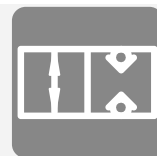


Directional seated valve type VP

Product documentation



Directional seated valve, zero leakage

Operating pressure $p_{\max}$:

400 bar

Flow rate $Q_{\max}$:

15 l/min



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1**Overview of directional seated valve type VP**

Directional seated valves are a type of directional valve. Their function is to direct the flow of hydraulic medium in certain directions, therefore connecting the relevant connections, or shutting off the flow with zero leakage. By this means they control the movement of the actuators in a hydraulic system.

The directional seated valve type VP is a manifold mounting valve. It is a cone-seated valve. 2/2, 3/2 and 4/2 directional seated valves with different types of actuation are available. All connections can be subjected to the same pressures.

The directional seated valve is suitable above all for highly viscous media (e.g. lubricating grease). Appropriate connection blocks enable direct pipe connection.

Features and advantages

- Suitable for highly viscous media (e.g. lubricating grease)
- No interaction between actuating elements and media
- Any flow direction
- Explosion-proof version
- Can be combined with sub-plates for directional seated valves size 12

Intended applications

- Lubricating systems
- Hydraulic presses
- Wind power plants
- Mining machinery
- Construction and construction materials machinery
- Handling and assembly technology



Directional seated valve type VP with interchangeable solenoid and connection block for pipe connection

2 Available versions

Ordering example

VP 1	R		-D
VP 1	W	-3/4	-GM 24 T1

2.4 "Actuation"

2.3 "Connection block for pipe connection"

2.2 "Circuit symbols"

2.1 "Basic type and size"

2.1 Basic type and size

Type	Flow rate $Q_{\max}$ (l/min)	Pressure $p_{\max}$ (bar)
VP 1	15	400

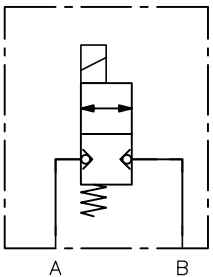
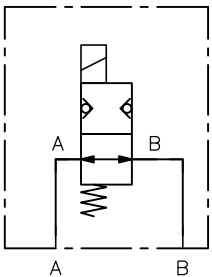
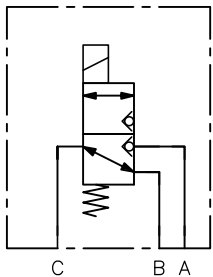
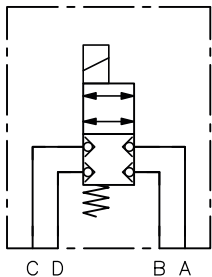
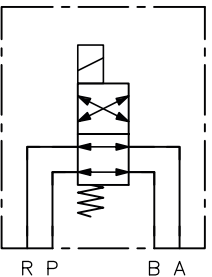
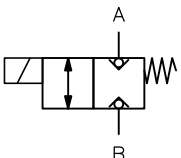
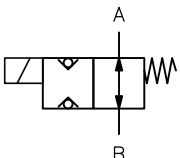
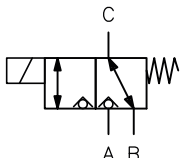
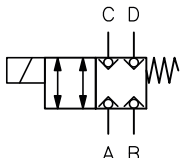
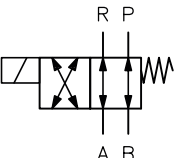
NOTICE

Operating pressures depend on the solenoid version, see Chapter 3.2, "Pressure and volumetric flow"

Specifications apply for hydraulic fluids, see Chapter 3.1, "General data"

2.2 Circuit symbols

Coding	Description
R	2/2-way directional valve, N/C contact
S	2/2-way directional valve, N/O contact
Z	3/2-way directional valve
G	4/2-way directional valve, closed
W	4/2-way directional valve, P-B/A-R open

Circuit symbol	R	S	Z	G	W
detailed circuit symbols					
simplified circuit symbols					



NOTICE

Coding W available only with electrical actuation.

2.3 Connection block for pipe connection

Coding	Ports (ISO 228-1 or ANSI B1.20.3)	Suitable for circuit symbol	Circuit symbol
	A, B, C, D, P, R		
Without coding	--	--	-
-1/4	G 1/4	R, S, Z, G	R, S Z G
-1/4 NPTF	1/4-18 NPTF	R, S, Z	
-3/8	G 3/8	R, S, Z, G	
-3/8 NPTF	3/8-18 NPTF	R, S, Z	
-1/2	G 1/2	R, S, Z	
-1/2 NPTF	1/2-14 NPTF	R, S, Z	
-3/4	G 3/4	W	W

NOTICE
 For circuit symbols R, S and Z the connection blocks of the directional seated valves type G size 12 to [D 7300-12](#) can also be used.

2.4 Actuation

2.4.1 Solenoid voltage and connector

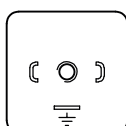
Coding	Electrical connection	Nominal voltage	Protection class (IEC 60529)
Solenoid with interchangeable solenoid			
X(G)M 12 X(G)M 24 X(G)M 48 X(G)M 98 X(G)M 205	EN 175 301-803 A ▪ XM: without connector ▪ GM: with line connector ▪ LM: with LED connector ▪ WGM: with a rectifier circuit in the line connector ▪ L5KM: with LED connector and moulded-on cable 5 m long, see D 7163	12 V DC 24 V DC 48 V DC 98 V DC 205 V DC	IP 65
X(G)M 24/18W		24 V DC	
WGM 110 WGM 230		110 V AC / 98 V DC 230 V AC / 205 V DC	
LM 12 LM 24		12 V DC 24 V DC	
L5KM 12 L5KM 24		12 V DC 24 V DC	
Explosion-proof solenoid in terminal box			
X 24 EX 55 FM X 24 EX M 55 FM	ATEX ATEX metric connection	24 V DC	IP 66/67
 NOTICE Observe the electrical data for explosion-proof solenoids! see Chapter 3.5.2, "Electrical data for explosion-proof solenoids"			
 NOTICE When using a connection block that you have prepared yourself: The minimum volume of the connection block must not be less than specified, see Chapter 3.5.2, "Electrical data for explosion-proof solenoids"			

INFORMATION

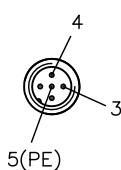
The specifications regarding the IP protection class apply for versions featuring a properly assembled male connector!

Connection pattern

G .., X .., L(5K), WG ..

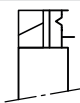
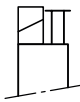


M 12, M 24



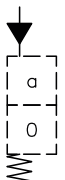
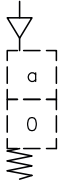
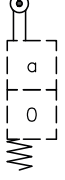
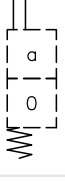
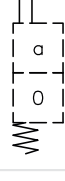
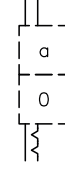
Additional plug options available on request.

