Valve bank (directional spool valve) type CWL

Product documentation

Series connection

Operating pressure p_{max}:	350 bar
Flow rate Q_{max}:	80 l/min

D 7953 CWL
09-2026 -1.4 en

HAWE HYDRAULIK

© by HAWE Hydraulik SE.
The reproduction and distribution of this document, as well as the use and communication of its contents to others without explicit authorization, is prohibited.
Offenders will be held liable for the payment of damages.
All rights reserved in the event of patent or utility model applications.
Brand names, product names and trademarks are not specifically indicated. In particular with regard to registered and protected names and trademarks, usage is subject to legal provisions.
HAWE Hydraulik respects these legal provisions in all cases.
HAWE Hydraulik cannot provide individual guarantees that the stated circuits or procedures (including in part) are not subject to the intellectual property rights of third parties.
Printing date / document generated on: 2026-09-29

Table of Contents

1 Overview of valve bank (directional spool valve) type CWL 4
1.1 Configuration example 5

2 Available versions 6
2.1 Connection block 6
2.1.1 Basic type and size 6
2.1.2 Connections 6
2.1.3 Connection block basic types 7
2.1.4 Pressure-limiting valve 9
2.2 Directional valve section 10
2.2.1 Circuit symbol 11
2.2.2 Flow rate 12
2.2.3 Actuation 13
2.2.4 Hand lever 15
2.2.5 Additional functions 17
2.3 Ancillary block 18
2.3.1 Seal of consumer ports 21
2.4 Intermediate plate 22
2.5 End plate 23
2.5.1 Mounting bracket 23
2.6 Solenoid version 24

3 Parameters 25
3.1 General data 25
3.2 Pressure and flow rate 26
3.3 Weight 26
3.4 Characteristic lines 27
3.5 Electrical data 30

4 Dimensions 32
4.1 Connection block 32
4.2 Directional valve section 39
4.2.1 Actuation 40
4.2.2 Hand lever 42
4.3 Ancillary block 47
4.3.1 Seal of consumer ports 53
4.4 Intermediate plate 54
4.5 End plate 54

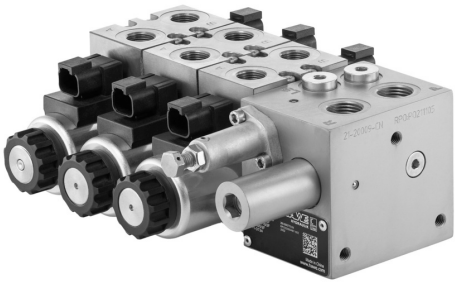
5 Installation, operation and maintenance information 55
5.1 Intended use 55
5.2 Assembly information 55
5.2.1 Conversion of the connection block of CL6 and CV6 56
5.3 Operating instructions 56
5.4 Maintenance information 57

6 Other information 58
6.1 Accessories, spare and individual parts 58

1 Overview of valve bank (directional spool valve) type CWL

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

The directional spool valve bank type CWL with series connection is actuated directly. The consumers can be operated with on-off or proportional control. The type CWL has one integral LS output and thanks to the various connection blocks and ancillary blocks offers a broad spectrum of applications.



Directional spool valve type CWL

Features and advantages

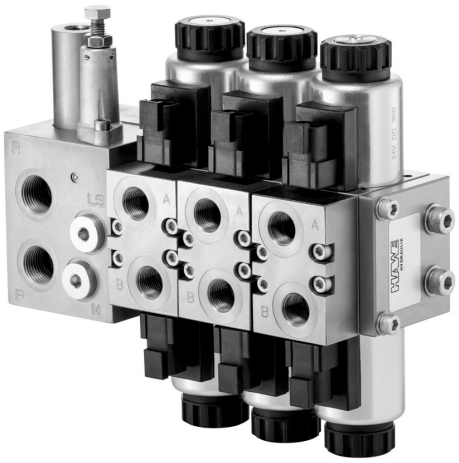
- Low-cost load-sensing valve without any individual pressure compensators
- Modular system with many variants and combination options
- One valve for a range of different control functions and small flow quantities
- Compact and robust design
- Robust long-life design

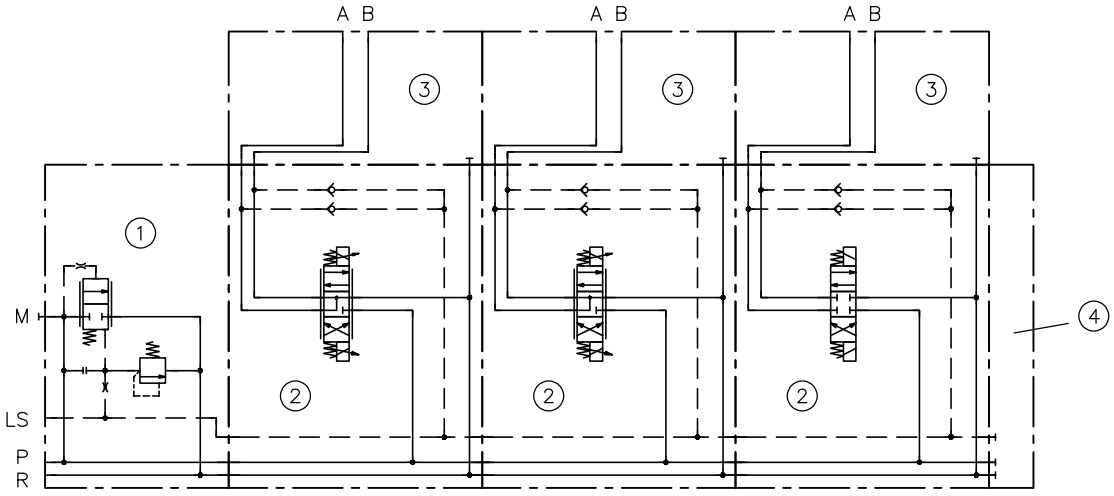
Intended applications

- Municipal trucks
- Machines for forestry and agricultural purposes
- Lifting platforms
- Construction machines

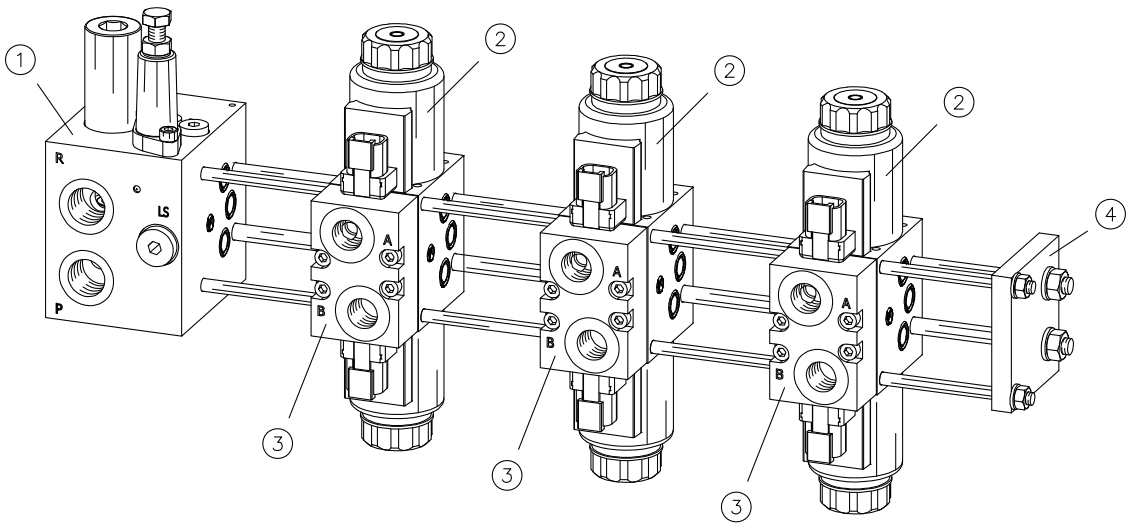
1.1 Configuration example

CWL 23 CL6/250
-D40/MP/0/2F
-D20/MP/0/2F
-G/M/0/2F
-1-DT 24





1 Connection block
2 Valve section
3 Ancillary block
4 End plate



2 Available versions

Ordering example

CWL 23 A61/H 200 | **-D/M/0/2C** | **-1** | **-DT 24**

- -DT 24 → Chapter 2.6, "Solenoid version"
- -1 → Chapter 2.5, "End plate"
- -D/M/0/2C → Chapter 2.2, "Directional valve section"
- CWL 23 A61/H 200 → Chapter 2.1, "Connection block"

NOTICE
A maximum of 10 valve sections can be combined in one valve bank.

2.1 Connection block

Ordering example

CWL 2 | **3** | **A61** | **/H 200**

- /H 200 → 2.1.4 "Pressure-limiting valve"
- A61 → 2.1.3 "Connection block basic types"
- 3 → 2.1.2 "Connections"
- CWL 2 → 2.1.1 "Basic type and size"

2.1.1 Basic type and size

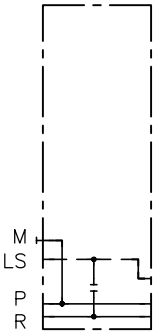
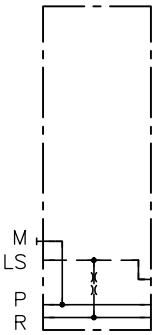
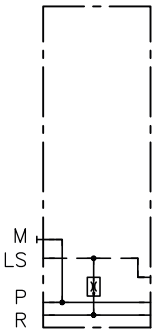
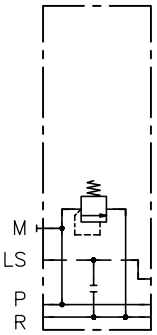
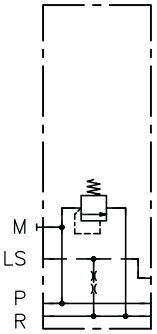
Type	Description	Flow rate Q_{max} (l/min)	Pressure p_{max} (bar)
CWL 2	Directional spool valve	80	350

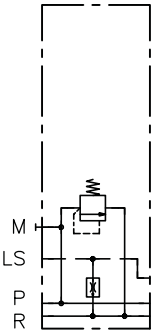
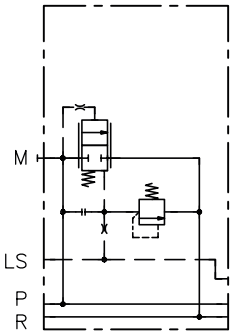
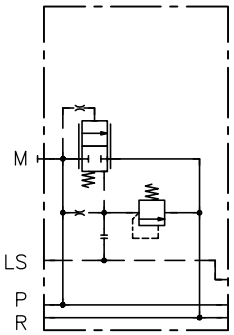
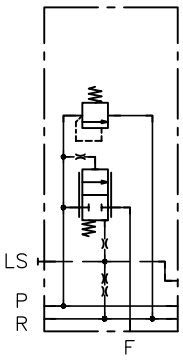
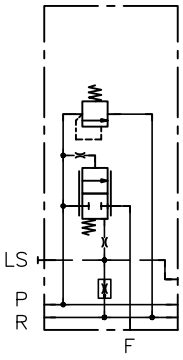
NOTICE
Depending on the circuit symbol and pressure, the maximum switchable flow rate may be lower, see Chapter 3.4, "Characteristic lines".

2.1.2 Connections

Coding	Connections	
	P, R	LS, M
CWL 23	G 1/2 (ISO 228-1)	G 1/4 (ISO 228-1)
CWL 2 UNF3	SAE-10 or 7/8-14 UNF-2B (SAE J 514)	SAE-4 or 7/16-20 UNF-2B (SAE J 514)
CWL 2 JIS3	G 1/2 JIS (B 2351)	G 1/4 JIS (B 2351)

2.1.3 Connection block basic types

Coding	Description	Circuit symbol
A50	Connection block without additional valves and without relief of the LS signal	
A51	Connection block without additional valves, with two 0.5 mm orifices in series for relief of the LS signal	
A52	Connection block without additional valves, with flow control valve for relief of the LS signal	
A60	Connection block with pressure-limiting valve type MVF 6C or MVB 6 C according to D 7000 E/1 and without relief of the LS signal	
A61	Connection block with pressure-limiting valve type MVF 6 C or MVB 6 C according to D 7000 E/1 and two 0.5 mm orifices in series for relief of the LS signal	

Coding	Description	Circuit symbol
A62	Connection block with pressure-limiting valve type MVF 6 C or MVB 6 C according to D 7000 E/1 and flow control valve for relief of the LS signal	
CL6	Connection block with integral 3-way controller for use in open centre systems with constant pumps. Circulation pressure: approx. 9 bar	
CV6	Connection block with pilot-controlled pressure-limiting valve for use in closed centre systems with variable pumps or for simultaneous supply of two or more manifolds with a shared constant pump	
CY61	Connection block with integrated 3-way controller for use in Open Center systems with constant pumps. Circulation pressure: approx. 9 bar Additionally with a connection suitable for pressure loads for the 3-way controller's outflow (power beyond function). You can connect a second manifold to the F port. The first manifold's valve sections are prioritised. The second manifold's valve sections are supplied with the remaining flow rate. ▪ **CY61:** Pressure-limiting valve type MVF 6 C or MVB 6 C according to D 7000 E/1 and two 0.5 mm orifices in series for relief of the LS signal. ▪ **CY62:** Pressure-limiting valve type MVF 6 C or MVB 6 C according to D 7000 E/1 and flow control valve for relief of the LS signal.	
CY62		

NOTICE
Instructions for converting the connection block from CL6 to CV6 see Chapter 5.2.1.

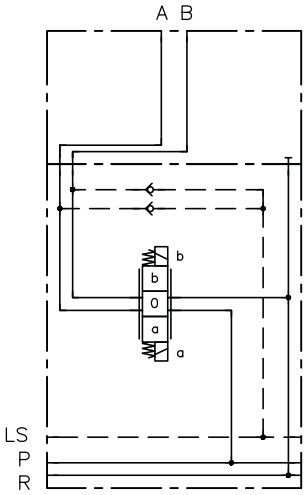
2.1.4 Pressure-limiting valve

Coding	Description
/...	Standard pressure-limiting valve (type MVF 4 C / MVF 6 C as per D 7000 E/1) Max. permissible return pressure p_R = 20 bar (adjustment range 50 to 315 bar)
/H...	Pressure-limiting valve for increased return pressure (type MVB 4 C / MVB 6 C as per D 7000 E/1) Max. permissible return pressure p_R = 200 bar (adjustment range 50 to 315 bar)

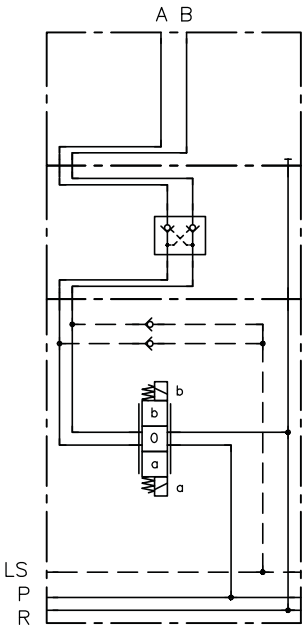
2.2 Directional valve section

The directional valve section contains a flange surface for mounting an ancillary block (Chapter 2.3) or an intermediate plate (Chapter 2.4).

Directional valve section with ancillary block



Directional valve section with intermediate plate and ancillary block



Ordering example

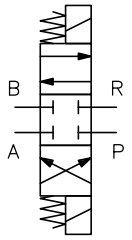
CWL 2 **-D** **/M** **HA** **/0** **/2C** **A**

- 2.3.1 "Seal of consumer ports"
- 2.3 "Ancillary block"
- 2.2.5 "Additional functions"
- 2.2.4 "Hand lever"
- 2.2.3 "Actuation"
- 2.2.1 "Circuit symbol"

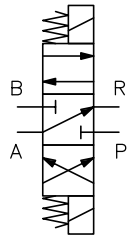
2.2.1 Circuit symbol

4/3 directional spool valve

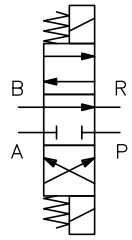
G



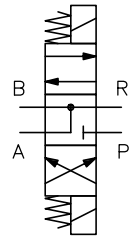
O



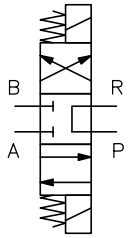
E



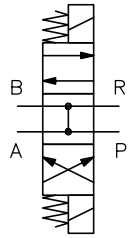
D



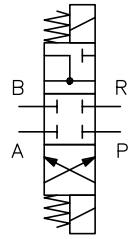
L



H

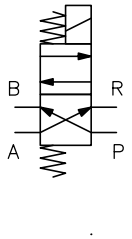


C

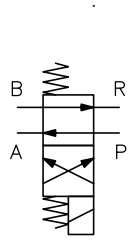


4/2 directional spool valve

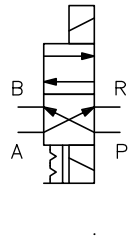
W



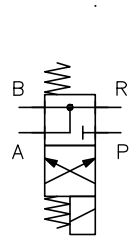
B



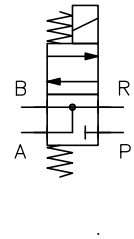
K



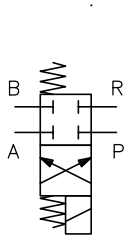
DW



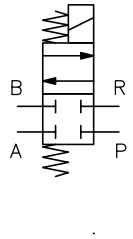
DB



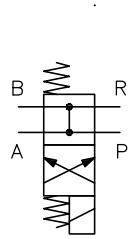
GW



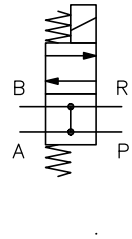
GB



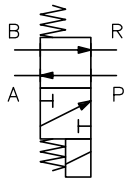
HW



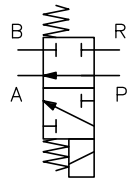
HB



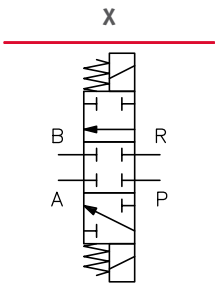
R



V



3/3 directional spool valve



2.2.2 Flow rate

For sections with proportional actuation (see Chapter 2.2.3, "Actuation") the meter-in edges of the spool valves are obtainable in the four nominal sizes listed below:

Coding	Flow rate $Q_{A/B}$ (l/min) at maximum spool valve displacement and a pressure difference of 9 bar
10	10
20	20
30	30
40	40

NOTICE

Only available in conjunction with circuit symbols D, DW, DB, G, GW and GB.

