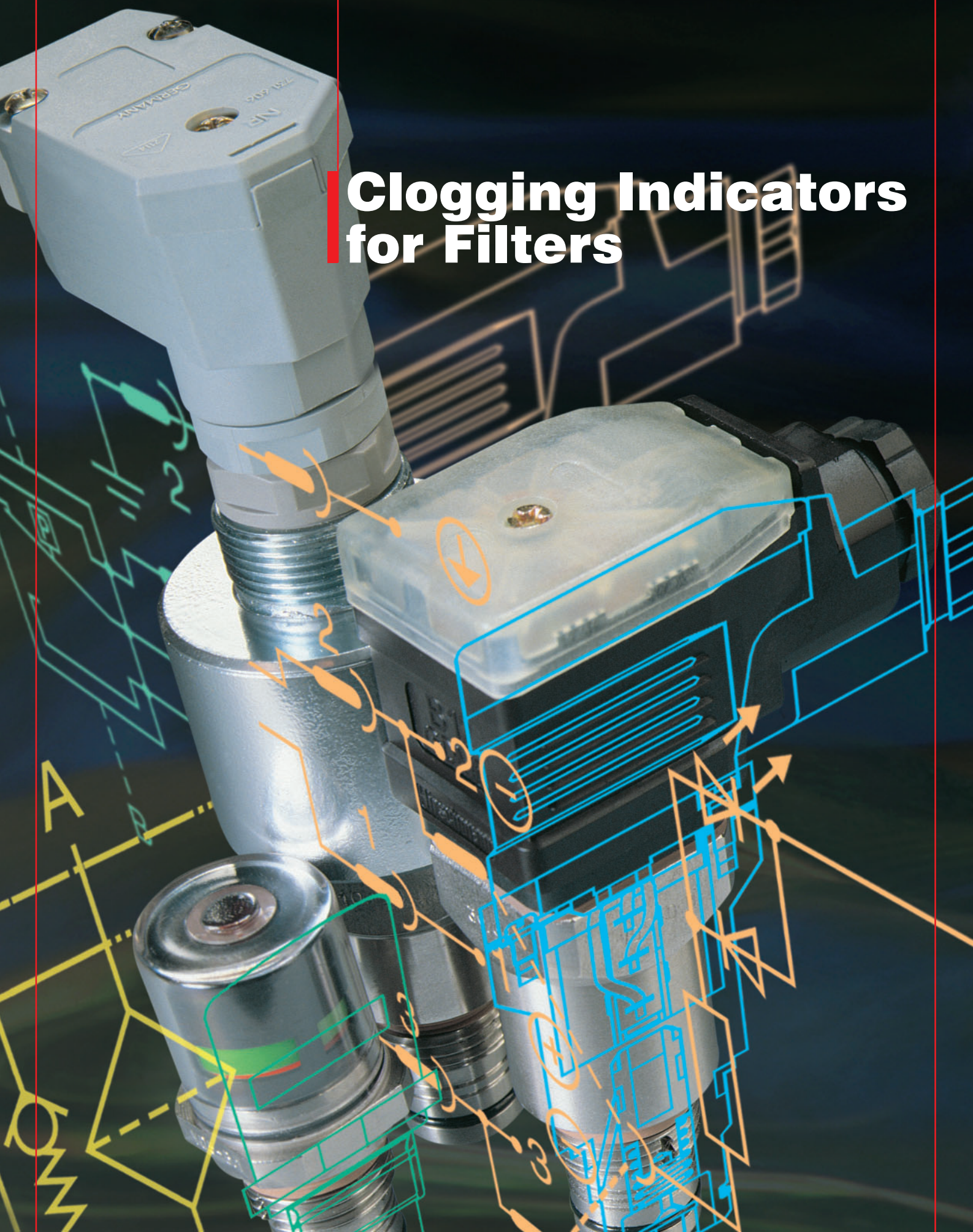


HYDAC

INTERNATIONAL

Clogging Indicators for Filters



HYDAC clogging indicators are designed to show visually and/or electrically when a filter element has to be changed or cleaned.

Operational safety of a system and efficient utilisation of a filter element can only be guaranteed if clogging indicators are used.

INDEX	Page:
1. RETURN LINE INDICATORS	2
1.1. DESCRIPTION	2
1.1.1. General	2
1.1.2. Selection table	3
1.2. TECHNICAL SPECIFICATIONS	3-11
1.3. DIMENSIONS	12
1.4. TORQUE RATINGS	14
1.5. SPARE PARTS LIST	14
1.6. MODEL CODE	15
2. DIFFERENTIAL PRESSURE INDICATORS	16
2.1. DESCRIPTION	16
2.1.1. General	16
2.1.2. Selection table	17
2.2. TECHNICAL SPECIFICATIONS	17-23
2.3. DIMENSIONS	24
2.4. TORQUE RATINGS	26
2.5. SPARE PARTS LIST	26
2.6. MODEL CODE	27
3. ADAPTORS FOR CLOGGING INDICATORS	28
4. DESINA SPECIFICATIONS	29
5. NOTE	29

1. RETURN LINE INDICATORS

1.1. DESCRIPTION

1.1.1. **General**

Return line indicators are used for return line and suction filters. In return line filters they react to the increasing static pressure before the filter element, caused by increasing contamination; in suction filters to the decreasing pressure after the filter element.

On standard models the sealing material is NBR (Perbunan). All standard filters can be fitted with an indicator at any time by simply screwing it in.

(EXCEPTION: The differential pressure indicator, type V02 must be fitted separately inline!)

Please note:

For a return line filter/cooler/tank arrangement, differential pressure indicators must be used.

1.1.2. Selection table - Return line indicators




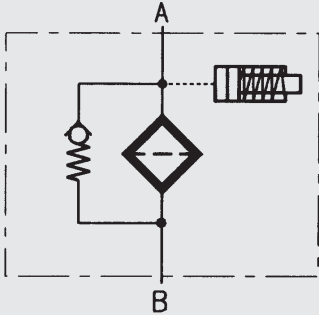
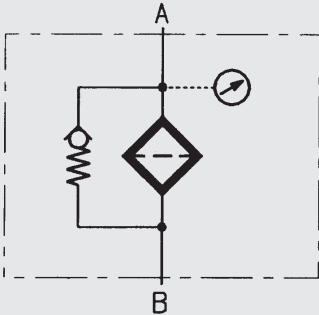
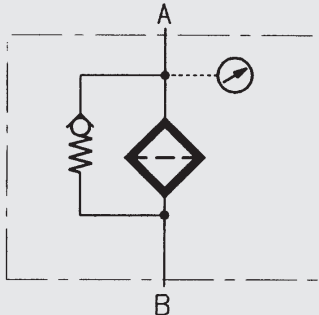
Designation	suitable for filter types				
	RF, RFD RFM (except size 75/165/185)	RFM 75/165/185 RFN ≤ 100	NF/ NFD... 1.0 RFN/D ≥ 160	MF/ MFD	BF7 ELF7
VR 2 B.1	●		●		
VMF 2 B.1		●			
VR 2 C.0	●		●		
VMF 2 C.0		●			
VR 2 D.0/-L	●		●		
VMF 2 D.0/-L		●			
VR 2 E.0	●		●		
VMF 2 E.0		●			
VMF 16 E.0				●	
VR 2 ES.0	●		●		
VR 2 F.0	●		●		
VMF 2 F.0		●		●	
VR 2 H.0	●		●		
VMF 2 H.0		●			
VMF 0.6 K.0					●
VR 2 LE.1	●		●		
VR 2 LZ.1/-DB	●		●		
VR 2 LZ.1/-CN	●		●		
VR 2 GC.0	●		●		
VMF 1 UE.0				● ¹⁾	
VMF 0.2 UF.0				● ¹⁾	
VR 2.5 LZ.1/-BO	●		●		
VR 2.5 LZ.1/-AV	●		●		
VR 2.5 LZ.1/-D4C	●		●		
VR 2.5 LZ.1/-BO-LED	●		●		
VR 2.5 LZ.1/-GM	●		● ²⁾		
VMF 2.5 LZ.1/-D4C		●			
VMF 2.5 LZ.1/-BO-LED		●			

1) only when used in suction applications

2) only sizes 250/500

1.2. TECHNICAL SPECIFICATIONS

1.2.1. Return line indicators

1.2. TECHNICAL SPECIFICATIONS					
1.2.1. Return line indicators					
					
General details					
Designation of clogging indicator	VR 2 B.1	VMF 2 B.1 (not illustrated)	VR 2 E.0	VMF 2 E.0 (not illustrated)	VR 2 ES.0
Suitable for filter types	all RF, RFD, RFM (except size 75/165/185), NF/NFD...1.0	RFM 75/165/185 (please contact our sales/techn. department)	all RF, RFD, RFM (except size 75/165/185), NF/NFD...1.0	RFM 75/165/185 (please contact our sales/techn. department)	all RF, RFD, RFM (except size 75/165/185), NF/NFD...1.0
Weights	44 g	84 g	140 g	80 g	120 g
Type of indication	visual, red pin		visual-analogue scale green-yellow-red		visual-analogue scale green-yellow-red
Hydraulic details					
Cracking pressure/ indication range	2 bar - 0.2 bar		0 bar to +10 bar		0 bar to +10 bar
Permissible operating pressure	7 bar		7 bar -continuous		7 bar -continuous
Permissible temperature range ¹⁾	- 30 °C to +100 °C		- 20 °C to +60 °C		- 20 °C to +60 °C
Accuracy class	-		1.6		1.6
Electrical details					
Switching type	-		-		-
Max. switching voltage	-		-		-
Electrical connection	-		-		-
Max. switching output at resistive load	-		-		-
Switching capacity ²⁾	-		-		-
Safety type (to DIN 40050)	-		-		-
Symbols					

¹⁾ Only NBR (Perbunan) seals can be used in the temperature range - 30 °C to - 10 °C.

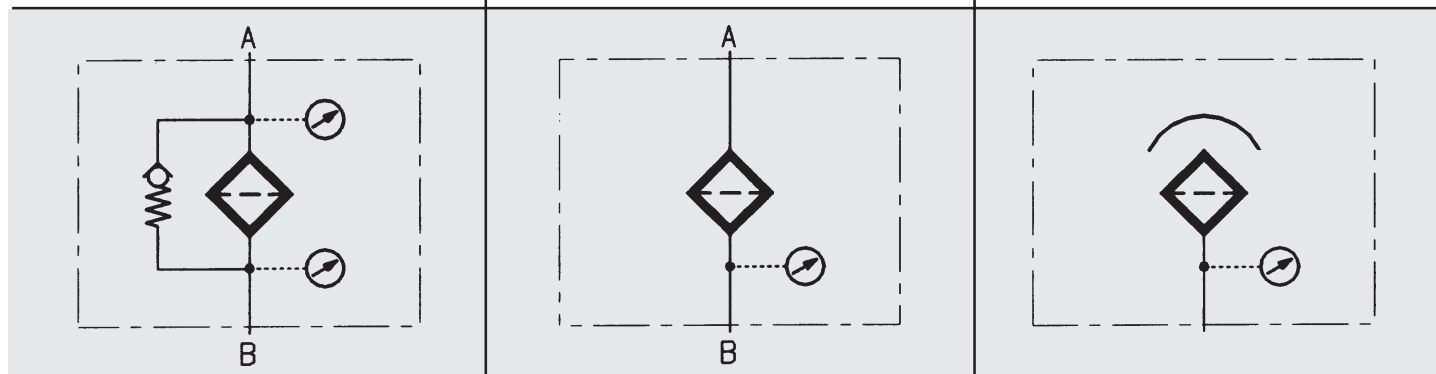
²⁾ High voltage peaks sometimes occur when inductances are switched off. Therefore the use of protection diodes should be considered.


