

Load-holding valve type CLHV-C

Product documentation



Screw-in valve

Pressure setting p_{\max} : 350 bar

Load pressure p_{\max} : 320 bar

Flow rate Q_{\max} : 320 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. As a screw-in valve, type CLHV-C can either be installed at the manifold, in the pipe, or directly at the cylinder or hydraulic motor.

Features and benefits:

- Pressure settings up to 350 bar
- 4 sizes from 4 to max. 320 lpm
- Various adjustment options
- Various types of relief
- Various bore holes

Intended applications:

- Cranes
- Construction machines
- Lifting devices
- Agricultural machinery



Load-holding valve type CLHV 2 2UNF C

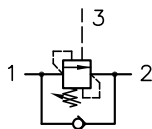


Load-holding valve type CLHV 3 T11A C

2 Available versions, main data

2.1 Order coding, overview

Circuit symbol:



Order coding example:

CLHV 2	2UNF	C	B	4	N	M	- ...	V	PYD
									seal material "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 Cartridge
									Bore hole "Table 1"
									Basic type and size "Table 1"

Table 1 Basic type, size and bore hole

Type	Bore hole	Description	Flow rate Q_{\max} (lpm)	Pressure setting p_{\max} (bar)
CLHV 2	2UNF	SAE 08	30	350
CLHV 3	3UNF	SAE 10	60	350
	T11A	T11A	75	350
CLHV 5	4UNF	SAE 12	120	350
	T2A	T2A	150	350
CLHV 7	6UNF	SAE 20	320	350

For a dimension drawing of the bore hole see [Chapter 4, "Dimensions"](#)

Table 2 Flow rate

Coding	Bore hole					
	2UNF	3UNF	T11A	4UNF	T2A	6UNF
A	--	--	75	--	150	--
B	30	60	60	120	120	320
C	--	--	30	--	--	--
D	--	--	12	--	--	--
E	4	--	4	--	--	--

Table 3 Control behaviour

Coding	Geometric control behaviour	Available bore holes
3	3:1	3UNF, T11A
4	4:1	2UNF, 4UNF, T11A, T2A
5	5:1	T11A (flow rate B)
8	8:1	2UNF, 6UNF
9	9:1	T11A (flow rate C)
10	10:1	T11A (flow rate A, B)

Table 4 Return pressure dependence

Coding	Description	Available sizes	Available pilot ratios	Circuit symbol
N	Normal (undischarged)	2, 3, 5, 7	All	
C	Return pressure compensated	5 (T2A)	4:1	
V	Discharged (atmospheric)	2, 3	Size 2 = 4:1 Size 3 = 3:1, 5:1	

i NOTE

For coding N, the return pressure at port 2 is added to the pressure setting with $(1 + \text{pilot ratio}) \times \text{return pressure}$!

Table 5 Pressure setting range

Coding	Pressure setting (bar)	Adjustment (bar/U)	Control behaviour (Table 3)	Flow rate (Table 2)	Bore hole	
L	30 - 105	27	4:1	B	2UNF	
T	70 - 150	73	4:1	B	2UNF	
	35 - 95	33	3:1	A	T11A	
	35 - 105	33	3:1	B		
M	100 - 210	109	4:1	B	2UNF	
	70 - 210	132	All		3UNF	
	70 - 155	132	3:1	A	T11A	
	70 - 185	63	10:1			
	70 - 210	132	3:1			
	70 - 210	63	10:1	B	T11A	
	70 - 280	155	All	C, D, E		
	70 - 210	49	4:1	A	T2A	
	70 - 210	49	All	B	T2A	
	70 - 210	49			4UNF	
	70 - 210	85			6UNF	
	D	140 - 350	136	All	B	2UNF
		140 - 350	136	4:1	E	2UNF
140 - 350		206	All	B	3UNF	
140 - 265		206	3:1	A	T11A	
140 - 390		115	10:1			
140 - 350		206	3:1	B	T11A	
210 - 360		115	10:1			
140 - 350		156	4:1	A	T2A	
140 - 350		156	All	B	T2A	
140 - 350		156			4UNF	
140 - 420		133			6UNF	

 NOTE

The pressure setting should be at least 30% higher than the maximum load pressure
Turn clockwise to increase pressure.

 CAUTION
Overloading components due to incorrect pressure settings

Risk of minor injury.

- Always monitor the pressure gauge when setting and changing the pressure.

Table 6 Adjustability

Coding	Description
No designation	Fixed, not for size 5
V	Fixed, tool adjustable
VA	Fixed, tool adjustable and with adjustment protection cap

Table 7 Seal material

Coding	Description
No designation	Series, HNBR
PYD	FKM – available on request

3 Parameters

General information

Designation	Load-holding valve CLHV
Model	Screw-in valve
Material	Galvanised steel
Attachment	See Chapter 4, "Dimensions"
Tightening torques	See Chapter 4, "Dimensions"
Installation position	As desired
Ports	<ul style="list-style-type: none"> ▪ Port 1: Consumer ▪ Port 2: Directional valve ▪ Port 3: Control oil pressure
Flow direction	<p>Operating direction 1 → 2 (Load-holding function)</p> <p>Free flow 2 → 1</p>
Control behaviour	See Chapter 2, "Available versions, main data" , Table 3
Hydraulic fluid	<p>Hydraulic oil according to DIN 51 524 Part 1 to 3; ISO VG 10 to 68 according to DIN 51 519</p> <p>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.</p> <p>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.</p> <p>Biologically degradable pressure fluids: Note manufacturer specifications. With consideration for the seal compatibility, not above +70°C.</p>