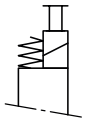
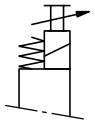
NOTICE

The valve spool sizes are designed so that in practice the actual flow rate is slightly higher.

Depending on the position of the valve section in the manifold, and especially at high flow rates and resulting pressure losses in the manifold, the flow rate may fall below the nominal value.

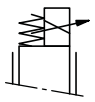
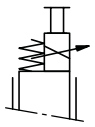
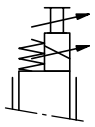
2.2.3 Actuation

On-off actuation

Coding	Description	Combination options	Circuit symbol
M	Electrical actuation. Plug position inside on the spool block and upwards in the direction of the consumer ports (standard version).	**In conjunction with** ▪ the solenoid version DT (see Chapter 2.6, "Solenoid version") and ▪ the ancillary blocks coding /2CH, /2CHA, /CHB (see Chapter 2.3) two additional spacer plates with coding /ZC11 (see Chapter 2.4, "Intermediate plate") are necessary to prevent a collision between the magnetic plug and the ancillary block.	M, M1, M2 MT, MT1, MT2  MD, MD1, MD2 
MT	Electrical actuation with manual override. Plug position inside on the spool block and upwards in the direction of the consumer ports (standard version).		
MD	Electric actuation with manual override and locking function. Plug position inside on the spool block and upwards in the direction of the consumer ports (standard version).		
M1	Electrical actuation. Plug position outside and upwards in the direction of the consumer ports.	**Only in conjunction with** ▪ the solenoid version X, G or AMP (see Chapter 2.6, "Solenoid version")	
MT1	Electrical actuation with manual override. Plug position outside and upwards in the direction of the consumer ports.		
MD1	Electric actuation with manual override and locking function. Plug position outside on the spool block and upwards in the direction of the consumer ports.		
M2	Electrical actuation. Plug position inside on the spool block and downwards.	Two retaining plates are optionally available to be able to mount the manifold in the vehicle easily despite the plugs facing downwards. The retaining plates are attached to the mounting points on the connection block and the end plate respectively. This means the manifold gains some height and there is sufficient space for the plugs. see Chapter 2.5.1, "Mounting bracket"	
MT2	Electrical actuation with manual override. Plug position inside on the spool block and downwards.		
MD2	Electric actuation with manual override and locking function. Plug position inside on spool block and downwards.		

NOTICE
The manual override with coding MT, MT1, MT2 cannot be combined with manual actuation with coding H as per Chapter 2.2.4, "Hand lever" see Chapter 2.2.4, "Hand lever".

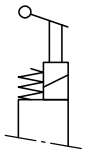
Electro-proportional actuation

Coding	Description	Combination options	Circuit symbol
MP	Electro-proportional actuation. Plug position inside on the spool block and upwards in the direction of the consumer ports (standard version).	**In conjunction with** a) the solenoid version DT (see Chapter 2.6, "Solenoid version") and b) the ancillary blocks coding /2CH, /2CHA and /CHB, (see Chapter 2.3) two additional spacer plates with coding /ZC11 (see Chapter 2.4, "Intermediate plate") are necessary to prevent a collision between the magnetic plug and the ancillary block.	MP, MP1, MP2 
MPT	Electro-proportional actuation with manual override. Plug position inside on the spool block and upwards in the direction of the consumer ports (standard version).		MPT, MPT1, MPT2 
MPD	Electro-proportional actuation with manual override and locking function. Plug position inside on the spool block and upwards in the direction of the consumer ports (standard version).		MPD, MPD1, MPD2 
MP1	Electro-proportional actuation. Plug position outside and upwards in the direction of the consumer ports.	**Only in conjunction with** ▪ the solenoid version X, G or AMP (see Chapter 2.6, "Solenoid version")	
MPT1	Electro-proportional actuation with manual override. Plug position outside and upwards in the direction of the consumer ports.		
MPD1	Electro-proportional actuation with manual override and locking function. Plug position outside and upwards in the direction of the consumer ports.		
MP2	Electro-proportional actuation. Plug position inside on spool block and downwards.	Two retaining plates are optionally available to be able to mount the manifold in the vehicle easily despite the plugs facing downwards. The retaining plates are attached to the mounting points on the connection block and the end plate respectively. This means the manifold gains some height and there is sufficient space for the plugs. see Chapter 2.5.1, "Mounting bracket"	
MPT2	Electro-proportional actuation with manual override. Plug position inside on spool block and downwards.		
MPD2	Electro-proportional actuation with manual override and locking function. Plug position inside on spool block and downwards.		

NOTICE
The manual override with coding MPT, MPT1, MPT2 cannot be combined with manual actuation with coding H, see Chapter 2.2.4, "Hand lever" .

2.2.4 Hand lever

Hand lever actuation for combination with electrical actuation

Coding	Description	Combination options	Circuit symbol
Without coding	Without manual actuation (standard version)	--	-
HA	Manual actuation on the A-side	**Only in conjunction with** ▪ the ancillary blocks /2F	
HB	Manual actuation on B-side		
H1A	Manual actuation on the A-side Hand lever mounted at 30° angle to the outside	**Only in conjunction with** ▪ the ancillary blocks /2F, /2C, /2CAN...BN..., /2CAN..., /2CBN and /2CAS...BS..., /2CHB, /2CBL... When using the intermediate plate /ZCH or ancillary blocks /2CH or /2CHA an additional spacer plate with coding /ZC11 (see Chapter 2.4, "Intermediate plate") is necessary to prevent a collision between the hand lever and intermediate plate/ancillary block.	
H1B	Manual actuation on B-side Hand lever mounted at 30° angle to the outside		
H2A	Manual actuation on the A-side Lever housing rotated through 180°	Can be combined with all valve sections, ancillary blocks and intermediate plates.	
H2B	Manual actuation on B-side Lever housing rotated through 180°		
H3A	Manual actuation on the A-side Lever housing rotated through 180° and hand lever mounted at 30° angle to outside		
H3B	Manual actuation on B-side Lever housing rotated through 180° and hand lever mounted at 30° angle to outside		
H4A	Manual actuation on the A-side Hand lever on opposite side (on side of the connection block)	**Only in conjunction with** ▪ the ancillary blocks /2F and /2C	
H4B	Manual actuation on B-side Hand lever on opposite side (on side of the connection block)		

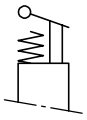
Manual actuation with lever, without notch. Actuation force: 5 Nm.

NOTICE
Manual actuations with coding HA, H1A, H2A, H3A and H4A cannot be combined with a manual override with coding MT, MT1, MT2, MPT, MPT1 or MPT2.

NOTICE
For circuit symbols W, GB, HB and K, manual operation is not possible on the A-side.

NOTICE
When combined with PSL, the hand lever is mounted on the B side, meaning all hand levers are mounted on the same side.

Hand lever actuation only, without electrical actuation

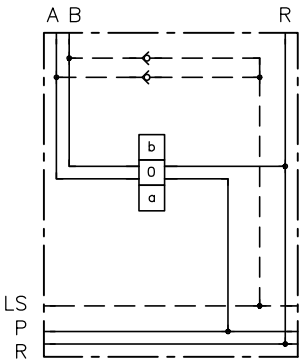
Coding	Description	Combination options	Circuit symbol
AA	Manual actuation on the A-side	**Only in conjunction with** ▪ the ancillary blocks /2F	
AB	Manual actuation on B-side		
A1A	Manual actuation on the A-side Hand lever mounted at 30° angle to the outside	**Only in conjunction with** ▪ the ancillary blocks /2F, /2C, /2CAN...BN..., /2CAN..., /2CBN and /2CAS...BS..., /2CHB, /2CBL... When using the intermediate plate /ZCH or ancillary blocks /2CH or /2CHA an additional spacer plate with coding /ZC11 (see Chapter 2.4, "Intermediate plate") is necessary to prevent a collision between the hand lever and intermediate plate/ancillary block.	
A1B	Manual actuation on B-side Hand lever mounted at 30° angle to the outside		
A2A	Manual actuation on the A-side Lever housing rotated through 180°	Can be combined with all valve sections, ancillary blocks and intermediate plates.	
A2B	Manual actuation on B-side Lever housing rotated through 180°		
A3A	Manual actuation on the A-side Lever housing rotated through 180° and hand lever mounted at 30° angle to outside		
A3B	Manual actuation on B-side Lever housing rotated through 180° and hand lever mounted at 30° angle to outside		
A4A	Manual actuation on the A-side Hand lever on opposite side (on side of the connection block)	**Only in conjunction with** ▪ the ancillary blocks /2F and /2C	
A4B	Manual actuation on B-side Hand lever on opposite side (on side of the connection block)		

Manual actuation with lever, without notch. Actuation force: 5 Nm.

NOTICE
For circuit symbols W, GB, HB and K, manual operation is not possible on the A-side.

NOTICE
When combined with PSL, the hand lever is mounted on the B side, meaning all hand levers are mounted on the same side.

2.2.5 Additional functions

Coding	Description	Circuit symbol
/0	Standard valve section without integrated thread for combining with an ancillary block (see Chapter 2.3, "Ancillary block") or an intermediate plate (see Chapter 2.4, "Intermediate plate")	

2.3 Ancillary block

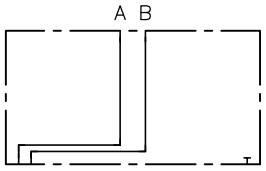
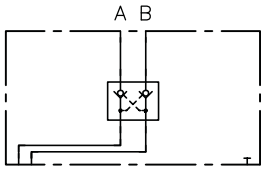
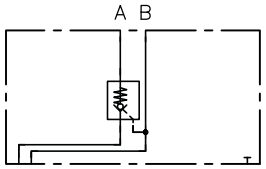
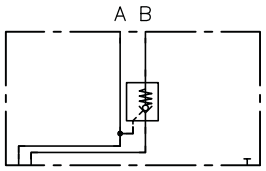
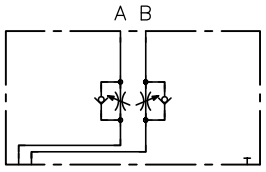
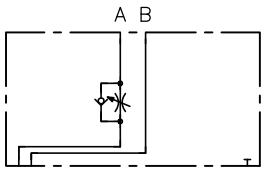
Depending on their version, the ancillary blocks contain different kinds of additional valves (e.g. releasable check valves, shock valves or restrictor check valves). They can be flange-mounted either on a valve section with flange surface or on an intermediate plate (see Chapter 2.4, "Intermediate plate").

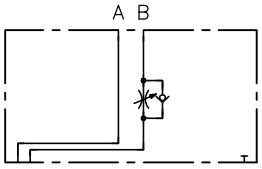
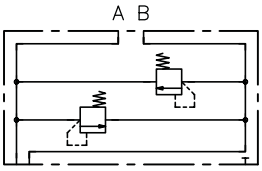
NOTICE

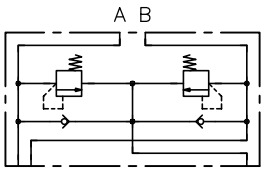
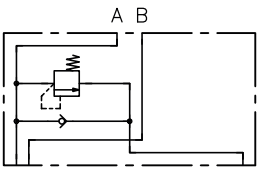
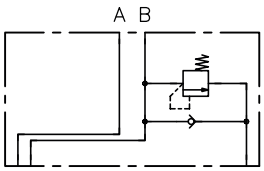
When placing individual orders of ancillary blocks, the screws for mounting the ancillary blocks on the valve section are not included. The screws can be ordered separately if required, see Chapter 6.1, "Accessories, spare and individual parts".

Ports A and B to ISO 228-1 or SAE J 514 or JIS B 2351:

- **/2:** G 3/8
- **/UNF12:** SAE-6 (9/16-18 UNF-2B)
- **/UNF2:** SAE-8 (3/4-16 UNF-2B)
- **/JIS2:** G 3/8 JIS

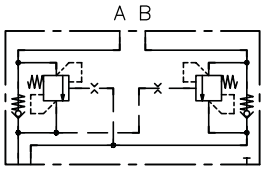
Coding	Description	Circuit symbol
/2C **/UNF12C** **/UNF2C** **/JIS2C**	Without additional function (height: 45 mm)	
/2F **/UNF12F** **/JIS2F**	Without additional function (height: 25 mm)	
/2CH **/UNF12CH** **/JIS2CH**	Double pilot ratio check valve (pilot ratio 1:4.5) Q_{max} = 50 l/min	
/2CHA **/UNF12CHA** **/JIS2CHA**	Releasable check valve in A (pilot ratio 1:4.5) Q_{max} = 50 l/min	
/2CHB **/UNF12CHB** **/JIS2CHB**	Releasable check valve in B (pilot ratio 1:4.5) Q_{max} = 50 l/min	
/2CQ **/UNF12CQ** **/JIS2CQ**	Restrictor check valves in A and B Q_{max} = 36 l/min	
/2CQA **/UNF12CQA** **/JIS2CQA**	Restrictor check valve in A Q_{max} = 36 l/min	

Coding	Description	Circuit symbol
/2CQB **/UNF12CQB** **/JIS2CQB**	Restrictor check valve in B Q_{max} = 36 l/min	
/2CAS... BS... **/UNF12CAS... BS...** **/JIS2CAS... BS...**	Fixed shock valves in A and B Q_{max} = 40 l/min	

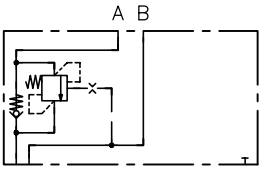
Coding	Description
/2CAN... BN... **/UNF12CAN... BN...** **/JIS2CAN... BN...** **/2CAN...** **/UNF12CAN...** **/JIS2CAN...** **/2CBN...** **/UNF12CBN...** **/JIS2CBN...**	Shock and anti-cavitation valves ▪ **/2CAN... BN...:** Fixed shock and anti-cavitation valves in A and B ▪ **/2CAN...:** Fixed shock and anti-cavitation valve in A ▪ **/2CBN...:** Fixed shock and anti-cavitation valve in B ▪ **/2CAN(N,B,G,V,W)... BN(N,B,G,V,W)...:** Adjustable shock and anti-cavitation valves in A and B ▪ **/2CAN(N,B,G,V,W)...:** Adjustable shock and anti-cavitation valve in A ▪ **/2CBN(N,B,G,V,W)...:** Adjustable shock and anti-cavitation valve in B /2CAN... BN...  /2CAN...  /2CBN...  **Ordering example:** /2CAN **N** **200** Pressure setting in bar Pressure setting range **Flow rate** ▪ Q_{max} = 40 l/min **Pressure setting range** ▪ Without coding: Fixed, non-adjustable setting ▪ Coding **N**: Adjustable pressure range 10 - 50 bar ▪ Coding **B**: Adjustable pressure range 51 - 100 bar ▪ Coding **G**: Adjustable pressure range 101 - 170 bar ▪ Coding **V**: Adjustable pressure range 171 - 250 bar ▪ Coding **W**: Adjustable pressure range 251 - 350 bar

Coding	Description
/2CAL... BL... **/UNF12CAL... BL...** **/JIS2CAL... BL...** **/2CAL...** **/UNF12CAL...** **/JIS2CAL...** **/JIS2CBL...** **/UNF12CBL...** **/2CBL...**	Load-holding valves (type CLHV as per D 7918-VI-C) ▪ **/2CAL... BL...:** Load-holding valves in A and B ▪ **/2CAL...:** Load-holding valve in A ▪ **/2CBL...:** Load-holding valve in B

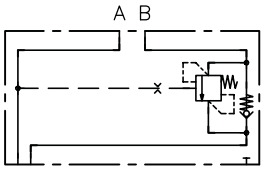
/2CAL... BL...



/2CAL...



/2CBL...



Ordering example:

/2CAL	-0	B	4	N	T	/200	V

- V: Pressure setting
- /200: Pressure setting in bar
- T: Pressure setting range
- N: Return pressure dependence
- 4: Geometric pilot ratio
- B: Flow rate

Flow rate

- Coding **B**: Q_{max} = 30 l/min

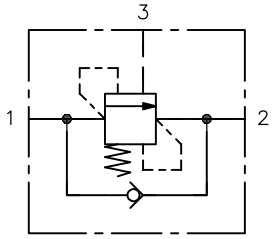
Geometric pilot ratio

- Coding **4**: 4:1
- Coding **8**: 8:1

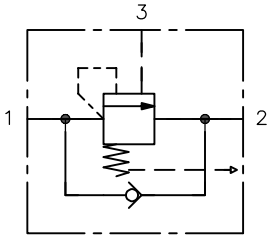
Return pressure dependence

- Coding **N**:
  - Normal (not relieved)
  - Available pilot ratios: all
- Coding **V**:
  - Relieved (atmospheric)
  - Available sizes 2 and 3
  - Available pilot ratios:
    - ► Size 2 = 4:1

Coding **N**

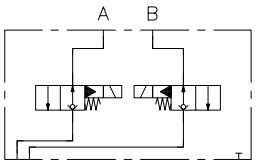
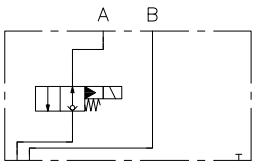
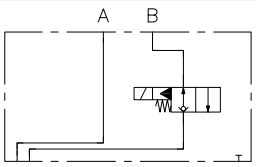


Coding **V**



NOTICE
For coding N, the return pressure at port 2 is added to the pressure setting with (1 + pilot ratio) x return pressure!