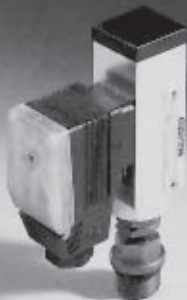

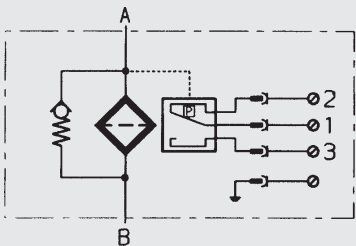
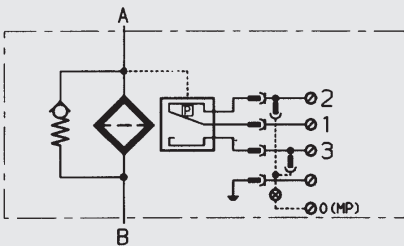
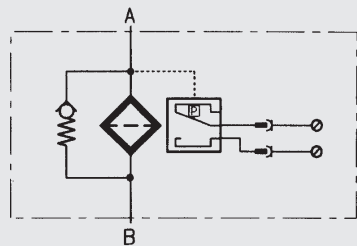
¹⁾ Only NBR (Perbunan) seals can be used in the temperature range - 30 °C to - 10 °C.

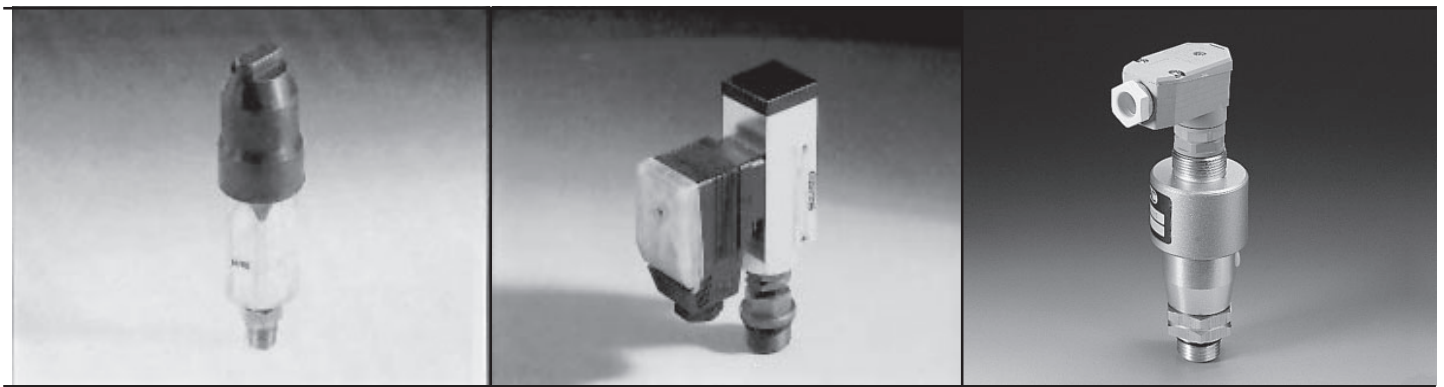
²⁾ High voltage peaks sometimes occur when inductances are switched off. Therefore the use of protection diodes should be considered.



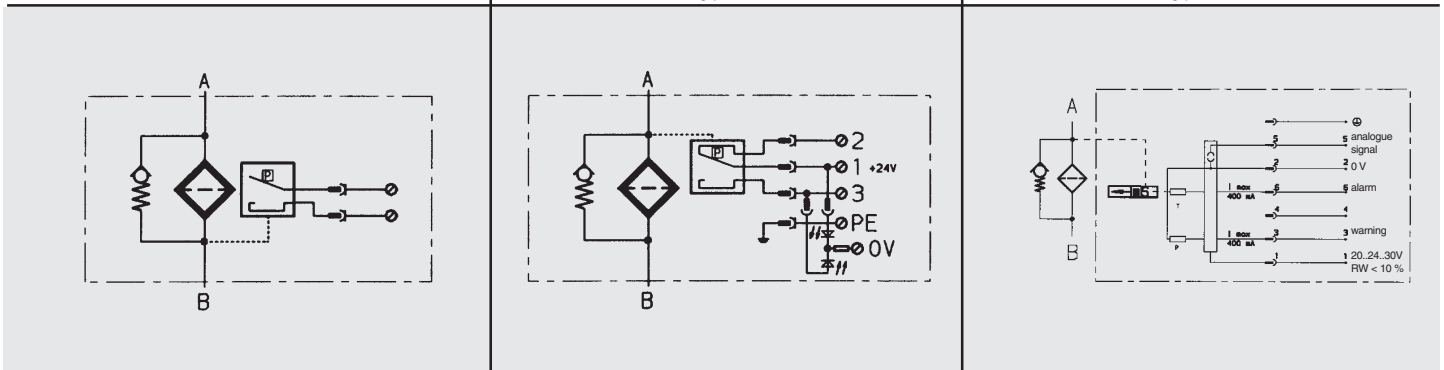
VMF 16 E.0	VMF 1 UE.0	VMF 0.6 K.0
MF/MFD	MF/MFD when used as suction filter	BF/ELF 7
80 g	100 g	100 g
visual-analogue, scale white, graduated	visual-analogue, scale white, graduated	visual-analogue, scale white, graduated
0 bar to +16 bar	- 1 bar to 0 bar	- 1 bar to +0.6 bar
11 bar -continuous	- 0.7 to 0 bar -continuous	- 0.7 to +0.4 bar -continuous
- 20 °C to +60 °C	- 20 °C to +60 °C	- 20 °C to +60 °C
1.6	1.6	1.6
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-


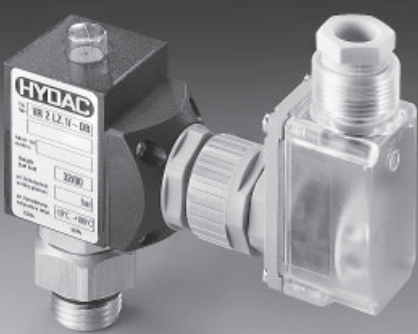
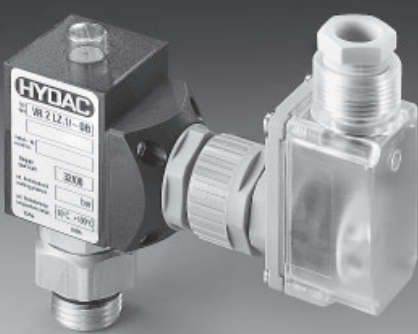
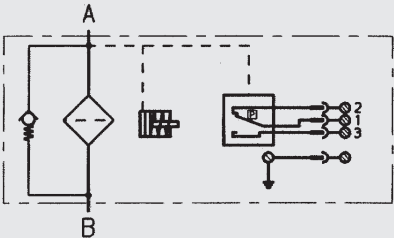
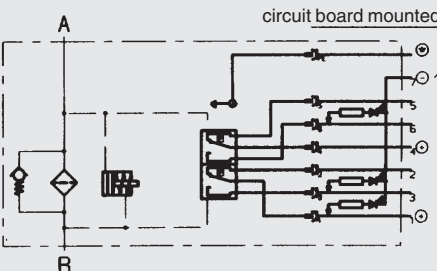
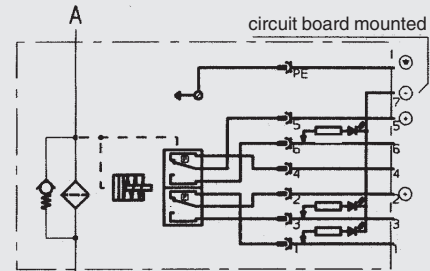


					
VR 2 C.0	VMF 2 C.0 (not illustrated)	VR 2 D.0/-L...	VMF 2 D.0/-L... (not illustrated)	VR 2 F.0	VMF 2 F.0 (not illustrated)
all RF, RFD, RFM (except size 75/165/185), NF/NFD...1.0	RFM 75/165/185	all RF, RFD, RFM (except size 75/165/185), NF/NFD...1.0	RFM 75/165/185	all RF, RFD, RFM (except size 75/165/185), NF/NFD...1.0	RFM 75/165/185, MF/MFD when used as return line filter
340 g	270 g	360 g	300 g	130 g	75 g
electrical		visual/electrical		electrical	
2 bar ± 0.3 bar		2 bar ± 0.3 bar		2 bar ± 0.4 bar	
40 bar		40 bar		40 bar	
- 30 °C to +100 °C		- 30 °C to +100 °C		- 30 °C to +100 °C	
-		-		-	
N/O or N/C contacts (change-over contacts)		N/O or N/C contacts (change-over contacts)		N/O contact	
230 V		24 V, 48 V, 110 V, 230 V depending on type of light insert		42 V	
plug connection, PG11, socket to DIN 43650		plug connection, PG11, socket to DIN 43650		threaded connection	
250 W = 300 VA ~		250 W = 300 VA ~		60 W = 100 VA ~	
ohmic 6 A at 24 V = ohmic 0.03 to 6 A at max. 230 V ~		ohmic 6 A at 24 V = ohmic 0.03 to 6 A at max. 230 V ~		ohmic 2.5 A at 24 V = ohmic 2.5 A at 42 V ~	
IP 65 (only if the plug is wired and fitted correctly)		IP 65 (only if the plug is wired and fitted correctly)		IP 65, terminals IP 00	
					



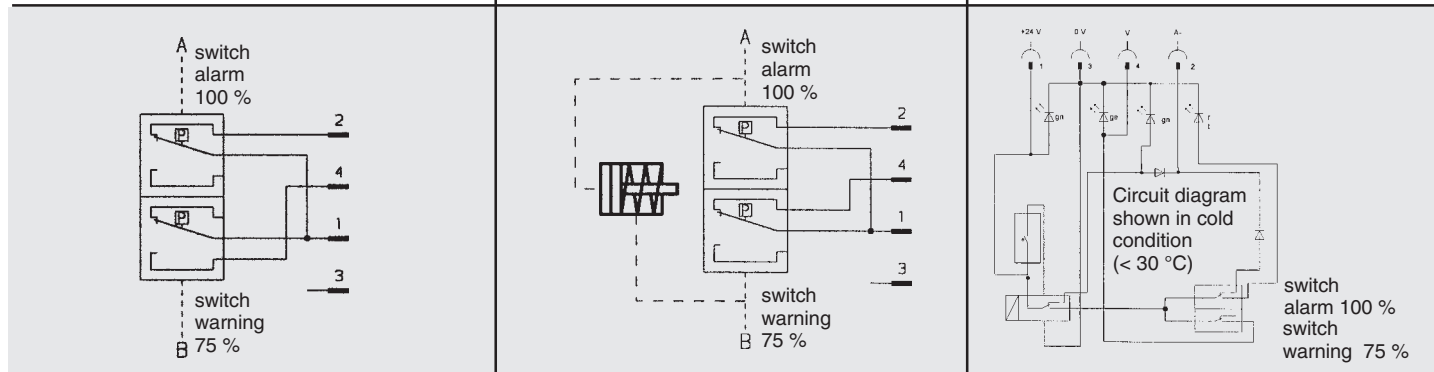
VMF 0.2 UF.0	VR 2 D.0/-LED	VMF 2 D.0/-LED (not illustrated)	VR 2 GC.0
MF/MFD, when used as suction filter	all RF, RFD, RFM (except size 75/165/185), NF/NFD...1.0	RFM 75/165/185	all RF, RFD, RFM (except size 75/165/185), NF/NFD...1.0
170 g	360 g	300 g	340 g
electrical	visual/electrical (visual = 2 light emitting diodes)		electronic-analogue (4-20 mA or 1-10 V) and 1 electr. switching contact at 75 % and at 100 % of the cracking pressure Analogue signal up to 20 % of the cracking pressure remains constant at 4 mA or 1 V. It then increases linearly with pressure up to 20 mA or 10 V.
- 0.2 bar \pm 0.1 bar	2 bar - 10 %		2 bar - 10 %
20 bar	40 bar		7 bar
- 30 °C to +100 °C	- 30 °C to +100 °C		- 30 °C to +80 °C
-	-		-
N/O contact	N/O contact		N/O or N/C contacts, electronic PNP positive switching
42 V	24 V		operating voltage 20 - 30 V DC
threaded connection	plug connection PG 11 socket to DIN 43650		7-pole plug connector to DIN 43651
60 W = 100 VA ~	250 W = 300 VA ~		12 W
ohmic 2.5 A at 24 V = ohmic 2.5 A at 42 V ~	ohmic 6 A at 24 V =		ohmic 0.4 A at 30 V =
IP 65, terminals IP 00	IP 65 (only if the plug is wired and fitted correctly)		IP 65 (only if the plug is wired and fitted correctly)