Pressure and flow rate

Pressure setting	$P_{\max} = 350 \text{ bar}$ See Chapter 2, "Available versions, main data" , Table 5
Flow rate	Maximum flow rates, see Chapter 2, "Available versions, main data" , Table 2
Maximum valve leakage at shut-off pressure	5 drops/min
Shut-off pressure	85% of set value

Weight

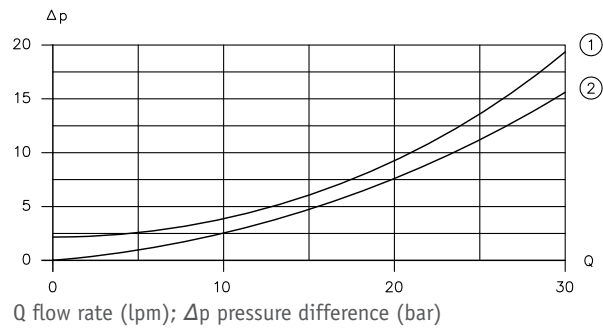
	Type	
	CLHV 2 2UNF	= 0.15 kg
	CLHV 3 3UNF	= 0.19 kg
	CLHV 5 4UNF	= 0.35 kg
	CLHV 7 6UNF	= 1.0 kg
	CLHV 3 T11A	= 0.15 kg
	CLHV 5 T2A	= 0.35 kg

Characteristics

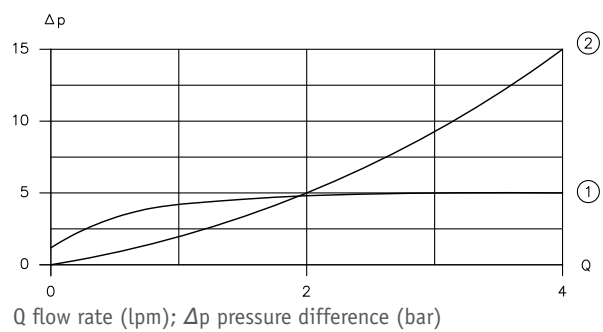
Oil viscosity approx. 60 mm²/s

Δp -Q characteristics

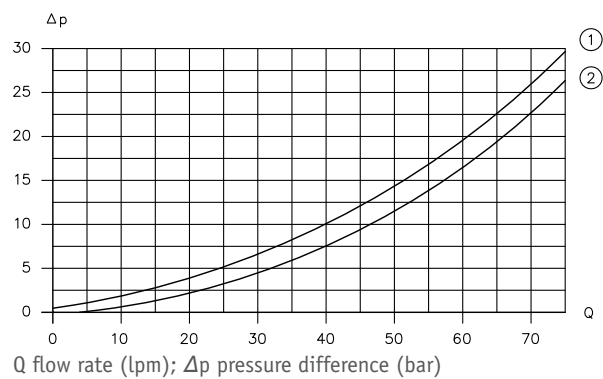
CLHV 2 (coding B)



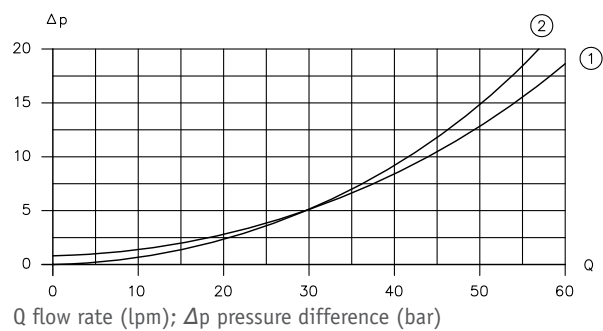
CLHV 2 (coding E)



CLHV 3 (coding A)



CLHV 3 (coding B)

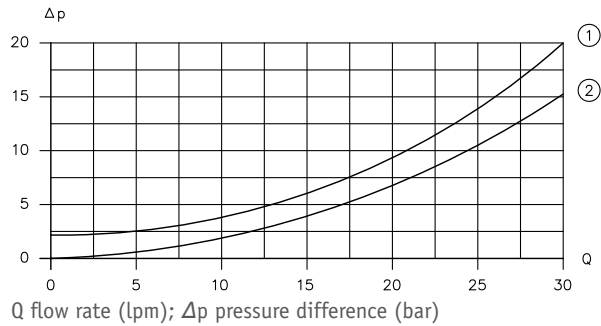


- 1 Free flow 2 → 1
- 2 Operating direction 1 → 2 (fully open)

