

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, 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, GW	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

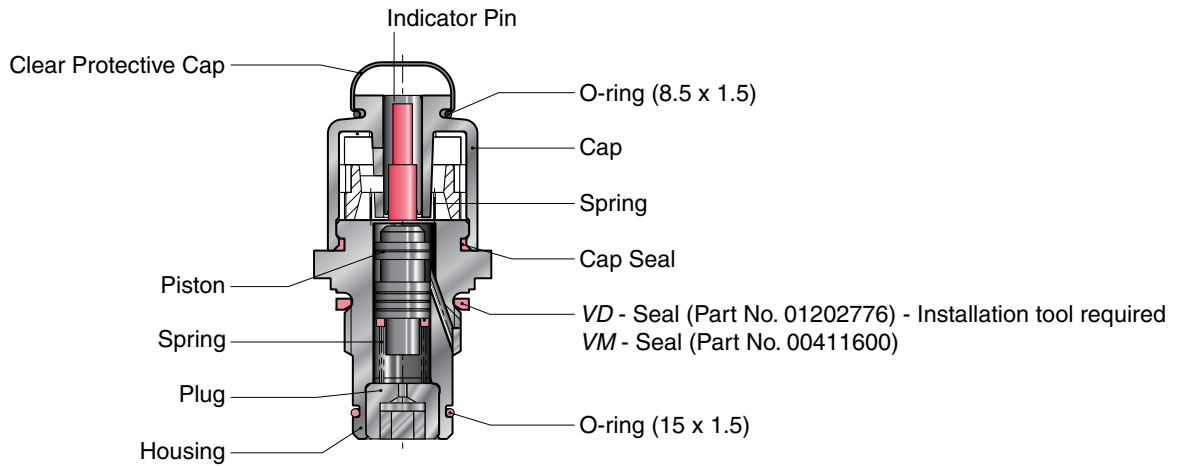
Increasing pressure upstream of the filter acts upon a diaphragm in the indicator (*Type 3*) and causes the indicator pin to overcome an opposing spring force until it trips at a pre-set pressure. The indicator pin automatically resets once pressure is reduced below the trip pressure. Electric static 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:

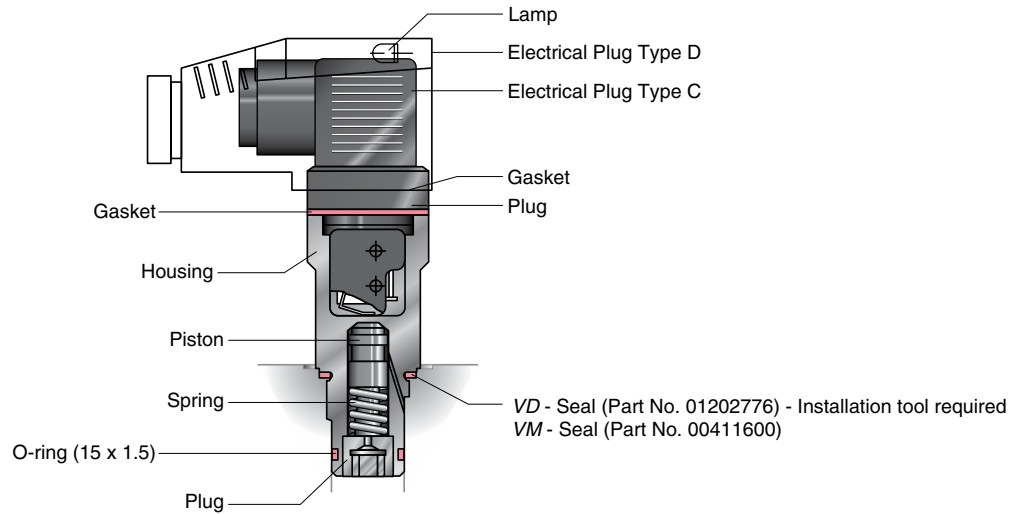
TYPE 1 Visual Indicator

Differential Pressure



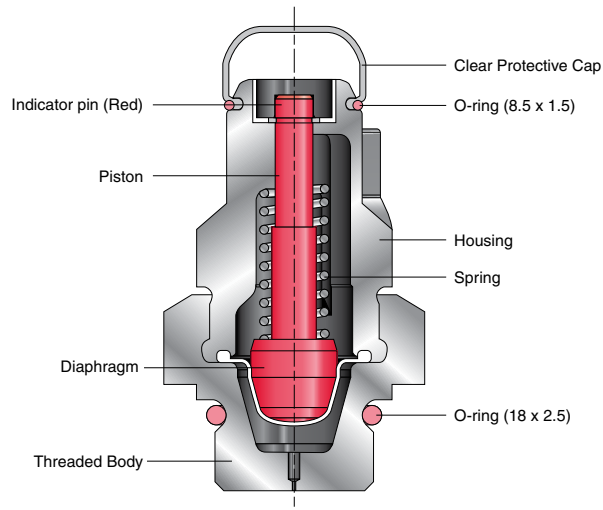
TYPE 2 Electric Indicator

Differential Pressure



TYPE 3 Visual Indicator

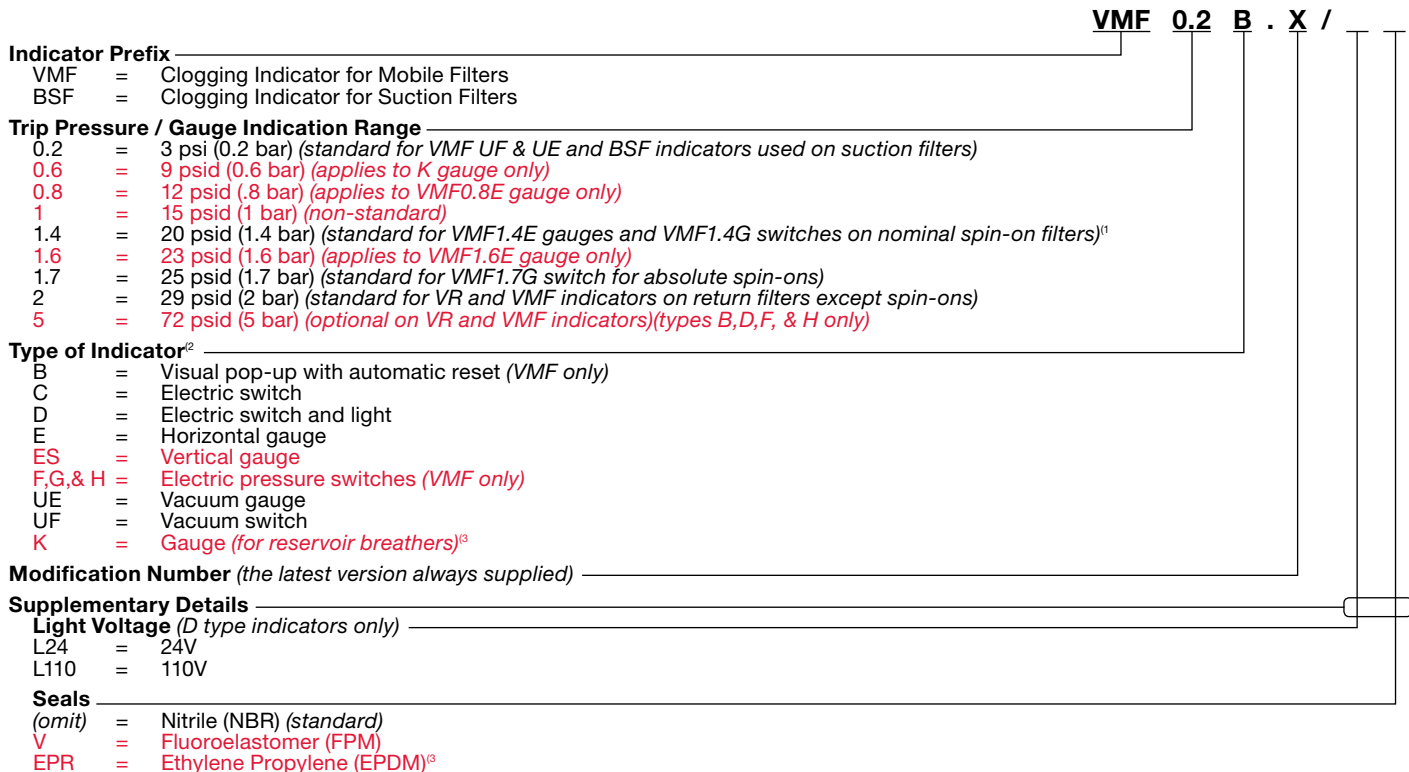
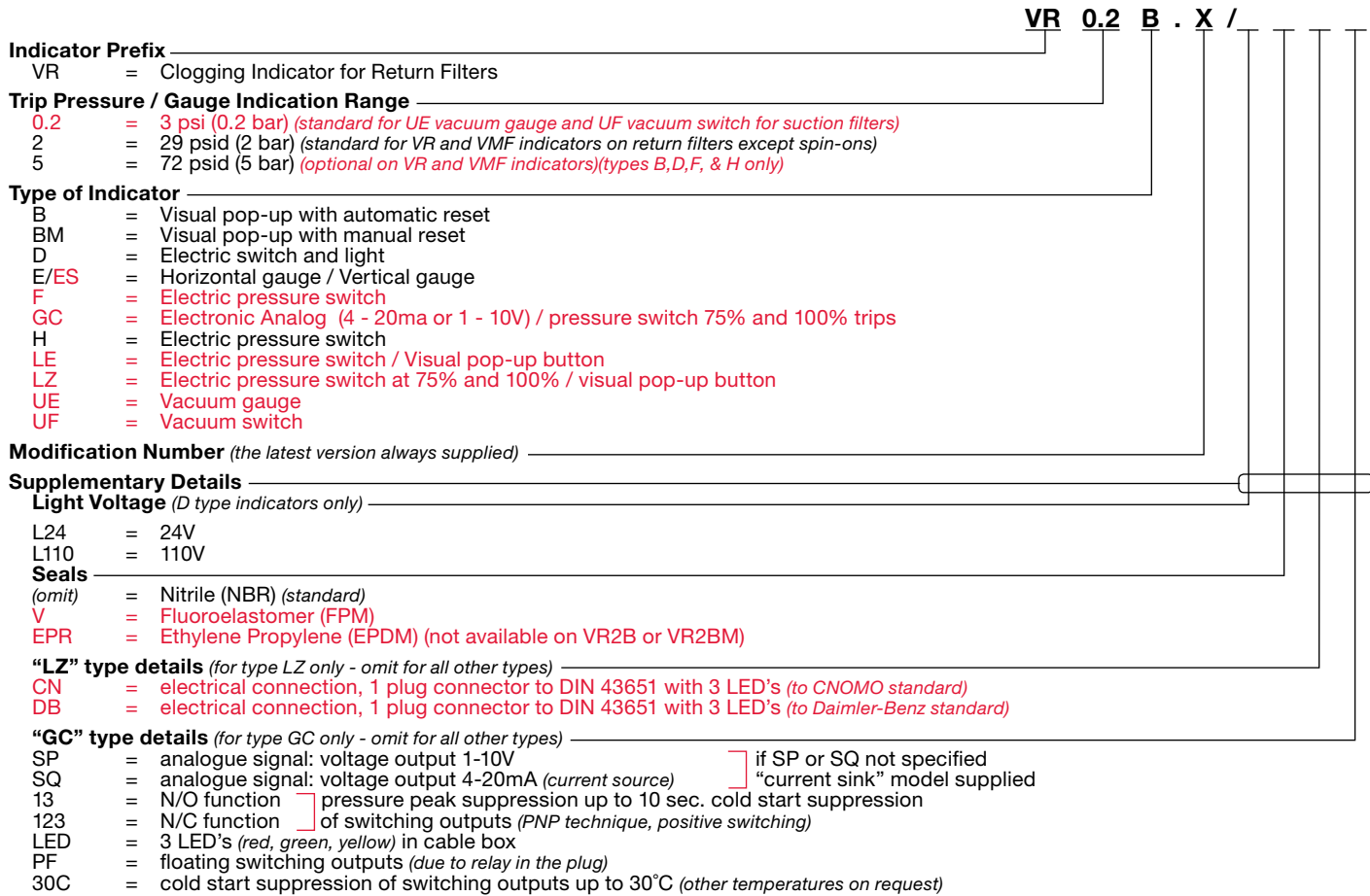
Static Pressure



