HYDRAULIC VALVES Z50

Simple compact and heavy duty designed monoblock valve from 1 to 8 sections for open and closed centre hydraulic systems.

• Equipped with a main pressure relief valve and load check valves (individual check valve per spool – maximum 4 spools).

• Available with parallel and tandem circuit (for 2, 3 and 4 spool valves).

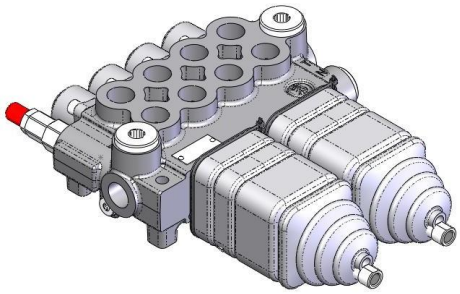
• Optional power beyond port for parallel and tandem circuits.

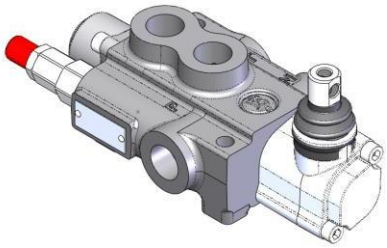
• 16 mm diameter interchangeable spools.

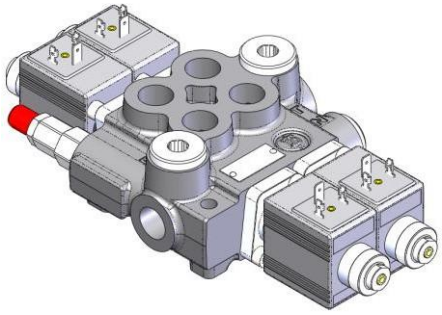
• Wide range of configuration options.

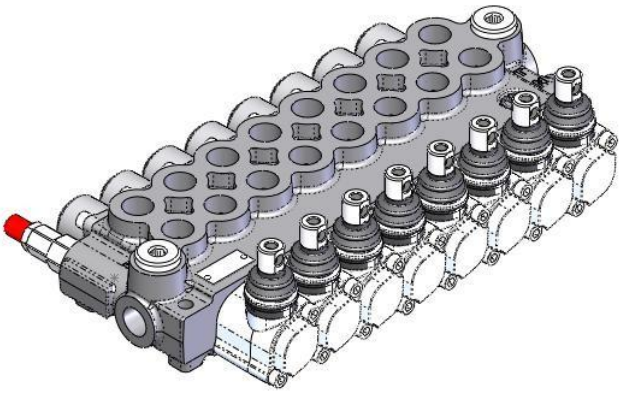
• Floating and regenerative spools and kits do not require additional machining of the valve body.

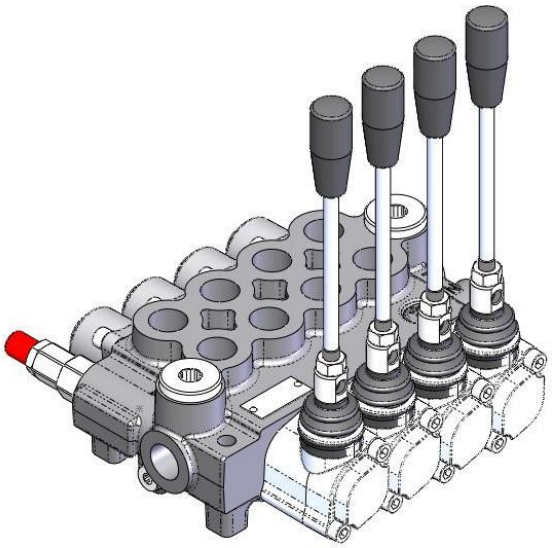
• Actuation options: manual, pneumatic, electro-pneumatic, hydraulic, electro-hydraulic, solenoid control and remote control with flexible cable spool control kits.











Working conditions

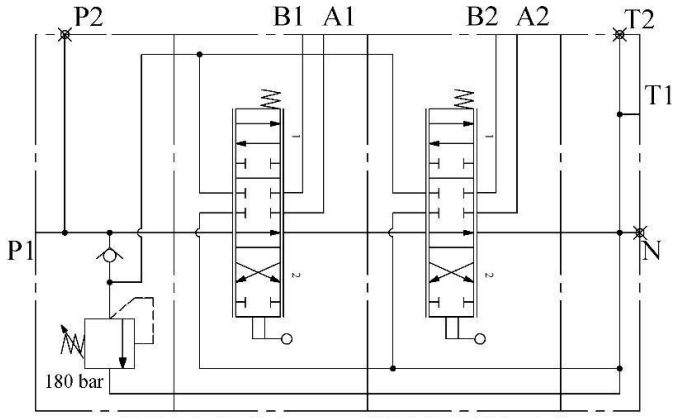
Nominal flow rating		50 l/min
Operating pressure (max.)	parallel and tandem	315 bar
Back pressure (max.)		35 bar
Internal leakage (min.) A(B) to T	Δp = 100 bar (1450 psi) fluid and valve at 40°C	7 cm3/min
Hydraulic fluid		Mineral based oil
Fluid temperature	with NBR seals with FPM (Viton) seals	from -20°C to 80°C from -20°C to 100°C
Viscosity	operating range min. max.	from 15 to 75 mm2/s 12 mm2/s 400 mm2/s
Permisable degree of fluid contamination		-/19/16 - ISO 4406
Ambient temperature with	mechanical valves pneumatic and hydraulic valves electric valves	from -40°C to 60°C from -30°C to 60°C from -20°C to 50°C

Standard threads

Port threads and codes						
Codes:	**G**	**G38**	**G12**	**S**	**S8**	**M**
Main ports	BSP	BSP	BSP	UN-UNF	UN-UNF	Metric
Inlet P and outlet T	G1/2	G3/8	G1/2	7/8-14 (SAE10)	3/4-16 (SAE8)	M22x1.5
Working ports A and B	G3/8	G3/8	G1/2	3/4-16 (SAE8)	3/4-16 (SAE8)	M18x1.5
Control pilot ports						
Pneumatic				1/8-27 NPTF		
Hydraulic	G1/4	G1/4	G1/4	9/16-18 (SAE6)	9/16-18 (SAE6)	G1/4

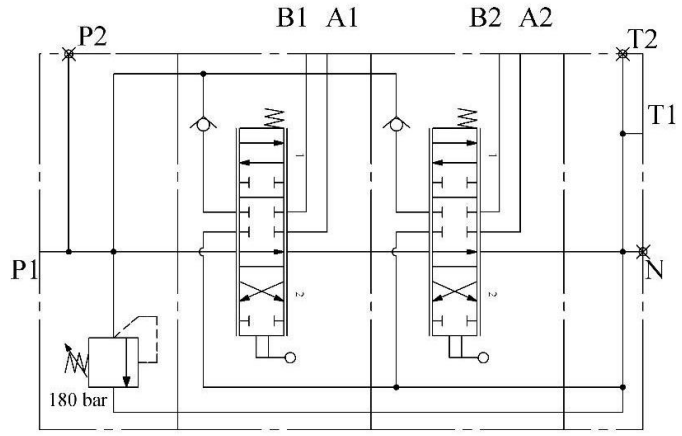
Hydraulic circuits

Standard configuration – parallel body, common check valve (available 1 to 8 spools).



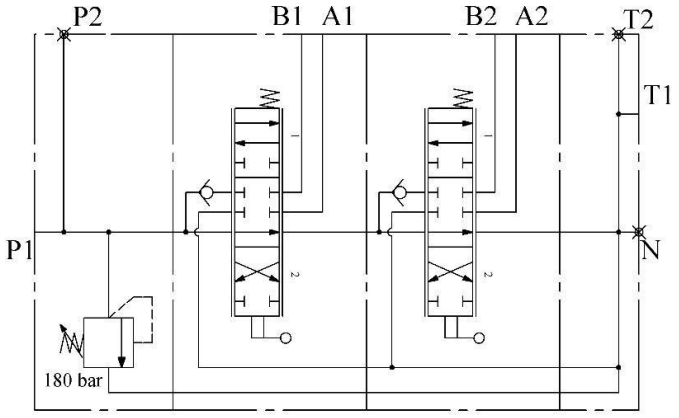
02Z50/2x(A1KZ1)-G *same as (02Z50/A1KZ1/A1KZ1-G)*

Standard configuration – parallel body, individual check valve (available 2 to 4 spools).



2Z50/1/2x(A1KZ1)-G *same as (2Z50/1/A1KZ1/A1KZ1-G)*

Standard configuration – tandem body, individual check valve (available 2 to 4 spools).

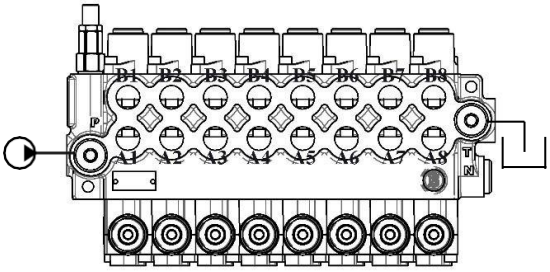


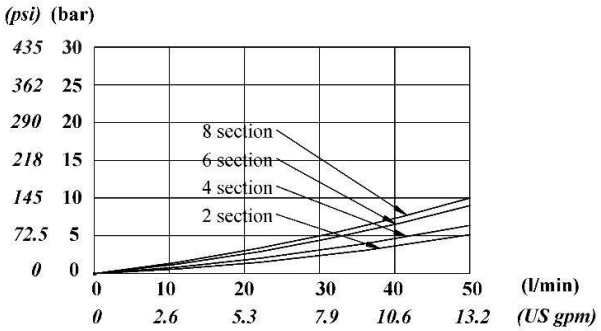
2Z50/2/2x(A1KZ1)-G *same as (2Z50/2/A1KZ1/A1KZ1-G)*

Performance data

Open centre

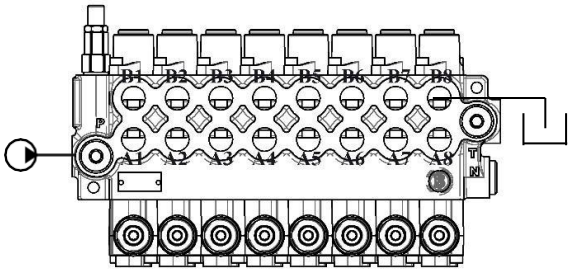
From side inlet to side outlet.

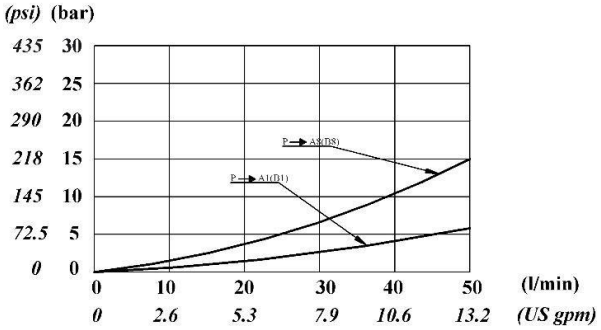




Inlet to work port

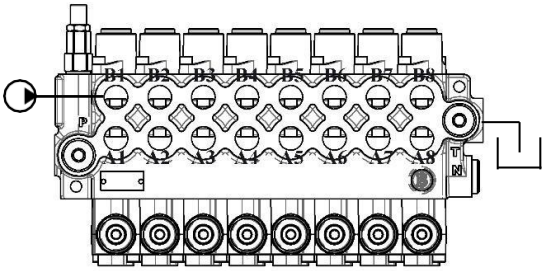
From side inlet to A port spool in position 2 or B port spool in position 1.

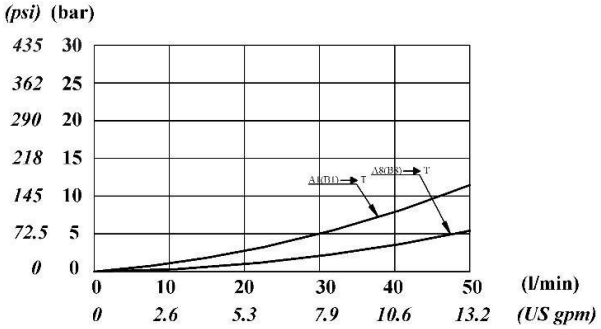




Work port to outlet

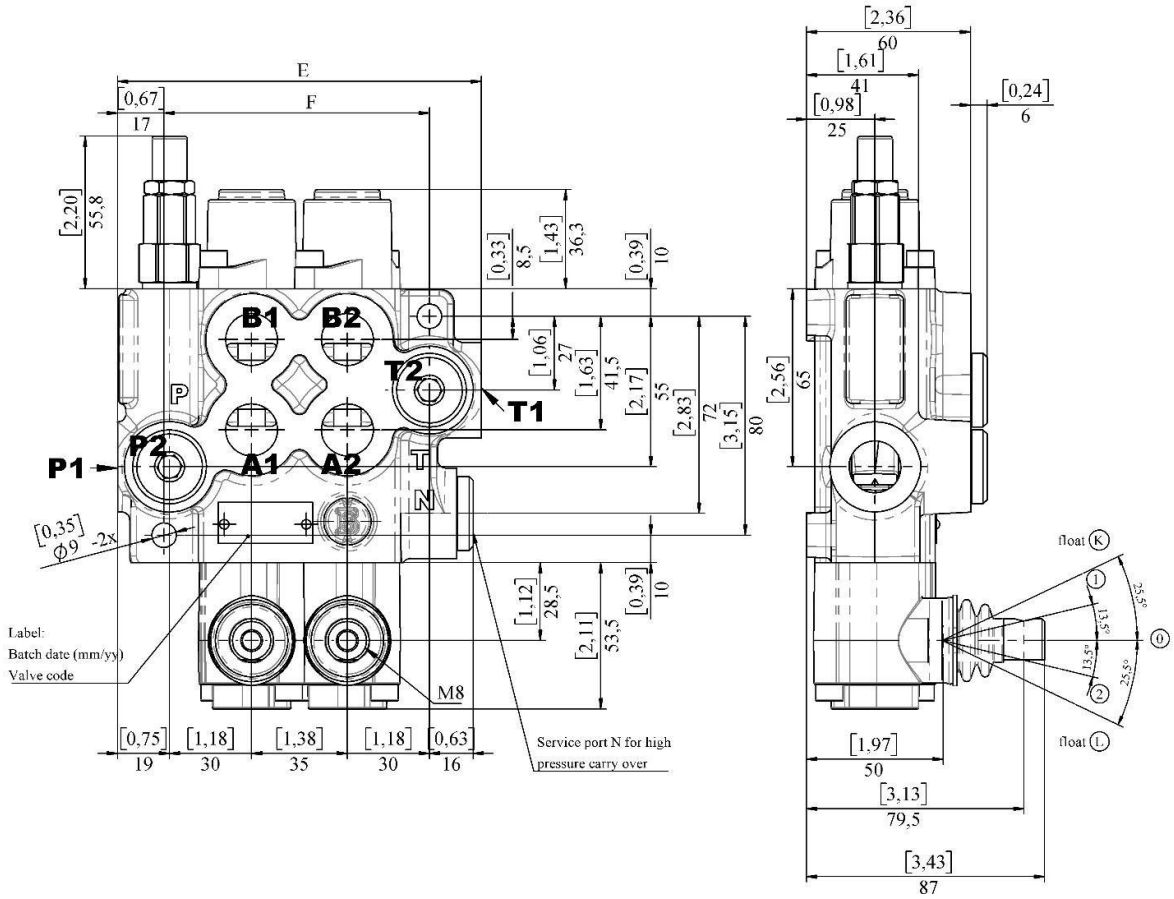
From A port spool in position 1 or B port spool in position 2 to side outlet.





