Directional spool valve type HSL, HSF

Product documentation

Operating pressure p_{max}:	400 bar
Flow rate Q_{max}:	160 l/min

D 7493/1
09-2023-1.0 en

HAWE HYDRAULIK

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1 Overview Directional spool valve type HSL, HSF

Directional spool valves are a type of directional valve. They control the direction of movement of single and double-acting hydraulic consumers.

The directional spool valve type HSL is a single valve for pipe connection. Type HSF is a manifold mounting valve. Due to its robust design, operating pressures up to 400 bar are achievable.

Adjustable thread type throttles are used to adjust the response time. This prevents harsh consumer operations and decompression surges, which can occur particularly in the event of high pressure and large consumer volumes.

Directional spool valve type HSF

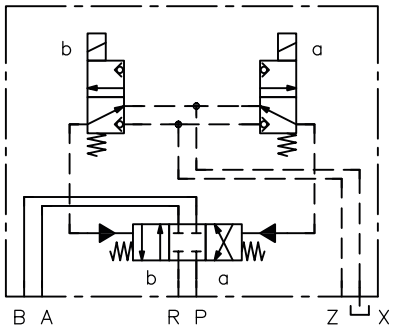
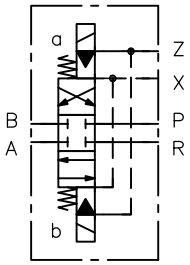
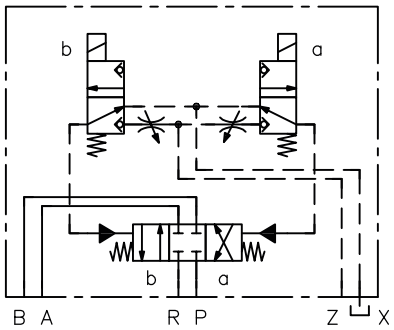
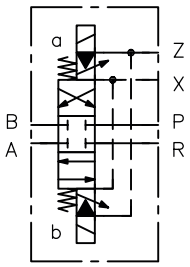
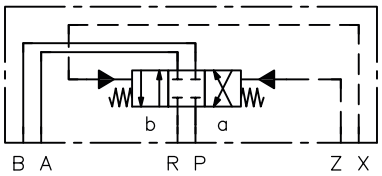
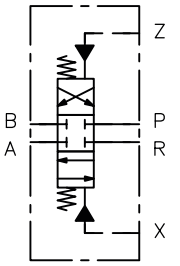
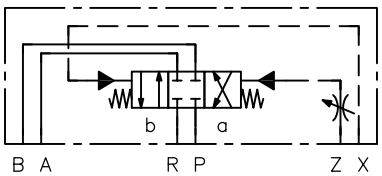
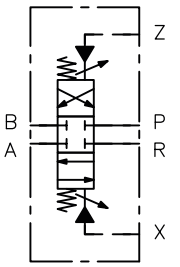
Features and advantages

- Sturdy design
- Wide variety of circuit symbol variants
- High flow rates are gently switched
- Suitable for high pressure thanks to steel housing
- Optionally also possible with response time adjustment

Intended applications

- Mining machinery
- Cranes and lifting equipment
- Construction and construction materials machinery
- Material handling (industrial trucks, etc.)

1.1 Type overview

Description	Detailed circuit symbols	Simplified circuit symbols
Standard version with: ▪ Pilot valve type WN 1 H according to D 7470 A/1 Ordering example: **HSL 3 G-G 24**		
Version with response time adjustment (throttled) comprising: ▪ Pilot valve type WN 1 H according to D 7470 A/1 ▪ Grub screws ISO 4026-M6x40 for the response time adjustment Ordering example: **HSL 3 G 1-G 24**		
Version without pilot valve Ordering example: **HSL 3 G-X**		
Version without pilot valve, with response time adjustment, comprising: ▪ Grub screw ISO 4026-M6x40 for the response time adjustment (in the Z control port only) ▪ Throttle valve e.g. type FG or FG-S 6 according to D 7275 in the X control line (not included in the scope of delivery) Ordering example: **HSL 3 G 1-X**		

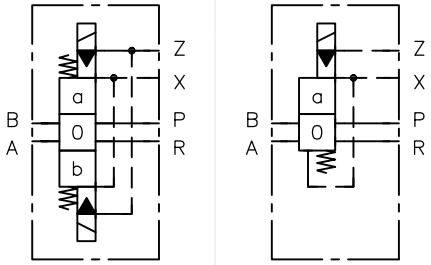
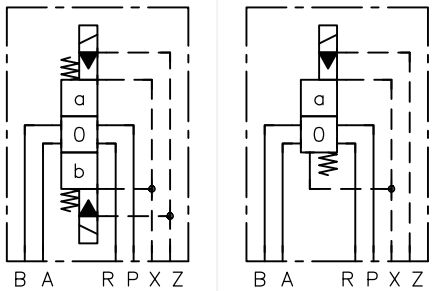
2 Available versions

Ordering example

HSL 3 | W | 1 | 2 | -G 24

- -G 24 → 2.5 "Solenoid voltage of pilot valve"
- 2 → 2.4 "Actuation"
- 1 → 2.3 "Response time adjustment"
- W → 2.2 "Circuit symbols"
- HSL 3 → 2.1 "Basic type and size"

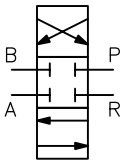
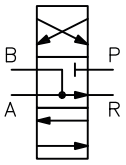
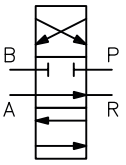
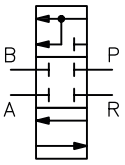
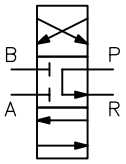
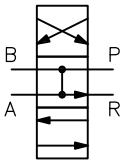
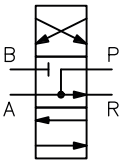
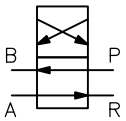
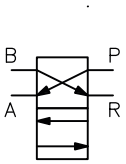
2.1 Basic type and size

Type	Flow rate Q_{max} (l/min)	Pressure p_{max} (bar)		Ports (ISO 228-1)		Circuit symbol
		P, R, A, B	Z, X **	P, R, A, B	Z, X	
Single valve for pipe connection						
HSL 3	80	400	160	G 1/2	G 1/4	
HSL 4	160			G 3/4	G 1/4	
Single valve for manifold mounting						
HSF 3	80	400	160	*	*	
HSF 4	160			*	*	

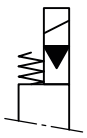
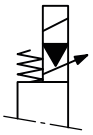
* For ports for a single valve for manifold mounting see Chapter 4.3, "Single valve for manifold mounting type HSF 3" and Chapter 4.4, "Single valve for manifold mounting type HSF 4"

** Pilot pressure: max. 160 bar, min. 10 bar; optimum operating range 15 to 40 bar, either from own control circuit or via a pressure reducing valve e.g. ADC 1-25 according to D 7458.

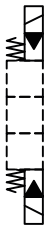
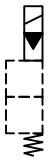
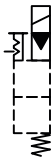
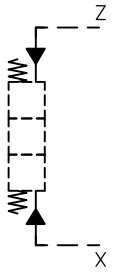
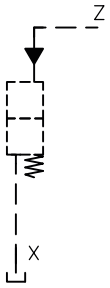
2.2 Circuit symbols

Coding	Description	Circuit symbol			
G, D, E, C	4/3-way directional spool valve for parallel circuit	G 	D 	E 	C 
L, H, F	4/3-way directional spool valve with idle circulation P → R for series circuit	L 	H 	F 	
W, B	4/2-way directional spool valve for parallel circuit - Circuit symbol **B** only for **HSF 3, HSF 4**	W 	B 		

2.3 Response time adjustment

Coding	Description	Circuit symbol
without coding	Standard version without response time adjustment	
1	Version with response time adjustment	

2.4 Actuation

Coding	Description	Circuit symbol	
without coding	Standard actuation by an electrically switched pilot valve type WN 1 H according to D 7470 A/1		
2	Like standard actuation, but with detent - Only available in combination with **HSL** and circuit symbol **W**	-	
X	Hydraulic remote control without pilot valve - Provide for throttle valve e.g. type FG or FG-S 6 according to D 7275 for the control line at port X (see Chapter 1.1, "Type overview")		

2.5 Solenoid voltage of pilot valve

For further solenoid voltages see D 7470 A/1

Coding	Electrical connection	Nominal voltage
G 12 **G 24** **X 12** **X 24**	EN 175 301-803 A ▪ **G:** with male connector (MSD 3-309 acc. to D 7163) ▪ **X:** without male connector	12 V DC 24 V DC 12 V DC 24 V DC
L 12 **L 24** **L5K 12** **L5K 24** **L10K 12** **L10K 24**	▪ **L:** with male connector with LED (SVS 296365 acc. to D 7163) ▪ **L5K:** with male connector with LED and 5 m cable (L5K-VZP acc. to D 7163 Erg. 78/1) ▪ **L10K:** with male connector with LED and 10 m cable (L10K-VZP acc. to D 7163 Erg. 78/1)	12 V DC 24 V DC 12 V DC 24 V DC 12 V DC 24 V DC
WG 110 **WG 230**	▪ **WG:** with male connector with alternating rectifier (MSD4-209-P10 acc. to D 7163)	110 V AC 230 V AC
S 12 **S 24**	SCHLEMMER (bayonet PA 6)	12 V DC 24 V DC

3 Parameters

3.1 General data

Designation	Directional spool valve
Design	Spool valve
Model	Single valve for pipe connection or manifold mounting
Material	Spool block: steel, surface electro-galvanised Valve spool hardened, ground and deburred by polishing
Attachment	Mounting thread or tapped holes, see Chapter 4, "Dimensions"
Installation position	As desired
Ports/connections	▪ **P** = Pump ▪ **R** = Reflux ▪ **A, B** = Consumers ▪ **Z** = Control oil inlet ▪ **X** = Control oil outlet for standard actuation without coding and for actuation coding 2, see Chapter 2.4, "Actuation" ▪ **X** = Control oil inlet for actuation coding X, see Chapter 2.4, "Actuation"
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 - 1500 mm²/s Optimal operating range: approx. 10 - 500 mm²/s Also suitable for biologically degradable hydraulic fluids type HEES (synthetic ester) at operating temperatures up to approx. +70°C.
Cleanliness level	**ISO 4406** 20/17/14
Temperatures	Environment: approx. -25 to +80°C, hydraulic fluid: -25 to +80°C, ensure the correct 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.

