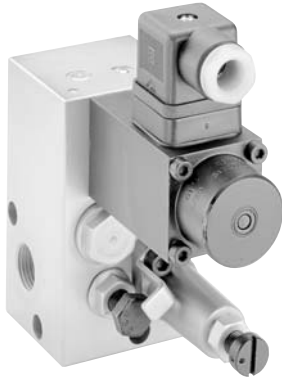


Lifting / Lowering valve type HSV and HZV

Flow $Q_{\max} = 160 \text{ lpm}$
 Pressure $p_{\max} = 400 \text{ bar}$

Type HSV 21(22)

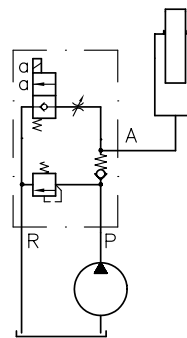


Type HSV 41(61)

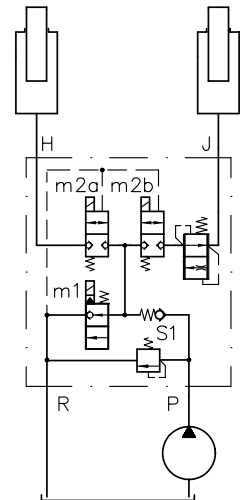


Example circuits

Type HSV 21 R2 - 150 - G 24



Type HZV 21 R6/10 - 150 - G 24



1. General information

This valve combination type HSV or HZV is preferably used for controlling lifting equipment with one or two single acting hydraulic cylinders.

The valve consists of:

- Solenoid actuated 2/2-way directional seated valve for lowering the lifted load
- Adjustable throttle valve (optional) for limiting the drop rate
- The 2-way flow control valve, available as option for valves type HSV 23-R6 and HZV 21(22)-R6, ensure a largely load independent drop rate.
- Pressure limiting valve for the limitation of the permissible load (max. operation pressure). Factory set to 220 bar, adjustable up to 400 bar.
- Check valve prevents load pressure from acting on the switched off pump, when the load is lifted and prevents e.g. reverse rotation of the pump. The location of the check valve in relation to the pressure limiting valve depends on the application. Version R2 and R4 (S2 and S4) prevents uncontrolled lowering of the load in case the pressure limiting valve is "floating" (load pressure in the range of the set pressure).

2. Available versions, main data

Order examples:

HSV 21 - R2 R-150 - G 24

HSV 41 - R1

- WG 230

Table 1: Basic type

Coding	Flow Q_{max} ⁶⁾ (lpm)	Pressure p_{max} (bar)	Ports conforming ISO 228/1 (BSPP) resp. SAE J514 (SAE-10)			
			P	A, R, H	J	
HSV 21 ¹⁾	20	315	G 3/8		---	
HSV 22 ¹⁾	30	315	G 3/8	G 1/2	---	
HSV 23 ^{1) 3)}	40	315	G 3/8		---	
HSV 41	40	400	G 1/2		---	
HSV 61	60	400	G 1/2		---	
HSV 61 UNF	60	400	7/8-14 UNF-2B		--	
HSV 71 ²⁾	160	400	G 3/4		---	
HZV 21 ³⁾	20	315	G 3/8	G 3/8		
HZV 22 ^{3) 5)}	20	315	G 3/8	G 1/4		

Table 2: Design, flow pattern of the solenoid valve and location of the check valve in relation to the pressure limiting valve

Basic type	With throttle valve				Without throttle valve				With 2-way flow control valve	
	R 1	R 2	R 3	R 4	R 3	R 4	R 3	R 4	R 6	
HSV 21 ¹⁾ HSV 22 ¹⁾										
HSV 41 HSV 61 HSV 61 UNF HSV 71 ²⁾										

Note for HZV 21 and HZV 22:
Specify the flow Q (lpm) to be set for the 2-way flow control valve (drop rate brake), here 10 lpm.
Example: HZV 21 R6/10-150-G24

- 1) Suited for mounting onto compact hydraulic power packs, see appendix in sect. 5
- 2) Only available as version ...S4 and R4, featuring a tool adjustable pressure limiting valve.
- 3) Only available as version ...R6
- 4) Type HZV without flow controller (similar to version R 4) only on request

Table 4: Nom. voltage of the solenoid

Standard (with plug)	without plug	with plug featuring LED's	Nom. voltage
G 12	X 12	L 12	12 V DC
G 24 G 24 EX ⁷⁾	X 24 ---	L 24 ---	24 V DC
WG 230	---	---	230 V AC 50 / 60 Hz
G 205	X 205	---	205 V DC

Other voltages on request!