Quick Reference Guide

Filter Model	Indicator Model	Trip Pressure, psi [bar]	Indicator Type Options
Low Pressure			
RF	VR	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, FD, H, D, E, F, LE, LZ, GC
NF 1.0 <i>(In-Tank Version)</i>	VR	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, H, D, E, F, UE, GC
NF 2.0, 3.0 <i>(Inline Version)</i>	VD, VM, VL	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, C, D, LE, LZ, GC, GW
RFD	VR	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, H, D, E, F, LE, LZ, GC
NFD <i>(In-Tank Version)</i>	VR	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, H, D, E, F
NFD <i>(Inline Version)</i>	VD, VM, VL	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, C, D, LE, LZ, GC, GW
RFM	VR <i>(Sizes 30, 330-851)</i> , VMF <i>(Sizes 75-270)</i>	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	W, A, B, BM, C, D, E, F, FD, H
HF4R(S)	VMF	1 (0.08), 10 (0.8), 20 (1.4), 29 (2)	A, C, E, G, J, J4, LE, LZ
RKM	VMF	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	W, A, E, F, FD, K, UF
RFM...S/Set Series	N/A	N/A	W
RFL <i>(Cast Series)</i>	VM, VD, VL	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, BM, C, D, LE, LZ, GC, GW
RFL <i>(Welded Series)</i>	VM, VD, VL	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, BM, C, D, LE, LZ, GC, GW
FLN	VM, VD	29 (2), 72 (5), 116 (8)	A, B, C, D, LE, LZ
NFH	VM, VD, VL	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, BM, C, D, J, J4, GC, GW
RFLD <i>(Cast Series)</i>	VM, VD, VL	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, BM, C, D, LE, LZ, GC, GW
RFLD <i>(Welded Series)</i>	VM, VD, VL	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, BM, C, D, LE, LZ, GC, GW
FLND	VM, VD, VL	29 (2), 72 (5), 116 (8)	A, B, C, D, LE, LZ
NFHD	VM, VD, VL	29 (2) <i>(standard)</i> , 72 (5) <i>(optional)</i>	A, B, BM, C, D, J, J4, GC, GW
Spin-ons - MF, MFD, MFDS	VMF	20 (1.4), 29 (2)	A, E, G, UE, UG, B, C, W
SF	VR	3 (0.2)	A, C, D, UE
MXF	VL, VM	15 (1), 36 (2.5)	W, A, B, C, CD, D, BF, M, J, J4
Medium Pressure			
HF4RL	VM, VD, VL	29 (2) <i>(optional)</i> , 72 (5) <i>(standard)</i>	A, B, BM, C, D, J, J4, LE, LZ, GC, GW
LPF	VM, VD, VL, B..HFV <i>(LPF 660)</i>	29 (2) <i>(optional)</i> , 72 (5) <i>(standard)</i>	A, B, BM, BF C, CD, D, J, J4, LE, LZ, GC, GW
LF	VM, VD, VL	29 (2) <i>(optional)</i> , 72 (5) <i>(standard)</i>	A, B, BM, C, CD, D, J, J4, LE, LZ, GC, GW
FMND	VD	29 (2) <i>(optional)</i> , 72 (5) <i>(standard)</i>	A, B, C, D, J, J4, LE, LZ, GC
High Pressure			
DF	VD	29 (2), 72 (5) <i>(standard)</i> , 116 (8)	A, B, BM, C, D, J, J4, LE, LZ, GC
DF/DFF 1500	VD	29 (2), 72 (5), 116 (8)	A, B, BM, C, D, J, J4, LE, LZ, GC
HF2P	VD	29 (2), 72 (5) <i>(standard)</i> , 116 (8)	A, B, BM, C, D, J, J4, LE, LZ, GC
HF3P	VD	29 (2), 72 (5) <i>(standard)</i> , 116 (8)	A, B, BM, C, D, J, J4, LE, LZ, GC
HF4P	VD	29 (2), 72 (5) <i>(standard)</i> , 116 (8)	A, B, BM, C, D, J, J4, LE, LZ, GC
MFM	VD	72 (5)	W, A, B, BM, C, CD, D, J, J4, LE, LZ, GC
HFM	VD	72 (5)	W, A, B, BM, C, CD, D, J, J4, LE, LZ, GC
DFDK	VD	116 (8)	A, B, BM, C, D, J, J4, LE, LZ, GC
HFDK4P	VD	72 (5), 116 (8) <i>(standard)</i>	B, BM, C, D, J, J4, LE, LZ, GC
DFFH	VD	29 (2), 72 (5) <i>(standard)</i>	A, B, BM, C, D, J, J4, LE, LZ, GC
DFFHM	VD	29 (2), 72 (5) <i>(standard)</i>	A, B, BM, C, D, J, J4, LE, LZ, GC
DF...QE	VD	29 (2), 72 (5) <i>(standard)</i>	A, B, BM, C, D, J, J4, LE, LZ, GC
DFP	VD	29 (2), 72 (5) <i>(standard)</i>	A, B, BM, C, D, J, J4, LE, LZ, GC
DFZ	VD	116 [8]	A, B, BM, C, D, J, J4, LE, LZ, GC
CF	N/A	N/A	W
CP-C16	N/A	N/A	W
CP-SAE	N/A	N/A	W