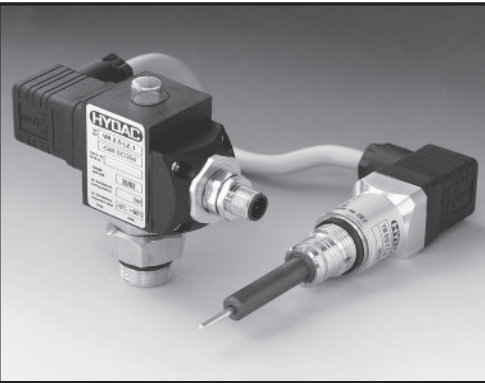
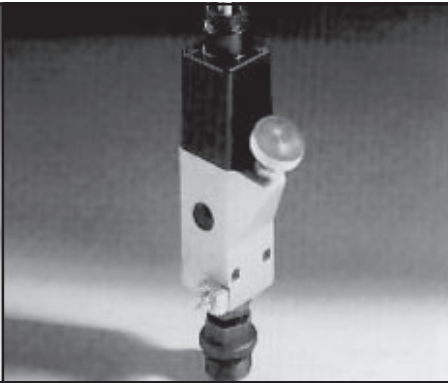
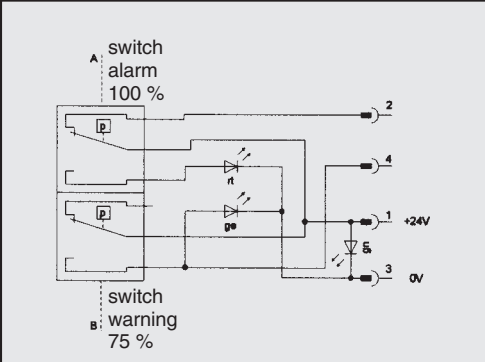
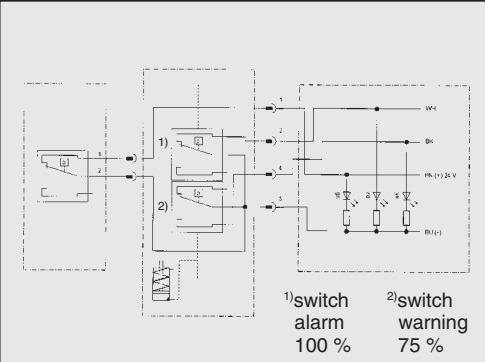
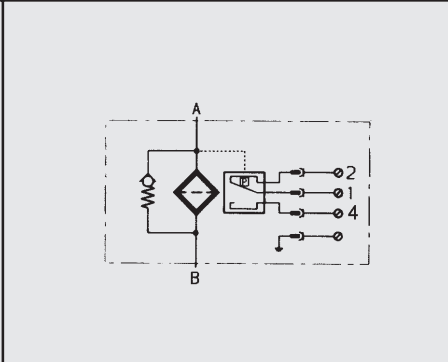


		
VR 2 LE.1	VR 2 LZ.1/-DB	VR 2 LZ.1/-CN
RF, RFD, RFM (except size 75/165/185) NF/NFD...1.0	RF, RFD, RFM (except size 75/165/185) NF/NFD...1.0	RF, RFD, RFM (except size 75/165/185) NF/NFD...1.0
143 g	190 g	190 g
visual, red pin and electrical switch 1 switching contact at 100 % of the cracking pressure	visual, red pin and 1 electr. switching contact at 75 % and at 100 % of the cracking pressure /-DB: 1 green LED constantly lit 1 yellow LED lit from 75 % 1 red LED lit from 100 % Δp	visual, red pin and 1 electr. switching contact at 75 % and at 100 % of the cracking pressure /-CN : 1 green LED goes out from 75 % Δp 1 yellow LED lit from 75 % 1 red LED lit from 100 % Δp
2 bar - 0.2 bar	2 bar - 0.2 bar	2 bar - 0.2 bar
7 bar	7 bar	7 bar
- 30 °C to +100 °C	- 30 °C to +100 °C	- 30 °C to +100 °C
-	-	-
N/O or N/C contacts, reed contacts (change-over contact)	N/O or N/C contacts, reed contacts (change-over contact)	N/O or N/C contacts, reed contacts (change-over contact)
115 V	24 V	24 V
plug connection, PG 11 socket to DIN 43650	plug connection, PG 11 socket to DIN 43651, with transparent housing and 3 built-in LED's	plug connection, PG 11 socket to DIN 43651, with transparent housing and 3 built-in LED's
15 W= max. 15 VA~	15 W= max. 15 VA~	15 W= max. 15 VA~
ohmic 1 A at 15 V = ohmic 1 A at 15 V ~	ohmic 1 A at 15 V = ohmic 1 A at 15 V ~	ohmic 1 A at 15 V = ohmic 1 A at 15 V ~
IP 65 (only if the plug is wired and fitted correctly)	IP 65 (only if the plug is wired and fitted correctly)	IP 65 (only if the plug is wired and fitted correctly)
		



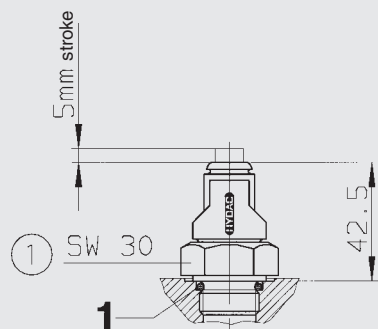
VR 2.5 LZ.1/-BO	VR 2.5 LZ.1/-AV	VR 2.5 LZ.1/-D4C	VMF 2.5 LZ.1/-D4C (not illustrated)
RFN, RFND, RF, RFD, RFM (except size 75/165/185) NF/NFD .. 1.0	RFN, RFND, RF, RFD, RFM (except size 75/165/185) NF/NFD .. 1.0	RFN, RFND, RF, RFD, RFM (except size 75/165/185) NF/NFD .. 1.0	RFM 75/165 /185, RFN 40/63/100
145 g	145 g	205 g	245 g
visual, red pin and 1 electr. switching contact at 75 % and at 100 % of the cracking pressure.	visual, red pin and 1 electr. switching contact at 75 % and at 100 % of the cracking pressure.	1 electr. switching contact at 75 % and at 100 % of the cracking pressure and suppression of the switching signal when operating temperature is below 30 °C 1 green LED constantly lit 1 yellow LED lit from 75 % 1 red LED lit from 100 % Δp	
2 bar or 2.5 bar -10 %	2 bar or 2.5 bar -10 %	2.5 bar -10 %	
7 bar	7 bar	7 bar	
- 10 °C to +100 °C	- 10 °C to +100 °C	- 10 °C to +100 °C	
-	-	-	
N/O contact (75 %) N/C contact (100 %)	N/C contact (75 % and 100 %)	N/O contact (75 %) N/C contact (100 %)	
24 V	24 V	24 V	
plug connection M 12 x 1	plug connection M 12 x 1	plug connection M 12 x 1	
15 W= max. 15 VA~	15 W= max. 15 VA~	15 W= max. 15 VA~	
ohmic 1 A at 15 V = ohmic 1 A at 15 V ~	ohmic 1 A at 15 V = ohmic 1 A at 15 V ~	ohmic 1 A at 15 V = ohmic 1 A at 15 V ~	
IP 67	IP 67	IP 67	



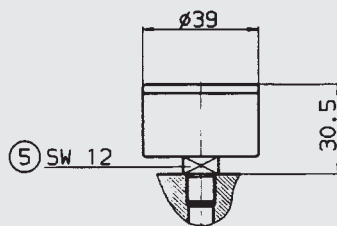
			
VR 2.5 LZ.1/-BO-LED		VMF 2.5 LZ.1/-BO-LED (not illustrated)	VR 2.5 LZ.1/-GM
RFN, RFND, RF, RFD, RFM (except size 75/165/185) NF/NFD .. 1.0		RFN (only size 250/500)	RF, RFD, RFM (except size 75/165/185) NF/NFD...1.0
200 g		290 g	305 g
1 electr. switching contact at 75 % and at 100 % of the cracking pressure 1 green LED constantly lit 1 yellow LED lit from 75% 1 red LED lit from 100% Δp		visual, red pin and 1 electr. switching contact at 75 % and at 100 % of the cracking pressure. Indicator function possible only in conjunction with the "No element" indicator.	electrical
2.5 bar -10 %		2.5 bar -10 %	2 bar ± 0.3 bar
7 bar		7 bar	200 bar
- 10 °C to +100 °C		- 10 °C to +100 °C	- 30 °C to +80 °C
-		-	-
N/O contact (75 %) N/C contact (100 %)			N/O or N/C contacts (change-over contact)
24 V		24 V	250 V
plug connection M 12 x 1		plug connection M 12 x 1	cable connection PG 9 cable length 2 m
15 W= max. 15 VA~		15 W= max. 15 VA~	62.5 W= 250 VA~
ohmic 1 A at 15 V = ohmic 1 A at 15 V ~		ohmic 1 A at 15 V = ohmic 1 A at 15 V ~	ohmic 0.25 A at 250 V = ohmic 1 A at 250 V ~
IP 67		IP 67	EEx d IICT6 (to EN 50014...50020)
			

1.3. DIMENSIONS - RETURN LINE INDICATORS

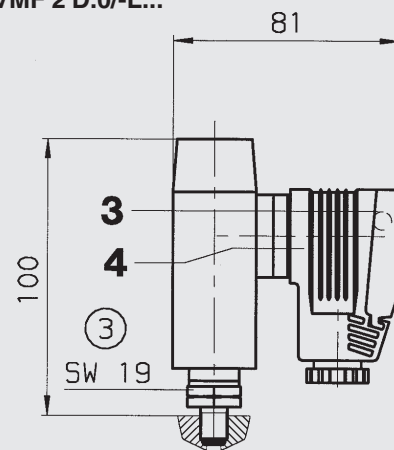
VR 2 B.1



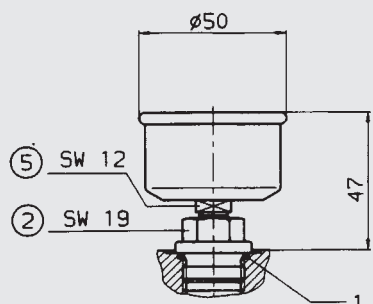
VMF 0.6 K.0



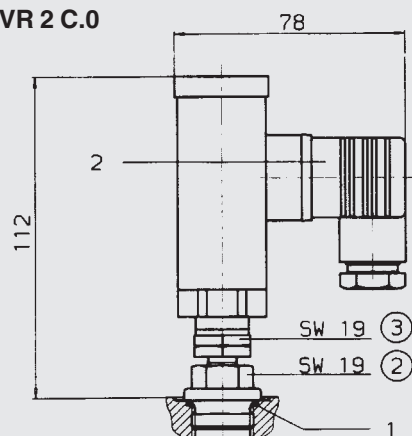
VMF 2 D.0/-L...



