

G Clogging Indicators

Early warning pressure devices protect the hydraulic circuit from contamination, alerting the operator that the filter element is near capacity and must be changed. The clogging indicator is typically set to trip at 1-bar (14 psid) below the filter bypass setting, to allow the operator sufficient time for element change-out. Available in visual, combo electrical/visual, as well as an extensive list of other options and certifications. A comprehensive offering of clogging indicators ensures that any application can be accommodated.

Clogging Indicators Sections

Contents	Page:
Introduction	G2
General Indicator Type Drawings	G4
Standard Indicators	
Vacuum	G6
Return line	G8
Differential pressure	G21
Mobile Indicators	
Return line	G29
Differential pressure	G30
ATEX Indicators	
Return line	G32
Differential pressure	G34
UL/CSA Indicators	
Return line	G36
Differential pressure	G36
Model Code - Standard	G38
Dual Indicator / Gauge Blocks	G40

FILTER CLOGGING INDICATORS

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.

Special Indicators

Mobile indicators

These indicators have been developed for special applications and are fitted with AMP, Deutsch and Junior Power Timer plugs.

ATEX indicators

These indicators are used in potentially explosive locations and are subject to the ATEX Equipment Directive 94/9/EC and the ATEX Operator Directive 1999/92/EC.



UL and CSA indicators

Indicators which are exported to the USA and Canada often require classification according to current UL and CSA standards. The UL and CSA symbols are found on many products, particularly in the field of electrical engineering.



Key Features

Automatic vs. Manual Reset

All indicators with electric switches reset automatically to their original position when the pressure across the filter drops below trip pressure. This is true, also, for the type B visual indicator. However, on the type BM visual indicator with manual reset, the signal arm extends once the trip pressure is exceeded and remains that way until physically reset. The advantage is that the indicator signals that the element is dirty even after the system is shut down, thus, simplifying maintenance.

Thermal Lockout

When mobile and other equipment is started in the cold, the hydraulic or lube fluid is likely to be highly viscous until it approaches normal operating temperature. The high pressure drop created by a highly viscous fluid can trip the indicator and falsely signify that the element is clogged. An optional thermal lockout device, available on many HYDAC electric indicators, prevents the indicator from tripping until the fluid reaches a certain specified temperature. The device consists of a switch in series in the indicator circuit, which is caused to make or break by a bi-metal strip that alters in shape according to temperature.

The thermal lockout feature may be chosen so that the indicator is deactivated at a fluid temperature less than $100^{\circ}\text{F} \pm 5^{\circ}$ (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.

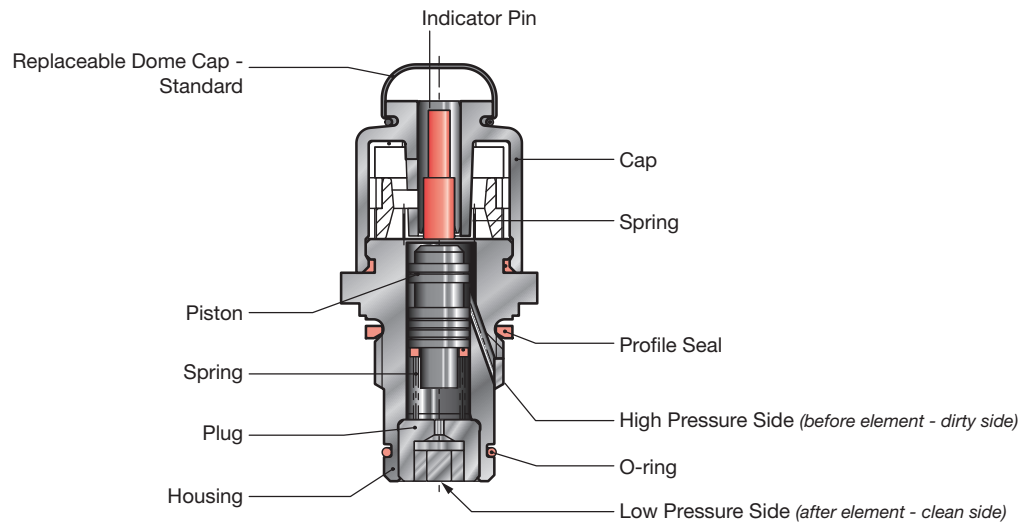
Note: Certain indicators have a red/ yellow/ green display in addition to, or instead of, the pop-up indicator pin.

FILTER CLOGGING INDICATORS

General Indicator Type Drawings:

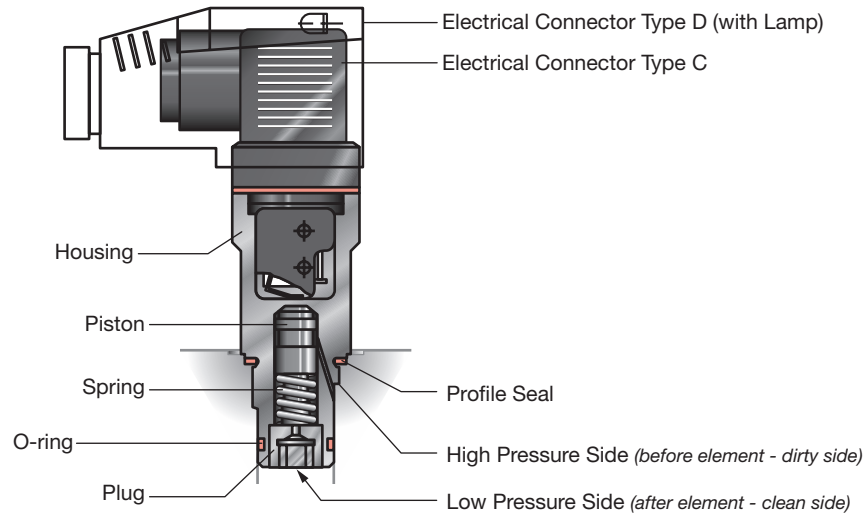
TYPE 1 Differential Pressure

Visual Indicator (B/BM)



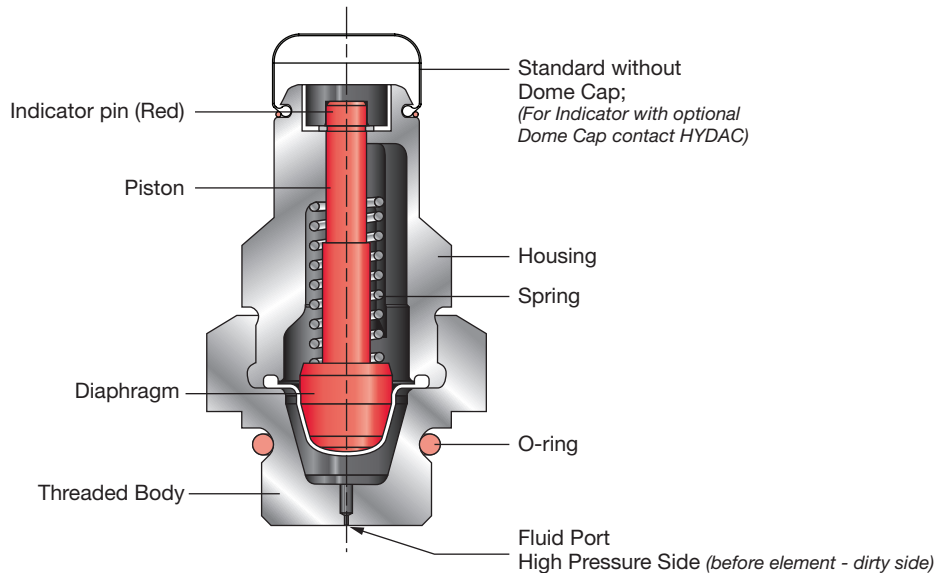
TYPE 2 Differential Pressure

Electric Indicator (C or D)



TYPE 3 Static Pressure

Visual Indicator (B/BM)



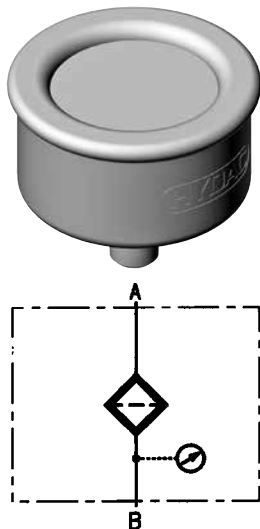
This image shows a full page of graph paper. The grid consists of thin, light gray horizontal and vertical lines that intersect to form small squares across the entire surface. In the bottom right corner, there is a small, square QR code. The rest of the page is empty except for the grid lines.



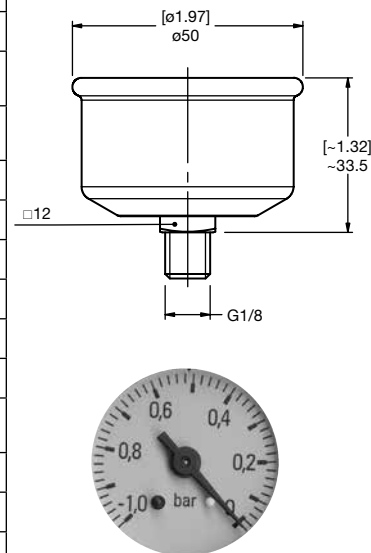
FILTER CLOGGING INDICATORS

Specifications of Vacuum Indicators

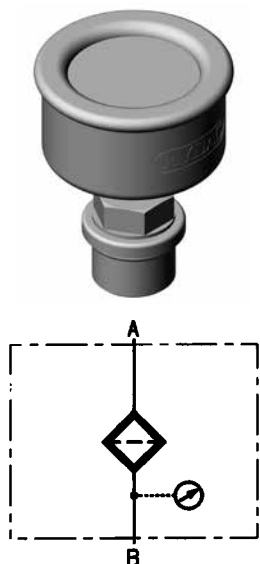
VMF x UE.x



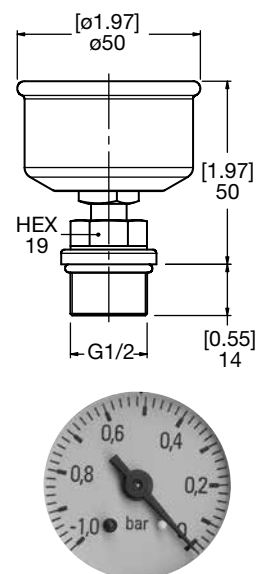
Type of indication	Visual-analog, scale indication
Weight	0.12 lbs (54 g)
Trip Pressure / Range	-14.5 psi to 0 psi (-1 bar to 0 bar)
Permitt. operating pressure	-10.2 psi to 0 psi (-0.7 to 0 bar) continuous
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VMF 1 UE.0



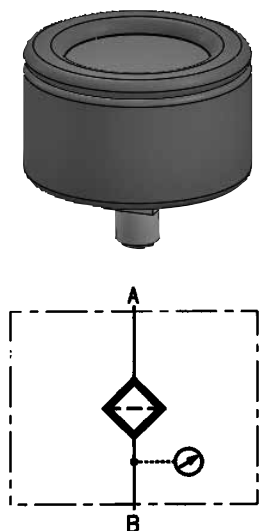
VR x UE.x



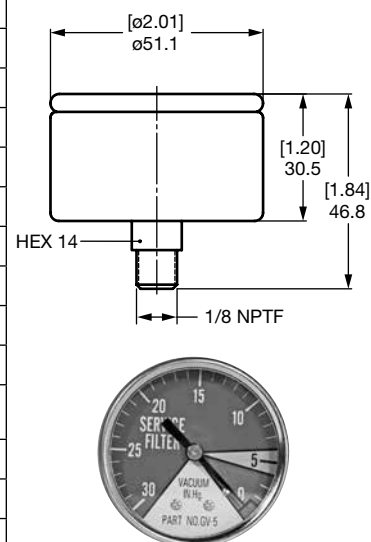
Type of indication	Visual-analog, scale indication
Weight	0.28 lbs (125 g)
Trip Pressure / Range	-14.5 psi to 0 psi (-1 bar to 0 bar)
Permitt. operating pressure	-10.2 psi to 0 psi (-0.7 to 0 bar) continuous
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)
Thread	G 1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VR 1 UE.0



VMF 0.2 UE.x /3

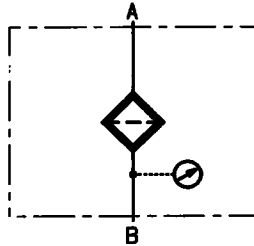
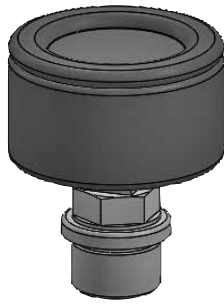


Type of indication	Visual-analog, scale indication
Weight	0.18 lbs (80 g)
Trip Pressure / Range	use w/3 psi (0.2 bar) bypass valve
Permitt. operating pressure	-30 inHg to 0 inHg
Permitt. temperature range	-40°F to 200°F (-40°C to 93°C)
Thread	1/8" NPTF
Max. torque	-
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VMF0.2UE.0/3

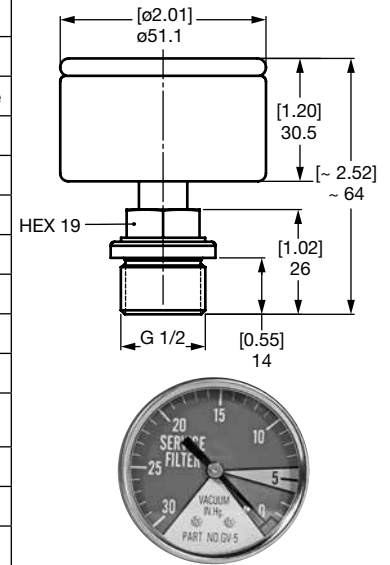


Specifications of Vacuum Indicators

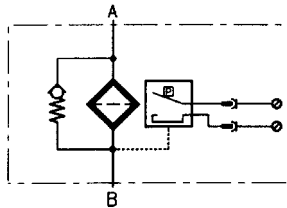
VR 0.2 UE.x



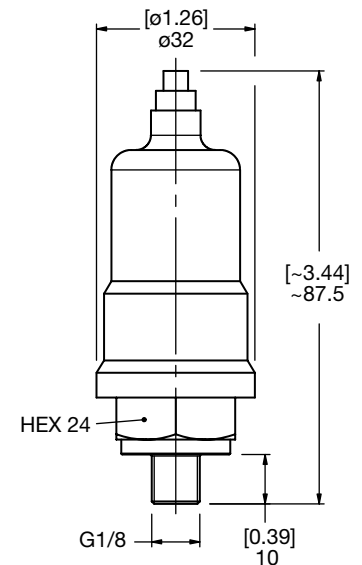
Type of indication	Visual-analog, scale indication
Weight	0.28 lbs (125 g)
Trip Pressure / Range	use w/3 psi (0.2 bar) bypass valve
Permitt. operating pressure	-30 inHg to 0 inHg
Permitt. temperature range	-22°F to 200°F (-30°C to 93°C)
Thread	G 1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VR 0.2 UE.0



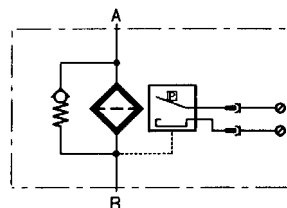
VMF x UF.x



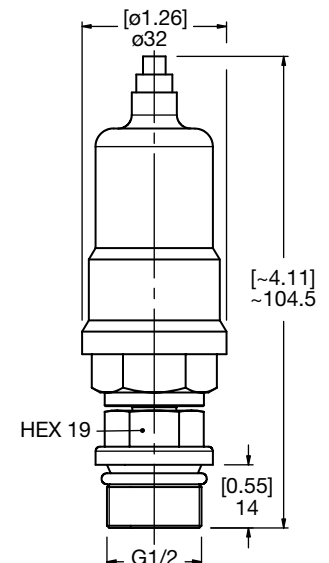
Type of indication	Electrical switch
Weight	0.37 lbs (170 g)
Trip Pressure / Range	-2.9 psi ±1.5 psi (-0.2 bar ±0.1 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/O contact
Max. switching voltage	48 V
Electrical connection	threaded connection
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	ohmic 2.5 A at 24 V = ohmic 2.5 A at 42 V ~
Protection class to DIN 40050	IP 65, terminals IP 00
Order example	VMF 0.2 UF.0



VR x UF.x



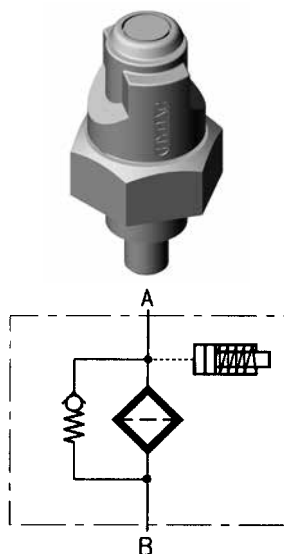
Type of indication	Electrical switch
Weight	0.37 lbs (170 g)
Trip Pressure / Range	-2.9 psi ±1.5 psi (-0.2 bar ±0.1 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	N/O contact
Max. switching voltage	48 V
Electrical connection	threaded connection
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	ohmic 2.5 A at 24 V = ohmic 2.5 A at 42 V ~
Protection class to DIN 40050	IP 65, terminals IP 00
Order example	VR 0.2 UF.0



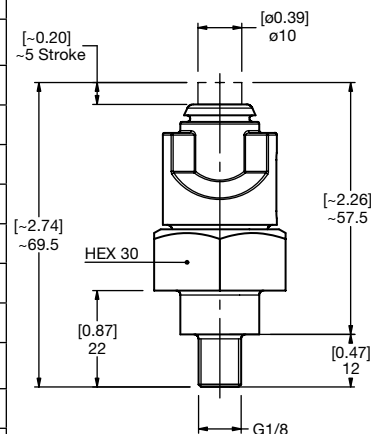
FILTER CLOGGING INDICATORS

Specifications of Static Indicators

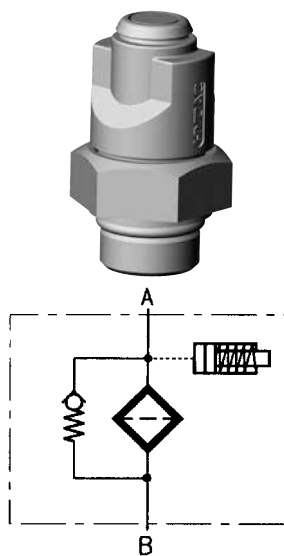
VMF x B.x



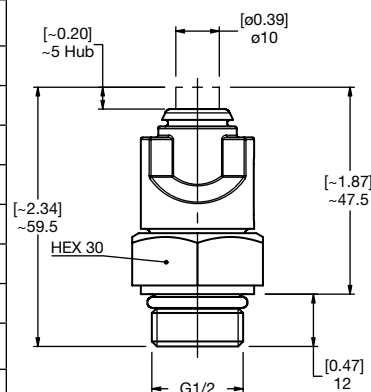
Type of indication	Visual, red pin
Weight	0.19 lbs (84 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VMF 2 B.1



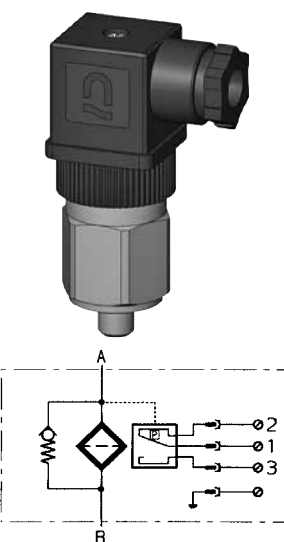
VR x B.x



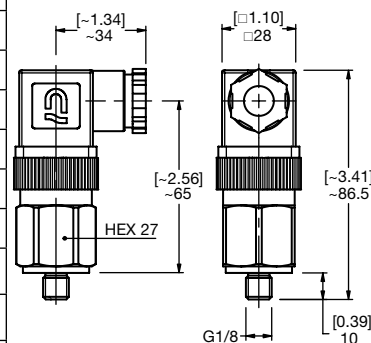
Type of indication	visual, red pin
Weight	0.10 lbs (44 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	11 Lbf-ft (15 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VR 2 B.1



