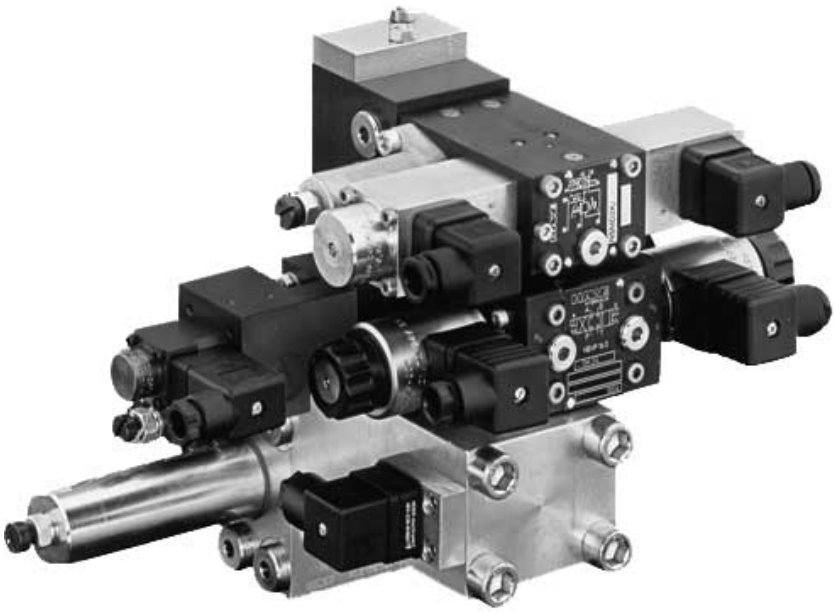
Valve bank (nominal size 6) type BA

Product documentation

Operating pressure p_{max}:	500 bar
Flow rate Q_{max}:	50 lpm



D 7788
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HAWE HYDRAULIK

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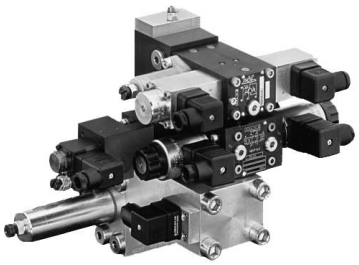
Contents

1 Overview of valve bank (nominal size 6) type BA

A valve bank combines different valves for operating independent consumers. The directional valve bank type BA consists of several valve sections, which are based on sub-plates. They can be used to flexibly assemble compact hydraulic manifolds.
The type BA valve bank can be flange mounted directly on the hydraulic power packs.
The intermediate plates type NZP make possible additional functions and contain, e.g., pressure-reducing valves, shock valves, load-holding valves etc. An intermediate plate can be inserted between the sub-plate and the valve. The valve bank type BA can be flange-mounted directly on the compact hydraulic power pack.



Valve bank (nominal size 6) type BA

Features and benefits:

- Sub-plates for flexible combination of directional valves with NG6 standard connection pattern
- Flange mount the valve bank directly onto the connection block of a hydraulic power pack. Can also be used as a separately arranged valve bank for the pipe connection.
- Hydraulic accumulator can be mounted directly

Intended applications:

- Clamping systems on machine tools and equipment
- Process control on deforming machine tools

2 Available versions, main data

2.1 Order coding, overview

Order coding example:

BA 2	**A5**	**- NBVP 16 G** **- NSWP 2 D03/MP/NZP 16 Q33** **- CZ 5R/180/5R** **- NBVP 16 G/ABR0,8 BBR1,0/M**	**/3** **/1** **/0**	**- 1**	**- G 24**

Solenoid voltage Table 3a Solenoid voltage

End plates Table 14 End plates

Sub-plates Table 4 Sub-plates

Directional valves and intermediate plates Table 3 Directional valves
Table 5 Intermediate plates

Connection block Table 2 Connection block

Basic type and size Table 1 Basic type and size

2.2 Input section

Table 1 Basic type and size

Basic type and size	Description	Flow rate Q_{max} (lpm)	Pressure p_{max} (bar)
BA 2	for directional valves NG 6 (ISO 4406) and others	50	500

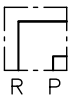
Note
The specifications of the installed directional valves or preceding hydraulic power packs must be observed!

Table 2 Connection block

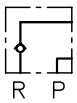
Coding	Description	Port (BSPP) P, R
No designation	Direct mounting on connection blocks type A (D 6905 A/1) for combining with compact hydraulic power packs type HK (D 7600 ff), HC D 7900, MP D 7200 H	--
A5	Version for pipe connection	G 3/8
A8	Version for pipe connection, additional check valve in R	G 3/8
A9	End plate, if P and R connection takes place via an intermediate segment or the end plate	--

Circuit symbols

Coding **A5**



Coding **A8**

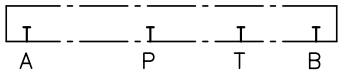
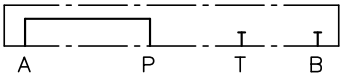
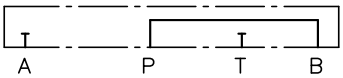
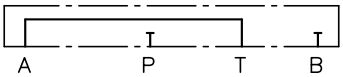
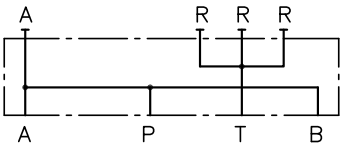


Coding **A9**

2.3 Valve sections

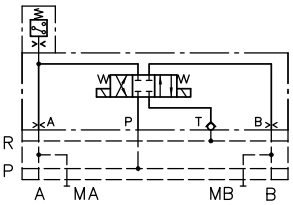
2.3.1 Directional valves and sub-plates

Table 3 Directional valve

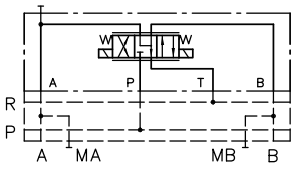
Coding	Description	Flow rate Q_{max} (lpm)	Pressure p_{max} (bar)	Publication
Directional valves NG 6 Combination with intermediate plates type NZP in accordance with D 7788 Z possible				
NSWP 2	3/2, 3/3, 4/2 and 4/3 directional spool valve with additional options (pressure monitoring, restrictors and restrictor check valves in the ports)	25	315	D 7451 N
SWPN 2	3/3 and 4/3 directional spool valve	60	350	D 7451 AT
NSMD 2	Clamping module (combination of 4/2 or 4/3 directional spool valve, pressure reducing valve and tracked pressure switch)	25	100	D 7787
NBVP 16	2/2, 3/2 and 4/3 directional seated valves **Note** In contrast to the designation of a single valve as per D 7765 N, a coding for actuation must also be specified (M solenoid - 400 bar; GM solenoid - 250 bar; H - hydraulic; P - pneumatic; A - hand lever)	20	400	D 7765 N
NBMD 16	Brake module (combination of directional seated valves and preloaded reflux)	20	400	Sk 7983 ++
NPMVP	Proportional pressure-limiting valve	16	(500)	D 7485 N
NG 6X	Reactive plate (for subsequent installation of a directional valve)			
NG 6X PA	Reactive plate with short circuit connection from P to A			
NG 6X PB	Reactive plate with short circuit connection from P to B			
NG 6X AT	Reactive plate with short circuit connection from A to T			
NG 6X PA 22	Reactive plate with connections			
Directional valves				
SP 1	manually operated directional spool valve, only in combination with sub-plate coding /9	12	400	D 5650/1

Circuit symbols for directional valves with sub-plate (examples)

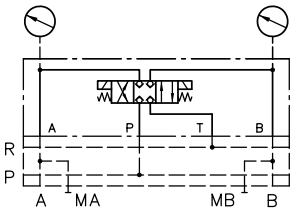
NSWP 2 G/M/R/ABV1.0 BBV1.5/70/S/3



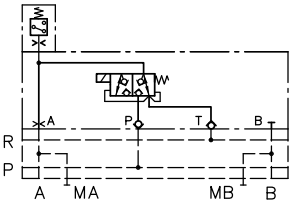
NSWP 2 D06/MP/20/3



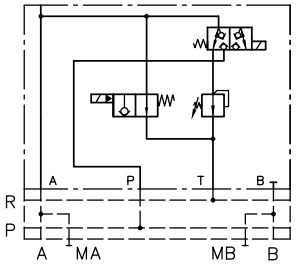
NBVP 16 G/R/A9/400/B9/700-M/3



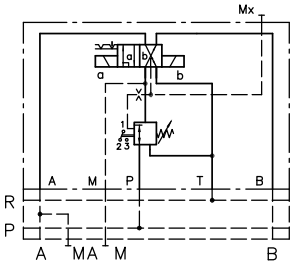
NBVP 16 Z/R/AB1.5/4/S-M/3



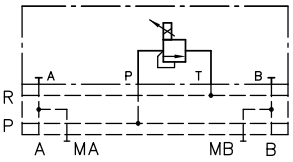
NBMD 16 Z/EMP 21S/10/3



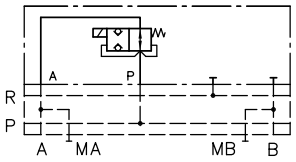
NSMD 2 K/GRK/M/0



NPMVP 4-41/G 24/3



NBVP 16S/2-M/3



SP 1 G - A/9

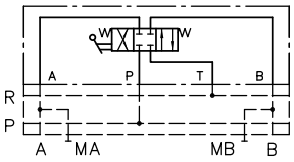


Table 3a Solenoid voltage

Coding	Electrical connection	Nominal voltage	Protection class (IEC 60529)
X 12	DIN EN 175 301-803 A	12 V DC	IP 65
X 24	(Coding G... with line connector, coding L... with line connector with	24 V DC	
X 98	LEDs)	98 V DC	
X 205	(Coding WG with alternating rectifier in line connector)	205 V DC	
WG 110		110 V AC 50/60 Hz	
WG 230		230 V AC 50/60 Hz	

Note

- The availability of additional solenoid voltages and solenoid versions is based on the directional valves used.
- The solenoid voltages and solenoid versions are specified at the end of the valve bank and this applies to all solenoids.
- The specifications regarding the IP protection class apply for versions featuring a properly assembled line connector.