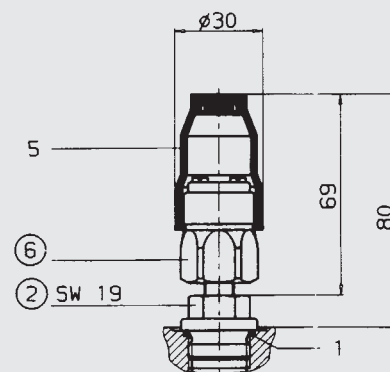
VR 2 E.0



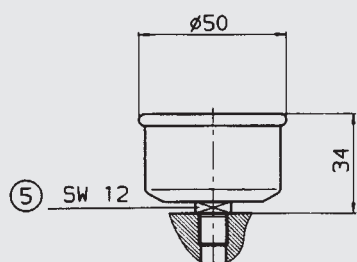
VR 2 C.0



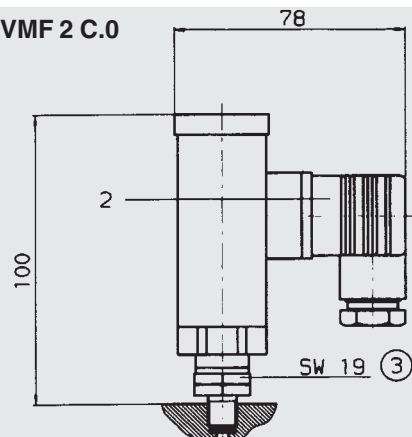
VR 2 F.0



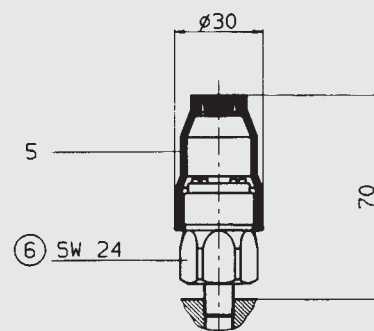
**VMF 2 E.0 / VMF 16 E.0
VMF 1U E.0**



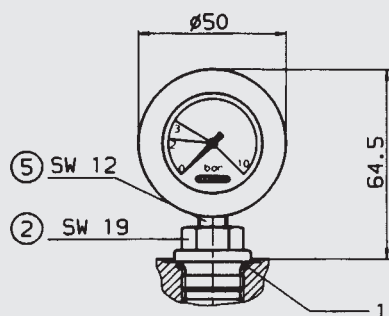
VMF 2 C.0



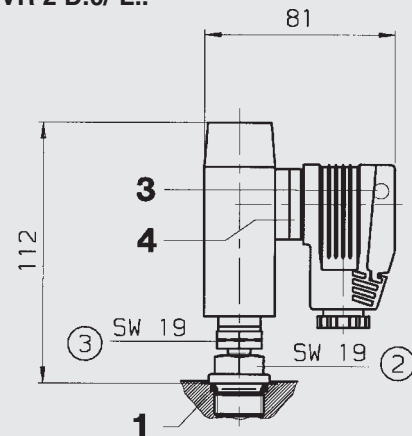
VMF 2 F.0



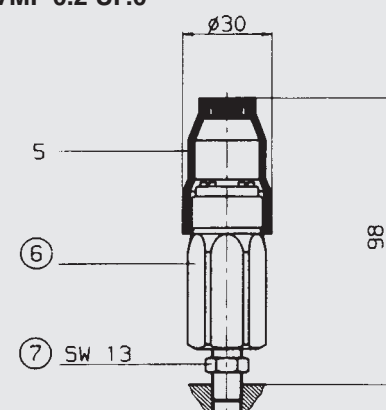
VR 2 ES.0



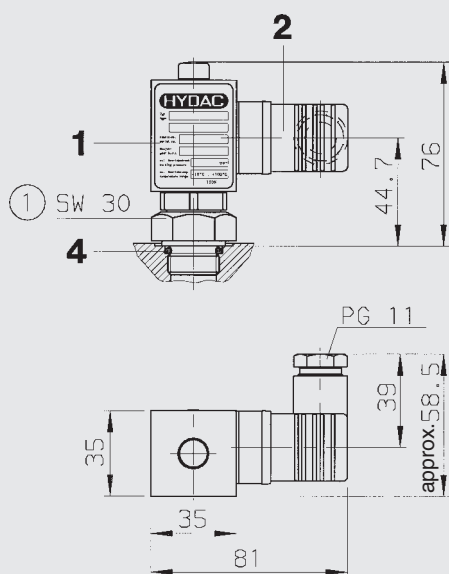
VR 2 D.0/-L..



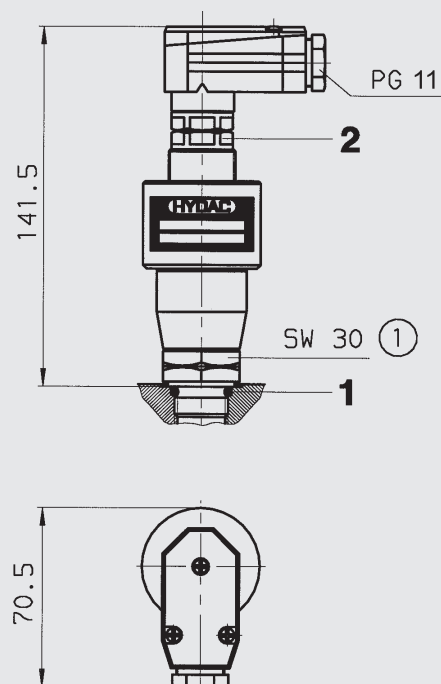
VMF 0.2 UF.0



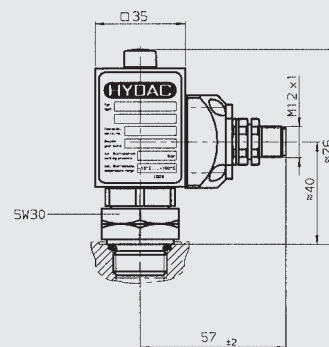
VR 2 LE.1



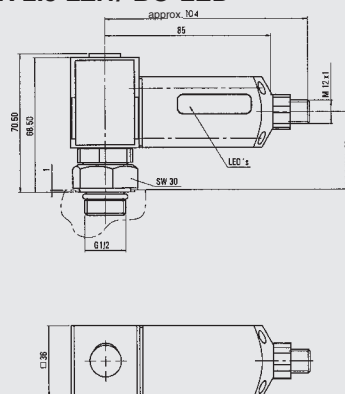
VR 2 GC.0



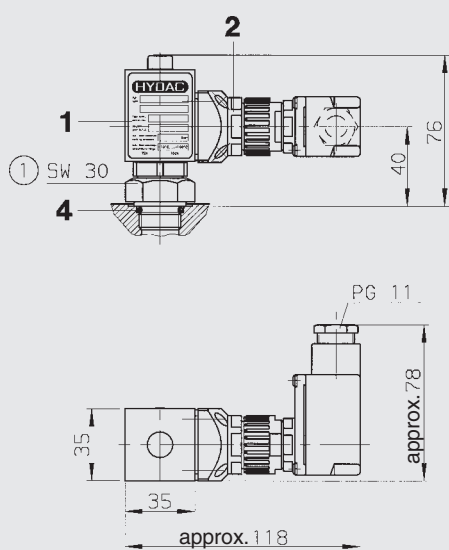
VR 2.5 LZ.1/-BO VR 2.5 LZ.1/-AV



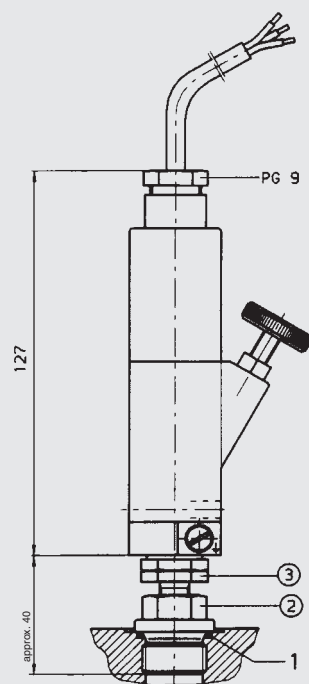
VR 2.5 LZ.1/-D4C VR 2.5 LZ.1/-BO-LED



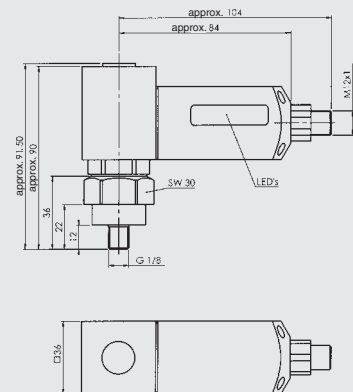
VR 2 LZ.1/-DB VR 2 LZ.1/-CN



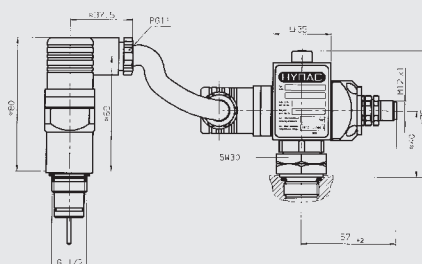
VR 2 C.0/-EX



VMF 2.5 LZ.1/-D4C VMF 2.5 LZ.1/-BO-LED



VR 2.5 LZ.1/-GM



1.4. TORQUE RATINGS - RETURN LINE INDICATORS

Please note: The clogging indicators must only be tightened/adjusted on the hexagon flats (SW) as stated below.

Model	Item	SW	Max. fitting torque (Nm)	Item	SW	Max. adjustment torque (Nm)	Threaded connection
VR 2 B.1	①	30	15	-	-	-	G 1/2
VR 2 E.0	②	19	30	⑤	12	15	G 1/2
VMF .. E.0	⑤	12	15	-	-	-	G 1/8
VMF 1 UE.0	⑤	12	15	-	-	-	G 1/8
VR 2 ES.0	②	19	30	⑤	12	15	G 1/2
VMF 0.6 K.0	⑤	12	15	-	-	-	G 1/8
VR 2 C.0	②	19	30	③	19	15	G 1/2
VMF 2 C.0	③	19	15	-	-	-	G 1/8
VR 2 D.0/-L ..	②	19	30	③	19	15	G 1/2
VMF 2 D.0/-L ..	③	19	15	-	-	-	G 1/8
VR 2 F.0	②	19	30	-	-	-	G 1/2
VMF 2 F.0	⑥	24	15	-	-	-	G 1/8
VMF 0.2 UF.0	⑦	13	15	-	-	-	G 1/8
VR 2 LE.1	①	30	15	-	-	-	G 1/2
VR 2 LZ.1/-DB	①	30	15	-	-	-	G 1/2
VR 2 LZ.1/-CN	①	30	15	-	-	-	G 1/2
VR 2 GC.2	①	30	15	-	-	-	G 1/2
VR 2 C.0/-EX	②	19	30	③	19	15	G 1/2
VR 2.5 LZ.1/-BO	①	30	15	-	-	-	G 1/2
VR 2.5 LZ.1/-AV	①	30	15	-	-	-	G 1/2
VR 2.5 LZ.1/-D4C	①	30	15	-	-	-	G 1/2
VR 2.5 LZ.1/-BO-LED	①	30	15	-	-	-	G 1/2
VR 2.5 LZ.1/-GM	①	30	15	-	-	-	G 1/2
VMF 2.5 LZ.1/-D4C	①	30	15	-	-	-	G 1/8
VMF 2.5 LZ.1/-BO-LED	①	30	15	-	-	-	G 1/8