VMF x C.x



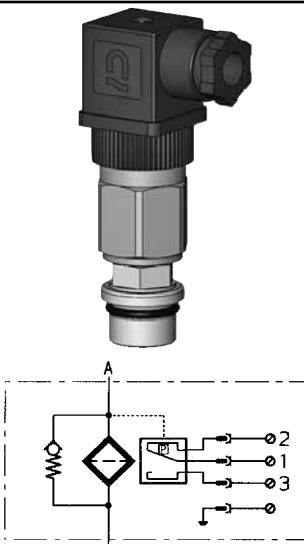
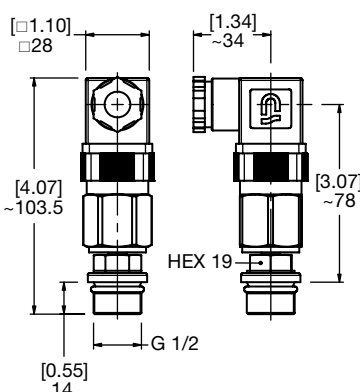
Type of indication	Electrical switch
Weight	0.60 lbs (270 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	230 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	250 W = 300 VA ~
Switching capacity	Ohmic 6 A at 24 V = Ohmic 0.03 to 6 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VMF 2 C.1



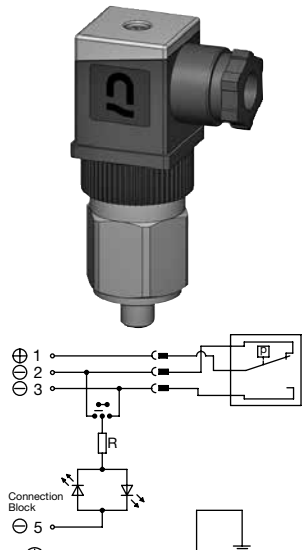
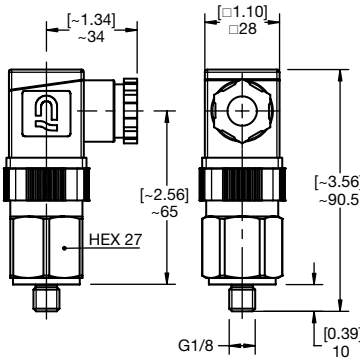
*When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

Specifications of Static Indicators

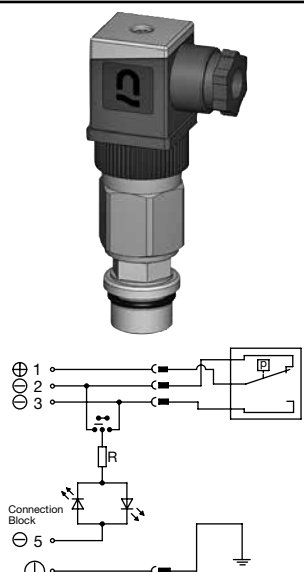
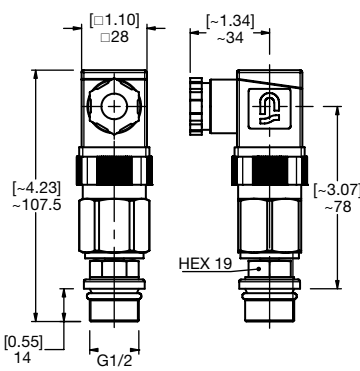
VR x C.x

	Type of indication	Electrical switch	
	Weight	0.75 lbs (340 g)	
	Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)	
	Permitt. operating pressure	580 psi (40 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/2	
	Max. torque	22 Lbf-ft (30 Nm)	
	Switching type	N/C or N/O (<i>change-over contacts</i>)	
	Max. switching voltage	230 V	
	Electrical connection	Male connection M20 Female connector to DIN 43650	
	Max. switching voltage at resistive load	250 W = 300 VA ~	
	Switching capacity	Ohmic 6 A at 24 V Ohmic 0.03 to 6 A at max. 230 V ~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VR 2 C.1	

VMF x D.x /-L...

	Type of indication	Visual indicator & electrical switch	
	Weight	0.66 lbs (300 g)	
	Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)	
	Permitt. operating pressure	580 psi (40 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/8	
	Max. torque	11 Lbf-ft (15 Nm)	
	Switching type	N/C or N/O (<i>change-over contacts</i>)	
	Max. switching voltage	24, 48, 115, 230 V (<i>depending on the type of light insert</i>)	
	Electrical connection	Male connection M20 Female connector to DIN 43650	
	Max. switching voltage at resistive load	250 W = 300 VA ~	
	Switching capacity	Ohmic 6 A at 230 V = Ohmic 0.03 to 6 A at max. 230 V ~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VMF 2 D.1 /-L24	

VR x D.x /-L...

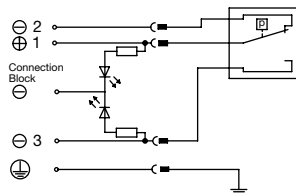
	Type of indication	Visual indicator & electrical switch	
	Weight	0.79 lbs (360 g)	
	Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)	
	Permitt. operating pressure	580 psi (40 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/2	
	Max. torque	22 Lbf-ft (30 Nm)	
	Switching type	N/C or N/O (<i>change-over contacts</i>)	
	Max. switching voltage	24, 48, 115, 230 V (<i>depending on the type of light insert</i>)	
	Electrical connection	Male connection M20 Female connector to DIN 43650	
	Max. switching voltage at resistive load	250 W = 300 VA ~	
	Switching capacity	Ohmic 6 A at 24 V = Ohmic 0.03 to 6 A at max. 230 V ~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VR 2 D.1 /-L110	

*When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

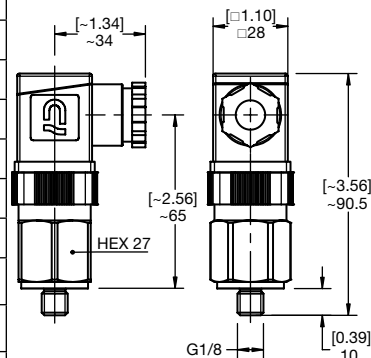
FILTER CLOGGING INDICATORS

Specifications of Static Indicators

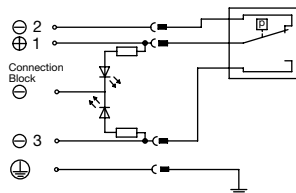
VMF x D.x /-LED



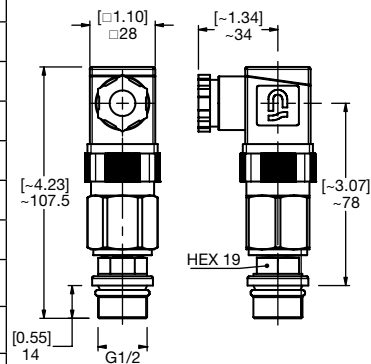
Type of indication	Visual indicator & electrical switch
Weight	0.66 lbs (300 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/O contact
Max. switching voltage	24 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	250 W = 300 VA ~
Switching capacity	Ohmic 6 A at 24 V =
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VMF 2 D.1 /-LED



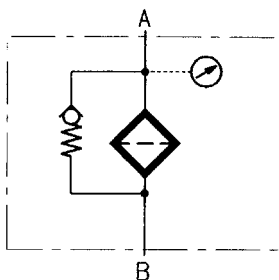
VR x D.x /-LED



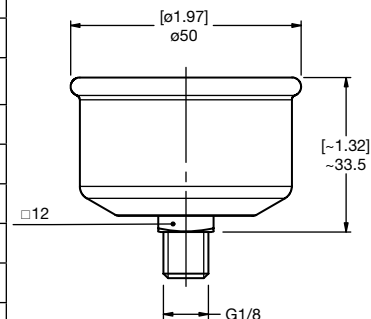
Type of indication	Visual indicator & electrical switch
Weight	0.79 lbs (360 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	N/O contact
Max. switching voltage	24 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	250 W = 300 VA ~
Switching capacity	Ohmic 6 A at 24 V =
Protection class to DIN 40050	IP 65 (only if the connector is wired and fitted correctly)
Order example	VR 2 D.1 /-LED



VMF x E.x



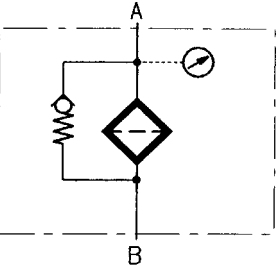
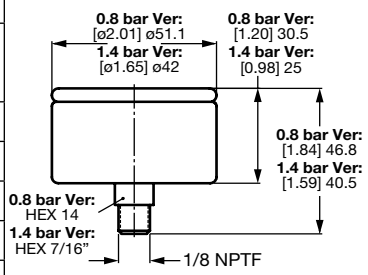
Type of indication	Visual-analog, scale indication
Weight	0.12 lbs (54 g)
Trip Pressure / Range*	0 psi to 145 psi (0 bar to 10 bar)
Permitt. operating pressure	102 psi (7 bar) continuous
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VMF 2 E.0



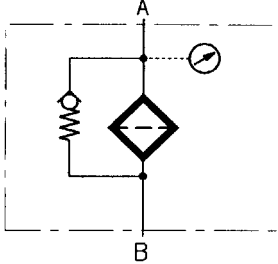
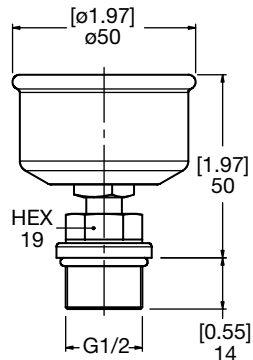
*When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

Specifications of Static Indicators

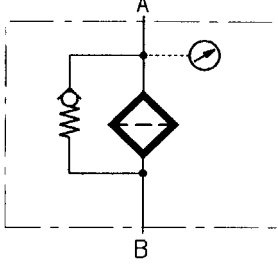
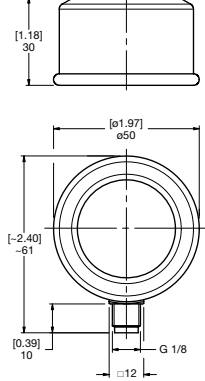
VMF x E.x /-3

 	Type of indication	Visual-analog, scale indication	 
	Weight	0.22 lbs (98 g)	
	Trip Pressure / Range	Green Range: 0-12 / 0-20 psi Yellow Range: 12-15 / 20-25 psi Red Range: 15-60 / 25-60 psi	
	Permitt. operating pressure	60 psi (4 bar)	
	Permitt. temperature range	-40°F to 200°F (-40°C to 93°C)	
	Thread	1/8" NPTF	
	Max. torque	—	
	Switching type	—	
	Max. switching voltage	—	
	Electrical connection	—	
	Max. switching voltage at resistive load	—	
	Switching capacity	—	
	Protection class to DIN 40050	—	
	Order example	VMF 0.8 E.1 /-3; VMF 1.4 E.1 /-3	

VR x E.x

 	Type of indication	Visual-analog, scale indication	 
	Weight	0.28 lbs (125 g)	
	Trip Pressure / Range	0 psi to 145 psi (0 bar to 10 bar)	
	Permitt. operating pressure	102 psi (7 bar) continuous	
	Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)	
	Thread	G 1/2	
	Max. torque	22 Lbf-ft (30 Nm)	
	Switching type	—	
	Max. switching voltage	—	
	Electrical connection	—	
	Max. switching voltage at resistive load	—	
	Switching capacity	—	
	Protection class to DIN 40050	—	
	Order example	VR 2 E.0	

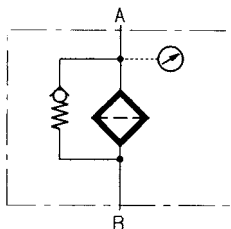
VMF x ES.x

 	Type of indication	Visual-analog, scale indication	 
	Weight	0.12 lbs (54 g)	
	Trip Pressure / Range	0 psi to 145 psi (0 bar to 10 bar)	
	Permitt. operating pressure	102 psi (7 bar) continuous	
	Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)	
	Thread	G 1/8	
	Max. torque	11 Lbf-ft (15 Nm)	
	Switching type	—	
	Max. switching voltage	—	
	Electrical connection	—	
	Max. switching voltage at resistive load	—	
	Switching capacity	—	
	Protection class to DIN 40050	—	
	Order example	VMF 2 ES.0	

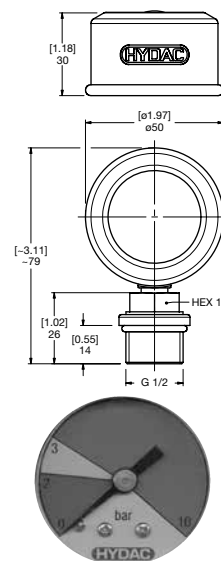
FILTER CLOGGING INDICATORS

Specifications of Static Indicators

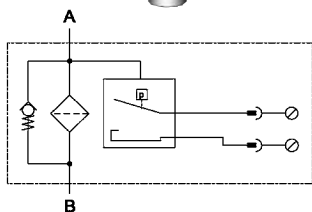
VR x ES.x



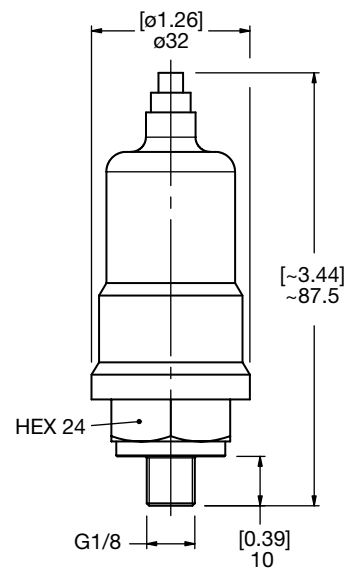
Type of indication	Visual-analog, scale indication
Weight	0.28 lbs (125 g)
Trip Pressure / Range	0 psi to 145 psi (0 bar to 10 bar)
Permitt. operating pressure	102 psi (7 bar) continuous
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C)
Thread	G 1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VR 2 ES.0



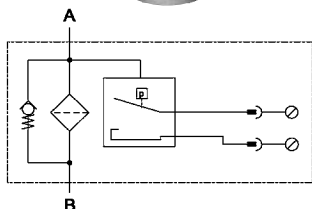
VMF x F.x



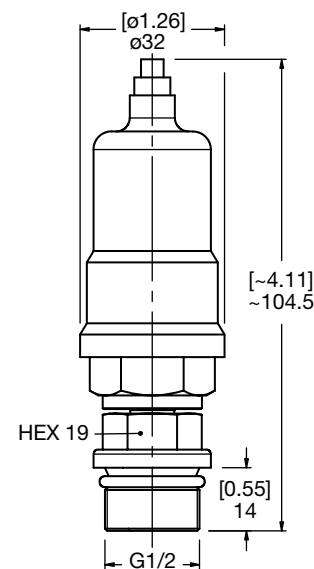
Type of indication	Electrical switch
Weight	0.15 lbs (70 g)
Trip Pressure / Range	29 psi ±4.4 psi (2 bar ±0.3 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/O contact (<i>N/C as an option</i>)
Max. switching voltage	42 V
Electrical connection	threaded connection
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	Ohmic 2.5 A at 24 V = Ohmic 2.5 A at 42 V ~
Protection class to DIN 40050	IP 65, terminals IP 00
Order example	VMF 2 F.0



VR x F.x

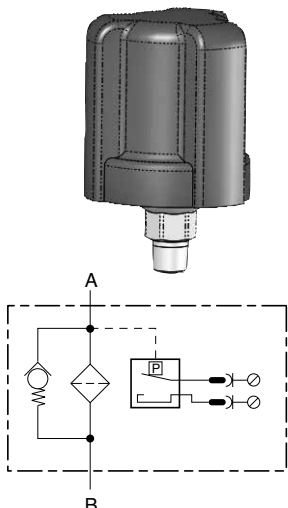
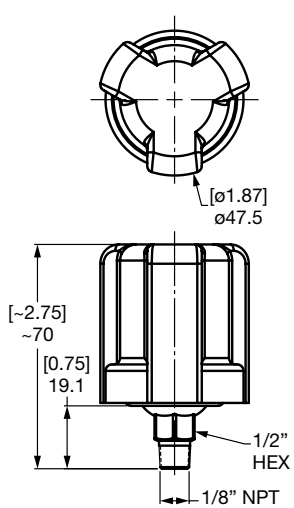


Type of indication	Electrical switch
Weight	0.29 lbs (130 g)
Trip Pressure / Range	29 psi ±4.4 psi (2 bar ±0.3 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	N/O contact (<i>N/C as an option</i>)
Max. switching voltage	42 V
Electrical connection	threaded connection
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	Ohmic 2.5 A at 24 V = Ohmic 2.5 A at 42 V ~
Protection class to DIN 40050	IP 65, terminals IP 00
Order example	VR 2 F.0

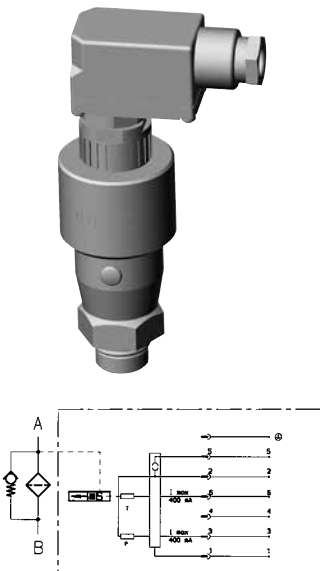
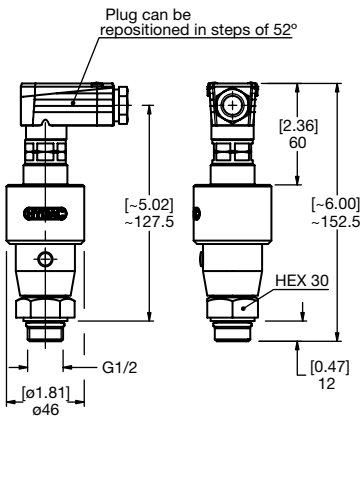


Specifications of Static Indicators

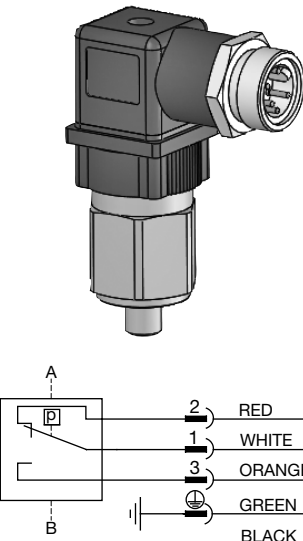
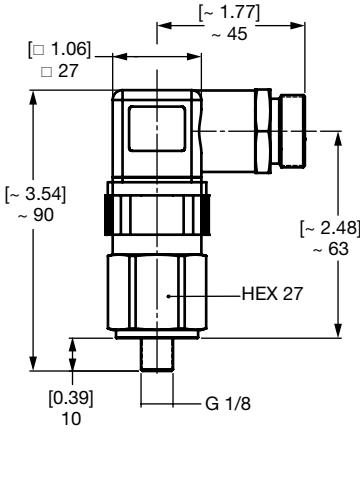
VMF x G.x /-3

	Type of indication	Electrical switch	
	Weight	0.18 lbs (82 g)	
	Trip Pressure / Range*	20 psi $\pm$ 3 psi (1.4 bar $\pm$ 0.2 Bar)	
	Permitt. operating pressure	250 psi (17 bar)	
	Permitt. temperature range	-40°F to 250°F (-40°C to 121°C)	
	Thread	1/8" NPT	
	Max. torque	—	
	Switching type	N/O - SPDT	
	Max. switching voltage	240 VDC and 240 VAC	
	Electrical connection	2x #8-32 screw terminals	
	Max. switching voltage at resistive load	24 VDC	
	Switching capacity	Ohmic 4 A at 24 V = Ohmic 1 A at 120 V ~	
	Protection class to DIN 40050	Terminals IP 00	
	Order example	VMF 1.4 G.0 /3	

VR x GC.x

	Type of indication	Electronic / Analog (4-20 mA or 1-10 V) 1 electrical switching contact at 75% and at 100% of pressure setting Analog signal up to 20% of pressure setting constant 4mA or 1 V	
	Weight	0.75 lbs (340 g)	
	Trip Pressure / Range*	29 psi -10% (2 bar -10%)	
	Permitt. operating pressure	102 psi (7 bar)	
	Permitt. temperature range	-22°F to 176°F (-30°C to 80°C)	
	Thread	G 1/2	
	Max. torque	11 Lbf-ft (15 Nm)	
	Switching type	N/C or N/O, electronic, PNP positive switching (<i>factory setting</i>)	
	Max. switching voltage	Operating voltage 20-30 V DC	
	Electrical connection	7 pole plug to DIN 43651, PG 11	
	Max. switching voltage at resistive load	12 W	
	Switching capacity	Ohmic 0.4 A at 30 V =	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VR 2 GC.0 /-LED-SQ-123	