Tab. 3: Pressure limiting valve (with option of pressure setting in bar.
Example: HSV 21 R2R-150-G 24
HZV 22 R6/14-170/150-G 24

No coding		Tool adjustable		R		Manually adjustable
-----------	--	-----------------	--	----------	--	---------------------

- 5) With second pressure stage for lifting and additional functions
- 6) See also Δp -Q-curves in sect. 3.1
- 7) Explosion-proof version
(Only available as type HSV 21 and HSV 22!)

3. Additional parameter

3.1 General and hydraulic data

Nomenclature, design 2/2-way directional seated valve (cone seated valve), solenoid actuated, combined with a pressure limiting, a throttle and a check valve in one valve body.

Pipe connection P = Inlet for pressurized oil ISO 228/1 (BSPP), for pipe fittings with male thread
 A, H, J = Consumer shape B, DIN 2852 page 2
 R = Return Type HSV 61 UNF with thread 7/8-14 UNF-2B (acc. to table 1)

Mounting position Any

Mass (weight)	Type	HSV 21(22, 23)	HSV 41	HSV 61	HSV 71	HZV 21	HZV 22
approx. kg		2.2	2.2	2.5	3.1	3.9	4.0

Flow direction P → A lifting; A → R lowering
 The function of the valves rule ports P, R and A(H, J) and mustn't be interchanged. R is the return port always ($\Delta p < 20$ bar)

Perm. pressure max. 400 bar

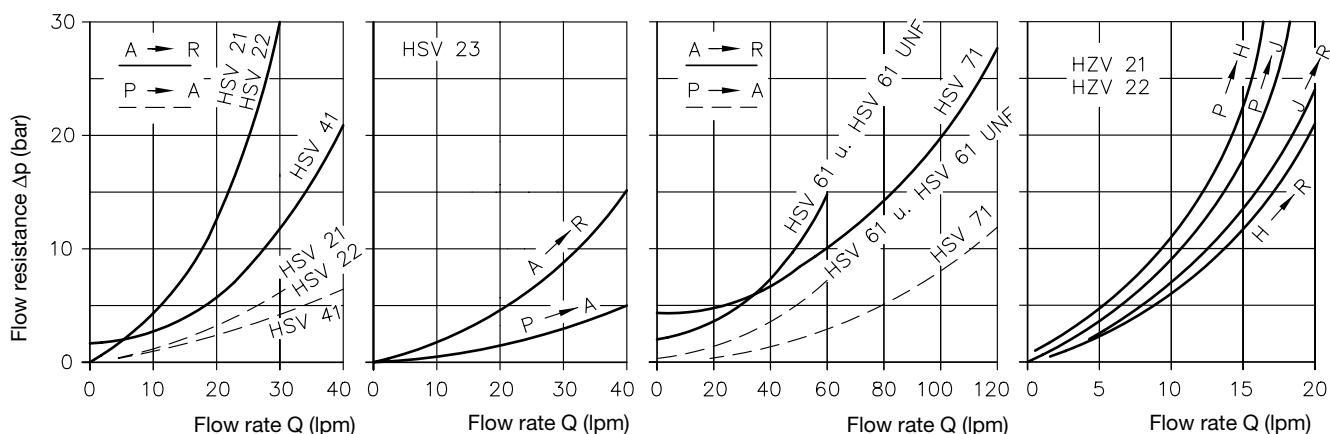
Perm. flow see section 2 and Δp -Q-curves

Pressure fluid Hydraulic oil conforming DIN 51524 part 1 to 3: ISO VG 10 to 68 conforming DIN 51519.
 Viscosity limits: min. approx. 4, max. approx. 1500 mm²/sec;
 opt. operation approx. 10... 500 mm²/sec .
 Also suitable for biological degradable pressure fluids types HEPG (Polyalkylenglycol) and HEES (Synth. Ester) at service temperatures up to approx. +70°C

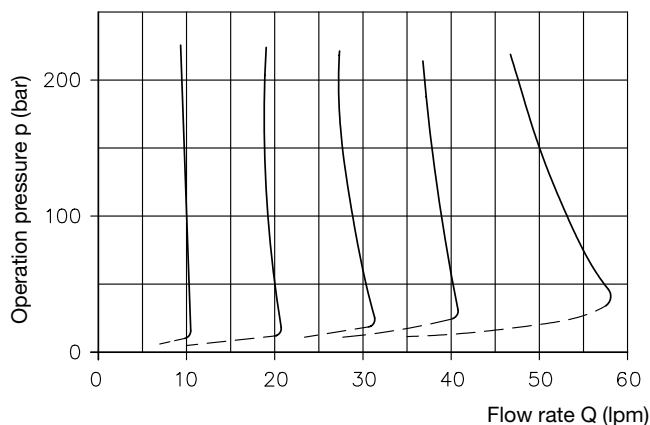
Temperature Ambient: approx. -40...+80°C; Fluid: -25...+80°C, pay attention to the viscosity range!
 Start temperature down to -40°C are allowable (Pay attention to the viscosity range during start!), as long as the operation temperature during subsequent running is at least 20K higher. Biological degradable pressure fluids: Pay attention to manufacturer's information. With regard to the compatibility with sealing materials do not exceed +70°C.

