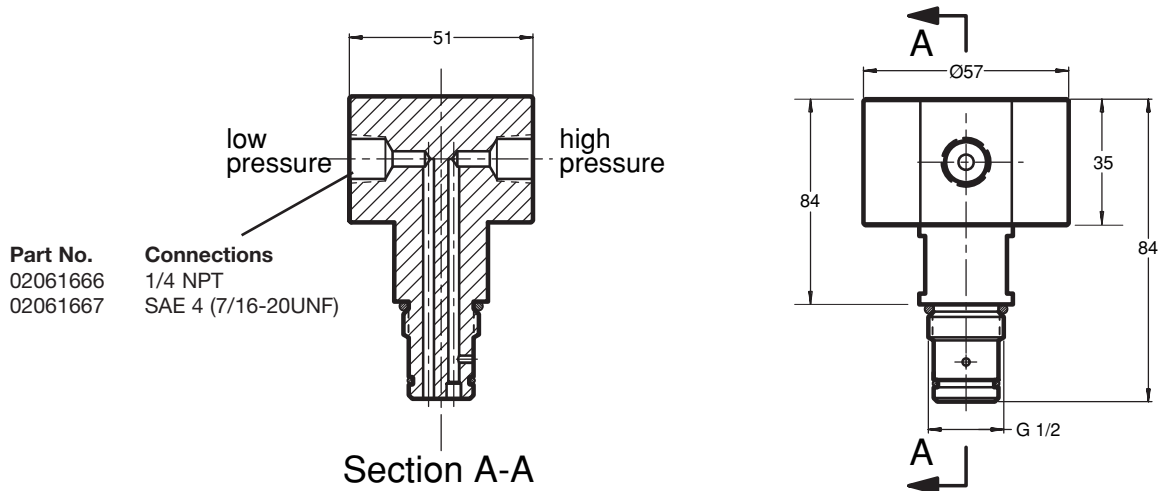
Model Code: Differential Pressure Indicators

Indicator Prefix	VM 5 B . X /
VM	= G 1/2 3000 psi
VD	= G 1/2 6000 psi
Trip Pressure / Gauge Indication Range	
1	= 15 psi (1 bar) (optional for typically for lube applications)
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 for use on DFDK filters & DFZ)
Type of Indicator	
B	= Visual pop-up with automatic reset (VD & VM only)
BM	= Visual pop-up with manual reset (VD & VM only)
C	= Electric switch (VD, VM, VD...T, & VMH...T only)
D	= Electric switch and light (VD, VM, VD...T, & VMH...T only)
GC	= Electronic Analog (4-20ma or 1-10V) / pressure switch 75% and 100% trips (VD only)
J	= Electric switch (Brad Harrison 5-pin mini connection) (VDH only)
J4	= Electric switch (Brad Harrison 4-pin micro connection) (VDH & VMH only)
LE	= Electric pressure switch / Visual pop-up button (VD only)
LZ	= Electric pressure switch at 75% and 100% / visual pop-up button (VD only)
Modification Number (latest version always supplied)	
Supplementary Details	
Seals	
(omit)	= Nitrile (NBR) (standard)
V	= Fluoro Rubber (FKM)
EPR	= Ethylene Propylene (EPDM)
Light Voltage (D type indicators only)	
L24	= 24V
L115	= 115V
"LZ" type details (for type LZ only - omit for all other types)	
CN	= electrical connection, 1 plug connector to DIN 43651 with 3 LED's (to CNOMO standard)
DB	= electrical connection, 1 plug connector to DIN 43651 with 3 LED's (to Daimler-Benz standard)
BO	= (M12x1) Brad Harrison 4-pin micro connection
"GC" type details (for type GC only - omit for all other types)	
SP	= analogue signal: voltage output 1-10V
SQ	= analogue signal: voltage output 4-20mA (current source)] if SP or SQ not specified "current sink" model supplied
113	= N/O function] pressure peak suppression up to 10 sec. cold start suppression
123	= N/C function] of switching outputs (PNP technique, positive switching)
LED	= 3 LED's (red, green, yellow) in cable box
PF	= floating switching outputs (due to relay in the plug)
30C	= cold start suppression of switching outputs up to 30°C (other temperatures on request)
Thermal Lockout (VM, VD types C, D, J, and J4 only)	
T100	= Lockout below 100°F