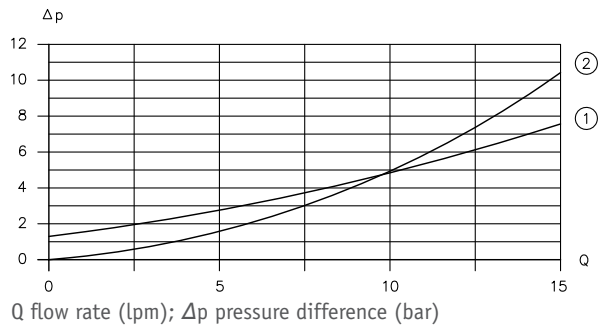
Oil viscosity approx. 60 mm²/s

Δp -Q characteristics

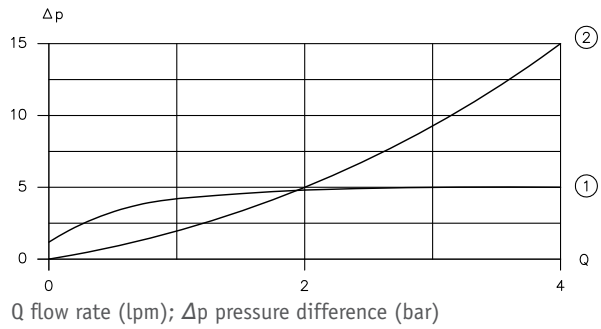
CLHV 3 (coding C)



CLHV 3 (coding D)



CLHV 3 (coding E)



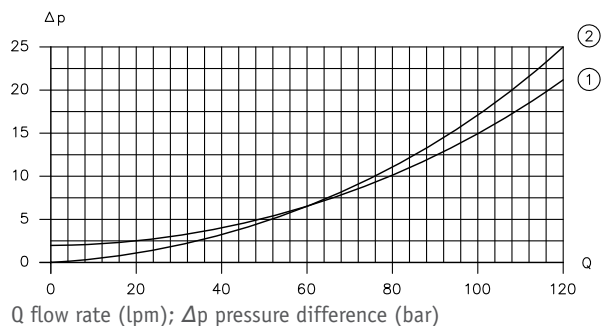
- 1 Free flow 2 → 1
- 2 Operating direction 1 → 2 (fully open)

Characteristics

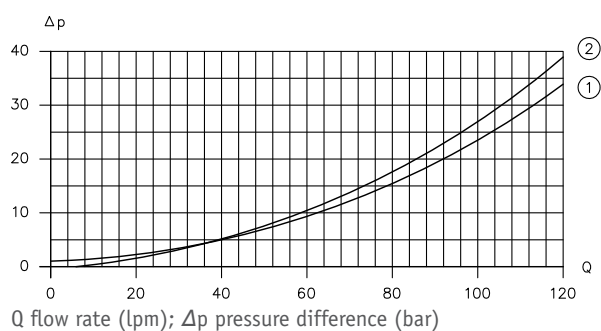
Oil viscosity approx. 60 mm²/s

Δp -Q characteristics

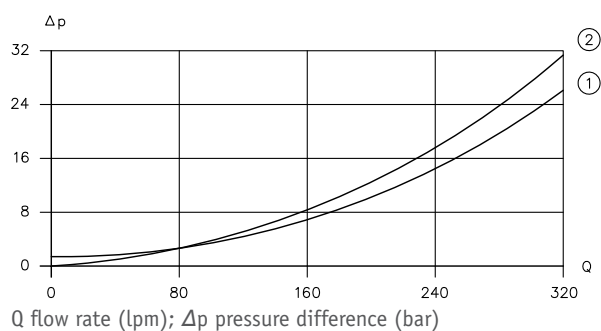
CLHV 5 (coding A)



CLHV 5 (coding B)



CLHV 7



- 1 Free flow 2 → 1
- 2 Operating direction 1 → 2 (fully open)

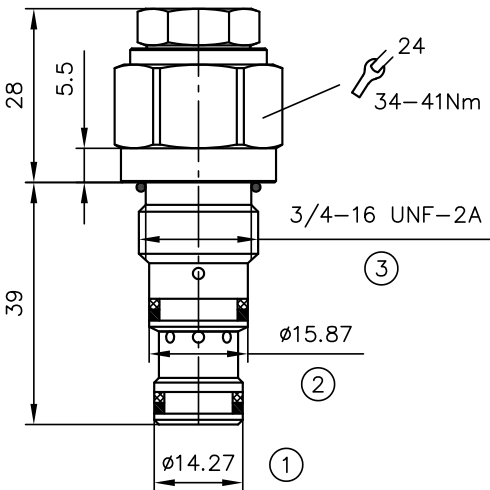
4 Dimensions

All dimensions in mm, subject to change.

4.1 Screw-in valve

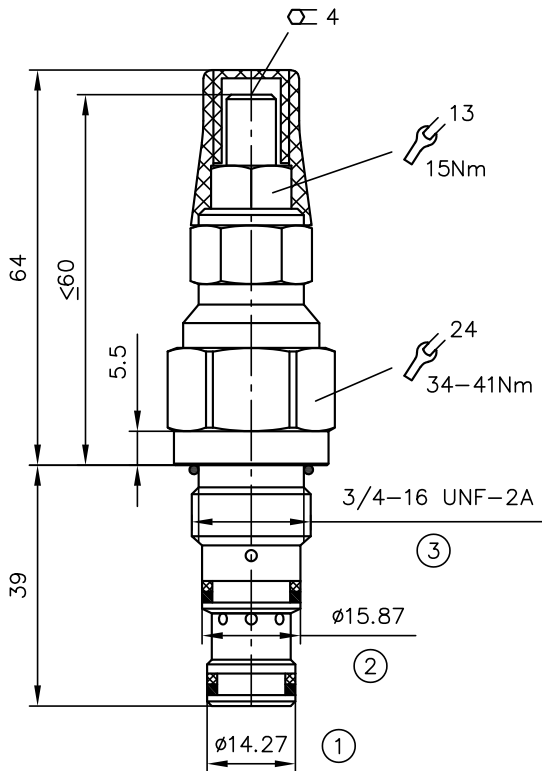
CLHV 2

CLHV 2 2UNF C (fixed)