Restrictions for version with ex-proof solenoid!

Δp -Q-curves



2-way flow control valve (with type HSV 23-R6)



Oil viscosity during tests approx. 60 mm²/s

3.2 Electrical data

Coding	HSV 21(22)		HSV 23(41)		HSV 61(...UNF)		HSV 71		HZV 21(22)				
	G 24 G 24 EX ²⁾	WG 230 1)	G 24	WG 230 1)	G 24	WG 230 1)	G 24	WG 230 1)	G 24	WG 230 1)	G 24	WG 230 1)	
Nom. voltage U_N	24 V DC	230 V AC 50/60 Hz	24 V DC	230 V AC 50/60 Hz	24 V DC	230 V AC 50/60 Hz	24 V DC	230 V AC 50/60 Hz	24 V DC	230 V AC 50/60 Hz	24 V DC	230 V AC 50/60 Hz	
For further data see solenoid valve type ... acc. to pamphlet ...	BVG 2 BVP 2 D 7400		EM 21V D 7490/1		EM 31V D 7490/1		EM 41V D 7490/1		m1: EM 21V (D 7490/1) m2a/m2b: VZP1 (D 7785A) m1 m2.. m1 m2..				
Nom. power P_N (W)	26.4	26.6	21	21	21	21	30	30	21	27	21	26	
Switching time (guideline) ms	on	100	200	50	100	50	100	50	100	100	~50	200	~70
	off	80	160	150	300	150	300	150	300	80	~65	160	~130
Switchings	max. approx. 2000 (roughly even distributed)												
Protection mode	IP 65, acc. to IEC 60529 (plug properly mounted)												
Plugs (connection and circuitry) All plugs EN 175 301-801 A	DC-voltage coding G 24		AC-voltage coding WG 230				Terminals at the solenoid						
The valve order coding always includes the plug. Additionally available plugs (for more details, see D 7163):													
Device socket			Order coding										
			for all valves			add. with HZV 21(22)							
with LED and safety circuit with 2 diodes			SVS 296048 SVS 3129020			SVS 296107							
with clamp diode			MSD 3-209 C1			MSD 4-309 C2							

¹⁾ With bridge rectifier in the plug (solenoid 205 V DC)

²⁾ Only available for type HSV 21 and HSV 22. For detailed information, see below.

