

Load-holding valve type CLHV-PIB

Product documentation



Single valve or twin valve for pipe connection and manifold mounting

Pressure setting p_{\max} :	350 bar
Load pressure p_{\max} :	320 bar
Flow rate Q_{\max} :	350 lpm



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Load-holding valves are a type of pressure control valve. They prevent loads on cylinders or motors dropping in an uncontrolled manner. For this purpose they are pre-loaded with a pressure setting that is higher than the largest possible load. A hydraulic piston controls the opening of the valve to achieve the required lowering velocity.

The load-holding valve type CLHV is suitable for applications with low and medium tendencies to oscillate and is used especially in connection with proportional directional spool valves, e.g. types PSL and PSV.

It is also available with return pressure compensation and spring chamber relief. Type CLHV-PIB can either be installed in the pipe or directly at the cylinder or hydraulic motor.



Load-holding valve type CLHV

Features and benefits:

- Pressure settings up to 350 bar
- 4 sizes from 4 to max. 350 lpm
- Various adjustment options
- Various types of relief
- Various models

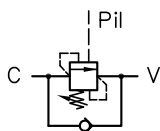
Intended applications:

- Cranes
- Construction machines
- Lifting devices
- Agricultural machinery

2 Available versions, main data

2.1 Order coding, overview

Circuit symbol:



Order coding example:

CLHV 2	PIB	B	2	N	M	- ...	V	- 1 GS-11
								Connection block "Table 7"
								Adjustability "Table 6"
								Pressure setting
								Pressure setting range "Table 5"
								Return pressure dependence "Table 4"
								Control behaviour "Table 3"
								Flow rate "Table 2"
	Model	Parts-in-body						
								Basic type and size "Table 1"

Table 1 Basic type and size

Type	Flow rate Q_{\max} (lpm)	Pressure setting p_{\max} (bar)
CLHV 2	40	350
CLHV 3	90	350
CLHV 5	150	350
CLHV 7	350	350



NOTE

Size 7 only available on request

Table 2 Flow rate

Coding	Flow rate
B	Series

Table 3 Pilot ratio

Coding	Geometric control behaviour	Available sizes
2	2:1	3
4	4:1	2, 3, 5

Table 4 Return pressure dependence

Coding	Description	Available sizes	Available pilot ratios	Circuit symbol
N	Normal (undischarged)	2, 3, 5	All	
C	Return pressure compensated	3	4:1	
V	Discharged (atmospheric)	2, 5, only in combination with manifold mounting connection blocks	4:1	

! NOTE

For coding N, the return pressure at port V is added to the pressure setting with $(1 + \text{pilot ratio}) \times \text{return pressure!}$

Table 5 Pressure setting range

Coding	Pressure setting (bar)
M	60 - 210 (fixed) 80 - 210 (adjustable)
D	200 - 350

i NOTE

The pressure setting should be at least 30% higher than the maximum load pressure.

Table 6 Adjustability

Coding	Description
No designation	Fixed, only for size 3
V	Fixed, tool adjustable
VA	Fixed, tool adjustable and with adjustment protection cap

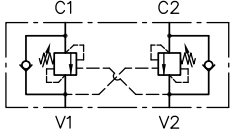
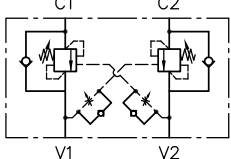
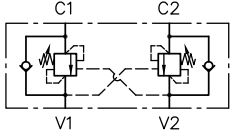
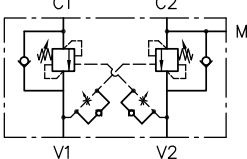
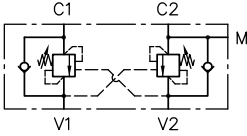
Table 7 Connection block
Single valve

Coding	Size	Port (BSPP)	Circuit symbol
Pipe connection			
1 GS-11	2	G 1/4	
2 GS-11	3	G 3/8	
3 GS-11 *	3	G 1/2	
1 GS-14	2	G 1/4	
2 GS-14	3	G 3/8	
3 GS-14	3	G 1/2	
3 GS-14	5	G 1/2	
4 GS-14	5	G 3/4	
Manifold mounting			
2 PS-12	3	G 3/8	
3 PS-12	5	G 1/2	
4 PS-12	5	G 3/4	
2 PS-13	3	G 3/8	
3 PS-13 *	3	G 1/2	
1 PS-14	2	G 1/4	
2 PS-14	3	G 3/8	
3 PS-14	3	G 1/2	
3 PS-14	5	G 1/2	
4 PS-14	5	G 3/4	