Indicator Prefix	B 2 210 B HF V /
B	= 3/4 - 16 UNF Thread
Trip Pressure / Gauge Indication Range	
1	= 15 psi (1 bar) (optional for typically for lube applications)
2	= 29 psid (2 bar) (standard for B indicators use on return line filters)
5	= 72 psid (5 bar) (standard for B indicators use on pressure filters, except DF-ZS0104H)
8	= 120 psid (8 bar) (standard for B indicators use on DF-ZS0104H)
Operating Pressure	
210	= 3000 psi (210 bar) (B & BE not available)
420	= 6000 psi (420 bar)
Type of Indicator	
B	= Visual pop-up with automatic reset
BM	= Visual pop-up with manual reset
C	= Electric switch
D	= Electric switch and light
J	= Electric switch (Brad Harrison 5-pin mini connection)
J4	= Electric switch (Brad Harrison 4-pin micro connection)
Application	
HF	= Hydraulic filters
Seals	
V	= Fluoro Rubber (FKM) (standard)
EPR	= Ethylene Propylene (EPDM)
Supplementary Details	
Light Voltage (D type indicators only)	
L24	= 24V
L115	= 115V
Thermal Lockout (types C, D, J, and J4 only)	
T100	= Lockout below 100°F

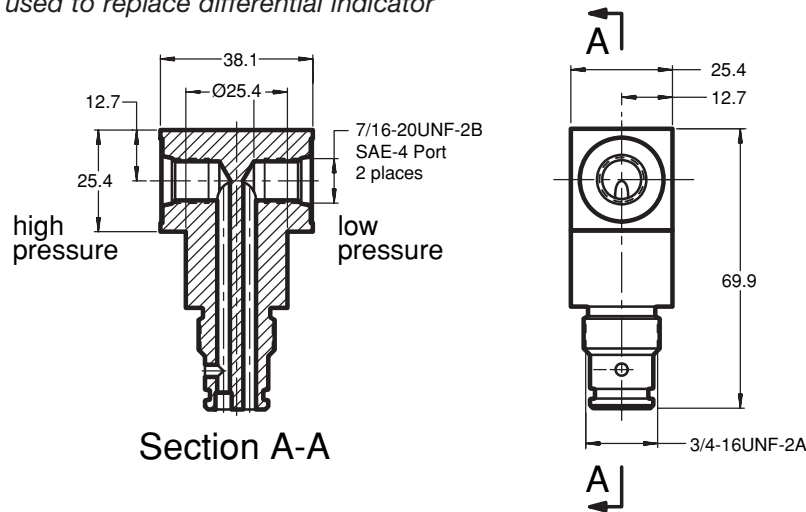
Dual Indicator/Gauge Blocks

Dual Gauge Block - G 1/2 (Part No. 02061666 & 02061667) - used to replace differential indicator

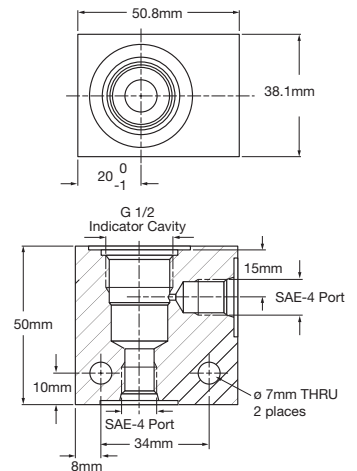


Dual Gauge Block - 3/4-16UNF (Part No. 02059931)

