Pressure control valves

2.3 Pressure-limiting valve type MV, SV and DMV

Pressure-limiting valves and sequence valves are types of pressure control valves. Pressure-limiting valves safeguard the system against excessive system pressure or limit the operation pressure. Sequence valves generate a constant pressure difference between the inlet and outlet flow.

Type MV and SV is a directly controlled valve that is damped as standard. Versions that correspond to the Pressure Equipment Directive are also available.

Features and benefits:

- Operating pressures up to 700 bar
- Various adjustment options
- Numerous configurations

Intended applications:

- General hydraulic systems
- Test benches
- Hydraulic tools

Nomen-clature:	Pressure-limiting valve, sequence valve (directly controlled)
Design:	Individual valve for pipe connection Screw-in valve Individual manifold mounting valve Assembly kit
Adjustment:	Fixed Manually adjustable
p_{max}:	700 bar
Q_{max}:	160 lpm

Design and order coding example

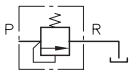
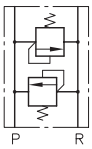
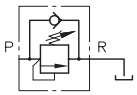
MVS 52	B	R	X	- 650

- **Pressure setting]**
- **Optionally without dampening (X)**
- **Adjustability (while pressurized)**
  - fixed
  - Manually adjustable
  - Adjustable with turn knob (self-locking/lockable)
- **Pressure range and volumetric flow** — Pressure ranges A, B, C, E and F
- **Basic type, size** — Type MV.., DMV.. and SV..

Additional versions

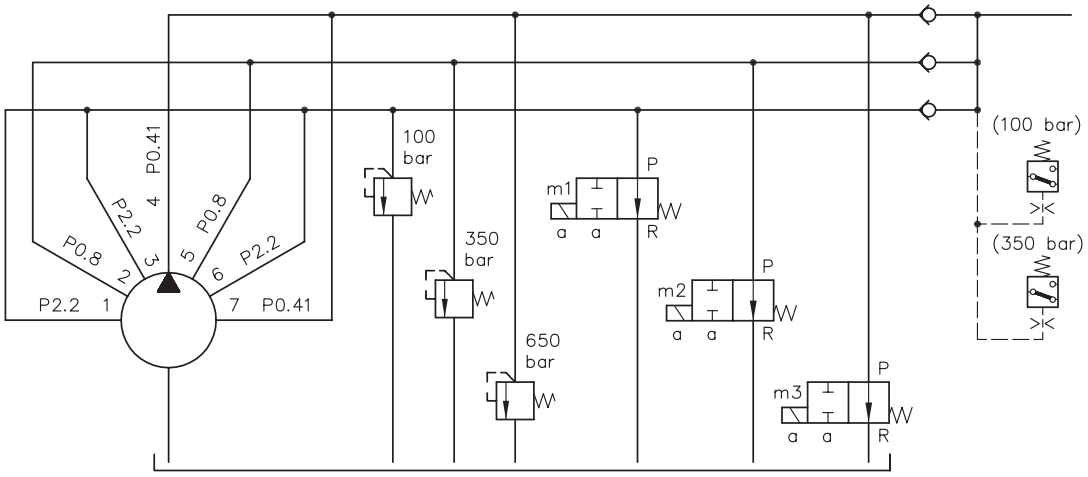
- Pressure-limiting valves with unit approval (TÜV valves) (type MVX, MVSX, MVEX, MVPX, SVX, size 4, 5 and 6)
- Various actuations: ball head for controls via cam, lever etc. (type MVG and MVP only)

Function

	MV[1]	MVS MVG	MVE	SV	MVP	DMV	MVCS MVGC	SVC	MVB
									
Function	Pressure limiting valve	Pressure limiting valve and differential pressure regulators				Pressure limiting valve	Pressure-limiting valve with free reflux R→P via a bypass check valve		Pressure limiting valve and differential pressure regulators
Brief description	Corner valve for pipe connection	Corner valve for pipe connection	Screw-in valve	Straight-way valve for straight pipe installation	Manifold mounting valve	Twin valve as shock valve for hydraulic motors	Corner valve for pipe connection	Straight-way valve for straight pipe installation	Assembly kit
Size	4, 5, 6	13, 14, 4, 5, 6, 8	13, 14, 4, 5, 6, 8	4, 5, 6, 8	13, 14, 4, 5, 6, 8	4, 5, 6, 8	13, 14, 4, 5, 6	4, 5, 6	4, 5, 6, 8
$p_{perm\ R}$ [bar]	20	500	500	500	500	350	500	500	200

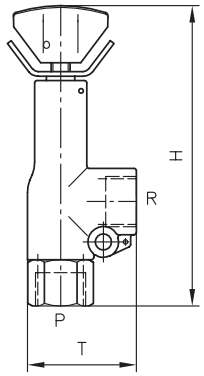
1) Only size 4, 5, 6, and 8
Type MVG and MVGC only size 13 and 14

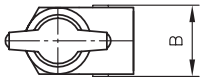
Circuit example:



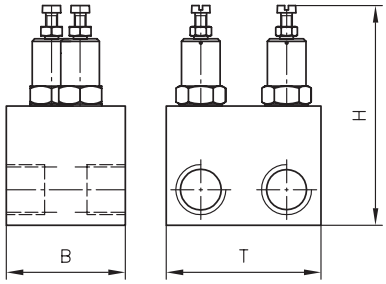
General parameters and dimensions

MV, MVS

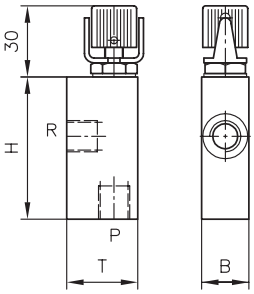




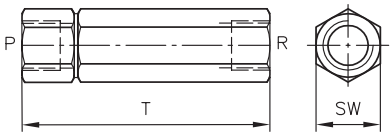
DMV



MVG



SV, SVC



See following table for dimensions

	Size	Dimensions [mm]			m [kg]	Size	Pressure range/ Flow	Ports[1]
		H_{max}	B/SW	T_{max}				
MV, MVS, MVCS, MVE	4	126	24	48	0.3	4	F: 80/20 E: 160/20 C: 315/20 B: 500/20 A: 700/12	G 1/4, G 3/8
	5	142	29	60	0.4			
	6	164	36	70	0.7			
	8	208	40	60	2.0			
DMV	4	107	40	52	0.7	5	F: 80/40 E: 160/40 C: 315/40 B: 500/40 A: 700/20	G 3/8, G 1/2
	5	123	50	65	1.3			
	6	142.5	60	75	1.8			
	8	192	80	96	4.5			
MVP	4	102	28	35	0.3	6	F: 80/75 E: 160/75 C: 315/75 B: 500/75 A: 700/40	G 1/2 G 3/4
	5	113	32	40	0.5			
	6	133	35	50	0.8			
	8	172	50	60	1.6			
	13, 14	82	29	50	0.3	8	E: 160/160 C: 315/160 Bi: 500/160 A: 700/75	G 3/4, G 1
MVE	13, 14	75	SW 27	-	0.1			
MVG, MVGC	13, 14	94	20	42	0.3	13	H: 700/5	G 1/4
SV, SVC	4	-	SW 22	87	0.2	14	N: 50/8 M: 200/8 H: 400/8	G 1/4
	5	-	SW 27	108	0.4			
	6	-	SW 32	132	0.9			
SV	8	-	SW 41	157	0.9			

1) For pipe connection versions only

Associated technical data sheets:

- Pressure-limiting valve type MV, SV and DMV: D 7000/1
- Pressure-limiting valve and pre-load valve type MVG, MVE and MVP: D 3726
- Pressure-limiting valve (installation kit) type MV: D 7000 E/1
- Multiple pressure-limiting valve type MV: D 7000 M
- Pressure-limiting valve, with unit approval type MV .X: D 7000 TUV

Similar products:

- Pressure control valves for screwing in type CMV, CSV: Page 166
- Pilot-controlled pressure control valves type DV: Page 168
- Pilot-controlled pressure control valves type A: Page 168

Pressure valves

2.3 Pressure control valve type CMV, CMVZ, CSV and CSVZ

Pressure-limiting valves and sequence valves are types of pressure control valves. Pressure-limiting valves safeguard the system against excessive system pressure or limit the operation pressure. Sequence valves generate a constant pressure difference between the inlet and outlet flow.

Type CMV and CSV is a directly controlled valve that is damped as standard. Versions that correspond to the Pressure Equipment Directive are also available. Type CMVZ and CSVZ is not influenced by the pressure conditions downstream and is therefore suitable for use in loss-free sequence control systems.

Valve type CMV and CSV can be screwed-in and can be integrated into control blocks. The necessary mounting holes are straightforward to make.

