Directional seated valve type G with interchangeable solenoid

Product documentation



Directional seated valve, zero leakage

Operating pressure $p_{\text{\scriptsize max}}\text{:}$

Flow rate Q_{max} :

700 bar 12 lpm







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1

Overview of directional seated valves type G with interchangeable solenoid

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 G is available as a 2/2, 3/2, 4/2, 3/3 and 4/3 directional seated valve with different actuation types and plug types. It is a ball seated valve. Actuation using a hand lever enables switchable pressures of up to 700 bar.

Appropriate connection blocks enable direct pipe connection. The directional seated valves are available as chained valves in a valve bank type VB.

Features and advantages

- Dirt-resistant design with high switching reliability
- Low shifting forces and smooth, shock-free shifting
- Operating pressures up to 700 bar
- Interchangeable solenoid for greater flexibility and easy servicing
- Version for HFA fluid
- Version with standard connection pattern

Intended applications

- Machine tools (cutting and non-cutting)
- Clamping tool, punching tools, fixtures
- Rubber and plastics machinery
- Hydraulic tools



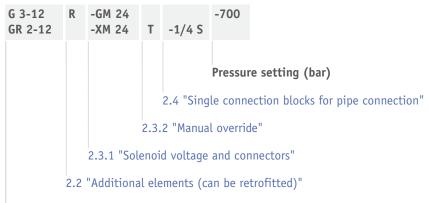
Directional seated valve type G with interchangeable solenoid



2

Available versions

Ordering example



2.1 "Basic type and size"

2.1 Basic type and size

Туре	Circuit symbol	Size	Description	Flow rate Q _{max} (lpm)	Pressure p _{max} (bar)
	R 2		2/2-way directional valve		
	S 2		2/2-way unectional valve		
	3		2/2 way directional valve		
G	Z 3	-12	3/2-way directional valve 4/2-way directional valve	-12	500
d	4	-12			
	Z 4		4/2-way unectional valve		
	21		3/3-way directional valve		
	22		4/3-way directional valve		350



NOTICE

Deviating from standard operation, the following operation is permissible:

- Solenoid with lower current consumption XM, GM 24/18W: Max. 8 lpm for 500 bar operation
- Standard solenoids XM, GM, LM 12, 24; XM, GM 48, 98, 205: Max. 8 lpm for 700 bar operation during loading at ≤ 10 % duty cycle, ambient temperature ≤ 40°C
- Only for circuit symbol S 2: Variants with stronger solenoid XM, GM 12/30W, XM, GM 24/30W: Max. 8 lpm for 700 bar operation during loading at ≤ 50 % duty cycle, ambient temperature ≤ 40°C



Circuit symbol	Detailed circuit symbols	Simplified circuit symbols
R 2	R	R W P
S 2	R	R R W P
3	A P R	A R P
Z 3	A P R	A W R P
21	A P R	R P
22	B A P R	B A R P



Circuit symbol	Detailed circuit symbols	Simplified circuit symbols
4	P R A	B A R P
Z 4	B B A B A	B A R P

2.2 Additional elements (can be retrofitted)

Coding	Description		Suitable for circuit symbol	Circuit symbol
without coding	Series			
R	Check valve at P	ER 11 acc. to D 7325	R 2, S 2	
	Cannot be combined with B		3, Z 3 4, Z 4	
В	Orifice at P	EB 1 - 0.4; 0.6; 0.8; 1.0 acc. to D 6465	R 2, S 2 3, Z 3	
	Cannot be combined with R , spe	ecify orifice diameter	21	R P
S	Return pressure stop in R	7332 000b	R 2, S 2	
	Combination with R or B possi	ble.	3, Z 3	R P