Coding	Description
	Pressure setting range ▪ Coding **T**: – Pressure setting: 70 - 150 bar – Adjustment: 73 bar/U – Pilot ratio 4:1 ▪ Coding **M**: – Pressure setting: 100 - 210 bar – Adjustment: 109 bar/U – Pilot ratio 4:1 ▪ Coding **D**: – Pressure setting: 140 - 350 bar – Adjustment: 136 bar/U – Pilot ratio: all **Pressure setting** ▪ without coding: fixed ▪ Coding **V**: Adjustable within the selected pressure range

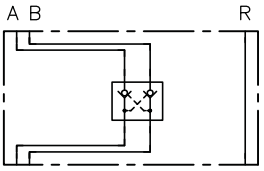
Coding	Description	Circuit symbol
/2 CVV **/UNF12 CVV**	Electrically actuated 2/2-way directional seated valve closed in neutral position as check valve in A or B Q_{max} = 40 l/min; p_{max} = 350 bar ▪ **/2 CVV, /UNF12 CVV:** Check valves in A and B ▪ **/2 CVX, /UNF12 CVX:** Check valve in A ▪ **/2 CXV, /UNF12 CXV:** Check valve in B Common applications: Seat-tight sealing of consumers.	
/2 CVX **/UNF12 CVX**		
/2 CXV **/UNF12 CXV**		

2.3.1 Seal of consumer ports

Coding	Description
Without coding	Standard version without tapped plug
A	Port A sealed
B	Port B sealed
C	Port A and B sealed

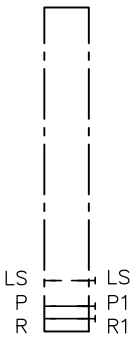
2.4 Intermediate plate

The intermediate plates are mounted between a valve section and an ancillary block (see Chapter 2.3, "Ancillary block") and are intended as either a spacer plate or to combine two additional valves with each other.

Coding	Description	Circuit symbol
/ZC11	Spacer plate with 11 mm height to avoid collisions between the magnetic plug and ancillary block or the hand lever and ancillary block	
/ZCH	Intermediate plate with double releasable check valve (pilot ratio 1:4.5)	

2.5 End plate

End plates are the final element in a manifold and close off the valve bank. Depending on the version, they may have additional ports (e.g. a P1 port for supplying a downstream manifold).

Coding	Description	Ports P1, R1	Circuit symbol
1	Standard version	--	
11	Additional LS relief via 2x 0.5 mm orifice	--	
22	Additional port: P1, R1, LS	G 3/8, G 1/4 (ISO 228-1)	
UNF22		SAE-8 or 3/4-16 UNF-2B (SAE J 514)	
JIS22		G 3/8 JIS (B 2351)	

2.5.1 Mounting bracket

Coding	Description
without coding	Without mounting bracket (standard version)
K	Including mounting bracket consisting of two retaining plates which are attached to the metric mounting threads on the connection block and the end plate respectively. This means the manifold gains some height and, when actuation is by coding M2, MT2, MP2, MPT2, there is sufficient space for the plugs see Chapter 2.2.3, "Actuation".

2.6 Solenoid version

Coding	Electrical connection	Nominal voltage	Protection class (IEC 60529)
X 12 **X 24**	EN 175301-803 A ▪ **X:** without male connector	12 V DC 24 V DC	IP 65
G 12 **G 24**	▪ **G:** with male connector (MSD 3-309 as per D 7163)	12 V DC 24 V DC	IP 65
L 12 **L 24**	▪ **L:** with male connector with LED (SVS 296365 as per D 7163)	12 V DC 24 V DC	IP 65
AMP 12 **AMP 24**	AMP Junior Timer	12 V DC 24 V DC	IP 67
DT 12 **DT 24**	German (DT 04-2P)	12 V DC 24 V DC	IP 69k

For electrical parameters see Chapter 3.5, "Electrical data"

NOTICE
The specifications regarding the IP protection class apply for versions featuring a properly assembled male connector.

3 Parameters

3.1 General data

Designation	Directional spool valve bank
Design	Spool valve, directly actuated
Model	Valve bank
Material	▪ Steel/cast Zn-Ni coated ▪ Solenoids: electro-galvanised
Attachment	M6 mounting thread
Installation position	As desired
Ports/connections	▪ **P** = Pump ▪ **R** = Reflux ▪ **A, B** = Consumers ▪ **LS** = Load pressure signal ▪ **M** = Pressure gauge connection for pump pressure
Flow direction	▪ According to arrow direction in the circuit symbols ▪ Interchange not permitted!
Hydraulic fluid	Hydraulic fluid, according to DIN 51524 Parts 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity range: 4 - 500 mm²/s Also suitable for biologically degradable hydraulic fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C. Not suitable for water-based fluids and native oils (HETG). Not suitable for HETG such as rapeseed oil and water-glycol solutions, e.g. HFA and HFC.
Cleanliness level	**ISO 4406** 20/17/14
Temperatures	Environment: approx. -40 to +80 °C, hydraulic fluid: -25 to +80 °C, pay attention to the viscosity range. Start temperature: down to -40 °C is permissible (take account of the start viscosities!), as long as the steady-state temperature is at least 20 K higher during subsequent operation. Biologically degradable hydraulic fluids: note manufacturer specifications. With consideration for the seal compatibility, not above +70°C.

3.2 Pressure and flow rate

Operating pressure	p_{max} = 350 bar (ports P, A, B, LS) Return pressure ≤ 20 bar (port R). For coding H ≤ 200 bar (see Chapter 2.1.4, "Pressure-limiting valve")
Flow rate	Q_{max} = 80 l/min **NOTICE** Comply with the restrictions for the valve sections, see switchable flow rates in Chapter 3.4, "Characteristic lines" and the “Actuation” section

3.3 Weight

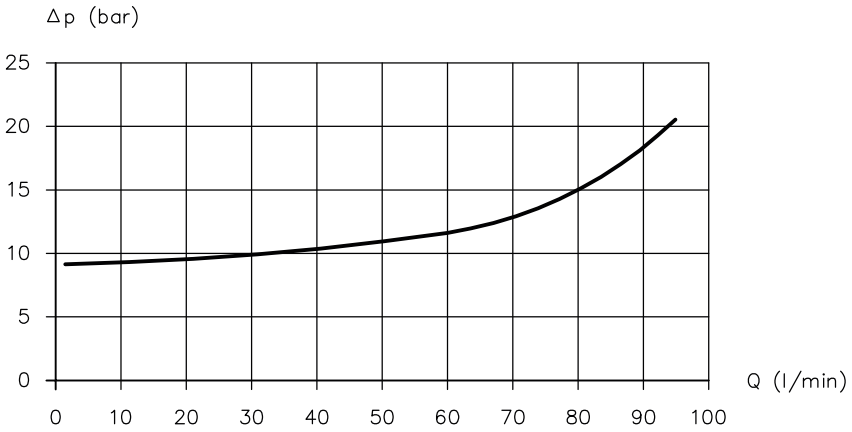
Connection block	**Type**	
	CWL 23 A51	= 1.85 kg
	CWL 23 A52	= 1.90 kg
	CWL 23 A61	= 1.79 kg
	CWL 23 A62	= 2.10 kg
	CWL 23 CL6, CWL 23 CV6	= 4.50 kg
	Also applies to ports in UNF and JIS.	
Directional valve section	Valve section with a magnet (4/2 symbol, example coding “B”)	= 1.78 kg
	Valve section with two magnets (4/3 symbol, example coding “D”)	= 2.30 kg
	Manual actuation	= + 0.80 kg
Ancillary block	**Coding**	
	/2C, /2F	= 0.5 kg
	/2CH, /2CHA, /2CHB	= 1.4 kg
	/2CQ, /2CQA, /2CQB	= 0.7 kg
	/2CAN... BN..., /2CAS... BS..., /2CAN..., /2CBN...	= 1.0 kg
	Also applies to ports in UNF and JIS.	
Intermediate plate	**Coding**	
	/ZC11	= 0.2 kg
	/ZCH	= 1.2 kg
End plate	**Coding**	
	1, 11	= 0.3 kg
	22	= 1.0 kg
	Also applies to ports in UNF and JIS.	

3.4 Characteristic lines

Viscosity of the hydraulic fluid approx. 60 mm²/s

3-way controller

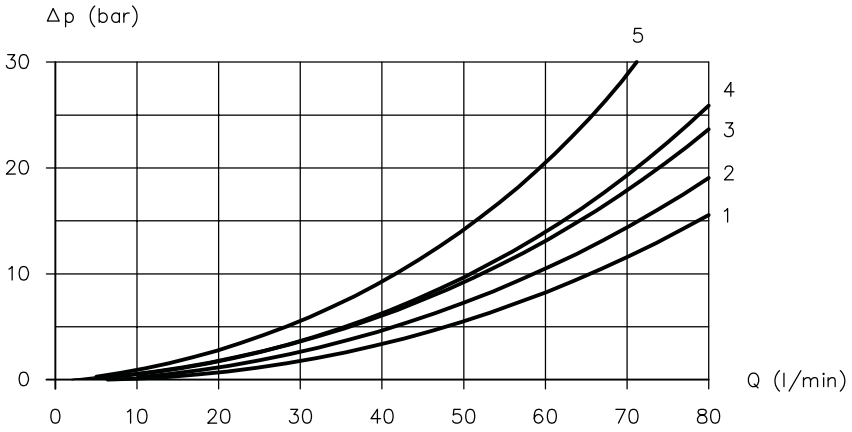
Circulation pressure (P → R) for CWL 23 CL6/...



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

Directional valve section with on-off actuation

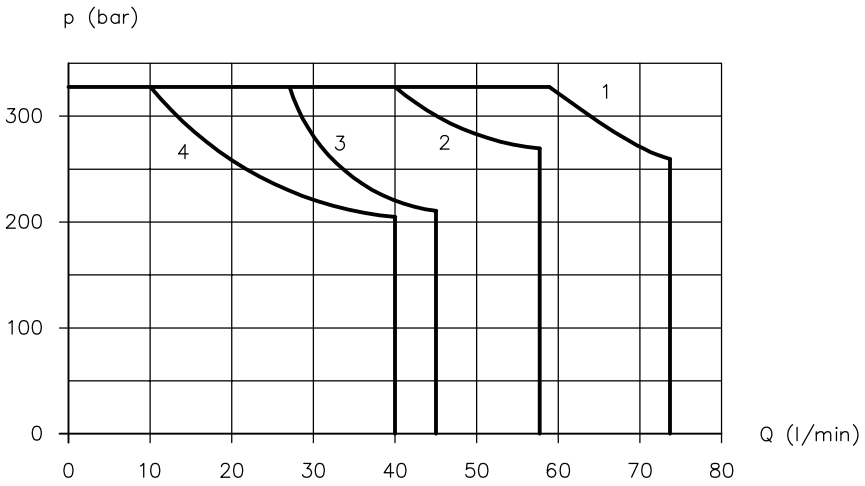
Pressure difference P → A/B and A/B → R



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

Circuit symbol	Middle position	Switching position a		Switching position b	
	P → R	P → B	A → R	P → A	B → R
G, GW, GB	--	3	1	3	1
D, DW, DB	--	3	2	3	2
H, HW, HB	3	1	2	1	2
L	5	5	2	5	2
X	--	3	--	3	--
W, B	--	4	1	4	1

Switchable flow rates

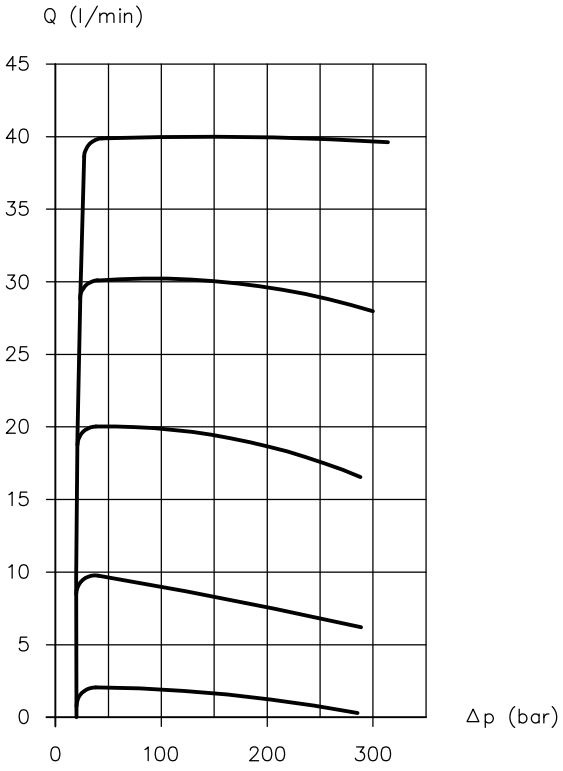


Q flow rate (l/min); p pressure difference (bar)

Circuit symbol	Curve
G, B, W, X	1
H, HW, HB	2
D, DW, DB	3
L	4

Directional valve section with electro-proportional actuation

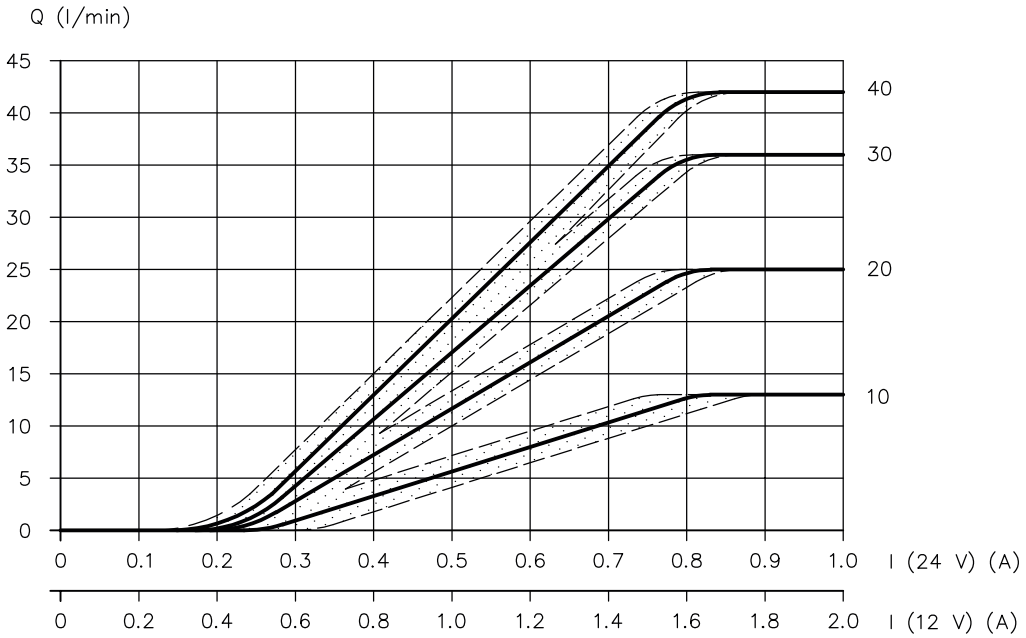
Control characteristic line for consumer flow rate according to Chapter 2.2.2, "Flow rate" (reference values measured with 3-way controller)



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

Q-I characteristic line

(Reference values measured with a Δp of 9 bar)



I current (A); Q flow rate (l/min)

NOTICE

The relief of the LS signal in the CWL connection block or in the PSL-CWL intermediate plate results in flow rate being taken from A/B at the CWL section with the highest load. This shifts the characteristic line to the right and changes the starting flow, especially for spool valves with a small nominal flow rate.

If the LS relief is provided using a flow control valve, approx. 0.6 l/min are taken. If the LS relief is provided using two 0.5 mm orifices, the figure is approx. 1.0 to 1.5 l/min depending on the LS pressure.