Features and benefits:

- Operating pressures up to 500 bar
- Various adjustment options
- Easily produced mounting hole

Intended applications:

- General hydraulic systems
- Test benches
- Hydraulic tools

Nomen-clature:	▪ **Pressure-limiting valve** ▪ **Sequence valve (directly controlled)**
Design:	**Screw-in valve**
Adjustment:	▪ **Tool adjustable (fixed)** ▪ **Manually (adjustable)**
p_{max}:	**500 bar**
Q_{max}:	**60 l/min**

Design and order coding example

CMV 3 | F | R | - 200 | - 1/4

Single connection block for pipe connection

Pressure setting [bar]

Adjustability (while pressurized) fixed or manually adjustable

Pressure range Pressure ranges B, C, E and F

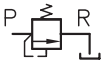
Basic type, size Type CMV (pressure limiting valve), size 1 to 3
Type CSV (pressure difference valve), size 2 to 3

Additional versions:

- Sequence valves CMVZ or CSVZ
- Version with unit approval type CMVX
- Undamped version (CMV)

Function

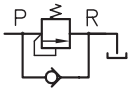
CMV



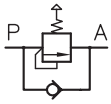
CMVZ

Pressure limiting valve (port R pressure resistant)

CSV



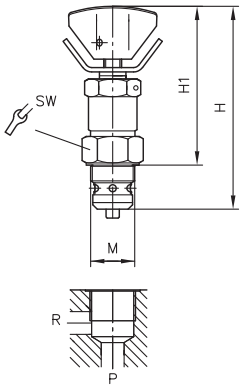
CSVZ



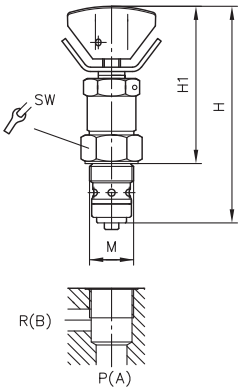
Sequence valves with by-pass check valve

General parameters and dimensions

CMV/CMVZ



CSV/CSVZ



	Size	Q_{max} [lpm]	Pressure range p_{max} [bar]	M	SW = a/f	Dimensions [mm]		m [g]
						H_{max}	$H1_{max}$	
CMV, CMVZ	1	20	F: 80 E: 160 C: 315 B: 500	M 16 x 1.5	SW 22	78	57	90
	2	40		M 20 x 1.5	SW 24	94	72	160
	3	60		M 24 x 1.5	SW 30	114	83	275
CSV, CSVZ	2	40		M 20 x 1.5	SW 24	104	73	150
	3	60		M 24 x 1.5	SW 30	122	82	300

Associated technical data sheets:

- Pressure control valve type CMV, CMVZ, CSV and CSVZ: D 7710 MV
- Safety valve with unit approval type CMVX: D 7710 TUV

Similar products:

- Pressure-limiting valves type MV, SV etc.: Page 162
- Miniature pressure-limiting valves type MVG etc.:Page 162
- Pilot-controlled pressure control valves type DV: Page 168
- Pilot-controlled pressure control valves type AS: Page 168

2.3 Pressure-limiting valve, pilot-controlled type DV, AS etc.

Pressure-limiting valves are a type of pressure control valve. They safeguard the system against excessive system pressure or limit the operation pressure.

The pressure-limiting valve type DV and AS is pilot-controlled. Type AS also has an additional check valve in the consumer port.

Features and benefits:

- Various adjustment options
- Various additional functions

Intended applications:

- General hydraulic systems
- Test benches

Nomen-clature:	Pressure-limiting valve Sequence valve Switch-off/release valve (pilot-controlled)
Design:	Single valve for pipe connection Individual valve for manifold mounting
Adjustment:	Tool adjustable (fixed) Manually (adjustable)
p_{max}:	420 bar
Q_{max}:	120 l/min

Design and order coding example

DV3 G H R - WN 1F- 24 - 200

Pressure setting [bar]

2/2-way directional seated valve Optionally with mounted 2/2-way directional seated valve for arbitrary idle circulation

Adjustability in operation fixed or manually adjustable (R)

- Various actuations for the pilot valve: ball head for controls via cam, lever etc. (type DV, DVE)

Pressure range

- N: 2 to 100 bar
- H: 5 to 420 bar

Line connection Pipe connection or manifold mounting

Basic type, size

Type DV (internal control oil drain),
Type DVE (external control oil drain),
Type DF (valve for remote control), size 3 to 5
Type AS (additional check valve), size 3 to 5
Type AE (release valve), size 3 to 5

Additional versions:

- Additional switching combinations with the types AS and AE

Function

DV

Pressure limiting, sequence valve

DVE

Follow-up valve

DF

Pressure limiting, sequence valve, follow-up valve or 2/2-way directional valve (remote controlled, depending on the kind of valve connected to port X)

AS

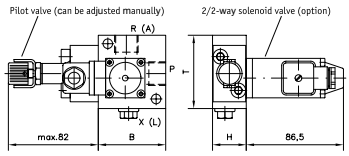
Pressure limiting valve

AE

Release valve (remote controlled), combined function as pressure limiting valve possible (type ASE)

General parameters and dimensions

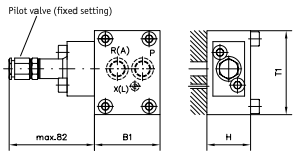
DV .. G



1 Pilot valve (can be adjusted manually)

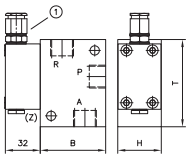
2 2/2-way solenoid valve (option)

DV .. P



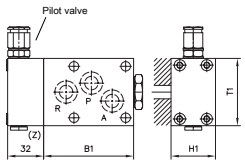
1 Pilot valve (fixed)

AS .. G



1 Pilot valve

AS .. P



1 Pilot valve

Type, size	Q_{max} [lpm]	Pressure range: p_{max} [bar]	Ports	Dimensions [mm]					m [kg]
DV, DVE, DF				H	B	B1	T	T1	
3	50	N: 100 H: 420	G 1/2	30	60	-	66	-	1,1 / -
4	80		G 3/4	40	65	60	71	78	1,5 / 2,0
5	120		G 1	50	80	88	73	81	2,0 / 2,5

Type, size	Q_{max} [lpm]	Pressure range: p_{max} [bar]	Ports	Dimensions [mm]						m [kg][1)]
AS, ASE, AE				H	H1	B	B1	T	T1	
3	50	M: 200 H: 350/300 (type AE)	G 1/2	40	-	60	-	80	-	1,8
4	80		G 3/4	40	40	70	80	94	60	2,2
5	120		G 1	6,3	40	100	94	85	80	4,1

1) Versions for pipe connection/manifold mounting (with installed solenoid valve + 0.6 kg)

Associated technical data sheets:

- Pressure-limiting valve, pilot-controlled type DV, DVE and DF: D 4350
- Pressure valve with check valve type AL, AE and AS: D 6170

Similar products:

- Pressure-limiting valves type MV, SV etc.: Page 162
- Miniature pressure-limiting valves type MVG etc.: Page 162
- Pressure-limiting valves type CMV(Z): Page 166

2.3 Sequence valves with check valve type VR

Pre-load valves, also called sequence valves are a type of pressure control valve. They generate a largely constant pressure drop between the inlet and outlet on the valve. In the opposite direction the flow can pass freely. In the normal position the valve has minor leakage.

The sequence valve type VR is available as a screw-in valve and in a housing version for in-line installation.

The primary application area is in return lines for oscillation damping, mainly in lifting equipment, lifting platforms, handling systems and in lifting gantries as fall protection.

Features and benefits:

- Compact screw-in valve

Intended applications:

- Lifting equipment
- Lifting platforms
- Handling technology

Nomen-clature:	Sequence valve
Design:	Screw-in valve Combination with housing for pipe connection
Adjustment:	Fixed (non-adjustable)
p_{max}: Δp_{max}:	315 bar 15 bar
Q_{max}:	120 l/min

Design and order coding example

VR 3 | 3 | C

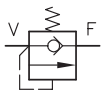
Design with housing
- Cartridge valve
- Versions with housing for pipe connection
- Design with metric fine thread

Pre-load pressure Open-up pressure Δp_{max} 3 to 15 bar

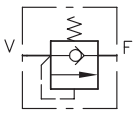
Basic type, size Type VR, size 1 to 4

Function

VR



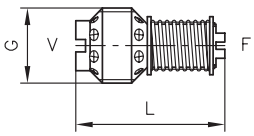
Screw-in valve



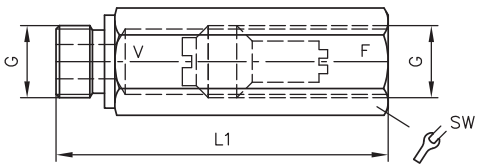
Version with housing for pipe connection

General parameters and dimensions

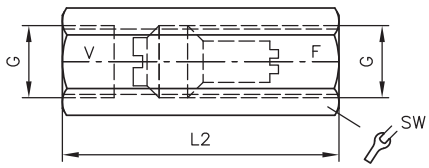
VR 3 3 C
Insert valve



VR 4 9 E
Version with housing



VR 1 15 G
Version with housing



	Q_{max} [lpm]	Δp_{max} [bar] 1)	Dimensions [mm]					m [g] 2)
			G (BSPP)	L	L1	L2	SW = a/f	
VR 1	15	3, 5, 7, 9, 12, 15	G 1/4 (A)	31	78	66	SW 19	15/120
VR 2	40	3, 5, 7, 9, 12, 15	G 3/8 (A)	36	82	70	SW 22	25/160
VR 3	65	3, 5, 7, 9, 12	G 1/2 (A)	42	96	80	SW 27	40/270
VR 4	120	3, 5, 7, 9, 12	G 3/4 (A)	54	106	100	SW 32	80/400