3.2 Pressure and volumetric flow

Operating pressure	p_{max} = 400 bar (ports P, R, A, B)
Pilot pressure	10 bar < p_{max} < 160 bar (ports Z, X) Optimum range: 15 bar < p_{max} < 40 bar
Flow rate	see Chapter 2.1, "Basic type and size"

3.3 Weight

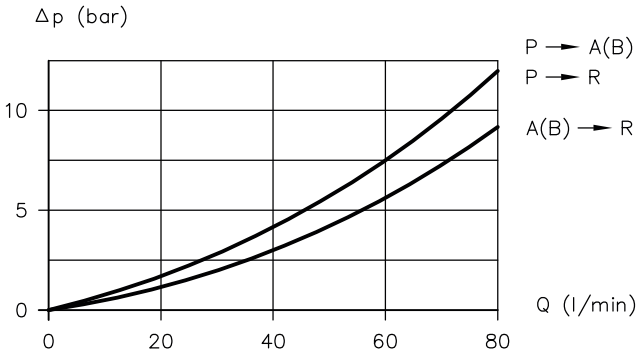
Type	
HSL 3, HSF 3	= 2.8 kg
HSL 4, HSF 4	= 5.0 kg

3.4 Characteristic lines

Viscosity of the hydraulic fluid approx. 60 mm²/s

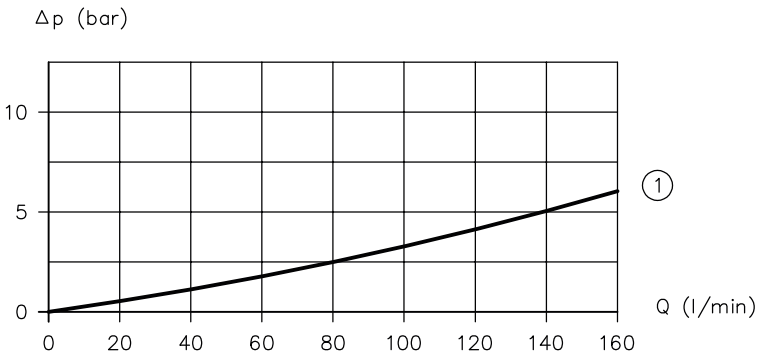
Flow resistance

HSL 3, HSF 3



Q flow rate (l/min); Δp pressure difference (bar)

HSL 4, HSF 4



Q flow rate (l/min); Δp pressure difference (bar)

1 all flow directions

3.5 Electrical data

Coding		G 12 X 12 L 12	G 24 X 24 L 24	WG 110	WG 230
Nominal voltage U_N		12 V DC	24 V DC	110 V AC	230 V AC
Nominal current I_N		2.14 A	1.02 A	0.25 A	0.15 A
Nominal power P_N		25.7 W	24.5 W	27.4 W	31.4 W
Switching time of pilot valve (ms)	On	60 to 70	60 to 70	120 to 270	120 to 270
	Off	30 to 60	30 to 60	60 to 180	60 to 180
Switching frequency		3600 switches/h			

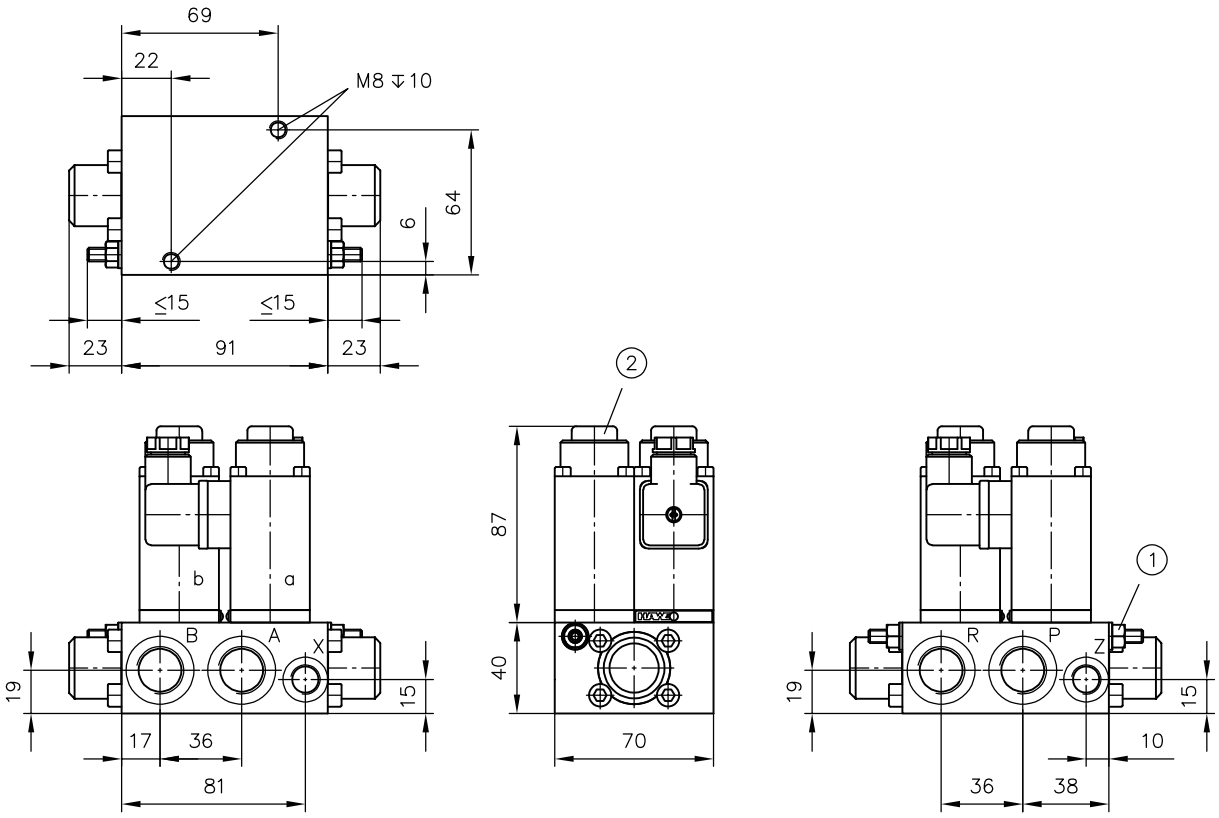
4 Dimensions

All dimensions in mm, subject to change.

4.1 Single valve for pipe connection type HSL 3

Standard actuation

Circuit symbols **G, D, E, C, L, H, F**



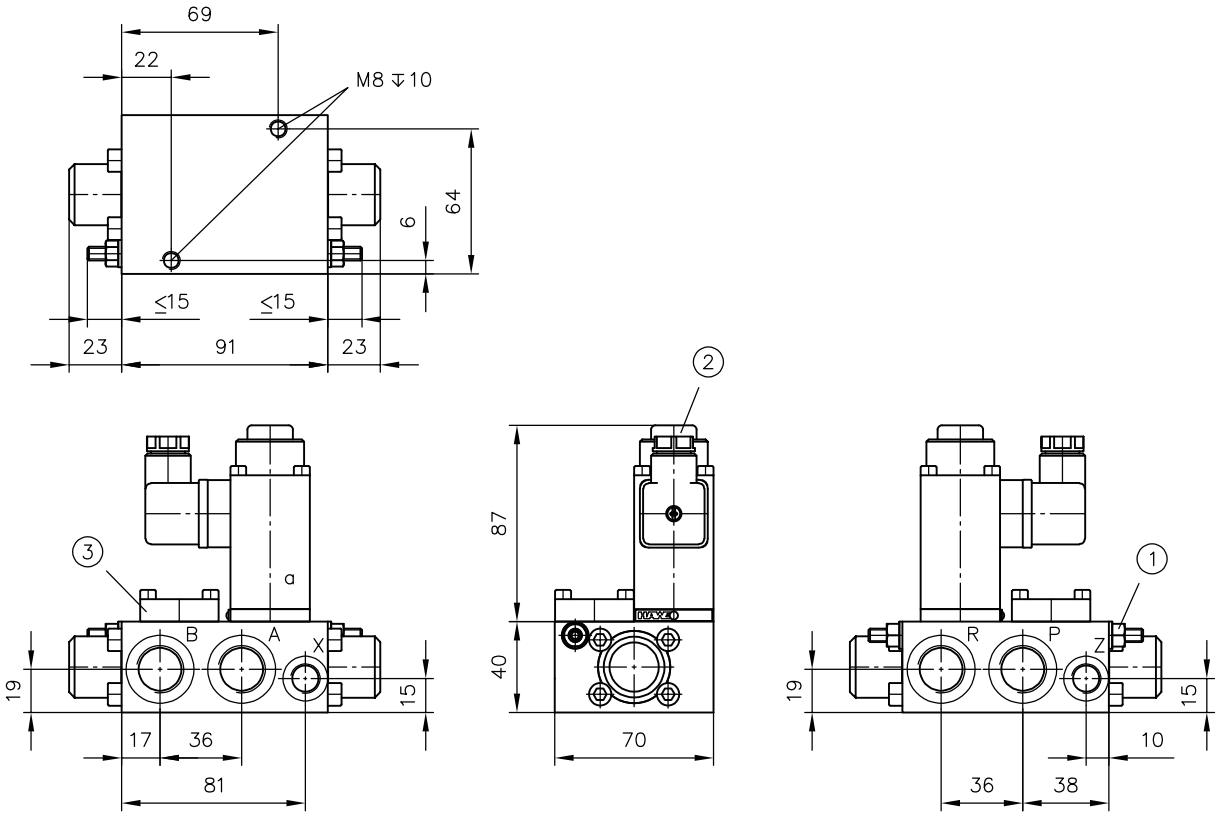
1 Adjusting screw for response time adjustment (size 3 hex socket, size 10 lock nut)
On version without response time adjustment: sealed with M6 tapped plug