2.3 Actuation

2.3.1 Solenoid voltage and connectors

Coding	Electrical connection	Nominal voltage	Protection class (IEC 60529)
Solenoid with inter	changeable 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	12 V DC 24 V DC 48 V DC 98 V DC 205 V DC	IP 65
X(G)M 12/30W X(G)M 24/18W X(G)M 24/30W	 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 24 V DC	
WGM 110 WGM 230	• NOTICE	110 V AC / 98 V DC 230 V AC / 205 V DC	
LM 12 LM 24	X(G)M 12/30W and X(G)M 24/30W only for circuit symbol S 2	12 V DC 24 V DC	
L5KM 12 L5KM 24		12 V DC 24 V DC	
M 12 M 24	M12x1	12 V DC 24 V DC	
Explosion-proof solo	enoid in terminal box		
X 24 EX 55 FM	• NOTICE Observe the electrical data for explosion-proof solenoids! An application-specific cable can be used by the customer. Cable gland and other data, see Chapter 3.5, "Electrical data"	24 V DC	IP 67
	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, "Electrical data"		

Connection pattern

GM .., XM .., L(5K)M, WGM ..



M 12, M 24



Additional plug options available on request.



2.3.2 Manual override

Coding	Description
without coding	Series
T	with detent
T1	not detented

2.4 Single connection blocks for pipe connection

Coding	Connections (ISO 228-1) P, A, B, R	Description	Suitable for circuit symbol	Circuit symbol
-1/4 -3/8	G 1/4 G 3/8	Connection Suitable for parallel and series connection, taking into account the permissible load capacity of the connections P, A, B and R see Chapter 3.1, "General data"	3, Z3 4, Z4 21	2/2 directional valve R2, S2 R P A P R 4/2 directional valve 4, Z4 3/3-way directional valve 21 A P R 4/3-way directional valve 22



Coding	Connections (ISO 228-1) P, A, B, R	Description	Suitable for circuit symbol	Circuit symbol
-1/4 S -1/4 SR	G 1/4	Connection block for pipe connection with pressure-	R2, S2 3, Z3	2/2 directional valve R2, S2 3/2 directional valve 3, Z3
-3/8 S -3/8 SR	G 3/8	limiting valve, type MVE 4 according to D 7000/1 /S Fixed Manually adjustable (wing nut) Connection R only reflux (pressureless) to ensure the function of the pressure- limiting valve.		R P R
-1/4 C	G 1/4	Connection block for pipe	R2, S2	2/2 directional valve R2 , S2
-3/8 C	G 3/8	connection with bypass check valve A bypass check valve is required if there should be flow in the direction R to P. Avoid pressure surges (decompression surges) in direction R to P!		R
-1/4 G	G 1/4	Connection block for pipe connection with check valves in Graetz circuit The Graetz circuit enables the function utilisation of the 2/2 directional valve in both flow directions. The connections P and R are completely equivalent here and therefore not specifically marked on the connection block.	R2, S2	2/2 directional valve R2, S2



3

Parameters

3.1 General data

Designation	2/2, 3/2, 3/3, 4/3 and 4/2 directional seated valves
Design	Ball seated valve
Model	Manifold mounting valve
Material	Steel; Electro-galvanised valve housing; Hardened and ground functional inner parts; Coil housing zinc-nickel coated
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	Only in direction of arrow according to circuit symbol see Chapter 2.1, "Basic type and size". The connections P (pump connection), R (reflux), A and B (consumer) are determined by the internal action of the valve and cannot be changed.
Hydraulic fluid	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 mm²/s Optimal operating range: approx. 10 - 200 mm²/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 21/18/1519/17/13
Temperatures	Environment: approx40 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 type of mechanical part IP 40 (EN 60529)



3.2 Pressure and flow rate

Operating pressure	see Chapter 2.1, "Basic type and size" All connections can be loaded with full operating pressure, but the pressure drop always in the direction of the arrow according to the circuit symbol, i.e. pressure at P to A(B) to R. For 4/3 directional valve R only reflux. For increased switchable pressures, see Chapter 3.5, "Electrical data"
Flow rate	12 lpm, reduced flow rates, see Chapter 2.1, "Basic type and size", Chapter 3.5, "Electrical data". Minimum flow rate for 4/2 directional valves = 2 lpm