Dimensions

This drawing refers to a directional control valve with two working sections and a common check valve.

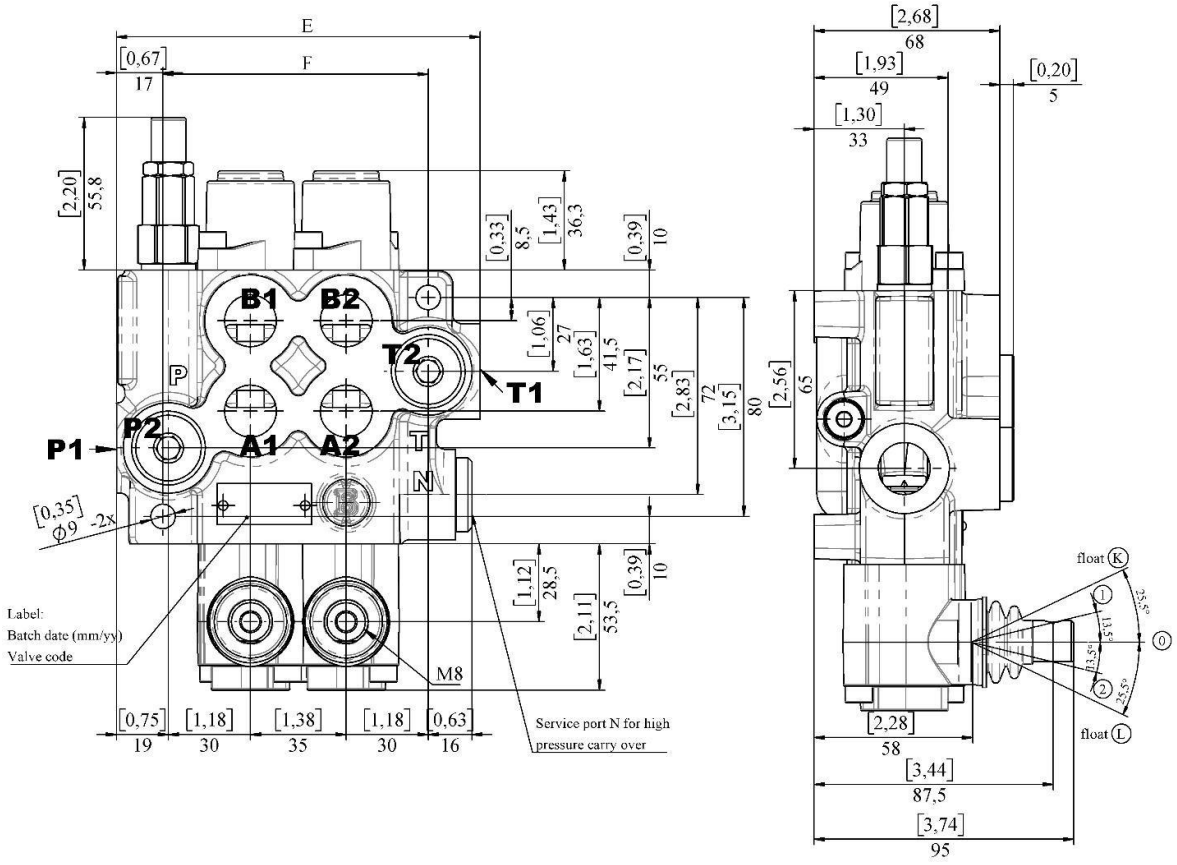


The float position (L) is shown only as a reference for direction. The Z50 valve can be equipped with a float spool only in the right-hand version

	E	F	Weight
	mm	mm	kg
1xZ50	88	60	2,5
2xZ50	133	97	4,1
3xZ50	168	132	5,5
4xZ50	203	167	6,9
5xZ50	238	202	8,3
6xZ50	273	237	9,7
7xZ50	308	272	11,1
8xZ50	343	307	12,5

Dimensions

This drawing refers to a directional control valve with two working sections and an individual check valve for each spool.



The float position (L) is shown only as a directional reference. The Z50 valve can be equipped with a float spool only in the right-hand version.

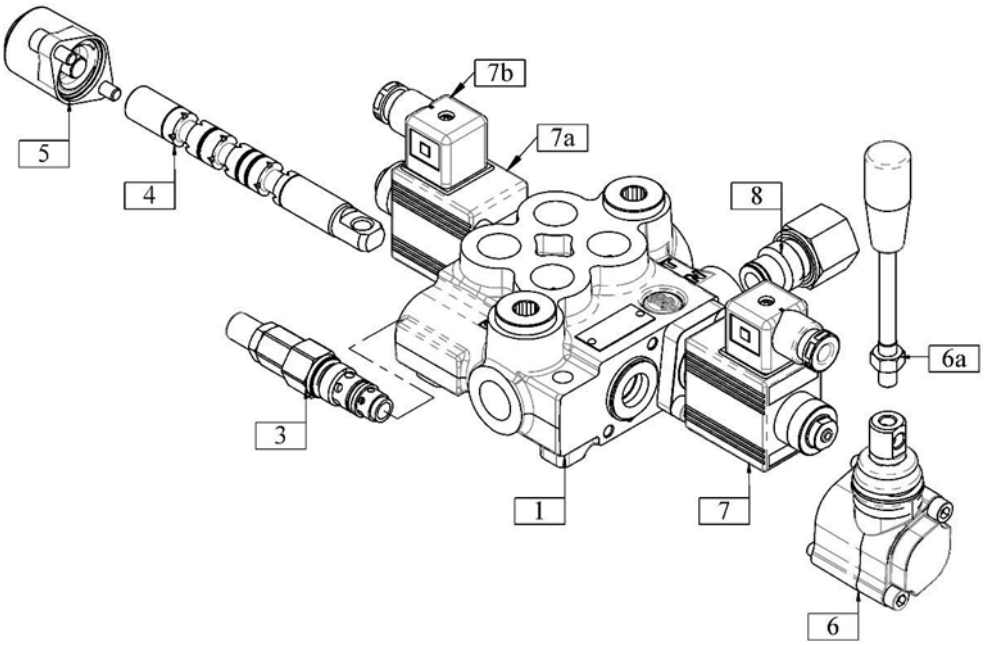
	E	F	Weight
	mm		kg
2xZ50	133	97	4,1
3xZ50	168	132	5,5
4xZ50	203	167	6,9

Order code

02Z50 (D4-280-FV)/A 1 KZ1/A ES3–12V(C)–C2 – G - Zn

1 2 3 4 5 6 7 8 10 11

For identical sections use quantity of sections x (code of section), e.g. 2x(A1KZ1)…



1	Body kits
Type	**Description**
Z50	Parallel, 1 section
02Z50	Parallel, 2 sections, common check valve
03Z50	Parallel, 3 sections, common check valve
04Z50	Parallel, 4 sections, common check valve
05Z50	Parallel, 5 sections, common check valve
06Z50	Parallel, 6 sections, common check valve
07Z50	Parallel, 7 sections, common check valve
08Z50	Parallel, 8 sections, common check valve
2Z50/1/	Parallel, 2 sections, individual load checks
3Z50/1/	Parallel, 3 sections, individual load checks
4Z50/1/	Parallel, 4 sections, individual load checks
2Z50/2/	Tandem, 2 sections, individual load checks
3Z50/2/	Tandem, 3 sections, individual load checks
4Z50/2/	Tandem, 4 sections, individual load checks

2	Position with respect to pump inlet
omit	Left-hand configuration: the pump port is located on the left-hand side with respect to the control lever.
R	Right-hand configuration: the pump port is located on the right-hand side with respect to the control lever.

3	Inlet relief options
Type	**Description**
omit	Range 120-250 bar, standard setting at 180 bar
(D2-120)	Range 50-120 bar, standard setting at 120 bar (pressure range has to be always specified)
(120-250)	Range 120-250 bar, setting other than 180 bar
(D4-220)	Range 220-315 bar, standard setting at 220 bar (pressure range has to be always specified)
(sok)	Without check valve
(svp)	Relief valve blanking plug
(FV)	Fixed valve setting and steel cap nut

The standard setting refers to a flow rate of 12 l/min. Example: relief valve preset to 250 bar with cap nut, without check valve (D4-250-SOK-FV).

4	Spool options
Type	**Description**
A	Double acting, 3 position, with A and B closed in position 0
As	Double acting, 3 position, with A and B closed in position 0, fine metering
B	Single acting on A, 3 positions, B plugged, requires a plug.
C	Single acting on B, 3 positions, A plugged, requires a plug.
D	Double acting, 3 position, with A and B opened to tank in position 0
E	Double acting, 3 position, B opened to tank in position 0
F	Double acting, 3 position, A opened to tank in position 0
Dd	Double acting, 3 position, with A and B partially open to tank in position 0
Ed	Double acting, 3 position, B partially opened to tank in position 0
Fd	Double acting, 3 position, A partially opened to tank in position 0
M	Double acting, 3 position, blocked b
Special spools for particular positioner kits	
Us	Double acting, 4 positions, regenerative position in between position 0 and position 2, spool in
K	Double acting, 4 positions, floating circuit in 4th position with spool out, only available in left hand configuration
L	Double acting, 4 positions, floating circuit in 4th position with spool in, only available in right hand configuration

5	Spool positioners (side B)
Type	**Description**
1	With spring return in position 0
1C	With spring return in position 0, soft spring
1Z	With spring return in position 0 and pin with M8x1 male thread for dual control
1rAB	With spring return in position 0 and stroke adjustments both directions
1zS1	With spring return in position 0 and pin with M8 male thread for dual control
1D(M6)	With spring return in pos 0 and pin with M6 female thread for dual control
1E	With spring return in position 0, includes microswitch kit
14	Spring return in position 0, no microswitch kit included
14C	Spring return in position 0, soft spirng, no microswitch kit included
4	2 positions, with spring return in position 0 from position 2
5	2 positions, with spring return in position 0 from position 1
6	2 positions, with spring return in position 1 from position 2
7	2 positions, with spring return in position 2 from position 1
7Z	2 positions, with spring return in position 2 from position 1 and pin with M8x1 male thread for dual control
7T	2 positions, with spring return in position 2 from position 1 with teton (push piston)
7D(M6)	2 positions, with spring return in position 2 from position 1, and pin with M6 female thread for dual control
7zS1	2 positions, with spring return in position 2 from position 1 with special tie rod kit M8 for dual control
8	Detent in positions 0, 1 and 2
8Z	Detent in positions 0, 1 and 2, and pin with M8 male thread for dual control
9	Detent in positions 1 and 0
10	Detent in positions 0 and 2
11	Detent in positions 1 and 2
11B	Detent in positions 1 and 2, and spring return to position 0
2	With detent in position 1 and spring return in position 0
3	With detent in position 2 and spring return in position 0
1V2	With spring return in position 0 for flexible cable control
8V2	Detent in positions 0, 1 and 2 for flexible cable control
1H	Proportional hydraulic control- single side
1P	ON/OFF pneumatic control
1EP	ON/OFF electro-pneumatic control
1ED3	ON/OFF electro-hydraulic control

Particular positioner kits for special spools

17	4 position with spring return to position 0 from position 2, soft stop at (regenerative) before position 2 and detent in position 1
12	4 position with spring return in position 0 and detent in float position - only for spool L
13	Detent in 4 positions - only for spool L
16	4 position with spring return in position 0 and detent in float position - only for spool K
15	Detent in 4 positions - only for spool K

6	Spool controls (side A)
	Without lever box, with plate
KZ	Lever box for M8
KZ(M10)	Lever box for M10
KZT	Lever box for M8 with teton (push piston)
KI	Lever box, collet type, horizontal Ø9 mm
KY	Lever box, collet type, vertical Ø9 mm
KZ(rA)	Lever box, with stroke limiter
Kze	Lever box for M8, extreme conditions
Kze(M10)	Lever box for M10, extreme conditions

Adding a "0" after the first part of the code indicates a 180° rotation of the valve body. In this configuration, the lever faces the bottom side of the valve rather than the ports.

KZV	Safety lever box, vertical configuration
KZH	Safety lever box, horizontal configuration
SLP	Without lever box with dustproof plate
V1	Flexible cable connection
ju+1	Joystick lever for 2 sections with pivot above right, standard cylindrical handle
ju+2	Joystick lever for 2 sections with pivot above left, standard cylindrical handle
ju+3	Joystick lever for 2 sections with pivot bottom left, standard cylindrical handle
ju+4	Joystick lever for 2 sections with pivot bottom right, standard cylindrical handle

Optional ball type handle (jb+…), and custom lengths

6a	Handle options
1	Depending on lever kit M8x150 or M10x170
Custom lengths and bends available	

7	Complete controls
1ESD	Double acting solenoid kit, standard version with lock/unlock lever kit K1
ES	Single acting solenoid kits - ES3/ES2/ES1
A26	Control with rotation (CW-CCW)

7a	Coil specifications
12V	12V coil, for ISO4400 connector
24V	24V coil, for ISO4400 connector
12V(DT)	12V coil, for Deutsch connector
24V(DT)	24V coil, for Deutsch connector
Exact coil specifications follow in the catalog	

7b	Connectors
omit	By default connectros are not included, except in 1ESD control and electro-pneuamtic control 1EP
(C)	Connector for the particular coil is included

8	Outlet port options
omit	BSP G1/2 plug on port N
C	Closed center plug
C2	For BSP threading - G1/2 high pressure carryover sleeve
C2(38)	For BSP threading - G3/8 high pressure carryover sleeve
C2(s)	For SAE threading - SAE10 high pressure carry-over sleeve
C2(NPTF)	For NPTF threading - 1/2NPTF high pressure carry-over sleeve
C2D	High pressure carry-over kit, direct connection
VRE	Back pressure valve

9	Inlet outlet selection
omit	Side inlet, side outlet, others plugged
22	Top inlet, top outlet, others plugged
12	Side inlet, top outlet, others plugged
21	Top inlet, side outlet, others plugged

10	Valve Threading - refer to page 2

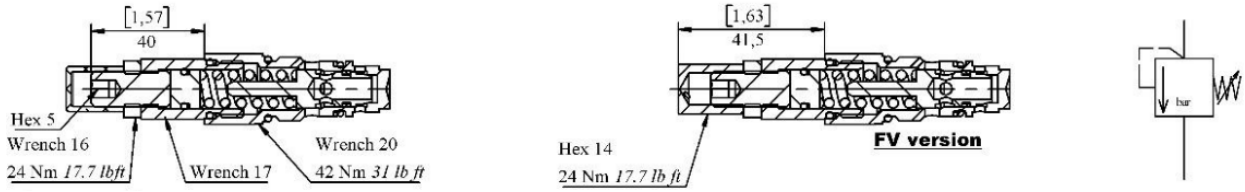
11	Coating and plating
omit	Valve body is phoshpated, steel parts zinc plated, spools either Ni, or Cr plating (omit in valve description)
Zn	Valve body - Zinc plated
BP	Painting, standard black, others optional

Inlet relief options

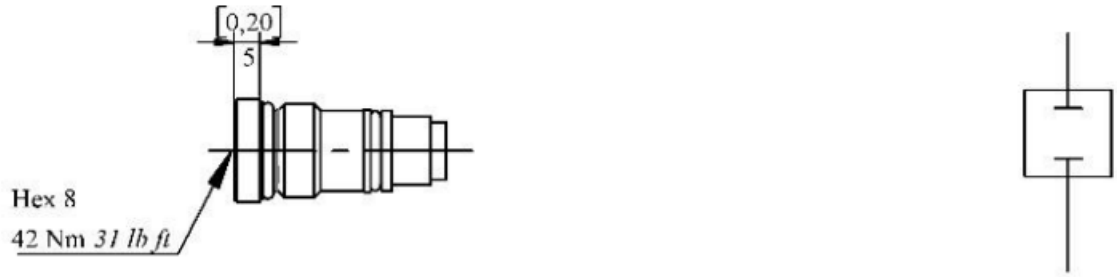
D4-280-sok-FV

D4	280	Sok	FV
Adjustable spring type (2 and 4)	Pressure setting, if not specified – standard pressure setting per spring	without load check valve	Steel cap nut for pre-set pressure

Pressure setting within the range of 120–250 bar. By default, spring No. 3 is used and does not need to be specified in the ordering code (e.g. 150).