1) The selected pre-load pressure e.g. opening pressure cannot beltered
2) Individual valve/design with housing

Associated technical data sheets:

- Pre-load check valve type VR: D 7340

Similar products:

- Pressure-limiting valves type MV, SV etc.: Page 162
- Miniature pressure-limiting valves type MVG etc.: Page 162
- Pilot-controlled pressure control valves type DV: Page 168
- Pressure-limiting valves type CMV: Page 166

2.3 Proportional pressure-limiting valve type PMV and PDV

Proportional pressure-limiting valves are a type of pressure control valve. They remotely control the pressure in hydraulic systems continuously and electrically.
The pressure-limiting valve type PMV is a directly actuated valve in a spring-loaded ball version. The pressure can be set to up to 700 bar. The pressure-limiting valve type PDV is a pilot valve in a piston version, where pressures up to 350 bar can be set. The pressure-limiting valve type PMV and PDV is available as a single valve for pipe connection or as a manifold mounting valve.
The proportional pressure-limiting valve is particularly suitable for maximum pressure limitation in hydraulic systems.

Features and benefits:
- Max. operating pressure 700 bar
- Precise control

Intended applications:
- General hydraulics
- Test benches
- Mining machinery

Nomen-clature:	Prop. pressure-limiting valve (directly controlled or piloted)
Design:	Individual valve for pipe connection Individual valve Manifold mounting
Adjustment:	Electro-proportional
p_{max}:	700 bar
Q_{max}:	120 l/min

Design and order coding example

PDV4G PMVP4	H - 44	- G24 - G24

Solenoid voltage — Prop. solenoid
- 12V DC, 24V DC
- Control using proportional amplifier or PLVC

Pressure range [bar]

Basic type, port size, size — Type PMV (pipe connection), type PMVP (manifold mounting)
- Optionally with separate control oil supply, i.e. pressure reduction right above 0 bar, zero-leakage in the main pump circuit (type PMVS, PMVPS)

Type PDV.G (pipe connection), type PDV.P (manifold mounting)
- Additionally with 2/2-way solenoid valves for arbitrary idle circulation

Function

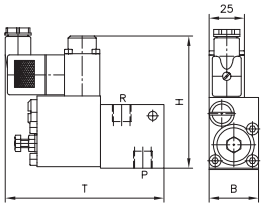
PMV, PDV

Pipe connection

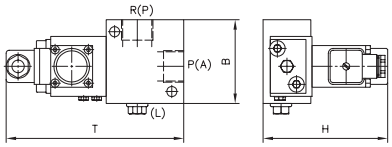
Manifold mounting valve

General parameters and dimensions

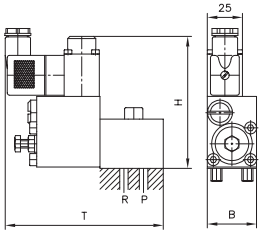
PMV



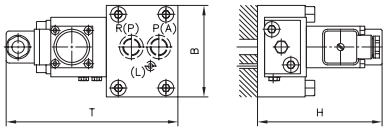
PDV..G



PMVP



PDV..P



	Size	Q_{max} [lpm]	Pressure range p_{max} [bar]	Ports [1]	Dimensions [mm]			m [kg]
					H	B	T	
PMV/PMVP	4	16	41: 180 42: 290 43: 440 44: 700	G 1/4, G 3/8	97/95	35	135	1,2 / 1,1
	5	60	41: 110 42: 180 43: 270 44: 450	G 1/4, G 3/8, G 1/2	98/95	35/40	140	1.2
	6	75	41: 80 42: 130 43: 190 44: 320	G 3/8, G 1/2, G 3/4	102/95	40/50	150/140	1,5/1,3
	8	120	41: 45 42: 70 43: 110 44: 180	G 3/4, G 1	107/97	45/60	160/150	1,9/1,7
PDV.G/PDV.P	3	40	N: 130 M: 200 H: 350	G 1/2	96	66	150	1.8
	4	80		G 3/4	99.5	71/78	155/150	2,2/2,7
	5	120		G 1	104.5	73/81	170/178	2.7/3.2

1) For pipe connection versions only

Associated technical data sheets:

- Proportional pressure-limiting valve type PMV and PMVP: D 7485/1
- Proportional pressure-limiting valve type PDV and PDM: D 7486
- Proportional pressure-limiting valve type NPMVP: D 7485 N
- Intermediate plate type NZP: D 7788 Z

Suitable accessories:

- Proportional amplifier type EV1M3: Page 272
- Proportional amplifier type EV2S: "CAN-IO, EV2S-CAN"
- Proportional amplifier type EV1D: Page 272

Pressure valves

2.3 Pressure-reducing valve type ADC, ADM, ADME and AM

Pressure reducing valves are a type of pressure control valve. They maintain a largely constant outlet pressure even at a variable (higher) inlet pressure.
The pressure reducing valve type ADC and AM is suitable for the supply of control circuits with low oil consumption. These valves feature an override compensation, i.e. acting like a pressure-limiting valve if the secondary pressure exceeds the set pressure e.g. due to external forces. There is a design-related leakage flow.

Features and benefits:
- Compact design
- Numerous configurations

Intended applications:
- For control oil supply in pilot circuits

Nomen-clature:	Pressure reducing valve
Design:	Screw-in valve Valve for pipe connection
Adjustment:	Fixed (non-adjustable)
$p_{max\ P}$:	400 bar
$p_{max\ A}$:	100 bar
Q_{max}:	10 lpm

Design and order coding example

ADC 1 - 25 - 1/4

Design
- Cartridge valve
- Design with housing for direct pipe connection
- Version with housing for manifold mounting (type AM 11)

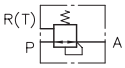
Pressure downstream Pressure at port A [bar]

Basic type Type ADC, AM
Type ADM, ADME
- Type ADM 1 adjustable version available

Function

ADC, AM, ADM, ADME

Screw-in valve



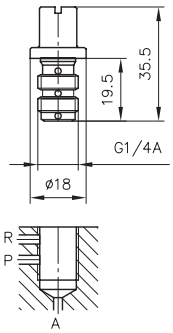
Pipe installation

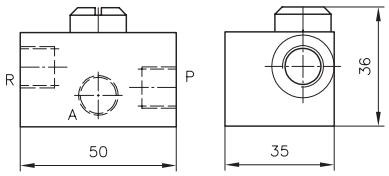
ADC 1 - 25
Pressure reducing valve type ADC 1 as screw-in valve, pressure at A (on the consumer side) approx. 25 bar

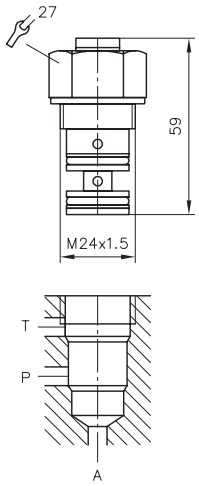
AM 1 - 20 - 1/4
Pressure reducing valve type AM 1, version for pipe connection (threaded connections G 1/4), pressure at A (on the consumer side) approx. 20 bar

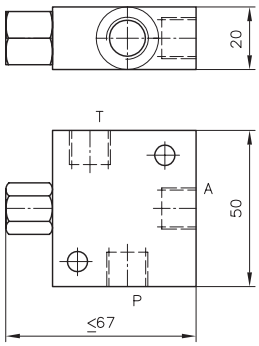
ADME 1 - ...

ADM 1 - 70
Pressure reducing valve type ADM 1, version for pipe connection, pressure at A (on the consumer side) approx. 70 bar









	Q_{max} [lpm]	p_{max} [bar]	Outlet pressure [bar] at A	Ports [1]	m_{max} [kg]	
					Screw-in valve	Pipe installation
ADC 1	2	300	15, 25	G 1/4	0.03	0.32
AM 1	2	400	20, 30, 40, 100	G 1/4	0.03	0.3
ADM 1	8 ... 10	300	15, 20, 30, 70	G 1/4	-	0.34
ADME	8	300	15, 20, 30	-	0.05	-

1) In version for pipe connection only

Associated technical data sheets:
- Pressure-reducing valve type ADC, ADM, ADME and AM: D 7458

Similar products:
- Pressure reducing valves type ADM, VDM: Page 176
- Pressure reducing valves type CDK: Page 180
- Prop. pressure reducing valves type PDM: Page 186
- Miniature prop. pressure reducing valves type PM, PMZ: Page 184

Pressure valves

2.3 Pressure-reducing valve type ADM and VDM

Pressure reducing valves are a type of pressure control valve. They maintain a largely constant outlet pressure even at a variable (higher) inlet pressure.
The pressure reducing valve type ADM is directly controlled, the type VDM is hydraulically pilot-controlled. These valves feature an override compensation, i.e. acting like a pressure-limiting valve if the secondary pressure exceeds the set pressure e.g. due to external forces. There is a design-related leakage flow.