Model Code: Static Vacuum






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

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

			
General Information			
Model Code	VR2B.0 & VR2BM.0	VR2C.1	VR2D.1
Method of Indication	Visual: Red pin pops up to signal clogged element. Type B: Automatic Reset Type BM: Manual Reset	Electric: Electric switch activates to indicate 100% clogged element.	Visual: LED energizes for local 100% Clogged Indication. Electrical Contact: N/O or N/C Contact at 100%
Port Connection	G1/2 (ISO 228)	G1/2 (ISO 228)	G1/2 (ISO 228)
Adapter	—	included, VR-1/8-S P/N 00246881	included, VR-1/8-S P/N 00246881
Housing Material	aluminum	steel	aluminum
Seals	nitrile (NBR) - standard fluoroelastomer (FPM)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)
Weight	0.18 lbs (80 grams)	0.31 lbs (140 grams)	0.84 lbs (380 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 factory adjustable from 10 psi to 130 psi
Hydraulic Data			
Operating Pressure	100 psi (7 bar)	290 psi (20 bar)	290 psi (20 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) -15%	29 psi (2 bar) -10% <i>(contact HYDAC for special settings from 15 psi to 120 psi)</i>
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)	-22°F to 250°F (-30°C to 121°C)
Electrical Data			
Contact Voltage max.	—	250 VAC or 24 VDC	250 VAC or 24 VDC
Maximum Induction-free Power Rating	—	5 A at 250 VAC 4 A at 24 VDC	5 A at 250 VAC 4 A at 24 VDC
Lamp / LED Supply Voltage	—	—	24 VDC 110/220 VAC
Electrical Connection	—	M20 x 1.5mm	M20 x 1.5mm
Switching Type	—	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)
Insulation	—	IP65, Terminal IP00	IP65
Other Electrical Data	—	for high voltage, low amperage <i>(See Type GW schematic on page 237)</i>	Optional voltages for indicator light: 24V or 110V <i>(See Type D schematic on page 237)</i>




Note: Applicable Filters - see page 216, Quick Reference Guide.

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

			
General Information			
Model Code	VR2E.0 & VR2ES.0	VR2F.0	VR2FD.0
Method of Indication	Green Range: 0-29 psi Yellow Range: 29-43 psi Red Range: 43-145 psi	Electric: Electric switch activates to indicate 100% clogged element.	Electric: Electric Switch activates to indicate 100% clogged element
Port Connection	G1/2 (ISO 228)	G1/2 (ISO 228)	G 1/2 (ISO 228)
Adapter	included, VR-1/8-S P/N 00246881	included, VR-MF.S.0 P/N 00319004	included, VR-1/8-S P/N 00246881
Housing Material	brass	steel	steel
Seals	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)
Weight	0.26 lbs (120 grams)	0.18 lbs (80 grams)	0.20 lbs (90 grams)
Torque Rating	11 Lbf-ft	11 Lbf-ft	22 Lbf-ft
Other Characteristics		Trip Pressure adjustable from 15 psi to 145 psi	
Hydraulic Data			
Operating Pressure	145 psi (10 bar)	580 psi (40 bar)	145 psi (10 bar)
Trip Pressure (or Indication Range)	0 to 145 psi (0 - 10 bar)	29 psi (2 bar) -20%	29 psi (2 bar) ± 4psi (±0.3 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)	-.22F to 250F (-30C to 121C)
Electrical Data			
Contact Voltage max.	—	42 VAC or DC	250VAC
Maximum Induction-free Power Rating	—	2.5 A at 24 VDC	48V at 0.5A
Lamp / LED Supply Voltage	—	—	N/A
Electrical Connection	—	Screw terminal 0.156 in. (4 mm)	Deutsch DT 04-2P
Switching Type	—	Normally Open Contacts (SPST)	Normally Open Contacts
Insulation	—	IP52	IP65
Other Electrical Data	—	for low voltage, high amperage (See Type F schematic on page 238)	—




Note: Applicable Filters - see page 216, Quick Reference Guide.

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

			
General Information			
Model Code	VR2GC.0	VR2LE.0	VR2LZ.0
Method of Indication	Electric: Electronic-analog (4-20 ma) and two electrical switches at 75% and 100% clogged.	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)	G1/2 (ISO 228)
Adapter	—	—	—
Housing Material		steel	steel
Seals	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)
Weight	0.75 lbs (340 grams)	0.54 lbs (245 grams)	0.67 lbs (305 grams)
Torque Rating	11 Lbf-ft	11 Lbf-ft	11 Lbf-ft
Other Characteristics		—	—
Hydraulic Data			
Operating Pressure	100 psi (7 bar)	100 psi (7 bar)	100 psi (7 bar)
Trip Pressure (or Indication Range)	29 psi (2 bar) -20%	29 psi (2 bar) -20%	29 psi (2 bar) -15%
Thermal Lockout	optional	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.	20-30 VDC	115 VAC	24 VDC
Maximum Induction-free Power Rating	6 A at 220 VAC 6 A at 24 VDC	1 A at 15 VAC	1 A at 15 VAC
Lamp / LED Supply Voltage	—	—	24 VDC
Electrical Connection	7 pin plug connector to DIN 43651	M20 x 1.5mm	M20 x 1.5mm
Switching Type	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT) reed contacts	Normally Open (75% alarm) (SPST) Normally Closed (100% alarm) (SPST) reed contacts
Insulation	IP65	IP65	IP65
Other Electrical Data	See Type GC schematic on page 227	for low voltage, high amperage (See Type LE schematic on page 228)	for low voltage, high amperage (See Type LZ schematic on page 228)




Note: Applicable Filters - see page 216, Quick Reference Guide.

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

			
General Information			
Model Code	VMF2B.0	VMF2D.0/L... & VMF5D.0/L...	VMF2F.0
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"	G1/8" male
Adapter	—	—	—
Housing Material	aluminum	aluminum	steel
Seals	nitrile (NBR) - standard fluoroelastomer (FPM)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) 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	—
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 110/220 VAC	—
Electrical Connection	—	M20 x 1.5mm	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 110 V <i>(See Type F schematic on page 238)</i>	for high voltage, low amperage <i>(See Type F schematic on page 238)</i>

Note: Applicable Filters - see page 216, Quick Reference Guide.

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

			
General Information			
Model Code	VMF2FD.0	VMF2C.1 & VMF5C.1	VMF0.2UF.0
Method of Indication	Electric: Electric Switch activates to indicate 100% clogged element	Electric: Electric switch activates to indicate 100% clogged element.	Electric: Electric vacuum switch activates at vacuum setting to indicate 100% clogged element.
Port Connection	G1/8"	G1/8"	G1/8" male
Adapter	—	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	steel
Seals	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)
Weight	0.16 lbs (70 grams)	0.26 lbs (120 grams)	0.34 lbs (155 grams)
Torque Rating	22 Lbf-ft	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	160 psi (11 bar)	290 psi (20 bar)	300 psi (20 bar)
Trip Pressure (or Indication Range)	29 psi (2 bar) -10%	29 psi (2 bar) -10% <i>(contact HYDAC for special settings from 15 psi to 120 psi)</i>	-3 psi (0.2 bar) -0.2 bar <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.	250 VAC	250 VAC or 24 VDC	42 VAC or VDC
Maximum Induction-free Power Rating	5 A at 250 VAC, 3A at 12, 24 VDC, 1 A at 60VDC	5 A at 250 VAC 4 A at 24 VDC	2.5 A at 24 VDC
Lamp / LED Supply Voltage	—	—	—
Electrical Connection	Deutsch DT 04-2P	M20 x 1.5mm	Screw terminal 0.156 in. (4 mm)
Switching Type	Normally Open Contacts	Normally Open and Normally Closed Contacts (SPDT)	Normally Open Contacts (SPST)
Insulation	IP65	IP65, terminals IP00	IP65, Terminal IP00
Other Electrical Data	—	—	<i>(See Type UF schematic on page 238)</i>



Note: Applicable Filters - see page 216, Quick Reference Guide.

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
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	—	—	—
Housing Material	brass	brass	steel
Seals	—	—	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 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 237)



Note: Applicable Filters - see page 216, Quick Reference Guide.

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

		
General Information		
Model Code	VMF1.7G.0/3	VMF0.2UE.0/3
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	—	—
Housing Material	steel	brass
Seals	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	—
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	#8-32 Screw Terminals	—
Electrical Connection	Normally Open Contacts (SPST)	—
Switching Type	—	—
Insulation	—	—
Other Electrical Data	<i>(See Type G schematic on page 237)</i>	—




Note: Applicable Filters - see page 216, Quick Reference Guide.