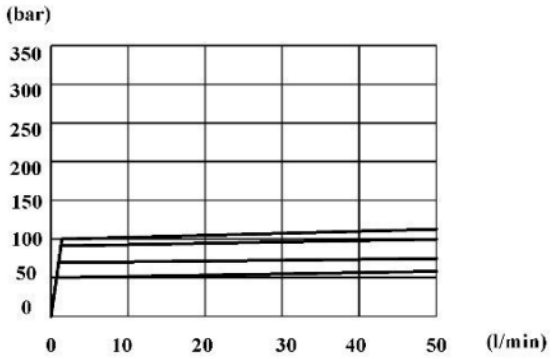


svp – relief valve blanking plug

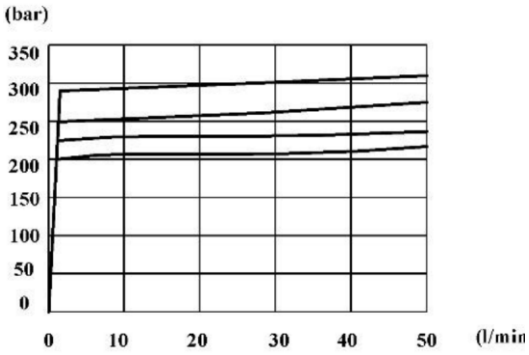


Relief valve type “D” performance characteristics

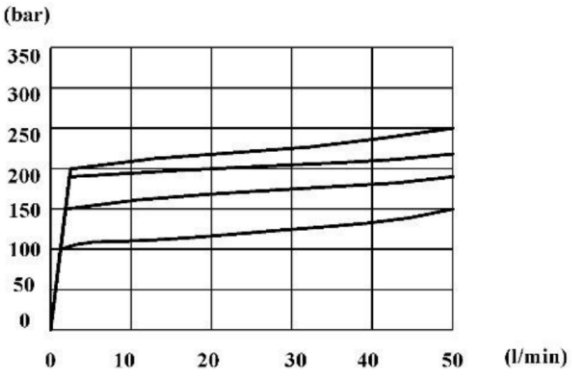
Spring nr. 2



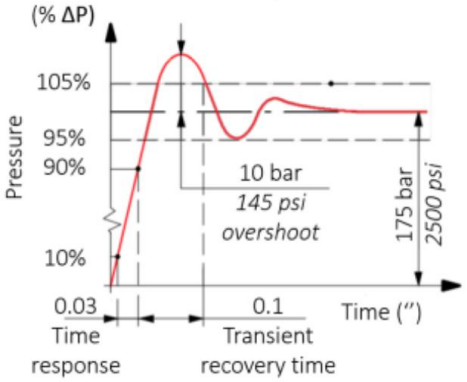
Spring nr. 4



Spring nr. 3

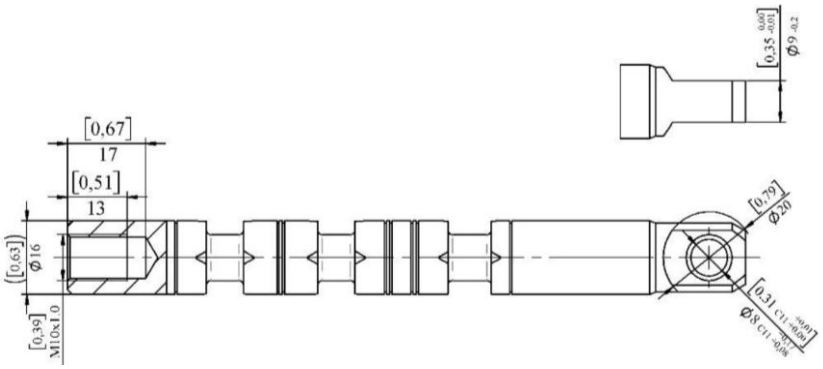


Time response

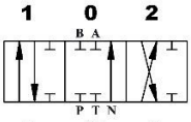
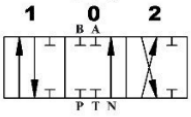
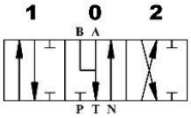
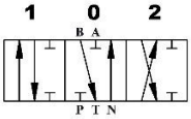
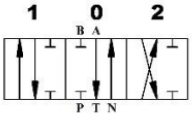
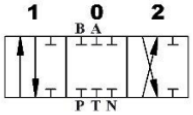
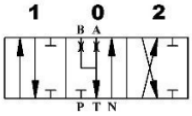
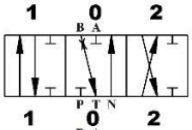
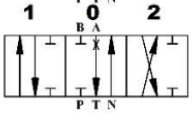


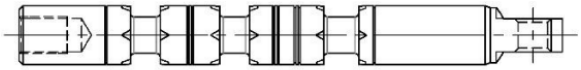
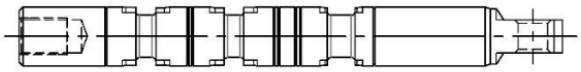
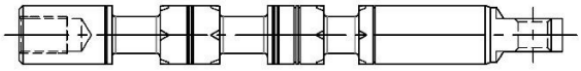
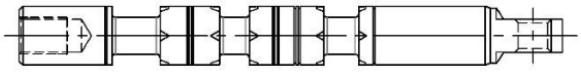
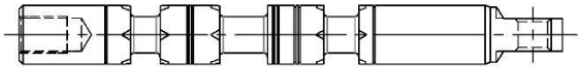
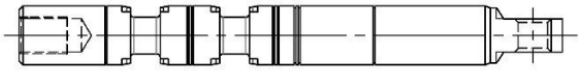
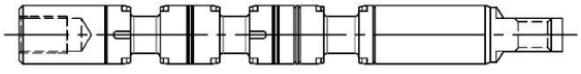
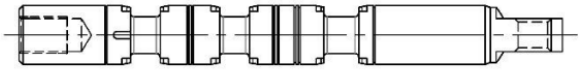
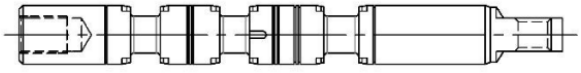
Spool options

Our standard spool have the end shown in the drawing below.

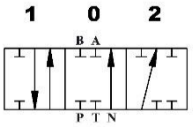


Double acting spools

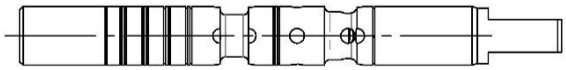
	**A**	Double acting spool, work ports closed in neutral position.
	**As**	Double acting spool, high metering, work ports closed in neutral position.
	**D**	Double acting spool, work ports open to tank in neutral position.
	**E**	Double acting spool, work port B open to tank in neutral position.
	**F**	Double acting spool, work port A open to tank in neutral position.
	**M**	Double acting spool, closed center, work ports closed in neutral.
	**Dd**	Double acting spool, closed center, work ports partially open to tank.
	**Ed**	Double acting spool, closed center, work port B partially open to tank.
	**Fd**	Double acting spool, closed center, work port A partially open to tank.

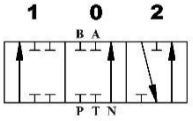










Single acting spools

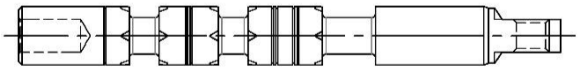


B Single acting on A, 3 positions, B plugged

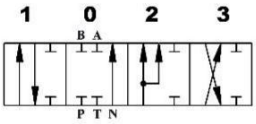




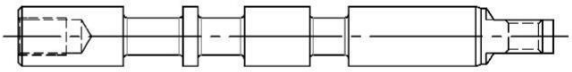
C Single acting on B, 3 positions, A plugged



Regenerative spools

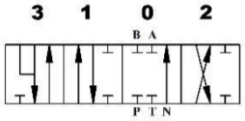


Us Double acting, 4 positions, regenerative

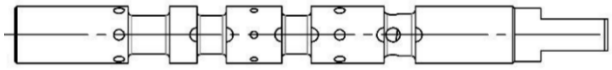


Spool U requires positioner 6 or 17 and is available only in left-hand configuration (P on left relative to lever).

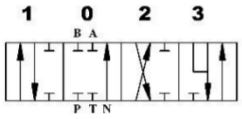
Floating spools



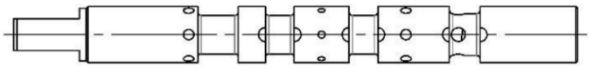
K Double acting, 4 positions, regenerative



Spool K requires a spool positioner (16 or 15) and is available only for valves with left-hand configuration (P on the left side relative to the control lever).



L



Spool L requires a spool positioner (12 or 13) and is available only for valves with "R" (right-hand) configuration (P on the right side relative to the control lever).

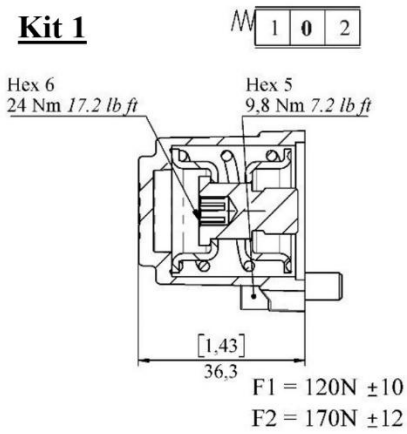
All spools have “R” version for right version of the valve, exceptions are Us, K and L.

To order right hand version of a spools, add “R” behind the spool description e.g. AR, BR, CR, etc.

To order low leakage version of spools, add “n” behind the spool description e.g. An, Bn, Cn, etc.

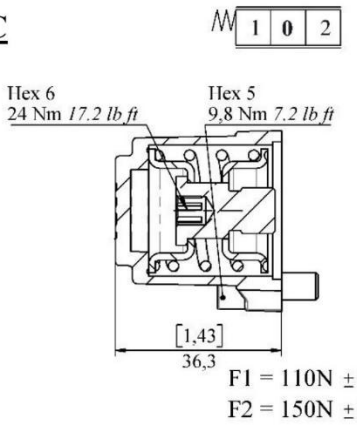
Spool positioners (B-side)

Kit 1



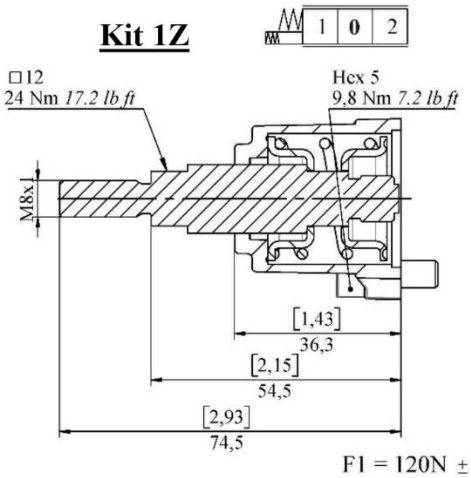
F1 = 120N ±10
F2 = 170N ±12

Kit 1C



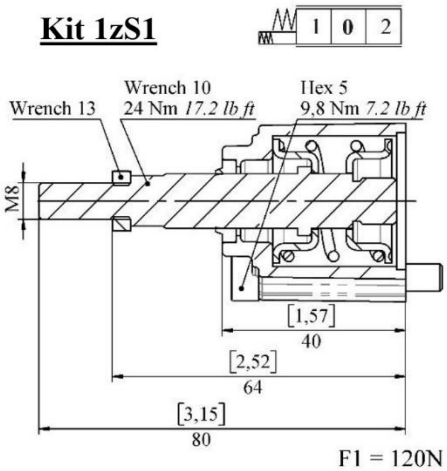
F1 = 110N ±10
F2 = 150N ±12

Kit 1Z



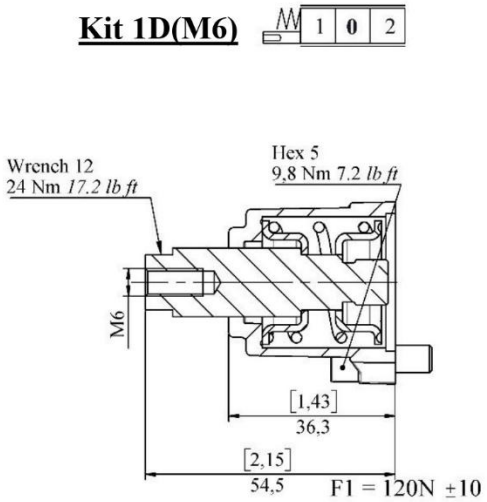
F1 = 120N ±10
F2 = 170N ±12

Kit 1zS1



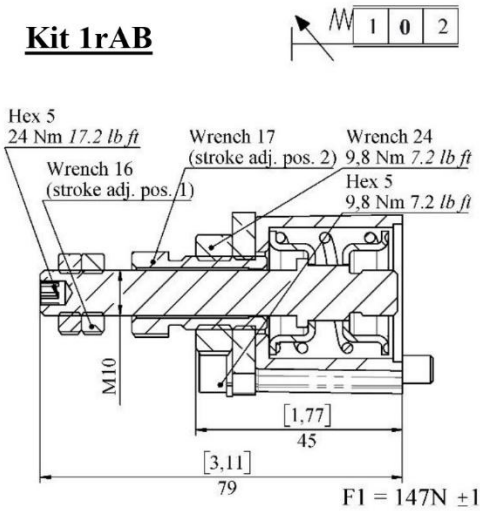
F1 = 120N ±10
F2 = 170N ±12

Kit 1D(M6)



F1 = 120N ±10
F2 = 170N ±12

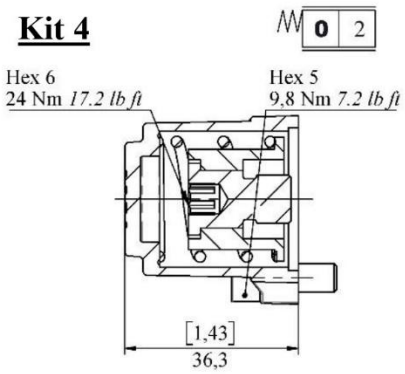
Kit 1rAB



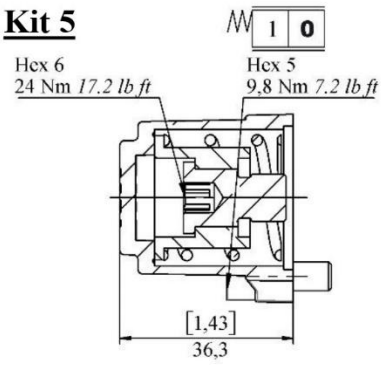
F1 = 147N ±10
F2 = 229N ±12

Spool positioners (B-side)