Manual override

Coding	Description	Circuit symbol
Without coding	Series	-
T	with detent	
T1	without detent, spring return mechanism	

For further technical data see Chapter 3.5.1, "Electrical data for a standard solenoid"

2.4.2 Further actuations

Coding	Actuation	Pressure $p_{\max}$ (bar)	Main data	Circuit symbol
H	Hydraulic	400	Pilot pressure: $p_{st} = 12$ to bar	
P	Pneumatic	400	Pilot pressure: $p_{st} = 4$ to 15 bar	
K	Mechanical (sensing roller)	400	Actuation force: $F_B = 25$ to 28 N	
T	Mechanical (sensing pin)	400	Actuation force: $F_B = 51$ to 57 N	
F	Manual (sensing lever)	400	Actuation force: $F_B = 25$ to 28 N	
D	Manual (rotary knob)	400	Actuation torque: $M_B = 63$ Ncm	

For further technical data, see Chapter 3.6, "Technical data - Further actuations"

3.1 General data

Designation	2/2, 3/2 and 4/2 directional seated valves
Design	Cone-seated valve
Model	Individual valve for manifold mounting
Material	Steel; electro-galvanised valve housing; zinc-nickel coated coil housing
Attachment	Base plate assembly without/with connection block
Overlap	Negative, transition from one flow direction to the other is completed only at the stroke end position. During switching, all passages are connected to each other.
Installation position	Any; vertical with actuation upwards preferred
Flow direction	any, see Chapter 2.2, "Circuit symbols"
Hydraulic fluid	Lubricating greases from NLGI grades 000 ... 2 in accordance with DIN 51 818 based on mineral oil and synthetic oil at operating temperatures up to approx. +70°C. Hydraulic fluid, according to DIN 51 524 Parts 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity range: 4 - 800 mm ² /s Optimal operating range: approx. 10 - 200 mm ² /s Also suitable for biologically degradable hydraulic fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C.
Cleanliness level	ISO 4406 <u>21/18/15...19/17/13</u>
Temperatures	Environment: approx. -40 to +80 °C, hydraulic fluid: -25 to +80 °C, pay attention to the viscosity range. Start temperature: down to -40 °C is permissible (take account of the start viscosities!), as long as the steady-state temperature is at least 20 K higher during subsequent operation. Biologically degradable hydraulic fluids: note manufacturer specifications. With consideration for the seal compatibility, not above +70°C.  NOTICE Observe the correct duty cycle, see Chapter 3.5, "Electrical data" Note restrictions on explosion-proof solenoid.
Outdoor use	Comparative protection class of mechanical part IP 40 (IEC 60529)



NOTICE

Standard seals NBR

3.2 Pressure and volumetric flow

Operating pressure	$p_{\max} = 400 \text{ bar}$, 250 bar for the solenoid X 24 EX 55 FM, X 24 EX M 55 FM and X(G)M 24/18W, all connections can withstand the full operating pressure.
Flow rate	$Q_{\max} = 15 \text{ l/min}$ Values are for hydraulic fluid

3.3 Weight

Valve complete with actuation	Coding	
	solenoid actuation XM, GM, LM	
	R, S, Z	= 0.7 kg
	G	= 1.0 kg
	W	= 1.0 kg
	hydraulic H	
	R, S, Z	= 0.5 kg
	G	= 0.8 kg
	pneumatic P	
	R, S, Z	= 0.4 kg
Single connection block (without valve)	G	= 0.7 kg
	mechanical	
	sensing roller K / sensing pin T	
	R, S, Z	= 0.4 kg
	G	= 0.7 kg
	manual	
	sensing lever F / rotary knob D	
	R, S, Z	= 0.4 kg
	G	= 0.7 kg
	Coding	
	- 1/4	= 0.5 kg
	- 3/8	= 0.5 kg
	- 1/2	= 1.0 kg
	- 3/4	= 1.2 kg

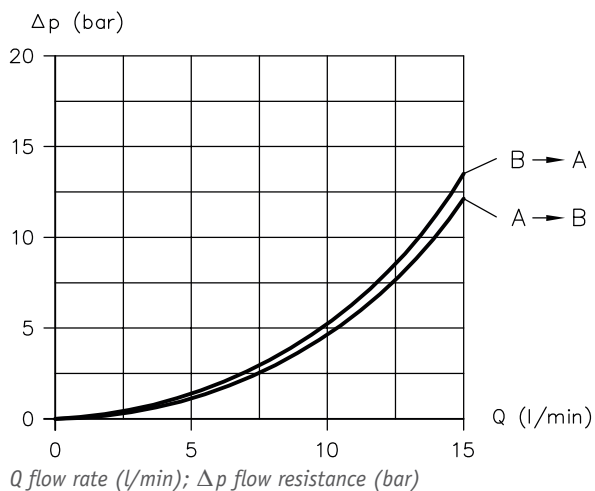
3.4 Characteristic lines

Δp -Q characteristic lines

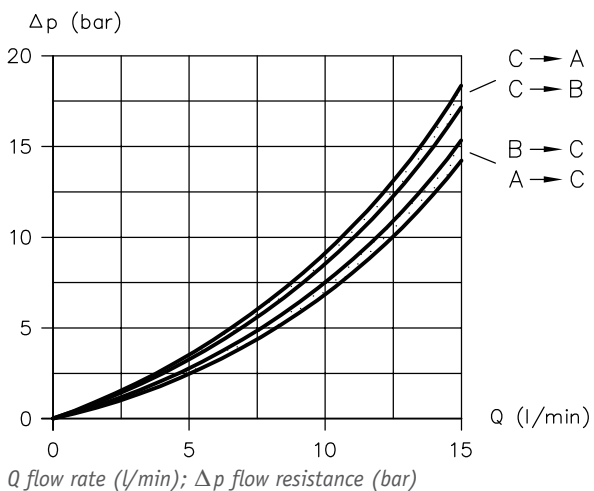
Viscosity of the hydraulic fluid approx. 60 mm²/s

Characteristic lines indicate reference values and apply for hydraulic fluid.

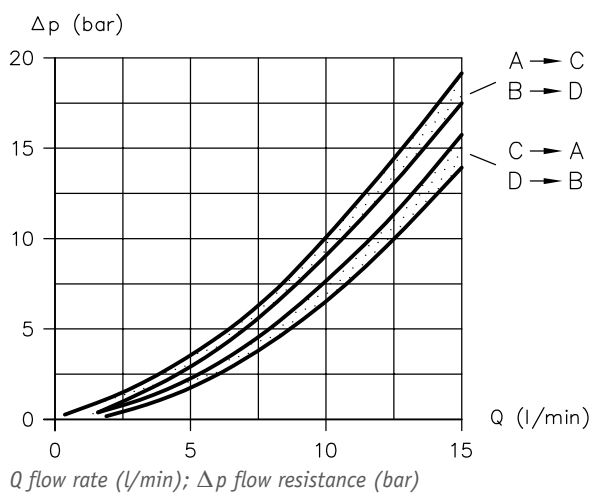
Circuit symbol **R, S**



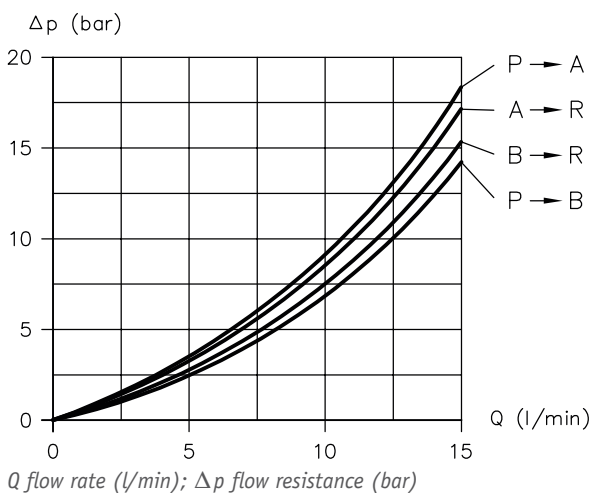
Circuit symbol **Z**



Circuit symbol **G**



Circuit symbol **W**



3.5 Electrical data

3.5.1 Electrical data for a standard solenoid

The solenoids are built and tested to DIN VDE 0580.