- 1 Consumer port
- 2 Directional valve port
- 3 Control oil pressure port

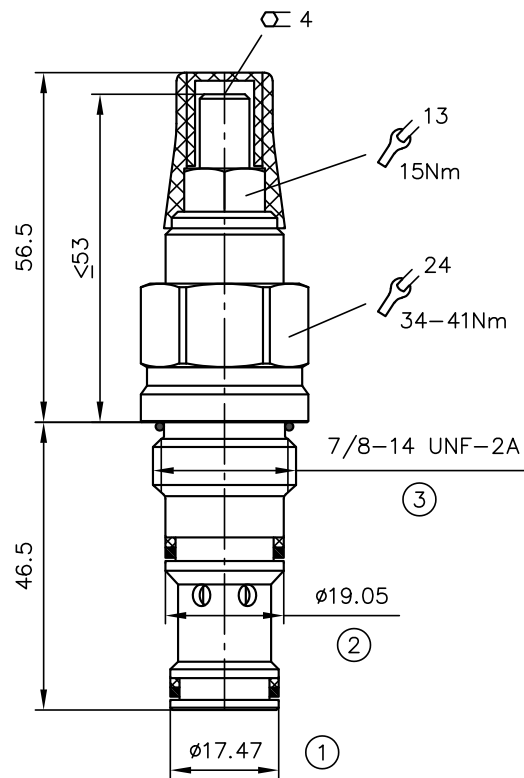
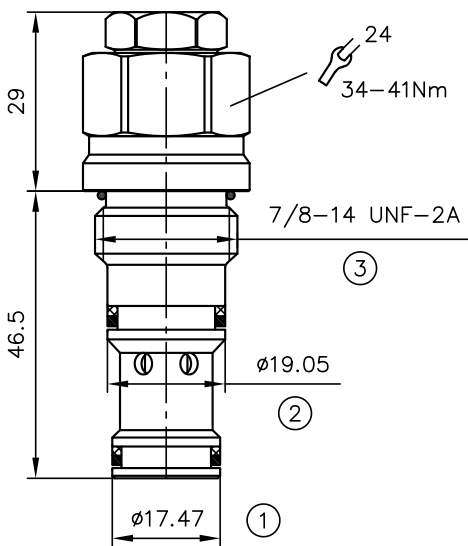
CLHV 2 2UNF C (fixed, tool adjustable)



CLHV 3

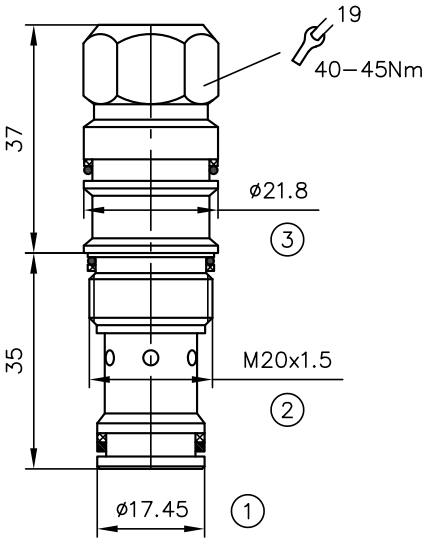
CLHV 3 3UNF C (fixed)

CLHV 3 3UNF C (fixed, tool adjustable)

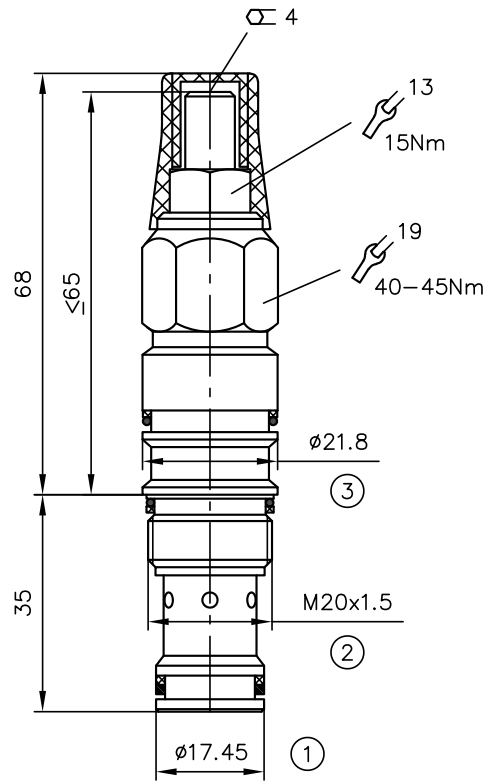


- 1 Consumer port
- 2 Directional valve port
- 3 Control oil pressure port

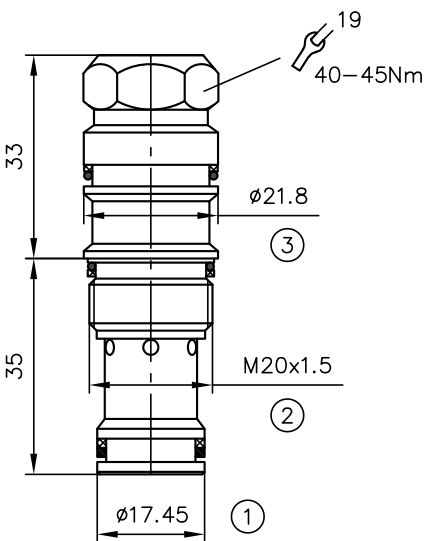
CLHV 3 T11A C (fixed)
for flow rate coding A, B