* only in combination with pilot ratio 4:1 and return pressure dependence coding "C"

To Table 7 Connection block

Twin valve

Coding	Size	Port (BSP)	Circuit symbol
Pipe connection			
1 GS-21	2	G 1/4	
2 GS-21	3	G 3/8	
3 GS-21	3	G 1/2	
3 GS-21	5	G 1/2	
4 GS-21	5	G 3/4	
Manifold mounting			
1 PS-21	2	G 1/4	
2 PS-21	3	G 3/8	
3 PS-21	3	G 1/2	
3 PS-21	5	G 1/2	
4 PS-21	5	G 3/4	
2 PS-22	3	G 3/8	
3 PS-22	3	G 1/2	

3 Parameters

General information

Designation	Load-holding valve CLHV
Model	<ul style="list-style-type: none"> ▪ Single or twin valve for pipe connection or manifold mounting ▪ Parts-in-body (PIB)
Material	Coding GS, PS: Steel housing (galvanised)
Attachment	See Chapter 4, "Dimensions"
Tightening torques	See Chapter 4, "Dimensions"
Installation position	As desired
Ports	<ul style="list-style-type: none"> ▪ Port C: Consumer ▪ Port V: Directional valve ▪ Port Pil: Control oil pressure ▪ Port M: Pressure gauge
Flow direction	<p>Operating direction C → V (Load-holding function)</p> <p>Free flow V → C</p>
Control behaviour	See "Table 3 Pilot ratio"
Hydraulic fluid	<p>Hydraulic oil according to DIN 51 524 Part 1 to 3; ISO VG 10 to 68 according to DIN 51 519 Viscosity range: 10 - 500 mm²/s</p> <p>Also suitable for biologically degradable pressure fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C.</p>
Cleanliness level	<p>ISO 4406</p> <hr style="width: 20%; margin-left: 0;"/> <p>19/17/14</p>
Temperatures	<p>Environment: -40 ... +50°C, oil: -25 ... +80°C, pay attention to the viscosity range. Start temperature: down to -40°C is permissible (observe start viscosities!), as long as the steady-state temperature is at least 20K higher for subsequent operation. Biologically degradable pressure fluids: Note manufacturer specifications. With consideration for the seal compatibility, not above +70°C.</p>

Pressure and flow rate

Load pressure	<ul style="list-style-type: none"> ▪ $P_{\max} = 320$ bar with code GS, PS ▪ In the event of higher pressures, please contact HAWE 			
Pressure setting	<ul style="list-style-type: none"> ▪ $p_{\max} = 350$ bar ▪ $p_{\min} = 60$ bar with control behaviour $\leq 4:1$ ▪ $p_{\min} = 100$ bar with control behaviour $\geq 7:1$ 			
Flow rate	Maximum flow rates, see "Table 2: Flow rate"			
Maximum valve leakage at shut-off pressure	5 drops/min			
Shut-off pressure	85% of set value			
Pressure setting	Size	Relief	Control behaviour	Pressure change Δp / revolution (bar/R)
	2	N	4:1	M: 103 D: 171.5
		V	4:1	M: 82 D: 137
	3	N	2:1, 4:1	M: 61.5 D: 137
		C	4:1	M: 49 D: 110
	5	N / V	4:1	M: 30 D: 73



CAUTION

Risk of injury on overloading components due to incorrect pressure settings!

Risk of minor injury.

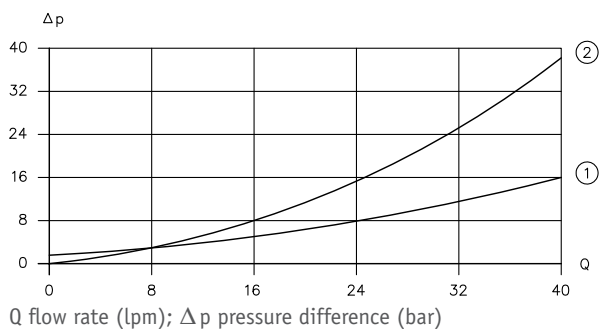
- Pay attention to the maximum operating pressure of the pump and the valves.
- Always monitor the pressure gauge when setting and changing the pressure.