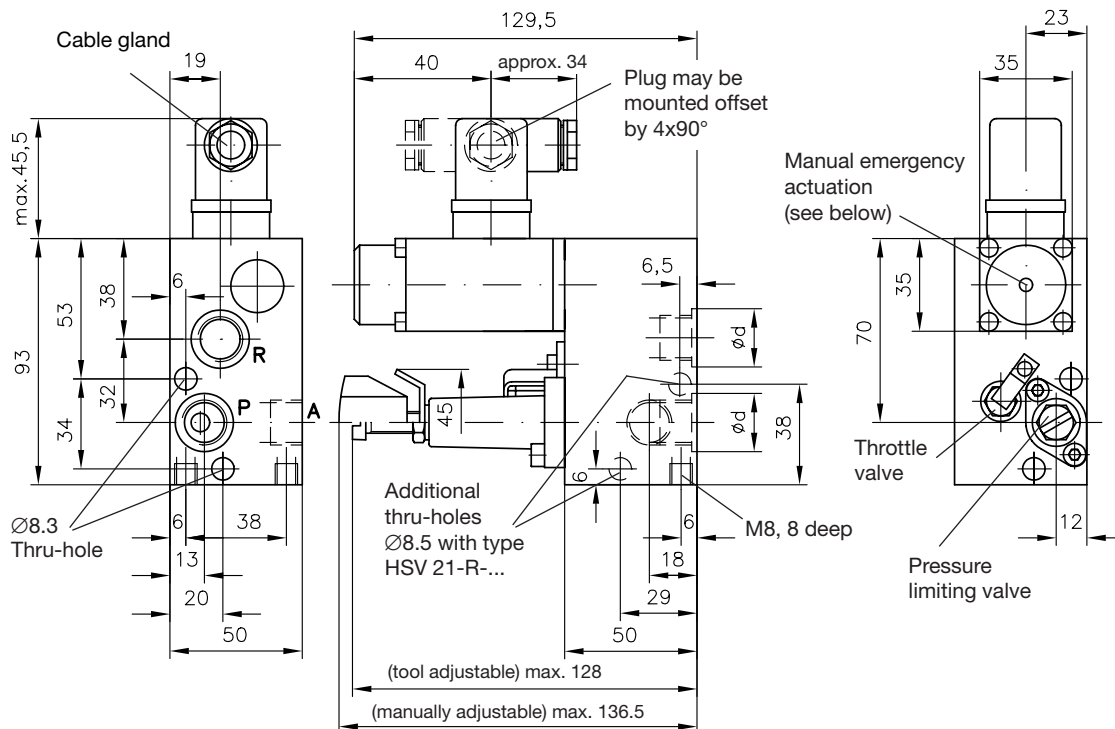
Electrical data for ex-proof solenoids

ATEX-Certificate of conformity	TÜV-A 03ATEX 0017 X
Coding	⊕ II 2 G Ex d IIB + H2 T4 ⊕ II 2 D Ex mbD 21 T135°C
Oper. duration	100% ED
Duty cycle	IP 67 (IEC 60529)
Nom. voltage U_N	24 VDC
Power P_N	23 W
Restrictions for use:	
Ambient temperature	-35 ... +40°C
max. fluid temperature	+70°C
el. protection against overload (conf. IEC 60127)	$I_F < 1.6$ A-T
Surface coating	Housing galvanically zinc coated Coil and connection cavity are moulded
Electrical connection	3x0.5 mm ²
Cable length	3 m, Option 10 m (cable ÖLFLEX-440P ® Co. LAPP, D-70565 Stuttgart)

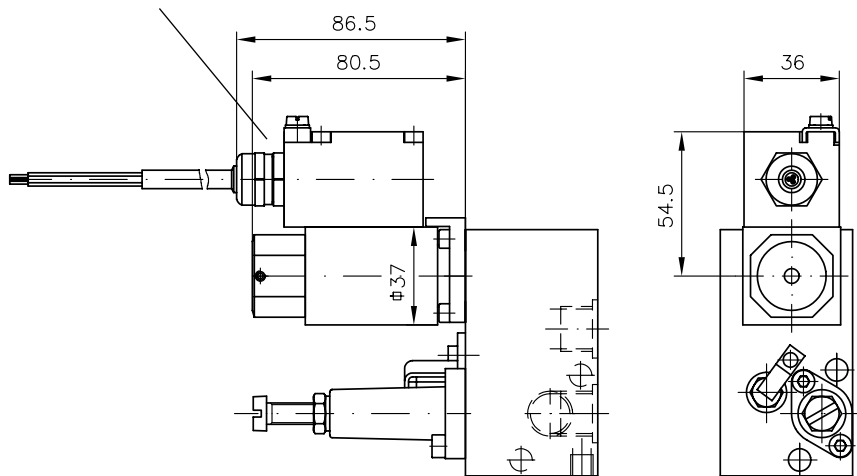
Attention : Protect the complete valve against direct sun light.
Observe the operation manuals B 03/2004 and B ATEX!
Electrical lay-out and testing conforming EN 60079, VDE 0170-1, VDE 0170-5

4. Unit dimensions All dimensions are in mm and subject to change without notice!

4.1 Type HSV 21-.. and HSV 22-...

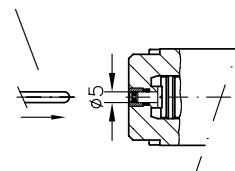


Ex-proof solenoid



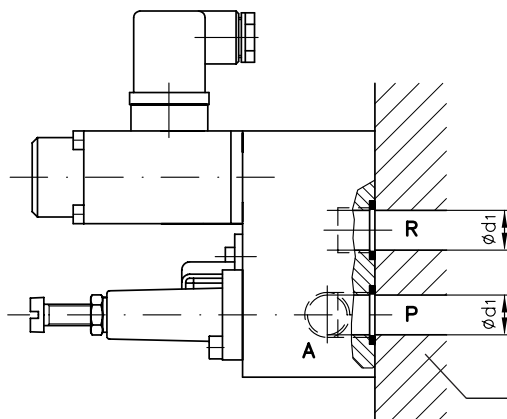
Manual emergency actuation

Actuation aid (max $\phi 4.5$ mm).
Do not use any sharp edged parts.
Actuation force ≤ 10 N



Important notes:

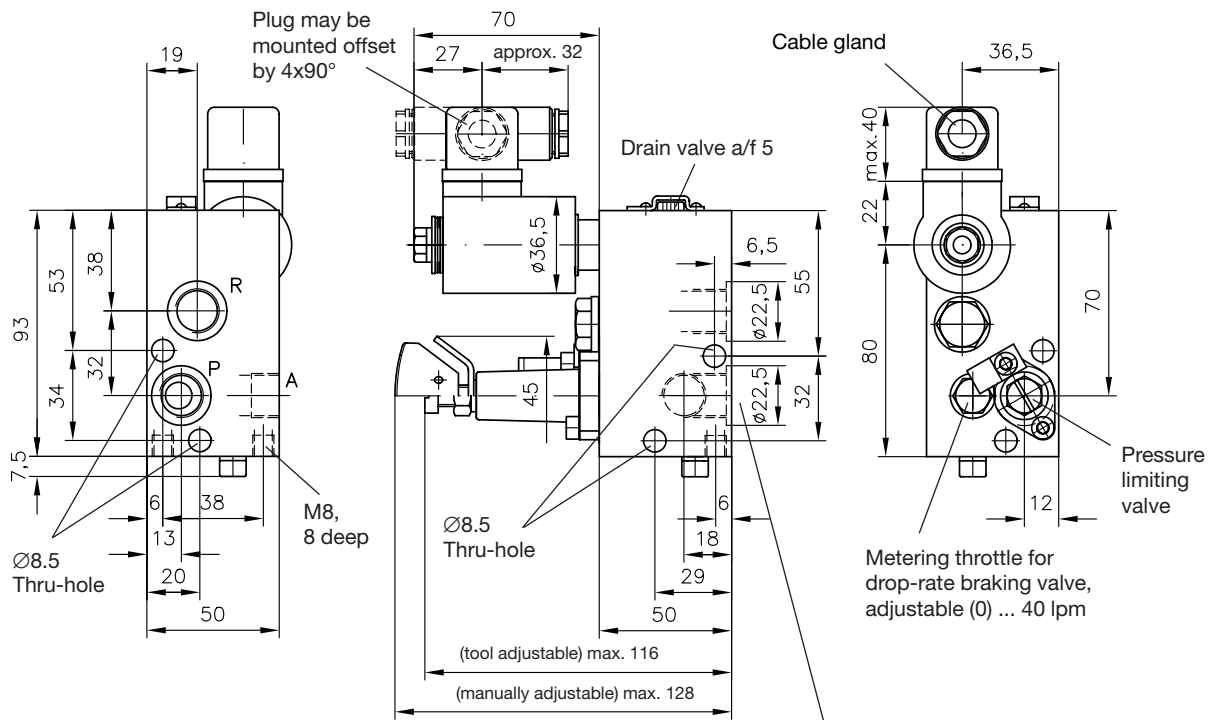
This valve may be mounted onto customer furnished manifold also. The ports will then be sealed to the outside by O-rings. Two socket head bolts ISO 4762-M8x65-10.9-A2K are required for mounting.



	HSV 21-..	HSV 22-...	
	A, P and R	A and R	P
Thread ISO 228/1 (BSPP)	G 3/8	G 1/2	G 3/8
ϕd	22.5	26.5	22.5
$\phi d1$	14	19	14
O-ring NBR 90 Sh	18x2.5	22x2.5	18x2.5

Manifold not part of delivery from HAWE !