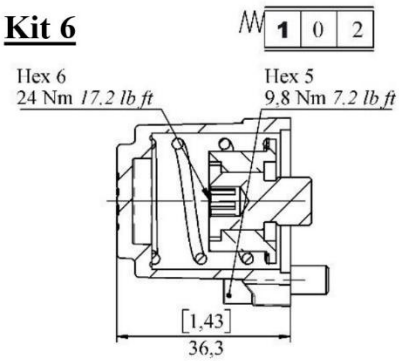
Kit 4



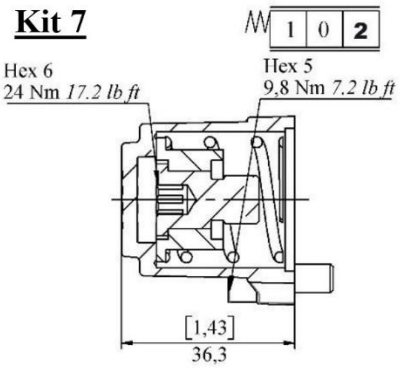
Kit 5



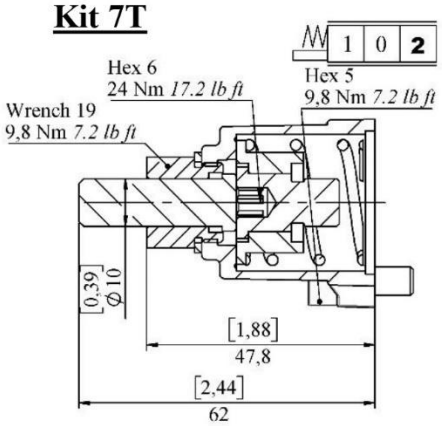
Kit 6



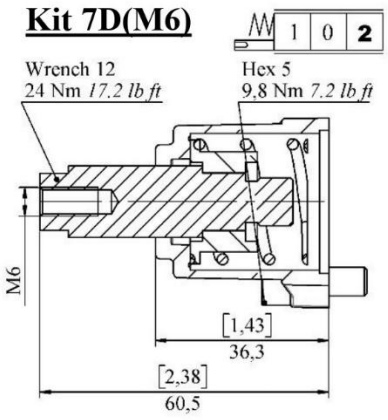
Kit 7



Kit 7T

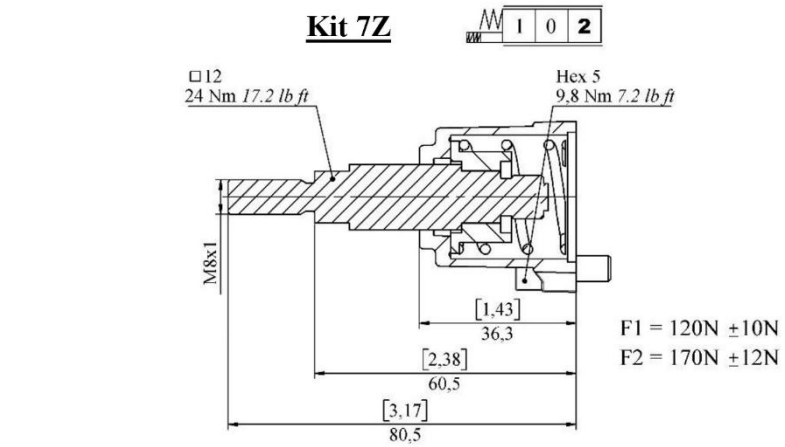


Kit 7D(M6)

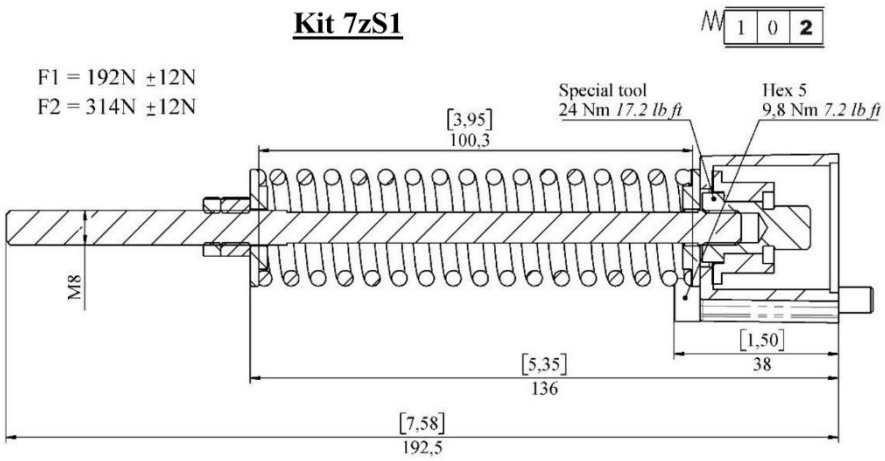


Spool positioners (B-side)

Kit 7Z

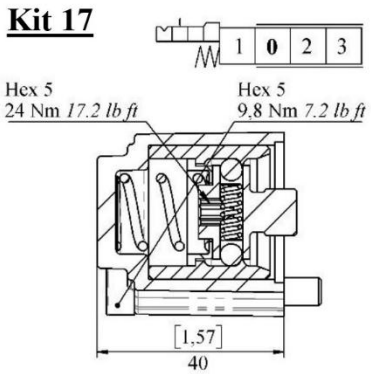


Kit 7zS1

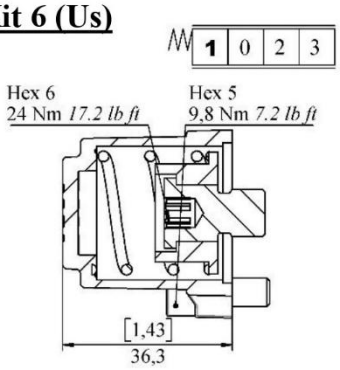


Particular kits for regenerative spool Us

Kit 17

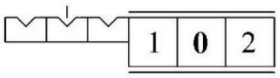


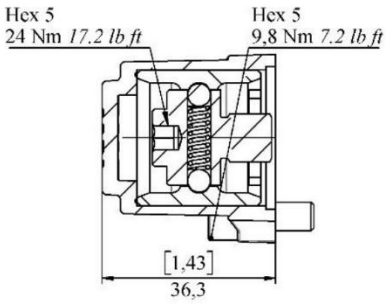
Kit 6 (Us)



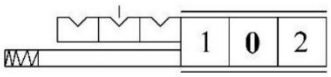
Spool positioners (B-side)

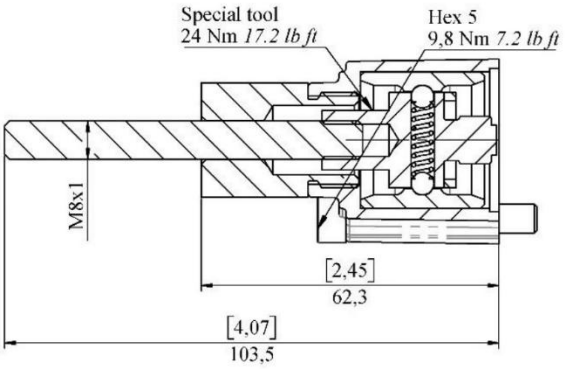
Kit 8



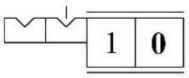


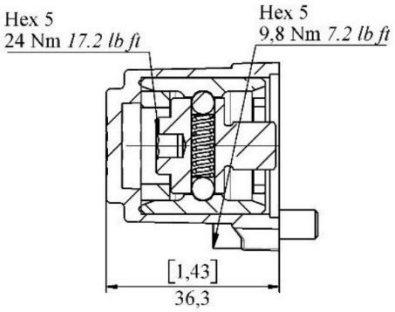
Kit 8Z



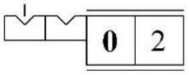


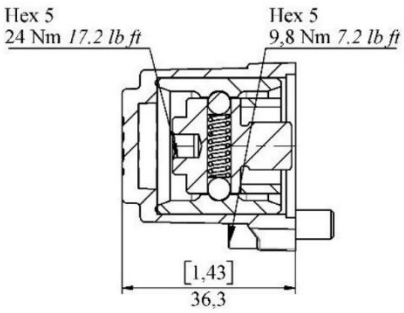
Kit 9



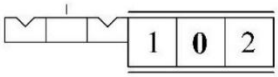


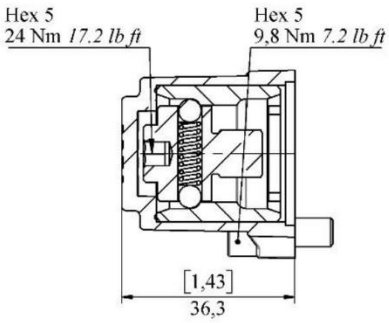
Kit 10





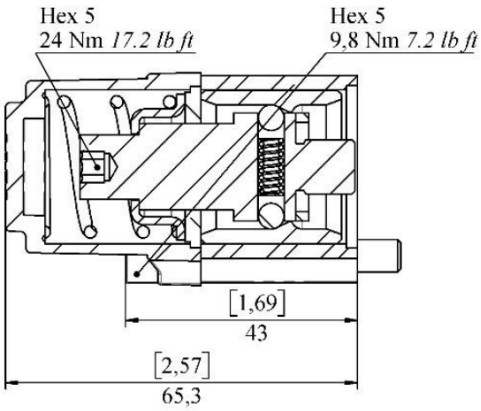
Kit 11

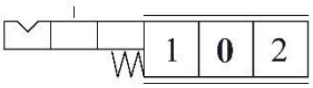




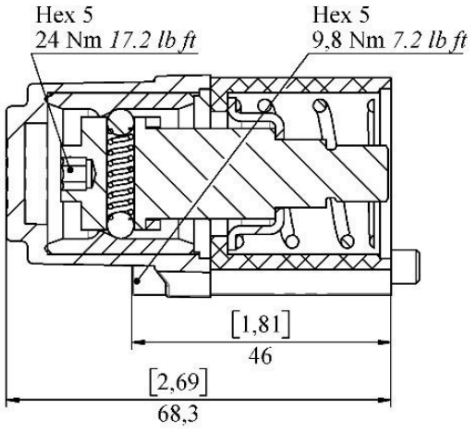
Spool positioners (B-side)

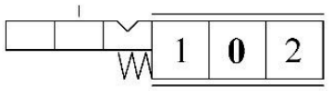
Kit 2: 3 positions, spring return from pos. 2 to position 0 and detent in position 1



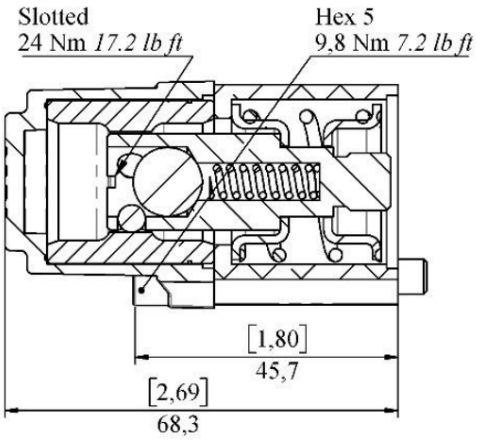


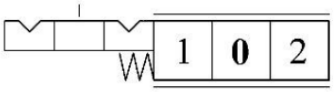
Kit 3: 3 positions, spring return from position 1 and detent in position 2





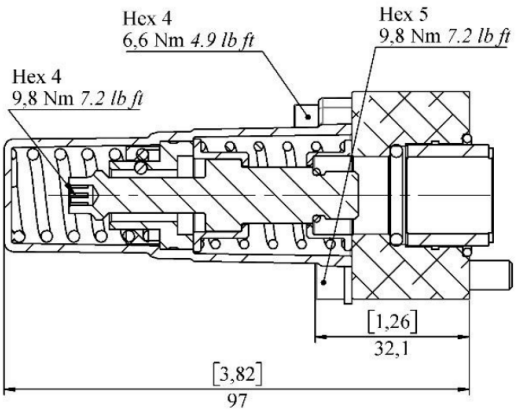
Kit 11B: 2 positions, with detent in both positions and spring return to neutral from either direction

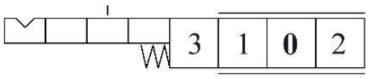




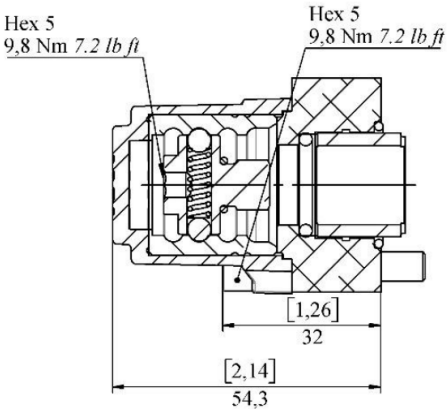
Particular spool positioners kits for floating spool K (float when spool OUT)

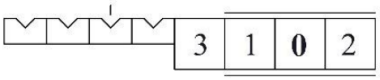
Kit 16: four-position spool with return to neutral from positions 1 and 2 and detent in float position.



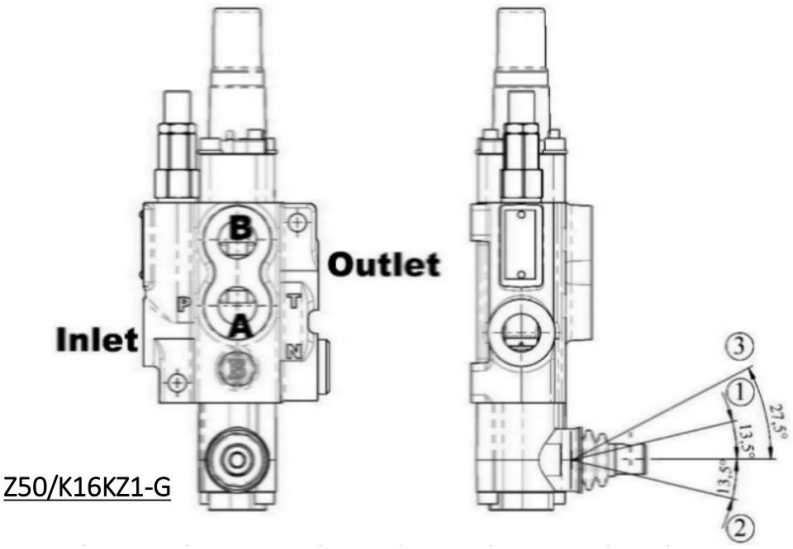


Kit 15: four position detent





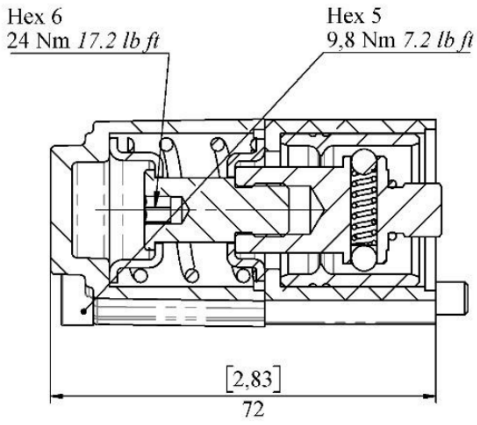
Limitations of floating sections for Z50

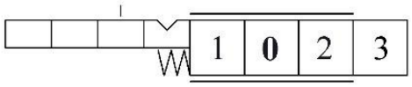


Floating spool OUT (K16 and K15) can be used only in standard configuration with left-side inlet (relative to the control lever).