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

		
General Information		
Model Code	BSF0.2C.0	BSF0.2D.0/L...
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	—	—
Housing Material	aluminum	aluminum
Seals	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) 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	M 20 x 1.5mm	M 20 x 1.5mm
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 237)	Optional voltages for indicator light: 24V or 110 V (See Type D schematic on page 237)

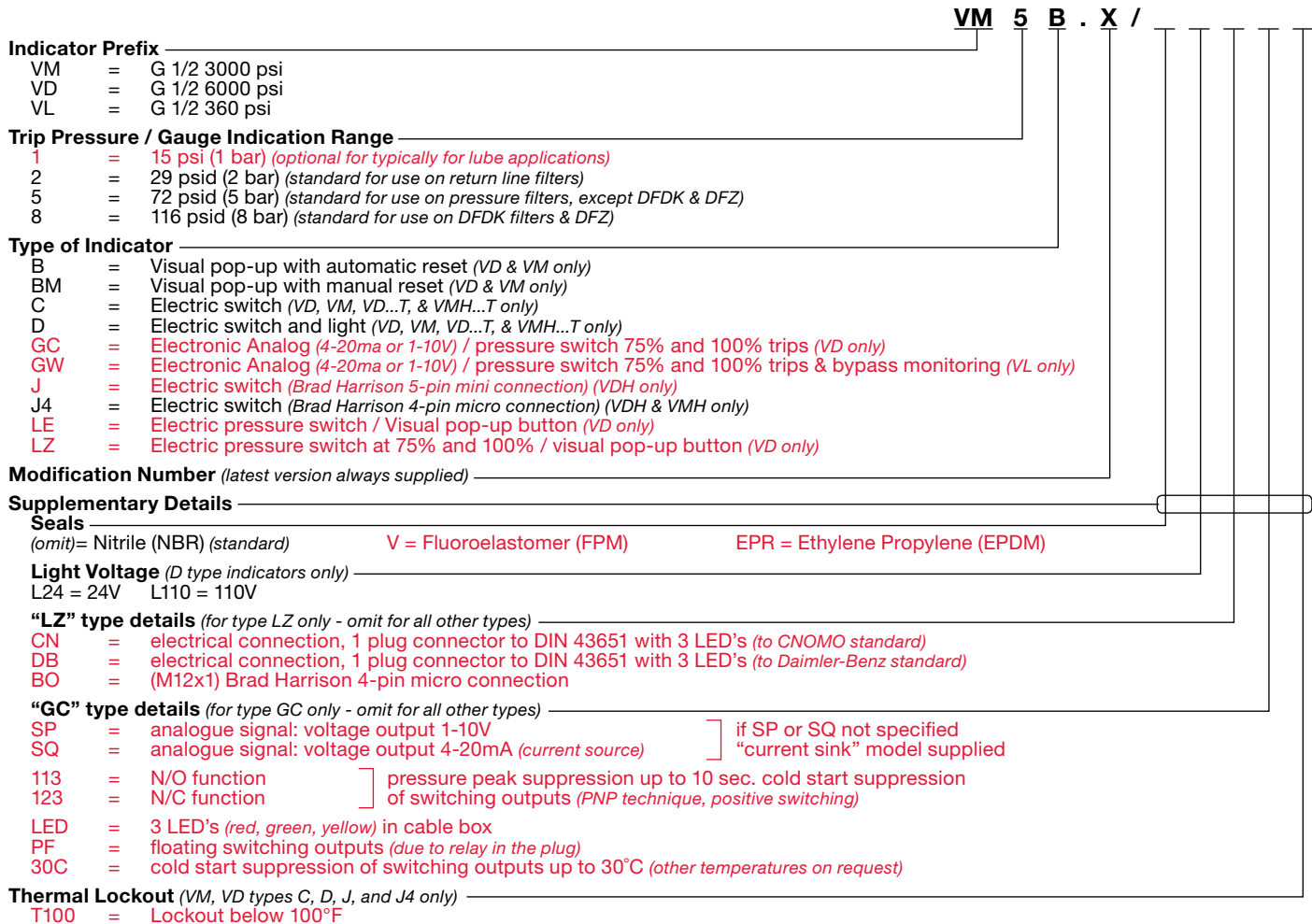
Note: Applicable Filters - see page 216, Quick Reference Guide.

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

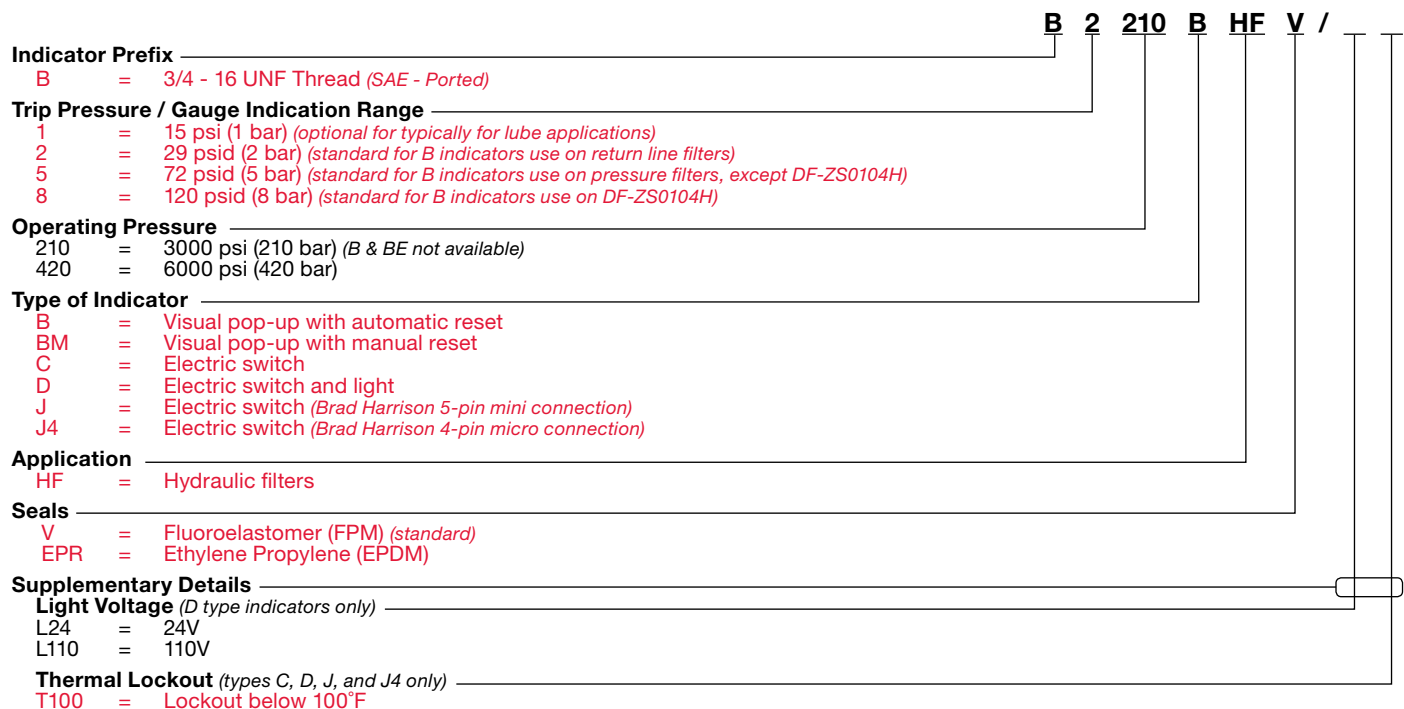
			
General Information			
Model Code	VR0.2UE.0	VR0.2UF.0	VMF0.6K.0
Method of Indication	Visual: Vacuum gauge including graduated scale	Electric: Electric switch activates to indicate 100% clogged element	Visual: Gauge includes graduated scale
Port Connection	G1/2 (ISO 228)	G1/2 (ISO 228)	G1/8"
Adapter	included, G1/2 male x 1/8NPTF P/N 02067828	included, VR-1/8-S P/N 00246881	—
Housing Material	brass	brass	aluminum
Seals	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) 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	—	—	—
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 <i>(See Type UF schematic on page 238)</i>	—

Note: Applicable Filters - see page 216, Quick Reference Guide.




Model Code: Differential Pressure Indicators



Underwriters Approval
CRUUS = Electrical Indicators VMC, VMD, VMJ, VMJ4, VDC, VDD, VDJ, VDJ4






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
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	—	—	—
Housing Material	aluminum	aluminum	aluminum
Seals	fluoroelastomer (FPM) - standard ethylene propylene (EPR)	fluoroelastomer (FPM) - standard ethylene propylene (EPR)	fluoroelastomer (FPM) - 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	Option: Below 100°F	Option: Below 100°F	Option: Below 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	M 20 x 1.5mm	M 20 x 1.5mm	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	—
Other Electrical Data	Electrical connector can be rotated in 90° increments (See Type C schematic on page 211)	—	—
cRU_{US} 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 110 V (See Type D schematic on page 237)	(See Type J4 schematic on page 238)

Note: Applicable Filters - see page 216, Quick Reference Guide.