4.2 Type HSV 23-R6/...

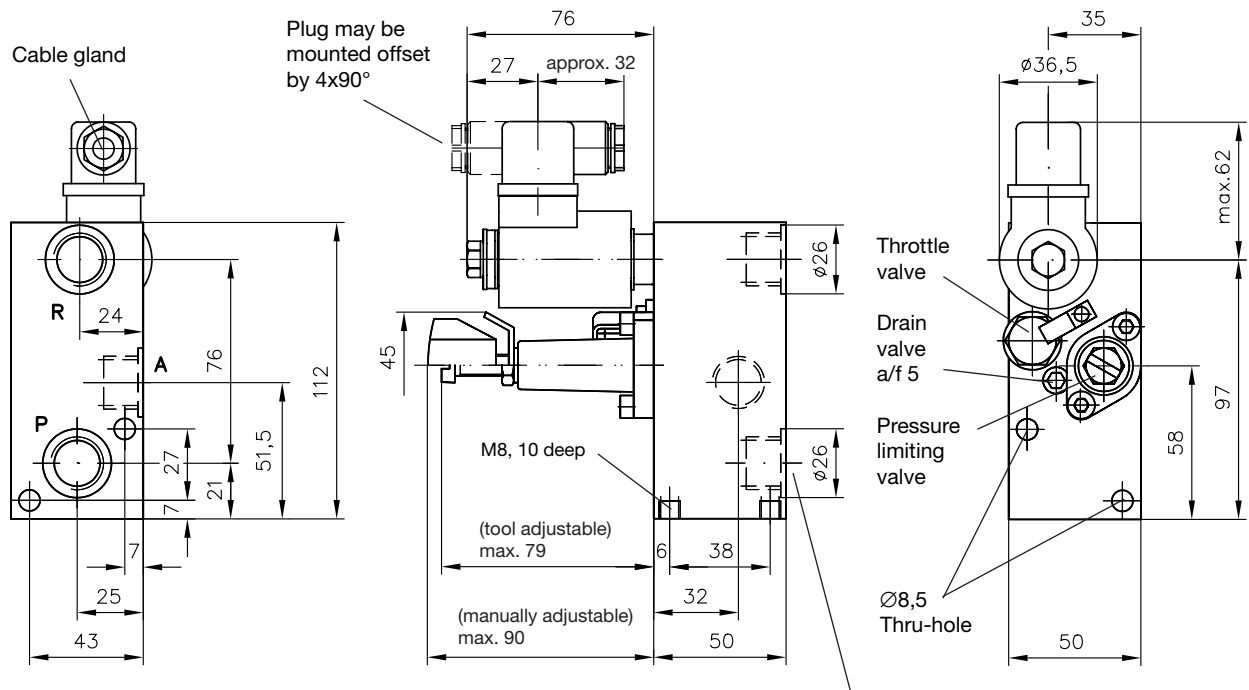


Ports conforming ISO 228/1 (BSPP):
A, P, and R = G 3/8

Important notes:

This valve may be mounted onto customer furnished manifold also. The ports will then be sealed to the out-side by O-rings 18x2.5 NBR 90 Sh (customer furnished).
Two socket head bolt ISO 4762-M8x65-10.9-A2K are required for mounting.

4.3 Type HSV 41-..

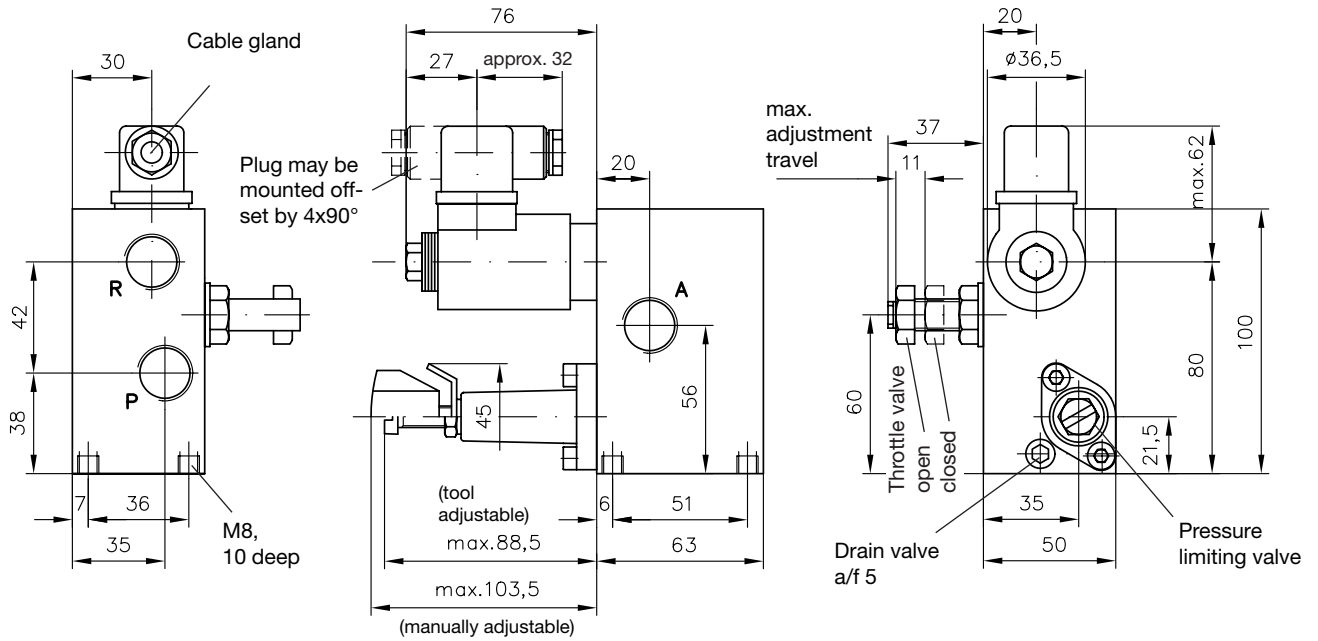


Ports conforming ISO 228/1 (BSPP):
A, P and R = G 1/2

Important notes:

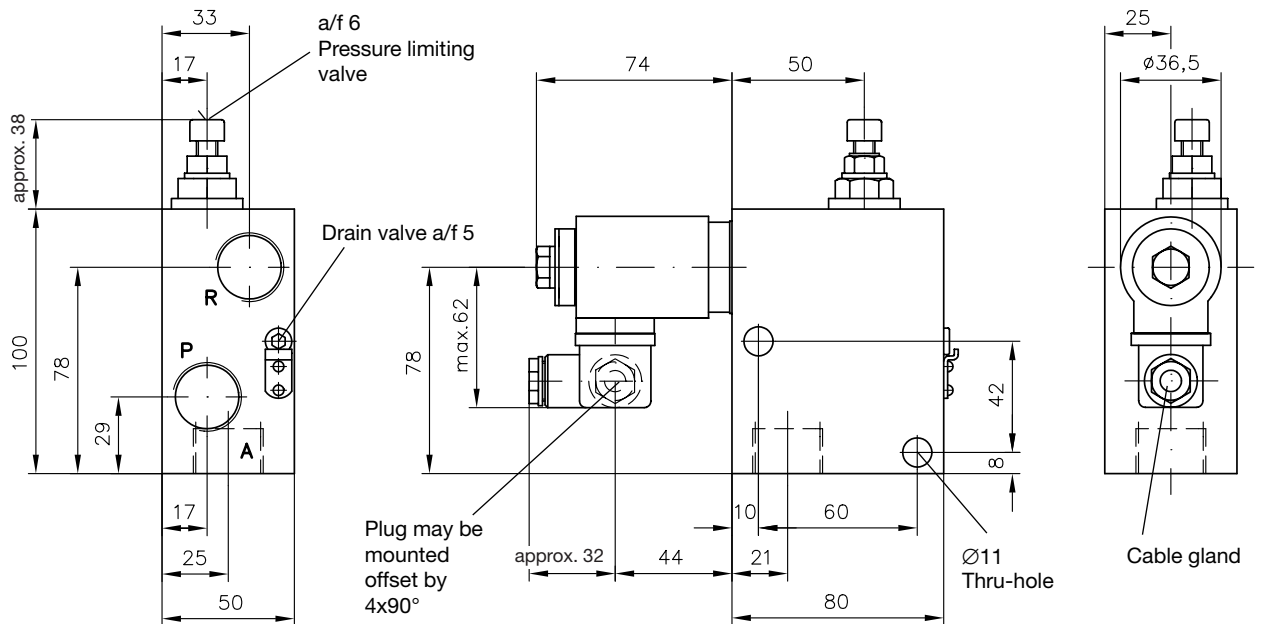
This valve may be mounted onto customer furnished manifold also. The ports will then be sealed to the out-side by O-rings 22x2 NBR 90 Sh (customer furnished).
Two socket head bolt ISO 4762-M8x65-10.9-A2K are required for mounting.

4.4 Type HSV 61-.. and HSV 61 UNF



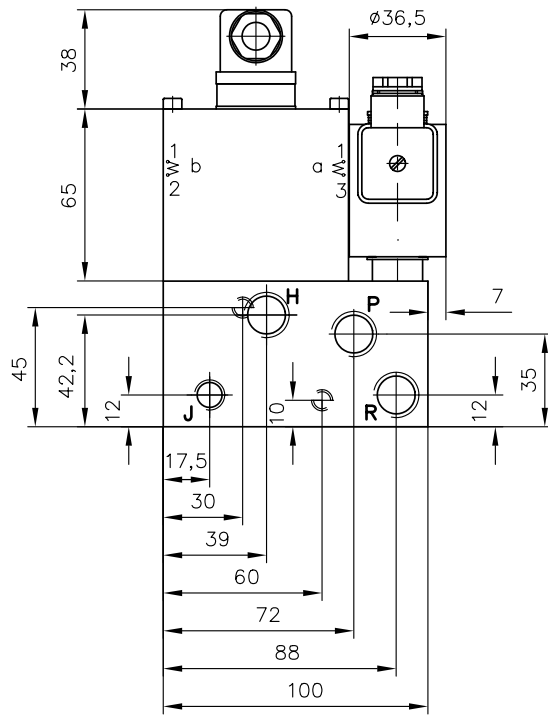
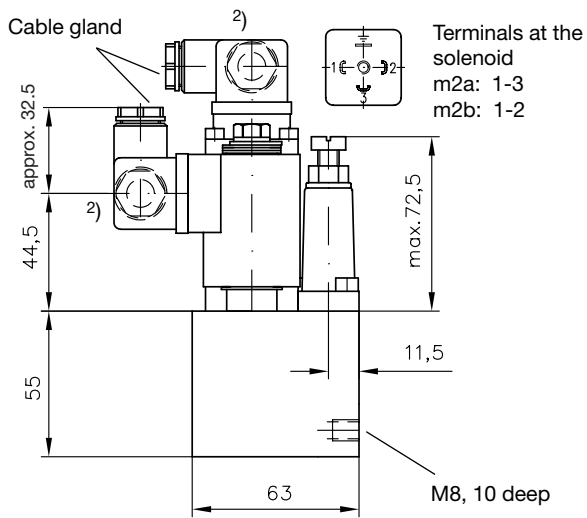
Ports A, P, and R conforming ISO 228/1 (BSPP) = G 1/2 (type HSV 61)
 conforming SAE J 514 (SAE-10) = 7/8-14 UNF-2B (type HSV 61 UNF)