1.5. SPARE PARTS LIST - RETURN LINE INDICATORS

	Item	1*	2	3	4	5
Model	Description	O-ring 18 x 2.5 NBR	Plug-E electrical	Light- insert-E	Plug-E visual/electr.	Safety cap 610307
VR 2 B.1		1	-	-	-	-
VR 2 E.0		1	-	-	-	-
VMF .. E.0		-	-	-	-	-
VMF 1 UE.0		-	-	-	-	-
VR 2 ES.0		1	-	-	-	-
VMF 0.6 K.0		-	-	-	-	-
VR 2 C.0		1	1	-	-	-
VMF 2 C.0		-	1	-	-	-
VR 2 D.0/-L ..		1	-	1	1	-
VMF 2 D.0/-L ..		-	-	1	1	-
VR 2 F.0		1	-	-	-	1
VMF 2 F.0		-	-	-	-	1
VMF 0.2 UF.0		-	-	-	-	1
VR 2 LE.1		1	1	-	-	-
VR 2 LZ.1/-DB		1	-	1	1	-
VR 2 LZ.1/-CN		1	-	1	1	-
VR 2 GC.2		1	1	-	-	-
VR 2 C.0/-EX		1	-	-	-	-
VR 2.5 LZ.1/-BO		1	1	-	-	-
VR 2.5 LZ.1/-AV		1	1	-	-	-
VR 2.5 LZ.1/-D4C		1	-	-	1	-
VR 2.5 LZ.1/-BO-LED		1	-	-	1	-
VR 2.5 LZ.1/-GM		1	1	-	-	-
VMF 2.5 LZ.1/-D4C		-	-	-	1	-
VMF 2.5 LZ.1/-BO-LED		-	-	-	1	-

*Item 1 only available as part of the "Seal kit E VD/VM/VR"

Order example: Item 4 plug E D.0/-L24

1.6. MODEL CODE

(also order example)

VR 2 GC . X / - V - 123

Return line indicator

VR clogging indicator
VMF clogging indicator

Cracking pressure of clogging indicator

0.2 - 0.2 bar (only for VMF.. UF indicator)
0.6 - 1.0 bar to + 0.6 bar (only for K indicator)
1 - 1.0 bar to 0 bar (only for VMF..UE indicator)
2 + 2.0 bar (for all, except K, UE, UF indicators)
2.5 + 2.5 bar (only for RFN/D)
16 + 16 bar (only for VMF..E indicator)

Cracking pressure of bypass valve must be taken into account.

Type of clogging indicator

B¹⁾ visual indicator
C electrical indicator
D visual/electrical indicator
E pressure gauge, horizontal
ES pressure gauge, vertical
F pressure switch
K pressure gauge, horizontal
LE visual mechanical indicator with 100 % switching contact
LZ visual mechanical indicator with 75 % and 100 % switching contact
GC electronic-analogue indicator
UE vacuum gauge, horizontal
UF vacuum switch

Modification number

X the latest version is always supplied

Supplementary details

without details = standard = NBR (Perbunan) seal
-V FPM (Viton) seal, indicator suitable for phosphate ester (HFD-R) and rapidly biodegradable oils
-W indicator suitable for oil-water emulsion (HFA, HFC)
-L24 light with 24 Volt supply
-L48 light with 48 Volt supply
-L110 light with 110 Volt supply
-L220 light with 230 Volt supply
-LED 2 light emitting diodes up to 24 Volt supply
-EX explosion-proof model only for model "C"

only for model "D"

Details for "LZ" model

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

Details for "GC" model

-SP analogue signal: voltage output 1-10 V
-SQ analogue signal: voltage output 4...20 mA (current source)] if SP or SQ not specified
] "current sink" model supplied
-113 N/O function pressure peak suppression up to 10 sec
cold start suppression of switching outputs
(PNP technique, positive switching)
up to 25 °C
-123 N/C function pressure peak suppression up to 10 sec
cold start suppression of switching outputs
(PNP technique, positive switching)
up to 25 °C
-LED 3 LEDs (red, green, yellow) in terminal box
-PF floating switching outputs (due to relay in the plug)
-30C cold start suppression of switching outputs up to 30 °C
(other temperatures on request)

must be specified

¹⁾ for model VMF, please contact our sales/technical department

INDEX	Page:
2. DIFFERENTIAL PRESSURE INDICATORS	16
2.1. DESCRIPTION	16
2.1.1. General	16
2.1.2. Selection table	17
2.2. TECHNICAL SPECIFICATIONS	17-23
2.3. DIMENSIONS	24
2.4. TORQUE RATINGS	26
2.5. SPARE PARTS LIST	26
2.6. MODEL CODE	27
3. ADAPTORS FOR CLOGGING INDICATORS	28
4. DESINA SPECIFICATION	29
5. NOTE	29

2. DIFFERENTIAL PRESSURE INDICATORS

2.1. DESCRIPTION

2.1.1. **General**

Differential pressure indicators are used for all inline filters and react to the increasing pressure differential caused by increasing contamination of the filter element.

On standard models the sealing material is NBR (Perbunan). All standard filters can be fitted with an indicator at any time by simply screwing it in.

(EXCEPTION: The differential pressure indicator, type V02 must be fitted separately inline!)

2.1.2. Selection table - Differential pressure indicators
Pressure setting (given in bar)

Designation	suitable for filter types										
	RFL RFLD	LF MDF	NF/NFD 2.0, 3.0	DFF DFG	DF..MA DF..QE	DF..P	DF DFN	DFDK	DFZ	LFN LFNF	FLN FLND FMND
VM .. B.1	2	5			5					5	5
VD .. B.1				8	5		5	8			
VM .. BM.1	2	5	2		5					5	5
VD .. BM.1				8	5	5	5	8	8		
VM .. C.0	2	5	2		5					5	5
VD .. C.0				8	5	5	5	8	8		
VM .. D.0/-L	2	5	2		5					5	5
VD .. D.0/-L				8	5	5	5	8	8		
VD .. GC.0	2	5	2	8	5	5	5	8	8		
VD .. LE.1	2	5	2	8	5	5	5	8	8	5	5
VD .. LZ.1/-DB	2	5	2	8	5	5	5	8	8	5	5
VD .. LZ.1/-CN	2	5	2	8	5	5	5	8	8	5	5
VRD 1 UE.0 ¹⁾	-1	-1									
VRD 0.2 UF.0 ¹⁾	-0,2	-0,2									
V02 .. V.0	2										
V02 .. VE.0	2										
V02 .. VZ.0	2										
VD .. LZ.1/-BO	2	5	2	8	5	5	5	8	8	5	5
VD .. LZ.1/-AV	2	5	2	8	5	5	5	8	8	5	5
VD .. LZ.1/-D4C	2	5	2	8	5	5	5	8	8	5	5
VD .. LZ.1/-BO-LED	2	5	2	8	5	5	5	8	8	5	5

¹⁾ only when used in suction applications

2.2. TECHNICAL SPECIFICATIONS
2.2.1. Differential pressure indicators






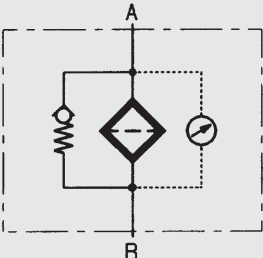
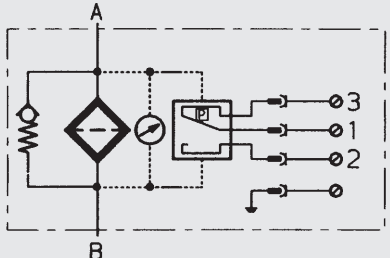
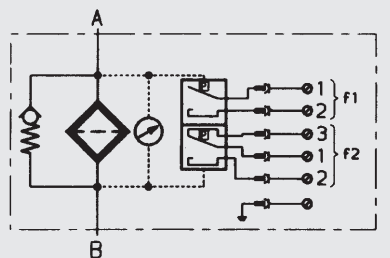
General details					
Designation of clogging indicator	VM..B.1	VM..BM.1 (not illustrated)	VD..B.1 (not illustrated)	VD..BM.1	VRD 1 UE.0
Suitable for filter types	all RFL, RFLD, LF, MDF, DF..MA	all RFL/RFLD, LF, MDF, DF..MA NF 1310/2610..2.0 NF 1310/2610..3.0,	all DF, DFF, DFG, DF..QE, DFDK	all DF, DFF, DFG, DF..QE, DF..P, DF..Z, DFDK	all RFL/ RFLD, LF, MDF when used as suction filter
Weights	55 g	55 g	110 g	110 g	180 g
Type of indication	visual, green-red display automatic re-set manual re-set		visual, green-red display automatic re-set manual re-set		visual-analogue, scale white, graduated
Hydraulic details					
Cracking pressure/ indication range	2 bar - 10% 5 bar - 10% 8 bar ± 10%	for standard cracking pressure, see housing brochure	5 bar - 10% 8 bar ± 10%	for standard cracking pressure, see housing brochure	- 1 bar to 0 bar
Permissible operating pressure	210 bar		420 bar		- 0.7 to + 0.4 bar -continuous
Permissible temperature range ¹⁾	- 30 °C to +100 °C		- 30 °C to +100 °C		- 20 °C to +60 °C
Accuracy class	-				1.6
Electrical details					
Switching type	-		-		-
Max. switching voltage	-		-		-
Electrical connection	-		-		-
Max. switching output at resistive load	-		-		-
Switching capacity ²⁾	-		-		-
Safety type (to DIN 40050)	-		-		-
Symbols					

¹⁾ Only NBR (Perbunan) seals can be used in the temperature range - 30 °C to - 10 °C.
²⁾ High voltage peaks sometimes occur when inductances are switched off. Therefore the use of protection diodes should be considered.



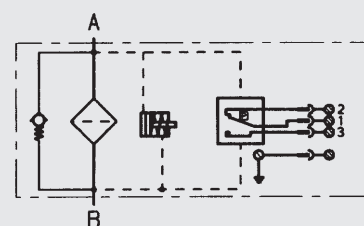
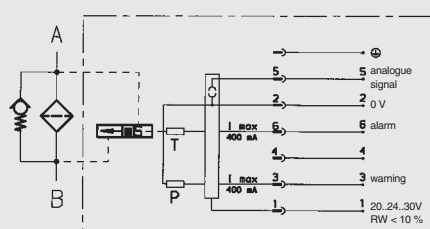
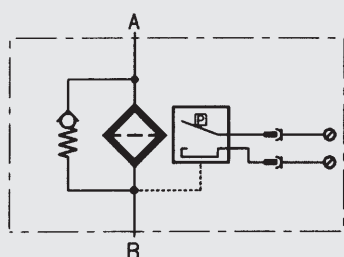
VM..C.0	VD..C.0	VM..D.0/-L...	VD..D.0/-L..	VM..D.0/-LED	VD..D.0/-LED
all RFL/ RFLD, LF, MDF, DF..MA, NF 1310/2610..2.0, NF 1310/2610..3.0	all DF, DFF, DFG, DF..QE, DF..P, DF..Z, DFDK	all RFL/ RFLD, LF, MDF, DF..MA, NF 1310/2610..2.0,	all DF, DFF, DFG, DF..QE, DF..P, DF..Z, DFDK	all RFL/ RFLD, LF, MDF, DF..MA, NF 1310/2610..2.0, NF 1310/2610..3.0	all DF, DFF, DFG, DF..QE, DF..P, DF..Z, DFDK
120 g	220 g	150 g	250 g	150 g	250 g
electrical		visual/electrical (visual = light)		visual/electrical (visual = 2 light emitting diodes)	
$\left[\begin{array}{l} 2 \text{ bar} - 10 \% \\ 5 \text{ bar} - 10 \% \\ 8 \text{ bar} \pm 10 \% \end{array} \right]^*$		$\left[\begin{array}{l} 2 \text{ bar} - 10 \% \\ 5 \text{ bar} - 10 \% \\ 8 \text{ bar} \pm 10 \% \end{array} \right]^*$		$\left[\begin{array}{l} 2 \text{ bar} - 10 \% \\ 5 \text{ bar} - 10 \% \\ 8 \text{ bar} \pm 10 \% \end{array} \right]^*$	
210 bar	420 bar	210 bar	420 bar	210 bar	420 bar
- 30 °C to +100 °C		- 30 °C to +100 °C		- 30 °C to +100 °C	
-		-		-	
N/O or N/C contacts (change-over contact)		N/O or N/C contacts (change-over contact)		N/O contact	
230 V		24 V, 48 V, 110 V, 230 V depending on type of light insert		24 V	
plug connection, PG 11, socket to DIN 43650		plug connection, PG 11, socket to DIN 43650		plug connection, PG 11, socket to DIN 43650	
60 W = 100 VA~		60 W = 100 VA~		60 W = 100 VA~	
ohmic 3 A at 24 V = ohmic 0.03 to 6 A at max. 230 V ~		ohmic 3 A at 24 V = ohmic 0.03 to 6 A at max. 230 V ~		ohmic 3 A at 24 V =	
IP 65 (only if the plug is wired and fitted correctly)		IP 65 (only if the plug is wired and fitted correctly)		IP 65 (only if the plug is wired and fitted correctly)	