Features and benefits:

- With safety valve function
- Various adjustment options
- Various additional functions

Intended applications:

- General hydraulics
- Jigs
- Test benches

Nomen-clature:	Pressure reducing valve (directly-controlled or pilot-controlled)
Design:	Single valve for pipe connection Individual valve for manifold mounting
Adjustment:	Tool adjustable (fixed) Manually (adjustable)
$p_{max\ P}$:	400 bar
$p_{max\ A}$:	300 bar
Q_{max}:	120 l/min

Design and order coding example

ADM 22 D R - 250

Pressure setting [bar]

Adjustability in operation
- Fixed (-)
- Manually adjustable (R)
- Adjustable with turn knob (self-locking -V/lockable -H)

Pressure range Pressure ranges for outlet pressure at A

Basic type, size Type ADM (non-piloted), size 1 to 3

VDM 5 H R - 250

Pressure setting [bar]

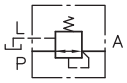
Adjustability in operation
- Fixed (-)
- Manually adjustable (R)

Pressure range Pressure ranges for outlet pressure at A

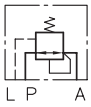
Basic type, size Type VDM (hydraulically piloted), size 3 to 5
- Hydraulically piloted pressure-reducing valve type VDX (pressure-limiting valve at port L)

Function

ADM..

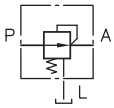


Valve for pipe connection



Manifold mounting valve

VDM..



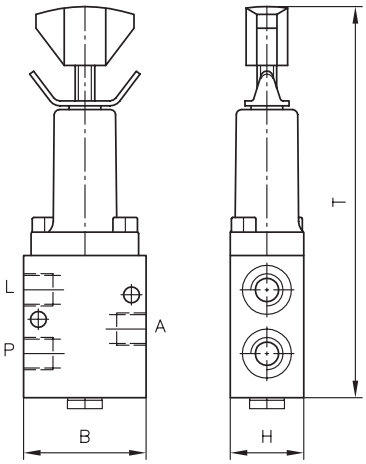
Valve for pipe connection

Manifold mounting valve

General parameters and dimensions

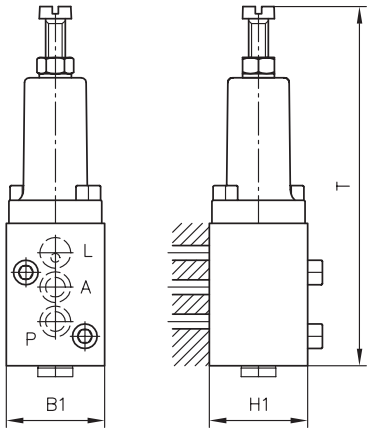
ADM 22 DR

Version for pipe connection
Directly controlled pressure reducing valve type ADM, size 2
for pipe connection
(threaded connections G 3/8, coding 2),
pressure range 30 to 120 bar (coding D),
manually adjustable pressure (coding R)

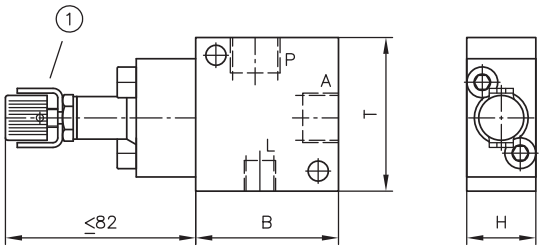


ADM...P

Version as manifold mounting valve

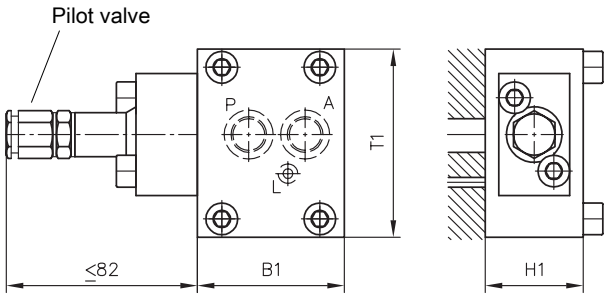


VDM...G
Version for pipe connection



1 Pilot valve

VDM 5 PH - 250
Version as manifold mounting valve
Pilot-controlled pressure reducing valve type VDM, size 5
for manifold mounting (coding P),
pressure range 10 to 400 bar (coding H),
pressure fixed at 250 bar



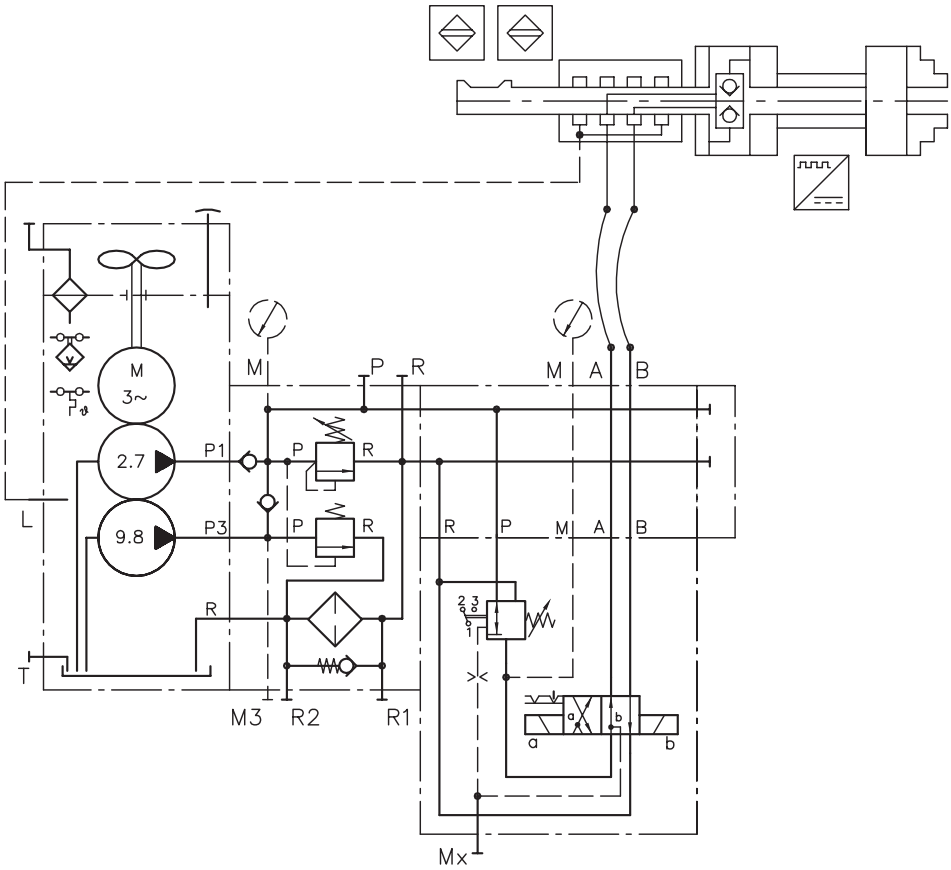
1 Pilot valve

	Q_{max} [lpm]	p_{max} [bar]	$p_{max\ A}$ [bar]	Ports [2]	Leakage flow Q_{leak} [lpm]	Dimensions [mm]						m_{max} [kg] [3]
						H	H1	B	B1	T	T1	
ADM 1...	12	300	F: 30 D: 120 C: 160 A: 250	G 1/4	<0.05	30	35	45	35	141	-	0.6/0.6
ADM 2..	25			G 1/4, G 3/8	<0.05	30	40	50	40	162	-	0.7/0.85
ADM 3..	60		F: 25 D: 100 C: 160 A: 250	G 3/8, G 1/2	<0.07	30	40	50	40	174	-	1.0/1.1
VDM 3..	40	400	N: 100 H: 400[1]	G 1/2	<0.4	30	-	60	-	66	-	1.1/--
VDM 4..	70			G 3/4		40	40	65	60	71	78	1.5/2.0
VDM 5..	120			G 1		50	50	80	88	73	81	2.0/2.5

1) Max. pressure difference between inlet and outlet pressure is 300 bar
2) For pipe connection versions only
3) Versions for pipe connection / manifold mounting

Circuit example:

HK 43 LDT/1 M - ZZ 2.7/9.8
-AN 21 F 2-D45-F50
-BA 2
-NSMD 2 K/GRK/0
-1-G 24



Associated technical data sheets:

- Pressure-reducing valve type ADM: D 7120
- Pressure-reducing valve, pilot-controlled type VDM: D 5579

Similar products:

- Miniature pressure reducing valves type ADC etc.: Page 174
- Miniature prop. pressure reducing valves type PM, PMZ: Page 184
- Pressure reducing valves type CDK: Page 180
- Prop. pressure reducing valves type PDM: Page 186

2.3 Pressure-reducing valve type CDK, CLK, DK, DLZ and DZ

Pressure reducing valves are a type of pressure control valve. They maintain a largely constant outlet pressure even at a variable (higher) inlet pressure.
The pressure reducing valve type CLK features an override compensation, i.e. acting like a pressure-limiting valve if the secondary pressure exceeds the set pressure e.g. due to external forces. The pressure reducing valve type DK features a tracked pressure switch, e.g. pressure and switch are set simultaneously with an adjustment device.
All versions have zero leakage when in the closed state. The valve type CDK and CLK can be screwed-in and can be integrated into control blocks. The necessary mounting holes are straightforward to make.