3.3 Weight

Directional valve	Circuit symbol	
	R 2, S 2, 3, Z 3	= 0.65 kg
	2/2 and 3/2 directional valves	
	4, Z 4	= 1.9 kg
	4/2-way directional valve	
	21	= 1.4 kg
	3/3-way directional valve	
	22	= 1.6 kg
	4/3-way directional valve	
Single connection block	Coding	
Single connection block	Coding -1/4, -3/8	= 0.5 kg
Single connection block	-	= 0.5 kg
Single connection block	-1/4, -3/8	= 0.5 kg = 1.2 kg
Single connection block	-1/4, -3/8 For pipe connection	
Single connection block	-1/4, -3/8 For pipe connection -1/4 S(SR), 3/8 S(SR)	
Single connection block	-1/4, -3/8 For pipe connection -1/4 S(SR), 3/8 S(SR) with pressure-limiting valve	= 1.2 kg
Single connection block	-1/4, -3/8 For pipe connection -1/4 S(SR), 3/8 S(SR) with pressure-limiting valve -1/4 C, -3/8 C	= 1.2 kg



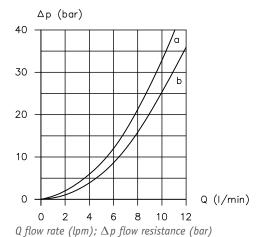
3.4 Characteristic lines

Viscosity of the hydraulic fluid approx. 60 mm²/s

 $\Delta\,\mathrm{p ext{-}Q}$ characteristic lines

Basic valve

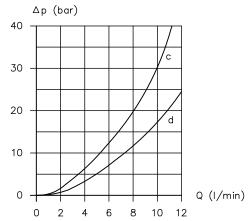
2/2 and 3/2 directional valves



Curve a: $P \rightarrow A$ and $A \rightarrow R$

Curve b: $P \rightarrow R$

3/3, 4/3 and 4/2 directional valves

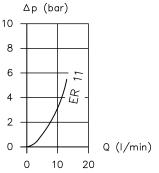


Q flow rate (lpm); Δp flow resistance (bar)

Curve c: $P \rightarrow A(B)$ Curve d: $A(B) \rightarrow R$

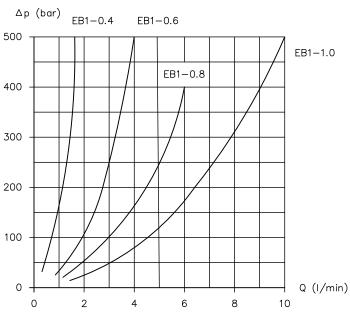
Additional elements

Check valve



Q flow rate (lpm); Δp flow resistance (bar)

Orifice



Q flow rate (lpm); Δp flow resistance (bar)



3.5 Electrical data

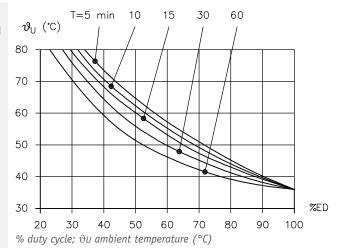
3.5.1 Electrical data for a standard solenoid

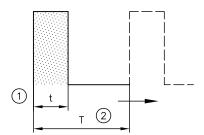
The solenoids are built and tested to DIN VDE 0580.

Coding	GM 12 XM 12 LM 12	GM 24 XM 24 LM 24 L5KM 24	GM 24/18W XM 24/18W	GM 12/30W XM 12/30W	GM 24/30W XM 24/30W	GM 48 XM 48	GM 98 XM 98	GM 205 XM 205		
Nominal voltage	12 V DC	24 V DC	24 V DC	12 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	30 W	30 W	26.1 W	24.8 W	28 W		
Nominal current I _N	2.18 A	1.1 A	0.79 A	2.5 A	1.25 A	0.54 A	0.25 A	0.14 A		
Switching times	on: 100 ms off: 50 ms (G) and 125 ms (WG)									
Switching operations	Approx. 200	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.									



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





Relative duty cycle $t_r = \frac{t_{OII}}{T} \cdot 100 \left(\% ED \right)$

- t on (switch-on time)
- 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!