2 Directional seated valve, see D 7470 A/1

NOTICE

Lock nut: before adjusting the throttle screw, completely loosen the SEAL-Lock collar nut in order to relieve the load on the integrated elastomer sealing ring in the thread.

Circuit symbol **W**



1 Adjusting screw for response time adjustment (size 3 hex socket, size 10 lock nut)
On version without response time adjustment: sealed with M6 tapped plug

2 Directional seated valve, see D 7470 A/1

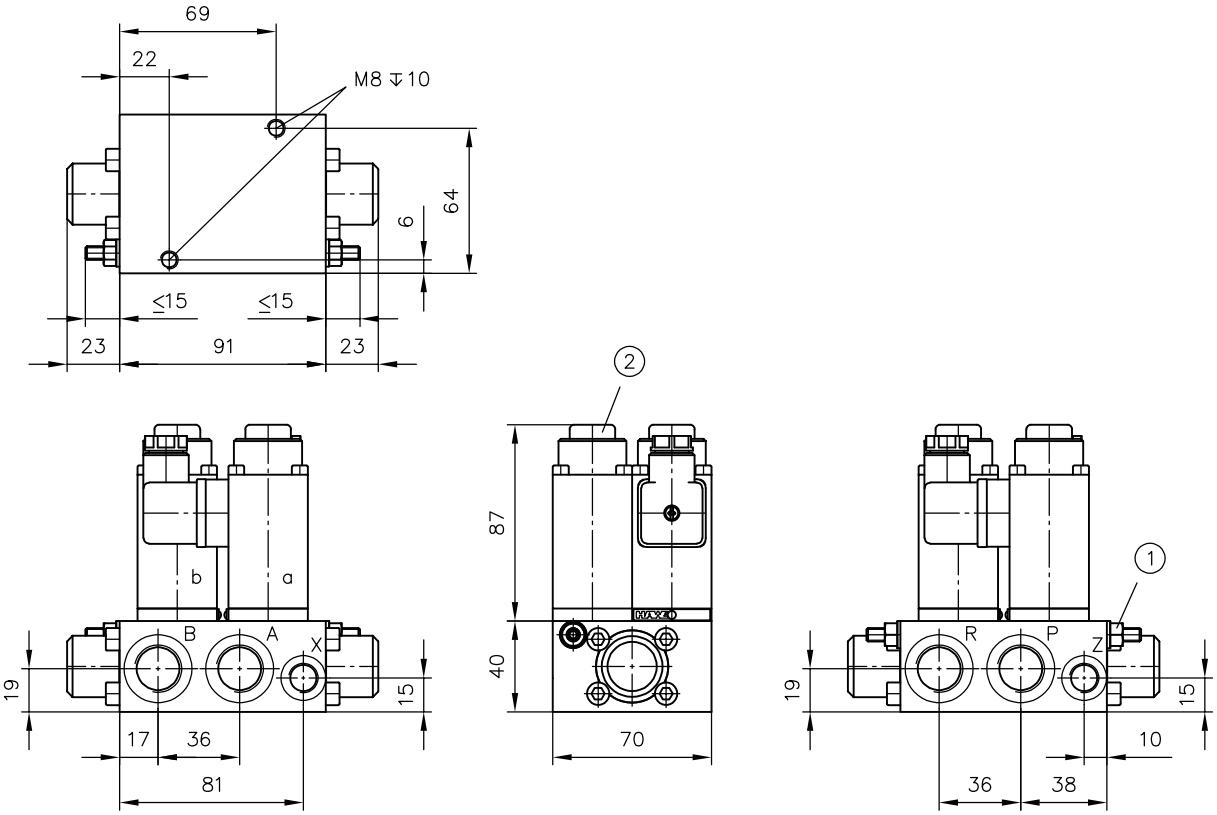
3 Idle circulation plate 7470 058

NOTICE

Lock nut: before adjusting the throttle screw, completely loosen the SEAL-Lock collar nut in order to relieve the load on the integrated elastomer sealing ring in the thread.

Actuation with detent coding 2

Circuit symbol **W**

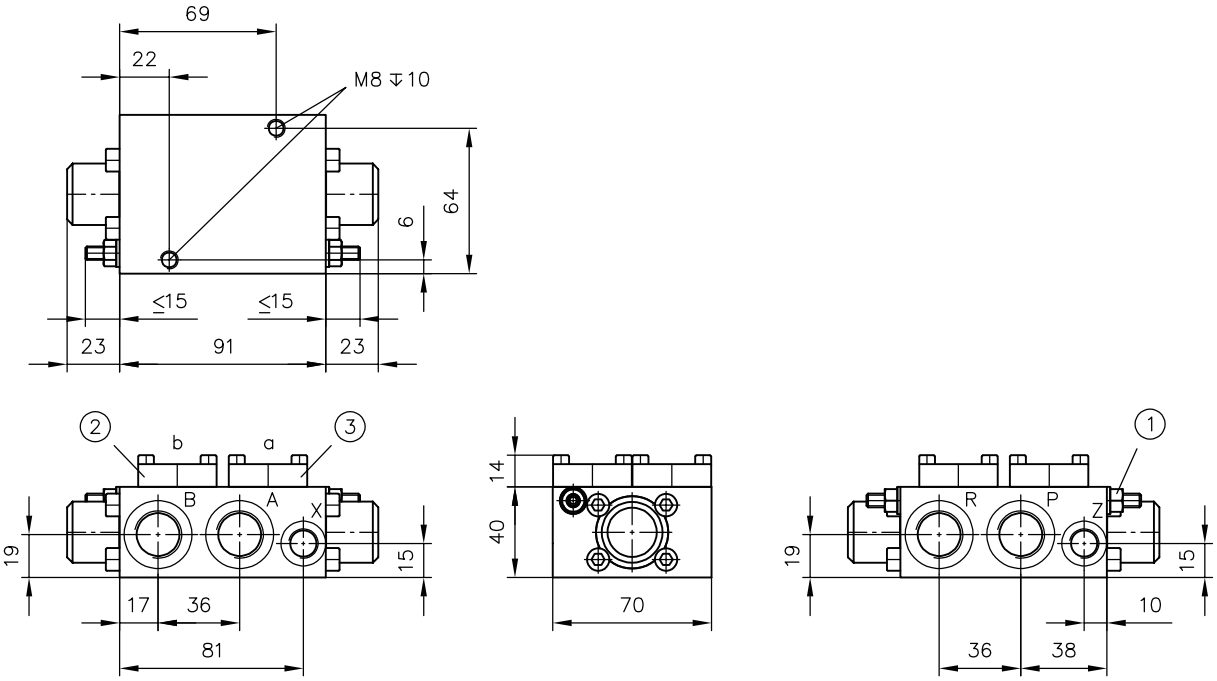


1 Adjusting screw for response time adjustment (size 3 hex socket, size 10 lock nut)
On version without response time adjustment: sealed with M6 tapped plug

2 Directional seated valve, see D 7470 A/1

Hydraulic remote control without pilot valve coding X

Circuit symbols **G, D, E, C, L, H, F, W**



1 Adjusting screw for response time adjustment (size 3 hex socket, size 10 lock nut)
On version without response time adjustment: sealed with M6 tapped plug

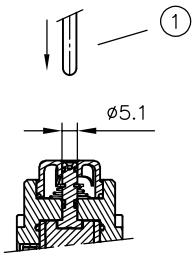
2 Idle circulation plate 7470 058

3 Idle circulation plate 7470 056

NOTICE

Lock nut: before adjusting the throttle screw, completely loosen the SEAL-Lock collar nut in order to relieve the load on the integrated elastomer sealing ring in the thread.