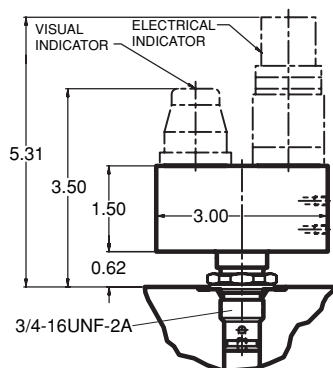
used to replace differential indicator



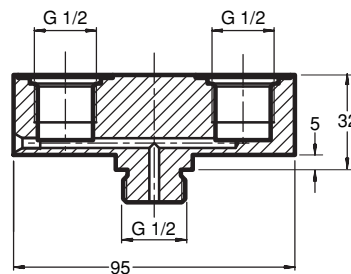
Pipe Connection Block - G1/2" Indicator SAE-4 Ports (Part No. 02080588)



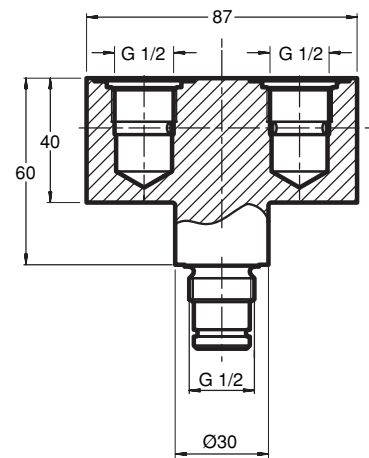
Dual Indicator Block - Differential - 3/4-16UNF (Part No. 02063707)



Dual Indicator Block - Static - G 1/2 (Part No. 00318741)



Dual Indicator Block - Differential - G 1/2 (Part No. 00318732)

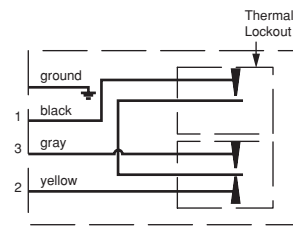
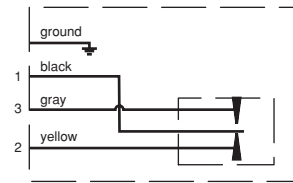


HYDAC Clogging Indicators

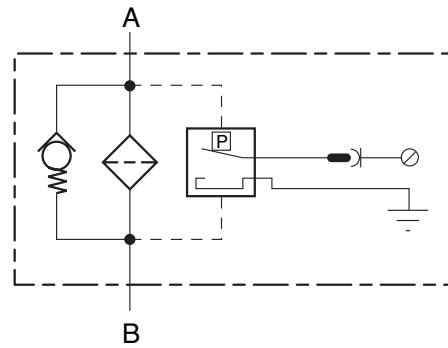
Electrical Schematics for Clogging Indicators

Type C

Clean Element Condition Shown
Below Trip Pressure

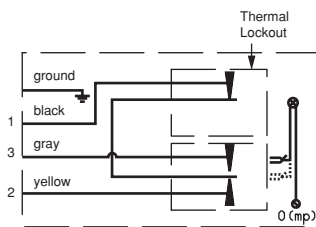
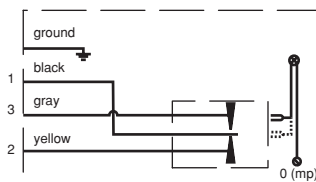