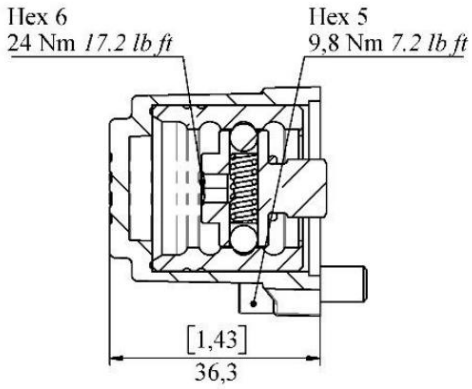
Particular spool positioners kits for floating spool L (float when spool IN)

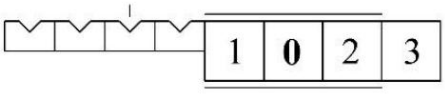
Kit 12: 4 positions, return to neutral from 1 and 2 and detent in float



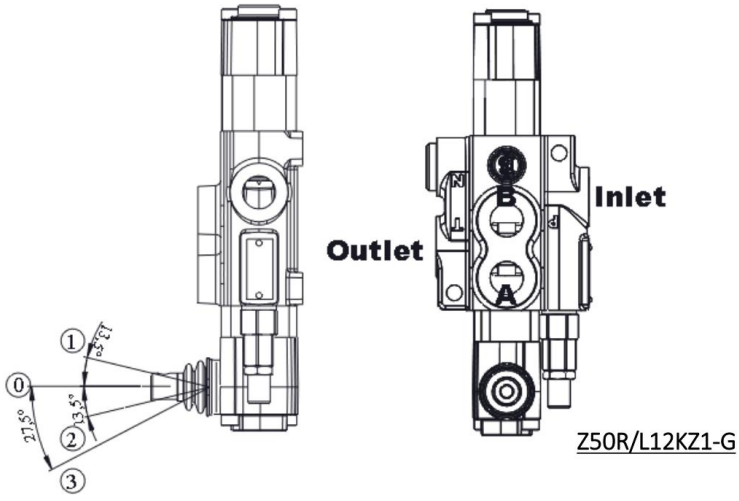


Kit 13: 4 positions detent





Limitations of floating sections for Z50

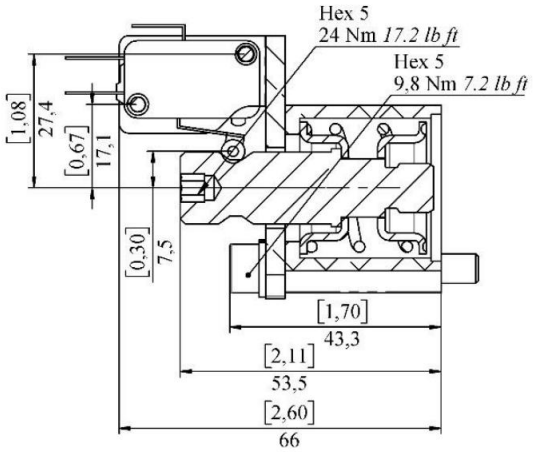


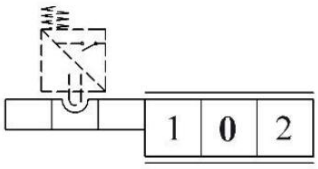
Z50R/L12KZ1-G

Floating spool IN (L12 and L13) can be used only on valves with "R" configuration and right-side inlet (relative to the control lever).

Particular spool positioners kits for microswitch

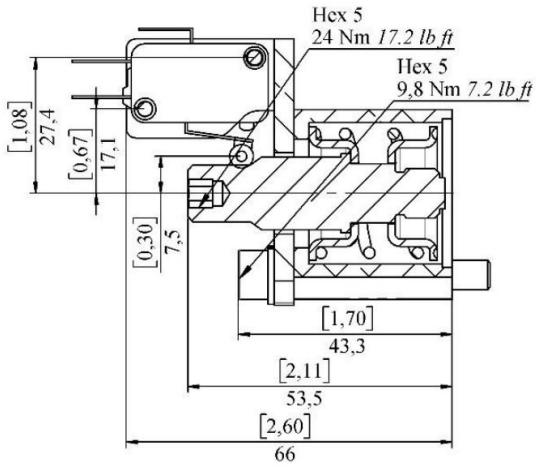
Kit 1E for double acting spool A or D

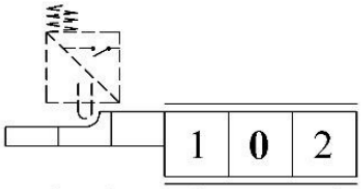




For double acting spool A

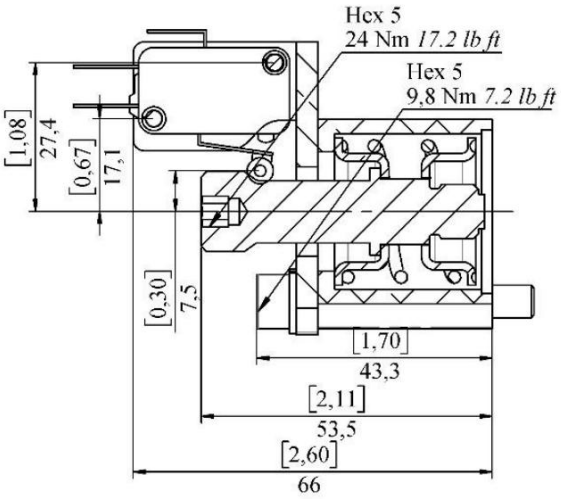
Kit 1E for single acting spool B

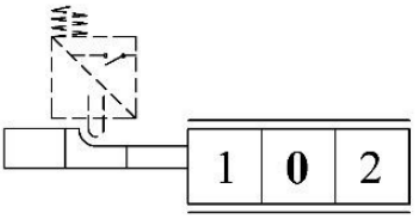




For single acting spool B

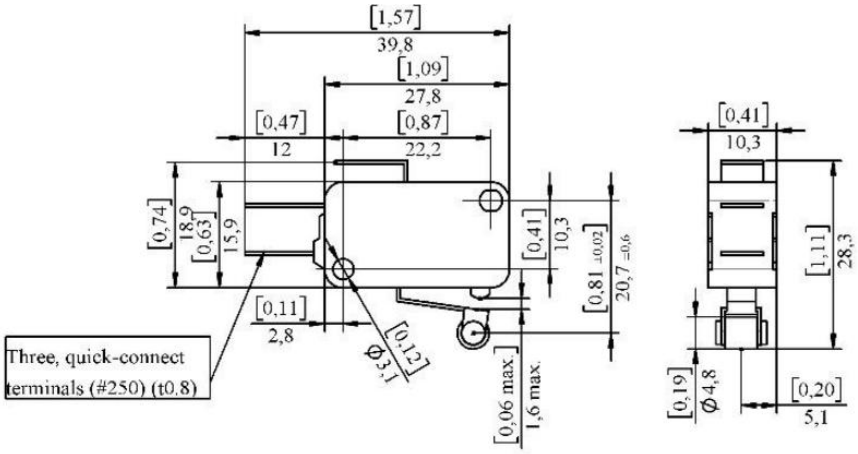
Kit 1E for single acting spool C





For single acting spool C

Microswitch specification for spool positioner

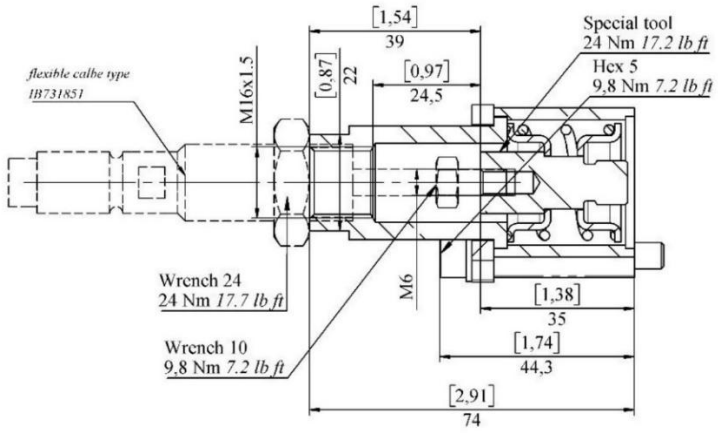


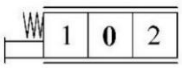
Omron code: V-165-1C5.

Requires a special bracket for assembly with spool positioners.

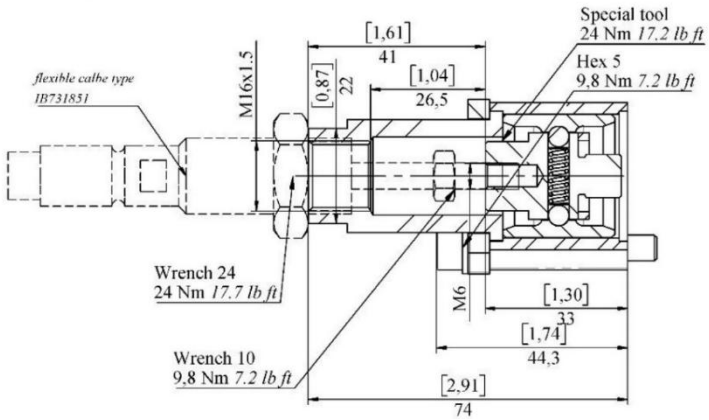
Spool positioner for flexible cable connection (side B)

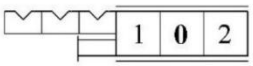
Kit 1V2





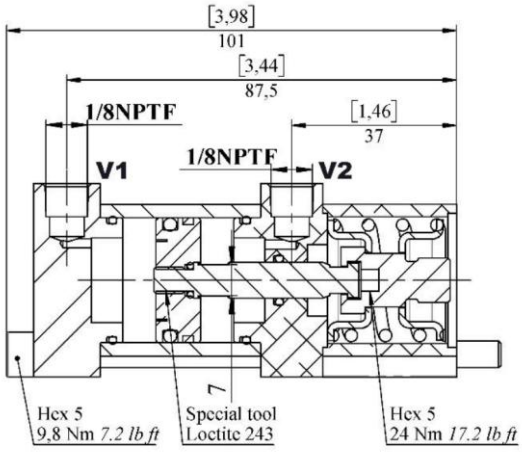
Kit 8V2

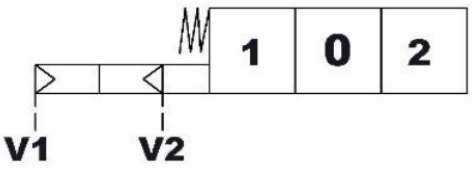




ON/OFF Pneumatic kit - 1P

With spring return to neutral position

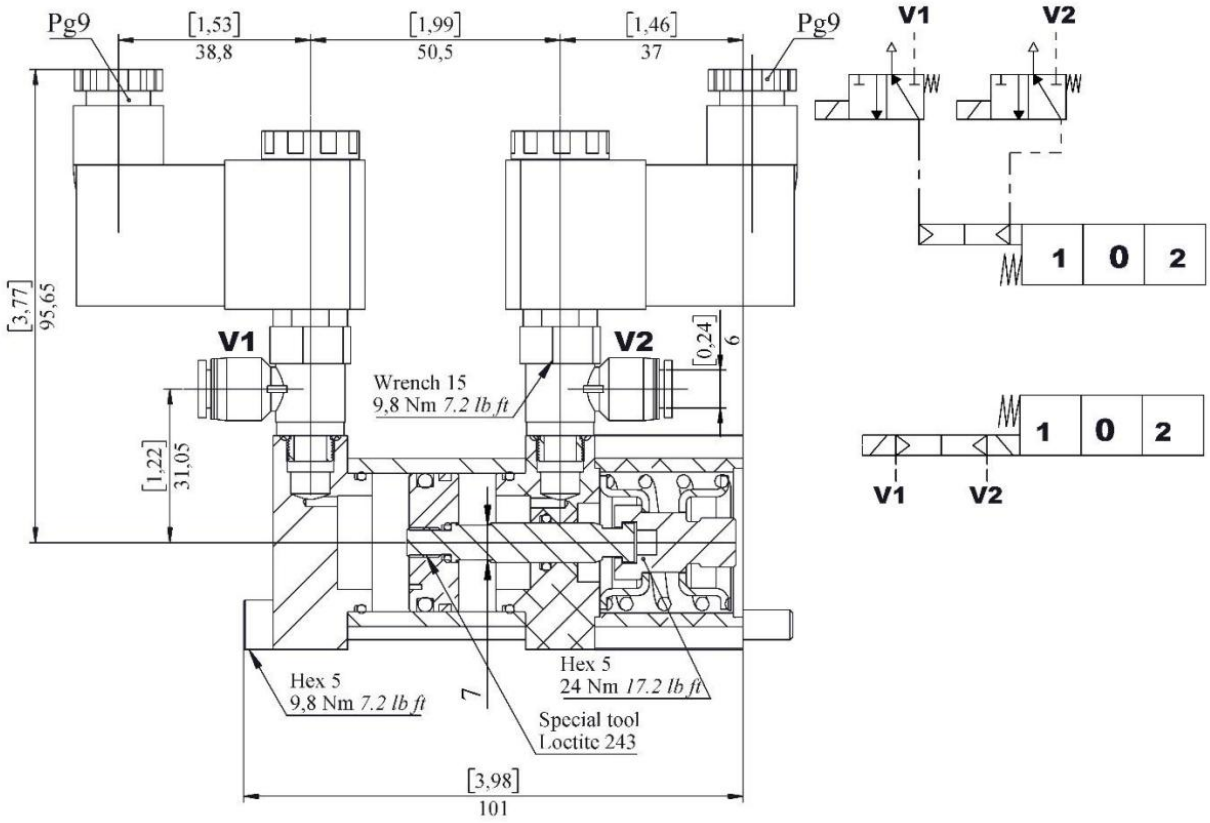




Operating features:
pilot pressure – min 5,5 bar, max. 10 bar

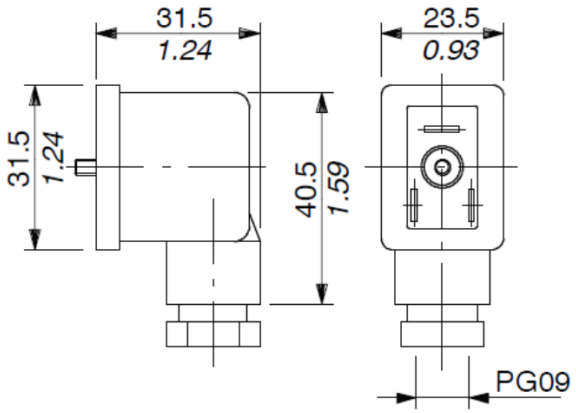
ON/OFF Electro pneumatic kit – 1EP

With spring return to neutral position



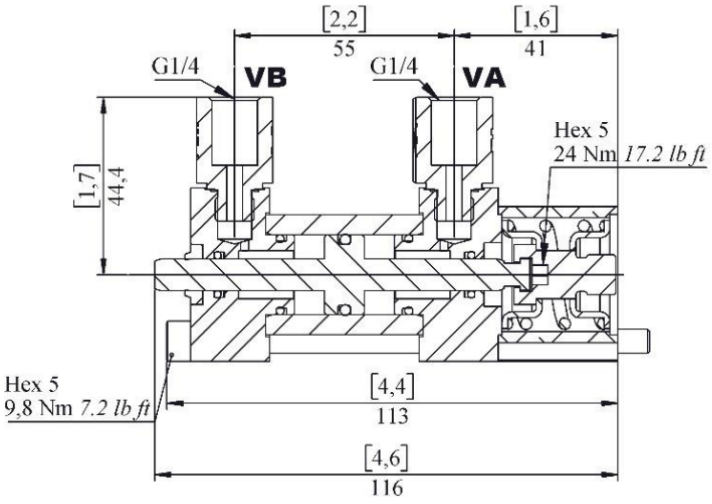
Connector specifications and operating features:

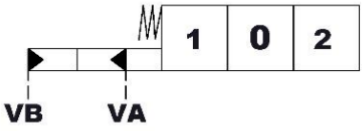
Pilot pressure: 5,5 bar (min.), 10 bar (max.)
Nominal voltage tolerance: ±10 %
Power rating: 4,8 W
Nominal current: 0,4 A – 12 VDC and 0,2 A – 24 VDC
Coil insulation: Class F
Weather protection: IP65
Duty cycle: 100%