VMF x J.x

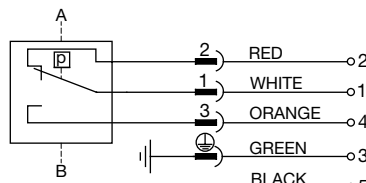
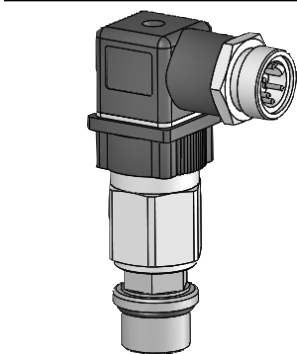
	Type of indication	Electrical switch	
	Weight	0.66 lbs (300 g)	
	Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)	
	Permitt. operating pressure	580 psi (40 bar)	
	Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)	
	Thread	G 1/8	
	Max. torque	11 Lbf-ft (15 Nm)	
	Switching type	N/C or N/O (<i>change-over contacts</i>)	
	Max. switching voltage	230 V	
	Electrical connection	7/8" Mini connector (5 PIN); Female connector to DIN 43650	
	Max. switching voltage at resistive load	250 W = 300 VA ~	
	Switching capacity	Ohmic 6 A at 24 V = Ohmic 0.03 to 6 A at max. 230 V ~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VMF 2 J.1	

*When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

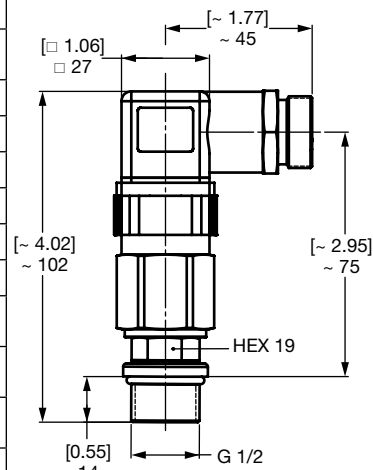
FILTER CLOGGING INDICATORS

Specifications of Static Indicators

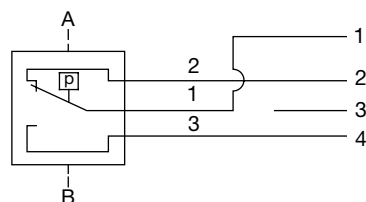
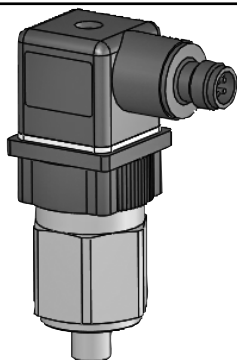
VR x J.x



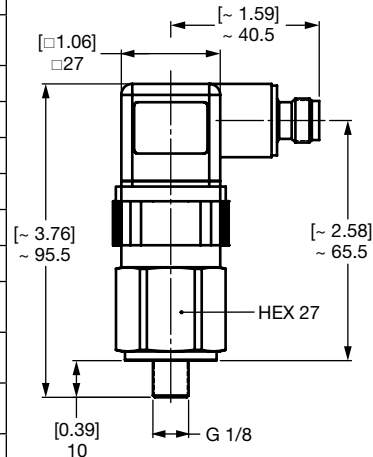
Type of indication	Electrical switch
Weight	0.82 lbs (370 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)
Thread	G 1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	230 V
Electrical connection	7/8" Mini connector (5 PIN); Female connector to DIN 43650
Max. switching voltage at resistive load	250 W = 300 VA ~
Switching capacity	Ohmic 6 A at 24 V Ohmic 0.03 to 6 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VR 2 J.1



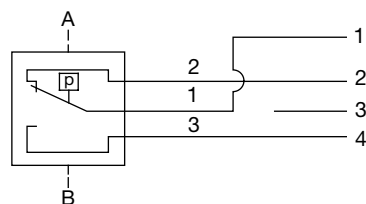
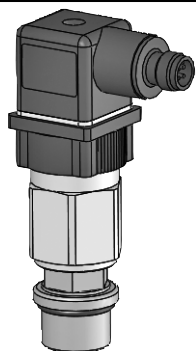
VMF x J4.x



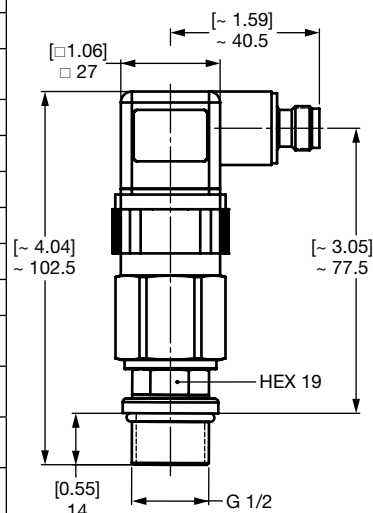
Type of indication	Electrical switch
Weight	0.60 lbs (270 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)
Thread	G1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	230V
Electrical connection	12mm (Micro) connector (4 PIN); Female connector to DIN 43650
Max. switching voltage at resistive load	250W= 300VA~
Switching capacity	Ohmic 6A at 24V= Ohmic 0.03 to 6A at max. 230V~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VMF 2 J4.1



VR x J4.x



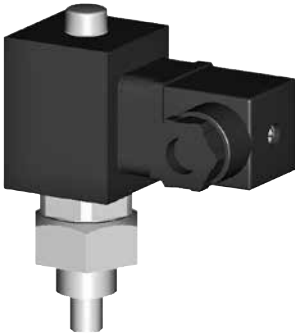
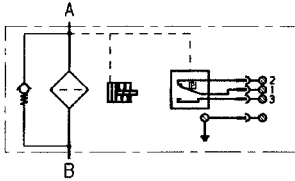
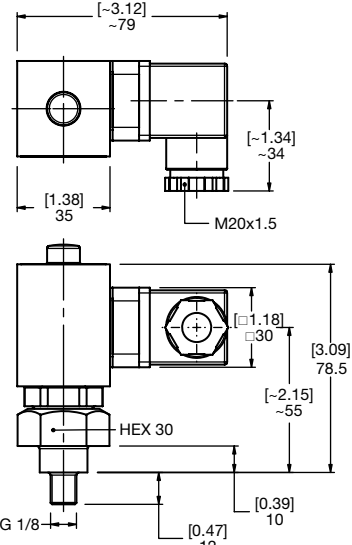
Type of indication	Electrical switch
Weight	0.75 lbs (340 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar) 73 psi -7.3 psi (5 bar -0.5 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)
Thread	G1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	230V
Electrical connection	12mm (Micro) connector (4 PIN); Female connector to DIN 43650
Max. switching voltage at resistive load	250W= 300VA~
Switching capacity	Ohmic 6A at 24V= Ohmic 0.03 to 6A at max. 230V~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VR 2 J4.1



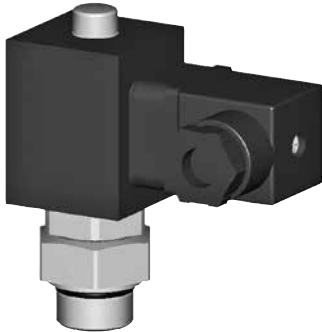
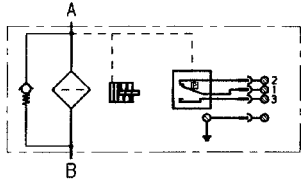
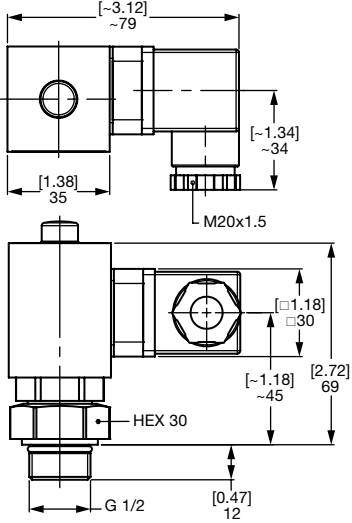
*When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

Specifications of Static Indicators

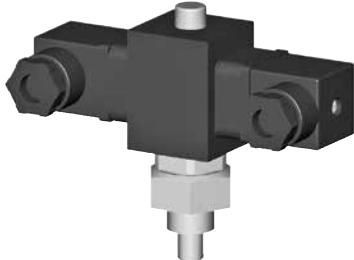
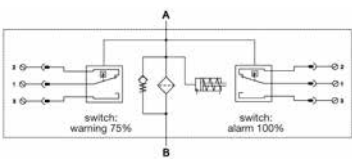
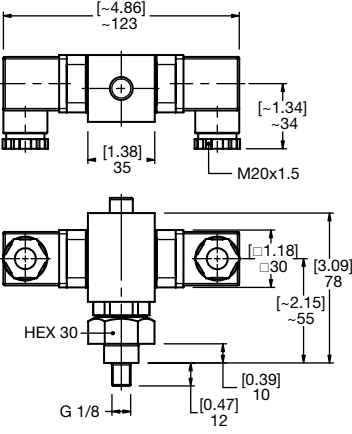
VMF x LE.x

 	Type of indication	Visual (red pin) & electrical switch (100% activation)	
	Weight	0.26 lbs (120 g)	
	Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)	
	Permitt. operating pressure	102 psi (7 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/8	
	Max. torque	11 Lbf-ft (15 Nm)	
	Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)	
	Max. switching voltage	115 V	
	Electrical connection	Male connection M20 Female connector to DIN 43650	
	Max. switching voltage at resistive load	15 W = max. 15 VA ~	
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VMF 2 LE.1	

VR x LE.x

 	Type of indication	Visual (red pin) & electrical switch (100% activation)	
	Weight	0.32 lbs (143 g)	
	Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)	
	Permitt. operating pressure	102 psi (7 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/2	
	Max. torque	11 Lbf-ft (15 Nm)	
	Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)	
	Max. switching voltage	115 V	
	Electrical connection	Male connection M20 Female connector to DIN 43650	
	Max. switching voltage at resistive load	15 W = max. 15 VA ~	
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VR 2 LE.1	

VMF x LZ.x

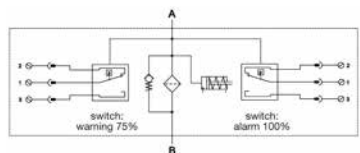
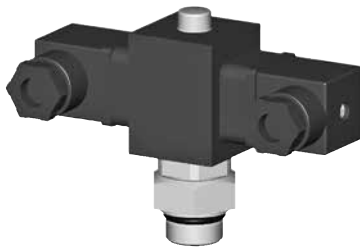
 	Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)	
	Weight	0.51 lbs (230 g)	
	Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)	
	Permitt. operating pressure	102 psi (7 bar)	
	Permitt. temperature range	14°F to 212°F (-10°C to 100°C)	
	Thread	G 1/8	
	Max. torque	11 Lbf-ft (15 Nm)	
	Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)	
	Max. switching voltage	115 V	
	Electrical connection	Male connection M20 Female connector to DIN 43650	
	Max. switching voltage at resistive load	15 W = max. 15 VA ~	
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VMF 2 LZ.1	

*When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

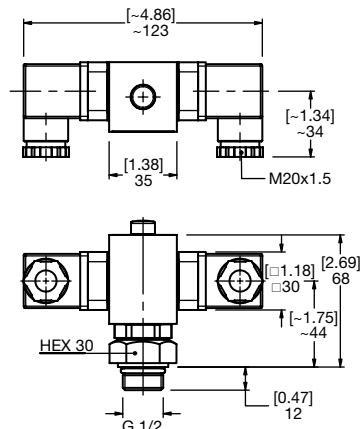
FILTER CLOGGING INDICATORS

Specifications of Static Indicators

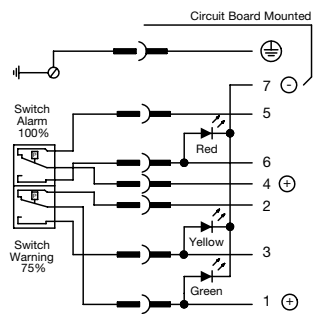
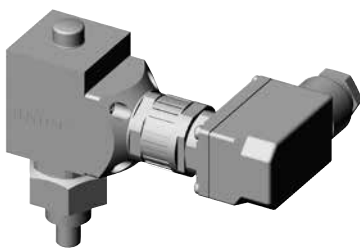
VR x LZ.x



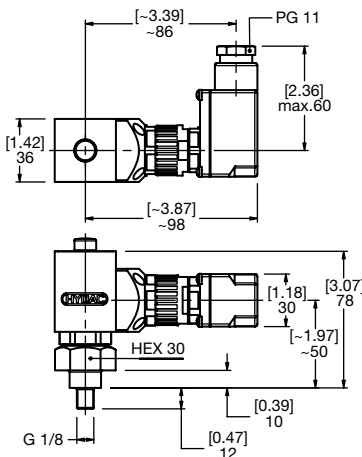
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.42 lbs (190 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)
Max. switching voltage	115 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	15 W = max. 15 VA ~ Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Switching capacity	Ohmic 1 A at 15 V ~ Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VR 2 LZ.1



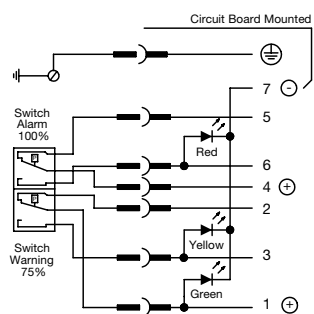
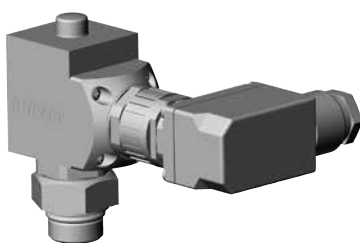
VMF x LZ.x /-DB



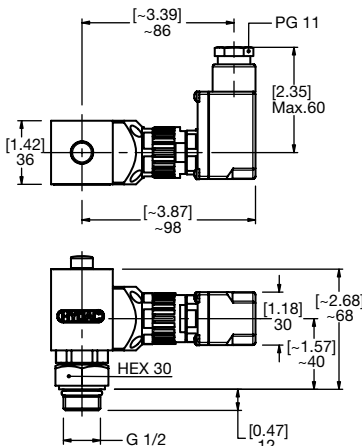
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=power, yel=75%, red=100%)
Weight	0.37 lbs (170 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)
Max. switching voltage	24 V
Electrical connection	Male connection PG 11 Female connector to DIN 43651
Max. switching voltage at resistive load	15 W = max. 15 VA ~ Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VMF 2 LZ.1 /-DB



VR x LZ.x /-DB



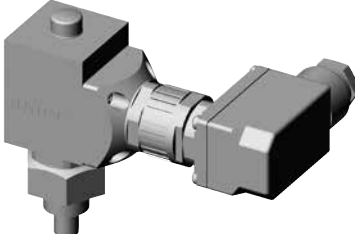
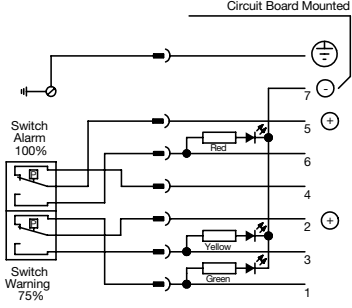
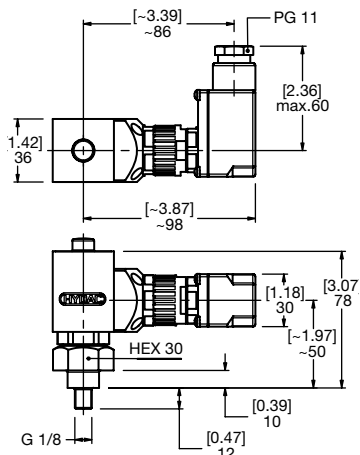
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=power, yel=75%, red=100%)
Weight	0.42 lbs (190 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)
Max. switching voltage	24 V
Electrical connection	Male connection PG 11 Female connector to DIN 43651
Max. switching voltage at resistive load	15 W = max. 15 VA ~ Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VR 2 LZ.1 /-DB



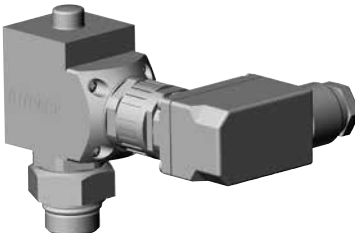
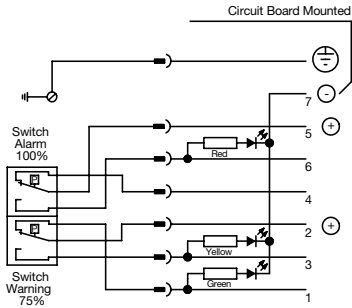
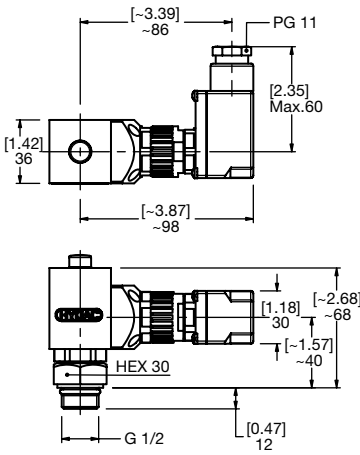
*When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

Specifications of Static Indicators

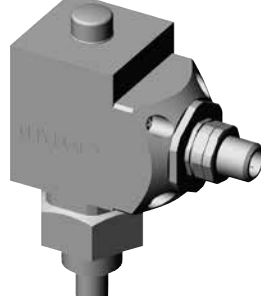
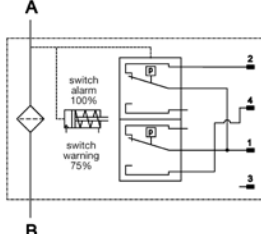
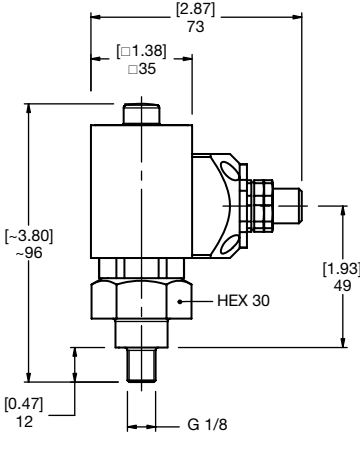
VMF x LZ.x /-CN

 	Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)	
	Weight	0.37 lbs (170 g)	
	Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)	
	Permitt. operating pressure	102 psi (7 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/8	
	Max. torque	11 Lbf-ft (15 Nm)	
	Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)	
	Max. switching voltage	24 V	
	Electrical connection	Male connection PG 11 Female connector to DIN 43651	
	Max. switching voltage at resistive load	15 W = max. 15 VA ~	
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VMF 2 LZ.1 /-CN	

VR x LZ.x /-CN

 	Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)	
	Weight	0.42 lbs (190 g)	
	Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)	
	Permitt. operating pressure	102 psi (7 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/2	
	Max. torque	11 Lbf-ft (15 Nm)	
	Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)	
	Max. switching voltage	24 V	
	Electrical connection	Male connection PG 11 Female connector to DIN 43651	
	Max. switching voltage at resistive load	15 W = max. 15 VA ~	
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VR 2 LZ.1 /-CN	

VMF x LZ.x /-BO

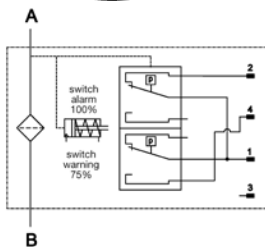
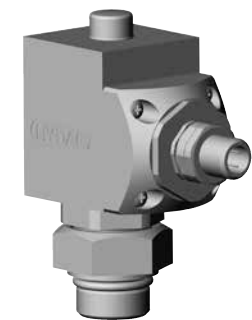
 	Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)	
	Weight	0.26 lbs (120 g)	
	Trip Pressure / Range*	29 psi (or 36 psi) -10% 2 bar (or 2.5 bar) -10%	
	Permitt. operating pressure	102 psi (7 bar)	
	Permitt. temperature range	14°F to 212°F (-10°C to 100°C)	
	Thread	G 1/8	
	Max. torque	11 Lbf-ft (15 Nm)	
	Switching type	N/O (75%) N/C (100%)	
	Max. switching voltage	24 V	
	Electrical connection	Male connection M12 x 1	
	Max. switching voltage at resistive load	15 W = max. 15 VA ~	
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~	
	Protection class to DIN 40050	IP 65	
	Order example	VMF 2 LZ.1 /-BO	