Type C Spin-On

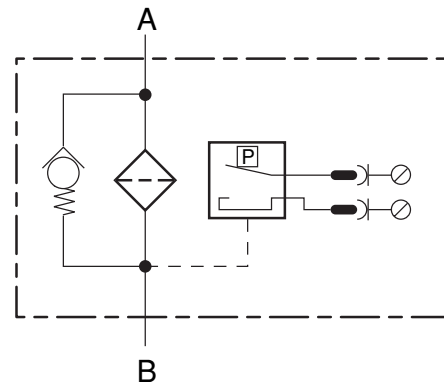


Type D

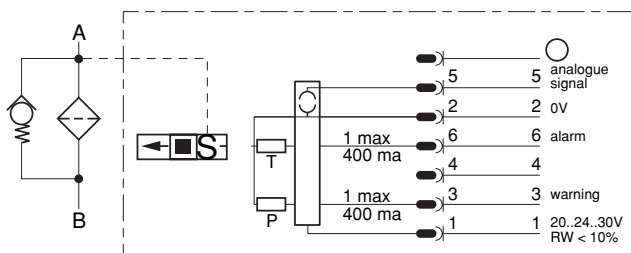
Clean Element Condition Shown
Below Trip Pressure



Type G

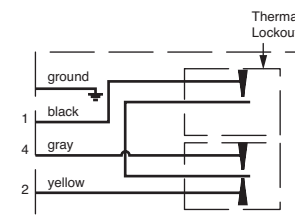
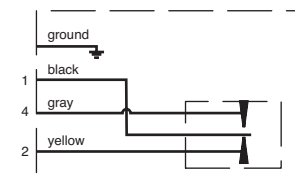


Type GC

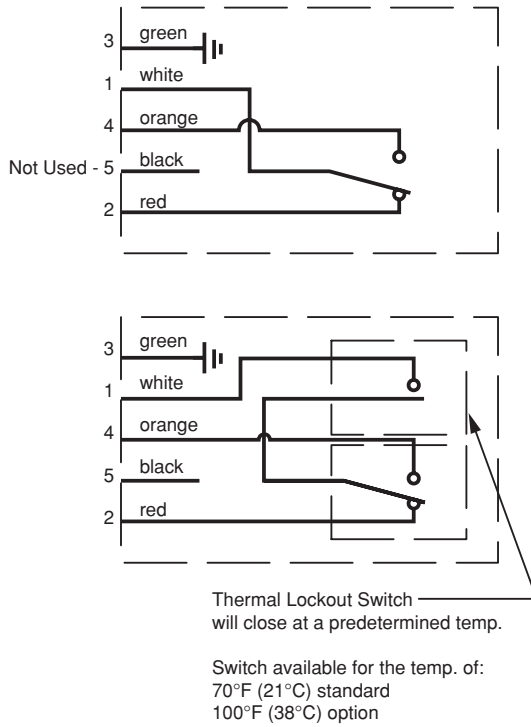


Type H

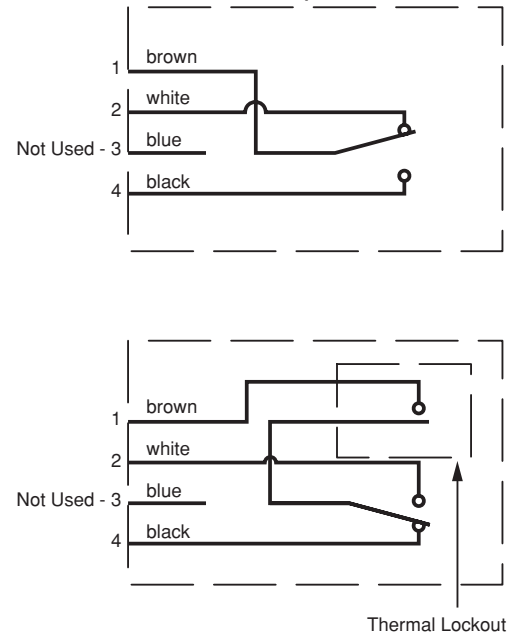
Clean Element Condition Shown
Below Trip Pressure