Proportional hydraulic, single side kit - 1H

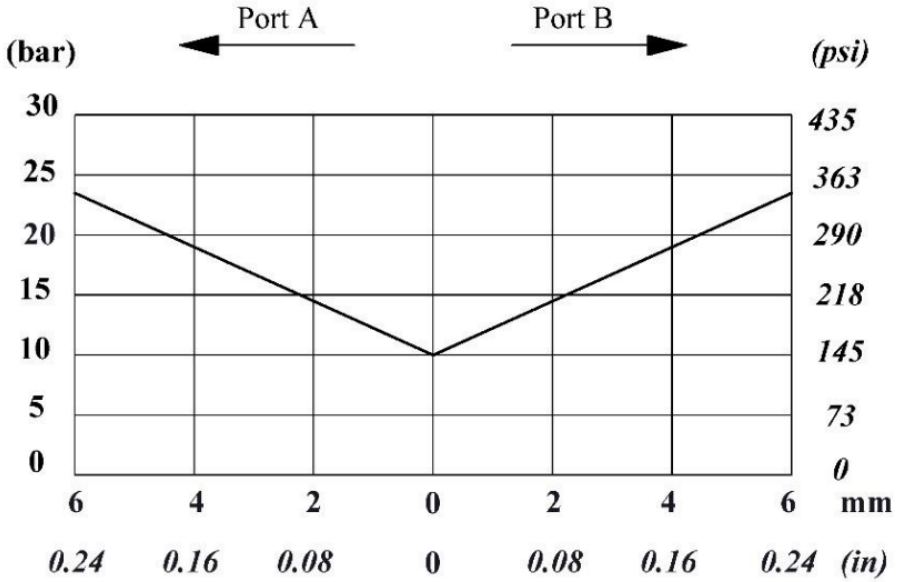
With spring return to neutral position





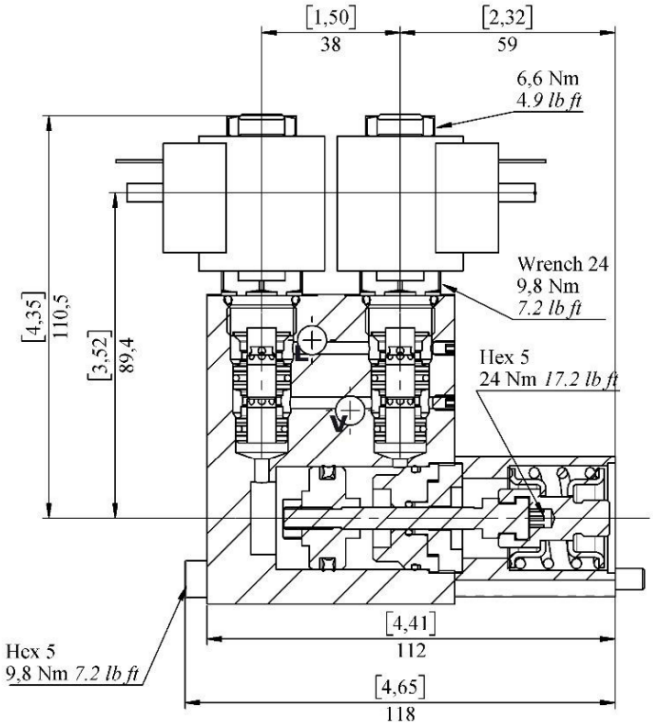
Pilot pressure max. 50 bar

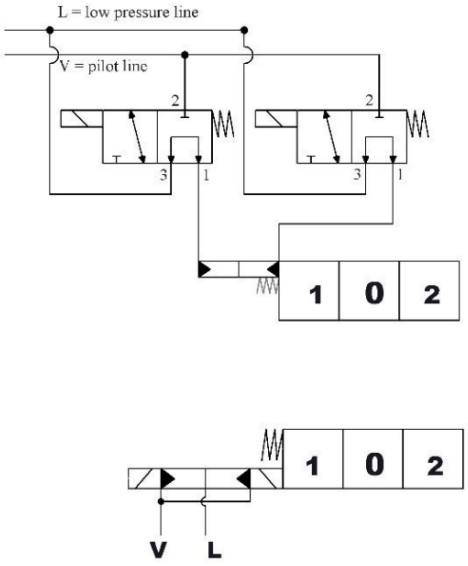
Pilot pressure - stroke diagram



ON/OFF electro-hydraulic kit - 1ED3

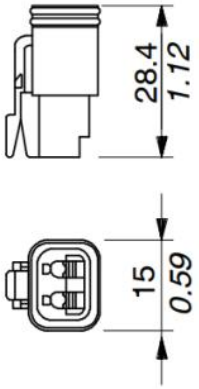
With spring return to neutral position



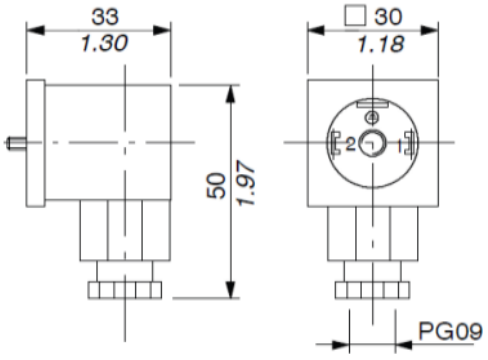


Connector specifications

2 poles, Deutsch DT06-2S
Male housing with female ends



2P+T according to ISO 4400 / EN175301-803



Operating features:

Pilot pressure: 10 bar (min.), 50 bar (max.)

Back pressure on drain L: 25 bar (max.)

Coil specifications:

Nominal voltage tolerance: ±10 %

Power rating: 21 W

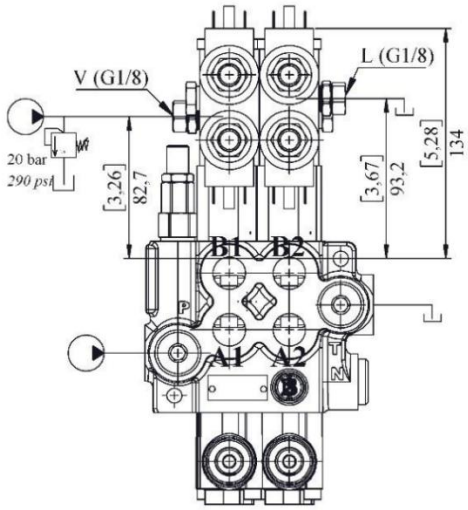
Nominal current: 1,75 A – 12 VDC / 0,87 A – 24 VDC

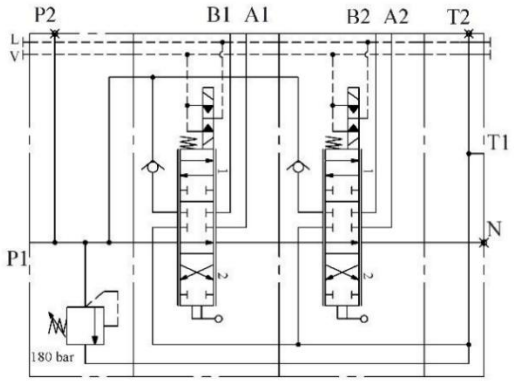
Coil insulation: Class F

Weather protection: IP65

Duty cycle: 100%

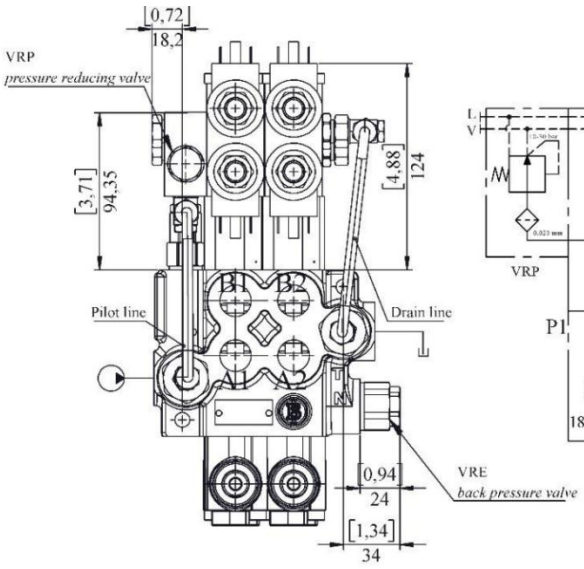
ON/OFF electro-hydraulic kit - 1ED3 with external drain

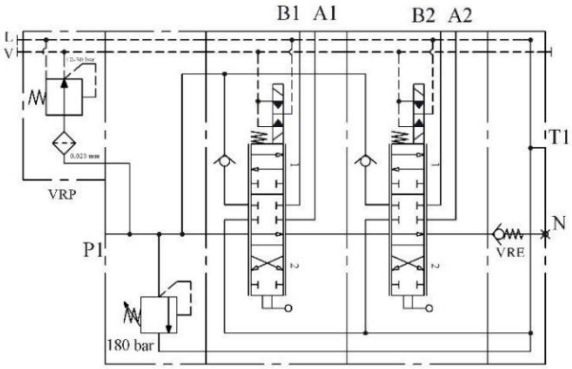




ON/OFF electro-hydraulic kit - 1ED3 with pilot and drain lines

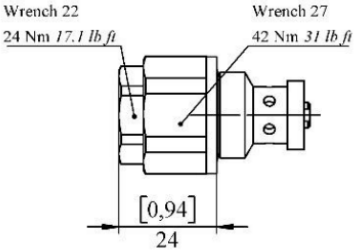
Kit consists of pressure reducing valve, VRP, back pressure valve VRE and pipes

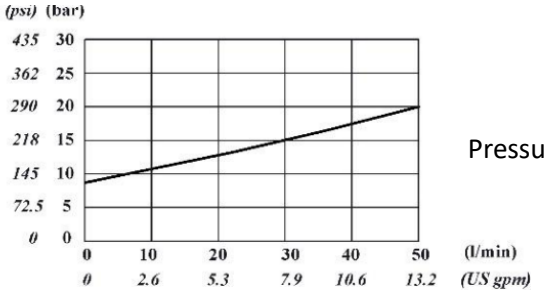




Back pressure valve (VRE) specifications

Valve is assembled on the bypass flow port N to provide pilot pressure to the actuator

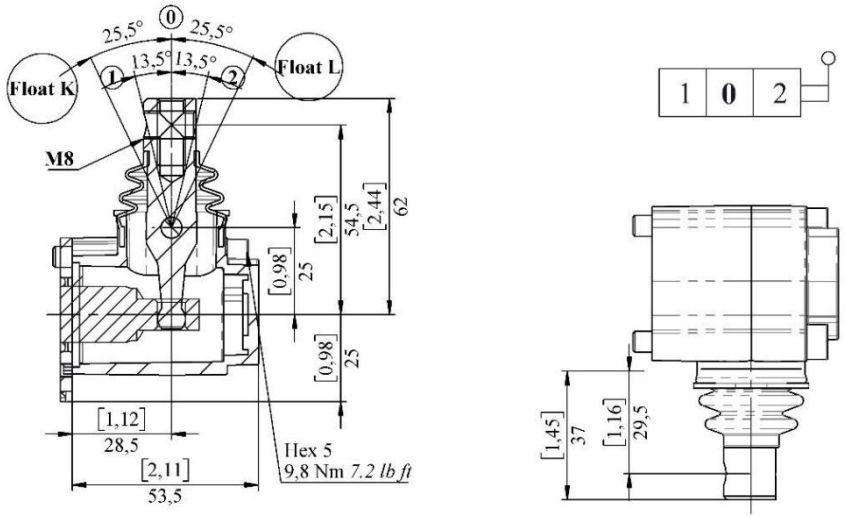




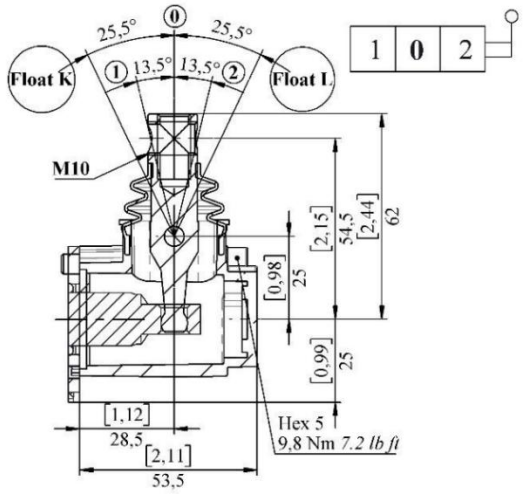
Pressure drop P-T

Lever control (Side A) – aluminum cap, with protection booth lever pivot box

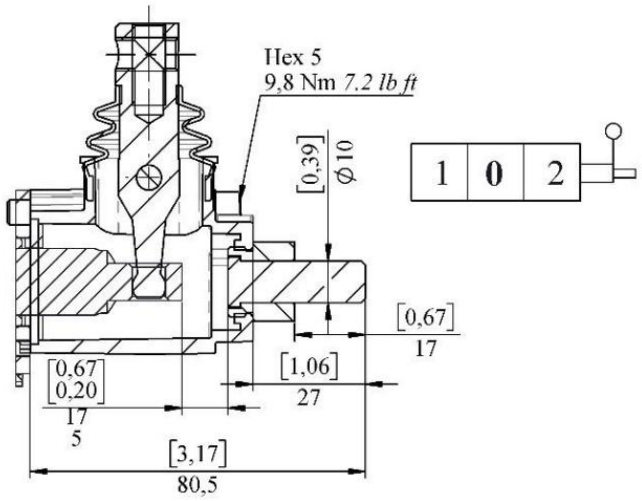
Type KZ and KZe



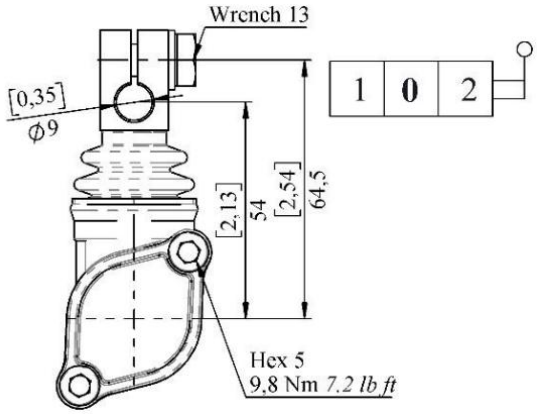
Type KZ (M10) and KZe (M10)