Electrical connection for actuating solenoid

G .., X .., L .. (WG)

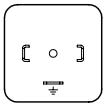
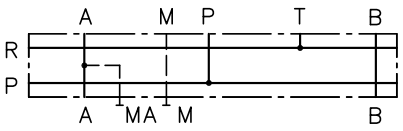


Table 4 Sub-plates

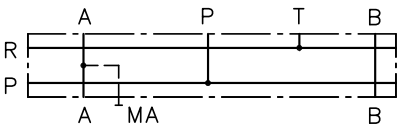
Coding	Description	Port (BSPP)	
		A, B	M, M1, M2, MA, MB
/0	Series	G 3/8	G 1/4
/01	Series	G 1/4	G 1/4
/02	Position of the consumer ports on opposite side	G 3/8	G 1/4
/1	additional, releasable check valve in A (Type CRH 1 in accordance with D 7712)	G 3/8	--
/2	with additional throttle in T (Type Q 30 in accordance with D 7730)	G 3/8	G 1/4
/3	additional pressure gauge connections M_A and M_B	G 3/8	G 1/4
/4	additional drain port for the combination with the intermediate plate NZP 16 SDM 2L in accordance with D 7788 Z **Note** following valve sections must also have sub-plate coding /4. For the end plate, coding -1L in accordance with Chapter 2.4, "End plates", Table 14 must be selected.	G 3/8	G 1/4
/5	doubly releaseable check valve	G 3/8	--
/6	arbitrary blocking of P gallery, only in combination with 2/2 directional valves, for example, NBVP 16 S/2-M	--	G 1/4
/8	for mounting of valve sections type BVH 11 in accordance with D 7788 BV	G 3/8	G 1/4
/9	for installation of manually operated directional spool valves type SP 1 in accordance with D 5650/1	G 3/8	G 1/4

Circuit symbols

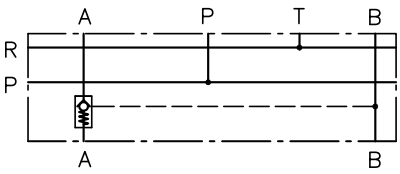
Coding **/0, /02**



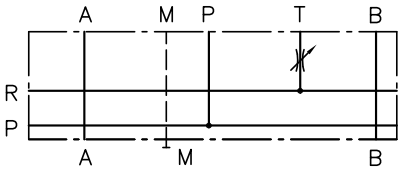
Coding **/01**



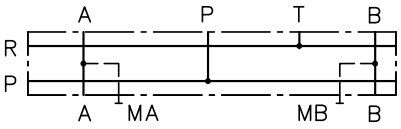
Coding **/1**



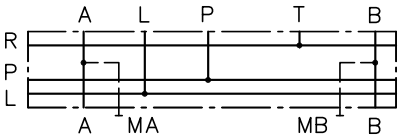
Coding **/2**



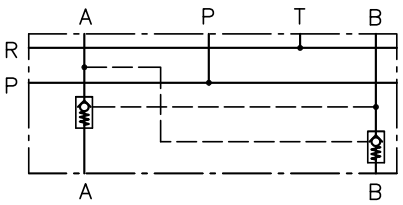
Coding **/3, /8, /9**



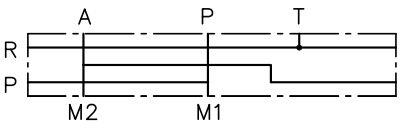
Coding **/4**



Coding **/5**

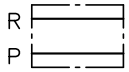
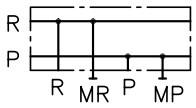


Coding **/6**



2.3.2 Intermediate plates

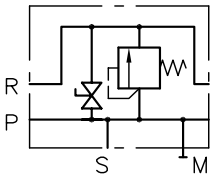
Table 5 Intermediate plates

Coding	Description	Flow rate Q_{max} (lpm)	Pressure p_{max} (bar)	Publication
CZ **CZA** **CZD** **LZ**	Pressure reducing valve for pressure reduction in downstream P gallery see Chapter 2.3.3, "Pressure reducing valves in P gallery"	22	500	D 7745 D 7745 L
Z 5	Intermediate plate as spacer (50 mm) without internal function			
Z 52	Intermediate plate with additional P and R ports			
ZPL/V... **ZPL/S...**	Intermediate plate for 2nd speed see Chapter 2.3.4, "Intermediate plate for 2nd speed"			D 7490/1
ZPL/MVE 6/.. **ZPL/MVE 6/../R** **ZPL/MVEX 6/..** **ZPL/MVEX 6/../R**	Intermediate plate with pressure-limiting valve, drain valve and accumulator port - Coding ZPL/MVEX 6 - pressure-limiting valve with unit approval (certified valve) - Coding ../R - check valve in P **Note** Not as 1st valve section for combination with connection blocks type A .. D (version with pressure filter) in accordance with D 6905 A/1 and D 6905 TUV	60	450	D 7000/1 D 7000 TUV
ZPL/P4... **ZPL/P 45...**	Intermediate plate with proportional pressure-limiting valve for a second pressure circuit in BA valve bank see Chapter 2.3.5, "Intermediate plate with proportional pressure-limiting valve for second pressure circuit in BA valve bank"	16	500 (700)	D 7485/1
Shut-off disks or orifices				
XR **XP** **XPR**	Shut-off disc for P and/or R gallery	--	P: 315 R: 315 *	
XP... **XR...** **XP...R...**	Orifices in P and/or R gallery possible orifice diameters (mm) ∅ 0.5 / 0.6 / 0.8 / 1.0 / 1.5 / 2.0 / 2.5 / 3.0	--	P: 315 R: 315 *	

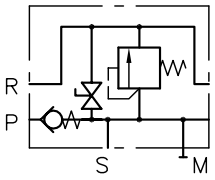
Note
* observe maximum permissible return pressure of installed valves!

Circuit symbols

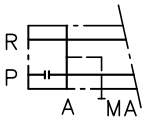
Coding
ZPL/MVE 6/...
ZPL/MVEX 6/...



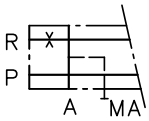
Coding
ZPL/MVE 6/.../R
ZPL/MVEX 6/.../R



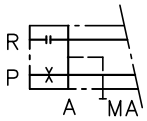
Coding **XP**



Coding **XR ...**



Coding **XP ... R**



2.3.3 Pressure reducing valves in P gallery

Order coding example:

BA 2 A5	- ... - CZ	5	R	/ 120	/ 5R	- ...

Check valve Table 9 Check valve

Pressure setting in bar

Adjustment Table 8 Adjustment

Pressure range Table 7 Pressure range

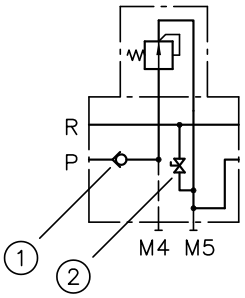
Basic type Table 6 Basic type

Table 6 Basic type

Coding	Description	Port (BSPP)	
		M2, M3, M4, M5, M6	S
- CZ - CZA	Pressure reducing valve type CDK in accordance with D 7745	G 1/4	--
- CZD	Pressure reducing valve type CDK in accordance with D 7745, with direct accumulator port	G 1/4	G 3/8
- LZ	Pressure reducing valve type CLK in accordance with D 7745 L, with overpressure function	G 1/4	--

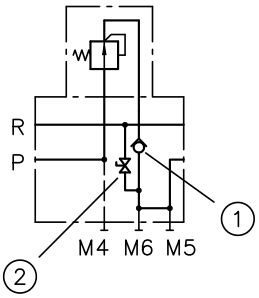
Circuit symbols

Coding **- CZ**



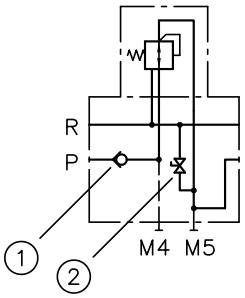
1 Check valve in P coding R
2 Drain valve

Coding - **CZA**



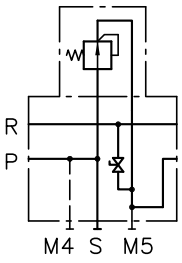
1 Check valve in P coding R
2 Drain valve

Coding **- LZ**

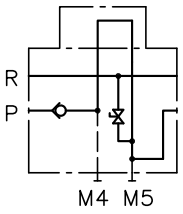


1 Check valve in P coding R
2 Drain valve

Coding **- CZD**



Coding **- CZX, CZAX, CZDX, LZX**



(Example illustration as type CZX)

Table 7 Pressure range

Coding	Pressure range p_A from ... to (bar)	Flow rate Q_{max} (lpm)
08 *	50 ... (450)	12
081 *	50 ... (500)	12
1	30 ... 300	12
1K **	30 ... 200	12
11	30 ... (380)	12
2	20 ... 200	12
21	20 ... 250	12
2K **	20 ... 140	12
5	15 ... 130	12
51	15 ... 165	12
5K **	15 ... 90	12
25	8 ... 130	6
251	8 ... 165	6
25K **	8 ... 90	6
55	30 ... 130	22
551	30 ... 165	22
55K **	30 ... 90	22
X ***	prepared	

* not for type LZ
** short model, not for type LZ
*** Tapped plug

Table 8 Adjustment

Coding	Description	Circuit symbol
No designation	Fixed, tool adjustable	
R *	Manually adjustable, with lock nut	
H **	Turn knob, lockable	

* not directly combinable next to each other
** not for type LZ

Table 9 Check valve

Coding	Description
5	without check valve in P
5R	with check valve in P (not for type CZD)

2.3.4 Intermediate plate for 2nd speed

Application: Arbitrary switching of a second speed, for example for set-up mode or to vary the flow rate to traverse speed profiles.

Order coding example:

BA 2 A5	**- ...** **- ZPL/V**	**/PB 0,3**	**- ...**	**- G 24**

Solenoid voltage see Chapter 2.3.1, "Directional valves and sub-plates", Table 3a

Orifices Table 11 Orifice in P gallery

Intermediate plates Table 10 Intermediate plates

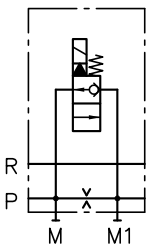
Table 10 Intermediate plates

2/2 directional seated valves, type EM 21 and EMP 21 according to D 7490/1 are used.

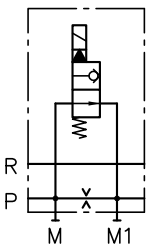
Coding	Description
ZPL/V	N/C contact (type EM 21 V)
ZPL/S	N/O contact (type EM 21 S)
ZPL/VPG	N/C contact, damped switching behaviour (type EMP 21 VG)
ZPL/SPG	N/O contact, damped switching behaviour (type EMP 21 VG)
ZPL/VP	N/C contact, proportional valve (throttle function, type EMP 21 V)
ZPL/SP	N/O contact, proportional valve (throttle function, type EMP 21 S)

Circuit symbols

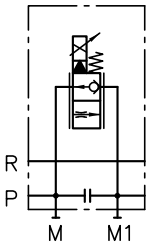
Coding **ZPL/V(PG)/PB...**



Coding **ZPL/S(PG)/PB...**



Coding **ZPL/VP**



Coding **ZPL/SP**

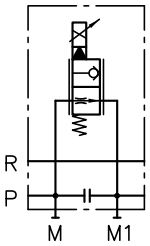


Table 11 Orifice in P gallery

(not in combination with coding ZPL/VP and ZPL/SP)

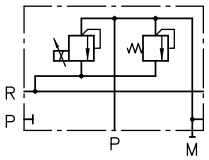
Coding	Orifice diameter ∅ (mm)
PB 0.3	0.3
PB 0.4	0.4
PB 0.5	0.5
PB 0.8	0.8
PB 1.0	1.0
PB 1.5	1.5
PB 1.8	1.8
PB 2.0	2.0
PB 2.5	2.5

2.3.5 Intermediate plate with proportional pressure-limiting valve for second pressure circuit in BA valve bank

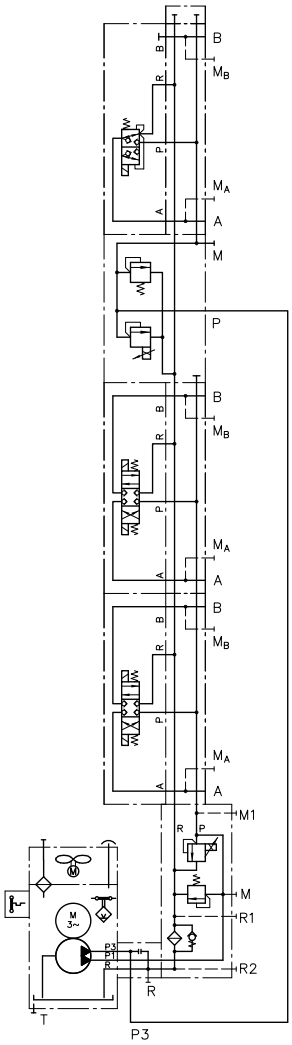
Application: Compact solution for two pressure circuits in one valve bank.