*When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

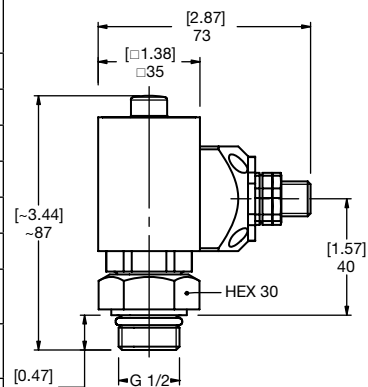
FILTER CLOGGING INDICATORS

Specifications of Static Indicators

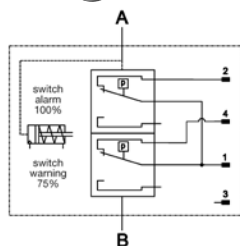
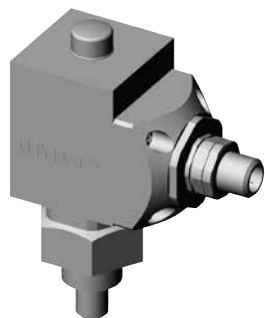
VR x LZ.x /-BO



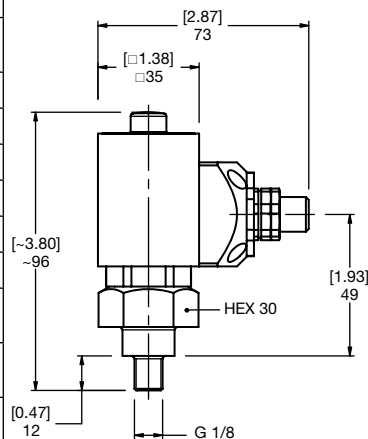
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.32 lbs (145 g)
Trip Pressure / Range	29 psi (or 36 psi) -10% 2 bar (or 2.5 bar) -10%
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/O (75%) N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VR 2 LZ.1 /-BO



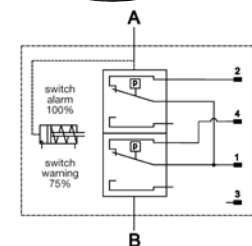
VMF x LZ.x /-AV



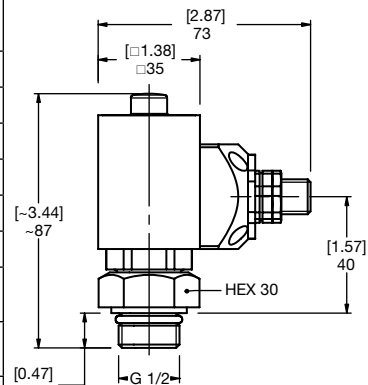
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.26 lbs (120 g)
Trip Pressure / Range	29 psi (or 36 psi) -10% 2 bar (or 2.5 bar) -10%
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/C (75% and 100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VMF 2 LZ.1 /-AV



VR x LZ.x /-AV

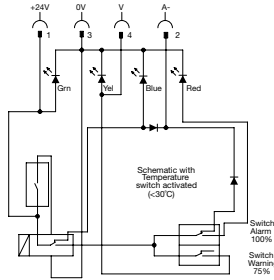
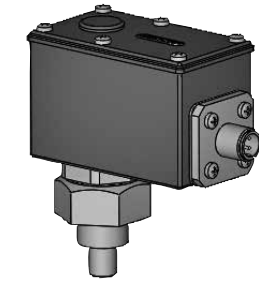


Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.32 lbs (145 g)
Trip Pressure / Range	29 psi (or 36 psi) -10% 2 bar (or 2.5 bar) -10%
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/C (75% and 100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VR 2 LZ.1 /-AV

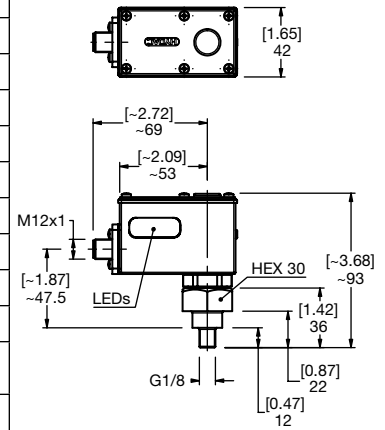


Specifications of Static Indicators

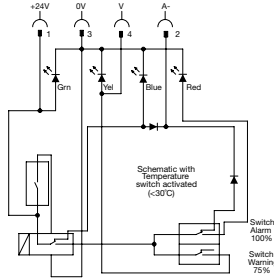
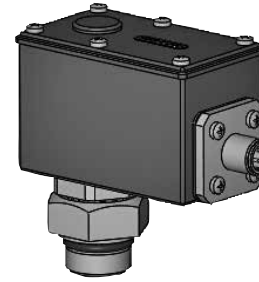
VMF x LZ.x /-D4C



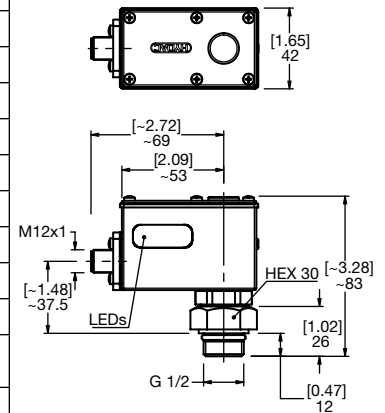
Type of indication	Electrical switch (75% & 100% activation) w/30°C thermal lockout. 4 LEDs (grn=pwr, blue= below 86°F, yel=75%, red=100%)
Weight	0.54 lbs (245 g)
Trip Pressure / Range	36 psi -10% (2.5 bar -10%)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/O (75%), N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VMF 2 LZ.1 /-D4C



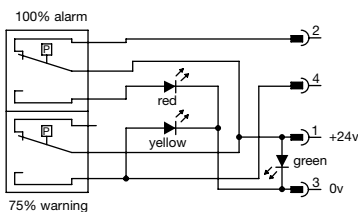
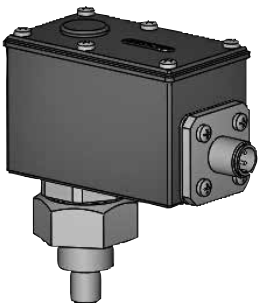
VR x LZ.x /-D4C



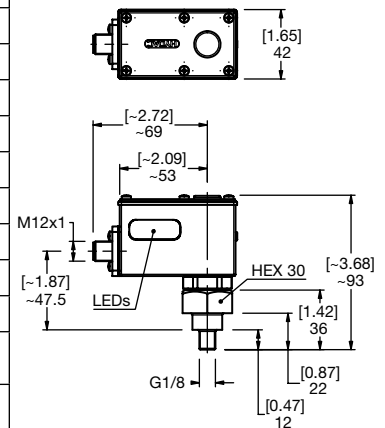
Type of indication	Electrical switch (75% & 100% activation) w/30°C thermal lockout. 4 LEDs (grn=pwr, blue= below 86°F, yel=75%, red=100%)
Weight	0.45 lbs (205 g)
Trip Pressure / Range	36 psi -10% (2.5 bar -10%)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/O (75%), N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VR 2 LZ.1 /-D4C



VMF x LZ.x /-BO-LED



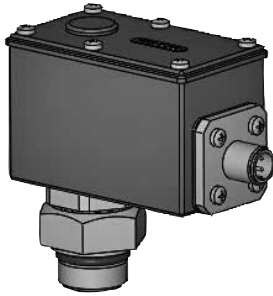
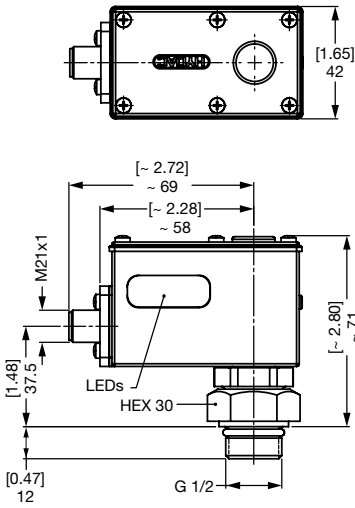
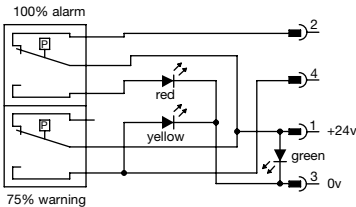
Type of indication	Electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)
Weight	0.54 lbs (245 g)
Trip Pressure / Range	36 psi -10% (2.5 bar -10%)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/O (75%), N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x 1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VMF 2 LZ.1 /-BO-LED



FILTER CLOGGING INDICATORS

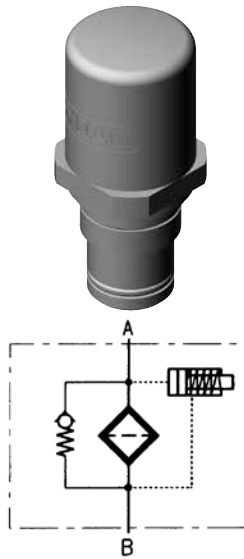
Specifications of Static Indicators

VR x LZ.x /-BO-LED

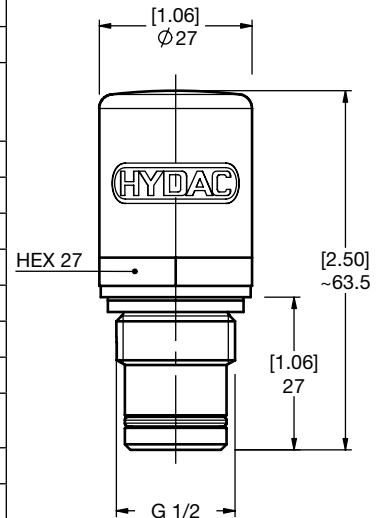
	Type of indication	Electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)	
	Weight	0.45 lbs (205 g)	
	Trip Pressure / Range	36 psi -10% (2.5 bar -10%)	
	Permitt. operating pressure	102 psi (7 bar)	
	Permitt. temperature range	14°F to 212°F (-10°C to 100°C)	
	Thread	G 1/2	
	Max. torque	11 Lbf-ft (15 Nm)	
	Switching type	N/O (75%), N/C (100%)	
	Max. switching voltage	24 V	
	Electrical connection	Male connection M12 x 1	
	Max. switching voltage at resistive load	15 W = max. 15 VA ~	
	Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~	
	Protection class to DIN 40050	IP 65	
	Order example	VR 2 LZ.1 /-BO-LED	

Specifications of Differential Pressure Indicators

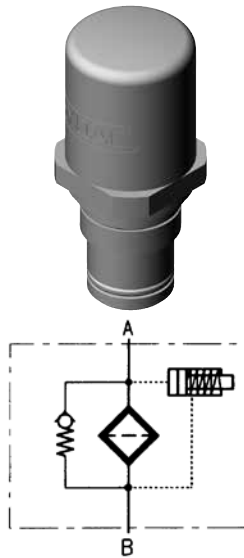
VM x B.x



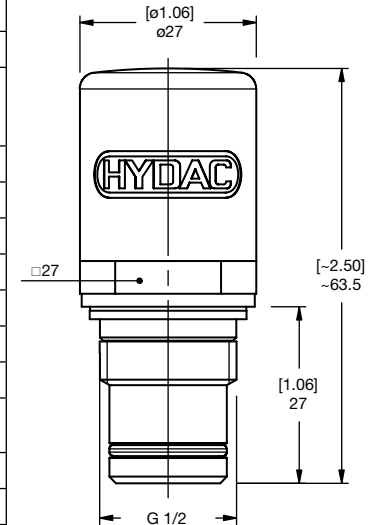
Type of indication	Visual, red/green band automatic reset
Weight	0.12 lbs (55 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	24 Lbf-ft (33 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VM 5 B.1



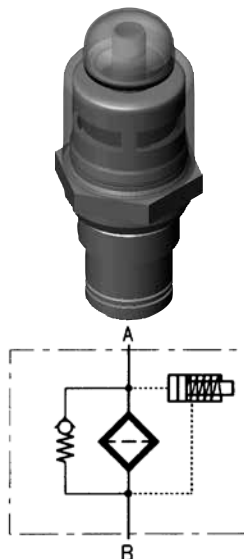
VD x B.x



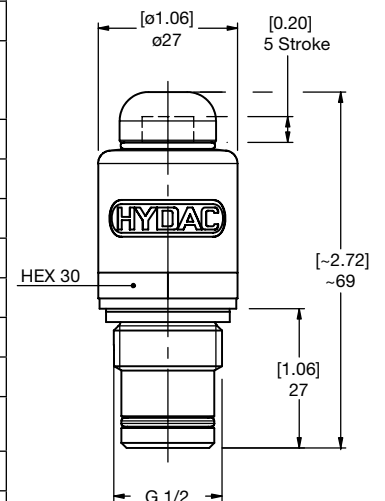
Type of indication	Visual, red/green band automatic reset
Weight	0.24 lbs (110 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi 420 bar
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	74 Lbf-ft (100 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VD 5 B.1



VM x BM.x



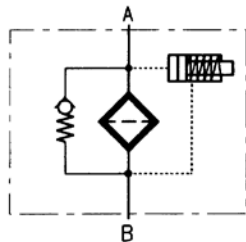
Type of indication	Visual, red/green band manual reset
Weight	0.12 lbs (55 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	24 Lbf-ft (33 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VM 5 BM.1



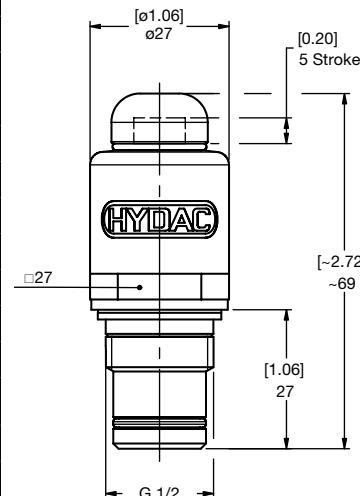
FILTER CLOGGING INDICATORS

Specifications of Differential Pressure Indicators

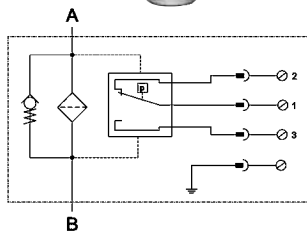
VD x BM.x



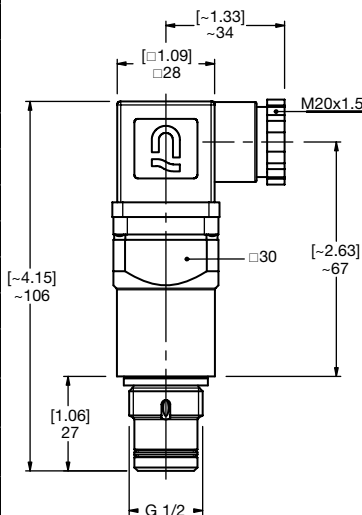
Type of indication	Visual, red/green band manual reset
Weight	0.24 lbs (110 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	74 Lbf-ft (100 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VD 5 BM.1



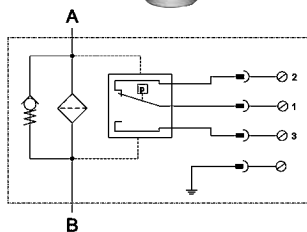
VM x C.x



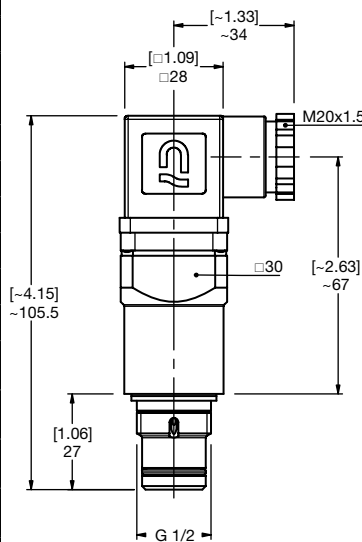
Type of indication	Electrical switch
Weight	0.26 lbs (120 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	24 Lbf-ft (33 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	230 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity*	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VM 5 C.0



VD x C.x



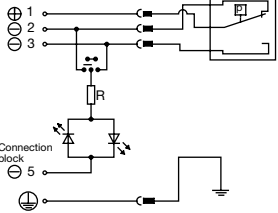
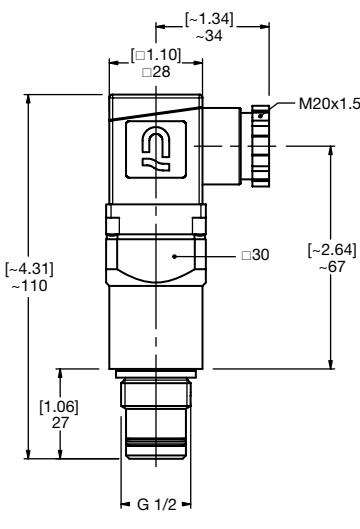
Type of indication	Electrical switch
Weight	0.49 lbs (220 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	74 Lbf-ft (100 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	230 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity*	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VD 5 C.0



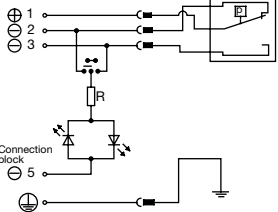
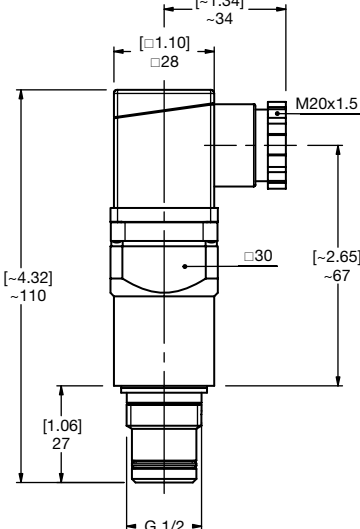
*Required amperage > 20 mA; for lower amperages, order "-SO135" indicators (see Supplementary Details in the Model Code).

Specifications of Differential Pressure Indicators

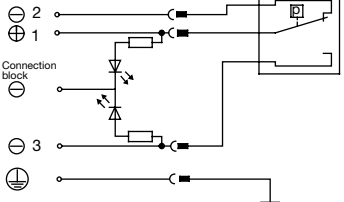
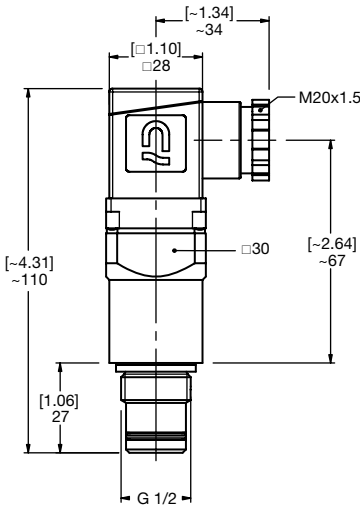
VM x D.x/-L...

 	Type of indication	Visual indicator & electrical switch	
	Weight	0.33 lbs (150 g)	
	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)	
	Permitt. operating pressure	3000 psi (210 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/2	
	Max. torque	24 Lbf-ft (33 Nm)	
	Switching type	N/C or N/O (<i>change-over contacts</i>)	
	Max. switching voltage	24, 48, 115, 230 V (<i>depending on the type of light insert</i>)	
	Electrical connection	Male connection M20 Female connector to DIN 43650	
	Max. switching voltage at resistive load	60 W = 100 VA ~	
	Switching capacity*	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V ~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VM 5 D.0 /-L24	

VD x D.x/-L...