Manual override

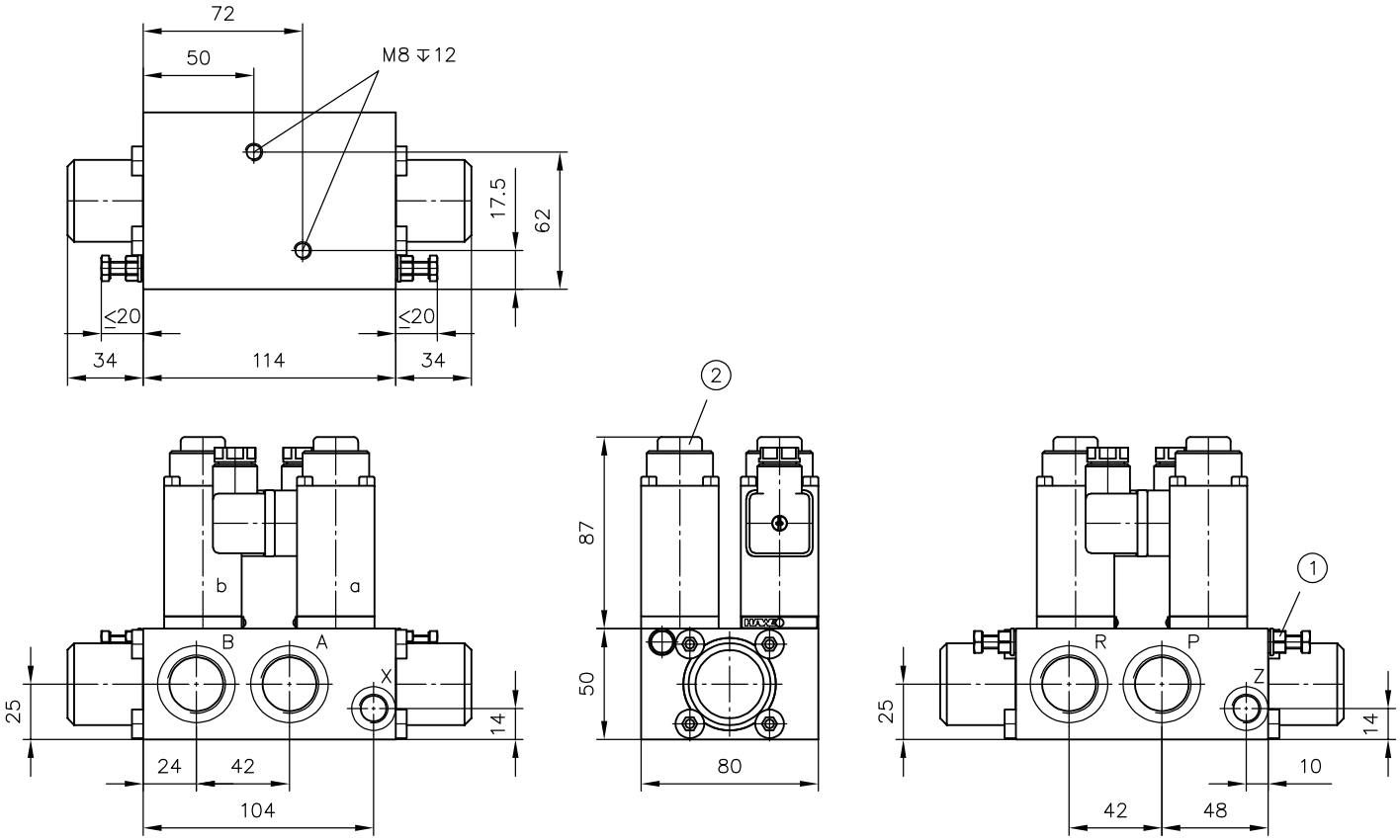


1 Auxiliary tool for actuation
Do not use any parts with sharp edges!

4.2 Single valve for pipe connection type HSL 4

Standard actuation

Circuit symbols **G, D, E, C, L, H, F**



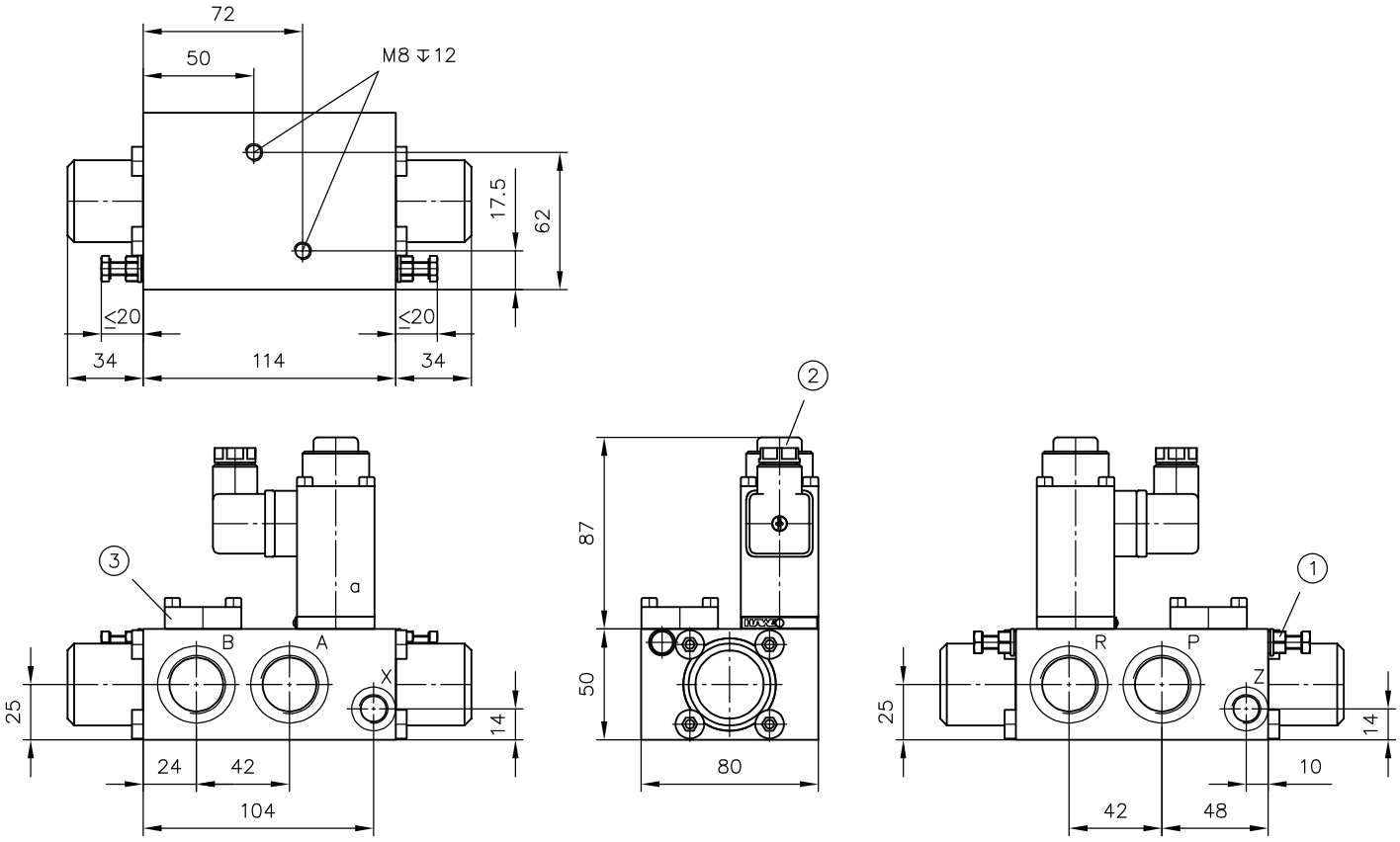
1 Adjusting screw for response time adjustment (size 3 hex socket, size 10 lock nut)
On version without response time adjustment: sealed with M6 tapped plug

2 Directional seated valve, see D 7470 A/1

NOTICE

Lock nut: before adjusting the throttle screw, completely loosen the SEAL-Lock collar nut in order to relieve the load on the integrated elastomer sealing ring in the thread.

Circuit symbol **W**



1 Adjusting screw for response time adjustment (size 3 hex socket, size 10 lock nut)
On version without response time adjustment: sealed with M6 tapped plug