Combination with a dual-circuit pump, for example type HK 4 according to D 7600-4 and a connection block type Sk 6905 Z/AP is possible.

Circuit symbols



Example schematic plan



Order coding example:

HKF 449 DT/1 - HH 2,5/2,5 - ...	**- ZPL / P45-42**	**/ G 24**	**- 150**	**/ R**	- ...

Check valve at P (optimal)

Max. pressure setting in bar

Solenoid voltage Table 13 Solenoid voltage proportional solenoid

Proportional pressure-limiting valve Table 12 Proportional pressure-limiting valve

Table 12 Proportional pressure-limiting valve

(For details see D 7485/1)

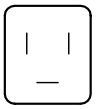
Main valve	Proportional actuator			
	-41	-42	-43	-44
	Proportional controllable pressure range (bar) p_{min} to p_{max}			
ZPL / P4	5 ... 180	5 ... 290	5 ... 440	5 ... 700
ZPL / P45	5 ... 110	5 ... 180	5 ... 270	5 ... 450

Table 13 Solenoid voltage proportional solenoid

Coding	Electrical connection	Nominal voltage	Protection class (IEC 60529)
X 12 X 24	Industry standard, 11 mm contact gap (Coding G.. with line connector, coding L.. with line connector with LED)	12 V DC 24 V DC	IP 65

Connection pattern

G .., X .., L ..



2.4 End plates

Table 14 End plates

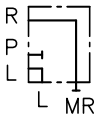
<table>
<tr><th>Coding</th><th>Description</th><th colspan="3">Port (BSPP)</th></tr>
<tr><th></th><th></th><th>L, M, MR, R, R1, P.</th><th>P, P1, R, R1</th><th>S, S1, S2</th></tr>
<tr><td>1
11 *
12 *</td><td>Series</td><td>--</td><td>--</td><td>--</td></tr>
<tr><td>1L</td><td>additional drain port, only in combination with sub-plates coding /4, Chapter 2.3.1, "Directional valves and sub-plates", Table 4</td><td>G 1/4</td><td>--</td><td>--</td></tr>
<tr><td>2
21 *
22 *</td><td>additional P and R port</td><td>--</td><td>G 3/8</td><td>--</td></tr>
<tr><td>4 (DG 1)/(DG 2)
4 (DG 1)/(DG 2) 1 *
4 (DG 1)/(DG 2) 2 *</td><td>with dri, P and R port and two pressure switches according to D 5440
(DG 1), (DG 2) - coding for pressure switch
<table>
<tr><th>Coding</th><th>Pressure switch</th><th>Adjustment range (bar)</th></tr>
<tr><td>2</td><td>prepared</td><td>--</td></tr>
<tr><td>3</td><td>DG 33</td><td>200 ... (700)</td></tr>
<tr><td>4</td><td>DG 34</td><td>100 ... 400</td></tr>
<tr><td>5</td><td>DG 35</td><td>40 ... 250</td></tr>
<tr><td>6</td><td>DG 36</td><td>4 ... 12</td></tr>
<tr><td>7</td><td>DG 365</td><td>12 ... 170</td></tr>
<tr><td>8</td><td>DG 364</td><td>4 ... 50</td></tr>
</table></td><td>G 1/4</td><td>--</td><td>--</td></tr>
<tr><td>6
61 *
62 *</td><td>with drain valve</td><td>--</td><td>--</td><td>--</td></tr>
<tr><td colspan="5">End plates with accumulator port (hydraulic accumulator see D 7969)</td></tr>
<tr><td>8</td><td>additional port S with warning and drain valve</td><td>--</td><td>--</td><td>G 1/2</td></tr>
<tr><td>8W</td><td>with warning, without drain valve</td><td>G 1/4</td><td>--</td><td>G 1/2</td></tr>
<tr><td>80</td><td>without warning, without drain valve</td><td>G 1/4</td><td>--</td><td>G 1/2</td></tr>
<tr><td>8W / EM 21D(S)
80 / EM 21S(V)
80 / EMP 21S(V)</td><td>like coding 80 or 8W, additionally with electrically actuated drain valve or idle circulation valve</td><td>--</td><td>--</td><td>G 1/2</td></tr>
<tr><td>81</td><td>multiple P ports</td><td>G 1/4</td><td>--</td><td>--</td></tr>
<tr><td>88
88W
880
880(88W) / EM 21D(DS)</td><td>see coding 8..,
however, with two ports S1 and S2</td><td>G 1/4</td><td>--</td><td>G 1/2</td></tr>
<tr><td colspan="5">Transition plates to additional valve banks</td></tr>
<tr><td>BWN 1F
BWH 1F</td><td colspan="4">Valve bank type BWN 1 and BWH 1 according to D 7470 B/1</td></tr>
<tr><td>BVH 11</td><td colspan="4">Valve bank type BVH 11 according to D 7788 BV
Direct mounting to sub-plate coding 8 Chapter 2.3.1, "Directional valves and sub-plates", Table 4</td></tr>
</table>

* Coding **.1** with space for one valve section to be mounted later
Coding **.2** with space for two valve sections to be mounted later

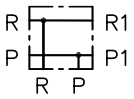
Circuit symbols (end plates)

Coding **1**

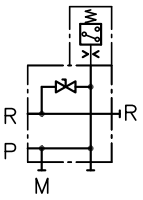
Coding **1L**



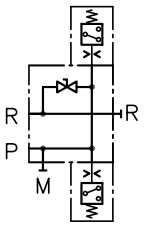
Coding **2**



Coding **4**
(example: -46/2)



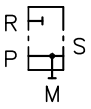
(example: -47/8)



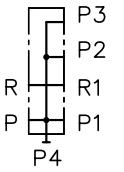
Coding **6**

Coding **8**

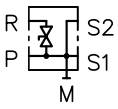
Coding **80, 8W**



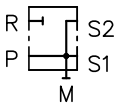
Coding **81**



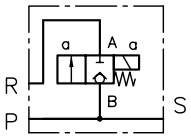
Coding **88**



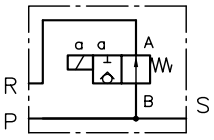
Coding **880, 88W**



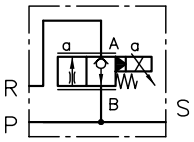
Coding **8W/EM 21 D**



Coding **8W/EM 21 DS**

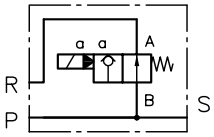


Coding **80/EM(P) 21 V**



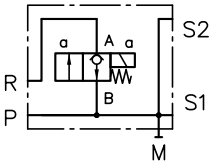
here EMP 21 V shown

Coding **80/EM(P) 21 S**

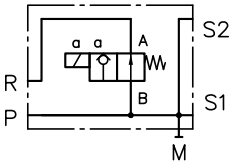


here EMP 21 S shown

Coding **880(88W)/EM 21 D**

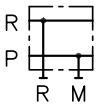


Coding **880(88W)/EM 21 DS**

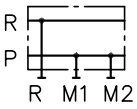


Circuit symbols (transition plates)

BWN(H) 1 F
BWH 2 F



BWN(H) 1 F1



3 Parameters

General

Designation	Valve bank
Design	Segmental construction; up to 10 valve sections
Model	Manifold mounting
Material	Steel, zinc-nickel coated
Attachment	See Chapter 4, "Dimensions"
Installation position	As desired
Ports	**P.** = Pump port **R.** = Return port **A, B** = Consumer ports **S.** = Accumulator port **M.** = Pressure gauge connection
Hydraulic fluid	Hydraulic oil: according to DIN 51524-1 part 1 to 3; ISO VG 10 to 68 according to ISO 3448 Viscosity range: min. approx. 4; max. approx. 400 mm^2/s Also suitable for biologically degradable hydraulic fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester).
Cleanliness level	**ISO 4406** 20/17/14...18/15/12
Temperatures	Environment: approx. -20 to +80°C, oil: -20 to +60°C, pay attention to the viscosity range. Start temperature: down to -40°C is permissible (observe start viscosities!), as long as the steady-state temperature is at least 20K higher during subsequent operation. Biologically degradable hydraulic fluids: note manufacturer specifications.

Note
The specifications of the installed directional valves or preceding hydraulic power packs must be observed!

Weight

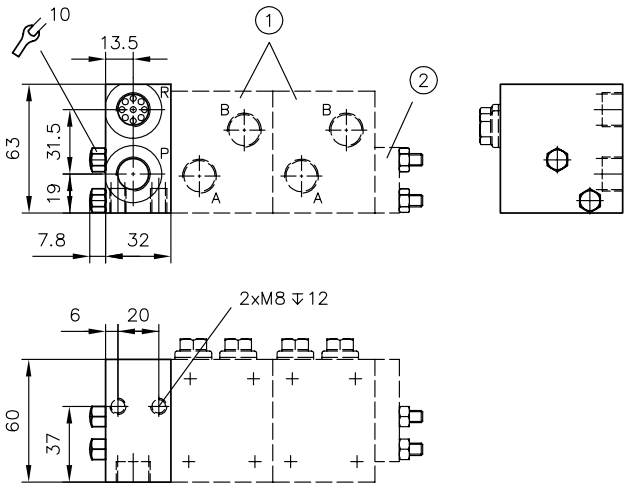
Connection block	**Coding**	
	A5 (A8)	= 0.8 kg
	A9	= 0.3 kg
End plates	1, 1L	= 0.3 kg
	2	= 0.8 kg
	4	= 1.2 kg
	6	= 0.4 kg
	8, 80, 8W	= 3.5 kg
	80(8W) / EM 21 D(DS)	= 1.3 kg
	81	= 0.8 kg
	88, 880, 88W	= 3.5 kg
	880(88W) / EM 21 D(DS)	= 3.8 kg
Sub-plates	/01, /02	= 0.6 kg
	/0, /1, /2, /3, /4, /6, /8, /9	= 0.8 kg
	/5	= 1.4 kg
Intermediate plates	Z 5	= 0.8 kg
	Z 52	= 0.9 kg
	ZPL/MVE(X) 6	= 2.3 kg
	ZPL/V, ZPL/S	= 1.1 kg
	ZPL/P4, ZPL/P45	= 2.0 kg
	CZ, CZA, CZD, LZ	= 2.3 kg
	CZX, CZAX, CLX	= 1.6 kg
Reactive plate	NG 6X	= 0.3 kg
	NG 6X PA, NG 6X PB, NG 6X AT	= 0.4 kg
	NG 6X PA 22	= 1.0 kg
Directional valves	according to type, see corresponding publications	

4 Dimensions

All dimensions in mm, subject to change.