HYDAC | Clogging Indicators

Differential Pressure Indicators for Pressure Filters and Inline Return Filters

			
General Information			
Model Code	1) VL 2 GW.0 2) VL 5 GW.0	1) VM2B.1 2) VM5B.1	1) VM2BM.1 2) VM5BM.1
Method of Indication	Electric: Electric analog (4-20ma) and two electric switches activate to indicate 75% and 100% clogged.	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
Port Connection	G1/2	G1/2	G1/2
Adapter	—	—	—
Housing Material	aluminum	aluminum	aluminum
Seals	nitrile (NBR) - standard fluoroelastomer (FPM)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)
Weight	0.35 lbs (159 grams)	0.12 lbs (55 grams)	0.12 lbs (55 grams)
Torque Rating	24 Lbf-ft	24 Lbf-ft	24 Lbf-ft
Hydraulic Data			
Operating Pressure	360 psi (25 bar)	3000 psi (210 bar)	3000 psi (210 bar)
Trip Pressure (or Indication Range)	29 psi (2 bar) -10% 43 psi (3 bar) -10% 72 psi (5 bar) -10% (contact HYDAC for special settings from 15 psi to 120 psi)	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	Optional	not available	not available
Temperature Range	-40°F to 184°F (-40°C to 85°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.	20-30 VDC	—	—
Maximum Induction-free Power Rating	—	—	—
Electrical Connection	M12 x a, 8 pole male connector	—	—
Switching Type	—	—	—
Insulation	IP65	—	—
Other Electrical Data	Current input: 25mA + signal current 600 Ω max resistance Current output: <400 mA connected <1 mA disconnected	—	—
cRU_{US} Rating	—	—	—




Note: Applicable Filters - see page 216, Quick Reference Guide.

Differential Pressure Indicators for Pressure Filters and Inline Return Filters

			
General Information			
Model Code	1) VM2C.0 & VM2C.1/T... 2) VM5C.0 & VM5C.1/T...	1) VM2CD.0/2M0 2) VM5CD.0/2M0 3) VM2CD.0/2M0-OE 2) VM5CD.0/2M0-OE	1) VM2D0/L... & VM2D.1/L...T... 2) VM5D0/L... & VM5D.1/L...T...
Method of Indication	Electric: Electric switch activates to indicate 100% clogged element.	Electric: Electric Switch activates to indicate 100% clogged element	Visual/Electric: Electric switch and light activate to indicate 100% clogged element.
Port Connection	G 1/2	G 1/2 (ISO 228)	G 1/2
Adapter	—	—	—
Housing Material	aluminum	aluminum	aluminum
Seals	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)
Weight	0.33 lbs (150 grams)	0.22 lbs (100 grams)	0.33 lbs (150 grams)
Torque Rating	24 Lbf-ft	24 Lbf-ft	24 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	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	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	48 V at 0.5 A	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC
Lamp / LED Supply Voltage	—	—	24 VDC, 110/220 VAC
Electrical Connection	M 20 x 1.5mm	Deutsch DT 04-2P	M 20 x 1.5mm
Switching Type	Normally Open and Normally Closed Contacts (SPDT)	Normally Open or Normally Closed (OE) Change Over Contacts	Normally Open and Normally Closed Contacts (SPDT)
Insulation	IP65	IP65	IP65
Other Electrical Data	(See Type C schematic on page 237)	—	Optional voltages for light: 24 or 110 V (See Type D schematic on page 237)
cRU_{US} 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




Note: Applicable Filters - see page 216, Quick Reference Guide.

Differential Pressure Indicators for Pressure Filters and Inline Return Filters

			
General Information			
Model Code	1) VM2J4.1 2) VM5J4.1 3) VM5J4.0 Automotive	1) VM2J.1 2) VM5J.1 3) VM5J.0 Automotive	1) VD5B.1 2) VD8B.1
Method of Indication	Electric: Electric switch activates to indicate 100% clogged element.	Electric: Electric switch activates to indicate 100% clogged element.	Visual: Green and red display indicates when element is clean or 100% clogged.
Port Connection	G 1/2	G1/2	G1/2
Adapter	—	—	—
Housing Material	aluminum	aluminum	stainless steel
Seals	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)
Weight	0.33 lbs (150 grams)	0.33 lbs (150 grams)	0.24 lbs (110 grams)
Torque Rating	24 Lbf-ft	24 Lbf-ft	75 Lbf-ft
Hydraulic Data			
Operating Pressure	3000 psi (210 bar)	3000 psi (210 bar)	6000 psi (420 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)	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	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	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	—
Electrical Connection	Brad Harrison 4-pin micro (M12)	Brad Harrison 5-pin mini (ø 7/8" x 16 threads/in.)	—
Switching Type	Normally Open and Normally Closed Contacts (SPDT)	Normally Open and Normally Closed Contacts (SPDT)	—
Insulation	—	—	—
Other Electrical Data	(See Type J4 schematic on page 238)	(See Type J schematic on page 238)	—
cRU_{US} 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	—




Note: Applicable Filters - see page 216, Quick Reference Guide.

Differential Pressure Indicators for Pressure Filters and Inline Return Filters

			
General Information			
Model Code	1) VD5BM.1 2) VD8BM.1	1) VD5C.0 2) VD8C.0	VD5CD.0/2M0
Method of Indication	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.	Electric: Electric switch activates to indicate 100% clogged element.
Port Connection	G 1/2	G1/2	G 1/2
Adapter	—	—	—
Housing Material	stainless steel	stainless steel	steel
Seals	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)
Weight	0.24 lbs (110 grams)	0.55 lbs (250 grams)	0.42 lbs (190 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)	72 psi (5 bar)
Thermal Lockout	not available	Optional 100°F	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	250 VAC
Maximum Induction-free Power Rating	—	5 A at 250 VAC 3 A at 12,24 VDC 1 A at 60 VDC	48 V at 0.5 A
Electrical Connection	—	M 20 x 1.5mm	Deutsch DT 04-2P
Switching Type	—	Normally Open and Normally Closed Contacts (SPDT)	Normally Open Contacts
Insulation	—	IP65	IP65
Other Electrical Data	—	(See Type C schematic on page 227)	—
cRU_{US} Rating	—	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current	—




Note: Applicable Filters - see page 216, Quick Reference Guide.

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 3) VDH5J.0 Automotive
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	G 1/2	G1/2	G1/2
Adapter	—	—	—
Housing Material	stainless steel	stainless steel	stainless steel
Seals	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM)) 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	M 20 x 1.5mm	7 pin plug connector to DIN 43651	Brad Harrison 5 pin mini (ø 7/8" x 16 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	—
Other Electrical Data	Optional voltages for light: 24 or 110 V (See Type D schematic on page 237)	(See Type GC schematic on page 237)	(See Type J schematic on page 238)
cRU_{US} 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




Note: Applicable Filters - see page 216, Quick Reference Guide.

Differential Pressure Indicators for Pressure Filters and Inline Return Filters

			
General Information			
Model Code	1) VD5J4.1 2) VD8J4.1 3) VDH5J4.0 Automotive	1) VD2LE.1 2) VD5LE.1 3) VD8LE.1	1) VD2LZ.1 2) VD5LZ.1 3) VD8LZ.1
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	G 1/2	G1/2	G1/2
Adapter	—	—	—
Housing Material	stainless steel	stainless steel	stainless steel
Seals	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) ethylene propylene (EPR)	nitrile (NBR) - standard fluoroelastomer (FPM) 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	M20 x 1.5mm	M20 x 1.5mm
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
Other Electrical Data	(See Type J4 schematic on page 228)	(See Type LE schematic on page 228)	(See Type LZ schematic on page 228)
cRU_{US} Rating	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current	—	—




Note: Applicable Filters - see page 216, Quick Reference Guide.

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
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	—	—	—
Housing Material	stainless steel	stainless steel	stainless steel
Seals	fluoroelastomer (FPM) - standard ethylene propylene (EPR)	fluoroelastomer (FPM) - standard ethylene propylene (EPR)	fluoroelastomer (FPM) - 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) 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	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	—	—	M 20 x 1.5mm
Switching Type	—	—	Normally Open and Normally Closed Contacts (SPDT)
Insulation	—	—	—
Other Electrical Data	—	—	Electrical connector can rotate in 90° increments (See Type C schematic on page 237)
cRU_{US} Rating	—	—	3A, 250VAC, N.C. Contact 4A, 250VAC, N.O. Contact 4A, 250VAC, Continuous Current

Note: Applicable Filters - see page 216, Quick Reference Guide.

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) B2420JHF.1/V-S0126H 5) B5420JHFV Automotive 6) B2420JHFV Automotive	1) B5420J4HF.1/V 2) B8420J4HF.1/V 3) B5420J4HFV Automotive 4) B2420J4HFV Automotive
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	—	—	—
Housing Material	stainless steel	stainless steel	stainless steel
Seals	fluoroelastomer (FPM) - standard ethylene propylene (EPR)	fluoroelastomer (FPM) - standard ethylene propylene (EPR)	fluoroelastomer (FPM) - 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, 110 / 220 VAC	—	—
Electrical Connection	M 20 x 1.5mm	Brad Harrison 5 pin mini (ø 7/8 - 16 threads/in.)	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	—	—	—
Other Electrical Data	1) Connector rotates in 90° increments 2) Optional voltage for light: 24 or 110 V (See Type D schematic on page 237)	(See Type J schematic on page 238)	(See Type J4 schematic on page 238)
cRU_{US} 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

Note: Applicable Filters - see page 216, Quick Reference Guide.