2 Directional seated valve, see D 7470 A/1

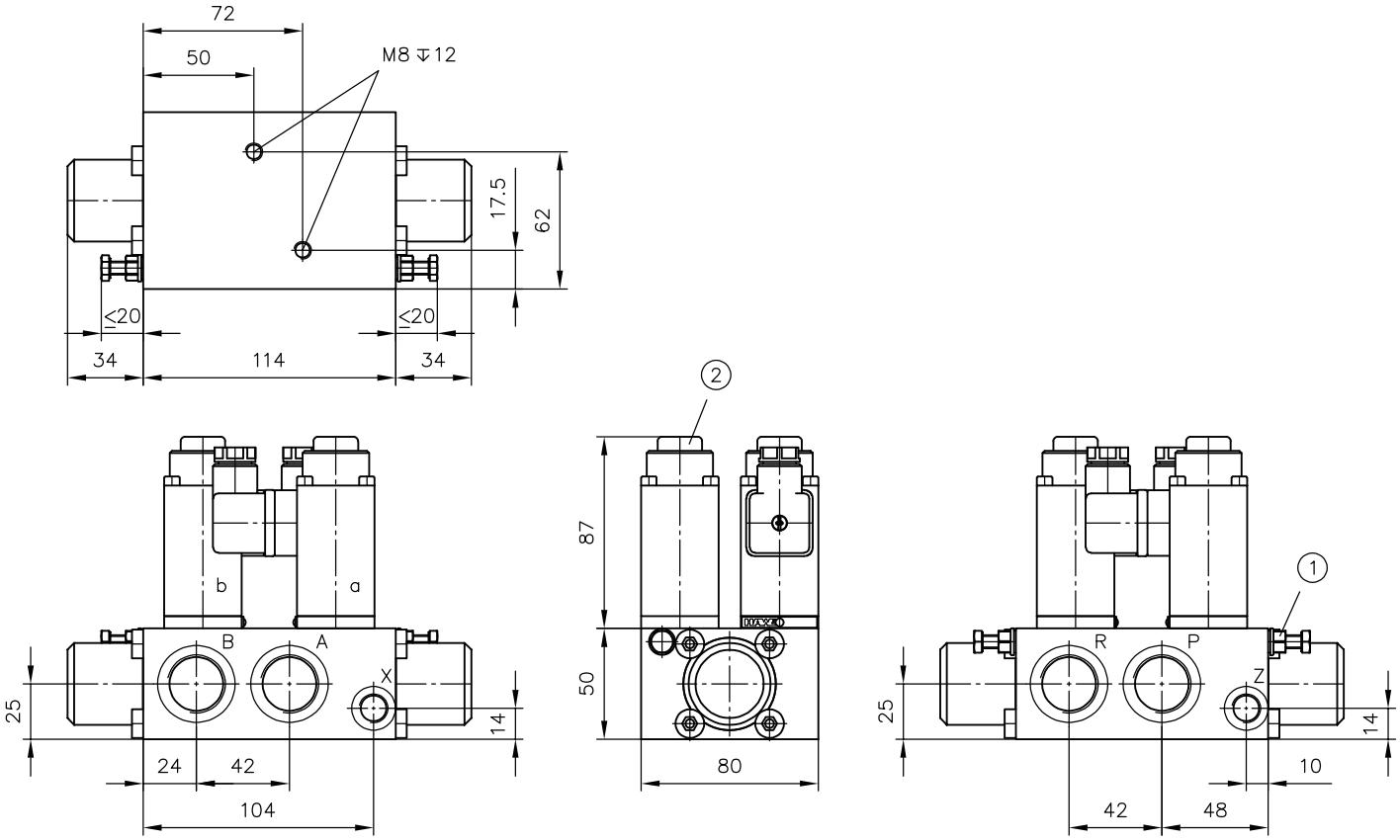
3 Idle circulation plate 7470 058

NOTICE

Lock nut: before adjusting the throttle screw, completely loosen the SEAL-Lock collar nut in order to relieve the load on the integrated elastomer sealing ring in the thread.

Actuation with detent

Circuit symbol **W**

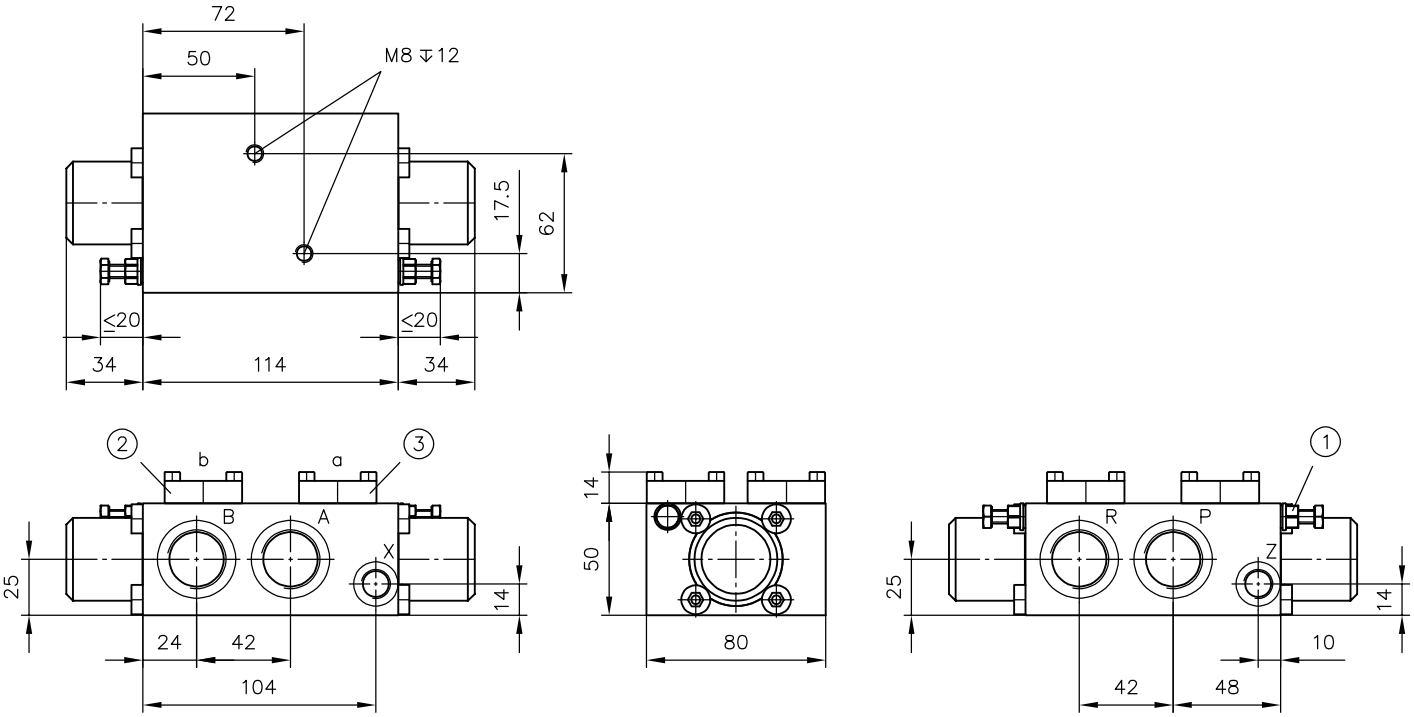


1 Adjusting screw for response time adjustment (size 3 hex socket, size 10 lock nut)
On version without response time adjustment: sealed with M6 tapped plug

2 Directional seated valve, see D 7470 A/1

Hydraulic remote control without pilot valve coding X

Circuit symbols **G, D, E, C, L, H, F, W**



1 Adjusting screw for response time adjustment (size 3 hex socket, size 10 lock nut)
On version without response time adjustment: sealed with M6 tapped plug

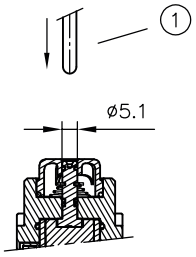
2 Idle circulation plate 7470 058

3 Idle circulation plate 7470 056

NOTICE

Lock nut: before adjusting the throttle screw, completely loosen the SEAL-Lock collar nut in order to relieve the load on the integrated elastomer sealing ring in the thread.

Manual override

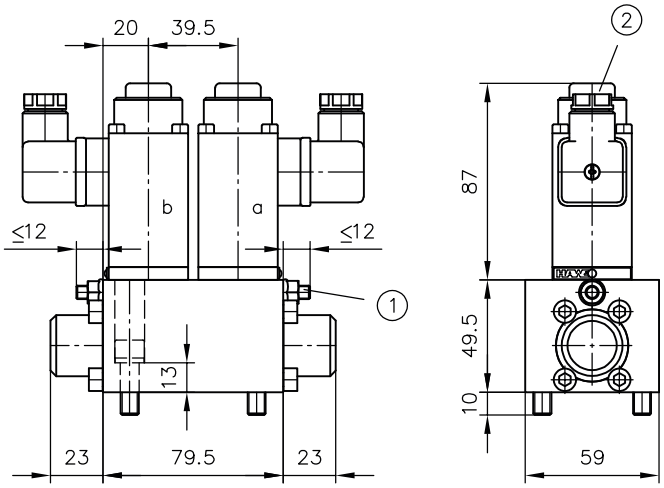


1 Auxiliary tool for actuation
Do not use any parts with sharp edges!

4.3 Single valve for manifold mounting type HSF 3

Standard actuation

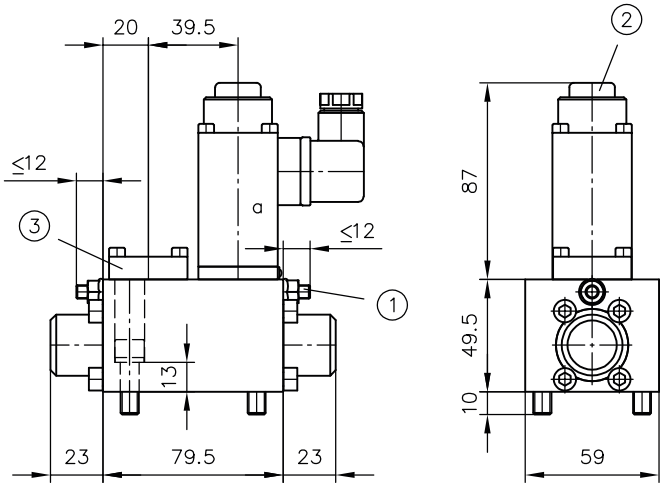
Circuit symbols **G, D, E, C, L, H, F**



1 Adjusting screw for response time adjustment – size 10 hex bolt
On version without response time adjustment: sealed with M6 tapped plug

2 Directional seated valve, see D 7470 A/1

Circuit symbols **W, B**



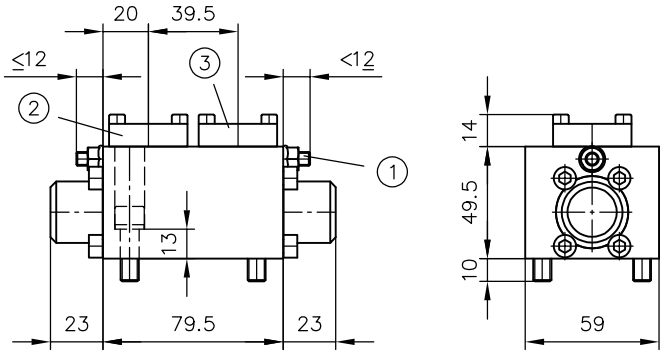
1 Adjusting screw for response time adjustment – size 10 hex bolt
On version without response time adjustment: sealed with M6 tapped plug