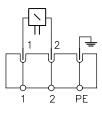
Protection class	Depending on the actuating solenoid see Chapter 2.3.1, "Solenoid voltage and connectors"
Electrical connection	Depending on the actuating solenoid see Chapter 2.3.1, "Solenoid voltage and connectors"
Cut-off energy	approx. < 1 Ws of reference value from measurements at nominal voltage U _N



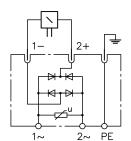
Circuit diagrams

DC voltage

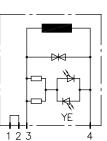
GM .., XM ..



LM ..

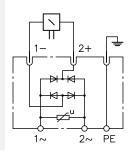


М..



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

Nominal voltage U _N	24 V DC					
Nominal power P _N	23 W					
ATEX declaration of conformity	FM 18ATEX0019 X					
Approvals	ATEX, IECEx, NEC, CEC					
Marking						
Electrical connection						
Circuit diagram						
Protective circuit						
Protection class (minimum requirement, depending on the cable fitting and cable)						
Electrical protection against overload (according to IEC 60127)	see B 40/2017 operating instructions/declaration of conformity for explosion-proof solenoid EX22 and B ATEX operating instructions for HAWE devices intended for use in potentially explosive atmospheres					
Relative duty cycle The duty cycle ED [%] depends on the ambient temperature and the cable type being used. For the definition of the duty cycle [%]: see B ATEX, Chapter 2.3 "Safety instruc- tions"						
Ambient temperature						
Max. medium temperature						
Surface protection	Electrogalvanised housing					
Cable kits	For cable kits with cable and cable fitting, see B ATEX operating instructions for HAWE devices intended for use in potentially explosive atmospheres					
Dimensioning Sub-plates	Single valve Block volume 65 250 mm³, block dimensions 29 mm x 45 mm x 50 mm Twin valve Block volume 138 000 mm³, block dimensions 30 mm x 92 mm x 50 mm Linking, single valves arranged next to one another 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					





A CAUTION

Shield against direct sunlight.



NOTICE

For electric version and certification, see B 40/2017 operating instructions/declaration of conformity for explosion-proof solenoid EX22



A CAUTION

The excitation and actuating systems are paired and must not be mixed up or replaced under any circumstances!



A CAUTION

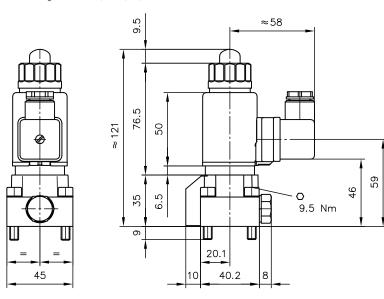
- Take particular care during assembly and dismantling work!
- The surfaces must not be damaged under any circumstances!

Dimensions

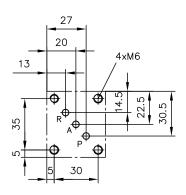
All dimensions in mm, subject to change.

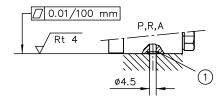
4.1 2/2 and 3/2 directional valves

Circuit symbol R 2, S 2, 3, Z 3



Hole pattern of the base plate





0-ring

	Ports	O-ring NBR 90 Sh		
2/2 and 3/2	P, R	8x1.5		
directional valves	A	5x1.5		



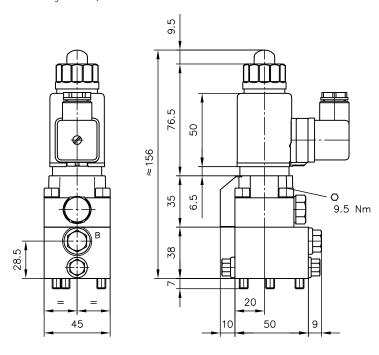
● NOTICE

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



4.2 4/2-way directional valve

Circuit symbol 4, Z 4

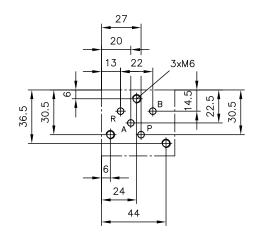


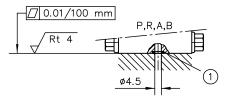
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NOTICE

For further dimensions see 2/2 and 3/2 directional valves.

