



HYDRA

90L GM

PART

90L Monoblock Valves

Specifications

Spool: 1,2,3,4,5,6 | Double -Single -Closed Centre- Motor- Floating -Regenerative Spool

Litre: 90L Nominal -100L Max

Ports: 1/2 Standard- 3/4 Optional

Front Cap: Handle -Mechanical Joystick- Hydraulic Joystick- Remote Cable Control -Lock Handle

End Cap: Spring -Detent- Floating - Wood Splitter -Pneumatic -Proportional Coil -Hydraulic Control-

Electro Hydraulic-Remote Cable Control

Open Centre | Carry over | Parallel Circuit



Open Centre | Carry over | Parallel Circuit

Features

Simple, compact and heavy duty designed monoblock valves from 1 to 6 sections for open and closed centre hydraulic systems.

- ▶ fitted With Main Pressure Relief Valve and a load check valve.
- ▶ Available with parallel circuit.
- ▶ Optional carryover port
- ▶ Diameter 20 mm-0.79 in interchangeable spools.
- ▶ A wide variety of service ports and circuit valves.
- ▶ Available manual, pneumatic, hydraulic, electro-hydraulic and remote with flexible cables spool control kits.

Additional information

This catalogue shows the product in the most standard configurations. Please contact Sales Dpt. for more information that is detailed or special request.

WARNING!

All specifications of this catalogue refer to the standard product at this date. Approved Hydraulics Limited, oriented to a continuous improvement, reserves the right to discontinue, modify or revise the specifications, without notice.

APPROVED HYDRAULICS LIMITED IS NOT RESPONSIBLE FOR ANY DAMAGE CAUSED BY AN INCORRECT USE OF THE PRODUCT.

1st edition January 2023:

Directional valve with left inlet

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Directional valve 90L GMC10 with parallel circuit.....	: page 34
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Valve general information

Working conditions

This catalogue shows technical specifications and diagrams measured with mineral oil of 46 mm²/s (46cSt) viscosity at 40°C (104°F) temperature.

Nominal flow rating		90 l/min.	24 US gpm
Max. flow		100 l	26 US gpm
Operating pressure (max.)		315 bar	4600 psi
Back pressure (max.)	T outlet port	20 bar	290 psi
Internal leakage (standard) A(B) T	p=100 bar (1450 psi)	3cm ³ /min.	0.18 in ³ /min.
Hydraulic fluid		Mineral base oil	
Fluid temperature	with NBR seals	from - 20° to 80°C	from -4°F to 176°F
	with FPM (VITON) seals	from - 20° to 100°C	from -4°F to 212°F
Viscosity	operating range	from 15 to 75 mm ² /s	from 15 to 75 cSt
	min.	12 mm ² /s	12 cSt
	max.	400 mm ² /s	400 cSt
Max. contamination level		-/19/16 - ISO 4406	NAS 1638 - class 10
Ambient temperature for working conditions	with mechanical devices	from -40°C to 60°C	from -40°F to 140°F
	with pneumatic and hydraulic devices	from -30°C to 80°C	from -22°F to 140°F
	with electric devices	from -20°C to 50°C	from -4°F to 122°F

Standard threads

REFERENCE STANDARD

	BSP	UN-UNF	METRIC
THREAD ACCORDING TO	ISO 228/1	ISO 263	ISO 262
	BS 2779	ANSI B1.1 unified	
CAVITY DIMENSION ACCORDING TO	ISO 1179-1	11926-1	9974-1
	SAE	J1926-1	J2244
	DIN 3852-2 shape X or Y		3852-1 shape X or Y

PORTS THREADING

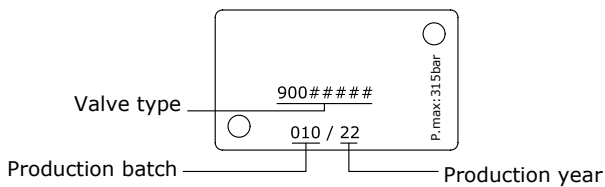
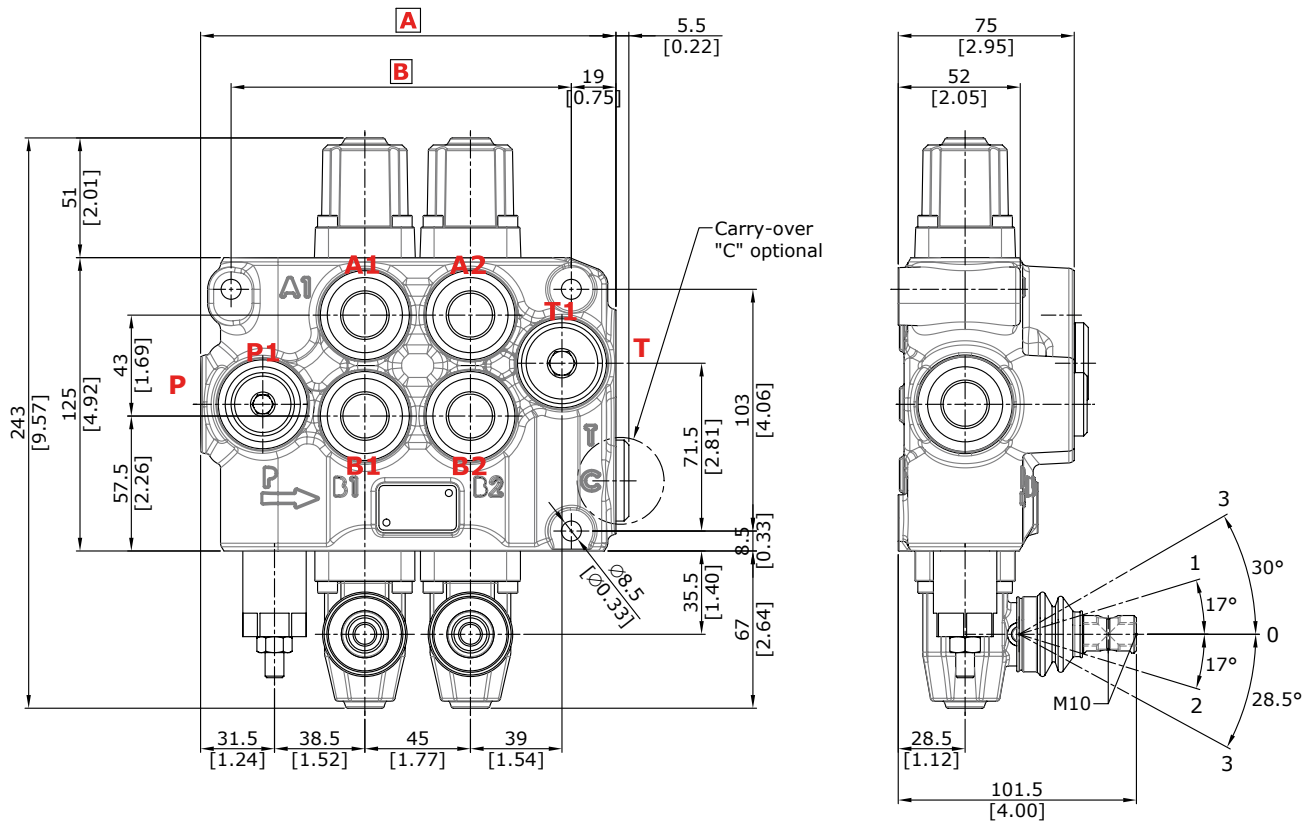
MAIN PORTS	BSP	OPTIONAL	UN-UNF	METRIC
P inlet and C carry-over	G 1/2	G 3/4	7/8-14 (SAE 10)	M18x1.5
A and B ports	G 1/2	G 3/4	3/4-16 (SAE 8)	M18x1.5
T outlet	G 3/4	G 3/4	7/8-14 (SAE 10)	M22x1.5
PILOT PORTS				
Hydraulic	G 1/4	-	-	-
Pneumatic	G 1/8	-	-	-

90L GM



directional valve with left inlet

Dimensional data (parallel circuit)



TYPE	A		B		Weight	
	mm	in	mm	in	Kg	lb
90L GM10/1-P	132	5.20	100	3.94	5.8	12.80
90L GM10/2-P	177	6.97	145	5.71	8.3	18.30
90L GM10/3-P	222	8.74	190	7.48	10.9	24.00

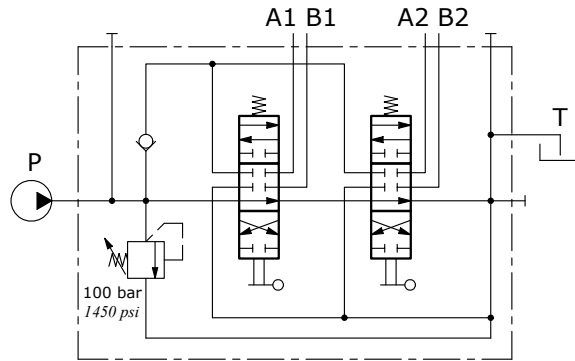
TYPE	A		B		Weight	
	mm	in	mm	in	Kg	lb
90L GM10/4-P	267	10.51	235	9.25	13.4	29.50
90L GM10/5-P	312	12.28	280	11.02	16.5	36.40
90L GM10/6-P	357	14.06	325	12.80	19.2	42.30

NOTE - Drawings and dimensions are referred to **BSP** thread configuration.

directional valve with left inlet

Hydraulic circuit

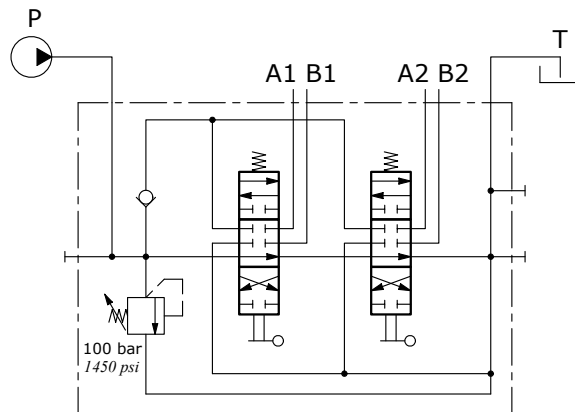
Standard configuration



Description example

90L GM10/2-P(X-100)/18L/18L/AET-PSL4

Upper inlet and outlet ports configuration



Description example

90L GM10/2-P(X-100)/18L/18L/AET-PSA4

directional valve with left inlet

Ordering codes

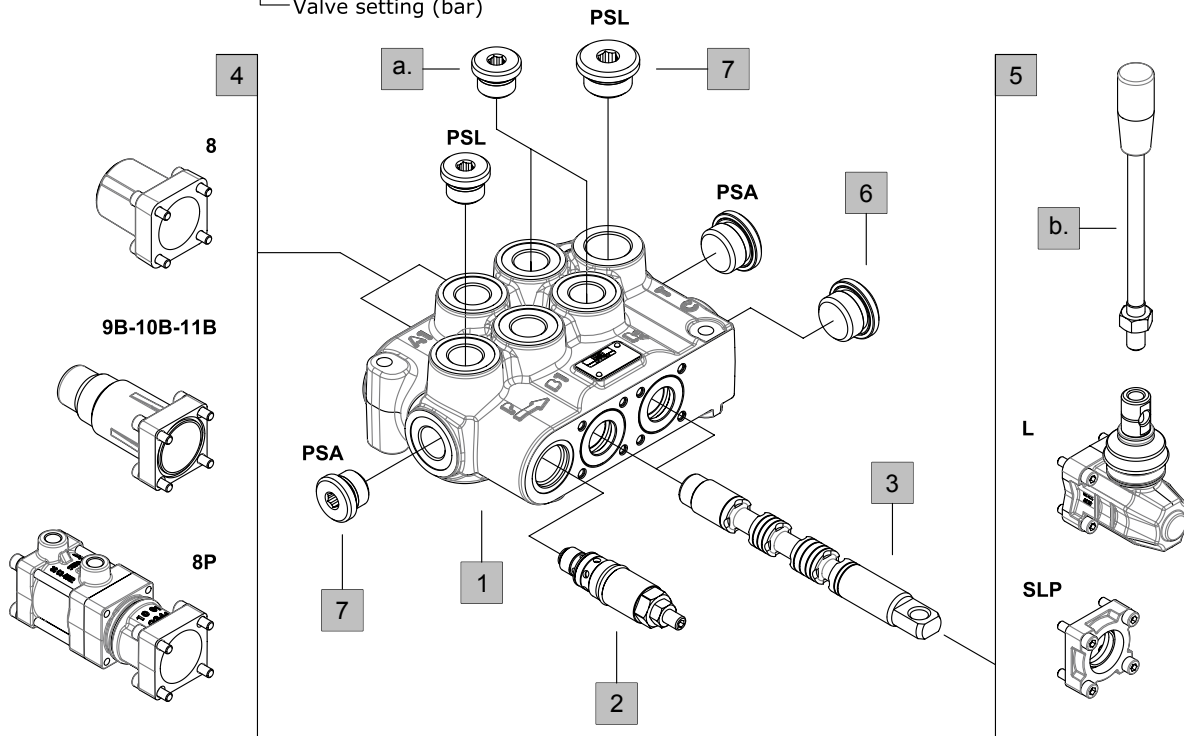
Description example:

90L GM10 / 2 - P (X - 100) / 1 8 L / 18L / AET - PSL4

1st section following section

1 2 3 4 5 6 7

Valve setting (bar)



1. Body kits *

TYPE	CODE	DESCRIPTION
1-P	30 08 9110	Parallel, 1 section
2-P	30 08 9111	Parallel, 2 sections
3-P	30 08 9112	Parallel, 3 sections
4-P	30 08 9113	Parallel, 4 sections
5-P	30 08 9114	Parallel, 5 sections
6-P	30 08 9115	Parallel, 6 sections

Include body, seals, rings and load check valve.

2. Inlet relief options page 9

TYPE	CODE	DESCRIPTION
Direct pressure relief valve X type (standard)		
(X-100)	30 05 4912	Range 60-315 bar (870-4570 psi) standard setting 100 bar (1450 psi)

TYPE	CODE	DESCRIPTION
Pilot operated pressure relief valve Z type		
(Z-100)	30 05 4915	Range 60-315 bar (870-4570 psi) standard setting 100 bar (1450 psi)

Standard setting is referred to 6 l/min flow.
(V) 30 05 4914 Relief valve blanking plug

3. Spools page 11

TYPE	CODE	DESCRIPTION
1	30 01 3568	Double acting, 3 positions, with A and B closed in neutral position
1(11A)	30 01 3575	As previous, need 11A spool positioner and dedicated working section kit
1A	30 01 3645	Double acting, 3 positions, with A open to tank in neutral position
1B	30 01 3646	Double acting, 3 positions, with B open to tank in neutral position
2	30 01 3571	Double acting, 3 positions, with A and B to tank in neutral position
2H	30 01 3572	Double acting, 3 positions, with A and B partially open to tank in neutral position
3	30 01 3573	Single acting on A, 3 positions, B plugged; requires G1/2 plug (see part a)
4	30 01 3574	Single acting on B, 3 positions, A plugged; requires G1/2 plug (see part a)
D4	30 01 3580	Double acting, 2 positions, without neutral position
5BY	30 01 3569	Double acting, 4 positions, float in position 3 with spool out, 13QN type positioner kit is required
5DY	30 01 3570	Double acting, 4 positions, float in position 3 with spool in, 13NZ type positioner kit is required

NOTE (*) - Codes are referred to **BSP** thread.

directional valve with left inlet

Ordering codes

4. "A" side spool positioners page 12

TYPE	CODE	DESCRIPTION
8	30 07 5375	With spring return in neutral position
8D	30 07 5383	As type 8, M8 female threaded pin extension for dual control
8D1	30 07 5402	As type 8, pin with Ø 8 mm (0.31 in) radial hole
8D2	30 07 5384	As type 8, M8 male threaded pin extension for dual control
8TL	30 07 5397	As type 8, for flexible cable control
8F2	30 07 5377	As type 8 with adjustable stroke limiter
8T	30 07 5376	With spring return in neutral position, for single acting spool type 3 and 4
19	30 07 5436	With spring return in position 0 from 1
20	30 07 5437	With spring return in position 0 from 2
11	30 07 5378	Detent in positions neutral, 1 and 2
12	30 07 5438	Detent in positions 1 and 2
15	30 07 5439	2 positions, detent in positions 1 and neutral
16	30 07 5440	2 positions, detent in positions 2 and neutral
17	30 07 5441	With spring return position 1
18	30 07 5381	With spring return position 2
17D	30 07 5442	With spring return position 1 and pin with M8 female thread for dual control
18D	30 07 5382	With spring return position 2 and pin with M8 female thread for dual control
9B	30 07 5386	With detent in position 1 and spring return in neutral position
10B	30 07 5387	With detent in position 2 and spring return in neutral position
11B	30 07 5388	Detent in positions 1 and 2 and spring return in neutral position
9BT	30 07 5389	With detent in position 1 and spring return in neutral position, for single acting spool type 3 and 4
10BT	30 07 5390	With detent in position 2 and spring return in neutral position, for single acting spool type 3 and 4
11BT	30 07 5391	Detent in positions 1 and 2 and spring return in neutral position, for single acting spool type 3 and 4
8K	30 07 7553	As type 8 and 12 VDC solenoid lock device
	30 07 7554	As previous, 24 VDC
8MG1(NO)	30 07 7538	As type 8, operation with microswitch (NO) in position 1
8MG1(NC)	30 07 7539	As previous, (NC)
8MG2(NO)	30 07 7536	As type 8, operation with microswitch (NO) in position 2
8MG2(NC)	30 07 7537	As previous, (NC)
8MG3(NO)	30 07 5562	As type 8, operation with microswitch (NO) in positions 1 and 2
8MG3(NC)	30 07 5563	As previous, (NC)
8P	30 07 5399	ON/OFF pneumatic kit
8PF	30 07 5596	Proportional pneumatic kit
8EP3	30 07 5443	12 VDC ON/OFF electro-pneumatic kit
8EP4	30 07 5400	24 VDC ON/OFF electro-pneumatic kit with manifold
	30 07 5345	12 VDC ON/OFF electro-pneumatic kit with manifold
	30 07 5346	24 VDC ON/OFF electro-pneumatic kit with manifold
8IZ	30 07 7542	Unilateral hydraulic proportional spool control kit
8EI3	30 07 5401	12 VDC ON/OFF electro-hydraulic kit
	30 07 5361	24 VDC ON/OFF electro-hydraulic kit
8EI3F	30 07 7565	12 VDC Proportional electro-hydraulic kit
	30 07 7566	24 VDC Proportional electro-hydraulic kit
11NZ	30 07 5394	Detent in positions neutral, 1,2 and detent in pos.3: for 5DY spool
11A	30 07 7601	With detent in positions 1 and 2, automatic release in neutral position

4. "A" side spool positioners

TYPE	CODE	DESCRIPTION
13NZ	30 07 5393	4 positions with spring return in neutral position and detent in pos.3: for 5DY spool
13QN	30 07 5392	4 positions with spring return in neutral position and detent in pos.3: for 5BY spool

5. "B" side options page 22

TYPE	CODE	DESCRIPTION
L	30 07 5403	Standard lever box
LF1	30 07 5405	Lever box with spool stroke limiter in position 1
LB	30 07 5407	Steel lever kit (LB1-LB3)
	30 07 5571	Steel lever kit (LB2-LB4)
	30 07 7556	Steel lever kit (LB5-LB7)
LCB	30 07 5433	Joystick lever for 2 sections operation
SL	-	Without lever box
SLP	30 07 5406	Without lever box, with dust-proof plate
TQ	30 07 5398	Flexible cable connection; for CT cables
LEB	30 07 5409	Safety lever box, vertical configuration
SLCZ	30 07 5347	Without lever box, with endcap.