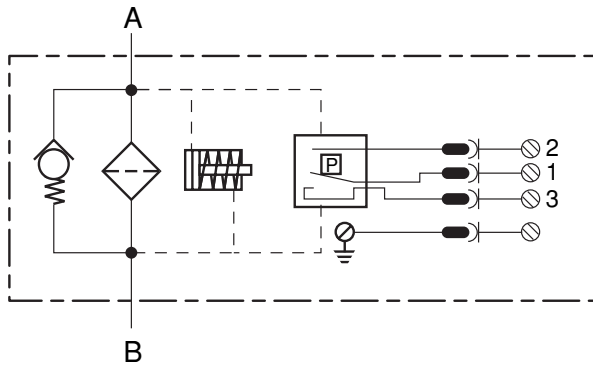
Type J Clean Element Condition Shown Below Trip Pressure



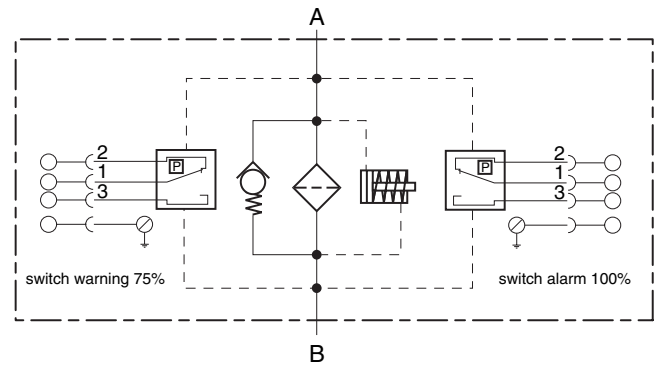
Type J4 Clean Element Condition Shown Below Trip Pressure