Hole pattern of the base plate





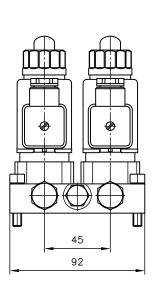
1 0-ring

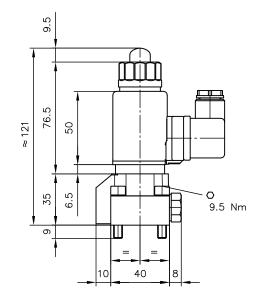
	Ports	O-ring NBR 90 Sh		
4/2-way directional	P	8x1.5		
valve	A, B, R	5x1.5		



4.3 3/3-way directional valve

Circuit symbol 21



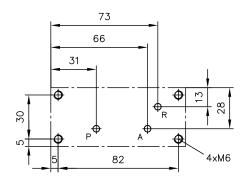


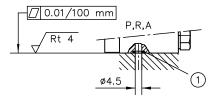


NOTICE

For further dimensions see 2/2 and 3/2 directional valves.

Hole pattern of the base plate





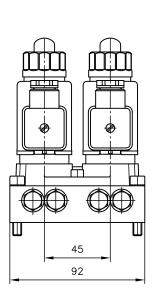
0-ring

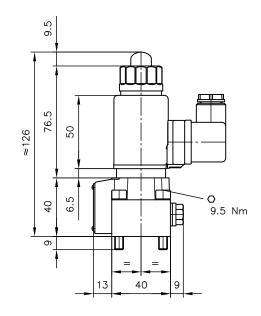
	Ports	O-ring NBR 90 Sh		
3/3-way directional	P	8x1.5		
valve	R, A	5x1.5		



4.4 4/3-way directional valve

Circuit symbol 22

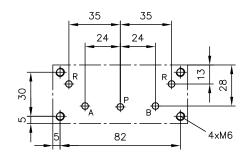


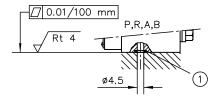


NOTICE

For further dimensions see 2/2 and 3/2 directional valves.

Hole pattern of the base plate





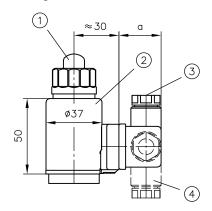
0-ring

	Ports	O-ring NBR 90 Sh		
4/3-way directional	Р	8x1.5		
valve	R, A, B	5x1.5		



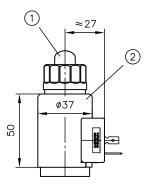
4.5 Solenoid actuation

Coding GM, WGM, XM



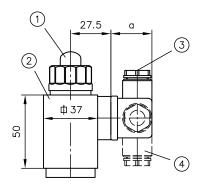
- 1 Manual override
- 2 Excitation system can be pivoted through 360°
- 3 Cable gland
- 4 Line connector can be mounted offset by 90° each

Coding GM, XM 24



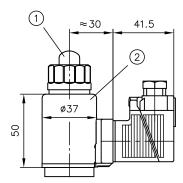
- 1 Manual override
- 2 Excitation system can be pivoted through 360°

Coding GM 24/18W, XM 24/18W



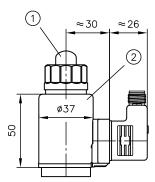
- 1 Manual override
- Excitation system can be pivoted through 360°
- 3 Cable gland
- 4 Line connector can be mounted offset by 90° each

Coding LM



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

Coding M



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

Solenoid	a
GM	28
WGM	34,5



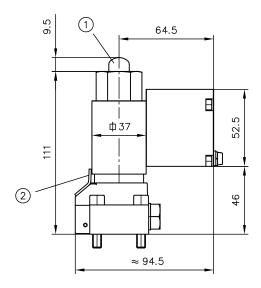
NOTICE

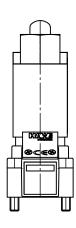
The size a is permitted by EN 175 301-803 be up to max. 40 mm. It may vary slightly depending on the values stipulated by the manufacturer.