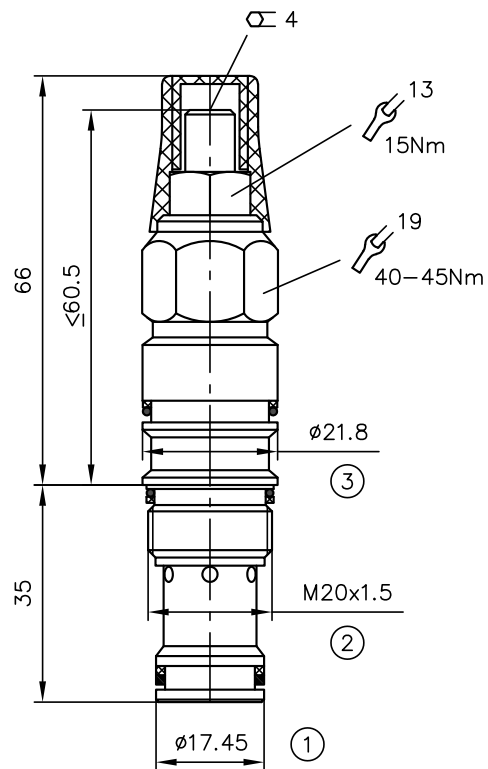
CLHV 3 T11A C (fixed, tool adjustable)
for flow rate coding A, B



CLHV 3 T11A C (fixed)
for flow rate coding C, D, E



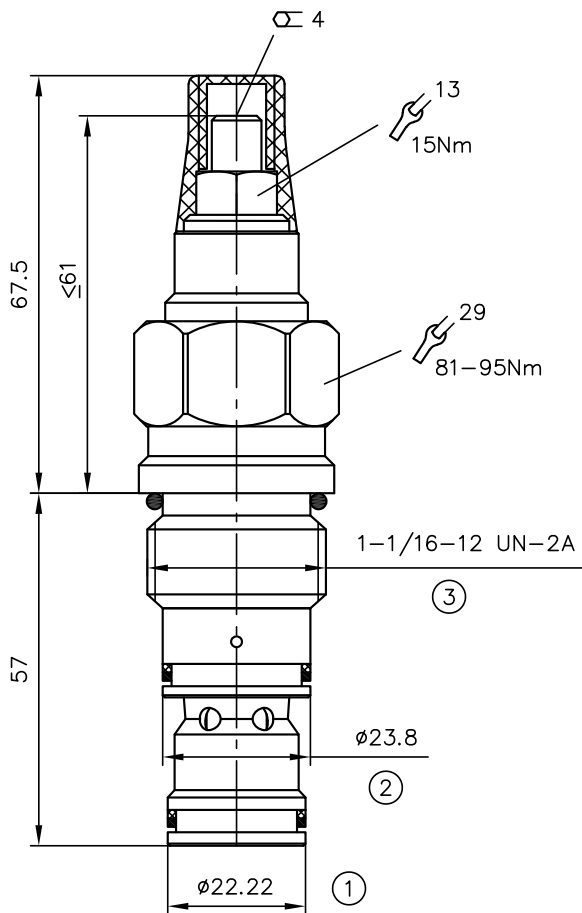
CLHV 3 T11A C (fixed, tool adjustable)
for flow rate coding C, D, E



- 1 Consumer port
- 2 Directional valve port
- 3 Control oil pressure port

CLHV 5

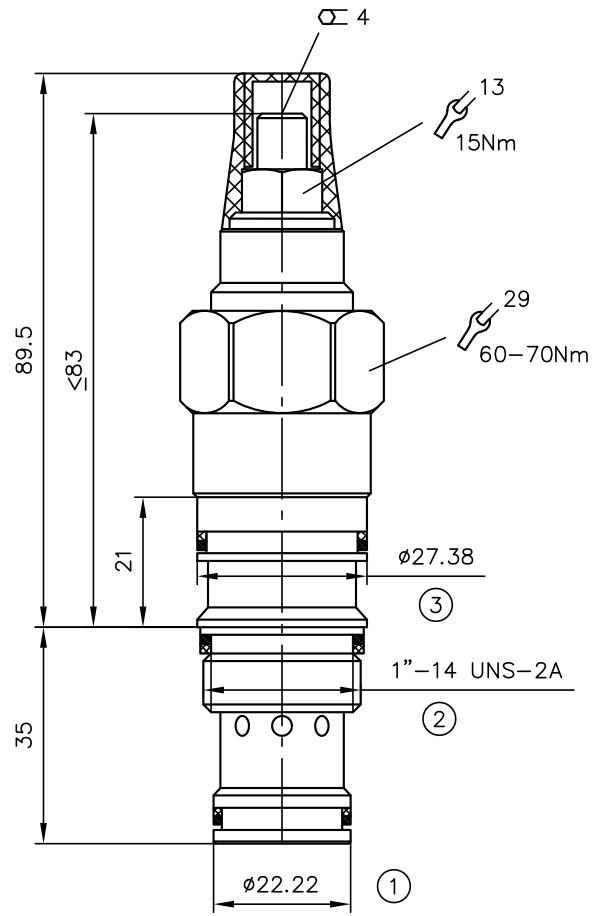
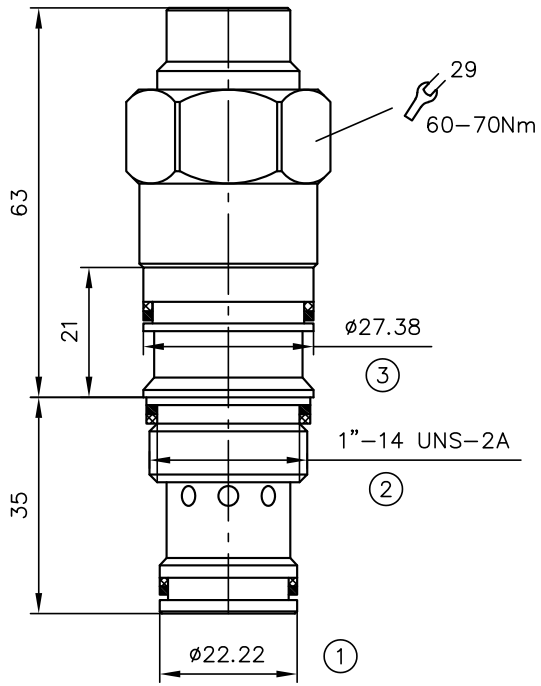
CLHV 5 4UNF C (fixed, tool adjustable)