4.5 Type HSV 71-...

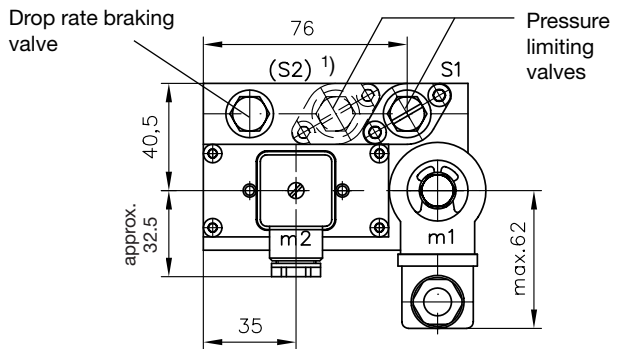


Ports conforming ISO 228/1 (BSPP):
 A, P, and R = G 3/4

4.6 Type HZV 21-R6/...-... and HZV 22-R6/...-...



Ports conforming ISO 228/1 (BSPP):
H, P, and R = G 3/8
J = G 1/4



- 1) Pressure limiting valve S2 only apparent with type HZV 22 - R6/...-...
- 2) Plug may be mounted offset by 4x90°

5. Appendix, mounting onto compact hydraulic power packs

Order example: HC 24/0,64 - HSV 23 - R6 - G 24

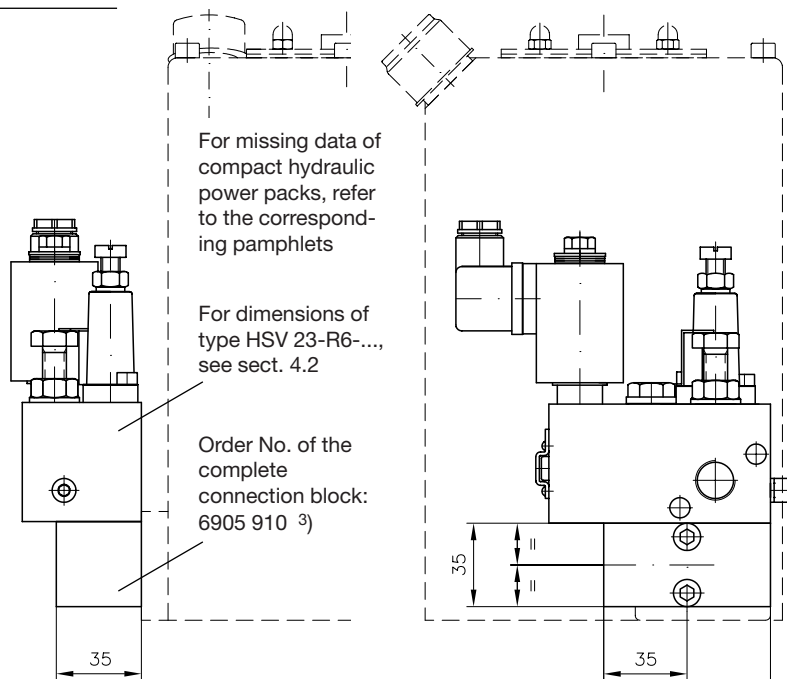
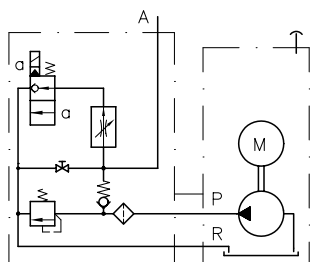
Compact hydraulic power pack

Suited types:

- HC acc. to D 7900
- HCG acc. to D 7900 G
- MP acc. to D 7200
- D 7200 H
- HK acc. to D 7600-2
- D 7600-3
- D 7600-4

Directly mounted lifting/lowering valve acc. to sect. 2, suited types: HSV 21..., HSV 23-R6

Example circuit corresponding to the order coding example above



For missing data of compact hydraulic power packs, refer to the corresponding pamphlets

For dimensions of type HSV 23-R6-..., see sect. 4.2

Order No. of the complete connection block: 6905 910 ³⁾

³⁾ Including O-rings and screw set