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
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	—	—
Adapter	—	—
Housing Material	plastic	steel
Seals	nitrile (NBR)	nitrile (NBR)
Weight	—	—
Torque Rating	—	—

Hydraulic Data

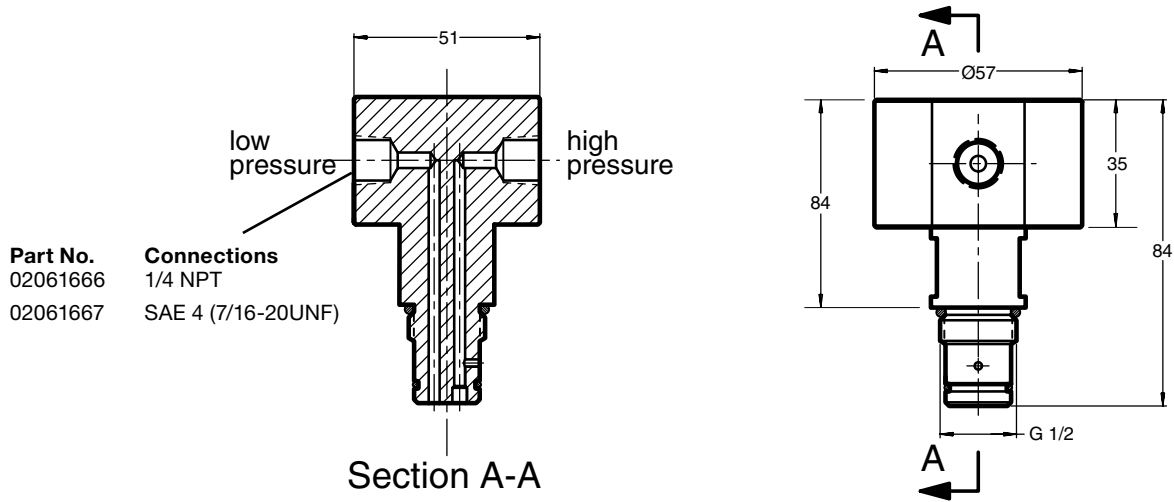
Operating Pressure	250 psi (16.5 bar)	250 psi (16.5 bar)
Trip Pressure (or Indication Range)	22 psid (1.5 bar) 44 psid (3.0 bar)	22 psid (1.5 bar) 44 psid (3.0 bar)
Thermal Lockout	—	—
Temperature Range	-22°F to 250°F (-30°C to 121°C)	-22°F to 250°F (-30°C to 121°C)

Electrical Data

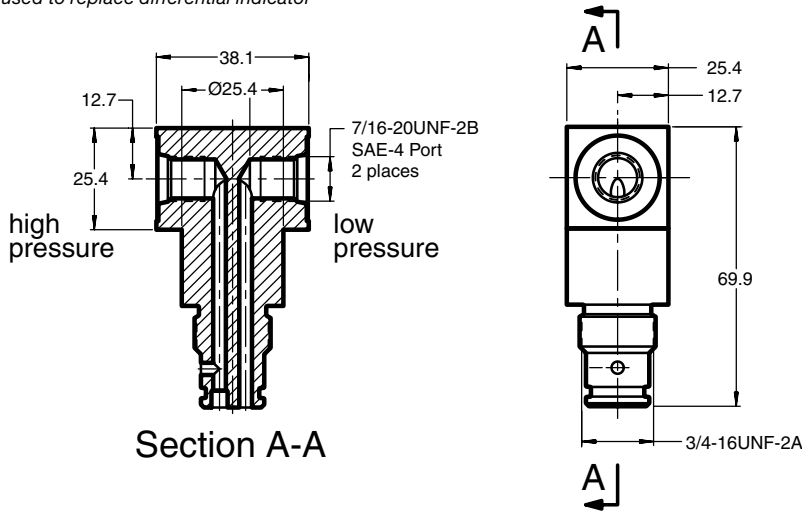
Contact Voltage max.	—	36 VDC
Maximum Induction-free Power Rating	—	200 ma at 36 VDC
Electrical Connection	—	#10 Screw Terminal
Switching Type	—	Normally Open Contacts (SPST)
Insulation	—	—
Other Electrical Data	—	(See Type C Spin-On schematic on page 237)

Dual Indicator/Gauge Blocks

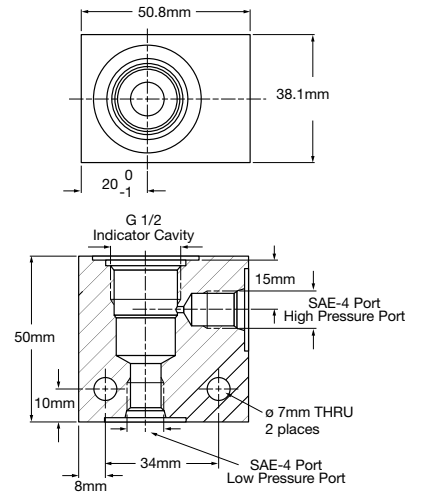
Dual Gauge Block - G 1/2 (Part No. 02061666 & 02061667) - used to replace differential indicator



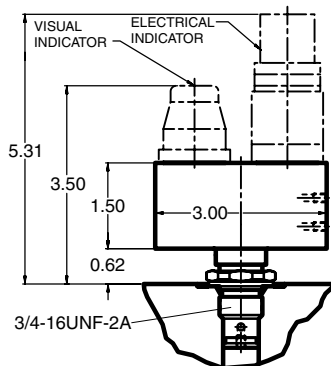
Dual Gauge Block - 3/4-16UNF (Part No. 02059931)
used to replace differential indicator



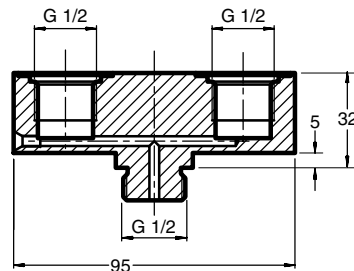
Pipe Connection Block -
G1/2" Indicator SAE-4 Ports
(Part No. 02080588)



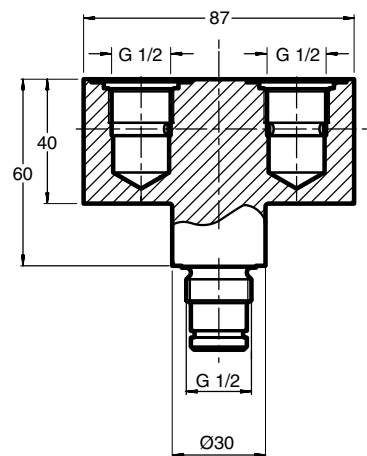
Dual Indicator Block -
Differential - 3/4-16UNF
(Part No. 02063707)



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



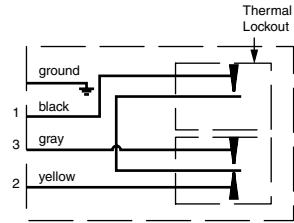
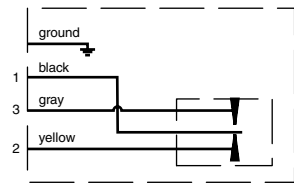
Dual Indicator Block -
Differential - G 1/2
(Part No. 00318732)



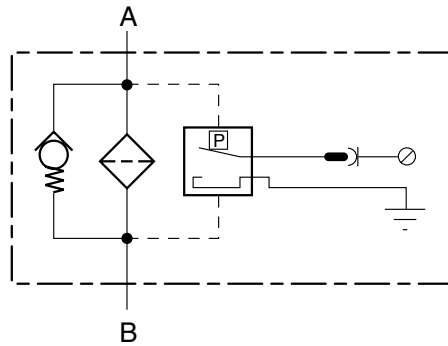
Electrical Schematics

Type C

Clean Element Condition Shown Below Trip Pressure

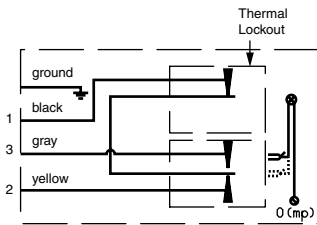
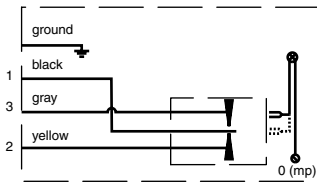