Characteristics

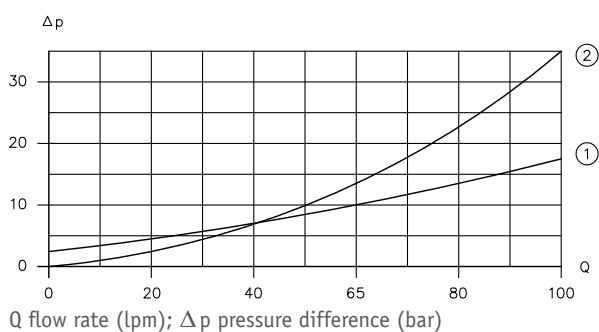
Oil viscosity approx. 60 mm²/s

Δp -Q characteristics

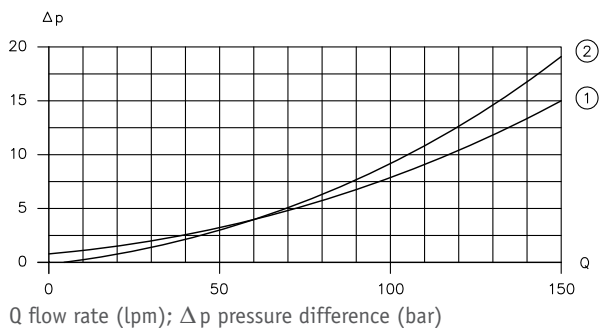
CLHV 2



CLHV 3



CLHV 5



- 1 Free flow F → V
- 2 Operating direction V → F

Weight

Connection block

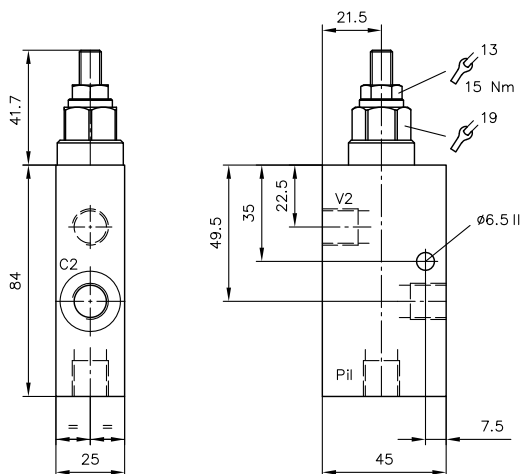
Coding	Size				
	2		3		5
	1 (G 1/4*)	2 (G 3/8*)	3 (G 1/2*)	3 (G 1/2*)	4 (G 3/4*)
GS-11	0.7 kg	1.1 kg	1.8 kg	--	--
GS-14	0.7 kg	1.4 kg	1.8 kg	2.5 kg	3.3 kg
PS-12	--	1.1 kg	--	2.4 kg	3.1 kg
PS-13	--	1.3 kg	1.8 kg	--	--
PS-14	0.7 kg	1.3 kg	1.8 kg	2.4 kg	3.1 kg
GS-21	1.9 kg	1.9 kg	2.7 kg	2.3 kg	--
PS-21	1.9 kg	1.9 kg	2.7 kg	2.2 kg	2.2 kg
PS-22	--	1.9 kg	2.6 kg	--	--

4 Dimensions

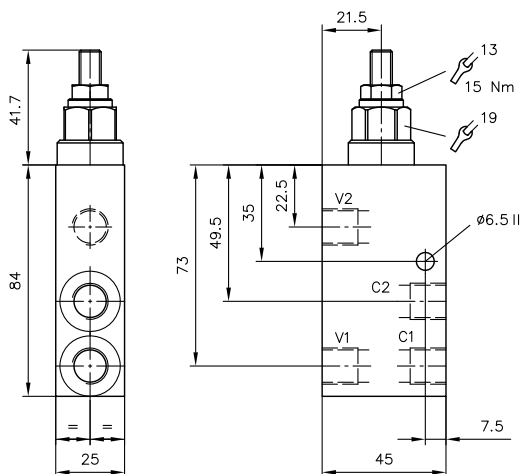
All dimensions in mm, subject to change.