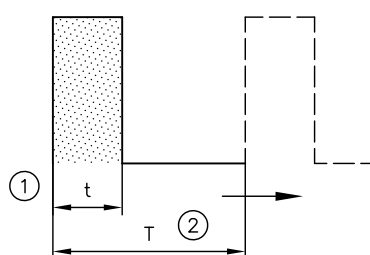
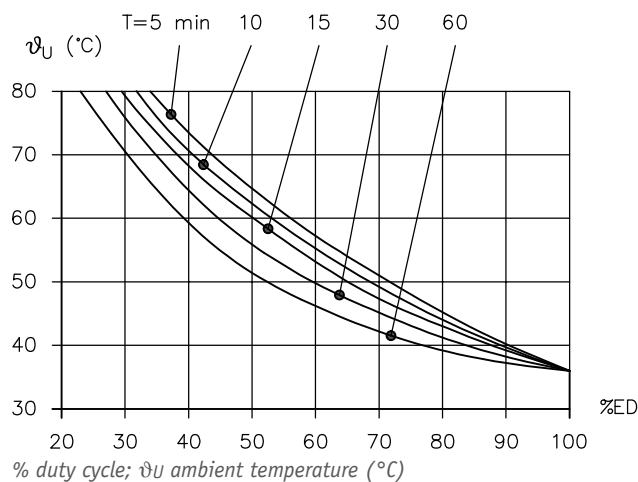
Coding	GM 12 XM 12 LM 12	GM 24 XM 24 LM 24 L5KM 24	GM 24/18W XM 24/18W	GM 48 XM 48	GM 98 XM 98	GM 205 XM 205
Nominal voltage	12 V DC	24 V DC	24 V DC	48 V DC	98 V DC	205 V DC
Nominal power P_N	26.2 W	26.5 W	18.9 W	26.1 W	24.8 W	28 W
Nominal current I_N	2.18 A	1.1 A	0.79 A	0.54 A	0.25 A	0.14 A

Coding	X 24 EX 55 FM X 24 EX M 55 FM	WGM 110	WGM 230	M 12	M 24
Nominal voltage	24 V DC	110 V DC 98 V DC	230 V DC 205 V DC	12 V AC	24 V AC
Nominal power P_N	26.1 W	24.8 W	28 W	26.2 W	26.5 W
Nominal current I_N	0.94 A	0.18 A	0.1 A	1.55 A	0.77 A

 **INFORMATION**
 The electrical data for GM solenoids and WGM solenoids are reference values (max) and may vary slightly depending on the values stipulated by the manufacturer.

Switching times	on: 100 ms off: 50 ms (G..) and 125 ms (WG..)
Switching operations	Approx. 2000/h, to be seen as approximately evenly distributed
Insulation material class	F
Contact temperature	Contact temperature at 20°C, ambient temperature: approx. 85°C ... 95°C (cladding). In adhering to the reference values for % duty cycle in operation, the permissible winding limit temperature of approx. 150°C according to insulation material class F is approximately reached as a steady-state temperature.
other solenoid voltages	Special voltages and plug options upon request

Relative duty cycle
100% duty cycle (specified
on solenoid)



Relative duty cycle

$$t_r = \frac{t_{on}}{T} \cdot 100 (\% ED)$$

- 1 t on (switch-on time)
- 2 T (cycle time)

! NOTICE

The thermal load on the coil can be reduced by means of an economy circuit, for example. For block circuits and ambient temperatures higher than 40°C, avoid placing solenoid valves that are switched on for long periods directly alongside each other!

Protection class Depending on the actuating solenoid see Chapter 2.4.1, "Solenoid voltage and connector"

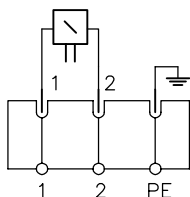
Electrical connection Depending on the actuating solenoid see Chapter 2.4.1, "Solenoid voltage and connector"

Cut-off energy approx. < 1 Ws of reference value from measurements at nominal voltage U_N

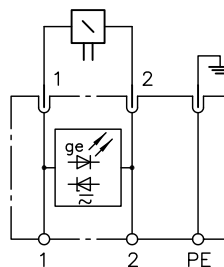
Circuit diagrams

DC voltage

GM .., XM ..

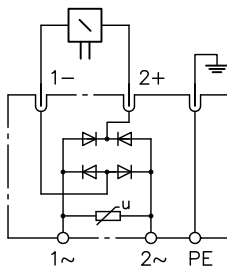


LM ..



AC voltage

WGM ..



NOTICE

For other connectors, such as those with clamp diodes, economy circuits or LEDs, see [D 7163](#)

3.5.2 Electrical data for explosion-proof solenoids

NOTICE

When using solenoids for potentially explosive atmospheres, it is essential to observe the operating instructions [B ATEX](#) and the separate operating instructions for the respective solenoid.

Refer to the applicable operating instructions B 22 (EX22) for operating thresholds, classifications, electrical parameters and electrical connections.

Coding

X 24 EX 55 FM
X 24 EX M 55 FM

Operating instructions with declaration of conformity

- B ATEX
- B 22 (EX22)

Dimensioning Sub-plates

Single valve VP 1 R,S,Z

Block volume 65 250 mm³, block dimensions 29 mm x 45 mm x 50 mm

Linking, single valves arranged next to one another VP 1 R, S, Z

Block volume 57 500 mm³, block dimensions 25 mm x 46 mm x 50 mm

Linking width 46 mm

Linking, twin valves arranged next to one another

Block volume 115 000 mm³, block dimensions 15 mm x 92 mm x 50 mm

Linking width 92 mm

Single valve VP 1 G

Block volume 120 000 mm³, block dimensions 40 mm x 50 mm x 60 mm

Single valve VP 1 W

Block volume 120 000 mm³, block dimensions 50 mm x 80 mm x 100 mm

CAUTION

- Take particular care during assembly and dismantling work!
- The surfaces must not be damaged under any circumstances!