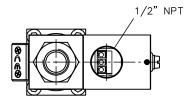


Explosion-proof solenoid in terminal box

X 24 EX 55 FM







- Manual override
- Anti-twist protection



NOTICE

Coding X 24 EX 55 FM:

The excitation and actuating systems are paired and must not be swapped over or replaced under any circumstances!



Manual override

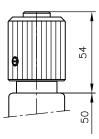
Series

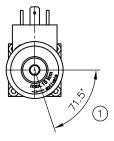


To actuate the valve:

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







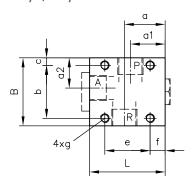
1 Maximum adjustment torque 15 Nm

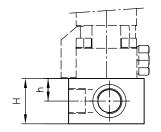


4.6 Single connection blocks for pipe connection

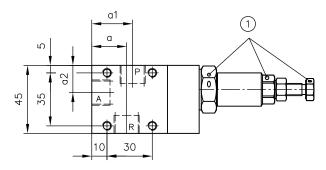
2/2 and 3/2 directional valves circuit symbol R 2, S 2, 3, Z 3

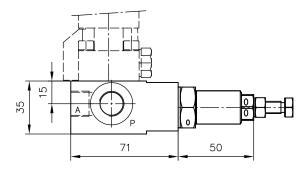
..-1/4, ..-1/4 C ..-3/8, ..-3/8 C





..1/4 S, ..1/4 SR ..3/8 S, ..3/8 SR





1 Sealing option

Coding	a	a1	a2	В	b	С	е	f	g	Н	h	L	Connection (ISO 228-1) P, R, A
1/4 (C)	29	21	20	45	35	5	30	10	M6, 10 deep	30	15	50	G 1/4
3/8 (C)	27	23	18	45	35	5	30	10	M6, 10 deep	30	15	50	G 3/8
1/4 S(SR)	21	29	20										G 1/4
3/8 S(SR)	23	27	18										G 3/8

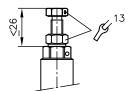


NOTICE

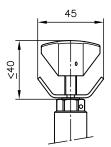
For 2/2 directional valve, port A is not present, otherwise same dimensions as 3/2 directional valve.

Adjustability

Coding ../..S (fixed)



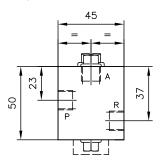
Coding ../..SR (manually adjustable)

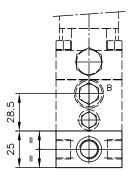




4/2-way directional valve Circuit symbol **4, Z 4**

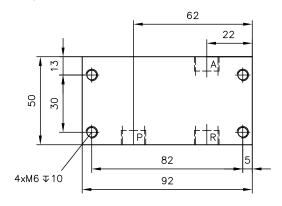
..-1/4

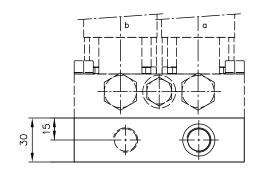


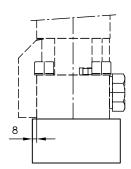


3/3-way directional valve Circuit symbol 21

..-1/4

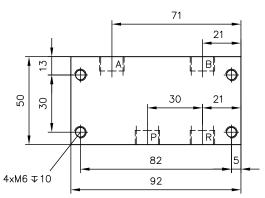


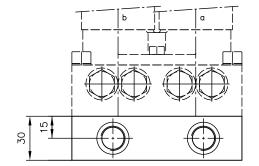


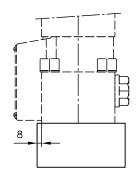


4/3-way directional valve Circuit symbol **22**

..-1/4



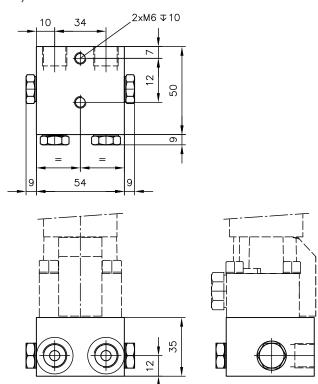






2/2-way directional valve Circuit symbol R 2, S 2

..1/4 G





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

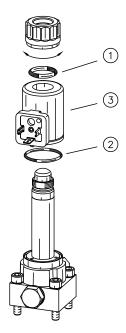
Sudden movement of the hydraulic drives when disassembled incorrectly

Risk of serious injury or death

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



5.2.1 Replacing the solenoid



- 0-ring 18.75x2.62 NBR 90 Sh
- 2 0-ring 28.00x1.50 NBR 90 Sh
- 3 Solenoid

Solenoid: see Chapter 6.1, "Accessories, spare and individual parts"



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.