Features and benefits:
- Zero leakage in closed state

Intended applications:
- General hydraulic systems
- Jigs
- Test benches

Nomen-clature:	Pressure reducing valve (2-way valve)
Design:	Screw-in valve combination with a connection block for ▪ Pipe connection ▪ Manifold mounting
Adjustment:	Fixed Manually (adjustable)
p_{max}:	500 bar
Q_{max}:	22 l/min

Design and order coding example

CDK 3 -2 | R | - 250

Pressure setting [bar]

Adjustment
- Fixed (-)
- Manually adjustable (R)
- Adjustable with turn knob (self-locking -V/lockable -H)

Basic type and pressure range

Type CDK, type CLK (with additional override compensation)
- Screw-in valve
- Version with connection block for pipe connection with/without pressure-limiting valve
- Version with connection block for manifold mounting with/without pressure-limiting valve
- In intermediate plate design NG6 (type NZP)

DK 2 | **R** | **/160** | **/4R**

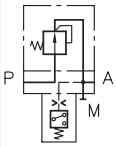
Additional elements Orifice/throttle

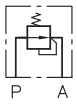
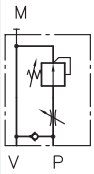
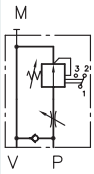
Pressure setting [bar]

Adjustment
- Fixed (-)
- Manually adjustable (R)
- Adjustable with turn knob (self-locking -V/lockable -H)

Basic type and pressure range Type DK (with tracked pressure switch)
Type DZ with type CDK
Type DLZ with type CLK
- With bypass check valve
- Manifold mounting
- Version with connection block for pipe connection

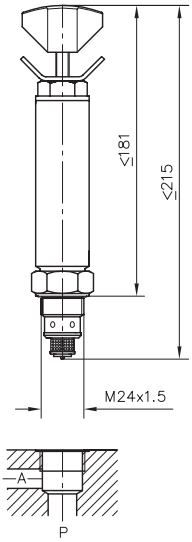
Function

CDK	CLK	CDK 3. -..-1/4-DG3.
		
Screw-in valve		Version for pipe connection, a pressure switch type DG 3. May be installed as option, additional port for pressure gauge

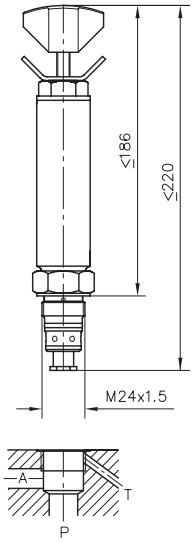
CDK 3. -..-P	DZ, DLZ	DK
		
Manifold mounting valve	Manifold mounting valve, optional with orifice/throttle and bypass check valve	Manifold mounting valve with tracked pressure switch

General parameters and dimensions

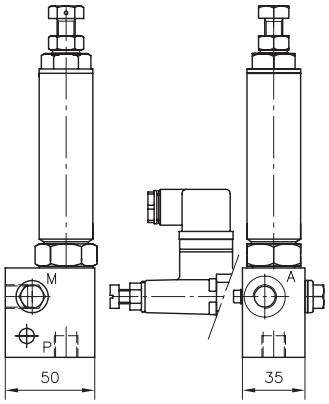
CDK 3..



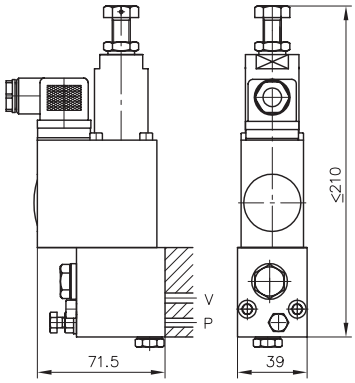
CLK 3..



CDK 3. -..-1/4-DG3.



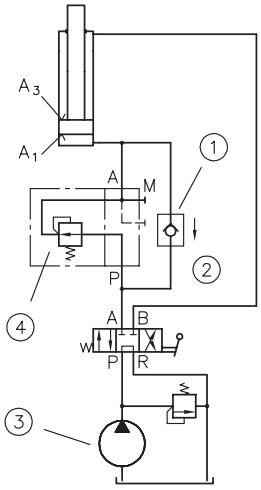
DK 2.



	Q_{max}[lpm]	Pressure range p_{max} [bar]		Ports (BSPP)	m [kg]
CDK 3.-..., CLK 3.-...	6... 22	**..-08:**450[1)]	**..-2:**200 ..	-	0.7
CDK 3. -..-1/4-DG3.		**..-081:**500[1)]	**..-21:**250 ..	G1/4	1.25
CDK 3. -..-P		**..-1:**300 ..	**..-5:**130 ..	-	1.4
DZ..., DLZ..., DK...		**..-11:**380 ..	**..-51:**165	-	

1) Only available as type CDK and DK

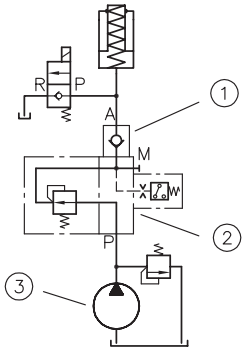
Example of a version
with large flow rate $Q_{A \rightarrow P}$
Example: Q_P = 15 lpm [formula]



Application example for large flow rate

1 E.g. type RK 2G in accordance with D 7445
2 Q_{return} = 45 lpm
3 Q_P = 15 lpm
4 Type CDK 3-2-1/4

Example of a version
with undesired return flow

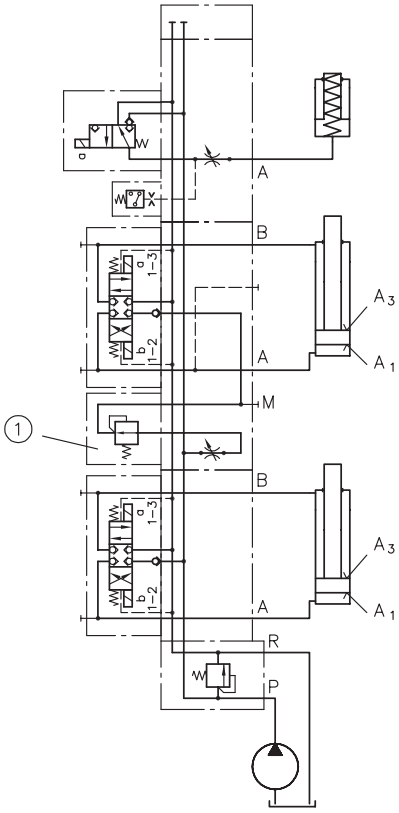


Application example for undesired return flow

1 E.g. type RK 1E in accordance with D 7445 (shown here screwed into connection A of the CDK 3 valve)
2 Type CDK 3- 2-1/4-DG 34

Use in the valve bank,
shown here with seated valves type BVZP 1

BVZP 1 A - 1/300 - G22/0
- G22/CZ2/100/4/2
- WN1H/10/4
- 1 - 1 - G 24



Application example in the valve bank

1 Type CDK 3-2-100 shown here incorporated as
-/CZ 2/100...

Associated technical data sheets:
- Pressure-reducing valve type CDK: D 7745
- Pressure-reducing valve type CLK: D 7745 L
- Pressure-reducing valve type DK, DZ and DLZ: D 7941

Similar products:
- Pressure reducing valves type ADM, VDM, VDX: Page 176
- Miniature pressure reducing valves type ADC etc.: Page 174
- Prop. pressure reducing valves type PDM: Page 186

Intermediate plates:
- Intermediate plate type NZP: D 7788 Z

Accessories:
- Pressure switches type DG 3., DG 5 E: Page 262

2.3 Proportional pressure-reducing valve type PDM

Proportional pressure-reducing valves are a type of pressure control valve. They remotely control the pressure in hydraulic systems continually and electrically.
The proportional pressure-reducing valve type PDM is a piloted valve with a piston and is controlled electro-proportionally. The valve has an external control oil drain. It continuously maintains a constant pressure on the secondary pressure side, independently of the inlet side. The pressure reducing valve is available as a single valve for pipe connection or as a manifold mounting valve.
The proportional pressure-reducing valve PDM is particularly suitable for dynamic control of the pressure level in hydraulic systems.