2 Directional seated valve, see D 7470 A/1

3 Idle circulation plate 7470 058

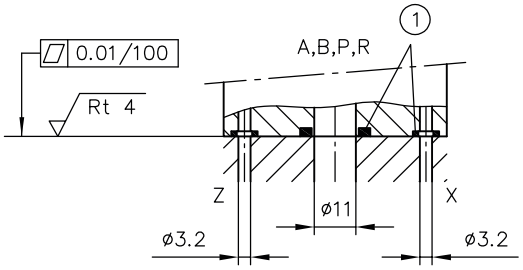
Hydraulic remote control without pilot valve coding X

Circuit symbols **G, D, E, C, L, H, F, W**

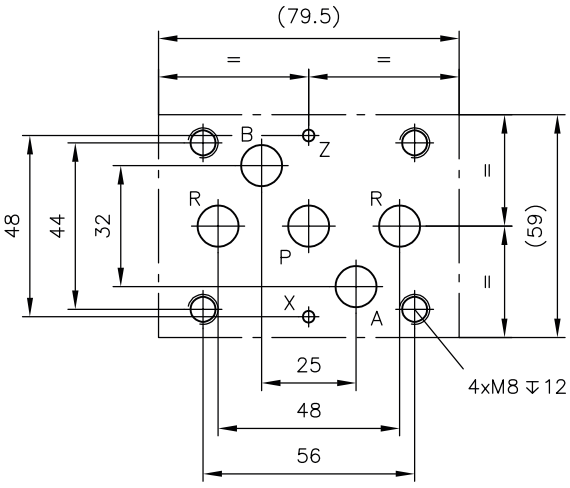


1 Adjusting screw for response time adjustment – size 10 hex bolt
On version without response time adjustment: sealed with M6 tapped plug
2 Idle circulation plate 7470 058
3 Idle circulation plate 7470 056

Hole pattern of the base plate

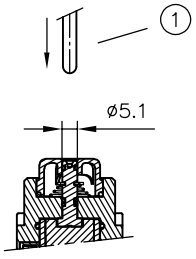


1 O-ring NBR 90 Sh



Ports	Spool housing sealed with O-ring NBR 90 Sh
A, B	18.75x2.62
P, R	20.29x2.62
X, Z	4.47x1.78

Manual override

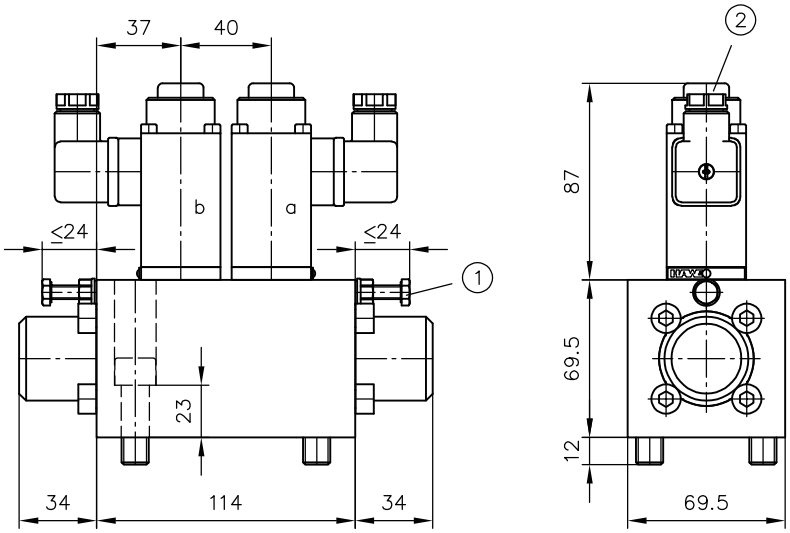


1 Auxiliary tool for actuation
Do not use any parts with sharp edges!

4.4 Single valve for manifold mounting type HSF 4

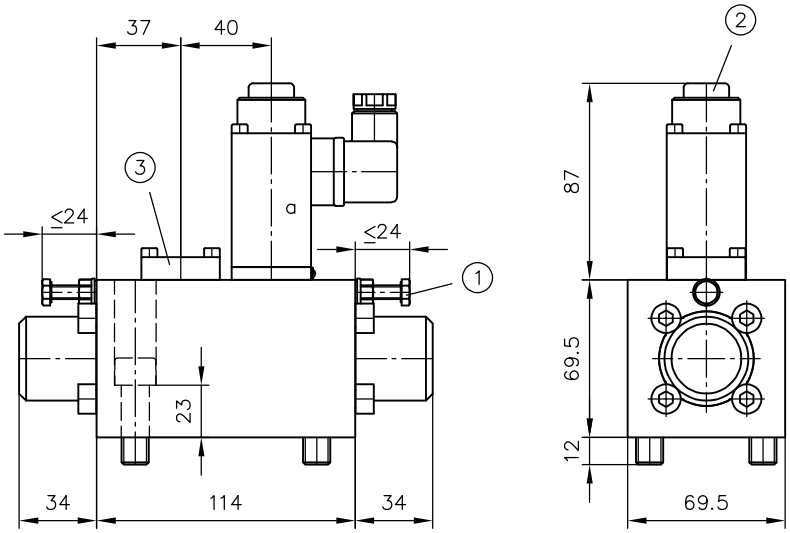
Standard actuation

Circuit symbols **G, D, E, C, L, H, F**



1 Adjusting screw for response time adjustment – size 10 hex bolt
On version without response time adjustment: sealed with M6 tapped plug
2 Directional seated valve, see D 7470 A/1

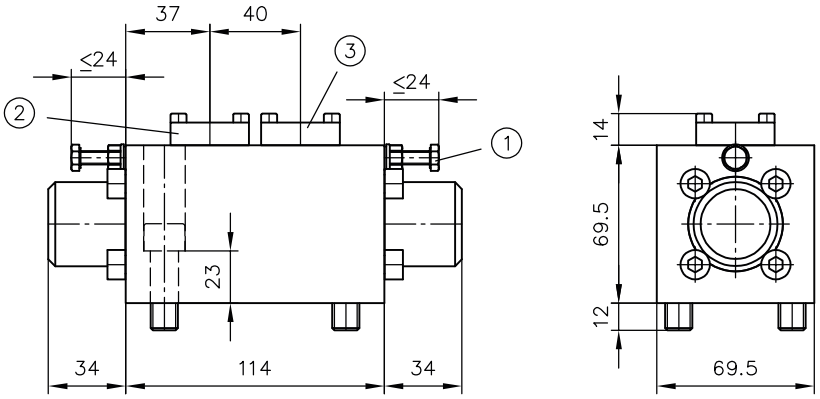
Circuit symbols **W, B**



1 Adjusting screw for response time adjustment – size 10 hex bolt
On version without response time adjustment: sealed with M6 tapped plug
2 Directional seated valve, see D 7470 A/1
3 Idle circulation plate 7470 058

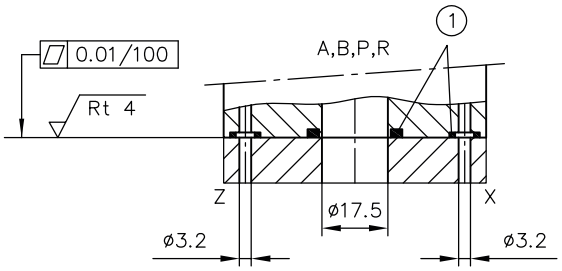
Hydraulic remote control without pilot valve coding X

Circuit symbols **G, D, E, C, L, H, F, W**



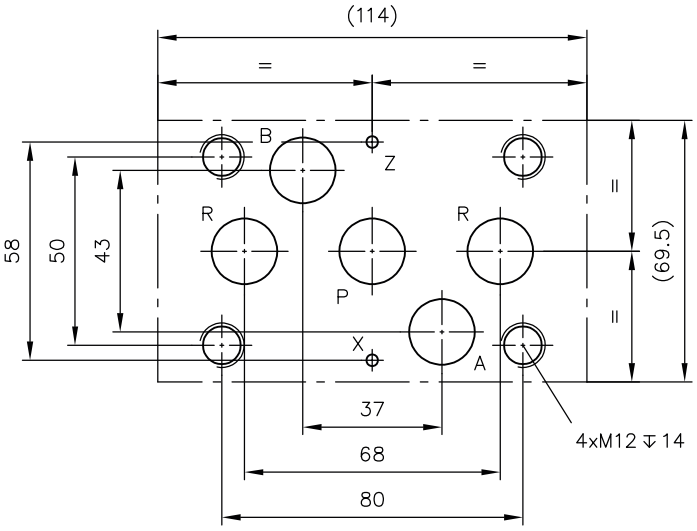
1 Adjusting screw for response time adjustment – size 10 hex bolt
On version without response time adjustment: sealed with M6 tapped plug
2 Idle circulation plate 7470 058
3 Idle circulation plate 7470 056

Hole pattern of the base plate

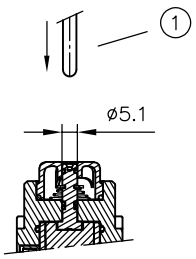


1 O-ring NBR 90 Sh

Ports	Spool housing sealed with O-ring NBR 90 Sh
A, B	18.75x2.62
P, R	20.29x2.62
X, Z	4.47x1.78



Manual override



1 Auxiliary tool for actuation
Do not use any parts with sharp edges!

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.