6. Outlet port options * page 32

TYPE	CODE	DESCRIPTION
AET	30 05 4920	Open centre plug
AEK	30 05 4931	Closed centre plug
AE1	30 05 4929	G1/2 carry-over sleeve
AE2	30 05 4930	G3/4 carry-over sleeve

7. Inlet and outlet selection * page 6

TYPE	CODE	DESCRIPTION
PSL4	30 05 4919	G1/2 plug for upper inlet
	30 05 4920	G3/4 plug for upper outlet
PSA4	30 05 4919	G1/2 plug for side inlet
	30 05 4920	G3/4 plug for side outlet

8. Complete controls * page 26

TYPE	CODE	DESCRIPTION
ON/OFF Hydraulic control		
8IM	30 07 5414	ON/OFF Hydraulic control
8IMF3	30 07 7569	With screws spool stroke adjusting.
13IM	30 07 5431	For floating circuit. need P5DY working section and 5DY spool type

Proportional hydraulic kit

8IMSPSD	30 07 7559	With spool position sensor execution. (ON/OFF)
8IMSPSL	30 07 7562	With spool position sensor execution.

Rotative control type

R	30 07 5379	Rotative control type
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a. "A" and "B" ports plugs *

TYPE	CODE	DESCRIPTION
G1/2	30 05 4919	For single acting spools type 3 and 4

b. Optional hand levers

TYPE	CODE	DESCRIPTION
M10x225	20 03 2381	Lenght L = 225mm / 8.86in

NOTE (*) – Codes are referred to **BSP** thread.

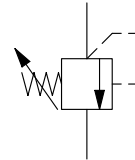
directional valve with left inlet

Inlet relief options

Direct pressure relief valve

30 05 4912 (**X - 100**)

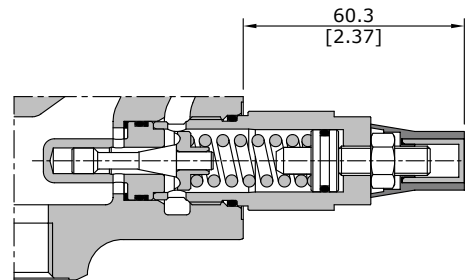
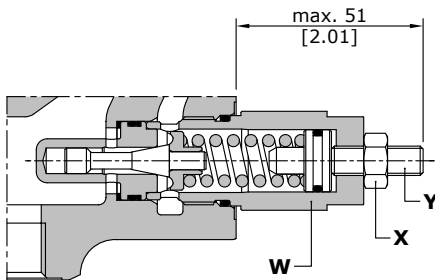
Configuration ——— Valve setting (bar)



Adjustment type

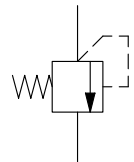
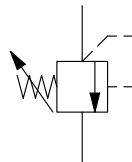
Configuration **X** type: adjustable with screw

Configuration **XH** type: valve set and locked



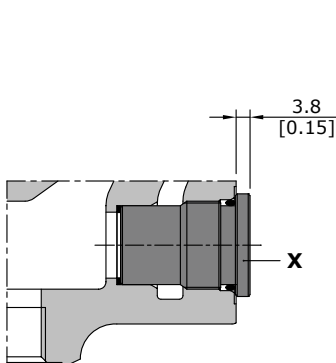
Wrenches and tightening torques

- X = wrench 13 - 24 Nm (17.7 lbf_t)
- Y = allen wrench 4
- W = wrench 24 - 42 Nm (31 lbf_t)



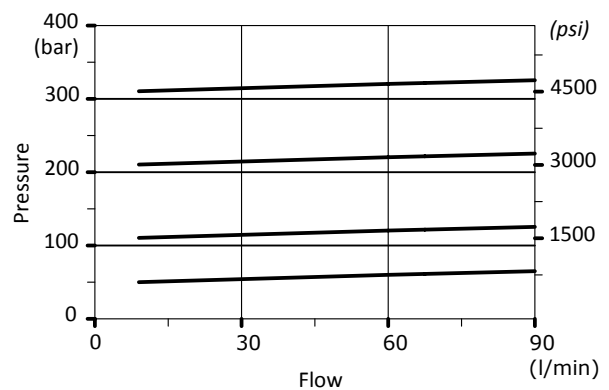
V: relief valve blanking plug

Performance data



Wrenches and tightening torques

- X = allen wrench 10 - 42 Nm (31 lbf_t)



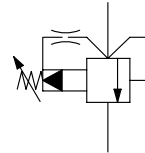
directional valve with left inlet

Inlet relief options

Pilot pressure relief valve

30 05 4915 (**Z** - **100**)

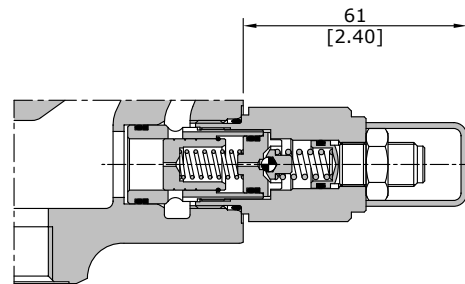
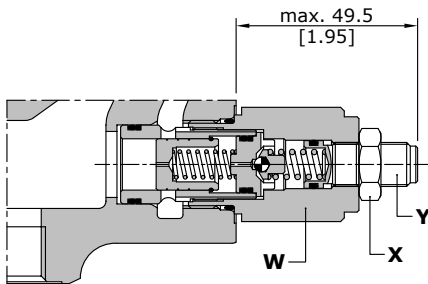
Configuration ——— Valve setting (bar)



Adjustment type

Configuration **Z** type: adjustable with screw

Configuration **ZH** type: valve set and locked

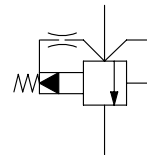
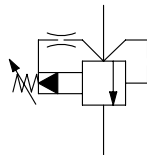


Wrenches and tightening torques

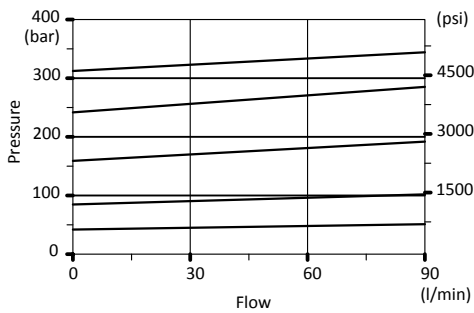
X = wrench 19 - 24 Nm (17.7 lbf_t)

Y = allen wrench 5

W = wrench 27 - 42 Nm (31 lbf_t)



Performance data

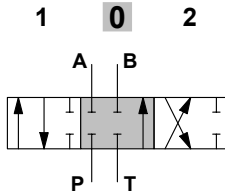


directional valve with left inlet

Spools options

1 (30 01 3568) spool type

Double acting, 3 positions, with A and B closed in neutral position

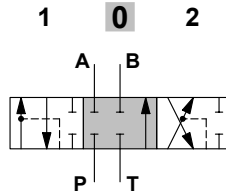


Spool stroke

position 1: + 7 mm (+ 0.28 in)
position 2: - 7 mm (- 0.28 in)

1(11A) (30 01 3575) spool type

Double acting, 3 positions, with A and B closed in neutral position

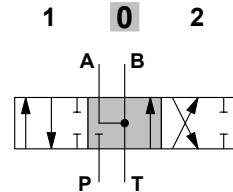


Spool stroke

position 1: + 7 mm (+ 0.28 in)
position 2: - 7 mm (- 0.28 in)

2 (30 01 3571) spool type

Double acting, 3 positions, with A and B open to tank in neutral position

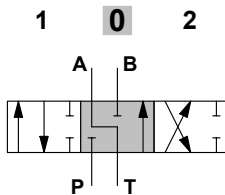


Spool stroke

position 1: + 7 mm (+ 0.28 in)
position 2: - 7 mm (- 0.28 in)

1A (30 01 3645) spool type

Double acting, 3 positions, with A open to tank in neutral position

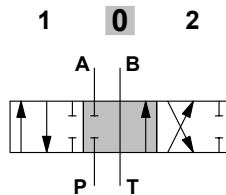


Spool stroke

position 1: + 7 mm (+ 0.28 in)
position 2: - 7 mm (- 0.28 in)

1B (30 01 3646) spool type

Double acting, 3 positions, with B open to tank in neutral position

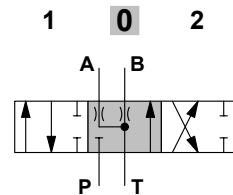


Spool stroke

position 1: + 7 mm (+ 0.28 in)
position 2: - 7 mm (- 0.28 in)

2H (30 01 3572) spool type

Double acting, 3 positions, with A and B partially open to tank in neutral position

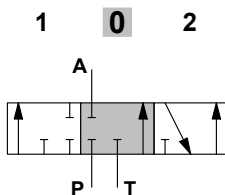


Spool stroke

position 1: + 7 mm (+ 0.28 in)
position 2: - 7 mm (- 0.28 in)

3 (30 01 3573) spool type

Single acting on A, 3 positions, B plugged; requires G1/2 plug

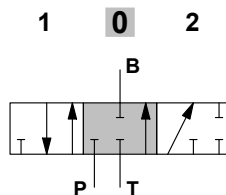


Spool stroke

position 1: + 4.5 mm (+ 0.18 in)
position 2: - 4.5 mm (- 0.18 in)

4 (30 01 3574) spool type

Single acting on B, 3 positions, A plugged; requires G1/2 plug

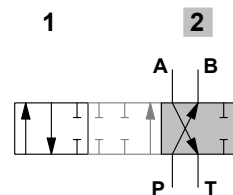


Spool stroke

position 1: + 4.5 mm (+ 0.18 in)
position 2: - 4.5 mm (- 0.18 in)

D4 (30 01 3580) spool type

Double acting, 2 positions, without neutral position

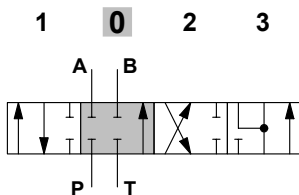


Spool stroke

position 1: + 12 mm (+ 0.48 in)

5DY (30 01 3570) spool type

Double acting, with A and B closed in neutral position, 4 positions, floating in position 3, with spool in

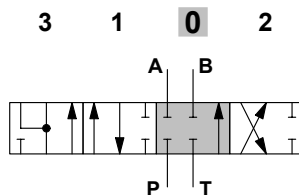


Spool stroke

position 1: + 6 mm (+ 0.24 in)
position 2: - 5 mm (- 0.20 in)
position 3: - 10.5 mm (- 0.41 in)

5BY (30 01 3569) spool type

Double acting, with A and B closed in neutral position, 4 positions, floating in position 3, with spool out



Spool stroke

position 3: + 12 mm (+ 0.47 in)
position 1: + 6 mm (+ 0.24 in)
position 2: - 6 mm (- 0.24 in)

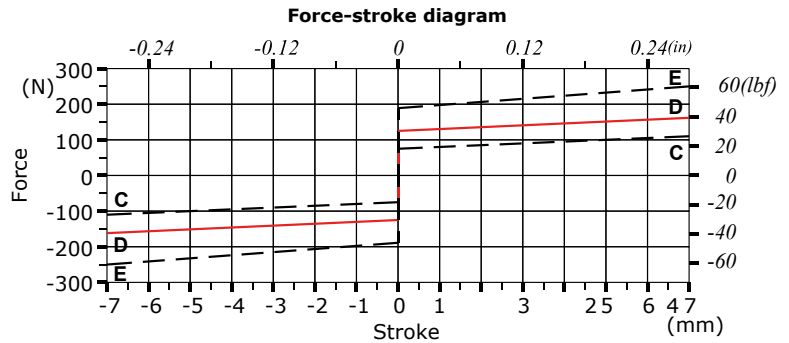
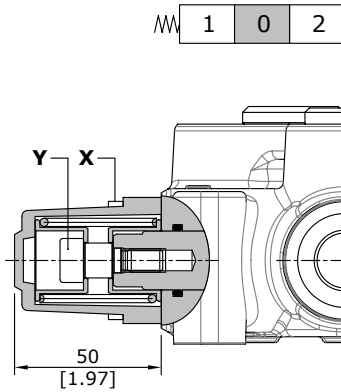
directional valve with left inlet

"A" side spool positioners

With spring return in neutral position

8 type (30 07 5375)

It's supplied with standard spring type D (see force-stroke diagram) and available with lighter spring type C (**8MC**) or heavier type E (**8ME**).

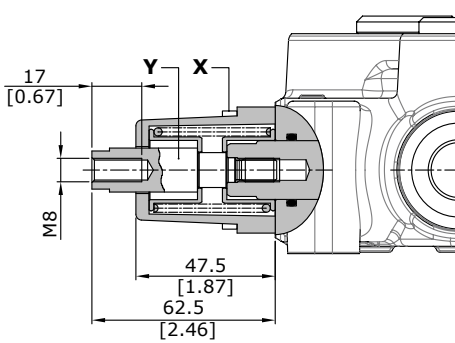


Wrenches and tightening torques

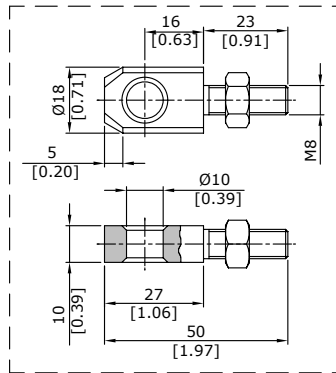
X = allen wrench 4 - 6 Nm (4.4 lbf_t)
Y = allen wrench 6 - 24 Nm (17.7 lbf_t)

8D type (30 07 5383)

With M8 female threaded pin extension for dual control.



Spool end joint dimensions (optional)



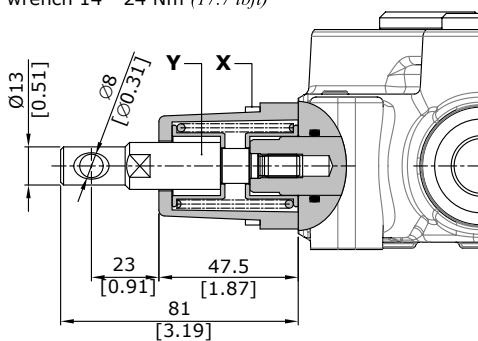
Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbf_t)
Y = wrench 13 - 24 Nm (17.7 lbf_t)

8D1 type (30 07 5402)

Wrenches and tightening torques

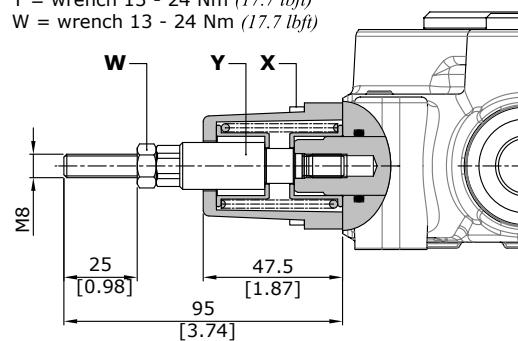
X = allen wrench 4 - 6 Nm (4.4 lbf_t)
Y = wrench 14 - 24 Nm (17.7 lbf_t)



8D2 type (30 07 5384)

Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbf_t)
Y = wrench 13 - 24 Nm (17.7 lbf_t)
W = wrench 13 - 24 Nm (17.7 lbf_t)

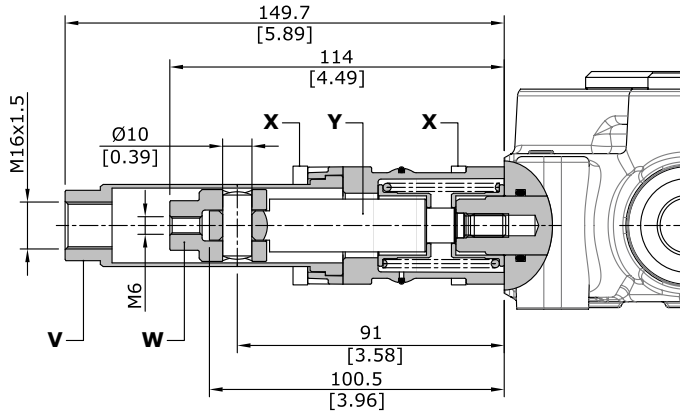


directional valve with left inlet

"A" side spool positioners

With spring return in neutral position

8TL type (30 07 5397)



Wrenches and tightening torques

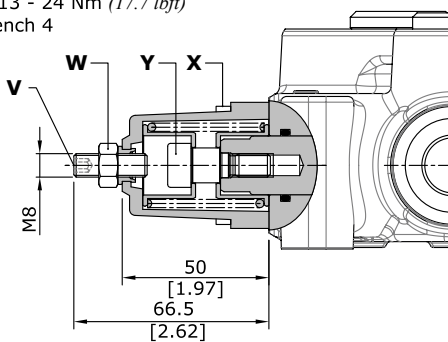
- X = allen wrench 4 - 6 Nm (4.4 lbft)
- Y = wrench 10 - 24 Nm (17.7 lbft)
- W = wrench 17
- V = wrench 24