Features and benefits:
- Integrated overpressure function

Intended applications:
- General hydraulic systems
- Equipment
- Test benches
- Hydraulic tools

Nomen-clature:	Prop. pressure-reducing valve (directly controlled or piloted)
Design:	Individual valve for pipe connection Individual valve Manifold mounting
Adjustment:	Electro-proportional
$p_{max\ P}$:	400 bar
$p_{max\ A}$:	350 bar
Q_{max}:	120 l/min

Design and order coding example

PDMP 2
PDM 4 G **- 43** **- G24**

Solenoid voltage Prop. solenoid
- 12V DC, 24V DC
- Control using proportional amplifier or PLVC

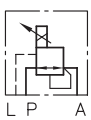
Pressure range Pressure ranges for pressure downstream at A

Basic type, size, design Type PDM (pipe connection), size 11, 21, 22
Type PDMP (manifold mounting), size 11, 22
Type PDM, size 3 to 5
Pipe connection (G), manifold mounting (P)

Function

PDM
Valve for pipe connection:

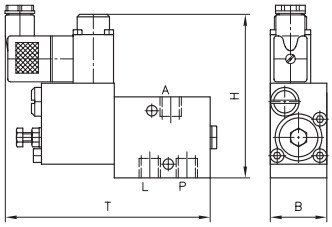
Manifold mounting valve:



General parameters and dimensions

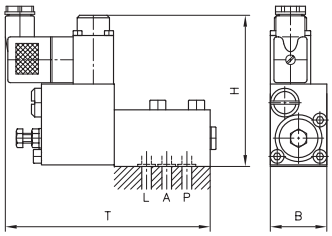
PDM 11, PDM 21, PDM 22

Valve for pipe connection

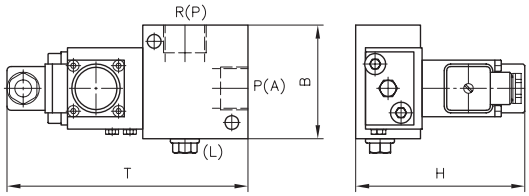


PDMP 11 and PDMP 22

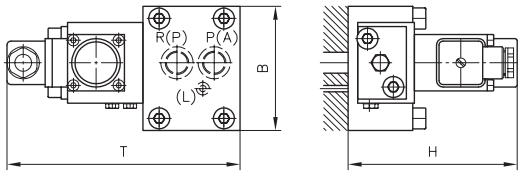
Manifold mounting valve



PDM 3 to 5



PDM 4P and PDM 5P



		Q_{max} [lpm]	Pressure range $p_{max\ A}$ [bar]	Ports [1]	Leakage flow Q_{leak} [lpm]	Dimensions [mm]			m [kg]
						H	B	T	
PDM 11	Directly controlled	12	41: 80 42: 130 43: 200 44: 320	G 1/4	< 0.5	101	33	150	1.5
PDMP 11				-		93,5	35	150	1.4
PDM 21/22		20	41: 45 42: 70 43: 110 44: 180	G 1/4, G 3/8	< 0.5	101	38	157	1.6
PDMP 22				-		96	40	157	1.3
PDM 3 G	Piloted	40	N: 130 M: 200 H: 350	G 1/2	< 0.8	100	65	150	1.8
PDM 4 G		80		G 3/4		99.5	71	155	2.2
PDM 5 G		120		G 1		104.5	73	170	2.7
PDM 4 P		80		-	-	99.5	78	150	2.7
PDM 5 P		120		-	-	104.5	81	178	3.2

1) For pipe connection versions

Associated technical data sheets:

- Prop. pressure reducing valves type PDM: D 7486, D 7584/1

Similar products:

- , Proportional pressure-reducing valve type PM and PMZ: Page 184

Suitable accessories:

- Proportional amplifier type EV1M3: Page 272
- Proportional amplifier type EV2S: Page 274
- Proportional amplifier type EV1D: Page 272

2.3 Pressure-controlled shut-off valve type CNE

Shut-off valves are a type of pressure control valve. They receive the control oil from a high-pressure circuit and switch the delivery flow of a low-pressure pump to unpressurised circulation if the pressure value set has been reached. During this process, the consumer side is separated from the idle circulation by a zero-leakage check valve. If the pressure on the consumer side drops below the pressure setting, the idle circulation is interrupted and the oil fed to the consumer again.

Via a control line the higher pressure in the high-pressure circuit holds open the pressure-controlled 2 directional valve type CNE and with it the idle circulation. In the low-pressure circuit the valve acts simultaneously as a pressure-limiting valve.

The valve type CNE can be screwed-in and can be integrated into control blocks. The necessary mounting holes are straightforward to make.

Features and benefits:

- Compact design
- Easily produced mounting hole

Intended applications:

- Dual-stage systems (high-pressure, low-pressure)
- Jigs

Nomen-clature:	2-way circulation valve
Design:	Screw-in valve
Adjustment:	Fixed
p_{max}: $p_{max\ adjust}$:	500 bar 450 bar
Q_{max}:	30 l/min

Design and order coding example

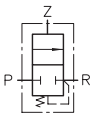
CNE 2 C - 50

- **- 50** — **Pressure setting [bar]**
- **C** — **Pressure range**
- **CNE 2** — **Basic type, size**: Pressure controlled 2-way valve type CNE

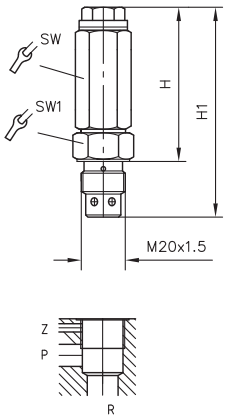
Additional versions:

- Additionally sealed tapped journal to minimize the internal leakage loss (type CNE 21)
- Additionally sealed tapped journal and piston to minimise leakage loss (type CNE 22 and CNE 23)

Function



General parameters and dimensions

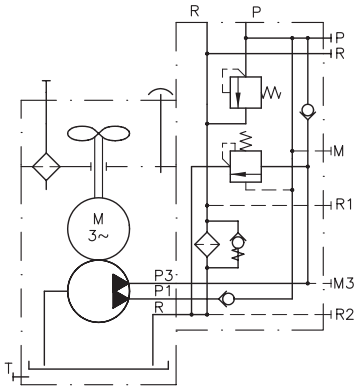


	Q_{max} [lpm]	Operating pressure p_{max} [bar] with		Dimensions [mm]			
		P	Z	H	H1	SW	SW1
CNE 2 CNE 21 CNE 23	30	E: 30 D:45 C:60 B:75 A:90 M:120 L:150	500	70	96	22	24
CNE 22	30	C: 320 B: 450	500	120	147	30	27

Circuit example:

HK448/1-HH..-AN21F2

Idle circulation valve integrated in connection block type AN 21 F2 for compact hydraulic power packs type HK with two pump circuits



Associated technical data sheets:

- Pressure-controlled shut-off valve type CNE: D 7710 NE

Similar products:

- Two-stage valves type NE: Page 192
- Switch units type CR: Page 152
- Shut-off valves type LV, ALZ: Page 194
- Directional valves type AE: Page 168

Connection blocks:

- Connection block type A: Page 62

2.3 Two-stage valve type NE

Two-stage valves are a type of pressure control valve. They are used in hydraulic systems that are supplied by dual stage pumps, a combination of high-pressure pump and low-pressure pump.

The two-stage valve type NE combines the two pump delivery flows into a common volumetric flow. It switches the low-pressure pump to unpressurised circulation if the pressure value set is reached. It protects both pumps against exceeding the high or low-pressure value set.

The two-stage valve type NE is used with directional valves to control double-acting hydraulic cylinders.

Features and benefits:

- Operating pressures up to 700 bar
- Direct mounting on hydraulic power packs
- Direct combination with valve banks

Intended applications:

- Presses
- Test benches
- Hydraulic tools

Nomen-clature:	Two stage valve (high pressure (HP) / low pressure (LP) stage)
Design:	Individual valve for pipe connection
Adjustment:	Fixed
p_{max}:	700 bar (HP) / 80 bar (LP)
Q_{max}:	25 (HP) / 180 (LP) lpm

Design and order coding example

NE 20 - 650/20

Pressure setting [bar] High- /low pressure

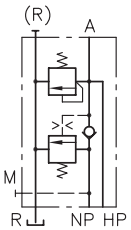
Basic type NE 20, 70 and 80

Additional versions:

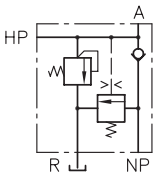
- Direct attachment on pump units type MPN, RZ and FXU possible
- Valve banks type BV can be directly mounted (type NE 21)