- 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:

- 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 Accessories, spare and individual parts

To purchase spare parts, please see HAWE Hydraulik interactive contact map.

6.1.1 Standard additional elements

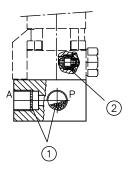
Protection of directional seated valves from coarse, occasional contamination

Directional seated valves are largely insensitive to the microfine, suspended contamination that is always present in hydraulic oil. Coarse, occasional impurities entrained by the flow of oil, such as torn particles of cuffs, scaling, swarf etc., can however lead to abrupt disturbances, if such a particle gets stuck in the valve gap and prevents the valve from closing. Therefore, the valves are already largely protected at the factory by built-in screen filters.

For further preventive protection, in the connection plates, in accordance with Chapter 4.6, "Single connection blocks for pipe connection" for the valves at P and A (B), screen discs HFC 1/4 or HFC 3/8 according to D 7235 are screwed in (as standard).

The screen filters are no substitute for conventional hydraulic filters. However, as practice shows, they are sufficient to protect small hydraulic systems against malfunctions. If such malfunctions occur, the first step should be to check the screen filters.

For clearer overview, these screen filters are not shown separately.



- 1 Screen filters HFC according to D 7235
- 2 Screen filters



6.1.2 Order coding for individual parts

Excitation system (solenoids):		Male connector:	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				

Seal kit (0-ring):

Coding	Order no.		
DS 7300-11/N 2/2, 3/2 directional valves	6800 7592-00		
DS 7300-12/N 3/3, 4/3 directional valves	6800 8850-00		

6.2 Versions for special media

HFA (water/glycol solution as per VDMA 24317)

To prevent corrosion, important functional parts are made of stainless steel (valve balls, seat, switching pin, etc.) or are hardened using the Tenifer technique (housing, tapped plug, etc.). Seals are partly made of FKM and NBR as standard for this variant. Only the 2/2, 3/2, and 4/2 directional valves are available (circuit symbols R 2, S 2, 3, Z 3 see Chapter 2.1, "Basic type and size"). Combination with explosion-proof magnet is possible.

Type designation: G 3-12-GM 24 -HFA

Size	Pressure p _{max} (bar)	Flow rate Q _{zul} (lpm) approx. with reflux counterpressure 1 bar 2 bar		Comment
12	400	5	6	A low counter-pressure in the return line is often achieved as the weight pressure of the liquid by placing the tank at the highest point of the system.

To avoid cavitation damage, the flow rate of valves with return connection (3/2 and 4/2 directional valves as well as 2/2 directional valves in bypass circuit to the tank) must be limited by upstream throttles (self-manufactured cascade throttles or throttle sections by means of helically wound pipeline with a narrow diameter) when used in storage circuits in such a way that the previously specified permissible flow values are not exceeded at the highest possible pressure for operation.

Brake fluid based on glycol
 Versions for glycol-based brake fluid (e.g. ATE) or other special media with seals made of EPDM (ethylene-propylene-diene rubber).

Type designation: GR 2-12-GM 24 -AT

Media where FKM (Viton) seals (fluorocarbon rubber) are necessary e.q. some HFD fluids (flame retardant, as per VDMA 24317)

Type designation: GS 2-12-WGM 230 -PYD





Additional versions

- Directional seated valve type G, WG and others: D 7300
- Directional seated valve type NBVP 16: D 7765 N
- Directional seated valve type ROLV: D 8144
- Valve bank (directional seated valve) type VB: D 7302



HAWE Hydraulik SE

D 7300-12 12-2022-1.6