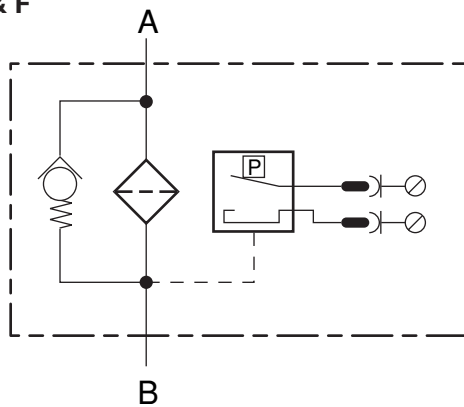
Type LE



Type LZ



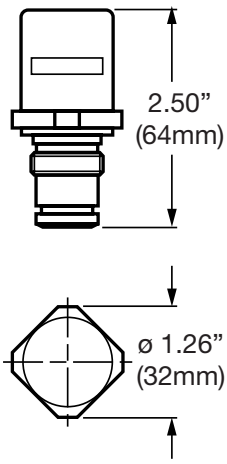
Type UF & F



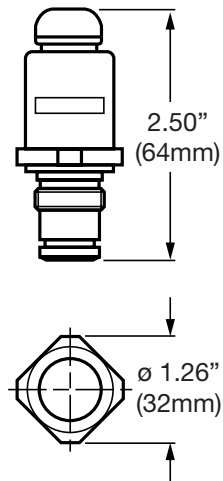
HYDAC Clogging Indicators

Dimensions for Clogging Indicators

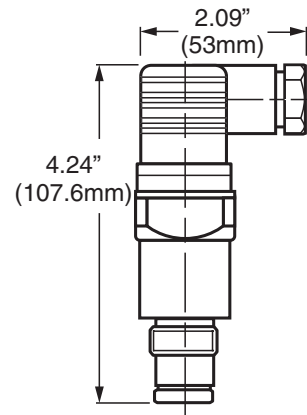
VD/VM...B



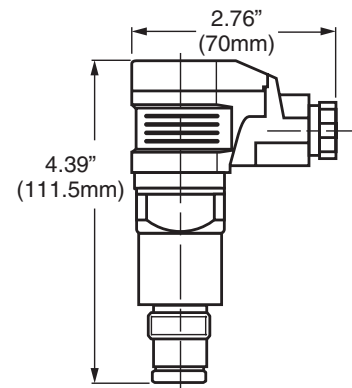
VD/VM...BM



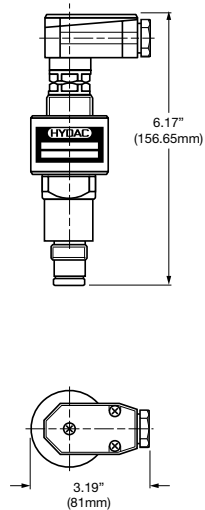
VD/VM...C



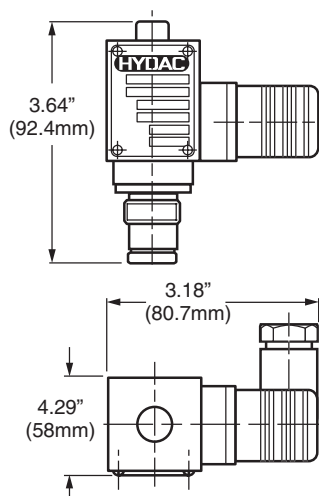
VD/VM...D



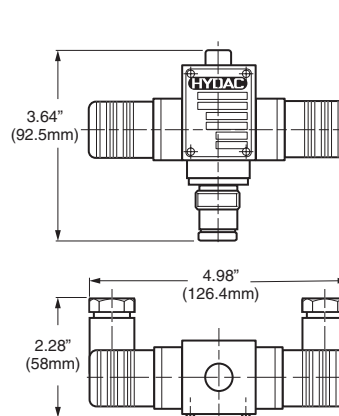
VD...GC



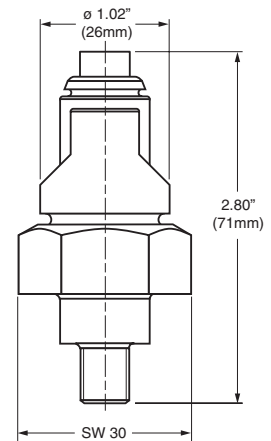
VD...LE



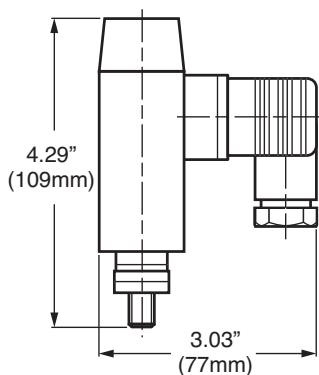
VD...LZ



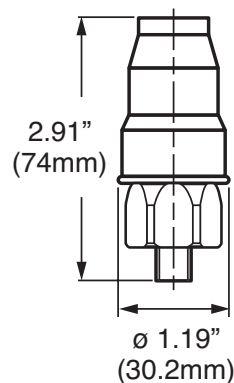
VMF2B.0



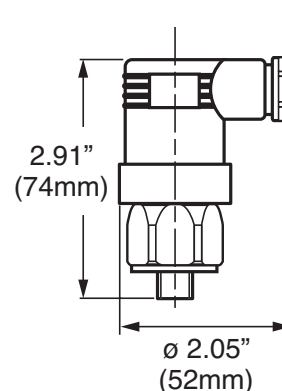
VMF2D.0/L...