3.6 Technical data - Further actuations

Coding	Actuation	Description
H	Hydraulic	The actuating element is a single-acting pilot piston with a spring return. The switching position a is maintained as long as the pilot pressure is present. If the pilot pressure is relaxed to < 1 bar the valve automatically reverts to the default position 0. The pilot piston is sealed for zero leakage.
		Pilot medium Hydraulic fluid
		Pilot pressure max = 700 bar min = 12 bar
		Pilot volume 0.4 cm ³
		Temperature -40 ... +80 °C (ambient and pilot medium)
P	Pneumatic	The actuating element is a single-acting pilot piston with a spring return. The switching position a is maintained as long as the pilot pressure is present. If the pilot pressure is released the valve automatically reverts to the default position 0. The pilot piston is sealed for zero leakage.
		Pilot medium Compressed air, oiled and filtered
		Pilot pressure max = 15 bar min = 4 bar
		Pilot volume 1.0 cm ³
		Temperature -20 ... +70 °C (ambient and pilot medium)
K	mechanical	The actuating element is a roller with spring return, which is used if the actuating movement is horizontal. The valve is in switching position a when the actuating element is depressed by the means of actuation over the range of the stroke travel (for the dimensions see Chapter 4.1.2, "Further actuations").
		Switching force = 25 ... 28 N (coding K)
		Switching travel Dimensions see Chapter 4.1.2, "Further actuations"
T		The actuating element is a sensing pin with spring return, which is used directly if the actuating movement is vertical. The valve is in switching position a when the actuating element is depressed by the means of actuation over the range of the stroke travel (for the dimensions see Chapter 4.1.2, "Further actuations").
		Switching force = 51 to 57 N (coding T)
		Switching travel Dimensions see Chapter 4.1.2, "Further actuations"
F	manual	The actuating element is a sensing lever which acts on a sensing pin that is equipped with a return spring. Switching position a is maintained as long as the sensing lever is depressed.
		Switching force = 25 ... 28 N
		Switching travel Dimensions see Chapter 4.1.2, "Further actuations"
D		Actuating element with detent position. The switching position a or 0 is achieved by rotating the knob a further 90° in any direction.
		Switching torque = 63 Ncm
		Switching travel Dimensions see Chapter 4.1.2, "Further actuations"

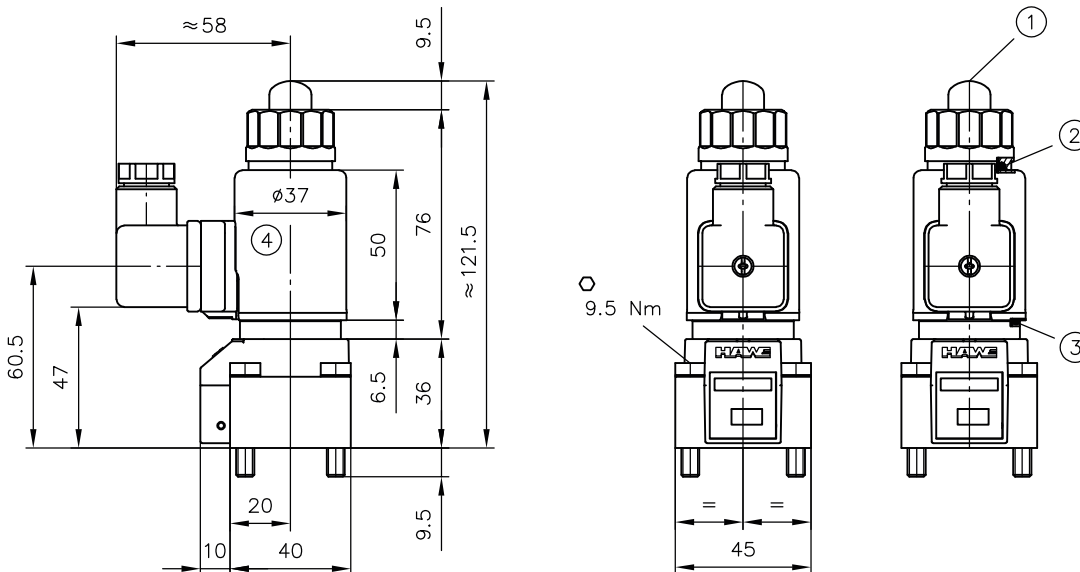
4

Dimensions

All dimensions in mm, subject to change.

4.1 Valve

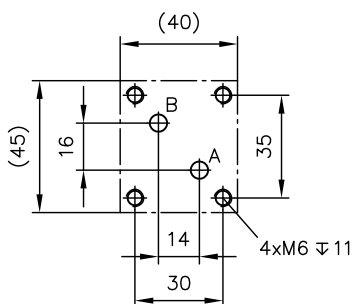
VP 1 R
VP 1 S
VP 1 Z



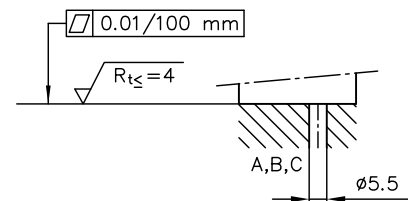
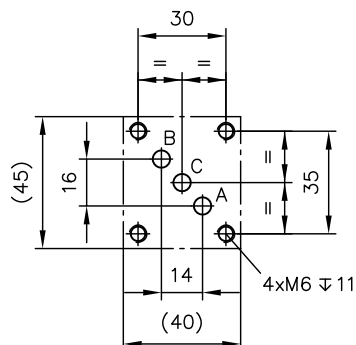
- 1 Manual override
- 2 Sealing between coil and nut
- 3 Sealing between coil and valve cartridge
- 4 Excitation system can be pivoted through 360°

Hole pattern of the base plate

Coding R, S



Coding Z

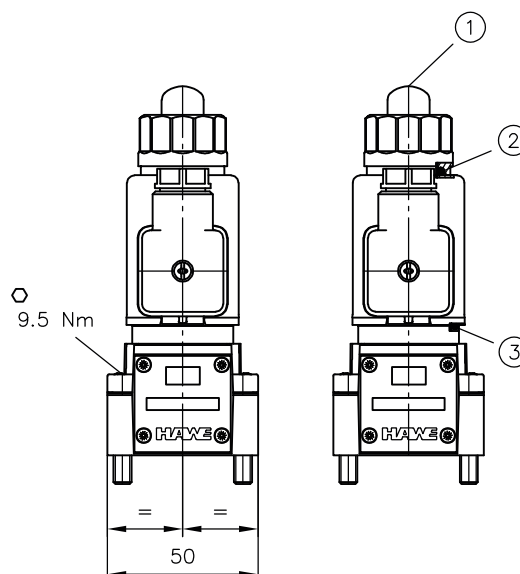
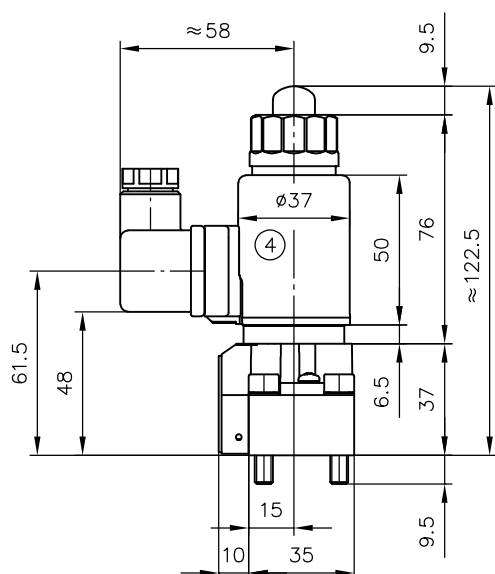


Connections	O-ring NBR 90 Sh
A, B, C	6.07x1.78

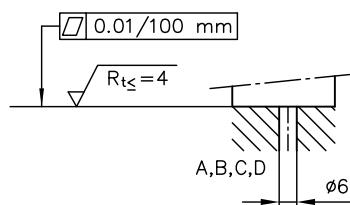
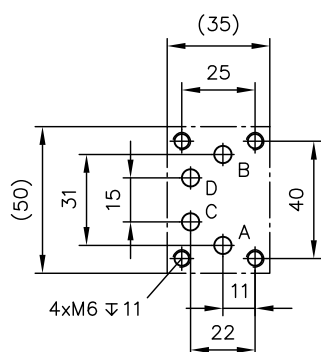


NOTICE

For 2/2 directional valves, port C is not present.