* for standard cracking pressure, see housing brochure

		
V02..V.0	V02..VE.0	V02..VZ.0
RFL/RFLD 2500-15000, for other types, please contact our sales/techn. department	RFL/RFLD 2500-15000, for other types, please contact our sales/techn. department	RFL/RFLD 2500-15000 for other types, please contact our sales/techn. department
580 g	640 g	650 g
visual-analogue	visual-analogue and 1 electrical switching contact at 100 % of the cracking pressure.	visual-analogue and 1 electrical switching contact at 75 % and at 100 % of the cracking pressure.
0.8 bar $\pm 10\%$ 2.0 bar $\pm 10\%$ 4.3 bar $\pm 10\%$	0.8 bar $\pm 10\%$ 2.0 bar $\pm 10\%$ 4.3 bar $\pm 10\%$	0.8 bar $\pm 10\%$ 2.0 bar $\pm 10\%$ 4.3 bar $\pm 10\%$
160 bar	160 bar	160 bar
- 30 °C to +100 °C	- 30 °C to +100 °C	- 30 °C to +100 °C
-	-	-
-	100% contact change-over contact	75% - contact, N/O 100% - contact, change-over contact
-	250V	250 V
-	threaded connection, PG 11	threaded connection, PG 11
-	100% contact 30 W = / 60 VA ~	75%-contact 120 W = / 120 VA ~ 100%-contact 30 W = / 60 VA ~
-	ohmic 2.5 A at 24 V = ohmic 1 A at 220 V ~	ohmic 2.5 A at 24 V = ohmic 1 A at 250 V ~
-	IP 55	IP 55
		



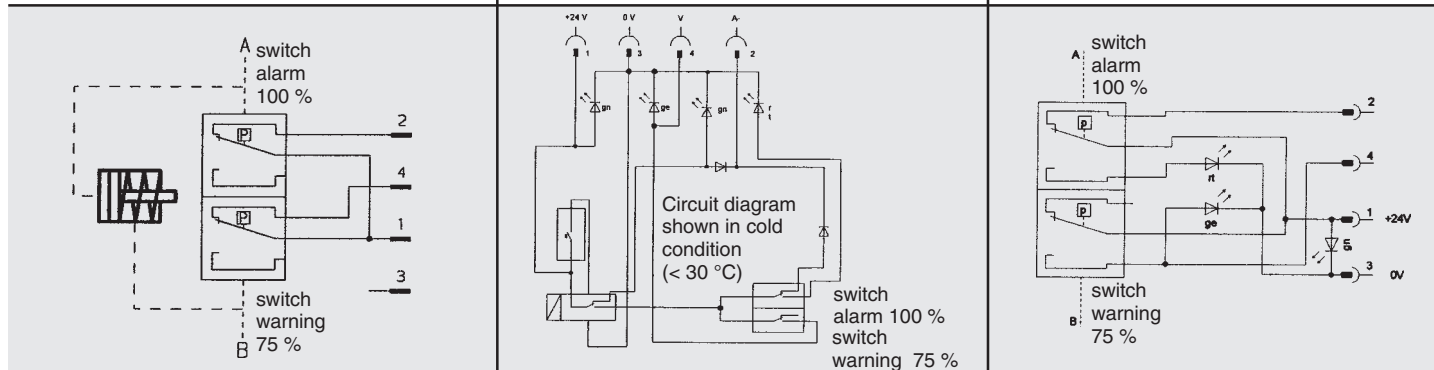
VRD 0.2 UF.0	VD..GC.0	VD..LE.1
all RFL/RFLD, LF, MDF, when used as suction filter	DF, LF, MDF, DFDK, DF..P, DFZ, DF..MA, DFF, DFG, RFL, RFLD, NF 1310/2610..2.0 NF 1310/2610..3.0	DF, LF, MDF, DFDK, DF..P, DFZ, DF..MA, DFF, DFG, RFL, RFLD, NF 1310/2610..2.0 NF 1310/2610..3.0
250 g	400 g	198 g
electrical	electronic-analogue (4-20 mA or 1-10 V) and 1 electrical switching contact at 75 % and at 100 % of the cracking pressure. Analogue signal up to 20 % of the cracking pressure remains constant at 4 mA or 1 V. It then increases linearly with pressure up to 20 mA or 10 V.	visual, red pin and electrical switch 1 electrical switching contact at 100 % of the cracking pressure.
-0.2 bar \pm 0.1 bar	2 bar - 10 % 5 bar - 10 % 8 bar - 10 %	2 bar - 10 % 5 bar - 10 % 8 bar - 10 %
20 bar	420 bar	420 bar
- 30 °C to +100 °C	- 30 °C to +80 °C	- 30 °C to +100 °C
-	-	-
N/O contact	N/O or N/C contacts, electronic PNP positive switching	N/O or N/C contacts, reed contacts (change-over contact)
42 V	operating voltage 20 - 30 V DC	115 V
threaded connection	7-pole plug connector to DIN 43651	plug connection PG 11, socket to DIN 43650
60 W = 100 VA~	12 W	15 W = max. 15 VA~
ohmic 2.5 A at 24 V = ohmic 2.5 A at 42 V ~	ohmic 0.4 A at 30 V =	ohmic 1 A at 15 V = ohmic 1 A at 15 V ~
IP 65 terminals IP 00	IP 65 (only if the plug is wired and fitted correctly)	IP 65 (only if the plug is wired and fitted correctly)



VD..LZ.1/-DB	VD..LZ.1/-CN	VD..LZ.1/-BO
DF, LF, MDF, DFDK, DF..P, DFZ, DF..MA, DFF, DFG, RFL, RFLD, NF 1310/2610..2.0 NF 1310/2610..3.0	DF, LF, MDF, DFDK, DF..P, DFZ, DF..MA, DFF, DFG, RFL, RFLD, NF 1310/2610..2.0 NF 1310/2610..3.0	DF, LFN, LFNF, FLN, FLND, FMND, DF, LF, MDF, DFDK, DP..P, DFZ, DF..MA, DFF, DFG, RFL, RFLD, NF 1310/2610 .. 2.0, NF 1310/2610 .. 3.0
245 g	245 g	197 g
visual, red pin and 1 electr. switching contact at 75 % and at 100 % of the cracking pressure 1 green LED constantly lit 1 yellow LED lit from 75 % 1 red LED lit from 100 % Δp	visual, red pin and 1 electr. switching contact at 75 % and at 100 % of the cracking pressure 1 green LED goes out from 75 % 1 yellow LED lit from 75 % 1 red LED lit from 100 % Δp	visual, red pin and 1 electrical switching contact at 75 % and at 100 % of the cracking pressure.
2 bar - 10 % 5 bar - 10 % 8 bar - 10 %	2 bar - 10 % 5 bar - 10 % 8 bar - 10 %	2 bar - 10 % 5 bar - 10 % 8 bar - 10 %
420 bar	420 bar	420 bar
- 30 °C to +100 °C	- 30 °C to +100 °C	- 10 °C to +100 °C
-	-	-
N/O or N/C contacts, reed contacts (change-over contact)	N/O or N/C contacts, reed contacts (change-over contact)	N/O contact (75 %) N/C contact (100 %)
24 V	24 V	24 V
plug connection, PG 11 socket to DIN 43651, with transparent housing and 3 built-in LEDs	plug connection, PG 11 socket to DIN 43651, with transparent housing and 3 built-in LEDs	plug connection M 12 x 1
15 W = max. 15 VA~	15 W = max. 15 VA~	15 W = max. 15 VA~
ohmic 1 A at 15 V = ohmic 1 A at 15 V ~	ohmic 1 A at 15 V = ohmic 1 A at 15 V ~	ohmic 1 A at 15 V = ohmic 1 A at 15 V ~
IP 65 (only if the plug is wired and fitted correctly)	IP 65 (only if the plug is wired and fitted correctly)	IP 65

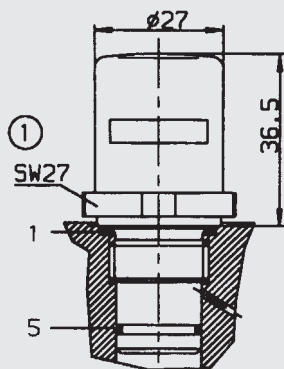


VD..LZ.1/-AV	VD..LZ.1/-D4C	VD..LZ.1/-BO-LED
DF, LFN, LFNF, FLN, FLND, FMND, DF, LF, MDF, DFDK, DP..P, DFZ, DF..MA, DFF, DFG, RFL, RFLD, NF 1310/2610 .. 2.0, NF 1310/2610 .. 3.0	DF, LFN, LFNF, FLN, FLND, FMND, DF, LF, MDF, DFDK, DP..P, DFZ, DF..MA, DFF, DFG, RFL, RFLD, NF 1310/2610 .. 2.0, NF 1310/2610 .. 3.0	DF, LFN, LFNF, FLN, FLND, FMND, DF, LF, MDF, DFDK, DP..P, DFZ, DF..MA, DFF, DFG, RFL, RFLD, NF 1310/2610 .. 2.0, NF 1310/2610 .. 3.0
197 g	256 g	250 g
visual, red pin and 1 electrical switching contact at 75 % and at 100 % of the cracking pressure	1 electrical switching contact at 75 % and at 100 % of the cracking pressure and suppression of the switching signal when operating temperature is below 30°C 1 green LED constantly lit 1 yellow LED lit from 75 % 1 red LED lit from 100 % Δp	1 electrical switching contact at 75 % and at 100 % of the cracking pressure 1 green LED constantly lit 1 yellow LED lit from 75 % 1 red LED lit from 100 % Δp
2 bar - 10 % 5 bar - 10 % 8 bar - 10 %	2 bar - 10 % 5 bar - 10 % 8 bar - 10 %	2 bar - 10 % 5 bar - 10 % 8 bar - 10 %
420 bar	420 bar	420 bar
- 10 °C to +100 °C	- 10 °C to +100 °C	- 10 °C to +100 °C
-	-	-
N/C contact (75 % and 100 %)	N/O contact (75 %) N/C contact (100 %)	N/O contact (75 %) N/C contact (100 %)
24 V	24 V	24 V
plug connection M 12 x 1	plug connection M 12 x 1	plug connection M 12 x 1
15 W = max. 15 VA~	15 W = max. 15 VA~	15 W = max. 15 VA~
ohmic 1 A at 15 V = ohmic 1 A at 15 V ~	ohmic 1 A at 15 V = ohmic 1 A at 15 V ~	ohmic 1 A at 15 V = ohmic 1 A at 15 V ~
IP 65	IP 65	IP 65