3.5 Electrical data

On-off actuation

Coding	X 12, G 12, L 12, AMP 12, DT 12	X 24, G 24, L 24, AMP 24, DT 24
Nominal voltage U_N	12 V DC	24 V DC
Permissible voltage deviation	10 %	10 %
Nominal current I_N	2.50 A	1.25 A
Nominal power P_N	30 W	30 W
Duty cycle	S1 (100 %)	
Switching times	Circuit symbol G: approx. 50 ms and off = approx. 80 ms	
Switching frequency	approx. 15,000 switching/h	
Insulation material class	H	
Contact temperature	max. 100°C at 20°C ambient temperature	

Electro-proportional actuation

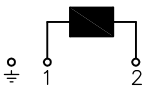
Coding	X 12, G 12, L 12, AMP 12, DT 12	X 24, G 24, L 24, AMP 24, DT 24
Nominal voltage U_N	12 V DC	24 V DC
Coil resistance R_{20}	5 Ω	20 Ω
Current, cold I_{20}	2.30 A	1.15 A
Limit current I_G (I_{lim})	1.70 A	0.85 A
Power, cold $P_{20} = U_N \times I_{20}$	28 W	28 W
Limit power $P_G = U_N \times I_G$	21 W	21 W
Duty cycle	S1 (100 %)	
Dither frequency	40 - 70 Hz	
Dither amplitude $A_D(\%) = \frac{I_{Peak-Peak}}{IG} \cdot 100$	20 % ≤ A_D ≤ 50 %	

Ancillary block CVV, CVX, CXV

Nominal voltage	12 V DC	24 V DC
Resistance R_{20}	7.06 Ω	28.23 Ω
Current, cold I_{20}	1.7 A	0.85 A
Nominal power P_N	20.5 W	20.5 W
Duty cycle	S1 (100%)	S1 (100%)
Insulation material class	H	H

Electrical connection

2-pin
Coil a (1)
Coil b (2)

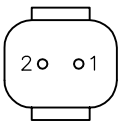


X 12, X 24

EN 175301-803 A
2-pin
IP 65 (IEC 60529)

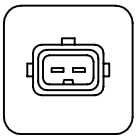
DT 12, DT 24

DT 04-2P (DEUTSCH)
2-pin
IP 69k (IEC 60529)



AMP 12, AMP 24

Junior Timer (AMP)
2-pin
IP 67 (IEC 60529)

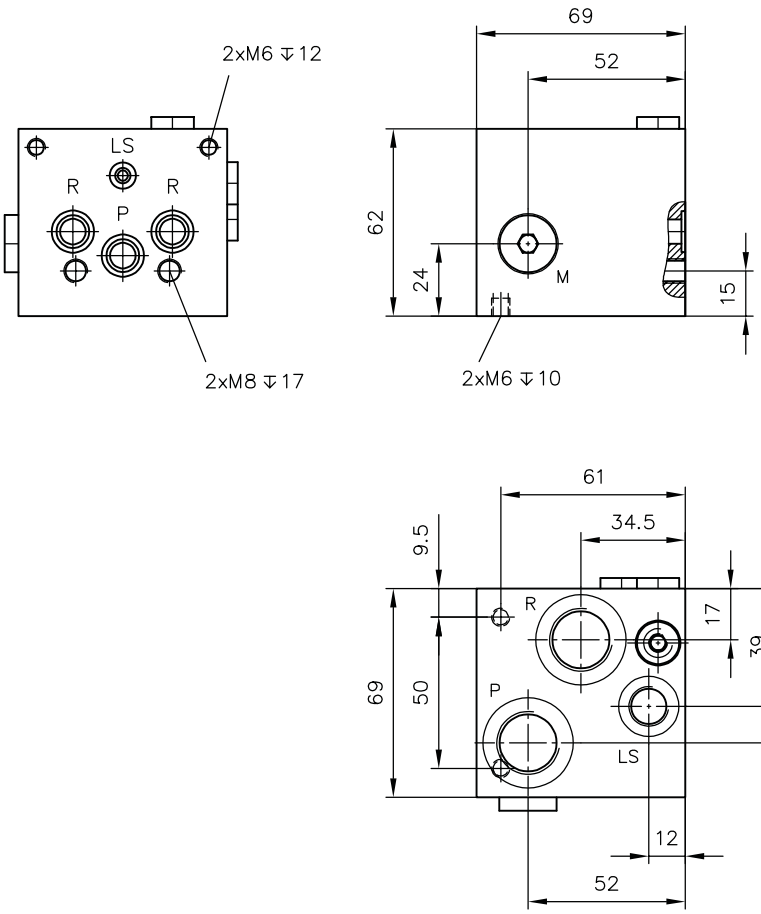


4 Dimensions

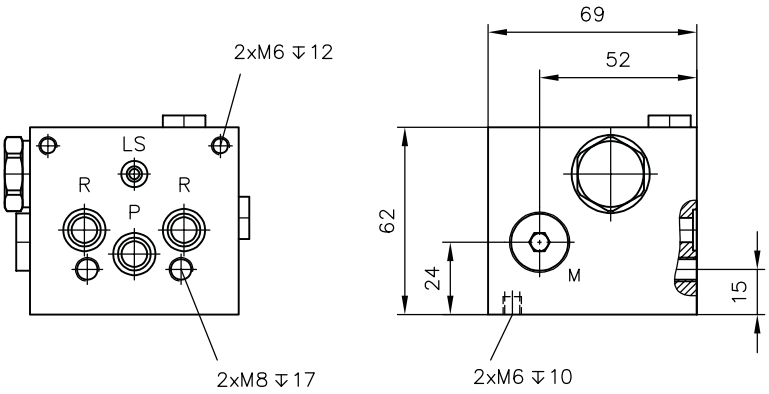
All dimensions in mm, subject to change.