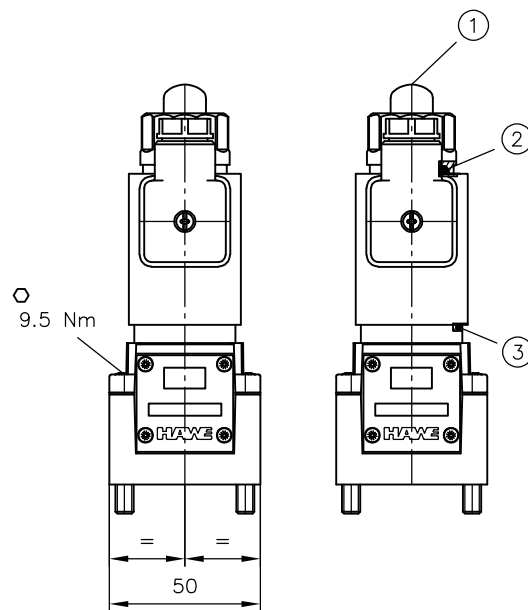
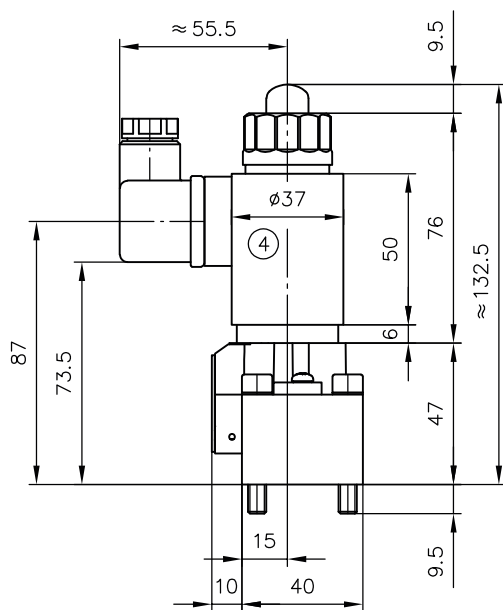
VP 1 G


- 1 Manual override
- 2 Sealing between coil and nut
- 3 Sealing between coil and valve cartridge
- 4 Excitation system can be pivoted through 360°

Hole pattern of the base plate


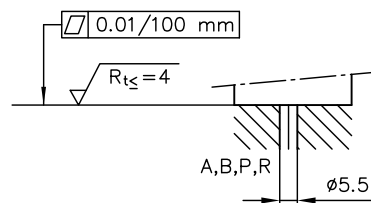
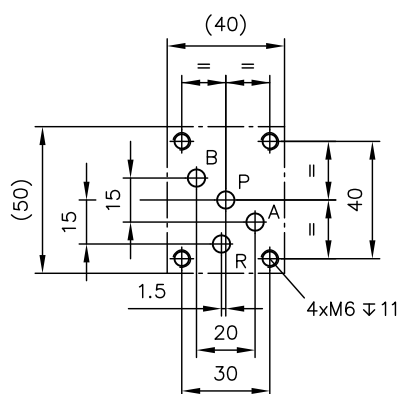
Connections	O-ring NBR 90 Sh
A, B, C, D	8.73x1.78

VP 1 W



- 1 Manual override
- 2 Sealing between coil and nut
- 3 Sealing between coil and valve cartridge
- 4 Excitation system can be pivoted through 360°

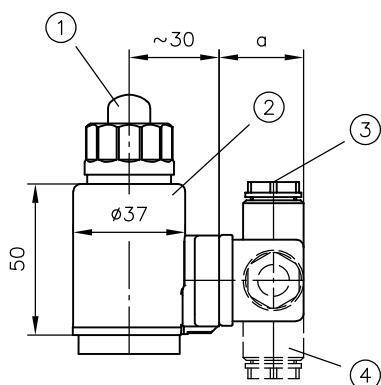
Hole pattern of the base plate



Connections	O-ring NBR 90 Sh
A, B, R, P	6.07x1.78

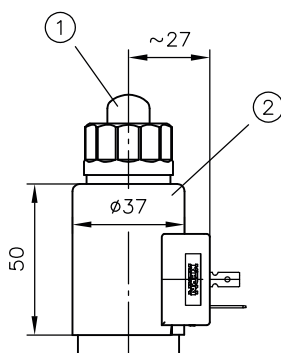
4.1.1 Solenoid actuation

GM, WGM, XM



- 1 Manual override
- 2 Excitation system can be pivoted through 360°
- 3 Cable gland
- 4 Line connector can be mounted offset by 90° each

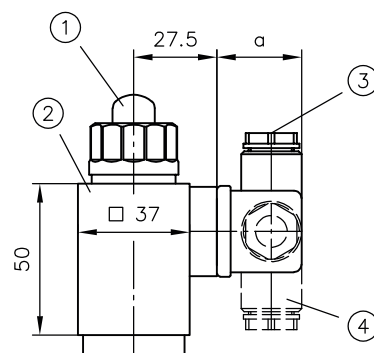
GM 24, XM 24



- 1 Manual override
- 2 Excitation system can be pivoted through 360°

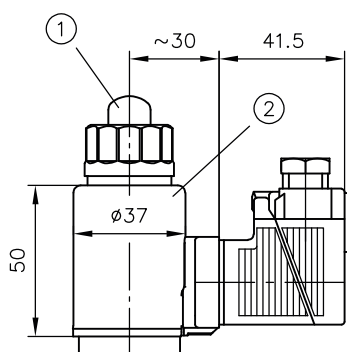
GM 24/18W, XM 24/18W

Circuit symbol R, S, Z, G



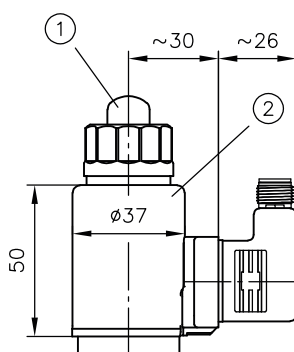
- 1 Manual override
- 2 Excitation system can be pivoted through 360°
- 3 Cable gland
- 4 Line connector can be mounted offset by 90° each

LM



- 1 Manual override
- 2 Excitation system can be pivoted through 360°

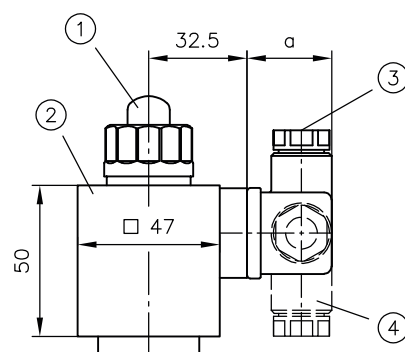
M



- 1 Manual override
- 2 Excitation system can be pivoted through 360°

GM 24/18W, XM 24/18W

Circuit symbol W



- 1 Manual override
- 2 Excitation system can be pivoted through 360°
- 3 Cable fitting
- 4 Line connector can be mounted offset by 90° each