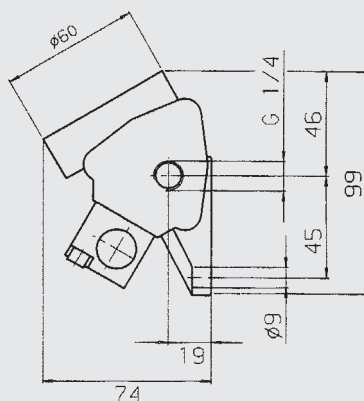


2.3. DIMENSIONS - DIFFERENTIAL PRESSURE INDICATORS

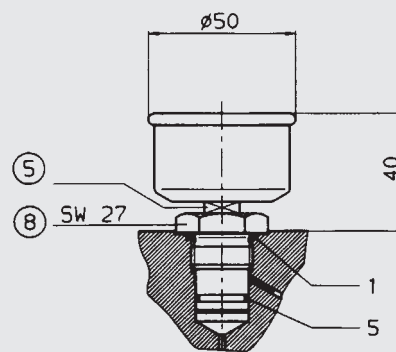
**VM..B.1
VD..B.1**



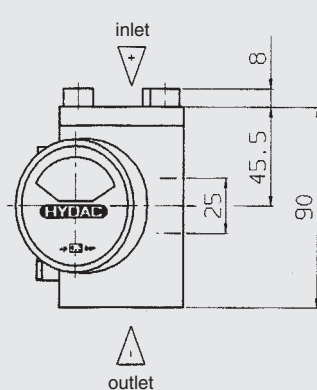
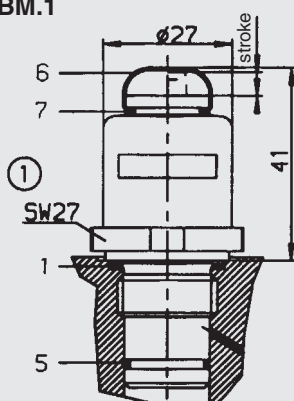
**V02..VE.0
V02..VZ.0**



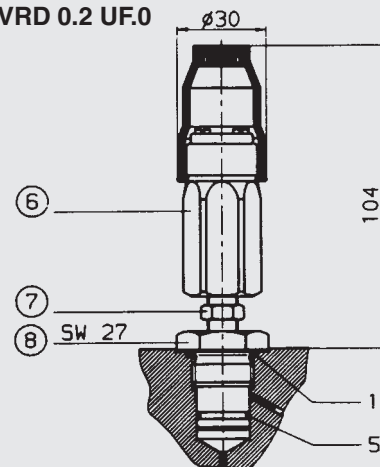
VRD 1 UE.0



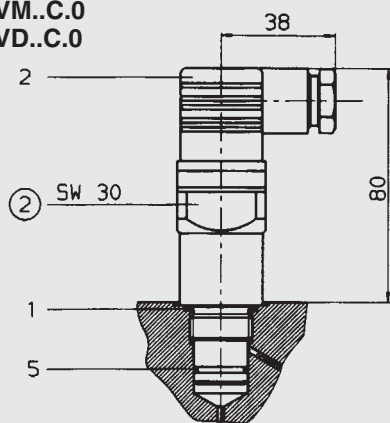
**VM..BM.1
VD..BM.1**



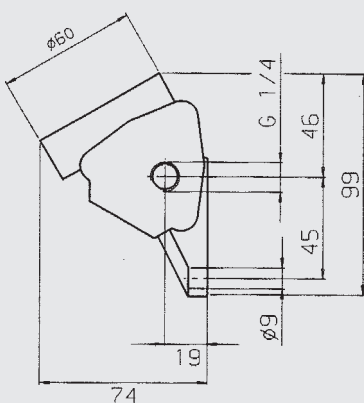
VRD 0.2 UF.0



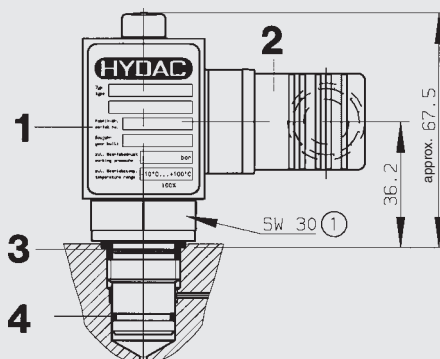
**VM..C.0
VD..C.0**



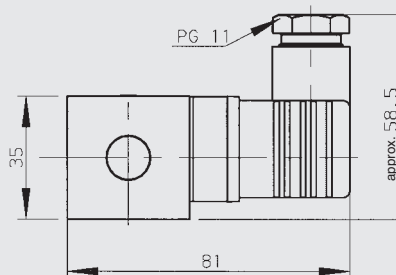
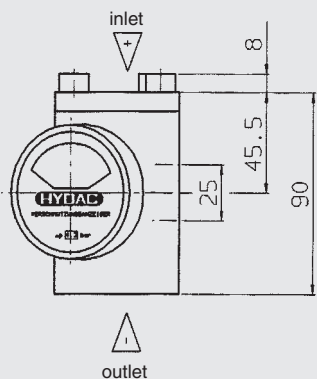
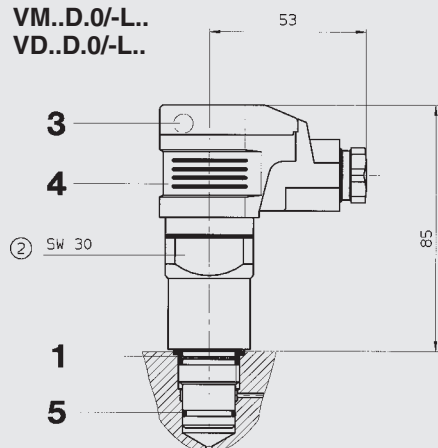
V02..V.0



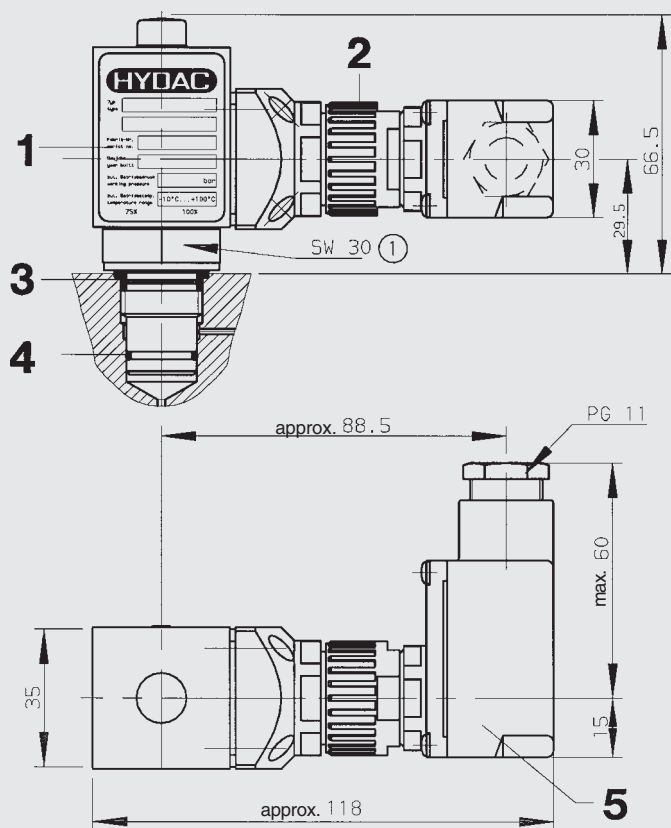
VD..LE.1



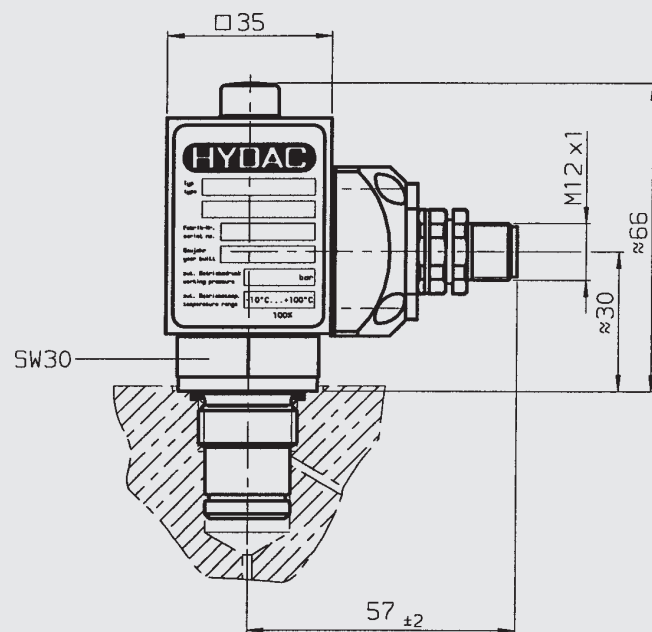
**VM..D.0/-L..
VD..D.0/-L..**



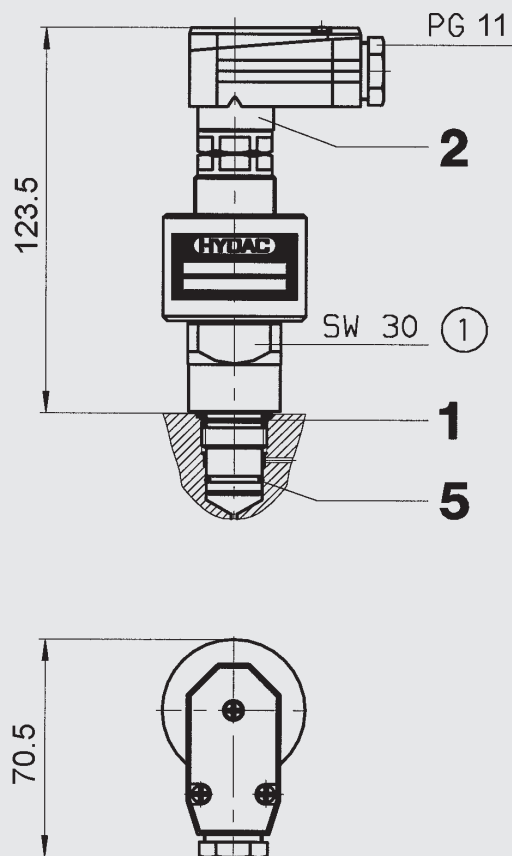
VD..LZ.1/-DB
VD..LZ.1/-CN



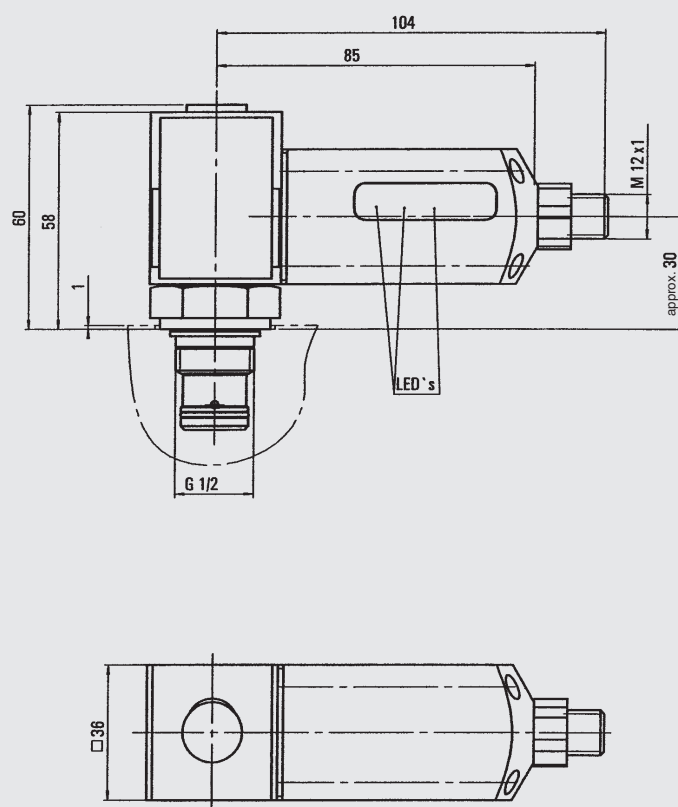
VD..LZ.1/-BO
VD..LZ.1/-AV



VD..GC.0



VD..LZ.1/-D4C
VD..LZ.1/-BO-LED



2.4. TORQUE RATINGS - DIFFERENTIAL PRESSURE INDICATORS

Please note:

The clogging indicators must only be tightened/adjusted on the hexagon flats (SW) as stated below.