8F2 type (30 07 5377)

With spool stroke adjustment in position 2 (P→B)

Wrenches and tightening torques

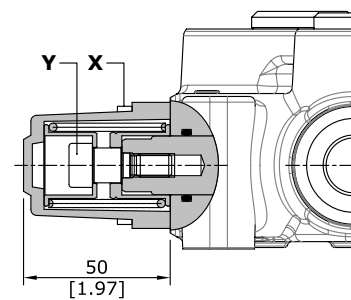
- X = allen wrench 4 - 6 Nm (4.4 lbft)
- Y = allen wrench 6 - 24 Nm (17.7 lbft)
- W = wrench 13 - 24 Nm (17.7 lbft)
- V = allen wrench 4



8T type (30 07 5376)

Wrenches and tightening torques

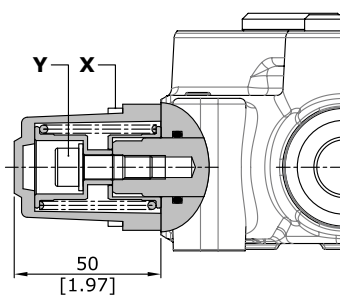
- X = allen wrench 4 - 6 Nm (4.4 lbft)
- Y = allen wrench 6 - 24 Nm (17.7 lbft)



19 type (30 07 5436)

Wrenches and tightening torques

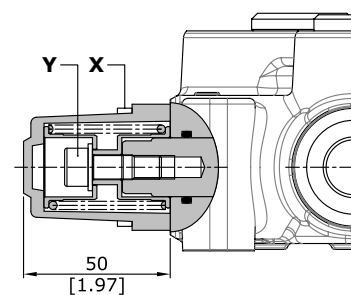
- X = allen wrench 4 - 6 Nm (4.4 lbft)
- Y = allen wrench 6 - 24 Nm (17.7 lbft)



20 type (30 07 5437)

Wrenches and tightening torques

- X = allen wrench 4 - 6 Nm (4.4 lbft)
- Y = allen wrench 6 - 24 Nm (17.7 lbft)

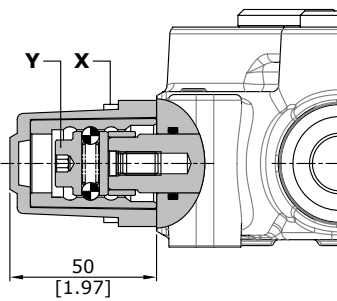
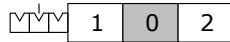


directional valve with left inlet

"A" side spool positioners

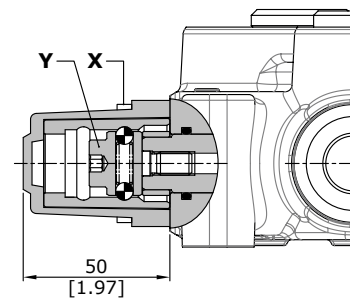
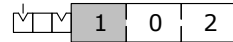
With detent

11 type (30 07 5378)



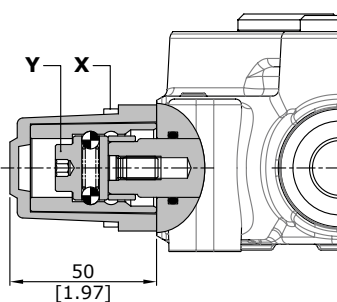
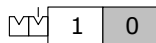
Wrenches and tightening torques
 X = allen wrench 4 - 6 Nm (4.4 lbft)
 Y = allen wrench 6 - 24 Nm (17.7 lbft)

12 type (30 07 5438)



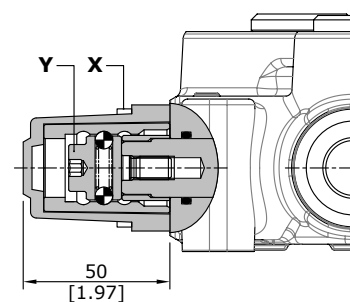
Wrenches and tightening torques
 X = allen wrench 4 - 6 Nm (4.4 lbft)
 Y = allen wrench 6 - 24 Nm (17.7 lbft)

15 type (30 07 5439)



Wrenches and tightening torques
 X = allen wrench 4 - 6 Nm (4.4 lbft)
 Y = allen wrench 6 - 24 Nm (17.7 lbft)

16 type (30 07 5440)



Wrenches and tightening torques
 X = allen wrench 4 - 6 Nm (4.4 lbft)
 Y = allen wrench 6 - 24 Nm (17.7 lbft)

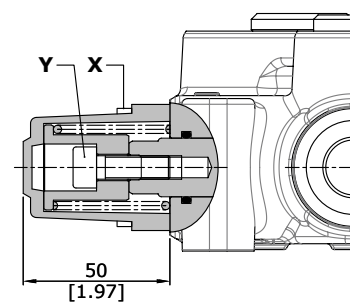
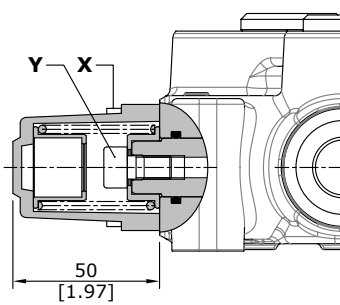
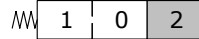
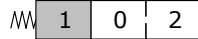
directional valve with left inlet

"A" side spool positioners

With spring return

17 type (30 07 5441)

18 type (30 07 5381)

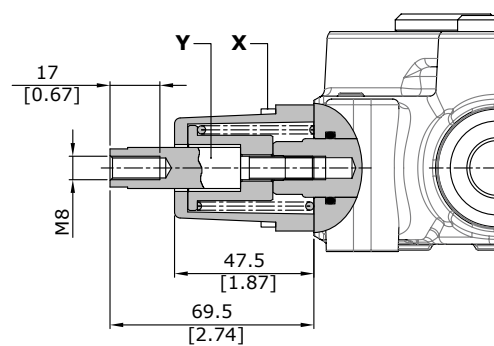
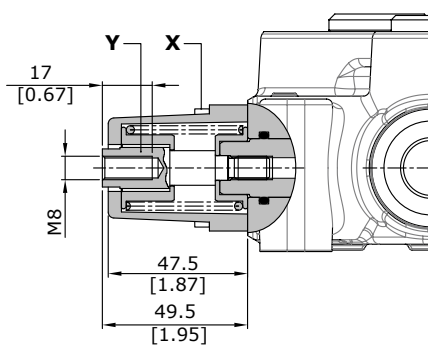
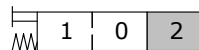


Wrenches and tightening torques
 X = allen wrench 4 - 6 Nm (4.4 lbft)
 Y = allen wrench 6 - 24 Nm (17.7 lbft)

Wrenches and tightening torques
 X = allen wrench 4 - 6 Nm (4.4 lbft)
 Y = allen wrench 6 - 24 Nm (17.7 lbft)

17D type (30 07 5442)

18D type (30 07 5382)



Wrenches and tightening torques
 X = allen wrench 4 - 6 Nm (4.4 lbft)
 Y = wrench 13 - 24 Nm (17.7 lbft)

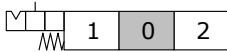
Wrenches and tightening torques
 X = allen wrench 4 - 6 Nm (4.4 lbft)
 Y = wrench 13 - 24 Nm (17.7 lbft)

directional valve with left inlet

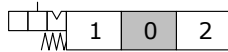
"A" side spool positioners

With detent and spring return to neutral position from either directions

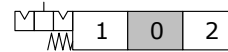
9B type (30 07 5386)
detent in position 1
(curve A)



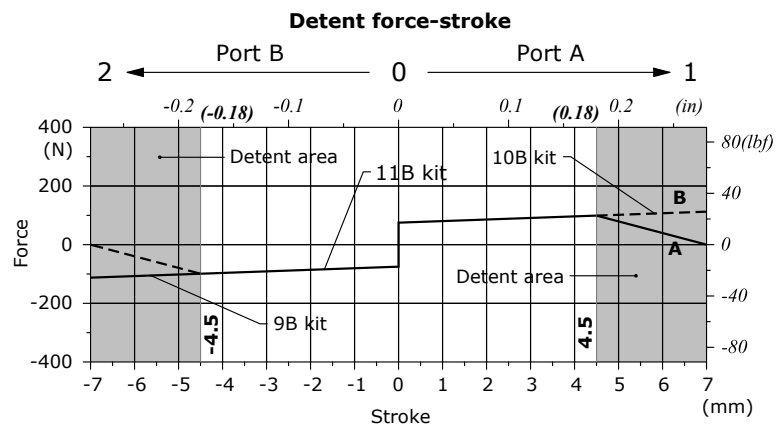
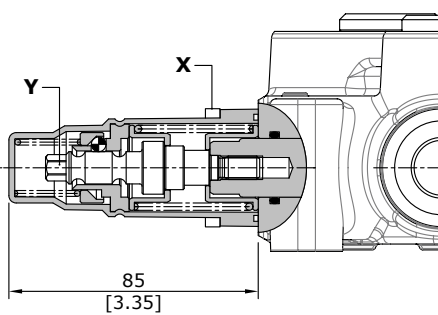
10B type (30 07 5387)
detent in position 2
(curve B)



11B type (30 07 5388)
detent in position 1 and 2
(curves A and B)



11B type



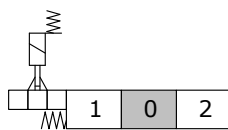
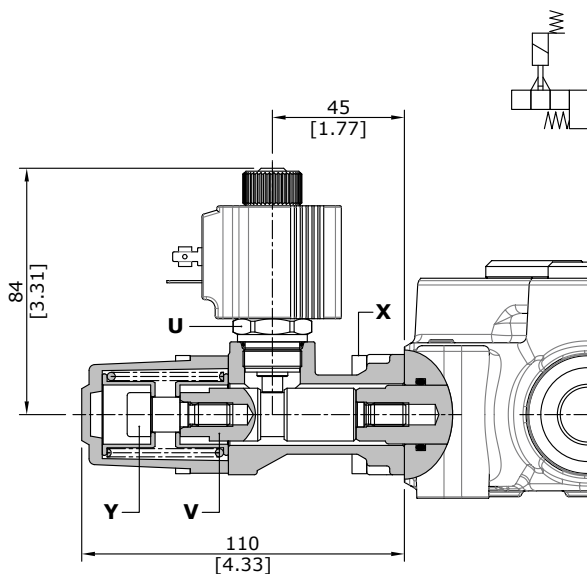
Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbf)
Y = wrench 8 - 9 Nm (6.6 lbf)

Position 1 - Detent force: 130 N (29.2 lbf) ± 10% / Release force: 215 N (48.3 lbf) ± 10%
Position 2 - Detent force: 145 N (32.6 lbf) ± 10% / Release force: 300 N (67.4 lbf) ± 10%

Solenoid lock device 8K type (30 07 7553)

With spring return and spool electromechanical lock in neutral position; when coil is feeded the spool can be moved. it's possible to obtain further configurations with several "A" side spool positioners: contact Sales Dept.



Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbf)
Y = allen wrench 6 - 24 Nm (17.7 lbf)
V = wrench 15 - 24 Nm (17.7 lbf)
U = wrench 24 - 24 Nm (17.7 lbf)

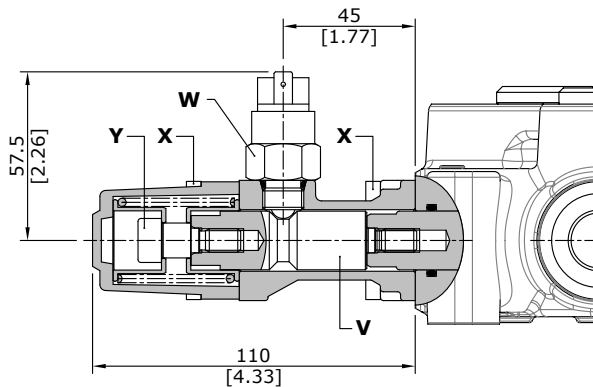
directional valve with left inlet

"A" side spool positioners

With microswitch

8MG3(NO) type (30 07 5562)

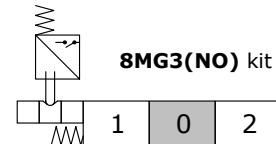
With spring return in neutral position and microswitch operated in both directions.
 Also available **8MG1(NO)** (microswitch operated in position 1) and **8MG2(NO)** (microswitch operated in position 2) configurations; dimension are the same of **8MG3(NO)** configuration.
 Same configurations are available with normally closed (NC) contact.
 For more information contact Sales Department.



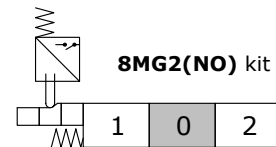
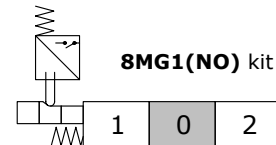
Wrenches and tightening torques
 X = allen wrench 4 - 6 Nm (4.4 lbf_t)
 Y = allen wrench 6 - 24 Nm (17.7 lbf_t)
 W = wrench 22 - 42 Nm (31 lbf_t)
 V = wrench 17 - 9.8 Nm (7.2 lbf_t)

Operating features

MICROSWITCH
 Mechanical life : 5x10⁵ operations
 Electrical life (resistive load) : 5x10⁴ operations 10A / 12VDC
 : 5x10⁴ operations 3A / 24VDC

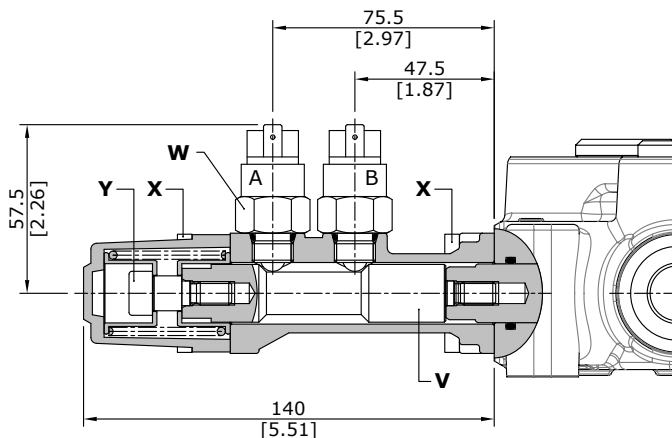


Other configurations



8MG1\MG2(NC\NC) type (30 07 5360)

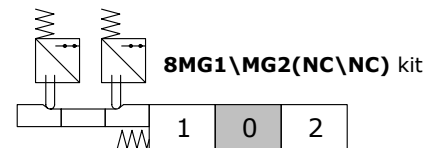
With double microswitch in position 1 and 2.



Wrenches and tightening torques
 X = allen wrench 4 - 6 Nm (4.4 lbf_t)
 Y = allen wrench 6 - 24 Nm (17.7 lbf_t)
 W = wrench 22 - 42 Nm (31 lbf_t)
 V = wrench 17 - 9.8 Nm (7.2 lbf_t)

Operating features

MICROSWITCH
 Mechanical life : 5x10⁵ operations
 Electrical life (resistive load) : 5x10⁴ operations 10A / 12VDC
 : 5x10⁴ operations 3A / 24VDC



Positions	A	B
1		
0		
2		

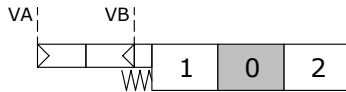
directional valve with left inlet

"A" side spool positioners

ON/OFF pneumatic kit and proportional pneumatic kit

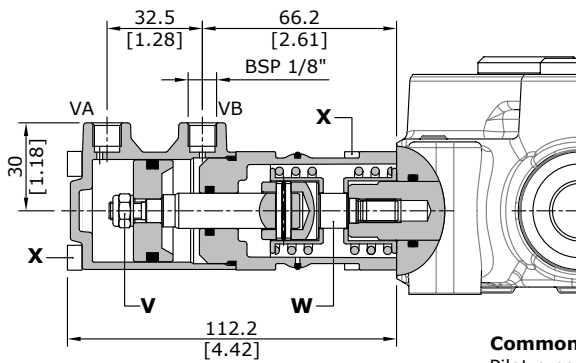
ON/OFF pneumatic: 8P type (30 07 5399)

With spring return to neutral position.



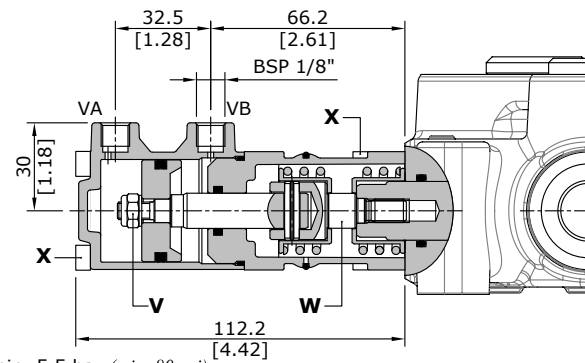
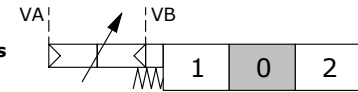
Wrenches and tightening torques

- X = allen wrench 4 - 6 Nm (4.4 lbf^t)
- W = wrench 17 - 24 Nm (17.7 lbf^t)
- V = wrench 13 - 9 Nm (6.6 lbf^t)



Proportional pneumatic: 8PF type (30 07 5596)

With spring return to neutral position.