4.1 Connection block

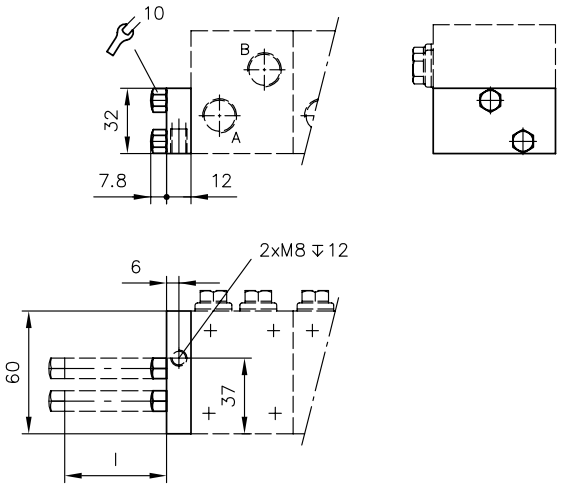
BA 2 A5, BA 2 A8



1 Valve sections (Chapter 4.2, "Valve sections")
2 End plates

	Ports (ISO 228-1) (BSPP)
P, R	G 3/8

BA 2 A9



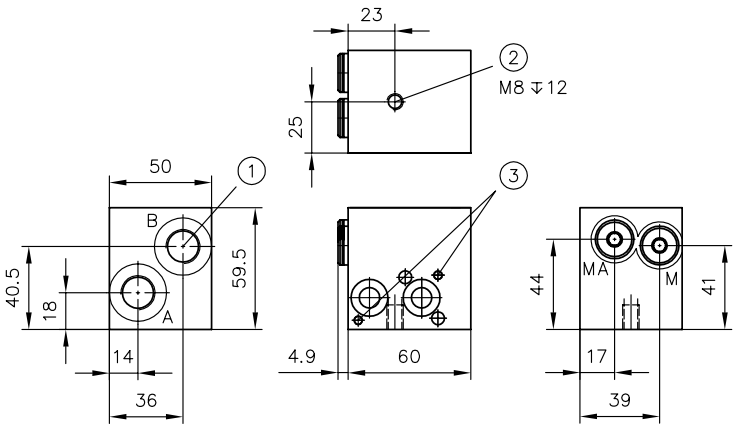
l = 50 for key figure **1** with space for one valve section to be mounted later

l = 100 for key figure **2** with space for two valve sections to be mounted later

4.2 Valve sections

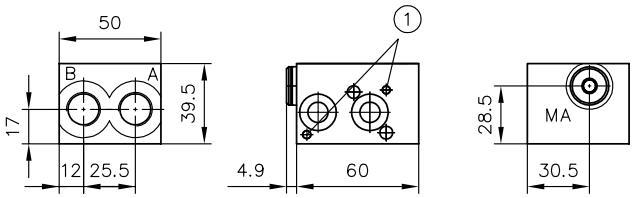
4.2.1 Sub-plates

Coding **/0**



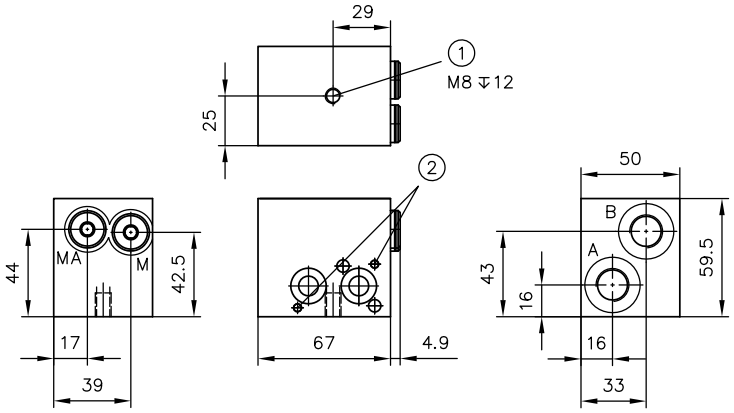
1 with 3/2 directional valves connection B sealed
2 Metric attachment thread
3 Centring pins ISO 8750-4x8-St

Coding **/01**



1 Centring pins ISO 8750-4x8-St

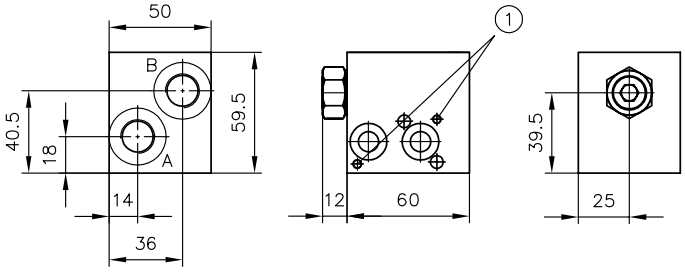
Coding **/02**



1 Metric attachment thread
2 Centring pins ISO 8750-4x8-St

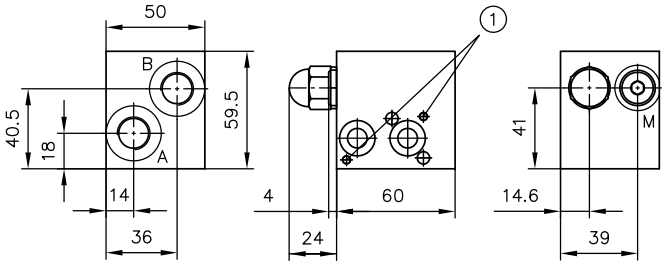
Coding	Ports (ISO 228-1) (BSPP)	
	A, B	M, MA
/0	G 3/8	G 1/4
/01	G 1/4	G 1/4
/02	G 3/8	G 1/4

Coding /1



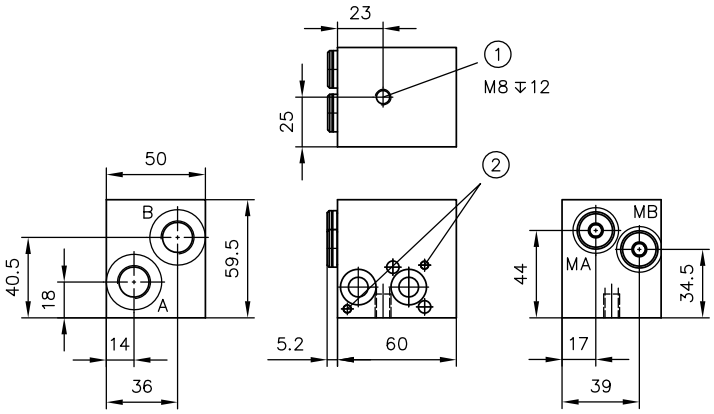
1 Centring pins ISO 8750-4x8-St

Coding /2



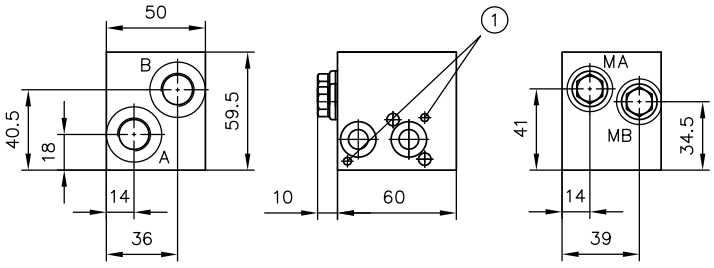
1 Centring pins ISO 8750-4x8-St

Coding /3



1 Metric attachment thread
2 Centring pins ISO 8750-4x8-St

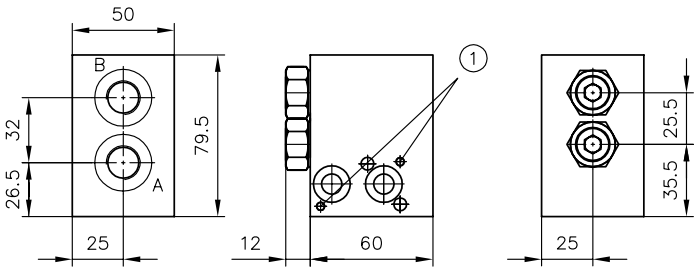
Coding /4



1 Centring pins ISO 8750-4x8-St

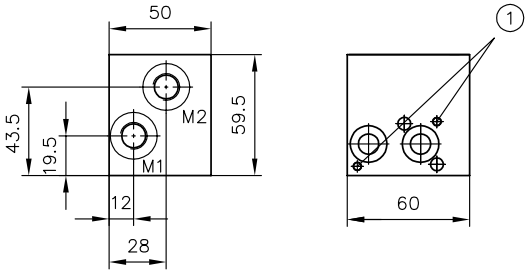
	Ports (ISO 228-1) (BSPP)
A, B	G 3/8
M, MA, MB	G 1/4