4.1 Load-holding valve type CLHV 2

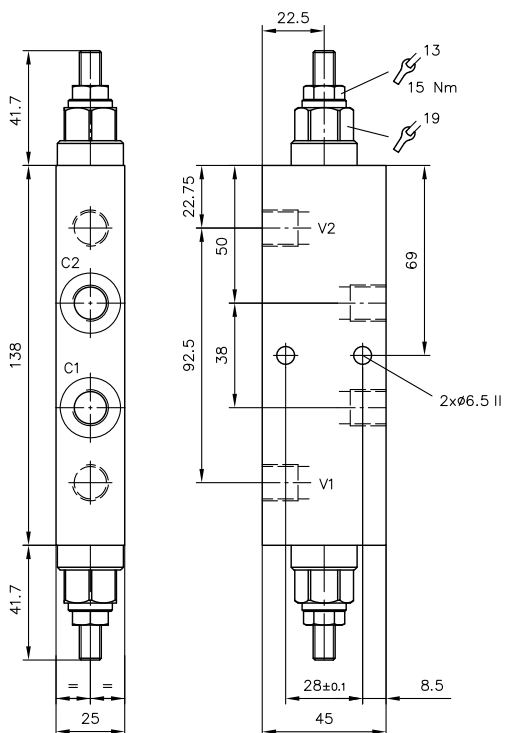
CLHV 2 ... - 1 GS-11



CLHV 2 ... - 1 GS-14



CLHV 2 ... - 1 GS-21

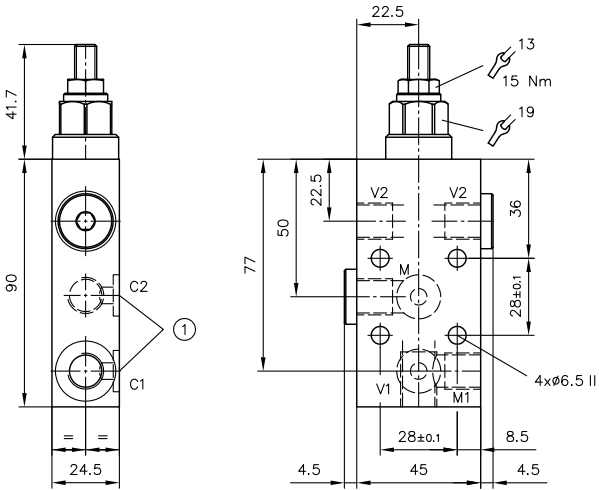


Port (ISO 228-1) (BSPP)

C1, C2, V1, V2, Pil

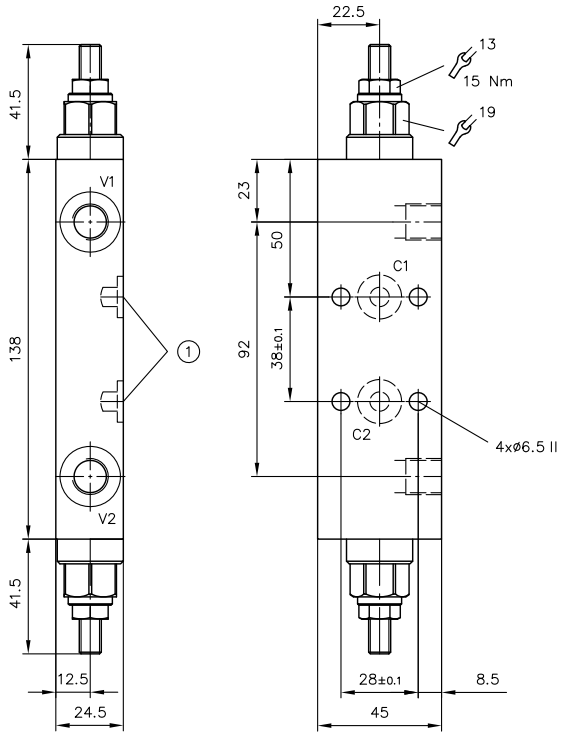
G 1/4

CLHV 2 ... - 1 PS-14



1 O-ring 9.92x2.62 NBR 90 Shore A

CLHV 2 ... - 1 PS-21



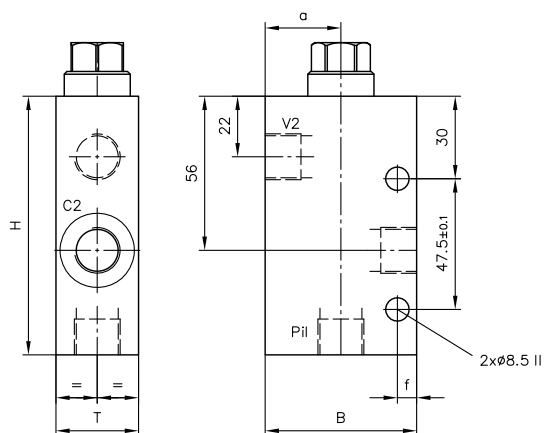
1 O-ring 9.92x2.62 NBR 90 Shore A

Type	Ports (ISO 228-1)		
	V1, V2	M, M1	C1, C2
CLHV 2 ... - 1 PS-14	G 1/4 (BSPP)	G 1/4 (BSPP)	Ø6
CLHV 2 ... - 1 PS-21		--	Ø7