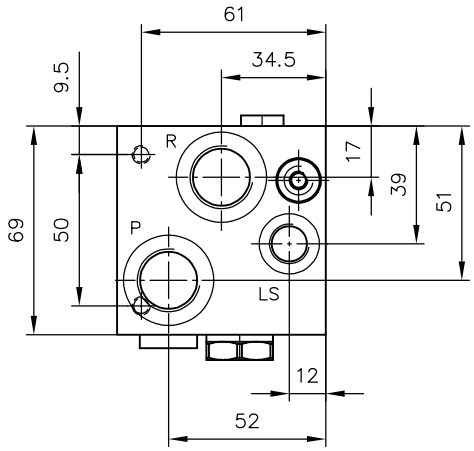
4.1 Connection block

CWL 2..A50/A51

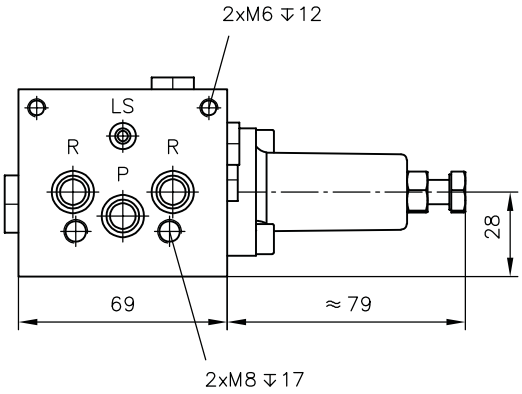


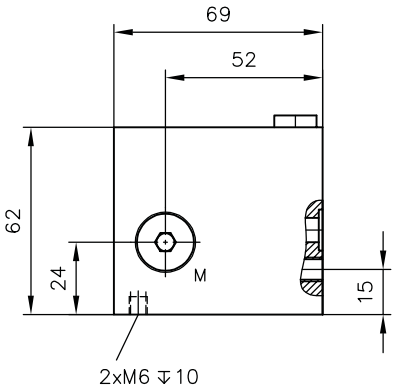
CWL 2..A52

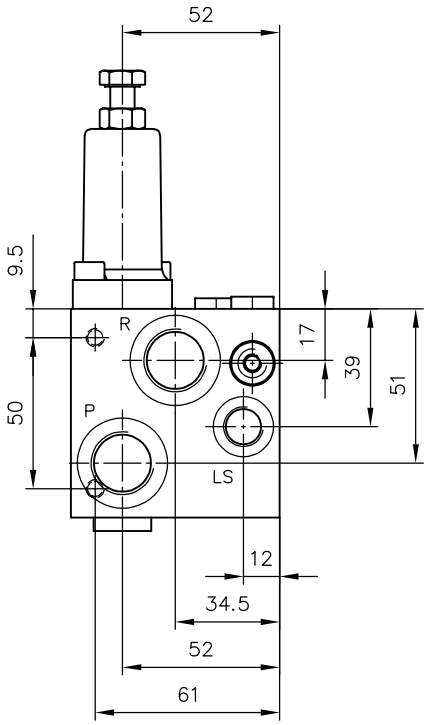

2xM6 ↧12
LS
R
R
P
2xM8 ↧17
69
52
62
24
M
15
2xM6 ↧10


61
34.5
9.5
R
17
39
51
69
50
P
LS
12
52

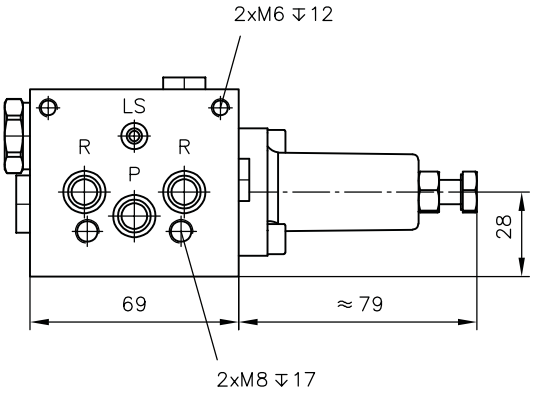
CWL 2..A60/A61

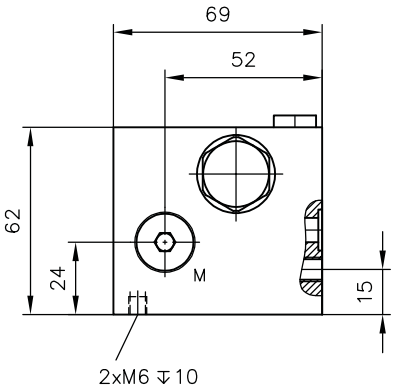

2xM6 ↧12
LS
R
P
R
28
69
≈ 79
2xM8 ↧17

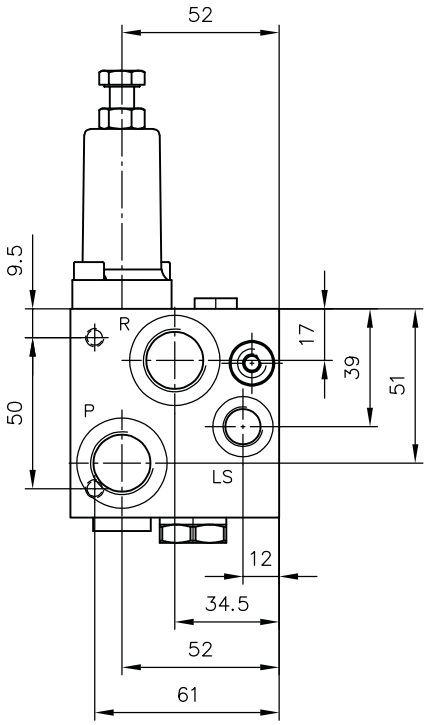

69
52
62
24
M
15
2xM6 ↧10


52
9.5
R
17
39
51
50
P
LS
12
34.5
52
61

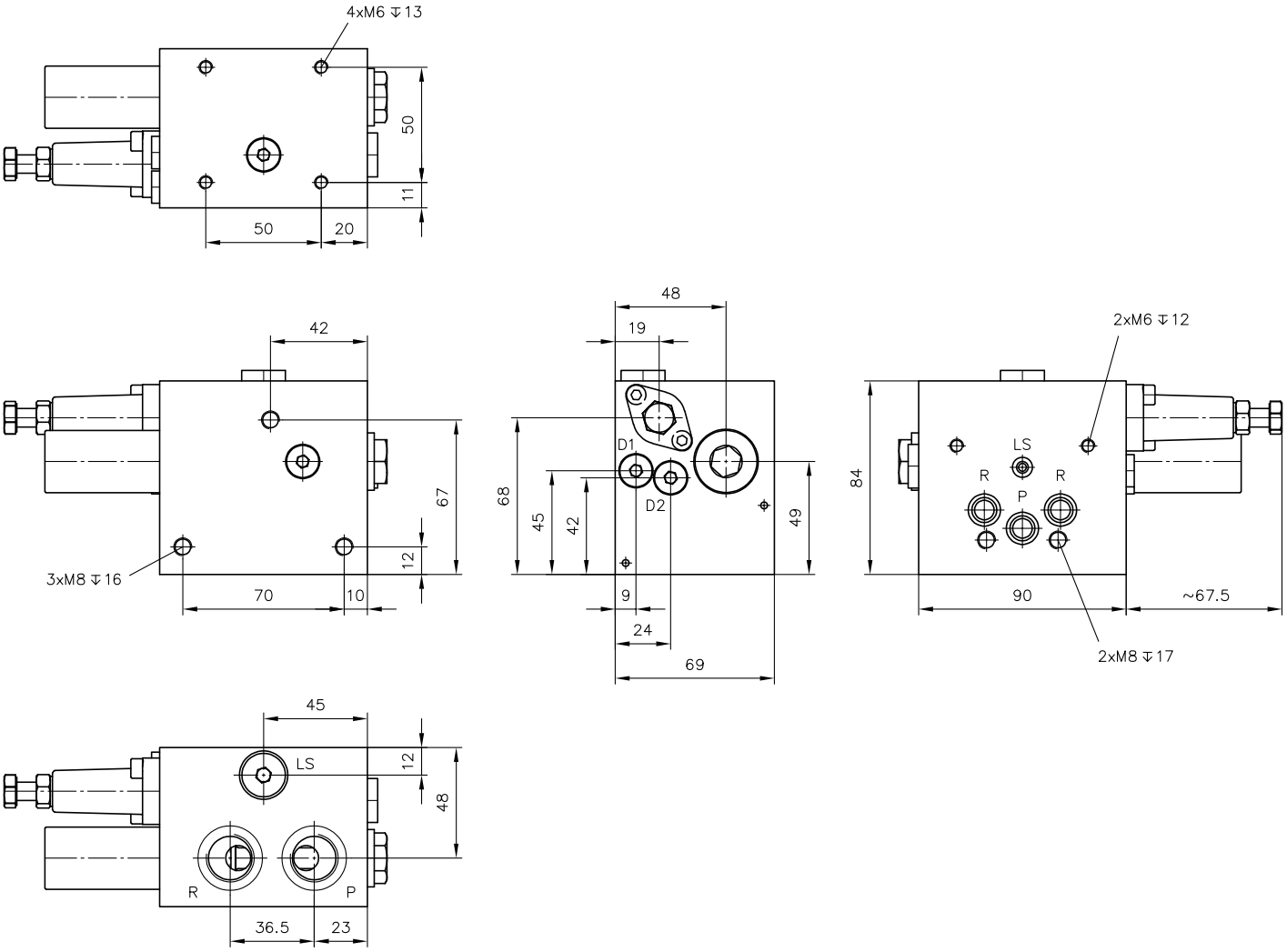
CWL 2..A62


2xM6 ↧12
LS
R
R
P
28
69
≈ 79
2xM8 ↧17


69
52
62
24
M
15
2xM6 ↧10

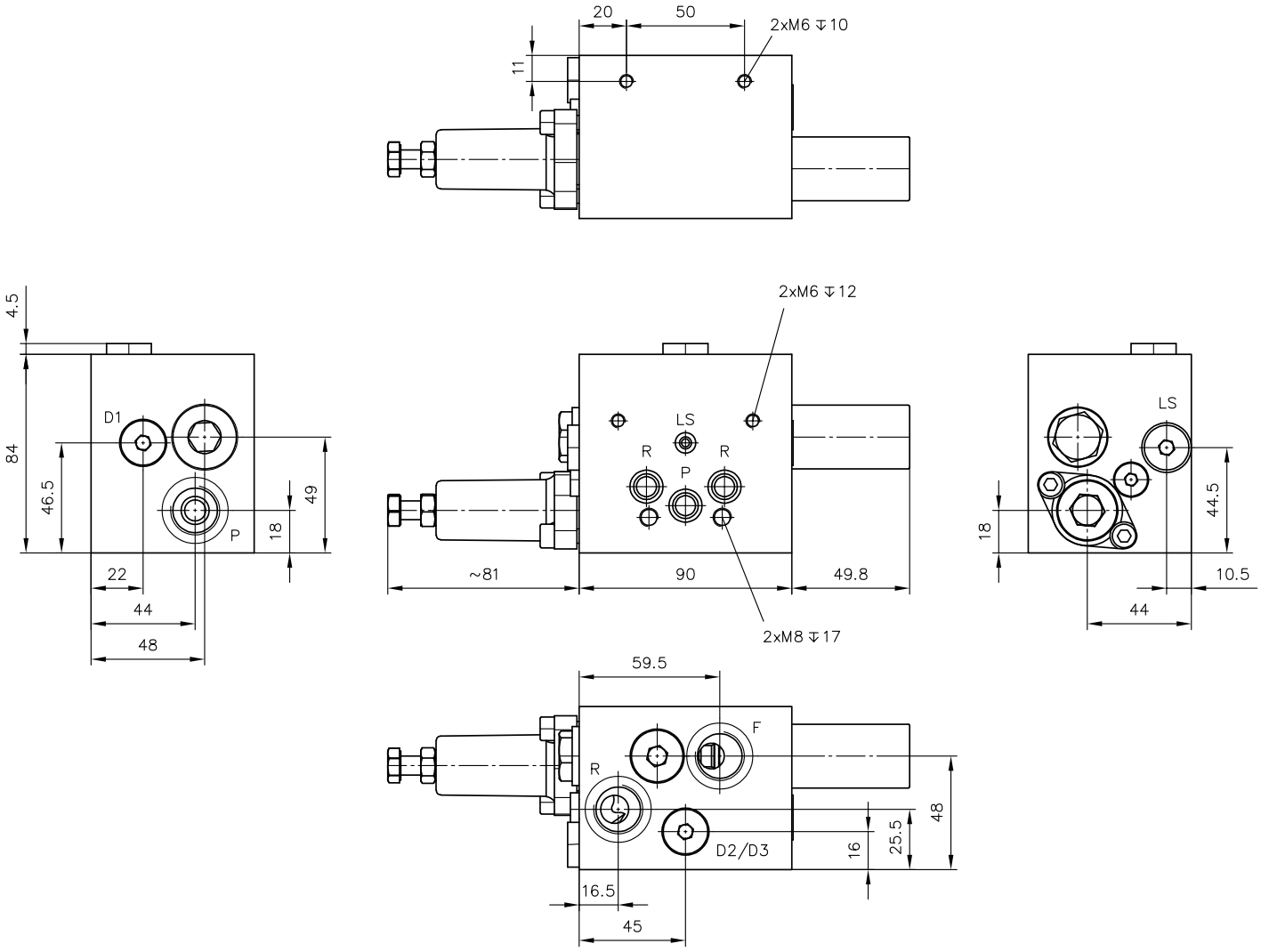

52
9.5
R
17
39
51
50
P
LS
12
34.5
52
61

CWL 2..CL6
CWL 2..CV6



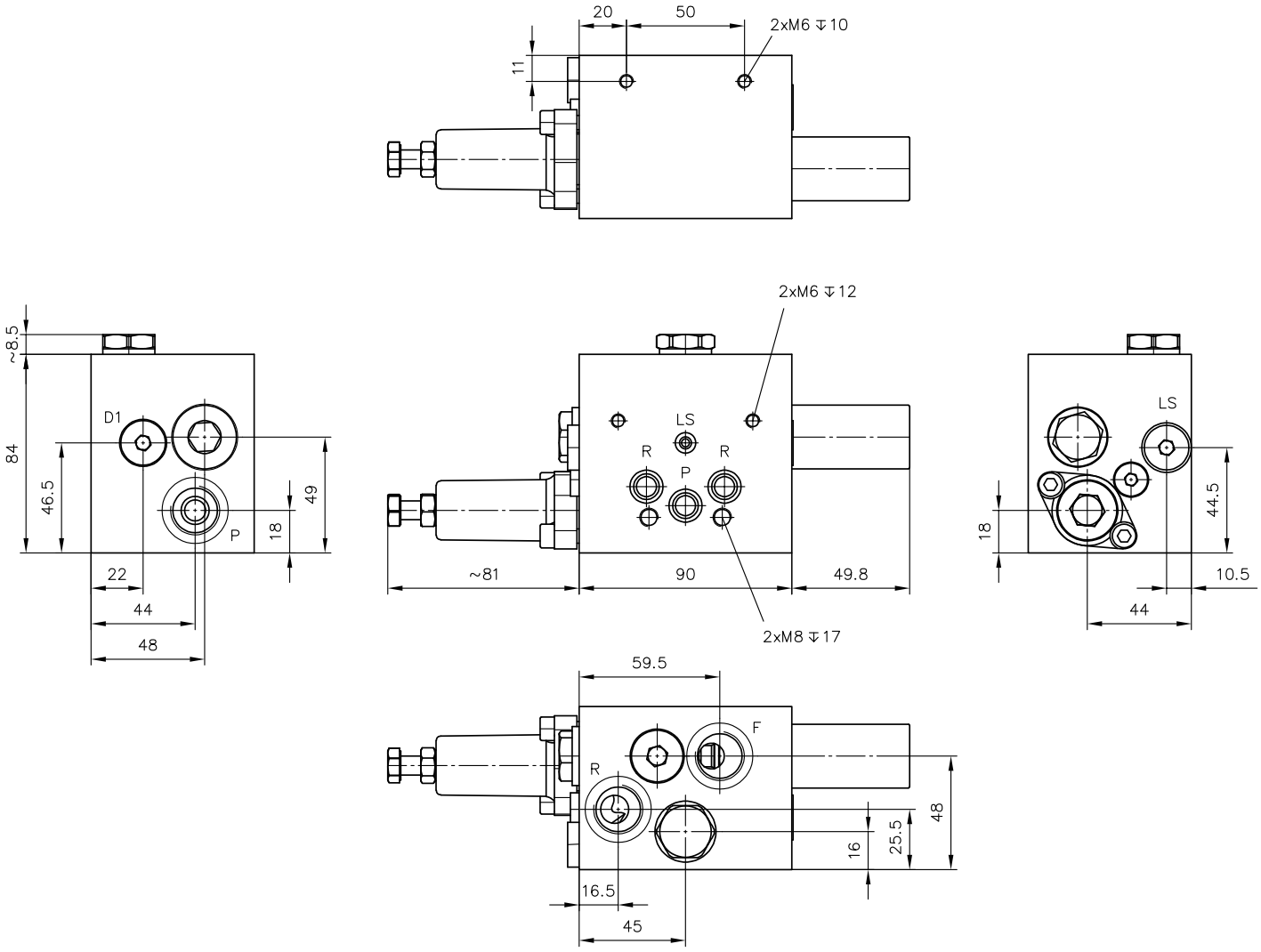
	Connections	
P, R	G 1/2	ISO 228-1
	7/8-14 UNF-2B	SAE J 514
	G 1/2 JIS	JIS B 2351-1
LS, M	G 1/4	ISO 228-1
	7/16-20 UNF-2B	SAE J 514
	G 1/4 JIS	JIS B 2351-1

CWL 2. CY61



	Connections	
P, R, F	G 1/2	ISO 228-1
	7/8-14 UNF-2B	SAE J 514
	G 1/2 JIS	JIS B 2351-1
LS	G 1/4	ISO 228-1
	7/16-20 UNF-2B	SAE J 514
	G 1/4 JIS	JIS B 2351-1

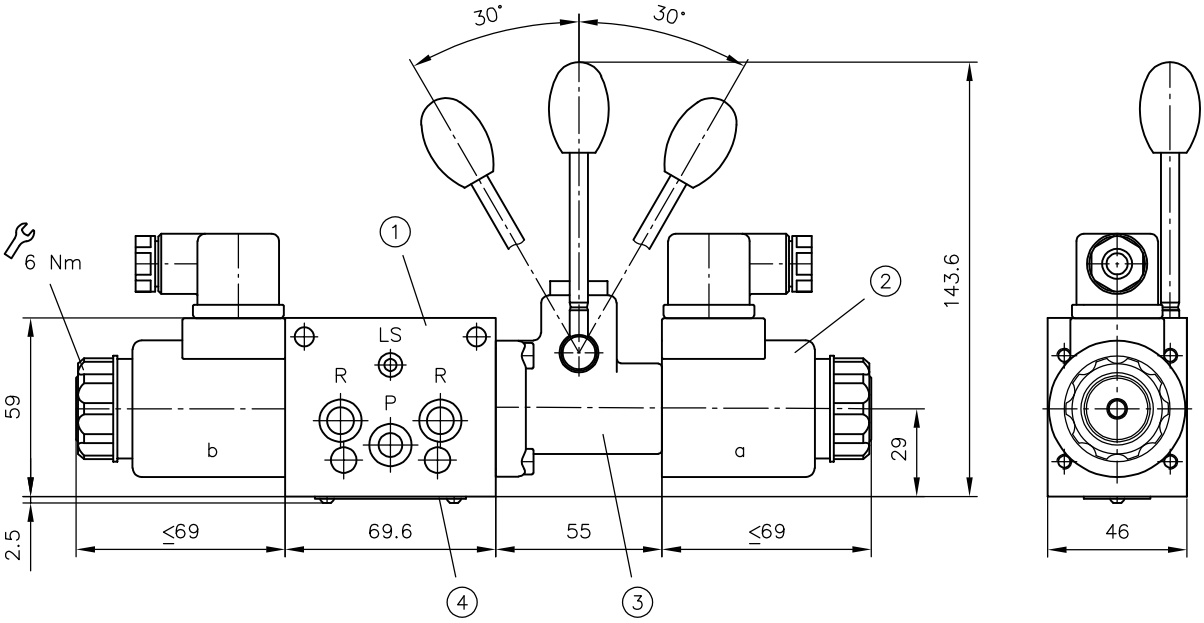
CWL 2. CY62



	Connections	
P, R, F	G 1/2	ISO 228-1
	7/8-14 UNF-2B	SAE J 514
	G 1/2 JIS	JIS B 2351-1
LS	G 1/4	ISO 228-1
	7/16-20 UNF-2B	SAE J 514
	G 1/4 JIS	JIS B 2351-1

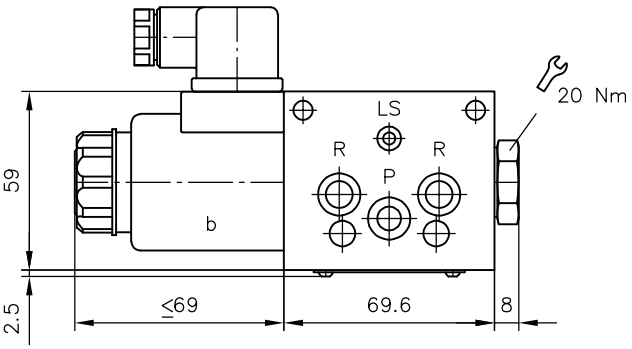
4.2 Directional valve section

4/3-way directional valve with circuit symbol G, D

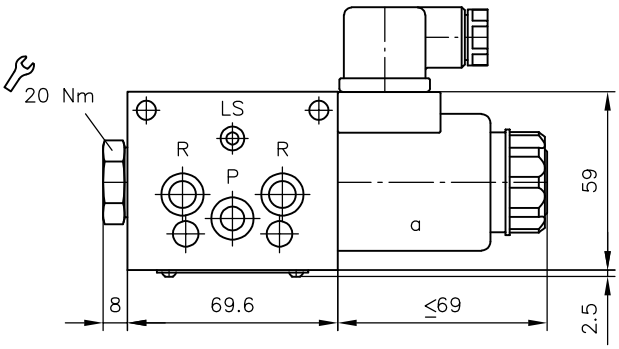


1 Directional valve section
2 Actuation
3 Hand lever
4 Type plate

4/2-way directional valve with circuit symbol W, DB, GB
(function in switching positions 0 and b)

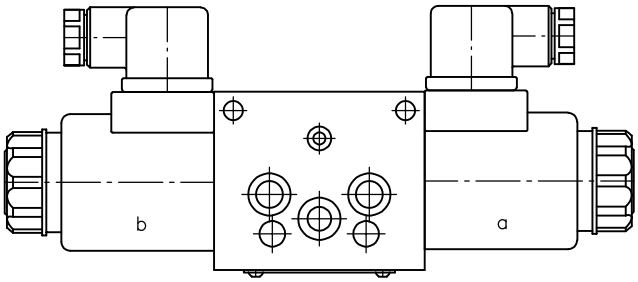


4/2-way directional valve with circuit symbol B, DW, GW
(function in switching positions 0 and a)

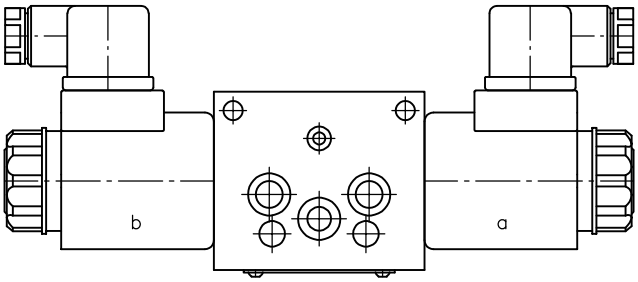


4.2.1 Actuation

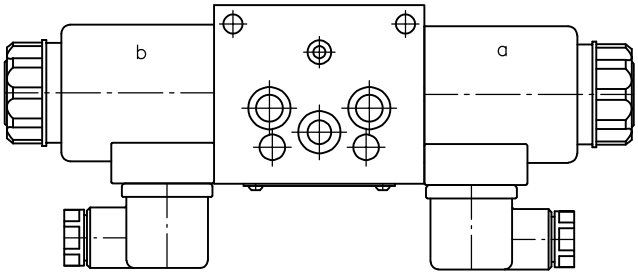
Coding **M(P)-G 12(24)**



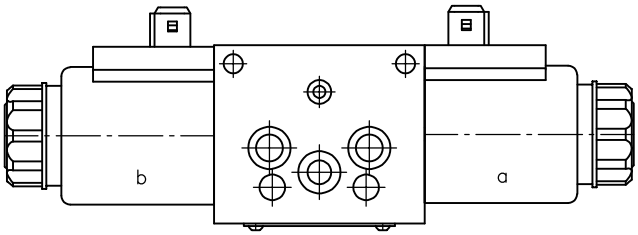
Coding **M(P)1-G 12(24)**



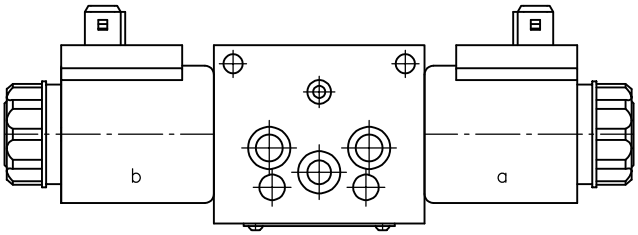
Coding **M(P)2-G 12(24)**



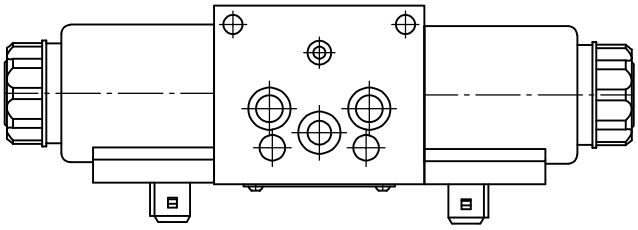
Coding **M(P)-AMP 12(24)**



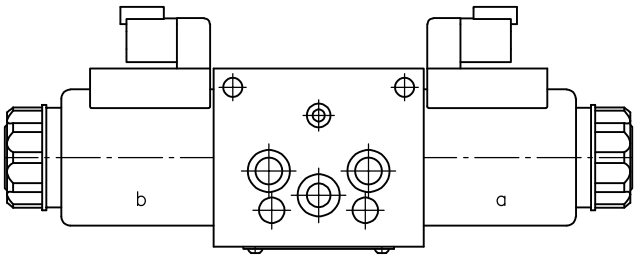
Coding **M(P)1-AMP 12(24)**



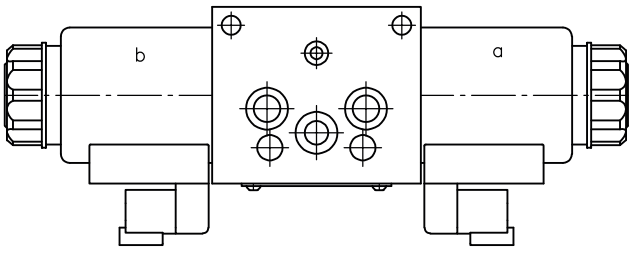
Coding **M(P)2-AMP 12(24)**



Coding **M(P)-DT 12(24)**

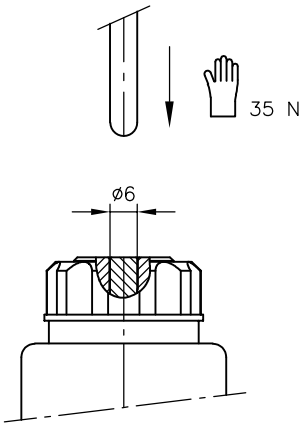


Coding **M(P)2-DT 12(24)**

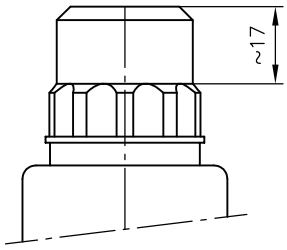


Emergency actuation

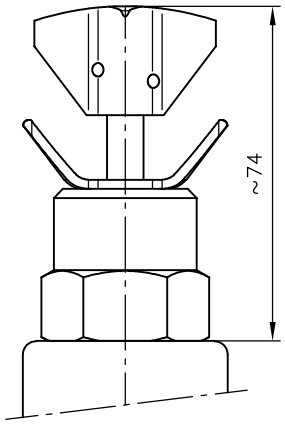
M
Auxiliary tool for actuation
(do not use any parts with sharp edges)



MT
Manual operation with push-button



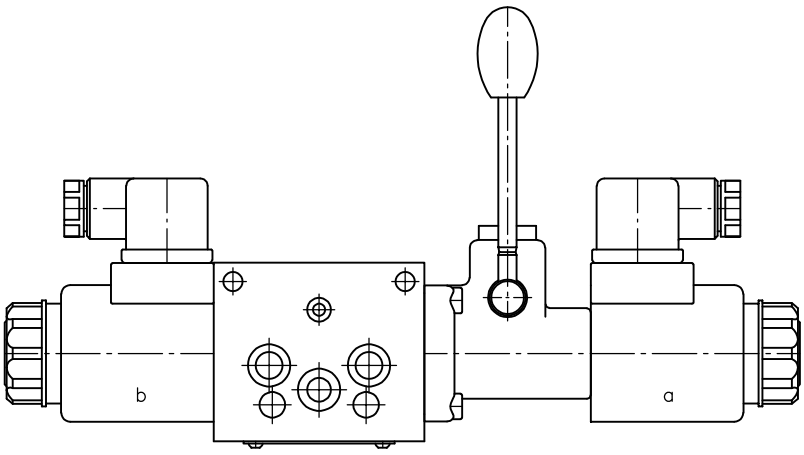
MD
Manual operation with locking function