Type C Spin-On

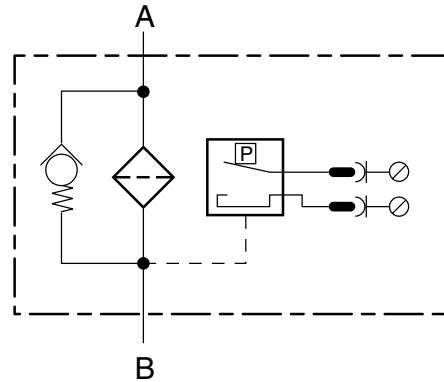


Type D

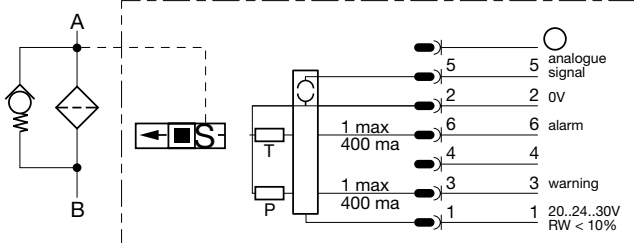
Clean Element Condition Shown Below Trip Pressure



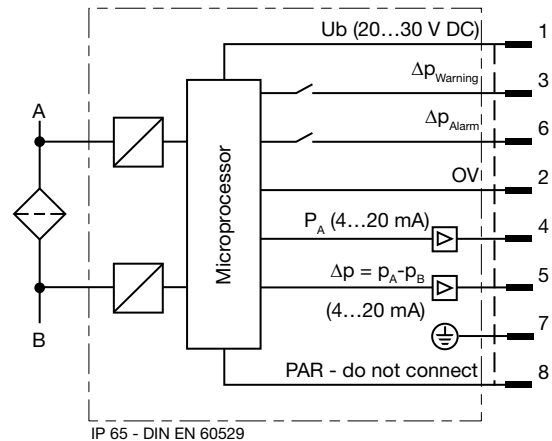
Type G



Type GC



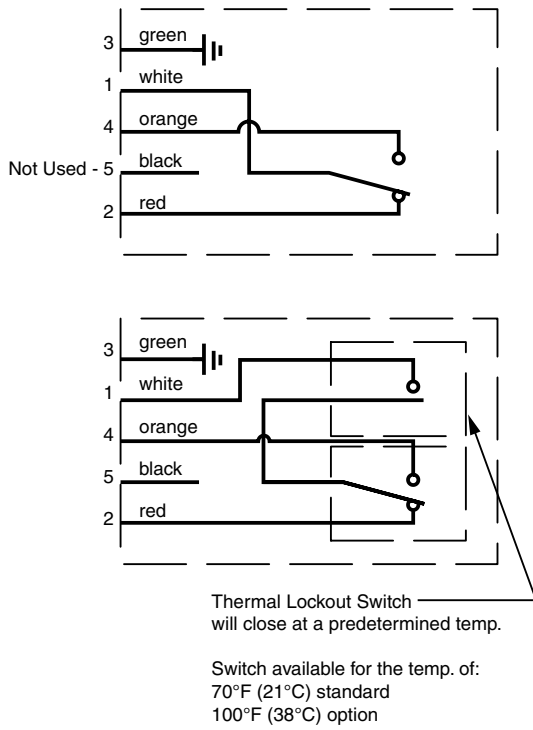
Type GW



IP 65 - DIN EN 60529

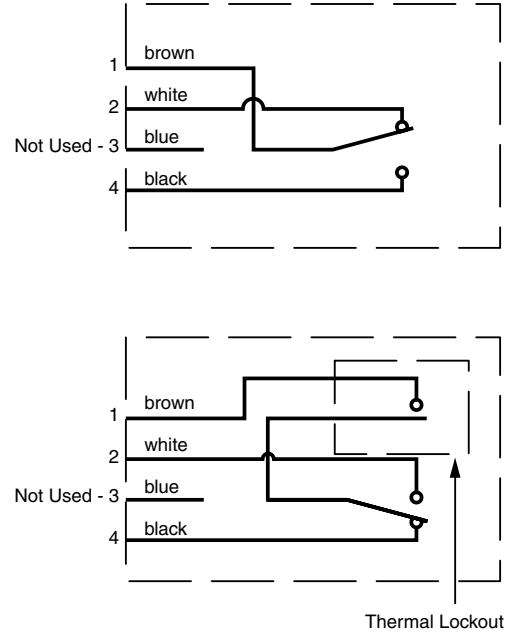
Type J

Clean Element Condition Shown Below Trip Pressure

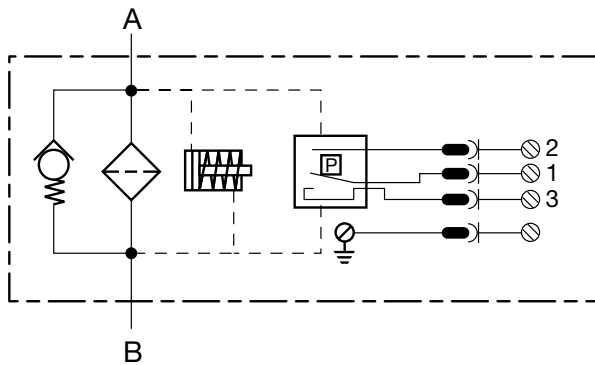


Type J4

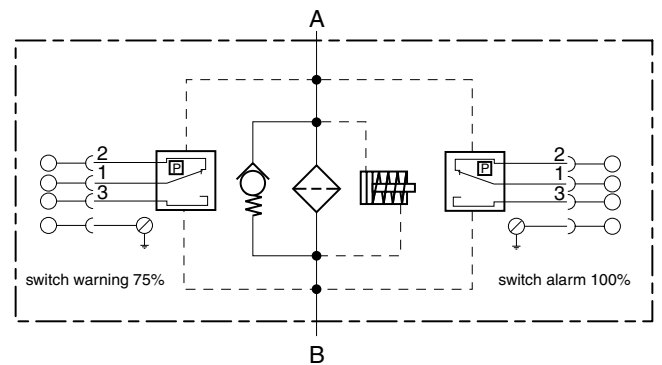
Clean Element Condition Shown Below Trip Pressure