Coding /5



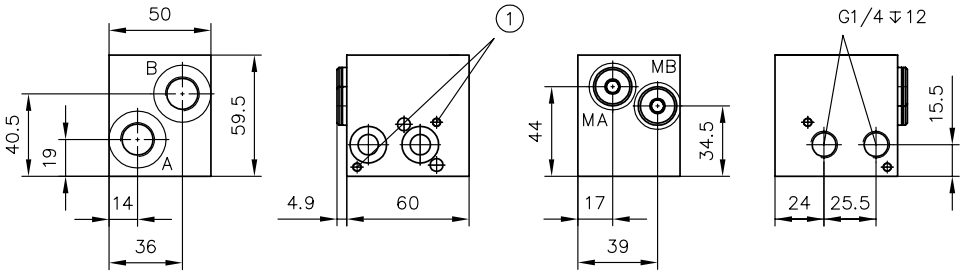
1 Centring pins ISO 8750-4x8-St

Coding /6



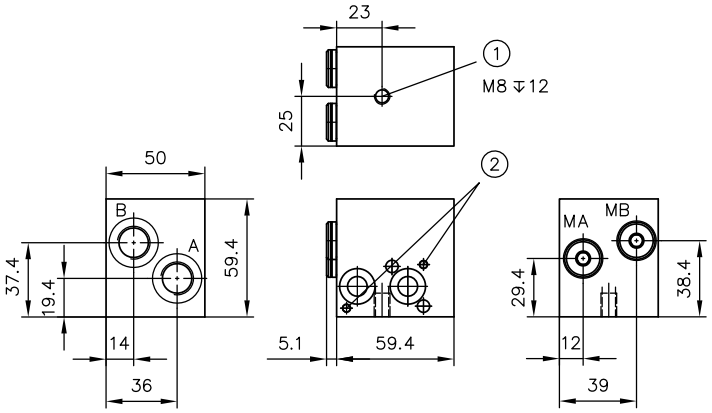
1 Centring pins ISO 8750-4x8-St

Coding /8



1 Centring pins ISO 8750-4x8-St

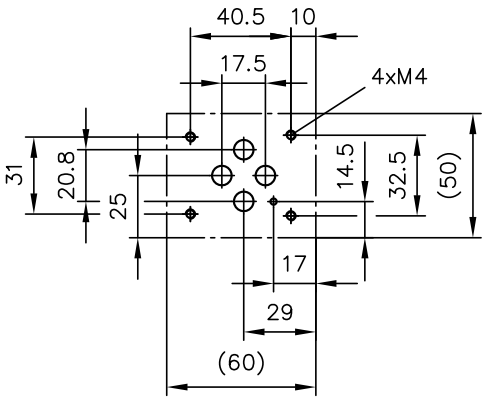
Coding /9



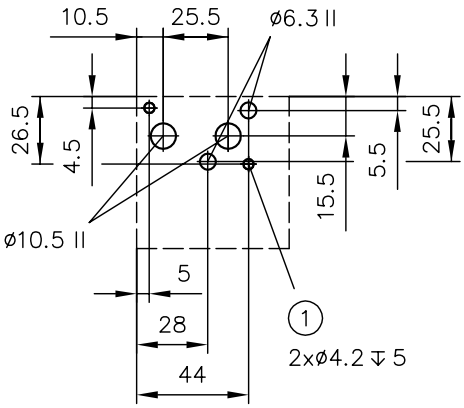
1 Metric attachment thread
2 Centring pins ISO 8750-4x8-St

	Ports (ISO 228-1) (BSPP)
A, B	G 3/8
M1, M2, MA, MB	G 1/4

Hole pattern for sub-plates



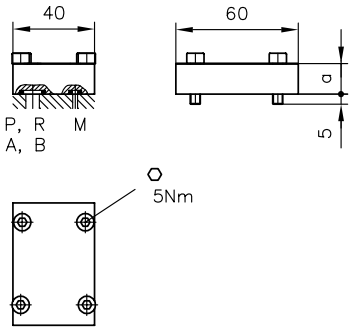
Hole pattern for flange side



1 Centring pin mount

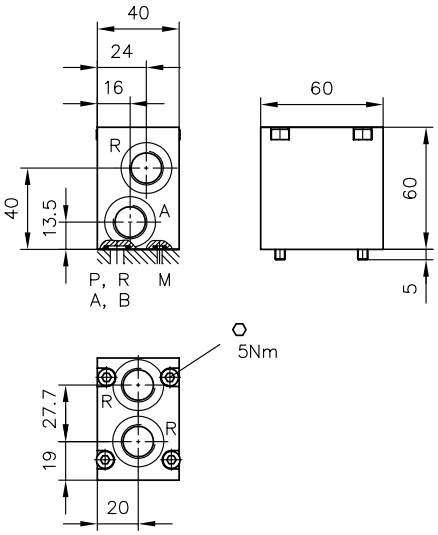
Reactive plate

Coding
NG 6X
NG 6X PA, NG 6X PB, NG 6X AT



Coding	a
NG 6X	15
NG 6X PA NG 6X PB NG 6X AT	20

Coding **NG 6 X PA 22**



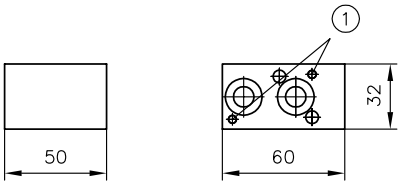
Sealing of the ports:

	O-ring
A, B, P, R	9.25x1.78 NBR 90 Sh
M	2.90x1.78 NBR 90 Sh

	Ports (ISO 228-1) (BSPP)
A, R	G 3/8

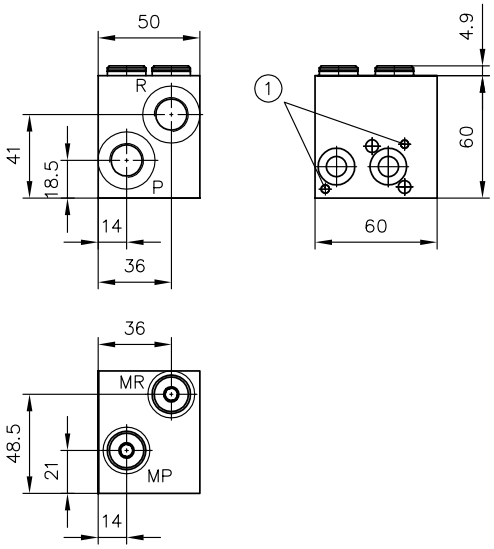
4.2.2 Intermediate plates

Coding **Z 5**



1 Centring pins ISO 8750-4x8-St

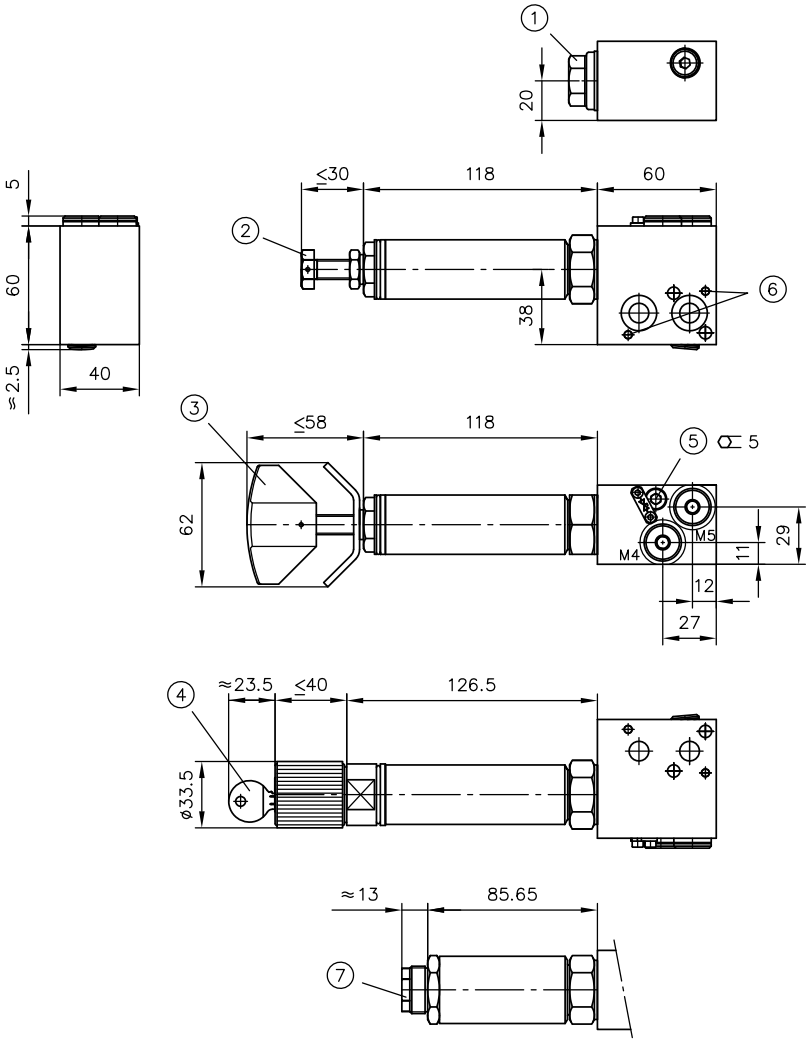
Coding **Z 52**



1 Centring pins ISO 8750-4x8-St

	Ports (ISO 228-1) (BSPP)
P, R	G 3/8
MP, MR	G 1/4

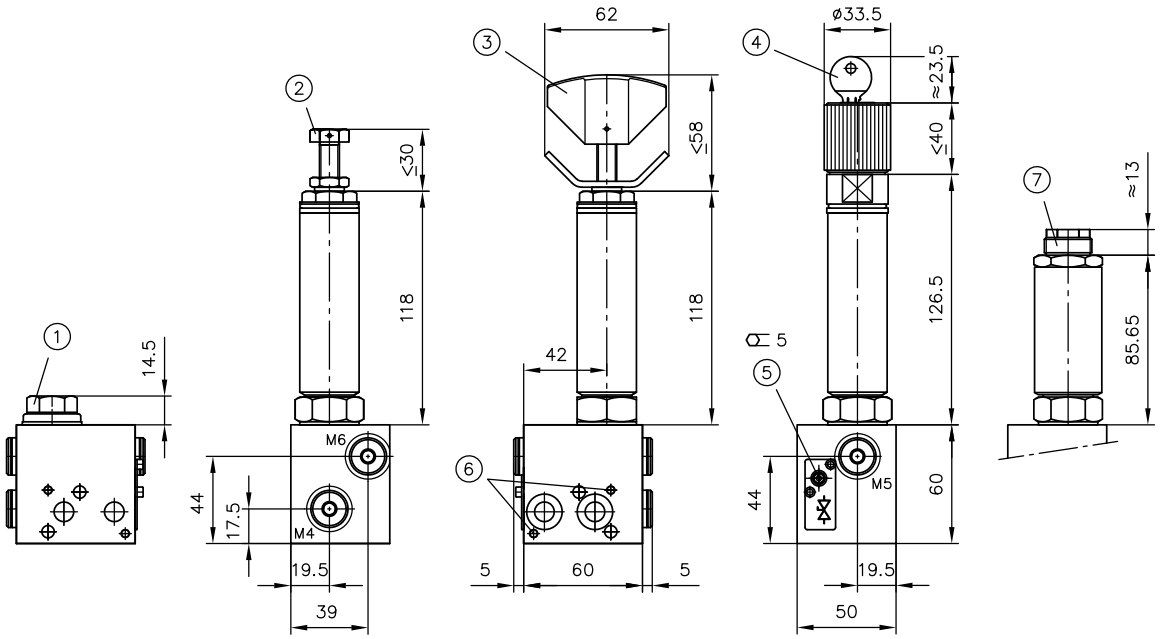
Coding **CZ**



1 Tapped plug for type CZX
2 Fixed
3 Coding R (adjustable)
4 Coding H (lockable)
5 Drain valve
6 Centring pins ISO 8750-4x8-St
7 Short model