5.3 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

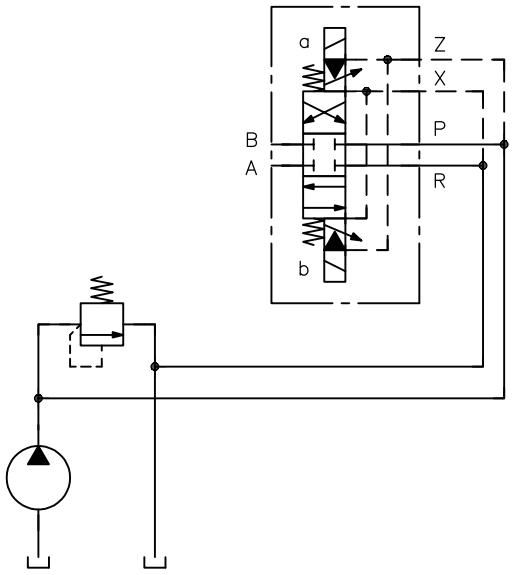
6.1 Other circuit examples

Example 1

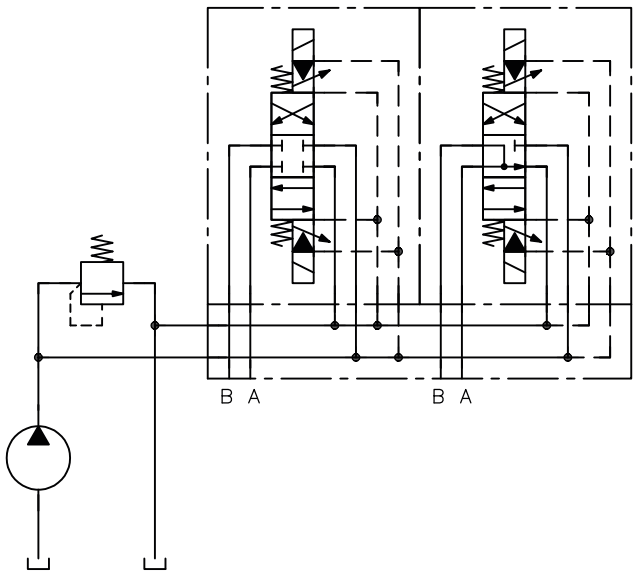
Simplest control system with spools suitable for a parallel circuit (circuit symbols G, D, E, C).
Control oil is taken and returned internally using ports X and Z.

Permitted up to approx. 160 bar (see Chapter 3.2, "Pressure and volumetric flow") and provided that no pressure surges (decompression surges) are expected in the return line.

HSL 3 G 1–G 24



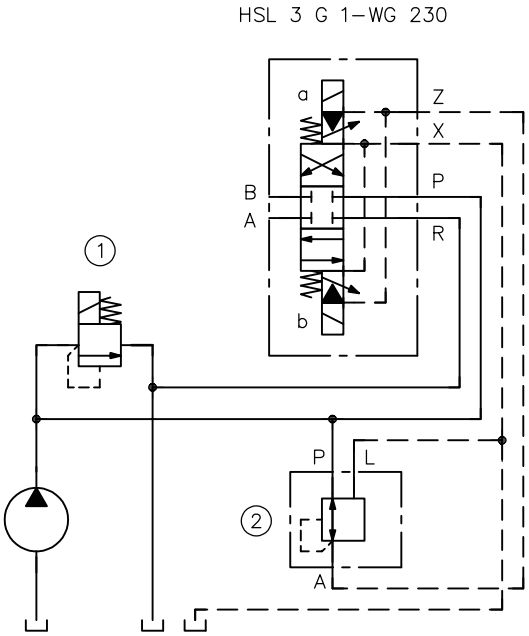
HSF 3 G 1–WG 230 HSF 3 D 1–WG 230



Example 2

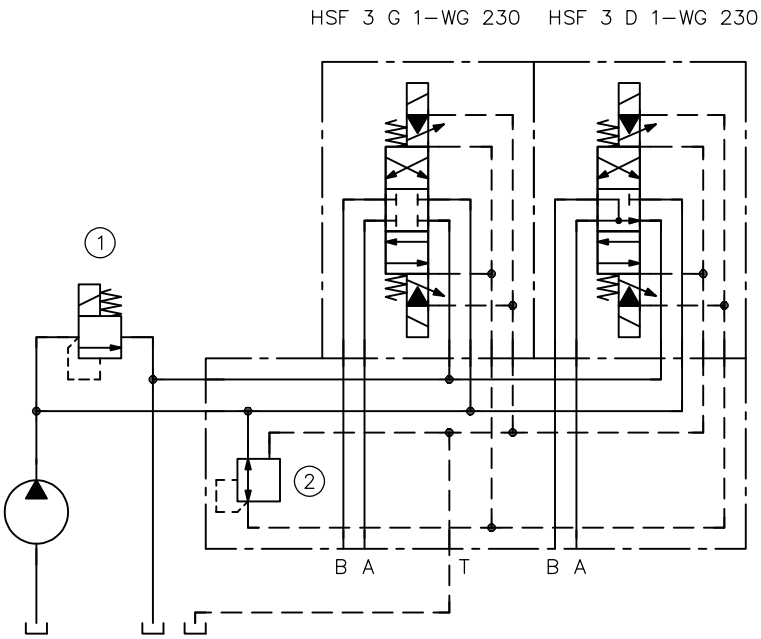
Same control task as in example 1; however, the control oil is taken from a pressure circuit of >160 bar via a separate pressure reducing valve e.g. type ADC 1-25-1/4 according to D 7458, which restricts the pressure in the control oil circuit to approx. 30 bar.

If pressure surges are expected in the return line, it is advisable to return the control oil to the tank via a dedicated line.



1 Type DV... - WN 1F-... according to D 4350 for pump idle circulation

2 e.g. pressure reducing valve type ADC 1-25-1/4 according to D 7458



1 Type DV... - WN 1F-... according to D 4350 for pump idle circulation

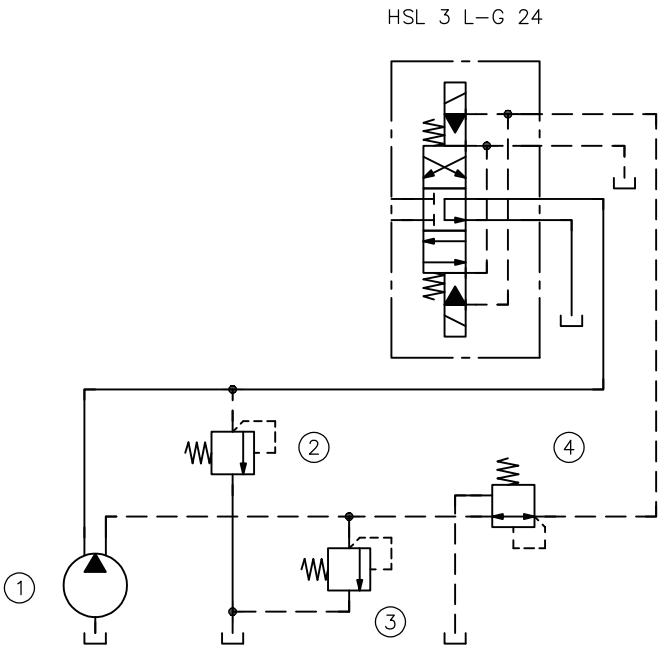
2 e.g. pressure reducing valve type ADC 1-25 according to D 7458

Example 3

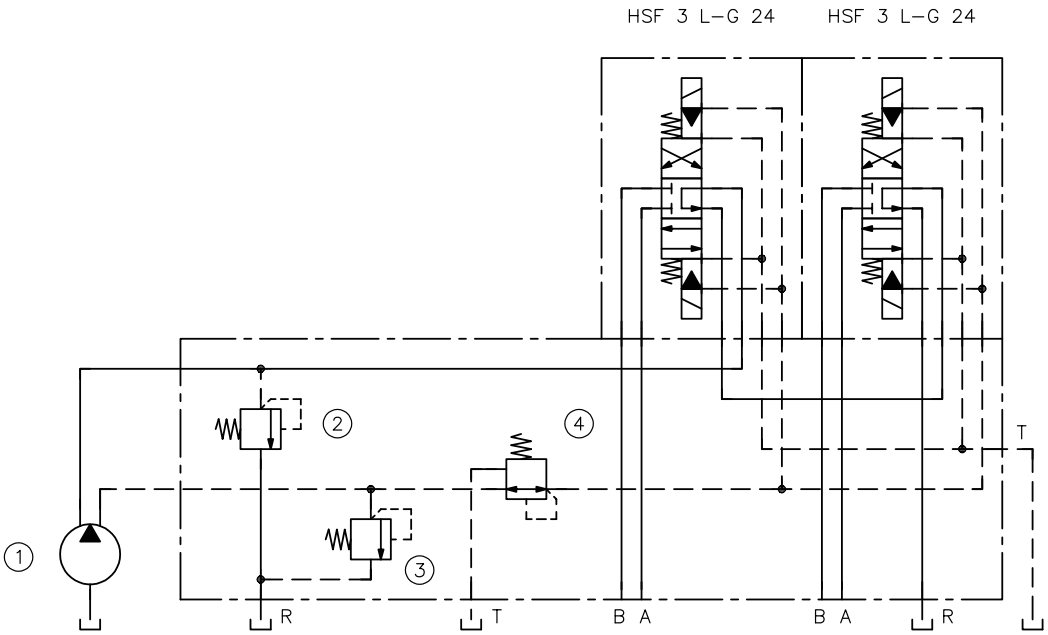
With the circuit symbols L, H and F, it is usually not possible to take the control oil directly from the pump pressure line because the circulation pressure when in the neutral position does not reach the minimum pilot pressure required for switching, especially if there is only one valve section, for example.