Solenoid	a
GM	28
WGM	34,5

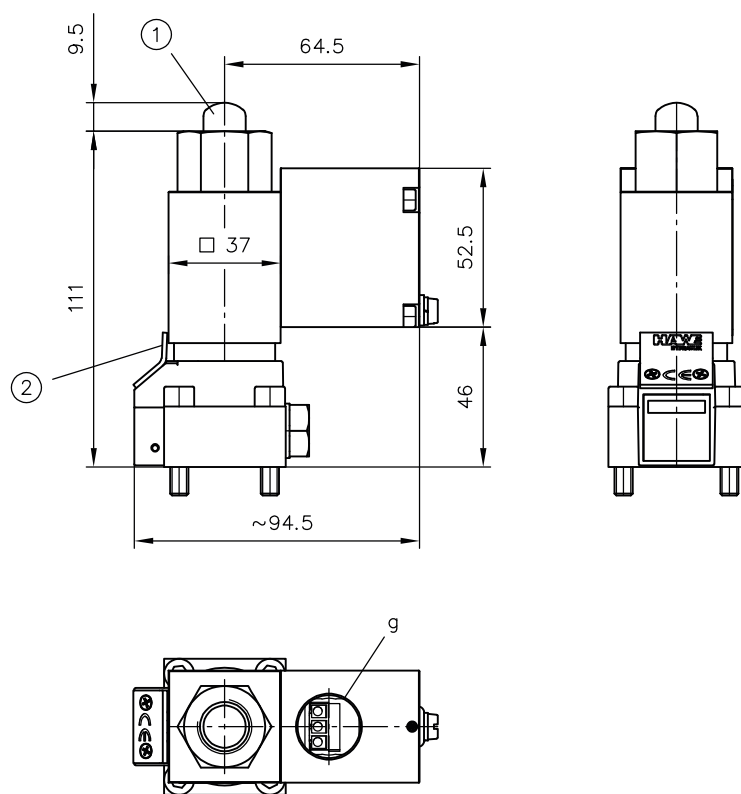
NOTICE

In accordance with EN 175 301-803 dimension a can be up to 40 mm, as stipulated by the manufacturer.

Explosion-proof solenoid in terminal box

X 24 EX 55 FM

X 24 EX M 55 FM

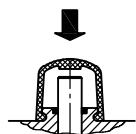


- 1 Manual override
- 2 Anti-twist protection

Coding	g
X 24 EX 55 FM	1/2-14 NPT
X 24 EX M 55 FM	M20x1.5-6H

Manual override

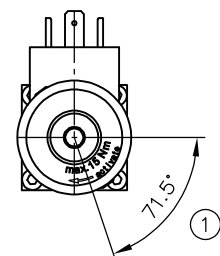
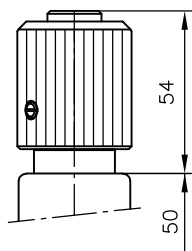
Series



To actuate the valve:

- By pressing the magnetic pin protruding under the rubber cap, max. actuation force 80 N

- .. T, - .. T1

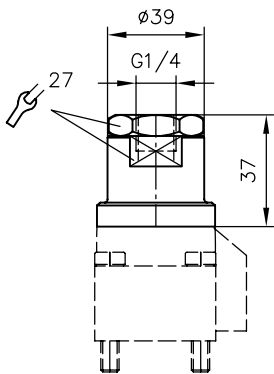


1 Maximum adjustment torque 15 Nm

4.1.2 Further actuations

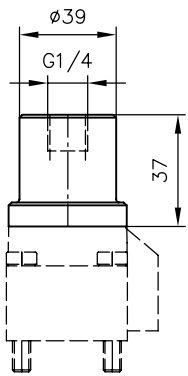
Hydraulic

Coding **H**



Pneumatic

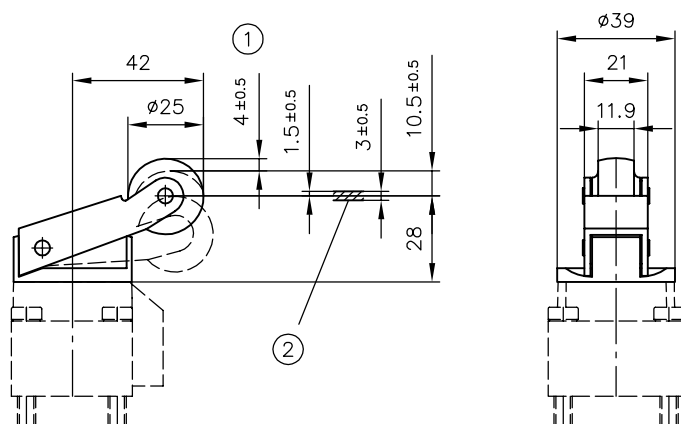
Coding **P**



Mechanical (sensing roller)

Coding K

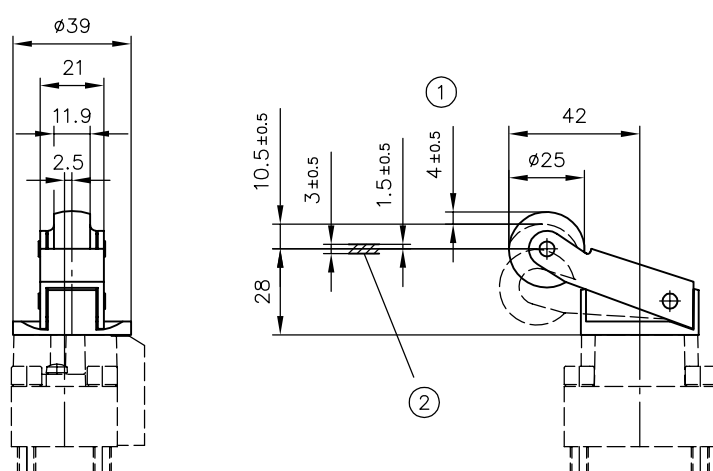
position for circuit symbols **R, S, Z**



- 1 Free travel
- 2 not for use as a stop!

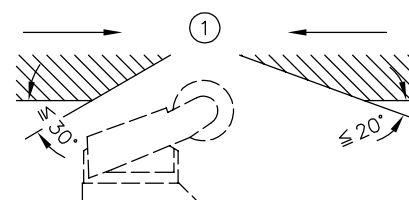
Coding K

position for circuit symbols **G, W**



- 1 Free travel
- 2 not for use as a stop!

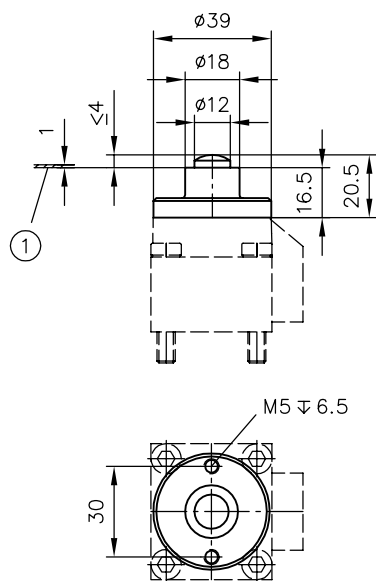
Switching curve for roller lever



- 1 Start-up direction

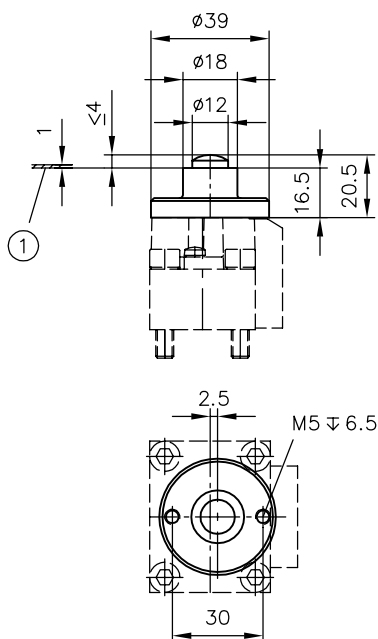
Mechanical (sensing pin)

Coding **T**
position for circuit symbols **R, S, Z**



1 not for use as a stop!