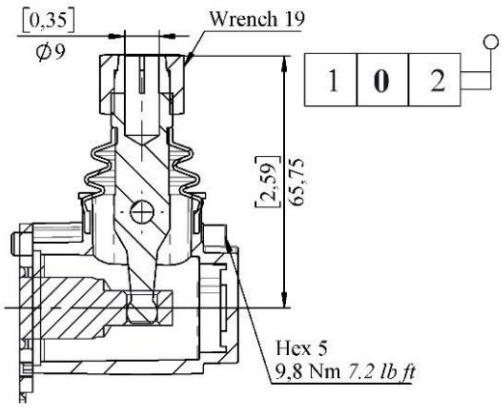
Kit KZT



Type KI



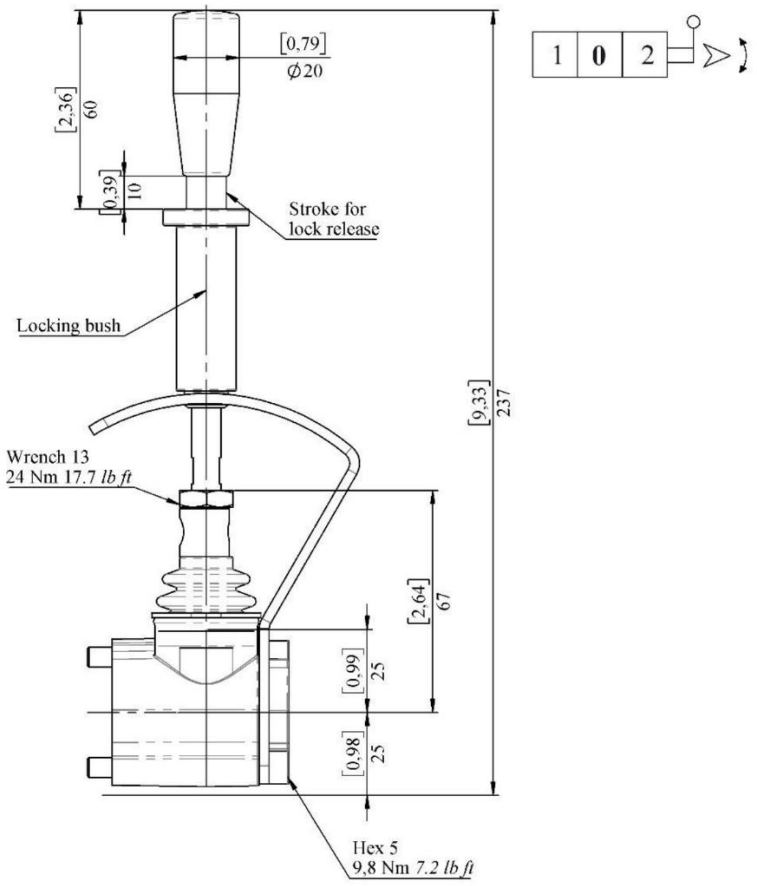
Type KY



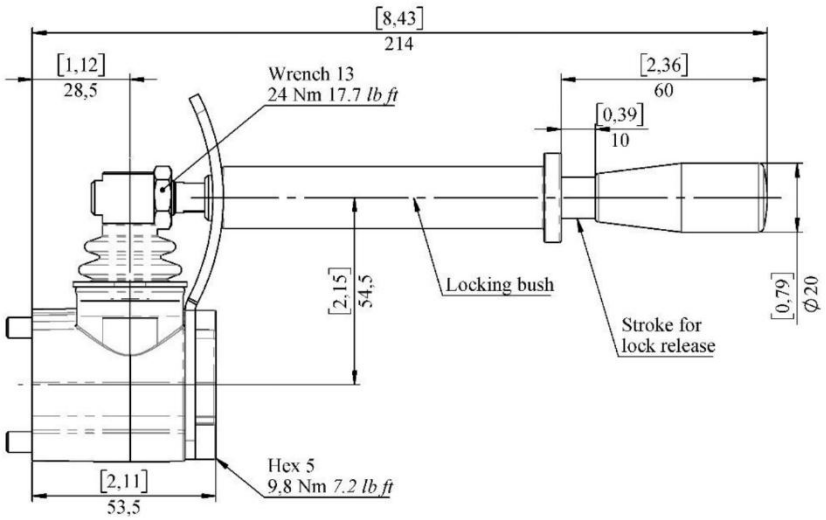
Special lever controls (side A)

Safety levers with neutral position lock, supplied complete with hand lever. The lever is activated by lifting the knob.

Type KZV

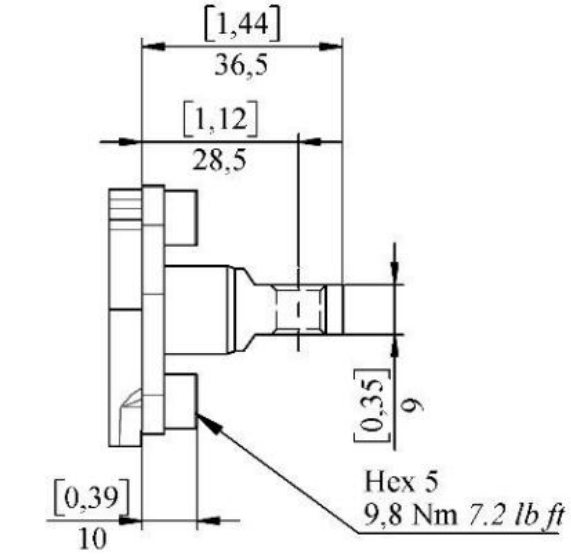


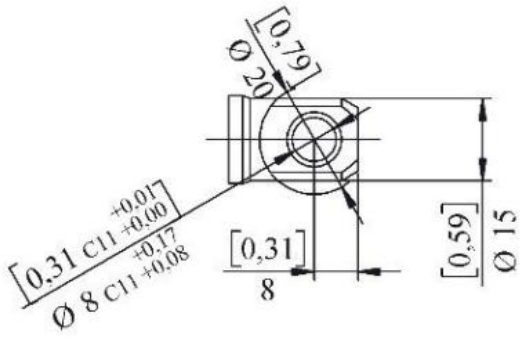
Type KZH



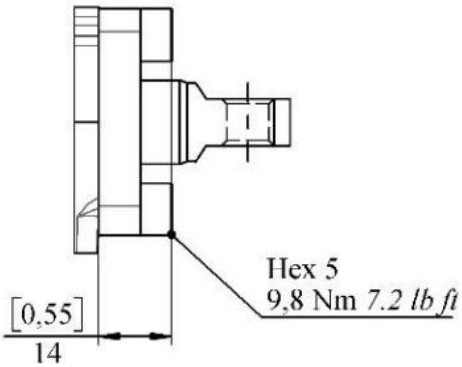
Other control arrangements (side A)

If in the order code side A is left blank, omit control type will be supplied:



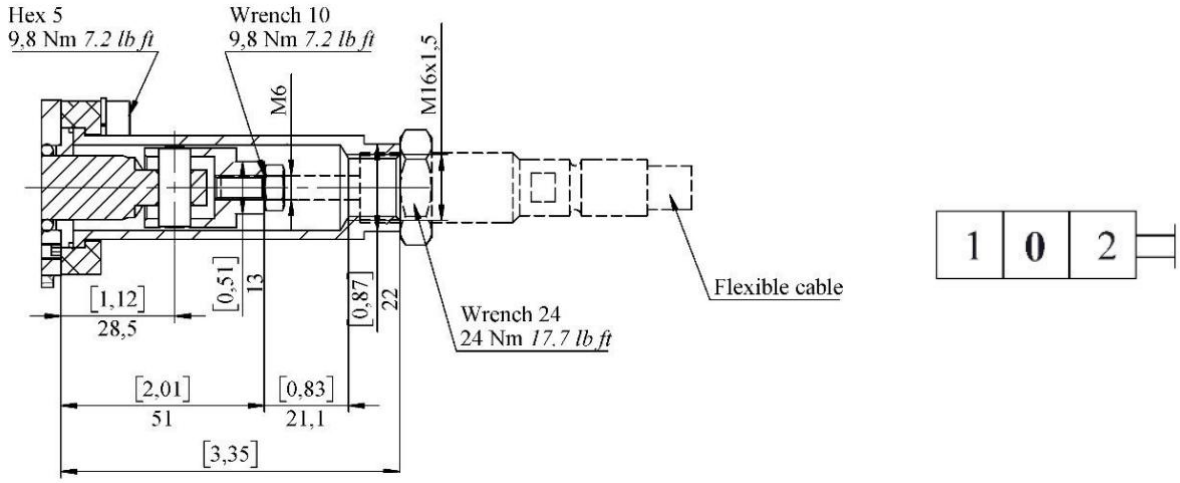


Type SLP

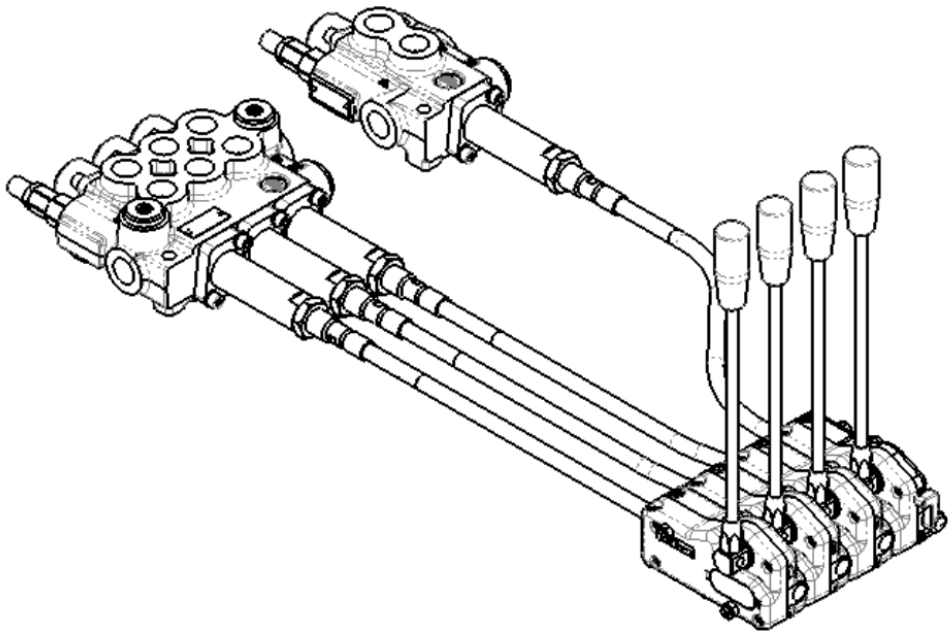


Mechanical control with dust-proof plate

Cable remote control – V1



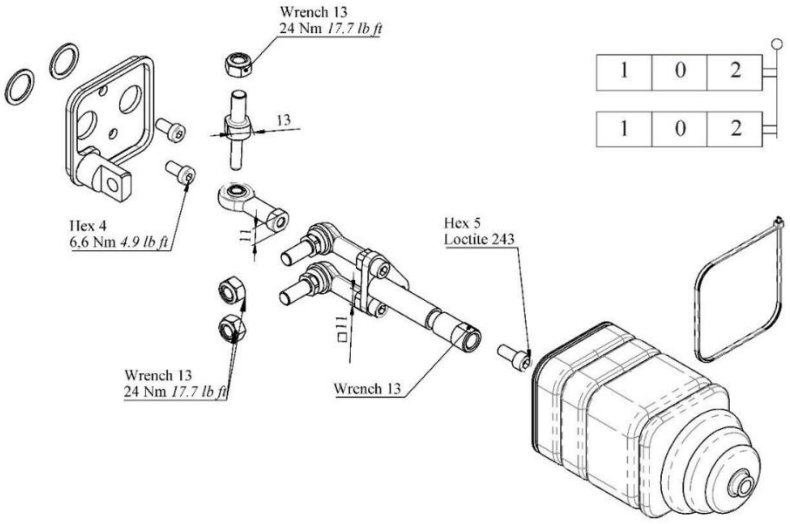
Control valves with V1



Controls for flexible cables	
3335	Mechanical joystick control for 2 spools without buttons
3375	Mechanical joystick control for 2 spools with 1 button
6008	Mechanical joystick control for 2 spools with 2 buttons
IS 3047	Single lever control
IS 3076	Single lever control with antireverse lock

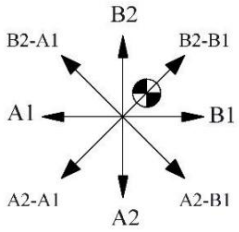
Flexible cable opitons code + length	
IT-731133	1 m
IT-731134	1,5 m
IT-731135	2 m
IT-731136	2,5 m
IT-731137	3 m
IT-731138	3,5 m
IT-731139	4 m

Mechanical joystick for two section control

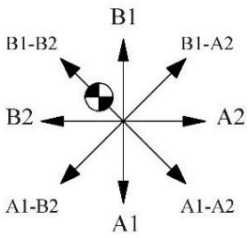


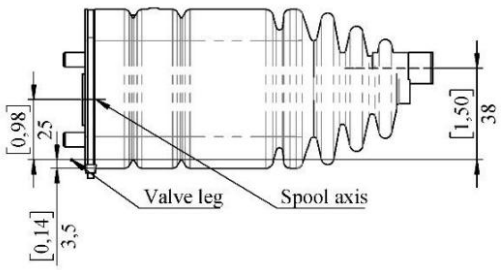
There are different types of hand levers, with different end executions - cylindrical handle, ball type handle, etc. has to be specified with order.

Type j+1
Pivot is above right

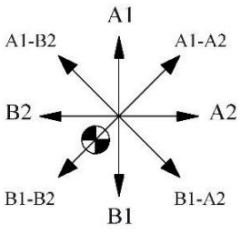


Type j+2
Pivot is above left

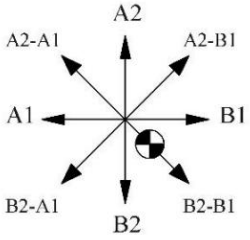


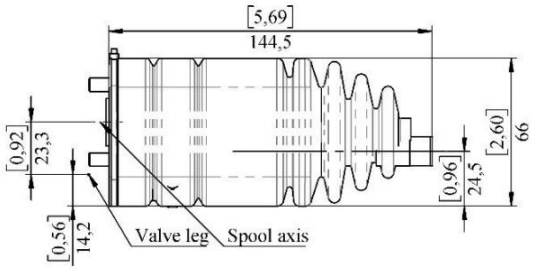


Type j+3
Pivot is above left

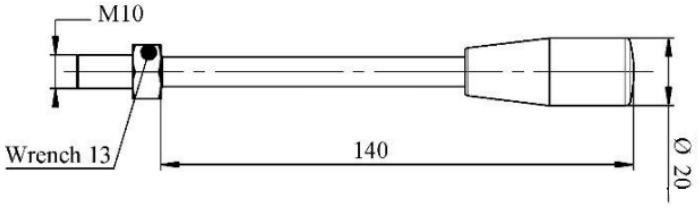


Type j+4
Pivot is above right





Standard hand lever dimensions

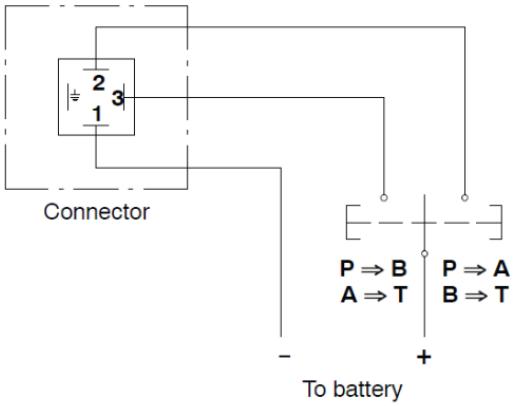


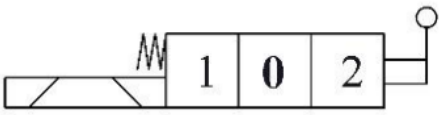
Complete control – double acting ON/OFF solenoid control

Complete control – 1ESDK1

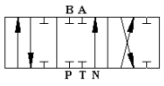
Direct control by double-acting solenoid with spring return to the neutral position, available for 1 to 8 spools, including 2-, 3- and 4-spool valve bodies with individual check valves (parallel and tandem versions).