Function

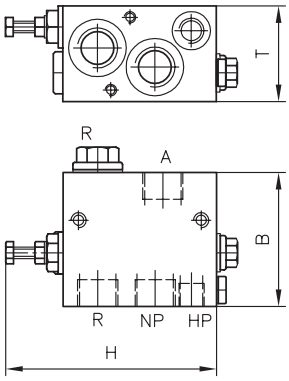
NE 20



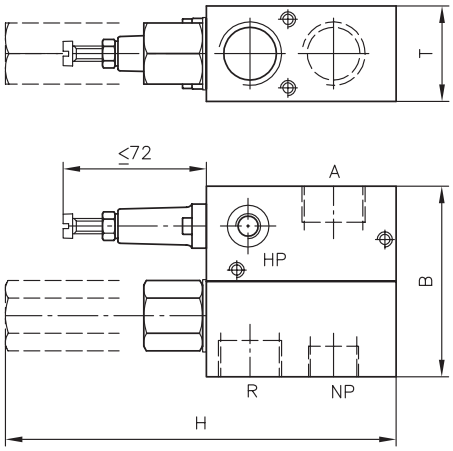
NE 70, NE 80



NE 20



NE 70, NE 80



	Q_{max} [lpm]		p_{max} [bar]		Ports			Dimensions [mm]			m [kg]
	HD	ND	HD	ND	A, R	HP	NP	H	B	T	
NE 20	10	40	20 ... 700	16 ... 80	G 1/2	G 1/4	G 1/2	110	70	50	2.1
NE 70	16	100	(0) ... 500	(0) ... 60	G 1	G 1/4	G 3/4	131	100	50	3.4
NE 80	25	180	(0) ... 500	(0) ... 30	G 1 1/4	G 3/8	G 1	259	120	60	7.0

Associated technical data sheets:

- Two-stage valve type NE: D 7161

Pumps:

- Compact hydraulic power packs type MP, MPN, MPW, MPNW: Page 50
- D 6910, D 6910 H

Similar products:

- Idle circulation valves type CNE: Page 190
- (Press) switch units type CR: Page 152
- Directional seated valves type VB: Page 114

Pressure valves

2.3 Shut-off valve type LV and ALZ

Shut-off valves or accumulator charging valves are a type of pressure control valve. They switch the delivery flow of a pump to unpressurised circulation if the pressure value set is reached. During this process, the consumer side is separated from the idle circulation by a zero-leakage check valve. If the pressure drops in the consumer side, the idle circulation is interrupted and the oil fed to the consumer again.

The shut-off valve type LV and ALZ operates using automatically controlled (pulse independent) step switching in the pilot valve.

Features and benefits:

- Various means of adjustment
- Various additional functions

Intended applications:

- Test benches
- Accumulator systems
- Hydraulic tools

Nomen-clature:	Shut-off valve (idle circulation valve, directly controlled or pilot-controlled)
Design:	Individual valve for pipe connection Individual valve Manifold mounting
Adjustment:	Fixed manually adjustable
p_{max}:	350 bar
Q_{max}:	120 l/min

Design and order coding example

LV 10 P	D	- 180
ALZ 3 G	CR	- 250

Pressure setting [bar]

Pressure range

- Fixed (-)
- Manually adjustable (R)

Basic type, size, design

Type LV, size 10, 20, 25

- Pipe connection (-)
- Manifold mounting (P)
- Design with low switching hysteresis (type LV 25)

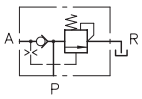
Type ALZ, size 3 to 5

- Pipe connection (G)
- Manifold mounting (P)

Function

LV, ALZ

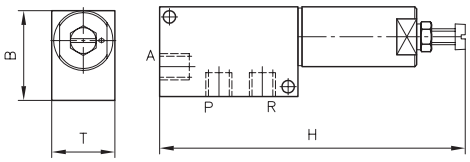
For pipe connection:



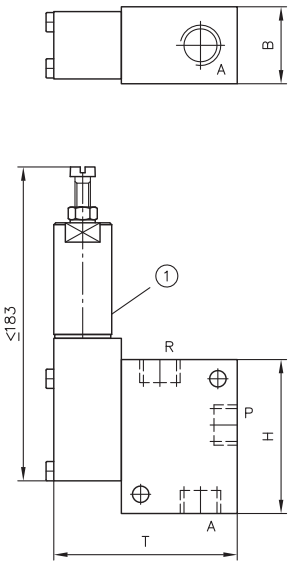
Manifold mounting valve:

General parameters and dimensions

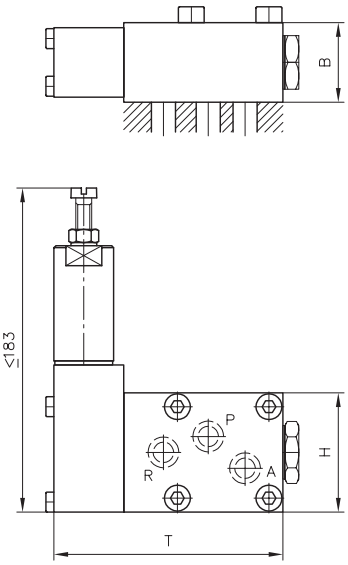
LV ..



ALZ .. G ..



ALZ .. P ..



1 Size 5: turned by 90°

	Control	Q_{max} [lpm]	Pressure range: p_{max} [bar]	Ports[1)]	Dimensions [mm]			m [kg]
					H	B	T	
LV 10	Direct	12	F: 60 E: 140 D: 240 C: 350	G 1/4	155	45	32	0.9
LV 20, LV 25		25	F: 80 E: 140 D: 220 C: 350	G 3/8	205	50	32	1.2
ALZ 3 G	Piloted	50	F: 60 E: 140 D: 240 C: 350	G 1/2	80	40	99	2.0
ALZ 4 G		80		G 3/4	94	40	109	2.4
ALZ 5 G		120		G 1	105	63	135	4.3
ALZ 4 P		80		G 3/4	60	40	119	2.1
ALZ 5 P		120		G 1	80	40	133	4.3

1) For pipe connection versions only

Associated technical data sheets:

- Shut-off valve type LV: D 7529
- Shut-off valve type ALZ: D 6170 ALZ
- Pressure valve with check valve type AL, AE and AS: D 6170

Similar products:

- Release valves type AE: Page 168
- Connection blocks type AL: Page 62

2.3 Pressure-dependent shut-off valve type DSV and CDSV

Pressure-dependent shut-off valves are a type of pressure control valve. When a set pressure value is reached and exceeded, they block the flow to consumer line B with zero leakage. The valves will open again if the pressure on inflow side A falls below the set value defined by the spring tension.

The pressure-dependent shut-off valve type DSV and CDSV is used as a safeguard pressure gauge, for example.

Features and benefits:

- Various adjustment options

Intended applications:

- General hydraulic systems
- Test benches
- (Pressure gauge) protection valve

Nomen-clature:	Shut-off valve
Design:	Single valve for pipe connection Individual valve for manifold mounting Screw-in valve
Adjustment:	Tool adjustable (fixed) Manually (adjustable)
p_{max}:	600 bar
Q_{max}:	60 l/min

Design and order coding example

CDSV 1 | A | - 1/4 | - 400

- **Pressure setting [bar]**
- **Design** with connection block (-1/4); Cartridge valve (-)
- **Pressure range** Fixed (-) or manually adjustable (R)
- **Basic type, size** Type CDSV (cartridge valve), size 1

DSV 21-1 | B | - 200

- **Pressure setting [bar]**
- **Pressure range** Fixed (-) or manually adjustable (R)
- **Basic type, size** Type DSV (pipe connection), type DSVP (manifold mounting), size 1, 2, 3

Function

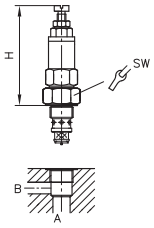
CDSV 1, DSV 2

DSVP 2

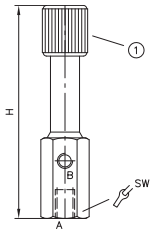
DSVP

General parameters and dimensions

CDSV 1

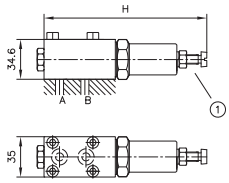


DSV 2-2



1 Manually adjustable

DSVP 21-1



1 Fixed

	Design	Size	Q_{max} [lpm]	p_{max} [bar]	Ports	H_{max} [mm]	SW = a/f	m [kg]
CDSV 1	Screw-in valve	1	10	C: 120 B: 350 A: 600	M 16 x 1.5	69	SW 22	0.13
DSV 2[1)]	Version for pipe connection	1	20	D: 40 C: 100 B: 220 A: 600	G 1/4	185	SW 36	0.7
		2	40	D: 20 C: 60 B: 120 A: 400	G 3/8	193	SW 36	0.9
		3	60	D: 20 C: 60 B: 120 A: 400	G 1/2	193	SW 46	1.1
DSVP 2[1)]	Manifold mounting valve	1	20	D: 40 C: 100 B: 220 A: 600	G 1/4	181	-	1.1

1) Manifold mounting valve only in size 1

Associated technical data sheets:

- Pressure-controlled shut-off valve type DSV: D 3990
- Pressure-controlled shut-off valve type CDSV: D 7876

2.3 Load-holding valve type LHK, LHDV and LHT

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 valves type LHK and LHT are suitable for applications that are not particularly prone to oscillations. The load-holding valve type LHDV has special damping characteristics. It is used particularly in conjunction with proportional directional spool valves, e.g. type PSL and PSV.

Shock valves and shuttle valves with or without restrictor check valves can be fitted in the load-holding valves type LHK, LHDV and LHT, e.g. to relieve hydraulic brakes with a delay.