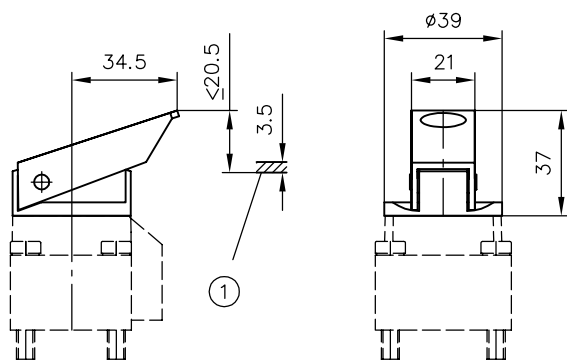
Coding **T**
position for circuit symbols **G, W**



1 not for use as a stop!

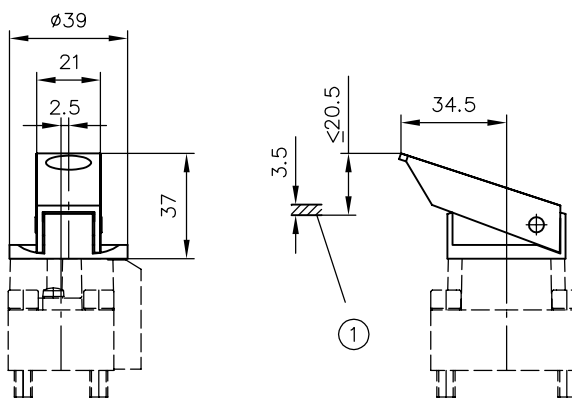
Manual (sensing lever)

Coding **F**
position for circuit symbols **R, S, Z**



1 not for use as a stop!

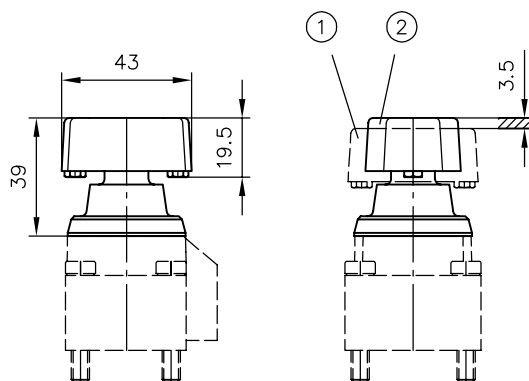
Coding **F**
position for circuit symbols **G, W**



1 not for use as a stop!

Manual (rotary knob)

Coding **D**



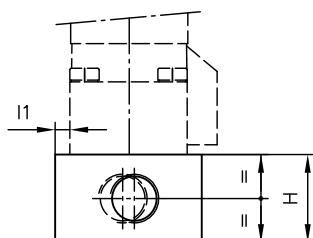
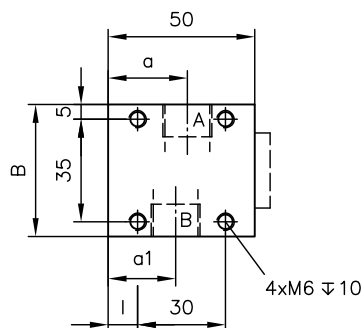
- 1 Switching position a
- 2 Switching position 0

4.2 Connection blocks

VP 1 R(S) -1/4 (NPTF)

VP 1 R(S) -3/8 (NPTF)

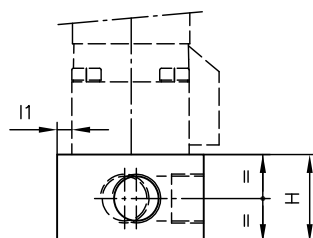
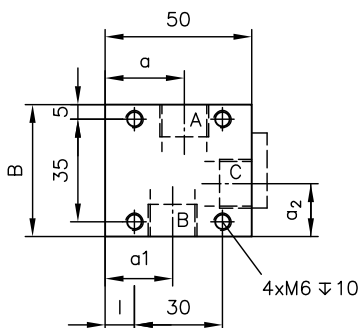
VP 1 R(S) -1/2 (NPTF)



VP 1 Z -1/4 (NPTF)

VP 1 Z -3/8 (NPTF)

VP 1 Z -1/2 (NPTF)

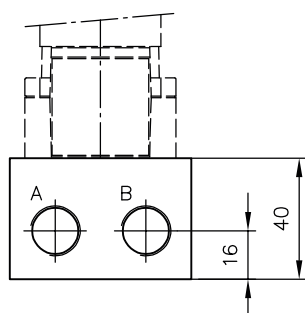
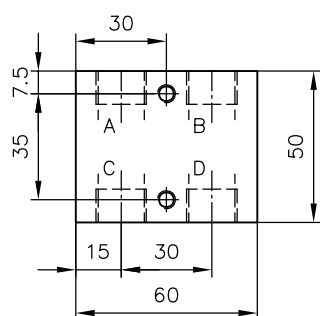


Type	H	B	a	a1	a2	l	l1
VP 1 R(S, Z) -1/4 VP 1 R(S, Z) -1/4 NPTF	30	45	29	21	20	10	5
VP 1 R(S, Z) -3/8 VP 1 R(S, Z) -3/8 NPTF	30	45	27	23	18	10	5
VP 1 R(S) -1/2 VP 1 R(S) -1/2 NPTF	45	50	25	25	--	10	5
VP 1 Z -1/2 VP 1 Z -1/2 NPTF	45	50	20	20	25	5	--

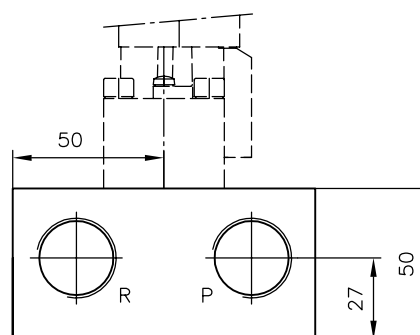
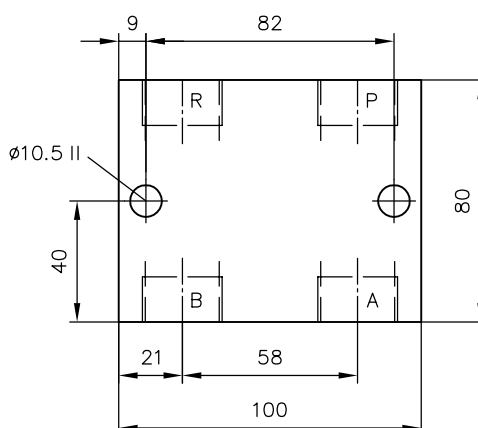
Type	Connections (ISO 228-1 or ANSI B1.20.3) A, B, C
------	---

VP 1 R(S, Z) -1/4 VP 1 R(S, Z) -1/4 NPTF	G 1/4 1/4-18 NPTF
VP 1 R(S, Z) -3/8 VP 1 R(S, Z) -3/8 NPTF	G 3/8 3/8-18 NPTF
VP 1 R(S, Z) -1/2 VP 1 R(S, Z) -1/2 NPTF	G 1/2 1/2-18 NPTF

VP 1 G -1/4
VP 1 G -3/8



VP 1 W -3/4



Type	Connections (ISO 228-1)	
	A, B, C, D	A, B, R, P
VP 1 G -1/4	G 1/4	--
VP 1 G -3/8	G 3/8	--
VP 1 W -3/4	--	G 3/4

5**Installation, operation and maintenance information**

Observe the document B 5488 "General operating instructions for assembly, commissioning, and maintenance."