- 1 Consumer port
- 2 Directional valve port
- 3 Control oil pressure port

CLHV 5 T2A C (fixed)

CLHV 5 T2A C (fixed, tool adjustable)

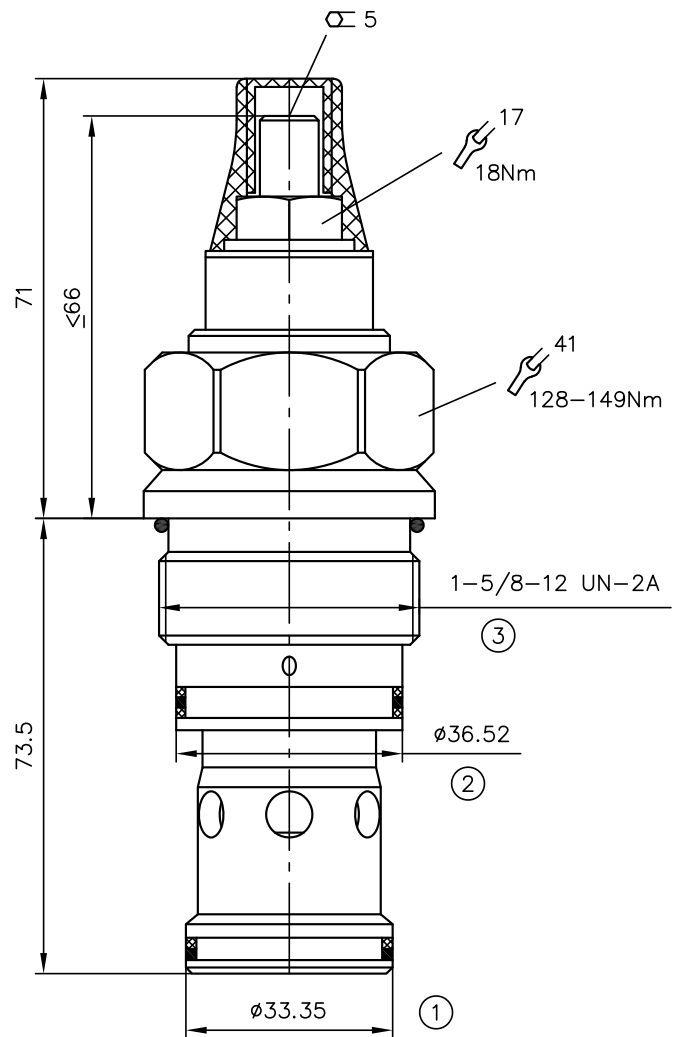
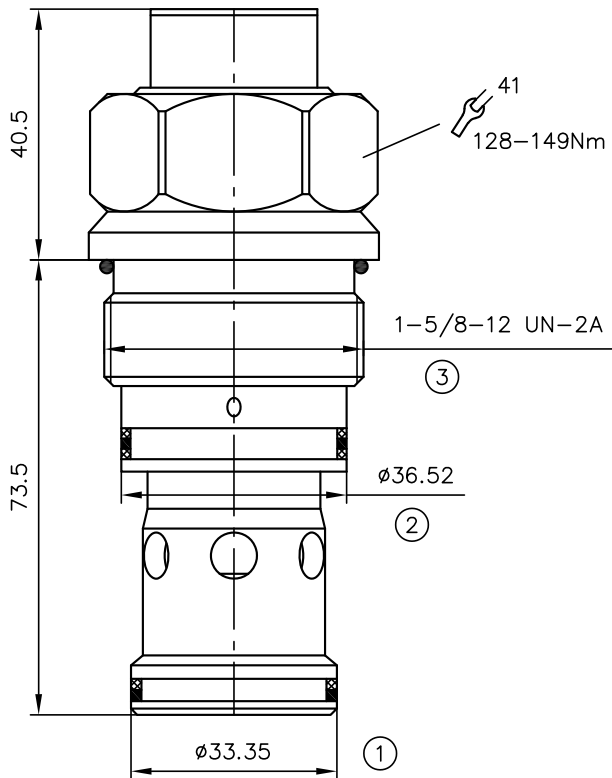