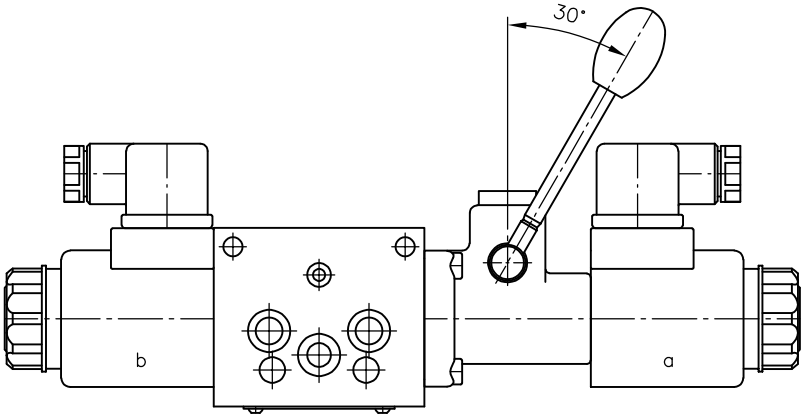
4.2.2 Hand lever

Hand lever actuation for combination with electrical actuation

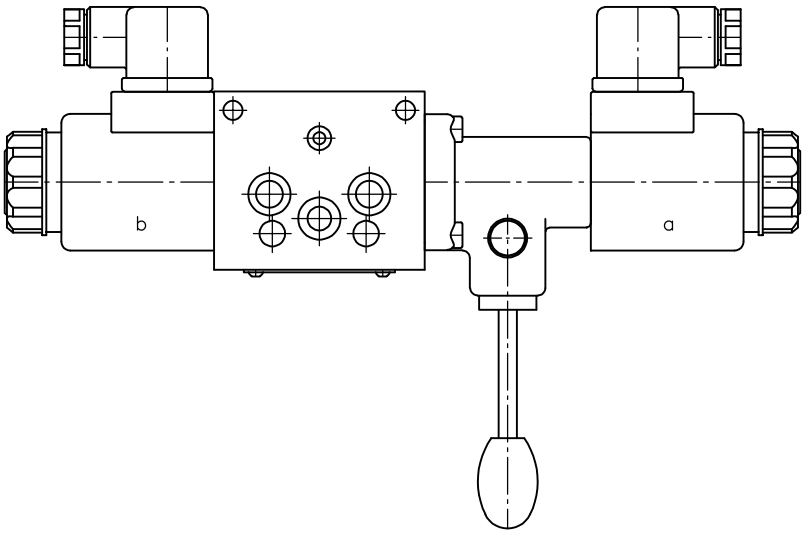
MHA



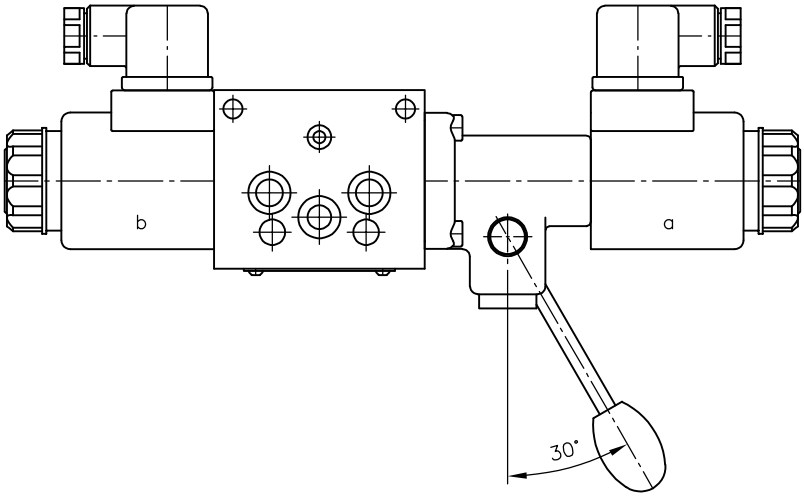
MH1A



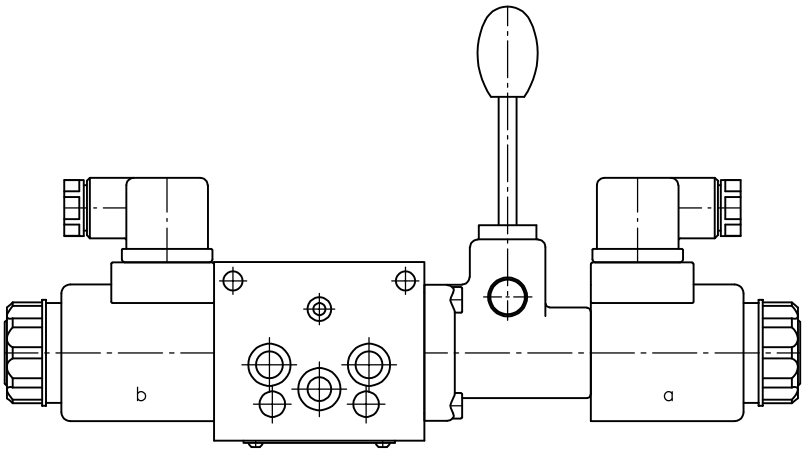
MH2A



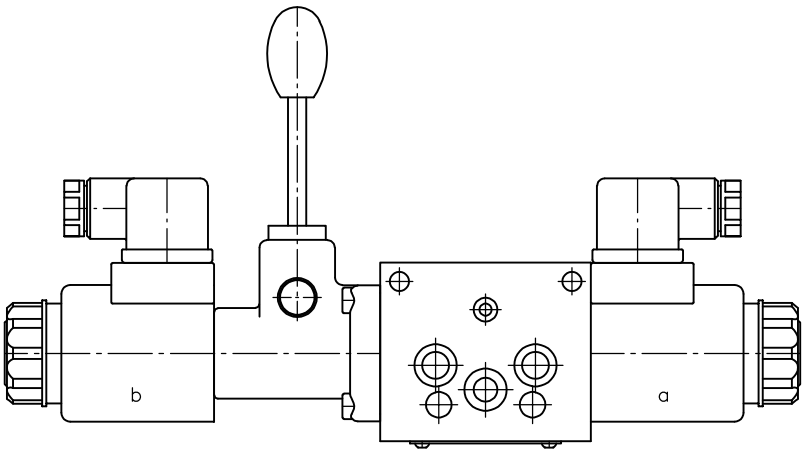
MH3A



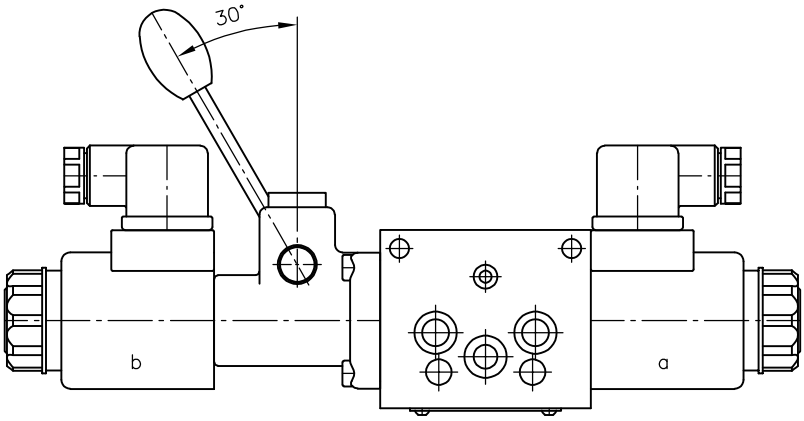
MH4A



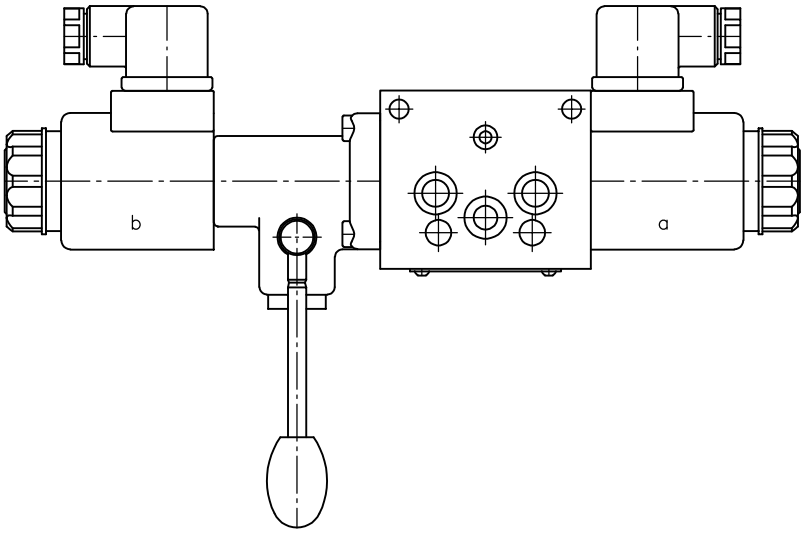
MHB



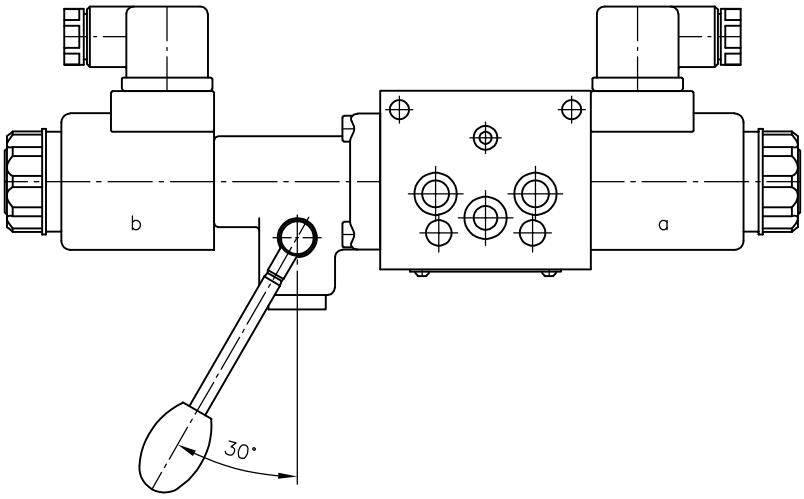
MH1B



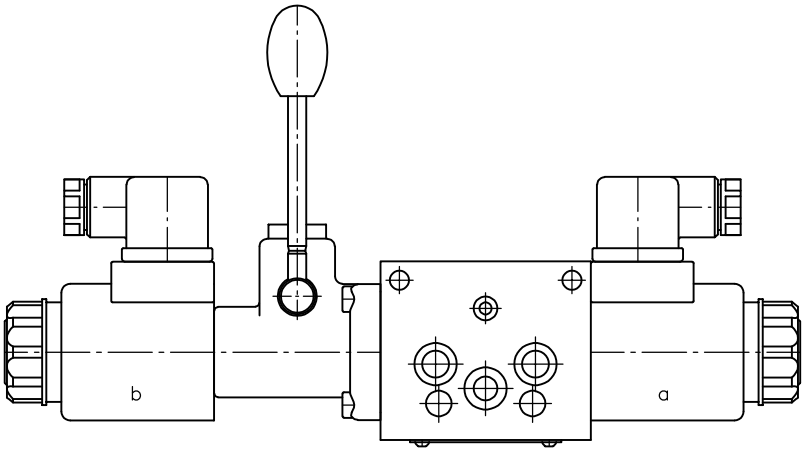
MH2B



MH3B

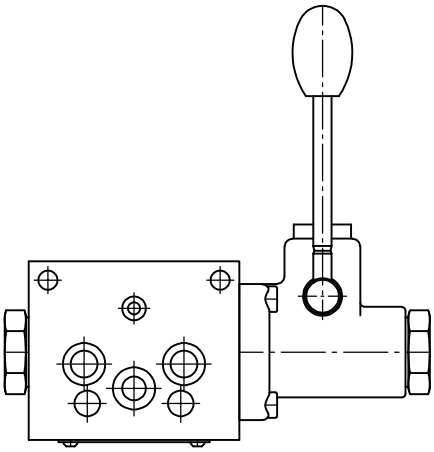


MH4B

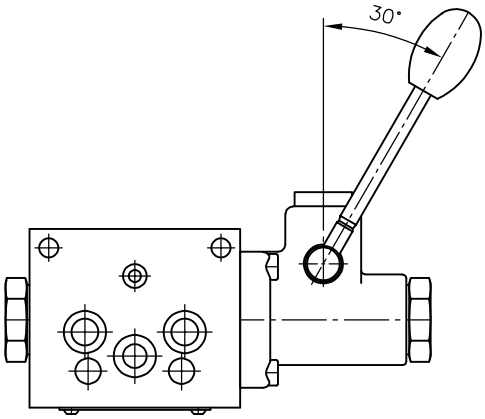


Hand lever actuation only, without electrical actuation

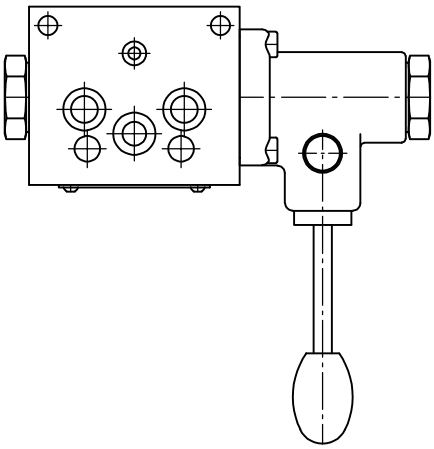
AA



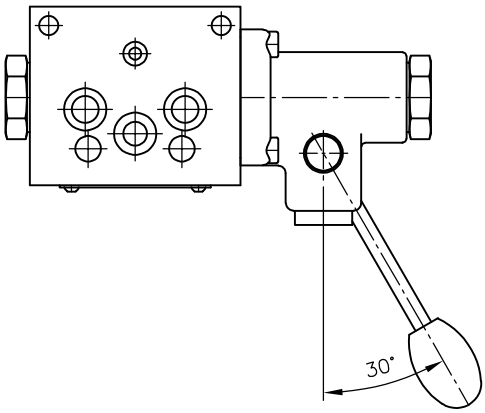
A1A



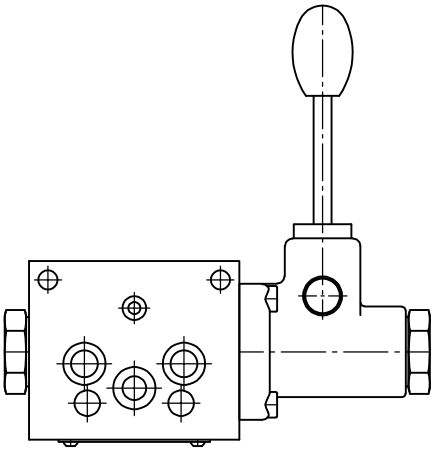
A2A



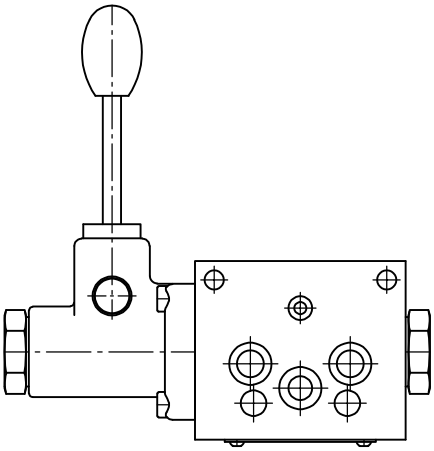
A3A



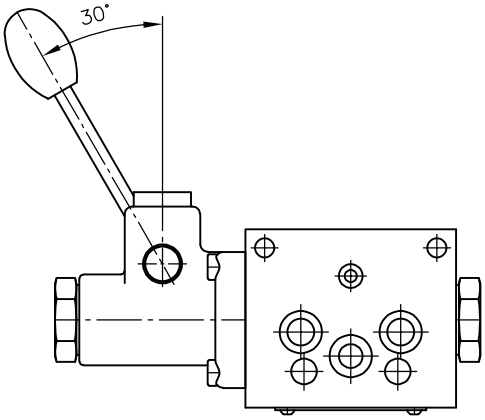
A4A



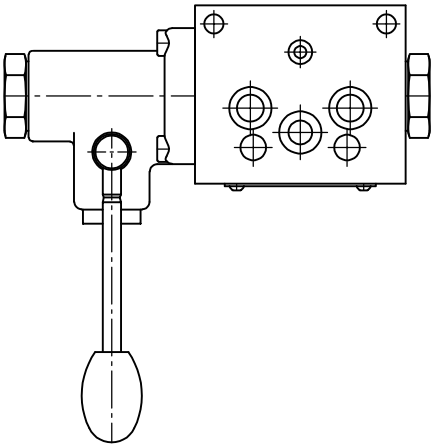
AB



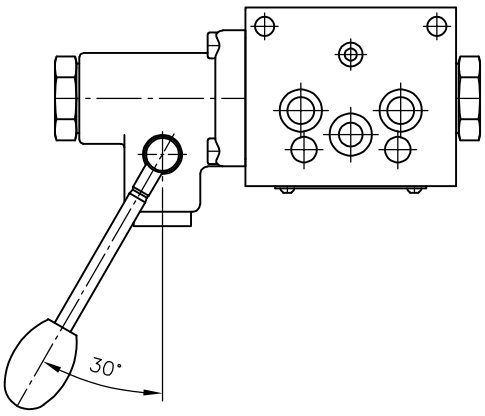
A1B



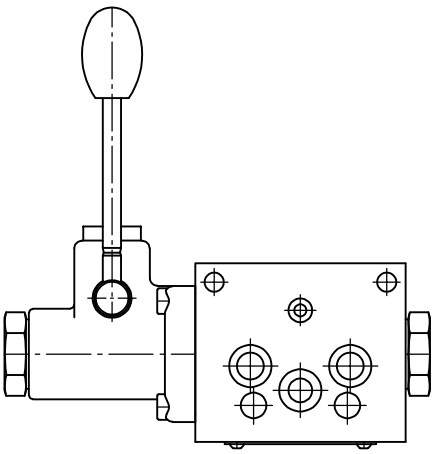
A2B



A3B



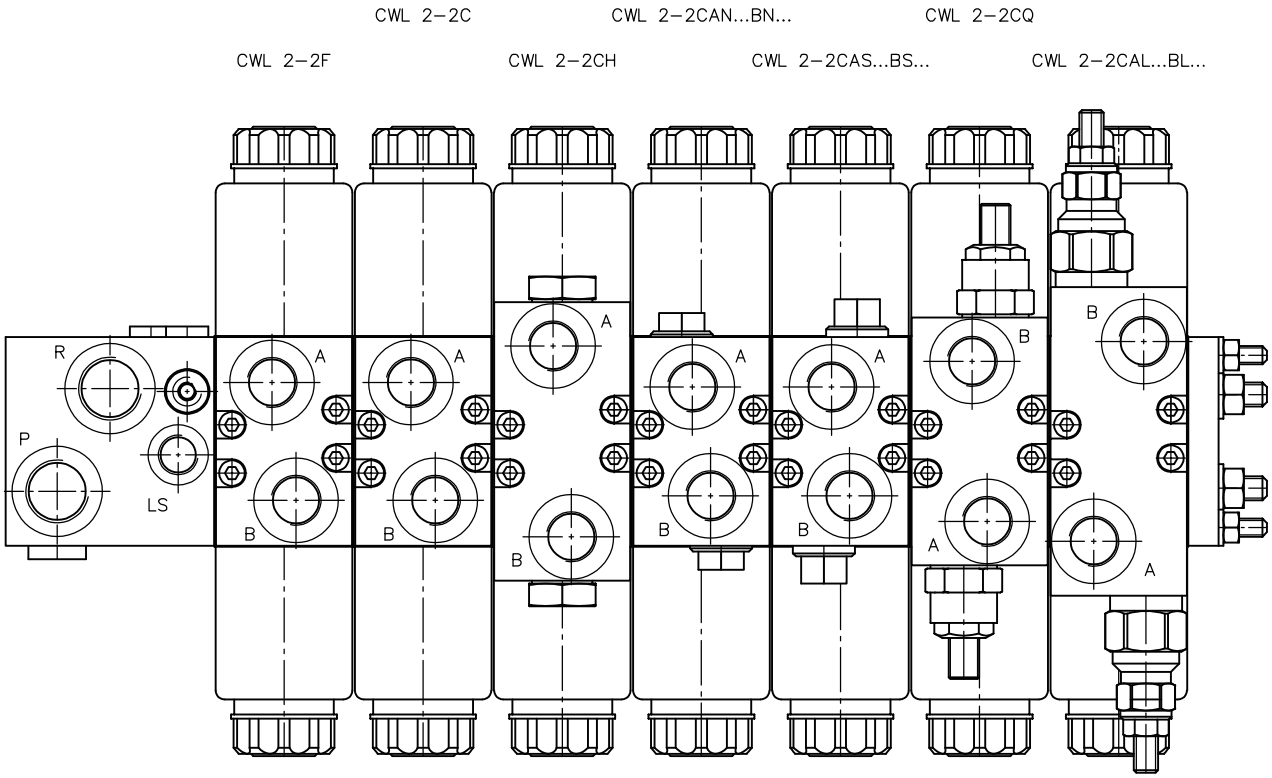
A4B



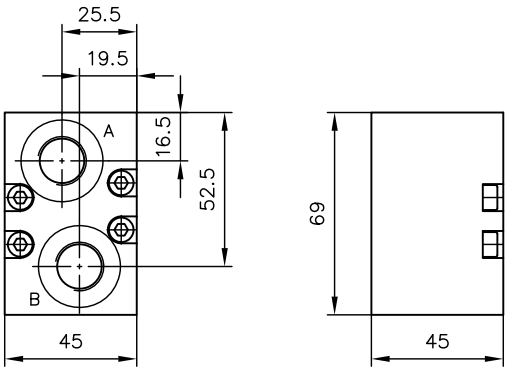
4.3 Ancillary block

see Chapter 2.3, "Ancillary block"