4.2 Load-holding valve type CLHV 3

CLHV 3 ... (V) - 2 GS-11

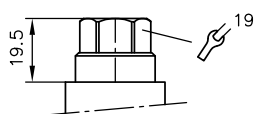
CLHV 3 ... (V) - 3 GS-11



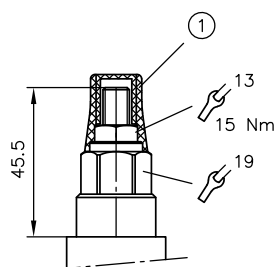
Type	H	B	T	a	f	Ports (ISO 228-1) (BSPP)	
						C2, V2	Pii
CLHV 3 ... (V) - 2 GS-11	94	55	30	27.5	7	G 3/8	G 3/8
CLHV 3 ... (V) - 3 GS-11	106	65	35	32.5	11	G 1/2	G 1/4

Adjustment

No designation
(Fixed)



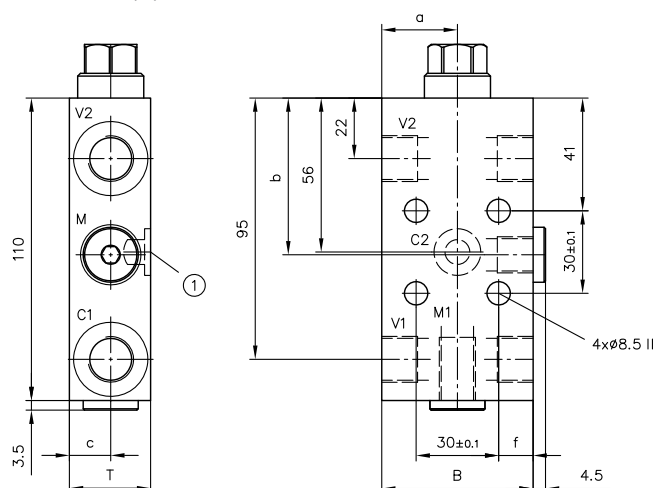
Coding V
(Fixed, tool adjustable)



1 Coding VA (fixed, tool adjustable and with adjustment protection cap)

CLHV 3 ... (V) - 2 PS-13

CLHV 3 ... (V) - 3 PS-13

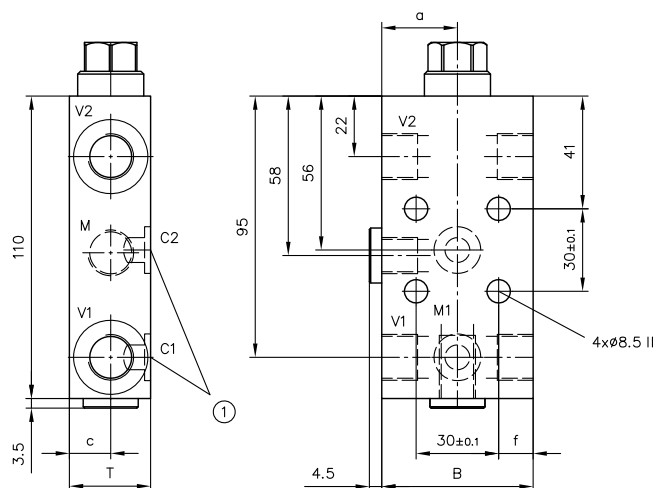


1 O-ring 10.77x2.62 NBR 90 Shore A

Type	B	T	a	b	c	f	Ports (ISO 228-1)		
							C1, V1, V2	M, M1	C2
CLHV 3 ... (V) - 2 PS-13	55	29.5	27.5	57	15	12.5	G 3/8 (BSPP)	G 1/4 (BSPP)	Ø9
CLHV 3 ... (V) - 3 PS-13	65	34.5	32.5	58	17.5	17.5	G 1/2 (BSPP)		