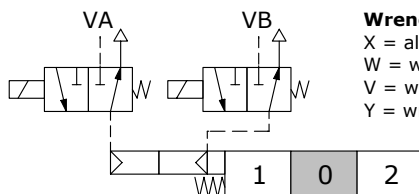
Common features

Pilot pressure.....: min. 5.5 bar (min. 80 psi)
: max. 10 bar (min. 145 psi)

ON/OFF electro-pneumatic kit

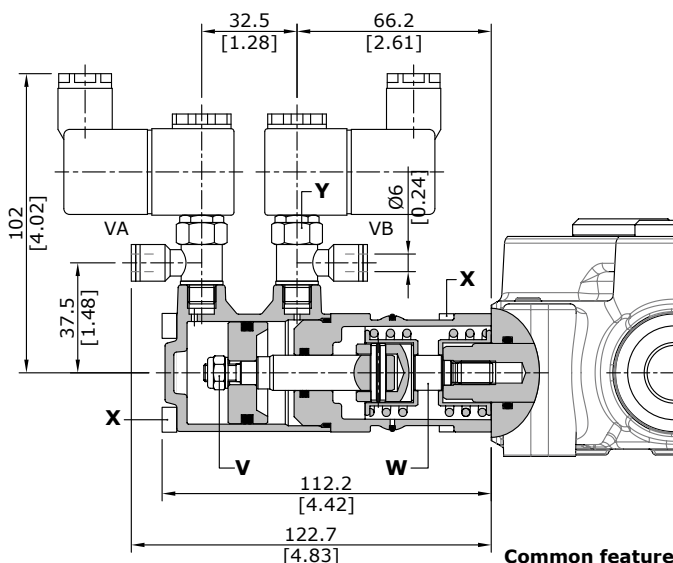
Electro-pneumatic: 8EP3 type

With spring return to neutral position.



Wrenches and tightening torques

- X = allen wrench 4 - 6 Nm (4.4 lbf^t)
- W = wrench 17 - 24 Nm (17.7 lbf^t)
- V = wrench 13 - 9 Nm (6.6 lbf^t)
- Y = wrench 15 - 6 Nm (4.4 lbf^t)

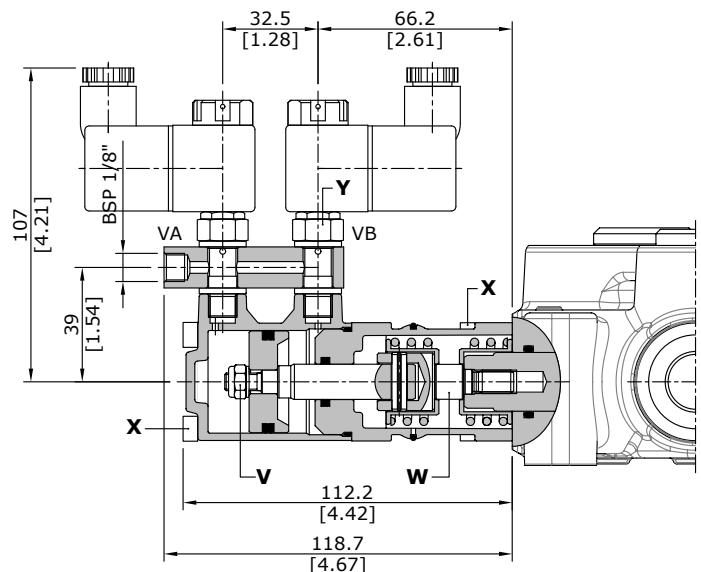
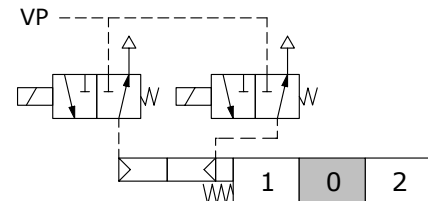


Common features

Pilot pressure.....: min. 5.5 bar (min. 80 psi)
: max. 10 bar (min. 145 psi)

Electro-pneumatic: 8EP4 type

With spring return to neutral position.



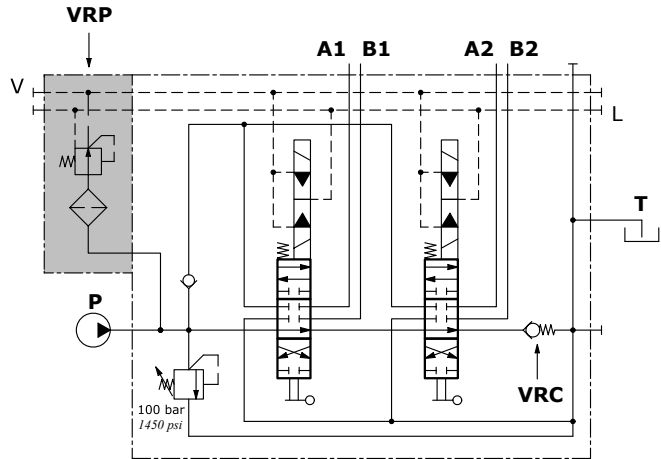
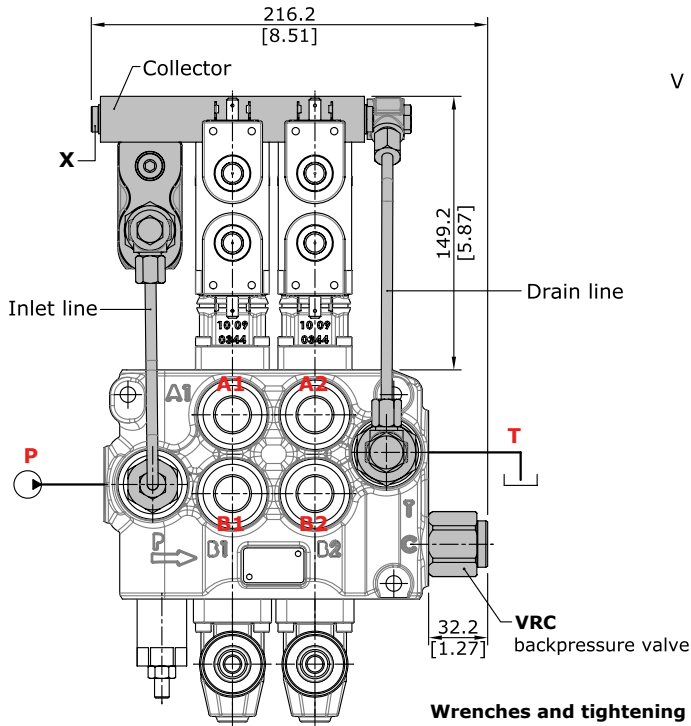
directional valve with left inlet

"A" side spool positioners

ON/OFF electro-hydraulic kit 8E13 type

Collector kit for internal pilot and drain

The kit include collector, VRP pressure reducing valve and pipes.



Description example:
90L GM10/2-P(X-100)/
18E13L/18E13L/
VRC-PSL4-KE2R0-24VDC

Features
VRP VALVE
Output pressure..... : 25 bar / 363 psi
Max. flow..... : 8 l/min
Filtering..... : 80 μ

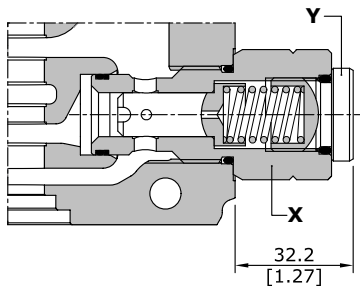
Wrenches and tightening torques
X = allen wrench 5 - 24 Nm (17.7 lbf_t)

COLLECTOR KIT CODES		
Type	Code *	Description
KE1R0	30 07 5494	Kit for one section
KE2R0	30 07 5495	Kit for 2 sections
KE3R0	30 07 5496	Kit for 3 sections
KE4R0	30 07 5497	Kit for 4 sections
KE5R0	30 07 5498	Kit for 5 sections
KE6R0	30 07 5499	Kit for 6 sections

(*) codes are referred to BSP thread

VRC backpressure valve

Valve assembled on flow through passage to provide pilot pressure to the actuator.



Wrenches and tightening torques
X = wrench 32 - 42 Nm (31 lbf_t)
Y = allen wrench 8 - 24 Nm (17.7 lbf_t)

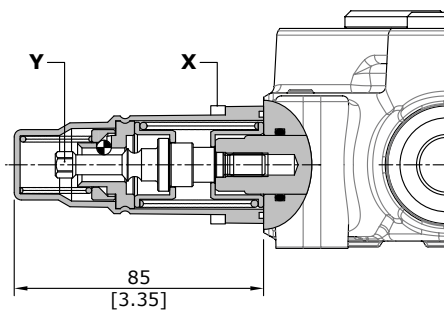
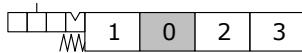
directional valve with left inlet

"A" side spool positioners

Particular positioner kits for special spools

13NZ type (30 07 5393)

4 positions with spring return in neutral and detent in position 3: for 5DY spool.

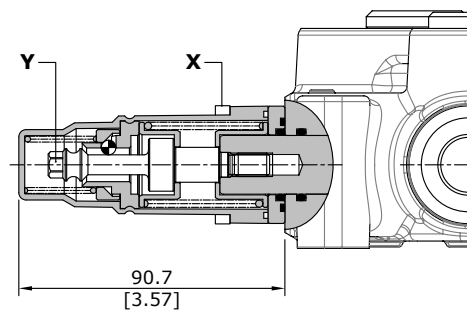
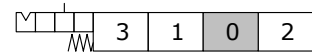


Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbft)
Y = wrench 8 - 9 Nm (6.6 lbft)

13QN type (30 07 5392)

4 positions with spring return in neutral and detent in position 3: for 5BY spool.

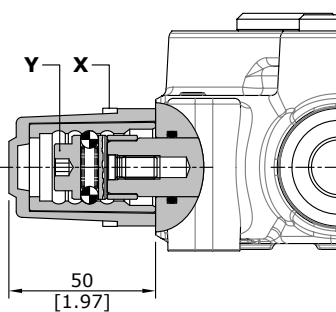
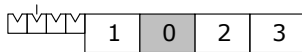


Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbft)
Y = wrench 8 - 9 Nm (6.6 lbft)

11NZ type (30 07 5394)

4 positions, detent in all positions

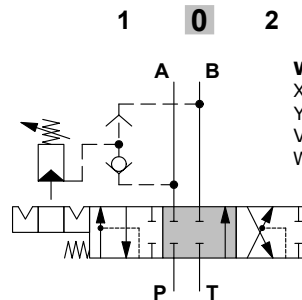


Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbft)
Y = allen wrench 6 - 24 Nm (17.7 lbft)

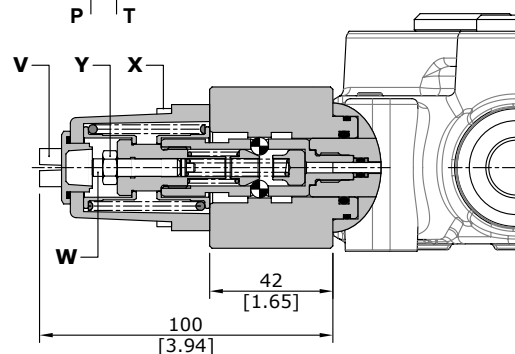
11A type (30 07 7601)

With detent in position 1 and 2, and automatic release in neutral position.



Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbft)
Y = wrench 10 - 9.8 Nm (7.23 lbft)
V = wrench 13 - 9.8 Nm (7.23 lbft)
W = allen wrench 3



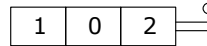
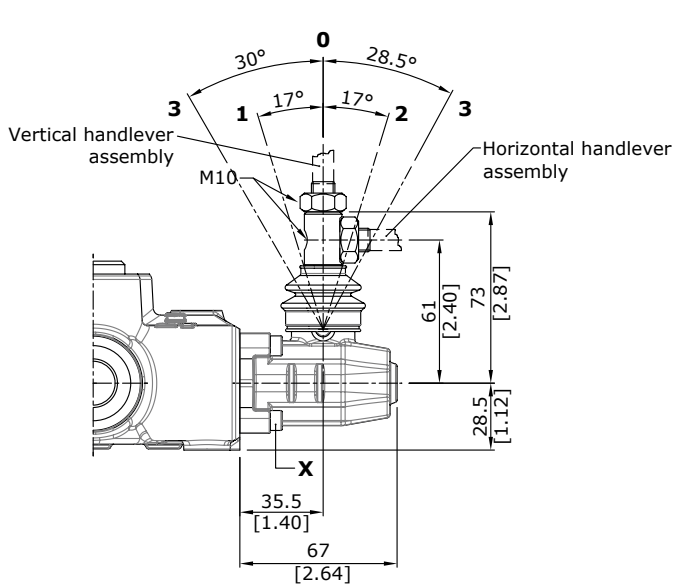
directional valve with left inlet

"B" side options

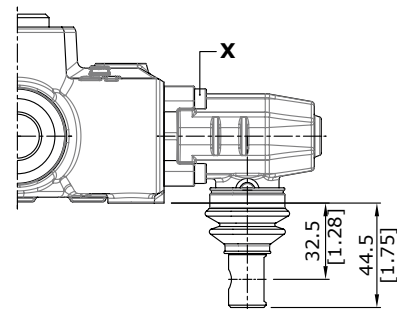
Lever control

L type (30 07 5403)

Alluminium lever pivot box with protective rubber bellow; it can be roated 180° (configuration **L180**).



configuration L180

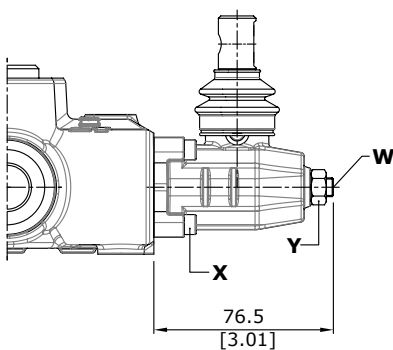
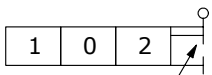


Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbf_t)

LF1 type (30 07 5405)

With spool stroke adjustment in position 12 (P A). It can be roated 180° (configuration **LF1180**).



Wrenches and tightening torques

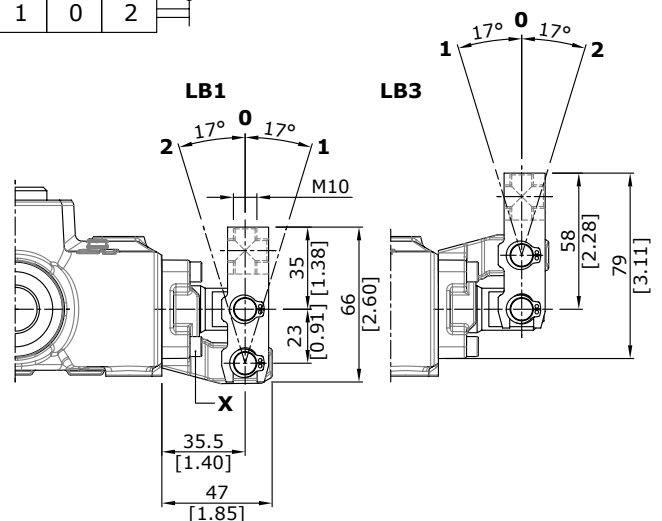
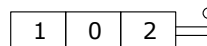
X = allen wrench 4 - 6 Nm (4.4 lbf_t)

Y = wrench 13 - 24 Nm (17.7 lbf_t)

W = allen wrench 4

LB type (30 07 5407)

Steel construction, LB1 with pivot placed down and LB3 with pivot placed over.



Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbf_t)

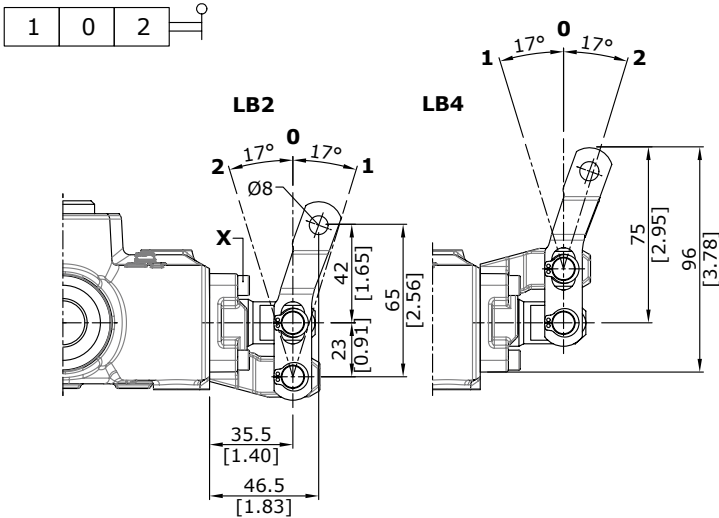
directional valve with left inlet

"B" side options

Lever control

LB type (30 07 5571)

Steel construction, LB2 with pivot placed down and LB4 with pivot placed over.

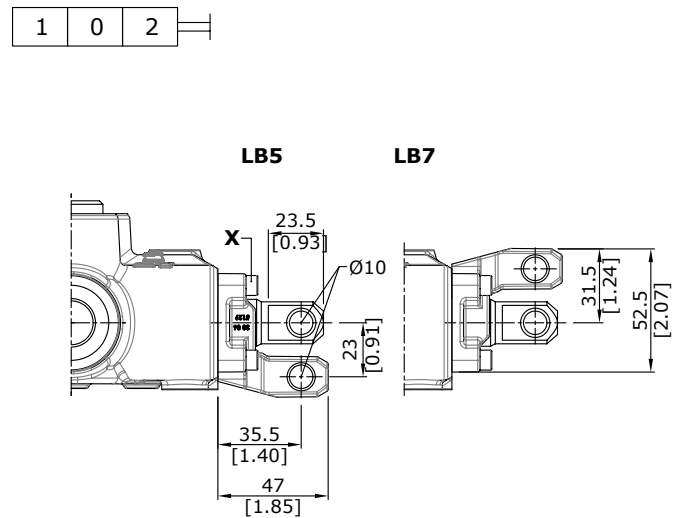


Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbf_t)

LB type (30 07 7556)

Steel construction, LB5 with pivot placed down and LB7 with pivot placed over.