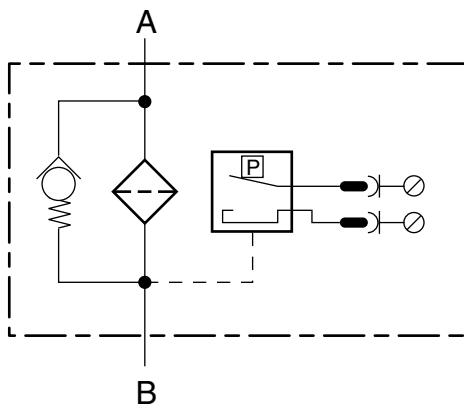
Type LE



Type LZ

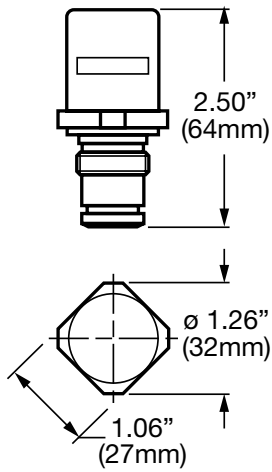


Type UF & F

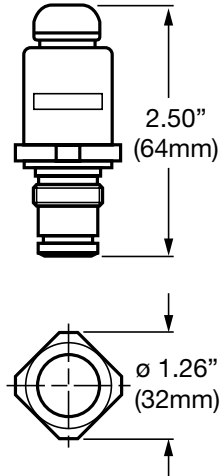


Dimensions

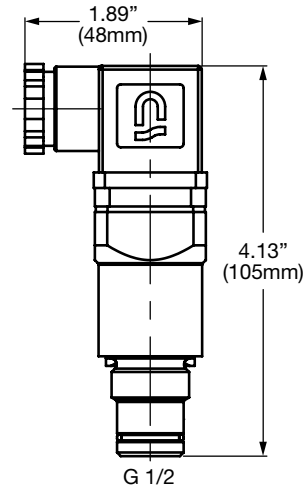
VD/VM...B



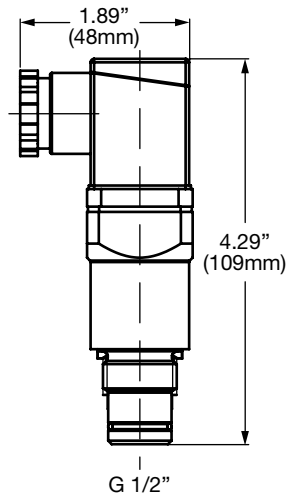
VD/VM...BM



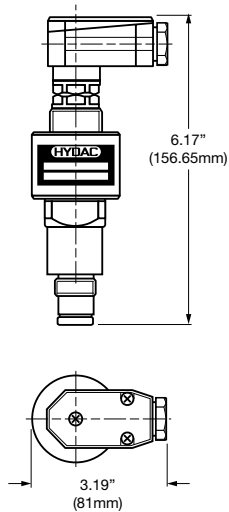
VD/VM...C



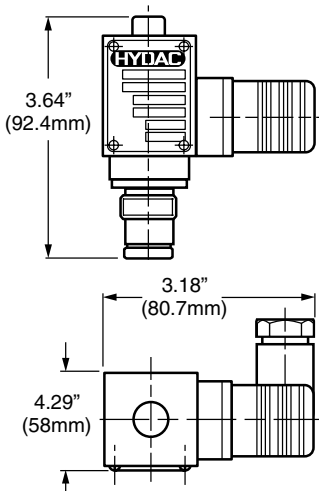
VD/VM...D



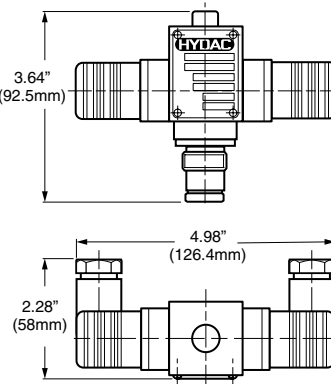
VD...GC



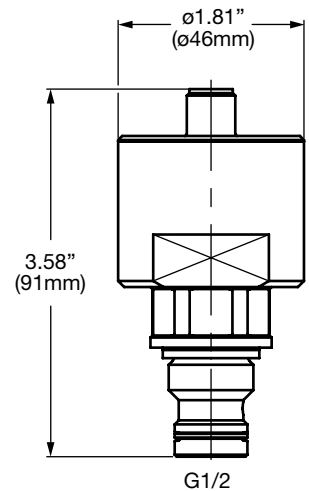
VD...LE



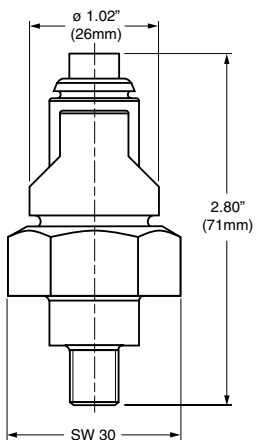
VD...LZ



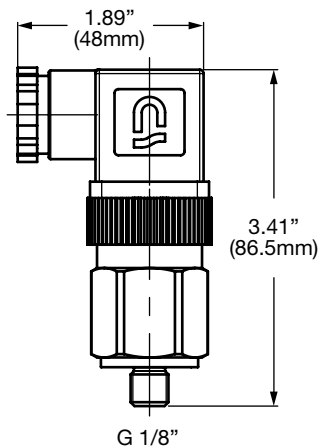
VL...GW



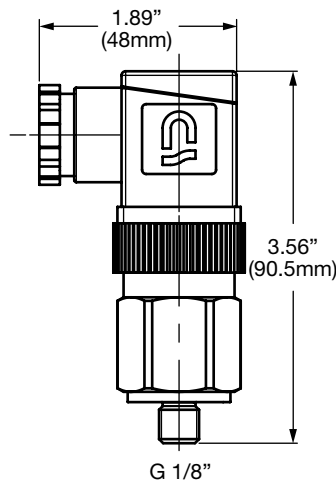
VMF2B.0



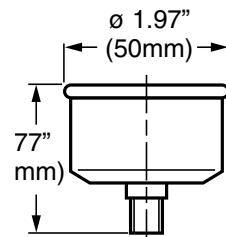
VMF...C



VMF...D



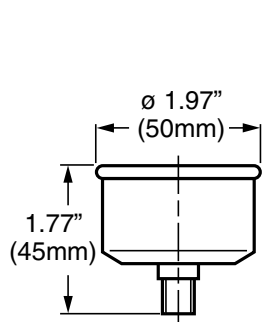
VMF.2E



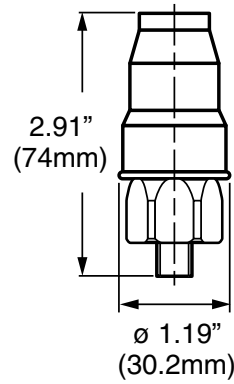
Dimensions shown are for general information and overall envelope size only. For complete dimensions please contact HYDAC to request a certified print.

Dimensions

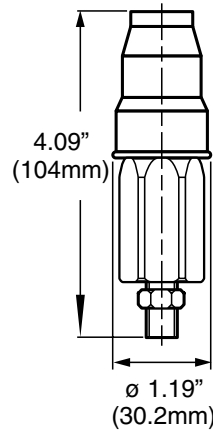
VMF0.2UE.0



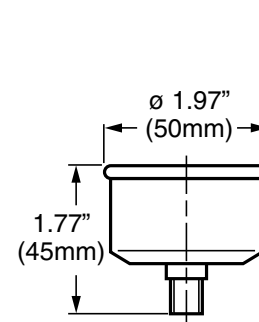
VMF2F.0



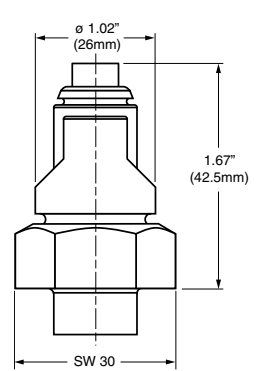
VMF0.2UF.0



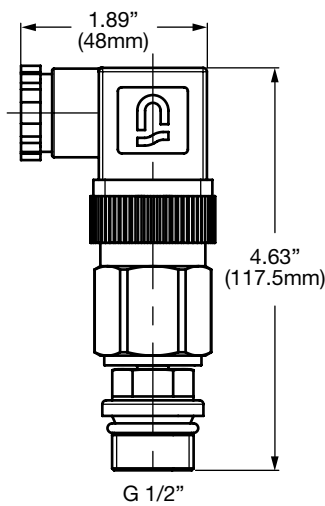
VMF0.6K.0



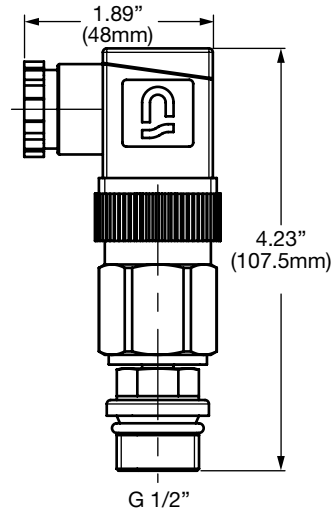
VR2B.0 & VR2BM.0



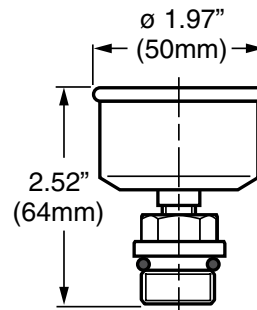
VR...C



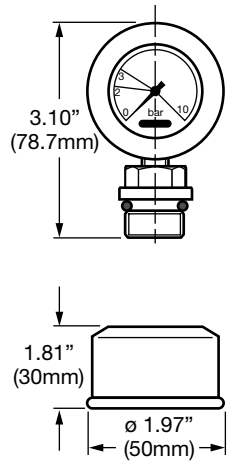
VR...D



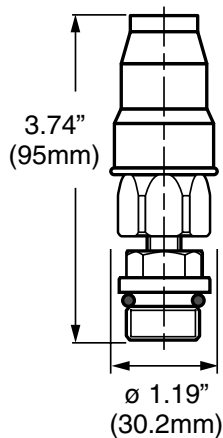
VR...E



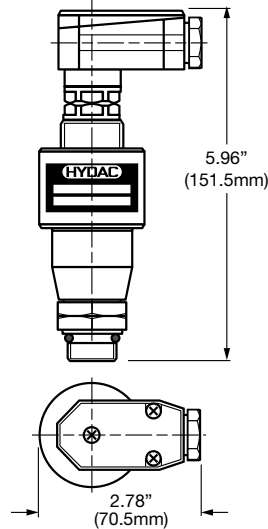
VR2ES.0



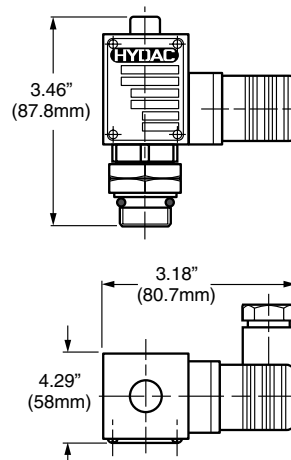
VR...F...



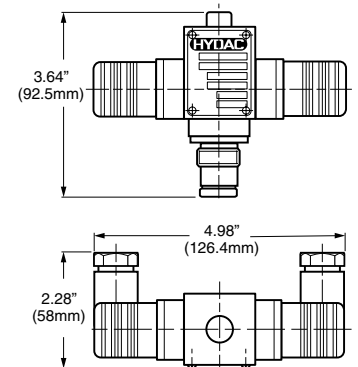
VR...GC



VR2LE.0



VR2LZ.0



Dimensions shown are for general information and overall envelope size only. For complete dimensions please contact HYDAC to request a certified print.