CLHV 3 ... (V) - 2 PS-14

CLHV 3 ... (V) - 3 PS-14



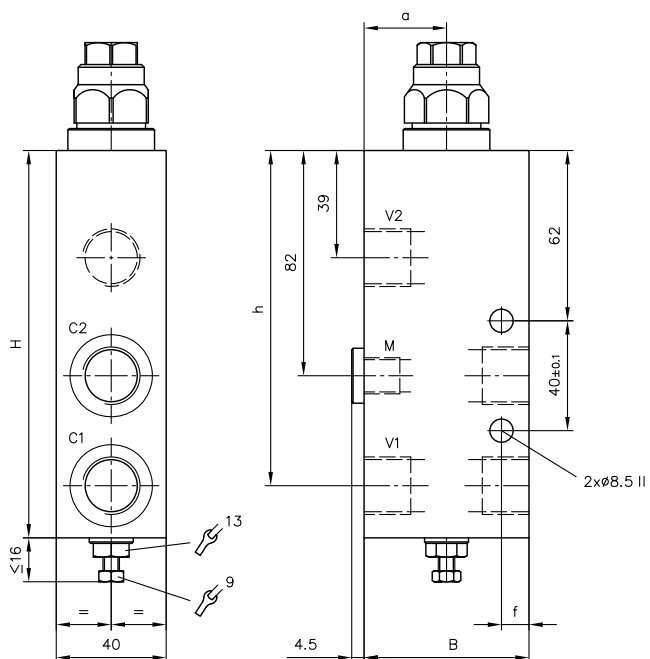
1 O-ring 10.77x2.62 NBR 90 Shore A

Type	B	T	a	c	f	Ports (ISO 228-1)		
						V1, V2	M, M1	C1, C2
CLHV 3 ... (V) - 2 PS-14	55	29.5	27.5	15	12.5	G 3/8 (BSPP)	G 1/4 (BSPP)	Ø9
CLHV 3 ... (V) - 3 PS-14	65	34.5	32.5	17.5	17.5	G 1/2 (BSPP)		

4.3 Load-holding valve type CLHV 5

CLHV 5 ..V - 3 GS-14

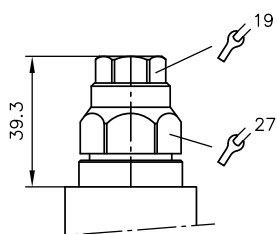
CLHV 5 ..V - 4 GS-14



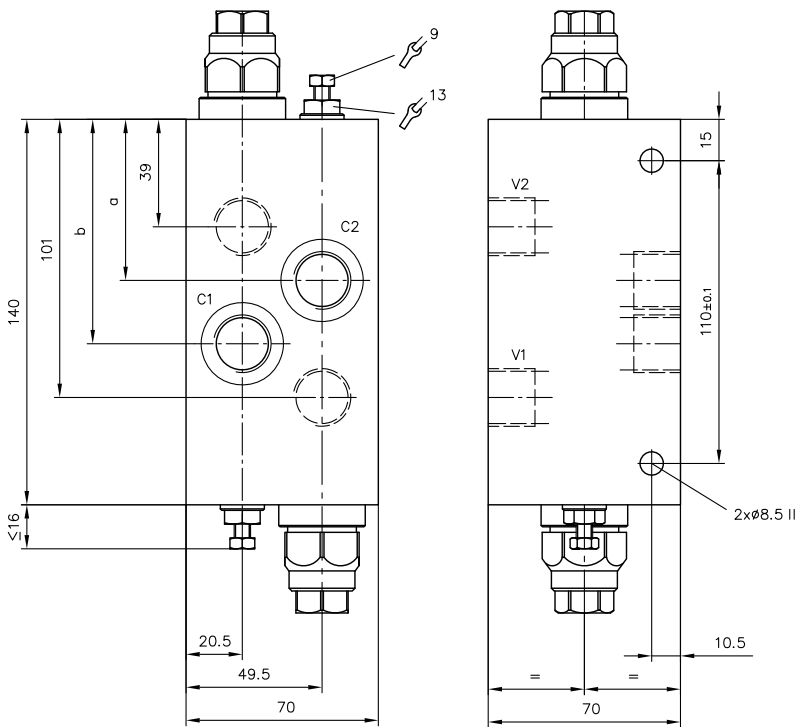
Type	H	B	a	f	h	Ports (ISO 228-1) (BSPP)	
						C1, C2, V1, V2	M
CLHV 5 ..V - 3 GS-14	141	60	30	10	122	G 1/2	G 1/4
CLHV 5 ..V - 4 GS-14	147	80	40	60	125	G 3/4	