	Ports (ISO 228-1) (BSPP)
M4, M5	G 1/4

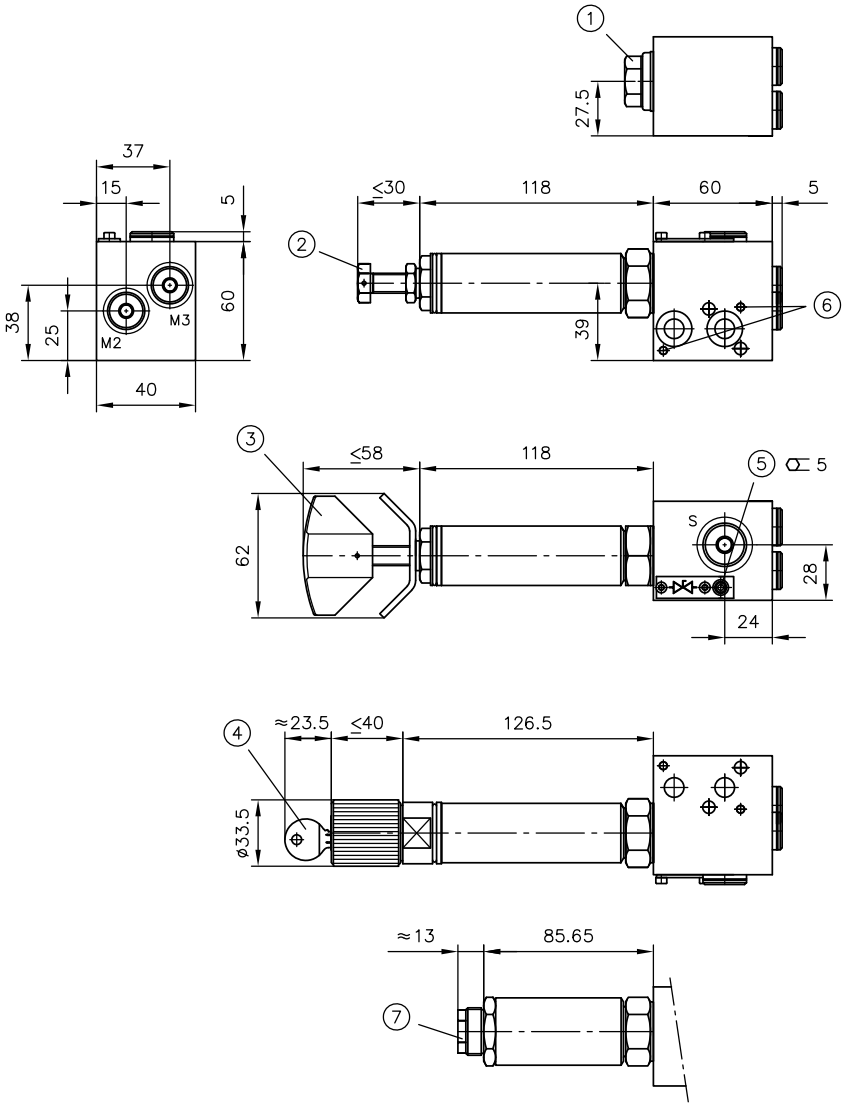
Coding **CZA**



1 Tapped plug for type CZAX
2 Fixed
3 Coding R (adjustable)
4 Coding H (lockable)
5 Drain valve
6 Centring pins ISO 8750-4x8-St
7 Short model

	Ports (ISO 228-1) (BSPP)
M4, M5, M6	G 1/4

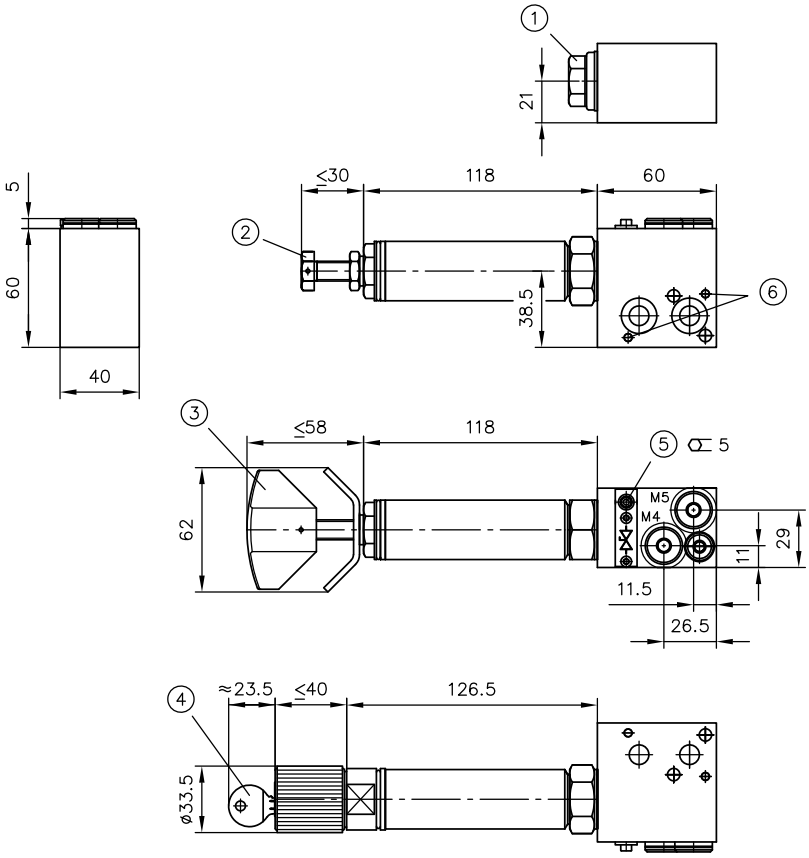
Coding **CZD**



1 Tapped plug for type CZDX
2 Fixed
3 Coding R (adjustable)
4 Coding H (lockable)
5 Drain valve
6 Centring pins ISO 8750-4x8-St
7 Short model

	Ports (ISO 228-1) (BSPP)
M2, M3	G 1/4
S	G 3/8

Coding **LZ**

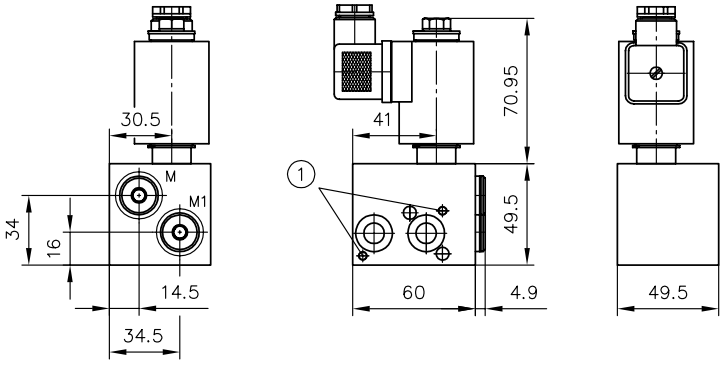


1 Tapped plug for type LZX
2 Fixed
3 Coding R (adjustable)
4 Coding H (lockable)
5 Drain valve
6 Centring pins ISO 8750-4x8-St

	Ports (ISO 228-1) (BSPP)
M4, M5	G 1/4

Second speed

Coding **ZPL/V..., ZPL/S...**

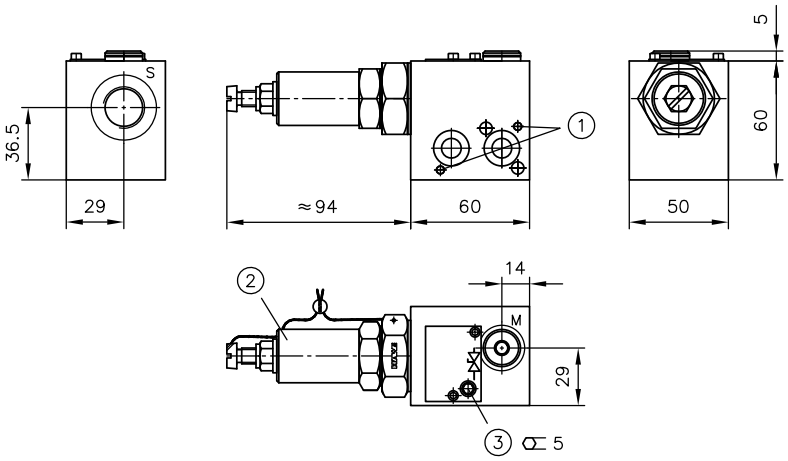


1 Centring pins ISO 8750-4-8-St

	Ports (ISO 228-1) (BSPP)
M, M1	G 1/4

Pressure-limiting valves

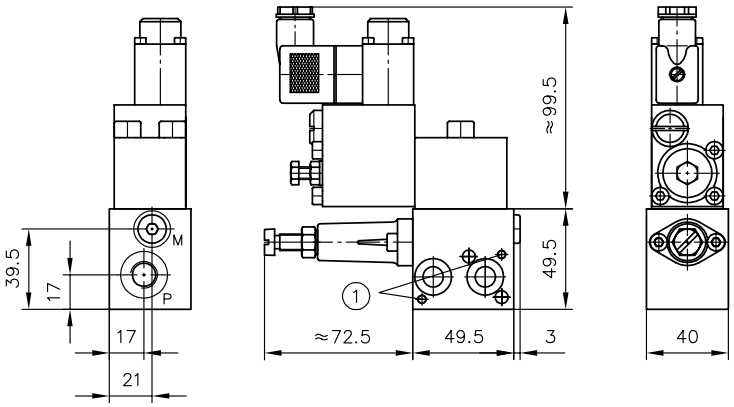
Coding **ZPL/MVE 6, ZPL/MVEX 6**



1 Centring pins ISO 8750-4x8-St
2 sealed for type MVEX
3 Drain valve

	Ports (ISO 228-1) (BSPP)
M	G 1/4
S	G 1/2

Coding **ZPL/P4..., ZPL/P45...**

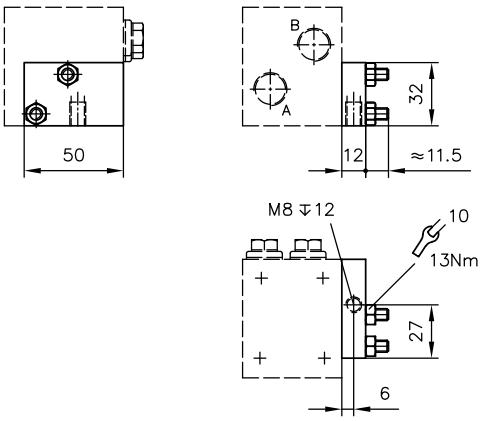


1 Centring pins ISO 8750-4x8-St

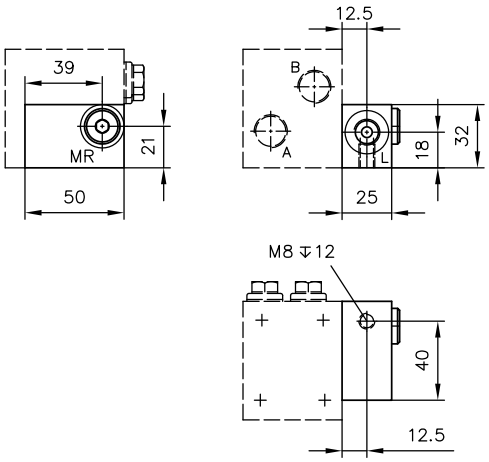
	Ports (ISO 228-1) (BSPP)
M	G 1/8
P	G 1/4