Features and benefits:

- Operating pressures up to 420 bar
- Various adjustment options
- Various configurations

Intended applications:

- Cranes
- Construction machinery
- Lifting devices

Nomen-clature:	Load holding valve (over center valve, for one sided or alternating load direction) Single or twin valve
Design:	Individual or twin valve for pipe connection Individual or twin manifold mounting valve Screw-in valve Version for banjo bolt mounting
p_{max}:	450 bar
Q_{max}:	250 l/min

Design and order coding example

LHK44 G - 11 - 160

Pressure setting load-holding pressure [bar]

Design Various housing designs available

Dampening Without/with, or with restrictor check valve

Basic type, size Type LHK (valve only, without shock valve), size 2 to 4

Additional versions:

- Some available with release ratio 1 : 2 and 1 : 7
- Version available as assembly kit

LHDV33	- 25WD	- B	6	-200/200-240/240

Pressure setting [bar] Load-holding pressure/load-holding pressure - shock valve pressure/shock valve pressure

Nozzle Release ratio may be altered with different orifice combinations in the range between 1 : 1.2 and 1 : 8.9

volumetric flow

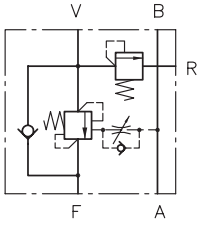
Additional elements
- With shock- and suction valves
- With shuttle valves for brakes
- With restrictor check valve

Basic type, size Type LHDV (with tailored dampening characteristics), size 3
Type LHT, size 2, 3 and 5

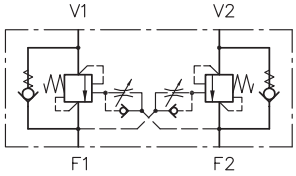
Additional versions:
- Cartridge valve versions
- Type LHT
- Type LHTE, with discharge pressure compensation

Function

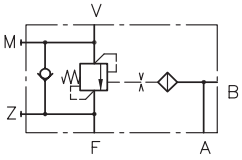
LHK 33 G-15-...



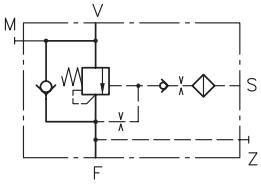
LHK 44 G-21-...



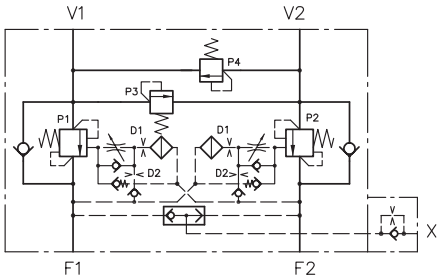
LHT 21 H-14-...



LHT 33 P-11-...

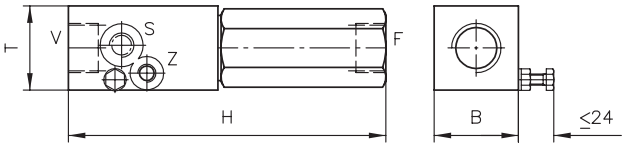


LHDV 33 G-25WD-...

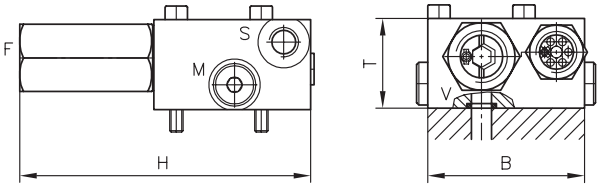


General parameters and dimensions

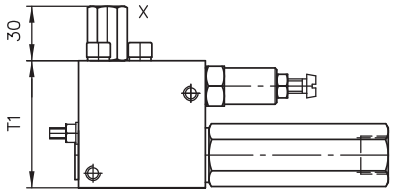
LHK 44 G - 11 - 160
Individual valve

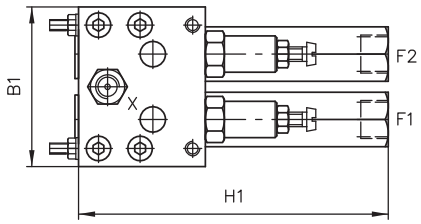


LHT 33 P - 15
Individual valve



LHDV 33 - 25 WD - B 6 - 200/200 - 240/240
Twin valve



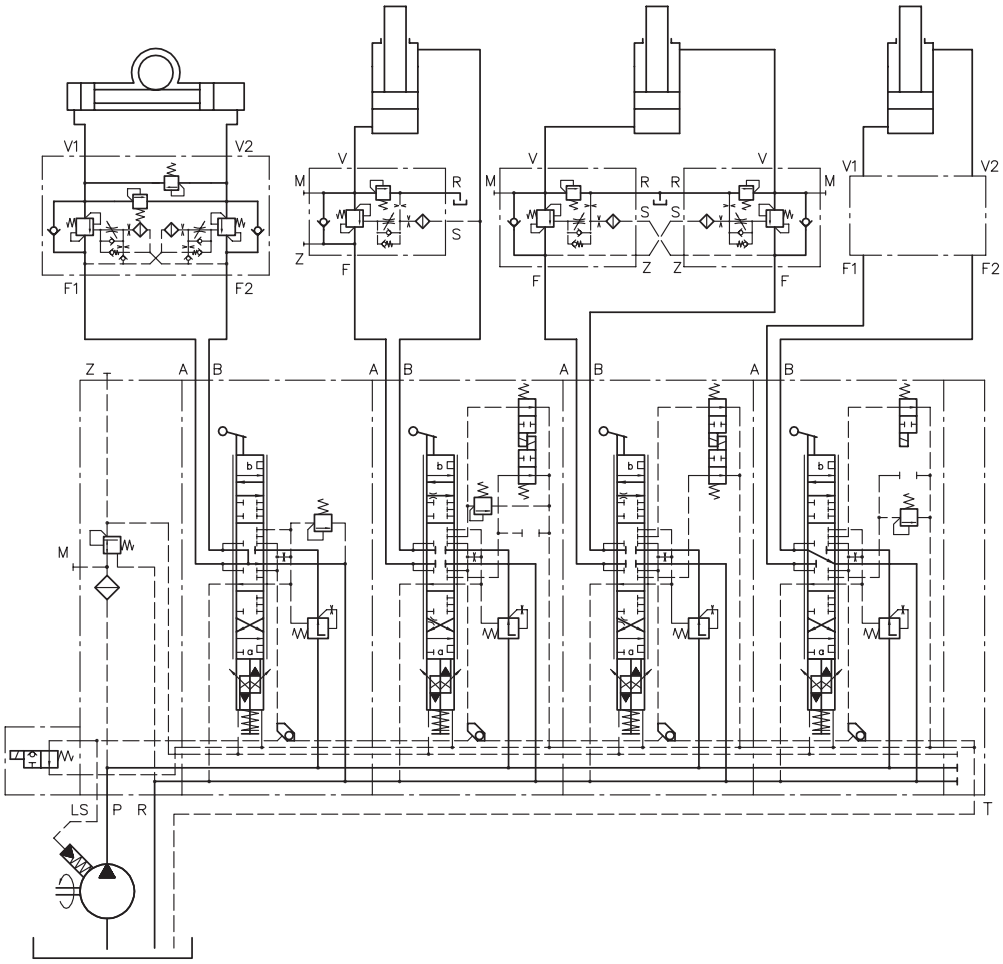


	Design	Q_{max} [lpm]	p_{max} [bar]	Pilot ratio	Ports	Dimensions [mm]			m [kg]
						H/H1	B/B1	T/T1	
LHK 22	Individual valve	20	400	1 : 4.6	G 3/8	97	32	32	0.5
	Twin valve[2)]					98	60	30	2.7
LHK 33	Individual valve	60	360	1 : 4.4	G 1/2	123	40	40	1.0
	Twin valve[2)]					125...291	80	40...60	2.7
LHK 44	Individual valve	100	350	1 : 4.4	G 3/4	170	45	45	1.6
	Twin valve[2)]					170	90	50	3.5
LHDV 33	Individual valve[2)]	80	420	1 : 8...1 : 1.2[1)]	G 1/2	170	50	40	1.8
	Twin valve					170	88	70	4.7
LHT 2	Individual valve	25	400	1 : 8, 1 : 4	G 1/4	132	40	24.8	1.2
	Twin valve					132	50	24.8	0.8
LHT 3	Individual valve[2)]	130	450	1 : 7...1 : 0.53 [1)]	G 1/2	128	70	40	1.6
LHT 5	Individual valve[2)]	250	450	1 : 6...1 : 0.79[1)]	G 1	113	50	50	1.0

1) Release ratio can be altered simply by changing the orifice
2) Note: Design may be significantly different to the illustrated version!

Circuit example:

LHDV 33-25-D6-180/180-200/200
LHDV 33 P-15-D6-280/300
LHDV 33 P-15-D6-280/300
LHK 33 G-21-... in accordance with D 7100



Associated technical data sheets:

- Load-holding valve type LHK: D 7100
- Load-holding valve type LHDV: D 7770
- Load-holding valve type LHT: D 7918

Suitable proportional directional spool valve:

- Proportional directional valves type EDL: Page 90
- Proportional directional valves type PSL, PSV: Page 90
- Proportional directional valves type PSLF, PSVF: Page 96