Adjustment

Coding V
(Fixed, tool adjustable)



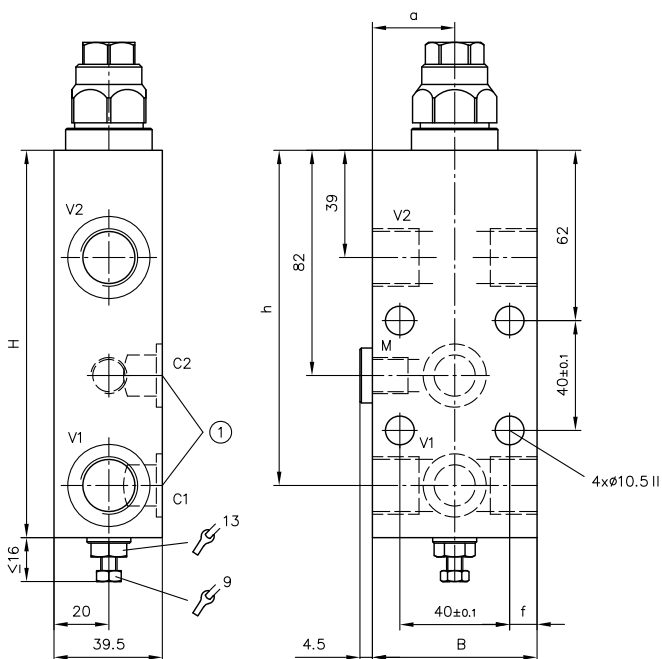
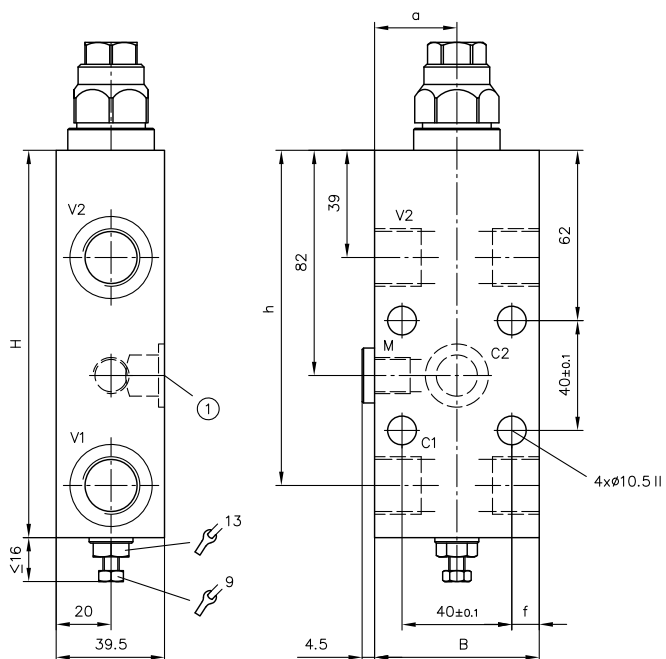
CLHV 5 ..V - 3 GS-21
CLHV 5 ..V - 4 GS-21



Type	a	b	Ports (ISO 228-1) (BSPP)
			C1, C2, V1, V2
CLHV 5 ..V - 3 GS-21	58.5	54	G 1/2
CLHV 5 ..V - 4 GS-21	81.5	86	G 3/4