- 1 Consumer port
- 2 Directional valve port
- 3 Control oil pressure port

CLHV 7

CLHV 7 6UNF C (fixed)

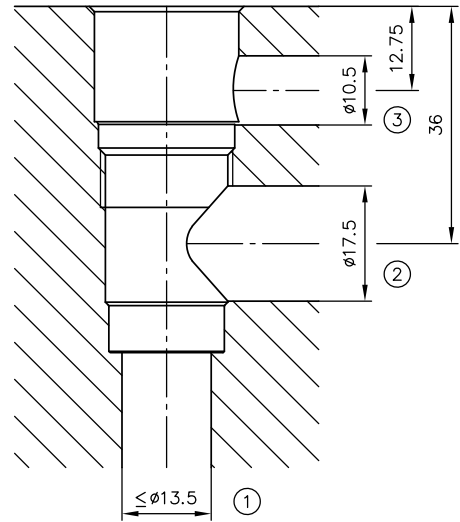
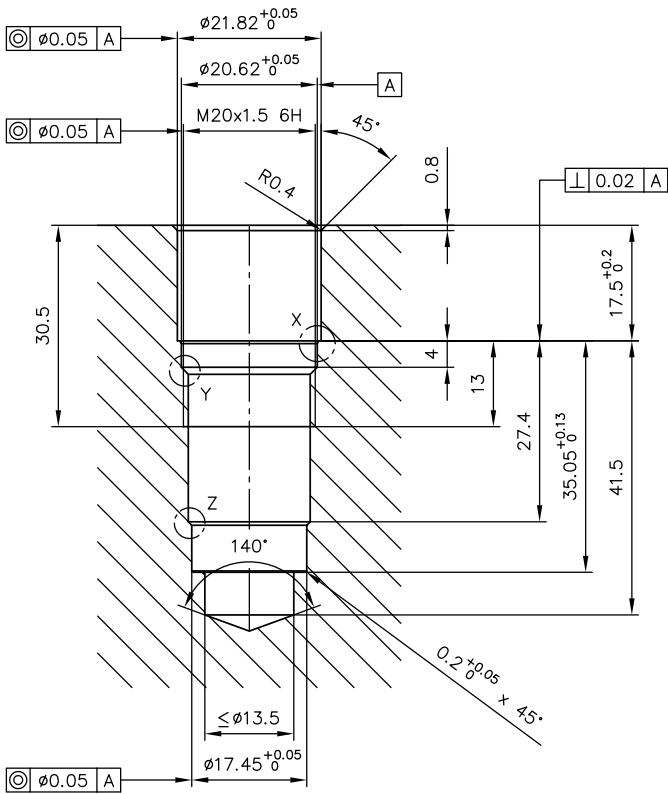
CLHV 7 6UNF C (fixed, tool adjustable)



- 1 Consumer port
- 2 Directional valve port
- 3 Control oil pressure port

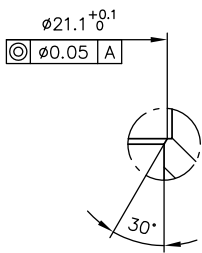
4.2 Mounting hole

T11A

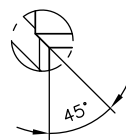


- 1 Consumer port
- 2 Directional valve port
- 3 Control oil pressure port

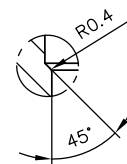
View X



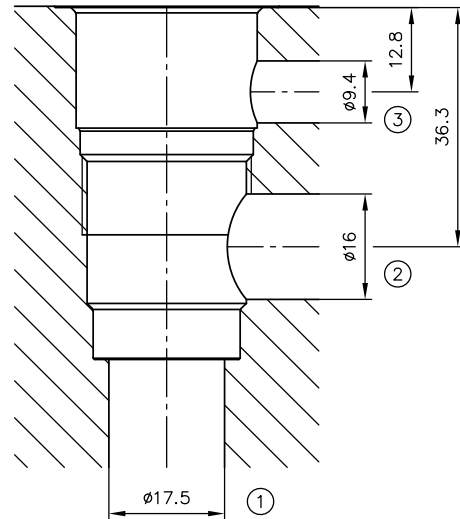
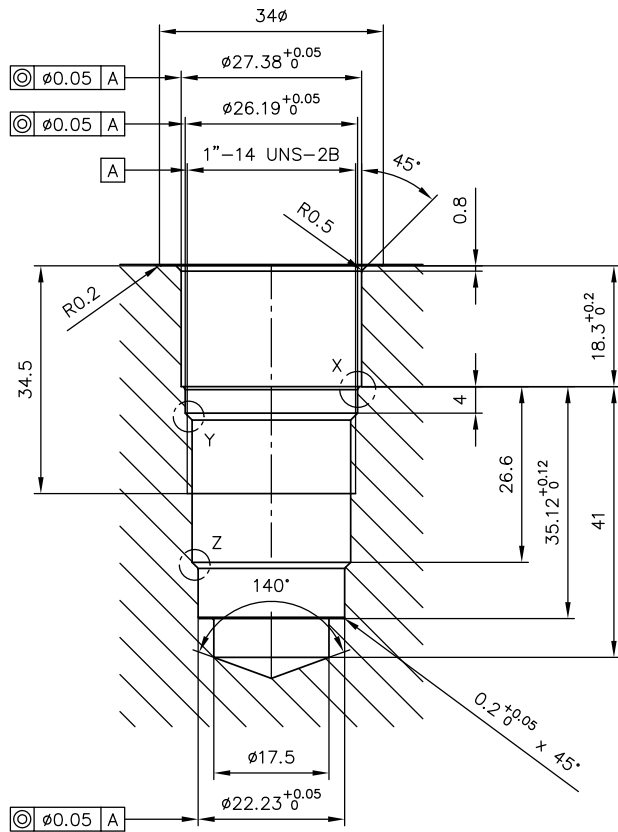
View Y