 	Type of indication	Visual indicator & electrical switch	
	Weight	0.55 lbs (250 g)	
	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)	
	Permitt. operating pressure	6000 psi (420 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/2	
	Max. torque	74 Lbf-ft (100 Nm)	
	Switching type	N/C or N/O (<i>change-over contacts</i>)	
	Max. switching voltage	24, 48, 115, 230 V (<i>depending on the type of light insert</i>)	
	Electrical connection	Male connection M20 Female connector to DIN 43650	
	Max. switching voltage at resistive load	60 W = 100 VA ~	
	Switching capacity*	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V ~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VD 5 D.0 /-L24	

VM x D.x/-LED

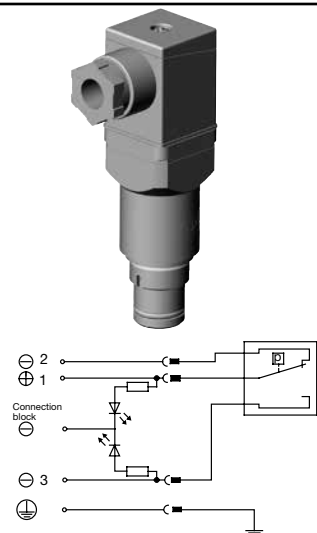
 	Type of indication	Visual indicator & electrical switch	
	Weight	0.33 lbs (150 g)	
	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)	
	Permitt. operating pressure	3000 psi (210 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/2	
	Max. torque	24 Lbf-ft (33 Nm)	
	Switching type	N/C or N/O (<i>change-over contacts</i>)	
	Max. switching voltage	24 V	
	Electrical connection	Male connection M20 Female connector to DIN 43650	
	Max. switching voltage at resistive load	60 W = 100 VA ~	
	Switching capacity*	Ohmic 3 A at 24 V =	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VM 5 D.0 /-LED	

*Required amperage > 20 mA; for lower amperages, order "-SO135" indicators (see Supplementary Details in the Model Code).

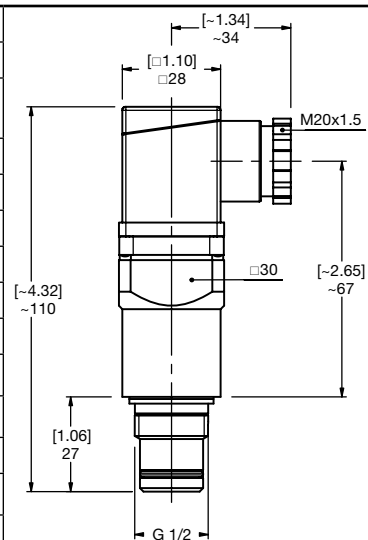
FILTER CLOGGING INDICATORS

Specifications of Differential Pressure Indicators

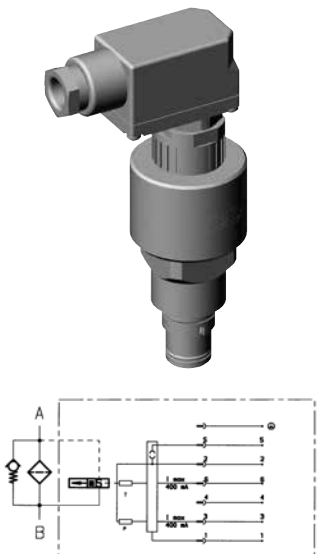
VD x D.x/-LED



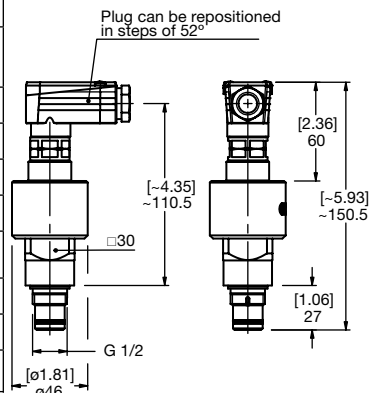
Type of indication	Visual indicator & electrical switch
Weight	0.55 lbs (250 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	74 Lbf-ft (100 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	24 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity*	Ohmic 3 A at 24 V =
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VD 5 D.0 /-LED



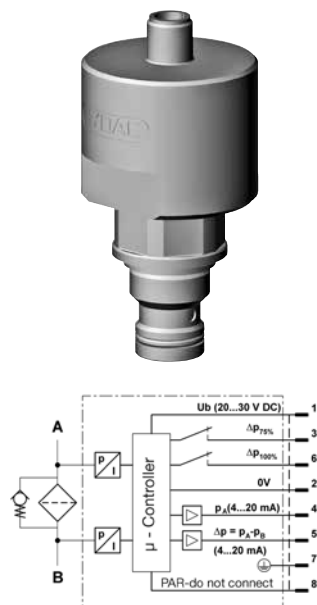
VD x GC.x



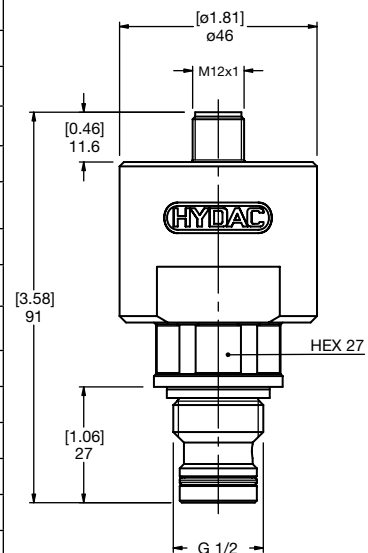
Type of indication	Electronic / Analog (4-20 mA or 1-10 V) 1 switch contact at 75% and at 100% trip pressure
Weight	0.88 lbs (400 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi -10% (8 bar -10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 176°F (-30°C to 80°C)
Thread	G 1/2
Max. torque	74 Lbf-ft (100 Nm)
Switching type	N/C or N/O, electronic PNP positive switching (<i>factory setting</i>)
Max. switching voltage	Operating voltage 20-30 V DC
Electrical connection	7 pole plug to DIN 43650, PG 11
Max. switching voltage at resistive load	12 W
Switching capacity	Ohmic 0.4 A at 30 V =
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VD 5 GC.0 /-LED-SQ-123



VL x GW.x



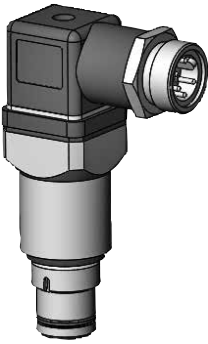
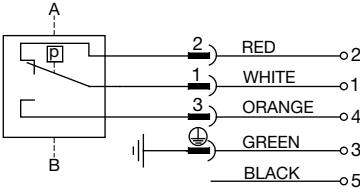
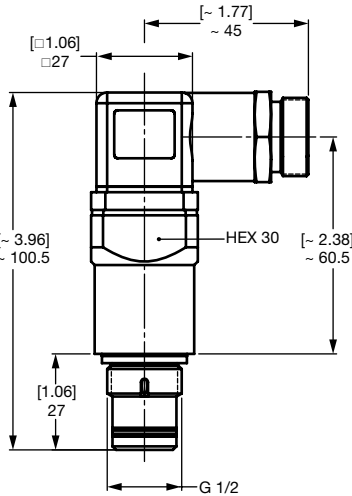
Type of indication	Electronic / Analog, (4-20 mA) 1 switch contact at 75% and at 100% trip pressure
Weight	0.35 lbs (157 g)
Pressure setting (100%)	29 psi ±5% (2 bar ±5%) 44 psi ±5% (3 bar ±5%) 73 psi ±5% (5 bar ±5%)
Indication range Δp	0 - 73 psi (0 - 5 bar) 0 - 73 psi (0 - 5 bar) 0 - 116 psi (0 - 8 bar)
Indication range (p before filter)	363 psi (25 bar)
Switching type (<i>output Δp</i>)	El. switch, PNP positive switching N/C or N/O contacts (<i>factory set.</i>)
Output load	400 mA
Max. switching operating voltage	20 - 30V DC
Analog outputs (p before filter & Δp)	4 - 20 mA (max. load resistance 600Ω)
Electrical connection	M12x1/8 pole
Protection class to DIN 40050	IP 65
Permitt. operating pressure	25 bar
Permitt. temperature range	-40°F to 185°F (-40°C to 85°C)
Thread	G 1/2
Max. torque	24 Lbf-ft (33 Nm)
Order example	VL 5 GW.0 /-V-123



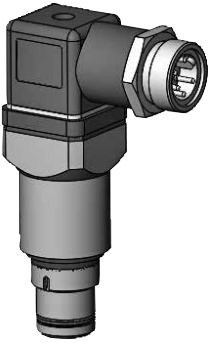
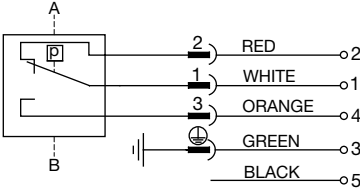
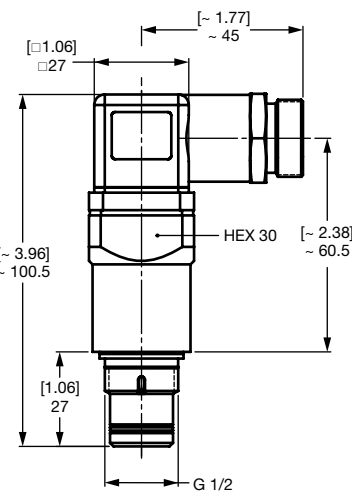
*Required amperage > 20 mA; for lower amperages, order "-SO135" indicators (see Supplementary Details in the Model Code).

Specifications of Differential Pressure Indicators

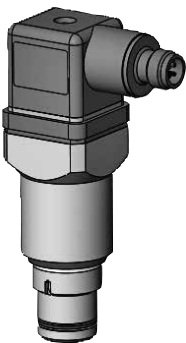
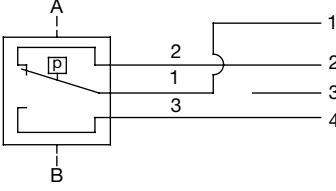
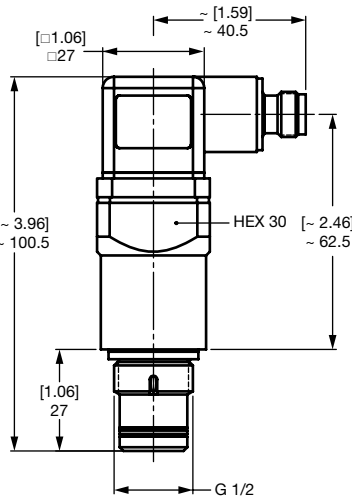
VM x J.x

 	Type of indication	Electrical switch	
	Weight	0.33 lbs (150 g)	
	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)	
	Permitt. operating pressure	3000 psi (210 bar)	
	Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)	
	Thread	G 1/2	
	Max. torque	24 Lbf-ft (33 Nm)	
	Switching type	N/C or N/O (<i>change-over contacts</i>)	
	Max. switching voltage	230V	
	Electrical connection	7/8" (Mini) connector (5 PIN); Female connector to DIN 43650	
	Max. switching voltage at resistive load	60W= 100VA~	
	Switching capacity	Ohmic 3A at 24V= Ohmic 0.03 to 5A at max. 230V~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VM 5 J.1	

VD x J.x

 	Type of indication	Electrical switch	
	Weight	0.55 lbs (250 g)	
	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)	
	Permitt. operating pressure	6000 psi (420 bar)	
	Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)	
	Thread	G 1/2	
	Max. torque	74 Lbf-ft (100 Nm)	
	Switching type	N/C or N/O (<i>change-over contacts</i>)	
	Max. switching voltage	230V	
	Electrical connection	7/8" (Mini) connector (5 PIN); Female connector to DIN 43650	
	Max. switching voltage at resistive load	60W= 100VA~	
	Switching capacity	Ohmic 3A at 24V= Ohmic 0.03 to 5A at max. 230V~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VD 5 J.1	

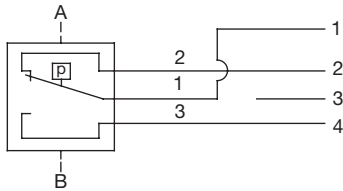
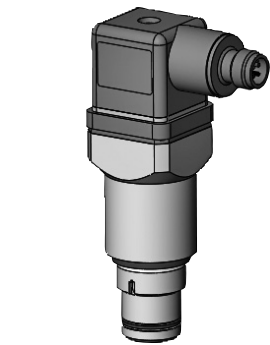
VM x J4.x

 	Type of indication	Electrical switch	
	Weight	0.26 lbs (120 g)	
	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)	
	Permitt. operating pressure	3000 psi (210 bar)	
	Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)	
	Thread	G 1/2	
	Max. torque	24 Lbf-ft (33 Nm)	
	Switching type	N/C or N/O (<i>change-over contacts</i>)	
	Max. switching voltage	230V	
	Electrical connection	12mm (Micro) connector (4 PIN); Female connector to DIN 43650	
	Max. switching voltage at resistive load	60W= 100VA~	
	Switching capacity	Ohmic 3A at 24V= Ohmic 0.03 to 5A at max. 230V~	
	Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)	
	Order example	VM 5 J4.1	

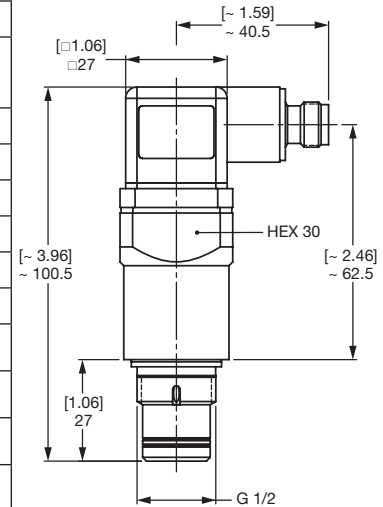
FILTER CLOGGING INDICATORS

Specifications of Differential Pressure Indicators

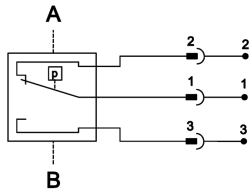
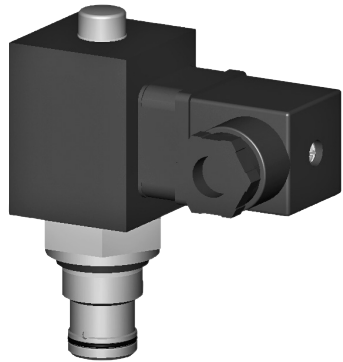
VD x J4.x



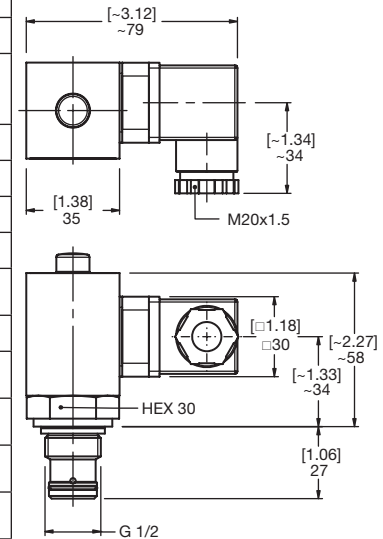
Type of indication	Electrical switch
Weight	0.49 lbs (220 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-13°F to 185°F (-25°C to 85°C)
Thread	G 1/2
Max. torque	74 Lbf-ft (100 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	230V
Electrical connection	12mm (Micro) connector (4 PIN); Female connector to DIN 43650
Max. switching voltage at resistive load	60W= 100VA~
Switching capacity	Ohmic 3A at 24V= Ohmic 0.03 to 5A at max. 230V~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VD 5 J4.1



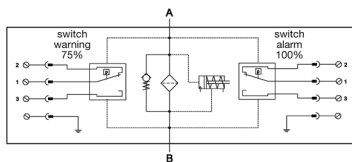
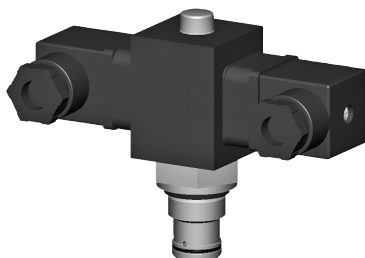
VD x LE.x



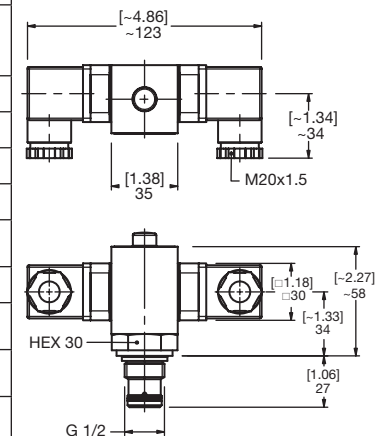
Type of indication	Visual (red pin) & electrical switch (100% activation)
Weight	0.44 lbs (198 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	37 Lbf-ft (50 Nm)
Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)
Max. switching voltage	115 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VD 5 LE.1



VD x LZ.x

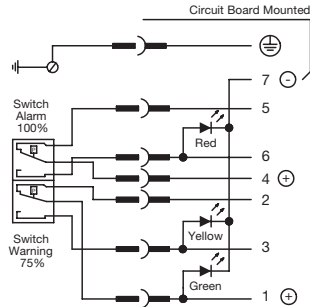
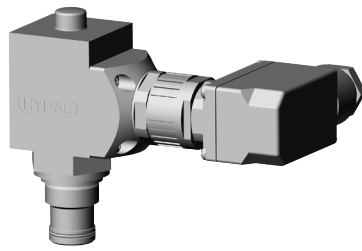


Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.53 lbs (240 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	37 Lbf-ft (50 Nm)
Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)
Max. switching voltage	115 V
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VD 5 LZ.1

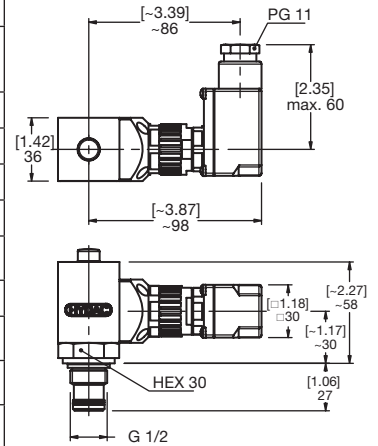


Specifications of Differential Pressure Indicators

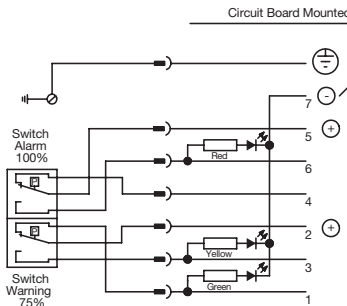
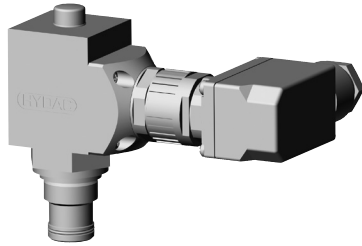
VD x LZ.x /-DB



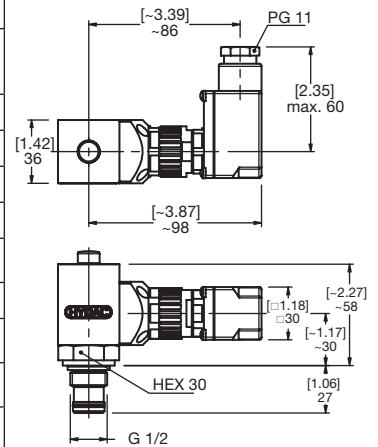
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)
Weight	0.54 lbs (245 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	37 Lbf-ft (50 Nm)
Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)
Max. switching voltage	24 V
Electrical connection	Male connection PG 11 Female connector to DIN 43651
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VD 5 LZ.1 /-DB



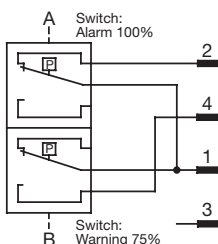
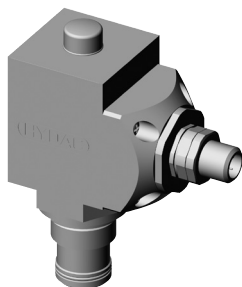
VD x LZ.x /-CN



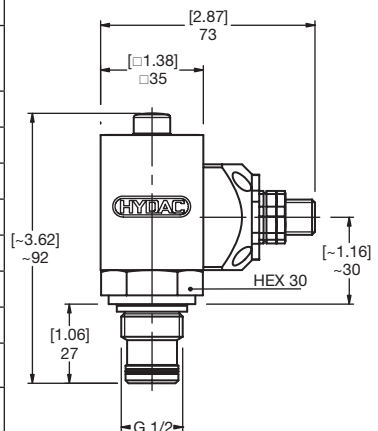
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)
Weight	0.54 lbs (245 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	37 Lbf-ft (50 Nm)
Switching type	N/C or N/O contacts, Reed contacts (<i>change-over contacts</i>)
Max. switching voltage	24 V
Electrical connection	Male connection PG 11 Female connector to DIN 43651
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VD 5 LZ.1 /-CN