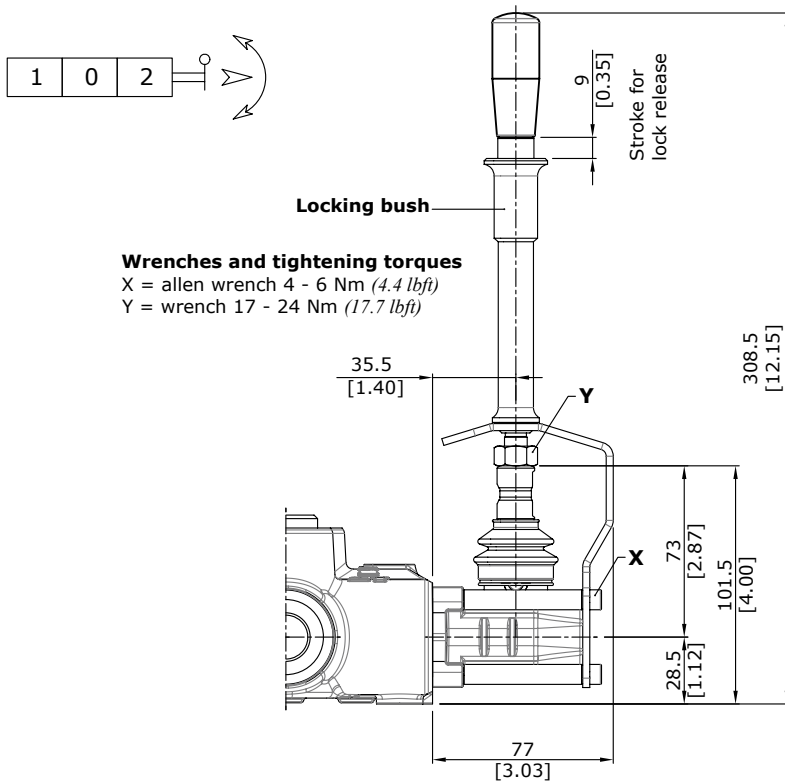


Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbf_t)

Safety lever LEB type (30 07 5409)

Safety levers with lock in neutral complete with handlever; lift handlever knob to operate.



Wrenches and tightening torques

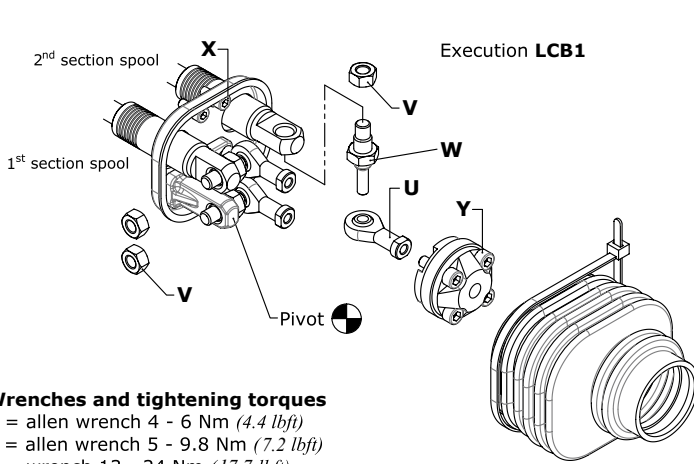
X = allen wrench 4 - 6 Nm (4.4 lbf_t)

Y = wrench 17 - 24 Nm (17.7 lbf_t)

directional valve with left inlet

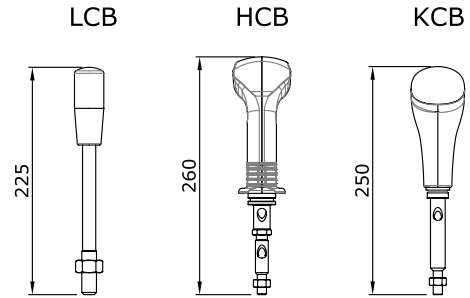
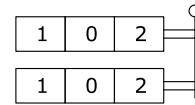
"B" side options

LCB mechanical joystick for two sections control (30 07 5433)



Wrenches and tightening torques

- X = allen wrench 4 - 6 Nm (4.4 lbf^t)
- Y = allen wrench 5 - 9.8 Nm (7.2 lbf^t)
- V = wrench 13 - 24 Nm (17.7 lbf^t)
- U = wrench 10
- W = wrench 15 - 24 Nm (17.7 lbf^t)



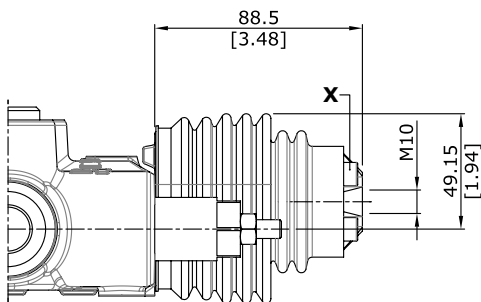
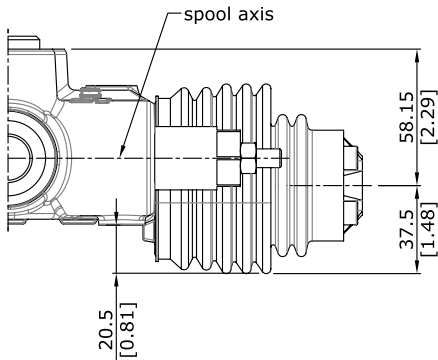
Description example

90L GM10/2-P(X-100)/18LCB1/18LCB1/AET-PSL4

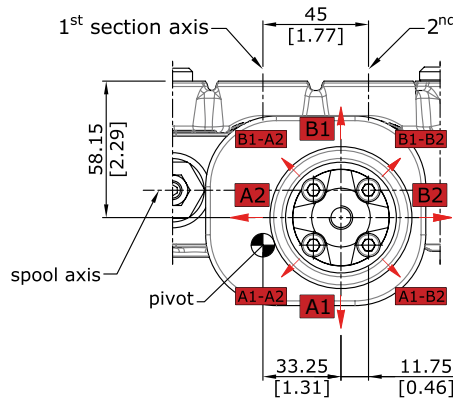
Dimensions and movement scheme for left inlet directional valve

Wrenches and tightening torques

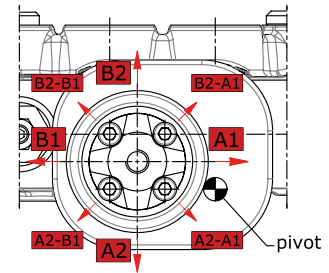
- X = allen wrench 5 - 9.8 Nm (7.2 lbf^t)



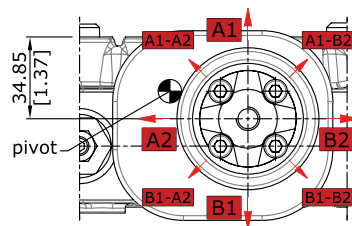
Execution **LCB1**
pivot placed down on the left



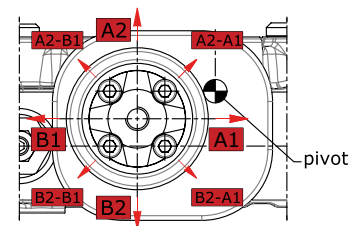
Execution **LCB2**
pivot placed down on the right



Execution **LCB3**
pivot placed above on the left



Execution **LCB4**
pivot placed above on the right

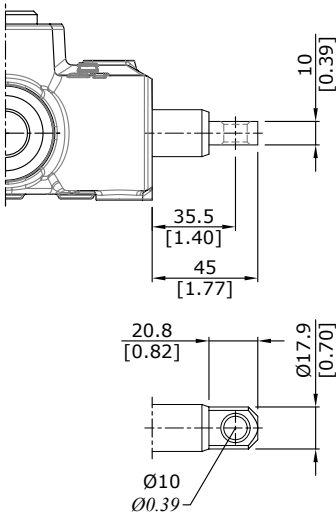
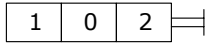


NOTE : Don't use with spool type 5DY.

directional valve with left inlet

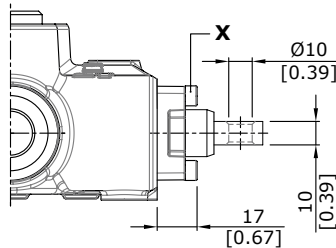
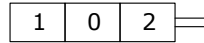
"B" side options

SL type



SLP type (30 07 5406)

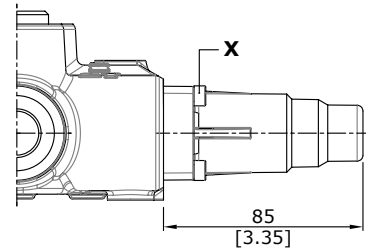
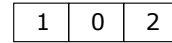
Mechanical control with dust-proof plate kit.



Wrenches and tightening torques
X = allen wrench 4 - 6 Nm (4.4 lbf_t)

SLCZ type (30 07 5347)

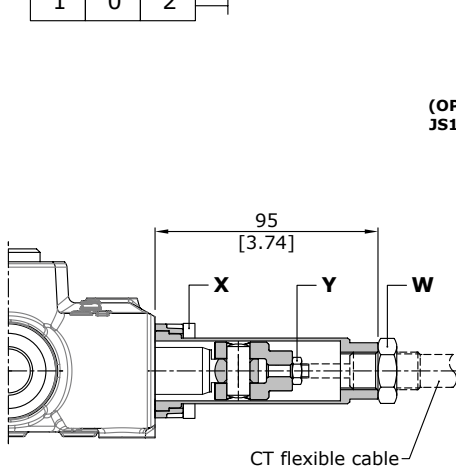
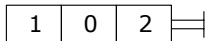
Protection cap usable with pneumatic, electropneumatic, and electrohydraulic spool positioners.



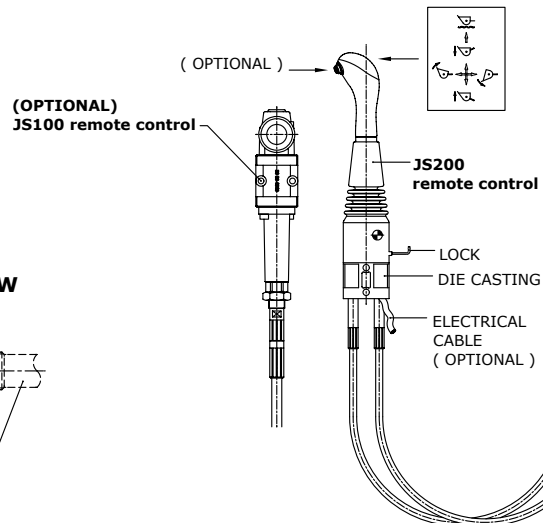
Wrenches and tightening torques
X = allen wrench 4 - 6 Nm (4.4 lbf_t)

TQ cable remote control kit (30 07 5398)

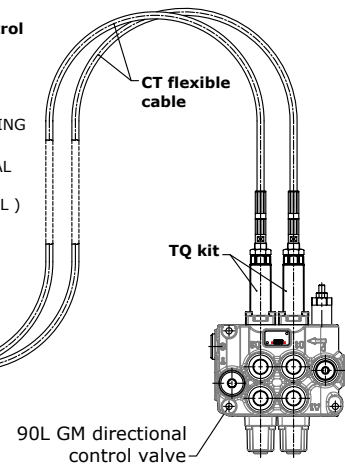
Prearranged for remote control with flexible cable.



Wrenches and tightening torques
X = allen wrench 4 - 6 Nm (4.4 lbf_t)
Y = wrench 10 - 9.8 Nm (7.2 lbf_t)
W = wrench 24 - 24 Nm (17.7 lbf_t)



Example of cable control



NOTE : For further information about remote cable control, require related documentation.

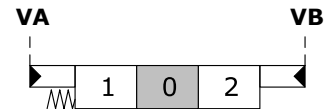
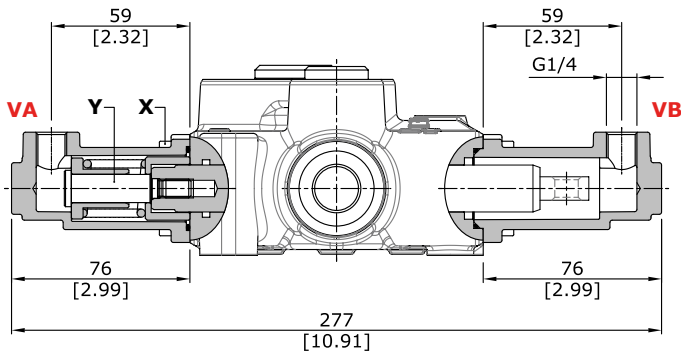
directional valve with left inlet

Complete controls

Proportional hydraulic controls

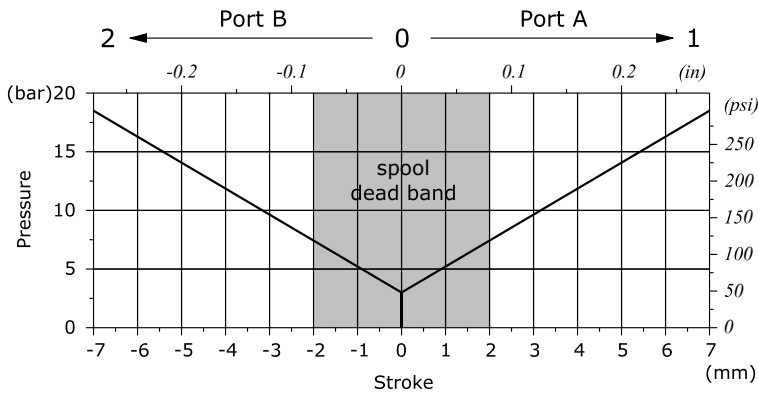
8IM type (30 07 5414)

It can be used with standard spools and body



Diagrams and features of proportional hydraulic controls

Pressure - stroke diagram
(for controls represented)



Wrenches and tightening torques

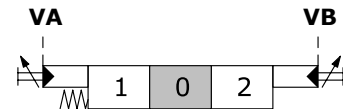
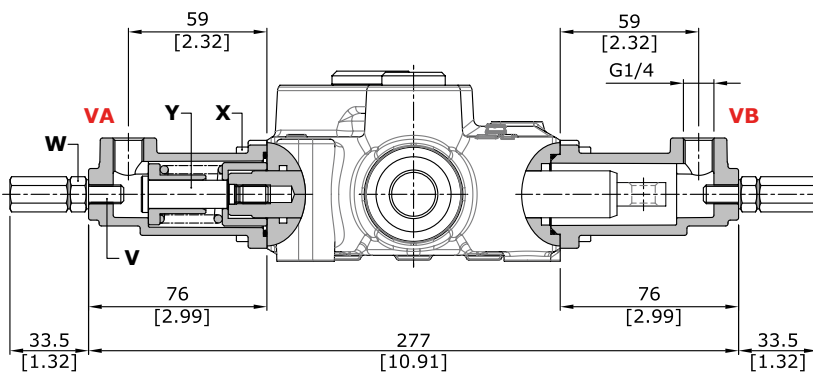
X = allen wrench 4 - 6 Nm (4.4 lbft)
Y = allen wrench 6 - 9 Nm (6.6 lbft)

Operating features

Pilot pressure : max. 50 bar (725 psi)
Internal leakage A(B) → T (Δ = 100 bar - (1450 psi) / T = 40°C)
..... : max. 6cm³/min - 0.37 in³/min

8IMF3 type (30 07 7569)

Configuration with screws for spool stroke adjustment.



Wrenches and tightening torques

X = allen wrench 4 - 6 Nm (4.4 lbft)
Y = allen wrench 6 - 9 Nm (6.6 lbft)
V = allen wrench 4
W = wrench 13 - 24 Nm (17.7 lbft)

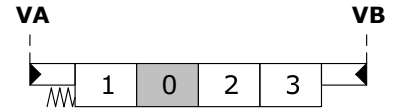
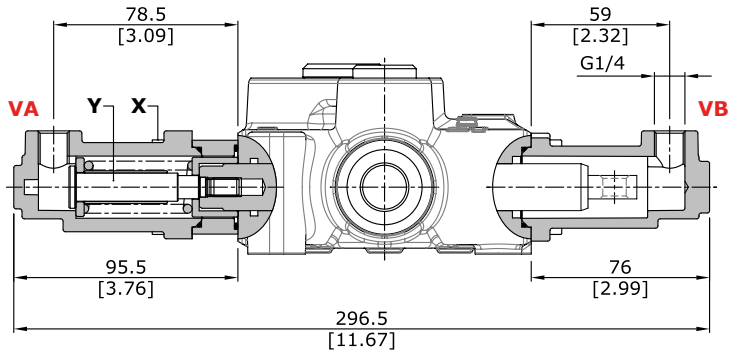
directional valve with left inlet

Complete controls

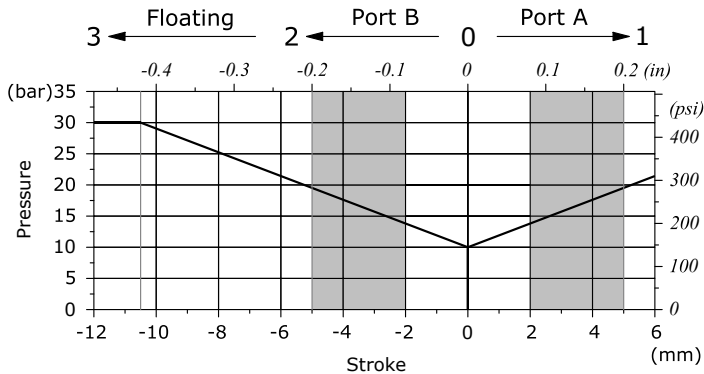
Proportional hydraulic control

13IM type (30 07 5431)

For floating circuit.