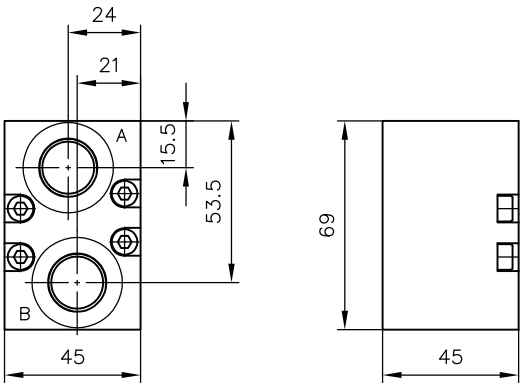
Overview drawing of the ancillary blocks



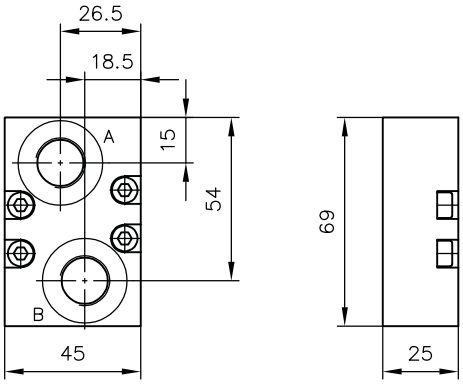
Coding **2C, UNF12C, JIS2C**



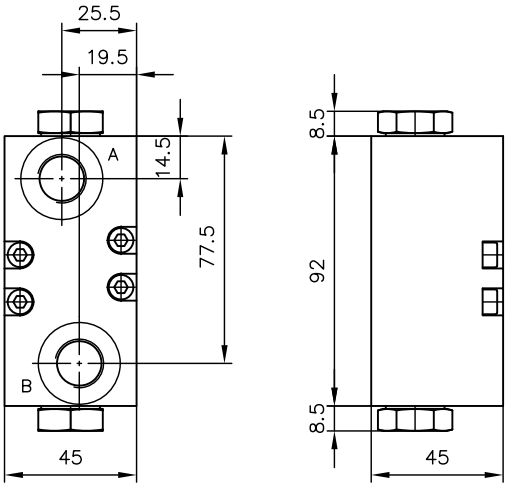
Coding **UNF2C**



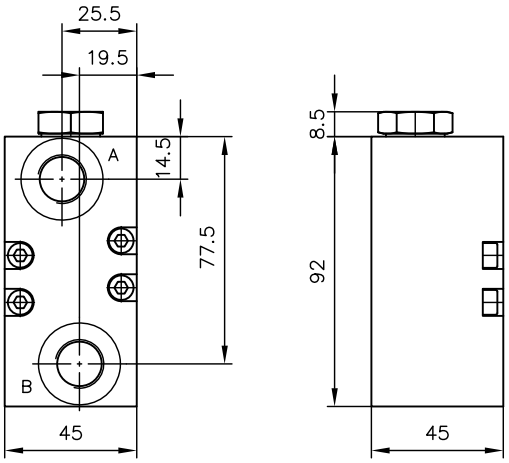
Coding **2F, UNF12F, JIS2F**



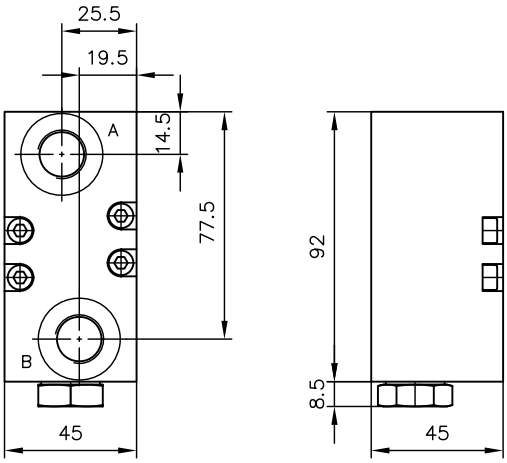
Coding **2CH, UNF12CH, JIS2CH**



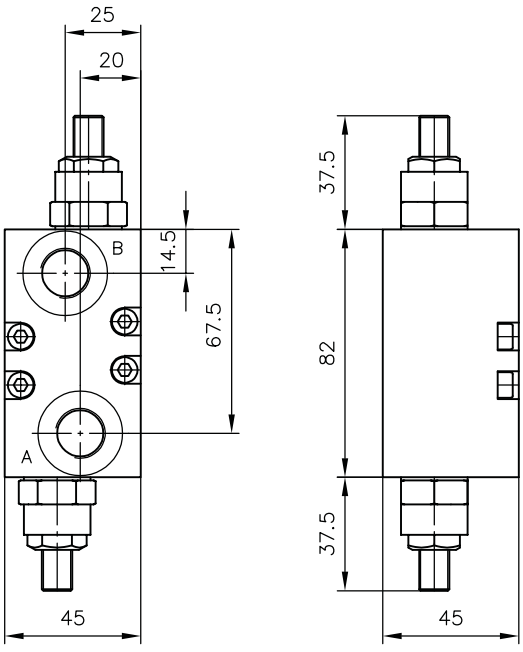
Coding **2CHA, UNF12CHA, JIS2CHA**



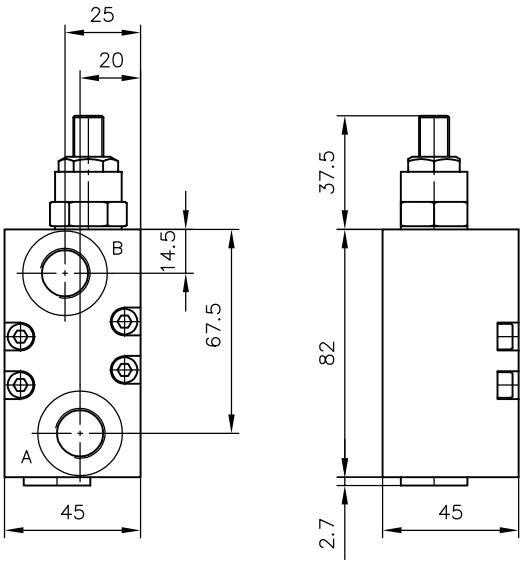
Coding **2CHB, UNF12CHB, JIS2CHB**



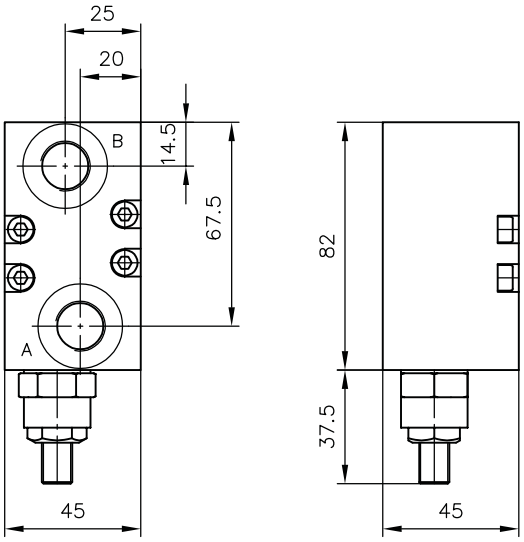
Coding **2CQ, UNF12CQ, JIS2CQ**



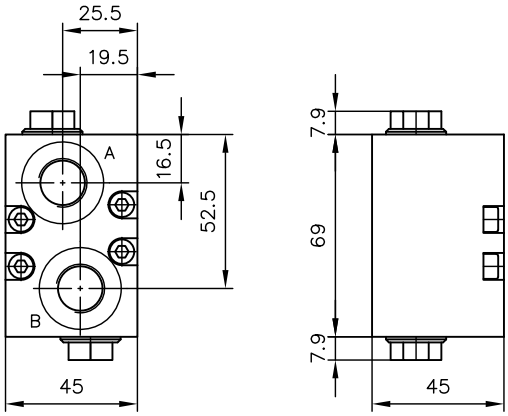
Coding **2CQB, UNF12CQB, JIS2CQB**



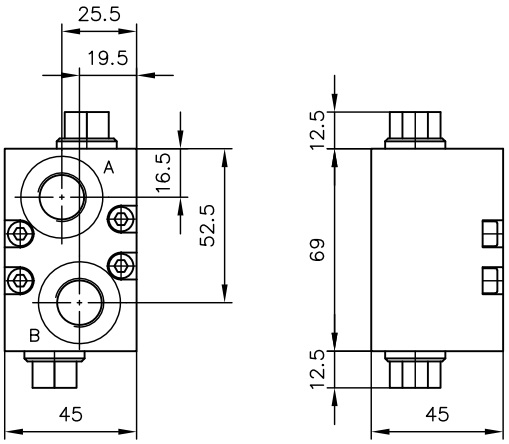
Coding **2CQA, UNF12CQA, JIS2CQA**



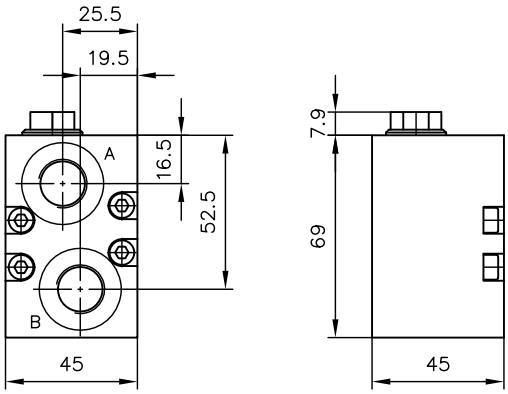
Coding **2CAN.. BN.., UNF12CAN.. BN.., JIS2CAN.. BN..**



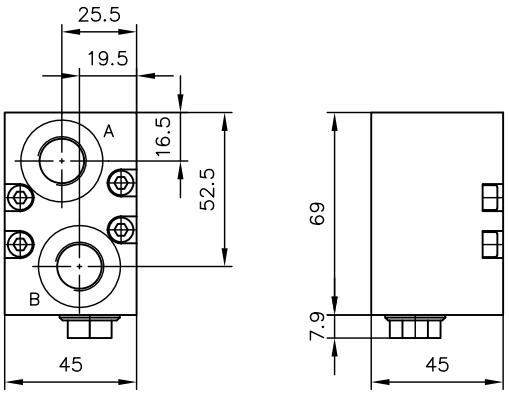
Coding **2CAS.. BS.., UNF12CAS.. BS.., JIS2CAS.. BS..**



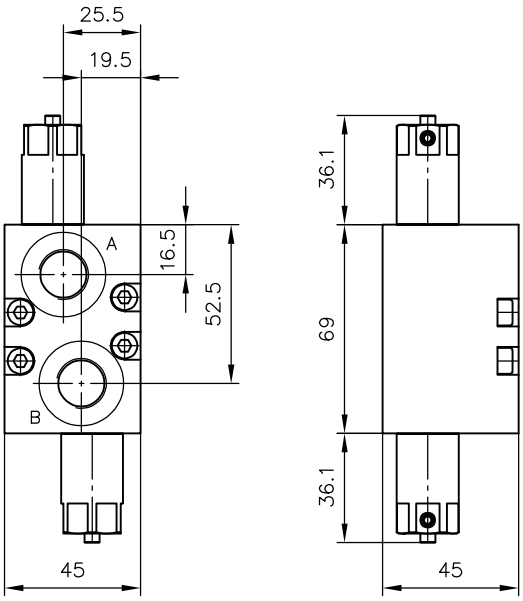
Coding **2CAN.., UNF12CAN.., JIS2CAN..**



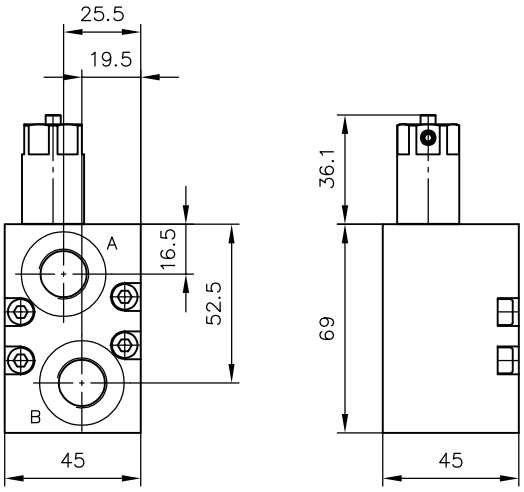
Coding **2CBN.., UNF12CBN.., JIS2CBN..**



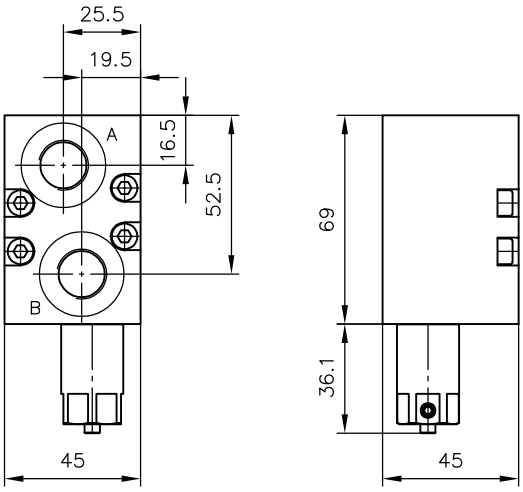
Coding **2CAN(N,B,G,V,W)... BN(N,B,G,V,W)..., UNF12CAN(N,B,G,V,W)... BN(N,B,G,V,W)..., JIS2CAN(N,B,G,V,W)... BN(N,B,G,V,W)...**



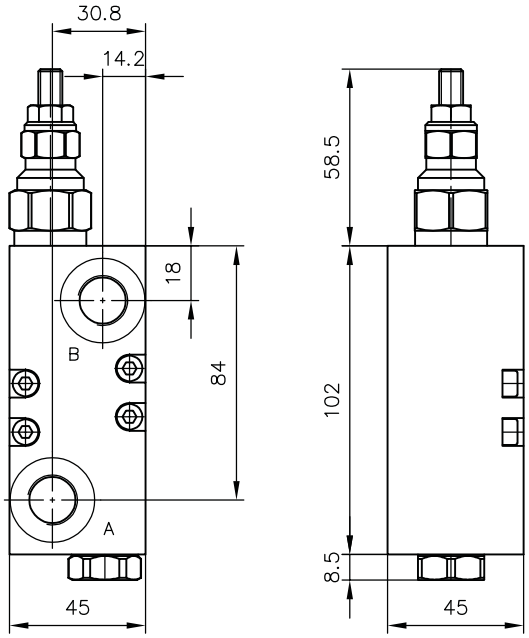
Coding **2CAN(N,B,G,V,W)..., UNF12CAN(N,B,G,V,W)..., JIS2CAN(N,B,G,V,W)...**



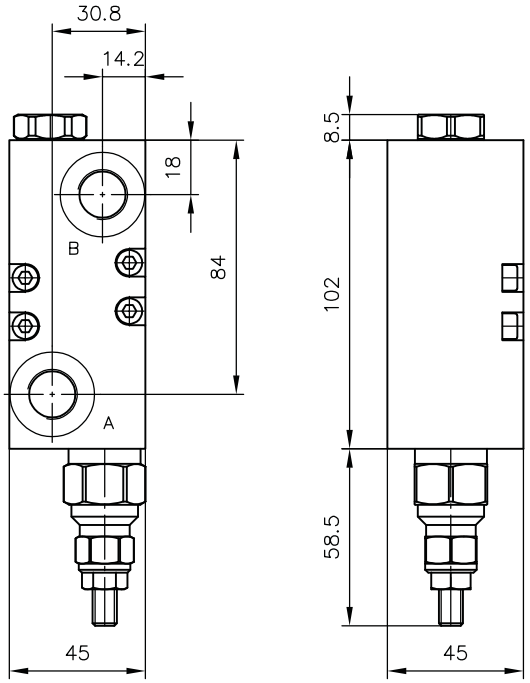
Coding **2CBN(N,B,G,V,W)..., UNF12CBN(N,B,G,V,W)..., JIS2CBN(N,B,G,V,W)...**