5.1 Intended use

This product is intended exclusively for hydraulic applications (fluid technology).

The user must observe the safety measures and warnings in this document.

Essential requirements for the product to function correctly and safely:

- ▶ All information in this documentation must be observed. This applies in particular to all safety measures and warnings.
- ▶ The product must only be assembled and put into operation by specialist personnel.
- ▶ The product must only be operated within the specified technical parameters described in detail in this document.
- ▶ All components must be suitable for the operating conditions when using an assembly.
- ▶ The operating instructions for the components, assemblies and the specific complete system must also always be observed.

If the product can no longer be operated safely:

1. Remove the product from operation and mark it accordingly.
 - ✓ It is then not permitted to continue using or operating the product.

5.2 Assembly information

The product must only be installed in the complete system with standard and compliant connection components (screw fittings, hoses, pipes, fixtures etc.).

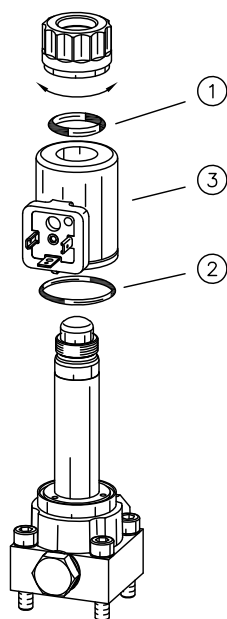
The product must be shut down correctly prior to disassembly (in particular in combination with hydraulic accumulators).

**DANGER****Sudden movement of the hydraulic drives when disassembled incorrectly**

Risk of serious injury or death

- ▶ Depressurise the hydraulic system.
- ▶ Perform safety measures in preparation for maintenance.

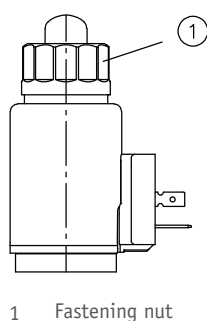
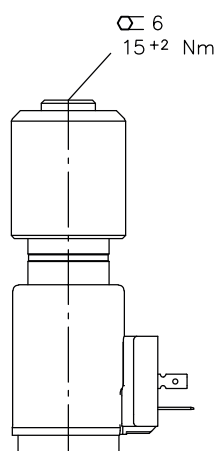
5.2.1 Replacing the solenoid



- 1 O-ring 18.75x2.62 NBR 90 Sh
- 2 O-ring 28.00x1.50 NBR 90 Sh
- 3 Solenoid

Solenoid: see Chapter 6.2, "Accessories, spare and individual parts"

5.2.2 Adjusting the connector position



1 Fastening nut



Plug position can be adjusted individually:

- Undo the fastening nut, undo the manual override at the size 6 hex socket.
- Position the coil
- Tighten the fastening nut, re-tighten the manual override at the size 6 hex socket.

SW = Width across flats

5.3 Operating instructions

Observe product configuration and pressure/flow rate.

The statements and technical parameters in this document must be strictly observed.

The instructions for the complete technical system must also always be followed.

NOTICE

- Read the documentation carefully before usage.
- The documentation must be accessible to the operating and maintenance staff at all times.
- Keep documentation up to date after every addition or update.

CAUTION

Overloading components due to incorrect pressure settings.

Risk of minor injury. Parts may burst or fly off, and uncontrolled leakage of hydraulic fluid.

- Pay attention to the maximum operating pressure of the pump, valves and fittings.
- Always monitor the pressure gauge when setting and changing the pressure.

Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of the product. Contamination can cause irreparable damage.

Examples of fine contamination include:

- Swarf
- Rubber particles from hoses and seals
- Dirt due to assembly and maintenance
- Mechanical debris
- Chemical ageing of the hydraulic fluid

NOTICE

New hydraulic fluid from the manufacturer may not have the required purity.

Damage to the product is possible.

- Filter new hydraulic fluid to a high quality when filling.
- Do not mix hydraulic fluids. Always use hydraulic fluid that is from the same manufacturer, of the same type, and with the same viscosity properties.

For smooth operation, pay attention to the cleanliness level of the hydraulic fluid (cleanliness level [see Chapter 3, "Parameters"](#)).

Additionally applicable document: [D 5488/1](#) oil recommendations

5.4 Maintenance information

Check regularly (at least once a year) by visual inspection whether the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the surface of the device regularly (at least once a year) (dust deposits and dirt).

6 Other information

6.1 Layout instructions

Direct Current (DC):

The voltage particulars (solenoid specification) should match the supply voltage actually available (a lower supply voltage will lead to a reduction of force, a higher supply voltage will lead to an unacceptably high temperature at the coil, tolerance ± 5 to 10 %).

Alternating Current (AC):

The voltage particulars should match the supply voltage actually available (50/60 Hz). An appropriate rectifier circuit in the line connector yields the required solenoid voltage of approx. 0.9 UAC-2V. The direct current solenoids to be used can be found on the table (for instance at 110 V AC 50 Hz a solenoid with UN = 98 V DC).

For block circuits and ambient temperatures higher than 40 °C, design the layout so that solenoid valves directly adjacent to each other are not actuated concurrently for extended periods of time. (Rel. duty cycle max. 40 % duty cycle)

6.2 Accessories, spare and individual parts

To purchase spare parts, please see [HAWE Hydraulik interactive contact map](#).

Excitation system (solenoids):		Male connector:	
Coding	Order no.	Coding	Order no.
GM 12, LM 12, XM 12	4704 8692-00	G ..	6217 0002-00
WGM 24, GM 24, LM 24, XM 24, L5KM 24	4704 8685-00	L ..	6217 8024-00
GM 24/18W, XM 24/18W	4704 5008-00	WG ..	6217 6002-00
GM 48, XM 48	4704 8695-00	L 5 K ..	6217 8088-00
WGM 110, XM 98	4704 8698-00	L 10 K ..	6217 8090-00
WGM 230, GM 205, XM 205	4704 8700-00		
M 12	4704 4041-00		
M 24	4704 4042-00		

References

Additional versions

- Directional seated valve type BVE: D 7921
- Directional seated valve type BVE 1F: D 7921 F
- Directional seated valve type G, WG and others: D 7300
- Directional seated valve type G with interchangeable solenoid: D 7300-12
- Valve bank (directional seated valve) type VB: D 7302