VD x LZ.x /-BO



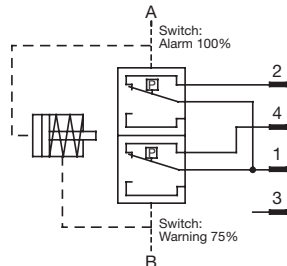
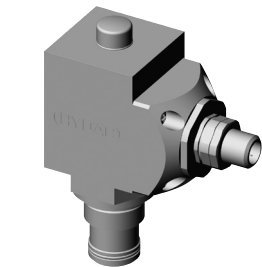
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.43 lbs (197 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	37 Lbf-ft (50 Nm)
Switching type	N/O (75%), N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VD 5 LZ.1 /-BO



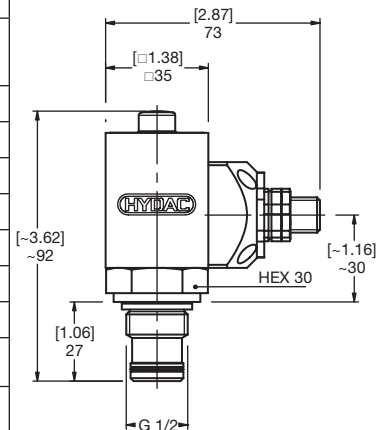
FILTER CLOGGING INDICATORS

Specifications of Differential Pressure Indicators

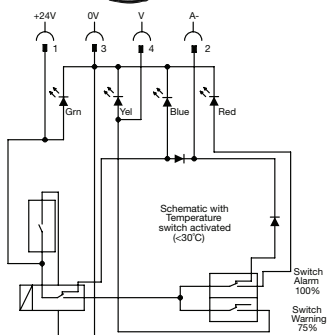
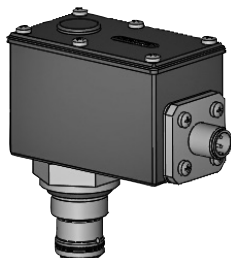
VD x LZ.x /-AV



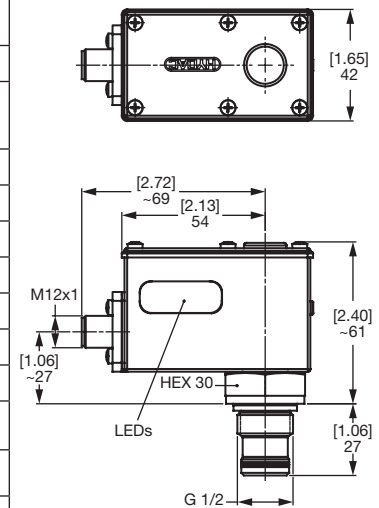
Type of indication	Visual (red pin) & electrical switch (75% & 100% activation)
Weight	0.43 lbs (197 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	37 Lbf-ft (50 Nm)
Switching type	N/C (75% and 100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VD 5 LZ.1 /-AV



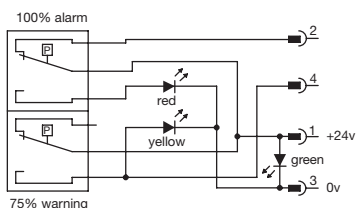
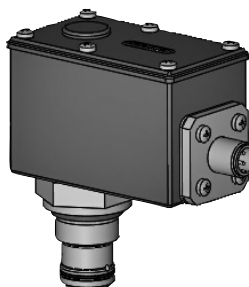
VD x LZ.x /-D4C



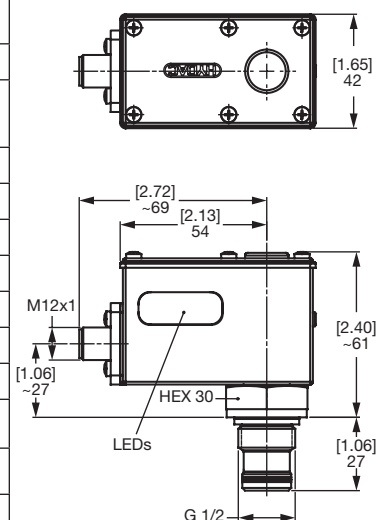
Type of indication	Electrical switch (75% & 100% activation) w/30°C thermal lockout. 4 LEDs (grn=pwr, blue= below 86°F, yel=75%, red=100%)
Weight	0.56 lbs (256 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	37 Lbf-ft (50 Nm)
Switching type	N/O (75%), N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VD 5 LZ.1 /-D4C



VD x LZ.x /-BO-LED

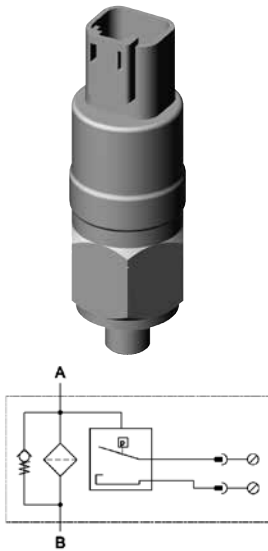


Type of indication	Electrical switch (75% & 100% activation). 3 LEDs (grn=pwr, yel=75%, red=100%)
Weight	0.55 lbs (250 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi (8 bar) - Consult HYDAC
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	14°F to 212°F (-10°C to 100°C)
Thread	G 1/2
Max. torque	37 Lbf-ft (50 Nm)
Switching type	N/O (75%), N/C (100%)
Max. switching voltage	24 V
Electrical connection	Male connection M12 x1
Max. switching voltage at resistive load	15 W = max. 15 VA ~
Switching capacity	Ohmic 1 A at 15 V = Ohmic 1 A at 15 V ~
Protection class to DIN 40050	IP 65
Order example	VD 5 LZ.1 /-BO-LED

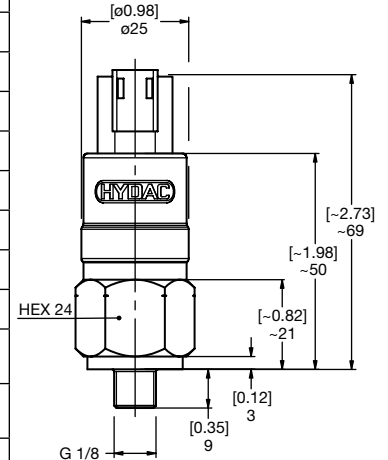


Specifications of Return Line Mobile Indicators

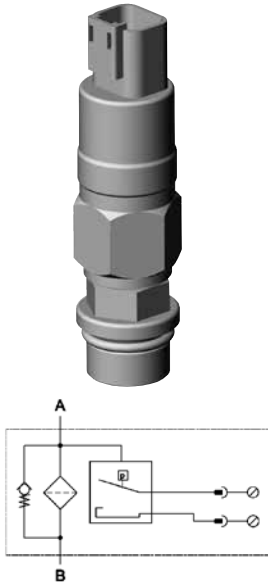
VMF x FD.x



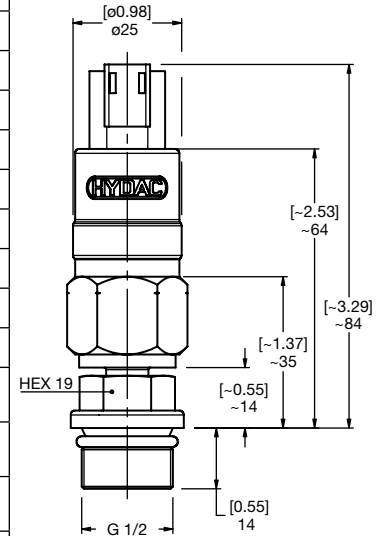
Type of indication	Electrical switch
Weight	0.15 lbs (70 g)
Trip Pressure / Range	29 psi $\pm$ 4.4 psi (2 bar $\pm$ 0.3 bar)
Permitt. operating pressure	160 psi (11 bar) continuous
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/O or N/C
Max. switching voltage	42 V
Electrical connection	Deutsch DT 04-2P
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	Ohmic 2.5 A at 24 V = Ohmic 1 A at 220 V ~
Protection class to DIN 40050	IP 67 (only if the connector is wired and fitted correctly)
Order example	VMF 2 FD.0 /-2M0



VR x FD.x



Type of indication	Electrical switch
Weight	0.20 lbs (90 g)
Trip Pressure / Range	29 psi $\pm$ 4.4 psi (2 bar $\pm$ 0.3 bar)
Permitt. operating pressure	160 psi (11 bar) continuous
Permitt. temperature range	-22°F to 212°F (-30 C to 100°C)
Thread	G 1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	N/O or N/C
Max. switching voltage	42 V
Electrical connection	Deutsch DT 04-2P
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	Ohmic 2.5 A at 24 V = Ohmic 1 A at 220 V ~
Protection class to DIN 40050	IP 67 (only if the connector is wired and fitted correctly)
Order example	VR 2 FD.0 /-2M0



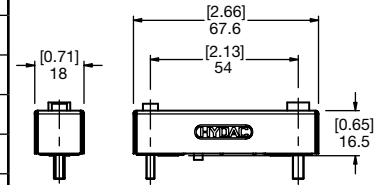
FILTER CLOGGING INDICATORS

Specifications of Differential Pressure Mobile Indicators

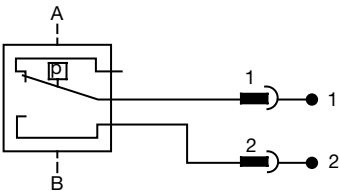
VL x BF.x



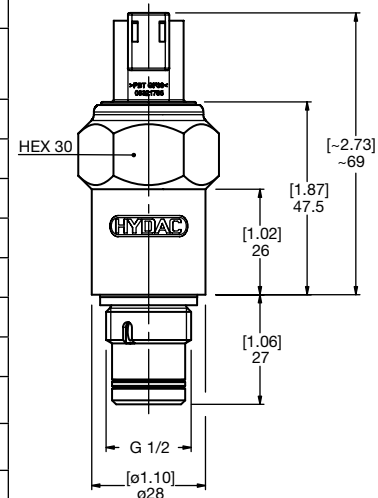
Type of indication	Visual
Weight	0.06 lbs (25 g)
Trip Pressure / Range	14.5 psi -10% (1 bar -10%) 36 psi -10% (2.5 bar -10%)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	14°F to 176°F (-10°C to 80°C)
Thread	M3; M4
Max. torque	0.1 Lbf-ft (0.6 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VL 2.5 BF.0



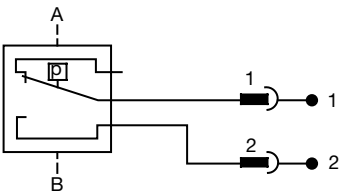
VM x CD.x



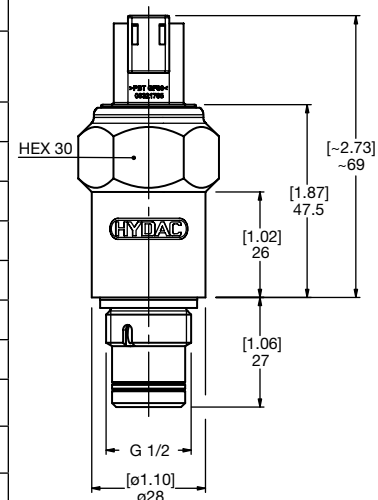
Type of indication	Electrical switch
Weight	0.22 lbs (100 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	24 Lbf-ft (33 Nm)
Switching type	N/O or N/C
Max. switching voltage	48 V
Electrical connection	-
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V ~
Protection class to DIN 40050	IP 67 (only if the connector is wired and fitted correctly)
Order example	VM 5 CD.0 /-2M0



VD x CD.x

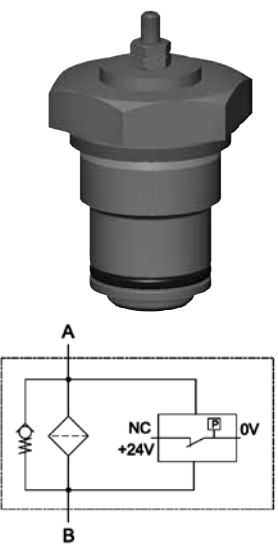
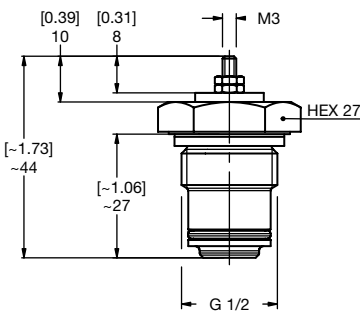


Type of indication	Electrical switch
Weight	0.43 lbs (195 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	74 Lbf-ft (100 Nm)
Switching type	N/O or N/C
Max. switching voltage	48 V
Electrical connection	-
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	Ohmic 3 A at 24 V = Ohmic 0.03 to 5 A at max. 230 V ~
Protection class to DIN 40050	IP 67 (only if the connector is wired and fitted correctly)
Order example	VD 5 CD.0 /-2M0

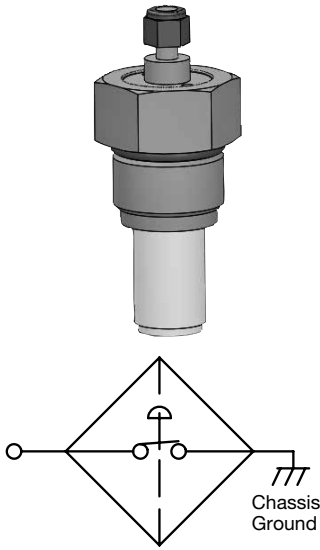
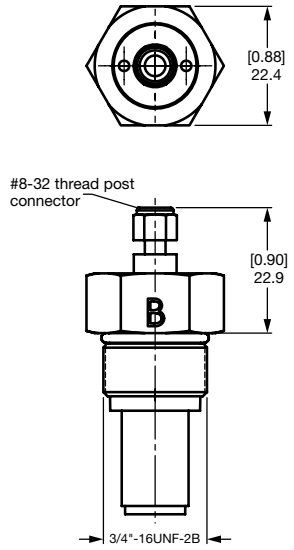


Specifications of Differential Pressure Mobile Indicators

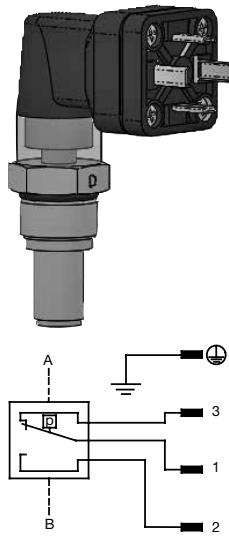
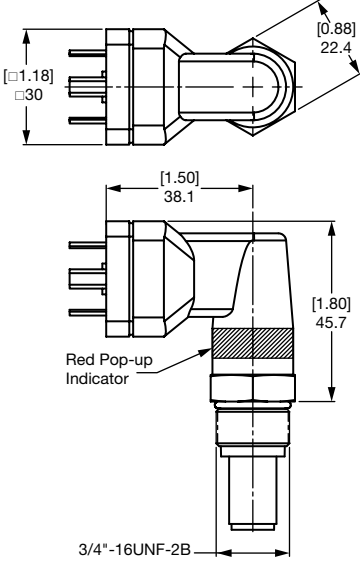
VM x M.x

	Type of indication	Single pole (<i>ground switching</i>)	
	Weight	0.07 lbs (31 g)	
	Trip Pressure / Range	29 psi ±15% (2 bar ±15%)	
	Permitt. operating pressure	3000 psi (210 bar)	
	Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)	
	Thread	G 1/2	
	Max. torque	24 Lbf-ft (33 Nm)	
	Switching type	N/O or N/C	
	Max. switching voltage	24V	
	Electrical connection	-	
	Max. switching voltage at resistive load	-	
	Switching capacity	-	
	Protection class to DIN 40050	Terminals IP00	
	Order example	VM 2 M.0	

B...CMF*

	Type of indication	Single pole (<i>ground switching</i>)	
	Weight	0.05 lbs (24 g)	
	Trip Pressure / Range	44 psi +6 psi (3 bar +0.4 bar)	
	Permitt. operating pressure	3000 psi (210 bar)	
	Permitt. temperature range	22°F to 200°F (-30°C to 93°C)	
	Thread	SAE-8 differential port	
	Max. torque	-	
	Switching type	N/O	
	Max. switching voltage	-	
	Electrical connection	#8 - 32 threaded post	
	Max. switching voltage at resistive load	-	
	Switching capacity	ohmic 200MA at 36VDC	
	Protection class to DIN 40050	Terminals IP00	
	Order example	B3420CMF.0	

B...LEMF*

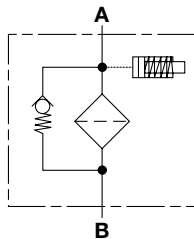
	Type of indication	Visual indicator & electric switch	
	Weight	0.18 lbs (80 g)	
	Trip Pressure / Range	44 psi +6 psi (3 bar +0.4 bar)	
	Permitt. operating pressure	3000 psi (210 bar)	
	Permitt. temperature range	22°F to 200°F (-30°C to 93°C)	
	Thread	SAE-8 differential port	
	Max. torque	-	
	Switching type	N/O or N/C (<i>change-over contacts</i>)	
	Max. switching voltage	-	
	Electrical connection	Female connector to DIN 43650	
	Max. switching voltage at resistive load	-	
	Switching capacity	ohmic 5A at 125/250VAC, 5A at 24VDC	
	Protection class to DIN 40050	IP60	
	Order example	B3420LEMF.0	

*This clogging indicator is for use with the MF/MFD/MFDS Series only.