Pressure - stroke diagram



Wrenches and tightening torques

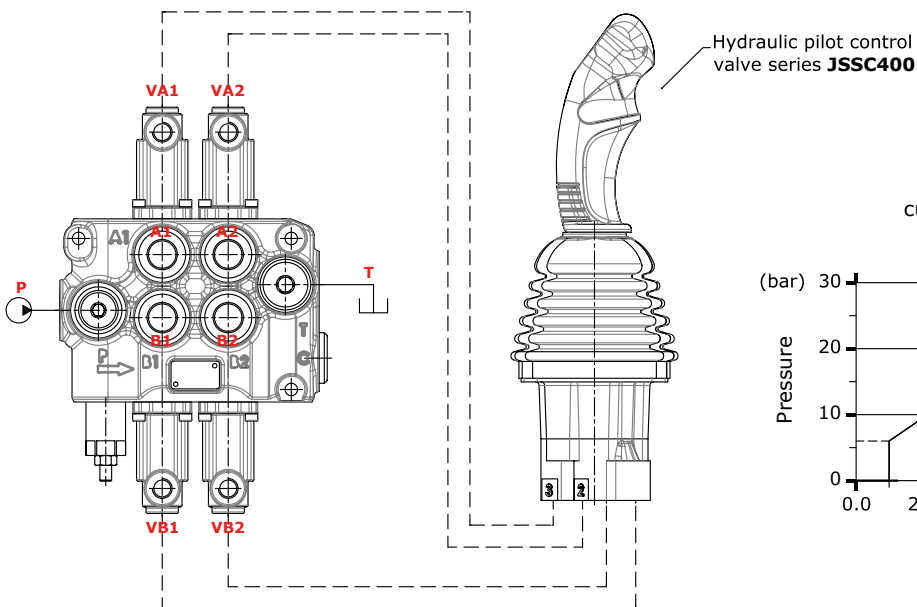
X = allen wrench 4 - 6 Nm (4.4 lbf_t)
 Y = allen wrench 6 - 9 Nm (6.6 lbf_t)

Operating features

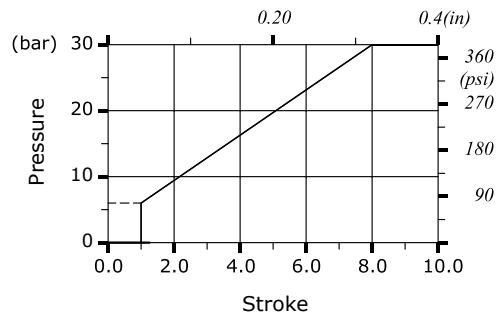
Pilot pressure : max. 50 bar (725 psi)
 Internal leakage A(B) → T (Δ = 100 bar - (1450 psi) / T = 40°C)
 : max. 6cm³/min - 0.37 in³/min

- Spool overlap area
- Metering area
- Floating area

Connection example



8IM control kit curve 001 without step



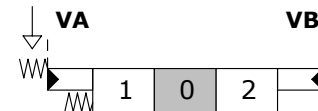
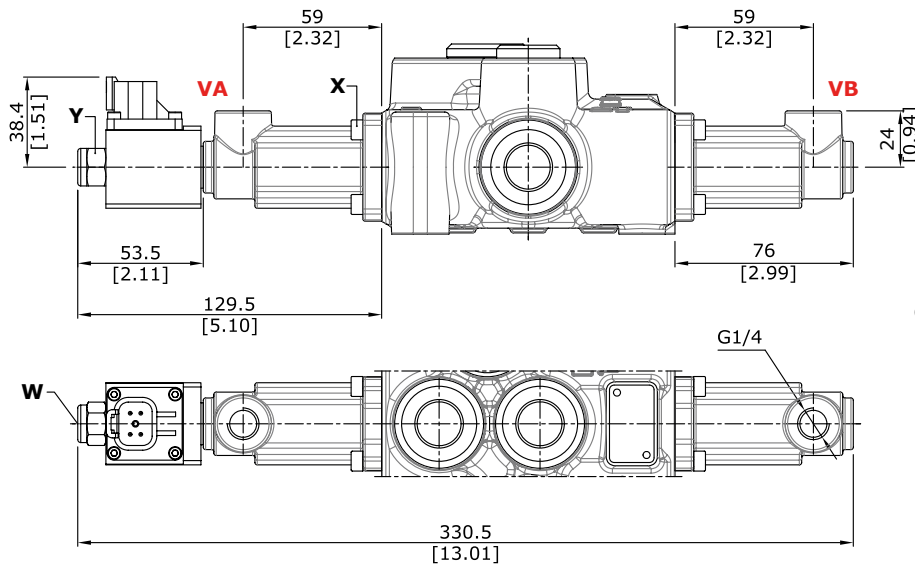
directional valve with left inlet

Complete controls

Proportional hydraulic control type

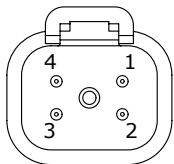
8IMSPSD (30 07 7559), 8IMSPSL (30 07 7562)

With spool position sensor.



Wrenches and tightening torques
 X = allen wrench 4 - 6 Nm (4.4 lbf_t)
 Y = wrench 17 - 9.8 Nm (7.23 lbf_t)
 W = allen wrench 4 - 9.8 Nm (7.23 lbf_t)

Control features
 Pilot pressure..... : max. 100 bar (1450 psi)
 Connector : Deutsch DT04-4P

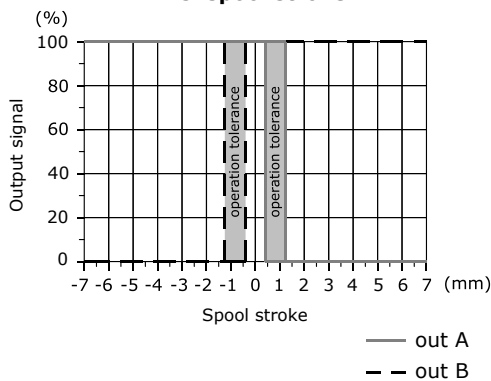


Connector PIN-OUT		
Functions		
Pin	for 5V supply	for 8-32V supply
1	+5V	signal OUT
2	N.C.	GND
3	GND	Vb+
4	signal Out	not connected

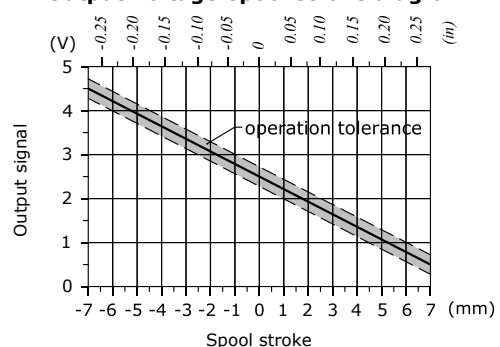
Spool position sensor features

Voltage supply range..... : from 9 to 32 VDC or 5 VDC
 Current absorption..... : <10 mA
 Mechanical life..... : 3x10⁶
 Connector type..... : Deutsch DT04-4P
 Weather protection..... : IP 67 - IP 69K
 Working temperature..... : -40/+105 °C
 Minimum load resistance..... : 10 KΩ
 Working pressure max..... : 350 bar • 5100 psi
 Max. mechanical stroke..... : ± 10mm
 Max. electrical stroke..... : ± 10mm

Output signal (SPSD example) vs. spool stroke



Output Voltage-spool stroke diagram



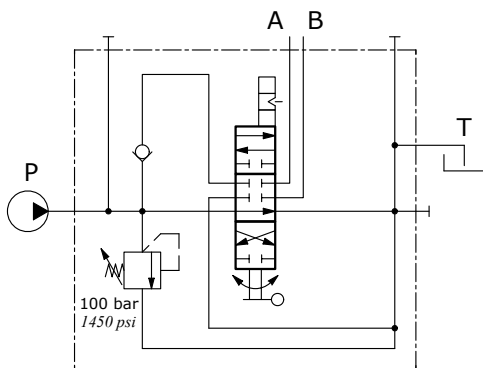
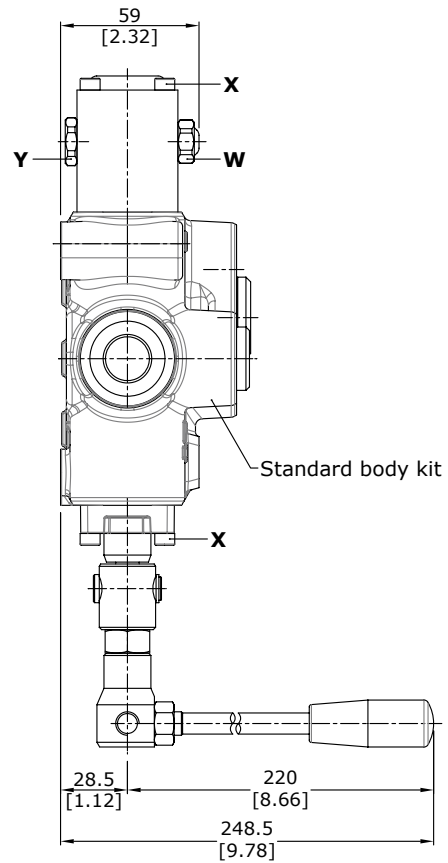
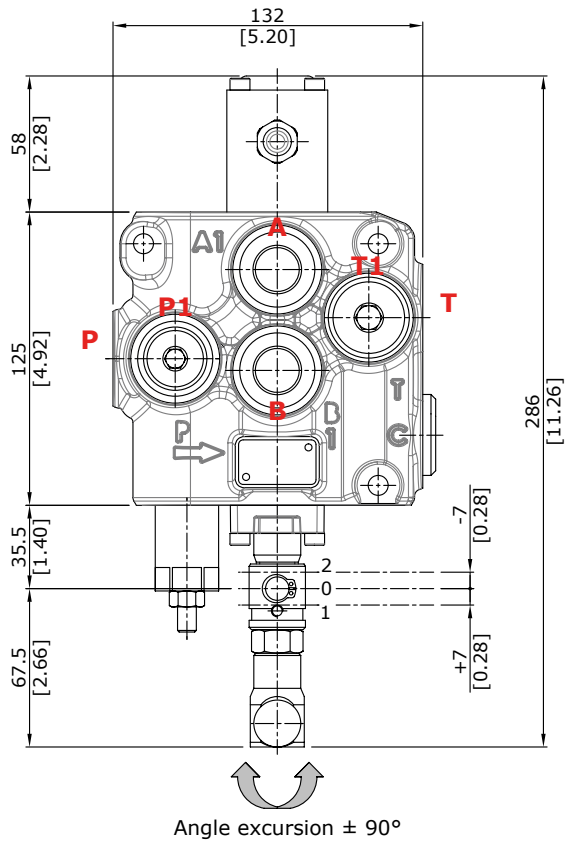
Output signal
 Range..... : from 0.5 to 4.5 V
 Linearity..... : ± 5%
 Spool in neutral..... : 2.5 ± 0.2 V
 Max current..... : 1 mA
 Mechanical vibrations,
 shock, bumps..... : IEC 68-2-6,27,29
 EMC compatibility..... : ISO 13766 - ISO 15982

directional valve with left inlet

Special configurations

Directional valve with rotary control kit

R type (30 07 5379)



Description example
90L GM10/1(X-100)/1 R SLP/AET-PSL4

Wrenches and tightening torques

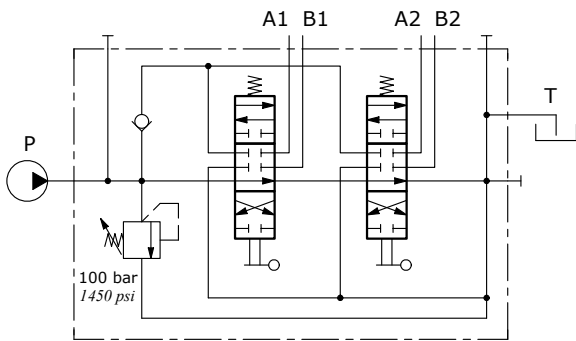
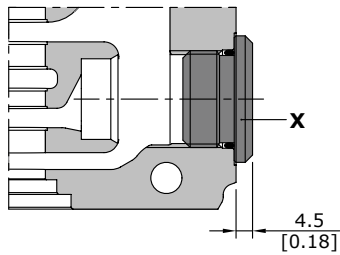
- X = allen wrench 4 - 6 Nm (4.4 lbf_t)
- Y = wrench 19 - 9.8 Nm (7.23 lbf_t)
- W = wrench 17 - 9.8 Nm (7.23 lbf_t)

directional valve with left inlet

Outlet port options

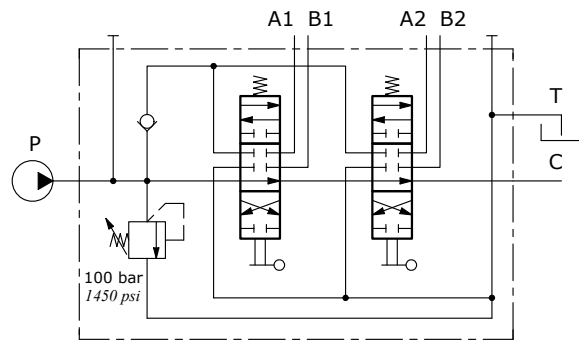
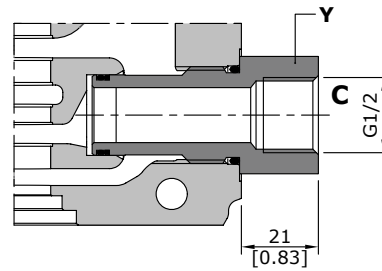
It's possible to have open centre, closed centre and carry-over.

AET: open centre (standard)



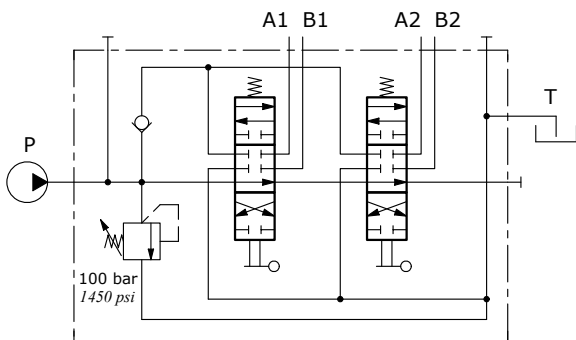
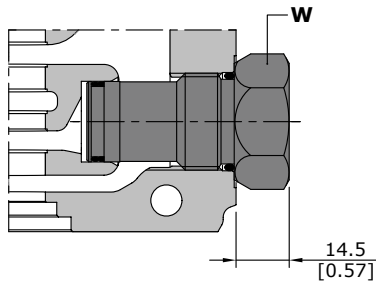
Description example
90L GM10/2-P(X-100)/18L/18L/AET-PSL4

AE1: with carry-over



Description example
90L GM10/2-P(X-100)/18L/18L/AE1-PSL4

AEK: closed centre



Description example
90L GM10/2-P(X-100)/18L/18L/AEK-PSL4

Wrenches and tightening torques

- X = allen wrench 10 - 42 Nm (31 lbft)
- Y = wrench 32 - 42 Nm (31 lbft)
- W = wrench 32 - 42 Nm (31 lbft)

directional valve with left inlet

Inlet port options

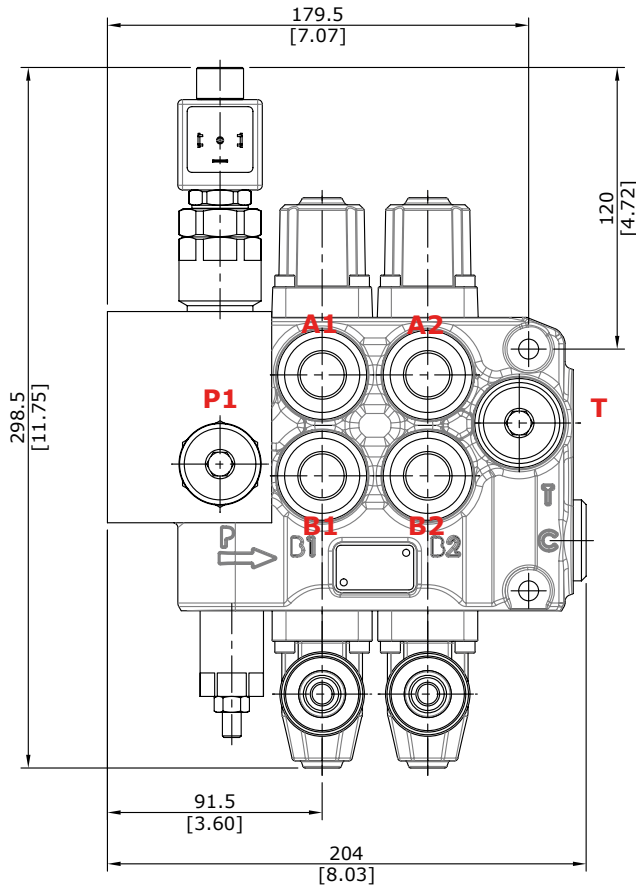
With solenoid pilot unloader valve

Description example:
90L GM10/2-P(X-100) **ELN(NO) - 12VDC**

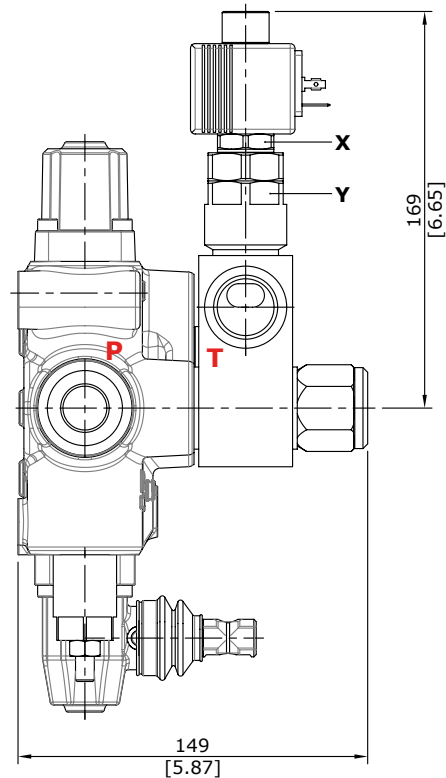
Solenoid operated valve: **ELN** — Feeding voltage:
ELP — for solenoid operated
ELT

Solenoid operated

Emergency with push button and spring return; for detent position turn the button after press it.
WARNING: the manual override option is intended for emergency use, not for continuous duty operation.