View Z

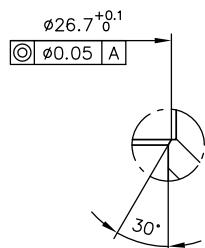


T2A

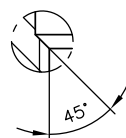


- 1 Consumer port
- 2 Directional valve port
- 3 Control oil pressure port

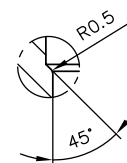
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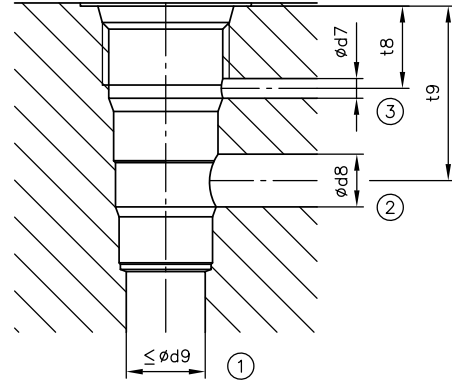
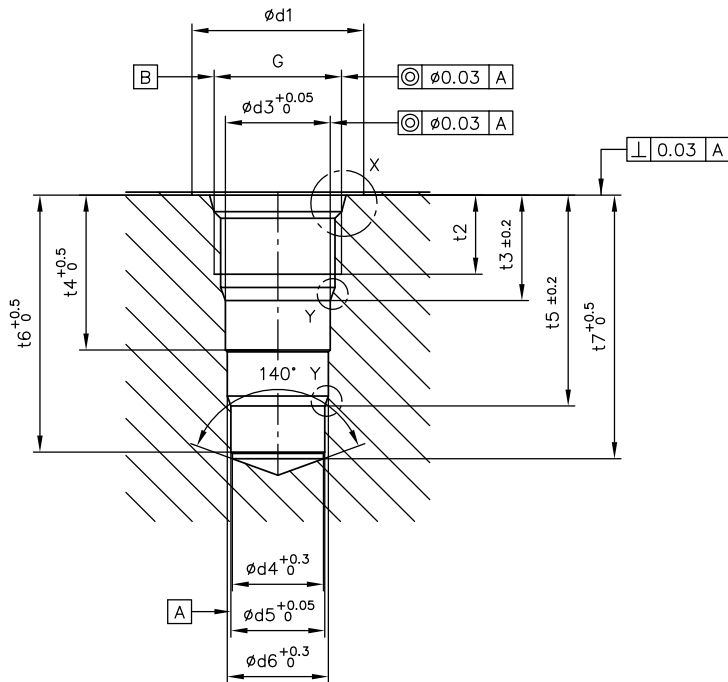
View Y



View Z

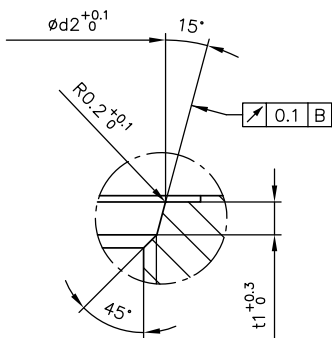


2UNF
3UNF
4UNF
6UNF

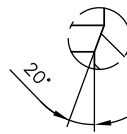


- 1 Consumer port
- 2 Directional valve port
- 3 Control oil pressure port

View X



View Y



Coding	$\varnothing d1$	$\varnothing d2$	$\varnothing d3$	$\varnothing d4$	$\varnothing d5$	$\varnothing d6$	$\varnothing d7$	$\varnothing d8$	$\varnothing d9$	G
2UNF	26	20.6	15.87	15.3	13.8	14.27	3	8	12	3/4-16 UNF-2B
3UNF	30	23.9	19.05	18.6	17	17.47	8	8	14	7/8-14 UNF-2B
4UNF	35	29.2	23.8	23.3	21.7	22.22	5	14	19	1-1/16-12 UN-2B
6UNF	48	43.5	36.52	36	32.8	33.35	7	28	31	1-5/8-12 UN-2B
	t1	t2	t3	t4	t5	t6	t7	t8	t9	
2UNF	2.5	12	16	23.5	32	39	40	12.5	26.5	
3UNF	2.6	13	18	27	40	47	49	18	34	
4UNF	3.3	21	26.5	37	49.5	58	60	22.5	40.5	
6UNF	3.3	20	25.5	38	65.5	75.5	78	20	50	

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.

All installation, set-up, maintenance and repairs must be performed by authorised, qualified and trained staff.

The use of this product beyond the specified performance limits, operation with non-specified fluids and/or use of non-genuine spare parts will invalidate the warranty.

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-PIB