4.3 End plates

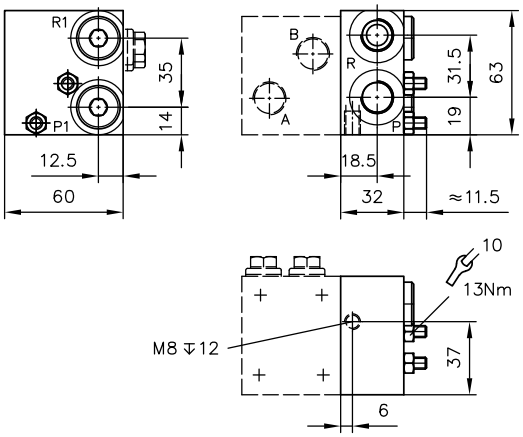
Coding **1**



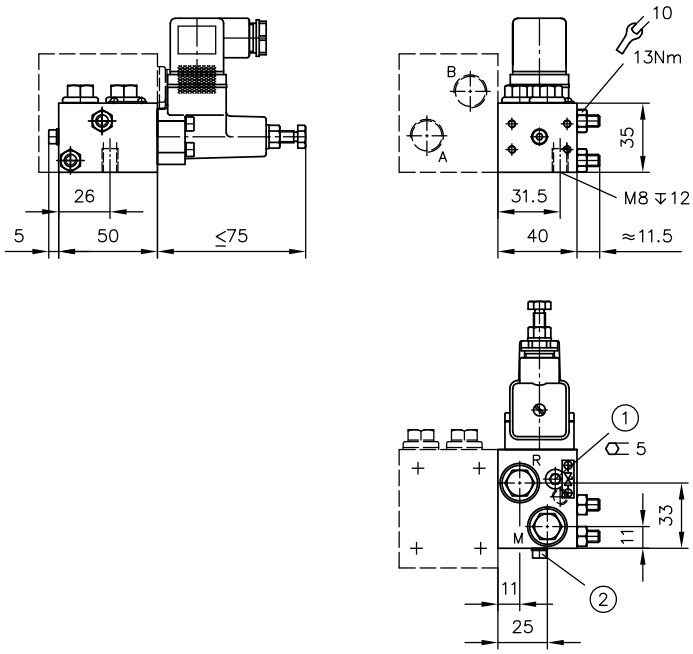
Coding **1L**



Coding **2**



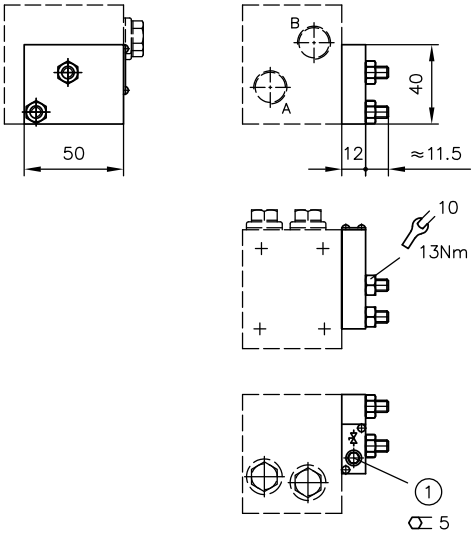
Coding **4**



1 Drain valve
2 Coding 2 (prepared)

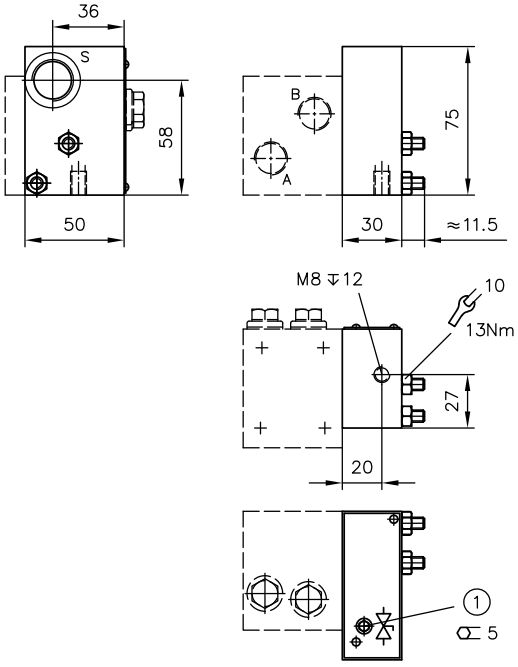
Coding	Ports (ISO 228-1) (BSPP)						
	L	M	MR	P	P1	R	R1
1L	G 1/4	--	G 1/4	--	--	--	--
2	--	--	--	G 3/8	G 3/8	G 3/8	G 3/8
4	--	G 1/4	--	--	--	G 1/4	--

Coding **6**



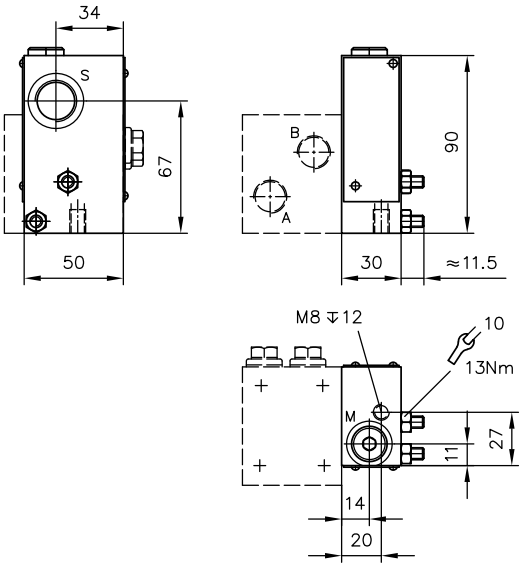
1 Drain valve

Coding **8**



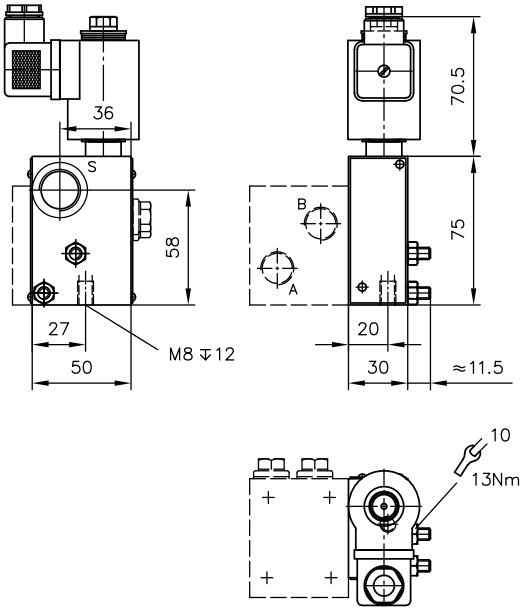
1 Drain valve

Coding **80, 8W**

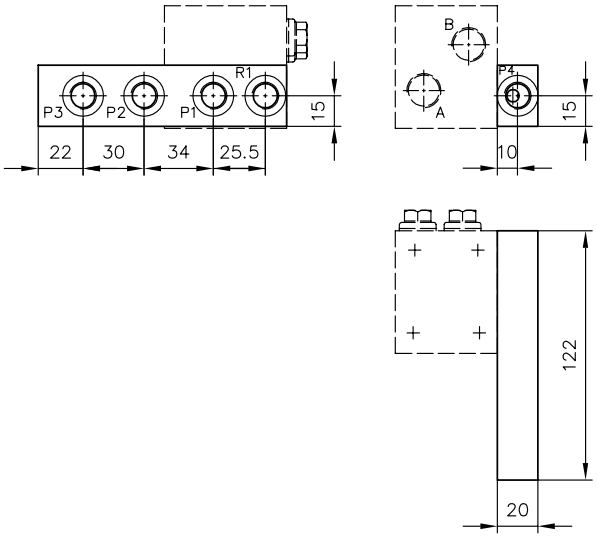


	Ports (ISO 228-1) (BSPP)
M	G 1/4
S	G 1/2

Coding **80/EM 21DV(S), 8W/EM 21D(DS), 80/EMP 21V(S)**

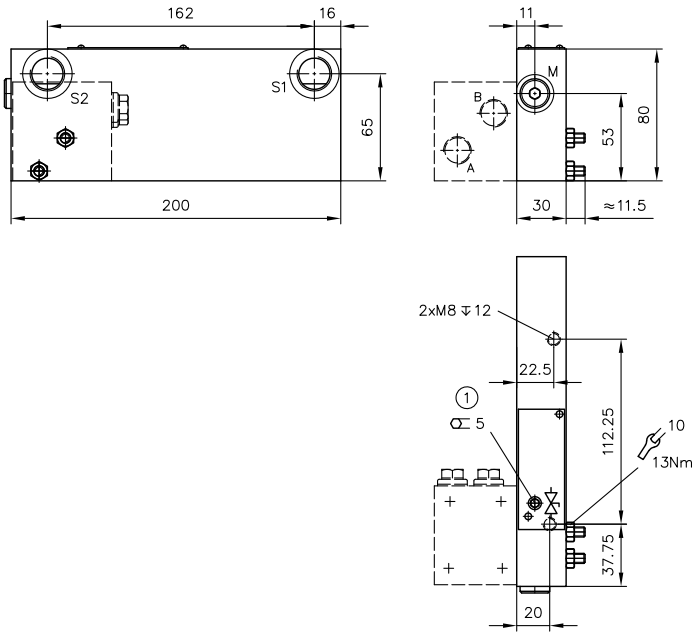


Coding **81**



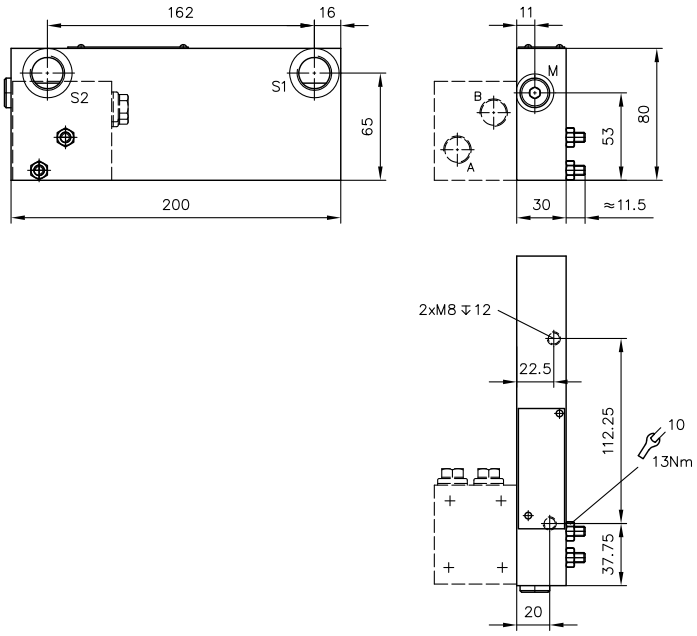
	Ports (ISO 228-1) (BSPP)
P1, P2, P3, P4, R1	G 1/4
S	G 1/2