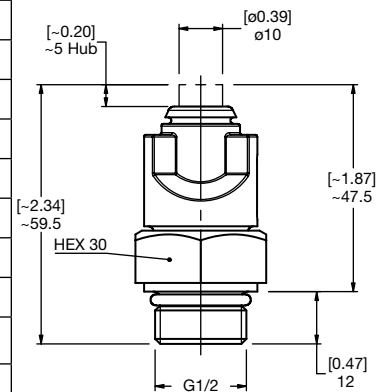
FILTER CLOGGING INDICATORS

Specifications of Return Line Indicators in accordance with ATEX Directive

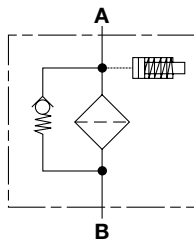
VR x B.x (ATEX) Can be used on aluminium filters up to Zone 1



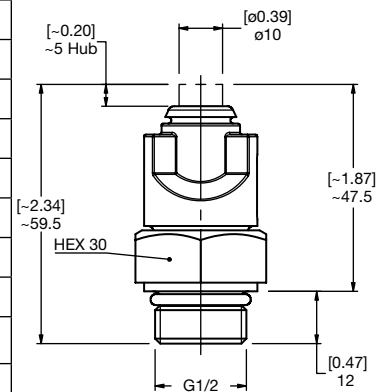
Type of indication	Visual, red pin
Weight	0.10 lbs (44 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	11Lbf-ft (15 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VR 2 B.0 /-2GC



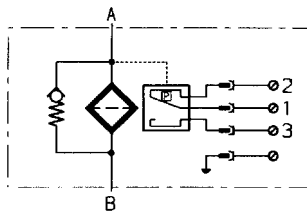
VR x B.x (ATEX) Can be used on steel/cast iron filters up to Zone 1



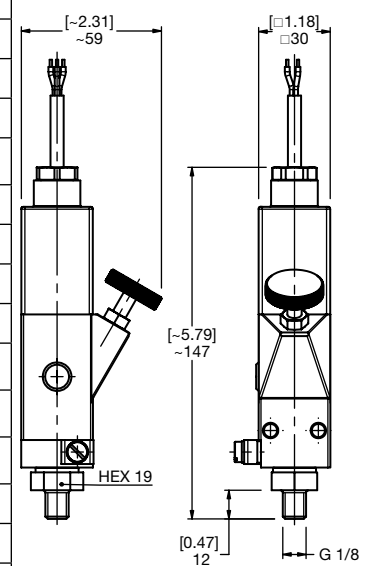
Type of indication	Visual, red pin
Weight	0.10 lbs (44 g)
Trip Pressure / Range*	29 psi -2.9 psi (2 bar -0.2 bar)
Permitt. operating pressure	102 psi (7 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	11Lbf-ft (15 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VR 2 B.0 /-2GC-SO174



VMF x C.x /-Ex2G



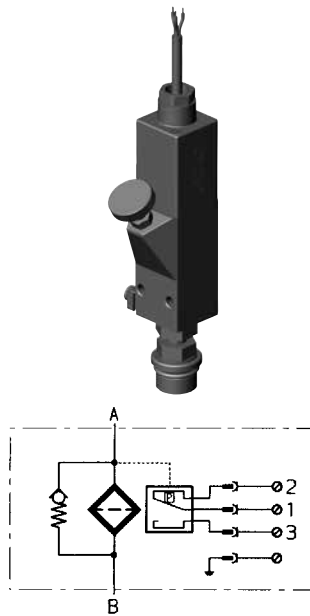
Type of indication	Electrical switch
Weight	0.91 lbs (415 g)
Trip Pressure / Range*	29 psi ±7.3 psi (2 bar ±0.5 bar)
Permitt. operating pressure	2901 psi (200 bar)
Permitt. temperature range	-4°F to 158°F (-20°C to 70°C) (T6) -4°F to 176°F (-20°C to 80°C) (T5)
Thread	G 1/8
Max. torque	11 Lbf-ft (15 Nm)
Switching type	N/C or N/O (change-over contacts)
Max. switching voltage	250 V
Electrical connection	Cable connection PG 9 Cable length 2 m
Max. switching voltage at resistive load	62.5 W = 250 VA ~
Switching capacity	Ohmic 0.25 A at 250 V = Ohmic 1 A at 250 V ~
Protection class to DIN 40050	IP 65
ATEX designation	II 2G EEx d IIC T6 / T5
Order example	VMF 2 C.0 /-Ex2G



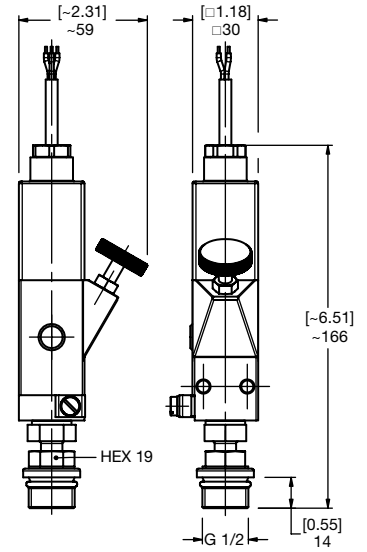
*When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

Specifications of Return Line Indicators in accordance with ATEX Directive

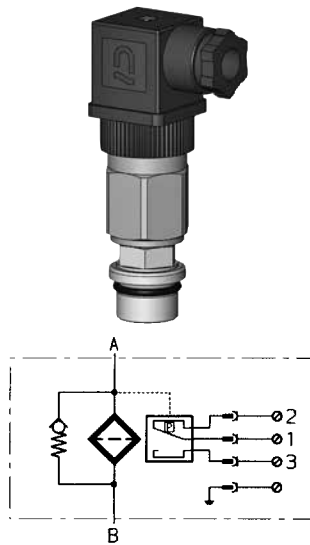
VR x C.x /-Ex2G



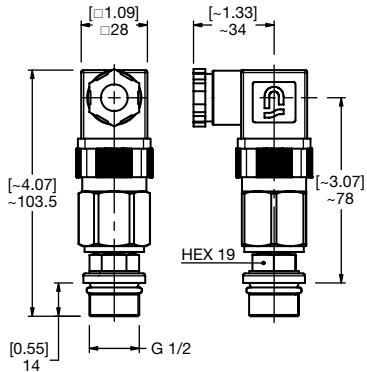
Type of indication	Electrical switch
Weight	1.04 lbs (470 g)
Trip Pressure / Range	29 psi $\pm$ 7.3 psi (2 bar $\pm$ 0.5 bar)
Permitt. operating pressure	2900 psi (200 bar)
Permitt. temperature range	-4°F to 158°F (-20°C to 70°C) (T6) -4°F to 176°F (-20°C to 80°C) (T5)
Thread	G 1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	250 V
Electrical connection	Cable connection PG 9 Cable length 2 m
Max. switching voltage at resistive load	62.5 W = 250 VA ~
Switching capacity	Ohmic 0.25 A at 250 V = Ohmic 1 A at 250 V ~
Protection class to DIN 40050	IP 65
ATEX designation	Ⓔ II 2G EEx d IIC T6 / T5
Order example	VR 2 C.0 /-Ex2G



VR x C.x (ATEX) Can be used on filters up to Zone 1*



Type of indication	Electrical switch
Weight	0.75 lbs (340 g)
Trip Pressure / Range	29 psi $\pm$ 4.4 psi (2 bar $\pm$ 0.3 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	*
Electrical connection	Male connection M20 Female connector to DIN 43650
Max. switching voltage at resistive load	*
Switching capacity	*
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VR 2 C.1 /-2GBC

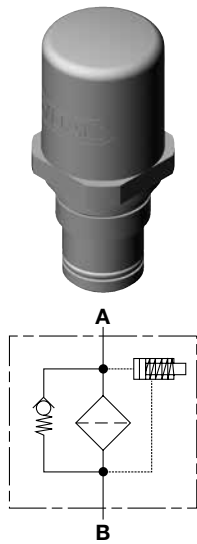


*The clogging indicator is simple electrical operating equipment according to DIN EN 60079-14 and may only be used in intrinsically safe circuits (*supplied with manufacturer's declaration and operating instructions*).

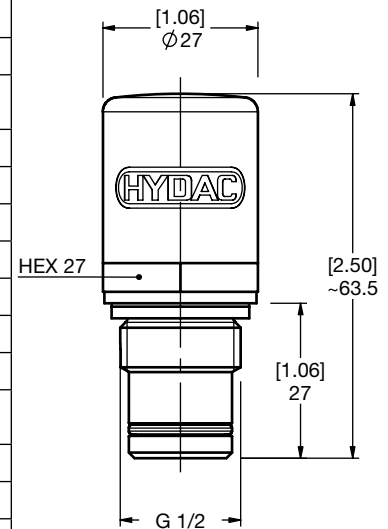
FILTER CLOGGING INDICATORS

Specifications of Differential Pressure Indicators in accordance with ATEX Directive

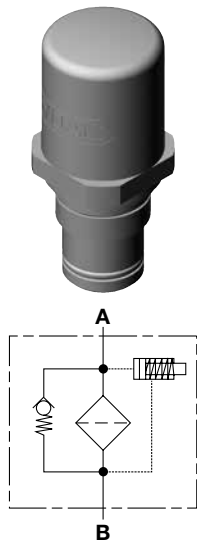
VM x B.x (ATEX) Can be used on aluminium filters up to Zone 1



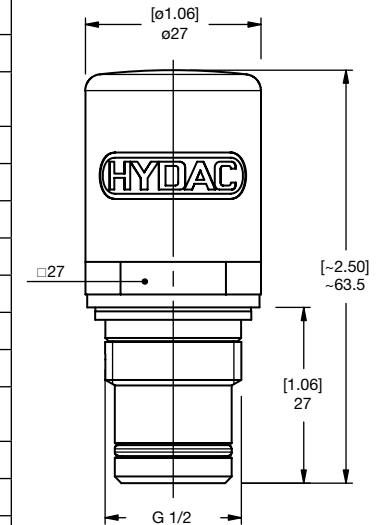
Type of indication	Visual, red/green band Automatic reset
Weight	0.24 lbs (110 g)
Trip Pressure / Range	73 psi - 10% (5 bar -10%) 116 psi ± 10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	24 Lbf-ft (33 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VM 5 B.1 /-2GC



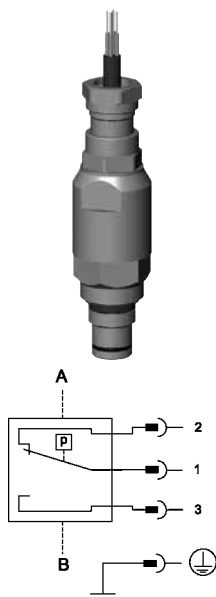
VD x B.x (ATEX) Can be used on filters up to Zone 1



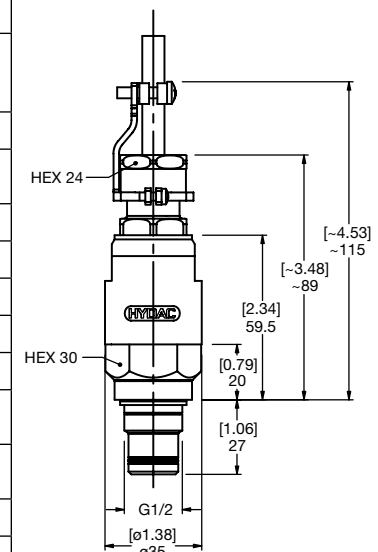
Type of indication	Visual, red/green band Automatic reset
Weight	0.24 lbs (110 g)
Trip Pressure / Range	73 psi - 10% (5 bar -10%) 116 psi ± 10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	74 Lbf-ft (100 Nm)
Switching type	-
Max. switching voltage	-
Electrical connection	-
Max. switching voltage at resistive load	-
Switching capacity	-
Protection class to DIN 40050	-
Order example	VD 5 B.1 /-2GC



VD x C.x /-2GEXDIIC

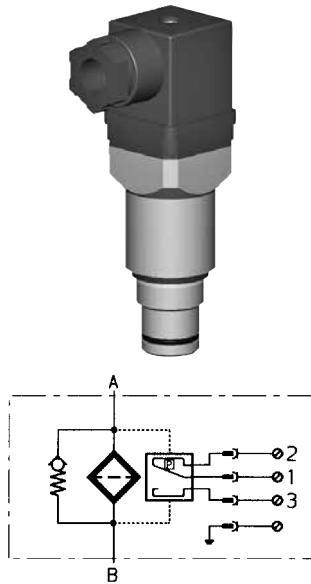


Type of indication	Electrical switch
Weight	1.32 lbs (600 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-4°F to 140°F (-20°C to 60°C) setting (media temp. max. 75° C)
Thread	G 1/2
Max. torque	74 Lbf-ft (100 Nm)
Switching type	Change-over
Max. switching voltage	250 V
Electrical connection	Cable connection
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	ohmic 3 A at 24 V = ohmic 0.03 A to 5 A at 250 V ~
Protection class to DIN 40050	IP 66
ATEX designation	Ex II 2G Ex d IIC T6
Order example	VD 2 C.1 /-2GEXDIIC

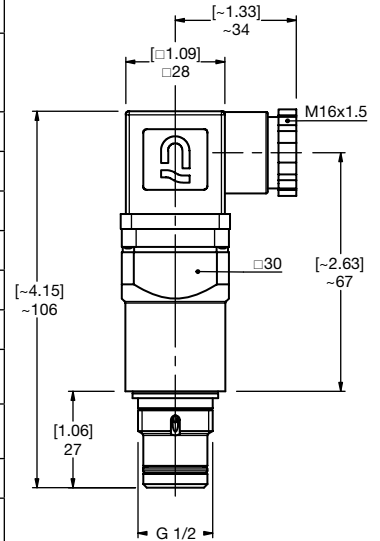


Specifications of Differential Pressure Indicators in accordance with ATEX Directive

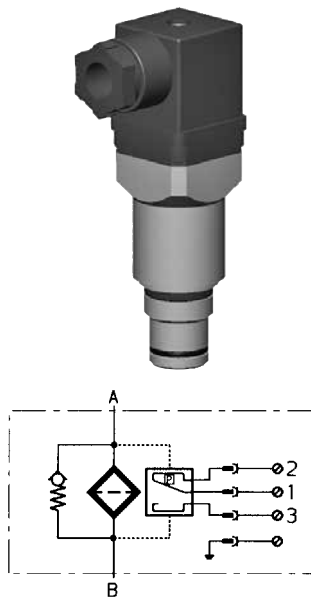
VM x C.x (ATEX) Can be used on aluminium filters up to Zone 1



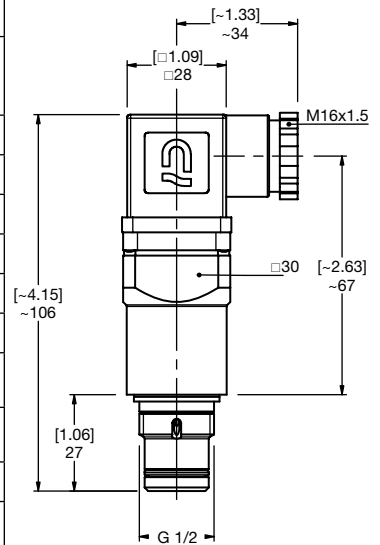
Type of indication	Electrical switch
Weight	0.26 lbs (120 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	24 Lbf-ft (33 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	*
Electrical connection	Male connection M16 Female connector to DIN 43650
Max. switching voltage at resistive load	*
Switching capacity	*
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VM 5 C.0 /-2GBC-SO135



VD x C.x (ATEX) Can be used on filters up to Zone 1*



Type of indication	Electrical switch
Weight	0.49 lbs (220 g)
Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 212°F (-30°C to 100°C)
Thread	G 1/2
Max. torque	74 Lbf-ft (100 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	*
Electrical connection	Male connection M16 Female connector to DIN 43650
Max. switching voltage at resistive load	*
Switching capacity	*
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VD 5 C.0 /-2GBC-SO135

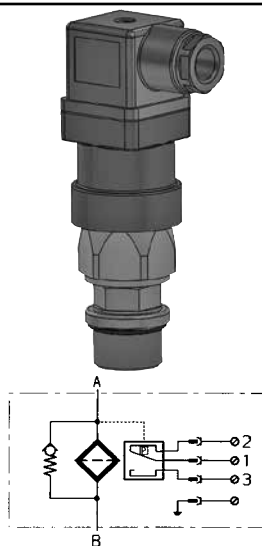


*The clogging indicator is simple electrical operating equipment according to DIN EN 60079-14 and may only be used in intrinsically safe circuits (*supplied with manufacturer's declaration and operating instructions*).

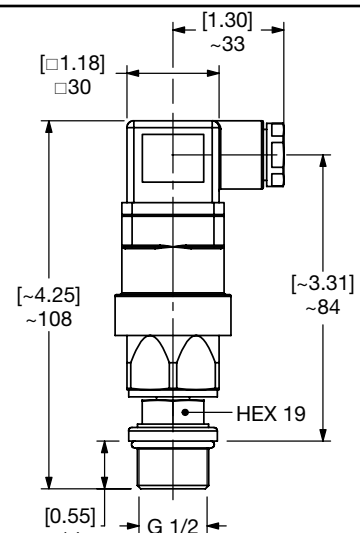
FILTER CLOGGING INDICATORS

Specifications of Return Line Indicators with UL or CSA approval

VR x C.x (CSA)

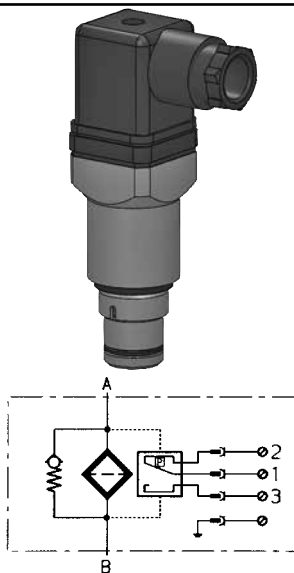


Type of indication	Electrical switch
Weight	0.75 lbs (340 g)
Trip Pressure / Range*	29 psi -4.4 psi (2 bar -0.3 bar)
Permitt. operating pressure	580 psi (40 bar)
Permitt. temperature range	23°F to 248°F (-5°C to 120°C)
Thread	G 1/2
Max. torque	22 Lbf-ft (30 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	230 V
Electrical connection	Male connection PG 9 Female connector to DIN 43650
Max. switching voltage at resistive load	250 W = 300 VA ~
Switching capacity	Ohmic 4 A at 24 V Ohmic 0.3 to 4 A at max. 230 V ~
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VR 2 C.0 /-CSA

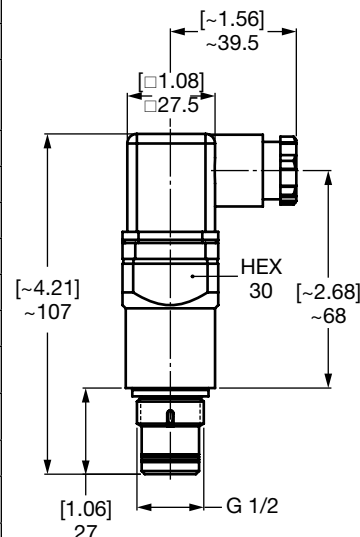


Specifications of Differential Pressure Indicators with UL or CSA approval

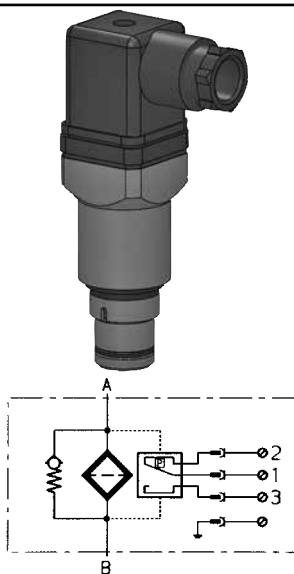
VM x C.x (UL, Standard 508)



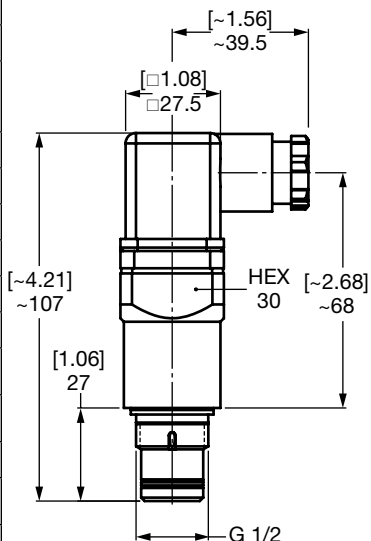
Type of indication	Electrical switch
Weight	0.26 lbs (120 g)
Trip Pressure / Range*	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	3000 psi (210 bar)
Permitt. temperature range	-22°F to 176°F (-30°C to 80°C)
Thread	G 1/2
Max. torque	24 Lbf-ft (33 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	115 V
Electrical connection	Male connection PG 11 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	ohmic 3 A at 24 V =
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VM 5 C.0 /-CRUUS



VD x C.x (UL, Standard 508)



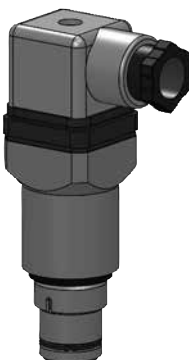
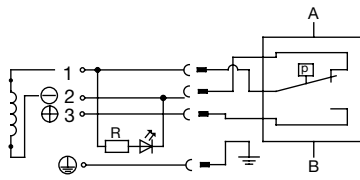
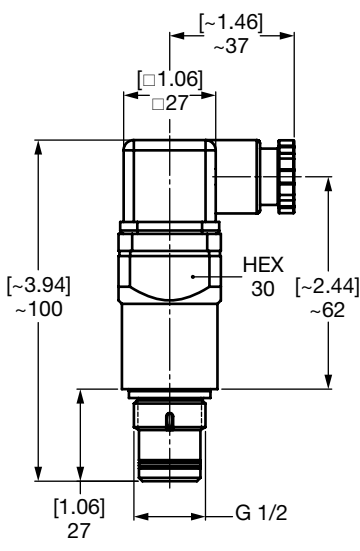
Type of indication	Electrical switch
Weight	0.55 lbs (250 g)
Trip Pressure / Range*	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)
Permitt. operating pressure	6000 psi (420 bar)
Permitt. temperature range	-22°F to 176°F (-30°C to 80°C)
Thread	G 1/2
Max. torque	74 Lbf-ft (100 Nm)
Switching type	N/C or N/O (<i>change-over contacts</i>)
Max. switching voltage	115 V
Electrical connection	Male connection PG 11 Female connector to DIN 43650
Max. switching voltage at resistive load	60 W = 100 VA ~
Switching capacity	ohmic 3 A at 24 V =
Protection class to DIN 40050	IP 65 (<i>only if the connector is wired and fitted correctly</i>)
Order example	VD 5 C.0 /-CRUUS



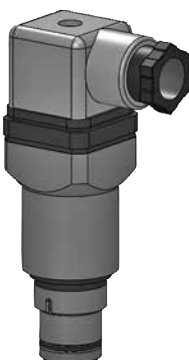
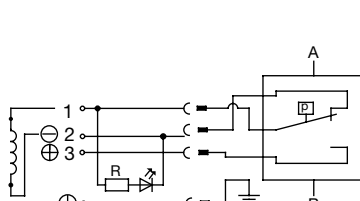
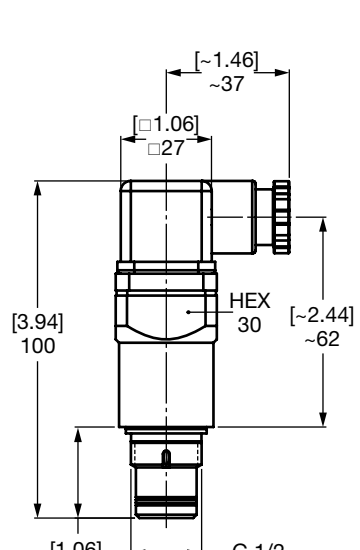
*When presented as a pressure followed by a negative (ex 29 psi -4.4 psi), the 4.4 is the lower tolerance. This is not to be interpreted as a range (ex 4.4 - 29 psi). The range in this instance would be 24.6 - 29 psi. Indicators are not field adjustable.