CLHV 5 ..V - 3 PS-12
CLHV 5 ..V - 4 PS-12

CLHV 5 ..V - 3 PS-14
CLHV 5 ..V - 4 PS-14

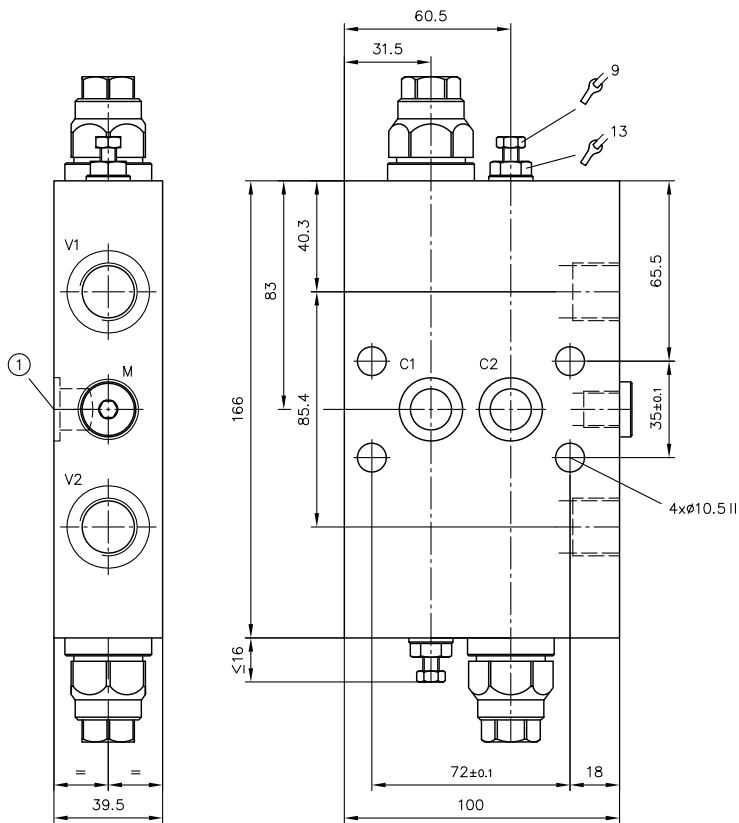


1 O-ring 17.12x2.62 NBR 90 Shore A

1 O-ring 17.12x2.62 NBR 90 Shore A

Type	H	B	a	f	h	Ports (ISO 228-1)		
						C1, V1, V2	M	C2
CLHV 5 ..V - 3 PS-12	141	60	30	10	122	G 1/2 (BSPP)	G 1/4 (BSPP)	Ø15
CLHV 5 ..V - 4 PS-12	147	80	40	20	125	G 3/4 (BSPP)		
Type	H	B	a	f	h	Ports (ISO 228-1)		
						V1, V2	M	C1, C2
CLHV 5 ..V - 3 PS-14	141	60	30	10	122	G 1/2 (BSPP)	G 1/4 (BSPP)	Ø15
CLHV 5 ..V - 4 PS-14	147	80	40	20	125	G 3/4 (BSPP)		

CLHV 5 ..V - 3 PS-21
CLHV 5 ..V - 4 PS-21



1 O-ring 17.12x2.62 NBR 90 Shore A

Ports (ISO 228-1)

V1, V2	G 1/2 (BSPP)
M	G 1/4 (BSPP)
C1, C2	∅15

5 Assembly, operation and maintenance recommendations

The document [B 5488](#) "General operating and maintenance manual for assembly, commissioning and maintenance" must be observed.

5.1 Intended use

This valve is exclusively intended for hydraulic applications (fluid engineering).

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

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 qualified personnel.
- The product must only be operated within the specified technical parameters. The technical parameters are described in detail in this documentation.
- All components must be suitable for the operating conditions in the event of application in an assembly.
- The operating and maintenance manual of 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 dismantling (in particular in combination with hydraulic accumulators).



DANGER

Risk to life caused by sudden movement of the hydraulic drives when dismantled incorrectly!

Risk of serious injury or death.

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

5.3 Operating instructions

Note product configuration and pressure / flow rate

The statements and technical parameters in this documentation must be strictly observed.
The instructions for the complete technical system must also always be followed.

i NOTE

- 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

Risk of injury on overloading components due to incorrect pressure settings!

Risk of minor injury.

- Pay attention to the maximum operating pressure of the pump and the valves.
- 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 hydraulic component. Contamination can cause irreparable damage.

Examples of fine contamination include:

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

i NOTE

New hydraulic fluid from the manufacturer does not necessarily have the required level of purity.
The hydraulic fluid must be filtered during filling.

To maintain faultless operation, make sure the hydraulic fluid meets the cleanliness level.
(see also cleanliness level in [Chapter 3, "Parameters"](#))

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

5.4 Maintenance information

Conduct a visual inspection at regular intervals, but at least once per year, to check if the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the device surface of dust deposits and dirt at regular intervals, but at least once per year.

Further information

Additional versions

- Proportional directional spool valve, type PSL and PSV size 2: D 7700-2
- Proportional directional spool valve, type PSL, PSM and PSV 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 size 3: D 7700-3F
- Proportional directional spool valve type PSLF, PSVF and SLF size 5: D 7700-5F
- Proportional directional spool valve banks, type PSLF, PSVF and SLF size 7: D 7700-7F
- Load-holding valve type LHT: D 7918
- Load-holding valve type LHDV: D 7770
- Load-holding valve type CLHV: D 7918-VI-C