Electric wiring example

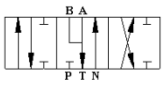




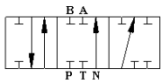
Available spool options



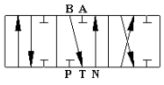
A(1ESD)



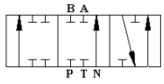
D(1ESD)



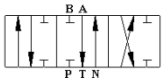
B(1ESD)



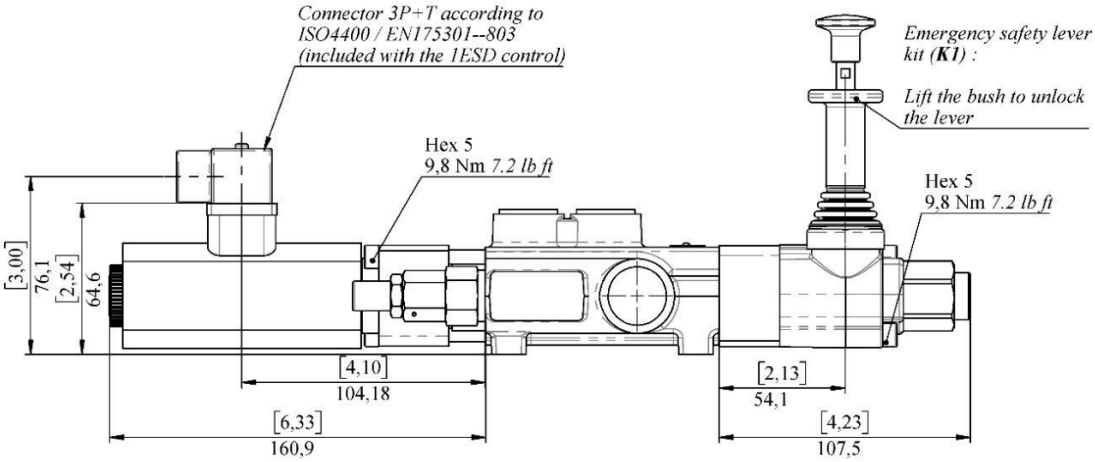
E(1ESD)



C(1ESD)



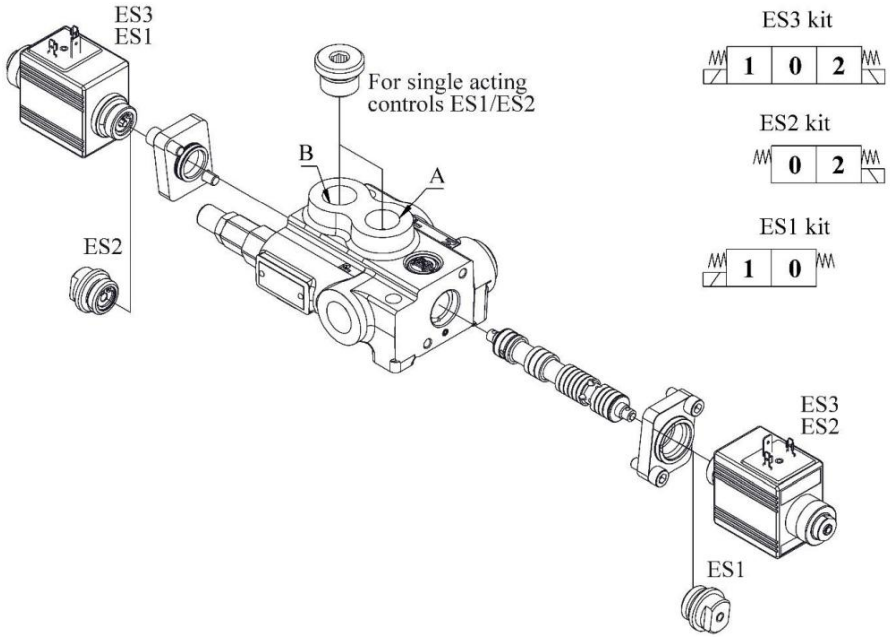
F(1ESD)



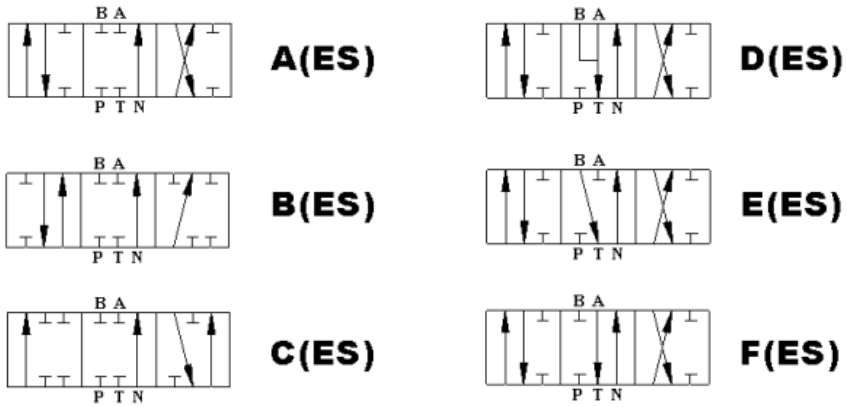
Complete control – single acting ON/OFF solenoid control

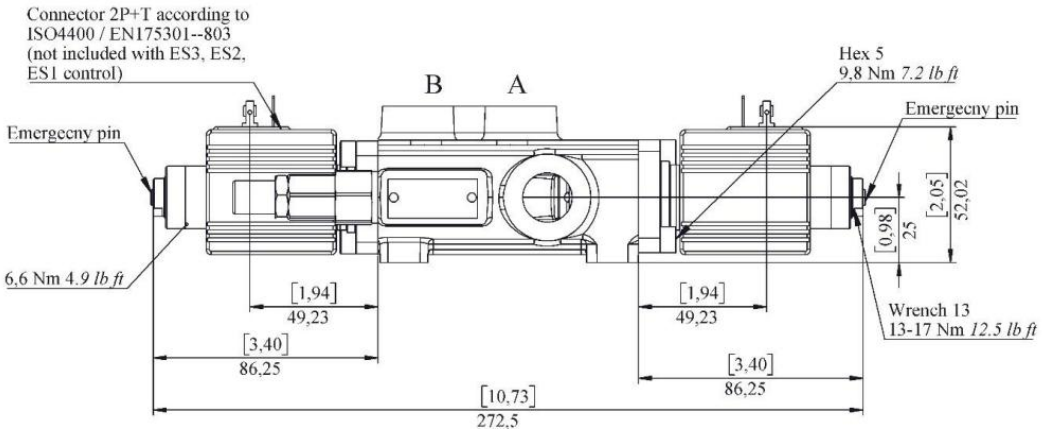
Complete control – ES3 / ES2 / ES1

Direct control by two single-acting solenoids with spring return to the neutral position (ES3) or by one single-acting solenoid (ES1 or ES2); available for 1 to 8 spools, including 2-, 3- and 4-spool valve bodies with individual check valves (parallel and tandem versions).



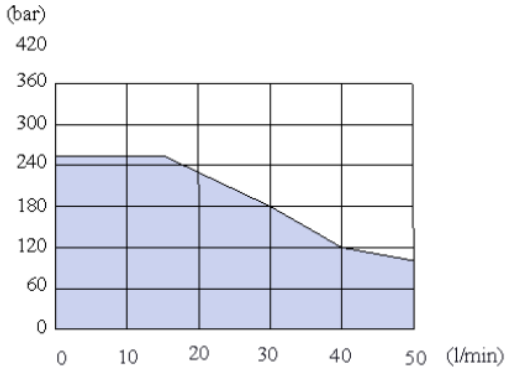
Available spool options:





Complete control – single acting ON/OFF solenoid control

Operating conditions

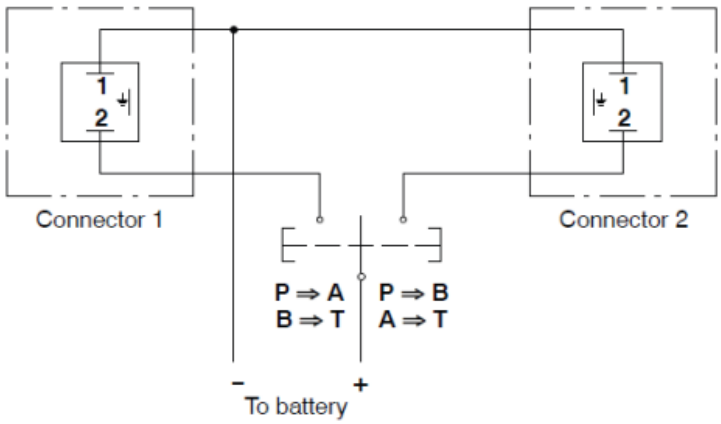


Operating features

Internal leakage (min.) A(B) to TΔp = 100 bar fluid and valve at 40°C

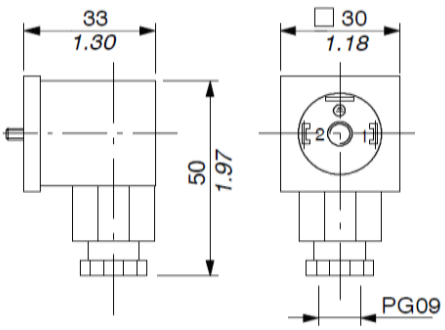
COIL specifications:
Nominal voltage tolerance: ±10 %
Power rating: 36 W
Current: 3 A - 12 VDC / 1,5 A - 24 VDC
Weather protection: IP65
Coil insulation: Class H
Duty cycle: 100%

Electric wiring example

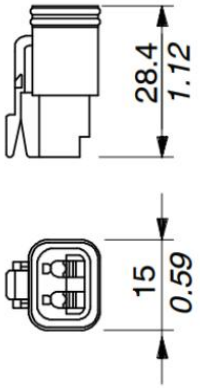


Connector specifications per type of coils available

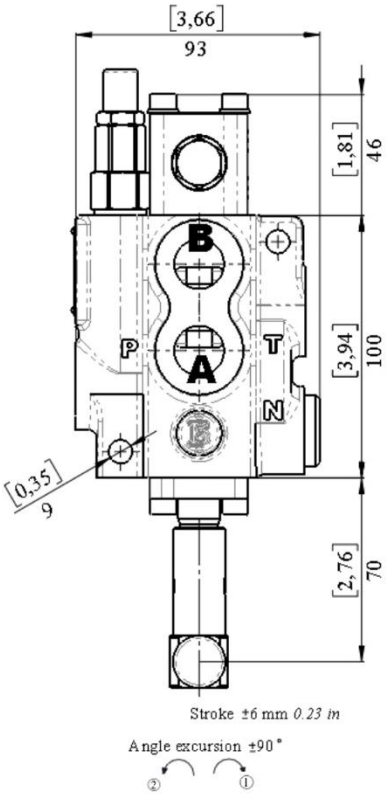
2P+T according to ISO 4400 / EN175301-803

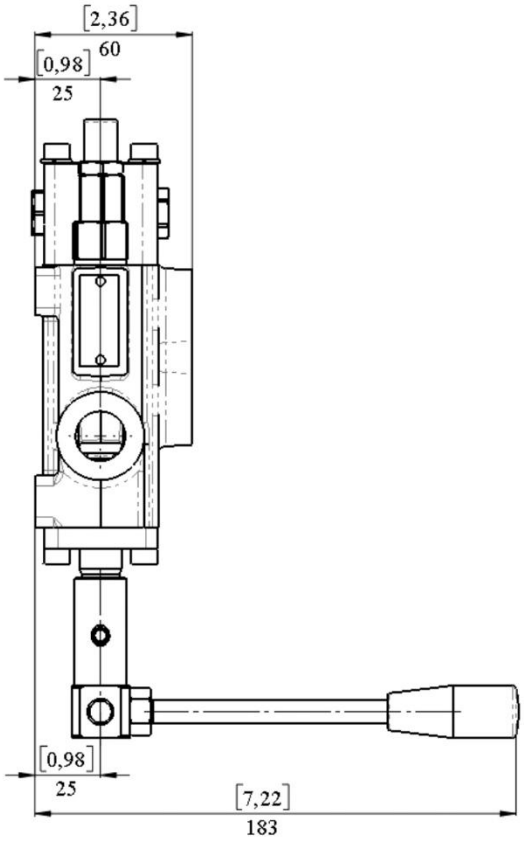


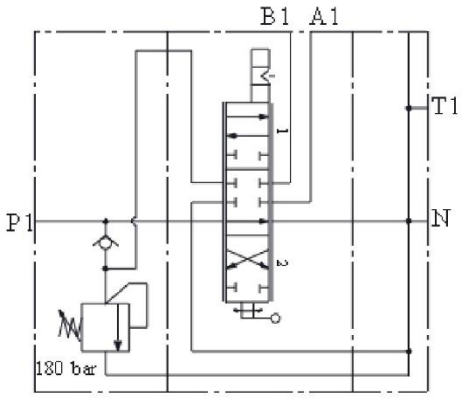
Connector specifications: 2 poles, type Deutsch DT06-2S, Male housing with female ends



Complete control – Rotary control A26



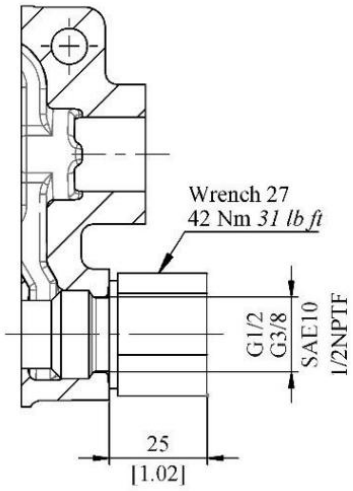


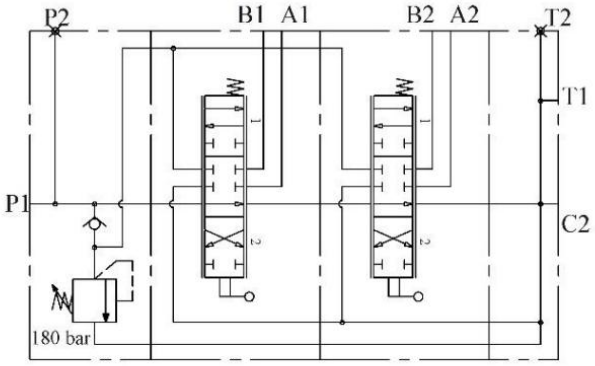


Outlet port options

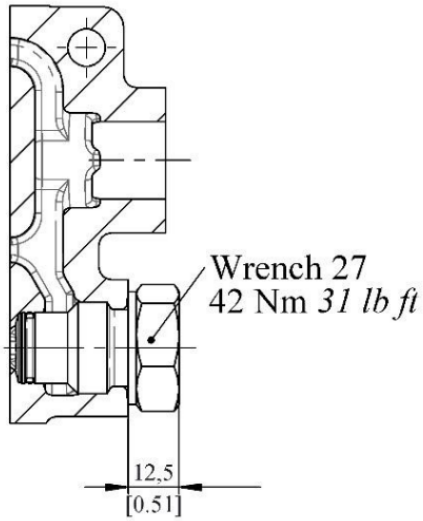
It is possible to have open centre, closed centre and high pressure carry-over (power beyond). If in the order code before the thread specification port N is plugged with standard G1/2 plug.

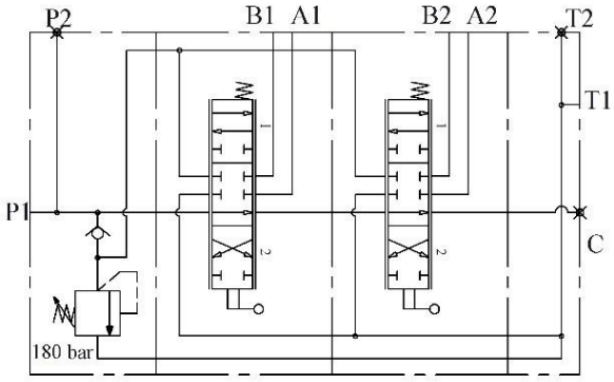
C2 - with carry-over (high pressure carry over)





C – closed center





C2D - Direct high pressure carry-over