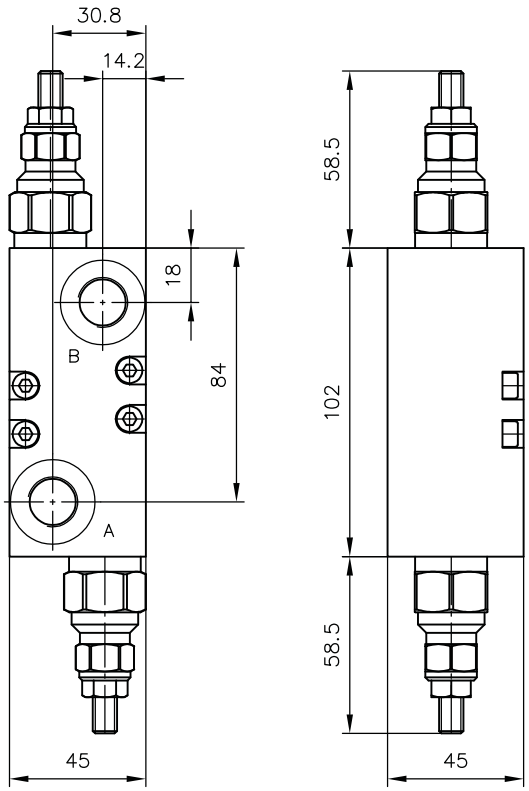
Coding **2CAL..., UNF12CAL..., JIS2CAL...**



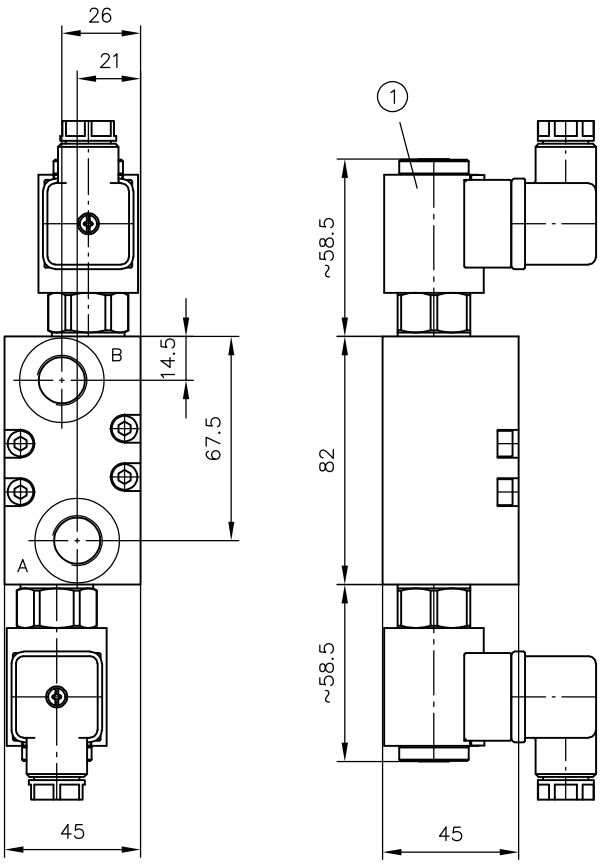
Coding **2CBL..., UNF12CBL..., JIS2CBL...**



Coding **2CAL...BL..., UNF12CAL...BL..., JIS2CAL...BL...**

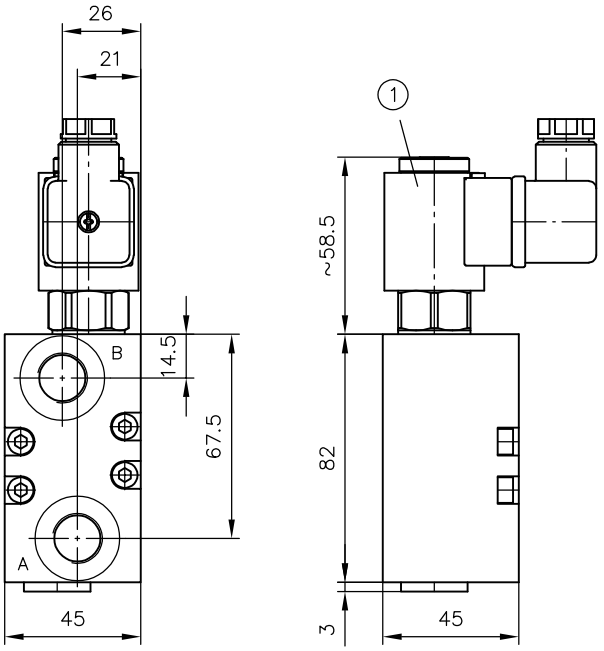


Coding **2CVV, UNF12CVV, JIS2CVV**



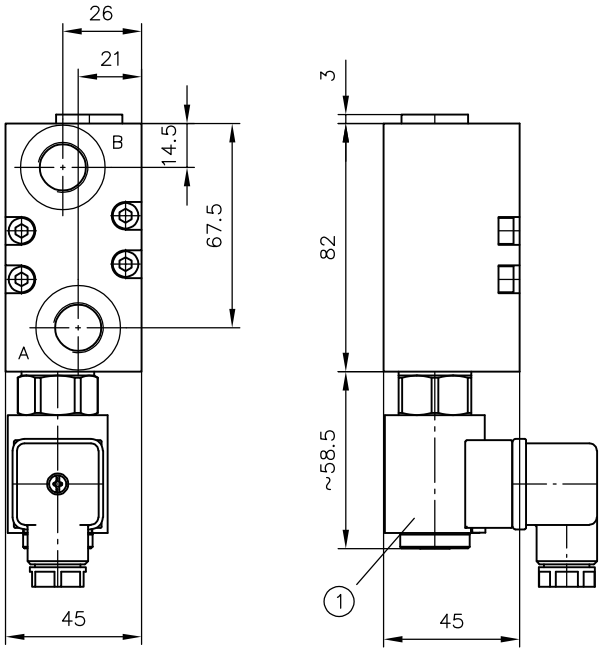
1 Actuation

Coding **2CXV, UNF12CXV, JIS2CXV**



1 Actuation

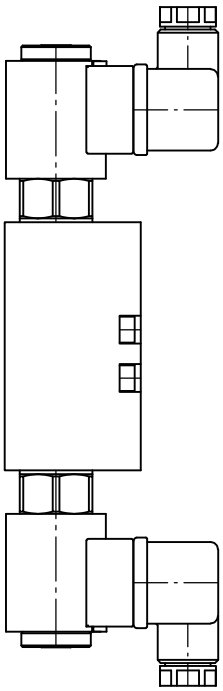
Coding **2CVX, UNF12CVX, JIS2CVX**



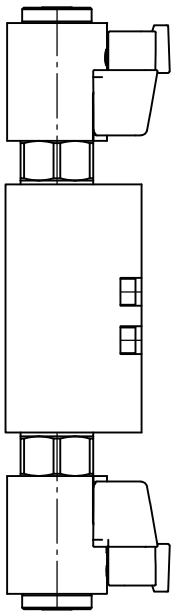
1 Actuation

	Ports A, B	
/2	G 3/8	ISO 228-1
/UNF12	SAE-6 (9/16-18 UNF-2B)	SAE J 514
/JIS2	G 3/8	JIS B 2351

Solenoid version **G**

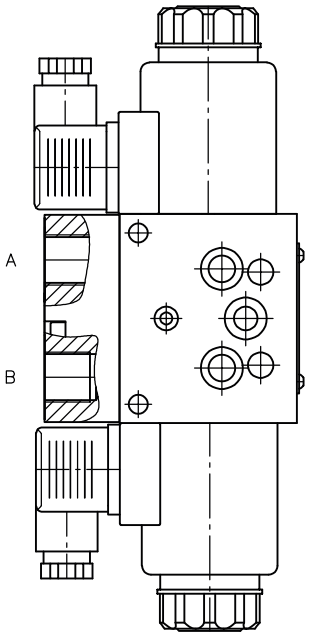


Solenoid version **DT**

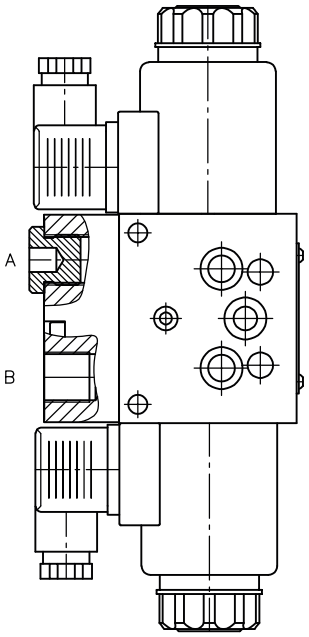


4.3.1 Seal of consumer ports

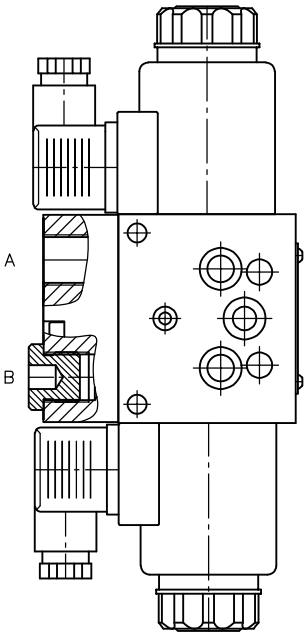
Without coding



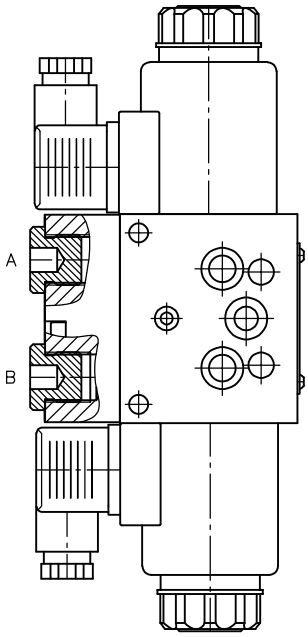
Coding **A**



Coding **B**



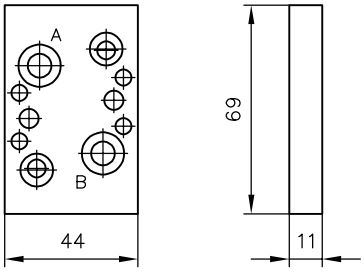
Coding **C**



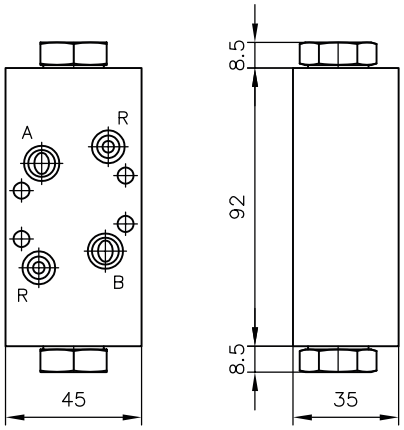
4.4 Intermediate plate

see Chapter 2.4, "Intermediate plate"

Coding **ZC11**

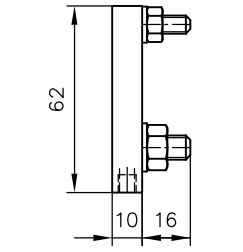


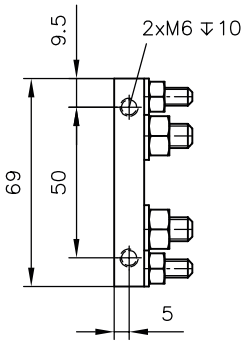
Coding **ZCH**



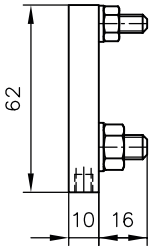
4.5 End plate

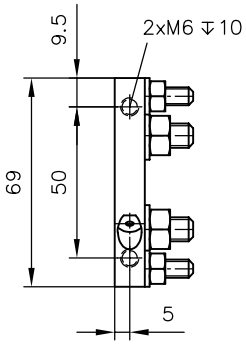
Coding **1**



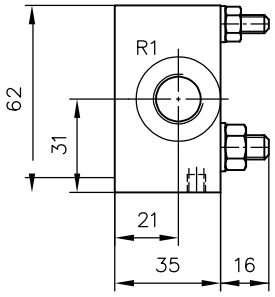


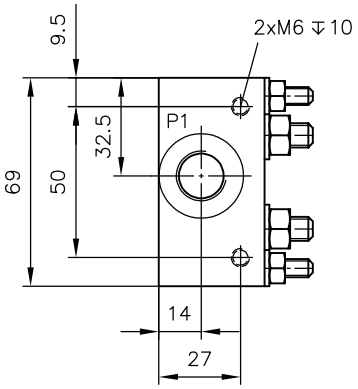
Coding **11**





Coding **22, UNF 22, JIS 22**





Coding	Ports		
	P1, R1	LS	
22	G 3/8	G 1/4	ISO 228-1
UNF 22	SAE-8 (3/4-16 UNF-2B)	SAE-4 (7/16-20)	SAE J 514
JIS 22	G 3/8 JIS	G 1/4 JIS	JIS B 2351-1

5 Installation, operation and maintenance information

Observe the document B 5488 “General operating instructions for assembly, commissioning, and maintenance.”

5.1 Intended use

This product is intended exclusively for hydraulic applications (fluid technology).

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

Essential requirements for the product to function correctly and safely:

- ► All information in this documentation must be observed. This applies in particular to all safety measures and warnings.
- ► The product must only be assembled and put into operation by specialist personnel.
- ► The product must only be operated within the specified technical parameters described in detail in this document.
- ► All components must be suitable for the operating conditions when using an assembly.
- ► The operating instructions for the components, assemblies and the specific complete system must also always be observed.

If the product can no longer be operated safely:

1. Remove the product from operation and mark it accordingly.
   ✓ It is then not permitted to continue using or operating the product.

5.2 Assembly information

The product must only be installed in the complete system with standard and compliant connection components (screw fittings, hoses, pipes, fixtures etc.).

The product must be shut down correctly prior to disassembly (in particular in combination with hydraulic accumulators).

⚠ **DANGER**

Sudden movement of the hydraulic drives when disassembled incorrectly

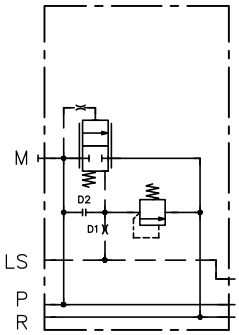
Risk of serious injury or death

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

5.2.1 Conversion of the connection block of CL6 and CV6

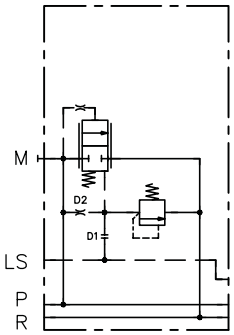
The connection block type CWL 23 CL6 and CWL 2UNF3 CL6 or CWL 2JIS3 CL6 can be converted at any time into a connection block for variable pump systems (correct type then type CWL 23 CV6 and CWL 2UNF3 CV6 or CWL 2JIS3 CV6). To do so, change or swap the parts listed below.

CWL 23 CL6

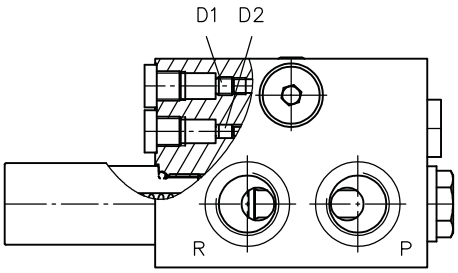


D1: Orifice M6x0.8
D2: sealed

CWL 23 CV6



D1: sealed
D2: Orifice M6x0.8



5.3 Operating instructions

Observe product configuration and pressure/flow rate.

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

NOTICE

- Read the documentation carefully before usage.
- The documentation must be accessible to the operating and maintenance staff at all times.
- Keep documentation up to date after every addition or update.

CAUTION

Overloading components due to incorrect pressure settings.

Minor injuries. Flyaway or bursting parts and uncontrolled leakage of hydraulic fluid.

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

Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of the product. Contamination can cause irreparable damage.

Examples of fine contamination include:

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

NOTICE

New hydraulic fluid from the manufacturer may not have the required purity.

Damage to the product is possible.

- ► Filter new hydraulic fluid to a high quality when filling.
- ► Do not mix hydraulic fluids. Always use hydraulic fluid that is from the same manufacturer, of the same type, and with the same viscosity properties.

For smooth operation, pay attention to the cleanliness level of the hydraulic fluid (cleanliness level see Chapter 3, "Parameters").

Additionally applicable document: D 5488/1 oil recommendations

5.4 Maintenance information

Check regularly (at least once a year) by visual inspection whether the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the surface of the device regularly (at least once a year) (dust deposits and dirt).

6 Other information

6.1 Accessories, spare and individual parts

Line connectors

Version	Order coding	
Line connector (black)	MSD 3-309	6217 0002-00
Line connector (grey)	MSD 3-309 gr	6217 0003-00
Line connector with LED	SVS 3129020	6217 8024-00
Line connector with LED, 5 m cable	L5K	6217 8088-00
Line connector with LED, 10 m cable	L10K	6217 8090-00
Line connector with clamp diode	MSD 3-209 C1	6236 5002-00

Cylinder screws

M5x30-12.9 - DIN EN ISO 4762	6005 0485-00
M5x40-12.9 - DIN EN ISO 4762	6005 0316-00
M5x50-12.9 - DIN EN ISO 4762	6005 0375-00
M5x60-12.9 - DIN EN ISO 4762	6005 0367-00
M5x65-12.9 - DIN EN ISO 4762	6005 0499-00
M5x75-12.9 - DIN EN ISO 4762	6005 1502-00
M5x85-12.9 - DIN EN ISO 4762	6005 0135-00

References

Additional versions

- Valve bank (directional spool valve) type CWS: D 7951 CWS
- Proportional directional spool valve type PSL, PSV size 2 and EDL: D 7700-2
- Proportional directional spool valves types PSL/PSV/PSM, size 3: D 7700-3
- Proportional directional spool valves type PSL, PSV, PSM, size 5: D 7700-5
- Proportional directional spool valve type PSLF, PSVF and SLF size 3: D 7700-3F
- Proportional directional spool valve banks type PSLF, PSVF size 5: D 7700-5F
- Proportional directional spool valve banks type PSLF and PSVF size 7: D 7700-7F
- Installation kits for pressure-limiting valve type MV..: D 7000 E/1

D 7953 CWL 09-2026-1.4

HAWE Hydraulik SE
Einsteinring 17 | 85609 Aschheim/Munich | P.O. Box 11 55 | 85605 Aschheim | Germany
Phone +49 89 379100-1000 | info@hawe.de | www.hawe.com

hawe.com/contact