It is advisable to use a pump with a separate control circuit here, e.g. according to D 6010 S or a completely separate control circuit, e.g. gear pump with approx. 0.5 to 1 l/min, safeguarded with approx. 20 bar.

In this case, an ADC 1-25 is not required. However, pay attention to the total flow resistances, particularly if multiple valve sections are arranged in series.



1 Type R 58.6-1.2 according to D 6010 S
2 Type MV 6 C according to D 7000/1
3 Type MV 4 F according to D 7000/1
4 Type ADC 1-25-1/4 according to D 7458



1 Type R 58.6-1.2 according to D 6010 S
2 Type MV 6 C according to D 7000/1
3 Type MV 4 F according to D 7000/1
4 Type ADC 1-25 according to D 7458

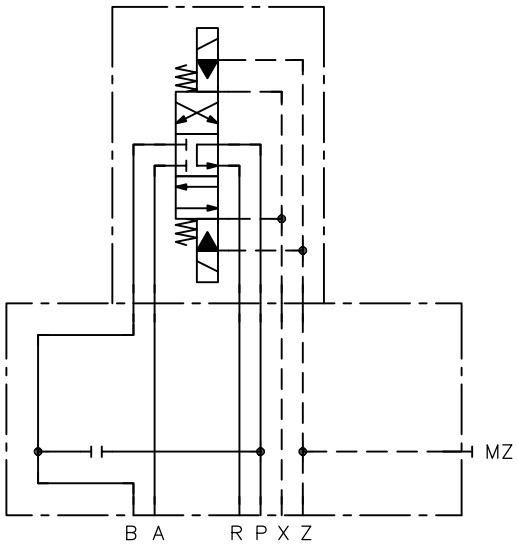
6.2 Accessories, spare and individual parts

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

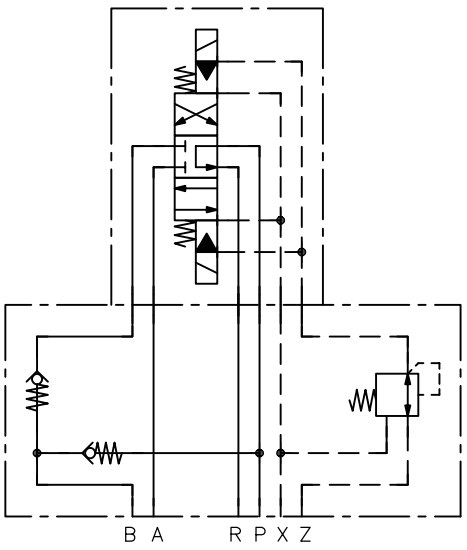
6.2.1 Changing over from HSP to HSF

The following intermediate plates are required to change over from HSP to HSF:

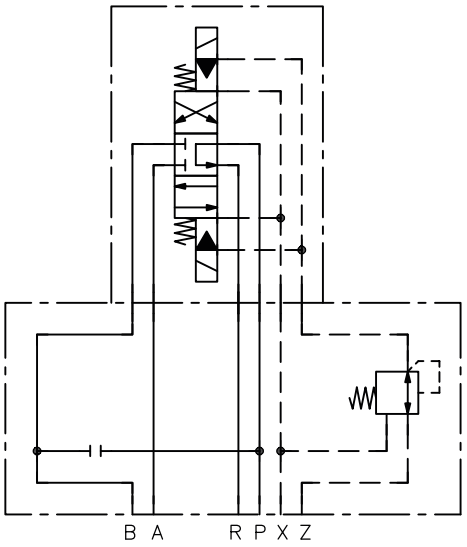
Intermediate plate for changing over from HSP 3 to HSF 3

Type designation	Material number	Circuit symbol
MANIFOLD 17-067-H-00-00	8800 9950-00	

Intermediate plate for changing over from HSP 5 to HSF 4; with differential function and with pressure reducing valve

Type designation	Material number	Circuit symbol
MANIFOLD 16-123-H-00-00	8800 9721-00	

Intermediate plate for changing over from HSP 5 to HSF 4; without differential function and with pressure reducing valve

Type designation	Material number	Circuit symbol
MANIFOLD 16-123-H-01-00	8800 9915-00	

Changing over from HSP type designation and material numbers to HSF

HSP type designation	HSP material number	HSF type designation	HSF material number
HSP 4/3 L 4-3-G3-1B-L 24	6963 0673-10	HSF 3 L 1-G 24	6900 4683-00
HSP 4/3 C 2-3-G 3-1 B-G 24	6963 0620-31	HSF 3 C-G 24	6950 5103-00
HSP 4/3 D2-3-WN 1 H-X 24	6963 0236-15	HSF 3 D-X 24	6963 1519-81
HSP 4/3 L2-3-X	6963 0160-88	HSF 3 L-X	6800 1731-07
HSP 4/3 G4-3-G3-1B-G 24-33	6963 0087-72	HSF 3 G 1-33-G 24	6963 0748-36
HSP 4/3 L4-3-G 3-1 B-G 24-33	6959 6844-00	HSF 3 L 1-33-G 24	6963 1054-32
HSP 4/3 G2-5-G 3-1 B-N 24	6958 4884-00	HSF 4 G-G 24	6950 0820-00
HSP 4/2 W1-5-EXG 3-1 B-G 24EX	6957 0838-00	HSF 3 W-G 24	6800 1891-02
HSP 4/3 L 4-3-G 3-1 B-G 24-B 33	6955 1423-00	HSF 3 L 1-33-G 24	6963 1054-32
HSP 4/3 L 4-5-G 3-1 B-N 24	6954 9929-00	HSF 4 L 1-G 24	6900 4659-00
HSP 4/3 L 2-5-X	6954 6590-00	HSF 4 L-X	6800 2083-07
HSP 4/3 G 2-5-X	6954 2413-00	HSF 4 G-X	6800 2083-01
HSP 4/3 L 3-3-X	6953 7722-00	HSF 3 L 1-X	6800 1938-07
HSP 4/2 W 4-5-WG 3-1 B-WG 230	6951 6277-00	HSF 4 W 1-WG 230	6963 0664-00
HSP 4/3 L 4-3-X	6950 9132-00	HSF 3 L 1-X	6800 1938-07
HSP 4/3 D 2-5-WN 1 H-B 0.7-G 24	6950 8054-00	HSF 4 D-G 24	6900 1125-00
HSP 4/3 D 2-3-WH 1 H-B 0.7-G 24	6950 6977-00	HSF 3 D-G 24	6900 0909-00
HSP 4/2 W 5-5-X	6950 6941-00	HSF 4 W 2-X	On request
HSP 4/3 E 4-5-G 3-1 B-N 24	6950 5615-00	HSF 4 E 1-G 24	6963 1519-82
HSP 4/3 D 2-5-WH 1 H-B 0.7-G 24	6950 1846-00	HSF 4 D-G 24	6900 1125-00
HSP 4/3 G 4-3-G 3-1 B-33-G 24	6950 1302-00	HSF 3 G 1-33-G 24	6963 0748-36
HSP 4/3 D 2-3-WN 1 H-B 0.7-G 24	6902 8292-00	HSF 3 D-G 24	6900 0909-00
HSP 4/2 W 4-5-X	6901 8114-00	HSF 4 W 2-X	On request
HSP 4/3 L 4-3-G 3-1 B-N 24	6901 8041-00	HSF 3 L 1-G 24	6900 4683-00

6.2.2 Changing over from HSG to HSL

Changing over from HSG type designation and material numbers to HSL

HSG type designation	HSG material number	HSL type designation	HSL material number
HSG 4/3 L 4-5-G 3-1 B-G 24	6900 2085-01	HSL 4 L 1-G 24	6963 0763-82
HSG 4/3 L 4-3-G 3-1 B-G 24	6900 2744-01	HSL 3 L 1-G 24	6963 1010-11
HSG 4/2 W 5-3-G 3-1 B-G 24	6900 5175-01	HSL 3 W 2-G 24	6963 1019-84
HSG 4/3 G 2-3-X	6900 8835-00	HSL 3 G-X	6963 0405-38
HSG 4/2 W 1-5 X	6900 9556-00	HSL 4 W-X	6963 0419-34
HSG 4/2 W5-3-WG3-1B-WG 230	6961 6112-00	HSL 3 W 2-WG 230	6963 1519-85
HSG 4/2 W 5-3-WG 3-1 B-WG 24	6955 2268-00	HSL 3 W 2-WG 24	6963 0865-85

References

- Directional spool valve type SG and SP: D 5650/1
- 4/2- and 4/3-way directional spool valves type SWPM (SAM, SBM, SCM): D 6420/1
- 4/2- and 4/3-way directional spool valves type SWPA (HAM, HBM, HCM): D 6450/1
- Directional spool valve type CWPN: D 7451 CWPN
- Directional spool valve type NSWP 2: D 7451 N
- Proportional directional spool valves types PSL, PSV size 2: D 7700-2
- Proportional directional spool valves types PSL/PSV/PSM, size 3: D 7700-3
- Proportional directional spool valve, type PSL, PSM and PSV size 5: D 7700-5
- Proportional directional spool valve type PSLF, PSVF and SLF: D 7700-F

D 7493/1 09-2023-1.0

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