Model	Item	SW	Max. torque (Nm)
VM .. B.1	①	27	33
VD .. B.1	①	27	100
VM .. BM.1	①	27	33
VD .. BM.1	①	27	100
VM .. C.0	②	30	33
VD .. C.0	②	30	100
VM .. D.0/-L..	②	30	33
VD .. D.0/-L..	②	30	100
VD .. GC.0	①	30	100 (33) ³⁾
VD .. LE.1	①	30	50 (33) ³⁾
VD .. LZ.1/-DB	①	30	50 (33) ³⁾
VD .. LZ.1/-CN	①	30	50 (33) ³⁾
VRD .. UE.0	⑧	30	33
VRD .. UF.0	⑧	27	33
VD .. LZ.1/-BO	①	30	50 (33) ³⁾
VD .. LZ.1/-AV	①	30	50 (33) ³⁾
VD .. LZ.1/-D4C	①	30	50 (33) ³⁾
VD .. LZ.1/-BO-LED	①	30	50 (33) ³⁾

2.5. SPARE PARTS LIST - DIFFERENTIAL PRESSURE INDICATORS

Item	1 ¹⁾	1 ²⁾	2	3	4	5 ¹⁾	6 ¹⁾	7 ¹⁾
Model	Seal ring 411600 NBR	Seal ring 1202776 PTFE special	Plug-E electrical	Light insert-E D.0/-L..	Plug-E visual/ electr.	O-ring NBR	Trans- parent cap	O-ring 15 x 1.5 Si
VM .. B.1	1	-	-	-	-	15 x 1.5	-	-
VD .. B.1	-	1	-	-	-	15 x 1.5	-	-
VM .. BM.1	1	-	-	-	-	15 x 1.5	1	1
VD .. BM.1	-	1	-	-	-	15 x 1.5	1	1
VM .. C.0	1	-	1	-	-	15 x 1.5	-	-
VD .. C.0	-	1	1	-	-	15 x 1.5	-	-
VM .. D.0/-L..	1	-	-	1	1	15 x 1.5	-	-
VD .. D.0/-L..	-	1	-	1	1	15 x 1.5	-	-
VD .. GC.0	-	1	1	-	-	15 x 1.5	-	-
VD .. LE.1	1	-	1	-	-	16 x 1	-	-
VD .. LZ.1/-DB	1	-	-	1	1	16 x 1	-	-
VD .. LZ.1/-CN	1	-	-	1	1	16 x 1	-	-
VRD .. UE.0	1	-	-	-	-	15 x 1.5	-	-
VRD .. UF.0	1	-	-	-	-	15 x 1.5	-	-
VD .. LZ.1/-BO	1	-	1	-	-	16 x 1	-	-
VD .. LZ.1/-AV	1	-	1	-	-	16 x 1	-	-
VD .. LZ.1/-D4C	1	-	-	-	1	16 x 1	-	-
VD .. LZ.1/-BO-LED	1	-	-	-	1	16 x 1	-	-

¹⁾ Only available as complete seal kit
Order example: Item 4 plug E D.0/-L24

²⁾ Assembly tool required

³⁾ In aluminium heads

2.6. MODEL CODE

(also order example)

VD 5 GC . X / - V - 123

Differential pressure indicator

- VM clogging indicator
- VD clogging indicator
- V02 clogging indicator (fit separately inline)
- VRD clogging indicator

Cracking pressure of clogging indicator

- 0.2 - 0.2 bar (only for VRD..UF indicator)
- 1 - 1.0 bar to 0 bar (only for VRD..UE indicator)
- 0.8 + 0.8 bar (only for V, VE, VZ indicators)
- 2 + 2.0 bar (for all, except UE, UF indicators)
- 4.3 + 4.3 bar (only for V, VE, VZ indicators)
- 5 + 5.0 bar (only for B, C, D, GC, LE, LZ indicators)
- 8 + 8.0 bar (only for B, C, D, GC, LE, LZ indicators)

Type of clogging indicator

- B¹⁾ visual indicator with automatic re-set
- BM visual indicator with manual re-set
- C electrical indicator
- D visual/electrical indicator
- LE visual mechanical indicator with 100 % switching contact
- LZ visual mechanical indicator with 75 % and 100 % switching contact
- V visual/analogue indicator
- VE visual/analogue indicator with 100 % switching contact
- VZ visual/analogue indicator with 75 % and 100 % switching contact
- GC electronic-analogue indicator
- UE vacuum gauge, horizontal (only for VRD indicator)
- UF vacuum switch (only for VRD indicator)

¹⁾ only for vertical installation

Modification number

- X the latest version is always supplied

Supplementary details

without details = standard = NBR (Perbunan) seal

-V FPM (Viton) seal, indicator suitable for phosphate ester (HFD-R) and rapidly biodegradable oils

-W indicator suitable for oil-water emulsion (HFA, HFC)

-L24 light with 24 Volt supply

-L48 light with 48 Volt supply

-L110 light with 110 Volt supply

-L220 light with 230 Volt supply

-LED 2 light emitting diodes up to 24 Volt supply

only for model "D"

-30C cold start suppression of switching outputs up to 30 °C ± 5 °C

(only for C, D and LZ models; DC supply voltage only; on D indicators, contacts must be wired normally open only)

-S0135 indicator suitable for programmable logic controls via Gold-Crosspoint contacts (only for C and D models)

Details for "LZ" model

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

Details for "GC" model

- SP analogue signal: voltage output 1-10 V
 - SQ analogue signal: voltage output 4 ... 20 mA (current source)
- if SP or SQ not specified
"current sink" model supplied

-113 N/O function

-123 N/C function

pressure peak suppression up to 10 sec
cold start suppression of switching outputs
(PNP technique, positive switching)
up to 25 °C

must be specified

-LED 3 LEDs (red, green, yellow) in terminal box

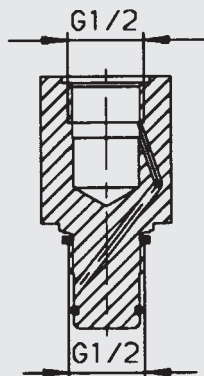
-PF floating switching outputs (due to relay in the plug)

-30C cold start suppression of switching outputs up to 30 °C (other temperatures on request)

3. ADAPTORS FOR CLOGGING INDICATORS

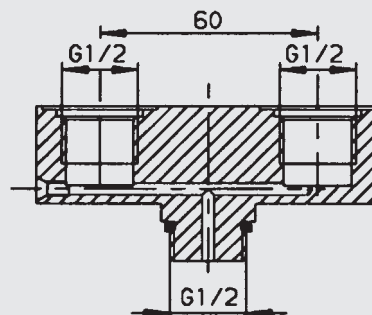
VD-D-S.0

DF..QE with
VD..GC-indicator



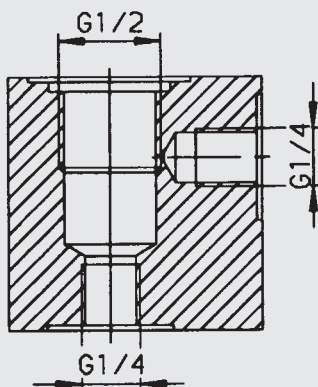
VR-R+R-S+S.0

RF, RFD



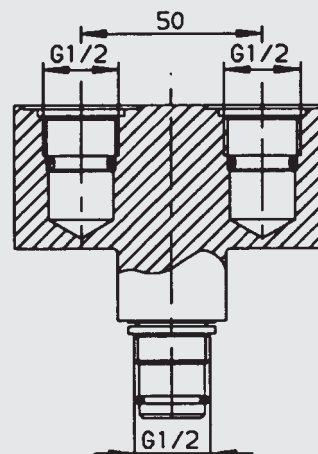
V 1/4 I-D-S.0

RFL/RFLD,
external mounting of
differential pressure indicators



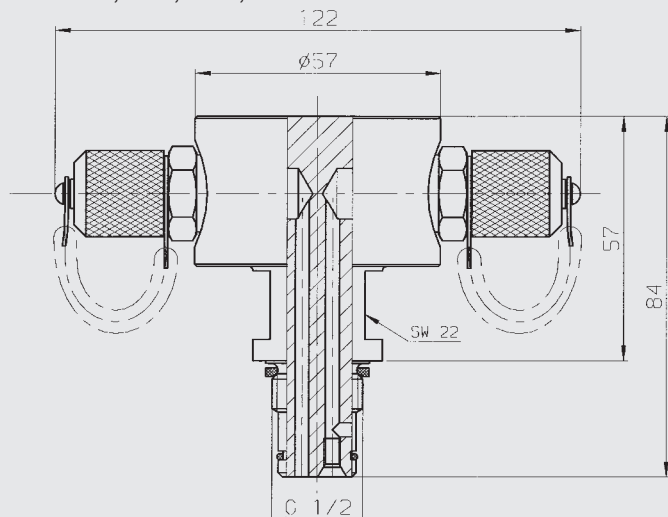
VD-D+D-S+S.0

LF, MDF, DF, NF...2.0/3.0
NFD...2.0, DFF, DFG, DF..MA



VD-1/4-1/4-W+W+W.0 /-00404337

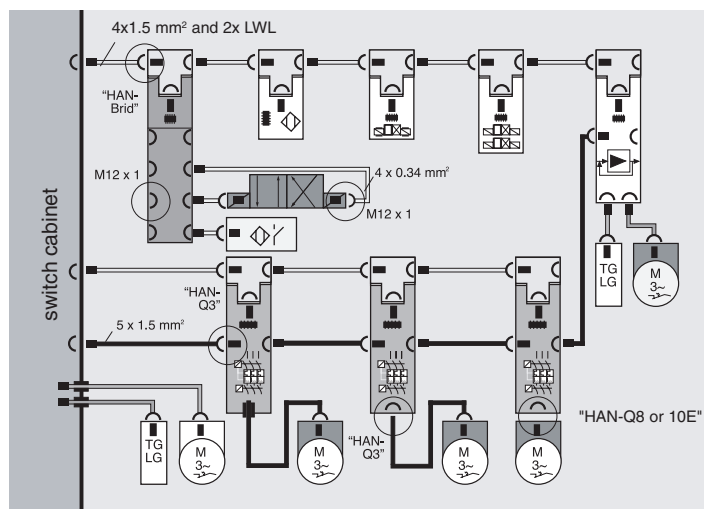
LF, MDF, DF, NF...2.0/3.0,
NFD...2.0, DFF, DFG, DF..MA



4. DESINA SPECIFICATION

DESINA is a fully comprehensive system intended to bring standardisation and decentralisation to the field of fluid technology and to electrical installation of machinery and systems. The system engineering, automotive and supply industries have worked together to draw up specifications of the necessary components. DESINA makes use of tried-and-tested solutions, such as open bus systems, standard industrial plugs etc. By standardising components, interfaces and connection systems, such as a hybrid field bus cable (Cu/LWL), a wide range of different field bus systems can be made compatible on a single physical base.

4.1. TOTAL CONCEPT FOR MACHINE TOOL INSTALLATION



4.2. CLOGGING INDICATORS

The following clogging indicators are approved to DESINA specification:

Type
VD 5 LZ.1 /-D4C
VR 2.5 LZ. 1 /-D4C
VD 5 LZ.1 /-BO
VR 2.5 LZ. 1 /-BO
VD 5 LZ. 1 /-AV
VR 2.5 LZ. 1 /-AV
VR 2.5 LZ. 0 /-GM

all with M12 x 1 connector



The DESINA logo is shown on the type code label of approved clogging indicators.

5. NOTE

The information in this brochure relates to the operating conditions and applications described.

For applications or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.