Coding **88**



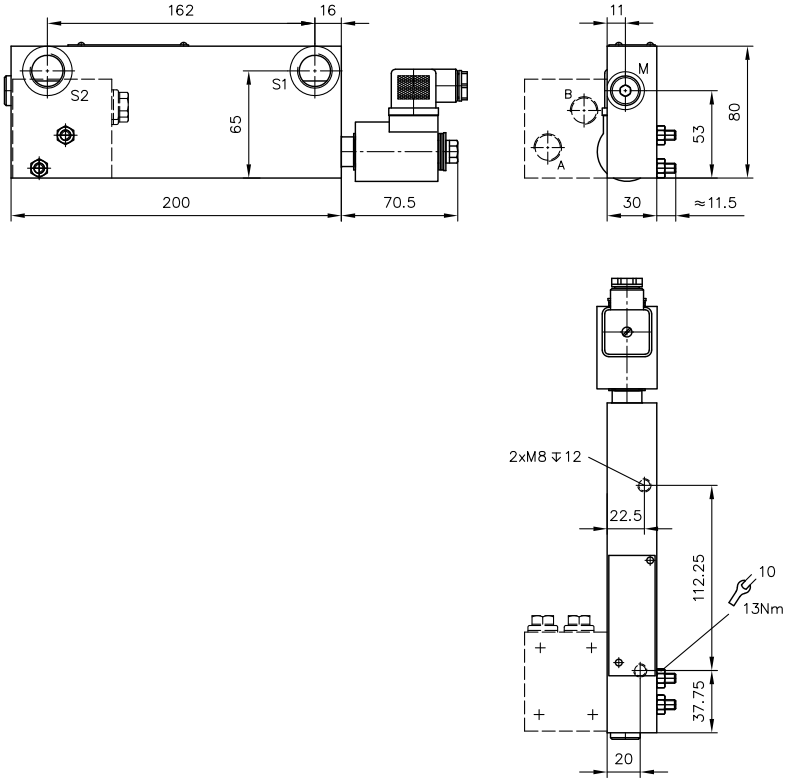
1 Drain valve

Coding **880, 88W**



	Ports (ISO 228-1) (BSPP)
M	G 1/4
S1, S2	G 1/2

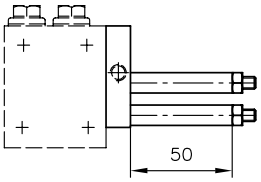
Coding **880/EM 21 D(DS), 88W/EM 21 D(DS)**



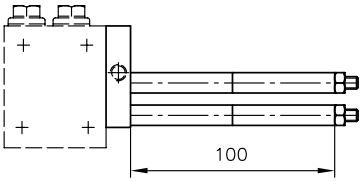
	Ports (ISO 228-1) (BSPP)
M	G 1/4
S1, S2	G 1/2

Extension

Coding **1**



Coding **2**



5 Assembly, operation and maintenance recommendations

5.1 Intended use

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

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

Essential requirements for the product to function correctly and safely:

- All information in this documentation must be observed. This applies in particular to all safety measures and warnings.
- The product must only be assembled and put into operation by qualified personnel.
- The product must only be operated within the specified technical parameters. The technical parameters are described in detail in this documentation.
- The operating and maintenance manual of the components, assemblies and the specific complete system must also always be observed.

If the product can no longer be operated safely:

1. Remove the product from operation and mark it accordingly.

✓ It is then not permitted to continue using or operating the product.

5.2 Assembly information

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

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

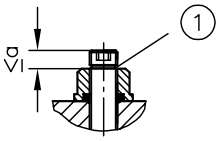
Danger

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

Risk of serious injury or death.

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

5.2.1 Maximum adjustment travel

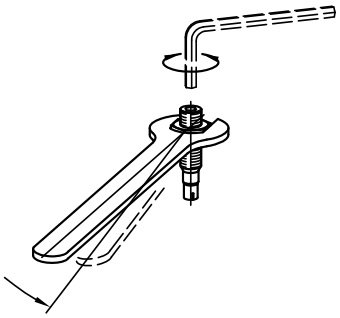


1 Red ring

For the largest adjustment travel (general figure a_{max} = 5 mm), the ring marking becomes visible. Unscrewing further does not change (decrease) the flow cross section that is influencing the Δp value any more.
An internal stopper to prevent further or complete unscrewing is not structurally possible. The red ring marking thus represents the end of the permissible adjustment travel. If this is exceeded, the number of load-bearing thread turns is reduced and if it is unscrewed too far there is a risk that the throttle screw may be ripped out under high pressure.
If necessary, this point must be listed in the operating manual or in the operating and maintenance manual of the system.

Danger
Sudden movement of the hydraulic drives.
Risk of serious injury or death.

- Do not unscrew the throttle screw via the red marking ring.



To adjust the throttle screw using pin spanner (size 5), only slight loosening of the seal-lock nut (size 17) is necessary. As a result, dripping oil leakage, if causing a problem, can be largely avoided.

1 Adjust release of the seal-lock nut slightly
2 Adjust using hex wrench
3 Tighten seal-lock nut

5.3 Operating instructions

Note product configuration and pressure / flow rate

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

Note

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

Caution

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

Risk of minor injury.

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

Purity and filtering of the hydraulic fluid

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

Examples of fine contamination include:

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

Note

Fresh hydraulic fluid from the drum does not always have the highest degree of purity. Under some circumstances the fresh hydraulic fluid must be filtered before use.

Adhere to the cleanliness level of the hydraulic fluid in order to maintain faultless operation.
(also see cleanliness level in Chapter 3, "Parameters").

Additionally applicable document: D 5488/1 Oil recommendations

5.4 Maintenance information

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

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

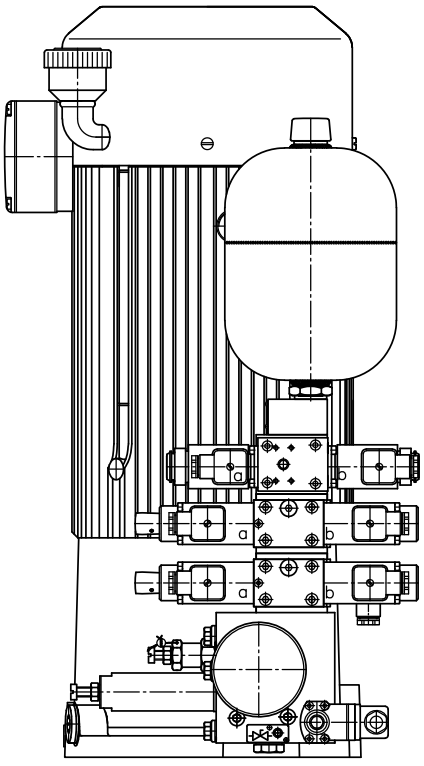
6 Other information

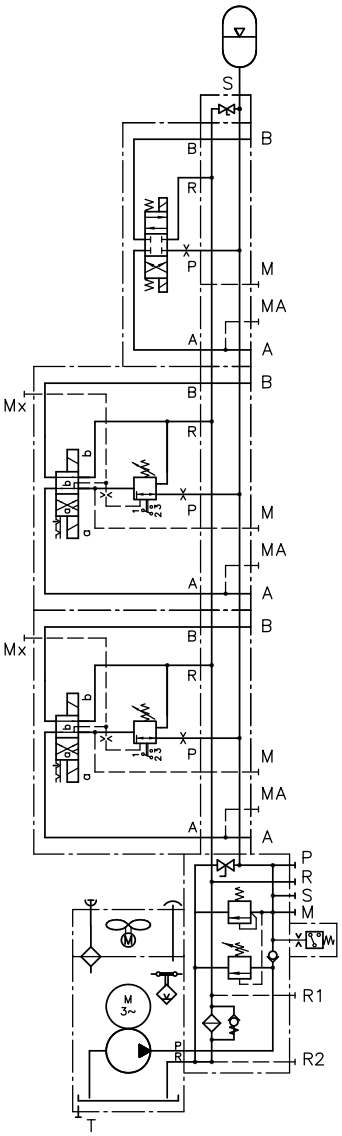
6.1 Circuit example

Order coding example:

Combination with compact hydraulic power pack type HKF according to D 7600-4

HKF 449 D/1 M - Z12,3	- AL 21 F2 - BA 2	- E50/60 - 5/150 - NSMD 2 K/GRK/B1,0/0 - NSMD 2 K/GRK/B1,0/0 - NSWP 2 G/02/B1,0/0 - 8 - G 24 - AC 2001





6.2 Accessories, spare parts and separate components

Shut-off disks and orifices

Order coding

Type	Designation	Order number
XP, XR	Disc	6905 018
XP 0.5, XR 0.5	Orifice disc	6905 018-0.5
XP 0.6, XR 0.6		6905 018-0.6
XP 0.8, XR 0.8		6905 018-0.8
XP 1.0, XR 1.0		6905 018-1.0
XP 1.5, XR 1.5		6905 018-1.5
XP 2.0, XR 2.0		6905 018-2.0
XP 2.5, XR 2.5		6905 018-2.5
XP 3.0, XR 3.0		6905 018-3.0

Further information

Additional versions

- Compact hydraulic power pack type KA and KAW size 2: D 8010
- Compact hydraulic power packs type KA and KAW size 4: D 8010-4
- Compact hydraulic power pack type MPN and MPNW: D 7207
- Compact hydraulic power pack type HK 3: D 7600-3
- Compact hydraulic power pack type HKL and HKLW: D 7600-3L
- Compact hydraulic power pack type HK 4: D 7600-4
- Hydraulic power pack type FXU: D 6020
- Connection blocks type A for hydraulic power packs: D 6905 A/1
- Connection block type AX, with unit approval: D 6905 TUV
- Valve bank (directional seated valve) type VB: D 7302
- Valve bank (directional seated valve) type BWN and BWH: D 7470 B/1
- Valve bank type BNG: D 7788 BNG
- Valve bank (directional seated valve) type BVH: D 7788 BV
- Directional seated valve type NBVP 16: D 7765 N
- Directional spool valve type NSWP 2: D 7451 N
- Directional spool valve type SWPN: D 7451 AT
- Proportional pressure-limiting valve type NPMVP: D 7485 N
- Clamping module type NSMD: D 7787
- Intermediate plate type NZP: D 7788 Z
- Directional spool valve type SG and SP: D 5650/1
- Fitting type X 84: D 7077
- Diaphragm accumulator type AC: D 7969
- Miniature accumulator type AC: D 7571

D 7788 - 09-2018-1.0

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