Specifications of Differential Pressure Indicators with UL or CSA approval

VM x D.x /-L... (UL, Standard 508)

 	Type of indication	Electrical switch	
	Weight	0.26 lbs (120 g)	
	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)	
	Permitt. operating pressure	3000 psi (210 bar)	
	Permitt. fluid temperature	-13°F to 176°F (-25°C to 80°C)	
	Thread	G 1/2	
	Max. torque	24 Lbf-ft (33 Nm)	
	Switching type	N/O	
	Max. switching voltage	24, 110 V <i>(depending on the type of light insert)</i>	
	Electrical connection	Male connection PG 11 Female connector to DIN 43650	
	Max. switching voltage at resistive load	60 W = 100 VA ~	
	Switching capacity	ohmic 3 A at 24 V =	
	Protection class to DIN 40050	IP 65 <i>(only if the connector is wired and fitted correctly)</i>	
	Order example	VM 5 D.0 /-L24-CRUUS	

VD x D.x /-L... (UL, Standard 508)

 	Type of indication	Electrical switch	
	Weight	0.49 lbs (220 g)	
	Trip Pressure / Range	29 psi -10% (2 bar -10%) 73 psi -10% (5 bar -10%) 116 psi ±10% (8 bar ±10%)	
	Permitt. operating pressure	6000 psi (420 bar)	
	Permitt. temperature range	-13° F to 176° F (-25° C to 80° C)	
	Thread	G 1/2	
	Max. torque	74 Lbf-ft (100 Nm)	
	Switching type	N/O	
	Max. switching voltage	24, 110 V <i>(depending on the type of light insert)</i>	
	Electrical connection	Male connection PG 11 Female connector to DIN 43650	
	Max. switching voltage at resistive load	60 W = 100 VA ~	
	Switching capacity	ohmic 3 A at 24 V =	
	Protection class to DIN 40050	IP 65 <i>(only if the connector is wired and fitted correctly)</i>	
	Order example	VD 5 D.0 /-L24-CRUUS	

FILTER CLOGGING INDICATORS

Model Code: Standard Clogging Indicators

		VR	2	D	.	X	/-V-L24
Category							
VMF	=	Return line (<i>static</i>) indicator; connection G 1/8					
VR	=	Return line (<i>static</i>) indicator; connection G 1/2					
VM	=	Differential pressure indicator; up to 3000 psi (210 bar) operating pressure					
VD	=	Differential pressure indicator; up to 6000 psi (420 bar) operating pressure					
VL	=	Differential pressure indicator; up to 360 psi (25 bar) operating pressure					
		G 1/2					
Pressure setting							
1 = 15 psi (1 bar) (<i>optional, for use in lube applications</i>) - (<i>not available with all types- Consult HYDAC</i>)							
2 = 29 psid (2 bar) (<i>standard, for use on return line filters</i>)							
5 = 72 psid (5 bar) (<i>standard, for use on pressure filters, except DFDK & DFZ</i>)							
8 = 116 psid (8 bar) (<i>standard, on DFDK & DFZ filters</i>) - (<i>not available with all types- Consult HYDAC</i>)							
Type							
B	=	Visual pop-up with automatic reset					
BF	=	Visual, mobile applications					
BM	=	Visual pop-up with manual reset					
C	=	Electrical switch					
CD	=	Electrical switch with Deutsch plug (<i>DT 04-2P</i>)					
D	=	Electric switch and Visual (<i>light - 24 VDC, 110 VAC</i>)					
E	=	Pressure gauge, horizontal (<i>static only</i>)					
ES	=	Pressure gauge, vertical					
F	=	Pressure switch, mobile applications					
FD	=	Pressure switch with Deutsch plug (<i>DT 04-2P</i>), mobile applications					
GC	=	Electronic analog (<i>4-20 mA or 1-10 V</i>) / pressure switch 75% and 100% trips (<i>VD & VR only</i>)					
GW	=	Electronic analog (<i>4-20 mA or 1-10 V</i>) / pressure switch 75% and 100% trips & bypass monitoring (<i>VL only</i>)					
J	=	Electric switch - Brad Harrison 5-pin mini connector					
J4	=	Electric switch - Brad Harrison 4-pin micro connector					
LE	=	Electric pressure switch / visual pop-up button with 100% switching contact					
LEM	=	Electric pressure switch / visual pop-up button with 100% switching contact and M12x1 plug, mobile applications					
LZ	=	Electric pressure switch / visual pop-up button with 75% and 100% switching contact					
M	=	Electrical, ground switching					
UE	=	Vacuum pressure gauge, horizontal					
UF	=	Vacuum switch					
Modification Number							
X	=	The latest version is always supplied					
Supplementary Details							
T100	=	Lockout below 100°F (VM, VD – types C, D, J and J4 only)					
30C	=	Cold start suppression of switching outputs up to 30°C ±5°C (<i>only for C, D, LZ indicators; DC voltage supply only – max. 24 Volt;</i> <i>C and D indicators only for VD and VM; on D and LZ indicators, contacts must be wired N/O only</i>)					
L...	=	Light with corresponding voltage (24, 48, 110, 230 Volt)					
LED	=	2 LEDs up to 24 Volt					
OE	=	N/C function					
SO135	=	Indicator suitable for PLC controls (<i>Gold-Crosspoint contacts</i>)					
W	=	Suitable for oil/water emulsions (HFA, HFC)					
V	=	Fluorocarbon elastomer (FKM), suitable for phosphate esters (HFD-R) and biodegradable oils (<i>must be specified for type "GW"</i>) Nitrile (NBR) is standard. Ethylene propylene (EPDM, code EPR) available upon request.					
2M0	=	Two contacts (<i>male</i>), 2-pin Deutsch connector, no connector cable					
2M20	=	Two contacts (<i>male</i>), 2-pin Deutsch connector, 200 mm connector cable					
Supplementary Details for "GC" type							
SP	=	Analog signal: output 1-10 V					
SQ	=	Analog signal: output 4-20 mA (<i>current source</i>)					
113	=	N/O function - pressure peak suppression up to 10 sec. Cold start suppression of switching outputs (<i>PNP technique, positive switching</i>) up to 25°C					
123	=	N/C function - pressure peak suppression up to 10 sec. Cold start suppression of switching outputs (<i>PNP technique positive switching</i>) up to 25°C					
30C	=	Cold start suppression of switching outputs up to 30°C (<i>other temperatures on request</i>)					
LED	=	3 LED's (<i>green, yellow, red</i>) in terminal box					
PF	=	Floating switching outputs (due to relay in the plug)					
Supplementary Details to "GW" type							
113	=	N/O function - pressure peak suppression up to 10 sec. Cold start suppression of switching outputs (<i>PNP technique positive switching</i>) up to 25°C					
123	=	N/C function - pressure peak suppression up to 10 sec. Cold start suppression of switching outputs (<i>PNP technique positive switching</i>) up to 25°C					

Supplementary Details for “LZ” type

- AV = Plug and connector to AUDI, VW specification
- BO = Plug and connector to BMW, Opel, Ford specification
- BO-LED= Same as BO, but with progressive LED strip
- CN = Electrical connection, 1 connector DIN 43651 with 3 LEDs *(to CNOMO specification NF E 48-700)*
- DB = Electrical connection, 1 connector to DIN 43651 with 3 LEDs *(to Daimler-Benz and BMW specification)*
- D4C = Plug and connector to Daimler-Chrysler specification with cold start suppression 30 °C

Supplementary Details to “ATEX” type

- 2GC = For visual indicator type “B” with ATEX certificate
- 2GBC = For electrical indicator type “C” with ATEX certificate *(the switch used in the indicator is a passive component according to EN 50020 and can therefore be used in intrinsically safe circuits as simple apparatus in accordance with EN 60079-14)*
- 2GEXDIIC = For electrical indicator suitable for use in Zone 1 (Category 2), gas atmosphere, Category d (Flameproof Enclosure), Explosive subdivision IIC to ATEX directive
- EX2G = Ex-protection type for the return line indicator type “C”

Supplementary Details for “UL” and “CSA” approval

- cRUus = For electrical differential indicator type “C” and “D” with UL Underwriter’s Recognition
- CSA = For electrical return line indicator type “C” with CSA approval

Notes: 1. Old style indicators for filters HF2P / HF3P / HF4P - pre 2008 (Example **Model Code: B2210BHF**), contact HYDAC for further information.

2. VMF indicators of type B, LE, LZ, and C I-EX2G, must include “V” at the end of the Model Code if Fluorocarbon elastomer (FKM) seals are required. All other VMF indicators come with Fluorocarbon elastomer (FKM) seals as a standard *(no Supplementary Detail required)*.

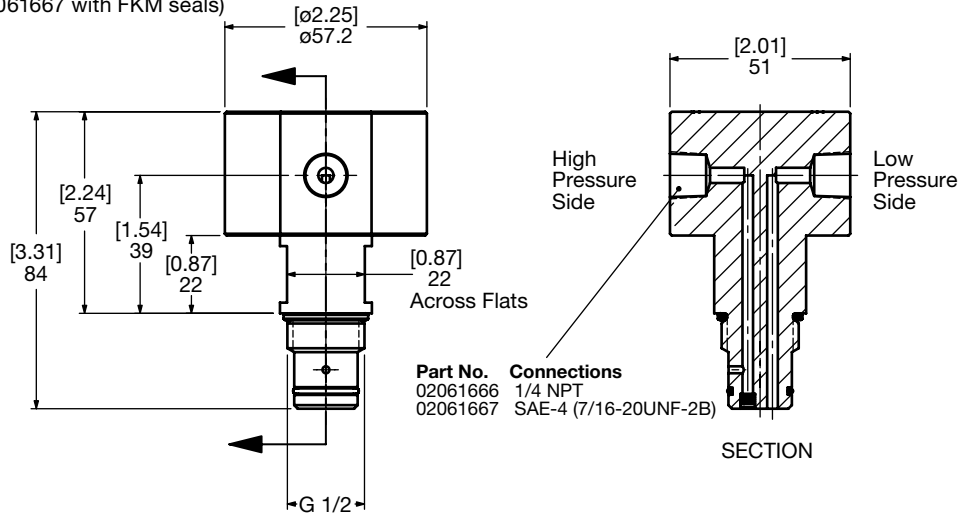
FILTER CLOGGING INDICATORS

Dual Indicator / Gauge Blocks

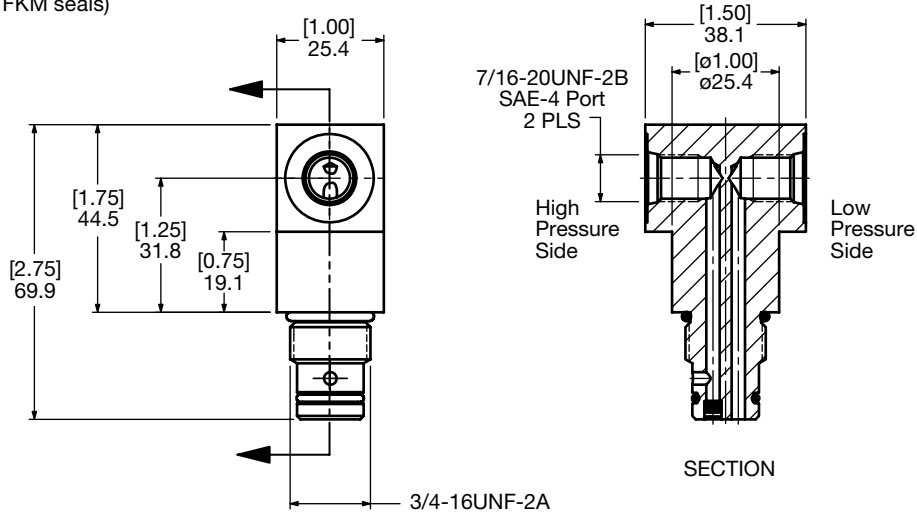
Dual Gauge Block - G 1/2 Differential Indicator Port to SAE-4 or 1/4 NPT Ports
(Part No. 02061666 & 02061667 with FKM seals)

Remote-mount Applications:

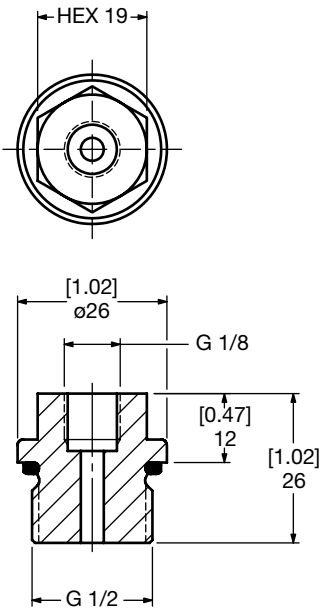
- Use Part No. 02061666 / 02061667 / 319004 in filter head
- Use Part No. 02080588 / 318740 in remote location
- Keep pipe run below 10 ft.



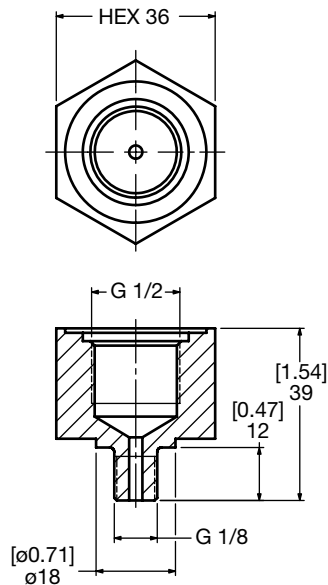
Dual Gauge Block - 3/4-16UNF-2A Differential Indicator Port to SAE-4 Ports
(Part No. 02059931 with FKM seals)



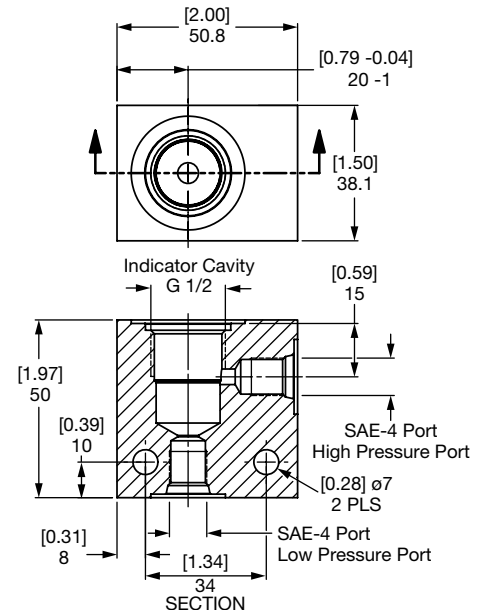
Adapter - Static - G 1/2" to G 1/8"
(Part No. 319004 w/NBR seal)



Adapter - Static - G 1/8" to G 1/2"
(Part No. 318740)

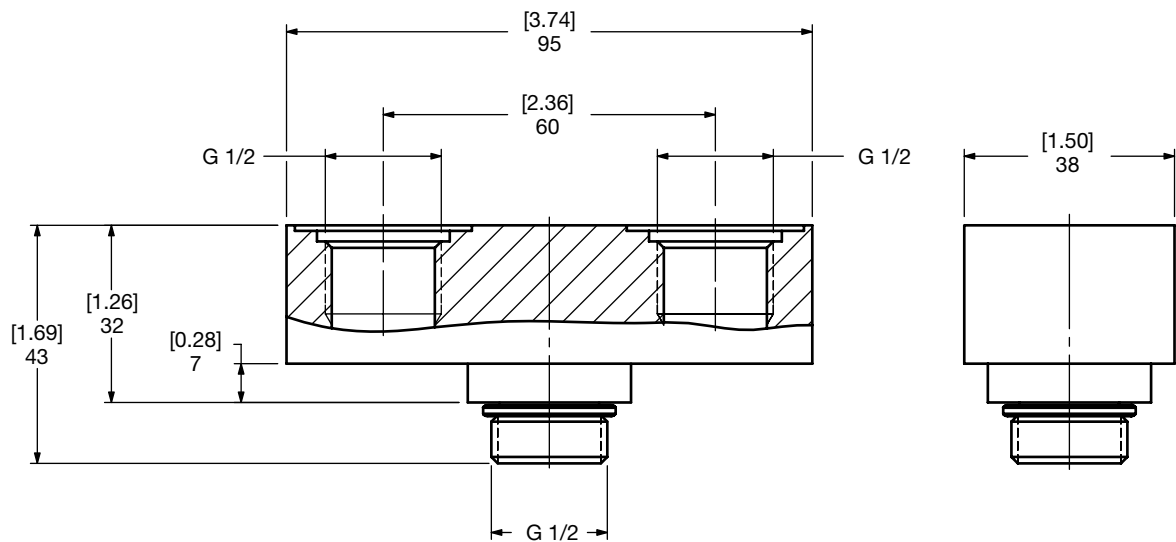


Pipe Connection Block - SAE-4 Ports to G1/2 Differential Indicator Port
(Part No. 02080588)

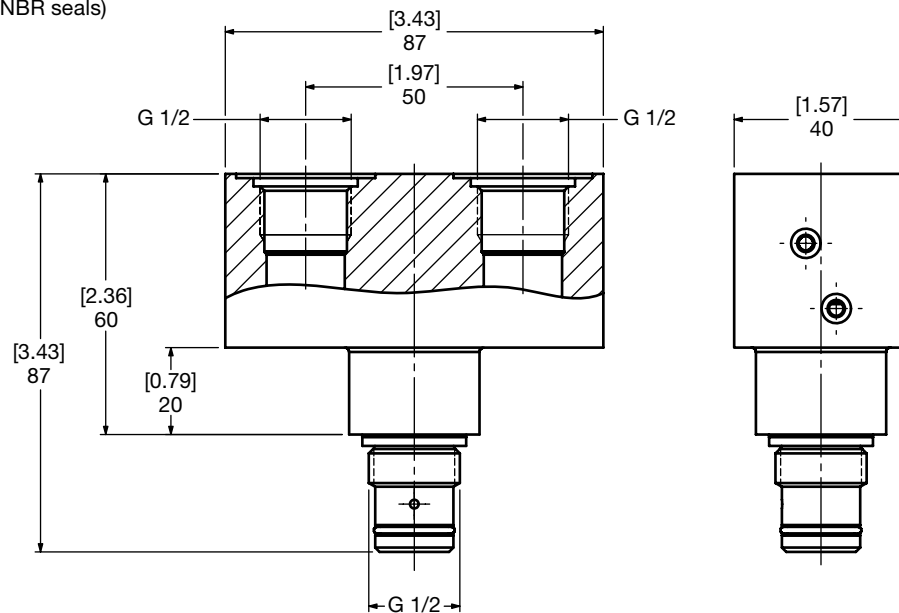


Note: Can be used as a test block

Dual Indicator Block- Static - G 1/2 port to 2 x G 1/2 ports (Part No. 00318741 with NBR seal)



Dual Indicator Block- Differential - G 1/2 Indicator Port to 2 x G 1/2 Indicator Ports (Part No. 00318732 with NBR seals)



FILTER CLOGGING INDICATORS

Notes

This image shows a full page of graph paper. The grid consists of small squares formed by thin gray lines. In the bottom right corner, there is a small QR code.