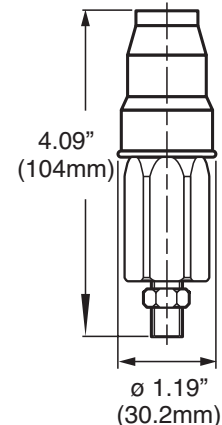
VMF2F.0



VMF2H.0

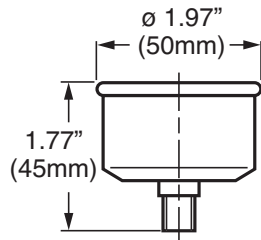


VMF0.2UF.0

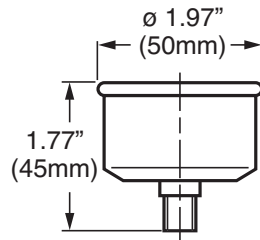


Dimensions for Clogging Indicators

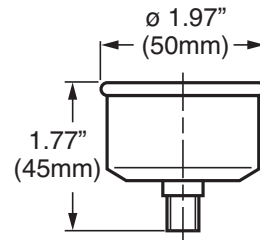
VMF.2E



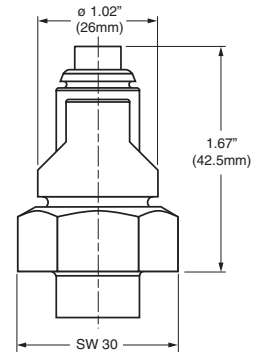
VMF0.2UE.0



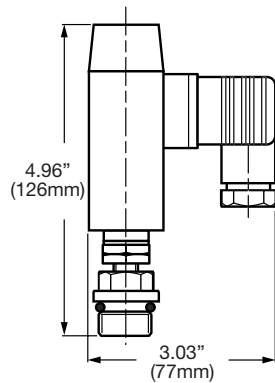
VMF0.6K.0



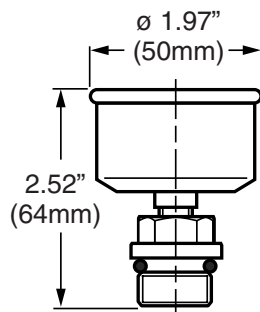
VR2B.0 & VR2BM.0



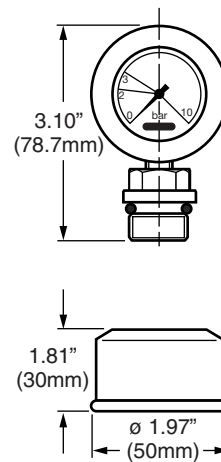
VR2D.0/L...



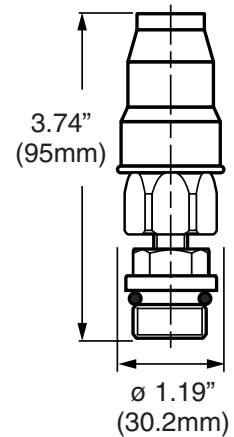
VR...E



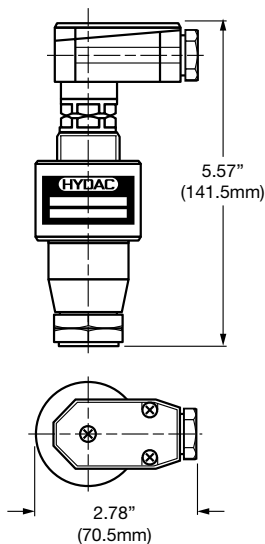
VR2ES.0



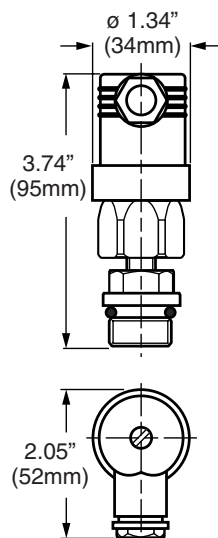
VR...F...



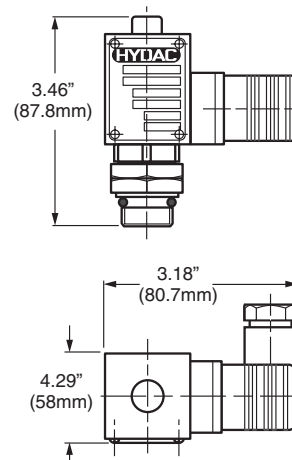
VR...GC



VR...H...



VR2LE.0



VR2LZ.0