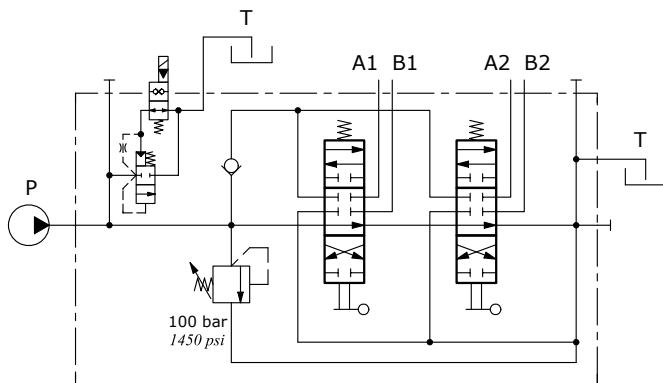


Normally open configuration type ELN



Wrenches and tightening torques

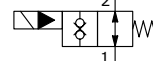
X = wrench 24 - 35 Nm (26 lbf_t)
Y = wrench 32 - 42 Nm (31 lbf_t)



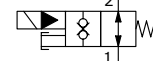
Description example

90L GM10/2-P(X-100) **ELN(NO)-12VDC/18L/18L/AET-PSL4**

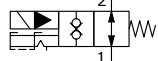
ELN: without emergency



ELP: push button type



ELT: "push & twist" type



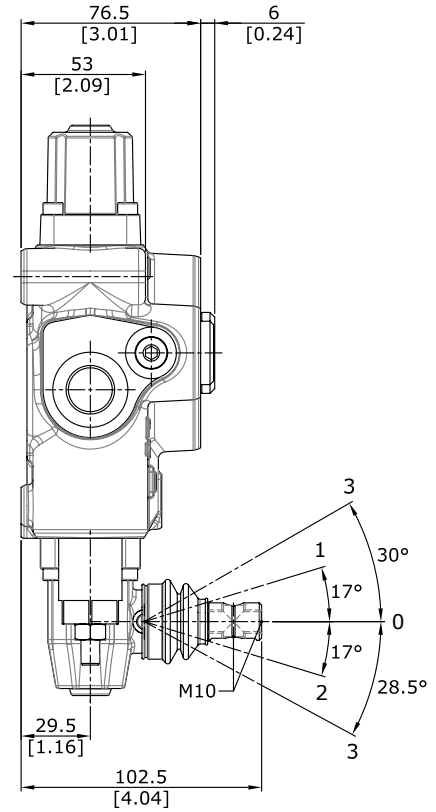
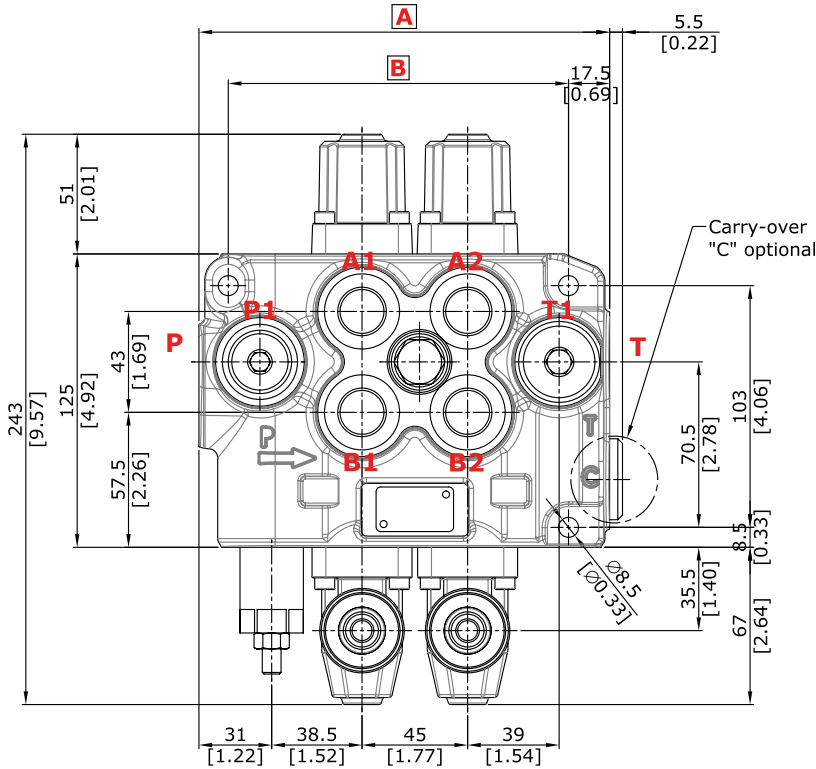
Valve operating features

Maximum operating pressure : 250 bar
Maximum flow : 15 l/min
Internal leakage: max 5 drops/min @ 250bar

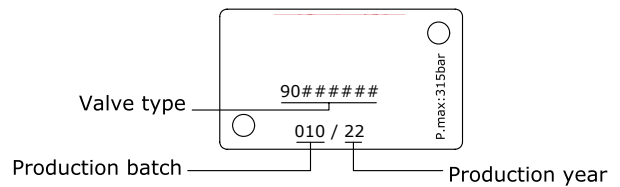
directional valve with left inlet

90L GMC

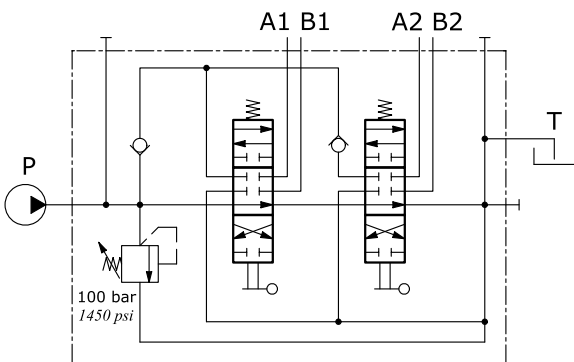
Dimensional data (parallel circuit)



TYPE	A		B		Weight	
	mm	in	mm	in	Kg	lb
90L GMC10/2-P	175	6.89	145	5.71	7	15.43
90L GMC10/3-P	220	8.66	190	7.48	11	24.25



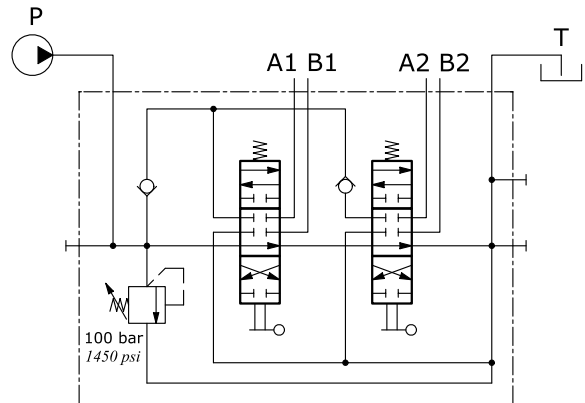
Standard configuration



Description example

90L GMC10/2-P(X-100)/18L/18L/AET-PSL4

Upper inlet and outlet ports configuration



Description example

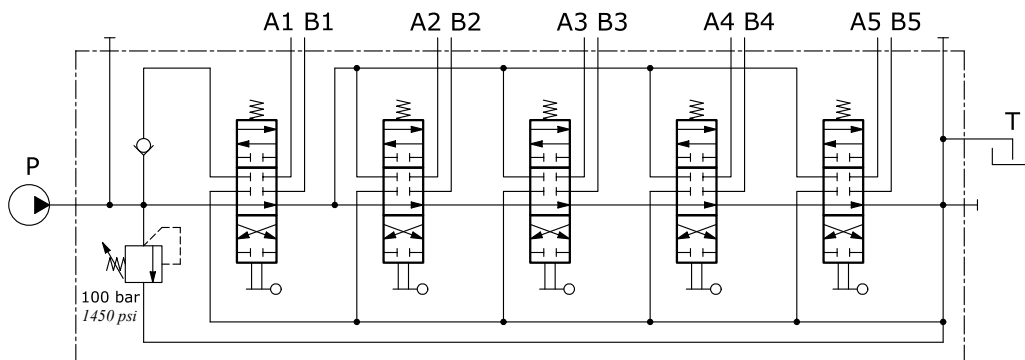
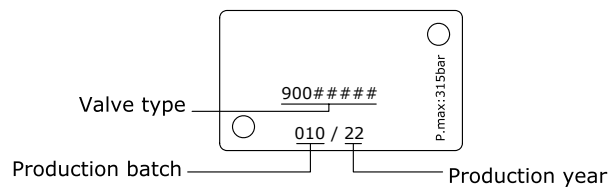
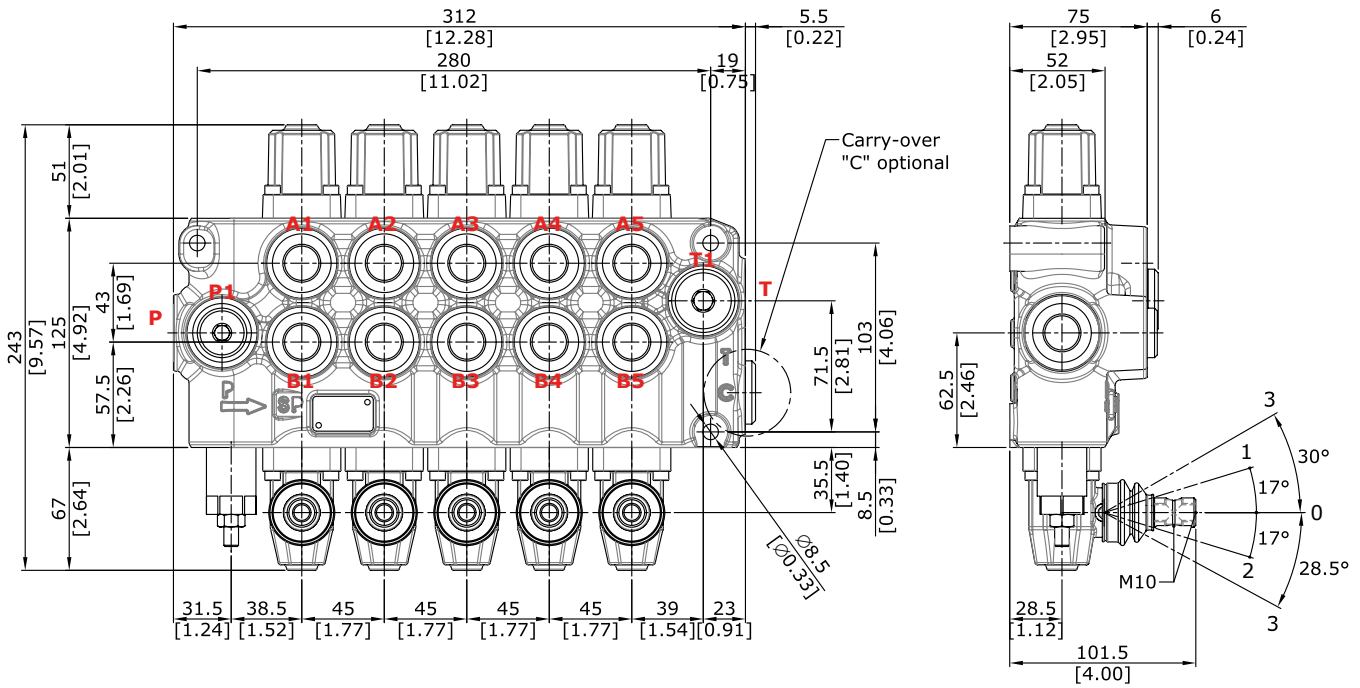
90L GMC10/2-P(X-100)/18L/18L/AET-PSA4

NOTE - Drawings and dimensions are referred to **BSP** thread configuration.

directional valve with left inlet

Dimensional data (with tandem circuit)

The description of **90L GM** valve with tandem circuit is marked with letters "SP" and one figure which indicate the downstream sections from tandem connection.

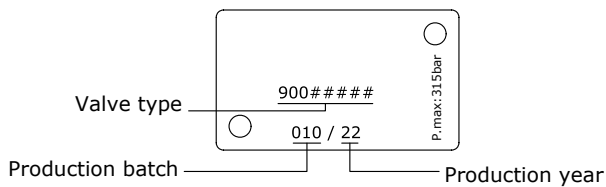
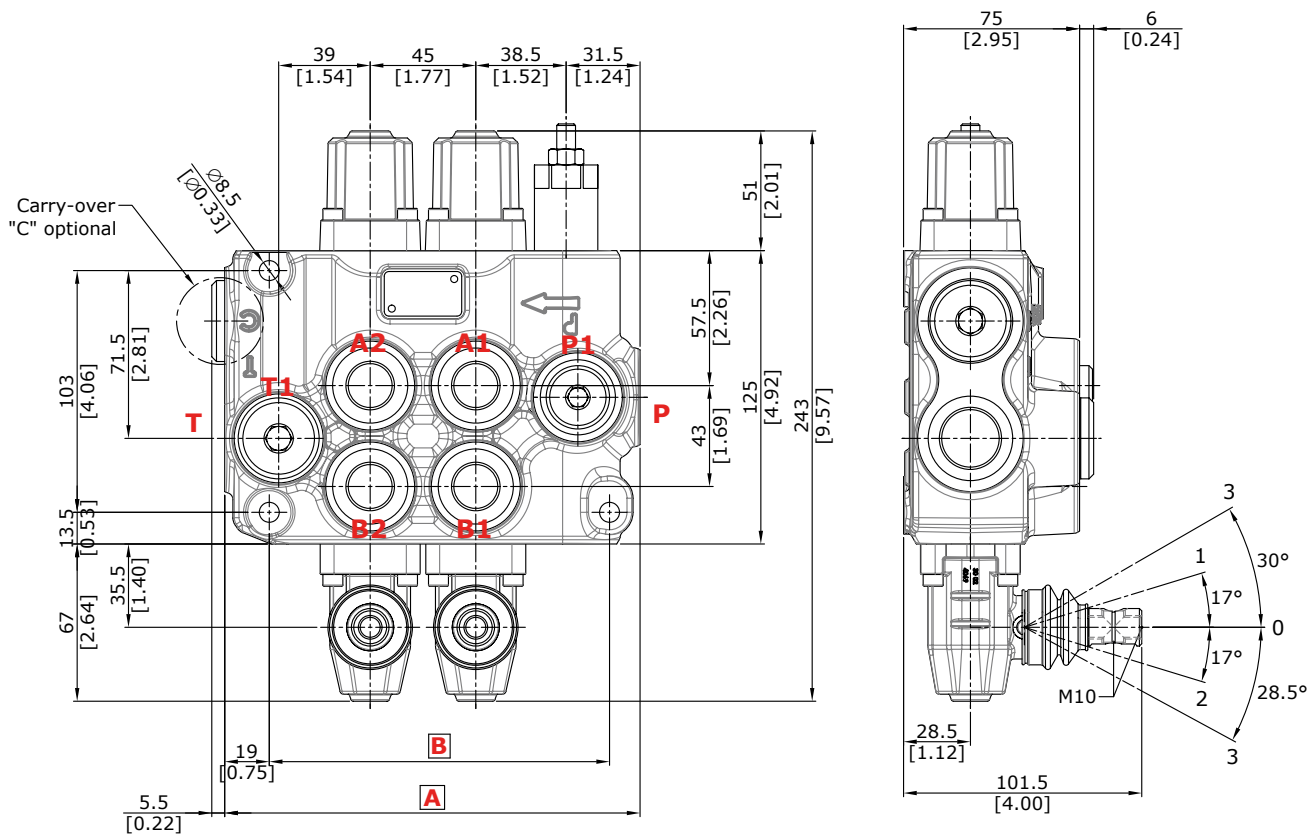


Description example
 90L GM10/5-**SP4**(X-100)/18L/18L/18L/18L/18L/AET-PSL4

NOTE - Drawings and dimensions are referred to **BSP** thread configuration.

directional valve with right inlet

Dimensional data (parallel circuit)



TYPE	A		B		Weight	
	mm	in	mm	in	Kg	lb
90L GM10/1-P	132	5.20	100	3.94	5.8	12.80
90L GM10/2-P	177	6.97	145	5.71	8.3	18.30
90L GM10/3-P	222	8.74	190	7.48	10.9	24.00

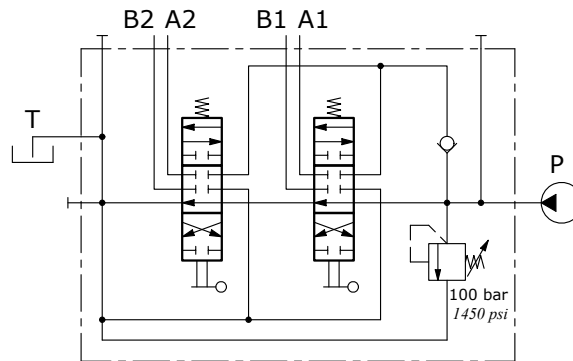
TYPE	A		B		Weight	
	mm	in	mm	in	Kg	lb
90L GM10/4-P	267	10.51	235	9.25	13.4	29.50
90L GM10/5-P	312	12.28	280	11.02	16.5	36.40
90L GM10/6-P	357	14.06	325	12.80	19.2	42.30

NOTE - Drawings and dimensions are referred to **BSP** thread configuration.

directional valve with right inlet

Hydraulic circuit

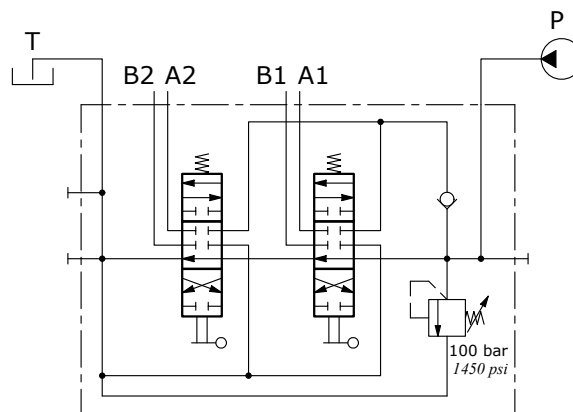
Standard configuration



Description example

90L GM10/2-P(X-100)/ED-18L/ED-18L/AET-**PSL4**

Upper inlet and outlet ports configuration



Description example

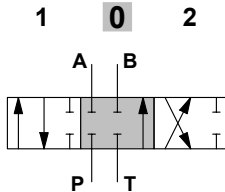
90L GM10/2-P(X-100)/ED-18L/ED-18L/AET-**PSA4**

directional valve with right inlet

Spools options

ED-1 (30 01 3576) spool type

Double acting, 3 positions, with A and B closed in neutral position

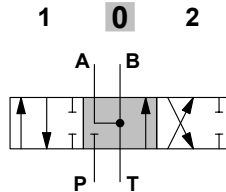


Spool stroke

position 1: + 7 mm (+ 0.28 in)
position 2: - 7 mm (- 0.28 in)

ED-2 (30 01 3577) spool type

Double acting, 3 positions, with A and B open to tank in neutral position

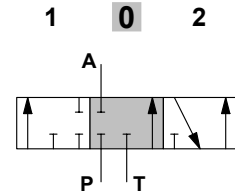


Spool stroke

position 1: + 7 mm (+ 0.28 in)
position 2: - 7 mm (- 0.28 in)

ED-3 (30 01 3578) spool type

Single acting on A, 3 positions, B plugged; requires G1/2 plug

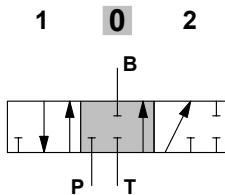


Spool stroke

position 1: + 4.5 mm (+ 0.18 in)
position 2: - 4.5 mm (- 0.18 in)

ED-4 (30 01 3579) spool type

Single acting on B, 3 positions, A plugged; requires G1/2 plug

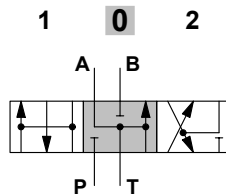


Spool stroke

position 1: + 4.5 mm (+ 0.18 in)
position 2: - 4.5 mm (- 0.18 in)

ED-4FAS (30 01 3783) spool type

Double acting, 3 positions, with A and carry-over C open to tank in neutral position

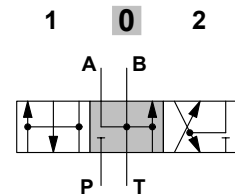


Spool stroke

position 1: + 5.7 mm (+ 0.22 in)
position 2: - 5.7 mm (- 0.22 in)

ED-4FASB (30 01 3785) spool type

Double acting, 3 positions, with A-B and carry-over C open to tank in neutral position

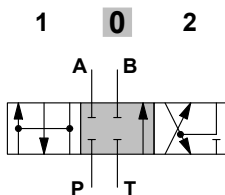


Spool stroke

position 1: + 5.7 mm (+ 0.22 in)
position 2: - 5.7 mm (- 0.22 in)

ED-4FASC (30 01 3801) spool type

Double acting, 3 positions, with A and B closed in neutral position

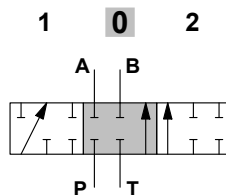


Spool stroke

position 1: + 5.7 mm (+ 0.22 in)
position 2: - 5.7 mm (- 0.22 in)

ED-1E (30 01 3799) spool type

Double acting, 3 positions, with A and B closed in neutral position



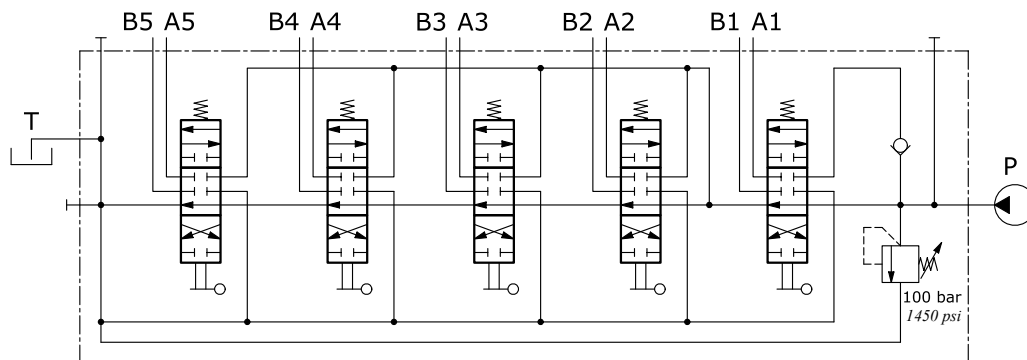
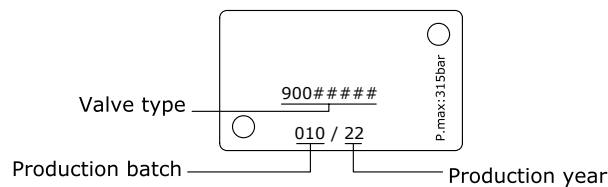
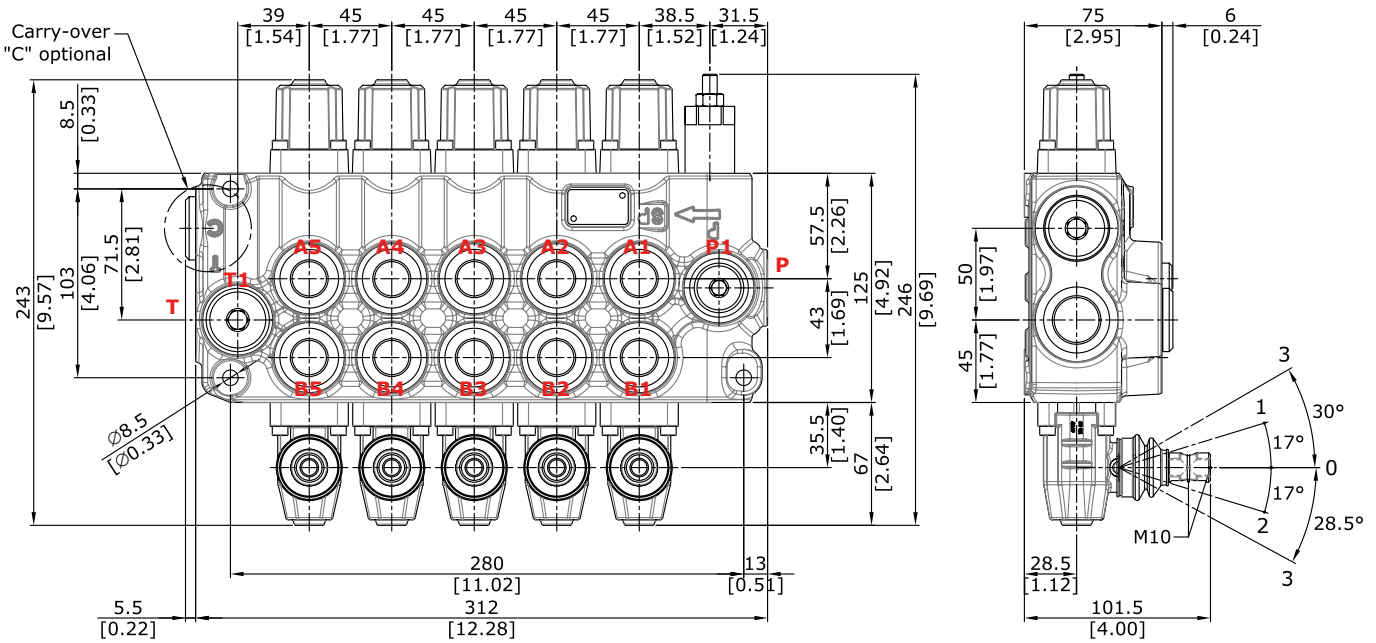
Spool stroke

position 1: + 5.7 mm (+ 0.22 in)
position 2: - 5.7 mm (- 0.22 in)

directional valve with right inlet

Dimensional data (with tandem circuit)

The description of **90L GM** valve with tandem circuit is marked with letters "SP" and one figure which indicate the downstream sections from tandem connection.



Description example

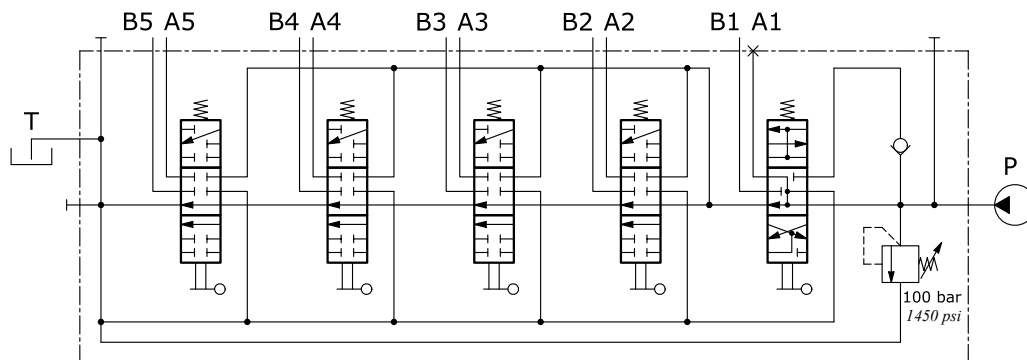
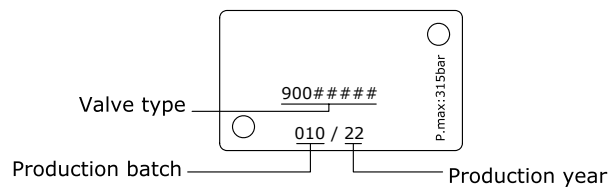
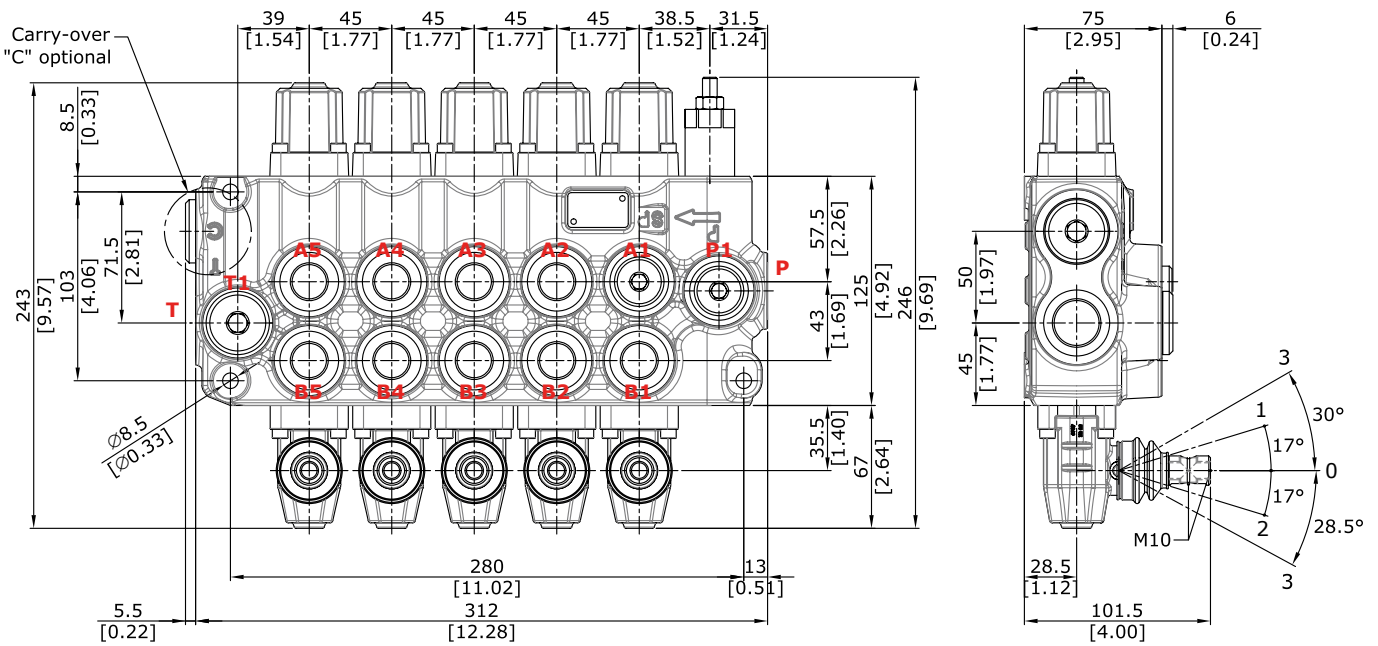
90L GM10/5-**SP4**(X-100)/ED-18L/ED-18L/ED-18L/ED-18L/ED-18L/AET-PSL4

NOTE - Drawings and dimensions are referred to **BSP** thread configuration.

directional valve with right inlet

Dimensional data (with tandem circuit)

The description of **90L GM** valve with tandem circuit is marked with letters "SP" and one figure which indicate the downstream sections from tandem connection.

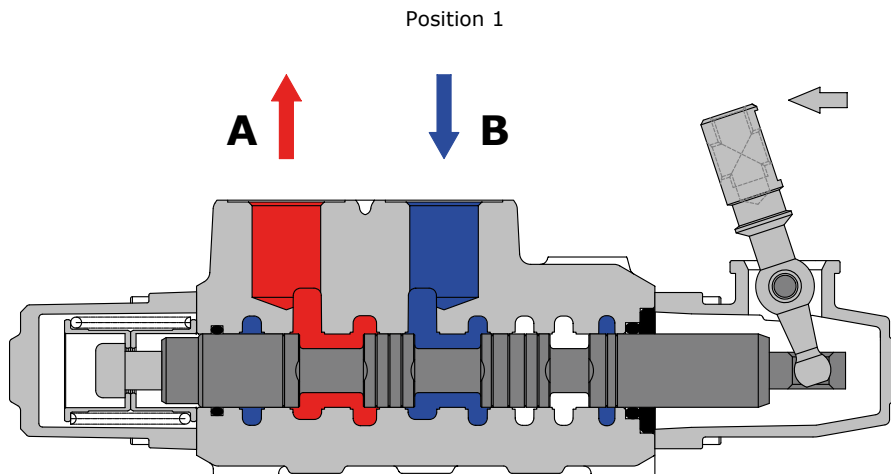


Description example
 90L GM10/5-SP4(X-100)/ED-4FAS8ORL/ED-1E8ORL/
 ED-1E8ORL/ED-1E8ORL/ED-1E8ORL/AET-PSL4

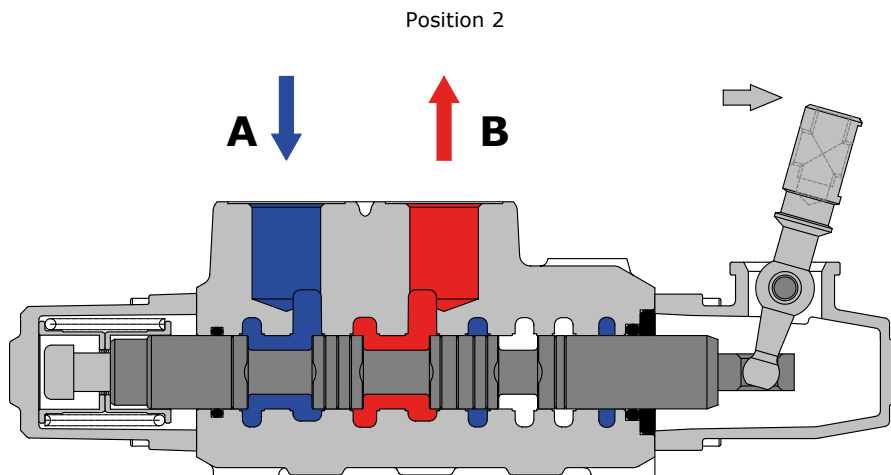
NOTE - Drawings and dimensions are referred to **BSP** thread configuration.

Sectional drawing

When hand lever pushed (spool out position) P to A port. B to T port.



When hand lever pulled (spool in position) P to B port. A to T port.

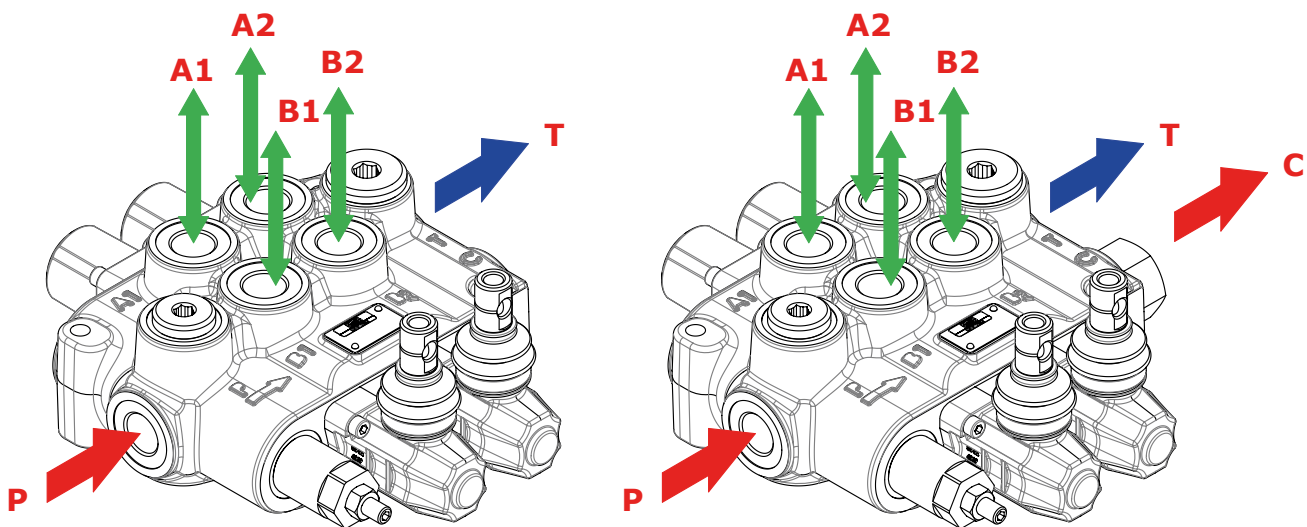


Installation and maintenance

The 90L GM valve is assembled and tested as per the technical specification of this catalogue.

Before the final installation on your equipment, follow the below recommendations:

- the valve can be assembled in any position; in order to prevent body deformation and spool sticking mount the product on a flat surface;
- In order to prevent the possibility of water entering the lever box and spool control kit, do not use high pressure wash down directly on the valve;
- prior to painting, ensure plastic port plugs are tightly in place.



Carry-over configuration

Fitting tightening torque - Nm (lbft)				
THREAD TYPE	P and C ports	A,B ports	T port	Hydraulic pilot
BSP (ISO 228/1)	G 1/2	G 1/2	G 3/4	G 1/4
With O-Ring seal	50 (36.9)	50 (36.9)	70 (51.6)	20 (14.7)
With copper washer	60 (44.3)	60 (44.3)	70 (51.6)	25 (18.4)
With steel and rubber washer	60 (44.3)	60 (44.3)	70 (51.6)	16 (11.8)
UN-UNF (ISO 11926-1)	7/8-14 (SAE 10)	3/4-16 (SAE 8)	7/8-14 (SAE 10)	9/16-18 (SAE 6)
With O-Ring seal	60 (44.3)	50 (36.9)	60 (44.3)	30 (22.1)
METRIC (ISO 262)	M18x1.5	M18x1.5	M22x1.5	-
With O-Ring seal	35 (25.8)	35 (25.8)	50 (36.9)	-
With copper washer	40 (29.5)	40 (29.5)	60 (44.3)	-
With steel and rubber washer	40 (29.5)	40 (29.5)	60 (44.3)	-

NOTE – These torque are recommended. Assembly tightening torque depends on many factors, including lubrication, coating and surface finish. The manufacturer shall be consulted.